

TOWNSHIP OF HURON-KINLOSS

# HURON LANDFILL SITE – 2022 ANNUAL MONITORING REPORT

MARCH 2023





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TOWNSHIP OF HURON-KINLOSS

PROJECT NO.: 101-16942-00 (121-60020-00)  
DATE: MARCH 2023

WSP  
SUITE 101  
1450, 1ST AVENUE WEST  
OWEN SOUND, ON, CANADA N4K 6W2

T: +1 519 376-7612  
F: +1 519 376-8008  
WSP.COM



March 30, 2023

TOWNSHIP OF HURON-KINLOSS  
PO Box 130  
21 Queen Street  
RIPLEY, ON  
N0G 2R0

**Attention: Mr. John Yungblut, CET, Director of Public Works**

Dear Mr. Yungblut:

**Subject: Huron Landfill Site, Township of Huron-Kinloss  
2022 Annual Monitoring Report**

Please find enclosed a copy of the report entitled, "Huron Landfill Site, Township of Huron-Kinloss, 2022 Annual Monitoring Report", dated March 2023.

By copy of this letter, we are forwarding an electronic copy of the above-mentioned annual report to Ms. Lisa Hines, Senior Environmental Officer, Ministry of the Environment, Conservation and Parks (MECP), Owen Sound, for their review.

Please contact the undersigned with any questions.

Sincerely,

A handwritten signature in blue ink that reads "S Hutchesson". The signature is fluid and cursive.

Sarah Hutchesson, M.Sc., P.Eng.  
Environmental Engineer

KT/SH/dlw

Encl.

cc: Ms. Lisa Hines, Ministry of the Environment, Conservation and Parks (MECP), Owen Sound  
WSP ref.: 101-16942-00 (121-60020-00)

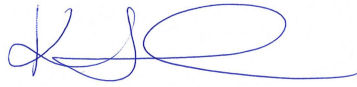
SUITE 101  
1450, 1ST AVENUE WEST  
OWEN SOUND, ON, CANADA N4K 6W2

T: +1 519 376-7612  
F: +1 519 376-8008  
wsp.com

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# SIGNATURES

## PREPARED BY



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Kaurel Tamasauskas  
Environmental Technologist

## REVIEWED BY



---

Sarah Hutchesson, M.Sc., P.Eng.  
Environmental Engineer

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The report is intended to be used in its entirety. No excerpts may be taken to be representative of the findings in the assessment.

The conclusions presented in this report are based on work performed by trained, professional and technical staff, in accordance with their reasonable interpretation of current and accepted engineering and scientific practices at the time the work was performed.

The content and opinions contained in the present report are based on the observations and/or information available to WSP at the time of preparation, using investigation techniques and engineering analysis methods consistent with those ordinarily exercised by WSP and other engineering/scientific practitioners working under similar conditions, and subject to the same time, financial and physical constraints applicable to this project.

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Benchmark and elevations used in this report are primarily to establish relative elevation differences between the specific testing and/or sampling locations and should not be used for other purposes, such as grading, excavating, construction, planning, development, etc.

Conditions can only be extrapolated to an undefined limited area around these testing and sampling locations. The conditions that WSP interprets to exist between testing and sampling points may differ from those that actually exist. The accuracy of any extrapolation and interpretation beyond the sampling locations will depend on natural conditions, the history of Site development and changes through construction and other activities. In addition, analysis has been carried out for the identified chemical and physical parameters only, and it should not be inferred that other chemical species or physical conditions are not present. WSP cannot warrant against undiscovered environmental liabilities or adverse impacts off-Site.



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# 1 INTRODUCTION

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## 1.1 BACKGROUND

The Huron Landfill Site is located on Part Lots 19 and 20, Concession 5 in the former Township of Huron in the amalgamated Township of Huron-Kinloss (Township), Bruce County, Ontario. Refer to **Figure 1** for the regional location of the site. The total landfill site is 17.7 hectares in area, of which 8 hectares is licensed for landfilling.

The landfill operates in accordance with Certificate of Approval No. A272601 issued on October 15, 1991, most recently amended in March 2012. The Certificate of Approval and amendments are enclosed in **Appendix A**.

The Township of Huron-Kinloss consists of the former Township of Huron, the former Township of Kinloss and the former Village of Lucknow. In 2022, the Huron Landfill serviced a population of approximately 7,000 residents in the Township.

Waste from the former Township of Huron is landfilled at the Huron Landfill. The Township of Huron-Kinloss has permission from the Ministry of Environment, Conservation and Parks (MECP) to allow landfilling of waste from the former Township of Kinloss at the Huron Landfill. Waste from the former Kinloss Township has been landfilled at the Huron Landfill since August 1, 2002.

As of July 2018, waste from the Village of Lucknow is also being landfilled at the Huron Landfill. This landfilling arrangement was reached prior to amalgamation. The Mid-Huron Landfill, located in Central Huron, closed June 30, 2018. The Township of Huron-Kinloss had inquired as to whether Lucknow waste could be landfilled at the Huron Landfill. The MECP has indicated that the inclusion of Lucknow waste (in addition to Kinloss waste now landfilled at the Huron Landfill), would represent a cumulative increase in service population of greater than 25%, and that such a request would be subject to approval under Section 27, Part V of the EPA. To plan for future waste management, the Township retained Pryde Schropp McComb Inc. (now WSP Canada Inc.), to complete a Service Area Study to support an application to revise the service area of the Huron Landfill to include the Village of Lucknow. The application and Service Area Study were submitted to the MOE Approvals Branch in April 2009 and approval was granted in the form of an amended Certificate of Approval issued on July 6, 2010.

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## 1.2 PURPOSE

The purpose of this report is to provide an annual report regarding the operation and monitoring of the landfill for the year 2022. The annual monitoring report (AMR) is required by Condition 11.1 of the Certificate of Approval (**Appendix A**).

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## 1.3 MECP REVIEW OF ANNUAL REPORT

The MECP has not provided comments on the 2021 Monitoring Report.

The Stormwater Management System submitted September 2019 is currently being reviewed by the MECP (**Appendix B**).

The MECP completed an inspection of the Huron Landfill on May 10, 2022. A copy of the inspection report is included in **Appendix B**.

The actions required from this inspection included the following:

- 1. The Owner/Operator shall ensure that wind blown litter originating from the site is picked up.*
- 2. Access to the landfill site by the public and other unauthorized personnel will be prohibited when burning is carried out, as per the Township's Design and Operations Manual.*

*3. Ensuring daily cover is maintained on the entire working face are under Condition 3.3 of ECA #A272601.*

The above-referenced items have been addressed by the Township as follows:

1. The litter outside the property and not within the treeline to the north was collected by the Township. The Township is continuing with collection efforts of litter migrating off and around site.
2. Chain link fencing was installed along the North property line, increasing site security and adding an extra barrier to prevent litter migrating from site.
3. As per the Township's Design and Operations Manual, burning operations continue to be carried out during days when the site is not open to the public. The day of the MECP inspection the burn pile had not been completely extinguished. The Township explained that this was due to high winds, which caused the pile to re-ignite. The landfill staff rectified the issue.
4. Interim cover on the area outside the working face was placed, along with daily cover of the working face.
5. A written response was sent to the MECP Provincial Officer on July 8, 2022, detailed the actions taken to address the above listed action items.

## 2 OPERATIONS

### 2.1 SITE LIFE

#### 2.1.1 ANNUAL LANDFILLED VOLUME

Weigh scales were installed at the site in 2002, allowing the collection and monitoring of incoming waste tonnages. **Table 2-1** summarizes the annual tonnages from 2003 to 2022 as collected from weigh scale records.

The site incorporated the trench method of landfilling until 2010, when landfilling commenced above the original ground surface, utilizing the “area method” of operation. This type of landfilling operation continues to date. The estimated landfilled volume for 2022 is 6,176 m<sup>3</sup>. The method of calculating the volume of refuse landfilled in 2022 is based on the volumetric difference between the site surveys completed on December 23, 2022 and on January 9, 2023. The 2022 volume landfilled (6,176 m<sup>3</sup>) is marginally above the 5 year average (2018 to 2022) of 9,333 m<sup>3</sup>, as shown in **Table 2-1**.

The estimated compaction densities from 2003 to 2022 are summarized in **Table 2-1**. The Township uses an 816K CAT compactor for compaction and cover operations, and a John Deere 544K loader to move material around the site. The calculated compaction density for 2022 operations is 603 kg/m<sup>3</sup> and does not include 20% cover material. Future compaction densities will continue to be determined through topographic survey data and DTM.

<b>Table 2-1</b> <b>Summary of Annual Waste Tonnages, Volumes and Densities</b>			
<b>Year</b>	<b>Annual Waste Received (tonnes)</b>	<b>Estimated Annual Landfilled Volume (m<sup>3</sup>)</b>	<b>Estimated Waste Compaction Density (kg/m<sup>3</sup>)</b>
2003	1,714	5,000	429
2004	1,980	5,000	495
2005	1,641	6,000	342
2006	1,859	6,700	347
2007	1,892	6,000	394
2008	2,182	6,340	430
2009	2,117	5,700	464
2010	2,317	6,155	471
2011	2,126	6,101	348
2012	2,310	6,750	428
2013	1,980	4,825	513
2014	2,670	7,250	460
2015	2,349	6,060	485
2016	2,726	8,140	419
2017	3,091	10,927	354
2018	3,723	13,161	354
2019	2,648	8,088	409
2020	2,887	8,795	410
2021	2,569	10,443	308
2022	2,568	6,176	603



5-year Average (2018–2022)		9,333	
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Note: 2011 estimated waste compaction density includes approximately 20% daily cover material. Estimated waste compaction density would be 436 kg/m<sup>3</sup> if cover materials were not included, as it has not been in previous years.

## 2.1.2 REMAINING CAPACITY AND SITE LIFE

Trenching operations at the Huron Landfill have been limited by the high water table conditions at the site. The Township of Huron-Kinloss has been actively pursuing the possibility of revising the original site development concept to allow for additional above ground landfilling and regaining of site capacity. An application was submitted to the MOE Environmental Assessment & Approvals branch (EAAB) in July 2004.

The Ministry has responded with correspondence dated June 28, 2007, stating the following position:

*The Ministry's final position is that, in this particular case, the reduction of depth of excavation should not be interpreted as a reduction in capacity and should be viewed as an operational issue. Furthermore we have, using the depth of excavation of 10 feet and height fill of 2 feet (also taken from the original application) the capacity is determined to be 288,000 cubic metres.*

A copy of this correspondence is enclosed in **Appendix B**. On July 6, 2010, the Ministry issued an amendment to the Certificate of Approval to allow above ground landfilling operations to be conducted and to allow the maximum approved capacity. Above ground landfilling commenced shortly after the final trench was closed in July 2010. The Township was required to submit an updated Design and Operations Plan. Pryde Schropp McComb, Inc. (now a part of WSP Canada Inc.) was retained to complete the Design and Operations Plan, which was submitted January 2010. The previous Design and Operation Plan was submitted to the Ministry of the Environment Approvals Branch on August 14, 2008 in support of an application to amend the Certificate of Approval to facilitate above-ground landfilling and regain the previously approved landfill capacity. The Township received comments from the MOE Approvals Branch regarding hydrogeological and surface water aspects of the Design and Operations Plan on December 22, 2008 (**Appendix B**). Pryde Schropp McComb, Inc. provided responses to these comments dated May 29 and August 26, 2009 (**Appendix B**). As per a request made in Section 4 of the amended C of A, dated July 6, 2010 (**Appendix A**), another revised Design and Operation Manual for the Waste Segregation/Recycling and WEEE program Facilities was required and submitted on December 23, 2010.

MOE correspondence dated August 13, 2004 (N. Pourhassani – MOE to M.R. Walden – Township of Huron-Kinloss) calculated the remaining capacity to be 103,490 m<sup>3</sup> as of the end of 2003. This calculation was based on a maximum theoretical capacity of 204,600 m<sup>3</sup>. When the maximum theoretical capacity was revised to 288,000 m<sup>3</sup> and the landfilling from 2003 to the end of 2007 was included, the remaining capacity of the site at the end of 2007 was 163,190 m<sup>3</sup>. In the Design and Operation Plan the remaining capacity was calculated to be 170,400 m<sup>3</sup> (as of the end of 2007). This estimation is relatively close to MOE estimation of 163,190 m<sup>3</sup>; therefore, the remaining capacity as of the end of 2007 was assumed to be 170,400 m<sup>3</sup>.

The Filling Beyond Limits (FBAL) was included in the Amended Environmental Compliance Approval dated April 16, 2020, **Appendix B**. Due to FBAL in the southeast end of the Huron Landfill, and based on a topographic survey from January 2023, the total landfilled volume for the Huron Landfill since 2007 has been estimated to be 111,896 m<sup>3</sup>. This would change the estimated closure date to March 2028, with 5-year average annual airspace of 9,333m<sup>3</sup>.

It should be noted that these closure dates calculations are estimated projections and are subject to revision.

## 2.2 BURNING OPERATIONS

The designated area for burning is illustrated in **Figure 2**, Existing Conditions (enclosed). As shown, the burn area is far removed from active landfilling, approximately 200 metres (m) southeast. In accordance with MECP Guideline C-7 *Burning at Landfill Sites*, only segregated brush, lumber and clean wood may be burned at the site.

Burning is conducted in accordance with Condition 4 of the Certificate of Approval (**Appendix A**) which states the following:

*No waste other than segregated brush, lumber and clean wood shall be burned at this site, in an area separate from the stump waste and only under conditions that will not cause any adverse off-site impact.*

The Plan of Operation (Maitland Engineering Ltd., 1985), which is incorporated into the Certificate of Approval (**Appendix A**), provides additional details regarding burning operations.

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## 2.3 RECYCLING/SEGREGATED MATERIALS

Prior to 2002, a recycling drop-off depot program existed for the Township. On-site bins were provided for the collection of newspapers, glass, cans and plastic. In July 2002, a “blue box” curbside collection program was implemented. Bruce Area Solid Waste Recycling (BASWR) has provided this program since its initiation. On-site collection bins were reinstated at the landfill in May 2004. Recycling material collected in on-site bins is included in the BASWR totals described below. All waste diversion totals for 2022 are combined for all Township landfills.

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### 2.3.1 SCRAP METAL

Scrap metal and white goods are stockpiled in the southeast area of the site, as shown in **Figure 2**, Existing Conditions (enclosed). The stockpile is located approximately 100 m from the active landfill area. Removal of the metal products occurs on a regular basis. As of December 2022, AOR Metals removed 150.59 tonnes of scrap metal from the site.

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### 2.3.2 TIRES

Tires are segregated and stockpiled west of the scrap metal pile, as shown on **Figure 2**. Tires are removed when the volume stockpiled justifies removal. During 2022, 5,181 tires were collected at the Huron and Kinloss landfill sites, with an estimated mass of 69.71 tonnes. As part of the Ontario Tire Stewardship Program, 5,181 tires (approximately 69.71 tonnes) were removed from the Huron and Kinloss landfill sites in 2022.

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### 2.3.3 E-WASTE AND MATTRESSES

E-waste was segregated at the Huron Landfill in 2022 and stockpiled beside the main building in a sea container. The total E-waste diverted from the landfill in 2022 was 11.45 tonnes.

Based on information provided by Huron-Kinloss, the Township initiated a mattress diversion program in 2015 but the program was discontinued after 15 weeks. Mattresses were subsequently segregated at the site and stockpiled in a sea container. The total number of mattresses shipped off site in 2022 was 455 (53.34 tonnes) for the Huron Landfill.

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### 2.3.4 EXPANDED POLYSTYRENE (EPS)

The Township began diverting Expanded Polystyrene (EPS) from the Huron and Kinloss sites in 2021. EPS was collected and stored in a shipping container located by the main building. Second Wind Recycling removed 0.46 tonnes of EPS from the site in 2022.

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### 2.3.5 RECYCLABLE MATERIALS

The service area of the Huron Landfill is provided with regular Blue Box pickup on a bi-weekly basis, as is the whole of the Township of Huron-Kinloss. Blue Box pickup is provided by BASWR.

Recycling bins are also located on-site, as shown in **Figure 2**. Cardboard recycling bins and regular Blue Box material recycling bins are available. BASWR picks up the materials from these bins on a regular basis.

The 2022 BASWR recycling data summary for the Township is enclosed in **Appendix C**.

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### 2.3.6 SUMMARY OF WASTE DIVERSION

**Table 2-2** summarizes the recycling and diverted materials data for the Township (both the Kinloss and Huron Landfills are represented) over the past five years. As shown in **Table 2-2** the recyclable tonnages have been relatively consistent over time. The 2022 tonnage of recyclables (223.66 tonnes) are lower compared to the 2021 tonnage (476.54 tonnes). When segregated materials (285.09 tonnes) are included, the total tonnage diverted from both Township landfills (Kinloss and Huron) is 508.75 tonnes in 2022. This tonnage represents an 18% diversion rate for the Township. The estimated saving in landfill space is 1017.50 m<sup>3</sup>.

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## 2.4 LANDFILL OPERATIONS

The operating hours of the Huron Landfill Site were Tuesdays, Fridays, and Saturdays from 10:00 a.m. to 4:00 p.m. for 2022.

The access road is gravel and well maintained by the Township. Access to the site is controlled by a lockable steel gate. Chain-link fencing is in place across the North property line of the site. In addition to the front fence, the evergreen trees planted along the north boundary of the site between the fence and the concession roadway provides additional screening and security.

Signage at the front gate identifies who may use the site, hours of operation, Certificate of Approval number, acceptable waste types and emergency contact information.

The weigh scales and attendant office are located inside the entrance gate of the landfill. Weigh scale monitoring provides the Township with data regarding incoming waste and allowing the fair assessment of tipping fees. Weigh scale records are maintained by the site attendant. The 2022 monthly breakdown of accepted waste has been provided in **Table 2-3**.

Access to the drop off area for residential recyclables, segregated or burnable materials is through the weigh scales to the south end of the site.

In 2021, a separate site entrance was created south of the main entrance to allow access to the site for drop off of residential compost and burnable materials, the new entrance is included in the 2022 annual survey. Any household waste that is dropped off is delivered to the trenches to be landfilled.

Waste collection is provided to the entire Township on a weekly basis. Currently the waste collection is completed by BASWR. Bag tag fees are currently assessed at \$2.50 per tag. Bi-weekly blue box is also provided to all residents.

The Township uses an 816K CAT compactor for compaction and cover operations, and a John Deere 544K loader to move material around the site. If large amounts of earthworks are needed, a contractor with equipment is hired. Compaction and covering operations are usually completed at the end of each operating day.

The Township indicated no complaints were received for the 2022 operating season.

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## 2.5 TRAINING

Condition 8.0 of the C of A 272601 amendment dated July 6, 2010 requires the Township to conduct ongoing landfill site training for its staff.

The training session for 2022 were held commencing in January 2022. The meetings from January to March took place virtually due to covid restrictions, and no training sheets were provided for those months. The monthly landfill training reviews for 2022 and additional Health & Safety training documentation are also provided in **Appendix B**.

# 3 PHYSICAL SETTING

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## 3.1 LOCAL GEOLOGY

Based on the borehole logs available for the site, the surficial geology at the site is characterized by clayey silt soils with sporadic layers of sandy soils at depth.

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## 3.2 GROUNDWATER FLOW SYSTEMS

To determine the lateral or horizontal groundwater gradient and flow patterns within the overburden aquifer beneath the landfill, water level measurements were taken at the site on May 31, 2022 and November 15, 2022. A summary of the water table elevation data is presented in **Table D-1**. **Figure D-1** is the hydrograph for the following upgradient and cross-gradient wells: OW3, OW4, OW5, OW10S and OW10D. **Figure D-2** is the hydrograph for the following downgradient and leachate wells: OW1, OW6, OW7S, OW7D, OW8S and OW11.

The groundwater regime beneath the landfill site acts as a “mixing” reservoir for the leachate generated in the refuse. The groundwater flow system is also the transporting medium for conveying contaminants away from the landfill area. As a result, the impact assessment of the site is dependent, to a large extent, on the groundwater distribution, flow rate, and flow pattern.

The groundwater flow direction is from points of high hydraulic head to points of lower hydraulic head. The actual flow path will follow a three-dimensional route along the strata of least resistance. Resistance to flow is measured in terms of the hydraulic conductivity of the deposit and the hydraulic gradient across the flow path. The borehole logs for each of the monitoring wells are enclosed in **Appendix D** for reference.

Two cross-sections, which present ground stratigraphy and monitor construction, are shown on **Figure 3**. Section A-A' shows conditions perpendicular to flow, section B-B' represents conditions parallel to groundwater flow. It is noted that the elevations presented in the cross section reflect a site survey completed in December 2022 whereby the elevations were established compared to sea level.

Based on the groundwater elevations for May 2022, the inferred shallow groundwater flow configuration is shown in **Figure 4**. Groundwater flow lines drawn perpendicular to groundwater contours indicate that the inferred flow direction is generally toward the west, as shown in **Figure 4**. The May 2022 flow pattern was generally consistent with previous year's results. The May 2022 horizontal hydraulic gradient varied between 0.0002 m/m and 0.05 within the eastern portion of the site, to 0.03 m/m within the central portion of the site. Based on the observed water level elevations at the monitoring points, the hydraulic gradient increases in the south and west where the topography slopes down to the South Pine River.

The hydrographs show seasonal fluctuations of typically 0.1- 2 m, but up to a maximum of approximately 2.7 m between the spring and fall monitoring events. This data suggests that the overburden aquifer monitored by the existing well network is seasonally variable.

Three of the monitoring wells were installed as well nests: OW7, OW8 and OW10. Vertical hydraulic gradients can be determined at these well nests.

The following table (**Table 3-1**) summarizes the vertical gradients of these well nests:

<b>Table 3-1 Vertical Gradients</b>		
<b>Well Nest</b>	<b>Date</b>	<b>Gradient</b>
OW7	May 2022	0.79 downward
	November 2022	1.16 downward
OW8	May 2022	1.05 downward
	November 2022	1.25 downward
OW10	May 2022	0.29 downward
	November 2021	0.43 downward

As shown in the table, the well nests exhibit a downward gradient, indicating a recharge zone.

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### 3.3 SURFACE WATER FLOW SYSTEM

The South Pine River is located adjacent to the landfill site, near the west, south, and east boundaries. The direction of water flow within the river is east to west. There are two surface water sampling stations established along the river as part of the surface water monitoring network. Station SW1 is located upstream of the landfill site, on the South Pine River, at the culvert under Concession Road 6. Station SW2 is located downstream of the landfill site, approximately 380 m west of active landfilling.

# 4 MONITORING PROGRAM AND RESULTS

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## 4.1 CURRENT MONITORING PROGRAM

The landfill site is monitored in accordance with Certificate of Approval No. A272601 issued on October 15, 1991, and most recently amended in March 2012. The monitoring program at the site has existed since 1989. Samples are obtained twice per year (spring and fall) from the monitoring wells and surface water stations. In addition, water level elevations are obtained twice per year to confirm the groundwater flow direction. The groundwater and surface water monitoring program at the Huron Landfill enables the delineation of the direction and concentration of the landfill generated leachate plume.

The approved monitoring program dictates that each observation well sampled shall be purged prior to sampling so that a representative sample is obtained. Well purging consists of removing a volume of water equivalent to a minimum of three well casing volumes from the well, or purging until the well was dry and allowing for recovery of the water for sampling.

Where required, each sample obtained from an observation well is simultaneously field filtered using a Waterra pumping unit equipped with a disposable high turbidity 0.45 micron in-line filter.

In 2022, water level measurements, purging and sampling were conducted on May 31 and November 15. Methane monitoring was completed on February 24, 2022 under winter conditions.

The water samples were sent to a private laboratory (Caduceon Environmental Laboratories) for analysis. The Certificates of Analyses are enclosed as **Appendix G**. **Appendix E** provides a historical summary of monitoring well water quality results.

Well inspections are conducted in conjunction with semi-annual sampling in spring and fall. All monitoring wells are protected with lockable steel casings. All monitoring wells were inspected and found to be locked. During the fall 2022 all locks were replaced. Most wells were found to be in good condition, with the exception of OW1 which is located in an area that is significantly eroded by the adjacent stream. It is noted that OW2 is no longer monitored and was decommissioned on March 12, 2018.

There are currently 13 overburden monitoring wells on the Huron Landfill Site. Ian D. Wilson & Associates Ltd. Installed observation wells OW1, OW2 (decommissioned), OW3, OW4 and OW5 in 1989. R.J. Burnside & Associates Ltd. (Burnside) constructed six wells in 1997: OW6, OW7S, OW7D, OW8S, OW8D and OW9. The purpose of these wells was to supplement the existing well network. These well nests provide the data to determine vertical hydraulic gradients and allow for monitoring of the deeper aquifer system.

In 2003, three additional wells were installed by Burnside: OW10S, OW10D and OW11. Wells OW10S and OW10D were constructed to characterize the downgradient water quality at the northern site boundary. OW11 was installed in the filled area of trench T1 as a leachate quality monitor. All monitoring wells have dedicated Waterra sampling equipment.

In 2013, the Township indicated that planned landfilling in Trench T3 may interfere with well OW6. It was WSP's opinion that OW6 should remain in place, and that protective armour stone or a concrete culvert be placed around the well in order to protect it. A vertical extension was added to OW6 on November 18, 2015.

The locations of the wells are shown on **Figure 2**. Cross-sections which show the subsurface conditions of the site are provided on **Figure 3**. Monitoring well construction details are provided in **Table 4-1**. The borehole logs of all monitoring wells are enclosed in **Appendix D**.

Surface water samples are obtained from one upstream station (SW1) and one downstream station (SW2) on the South Pine River. The ponded water (SW3), located in the south western portion of the site was added to the



sampling program in 2019. SW3 was added to the program in response to the 2018 AMR MECP comments. WSP recommends that sampling continue at SW3.

Methane monitoring was added to the monitoring program in 2002. There are four methane monitoring locations on-site. The gas probe construction logs are enclosed as **Appendix D**.

The above monitoring locations, including the 13 monitoring wells and three surface water locations, are monitored during the spring and fall monitoring events. The four methane monitoring sites are monitored in the winter, when the landfill site is under frozen conditions.

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## 4.2 GROUNDWATER QUALITY

The 2022 groundwater monitoring results are summarized in **Appendix E**. Historical groundwater chemistry results are also included for comparison. The laboratory Certificates of Analyses are enclosed in **Appendix G**.

In order to interpret the monitoring results more effectively, the monitoring wells are categorized into the following three groups:

Downgradient	Upgradient and Cross-Gradient	Leachate
OW1	OW3	OW6
OW7S	OW4	OW11
OW7D	OW5 (background well)	
OW8S	OW10S	
OW8D	OW10D	
OW9		

Chloride, hardness, DOC, and conductivity are leachate indicator parameters as these are typically elevated within the leachate and are mobile within the groundwater. **Figures E-1 to E-6** present spring and fall results for these parameters for well groups as follows:

**Figure E-1** – Upgradient and Cross-Gradient Wells – Spring

**Figure E-2** – Downgradient Wells – Spring

**Figure E-3** – Upgradient and Cross-Gradient Wells – Fall

**Figure E-4** – Downgradient Wells – Fall

The results from OW11 (leachate well) are also included in the above-noted figures for comparison.

To evaluate leachate impacts over time, the chloride results for the wells over time were plotted. **Figure E-5** is the plot of chloride over time for the upgradient and cross-gradient wells. **Figure E-6** is the plot of chloride over time for the downgradient wells.

To evaluate the potential influence of landfill leachate on the local groundwater system, it is necessary to determine background conditions. These background conditions reflect the naturally occurring levels of various parameters and provide a reference point to determine the magnitude of leachate impacts. The background conditions reflect conditions unaffected by the landfill operation. Based on the groundwater flow configuration (**Figure 4**), monitoring well OW5 is located upgradient of the landfilled area. OW4 is located cross-gradient of the landfilled area. Based on past monitoring (**Appendix E**), and proximity to landfilling activities, OW4 and OW5 are considered suitable for defining background groundwater chemistry. It is noted that due to their locations adjacent to Concession Road 6, there may be some impact from road salt.

Two monitoring wells were constructed as leachate wells: OW6 and OW11. As noted in the borehole logs in **Appendix D**, both wells are screened in the landfilled waste. In **Figures E-1 to E-4**, the results from OW11 were included for comparison. In general, concentrations of leachate indicator parameters in OW6 are higher than in OW11 and have increased since 2013.

The following is a summary of the characteristic parameters from leachate wells OW6 and OW11 from the May and November 2022 sampling events. Background monitoring well OW5 results are also included to indicate background conditions.

	Leachate Indicator Parameters historic range (OW6 and OW11)	OW6		OW11		OW5 (background)	
		May	Nov.	May	Nov.	May	Nov.
Chloride	14.8 – 547	480	485	306	300	107	102
Hardness	220 – 2410	1150	1260	928	942	451	443
DOC	1.3 – 650	16.5	81.4	8.2	5.1	2.7	0.7
Conductivity	695 – 5280	3720	4150	2430	2420	974	994
Arsenic	nd – 0.772	0.0106	0.0114	0.0027	0.0023	0.0017	0.0016
Barium	0.081 – 0.921	0.749	0.921	0.244	0.257	0.112	0.108
Iron	nd – 46.3	4.98	7.97	14.6	12.0	0.005	<0.005
Sodium	49 – 445	407	442	111	106	37.0	36.8
<b>Notes:</b> (i) All concentrations are in mg/L, except conductivity in us/cm. (ii) nd = parameter not detected in lab analysis							

Based on the 2022 monitoring data for OW6 and OW11, the leachate is elevated in the indicator parameters of chloride, hardness, DOC, TKN and conductivity. In monitor OW11, other elevated parameter concentrations, which indicate leachate influences, include iron, ammonia and alkalinity. The ammonia and iron concentrations at OW6 have increased since 2013. The results for chloride over time for both OW6 and OW11 are plotted in **Figures E-5 and E-6**. Based on these time-concentration graphs, the following trends are noted:

- While having increased at background monitor OW5, chloride is generally stable, fluctuating between 40 and 107 mg/L. A historic high concentration was reached in May 2022. The increases observed at OW5 may indicate off-site impacts from road salting activities migrating onto the site.
- The chloride concentrations for OW6 have decreased significantly from levels of over 400 mg/L in the late 1990's and had remained relatively constant at approximately 20 mg/L from 2003 onward until 2011. The chloride concentrations have subsequently increased between 2013 and 2021. Chloride concentrations reported in the spring and fall of 2022 have shown a slight decrease in concentrations.
- The chloride results for OW11 appear to reflect some seasonal fluctuations and an increase in 2014 followed by a decrease from fall 2015 to 2017, followed by another increase in 2018 through 2021, reaching a historic high spring 2021. Spring and fall 2022 sampling events show chloride results in the low 300 mg/L range. This pattern is likely attributed to the proximity of the active landfill area. The pattern of seasonal fluctuations may indicate some influence from road salt as the well is adjacent to the access road to the segregation area.

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#### 4.2.1 GROUNDWATER CHEMISTRY – UPGRAIDENT AND CROSS-GRADIENT WELLS

Monitor OW5 is located upgradient of active landfilling based on the interpreted groundwater configuration. The monitoring results to date (**Appendix E**) reflect conditions of near background (not impacted by leachate) water quality. As shown in **Figures E-1 and E-3**, the indicator parameter concentrations for OW5 are similar to the cross-gradient wells.

Monitor OW3 is located approximately 30 m south of Trench T1. The trench method of landfilling was used at the site until 2010, when landfilling commenced above the original ground. The location of the trenches is identified in previous reports. Although monitor OW3 is cross-gradient of the majority of trenches, there may be some influence from the adjacent trench (T1) as shown in **Figure 4**, Groundwater Flow. **Figures E-1 and E-3** indicate higher chloride levels at OW3 than the other cross-gradient wells. As stated above, it appears that OW11 could be impacted by leachate and road salt due to proximity of the access road adjacent to OW11. As OW3 is located downgradient of OW11, road salt impacts could also be occurring at this well. As shown in **Figures E-1 and E-3** the other indicator parameters (hardness, DOC and conductivity) are at background levels which support the interpretation of the elevated chloride being attributed to road salt rather than leachate impacts.

Monitoring well OW4 is located approximately 20 m northwest (cross-gradient) of Trench T6. Results summarized in **Appendix E** and **Figures E-1 and E-3** indicate near background water quality.

Monitoring wells OW10S and OW10D are located approximately 180 m west of Trench T6. OW10S is 5.6 m in depth and screened in clay. OW10D is 13.4 m in depth and is screened in a gravel and sand unit underlying the clay. Both wells are similar to background water quality, however the sulphate concentrations are relatively elevated. These elevated sulphate concentrations are attributed to natural sources, as the leachate indicator parameters for sulphate are at background levels.

In summary, based on the monitoring results collected to date, the wells interpreted to be in upgradient and cross-gradient locations demonstrate water quality at or near background, with the exception of slight impacts at OW3 which may be attributed to road salt impacts which has also been observed in background well OW5. These results confirm the anticipated groundwater flow configuration.

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#### 4.2.2 GROUNDWATER CHEMISTRY – DOWNGRAIDENT WELLS

Monitor OW1 is located approximately 20 m southwest of Trench T1. **Figures E-2 and E-4** indicate possible minor leachate impacts. Results for 2014 indicate parameters remained near background. **Figure E-6** shows chloride concentrations over time. The chloride for OW1 increased to 102 mg/L in October, 2000 but had remained relatively constant at approximately 30 mg/L until the fall 2015 monitoring event (96.6 mg/L) with the increasing trend continuing through 2017 with a historical maximum of 153 mg/L in November 2016. Chloride concentrations at OW1 were reported at 56.9 mg/L and 58.3 mg/L in the spring and fall of 2022, respectively. Field notes indicate that the protective casing at OW1 is being exposed due to erosion of the adjacent gully. This may be influencing analytical results in 2015 – 2022. The 2022 results continue to indicate minor leachate impacts at this monitoring location.

Monitoring wells OW7S and OW7D are located approximately 20 m southwest of Trench T1. The monitoring results for OW7S and OW7D (**Figures E-2 and E-4, Appendix E**) are similar and are indicative of background water quality. OW7S is 9.14 m in depth and screened in silt. OW7D is 13.70 m in depth and screened in sand/ gravel/ silt under the silt unit monitored by OW7S. The results indicate leachate impacts have likely not migrated laterally or vertically in the area of OW7S and OW7D.

Monitoring wells OW8S and OW8D are located in the central area of the site, approximately 10 m downgradient of trench T2. **Figures E-2 and E-4** indicate both wells are near background water quality. The wells exhibit moderate levels of sulphate but similarly to OW10S and OW10D the source of sulphate is expected to be naturally occurring. OW8S is 8.5 m in depth and screened in silt. OW8D is 13.7 m and is screened in a deeper silt unit. Based on the results from OW8S and OW8D leachate impacts have likely not migrated laterally or downward.

OW9 is located approximately 100 m downgradient of trenching. The well is 18.28 m in depth and is screened at the bottom of the silt layer. The monitoring results indicate background water quality as shown by **Figures E-2 and E-4**. The elevated sulphate concentrations are attributed to natural sources.

Based on the monitoring results of the downgradient wells, the migration of leachate from the trenches has is generally limited in both lateral and vertical directions.

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### 4.2.3 WATER QUALITY COMPLIANCE ASSESSMENT

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#### (1) REASONABLE USE

In accordance with the Ministry of the Environment, Conservation and Parks (MECP's) reasonable use criteria (April, 1994), a change in quality of the groundwater on an adjacent property will be accepted only as follows:

*The quality cannot be degraded by an amount in excess of 50% of the difference between background and the Ontario Drinking Water Standards for non-health related parameters and in excess of 25% of the difference between background and the Ontario Drinking Water Standards for health-related parameters. Background is considered to be the quality of the groundwater prior to any man-made contamination.*

In assessing the amount of degradation that is acceptable, consideration is given to the natural, uncontaminated quality of the water, the present quality of the groundwater and potential contamination of the groundwater from all sources.

The maximum concentration of a particular contaminant that would be acceptable in the groundwater beneath an adjacent property is calculated in accordance with the following relationship.

$$C_m = C_b + x (C_r - C_b)$$

Where  $C_m$  = maximum concentration accepted

$C_b$  = background concentration

$C_r$  = maximum concentration permitted in accordance with the *Ontario Drinking Water Standards*

$x$  = a constant that reduces the contamination to a level that is considered by the Ministry of the Environment to have a negligible effect on the water use. (i.e. 0.5 for non-health parameters; 0.25 for health parameters)

The suite of parameters used to assess leachate impacts at the boundary wells was determined in the 2010 Revised Design and Operation Plan. These parameters include:

- Chloride
- Nitrate
- DOC
- Arsenic
- Barium
- Iron
- Sodium

The monitoring wells chosen for Reasonable Use Criteria (RUC) monitors are located at or near the downgradient landfill boundaries. The following monitoring wells were selected as RUC monitors: OW1, OW7S, OW7D, OW8S, OW8D and OW9. The locations of these wells are shown in **Figure 4**. The 2022 monitoring results for these wells

are summarized in **Table 4-2** and **4-3**. The remaining monitors included in **Table 4-2** and **4-3** are for comparison purposes, only.

In 2022, the RUC were exceeded for DOC at monitors OW1 and OW7S during the spring monitoring event. DOC has exceeded the RUC at OW1 since 2012. No other leachate indicator parameters were elevated compared to the RUC at these monitoring locations in 2022.

Based on the 2022 monitoring results at the selected RUC monitors, leachate influence is not anticipated to be present beyond that allowable under MECP Guideline B-7 at or beyond the landfill boundary, with the exception of concentrations of DOC exceeding the RUC at OW1. WSP recommends that monitoring be continued at the boundary groundwater monitoring wells in 2023.

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## **(2) TRIGGER LEVELS**

The groundwater triggers for the contingency plan are based on the RUC, that is reviewed on an annual basis in the AMR. Trends in monitoring results are also determined in the AMR allowing for advance warning and anticipation of future leachate impacts.

The following parameters are to be used as groundwater triggers:

- Chloride
- Nitrate
- DOC
- Arsenic
- Barium
- Iron
- Sodium

These parameters have been shown to be indicative of leachate at the Huron Landfill. The reference monitors included in the RUC, which have the triggers applied, include OW1, OW3, OW7S, OW7D, OW8S, OW8D and OW9.

Trigger levels for these parameters were determined using historical data collected between 2007 and 2009 at background well OW5 (Cb) and leachate well OW11, as described in the 2010 Revised Design and Operation Plan.

Correspondence with the MOE dated December 22, 2008 indicated that the trigger levels should be set below the Reasonable Use Guideline (RUG), to allow for sufficient time to assess potential problems and implement management strategies. Effectively, lower trigger values were determined based on the distance between a well and the property boundary.

In 2022, DOC was above the 85% RUC at monitor OW1 during the spring and fall events and at OW7S during the spring event. OW3 was above the 85% RUC for chloride during the Spring 2022 event. Based on these results and in the absence of other elevated leachate indicator parameters, no supplemental monitoring or investigation is required and 'Stage 1 – Routine monitoring' will continue for 2023.

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## **4.3 SURFACE WATER QUALITY**

### **4.3.1 SOUTH PINE RIVER**

The surface water samples during the recent annual monitoring program were obtained on May 31 and November 15, 2022. The chemical results for these events, along with the historical results, are included in **Appendix F**.

There are two surface water sampling stations. SW1 is located in an upstream location on the South Pine River at the culvert under Concession Road 6. SW2 is located in a downstream location approximately 380 m west of active landfilling.

The 2022 monitoring results for SW1 and SW2 are summarized in **Table F-2**. The MECF PWQO is also included for reference. Any exceedance of a PWQO is indicated by a shaded cell. Surface water monitoring results from previous years are enclosed in **Appendix F**. **Figures F-1 to F-4** compare the indicator parameter concentrations for the upstream station (SW1) to the downstream station (SW2) for the May and November sampling events. In comparison, the results for SW1 and SW2 indicate very similar water quality.

In spring and fall 2022, the concentration for phosphorus at station SW1, 0.04 and 0.03 mg/L, exceeds the PWQO. Since this station is upstream of the landfill site, the presence of phosphorus at this location is attributed to non-landfill sources and is not anticipated to be related to landfill operations.

Aluminum exceeds the 0.075 mg/L PWQO at the downstream location, SW2, in the spring 2022 samples, the concentration of aluminum was 0.08 mg/L at SW2. This exceeds MECF Policy 2 (PWQO) where the concentration of aluminum in the surface water has increased downstream of the landfill. Historically, the upstream location SW1 has shown elevated concentration of aluminum, 0.07 mg/L at SW1 in the spring 2022. The elevated concentrations are not interpreted to be attributed to landfill operations.

The exceedances of the PWQO at the downstream station SW2 are similar to the concentration at the upstream station, SW1. Iron exceeds PWQO at SW2 in both spring and fall 2022 samples and at SW1 for the fall 2022 sample. Ammonia exceeds PWQO at both sampling location in spring and fall 2022 samples. There are no measurable landfill influences on the water quality of the South Pine River.

The monitoring results indicate that there is low potential for leachate impacts on the downstream surface water quality.

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### 4.3.2 PONDED WATER

Monitoring of the “Ponded Water”, within the south west portion of the site (SW3) has been undertaken since November 2019. Laboratory results are presented on **Table 4-4**.

Results show exceedances of the PWQO for phosphorus, aluminum, boron for the spring and fall 2022 monitoring event and pH, iron for the Spring event 2022. The monitoring results indicate evidence of potential leachate impact at the SW3 location. The proposed stormwater management system should focus on mitigation in this area. Interim and final cover should be used daily, as needed, to ensure proper grading over the site and prevent leachate run off.

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## 4.4 COMBUSTIBLE GAS

To address the concerns of methane gas at the site, gas monitoring of the headspace of the monitoring wells has been completed in the past, but since well screens are usually located below groundwater level, testing for methane in these wells may not provide an accurate determination of methane migration.

In 2006, four gas monitoring probes were constructed in the shallow overburden. The logs for these gas probes are included in **Appendix D**. The locations of the gas probes are illustrated in **Figure 2**.

In 2022, methane monitoring was conducted on February 24, 2022 under frozen conditions by WSP. **Table 4-5** summarizes the results of methane monitoring between 2007 and 2022. As shown in **Table 4-5**, methane was also detected in GP3 in July 2007 at near the LEL, as is consistent with historical monitoring at this location. February 24, 2022, GP3 measured 1.7% volume gas in air.

It is recommended that methane monitoring continue in 2023 with monitoring to take place under frozen conditions.

It is noted that two methane detectors have been installed in the scale house. In their review of the 2008 Annual Monitoring Report (correspondence enclosed in **Appendix B**, the MECF recommended that the Township consider moving the shed or installing a methane gas detector due to the detection of methane at GP3 (located adjacent to the

recycling attendants shed). As a result of MECP correspondence expressing concern regarding the elevated levels of methane detected at the GP3 monitoring location, located immediately adjacent to the recycling attendant shed, a letter was issued to the MOE on May 30, 2011. In this letter, the Township of Huron-Kinloss indicated that a Sensit Model HXG-2d gas detector was to be used by landfill staff when working in the vicinity of the attendants shed (**Appendix B**). Use of the gas detector began on May 27, 2011. In 2021 the methane gas detector was stolen from the scale house. The Township replaced the gas meter in 2022 with an Amprobe model GSD600 gas leak detector and monitoring began again in September 2022.



<b>Table 4-5</b> <b>Summary of Methane Monitoring</b>						
Date	GP1	GP2	GP3		GP4	Scalehouse
Jul 2007	0	0	4	0.2% vol. g.	0	
Dec 2007	0	0	0		0	
Jan 2008	0	0	0		0	
Jul 2008	0	0	49	2.5% vol. g.	0	
Dec 2008	0	0	0		0	
Jan 2009	0	0	0		0	
Mar 2010	0	0	0		0	0
Feb 2011	0	0	>100	9% vol. gas	0	0
Mar 2012	0	0	>100	16% vol. gas	0	0
Feb 2013	0	0	>100	77% vol. gas	0	0
Jan 2014	0	0	>100	35% vol. gas	0	0
Jan 2015	0	0	>100	24% vol. gas	0	0
Feb 2016	0	0	>100	10% vol. gas	0	0
Feb 2017	0	0	90	4.5% vol. gas	0	
Feb 2018	0	0	>100	52% vol. gas	0	
Mar 2019	0	0	>100	41% vol. gas	0	
Feb 2020	0	0	>100	15% vol. gas	0	
Feb 2021	0	0	>100	26% vol. gas	0	
Feb 2022	0	0	34		0	
<b>Notes:</b> 1. All results shown in % of lower explosive limit of methane unless otherwise noted. 2. Shaded cell indicates methane exceeded Lower Explosive Limit of 5%. 3. The 2007 and 2008 monitoring was conducted using a GMI Landsurveyor 1 gas monitor.						

## 5 FUTURE MONITORING PROGRAM

The proposed future monitoring program is provided in **Table 5-1**, and is based on the current monitoring program. The parameters outlined in **Table 5-1** include the historical leachate indicators (i.e. chloride, iron, conductivity, sulphate, DOC, ammonia, etc.) along with additional parameters to characterize the quality and extent of the leachate plume. If changes in leachate characteristics are observed in the future, this list of parameters can be modified.

All surface water stations will be sampled twice per year, including the “ponded water” (SW3) until the problem area is rectified. Combustible gas monitoring will also be conducted once annually under frozen conditions.

<b>Table 5-1</b> <b>Huron Landfill Site</b> <b>Proposed Monitoring Program</b>		
<b>Monitoring Location</b>	<b>Proposed Sampling Spring 2023</b>	<b>Proposed Sampling Fall 2023</b>
OW1	✓	✓
OW3	✓	✓
OW4	✓	✓
OW5	✓	✓
OW6	✓	✓
OW7S	✓	✓
OW7D	✓	✓
OW8S	✓	✓
OW8D	✓	✓
OW9	✓	✓
OW10S	✓	✓
OW10D	✓	✓
OW11	✓	✓
SW1	✓	✓
SW2	✓	✓
SW3	✓	✓
<b>Notes:</b> <ol style="list-style-type: none"> <li>✓ indicates to be sampled.</li> <li>The lab parameters to be tested for groundwater and surface water will include: <ul style="list-style-type: none"> <li>Alkalinity</li> <li>Ammonia</li> <li>Anions – Cl, NO<sub>2</sub>, NO<sub>3</sub>, SO<sub>4</sub></li> <li>Conductivity</li> <li>Dissolved metals by ICPMS</li> <li>Total phosphorus (Surface Water stations only)</li> <li>DOC</li> <li>Hardness</li> <li>Phenols</li> <li>pH</li> <li>TKN</li> </ul> </li> <li>At all monitoring wells and SW stations the following field measurements should be recorded: <ul style="list-style-type: none"> <li>Temperature</li> <li>pH</li> <li>Conductivity</li> </ul> </li> <li>Methane measurements from GP1, GP2, GP3, GP4 and the scalehouse will be under frozen conditions.</li> </ol>		

## 6 CONCLUSIONS

1. Approximately 2,979 tonnes of waste were received at the site in 2022, which equated to a landfilled volume of about 6,176 m<sup>3</sup> in 2022.
2. Assuming the service area for the Huron Landfill continues to include the Village of Lucknow and the former Townships of Huron and Kinloss waste, the anticipated site closure date for the Huron Landfill is March 2028.
3. The Township considers security and control of the site to be sufficient in 2022, with chain link fencing installed along the North property line.
4. A total of 223.66 tonnes of recyclable materials were recycled through the Blue Box Recycling Program and on-site collection bins in 2022. There were 150.59 tonnes of scrap metal, 69.71 tonnes of tires collected, 11.45 tonnes of E-waste and 53.34 tonnes of mattresses removed from the Huron and Kinloss Landfills for a total of 285.09 tonnes of non-blue box materials diverted from landfilling.
5. Based on groundwater elevation monitoring, the interpreted shallow groundwater flow is toward the west.
6. Leachate indicator parameters in leachate monitor OW6 have increased since 2013 and are generally higher compared to the concentration in leachate monitor OW11.
7. Based on monitoring results to date, wells located in interpreted upgradient and cross-gradient locations demonstrated water quality similar to background water quality, with the exception of minor influences at monitor OW3 which may be attributed to road salt. Downgradient monitoring indicates the migration of leachate impacts is limited both in lateral and vertical directions.
8. The Reasonable Use Criteria was exceeded for DOC in monitors OW1 and OW7S during the spring event in 2022. The parameter concentrations within the remaining site boundary monitors met the Guideline B-7 criteria. The RUC trigger criteria for DOC was exceeded at monitor OW1 during both events, and at OW7S for the spring event. OW3 exceeded for chloride during the spring event, in 2022.
9. Surface water monitoring on the South Pine River indicates that the presence of downstream influences from the landfill site are unlikely. Exceedances of PWQO at the downstream station are attributed to agricultural and/or other upgradient sources.
10. Combustible gas monitoring indicated no detections of methane between 2018 and 2022 at monitoring points GP1, GP2, GP4. Combustible gas was detected at a concentration of 34% LEL at gas probe GP3 in 2022. Gas probe GP3 is located at the south end of the landfill site where there are no structures or subsurface infrastructure. The combustible gas results indicate that potential landfill gas hazards within the area of on-site structures were unlikely during the monitoring events.

# 7 RECOMMENDATIONS

The following recommendations are provided:

- Based on the RUC trigger criteria results, no supplemental monitoring or investigation is interpreted to be required and 'Stage 1 – Routine monitoring' should be continued in 2022.
- The monitoring program should consist of semi-annual sampling of the 13 monitoring wells and three surface water stations. The four gas probes should be monitored for combustible gas under frozen conditions.
- WSP recommends the replacement of OW1 as the current location is in a significantly eroded section of stream bank.
- This report should be submitted to the MECP for review and comment as required by C of A 272601.

# TABLES



TABLE 2-2

## SUMMARY OF RECYCLING DATA

## HURON and KINLOSS LANDFILLS

Recyclable Product	2018		2019		2020		2021		2022	
	Weight (Tonnes)	Volume Saved (m <sup>3</sup> )	Weight (Tonnes)	Volume Saved (m <sup>3</sup> )	Weight (Tonnes)	Volume Saved (m <sup>3</sup> )	Weight (Tonnes)	Volume Saved (m <sup>3</sup> )	Weight (Tonnes)	Volume Saved (m <sup>3</sup> )
Newspaper	152.21	304.42	130.31	260.62	128.74	257.48	99.79	199.58	49.60	99.20
Steel (Cans, etc.)	32.20	64.40	27.57	55.14	32.66	65.32	31.38	62.76	15.60	31.20
Aluminum	9.94	19.88	8.51	17.02	16.00	32.00	16.41	32.82	8.16	16.32
Glass (Flint & Coloured)	65.80	131.60	56.33	112.66	80.74	161.48	73.00	146.00	36.28	72.56
Plastic (HDPE & PET)	74.20	148.40	63.52	127.04	76.25	152.50	78.10	156.20	38.81	77.62
White Paper	5.20	10.40	4.45	8.90	3.15	6.30	6.77	13.54	3.37	6.74
Boxboard	52.12	104.24	44.62	89.24	44.65	89.30	54.97	109.94	27.32	54.64
Corrugated Cardboard	111.83	223.66	94.48	188.96	94.26	188.52	107.12	214.24	44.52	89.04
<b>Total Recyclables</b>	<b>503.50</b>	<b>1007.00</b>	<b>429.79</b>	<b>859.58</b>	<b>476.45</b>	<b>952.90</b>	<b>467.54</b>	<b>935.08</b>	<b>223.66</b>	<b>447.32</b>
Tires	45.88	91.76	63.13	126.25	110.50	221.00	135.38	270.76	69.71	139.42
Scrap Metal	114.71	229.42	167.96	335.92	148.35	296.70	177.77	355.54	150.59	301.18
Bale Wrap	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E-waste	18.85	37.70	14.95	29.90	11.37	22.74	8.36	16.72	11.45	22.90
Mattresses	15.54	31.08	15.88	31.76	17.17	34.34	35.29	70.58	53.34	106.68
<b>Total Segregated</b>	<b>194.98</b>	<b>389.96</b>	<b>261.92</b>	<b>523.83</b>	<b>287.39</b>	<b>574.78</b>	<b>356.80</b>	<b>713.60</b>	<b>285.09</b>	<b>570.18</b>
<b>Total Diverted</b>	<b>698.48</b>	<b>1396.96</b>	<b>691.71</b>	<b>1383.41</b>	<b>763.84</b>	<b>1527.68</b>	<b>824.34</b>	<b>1648.68</b>	<b>508.75</b>	<b>1017.50</b>

Notes:

1. Data obtained from BASWRA and Township.
2. Assumed compaction density is 500 kg/m<sup>3</sup>.
3. Tires are converted to a volume by a factor of 8 tires/m<sup>3</sup>.
4. Recyclable tonnages are for the entire Township including Lucknow.
5. Tonnages of scrap metal and tires are combined totals for Kinloss and Huron Landfills.
6. 5,181 tires received in 2022 @ 8/tires/m<sup>3</sup>
7. 455 mattresses received in 2022 at 8.05 mattresses/tonne
8. Volume Saved - defined as waste diverted from the landfill through recycling programs.

**Table 2-3**  
**2022 Huron Landfill Accepted Waste Summary**

<b>Month</b>	<b>Commercial Accounts</b>	<b>BASWR (Tonnes)</b>	<b>Residential (Tonnes)</b>	<b>Yardwaste (Tonnes)</b>	<b>Totals (Tonnes)</b>	<b>Brush (Tonnes)</b>	<b>Mattresses (#)</b>
<b>January</b>	105.24	64.98	13.53	0.00	183.75	0.00	0
<b>February</b>	92.82	52.96	11.74	0.00	157.52	0.00	0
<b>March</b>	137.91	68.38	20.35	0.00	226.64	0.00	0
<b>April</b>	162.74	53.08	29.19	0.00	245.01	0.00	0
<b>May</b>	174.84	77.70	27.16	0.00	279.70	0.00	0
<b>June</b>	154.80	68.38	23.43	0.00	246.61	0.00	0
<b>July</b>	219.10	79.62	39.51	0.00	338.23	0.00	0
<b>August</b>	215.94	108.84	53.56	0.00	378.34	0.00	0
<b>September</b>	140.05	79.62	43.15	0.00	262.82	0.00	0
<b>October</b>	132.63	73.71	22.51	0.00	228.85	0.00	0
<b>November</b>	125.29	71.46	47.45	0.00	244.20	0.00	0
<b>December</b>	80.82	60.76	46.18	0.00	187.76	0.00	0
<b>TOTAL</b>	1,742.18	859.49	377.76	0.00	2,979.43	0.00	0

Notes:

1. BASWR noted here is waste portion, not recyclables collected by BASWR. See Table 2 for recycling portion totals.
2. The Township began diverting mattresses from the landfill in 2015.
3. Yardwaste and brush no longer goes into the landfill. It is converted to wood chips for daily cover use or added to the burn pile.



**TABLE 4-1**  
**MONITORING WELL CONSTRUCTION DETAILS**  
**HURON LANDFILL SITE**

Well Designation	Date Completed ( DD/MM/YY )	Reference * Elevation (mASL)	Ground Elevation (mASL)	Total Depth (mbgs)	Installed Depth (mbtoc)	Screened Interval				Unit Monitored	Note
						Depth (mbgs) from	Depth (mbgs) to	Elevation (mASL) from	Elevation (mASL) to		
<b>OW1</b>	26/09/89	230.13	229.43	5.99	6.69	4.49	5.99	224.94	223.44	Silt	
<b>OW3</b>	26/09/89	233.63	231.87	5.79	6.55	4.29	5.79	227.58	226.08	Silt	
<b>OW4</b>	26/09/89	230.88	230.08	4.02	4.82	2.52	4.02	227.56	226.06	Silt	
<b>OW5</b>	26/09/89	232.88	231.81	4.72	5.54	3.22	4.72	228.59	227.09	Silt	
<b>OW6</b>	02/07/97	235.24	232.88	9.17	11.53	7.67	9.17	225.21	223.71	Waste & Silt	Well pipe extension added 11/18/15
<b>OW7S</b>	02/07/97	231.91	230.98	8.89	9.19	7.39	8.89	223.59	222.09	Silt	
<b>OW7D</b>	02/07/97	231.22	230.92	13.63	14.56	12.13	13.63	218.79	217.29	Silt	
<b>OW8S</b>	03/07/97	230.69	230.08	8.58	9.13	7.08	8.58	223.00	221.50	Silt & Silt and Clay	
<b>OW8D</b>	03/07/97	230.71	230.11	13.87	14.47	12.37	13.87	217.74	216.24	Clay	
<b>OW9</b>	03/07/97	230.90	230.06	18.55	19.40	17.05	18.55	213.01	211.51	Clayey Silt	
<b>**OW10S</b>	22/07/03	225.48	224.55	5.64	6.57	4.14	5.64	220.41	218.91	Clay	
<b>**OW10D</b>	22/07/03	225.22	224.50	13.28	14.00	11.78	13.28	212.72	211.22	Clay & Gravel and Sand	
<b>OW11</b>	23/07/03	237.86	234.58	5.75	9.02	4.25	5.75	230.33	228.83	Waste	Well pipe extension added 11/18/15

Notes:

\* Reference elevations for top of well casing from survey of site on January 7, 2021

\*\* Reference elevations for OW10S and OW10D top of well casing estimated from 2021 survey of site

mASL - metres above sea level

mbgs - metres below ground surface

**TABLE 4-2**  
**REASONABLE USE CRITERIA FOR 2022 GROUNDWATER MONITORING**  
**HURON LANDFILL SITE**

Parameter	Background Concentration	Standard / Objective	Type	RUC	On Site		PROPERTY BOUNDARY			
					OW9		OW1		OW4	
					May-22	Nov-22	May-22	Nov-22	May-22	Nov-22
Chloride	7	250	OG	129	1.7	2.0	56.9	58.3	16.5	14.7
Nitrate	0.145	10	IMAC	2.61	0.3	0.09	0.4	<0.05	0.2	<0.05
DOC	2.6	5	AO	3.8	2.3	1.0	4.1	3.7	3.3	2.9
Arsenic	0.004	0.025	AO	0.009	0.0071	0.0038	0.0010	0.0013	0.0003	0.0004
Barium	0.0775	1	AO	0.308	0.023	0.022	0.094	0.097	0.069	0.081
Iron	0.05	0.3	OG	0.175	<0.005	<0.005	0.005	0.035	<0.005	0.029
Sodium	25.9	250	AO	113	73.3	75.1	42.1	40.8	16.9	17.4

Parameter	Background Concentration	Standard / Objective	Type	RUC	PROPERTY BOUNDARY							
					OW7S		OW7D		OW8S		OW8D	
					May-22	Nov-22	May-22	Nov-22	May-22	Nov-22	May-22	Nov-22
Chloride	7	250	OG	129	30.6	27.7	11.0	9.1	57.8	55.0	8.5	7.3
Nitrate	0.145	10	IMAC	2.61	0.3	<0.05	0.4	0.25	0.2	<0.05	0.3	0.16
DOC	2.6	5	AO	3.8	16.5	1.7	2.0	0.7	0.7	<0.2	1.9	0.8
Arsenic	0.004	0.025	AO	0.009	0.0007	0.0007	0.0005	0.0004	0.0008	0.0009	0.0002	0.0002
Barium	0.0775	1	AO	0.308	0.036	0.035	0.037	0.038	0.053	0.054	0.026	0.028
Iron	0.05	0.3	OG	0.175	<0.005	<0.005	<0.005	<0.005	0.008	0.013	<0.005	<0.005
Sodium	25.9	250	AO	113	58.6	56.1	70.8	69.7	67.1	64.9	81.0	79.5

Parameter	Background Concentration	Standard / Objective	Type	RUC	PROPERTY BOUNDARY				DOWNGRAIENT	
					OW10S		OW10D		OW3	
					May-22	Nov-22	May-22	Nov-22	May-22	Nov-22
Chloride	7	250	OG	129	1.0	1.4	5.1	3.6	116	97.1
Nitrate	0.145	10	IMAC	2.61	0.5	0.22	0.4	0.21	0.2	<0.05
DOC	2.6	5	AO	3.8	3.0	0.7	1.3	0.4	2.3	1.3
Arsenic	0.004	0.025	AO	0.009	0.0004	0.0003	0.0004	0.0004	0.0011	0.0017
Barium	0.0775	1	AO	0.308	0.024	0.030	0.104	0.1	0.108	0.100
Iron	0.05	0.3	OG	0.175	0.045	0.019	0.005	<0.005	<0.005	0.100
Sodium	25.9	250	AO	113	40.3	40.2	24.0	26.0	43.7	38.3

**Notes:**

1. Result concentrations reported in mg/L, unless otherwise indicated.
2. Shaded cell indicates parameter exceeded RUC.
3. Standard/Objective determined from Ontario Drinking Water Standards, Objectives and Guidelines (Revised June 2006).
4. OG = Operational Guideline  
AO = Aesthetic Objective  
IMAC = Interim Maximum Acceptable Concentration
5. Reference average based on the geometric mean for reference monitor OW5 since 2007 and 2009, as developed in 2010 Revised Design and Operation Plan.  
n - Indicates number of sample results included in the calculation of the reference average.

**TABLE 4-3**  
**TRIGGER LEVELS FOR REASONABLE USE CRITERIA, 2022 GROUNDWATER MONITORING**  
**HURON LANDFILL SITE**

Parameter	Background Values Cb mg/L	ODWQS	RUC Values			OW1 (85% RUC) May-22 mg/L	OW3 (85% RUC) May-22 mg/L	OW7S (85% RUC) May-22 mg/L	OW7D (85% RUC) May-22 mg/L	OW8S (80% RUC) May-22 mg/L	OW8D (80% RUC) May-22 mg/L	OW9 (100% RUC) May-22 mg/L
			100% mg/L	85% mg/L	80% mg/L							
Chloride	7	250	129	111	105	56.9	116	30.6	11.0	57.8	8.5	1.7
Nitrate	0.145	10	2.61	2.2	2.1	0.4	0.2	0.3	0.4	0.2	0.3	0.3
DOC	2.6	5	3.8	3.6	3.6	4.1	2.3	16.5	2.0	0.7	1.9	2.3
Arsenic	0.004	0.025	0.009	0.008	0.008	0.0010	0.0011	0.0007	0.0005	0.0008	0.0002	0.0071
Barium	0.0775	1	0.308	0.27	0.26	0.094	0.108	0.036	0.037	0.053	0.026	0.023
Iron	0.05	0.3	0.175	0.16	0.15	0.005	<0.005	<0.005	<0.005	0.008	<0.005	<0.005
Sodium	25.9	250	113	100	96	42.1	43.7	58.6	70.8	67.1	81.0	73.3

Parameter	Background Values Cb mg/L	ODWQS	RUC Values			OW1 (85% RUC) Nov-22 mg/L	OW3 (85% RUC) Nov-22 mg/L	OW7S (85% RUC) Nov-22 mg/L	OW7D (85% RUC) Nov-22 mg/L	OW8S (80% RUC) Nov-22 mg/L	OW8D (80% RUC) Nov-22 mg/L	OW9 (100% RUC) Nov-22 mg/L
			100% mg/L	85% mg/L	80% mg/L							
Chloride	7	250	129	111	105	58.3	97.1	27.7	9.1	55.0	7.3	2.0
Nitrate	0.145	10	2.61	2.2	2.1	<0.05	<0.05	<0.05	0.25	<0.05	0.16	0.09
DOC	2.6	5	3.8	3.6	3.6	3.7	1.3	1.7	0.7	<0.2	0.8	1.0
Arsenic	0.004	0.025	0.009	0.008	0.008	0.0013	0.0017	0.0007	0.0004	0.0009	0.0002	0.0038
Barium	0.0775	1	0.308	0.27	0.26	0.097	0.1	0.035	0.038	0.054	0.028	0.022
Iron	0.05	0.3	0.175	0.16	0.15	0.035	0.1	<0.005	<0.005	0.013	<0.005	<0.005
Sodium	25.9	250	113	100	96	40.8	38.3	56.1	69.7	64.9	79.5	75.1

Notes:

1. Background values determined from 2007 to 2009 from OW-5, as developed in 2010 Revised Design and Operation Plan.
2. ODWQS indicates Ontario Drinking Water Quality Standards.
3. Shaded values exceed the RUC trigger.
4. < indicates parameter concentration was below lab DL (Detection Limit)

**Table 4-4**  
**Surface Water Quality Assessment - Southwest Portion of Site**  
**Huron Landfill Site - 2022**

Surface Water Station Date			SW3/18 May-22	SW3/18 Nov-22
	Units	PWQO mg/L		
<b>Calculated Parameters</b>				
Hardness (CaCO <sub>3</sub> )	mg/L		167	298
<b>Inorganics</b>				
Ammonia-N	mg/L		0.07	0.48
Un-ionized Ammonia	mg/L	0.020 <sup>(10)</sup>	0.002	0.005
Conductivity	umho/cm		645	1010
Total Kjeldahl Nitrogen (TKN)	mg/L		2.8	1.9
Dissolved Organic Carbon	mg/L		37.3	9.6
pH	pH	6.5 - 8.5	8.85	7.94
Phenols	mg/L	0.001	<0.001	<0.001
Phosphorus	mg/L	0.030 <sup>(9)</sup>	0.13	0.06
Sulphate (SO <sub>4</sub> )	mg/L		17	57
Alkalinity	mg/L	(7)	205	262
Chloride (Cl)	mg/L		77.1	138.0
Nitrite (N)	mg/L		<0.05	<0.05
Nitrate (N)	mg/L		<0.05	0.1

Surface Water Station Date			SW3/18 May-22	SW3/18 Nov-22
	Units	PWQO mg/L		
<b>Metals</b>				
Aluminum (Al)	mg/L	0.075 <sup>(8)</sup>	0.35	0.11
Arsenic (As)	mg/L	0.100 <sup>(11)</sup>	0.0041	0.001
Beryllium (Be)	mg/L	1.100 <sup>(12)</sup>	<0.0001	<0.0001
Boron (B)	mg/L	0.200 <sup>(1)</sup>	0.96	0.519
Cadmium (Cd)	mg/L	0.0002 <sup>(3)</sup>	<0.000015	0.00002
Calcium (Ca)	mg/L		33.9	81.1
Chromium (Cr)	mg/L	0.001 <sup>(13)</sup>	0.001	0.002
Cobalt (Co)	mg/L	0.0009	0.0007	0.0004
Copper (Cu)	mg/L	0.005 <sup>(4)</sup>	0.0017	0.0029
Iron (Fe)	mg/L	0.300	2.06	0.195
Lead (Pb)	mg/L	0.025 <sup>(5)</sup>	0.00087	0.00018
Magnesium (Mg)	mg/L		19.9	23.20
Manganese (Mn)	mg/L		0.168	0.038
Molybdenum (Mo)	mg/L	0.040 <sup>(1)</sup>	0.0008	0.0007
Nickel (Ni)	mg/L	0.025	0.0036	0.0029
Potassium (K)	mg/L		11.9	21.3
Silver (Ag)	mg/L	0.0001	<0.0001	<0.0001
Sodium (Na)	mg/L		77.4	84.3
Vanadium (V)	mg/L	0.006 <sup>(1)</sup>	<0.005	<0.005
Zinc (Zn)	mg/L	0.030 <sup>(6)</sup>	0.016	0.006

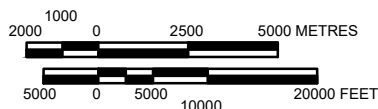
ND = Not Detected  
RDL = Reportable Detection Limit  
- = not done

Surface Water Station Date		SW3/18 May-22	SW3/18 Nov-22
<b>FIELD MEASUREMENTS</b>	<b>Units</b>		
Temperature	Degrees C	24.9	5.8
Conductivity	umhos	640	1127
pH		7.59	7.92

- NOTES:
- PWQO indicates Provincial Water Quality Objectives.
  - (I) indicates interim PWQO
  - Cadmium: PWQO = 0.2 µg/L; Interim PWQO = 0.5 µg/L (for Hardness >100 mg/L); = 0.1 µg/L (for hardness < 100 mg/L).
  - Copper Interim PWQO = 5 µg/L (for Hardness >20 mg/L)
  - Revised Interim PWQO = 5 µg/L (for Alkalinity > 80 mg/L (as CaCO<sub>3</sub>))
  - Zinc Revised Interim PWQO = 20 µg/L
  - Alkalinity should not be decreased by more than 25 % of the natural concentration.
  - Interim PWQO = 75 µg/L for pH >6.5 to 9.0.
  - PWQO = 0.020 mg/L to avoid nuisance algae growth, PWQO = 0.010 mg/L for high level of protection  
PWQO = 0.030 mg/L for prevention of excessive plant growth
  - PWQO for un-ionized ammonia
  - Interim PWQO for arsenic is 5 µg/L
  - For hardness < 7 mg/L: PWQO = 11 µg/L; for hardness > 75 mg/L: PWQO = 1100 µg/L.
  - Chromium: PWQO - 1 µg/L for hexavalent chromium, 8.9 µg/L for trivalent chromium.
  - Un-ionized Ammonia Fraction (f) where  $f = 1/(10^{pKa - pH} + 1)$ ;  $pKa = 0.09018 + 2729.92/T$ ;  $T = ^\circ C + 273.16$
  - █ value exceeds PWQO.

# FIGURES





SOURCE: MAPART CORP. 1:250,000 MAP OF WEST CENTRAL ONTARIO 1990/1991

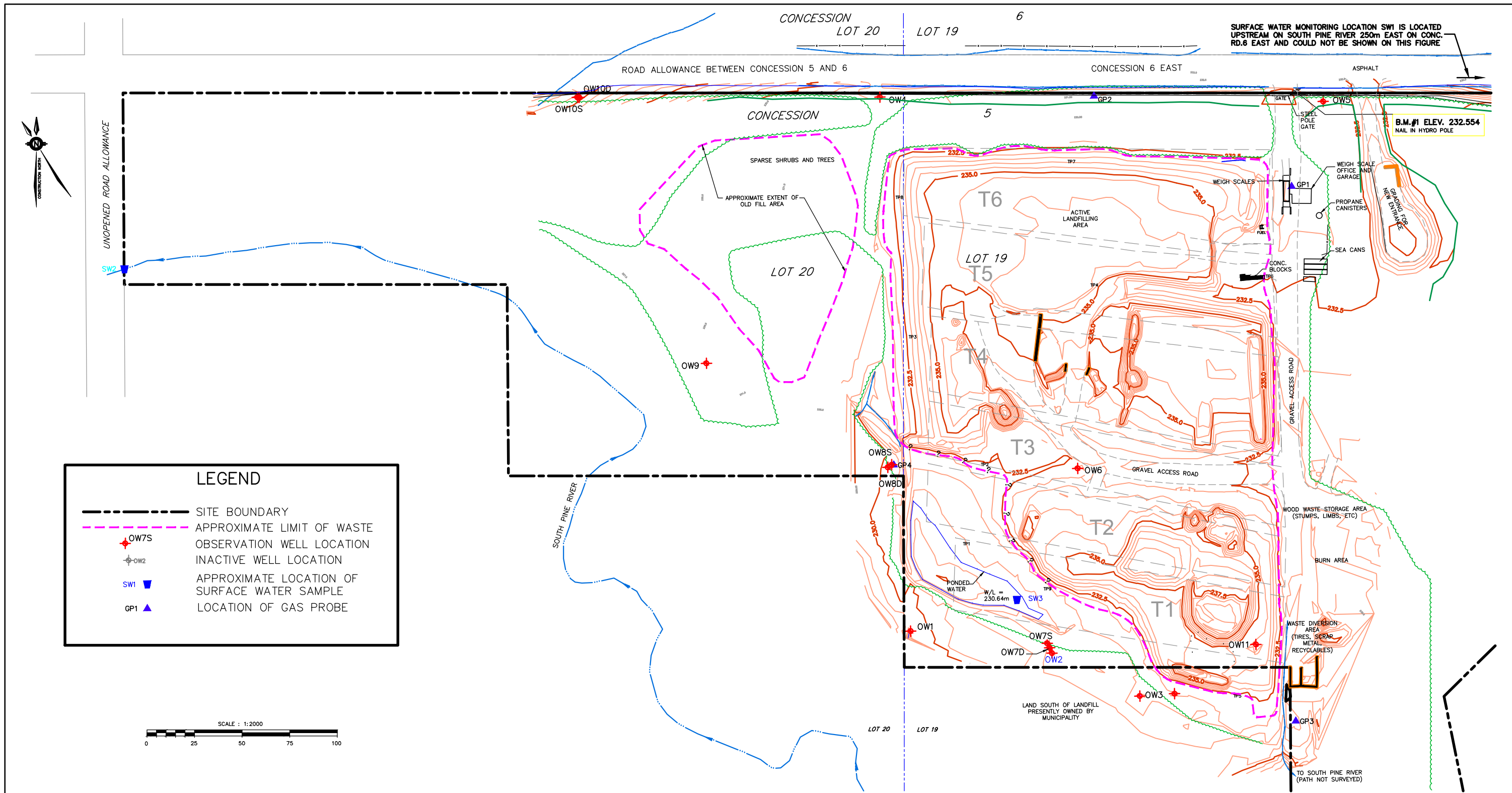
# REGIONAL LOCATION MAP HURON LANDFILL SITE TOWNSHIP OF HURON-KINLOSS



1450 1st Ave W. Suite 101, Owen Sound ON, N4K 6W2  
Telephone: (519) 376-7612 / Fax: (519) 376-8008  
Toll Free: 1-888-376-7612

DESIGN	---
DRAWN	TCG
APPROVED	S L H
DATE	MARCH 2022
SCALE	1:200,000
FILE No.	121-60020-22
FIG. No.	FIGURE 1





LEGEND

OW7S

OW2

SW1

GP1

SITE BOUNDARY

APPROXIMATE LIMIT OF WASTE

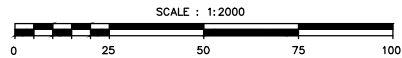
OBSERVATION WELL LOCATION

INACTIVE WELL LOCATION

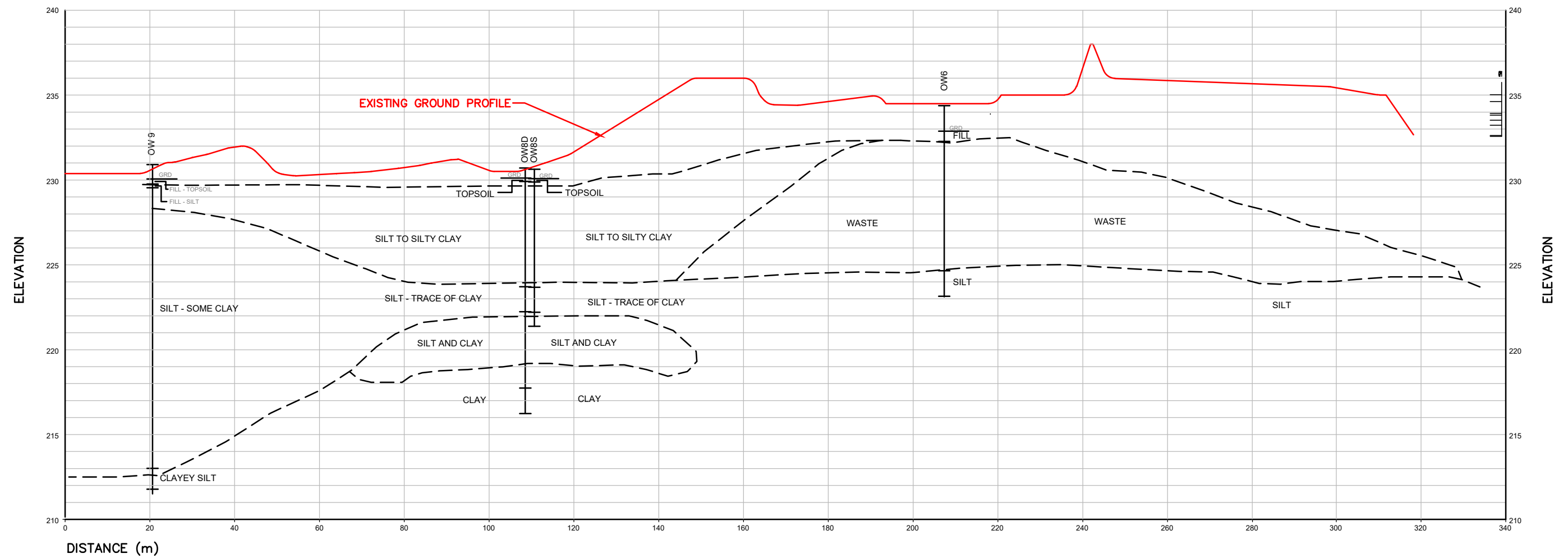
APPROXIMATE LOCATION OF

SURFACE WATER SAMPLE

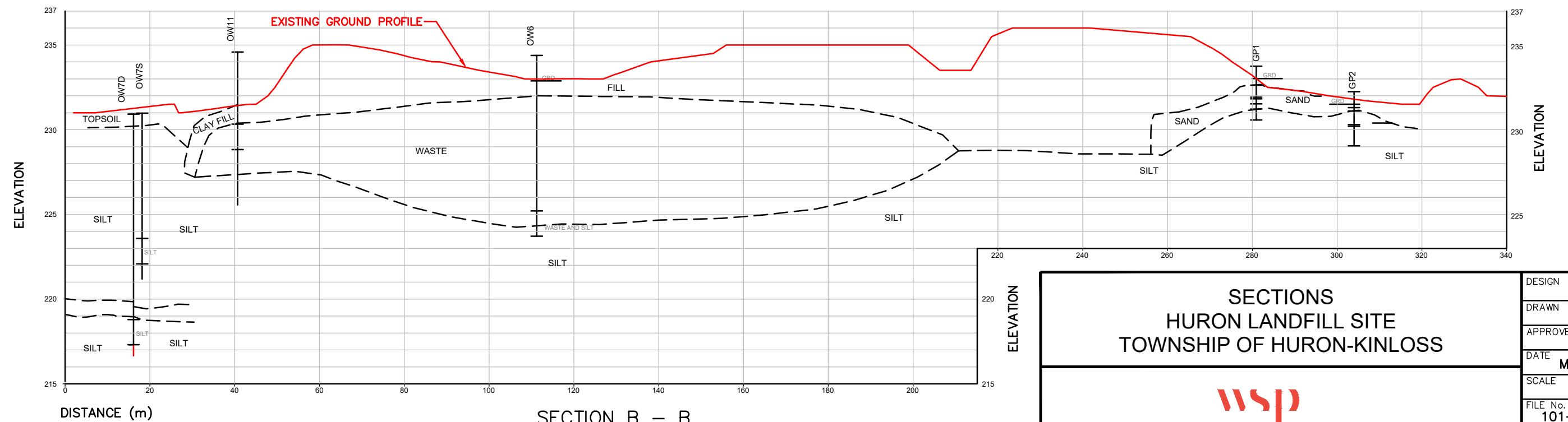
LOCATION OF GAS PROBE



<div><div><div>wsp</div></div><div>1450 1st Ave W. Suite 101, Owen Sound ON, N4K 6W2 Telephone: (519) 376-7612 / Fax: (519) 376-8008 Toll Free: 1-888-376-7612</div></div>					SEAL:	CLIENT:	PROJECT NO: 121-60020-22	DATE / DATE: 32	TITLE:  MONITORING WELL LOCATIONS	
						TOWNSHIP OF HURON-KINLOSS	DESIGNED BY: ---			
						CLIENT REF. #: --	DRAWN BY: TCG		DISCIPLINE: ENVIRONMENT	
						PROJECT:	CHECKED BY: S L H		ISSUE: --	
	IS.	RV.	DATE	DESCRIPTION		HURON LANDFILL DECEMBER 2022 EXISTING CONDITIONS	DRAWING NO: FIGURE 2	SCALE: 1:2000	DATE OF: MARCH 2023	RV. # 0



SECTION A – A  
SCALE HORZ 1: 1000, VERT 1: 250



SECTION B – B  
SCALE HORZ 1: 1000, VERT 1: 250

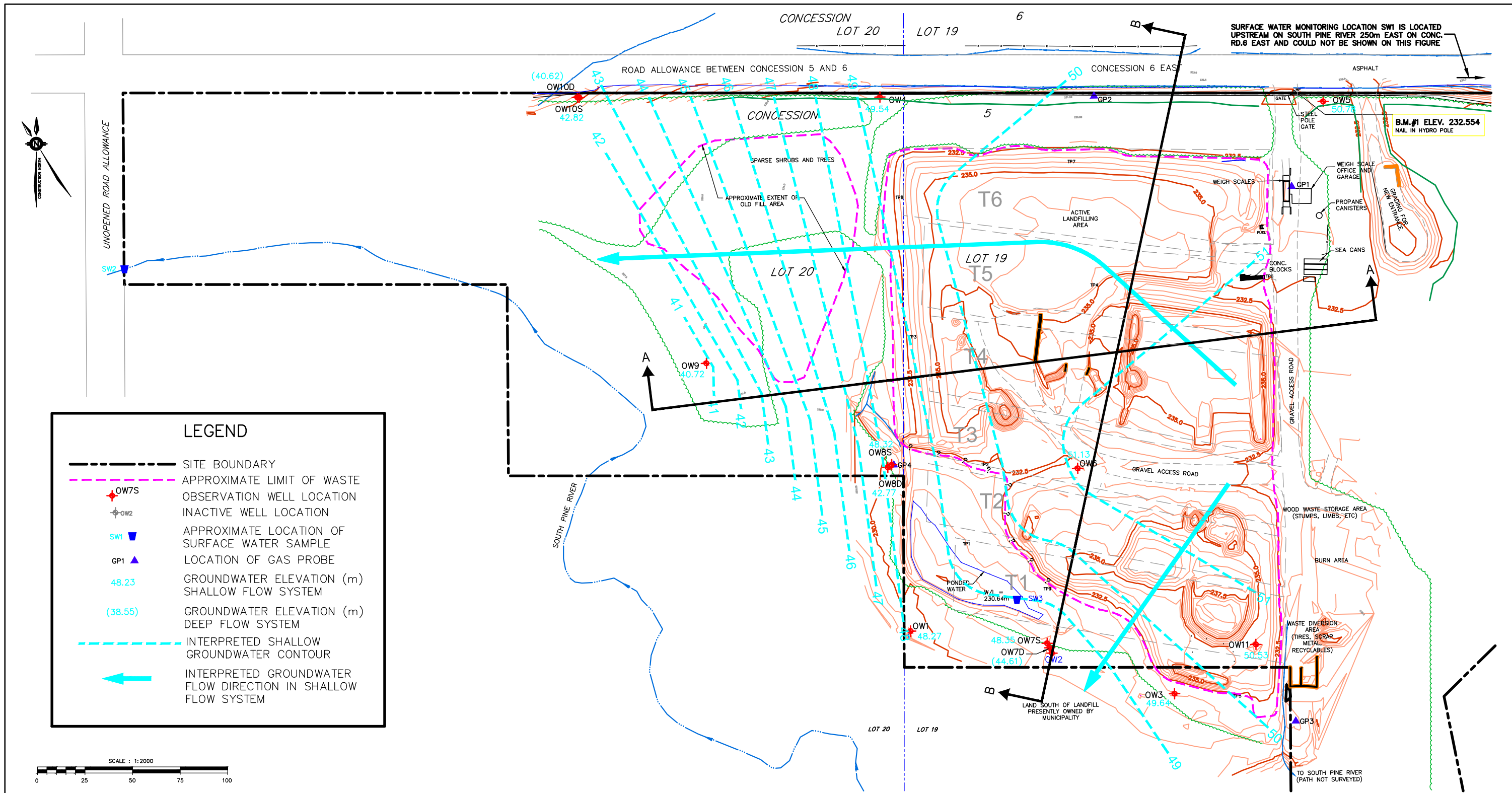
SECTIONS  
HURON LANDFILL SITE  
TOWNSHIP OF HURON-KINLOSS




1450 1st Ave W, Suite 101, Owen Sound ON, N4K 6W2  
Telephone: (519) 376-7612 / Fax: (519) 376-8008  
Toll Free: 1-888-376-7612

DESIGN	
DRAWN	J L K
APPROVED	S H
DATE	MARCH 2022
SCALE	AS SHOWN
FILE No.	101-16945-00
FIG. No.	3





<div><p>1450 1st Ave W. Suite 101, Owen Sound ON, N4K 6W2 Telephone: (519) 376-7612 / Fax: (519) 376-8008 Toll Free: 1-888-376-7612</p></div>					SEAL:	CLIENT:	PROJECT NO:	DATE / DATE:	TITLE:	
						TOWNSHIP OF HURON-KINLOSS	121-60020-22	MARCH 2023		
						CLIENT REF. #: --	DESIGNED BY:		DISCIPLINE:	
						PROJECT:	TCG			
							CHECKED BY:		ISSUE:	
IS.	RV.	DATE	DESCRIPTION			HURON LANDFILL	S L H			
							DRAWING NO:	SCALE:	DATE OF: MARCH 2023	
							FIGURE 4	1:2000		
									RV. #	
									0	

# APPENDIX

A

PROVISIONAL  
CERTIFICATE OF  
APPROVAL



of the  
Environment

Ministère  
de  
l'Environnement

Provisional Certificate of Approval for a  
Waste Disposal Site

Certificat provisoire d'autorisation du  
lieu d'élimination des déchets

Provisional Certificate of Approval No. A-272601  
Certificat provisoire d'autorisation no

Page 1 of 2  
page

Under the Environmental Protection Act and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Aux termes de la Loi sur la protection de l'environnement et des règlements y afférents et sous réserve des restrictions qui s'y appliquent, ce Certificat provisoire d'autorisation est délivré à:

Township of Huron,  
P. O. Box 149,  
Ripley, Ontario  
N0G 2R0

For the use and operation of an 8 hectare landfilling site within  
a total area of 17.7 hectares.

All in accordance with the following plans and specifications:

1. An application for a Certificate of Approval for a Waste Disposal Site (Landfill) completed by the Township of Huron, dated August 27, 1991.
2. Letter Re: Township of Huron Waste Disposal Site # A272601 dated August 20, 1991 from Maitland Engineering Services Ltd.

Located at: Part of Lots 19 and 20, Concession 5,  
Township of Huron, County of Bruce

Which includes the use of the site only for the disposal of the following categories of waste: (Note: Use of the site for additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval.) domestic, commercial, and non-hazardous solid industrial wastes (limited to scrap metal, wood, miscellaneous debris and inert fill).

Serving: The residents of the Township of Huron and the Village of Ripley.

and Subject to the following conditions:

1. This Certificate of Approval shall be registered on the title to the lands comprising the waste disposal site. No operation shall be carried out at the site after sixty days from this condition becoming enforceable unless this Certificate including the reasons for this condition has been registered by the applicant as an instrument in the appropriate Land Registry Office against title to the site and a duplicate registered copy thereof returned by the applicant to the Director, Approvals Branch, Ministry of the Environment.

Dated this  
day of

15

day of  
your

October

1991



of the  
Environment

de

l'Environnement

Ontario

Provisional Certificate of Approval for a  
Waste Disposal Site

*Certificat provisoire d'autorisation du  
lieu d'élimination des déchets*

Provisional Certificate of Approval No. A-272601  
*Certificat provisoire d'autorisation no*

Page 2 of 2  
page de

Under the Environmental Protection Act and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

*Aux termes de la Loi sur la protection de l'environnement et des règlements y afférents et sous réserve des restrictions qui s'y appliquent, ce Certificat provisoire d'autorisation est délivré à:*

2. Site monitoring under the direction of a professional consultant shall be in accordance with the attached Schedule "B".
3. The Municipality shall submit an annual report, prepared by their Consultant, to the Owen Sound District Office, Ministry of the Environment, addressing the requirements of Section 3.1.5 of report Schedule "A" Item 3, for each year by the subsequent March 31, of the following year, commencing March 31, 1990. Provided that on-site till material is used for final cover, Section 3.1.5 (c) need not be addressed.
4. No waste other than segregated brush, lumber and clean wood shall be burned at this site, in an area separate from the stump waste and only under conditions that will not cause any adverse off-site impact.
5. Access to the burning area by the public and other unauthorized personnel is prohibited when burning is being carried out.
6. No burning shall be carried out unless supervision is provided by the operating authority at all times.
7. The terms and conditions set out in this Provisional Certificate of Approval replace all terms and conditions set out in any Certificate No. A-272601 issued previous to the date of this Certificate of Approval.

Dated this  
date ce

day of  
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19

SCHEDULE "A"

This Schedule "A" forms part of Provisional Certificate of Approval No. A-272601 dated

1. Application for a Certificate of Approval for a waste disposal site dated July 13, 1972 submitted by the Township of Huron.
2. Application for a Certificate of Approval for a Waste Disposal Site (Landfill) dated December 20, 1985 submitted by the Township of Huron.
3. "Plan of Development and Operation, Township of Huron Waste Disposal Site, Township of Huron, County of Bruce" dated April 15, 1985, Revised October 11, 1985 prepared by Maitland Engineering Services Ltd.
4. Letter from the Township of Huron to the Ministry of the Environment dated November 26, 1987 requesting an emergency Certificate of Approval to include waste from the Village of Ripley.
5. Application for a Certificate of Approval for a Waste Disposal Site (Landfill) dated August 27, 1991, submitted by the Township of Huron.

#### SCHEDULE "B"

Water quality monitoring of the groundwater (three wells) and the surface water (Pine River upstream and downstream of the waste disposal site) plus the interceptor ditch shall be undertaken twice yearly in the periods of September-October and April-May commencing September-October, 1989.

Background water quality consisting of the following parameters shall be obtained on the first two monitoring occasions: pH, phenols, potassium, magnesium, calcium, sodium, sulphate, chloride, carbonate, bicarbonate, electrical conductivity, total kjeldahl nitrogen, nitrate, dissolved organic carbon and total metals (As, Cd, Co, Cr, Cu, Sg, Mn, Ni, Pb, Se, So, Cn, Zn).

Subsequent water quality monitoring shall be only for the following "indicator parameters": pH, conductance, chloride, hardness, DOC and phenols.

All surface water samples shall be tested for turbidity, total phosphorous and ammonia in addition to those parameters listed above.

All groundwater samples shall be field filtered utilizing a 0.45 micron filter.

Static water levels are to be obtained in the groundwater monitoring wells prior to commencing the sampling procedure. Each well is to be bailed the equivalent of three casing lengths of water prior to obtaining the sample.

TO:

Township of Huron  
P. O. Box 149  
Ripley, Ontario  
N0G 2R0

You are hereby notified that Provisional Certificate of Approval No. A 272601 has been issued to you subject to the conditions outlined therein.

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

1. The reason for Condition 1 requiring registration of the Certificate is that Section 45 of the Environmental Protection Act, prohibits any use being made of the lands after they cease to be used for waste disposal purposes within a period of twenty-five years from the year in which such land ceased to be used unless the approval of the Minister for the proposed use has been given. The purpose of this prohibition is to protect future occupants of the site and the environment from any hazards which might occur as a result of waste being disposed of on the site. This prohibition and potential hazard should be drawn to the attention of future owners and occupants by the Certificate being registered on title.
2. The reasons for Conditions 2 and 3, are to ensure that the approved water quality monitoring program is established with interpretation on a routine basis in conjunction with the site operation and development to document and remedy, if warranted, potential environmental problems associated with the operation of the site.
3. The reason for Condition 4, is that the burning of wastes other than segregated brush, lumber and clean wood results in unacceptable emissions of air contaminants.
4. The reason for Conditions 5 and 6 is that restricted access to the burning area and adequate supervision are required to ensure that burning is carried out in an acceptable manner under the proper conditions and only suitable types of waste are burned.
5. The reason for Condition 7 is to clarify that this Certificate sets out all of the requirements imposed with respect to this site other than requirements imposed by legislation and the common law.

The use and operation of this site without the above conditions may create a nuisance or result in a hazard to the health and safety of any person.

You may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 122a of the Environmental Protection Act, R.S.O. 1980, c. 141, as amended, provides that the Notice requiring the hearing shall state the portions of each term or condition in the approval in respect of which the hearing is required and the grounds on which you intend to rely at the hearing.

This Notice should be served upon:

The Secretary  
Environmental Appeal Board  
112 St. Clair Avenue West AND  
Suite 502  
Toronto, Ontario.  
M4V 1N3

The Director  
Section 38, E.P.A.  
Ministry of the Environment  
250 Davisville Ave.  
Toronto, Ontario.  
M4S 1H2

Dated at <sup>London</sup> ~~Toronto~~ this 15<sup>th</sup> day of October, 1991



Director,  
Section 38, E.P.A.  
Ministry of the Environment





RECEIVED  
JUL 16 2010  
orig - BPP  
NW copy - file 0094

Ministry of the Environment  
Ministère de l'Environnement

**AMENDMENT TO PROVISIONAL CERTIFICATE OF  
APPROVAL  
WASTE DISPOSAL SITE  
NUMBER A272601  
Notice No. 2  
Issue Date: July 6, 2010**

The Corporation of the Township of Huron-Kinloss  
21 Queen St  
Ripley, Ontario  
N0G 2R0

Site Location: Huron Landfill Site  
Lot 19 and 20, Concession 5  
Huron-Kinloss Township, County of Bruce

*You are hereby notified that I have amended Provisional Certificate of Approval No. A272601 issued on October 15, 1991, as amended for a waste disposal Site, consisting of 8.0 hectares Waste Fill Area within a total Site Area of 17.7 hectares , as follows:*

**1. LANDFILLING BY AREA METHOD**

Pursuant to Section 27 of the *Environmental Protection Act*, approval is hereby granted to change the landfilling operation at the Huron Landfill from Trench method to Area method, for the disposal of domestic, commercial, and solid non-hazardous industrial wastes (limited to scrap metal, wood, miscellaneous debris and inert fill); and

**2. OPERATION OF WASTE SEGREGATION/RECYCLING AND WEEE FACILITIES**

Pursuant to Section 27 of the *Environmental Protection Act*, approval is hereby granted for the establishment and operation of waste segregation/recycling centre and WEEE program at the Huron Landfill Site, for the acceptance, temporary storage, and transfer of non-putricible recyclable waste;

all in accordance with the following documentation which is added to Schedule "A", and forms part of the Provisional Certificate of Approval No. A272601, and subject to the terms and conditions listed herein:

Note: Use of the Site for any other type of waste and/or any other waste management activity is not approved under this Certificate, and requires obtaining a separate approval amending this Certificate.

*For the purpose of this Provisional Certificate of Approval and the terms and conditions specified below, the following definitions apply:*

**DEFINITIONS:**

- a. "*Certificate* " means this entire Provisional Certificate of Approval No. A272601, issued in accordance with section 39 of the *EPA* , and includes any schedules to it, the application and the supporting documentation listed in schedule "A";
- b. "*Director* " means any *Ministry* employee appointed in writing by the Minister pursuant to section 5 of the *EPA* as a Director for the purposes of Part V of the *EPA*;
- c. "*District Manager* " means the District Manager of the Owen Sound district office of the Ministry of the Environment;
- d. "*EPA* " means *Environmental Protection Act* , R.S.O. 1990, c. E. 19, as amended;
- e. "*Operator* " means any person, other than the Owner's employees, authorized by the Owner as having the charge, management or control of any aspect of the site and includes its successors or assigns;
- f. "*Owner* " means any person that is responsible for the establishment or operation of the site being approved by this *Certificate* , and includes the Township of Huron-Kinloss, its successors and assigns;
- g. "*Provincial Officer* " means any person designated in writing by the Minister as a provincial officer pursuant to section 5 of the *OWRA* or section 5 of the *EPA* .
- h. "*Regional Director* " means the Regional Director of the Southwestern Regional Office of the Ministry of the Environment;
- i. "*Regulation 232* " or "*Reg. 232* " means Ontario Regulation 232/98 (New Landfill Standards) made under the *EPA* , as amended from time to time;
- j. "*Regulation 347* " or "*Reg. 347* " means Regulation 347, R.R.O. 1990, made under the *EPA* , as amended from time to time;
- k. "*Site* " means the entire waste disposal site, including the buffer lands/contaminant attenuation zone, located at Lot 19, 20, Concession 5, Huron-Kinloss Township, County of Bruce, approved by this *Certificate* .
- l. "*Trained personnel*" means knowledgeable in the following through instruction and/or practice:
  - relevant waste management legislation, regulations and guidelines;

- major environmental concerns pertaining to the waste to be handled;
- occupational health and safety concerns pertaining to the processes and wastes to be handled;
- management procedures including the use and operation of equipment for the processes and wastes to be handled;
- emergency response procedures;
- specific written procedures for the control of nuisance conditions;
- Specific written procedures for refusal of unacceptable waste loads;
- the requirements of this *Certificate* .

m. "OWRA" means Ontario Water Resources Act, R. S. O. 1990

n. "WEEE" means Waste Electrical and Electronic Equipment (WEEE) Program

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

## **TERMS AND CONDITIONS**

### **1.0 GENERAL**

- 1.1 Except as otherwise provided by these conditions, the Site shall be designed, developed, used, maintained and operated, and all facilities, equipment and fixtures shall be built and installed, in accordance with the Applications for Provisional Certificate of Approval for a Waste Disposal Site, dated August 29, 2008 and April 23, 2009, and supporting documentation, and plans and specifications listed in Schedule "A".
- 1.2 The requirements specified in this Certificate are the requirements under the Environmental Protection Act, R.S.O. 1990. The issuance of this Certificate in no way abrogates the Owner/Operator's legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.
- 1.3 The requirements of this Certificate are severable. If any requirement of this Certificate, or the application of any requirement of this Certificate to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this Certificate shall not be affected in any way.
- 1.4 The Owner/Operator shall ensure compliance with all the terms and conditions of this Certificate. Any non-compliance constitutes a violation of the Environmental Protection Act, R.S.O. 1990 and is grounds for enforcement.
- 1.5 (a) The Owner/Operator shall, forthwith upon request of the Director, District Manager, or Provincial Officer (as defined in the Act), furnish any information requested by such persons with respect to compliance with this Certificate, including but not limited to, any records required to be kept under this Certificate; and

(b) In the event the Owner/Operator provides the Ministry with information, records, documentation or notification in accordance with this Certificate (for the purposes of this condition referred to as "Information"),

- (i) the receipt of Information by the Ministry;
- (ii) the acceptance by the Ministry of the Information's completeness or accuracy; or
- (iii) the failure of the Ministry to prosecute the Owner/Operator, or to require the Owner/Operator to take any action, under this Certificate or any statute or regulation in relation to the Information;

shall not be construed as an approval, excuse or justification by the Ministry of any act or omission of the Owner/Operator relating to the Information, amounting to non-compliance with this Certificate or any statute or regulation.

1.6 The Owner/Operator shall allow Ministry personnel, or a Ministry authorized representative(s), upon presentation of credentials, to carry out any and all inspections authorized by Section 156, 157 or 158 of the Environmental Protection Act, R.S.O. 1990, Section 15, 16 or 17 of the Ontario Water Resources Act, R.S.O. 1990, or Section 19 or 20 of the Pesticides Act, R.S.O. 1990, as amended from time to time, of any place to which this Certificate relates; and, without restricting the generality of the foregoing, to:

- a. enter upon the premises where the records required by the conditions of this Certificate are kept;
- b. have access to and copy, at reasonable times, any records required by the conditions of this Certificate;
- c. inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this Certificate; and
- d. sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this Certificate.

1.7 (a) Where there is a conflict between a provision of any document referred to in Schedule "A", and the conditions of this Certificate, the conditions in this Certificate shall take precedence; and

(b) Where there is a conflict between documents listed in Schedule "A", the document bearing the most recent date shall prevail.

1.8 The Owner/Operator shall ensure that all communications/correspondence made pursuant to this Certificate includes reference to the Provisional Certificate of Approval Number, A272601.

1.9 The Owner/Operator shall notify the Director in writing of any of the following changes within

thirty (30) days of the change occurring:

- a. change of Owner or Operator of the Site or both;
  - b. change of address or address of the new Owner;
  - c. any change of name of the company, and a copy of the most current "Initial Notice or Notice of Change" (form 1 or 2 of O. Reg. 182, Chapter C-39, R.R.O. 1990 as amended from time to time), filed under the Corporations Information Act shall be included in the notification to the Director; and
  - d. change in directors or officers of the company, and a copy of the most current "Initial Notice or Notice of Change" as referred to in 12(c), supra.
- 1.10 In the event of any change in ownership of the Site, the Owner/Operator shall notify, in writing, the succeeding owner of the existence of this Certificate, and a copy of such notice shall be forwarded to the Director.
- 1.11 Any information relating to this Certificate and contained in Ministry files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, R.S.O. 1990, C. F-31.
- 1.12 All records and monitoring data required by the conditions of this Certificate must be kept on the Site for a minimum period of two (2) years from the date of their creation.

#### **Transferral or Encumbrance of Site**

- 1.13 No portion of this Site shall be transferred or encumbered prior to or after closing of the Site, unless the Director is notified in advance in writing and is satisfied with the arrangements made to ensure that all terms and conditions of this Certificate will be carried out and sufficient financial assurance (EPA, Part XII) is deposited with the Ministry, to ensure that these terms and conditions will be carried out.

## **2.0 SITE DESIGN AND DEVELOPMENT**

### **Service Area**

- 2.1 Only waste generated from within the geographic boundaries of the **Township of Huron-Kinloss** shall be received for disposal at this Site. No waste generated and/or transferred from outside the **Township of Huron-Kinloss** shall be received for disposal at this Site.

### **Waste Types**

- 2.2 Only domestic, commercial, and solid non-hazardous industrial wastes (limited to scrap metal, wood, miscellaneous debris and inert fill), shall be received for disposal at this Site. **No hazardous**

**waste or liquid industrial waste**, as defined in Reg. 347, and as amended, shall be disposed at the Site.

#### **Waste Fill Rate**

- 2.3 The maximum rate at which the Site shall receive waste for disposal, is limited to **100 tonnes per day**, and **3,000 tonnes per calendar year**. The receipt of waste in excess of the daily maximum fill rate may only be allowed on a limited short-term basis, on no more than two consecutive operating days, and only with prior notification and concurrence from the District Manager.

#### **Site Capacity**

- 2.4 The total waste disposal capacity of the Site (waste filled by trench method and by area method), including waste, daily cover and interim cover is **288,000 cubic metres**.

#### **Waste Placement**

- 2.5 Landfilling operations shall be conducted by **Area method** in which waste shall be filled and compacted over the prepared base or on previously filled areas, as applicable, in layers and covered with approved cover material, in accordance with the "Design and Operations Plan (Revised)" (Section 3.4), Item 8 in Schedule "A", attached to this Certificate.
- 2.6 The Site shall be developed in a progressive manner from the northwest corner (Cell 1) towards eastward and landfilling shall be carried out sequentially from the top surface of the existing waste, in cells 1 to 6, each cell measuring approximately 40 metres in width, as shown on Map 3, "Initial Stage of Landfilling Operation", dated August 13, 2008, included in the "Design and Operations Plan (Revised)", Item 8, in Schedule "A", attached to this Certificate. No waste shall be landfilled outside the **limit of the 8.0 hectares footprint fill area**, surrounded on all sides by a minimum **30 metres** wide buffer.
- 2.7 Prior to landfilling by **Area method**, detailed Drawing showing the base preparation grades/contours consistent with the conceptual design minimum base elevations (i.e. top of existing waste by trench method), shall be submitted by the Owner/Operator, copied to the District Manager, for approval by the Director. No waste shall be landfilled below the top surface of the existing waste, as shown on Map 2, (Site Plan), dated January 6, 2010, included in Item 8, in Schedule "A", attached to this Certificate.
- 2.8 No waste shall be landfilled at any time above the **final contours** shown on Map 6, "Final Contours", dated January 6, 2010, included in the "Design and Operations Plan (Revised)", Item 8, in Schedule "A", attached to this Certificate. The maximum elevation of the fill area, including final cover, shall not exceed **238.75 metres above sea level**. Final slopes above grade at the time of site closure within the waste fill area shall be within the range of 4H:1V (25%) on the sides, and 20H:1V (5%) on the top surface.
- 2.9 Prior to waste placement in each cell, the existing vegetation, topsoil and cover material shall be

stripped to the top of the existing waste to provide hydraulic continuity through the existing and the new waste masses.

### **3.0 SITE OPERATIONS**

#### **Hours of Operation**

- 3.1 The Site shall be opened to receive waste for disposal from **Monday to Saturday, from 08:00 am to 5:00 pm**, as described in Item 13 in Schedule "A", attached to this Certificate. The Site shall be closed on statutory holidays.
- 3.2 The hours of operation may be amended from time to time to accommodate seasonal or unusual demand, based on prior concurrence from the District Manager.

#### **Daily, Interim and Final Covers**

- 3.3 Daily, interim and final cover material shall be applied in accordance with the Design & Operations Plan (Revised), (Section 3.5), Item 8 in Schedule "A", attached to this Certificate, and as follows:

- a. **Daily Cover** - At the end of each working day, after deposition of waste into the waste fill area, the entire working face shall be compacted and covered with a minimum thickness of 150 mm of soil cover or an approved thickness of alternative cover material such as **compost, wood-chips or foundry sand**. Prior to placing waste at the start of the next operating day, the existing daily cover material shall be scarified or removed to the extent practical, to ensure vertical hydraulic connection is maintained between layers of waste and to promote percolation of leachate downwards.
- b. **Interim Cover** - In areas where landfilling ceases temporarily for a period of 6 months or more, a minimum thickness of 300 mm of soil shall be placed as interim cover. The quality of soil for use as interim cover shall, as a minimum, meet the criteria for Industrial/Commercial land use specified in Table A in the Ministry's "Guideline for Use at Contaminated Sites in Ontario", revised February 1997.
- c. **Final Cover** - Final cover shall be applied progressively as areas of the landfill reach final waste elevations. The final soil cap shall consist of a minimum 600 mm thickness of impermeable compacted soil overlain by a minimum 150 mm topsoil and vegetative cover, as described in Section 2.3 in Item 8 in Schedule "A", attached to this Certificate. Prior to placement of final cover, the Owner/Operator shall submit for the approval of the Director, a report detailing the specifications, including particle size distribution of the final cover soil which shall confirm the designed permeability of  $10^{-5} \frac{\text{cm}}{\text{sec}}$  or less, as well as the protocols for testing and acceptance for on-site and off-site final cover soils. All areas of final cover shall be graded and vegetated as soon as practically possible.

#### **Alternative Daily and Interim Cover Materials**

3.4 Alternative materials to that approved under Condition 3.3 above, may be used as daily and interim cover material, based on an application with supporting information and applicable fee for a trial use or permanent use, submitted by the Owner/Operator to the Director, copied to the District Manager, and as approved by the Director via an amendment to this Certificate. The alternative material shall be non-hazardous according to Reg. 347 and will be expected to perform at least, as well as soil in relation to the following functions:

- a. Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires;
- b. Provision for an aesthetic condition of the landfill during the active life of the Site;
- c. Provision for vehicle access to the active tipping face; and
- d. Compatibility with the design of the Site for groundwater protection, leachate management and landfill gas management.

#### **Site Supervision and Security**

3.5 No waste shall be received, landfilled or transferred from the Site/Facilities unless a site supervisor



or attendant is present and supervises the operations during operating hours. The Site shall be closed when a site attendant is not present to supervise landfilling and/or waste transfer operations.

- 3.6 The Site shall be operated and maintained in a secure manner with lockable entrance and exit gates, such that unauthorized persons cannot enter the Site, during non-operating hours.

#### **Nuisance Controls and Adverse Effects**

- 3.7 The Owner/Operator shall implement control measures for odour, litter, birds, vector and vermin, as described in Sections 3.12 and 3.13 in Item 8 in Schedule "A", attached to this Certificate. Effectiveness of the control measures shall be reviewed and monitored regularly and updated/revised, as required, based on operational experience and complaints.
- 3.8 (a). The *Owner/Operator* shall ensure that wind-blown litter originating from the waste management activities at the Site is picked up regularly along the Site perimeter roads and access roads.
- (b). The *Owner/Operator* shall, at its own expense, remove wind-blown litter originating from the waste management activities at the Site, from adjacent neighbouring properties of the Site, a minimum once per month or more frequently when wind-blown litter from the Site becomes severe.
- 3.9 The Site shall be operated and maintained such that any other operational impacts, including dust, noise and traffic, do not create a nuisance. Any adverse effect on the natural environment or impairment of water quality resulting from the operations of the site, shall be ameliorated promptly, including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the impairment.

#### **Signage**

- 3.10 The existing sign shall be maintained at the main entrance/exit to the *Site* on which is legibly displayed the following information:
- (a) the name of the *Site* and *Owner /Operator*;
  - (b) the number of the Certificate;
  - (c) the normal hours of operation;
  - (d) the allowable and prohibited waste types;
  - (e) the telephone number to which complaints may be directed;
  - (f) a twenty-four (24) hour emergency telephone number (if different from above); and
  - (g) a warning against dumping outside the *Site* .
- 3.11 Signs shall also be posted along internal access roads controlling vehicle speed, turning movements and to direct vehicles and/or users to the working face and other designated areas and facilities on the Site, as appropriate. All landfill signs shall be kept legible, in good repair, and cleaned when required.

#### 4.0 WASTE SEGREGATION/RECYCLING AND WEEE FACILITIES

##### **Design and Operations Manual**

- 4.1 By December 31, 2010, the Owner/Operator shall submit for the approval of the Director, copy to the District Manager, an application with applicable fees, supported by detailed Design and Operations Manual for the Waste Segregation/Recycling and WEEE program Facilities. The detailed design and operations manual for the Facilities shall reflect the conceptual design and operations, as presented in Item 8 (Section 3.11), in Schedule "A", attached to this Certificate. The manual shall as a minimum, include, but not be limited to the following:
- (a) a full-scale site plan and specifications, showing the footprint of the 8.0 hectares waste fill area, the boundaries of the buffer/contaminant attenuation zone and the entire Site boundaries; and indicating all waste management activities, as well as the location and type of finished surface for each storage area, and identifying any storage bins;
  - (b) specify the area and storage capacity for each designated storage location;
  - (c) operating hours for receipt of materials at the facilities which shall be within the general hours of operation of the landfill site, and frequency for removal/transfer of stockpiled materials;
  - (d) an outline of the responsibilities of site personnel;
  - (e) personnel training protocols;
  - (f) procedure for monitoring incoming waste, and record-keeping procedures;
  - (g) proper storage, containment, handling, sorting and shipping procedures which shall avoid the creation of environmental nuisance or adverse effect;
  - (h) details on the inspection/monitoring, maintenance, repair and replacement of the facilities, as necessary;
  - (i) contingency measures and procedures to be followed by personnel in the event of fire, or spills or litter, or complaints, or any environmental nuisance or hazard, or other emergencies;
  - (j) proper management of other diverted materials such as rough fill (i.e. concrete slabs and stumps). provide detailed description of the final disposal/removal of this material;
  - (k) procedure detailing how unauthorised materials will be dealt with.
- 4.2 Any design optimization or modification that is inconsistent with the conceptual design and operation shall be clearly identified, along with an explanation of the reasons for the change.
- 4.3 The Waste Segregation/Recycling and the WEEE Facilities shall only accept **scrap metals, tires, white goods, solid non-hazardous recyclable materials, including cardboards, rough fill (i.e. concrete slabs and stumps), bale-wrap, propane canisters and E-waste**, which shall be segregated, stored temporary for a period not exceeding 120 days from the date of first receipt, or as needed, and transferred for off-site disposal, to ensure that the design storage capacities are not exceeded at any time. The storage of specific material beyond 120 days may be allowed, only with prior notification and written concurrence from the District Manager.
- 4.4 If the storage of material causes nuisance, or adverse effect, or fire hazard, the material shall be removed or transferred immediately regardless of the permitted storage period. If for any reason

waste cannot be transferred from the Waste Segregation/Recycling Facility, the Waste Segregation/Recycling Facility shall cease accepting waste.

- 4.5 The Waste Segregation/Recycling and the WEEE program Facilities shall be operated in a secure manner within containment structures or in storage containers, such that temporary storage of waste materials will not create nuisance, or fire hazard, or adverse effect. Containment structures or storage containers shall be clearly labeled to indicate the type and nature of the waste stored.
- 4.6 Any material/waste containing soluble or decomposable substances which may adversely impact the quality of surface water and groundwater, shall be placed on a floor/pad, to minimize the potential for adverse impacts.
- 4.7 Any white goods received which contain refrigerants shall have the refrigerants removed by a licenced technician in accordance with Ontario Regulation 189, prior to being shipped off-site.
- 4.8 The maximum number of **tire units** stored at the facility at any one time shall not exceed **5,000 units**.

## **5.0 INSPECTION AND MAINTENANCE**

- 5.1 The Owner/Operator shall conduct regular inspections of the Site, including the active waste tipping area, Waste Segregation/Recycling and WEEE Facilities and associated equipment, buildings/shacks, final cover, security fencing and barriers, to ensure that all are maintained in good working order and secure at all times and to ensure that no off-site impacts such as vermin, vectors, odour, dust, and litter, result from the operations of the Site/Facilities to cause any nuisance or adverse effect on the environment.
- 5.2 If any inspection indicates that there is an area of ponding or zero slope in the final soil capped area, and/or any deficiencies detected during these regular inspections, the Owner/Operator shall take all steps necessary to provide positive drainage and rehabilitate the final soil cap, and/or any deficiencies detected as soon as practically possible.
- 5.3 A written record of the inspections shall be maintained at the Site, and shall include the following:
  - (a) name and signature of trained personnel conducting the inspection;
  - (b) date and time of the inspection;
  - (c) list of equipments and Facilities inspected and all deficiencies and/or any nuisance impacts observed;
  - (d) a detailed description of any maintenance/repairs carried out and/or remedial action taken in order to control the nuisance;
  - (e) date and time of maintenance/repair activity; and
  - (f) recommendations for remedial action and any preventative measures taken to prevent future reoccurrences.

## **6.0 ENVIRONMENTAL CONTROL AND MONITORING**

- 6.1 Subject to the addition of Arsenic and Nitrate-N in the suite of parameters listed in Table 4, for groundwater quality monitoring, the Owner/Operator shall carry out monitoring programs for surface water, groundwater/leachate and landfill gas, as described in Section 6.4 and summarized in Table 4, in Item 8 in Schedule "A", as amended in Item 12, in Schedule "A", attached to this Certificate, and as per written recommendations of the District Manager, through the review of annual monitoring Reports, and any related OWRA requirements.
- 6.2 The groundwater quality at the site boundary shall meet the Ontario Drinking Water Quality Standards (DWQS) and the Provincial Water Quality Objectives (PWQO). The applicable parameters to meet the DWQS and PWQO, shall be selected and monitored through a recommendation in the Annual Monitoring Report, subject to the prior approval of the District Manager.
- 6.3 Upon commencement of landfilling by area method, the Owner/Operator shall commence developing a leachate quality profile, updated leachate quantity estimate generated, and the appropriate long-term leachate management plan for the Site. The results of the leachate management plan shall be included in the first annual report for the Site, as required by this Certificate.
- 6.4 If monitoring results show exceedance of the Provincial Water Quality Objectives along the Site boundary due to the landfill operations, the Owner/Operator shall install new wells downgradient of the existing wells, to confirm the suitability of groundwater quality discharging off-site. The appropriate sampling stations shall be determined and reviewed with the Ministry, prior to installation.
- 6.5 The Owner/Operator shall replace any on-site and/or off-site monitoring wells installed under the monitoring program, which are destroyed or in any way made inoperable for sampling, in a timely manner, so that regular sampling event is not severely compromised.

#### **Surface Water Management**

- 6.6 Within one (1) year of the date of this Notice, the Owner/Operator shall submit an application with applicable fees, for approval under OWRA, copied to the District Manager, to install a stormwater management facility for the site, as described in Section 7.0 in Item 8 in Schedule "A", as amended in Item 12, in Schedule "A", attached to this Certificate, to assess the interaction between groundwater and surface water, and on-site and the South Pine River.

#### **Landfill Gas Monitoring**

- 6.7 The Owner/Operator shall ensure that all buildings and structures existing at the Site or to be built on-Site which at times are occupied by people, or contains electrical equipment, or a potential source of ignition, are situated, constructed and monitored in a manner which minimizes the potential for explosive hazards due to landfill gas.

6.8 The Owner/Operator shall ensure that any proposed changes to the monitoring programs under this Certificate shall be implemented subject to prior written concurrence of the District Manager.

#### **7.0 TRIGGER MECHANISM AND CONTINGENCY PLANS**

7.1 The Owner/Operator shall carry out trigger mechanism for surface water, groundwater/leachate and landfill gas, as described in Section 9.0 and summarized in Table 5, in Item 8 in Schedule "A", as amended in Item 12, in Schedule "A", attached to this Certificate, and as per written recommendations of the District Manager, through the review of annual monitoring Reports.

7.2 In the event of a confirmed exceedance of the site-specific trigger level relating to groundwater/leachate, or surface water impacts due to leachate, or landfill gas, the Owner/Operator shall immediately notify the District Manager, and an investigation into the cause and the need for implementation of remedial or contingency actions shall be carried out by the Owner/Operator in accordance with the trigger mechanisms and associated contingency plans, as described in Section 9.2 in Item 8 in Schedule "A", attached to this Certificate.

7.3 The Owner/Operator shall ensure that any proposed changes to the site-specific trigger levels for leachate impacts to the groundwater and surface water, shall be approved in writing and in advance, by the District Manager.

#### **8.0 STAFF TRAINING PLAN**

8.1 The Owner/Operator shall develop and maintain a training plan for Site operations employees and shall ensure that all site operations employees have been adequately trained and received on-going training with respect to the following, as amended:

- (a) terms, conditions and operating requirements of this Certificate, A272601 and Notices for the Site;
- (b) the operation, inspection, and maintenance of the Site with respect to the approved design and operations documents;
- (c) Relevant waste management legislation and regulations;
- (d) Environmental concerns related to waste management at the Site;
- (e) Occupational Health and Safety concerns related to waste management at the Site; and
- (f) Emergency procedures and contingency plans in case of fire, spills, off-site impacts and any other emergency situations.

#### **9.0 SPILLS AND EMERGENCY RESPONSE AND REPORTING**

9.1 All spills, upsets and fires shall be immediately reported to the **Ministry's Spills Action Centre at 1-800-268-6060** and shall be recorded in the log book as to the nature of the spill or upset, and the action taken for clean-up, correction and prevention of future occurrences.

9.2 The Owner/Operator shall immediately take all measures necessary to contain and clean up any spill or leak which may result from the operations at this Site.

## **10.0 DAILY LOG BOOK**

10.1 The Owner/Operator shall ensure that a log book of records of observations made during site inspections and daily records of Site operations, are maintained for each operating day during the operation of the Site, and that the records are retained at the Site for at least two years after they are created. The daily records shall include the following information:

- (a) the date, time of arrival, name of hauler, vehicle license plate number, type, origin and quantity (tonnes) of all waste and cover material received at the site, and of all wastes rejected by the site;
- (b) quantity and type of waste (by waste class and name) received, temporarily stored and transferred from the Site;
- (c) any complaints from the public received by the Owner/Operator concerning landfilling operations as well as all other waste management activities, and a description of the action taken by the Owner/Operator in response;
- (d) a record of litter collection activities and the application of dust suppressants;
- (e) results of any tests done to determine the acceptability of waste at the site.
- (f) the area of the Site in which waste disposal operations are taking place;
- (g) quantity and type of any rejected wastes;
- (h) the receiving Site for the waste shipped from the Site;
- (i) the amount of any leachate removed, or treated and discharged from the Site if any;
- (j) a record of the daily inspections, including equipment and Site Inspection report as required under Condition 5.2 above; and
- (k) a description of any out-of-service period of any control, treatment, disposal or monitoring facilities, the reasons for the loss of service, and action taken to restore and maintain service.
- (l) a record of nuisance impact control;
- (m) all spills, fires, upsets or other problems encountered during the operation of the Site and action(s) taken to remediate the problem; and
- (n) records of staff training, as required under Condition 8.0.

## **11.0 ANNUAL REPORT**

Condition 3 in Notice dated October 15, 1991 is hereby revoked and replaced with Condition 10.1 as follows:

11.1 The Owner/Operator shall continue the preparation of an Annual Report on the development, operations and monitoring of the Site, based on Section 6.3 in the Design and Operations Plan (Revised), (Items 8) in Schedule "A" as amended by Item 12, in Schedule "A" attached to this Certificate, or as from time to time amended. The report shall be prepared by a qualified consultant, and submitted to the District Manager, with copies to the Regional Director, by **March 31** each year, and shall cover the preceding calendar year. The report shall as a minimum, include the following:

- a. The results and an interpretive analysis of the results of all leachate, groundwater, surface water, and landfill gas monitoring, including an assessment of leachate elevation data with

respect to trigger elevations; shallow aquifer watertable elevation mapping and groundwater flow direction; regional aquifer piezometric elevation mapping and groundwater flow direction; and an assessment of the need to amend the monitoring programs and trigger mechanisms or to implement contingency measures;

- b. Review and assessment of the effectiveness of the nuisance control programs, including the following information:
  - i. Impact and status of the Site operation on the wetlands and/or South Pine River;
  - ii. Implementation and effectiveness of active control measures;
  - iii. Changes undertaken, or required, to improve the effectiveness of nuisance control programs.
- c. An assessment of the operation and performance of all engineered facilities, the need to amend the design or operation of the Site, and the adequacy of and need to implement the contingency plans;
- d. Site plans showing the existing contours of the Site; areas of landfilling operation during the reporting period; areas of intended operation during the next reporting period; areas of excavation during the reporting period; the progress of final cover, vegetative cover, and any intermediate cover application; the progress of liner placement and leachate collection system placement; previously existing site facilities; facilities installed during the reporting period; and site preparations and facilities planned for installation during the next reporting period;
- e. Calculations of the volume of waste, daily and intermediate cover, final cover material deposited or placed at the Site during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;
- f. A calculation of the remaining capacity of the Site and an estimate of the remaining Site life;
- g. Summaries of the monthly, maximum daily (as available), and total annual quantity (tonnes) of waste received at the Site;
- h. a summary of any public complaints received by the Owner/Operator and the responses made;
- i. a discussion of any operational problems encountered at the Site and corrective action taken;
- j. the status of compliance with all conditions of this Certificate, including the inspection, monitoring and reporting requirements in the conditions of this Certificate;
- k. the extent to which the monitoring results indicate compliance with the conditions of this certificate, PWQO, ODWS, the Reasonable Use Guideline and any other relevant statutes and guidelines; and
- l. any other information with respect to the Site which the Regional Director or District Manager may require from time to time.

## 12.0 SITE CLOSURE PLAN

- 12.1 At least two (2) years prior to the anticipated date of closure of this Site or the date 90 per cent of the total waste disposal volume is reached, whichever occurs first, the Owner/Operator, shall submit to the Director for approval, with copies to the District Manager, a detailed Site Closure Plan pertaining to the termination of landfilling operations at this Site, post-closure inspection, maintenance and monitoring, and end-use plan for the Site. The Site closure plan shall as a minimum, include the following:
- a. A plan showing Site appearance after closure;
  - b. A description of the proposed end-use of the Site;
  - c. Descriptions of the procedures for closure of the Site, including:
    - i. advance notification of the public of the landfill closure;
    - ii. posting of a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
    - iii. completion, inspection and maintenance of the final cover and landscaping;
    - iv. site security;
    - v. removal of unnecessary landfill-related structures, buildings and facilities; and
    - vi. final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
  - d. Description of the procedures for post-closure care of the Site, including:
    - i. operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
    - ii. record keeping and reporting; and
    - iii. complaint contact and response procedures;
  - e. An assessment of the adequacy of and need to implement the contingency plans for leachate and landfill gas; and
  - f. An updated estimate of the contaminating life span of the Site, based on the results of the monitoring programs to date;



## **SCHEDULE "A"**

*The following documentation is hereby added to Schedule "A", and forms part of the Provisional Certificate of Approval No. A272601. If there is a conflict between documents listed in Schedule "A", the document bearing the most recent date shall apply:*

### **Documentation**

6. Letter dated June 28, 2007, from Tesfaye Gebrezghi, Waste Supervisor, Ministry of the Environment to John Tidball, Miller Thomson LLP and Mary Rose Walden, CAO-Administrator, the Corporation of the Township of Huron-Kinloss, Re: the approved theretical capacity for the Huron Landfill Site.
7. Letter dated August 14, 2008, from Brad R. Pryde, President - Pryde Schropp McComb Inc., to Tesfaye Gebrezghi, Waste Supervisor, Ministry of the Environment, Re: Application for Approval of Waste Disposal Site Amendment to Certificate of Approval, No. A272601, to change the landfilling operation at the Huron Landfill from Trench method to Area method. (MOE Ref # 7021-7HJKZF).
8. Report entitled "Design and Operation Plan (Revised), Huron Landfill, Township of Huron-Kinloss", dated January, 2010, prepared by Pryde Schropp McComb Inc.
9. Letter dated August 26, 2008, from Brad R. Pryde, President - Pryde Schropp McComb Inc., to Gabriela Sadowska, Application Assessment, Ministry of the Environment, Re: Application for Approval of Waste Disposal Site Amendment to Certificate of Approval, No. A272601, to change the landfilling operation at the Huron Landfill from Trench method to Area method, with attached completed Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated August 29, 2008, signed by Joanna Molott, Deputy Clerk, the Corporation of the Township of Huron-Kinloss. (MOE Ref # 7021-7HJKZF).
10. Letter dated May 1, 2009, from Stephen J. Cobean, Pryde Schropp McComb Inc., to the Director of Approvals, Ministry of the Environment, Re: Application for Approval of Waste Disposal Site Amendment to Certificate of Approval, No. A272601, to change the service area of the Huron Landfill to include the Village of Lucknow, with attached completed Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated April 23, 2009, signed by Hugh Nichol, Superintendent of Public Works, the Corporation of the Township of Huron-Kinloss. (MOE Ref # 1307-RQMZH).
11. Report entitled "Service Area Study, Huron Landfill, Township of Huron-Kinloss", dated April, 2009, prepared by Pryde Schropp McComb Inc.
12. Letter dated January 14, 2010, from Stephen J. Cobean, Pryde Schropp McComb Inc., to Dickson Odame-Osafo, Ministry of the Environment, Re: Response to the Ministry of the Environment review comment on the Design and Operation Plan, Huron Landfill (MOE Ref # 7021-7HJKZF).
13. Letter dated June 9, 2010, from Stephen J. Cobean, Pryde Schropp McComb Inc., to Dickson Odame-Osafo, Ministry of the Environment, Re: Draft Certificate of Approval Review, Huron Landfill

Site (MOE Ref # 7021-7HJKZF).

## REASONS

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

1. The reason for **Conditions 1.1, 2.5, 2.6, 2.9, 4.1, 4.2, 4.3, 6.8 and 7.3** is to ensure that the landfill Site is designed, developed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.
2. The reason for **Conditions 1.2 to 1.5, 1.7 and 1.11** is to clarify the legal rights and responsibilities of the Owner.
3. The reason for **Condition 1.6** is to ensure that appropriate Ministry staff have ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Certificate of Approval. This condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the EPA and OWRA.
4. The reason for **Condition 1.8** is to ensure that all correspondence relevant to this Certificate of Approval is properly identified by the Certificate of Approval number for ease of reference.
5. The reasons for **Conditions 1.9 and 1.13** are to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer or encumbrance can be made only on the basis that it will not endanger compliance with this Certificate of Approval.
6. **Condition 1.10** is included, pursuant to subsection 197(1) of the EPA, to provide that any persons having an interest in the Site are aware that the land has been approved and used for the purposes of waste disposal.
7. The reason for **Condition 1.12** is to ensure the availability of records, including drawings for inspection and information purposes.
8. The reasons for **Conditions 2.1, 2.2 and 2.3** are to specify the approved area from which waste may be accepted at the Site, the types of waste that may be accepted for disposal at the Site, and the maximum rates at which this Site may receive waste, based on the Owner's application and supporting documentation.
9. The reason for **Conditions 2.4, 2.7 and 2.8** is to specify restrictions on the extent of landfilling at this Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity of the site.
10. The reasons for **Conditions 3.1 and 3.2** are to specify the hours of operation for the landfill Site and a mechanism for amendment of the hours of operation, as may be necessary.
11. The reason for **Condition 3.3** is to ensure that daily and intermediate cover is used to control potential nuisance effects, to facilitate vehicle access on the site, and to ensure an acceptable site

appearance is maintained. The proper closure of a landfill site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the site.

12. The reason for **Condition 3.4** is to specify the approval requirements for use of alternative cover material at the Site.
13. The reasons for **Conditions 3.5 and 3.6** are to ensure that the Site is supervised by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person, and to ensure a controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.
14. The reason for **Conditions 3.7 to 3.9 and 4.4 to 4.8** is to ensure that the Site is operated in an environmentally acceptable manner for the protection of the natural environment and public health and safety.
15. The reason for **Conditions 3.10 and 3.11** is to ensure that users of the Site are fully aware of important information and restrictions related to Site operations and access under this Certificate of Approval.
16. The reason for **Conditions 5.1 and 5.2** is to ensure that the Site is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.
17. The reasons for **Conditions 6.1 to 6.6** are to demonstrate that the site performs in conformance with the requirements of this Certificate, the EPA and its regulations, and OWRA and its Regulations. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.
18. The reasons for **Conditions 7.1 and 7.2** are to ensure that the Owner follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site. A remedial action / contingency plan is necessary to ensure protection of the natural environment and public health and safety.
19. The reason for **Condition 8.1** is to ensure that the Site is operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.
20. The reason for **Conditions 9.1 and 9.2** is to ensure that the Ministry is notified forthwith of any spills as required in Part X of the EPA, so that appropriate spills response can be determined.
21. The reasons for **Conditions 5.3 and 10.1** are to ensure the availability of records for inspection and information purposes, to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this Certificate of Approval, the EPA and its regulations.

22. The reasons for **Condition 11.1** are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified, and to ensure that potential impacts on the local wetland are reviewed/updated regularly. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.
23. The reasons for **Condition 12.1** are to ensure that final closure of the Site is completed in an aesthetically pleasing manner and to ensure the long-term protection of the natural environment.

**This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A272601 dated July 31, 1989**

*In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:*

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

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

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

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
655 Bay Street, 15th Floor  
Toronto, Ontario  
M5G 1E5

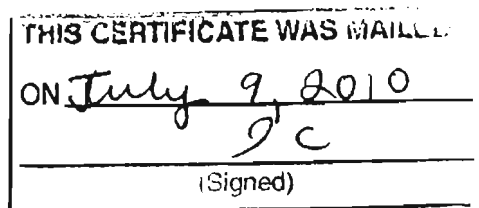
AND

The Director  
Section 39, *Environmental Protection Act*  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)

*The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.*

DATED AT TORONTO this 6th day of July, 2010



Tesfaye Gebrezghi, P.Eng.

Director

Section 39, *Environmental Protection Act*

DO/

c: District Manager, MOE Owen Sound  
Brad Schropp, Pryde Schropp McComb Inc. ✓

AMENDMENT TO PROVISIONAL CERTIFICATE OF  
APPROVAL  
WASTE DISPOSAL SITE  
NUMBER A272601  
Notice No. 3  
Issue Date: July 9, 2010

The Corporation of the Township of Huron-Kinloss  
21 Queen St  
Post Office Box, No. 130  
Ripley, Ontario  
N0G 2R0

Site Location: Huron Landfill Site  
Concession Road 6  
Lot 19, 20, Concession 5  
Huron-Kinloss Township, County of Bruce  
N0G 2R0

*You are hereby notified that I have amended Provisional Certificate of Approval No. A272601 issued on October 15, 1991, as amended for a waste disposal Site, consisting of 8.0 hectares Waste Fill Area within a total Site Area of 17.7 hectares, as follows:*

**1. EXPANSION OF SERVICE AREA**

Pursuant to Section 27 of the *Environmental Protection Act*, approval is hereby granted to expand the service area of the Huron Landfill site to include the Village of Lucknow;

all in accordance with the following documentation which is added to Schedule "A", and forms part of the Provisional Certificate of Approval No. A272601, and subject to the terms and conditions listed herein:

Note: Use of the Site for any other type of waste and/or any other waste management activity is not approved under this Certificate, and requires obtaining a separate approval amending this Certificate.

**Documentation**

*The following documentation is hereby added to Schedule "A", and forms part of the Provisional*

*Certificate of Approval No. A272601.*

10. Letter dated May 1, 2009, from Stephen J. Cobean, Pryde Schropp McComb Inc., to the Director of Approvals, Ministry of the Environment, Re: Application for Approval of Waste Disposal Site Amendment to Certificate of Approval, No. A272601, to change the service area of the Huron Landfill to include the Village of Lucknow, with attached completed Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated April 23, 2009, signed by Hugh Nichol, Superintendent of Public Works, the Corporation of the Township of Huron-Kinloss. (MOE Ref # 1307-RQMZH).
11. Report entitled "Service Area Study, Huron Landfill, Township of Huron-Kinloss", dated April, 2009, prepared by Pryde Schropp McComb Inc.

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

**Service Area**

- 2.1 Only waste generated from within the geographic boundaries of the **Township of Huron-Kinloss** which include the Township of Huron, the Township of Kinloss and the Village of Lucknow, shall be received for disposal at this Site. No waste generated and/or transferred from outside the **Township of Huron-Kinloss** shall be received for disposal at this Site.

The reason for this amendment to the Certificate of Approval is as follows:

The reason for **Condition 2.1**, is to specify the approved area from which waste may be accepted at the Site, due to amalgamation, based on the Owner's application and supporting documentation.

**This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A272601 dated July 31, 1989**

*In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:*

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

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;



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

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
655 Bay Street, 15th Floor  
Toronto, Ontario  
M5G 1E5

AND

The Director  
Section 39, *Environmental Protection Act*  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)

*The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.*

DATED AT TORONTO this 9th day of July, 2010



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Tesfaye Gebrezghi, P.Eng.  
Director  
Section 39, *Environmental Protection Act*

DO/

:: District Manager, MOE Owen Sound  
Steve J. Cobean, Pryde Schropp McComb Inc.

# APPENDIX

B

LANDFILL

CORRESPONDENCE

Ministry of the Environment  
Environmental Assessment and  
Approval Branch  
Floor 12A  
2 St Clair Ave W  
Toronto ON M4V 1L5  
Fax: (416) 314-8452  
Telephone: (416) 314-7029

Ministère de l'Environnement  
Direction des évaluations et des  
autorisations environnementales  
Étage 12A  
2 av St Clair O  
Toronto ON M4V 1L5  
Télécopieur: (416) 314-8452  
Téléphone: (416) 314-7029



June 28, 2007

John Tidball, Certified Specialist, Environmental Law  
Miller Thomson LLP  
600, 60 Columbia Way  
Markham, ON, L3R 0C9

Mary Rose Walden, CAO-Administrator  
The Corporation of the Township of Huron-Kinloss  
PO Box 130  
Ripley, Ontario  
N0G 2R0

Dear Mr. John Tidball:

Re: Application for Approval of Waste Disposal Sites  
Amendment to CoLA No. A272601: Huron Landfill Site  
Huron-Kinloss Township, County of Bruce  
MOE Reference Number 7333-62V8GY

I am writing in response to your letter dated October 17, 2006, in which you have enquired about the outstanding capacity calculation issue on the above noted file. The following provides a summary of the issue and the Ministry's current position:

#### HISTORY:

1. As you have noted in your letter Nafiseh Pourhassani in her letter dated August 13, 2004 calculated the capacity to be 204,600 cubic meters. This letter and calculation was part of a series of on going discussions with the consultant, Mr. Bob Kearse, R. J. Burnside, and was not the final "decision" of the Ministry. Ms. Pourhassani had used a depth of excavation of 5 meters in her calculation.
2. Shortly after preparing the above noted calculation, on October 27, 2004, Nafiseh Pourhassani received a call from Larry Struthers, Environmental Officer for the site who informed her that the final revision of the 1985 PDO dated October 11, 1985, had a one page addendum, "Addendum Number 1" which contained the following modification to the site design:

" The depth of excavation for trenches used for the burial of refuse shall be 3 meters below original grade as opposed to 5 meter depth indicated."

This final revision was missing from Ms. Pourhassani's file and Mr. Struthers provided a copy.

3. Ms. Pourhassani made a note in the file and communicated this new fact with Mr. Kearse immediately. She offered to provide a copy to Mr. Kearse; however, he indicated that he was already aware of the addendum and had a copy. The capacity calculation in Ms. Pourhassani's letter dated July 14, 2005, used the revised reduced depth of excavation of 3 meters.

#### UPDATE:

4. We have revisited the file and have obtained legal advice on the capacity issue. The Ministry's final position is that, in this particular case, the reduction in depth of excavation should not be interpreted as a reduction in capacity and should be viewed as an operational issue. Furthermore, we have also determined that the capacity should be calculated using the 8 ha footprint specified in the original application as well as the certificate of approval. Accordingly, using the depth of excavation of 10 feet and height of fill of 2 feet (also taken from the original application) the capacity is determined to be 288,000 cubic meters.

5. At this point we are prepared to issue an amendment approving the change of operation from the trench method to area method (the original intent of the July 2004 application) and specify the maximum approved capacity. However, the Township will be required to submit an updated design and operation plan within a year of issuance of the amendment to reflect landfill capacity and address the remaining design and operation issues (refer to items 2 through 9, in the July 14, 2005, letter from Ms. Pourhassani.) Please note that since we are using the 8 ha footprint for calculating the maximum capacity, the remaining capacity will be the maximum capacity less the waste already deposited in the entire 8 ha footprint.

If you have any questions, you may contact Nadisah Pourhassani at 416-314-7029.

Yours truly,



Tesfaye Gebrezghi  
Waste Unit Supervisor

c: Helmut Pfeiffer EO, Owen Sound

Ministry of the Environment  
Environmental Assessment and  
Approval Branch  
Floor 12A  
2 St Clair Ave W  
Toronto ON M4V 1L3  
Fax: (416) 314-8452  
Telephone: (416) 314-7029

Ministère de l'Environnement  
Direction des évaluations et des  
autorisations environnementales  
Étage 12A  
2 av St Clair O  
Toronto ON M4V 1L3  
Télécopieur : (416) 314-8452  
Téléphone : (416) 314-7029



August 13, 2004

Mary Ross Walden, CAO-Administrator  
The Corporation of the Township of Huron-Kinloss  
PO Box 130  
Ripley, Ontario  
N0G 2R0

Dear Ms. Walden:

Re: Application for Approval of Waste Disposal Sites  
Amendment to CoEA No. A172601: Huron Landfill Site  
Huron-Kinloss Township, County of Bruce  
MOE Reference Number 7335-62VSGY

We have completed our review of your application dated June 29, 2004 and the supporting documentation, as well as the letter dated May 6, 2004, from Mr. Hugh Nichol, Public Works Superintendent, requesting input on amending the service area of Huron-Kinloss Landfill site to include Village of Lucknow.

We have found the submitted application and the supporting documentation lacking in significant details. We refer to the letter dated January 26, 2004, from Ian Parrott, Supervisor, Waste Approvals, specifically indicating that "an assessment of any environmental impacts (e.g., groundwater and visual) and the results of public consultation" must accompany the application for the inquired amendment.

The following is a list of issues that were not dealt with sufficiently in the supporting documentation and must be addressed fully before we can assess your application further:

**Final Contours and Capacity Calculation:** The original supporting documentation package did not include any capacity calculations needed for reviewing the revised final contours. Subsequent to my telephone conversation with Mr. Bob Kears, a capacity calculation package was submitted on August 3, 2004. This calculation has made reference to the capacity of 10,000 tonnes (calculated to be 355,600 cu. m. using 0.45 t/m<sup>3</sup> for density) in the original application and items referenced in the Schedule A of the certificate of approval. However, not all the approved design parameters such as trench depth and width, which were developed in

the Plan of Development and Operation (PDO) of 1985, it would be simply impossible to achieve a 250,000 tonnes capacity at this site. Therefore the capacity of 250,000 tonnes is irrelevant.

The maximum theoretical capacity (air space) at this site, can be calculated using the square block method as follows:

Total Area (T1 + T2 + T3 + T4 + T5 + T6) X Depth = 4,092 sq. m. X 5 m. = 204,600 cu. m.

Furthermore, one can argue that if the site operations were to continue using the trench method and as outlined in the PDO, a 1 meter undisturbed soil at one end and a 3 meter undisturbed soil at the other end of each trench were to remain intact, the actual capacity would have been far less than the 204,000 cu. m.. Therefore 204,000 cu. m. is actually higher than the original intended site design and subsequent approval. At this point we are willing to accept the capacity of 204,600 cu. m. if the Visual Impact Study (see below) does not reveal any significant adverse impacts.

The remaining capacity is therefore calculated to be 103,490 m3 (Maximum Theoretical Capacity minus the previously filled capacity). Please provide revised final contours in accordance with this remaining capacity.

2. Visual Impact Study: Although our letter of January 24, 2004, specifically listed the "visual" impact of the change from trench method to the area method as one of the impacts to be addressed, no discussion was provided in the supporting documentation. Once the final contours have been determined using the remaining capacity of 103,490 cu. m., an assessment of the visual impact of the waste mound must be undertaken.

3. Impact on Groundwater: A reference to changes in the groundwater levels resulting in difficulty to utilize the approved trench depth has been made. However, no further information has been provided with respect to the groundwater flow conditions, present and future compliance with Reasonable Use Guideline, assessment of the adequacy of the current monitoring program including trigger parameters and contingency plans.

4. Cell preparation: There is a brief discussion on initial stripping of topsoil and overburden material from the work area and placement of 0.5 meter of ??? (It is not clear what this 0.5 meter thick material is) to form the working face of the cell. Depending on the groundwater conditions, including the leachate impact, current and future compliance with Reasonable Use Guideline, and subsurface soil conditions, there maybe a need for additional cell preparation work to provide a suitable base. Information provided is inadequate for our assessment.

5. Contaminating Life Span of the Site: A recalculation of the contaminating life span of the site

using the maximum design capacity of 204,600 cu. m. and a discussion of the results must be provided.

6. Stormwater Management: There is a brief reference to stormwater runoff entering trenches, the need for a large amount of handling of flows on site and recirculation of stormwater at the site. It has also been brought to our attention by the District Office that this site has persistent stormwater management problems and that there is a need to develop and implement a comprehensive stormwater management plan including the assessment of the need for detention ponds, methods for keeping stormwater that has come in contact with waste separate from noncontaminated stormwater and developing contingency plans. It is also my understanding that there might be drainage water flowing off site into a surface water body. Please note that if there are any discharges to a surface water body then an approval under Ontario Water Resources Act is required. A separate application for approval under OWRA must be submitted to the Wastewater unit of this Branch.

If all other issues listed in this letter are addressed to our satisfaction and the amendment is issued for the change from trench method to area method, submission of a stormwater management plan within a year will be a condition of approval.

7. Litter: It is also been brought to our attention that litter is a problem at this site and included in the application package there was a complaint in writing dated June 21, 2004, from one of the neighbors during the public notification / consultation with respect to continuous litter problems at her property. There is no discussion of the litter impact and contingency plan to deal with this issue. Our letter of January 24, 2004, specifically instructed the need for an assessment of any concerns raised during public consultation.

8. In response to the letter from Mr. Hugh Nichol requesting information with respect to addition of Village of Lucknow to the service area of Huron-Kinloss landfill site, we provide the following information: The addition of township of Kinloss to the service area of Huron-Kinloss landfill site in February 2002 constituted an increase in population to be served of approximately 18% which was less than the threshold of 25% (threshold is cumulative). The request for addition of Lucknow Village to the service area of Huron-Kinloss would exceed the cumulative threshold of 25% and is therefore subject to Section 27, Part V, EPA approval. As a minimum a public consultation for this rate change and an assessment of all environmental impacts such as increased dust, noise, litter and traffic must be undertaken.

MOE District Office has also requested that the amendment require submission of a closure report since the site is nearing its capacity. Typically closure reports are required one year prior to the closure of the site or when the site has reached 90% of its capacity.

Considering the amount of information that is required for review of this application and the fact

that the approved PDO is nearly 15 years old, you may wish to consider withdrawing your current application and submitting a complete package including an updated plan of development and operation which would also address all of the above noted issues such as a stormwater management plan, an updated environmental monitoring plan, and any potential additions to the service area. Your application fee of \$1400 less \$200 administration fee will be refunded to you if you wish to withdraw your application.

If you wish to continue with this application, please provide your response to my attention by August 31, 2004. If you have any questions, I can be reached at (416) 314- 7029.

Yours truly,



Nafiseh Pourhassani, P. Eng.  
Senior Approvals Engineer

cc District Manager, MOE Owen Sound  
Bob Kears, P.Eng., R.J. Burnside & Associates Limited  
Hugh Nichol, Public Works Superintendent, Township of Huron-Kinloss



Ministry of the Environment  
Environmental Assessment and  
Approvals Branch  
Floor 12A  
2 St Clair Ave W  
Toronto ON M4V 1L5  
Fax: (416) 314-8482  
Telephone: (416) 314-8274

Ministère de l'Environnement  
Direction des évaluations et des  
autorisations environnementales  
Étage 12A  
2 av St Clair O  
Toronto ON M4V 1L5  
Télécopieur : (416) 314-8482  
Téléphone : (416) 314-8274



**RECEIVED**  
DEC 29 2008

December 22, 2008

Hugh Nichol  
The Corporation of the Township of Huron-Kinloss  
21 Queen St  
Ripley, Ontario  
N0G 2R0

Dear Sir/Madam:

**Re: Application for Approval of Waste Disposal Sites  
Amendment to Certificate of Approval #A272601  
Huron-Kinloss Township, County of Bruce  
MOE Reference Number 7021-7HJKZF**

The Ministry has reviewed the report entitled "Township of Huron-Kinloss, Design and Operation Plan, Huron Landfill" dated August 2008, prepared by Pryde Schropp McComb Inc. (D & O Plan). The D & O Plan was submitted on behalf of the Corporation of the Township of Huron-Kinloss, to seek the Ministry's approval to change the landfilling operations at the Huron Landfill from the trench method to an area method.

This operational change is a result of loss of capacity in trench space due to shallow groundwater conditions existing at the site. To compensate for loss of capacity, the D & O Plan proposes above-ground landfilling with maximum capacity of 238,000 cubic metres for the site, of which 117,600 cubic metres has been used by end of 2007. The remaining capacity of 170,400 cubic metres is projected to achieve operational life of 29.7 years (page 9 of the report). The following comments are provided with respect to the hydrogeological and surface water aspects of the D & O Plan. Additional comments on other aspects of the D & O Plan will follow as soon as they become available.

#### **Stormwater Management**

Both Section 7.0 and Section 12 of the D & O Plan state that the existing stormwater management system for the trenching system will remain in place until such time that the above ground Area method is ready. The report goes on to state that at that time a stormwater management plan would be developed and submitted for Ministry's approval. The Ministry prefers that the plan be developed now and included in this application rather than

later. Given that the site has considerable operational life, it would be prudent that this site have a surface water control system put in place that will allow run-off water from the fill area collect to a central stormwater pond before discharge off site.

#### **Environmental Monitoring and Triggers**

Section 6.0 of the D & O Plan proposes that the current environmental monitoring be carried forward, which consists of sampling from two locations (SW1 and SW2) in upstream and downstream within the South Pine River. Samples are taken in spring and fall and analysed for general chemistry, nitrogen suite, metals and Phenols. The proposed sampling and analyses are considered satisfactory. However, upon completion of a stormwater management pond, additional sampling at the pond outlet will be required, and included in the surface water monitoring program which is currently sampled twice a year at SW1 and SW2.

Section 9.0 of the D & O Plan proposes to use the Provincial Water Quality Objectives (PWQO) for trigger contingency for surface water. The Ministry concurs with the use of PWQO as trigger at SW1 and SW2. However, it is premature to consider contingency trigger values at this time, for any future sampling location to be established, until sufficient sampling history is obtained.

#### **Groundwater**

The D & O Plan does not discuss the potential for new impacts to groundwater resources due to the operational change. It does address trigger levels and contingency plans that could be put in place should non-compliance occur at the site. Some of the concerns that were identified during the Ministry's review of the 2006 Annual Monitoring Report may be enhanced by the proposed changes to site operation, and these have been discussed below:

1. The parameters to be measured in the proposed future monitoring program (Table 3) are considered appropriate. However, given the direction of ground water flow in the area around well OW11, and considering the elevated concentrations of arsenic in this area, as evidenced in OW11, we suggest that Arsenic be added to the analysis suite. It should be noted that the Ministry has flagged in its previous review that the concentration of arsenic in 2006 was 100 times the Reasonable Use Guideline. In addition, elevated concentrations of ammonia-N at well OW11 (in excess of 50 mg/L) have been observed. Therefore, we suggest that nitrate-N be included in the analysis suite.
2. Section 9.1 of the D & O Plan recommends that the RUG be used as the trigger at which contingency plans will be initiated. We suggest that values slightly less than the RUG be set as triggers, to allow sufficient time to assess the problem and select an appropriate management strategy before the site actually becomes out of compliance.
3. The "leachate contingency plans" presented in section 9.0 of the D & O Plan are considered reasonable approaches. The exact details of such a plan cannot be finalized until the scenario where a non-compliance event occurs. Some methods (eg. impermeable barrier;

leachate infiltration pond in old fill area) need to be fully considered, so that a problem is not simply redirected to a different portion of the property.

4. The placement of new waste above the old waste could impact on both groundwater flow patterns and leachate strength. This concept was not discussed in the D & O Plan and needs to be addressed. While it is likely the effect would be minimal, the additional waste could enhance the severity of some of the concerns that were identified in the review of the 2006 Annual Monitoring Report.
5. A primary concern at this site continues to be the presence of elevated leachate concentrations in liquid sampled at well OW11. This well is located in the waste, and elevated concentrations are to be expected. However, the well is positioned less than 10 m from the property boundary, and we are concerned that leachate could migrate southwestwards across the property line. Given the proximity of the South Pine River, there is also the possibility that flow is more southerly than shown by the equipotential pattern. Please, assess and clarify the impact of additional waste placement, on the groundwater/leachate flow pattern (eg. mounding).
6. The consultant should consider a new shallow well just south of well OW11. Despite the low-conductivity of the geologic material, the proximity of the waste to the property boundary is "too close for comfort". Please, assess and provide a remedial action that deals with the already existing risk for non-compliance with RUG at this location; and as well, confirm and provide appropriate remedial action plan for the effect of the additional waste loading on the non-compliance risk increase. Alternatively, could lands between the landfill and the river be acquired for contaminant attenuation purposes?

Prior to approving the proposed change from trench to area method which would involve placing additional waste over the existing waste, the Township should provide a program and schedule that addresses the foregoing concerns, including any unacceptable impacts/non-compliance at the southern property boundary.

If you have any questions regarding the above, please contact me at the above phone number or Mr Ian Mitchell at 519-371-6191.

Yours truly,

  
Dickson Oduro-Osato  
Senior Engineer, Waste Unit

c: District Manager, MOE Owen Sound  
Brad Schropp, Pryde Schropp McComb Inc.



PRYDE SCHROPP McCOMB INC.

May 29, 2009  
File: 00941

**BY FAX ONLY – 3 Pages**

Ministry of the Environment  
Freedom of Information and Protection of Privacy Office  
40 St. Clair Avenue West  
12th Floor  
Toronto, ON M4V 1M2

Tel: 416-314-4075  
Fax: 416-314-4285  
Email: dickson.odameosaso@ontario.ca

**Attention: Mr. Dickson Odame-Osaso, Senior Review Engineer- Waste**

**Reference: MOE Review of the Design and Operation Plan  
Amendment to Certificate of Approval No. A272601  
Huron Landfill Site, Township of Huron-Kinloss  
MOE Reference Number 7021-7HJKZF**

We have reviewed your correspondence of December 22, 2008, which provided comments regarding the Design and Operation Plan for the Huron Landfill. The approval of the Design and Operation Plan will allow the Township to regain landfill capacity formerly lost due to shallow groundwater conditions.

Your correspondence of December 22, 2008, provided comments regarding the hydrogeological and surface water aspects of the Design and Operation Plan. It is our understanding that additional comments from the Ministry of the Environment regarding other aspects of the Design and Operation Plan will follow as soon as they become available.

Following are responses to your comments of December 22, 2008. We have organized our responses to correspond the order of your comments:

**Stormwater Management**

The Design and Operation Plan recommended that a Stormwater Management Plan be completed just prior to above ground landfilling. Your correspondence stated *"The Ministry prefers that the plan be developed now and included in this application rather than later."*

We have recommended that the Township initiate the Stormwater Management Plan in 2009. The Stormwater Management Plan would assess the requirements of the site for stormwater management during and after above ground landfilling. The Plan would make recommendations for the design and construction of stormwater control facilities and subsequent monitoring.

**Environmental Monitoring and Triggers**

The current surface water monitoring program consists of two (2) monitoring stations: SW1 – upstream South Pine River and SW2 – downstream South Pine River. Once the stormwater facilities are completed any stormwater retention facility will be added to the surface water monitoring program

**References:** MOE Review of the Design and Operation Plan  
Amendment to Certificate of Approval No. A272601  
Huron Landfill Site, Township of Huron-Kinloss  
MOE Reference Number 7021-7HJKZF

We concur with your recommendation that data from SW1 and SW2 continue to be collected as per the Annual Monitoring Report, to allow the determination of surface water triggers.

#### Groundwater

It was recommended that comments raised by the MOE review of the 2008 Annual Monitoring Report (prepared by Bumside and Associates Ltd.) be addressed. These comments include the following:

**1. OW11 Monitoring**

We would agree with the recommendation to include arsenic and nitrate to the monitoring parameters in 2009. It should be noted these two parameters were already included in 2008 monitoring.

**2. Reasonable Use Guidelines (RUG) Triggers**

It was recommended that the triggers for the monitoring wells be set at values slightly less than the RUG. In this way any environmental problems can be addressed before the site is in non-compliance.

We would recommend that the triggers be set for the boundary wells at "tiered" levels based on a percentage of the RUG and their distance from the site property boundary. These triggers can be included in an addendum to the Design and Operation Plan which would address the concerns of the MOE and allow the amendment of the Certificate of Approval to allow above ground landfilling.

**3. Leachate Contingency Plans**

We concur with the MOE comments.

**4. Placement of Additional Waste on the Trenches**

This issue can also be addressed in an addendum for the Design and Operation Plan. The impact of placing additional waste on the trenches will be addressed. As noted in your correspondence *"it is likely that the effect is minimal"*.

**5. Mounding in the Area of OW11**

There was concern raised regarding the placement of waste above grade in the area of OW11 causing mounding and possible leachate impacts migrating southward. This is also an item that can be addressed in an addendum to the Design and Operation Plan.

May 29, 2009  
Mr. Dickson Odame-Osalo, Senior Review Engineer- Waste  
Page 3 of 3

**Reference:** MOE Review of the Design and Operation Plan  
Amendment to Certificate of Approval No. A272601  
Huron Landfill Site, Township of Huron-Kinloss  
MOE Reference Number 7021-7HJKZP

**6. Remedial Action Plan in the Area of OW11**

It was recommended that a remedial action plan be in place for the southern property line in the area of OW11. There was concern regarding the migration of leachate to the nearby southern property line and towards the South Pine River. Possibilities include the installation of an additional monitoring well. Using 2008 monitoring data from the 2008 Annual Monitoring Report and historical data an estimation of environmental impacts and a remedial action plan can be completed. This information can be added to the addendum to the Design and Operation Plan.

It is recommended that the preparation of the addendum to the Design and Operation Plan be postponed until the remaining comments from the Ministry of the Environment have been received. Once all comments have been, Pryde Schropp McComb Inc. will complete an addendum to the Design and Operation Plan to address all of the Ministry's concerns.

We would ask for your comments regarding the appropriateness of this response to the concerns of the Ministry. Also could you provide our office with an estimation of when we could expect the remaining MOE comments?

We look forward to hearing from the Ministry regarding this matter. If you have any questions or concerns regarding these items please do not hesitate to contact our office.

Sincerely,

**PRYDE SCHROPP McCOMB, INC.**

Stephen J. Cobean, P. Eng.  
Associate, Project Manager

c: Mr. Hugh Nichol, Public Works Superintendent, Township of Huron-Kinloss

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**PRYDE SCHROPP McCOMB INC.**

August 26, 2009  
File: 00941

**BY FAX ONLY – 5 Pages**

Ministry of the Environment  
Freedom of Information and Protection of Privacy Office  
40 St. Clair Avenue West  
12th Floor  
Toronto, ON M4V 1M2

Tel: 416-314-4075  
Fax: 416-314-4285  
Email: dickson.odame-osaso@ontario.ca

**Attention: Mr. Dickson Odame-Osafo, Senior Review Engineer- Waste**

**Reference: MOE Review of the Design and Operation Plan  
Amendment to Certificate of Approval No. A272601  
Huron Landfill Site, Township of Huron-Kinloss  
MOE Reference Number 7021-7HJKZF**

Further to our letter of May 29, 2009 (enclosed for your reference) we are requesting on behalf of the Township of Huron-Kinloss an indication as to whether there will be further Ministry comments with regards to the Design and Operation Plan. We would like to move forward with this project as specified in our attached correspondence. The Township wishes to proceed with this matter as the currently approved site capacity is becoming limited. The approval of the Design and Operation Plan will allow the Township to regain landfill capacity formerly lost due to shallow groundwater conditions.

If there will be no further MOE comments regarding the Design and Operation Plan we will proceed with the work associated with addressing your comments of December 22, 2008, including the following:

- Stormwater Management
- Environmental Monitoring and Triggers
- Groundwater
  - OW11 Monitoring
  - Reasonable Use Guidelines (RUG) Triggers
  - Leachate Contingency Plans
  - Placement of Additional Waste on the Trenches
  - Mounding in the Area of OW11
  - Remedial Action Plan in the Area of OW11

Details regarding how the above items will be addressed are provided in our attached correspondence.

In summary we would respectfully request an indication, at your earliest convenience, as whether to proceed with the work described in the attached correspondence or wait for further MOE comments. If you have any questions or concerns regarding these items please do not hesitate to contact our office.

August 26, 2009  
Mr. Dikson Odame-Osato, Senior Review Engineer- Waste  
Page 2 of 2

Reference: MOE Review of the Design and Operation Plan  
Amendment to Certificate of Approval No. A272601  
Huron Landfill Site, Township of Huron-Kinloss  
MOE Reference Number 7021-7HJKZP

Sincerely,

**PRYDE SCHROPP McCOMB, INC.**

Stephen J. Cobean, P. Eng.  
Associate, Project Manager

Enclosure

c: Mr. Hugh Nichol, Public Works Superintendent, Township of Huron-Kinloss  
(by email with enclosure)

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Ministry of the Environment  
Southwestern Region  
Owen Sound District Office  
Owen Sound District Office  
3rd Flr  
101 17th St  
Owen Sound ON N4K 0A5  
Fax: (519) 371-2908  
Tel: (519) 371-8191

Ministère de l'Environnement  
Direction régionale du Sud-Ouest  
Bureau du district d'Owen Sound  
101 rue 17th, 3ème étage  
Owen Sound ON N4K 0A5  
Télécopieur: (519) 371-2908  
Tél: (519) 371-8191



January 29, 2010

Mr. Hugh McNichol  
Township of Huron-Kinloss  
PO Box 130  
21 Queen Street  
Ripley ON N0G 2R0

RECEIVED  
FEB 03 2010

00941  
a-2756  
GP7-file

Dear Mr. McNichol,

**RE: Huron Landfill Site, 2008 Annual Monitoring Report**

We have received a copy of the report titled "Huron Waste Disposal Site, Township of Huron-Kinloss, annual Monitoring Report - 2008" dated March 2009 and prepared by Pryde Schropp McComb Inc. The submission was forwarded to our Regional Technical Support section and comments from our Regional Hydrogeologist are provided below:

Upon review of hydraulic gradient data, it is clear that the primary ground water flow direction is downward. Vertical gradients are an order of magnitude or more higher than horizontal gradients. It is likely that ground water flow is directed down across the surficial silty clay formation towards a more conductive layer at depth. Gravel and sand was detected at a depth of about 11.3 m bgs in wells OW7D and OW10D. These wells are located at opposite sides of the site, and it is reasonable to assume that the gravel and sand formation is continuous across the site. Flow is likely very slow through the silty clay, with only relatively low amounts of contaminant mass delivered to the underlying sand and gravel. This geological setting is likely why impacts to ground water resources appear to be limited at this site.

On page 37, it is revealed that landfill gas was been detected in gas probe GP3 on two dates, at 21 and 49% methane by volume. This gas probe is shown to be located immediately adjacent to the Recycling attendant's shed, located at the southeast corner of the site. The shed does not have a gas detector. The consultant indicates that the shed's rudimentary construction allows for gaps that "potentially vent" methane. The consultant states that it is "reported that the attendant leaves the door and window open to vent gas."

**These are high concentrations of methane and we are not comfortable with the statements**

that gaps in the building might "potentially vent" the gas, and that mitigation relies upon a person remembering to open a door. For reasons of safety, the site owner should consider moving the recycling shed or else install a gas detection meter. Please provide a response outlining how you will be addressing this methane issue.

We have also received the revised Design and Operation Report dated January 2010 that was also submitted to our Environmental Assessment and Approvals Branch (EAAB). Comments on the D&O report will be provided from EAAB in separate correspondence; however our comments on the D&O report should be reviewed by the consultant prior to preparation of subsequent monitoring reports. The main concern about this site identified by our hydrogeologist is the lack of adequate buffer space between the waste trenches and the down-gradient (southern and some western) property boundaries. Our comments on the D&O report will provide more detailed discussion on this issue.

We will forward comments from our surface water reviewer once they have completed their review of the annual report. If you have any questions concerning this letter, please contact me at (519) 371-6191.

Yours truly,



Ian Mitchell, P.Eng.  
District Engineer  
Owen Sound District Office

File Storage Number: SI BR HK C5 610

cc. Shawn Carey, MOE, Owen Sound  
Mark Harris, MOE, London  
Steve Cobean, Pryde Schropp McComb, Port Elgin

Ministry of the Environment  
Southwestern Region  
Owen Sound District Office  
Owen Sound District Office  
3rd Flr  
101 17th St  
Owen Sound ON N4K 0A8  
Fax: (519)371-2908  
Tel: (519) 371-6191

Ministère de l'Environnement  
Direction régionale du Sud-Ouest  
Bureau du district d'Owen Sound  
101 rue 17th, 3ème étage  
Owen Sound ON N4K 0A8  
Téléphone: (519)371-2908  
Tél: (519) 371-6191



February 8, 2010

Mr. Hugh McNichol  
Township of Huron-Kinloss  
PO Box 130  
21 Queen Street  
Ripley ON N0G 2R0

RECEIVED  
FEB 10 2010  
00941  
S.C./J.S.  
copy - file

Dear Mr. McNichol,

**RE: Huron Landfill Site, 2008 Annual Monitoring Report**

Further to my letter to you dated January 29, 2010, our surface water evaluator has reviewed the 2008 Annual Monitoring Report for the Huron Waste Disposal Site, and provides the following comments:

Surface water samples collected in 2008 were taken in July and December. These periods represent dry conditions (summer due to low rainfall and winter due to frozen conditions) that are not ideal for capturing potential off site movement associated with runoff events or saturated soil conditions. Schedule "B" of the C. of A. A-272601 requires spring and fall collection. Historically the site has been sampled in spring and fall and future sampling should reflect this schedule.

Surface water sample results for SW2 (downstream of the South Pine River) do not suggest that the landfill has had an unacceptable impact upon the South Pine River for 2008.

If you have any questions concerning this letter, please contact me at (519) 371-6191

Yours truly,

A handwritten signature in dark ink, appearing to read "Ian Mitchell".

Ian Mitchell, P.Eng.  
District Engineer  
Owen Sound District Office

File Storage Number: SI BR HK C5 610

cc. Shawn Carey, MOE, Owen Sound  
Hugh Geurts, MOE, London  
Steve Cobean, Pryde Schropp McComb, Port Elgin

Ministry of the Environment  
Southwestern Region  
Owen Sound District Office  
Owen Sound District Office  
3rd Flr  
101 17th St  
Owen Sound ON N4K 0A5  
Fax: (519)371-2905  
Tel: (519) 371-6191

Ministère de l'Environnement  
Direction régionale du Sud-Ouest  
Bureau du district d'Owen Sound  
101 rue 17th, 3ème étage  
Owen Sound ON N4K 0A5  
Télécopieur: (519)371-2905  
Tél: (519) 371-6191



RECEIVED  
JUN 04 2010

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a. m. j. s.  
sc  
887-6191

June 3, 2010

Mr. Hugh McNichol  
Township of Huron-Kinloss  
PO Box 130  
21 Queen Street  
Ripley ON N0G 2R0

Dear Mr. McNichol,

RE: Huron Landfill Site, 2009 Annual Monitoring Report

We have received a copy of the report titled "Huron Waste Disposal Site, Township of Huron-Kinloss, Annual Monitoring Report – 2009" dated March 2010 and prepared by Pryde Schropp McComb Inc. The submission was forwarded to our Regional Technical Support section and comments from our regional surface water specialist are provided below:

Water quality results are summarized in Table 5 of the report and in a histogram graphic (figure 9) showing leachate indicator parameters. The report asserts that SW1 (upstream) and SW2 (downstream) show similar results and having reviewed the data, our reviewer generally agrees with this. We note that SW2 would have been better located in the South Pine River where the shallow groundwater flow from the landfill would be projected to intersect the river. The present location of SW2 at the concession road west of the landfill, is approximately 250 - 300 meters downstream of the area where the shallow groundwater intersects the South Pine River. Although we acknowledge some influence of background water quality on SW2, it may be that the report's explanation for some Provincial Water Quality Objectives (PWQO) exceedances at SW2 may not always be attributable to sedimentation and other sources and could be landfill related. At this time the Ministry is not advocating a repositioning of SW2, but this would be dependent on future water quality results at the current location of SW2.

There are a number of observations on the data presentation as follows:

1. Historical data (Appendix G) only goes as far back as 2007. We are aware that monitoring data exist prior to 2007 and should be summarized. Also, PWQO exceedances should be highlighted to facilitate review.

2. Figure 9 shows the histogram graphic, comparing four leachate indicator parameters for SW1 and SW2, for each sampling season. This should be replaced with a trend through time graphic, again to facilitate review and assess any trends. It is also noted that there appears to be two typos on the Figure 9. The hardness is labelled as mg/l /10 and should be x10. For DOC, it is labelled as mg/l x10 and should be /10.

We will forward comments from our groundwater reviewer once they have completed their review of the annual report. If you have any questions concerning this letter, please contact me at (519) 371-6191.

Yours truly,



---

Ian Mitchell, P.Eng.  
District Engineer  
Owen Sound District Office

File Storage Number: SI BR HK C5 610

cc. Shawn Carey, MOE, Owen Sound  
Jack Colonnello, MOE, London  
Jim Scott, Pryde Schropp McComb, Port Elgin

101-16942-01  
RECEIVED APR 27 2011

**Ministry of the Environment**  
Southwestern Region  
Owen Sound District Office  
3rd Flr  
101 17th St  
Owen Sound ON N4K 0A5  
Fax: (519)371-2905  
Tel: (519) 371-6191

**Ministère de l'Environnement**  
Direction régionale du Sud-Ouest  
Bureau du district d'Owen Sound  
101 rue 17th, 3ème étage  
Owen Sound ON N4K 0A5  
Télécopieur: (519)371-2905  
Tél: (519) 371-6191



April 15, 2011

Mr. Hugh Nichol  
Township of Huron-Kinloss  
PO Box 130  
21 Queen Street  
Ripley ON N0G 2R0

Dear Mr. Nichol,

**RE: Huron Landfill Site, 2010 Annual Monitoring Report**

We have received a copy of the report titled "Huron Waste Disposal Site, Township of Huron-Kinloss, Annual Monitoring Report – 2010" dated March 2011 and prepared by Genivar Inc.

The 2010 report documents methane levels at 100 % of the LEL at GP3 in February 2011. GP3 is located adjacent to the recycling attendant's shed, however it is our understanding that this shed does not have a methane detector. While methane levels have fluctuated at this location in the past, monitoring results have shown the potential for dangerous levels of landfill gas. The Municipality must take steps to address this issue, such as moving the shed or installing a methane detector/alarm to ensure the safety of this shed. In my letter to you dated January 29, 2010, which was included in Appendix B of the 2010 report, I requested a response outlining how the municipality will be addressing the methane issue. I could not locate any record of a response concerning this issue and ask that you provide me with a written response by May 30, 2011 regarding this issue.

The 2010 report was forwarded to our Regional Technical Support section and comments from our regional surface water specialist are provided below:

Two surface water monitoring stations exist for this landfill site that are located on the South Pine River. SW1 is upstream and SW2 downstream. In 2010, the report and data notes that Provincial Water Quality Objective (PWQO) exceedances for unionized ammonia and chromium were due to method detection limits (MDLs). The report asserts that lowered MDLs will be used for these two parameters to properly assess values with the respective PWQOs. The PWQO for total phosphorus was exceeded at both stations and therefore the exceedance at the downstream station (SW2) is related to offsite (agricultural practices). The

report concludes that there are no obvious landfill impacts on the South Pine River. After having reviewed the historical data and trend through time graphs, our surface water reviewer concurs with this assessment.

We will forward comments from our groundwater reviewer once they have completed their review of the annual report.

I look forward to your response by May 30, 2011 regarding the elevated methane levels measured near the recycling attendant's shed. If you have any questions concerning this letter, please contact me at (519) 371-6191.

Yours truly,



---

Ian Mitchell, P.Eng.  
District Engineer  
Owen Sound District Office

File Storage Number: SI BR HK C5 610

cc. Laszlo Barti, MOE, Owen Sound  
Jack Colonnello, MOE, London  
Neil McLean, Genivar, Hanover



**GENIVAR**

101-16942-00

May 30, 2011

Mr. Ian Mitchell, District Engineer  
Ministry of the Environment, Southwestern Region  
Owen Sound District Office  
101 17<sup>th</sup> Street, 3<sup>rd</sup> Floor  
OWEN SOUND, ON  
N4K 0A5

**Re: Methane Levels at Recycling Attendant Shed  
Huron Waste Disposal Site**

---

Dear Mr. Mitchell:

This letter follows up with your April 15, 2011 letter regarding the 2010 Huron Waste Disposal Site Annual Monitoring Report (AMR).

In your letter, you had indicated a concern regarding the elevated levels of methane detected at the recycling attendant shed at the Huron Waste Disposal Site. As indicated in the 2010 AMR, methane levels at the GP3 monitoring location, located immediately adjacent to the recycling attendant shed at the Huron Waste Disposal Site, were reported above the 100% of the lower explosive limit in air. Effectively, this has presented a dangerous situation in the vicinity of monitoring point GP3.

In order to ensure health and safety concerns are immediately met at the Huron Waste Disposal Site, the Township of Huron-Kinloss has ordered a Sensit Model HXG-2d gas detector to be used by the recycling attendant while the recyclable goods are being accepted at the Huron Waste Disposal Site. The gas detector will allow staff to continuously monitor the percentage of the lower explosive limit of methane in the air and avoid operating the recycling facilities during periods where percentage of methane gas in the air presents an unacceptable risk to staff and facility users. Use of the gas detector began on May 27, 2011.

If you have any further questions or comments, please do not hesitate to contact me at this office.

Yours truly,

GENIVAR Inc.

Neil McLean, M.Sc., P.Geo.  
/nrm/dhw

cc: Mr. Hugh Nichol, Director of Public Works, Township of Huron-Kinloss



Ministry of the Environment  
Southwestern Region  
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101 rue 17th, 3ème étage  
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Télécopieur: (519)371-2905  
Tél: (519) 371-6191



RECEIVED  
12 JUL 23 2012

July 19, 2012

Mr. Hugh McNichol  
Township of Huron-Kinloss  
PO Box 130  
21 Queen Street  
Ripley ON N0G 2R0

Dear Mr. McNichol,

**RE: Huron Landfill Site, 2011 Annual Monitoring Report**

We have received a copy of the report titled "Huron Waste Disposal Site, Township of Huron-Kinloss, Annual Monitoring Report – 2011" dated March 2012 and prepared by Genivar Inc.

The submission was forwarded to our Regional Technical Support section and comments from our regional surface water specialist with respect to the surface water assessment are provided below:

Water chemistry results for 2011 revealed only Provincial Water Quality Objective (PWQO) exceedances for total phosphorus at both the upstream (SW1) and downstream (SW2) stations located on the South Pine River. Having reviewed the 2011 monitoring results, historical data and trend through time graphics, our surface water reviewer agrees with the report conclusion that there are no obvious leachate impacts on the South Pine River.

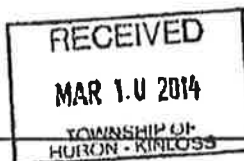
We will forward comments from our groundwater reviewer once they have completed their review of the annual report. If you have any questions concerning this letter, please contact me at (519) 371-6191.

Yours truly,

Ian Mitchell, P.Eng.  
District Engineer  
Owen Sound District Office

File Storage Number: SI BR HK C5 610

cc. Laszlo Barti, MOE, Owen Sound  
Jack Colonnello, MOE, London  
Neil McLean, Genivar, Owen Sound



Ministry of the Environment  
Ministère de l'Environnement

## Solid Non-Hazardous Waste Disposal Site Inspection Report

<b>Client:</b>	The Corporation of the Township of Huron-Kinloss Mailing Address: 21 Queen St Ripley, P.O. Box 130, Huron-Kinloss, Ontario, Canada, N0G 2R0 Physical Address: 21 Queen St Ripley, Huron-Kinloss, Township, County of Bruce, Ontario, Canada, N0G 2R0 Telephone: (519)395-3735, FAX: (519)395-4107, email: hurontwp@hurontel.on.ca Client #: 4545-4MERDZ, Client Type: Municipal Government Additional Address Info: Ripley		
<b>Inspection Site Address:</b>	Huron Landfill Site Address: Lot: 19 20, Concession: 5, Concession Road 6, Geographic Township: BRUCE, Huron-Kinloss, Township, County of Bruce, N0G 2R0 District Office: Owen Sound GeoReference: Map Datum: NAD27, Zone: 17, Accuracy Estimate: 1-10 metres eg. Good Quality GPS, Method: GPS, UTM Easting: 451457, UTM Northing: 4878824, UTM Location Description: Entrance gate., LIO GeoReference: Zone: , UTM Easting: , UTM Northing: , Latitude: 44.2708, Longitude: -81.433		
<b>Contact Name:</b>	Hugh Nichol	<b>Title:</b>	Public Works Superintendent
<b>Contact Telephone:</b>	(519)395-3735 ext	<b>Contact Fax:</b>	
<b>Last Inspection Date:</b>	2012/11/16		
<b>Inspection Start Date:</b>	2014/02/20	<b>Inspection Finish Date:</b>	2014/02/20
<b>Region:</b>	Southwestern		

### 1.0 INTRODUCTION

This facility was inspected as part of the Ministry of the Environment (MOE) 20013/2014 inspection program.

The purpose of this proactive inspection was to assess compliance of the operation of the site in relation to the terms and conditions of its Environmental Compliance Approval A272601 (ECA), any relevant control documents, MOE legislation and to confirm conformance with the MOE waste-related policies and guidelines. MOE Owen Sound District Office (OSDO) files were reviewed in preparation for this inspection.

This inspection included a visit of Huron Landfill site conducted on February 20, 2014 with the assistance of Terry Edmiston, Operator in Charge.

The Landfill is owned and operated by the Township of Huron-Kinloss. The Township consists of the former Township of Huron, the former Township of Kinloss and the former Village of Lucknow. The Landfill is located at 2087 Concession 6 East Road, on Lot 19, 20, Concession 5, in former Township of Huron, southwest of the community of Ripley.

### 2.0 INSPECTION OBSERVATIONS

**Certificate of Approval Number(s):**

-ECA A272601, issued on October 15, 1991 - requires registration of the ECA on the title; submission of an annual report to the MOE, monitoring of groundwater and surface water quality and imposes terms/conditions of onsite burning.

- A272601 Notice No. 1, Issued on August 14, 2007 - ECA was amended to include changes to operational plans to clarify theoretical capacity and to require a new Design and Operations Plan within one year of issuance.

- A272601 Notice No. 2, Issued on July 6, 2010 - ECA was amended to change the landfilling operation at the Landfill from trench method to area method, for disposal of domestic, commercial and solid non-hazardous industrial wastes and to approve the establishment and operation of waste segregation/recycling centre and WEEE program at the landfill, for acceptance, temporary storage and transfer of non-putrescible recyclable waste

- A272601 Notice No. 3, Issued on July 9, 2010 - ECA was amended to approve expansion of the service area of the landfill site to include the Village of Lucknow.

- A272601 Notice No. 4, Issued on March 2, 2012 - ECA was amended to approve operation of a Waste Segregation/Recycling Centre and WEEE program at the Landfill, for the acceptance, temporary storage, and transfer of non-putrescible recyclable waste.

**2.1 FINANCIAL ASSURANCE:**

**Specifics:**

Financial Assurance is not required for this facility.

**2.2 APPROVED AREA OF THE SITE:**

**Specifics:**

The total approved area of the site specified in the ECA consists of 8.0 hectares waste fill area within a total site area of 17.7 hectares.

**2.3 APPROVED CAPACITY:**

**Specifics:**

Condition 2.4 of the Certificate states that the total waste disposal capacity of the site (waste filled by trench method and by area method), including waste, daily cover and interim cover is 288,000 cubic metres.

Condition 2.3 of the Certificate states that the maximum rate at which the site shall receive waste for disposal, is limited to 100 tonnes per day, and 3,000 tonnes per calendar year. The receipt of waste in excess of the daily maximum fill rate may only be allowed on a limited short-term basis, on no more than two consecutive operating days, and only with prior notification and concurrence from the District Manager.

At the time of the inspection it was indicated that waste limits are known to staff and are monitored through the scale house computerized weigh scale tracking system. This tracking system allows site personnel to be able to monitor the daily waste quantity and total waste tonnage accepted onsite.

**2.4 ACCESS CONTROL:**

**Specifics:**

Access to the site is controlled by a locked gate at the main entrance and a vegetative screen and fencing along Concession 8 Road. The site is open year round for the public on Tuesday, Friday and Saturday between 10:00 a.m. to 4:00 p.m.

According to Mr. Edmiston, two staff are generally on site to supervise site activities.

**2.5 COVER MATERIAL:**

**Specifics:**

Environmental Compliance Approval A272601 Condition 3.3 of the Notice No. 2 states:

a. Daily Cover - At the end of each working day, after deposition of waste into the waste fill area, the entire working face shall be compacted and covered with a minimum thickness of 150 mm of soil cover or an approved thickness of alternative cover material such as compost, wood-chips or foundry sand. Prior to placing waste at the start of the next operating day, the existing daily cover material shall be

scarified or removed to the extent practical, to ensure vertical hydraulic connection is maintained between layers of waste and to promote percolation of leachate downwards.

b. Interim Cover - In areas where landfilling ceases temporarily for a period of 6 months or more, a minimum thickness of 300 mm of soil shall be placed as interim cover. The quality of soil for use as interim cover shall, as a minimum, meet the criteria for Industrial/Commercial land use specified in Table A in the Ministry's "Guideline for Use at Contaminated Sites in Ontario", revised February 1997.

c. Final Cover - Final cover shall be applied progressively as areas of the landfill reach final waste elevations. The final soil cap shall consist of a minimum 600 mm thickness of impermeable compacted soil overlain by a minimum 150 mm topsoil and vegetative cover, as described in Section 2.3 in Item 8 in Schedule "A", attached to this Certificate. Prior to placement of final cover, the Owner/Operator shall submit for the approval of the Director, a report detailing the specifications, including particle size distribution of the final cover soil which shall confirm the designed permeability of 10-5cm/sec or less, as well as the protocols for testing and acceptance for on-site and off-site final cover soils. All areas of final cover shall be graded and vegetated as soon as practically possible.

At the time of the inspection daily cover was not observed on the open face of the waste fill area.

According to Mr. Edmiston, due to winter conditions their cover material stock is frozen and site equipment cannot apply the required material to the waste fill area. He states that the most recent proper cover material application occurred in December 2013.

\* See Section 5.0 Actions Required.

Condition 3.7 of the ECA states that the Owner/Operator shall implement control measures for odour, litter, birds, vector and vermin, as described in Sections 3.12 and 3.13 in Item 8 in Schedule "A", attached to this Certificate. Effectiveness of the control measures shall be reviewed and monitored regularly and updated/revised, as required, based on operational experience and complaints.

Condition 3.8 of the ECA states that the Owner/Operator shall ensure that wind-blown litter originating from the waste management activities at the Site is picked up regularly along the Site perimeter roads and access roads. The Owner/Operator shall, at its own expense, remove wind-blown litter originating from the waste management activities at the Site, from adjacent neighbouring properties of the Site, a minimum once per month or more frequently when wind-blown litter from the Site becomes severe.

At the time of the inspection, a large volume of wind blown litter was observed on the east side of the work face along the access road.

According to Mr. Edmiston, usually a big site clean up is conducted in the spring and during the rest of the year the site attendants are responsible to maintain the site by manually picking/collecting the litter.

Snow fencing has been installed to address wind blown litter on the site however due to high winds the fencing has been severely damaged and is now not providing the function it was installed to provide.

The Owner shall use best efforts to contain wind blown litter within the Landfill footprint and clean the litter up frequently and on regular basis as stipulated by the ECA and supporting documents.

\* See Section 5.0 Actions Required.

## 2.6 WASTE BURNING:

Specifics:

Condition 4 of the ECA states that "no waste other than segregated brush, lumber and clean wood shall be burned at this site, in an area separate from the stump waste and only under conditions that will not cause any adverse off-site impacts."

Condition 5 of the ECA states that "access to the burning area by the public and other unauthorized personnel is prohibited when burning is being carried out."

Condition 6 of the ECA states that "no burning shall be carried out unless supervision is provided by the operating authority at all times."

At the time of inspection, there was no burning taking place. According to Mr. Edmiston, no recent burning activities have taken place due to the large volume of snow located on the site.

Site personnel is reminded when further burning activities commence to ensure full compliance with Condition 4, 5 and 6.

## **2.7 GROUNDWATER/SURFACEWATER IMPACT:**

### **Specifics:**

Due to snow conditions only a few monitoring wells were observed. Those checked were secured and locked as required.

Surface water samples are obtained from one upstream and one downstream station on the South Pine River. All the groundwater and surface water monitoring locations are monitored on semi-annual basis, during spring and fall.

### **Condition 6.2 of the ECA**

The groundwater quality at the site boundary shall meet the Ontario Drinking Water Quality Standards (DWQS) and the Provincial Water Quality Objectives (PWQO). The applicable parameters to meet the DWQS and PWQO, shall be selected and monitored through a recommendation in the Annual Monitoring Report, subject to the prior approval of the District Manager.

There was no evidence of groundwater or surface water impacts observed at the time of inspection.

## **2.8 LEACHATE CONTROL SYSTEM:**

### **Specifics:**

A Leachate Management Plan (the Plan) has been implemented to manage the leachate generated at this site. The Plan is designed to minimize the volume of leachate impacted surface water accumulation in the trench and contains procedures for managing the impacted water.

No leachate breakout was noted during the inspection.

## **2.9 METHANE GAS CONTROL SYSTEM:**

### **Specifics:**

There is no methane gas collection system at this site.

Condition 6.7 of the ECA states that the Owner/Operator shall ensure that all buildings and structures existing at the Site or to be built on-Site which at times are occupied by people, or contains electrical equipment, or a potential source of ignition, are situated, constructed and monitored in a manner which minimizes the potential for explosive hazards due to landfill gas.

The ECA approves the disposal of the following categories of waste at the Landfill: domestic, commercial and non-hazardous solid industrial wastes (limited to scrap metal, wood, miscellaneous debris and inert fill).

## 2.10 OTHER WASTES:

### Specifics:

Condition 3.11 of the Notice No. 2 states that signs shall also be posted along internal access roads controlling vehicle speed, turning movements and to direct vehicles and/or users to the working face and other designated areas and facilities on the Site, as appropriate. All landfill signs shall be kept legible, in good repair, and cleaned when required.

Observations made at the time of the inspection indicate that all necessary signage is currently in place on the site.

Condition 4.3 of the Notice No. 2 states that the Waste Segregation/Recycling and the WEEE Facilities shall only accept scrap metals, tires, white goods, solid non-hazardous recyclable materials, including cardboard, rough fill (i.e. concrete slabs and stumps), bale-wrap, propane canisters and E-waste, which shall be segregated, stored temporary for a period not exceeding 120 days from the date of first receipt, or as needed, and transferred for off-site disposal, to ensure that the design storage capacities are not exceeded at any time. The storage of specific material beyond 120 days may be allowed, only with prior notification and written concurrence from the District Manager.

There was no evidence of wastes other than wastes approved by the ECA being landfilled or stored at the site.

The Owner shall ensure that the Landfill is in compliance with the 120 days storage limit requirement of Condition 4.3 of the Notice No. 2.

On January 31, 2013, notification was provided to the MOE indicating that bale wrap and scrap metal collected at the site for recycling was exceeding the 120 day storage limit requirement.

Mr. Edmiston is advised to ensure full compliance with Condition 4.3 related to any future 120 day storage limit exceedances.

Propane tanks are accepted at the site and are stored in proximity of the scalehouse, on wooden pallets, out of vehicular traffic and are picked up by Huronia or Lucknow District Co-operative Inc. on as needed basis.

Vehicle batteries are not accepted at the Landfill.

No vector/vermin problem was noted at this site during inspection.

There were no notable odours surrounding the facility on the day of inspection.

At the time of the inspection several un-drained/untagged refrigerators were visibly stored next to the scrap metal pile. The majority of the units were found laying on their sides. According to Mr. Edmiston, Don Thompson TV & Appliances, Ripley is called to drain and tag the refrigerators when approximately 20 units are on site.

Refrigerators containing Chlorofluorocarbons (CFC) should be stored separately from the drained/tagged ones, to avoid damage of the un-drained units. Untagged refrigerators must be handled carefully, placed separate in upright position until CFCs are removed and tagged by a licensed technician. Rough handling will result in breaking of lines and loss of CFC's to the atmosphere.

**\*See Section 5.0 Actions Required.**

The e-wastes collected under the WEEE program are usually stored in a cargo trailer.

The Owner shall ensure that segregated wastes are stored properly and picked up on as needed basis.

Condition 8.1 of the Notice No. 2 states that the Owner/Operator shall develop and maintain a training plan for Site operations employees and shall ensure that all site operations employees have been adequately trained and received on-going training with respect to the following, as amended:

- a. terms, conditions and operating requirements of this Certificate, A272601 and Notices for the Site;
- b. the operation, inspection, and maintenance of the Site with respect to the approved design and operations documents;
- c. Relevant waste management legislation and regulations;
- d. Environmental concerns related to waste management at the Site;
- e. Occupational Health and Safety concerns related to waste management at the Site; and
- f. Emergency procedures and contingency plans in case of fire, spills, off-site impacts and any other emergency situations.

At the time of the inspection Mr. Edmiston provided a copy of an agenda from a meeting held by Genivar for site staff on June 13, 2013.

Based on a review of the agenda it is determined that the content during the training meeting does not meet the requirements of Condition 8.1.

The Owner shall develop and implement a training plan to ensure that all employees and contractors involved in any aspect of the Landfill operation are trained in accordance with Condition 8.1.

\* See Section 5.0 Actions Required.

### 3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

1. Ensure that cover material is applied in accordance with the ECA.

Item not resolved.

2. Ensure that wind-blown litter originating from the waste management activities at the site is picked up regularly along the site perimeter roads and access roads.

Item not resolved.

3. Ensure that burning of brush, lumber and clean wood are carried out in accordance with the ECA.

Item completed.

4. Ensure that the Landfill is in compliance with the 120 days storage limit requirement of the ECA.

Item completed.

5. Ensure that signs at the Landfill are posted and maintained in accordance with the requirements of the ECA and supporting documents.

Item completed.

6. Ensure that white goods containing Chlorofluorocarbons (CFC) are handled carefully, stored in a segregated area, in upright position to avoid breaking of lines and loss of CFC's to the atmosphere.

Item not resolved.

7. Ensure that segregated wastes are stored in an environmentally responsible manner.

Item completed.

8. Ensure that during the days open for the public, landfilling occurs under the supervision of the site attendants and scavenging is not permitted.

Item completed.

9. Develop and implement a training plan to ensure that all employees and contractors involved in any aspect of the Landfill operation are trained in accordance with the ECA requirements.

Item not resolved.

#### 4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate?

No

Specifics:

Not Applicable

Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?

No

Specifics:

Not Applicable

Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment ?

Yes

Specifics:

1. Failure to apply cover material in accordance with the Condition 3.3 of the Notice No. 2.

2. Failure to contain and clean up wind blown litter.

3. Failure to handle and store appliances containing CFCs in an environmentally responsible manner.

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?

No

Specifics:

Not Applicable

Was there any indication of minor administrative non-compliance?

No

Specifics:

The Owner is required to develop and implement a training plan to ensure that all employees and contractors involved in any aspect of the Landfill operation are trained in accordance with the ECA requirements.

#### 5.0 ACTION(S) REQUIRED



Solid Non-Hazardous Waste Disposal Site Inspection Rep

1. The Owner shall immediately ensure that cover material is applied in accordance with the ECA.
2. The Owner is immediately required to ensure that wind-blown litter originating from the waste management activities at the site is assessed and cleaned up regularly.
3. The Owner shall immediately ensure that white goods containing Chlorofluorocarbons (CFC) are handled carefully and in upright position to avoid breaking of lines and loss of CFC's to the atmosphere.
4. The Owner shall immediately develop and implement a training plan for employees and contractors that meets the requirements of Condition 8.
5. By no later than March 28, 2014 the Owner shall submit in writing to the undersigned details of the actions taken to address these items.

**8.0 OTHER INSPECTION FINDINGS**

**7.0 INCIDENT REPORT**

Applicable  
8857-9GNRVM

**8.0 ATTACHMENTS**

**PREPARED BY:**  
**Environmental Officer:**  
**Name:**  
**District Office:**  
**Date:**  
**Signature**

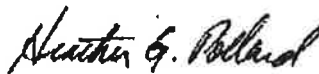
Andrew Torrie  
Owen Sound District Office  
2014/02/25



**REVIEWED BY:**  
**District Supervisor:**  
**Name:**  
**District Office:**  
**Date:**

Heather Pollard  
Owen Sound District Office  
2014/02/28

**Signature:**



**File Storage Number:** BR HK C5 610

**Note:**

"This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements"



March 28, 2014

**BY EMAIL ONLY**

Mr. Andrew Torrie  
Ministry of the Environment  
101 17<sup>th</sup> Street, 3<sup>rd</sup> Floor  
Owen Sound, ON N4N 0A5

Tel: 519-371-2901  
Fax: 519-371-2905  
Email: [Andrew.Torrie@ontario.ca](mailto:Andrew.Torrie@ontario.ca)

**Subject: Huron Landfill Site  
Response to MOE Site Inspection Report – February 20, 2014**

Dear Mr. Torrie:

On behalf of the Township of Huron-Kinloss, we have reviewed the Ministry of the Environment's Site Inspection Report dated February 20, 2014.

Based on this review, we provide the following comments regarding each of the findings contained in Section 5.0 of the report.

1. *The Owner shall immediately ensure that cover material is applied in accordance with the ECA.*

The Township will use their best efforts to apply daily cover material at the site during the winter months.

There are times after the snow has melted that prevents the placement and proper compaction of cover material at the site due to the working area becoming too wet for equipment to operate in. Another problem is that the native material being used for daily cover is frost susceptible and becomes very difficult to move and compact during the winter.

WSP and the Township will continue reviewing alternative methods to overcome the operational difficulties of applying daily cover at the site during the winter in order to meet the requirements of the ECA. One possible alternative that may be considered is to temporarily stockpile non-frost susceptible surplus material from the Township's road projects at the site during the warmer months of the year for use during the winter.

WSP Canada Inc.  
101 14<sup>th</sup> Avenue  
Hanover, ON N4N 3W1  
T 519-384-5700  
F 519-384-8937  
[www.wapgroup.com](http://www.wapgroup.com)

2. *The Owner is immediately required to ensure that wind-blown litter originating from the waste management activities at the site is assessed and cleaned up regularly.*

The Township will continue using their best efforts to ensure that litter pick-up is completed on a regular basis. The annual spring clean-up at the site will also be undertaken again this year which will pick up a majority of the windblown litter.

Once the snow has melted at the site, the snow fence that was originally installed to assist with litter control at the active face will also be repaired.

3. *The Owner shall immediately ensure that white goods containing Chlorofluorocarbons (CFC) are handled carefully and are in an upright position to avoid breaking of lines and loss of CFC's to the atmosphere.*

The landfill operator will be reminded that all white goods containing CFC's shall be stored in an upright manner to avoid loss of CFC's.

Safe and proper handling of CFCs will be reviewed at the next training session.

4. *The Owner shall develop and implement a training plan for employees and contractors that meet the requirements of Condition 8.*

In the absence of any formal training protocol established by the Ministry of the Environment, we are of the opinion that the training program that has currently been implemented for the Township's landfill employees does meet the requirements of Condition 8.

WSP has held two (2) annual training sessions with landfill staff over the past two (2) years. These training sessions consist of completing an overview of the various conditions contained in the current ECA as well as reviewing the current Design and Operations Plan and the Design and Operations Manual for Recycling Facilities that was prepared for the site as well.

It is recommended that these sessions continue to be held on an annual basis with all landfill staff in attendance. The content of the sessions are also recommended to remain focussed on the core items outlined in Condition Section 8.1 however, additional topics of discussions and possibly completing a portion of the session at the site may also prove beneficial.

5. *By no later than March 28<sup>th</sup>, 2014, the Owner shall submit in writing to the undersigned detail of the actions taken to address these items*

The purpose of this letter is to address Item #5.

We trust that the above response is satisfactory. Should you require clarification or additional information, please contact the undersigned at 519-364-5700 ext. 224.

Yours truly,



Stephen J. Cobean, P.Eng.  
Director – Municipal Infrastructure

cc: Mr. Hugh Nichol, Township of Huron-Kinloss (by email)  
Mr. Neil MacLean, WSP Canada Inc. (by email)

H:\P&M\Clerks\00841 Huron Landfill Site\Correspondence\Letters\2014-03-28 in form site inspection response sja 121-00020-00.docx

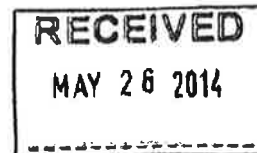
Ministry of the Environment  
Southwestern Region  
Owen Sound District Office  
3rd Flr  
101 17th St  
Owen Sound ON N4K 0A5  
Fax: (519) 371-2905  
Tel: (519) 371-6191

Ministère de l'Environnement  
Direction régionale du Sud-Ouest  
Bureau du district d'Owen Sound  
101 rue 17th, 3ème étage  
Owen Sound ON N4K 0A5  
Télécopieur: (519) 371-2905  
Tél: (519) 371-6191



May 21, 2014

Mr. Hugh McNichol  
Township of Huron-Kinloss  
PO Box 130  
21 Queen Street  
Ripley ON N0G 2R0



Dear Mr. Nichol,

**RE: Huron Landfill Site, 2013 Annual Monitoring Report**

We have received a copy of the report titled "Huron Waste Disposal Site, Township of Huron-Kinloss, Annual Monitoring Report – 2013" dated March 2014 and prepared by WSP Canada Inc.

The 2013 report documents methane levels at 100 % lower explosive limit (LEL) at GP3 in January 2014. This is the 4<sup>th</sup> consecutive year that measurement of GP3 has detected methane at 100% LEL indicating the potential for dangerous levels of landfill gas in this area, which is adjacent to the recycling attendant shed.

In response to my letter dated April 15, 2011 regarding the detection of elevated landfill gas at GP3 the Municipality obtained a gas detector for use by landfill staff when working in the area of the attendants shed and GP3. It is critical that the Municipality ensure appropriate health and safety measures are followed when landfill staff are working. The municipality and your consultant should consider if measures should be installed in this area to control landfill gas and should also comment on if more frequent monitoring of GP3 is warranted.

I look forward to your response to this letter. If you have any questions concerning this letter, please contact me at (519) 371-6191.

Yours truly,

A handwritten signature in black ink, appearing to read "Ian Mitchell".

Ian Mitchell, P.Eng.  
District Engineer  
Owen Sound District Office

File Storage Number: SI BR KB HK 610

cc. Scott Gass, MOE, Owen Sound  
Stephen Cobean, WSP, Owen Sound



101-16942-00

June 19, 2014

Mr. Ian Mitchell, P. Eng., District Engineer  
Ministry of the Environment  
101 17<sup>th</sup> Street East, Third Floor  
OWEN SOUND, ON N4K 0A5

Re: Huron Landfill Site, 2013 Annual Monitoring Report  
Landfill Gas Measurements at GP3

---

Dear Mr. Mitchell:

This correspondence is in response to your May 21, 2014 letter to Mr. Hugh Nichol at the Township of Huron-Kinloss (Township). In your letter, you suggested that the Township review their health and safety program due to the ongoing presence of methane, an explosive, lighter than air gas, at 100% of the lower explosive limit (LEL) at monitoring point GP3, which is located adjacent to the recycling attendant's shed.

As per our letter to you dated May 30, 2011, the Township uses a Sensit Model HXG-2d gas detector instrument prior to and during entry into the recycling attendants shed. Should methane be detected at any level in the shed, then the methane level is recorded into a log book by Township staff and reported in the annual monitoring report. To date, there has not been any methane detected in or around the shed. Further to this, the Township intermittently conducts extra due diligence and uses the gas detector to test the air between GP3 and the recycling area. During this intermittent testing, methane is only detected when the casing cap is removed from GP3.

It is the opinion of WSP Canada Inc. that the Township is conducting an appropriate level of due diligence in ensuring the Health and Safety of Township employees and citizens. The gas detector instrument should remain on hand with Township staff during operation of the recycling area, and the casing cap for GP3 should be periodically examined to ensure it remains secured. However, signage in the recycling area prohibiting smoking or spark generation should be considered.

Additional monitoring at GP3 is not considered to be necessary. It is expected that the LEL for methane at this monitoring point will remain at 100% of the LEL while active landfilling is occurring in the area. Effectively, additional monitoring is not expected to provide any additional information not already known to the Township, WSP Canada Inc. or the Ministry of the Environment.

Yours truly,

WSP Canada Inc.

Neil McLean, M.Sc., P.Geo.  
/nrm/dlw

cc: Mr. Hugh Nichol, Public Works Superintendent, Municipality of Huron-Kinloss  
Mr. Stephen Cobean, P.Eng., WSP Canada Inc.

WSP Canada Inc.  
1450 1<sup>st</sup> Ave. W.  
Suite 101  
Owen Sound, ON N4K 6W2

Phone: 519-376-7612  
Fax: 519-376-8008  
www.wspgroup.com



## MEETING NOTES

<b>JOB TITLE</b>	Landfill Training		
<b>PROJECT NUMBER</b>	101-16942-00 (121-60020-13)	<b>DATE</b>	25 October 2017
<b>TIME</b>	1pm to 3pm	<b>VENUE</b>	Huron Landfill and Huron-Kinloss Council Chambers
<b>SUBJECT</b>	Huron Landfill – 2017 Training		
<b>CLIENT</b>	Municipality of Huron-Kinloss		

ATTENDEES			
Name	Company	Phone	Email
Hugh Nicol	Municipality of Huron-Kinloss		hnicol@Huron.Kinloss.ca
Ian	Municipality of Huron-Kinloss		
Samantha	Municipality of Huron-Kinloss		
Terry	Municipality of Huron-Kinloss		
Peter Brodzikowski	WSP		Peter.Brodzikowski@wsp.com
Norm Bell	WSP		Norm.Bell@wsp.com

As required by Condition 8.0 of the amended C of A for the Huron Landfill dated July 6, 2010, the Township of Huron-Kinloss is required to complete on-going landfill site training for its staff.

In order to meet this requirement, the Township has retained WSP to conduct annual training sessions. The training session for 2017 was held on Wednesday, October 25th, 2017.

This year's training session was conducted at the site followed by a PowerPoint presentation at

The training session was attended by three (3) landfill site staff members plus the Director of Public Works.

The weather was overcast with intermittent rain.

The following provides a summary of the training session:

1. A general overview of the site history was completed
2. A review of the present status of the site was completed including reviewing the volume landfilled in 2015, the estimated compaction rate, estimated site closure date and diversion percentage

Suite 101  
1450, 1st Avenue West  
Owen Sound, ON, Canada N4K 6W2

T: +1 519 376-7612  
F: +1 519 376-8008  
wsp.com

## MEETING NOTES

3. A review of the 2016 Annual Monitoring Report was completed including a tonnages received, diversions and estimated density. general overview of the current Certificate of Approval that governs the operation of the site
4. The session then moved outdoors where a walking tour of the site was completed. The following areas were visited and the current operations discussed:
  - a. Equipment – A Caterpillar 816F (26 tonnes – 52,364.0 lbs) landfill compactor, purchased approximately 3 years ago, is being used.
  - b. Active landfilling area – a review of the current landfilling practices was completed. It was emphasized that the active face of the landfill should be limited to aid in proper compaction of the waste and to limit the blowing of garbage. Maintaining a small active working area will assist in managing surface water runoff and leachate breakouts. It was noted that garbage can be landfilled directly against a previous cell without the need for fill to be placed between them. This will provide additional landfill capacity within the site. The need for daily cover and interim cover was reviewed as contained in the C of A and the Design and Operations Plan.
  - c. Site signage and public access was reviewed and found to be adequate
  - d. The blue box recycling and scrap metal/white goods area at the back of the site was reviewed. The current setup works well and is adequately signed.
  - e. The burn area is located at the rear of the recycling area. Brush is dropped off away from the active burning area. Burning is to follow the Design and Operations Plan. Plans for a future rental of a tub grinder for 2018 were noted.
5. Emergency procedures were reviewed during the operation of the site.
6. Record keeping procedures were reviewed. The scale operator weighs and records each vehicle on entry and exit. Material to be received is noted and designated fee charged or waived. The current record keeping procedure that landfill staff follows is working well and should be maintained.
7. Acceptance of contaminated fill procedures were reviewed as they relate to O. Reg. 347. The non-hazardous waste classification of the site was noted. Only non-hazardous contaminated fill can be accepted at the site. Contaminated material brought to the site should be supported with lab analysis results demonstrating that the material is not leachate toxic per O. Reg. 558 (Schedule 4, TCLP) prior to acceptance. Slump and ignitability testing should also be completed and submitted to the Township prior to acceptance. Material is typically spread out within the licenced area and used for daily cover after a couple of weeks.
8. Asbestos waste procedures were reviewed. Contactors are to notify the site prior to disposal. Asbestos waste is to be properly sealed using poly wrapped per MOECC guidelines and buried immediately after receiving. The burial location in the landfill is to be noted and documented as part of the daily record keeping at the site.

Please let me know if you have any questions regarding this year's training session.

These minutes are considered to be accurate recording of all items discussed. Written notice of discrepancies, errors or omission must be given within seven (7) days, otherwise the minutes will be accepted as written.

## NEXT MEETING

An invitation will be issued for 2018 training via an additional meeting as required.

Respectfully prepared,



Norm Bell, P.Geo.





## Solid Non-Hazardous Waste Disposal Site Inspection Report

<b>Client:</b>	The Corporation of the Township of Huron-Kinloss Mailing Address: 21 Queen St, Post Office Box, 130, Ripley, Ontario, Canada, N0G 2R0 Physical Address: 21 Queen St Ripley, Huron-Kinloss, Township, County of Bruce, Ontario, Canada, N0G 2R0 Telephone: (519)395-3735, Extension: 130, FAX: (519)395-4107, email: hnichol@huronkinloss.com Client #: 4545-4MERDZ, Client Type: Municipal Government, NAICS: 22131 Additional Address Info: Ripley		
<b>Inspection Site Address:</b>	Huron Landfill Site Address: Lot: 19, 20, Concession: 5, Concession Road 6, Geographic Township: BRUCE, Huron-Kinloss, Township, County of Bruce, N0G 2R0 District Office: Owen Sound GeoReference: Map Datum: NAD27, Zone: 17, Accuracy Estimate: 1-10 metres eg. Good Quality GPS, Method: GPS, UTM Easting: 451457, UTM Northing: 4878824, UTM Location Description: Entrance gate., LIO GeoReference: Zone: , UTM Easting: , UTM Northing: , Latitude: 44.2708, Longitude: -81.433 Site #: 3678-5Q8L7L		
<b>Contact Name:</b>	Hugh Nichol	<b>Title:</b>	Public Works Superintendant
<b>Contact Telephone:</b>	(519)395-3735 ext	<b>Contact Fax:</b>	
<b>Last Inspection Date:</b>	2014/02/20		
<b>Inspection Start Date:</b>	2018/01/16	<b>Inspection Finish Date:</b>	2018/01/16
<b>Region:</b>	Southwestern		

### 1.0 INTRODUCTION

The Huron Landfill Site waste disposal facility was inspected as part of the Ministry of the Environment and Climate Change (MOECC) 2017/2018 inspection program.

The purpose of this pro-active inspection was to assess compliance of the operation of the site in relation to the terms and conditions of Environmental Compliance Approval (ECA) Number A272601, any relevant control documents, MOECC legislation and to confirm conformance with the MOECC waste-related policies and guidelines.

This inspection included an unannounced site visit conducted on January 16, 2018 to inspect the operational activities of the landfill site. At the time of inspection the landfill site was open and landfill attendants were present at the site. Mr. Terry Edmiston, operator in charge, assisted with the site inspection.

A copy of the 2016 Annual Report (AR) was previously forwarded to the Ministry's Technical Support; therefore, a detailed review of the monitoring data for the site was not conducted as part of this inspection. The 2016 Annual Report, as per Condition 11 of the ECA is required by March 31st of each year, prepared by WSP Canada Inc., dated March 2017, was reviewed as part of the inspection.

A previous MOECC inspection was conducted at this site on February 20, 2014. The landfill is owned and operated by the Township of Huron-Kinloss and services the residential and industrial, commercial and

institutional sectors located within the service area.

The landfill is located on Part Lots 19 and 20, Concession 5, in the former Township of Huron in the amalgamated Township of Huron-Kinloss, at 2087 Concession 6 East Road; southwest of the community of Ripley.

According to the AR, the Township is home to a total of approximately 7,000 residents that are serviced by the Huron Landfill. Additionally, waste from the former Township of Huron, the former Township of Kinloss and the Village of Lucknow is landfilled at the Huron Landfill.

## 2.0 INSPECTION OBSERVATIONS

### **Certificate of Approval Number(s):**

Environmental Compliance Approval A272601 was issued October 15, 1991 and amended in 2007, 2010 and 2012.

- ECA A272601, issued on October 15, 1991 - requires registration of the ECA on the title; submission of an annual report to the MOE, monitoring of groundwater and surface water quality and imposes terms/conditions of onsite burning.

- A272601 Notice No. 1, issued on August 14, 2007 - ECA was amended to include changes to operational plans to clarify theoretical capacity and to require a new Design and Operations Plan within one year of issuance.

- A272601 Notice No. 2, issued on July 6, 2010 - ECA was amended to change the landfilling operation at the Landfill from trench method to area method, for disposal of domestic, commercial and solid non-hazardous industrial wastes and to approve the establishment and operation of waste segregation/recycling centre and WEEE program at the landfill, for acceptance, temporary storage and transfer of non-putrescible recyclable waste

- A272601 Notice No. 3, issued on July 9, 2010 - ECA was amended to approve expansion of the service area of the landfill site to include the Village of Lucknow.

- A272601 Notice No. 4, issued on March 2, 2012 - ECA was amended to approve operation of a Waste Segregation/Recycling Centre and WEEE program at the Landfill, for the acceptance, temporary storage, and transfer of non-putrescible recyclable waste.

### 2.1 FINANCIAL ASSURANCE:

#### **Specifics:**

There is no financial assurance required for this landfill site as it is a municipally owned landfill.

### 2.2 APPROVED AREA OF THE SITE:

#### **Specifics:**

The total approved area of the site specified in the ECA consists of 8.0 hectares waste fill area within a total site area of 17.7 hectares.

At the time of inspection the Landfill footprint appeared defined by site topography and access roads. Wastes intended for landfilling were observed to be deposited into the approved area.

### 2.3 APPROVED CAPACITY:

#### **Specifics:**

Condition 2.4 of the ECA states that the total waste disposal capacity of the site (waste filled by trench method and by area method), including waste, daily cover and interim cover is 288,000 cubic metres.

Condition 2.3 of the Certificate states that the maximum rate at which the site shall receive waste for disposal, is limited to 100 tonnes per day, and 3,000 tonnes per calendar year. The receipt of waste in excess of the daily maximum fill rate may only be allowed on a limited short-term basis, on no more than two consecutive operating days, and only with prior notification and concurrence from the District Manager.

According to the AR, the average landfilled volume over the past five years is 6,605 cubic metres including waste and cover material. WSP used this average fill rate and remaining capacity determined in the Design and Operational Plan to result in a site closure date of 2035. Currently the former Village of Lucknow's waste is received by the Mid-Huron Landfill. However, this landfill was estimated to be closed in 2017. When this closure occurs the waste from the former Village of Lucknow will be landfilled at the Huron Landfill. The above estimate of reaching maximum capacity in 2035 does not account for future waste received from the former Village of Lucknow.

At the time of the inspection it was indicated that waste limits are known to staff and are monitored through the scale house computerized weigh scale tracking system. This tracking system allows site personnel to monitor daily waste quantities and total waste tonnage accepted onsite. Daily waste quantity records were observed by Environmental Officers during the inspection. Staff indicated that waste typically does not exceed 30 tonnes per day even in the peak season of summer.

#### **2.4 ACCESS CONTROL:**

##### **Specifics:**

Access to the site is controlled by a locked gate at the main entrance and a vegetative screen and fencing along Concession 6 Road. The site is open year round for the public on Tuesday, Friday and Saturday between 10:00 a.m. to 4:00 p.m.

During operating hours municipal staff are present to supervise site activities; one at the weight station and one or two at the recycling/dumping areas. At the time of inspection, the landfill site was open. A locked access gate was observed in place to restrict access to the site as required by section 11.(2) of O. Reg 347.

#### **2.5 COVER MATERIAL:**

##### **Specifics:**

Environmental Compliance Approval A272601 Condition 3.3 of the Notice No. 2 states:

a. Daily Cover - At the end of each working day, after deposition of waste into the waste fill area, the entire working face shall be compacted and covered with a minimum thickness of 150 mm of soil cover or an approved thickness of alternative cover material such as compost, wood-chips or foundry sand. Prior to placing waste at the start of the next operating day, the existing daily cover material shall be scarified or removed to the extent practical, to ensure vertical hydraulic connection is maintained between layers of waste and to promote percolation of leachate downwards.

b. Interim Cover - In areas where landfilling ceases temporarily for a period of 6 months or more, a minimum thickness of 300 mm of soil shall be placed as interim cover. The quality of soil for use as interim cover shall, as a minimum, meet the criteria for Industrial/Commercial land use specified in Table A in the Ministry's "Guideline for Use at Contaminated Sites in Ontario", revised February 1997.

c. Final Cover - Final cover shall be applied progressively as areas of the landfill reach final waste elevations. The final soil cap shall consist of a minimum 600 mm thickness of impermeable compacted soil overlain by a minimum 150 mm topsoil and vegetative cover, as described in Section 2.3 in Item 8 in Schedule "A", attached to this Certificate. Prior to placement of final cover, the Owner/Operator shall submit for the approval of the Director, a report detailing the specifications, including particle size distribution of the final cover soil which shall confirm the designed permeability of 10-5cm/sec or less, as well as the protocols for testing and acceptance for on-site and off-site final cover soils. All areas of final cover shall be graded and vegetated as soon as practically possible.

Daily cover was not observed on the open face of the waste fill area during the inspection in contravention to Condition 3.3 of the ECA (**See Section 5.0 Action(s) Required**). Mr. Edmiston indicated that cover material stock is clay based and forms clumps making it difficult for the site equipment to apply the required material.

#### **2.6 WASTE BURNING:**

##### **Specifics:**

ECA Condition 4 permits the burning of clean wood and brush. At the time of inspection, there was no burning taking place. Materials other than clean wood and brush were not observed in the burn pile at the time of inspection.

#### **2.7 GROUNDWATER/SURFACEWATER IMPACT:**

##### **Specifics:**

There was no obvious evidence of groundwater or surface water impact at this site.

The 2016 AR identifies that groundwater and surface water sampling occur twice annually, in the spring and fall. At the time of inspection, snow conditions caused only a few monitoring wells to be observed. All monitoring wells observed appeared to be in good condition with locks to control access. However, the Annual Report detailed that Well OW2 is damaged and has been filled with bentonite and fitted with a temporary cap. As required by Section 21(3) of O. Reg. 903, the well shall be properly abandoned (**See Section 5.0 Action(s) Required**).

According to the 2016 AR, surface water monitoring samples are obtained from an upstream and downstream station on South Pine River. Surface water monitoring results have not indicated any landfill related impacts.

The District Office has forwarded a copy of the 2016 Annual Report to the Ministry's Technical Support Section for review. Any comments regarding groundwater or surface water impacts will be dealt with under a letter separate from this report.

## **2.8 LEACHATE CONTROL SYSTEM:**

### **Specifics:**

A Leachate Management Plan (the Plan) has been implemented to manage the leachate generated at this site. The Plan is designed to minimize the volume of leachate impacted surface water accumulation in the trench and contains procedures for managing the impacted water.

According to Mr. Edmiston, leachate has collected in a pond-like formation to the south western corner of the landfill area near to the interceptor berm. He thinks there the pond is approximately 4 feet with 2 feet of that potentially being black leachate. Mr. Edmiston explained that the area needs to be pumped out and filled and that he hopes this will occur in the spring (**See Section 5.0 Action(s) Required**).

No leachate breakout was noted during the inspection, however, snow cover and frozen ground made it difficult to observe the site. The area to the south western corner of the landfill area did appear to be a depression in the landscape and have the presence of cattails, an aquatic vegetation.

## **2.9 METHANE GAS CONTROL SYSTEM:**

### **Specifics:**

There is no methane gas collection system at this site.

Condition 6.7 of the ECA requires the Owner/Operator to ensure that all buildings and structures existing at the Site or to be built on-Site which at times are occupied by people, or contains electrical equipment, or a potential source of ignition, are situated, constructed and monitored in a manner which minimizes the potential for explosive hazards due to landfill gas.

Testing for methane gas at this site was initiated in 2002. There are four methane monitoring locations on the site and the gas probes are monitored in the winter, when the waste disposal site is under frozen conditions.

According to the Annual Report, methane monitoring indicated no detections of methane in 2016-2017 at monitoring points GP1, GP2, GP4 and at the scale house. However, at GP3 methane was detected at 0.9 percent of its lower explosive limit. Mr. Edmiston indicated that the shed near the recycling bins has been removed from the site as per previous MOECC suggestion. In response to the detection of methane at the Landfill, the Township purchased a Sensit Model HXG-2D gas detector and trained the site attendants on the operation of the instrument. When working in the vicinity of GP3 the gas detector was reported to be utilized by staff. In 2016, there were no reports of the lower explosive limit being greater than zero.

Mr. Edmiston was not aware of any methane issues at the Landfill since the last inspection.

At the time of the inspection, no gas odours were noted on or off-site.

## **2.10 OTHER WASTES:**

### **Specifics:**

At the time of inspection, there was no evidence of wastes other than solid non-hazardous wastes being deposited in the fill area of the site.

According to the 2016 Annual Report, Huron Landfill accepted the following items:

- clean burnable wood,
- scrap metal,
- refrigeration units,
- e-waste,
- mattresses and,
- tires.

### Recyclable Materials

A series of signed bins are located near the entrance for recyclable materials including paper, cardboard and plastic/metal containers. Solid non-hazardous waste was found in small increments in the recycling area and attendants were sorting through it at the time of inspection.

### Bale Wrap

Bale wrap is no longer collected onsite Huron Landfill. The contractor, Switch Energy, now picks up the bale wrap individually and it does not enter the landfill.

#### Propane Cylinders

Propane cylinders were observed stored onsite. They were segregated, and the storage area was signed/labelled. Propane cylinders are stored next to a building structure, sheltered from incidental traffic accidents, in a manner which prevents cylinders from being knocked over or cylinder valves from breaking.

#### Tires

There were less than 5000 tire units stored at the site at the time of inspection. Less than 300 tire units were observed. The tires were segregated and the signage was legible.

#### Refrigeration Equipment

Refrigeration equipment was segregated for the storage of refrigerant appliances. At the time of inspection, Mr. Edmiston explained that Don Thompson TV & Appliances, Ripley was a licensed technician who removes the CFCs. Several units were observed and were not in an upright position. Refrigerators containing Chlorofluorocarbons (CFC) should be stored separately from the drained/tagged ones, to avoid damage of the un-drained units. Untagged refrigerators must be handled carefully, placed separately in upright position until CFCs are removed and tagged by a licensed technician as required by Section 41(1) of O. Reg. 463/10. Rough handling will result in breaking of lines and loss of CFC's to the atmosphere (**See Section 5.0 Action(s) Required**).

#### Scrap Metal

Scrap metal is collected on-site in a separate area for recycling. Scrap metal is removed by Sullivan Salvage.

#### Mattresses

Mattresses are collected onsite in a separate container as of 2015 and are shipped from the landfill on a regular basis.

### 3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

1. Failure to apply cover material in accordance with the Condition 3.3 of the Notice No. 2; **Action Item incomplete**
2. Failure to contain and clean up wind blown litter; **Action Item complete**
3. Failure of the Operator of the Landfill to extinguish the burn pile upon leaving the site; **Action Item complete**
4. Failure to ensure compliance with the 120 temporary storage/transfer days limit required by Condition 4.3 of the Notice No. 2; **Action Item complete**
5. Failure to post and maintain signs at the landfill in accordance with the requirements of Condition 3.11 of the Notice No. 2; **Action Item complete**
6. Failure to handle and store appliances containing CFCs in an environmentally responsible manner; **Action Item incomplete**
7. Failure to store segregated wastes in environmentally responsible manner; **Action Item complete**
8. Failure to prevent scavenging at the landfill in accordance with Section 23 O.Reg.232/98 and Section 11(19) of the O.Reg.347; **Action Item complete**
9. Failure to provide training to the employees involved with the site operation as required by Condition 8.1 of the Notice No. 2. **Action Item complete**

### 4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate?

No

Specifics:

Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?

No

Specifics:

Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment ?



Yes

**Specifics:**

Daily cover was not observed on the open face of the waste fill area during the inspection in contravention to Condition 3.3 of the ECA

Well OW2 is damaged and has been filled with bentonite and fitted with a temporary cap. As required by Section 21(3) of O. Reg. 903, the well shall be properly abandoned

Leachate pond-like formation to the south western corner of the landfill area near to the interceptor berm

Several refrigeration units were observed untagged and not in an upright position. Untagged refrigerators must be handled carefully, placed separately in upright position until CFCs are removed and tagged by a licensed technician as required by Section 41(1) of O. Reg. 463/10.

**Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?**

No

**Specifics:**

**Was there any indication of minor administrative non-compliance?**

No

**Specifics:**

## 5.0 ACTION(S) REQUIRED

1. The Owner/Operator shall ensure daily cover is maintained on the open face of the waste fill area as required by Condition 3.3 of the ECA.
2. The Owner/Operator shall properly abandon Well OW2 as per Section 21(3) of O. Reg. 903.
3. On or before March 15, 2018 the company shall provide a written response to the undersigned Provincial Officer detailing the actions to be taken to address the above listed Action Items.
4. On or before April 30, 2018 the Owner/Operator shall implement the Leachate Contingency Plan as per Section 9.2 of the Design and Operation Plan to address the pond-like formation of leachate to the south western corner of the landfill area near to the interceptor berm and provide notification of completion to the undersigned Provincial Officer.

## 6.0 OTHER INSPECTION FINDINGS

There were no other inspection findings associated with this inspection.

## 7.0 INCIDENT REPORT

Applicable  
3187-AVHRNS ☐

## 8.0 ATTACHMENTS

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IMG\_20180116\_140125.jpg; IMG\_20180116\_140200.jpg; IMG\_20180116\_140416.jpg; IMG\_20180116\_140440.jpg;  
IMG\_20180116\_140444.jpg; IMG\_20180116\_140511.jpg; IMG\_20180116\_140622.jpg; IMG\_20180116\_140709.jpg;  
IMG\_20180116\_140735.jpg; IMG\_20180116\_140908.jpg; IMG\_20180116\_141306.jpg; IMG\_20180116\_141310.jpg;  
IMG\_20180116\_141322.jpg; IMG\_20180116\_141942.jpg

**PREPARED BY:**

**Environmental Officer:**

**Name:**

Natasha Munn

**District Office:**

Southwestern Region

**Date:**

2018/01/25

**Signature**



**REVIEWED BY:**

**District Supervisor:**

**Name:**

Andrew Barton

**District Office:**

Owen Sound District Office

**Date:**

2018/01/31

**Signature:**



**File Storage Number:**

BR HK C5 610

**Note:**

"This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements"



March 8, 2018

Ms Natasha Munn, Inspector (Acting)  
Ministry of Environment and Climate Change,  
Drinking Water and Environmental Compliance Division,  
Environmental Enforcement and Compliance Office,  
Sector Compliance Branch,  
Sector Inspections Unit  
305 Milner Ave,  
TORONTO, ON  
M1B 3V4

Dear Ms. Munn:

**Subject: Inspection - Huron Landfill, Lot 19 and 20, Concession 5, Concession Road 6, Former Huron Township, Amalgamated Township of Huron-Kinloss, Bruce County, ON**

On behalf of the Corporation of the Township of Huron-Kinloss ('Township'), WSP responds to the Landfill Inspection completed at the Huron Landfill ('Site') by the Ministry of Environment and Climate Change (MOECC) on January 16, 2018 as detailed in the Solid Non-Hazardous Waste Disposal Site Inspection Report ('Report') dated January 31, 2018.

WSP's responses are in the order of those Section 3.0 and Section 5.0 Action(s) Required items in the January 16, 2018 report.

References are made by MOECC to the Design and Operations Plan by Pryde, Schropp McComb dated January 2010 (2010 D&O).

Regarding the 'Inspection Site Address', and such that there is not confusion and misidentification with the Township of Kinloss landfill, the Township clarifies that the landfill is in the former Township of Huron which is within the amalgamated Township of Huron-Kinloss.

## SECTION 2.5 – COVER MATERIAL

MOECC states 'Daily cover was not observed on the open face of the waste fill area during the inspection.'

## SECTION 2.8 – LEACHATE CONTROL SYSTEM

MOECC relies on the Site Operator's, Mr. Terry Edmiston, observations that leachate has collected in a pond-like formation to the southwestern landfill area near the interceptor berm.

The MOECC noted no leachate breakout. They state the area appeared to be a depression and had cattails, an aquatic vegetation.

## SECTION 2.10 – OTHER WASTES

Under 'Refrigeration', the MOECC noted 'several units were observed and not in an upright position'.



## SECTION 3.0 - PREVIOUS NON-COMPLIANCE ISSUES

Items noted as ‘Incomplete’ in the report are addressed below.

- 1 MOECC notes failure to apply cover material adequately.  
A response regarding cover material is provided below.
- 6 MOECC notes failure to handle and store appliances containing CFC’s in an environmentally responsible manner.  
Site staff are aware of the requirements for CFC containing appliances and have been advised to handle the items correctly and to maintain the appliances in an upright position.

## SECTION 4.0 – SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

The MOECC notes:

- That daily cover was not observed on the open face of the waste fill area during the inspection.
- That OW2 was ‘damaged and has been filled with bentonite and fitted with a temporary cap’.  
The MOECC references the 2016 Annual Monitoring Report (AMR) in assessing OW2.  
Per Appendix F of the 2016 AMR, OW2 was drilled in 1989 to a depth of 1.52 m.
- A leachate pond-like formation in the south west corner of the landfill area near the interceptor berm.

The clay interceptor berm was constructed 17 years ago in 2001. It is described in Section 7.2 of the 2010 D&O as being ‘approximately 1 m in height’.

Section 7.3 of the 2010 D&O describes the Surface Water Management Plan (SWMP) noting that the use of the retaining berm is to reduce the impact that of surface water runoff would have on the Site. The plan is ‘expected to minimize and control leachate production and to protect the existing drainage routes from erosion while not creating other erosional areas’.

Based on previous survey information, the area of possible pond-like formation behind the retaining berm before flowing around on either end (above the 231 mASL contour) is estimated at 424 m<sup>2</sup>. The low area defined by the 231 mASL contour is 1,026 m<sup>2</sup>. Based on a 1 m depth, a volume of 424 to 1,026 m<sup>3</sup> is calculated.

- Several refrigeration units to be untagged and not in an upright position.

For all of the above findings, the MOECC did not note any potential for environmental impairment.

## SECTION 5.0 - ACTION(S) REQUIRED

The Actions required are in quotations as followed by the proposed action(s) by the Township.

1. ‘The Owner/Operator shall ensure that daily cover is maintained on the open face of the waste fill area...’ per Condition 3.3 of the ECA.

Per Section 3.3 b) of the ECA, ‘at the end of each working day, after deposition of waste into the working area, the entire working face shall be compacted and covered with a minimum thickness of at least 150mm of soil...’

The operator understands the requirements of ECA Section 3.3 b) and ensures that all waste fill areas are covered adequately at the end of the working day.

2. 'The Owner/Operator shall properly abandon Well OW2...' in accordance with of Ontario Regulation (O. Reg.) 903.

Per the borehole log in Appendix F of the 2016 AMR, the construction of OW2 is to a depth of 1.52 m. It was temporarily filled with bentonite. As it is less than 3 m depth, it would not be classified as a 'well' within O Reg 903 and would not require a licenced driller to remove.

The Township has tentatively scheduled a backhoe to excavate the standpipe and refill and compact the excavated area. WSP will supervise the decommissioning work.

3. 'On or before **March 15, 2018**, the company shall provide a written response...' to the MOECC '...detailing the actions to be taken to address the above listed Action items'.

This correspondence is provided in satisfaction of this requirement.

4. 'On or before **April 30, 2018**, the Owner/Operator shall implement the Leachate Contingency Plan as per Section 9.2 of the Design and Operations Plan (2010 D&O) to address the formation of leachate in the south west corner of the landfill area near the interceptor berm and provide notification of the completion...' to MOECC.

Section 7.3 of the D&O describes the interceptor berm, the modifications for which are detailed in Section 3.3.3 of the SWMP.

Section 9.2 of the 2010 D&O details the Leachate Contingency Plan (LCP). The LCP is implemented if trigger levels are exceeded OR if 'leachate outbreaks are observed'.

The LCP is a process with different approaches being detailed in the 2010 D&O.

The Township has requested that WSP review the 2010 D&O and the LCP to assess whether the interceptor berm is constructed per Section 3.3.3 of the SWMP and is functioning adequately.

WSP will review the 2010 D&O Sections 7.3 and 9.2 i), and investigate and make recommendations regarding the required approach and determining which LCP options are required.

WSP will conduct a topographic survey of the south west interceptor berm area to determine the volume of impacted water.

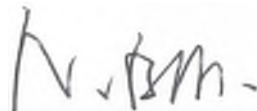
Given the past issue with the high water table at the Site, the effect of shallow groundwater will be considered.

WSP will collect a water quality sample(s) to characterize the quality of the surface water behind the interceptor berm.

WSP and the Township will update the MOECC on the progress of this action item.

We trust the above to be satisfactory. Please contact the undersigned with any questions or comments.

Yours truly,



Norm Bell, P.Geo.  
Senior Hydrogeologist / Project Geoscientist

/nab  
Encl.

cc: Mr Andrew Barton, MOECC Owen Sound District Office  
Mr Hugh Nichol, Township of Huron-Kinloss  
Mr Terry Edmiston, Township of Huron-Kinloss  
WSP ref.: 101-16942-00



April 30, 2018

Ms. Natasha Munn, Environmental Officer  
Ministry of the Environment and Climate Change  
Owen Sound District Office  
101 17th Street East  
OWEN SOUND, ON  
N4K 0A5

**Subject: Inspection - Huron Landfill, Lot 19 and 20, Concession 5, Concession Road 6, Former Huron Township, Amalgamated Township of Huron-Kinloss, Bruce County, Ontario - Action Item 4**

Dear Ms. Munn

On behalf of the Corporation of the Township of Huron-Kinloss (Township), WSP responds to the Landfill Inspection completed at the Huron Landfill (Site) by the Ministry of the Environment and Climate Change (MOECC) on January 16, 2018 as detailed in the Solid Non-Hazardous Waste Disposal Site Inspection Report (Report) dated January 31, 2018.

#### **EXISTING SITE CONDITIONS**

WSP visited the Site on April 9, 2018 and inspected the southwest corner of the open area where surface water ponding occurs. During our visit there was minimal snow cover on the ground. Refer to attached **Figure 1** which outlines the existing site conditions at that time.

It appears that at least a portion (north side) of the impoundment is affected by leachate seeping from the uncovered, relatively small portion of the active landfilling area. The remaining part of the landfill footprint is adequately covered (interim cover). Leachate escaping the active disposal area is diluted with stormwater draining from the remaining part of the Site. Water drains westerly towards the Impoundment #1 which is created by an interceptor berm aligned along the edge of the open area. There is a gap in the berm through which water drains further west forming a separate second ponding area. This second impoundment, designated as Impoundment #2, is at a lower elevation than Impoundment #1. It was observed that there is a notch (erosion washout) in the berm holding water in Impoundment #2 through which water is trickling down towards South Pine River.

Standing water in the south part of Impoundment #1 does not visually appear to be affected by leachate, while the remaining north portion of this water body and Impoundment #2 are discoloured by leachate.

Suite 101  
1450, 1st Avenue West  
Owen Sound, ON, Canada N4K 6W2

T: +1 519 376-7612  
F: +1 519 376-8008  
wsp.com

## SURFACE WATER QUALITY ASSESSMENT

Testing and sampling of water was carried out.

On April 23, 2018, three (3) unfiltered samples of surface water were obtained from the southwest portion of the Site. The samples were from the Impoundment #1 (South portion) (SW3/18) ponded surface water behind the interceptor berm. The Impoundment #1 (north portion) (SW4/18) sample was closest to landfilling and Impoundment Area #2 (SW5/18) further from active landfilling with possible dilution by overland flow from the northwest.

The field parameters measured for conductivity and pH were:

<b>1</b>	Impoundment #1 (SW3/18) – South portion	370 uS/cm	8.69
<b>2</b>	Impoundment #1 (SW4/18) – North portion	2,787 uS/cm	7.14
<b>3</b>	Impoundment #2 (SW5/18)	2,100 uS/cm	7.54

The Impoundment #1 (South portion) (SW3/18) sample was slightly grey and cloudy.

Impoundment #1 – North (SW4/18) and Impoundment #2 (SW5/18) samples were coloured yellow to brown and yellow to orangey respectively. No sheen was observed.

SW4/18 and SW5/18 appear impacted by leachate based on visual and odour indications.

The samples were submitted to Caduceon Environmental Laboratories for analyses of the identical parameters used for the surface water samples in the annual monitoring program for the site. Analyses were compared to the Provincial Water Quality Objectives (PWQO) and the existing SW1 (upstream) and SW2 (downstream) results from Table 6 of the 2017 Annual Monitoring Report (AMR).

The SW1 (upstream) sample had a conductivity of 463 and 686 uS/cm for June and October 2017 respectively. Alkalinity was 229 to 322 mg/L. Hardness was 218 to 357 mg/L. The total phosphorus concentrations were above the PWQO for the October 2017 at 0.07 mg/L.

The laboratory results for Impoundment #1 (South portion) (SW3/18) agree well with field results and has a conductivity of 378 uS/cm and pH of 8.41 indicating slightly alkaline conditions. The conductivity, alkalinity (110 mg/L) and hardness (181 mg/L) are less than that of the South Pine River at SW1 (upstream) in 2017. Chlorides are low at 25.6 mg/L.

Impoundment #1 (South portion) (SW3/18) is above the PWQO for:

- total phosphorus (0.09 mg/L),
- aluminum (0.9 mg/L),
- chromium (0.002 mg/L),
- iron (1.34 mg/L) and
- zinc (0.04 mg/L).

Impoundment #1 (North portion) (SW4/18) indicates impacts by leachate with conductivity of 3,060 uS/cm. Impoundment #2 (SW5/18) sample appears similarly impacted but is more dilute than the SW4/18 sample with correspondingly less conductivity at 2,290 uS/cm. Chlorides are up to 6.4x higher than Impoundment #1 – South at 163 and 126 mg/L respectively. Alkalinity and hardness are also elevated.

As noted above, the concentrations measured in Impoundment #1 (North portion) are higher than in Impoundment #2 and are typically an order of magnitude (10x) higher than concentrations in Impoundment #1 (South portion).

Impoundment #1 (North portion) (SW4/18) is above the PWQO for:

- Un-ionized ammonia (0.19 mg/L),
- total phosphorus (0.98 mg/L),
- phenolics (0.105 mg/L),
- aluminum (0.34 mg/L),
- boron (4.59 mg/L),
- chromium (0.019 mg/L),
- cobalt (0.006 mg/L),
- copper (0.0054 mg/L),
- iron (7.82 mg/L),
- vanadium (0.007 mg/L) and
- zinc (0.656 mg/L).

Impoundment #2 (SW5/18) is above the PWQO for:

- Un-ionized ammonia (0.35 mg/L),
- total phosphorus (0.53 mg/L),
- phenolics (0.070 mg/L),
- aluminum (0.23 mg/L),
- boron (3.33 mg/L),
- chromium (0.014 mg/L),
- cobalt (0.0052 mg/L),
- iron (5.11 mg/L) and
- zinc (0.402 mg/L).

Impacts by leachate on SW4/18 and SW5/18, obtained in Impoundment #1 (North portion) and Impoundment #2 respectively, are indicated. The SW4/18 and SW5/18 sample concentrations are significantly elevated above the Provincial Water Quality Objectives (PWQO) for un-ionized ammonia, total phosphorus, phenolics and metals (including aluminum, boron, chromium, cobalt, copper in SW4/18, iron, vanadium in SW4/18 and zinc).

## INTERPRETATION AND DISCUSSION

The above described leachate impact is a directly related to inadequate and irregular waste covering within the active landfilling area. While most of the landfill is adequately covered, contact surface water originating from this relatively small part of the landfill has impacted surface water accumulated in the southwest corner of the Site.

It appears that an unknown amount of surface water has already drained into the South Pine River.

The surface water sample analyses indicate the Impoundment #1 (South portion) (SW3/18) water has similar conductivity to the receiving water body, the South Pine River.

With on-site treatment for sediment removal (through use of a stilling basin constructed with staked straw bales), the Impoundment #1 (South portion) water would be suitable for a controlled release based on the analyses received. For assessment of ponded surface water in Impoundment #1 (South portion), we recommend the use of a 4 criteria assessment process whereby water is visually assessed for colour, odour and sheen and measured in the field for conductivity. For water having excessive discolouration, odour or sheen and a conductivity greater than 700 uS/cm (the approximate conductivity of the upstream receiving body), the water should be considered as unacceptable for release.

The sediment removal in the stilling basin may result in lowering of the concentration of several of the metal parameters which may be adsorbed onto particulates (iron, but also aluminum which, like the SW1 upstream sample, is above the PWQO). Further, a temporary soil berm is recommended to be placed between the south portion of Impoundment #1 and the north portion to prevent backflow during pump out of Impoundment #1 (South portion).

Release of the Impoundment #1 (North portion) and Impoundment #2 water would have potential environmental impacts on the receiving body, the South Pine River. Therefore, this water should not be released but should be taken off site for treatment.

## REMEDIAL MEASURES

The current situation is not desirable and should be rectified.

It was determined that the existing Impoundment #1 has not been constructed in accordance with the Surface Water Management Report included as Appendix I to the Design and Operation Plan (Revised) for the Huron Landfill dated January 2010. This report has called for installation of a 150 mm diameter outlet pipe through the interceptor berm to allow for controlled release of ponded water. The outlet pipe has not been installed to date.

It is proposed to make some modifications to the existing stormwater system to rectify the above noted problems. The reader is referred to the enclosed **Figure 2** which outlines the concept of the proposed works as follows:

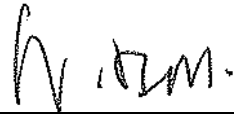
- 1 Pump out contaminated surface water in Impoundment #1 (north portion) and Impoundment #2 and truck away for treatment to a properly licenced sewage treatment plant. This should be done using a properly licensed hauler.
- 2 Ponded water in Impoundment #1 (South portion) which is determined as clean and not influenced by leachate (see above 4 criteria assessment) could be pumped over the interceptor berm into a stilling basin to remove sediment to drain to the receiving water body (South Pine River). Testing of water prior to release is covered above.
- 3 After dewatering, Impoundment #1 area should be regraded with the berm being strengthened/raised where required.
- 4 In addition, Impoundment #1 (South portion) area should be equipped with the pipe outlet connected with an isolation valve (normally open). This would allow for controlled release of surface water from this area through the natural channel downstream. The valve could be closed if water in the pond is affected by leachate. In such a case, water should be handled as per Item 1. In addition to flow control, the pond would treat surface water by settling of suspended solids.
- 5 It is also proposed to provide an emergency spillway (rip rap lined) to protect the facility against catastrophic berm failure which could occur under a rare, heavy storm event. The existing channel downstream from Impoundment #1 (South portion) shall also be reinforced with rip rap stone on geotextile.
- 6 Following the controlled release of the Impoundment #1 (South portion) water, the gap in the berm on the west side should be filled and the area of the existing Impoundment #2 should be returned to its natural state (regrade, topsoil and vegetate).

The proposed work plan, if approved by the MOECC, could be completed during the upcoming 2018 construction season. The conceptual design outlined herein would have to be firmed up with detail design.

Additional work, including a detailed topographical survey of the work area would be necessary to properly design various critical details including elevations (top of berm, pipe inverts, pond bottom, etc.).

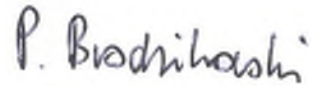
Before proceeding with this task, we will await your response and approval of the proposed work plan.

Yours truly,



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Norman A. Bell, P.Geo.  
Senior Hydrogeologist/Geoscientist



---

Peter Brodzikowski, P.Eng.  
Senior Environmental Engineer

PSB/NAB/dlw

cc: Mr. Hugh Nichol, Municipality of Huron-Kinloss  
Encl. Caduceon analyses results (April 23/2018), Sheet 1 and 2  
WSP ref.: 121-60020-13 (101-16942-00)

**Table 6a**  
**Surface Water Quality Monitoring Results**  
**Huron Landfill - 2018**

Surface Water Station			SW 1	SW 1	SW 2	SW 2	SW3/18	SW4/18	SW5/18
Date			(Upstream)	(Upstream)	(Downstream)	(Downstream)			
			12-Jun-17	30-Oct-17	12-Jun-17	30-Oct-17	23-Apr-18	23-Apr-18	23-Apr-18
	Units	PWQO mg/L							
<b>Calculated Parameters</b>									
Hardness (CaCO <sub>3</sub> )	mg/L		218	357	262	339	181	1200	859
<b>Inorganics</b>									
Total Ammonia-N	mg/L		0.03	<0.01	0.04	0.02	0.16	45.5	29.6
Calculated Un-ionized Ammonia	mg/L	0.02 <sup>(10)</sup>	<0.02	<0.02	<0.02	<0.02	0.02	0.19	0.35
Conductivity	umho/cm		463	686	486	688	378	3060	2290
Total Kjeldahl Nitrogen (TKN)	mg/L		0.6	0.67	0.9	0.66	1.0	74.9	48.8
Dissolved Organic Carbon	mg/L		5.1	6.0	4.7	5.4	7.5	239.0	184.0
pH	pH	6.5 - 8.5	8.11	8.28	8.05	8.29	8.41	7.80	7.98
Phenols-4AAP	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.105	0.070
Total Phosphorus	mg/L	0.03 <sup>(9)</sup>	0.02	0.07	0.07	0.06	0.09	0.98	0.53
Dissolved Sulphate (SO <sub>4</sub> )	mg/L		13	12	13	12	23	179	151
Alkalinity (Total as CaCO <sub>3</sub> )	mg/L	<sup>(7)</sup>	229	322	220	297	110	1240	847
Dissolved Chloride (Cl)	mg/L		10.2	14.9	10.4	15.0	25.6	163.0	126.0
Nitrite (N)	mg/L		0.26	<0.05	0.20	<0.05	<0.05	<0.05	<0.05
Nitrate (N)	mg/L		3.27	9.67	3.23	9.69	0.32	0.19	0.18

Surface Water Station			SW 1	SW 1	SW 2	SW 2	SW3/18	SW4/18	SW5/18
Date			(Upstream)	(Upstream)	(Downstream)	(Downstream)			
			12-Jun-17	30-Oct-17	12-Jun-17	30-Oct-17	23-Apr-18	23-Apr-18	23-Apr-18
	Units	PWQO mg/L							
<b>Metals</b>									
Total Aluminum (Al)	mg/L	0.075 <sup>(8)</sup>	0.09	0.15	0.12	0.13	0.90	0.34	0.23
Total Arsenic (As)	mg/L	0.100 <sup>(11)</sup>	0.0006	<0.0005	0.0006	<0.0005	0.0014	0.0113	0.0083
Total Beryllium (Be)	mg/L	1.100 <sup>(12)</sup>	<0.0001	<0.002	<0.0001	<0.002	<0.0001	<0.0001	<0.0001
Total Boron (B)	mg/L	0.200 <sup>(1)</sup>	0.008	0.012	0.023	0.014	0.190	4.57	3.33
Total Cadmium (Cd)	mg/L	0.0002 <sup>(3)</sup>	<0.000014	<0.000070	0.000033	<0.000070	0.00003	0.00011	0.00008
Total Calcium (Ca)	mg/L		51.8	96.5	64.1	91.3	56.8	319	223
Total Chromium (Cr)	mg/L	0.001 <sup>(13)</sup>	<0.001	<0.001	<0.001	<0.001	0.002	0.019	0.014
Total Cobalt (Co)	mg/L	0.0009	0.0001	<0.0005	0.0002	<0.0005	0.0008	0.0060	0.0052
Total Copper (Cu)	mg/L	0.005 <sup>(4)</sup>	0.0016	0.0009	0.0022	0.0009	0.0026	0.0054	0.0043
Total Iron (Fe)	mg/L	0.300	0.096	0.169	0.164	0.119	1.340	7.820	5.110
Total Lead (Pb)	mg/L	0.025 <sup>(5)</sup>	0.00006	<0.0001	0.00022	<0.0001	0.00190	0.00218	0.00143
Total Magnesium (Mg)	mg/L		21.5	28.2	24.9	26.9	9.52	96.90	73.40
Total Manganese (Mn)	mg/L		0.005	0.007	0.020	0.005	0.142	1.23	0.923
Total Molybdenum (Mo)	mg/L	0.040 <sup>(1)</sup>	0.0004	<0.0005	0.0004	<0.0005	0.0009	0.0041	0.0037
Total Nickel (Ni)	mg/L	0.025	0.0017	0.003	0.0019	0.003	0.0030	0.0244	0.0204
Total Potassium (K)	mg/L		1.9	2.7	2.2	2.6	5.6	84.6	62.9
Total Silver (Ag)	mg/L	0.0001	<0.00002	<0.0001	<0.00002	<0.0001	<0.00002	0.00005	0.00004
Total Sodium (Na)	mg/L		5.0	5.8	6.7	5.7	37.4	223	169
Total Vanadium (V)	mg/L	0.006 <sup>(1)</sup>	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.005
Total Zinc (Zn)	mg/L	0.030 <sup>(6)</sup>	<0.005	<0.005	0.054	<0.005	0.04	0.656	0.402

ND = Not Detected

RDL = Reportable Detection Limit

- = not done

**Surface Water Station**  
**Date**

**FIELD MEASUREMENTS**

Temperature

Conductivity

pH

Units
Degrees C
µmhos

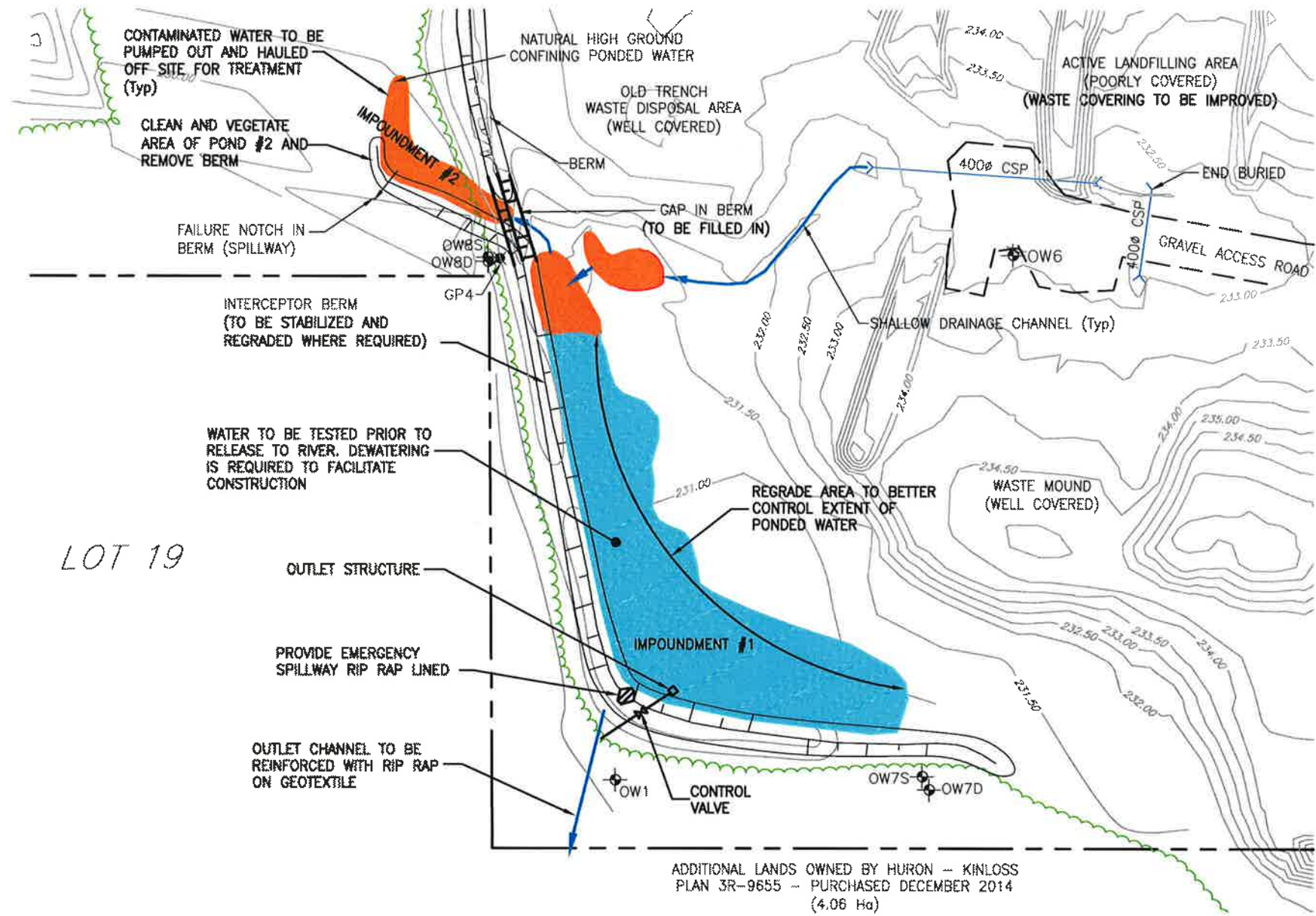
SW 1	SW 1	SW 2	SW 2	SW3/18	SW4/18	SW5/18
(Upstream)	(Upstream)	(Downstream)	(Downstream)			
12-Jun-17	30-Oct-17	12-Jun-17	30-Oct-17	23-Apr-18	23-Apr-18	23-Apr-18
21.2	8.8	20.0	8.8	16.4	16.7	18.0
463	705	478	702	370	2787	2100
7.85	8.08	7.60	8.02	8.69	7.14	7.54

**NOTES:**

- PWQO indicates Provincial Water Quality Objectives.
- (I) indicates interim PWQO
- Cadmium: PWQO = 0.2 µg/L; Interim PWQO = 0.5 µg/L (for Hardness >100 mg/L); = 0.1 µg/L (for hardness < 100 mg/L).
- Copper Interim PWQO = 5 µg/L (for Hardness >20 mg/L)
- Revised Interim PWQO = 5 µg/L (for Alkalinity > 80 mg/L (as CaCO<sub>3</sub>))
- Zinc Revised Interim PWQO = 20 µg/L
- Alkalinity should not be decreased by more than 25 % of the natural concentration.
- Interim PWQO = 75 µg/L for pH >6.5 to 9.0.
- PWQO = 0.020 mg/L to avoid nuisance algae growth, PWQO = 0.010 mg/L for high level of protection  
PWQO = 0.030 mg/L for prevention of excessive plant growth
- PWQO for un-ionized ammonia
- Interim PWQO for arsenic is 5 µg/L
- For hardness < 7 mg/L: PWQO = 11 µg/L; for hardness > 75 mg/L: PWQO = 1100 µg/L
- Chromium: PWQO - 1 µg/L for hexavalent chromium, 8.9 µg/L for trivalent chromium.
- Un-ionized Ammonia Fraction (f) where  $f = 1/(10^{pka - pH} + 1)$ ;  $pka = 0.09018 + 2729.92/T$ ;  $T = ^\circ C + 273.16$
- value exceeds PWQO.





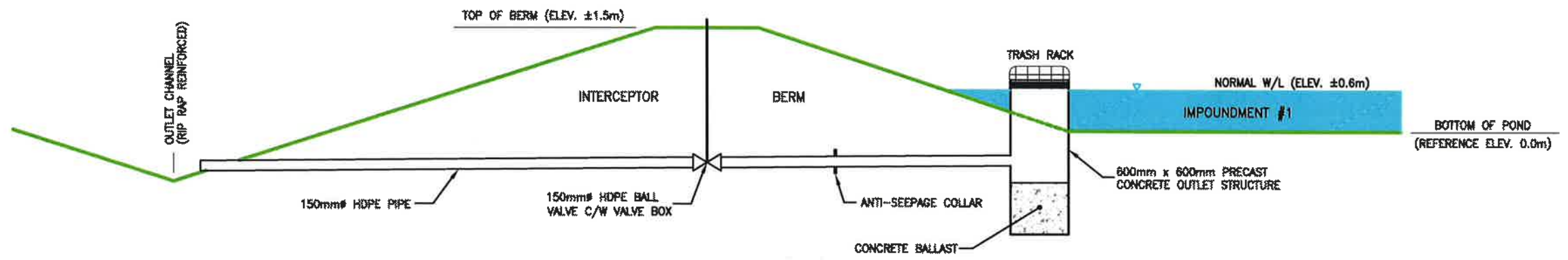


**LEGEND :**

- RELATIVELY CLEAN WATER NOT SHOWING DISCOLORATION
- PONDED WATER DISCOLORED
- LANDFILL PROPERTY LINE
- EXISTING GROUND CONTOURS
- EXISTING TREELINE
- GP4
- OW8S
- EXISTING GAS PROBE
- EXISTING OBSERVATION WELL

**NOTES :**

1. TOPOGRAPHIC FEATURES SHOWN ON THIS PLAN ARE BASED ON DECEMBER 19, 2017 FIELD SURVEY BY SMC GEOMATICS (MOUNDED WASTE DISPOSAL AREA) AND VISUAL OBSERVATIONS RECORDED DURING AN APRIL 9, 2018 SITE VISIT.
2. EXISTING GROUND CONTOURS SHOWN DO NOT NECESSARILY OUTLINE EXISTING GROUND TOPOGRAPHY ACCURATELY EXCEPT MOUNDED WASTE DISPOSAL AREA.



**OUTLET SCHEMATIC**  
N T S

WSP

4100000 STREET SOUTH, SUITE 202  
HAMILTON, ONTARIO L8N 2Y1  
TEL: 905-529-4414 | FAX: 905-529-2698 | WWW.WSPGROUP.COM

PROPOSED  
REMEDIATION WORK  
HURON LANDFILL SITE

DATE: APRIL 19, 2018  
SCALE: SEE BMR SCALE

TOWNSHIP OF HURON-KINLOSS  
DRAWING NO. 101-16942-00 - 2

CHK BY: T C G  
CHK BY: P S B

SHEET  
2



**C.O.C.: G67765**

**REPORT No. B18-10504**

**Report To:**

**WSP Canada Inc.**

1450 1st Ave. West, Suite 101  
Owen Sound ON N4K 6W2 Canada

**Attention:** Norm Bell

**Caduceon Environmental Laboratories**

2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 24-Apr-18

JOB/PROJECT NO.: Huron Landfill

DATE REPORTED: 25-Apr-18

P.O. NUMBER: 121.60020.05

SAMPLE MATRIX: Surface Water

WATERWORKS NO. 101.16942.00

**Relabeled SW3/18 SW4/18 SW5/18**

			Client I.D.	SW1-18	SW2-18	SW3-18	
			Sample I.D.	B18-10504-1	B18-10504-2	B18-10504-3	
			Date Collected	23-Apr-18	23-Apr-18	23-Apr-18	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Hardness (as CaCO <sub>3</sub> )	mg/L	1	SM 3120	24-Apr-18/O	181	1200	859
Alkalinity(CaCO <sub>3</sub> ) to pH4.5	mg/L	5	SM 2320B	25-Apr-18/O	110	1240	847
Conductivity @25°C	µmho/cm	1	SM 2510B	25-Apr-18/O	378	3060	2290
pH @25°C	pH Units		SM 4500H	25-Apr-18/O	8.41	7.80	7.98
Chloride	mg/L	0.5	SM4110C	24-Apr-18/O	25.6	163	126
Nitrate (N)	mg/L	0.05	SM4110C	24-Apr-18/O	0.32	0.19	0.18
Nitrite (N)	mg/L	0.05	SM4110C	24-Apr-18/O	< 0.05	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	24-Apr-18/O	23	179	151
Calcium	mg/L	0.02	SM 3120	24-Apr-18/O	56.8	319	223
Magnesium	mg/L	0.02	SM 3120	24-Apr-18/O	9.52	96.9	73.4
Sodium	mg/L	0.2	SM 3120	24-Apr-18/O	37.4	223	169
Potassium	mg/L	0.1	SM 3120	24-Apr-18/O	5.6	84.6	62.9
Aluminum	mg/L	0.01	SM 3120	24-Apr-18/O	0.90	0.34	0.23
Arsenic	mg/L	0.0001	EPA 200.8	24-Apr-18/O	0.0014	0.0113	0.0083
Beryllium	mg/L	0.0001	EPA 200.8	24-Apr-18/O	< 0.0001	< 0.0001	< 0.0001
Boron	mg/L	0.005	SM 3120	24-Apr-18/O	0.190	4.57	3.33
Cadmium	mg/L	0.000014	EPA 200.8	24-Apr-18/O	0.000030	0.000106	0.000077
Chromium	mg/L	0.001	EPA 200.8	24-Apr-18/O	0.002	0.019	0.014
Cobalt	mg/L	0.0001	EPA 200.8	24-Apr-18/O	0.0008	0.0060	0.0052
Copper	mg/L	0.0001	EPA 200.8	24-Apr-18/O	0.0026	0.0054	0.0043
Iron	mg/L	0.005	SM 3120	24-Apr-18/O	1.34	7.82	5.11
Lead	mg/L	0.00002	EPA 200.8	24-Apr-18/O	0.00190	0.00218	0.00143
Manganese	mg/L	0.001	SM 3120	24-Apr-18/O	0.142	1.23	0.923
Molybdenum	mg/L	0.0001	EPA 200.8	24-Apr-18/O	0.0009	0.0041	0.0037
Nickel	mg/L	0.0002	EPA 200.8	24-Apr-18/O	0.0030	0.0244	0.0204
Silver	mg/L	0.00002	EPA 200.8	24-Apr-18/O	< 0.00002	0.00005	0.00004
Vanadium	mg/L	0.005	SM 3120	24-Apr-18/O	< 0.005	0.007	0.005
Zinc	mg/L	0.005	SM 3120	24-Apr-18/O	0.040	0.656	0.402



R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an \*

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem  
Lab Manager - Ottawa District

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

**C.O.C.: G67765**

**REPORT No. B18-10504**

**Report To:**

**WSP Canada Inc.**

1450 1st Ave. West, Suite 101  
Owen Sound ON N4K 6W2 Canada

**Attention:** Norm Bell

**Caduceon Environmental Laboratories**

2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 24-Apr-18

JOB/PROJECT NO.: Huron Landfill

DATE REPORTED: 25-Apr-18

P.O. NUMBER: 121.60020.05

SAMPLE MATRIX: Surface Water

WATERWORKS NO. 101.16942.00

			Client I.D.	SW1-18	SW2-18	SW3-18	
			Sample I.D.	B18-10504-1	B18-10504-2	B18-10504-3	
			Date Collected	23-Apr-18	23-Apr-18	23-Apr-18	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Ammonia (N)-Total	mg/L	0.01	MOEE 3364	24-Apr-18/O	0.16	45.5	29.6
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	25-Apr-18/K	1.0	74.9	48.8
Phosphorus-Total	mg/L	0.01	E3199A.1	25-Apr-18/K	0.09	0.98	0.53
Phenolics	mg/L	0.001	MOEE 3179	24-Apr-18/O	< 0.001	0.105	0.070
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	24-Apr-18/O	7.5	239	184
Anion Sum	meq/L		Calc.	25-Apr-18/O	3.42	33.0	23.6
Cation Sum	meq/L		Calc.	25-Apr-18/O	5.48	39.4	28.5
% Difference	%		Calc.	25-Apr-18/O	23.2 <sup>1</sup>	8.80	9.34
Ion Ratio	AS/CS		Calc.	25-Apr-18/O	0.624	0.838	0.829
Sodium Adsorption Ratio	-		Calc.	25-Apr-18/O	1.21	2.81	2.51
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-18/O	225	1875	1358
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-18/O	440	2820	2160
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-18/O	0.596	0.613	0.593
EC(calc.)/EC(actual)	-		Calc.	25-Apr-18/O	1.16	0.921	0.944
Langelier Index(25°C)	S.I.		Calc.	25-Apr-18/O	0.773	1.88	1.74

<sup>1</sup> Outside of 10% Acceptance Criteria, solids present

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an \*

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie



Greg Clarkin, BSc., C. Chem  
Lab Manager - Ottawa District

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.



## MEMO

**TO:** File #101-16942-00  
**FROM:** Kaurel Tamasauskas., Environmental Technologist  
**SUBJECT:** Spring Monitoring – May 23, 2018 – Huron Landfill  
**DATE:** June 1, 2018

---

The following notes were completed after the spring monitoring event at the Huron landfill:

- Kaurel Tamasauskas and Nicole Collins measured water levels and collected water samples on May 23, 2018.
- The weather was sunny, hot and a high of 28°C.
- All groundwater monitors were purged to remove three (3) well volumes of water or were purged dry and allowed to recover prior to sampling.
- Sampling locations included the following groundwater monitors: OW1, OW3, OW4, OW5, OW6, OW7S, OW7D, OW8S, OW8D, OW9, OW10S, OW10D and OW11.
- Sampling locations for surface waters included: SW1 and SW2.
- SW1 is located in an upstream location on the South Pine River at the bridge on Concession Road 6.
- SW2 is located in a downstream location approximately 380 m west of active landfilling.
- Duplicate samples were collected at OW7S and SW2.
- GWC, metals, nutrients, phenols and DOC samples were collected at all groundwater and surface water locations (with the addition of total phosphorus for surface water samples only).
- Groundwater samples for nutrients, metals and DOC were field filtered at the time of collection. Surface water samples for metals (specifically aluminum) should also be field filtered.
- Field measurements of pH, conductivity and temperature were taken at all sampling locations.
- The cells being actively landfilled are the southeast side of cells T3 and T2.



- The channel/gully beside OW1 is being eroded and the edge of it is very close to monitor OW1, as the protective casing/culvert is exposed on the bank of the gully (see photos in directory).
- Rain water has also collected south of monitors OW8S and OW8D (west end of Cell T2). The water in this area appears to be dark grey to black in colour and a sheen is present on the surface (see photos in directory).
- OW3 and OW9 require a 2" PVC slip-on cap.
- No methane measurements were required during this round of sampling.
- Field notes are in HG 120 pages 28 - 33.
- Digital photos were taken of the site, and can be found in the project directory.

Prepared by:

A handwritten signature in blue ink, likely belonging to Kaurel Tamasauskas, is written over a horizontal line.

Kaurel Tamasauskas  
Environmental Technologist  
KMT/  
Encl.  
cc Norm Bell. P.Geo., WSP

**Ministry of the Environment and  
Climate Change**

Southwestern Region  
Owen Sound District Office  
3rd Flr  
101 17th St  
Owen Sound ON N4K 0A5  
Fax: (519) 371-2905  
Tel: (519) 371-6191

**Ministère de l'Environnement et de  
l'Action en matière de changement  
climatique**

Direction régionale du Sud-Ouest  
Bureau du district d'Owen Sound  
101 rue 17th, 3ème étage  
Owen Sound ON N4K 0A5  
Télécopieur: (519) 371-2905  
Tél: (519) 371-6191



June 8, 2018

Mr. Hugh Nichol  
Township of Huron-Kinloss  
PO Box 130  
21 Queen Street  
Ripley, ON N0G 2R0

Via email and mail

Dear Mr. Nichol,

**RE: Huron Landfill – Stormwater/Leachate Management**

We have received the letter dated April 30, 2018 and prepared by WSP, responding to the MOECC's January 2018 inspection of the Huron Landfill. Leachate has been identified draining from the landfill site through a gap in a berm. The WSP letter proposes remedial measures including pumping out contaminated water, raising the berm, regrading impoundment areas, and installing a pipe outlet with an isolation valve.

On June 7, 2018, we met with you and Peter Brodzikowski (WSP) on site. Hugh Geurts, our regional surface water specialist also attended the site meeting. Based on the WSP letter and our site visit on June 7, 2018, we provide the following comments.

It is evident that there is no clear separation of on-site landfill generated leachate and stormwater. Landfill leachate must remain separate from landfill stormwater. All precipitation that comes into contact with the open face of the landfill footprint is to be treated as leachate. The Municipality must promptly take measures to prevent leachate from draining off the landfill site and to separate leachate from stormwater.

During the site visit a corrugated steel pile was observed near the toe of the open face of the landfill, draining towards the onsite bermed pond area. Flow from the active face into stormwater must be stopped, as mentioned above.

The existing stormwater collection berm does not appear to be sufficient to provide adequate water quality for discharge to the Pine River. The Municipality should review the stormwater

management collection and containment options that would allow for improved collection and management before off site discharge.

Please note that Condition 6.6 of Notice No. 2 of Environmental Compliance Approval # A272601 issued July 6, 2010 states:

*Within one (1) year of the date of this Notice, the Owner/Operator shall submit an application with applicable fees, for approval under OWRA, copied to the District Manager, to install a stormwater management facility for the site, as described in Section 7.0 in Item 8 in Schedule "A", as amended in Item 12, in Schedule "A", attached to this Certificate, to assess the interaction between groundwater and surface water, and on-site and the South Pine River.*

We have reviewed our files and cannot locate an ECA stormwater application for this site, as required by Condition 6.6. This is non-compliance with the ECA.

The municipality must take the following actions:

- immediately take steps to prevent leachate from draining off the active landfill site area;
- immediately separate landfill leachate from landfill stormwater; and
- prepare and submit an ECA application as required by Condition 6.6 of ECA # A272601.

Please submit to this office by June 15, 2018 confirmation in writing that actions listed above are being undertaken, with details of the measures being taken

If you have any questions concerning this letter, please contact Natasha Munn at (519) 371-6582 or the undersigned at (519) 371-6191.

Yours truly,



---

Ian Mitchell , P.Eng.  
District Engineer  
Owen Sound District Office

File Storage Number: BR HK C5 610

cc. Norm Bell/Peter Brodzikowski, WSP, Owen Sound via email  
Natasha Munn, MOECC, Owen Sound  
Hugh Geurts, MOECC, London





## MEMO

**TO:** File #101-16942-00  
**FROM:** Kaurel Tamasauskas, Environmental Technologist  
**SUBJECT:** Fall Monitoring – October 25, 2018 – Huron Landfill  
**DATE:** November 6, 2018

---

The following notes were completed after the fall monitoring event at the Huron landfill:

- Kaurel Tamasauskas and Nicole Collins measured water levels and collected water samples on October 25, 2018.
- The weather was overcast, cool and a high of 9°C.
- All groundwater monitors were purged to remove three (3) well volumes of water or were purged dry and allowed to recover prior to sampling.
- Sampling locations included the following groundwater monitors: OW1, OW3, OW4, OW5, OW6, OW7S, OW7D, OW8S, OW8D, OW9, OW10S, OW10D and OW11.
- Sampling locations for surface waters included: SW1 and SW2.
- SW1 is located in an upstream location on the South Pine River at the bridge on Concession Road 6.
- SW2 is located in a downstream location approximately 380 m west of active landfilling.
- Duplicate samples were collected at OW10D and SW1.
- GWC, metals, nutrients, phenols and DOC samples were collected at all groundwater and surface water locations (with the addition of total phosphorus for surface water samples only).
- Groundwater samples for nutrients, metals and DOC were field filtered at the time of collection. Surface water samples for metals (specifically aluminum) should also be field filtered.
- Field measurements of pH, conductivity and temperature were taken at all sampling locations.
- The cell that is being actively landfilled is the north east side of cell T4.



- The channel/gully beside OW1 is being eroded and the edge of it is very close to monitor OW1, as the protective casing/culvert is exposed on the bank of the gully (see photos in directory).
- Rain water has collected west of monitor OW11. Many mattresses were also observed in this wet area.
- Rain water has also collected south of monitors OW8S and OW8D (west end of Cell T2). The water in this area appears to be dark grey to black in colour and a sheen is present on the surface (see photos in directory).
- Monitors OW4, OW7S and OW8S need new tubing next monitoring round.
- OW3 and OW9 require a 2" PVC slip-on cap.
- No methane measurements were required during this round of sampling.
- Field notes are in HG 120 pages 34 - 39.
- Digital photos were taken of the site, and can be found in the project directory.

Prepared by:

A handwritten signature in blue ink, appearing to read 'Kaurel Tamasauskas', is written over a horizontal line.

Kaurel Tamasauskas  
Environmental Technologist  
KMT/  
Encl.

cc Norm Bell. P.Geo., WSP



## Solid Non-Hazardous Waste Disposal Site Inspection Report

<b>Client:</b>	The Corporation of the Township of Huron-Kinloss Mailing Address: 21 Queen St, Huron-Kinloss, Ontario, Canada, N0G 2R0 Physical Address: 21 Queen St, Huron-Kinloss, Township, County of Bruce, Ontario, Canada, N0G 2R0 Telephone: (519)395-3735, Extension: 130, FAX: (519)395-4107, email: hnichol@huronkinloss.com Client #: 4545-4MERDZ, Client Type: Municipal Government, NAICS: 22131		
<b>Inspection Site Address:</b>	Huron Landfill Site Address: Lot: 19, 20, Concession: 5, Concession Road 6, Geographic Township: BRUCE, Huron-Kinloss, Township, County of Bruce, N0G 2R0 District Office: Owen Sound GeoReference: Map Datum: NAD27, Zone: 17, Accuracy Estimate: 1-10 metres eg. Good Quality GPS, Method: GPS, UTM Easting: 451457, UTM Northing: 4878824, UTM Location Description: Entrance gate., LIO GeoReference: Zone: , UTM Easting: , UTM Northing: , Latitude: 44.2708, Longitude: -81.433 Site #: 3678-5Q8L7L		
<b>Contact Name:</b>	John Yungblut	<b>Title:</b>	Public Works Superintendent
<b>Contact Telephone:</b>	(519)395-3735 ext	<b>Contact Fax:</b>	519-395-4107
<b>Last Inspection Date:</b>	2018/01/16		
<b>Inspection Start Date:</b>	2019/01/16	<b>Inspection Finish Date:</b>	2019/01/16
<b>Region:</b>	Southwestern		

### 1.0 INTRODUCTION

The Huron Landfill Site waste disposal facility was inspected as part of the Ministry of the Environment, Conservation and Parks (MECP) 2018/2019 inspection program.

The purpose of this pro-active inspection was to assess compliance of the operation of the site in relation to the terms and conditions of Environmental Compliance Approval (ECA) Number A272601, any relevant control documents, MECP legislation and to confirm conformance with the MECP waste-related policies and guidelines.

This inspection included an unannounced site visit conducted on January 16, 2019 to inspect the operational activities of the landfill site. At the time of inspection the landfill site was closed and landfill attendants were unavailable at the site.

A copy of the 2017 Annual Report (AR) was previously forwarded to the Ministry's Technical Support; therefore, a detailed review of the monitoring data for the site was not conducted as part of this inspection. The 2017 Annual Report, as per Condition 11 of the ECA is required by March 31st of each year, prepared by WSP Canada Inc., dated March 2018, was reviewed as part of the inspection.

A previous MECP inspection was conducted at this site on January 16, 2018. The landfill is owned and operated by the Township of Huron-Kinloss and services the residential and industrial, commercial and institutional sectors located within the service area.

The landfill is located on Part Lots 19 and 20, Concession 5, in the former Township of Huron in the amalgamated Township of Huron-Kinloss, at 2087 Concession 6 East Road; southwest of the community of Ripley.

According to the AR, the Township is home to a total of approximately 7,000 residents that are serviced by the Huron Landfill. Additionally, waste from the former Township of Huron, the former Township of Kinloss and the Village of Lucknow is landfilled at the Huron Landfill. The Mid-Huron Landfill was closed June 30, 2018, and therefore, as granted in the amended ECA from 2010, waste from the Village of Lucknow is now landfilled at the Huron Landfill.

## 2.0 INSPECTION OBSERVATIONS

### **Certificate of Approval Number(s):**

Environmental Compliance Approval A272601 was issued October 15, 1991 and amended in 2007, 2010 and 2012.

- ECA A272601, issued on October 15, 1991 - requires registration of the ECA on the title; submission of an annual report to the MOE, monitoring of groundwater and surface water quality and imposes terms/conditions of onsite burning.

- A272601 Notice No. 1, issued on August 14, 2007 - ECA was amended to include changes to operational plans to clarify theoretical capacity and to require a new Design and Operations Plan within one year of issuance

- A272601 Notice No. 2, issued on July 6, 2010 - ECA was amended to change the landfilling operation at the Landfill from trench method to area method, for disposal of domestic, commercial and solid non-hazardous industrial wastes and to approve the establishment and operation of waste segregation/recycling centre and WEEE program at the landfill, for acceptance, temporary storage and transfer of recyclable waste

- A272601 Notice No. 3, issued on July 9, 2010 - ECA was amended to approve expansion of the service area of the landfill site to include the Village of Lucknow.

- A272601 Notice No. 4, issued on March 2, 2012 - ECA was amended to approve operation of a Waste Segregation/Recycling Centre and WEEE program at the Landfill, for the acceptance, temporary storage, and transfer of recyclable waste.

## 2.1 FINANCIAL ASSURANCE:

### **Specifics:**

There is no financial assurance required for this landfill site as it is a municipally owned landfill.

## 2.2 APPROVED AREA OF THE SITE:

### **Specifics:**

The total approved area of the site specified in the ECA consists of 8.0 hectares waste fill area within a total site area of 17.7 hectares.

At the time of inspection the Landfill footprint appeared defined by site topography and access roads. Wastes intended for landfilling were observed to be deposited into the approved area with the exception of historic waste that was filled beyond the approved limits. It is the ministry's position that the waste can likely be left where it is provided it is not causing issues and is deducted from the overall approved capacity of the site **(See Section 5.0 Action(s) Required)**.

## 2.3 APPROVED CAPACITY:

### **Specifics:**

Condition 2.4 of the ECA states that the total waste disposal capacity of the site (waste filled by trench method and by area method), including waste, daily cover and interim cover is 288,000 cubic metres.

Condition 2.3 of the Certificate states that the maximum rate at which the site shall receive waste for disposal, is limited to 100 tonnes per day, and 3,000 tonnes per calendar year. The receipt of waste in excess of the daily maximum fill rate may only be allowed on a limited short-term basis, on no more than two consecutive operating days, and only with prior notification and concurrence from the District Manager.

According to the AR, the average landfilled volume over the past five years is 7,440 cubic metres including waste and cover material. The estimated landfill volume for 2017 is 10,927 cubic metres which is a historic annual maximum fill rate compared to previous years. WSP used the above average fill rate and remaining capacity determined in the Design and Operational Plan to result in a site closure date of 2031. Formerly, the former Village of Lucknow's waste

was received by the Mid-Huron Landfill. However, this landfill closed on June 30, 2018. Since this closure, waste from the former Village of Lucknow is landfilled at the Huron Landfill. The above estimate of reaching maximum capacity in 2031 does not account for waste received from the former Village of Lucknow.

## 2.4 ACCESS CONTROL:

### Specifics:

Access to the site is controlled by a locked gate at the main entrance and a vegetative screen and fencing along Concession 6 Road. The site is open year round for the public on Tuesday, Friday and Saturday between 10:00 a.m. to 4:00 p.m.

During operating hours municipal staff are present to supervise site activities; one at the weight station and one or two at the recycling/dumping areas. At the time of inspection, the landfill site was closed. A locked access gate was observed in place to restrict access to the site as required by section 11.(2) of O. Reg 347.

## 2.5 COVER MATERIAL:

### Specifics:

ECA A272601 Condition 3.3 of the Notice No. 2 states:

a. Daily Cover - At the end of each working day, after deposition of waste into the waste fill area, the entire working face shall be compacted and covered with a minimum thickness of 150 mm of soil cover or an approved thickness of alternative cover material such as compost, wood-chips or foundry sand. Prior to placing waste at the start of the next operating day, the existing daily cover material shall be scarified or removed to the extent practical, to ensure vertical hydraulic connection is maintained between layers of waste and to promote percolation of leachate downwards

b. Interim Cover - In areas where landfilling ceases temporarily for a period of 6 months or more, a minimum thickness of 300 mm of soil shall be placed as interim cover. The quality of soil for use as interim cover shall, as a minimum, meet the criteria for Industrial/Commercial land use specified in Table A in the Ministry's "Guideline for Use at Contaminated Sites in Ontario", revised February 1997.

c. Final Cover - Final cover shall be applied progressively as areas of the landfill reach final waste elevations. The final soil cap shall consist of a minimum 600 mm thickness of impermeable compacted soil overlain by a minimum 150 mm topsoil and vegetative cover, as described in Section 2.3 in Item 8 in Schedule "A", attached to this Certificate. Prior to placement of final cover, the Owner/Operator shall submit for the approval of the Director, a report detailing the specifications, including particle size distribution of the final cover soil which shall confirm the designed permeability of 10-5cm/sec or less, as well as the protocols for testing and acceptance for on-site and off-site final cover soils. All areas of final cover shall be graded and vegetated as soon as practically possible.

Cover on the landfill has been improved since the 2018 MECP inspection. Most sections of the landfill have adequate interim cover and solely one section is open for landfilling. However, daily cover was not observed on the open face of the waste fill area during the inspection in contravention to Condition 3.3 of the ECA (**See Section 5.0 Action(s) Required**). Landfill staff have previously indicated that cover material stock is clay based and forms clumps making it difficult for the site equipment to apply the required material. It is recommended that the municipality uses cover material that is more easily used in winter (**See Section 6.0 Other Inspection Findings**).

## 2.6 WASTE BURNING:

### Specifics:

ECA Condition 4 permits the burning of clean wood and brush. At the time of inspection, there was no burning taking place. Materials other than clean wood and brush were not observed in the burn pile at the time of inspection.

## 2.7 GROUNDWATER/SURFACEWATER IMPACT:

### Specifics:

There was no obvious evidence of groundwater or surface water impact at this site.

The 2017 AR identifies that groundwater and surface water sampling occur twice annually, in the spring and fall. At the time of inspection, snow conditions caused only a few monitoring wells to be observed. All monitoring wells observed appeared to be in good condition with locks to control access. However, the Annual Report detailed that Well OW2 was damaged and has been filled with bentonite and fitted with a temporary cap. A report received by the Owen Sound District Office indicated that the well was removed on March 12, 2018 as required by Section 21(3) of O. Reg. 903, the well shall be properly abandoned.

According to the 2017 AR, surface water monitoring samples are obtained from an upstream and downstream station on South Pine River. Surface water monitoring results have not indicated any landfill related impacts.

The District Office has forwarded a copy of the 2017 Annual Report to the Ministry's Technical Support Section for

review. Any comments regarding groundwater or surface water impacts will be dealt with under a letter separate from this report.

## **2.8 LEACHATE CONTROL SYSTEM:**

### **Specifics:**

A Leachate Management Plan (the Plan) was implemented to manage the leachate generated at this site. The Plan was designed to minimize the volume of leachate impacted surface water accumulation in the trench and contains procedures for managing the impacted water.

However, during the previous 2018 MECP landfill inspection, it came to the attention of the Environmental Officer that leachate was ponding at the interceptor berm toward Pine River. A Leachate Contingency Plan is currently underway from consultants WSP as per Section 9.2 of the Design and Operation Plan (**See Section 5.0 Action(s) Required**).

An additional site visit was conducted in conjunction with the MECP's district staff, MECP's Surface Water Specialist, municipal staff and WSP consultants on June 7, 2018. It was observed that a catch basin was located at the base of the berm and corrugated steel piping was located on the downhill, near the open face of the landfill. This pipe appeared to direct overland flow toward the stormwater collection berm. Leachate coloured runoff was observed to be flowing off the approved landfill footprint with no collection or containment structures. Since these observations took place, the corrugated steel pipe was reported by the municipality to have been covered over with both ends blocked. It no longer functions as a corrugated steel pipe and is unable to transmit runoff or leachate on the site.

WSP consultants reported that material was delivered to the landfill site on June 22, 2018, to fill in the gap in the interceptor berm. It was reported that the area where leachate was ponding and trickling off site has been levelled off and there was no sign of leachate.

Additionally, the operator has created two berm-like structures extending from the outside limits of the existing fill area that will direct any runoff from the waste across the access road to a small collection area where it can infiltrate into the ground. The berms are small enough to allow traffic to still cross over when accessing the pit. During the time of the inspection, the berms were observed and it was noted that they appear to be intercepting runoff.

In 2018, it came to the ministry's attention that an ECA (stormwater) failed to be submitted by the municipality as required by Condition 6.6 of ECA # A272601 (**See Section 5.0 Action(s) Required**). WSP Consultants have proposed to develop a plan to accommodate a stormwater pond within the footprint of the landfill and submit an ECA application. Specific dates on workplan and timelines have not yet been submitted to the MECP.

## **2.9 METHANE GAS CONTROL SYSTEM:**

### **Specifics:**

There is no methane gas collection system at this site.

Condition 6.7 of the ECA requires the Owner/Operator to ensure that all buildings and structures existing at the Site or to be built on-Site which at times are occupied by people, or contains electrical equipment, or a potential source of ignition, are situated, constructed and monitored in a manner which minimizes the potential for explosive hazards due to landfill gas.

Testing for methane gas at this site was initiated in 2002. There are four methane monitoring locations on the site and the gas probes are monitored in the winter, when the waste disposal site is under frozen conditions.

According to the AR, methane monitoring indicated no detections of methane in 2017-2018 at monitoring points GP1, GP2, GP4 and at the scale house. However, at GP3 methane was detected at 100 percent of its lower explosive limit. The shed in close proximity to GP3 has been removed from the site as per previous MECP suggestion. In response to the detection of methane at the Landfill, the Township purchased a Sensit Model HXG-2D gas detector and trained the site attendants on the operation of the instrument. When working in the vicinity of GP3 the gas detector was reported to be utilized by staff. In 2017, there were no reports of the lower explosive limit being greater than zero.

At the time of the inspection, no gas odours were noted on or off-site.

## **2.10 OTHER WASTES:**

### **Specifics:**

At the time of inspection, there was no evidence of wastes other than solid non-hazardous wastes being deposited in the fill area of the site.

According to the 2017 Annual Report, Huron Landfill accepted the following items:

- recyclable materials
- clean burnable wood,
- scrap metal,

- refrigeration units,
- e-waste,
- mattresses and,
- tires.

#### Recyclable Materials

A series of signed bins are located near the entrance for recyclable materials including paper, cardboard and plastic/metal containers. Recycling tonnages removed from the site have increased in recent years with 2017 diverting 429.82 tonnes from the landfill, as stated in the AR.

#### Bale Wrap

Bale wrap is no longer collected onsite Huron Landfill. The contractor, Switch Energy, now picks up the bale wrap individually and it does not enter the landfill.

#### Propane Cylinders

Propane cylinders were observed stored onsite. They were segregated, and the storage area was signed/labelled. Propane cylinders are stored next to a building structure, sheltered from incidental traffic accidents, in a manner which prevents cylinders from being knocked over or cylinder valves from breaking.

#### Tires

There were less than 5000 tire units stored at the site at the time of inspection. The tires were segregated and the signage was legible.

#### Refrigeration Equipment

Refrigeration equipment was segregated for the storage of refrigerant appliances. Several units were observed and were not in an upright position. Refrigerators containing Chlorofluorocarbons (CFC) should be stored separately from the drained/tagged units, to avoid damage of the un-drained units. Untagged refrigerators must be handled carefully, placed separately in upright position until CFCs are removed and tagged by a licensed technician as required by Section 41(1) of O. Reg. 463/10. Rough handling will result in breaking of lines and loss of CFC's to the atmosphere **(See Section 5.0 Action(s) Required)**.

#### Scrap Metal

Scrap metal is collected on-site in a separate area for recycling. Scrap metal is removed by AOR and Triple M Metal LP on a regular basis as needed.

#### Mattresses

Mattresses were collected onsite in a separate area as of 2015 and were shipped from the landfill on a regular basis. As previously noted in this inspection report, several mattresses were observed outside of the current working landfill area and were not covered by daily cover **(See Section 6.0 Other Inspection Findings)**.

### **3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES**

The following previous non-compliance issues were noted in the January 2018 inspection;

The Owner/Operator shall ensure daily cover is maintained on the open face of the waste fill area as required by Condition 3.3 of the ECA.

- daily cover remained a non-compliance issue during this site inspection

The Owner/Operator shall properly abandon Well OW2 as per Section 21(3) of O. Reg. 903.

- complete

On or before April 30, 2018 the Owner/Operator shall implement the Leachate Contingency Plan as per Section 9.2 of the Design and Operation Plan to address the pond-like formation of leachate to the south western corner of the landfill area near to the interceptor berm and provide notification of completion to the undersigned Provincial Officer.

- a Leachate Contingency Plan is currently being worked on by consultants WSP. It has not been submitted to the MECP to this date.

In 2018, it came to the ministry's attention that a stormwater ECA was not submitted in contravention to Condition 6.6 of ECA # A272601.

- consultants WSP have been hired and they are currently going over different options for stormwater pond placement

### **4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)**

**Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate?**

No

**Specifics:**

**Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?**

No

**Specifics:**

**Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment ?**

Yes

**Specifics:**

Historic waste deposited beyond the approved landfill limits.

Daily cover was not observed on the open face of the waste fill area during the inspection in contravention to Condition 3.3 of the ECA.

An ECA (stormwater) was not submitted by the municipality as required by Condition 6.6 of ECA # A272601.

A Leachate Contingency Plan must be completed as per Section 9.2 of the Design and Operation Plan.

Several refrigeration units were observed untagged and not in an upright position. Untagged refrigerators must be handled carefully, placed separately in upright position until CFCs are removed and tagged by a licensed technician as required by Section 41(1) of O. Reg. 463/10.

**Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?**

No

**Specifics:**

**Was there any indication of minor administrative non-compliance?**

No

**Specifics:**

## **5.0 ACTION(S) REQUIRED**

1. The Owner/Operator shall ensure daily cover is maintained on the open face of the waste fill area as required by Condition 3.3 of the ECA.
2. The Owner/Operator shall ensure refrigeration units are stored in segregated, in an upright position until CFCs are removed and tagged by a licensed technician as required by Section 41(1) of O. Reg. 463/10.
3. The Owner/Operator shall contact the MECP's Client Services and Permissions Branch to ensure that historic waste that was filled beyond the approved limits of the landfill can remain where it is provided it is not causing issues and is deducted from the overall approved capacity of the site, at Client Services and Permissions Branch 2 St. Clair Avenue West, Floor 12A, Toronto, Ontario, M4V 1L7, with a copy to the MECP Owen Sound District Office at 101-17th Street East, Owen Sound, Ontario, N4K 0A5.
4. On or before March 1, 2019 the owner shall provide a written response to the undersigned Provincial Officer detailing the actions to be taken to address the above listed Action Items.
5. On or before April 30, 2019, the Owner/Operator shall complete a Leachate Contingency Plan as per Section 9.2 of the Design and Operation Plan.




6. On or before April 30, 2019, the Owner/Operator shall submit an Application for ECA (stormwater) to the MECP as required by Condition 6.6 of ECA # A272601, made under the EPA, accompanied by all necessary supporting documentation and fees, to the Director of Client Services and Permissions Branch, 2 St. Clair Avenue West, Floor 12A, Toronto, Ontario, M4V 1L7, with a copy to the MECP Owen Sound District Office at 101-17th Street East, Owen Sound, Ontario, N4K 0A5.

## 6.0 OTHER INSPECTION FINDINGS

During the site inspection ponding water was observed in the open face of the landfill. It appeared that garbage was iced into the ponded areas on the site. Waste should not be placed in water and water should be diverted from the open face of the landfill.

Additionally, 2 large piles of mattresses were observed towards the south of the landfill. The mattresses were piled on top of the berm with some spilling over the berm. The ministry was concerned that these mattresses were placed outside of the landfill area and were without daily cover as required by Condition 3.3 of the ECA.

## 7.0 INCIDENT REPORT

Applicable  
6011-B8MTVQ 

## 8.0 ATTACHMENTS

Huron LF Jan 16 19 10.JPG; Huron LF Jan 16 19 11.JPG; Huron LF Jan 16 19 12.JPG; Huron LF Jan 16 19 13.JPG; Huron LF Jan 16 19 14.JPG; Huron LF Jan 16 19 15.JPG; Huron LF Jan 16 19 16.JPG; Huron LF Jan 16 19 1.JPG; Huron LF Jan 16 19 2.JPG; Huron LF Jan 16 19 3.JPG; Huron LF Jan 16 19 4.JPG; Huron LF Jan 16 19 5.JPG; Huron LF Jan 16 19 6.JPG; Huron LF Jan 16 19 7.JPG; Huron LF Jan 16 19 8.JPG; Huron LF Jan 16 19 9.JPG

### PREPARED BY:

#### Environmental Officer:

Name:

Natasha Munn


District Office:

Southwestern Region

Date:

2019/01/28

Signature



### REVIEWED BY:

#### District Supervisor:

Name:

Scott Gass

District Office:

Owen Sound District Office

Date:

2019/01/29

Signature:



File Storage Number:

BR HK QU 610

### Note:

"This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements"





## MEMO

**TO:** File #101-16942-00  
**FROM:** Kaurel Tamasauskas, Environmental Technologist  
**SUBJECT:** Methane Monitoring – March 11, 2019 – Huron Landfill  
**DATE:** March 14, 2019

---

The following notes were completed after the methane monitoring event at the Huron Landfill:

- On March 11, 2019, methane gas monitoring was completed by Kaurel Tamasauskas at the Huron Landfill. In conjunction with methane monitoring, static water level readings were obtained from all of the gas probes. Methane gas readings were taken using the Gasurveyor 3-5000 methane meter at the following locations:

Location	Methane
GP1	0.0% LEL
GP2	0.0% LEL
GP3	41.0% VOL. GAS
GP4	0.0% LEL

- The weather was overcast with a high of -5°C.  
→ Field notes are in HG 120, page 40.

Prepared by:

Kaurel Tamasauskas  
Environmental Technologist  
KMT/  
Encl.



## MEMO

**TO:** File #101-16942-00 (121-60020-05)  
**FROM:** Peter Brodzikowski, P.Eng.  
**SUBJECT:** Huron Landfill – Fill Beyond Approved Limit (FBAL)  
**DATE:** February 21, 2019

---

It was recently discovered that some waste has been landfilled outside the approved landfill limit defined by the Design and Operations Plan (D&O) prepared by Pryde Schropp McComb in January 2010. The area in question is located in the southeast corner of the waste fill area. The Ministry of the Environment, Conservation and Parks (MECP) Site Inspection Report dated January 29, 2019, requires the Township of Huron-Kinloss to assess and resolve this issue with the MECP's Client Services and Permissions Branch. This requirement constitutes Item 3 of Action(s) Required from the above noted report.

WSP has calculated that there is approximately 11,846 m<sup>3</sup> of waste deposited outside the approved fill limit in the above noted part of the site. This volume was determined by comparison of the existing site topography with the approved top of waste contours and assumed waste bottom outside the approved fill area. This overfill is presented graphically on attached **Figure 1**. This figure outlines the following:

- the existing site topography as of December 2018;
- approved top of waste contours as per D&O; and
- depth of waste deposit outside the approved fill limit is delineated by 0.5 m interval contours (red). These contours represent FBAL.

It is proposed to leave all material deposited outside the approved fill limit in place “as is” since there is no significant adverse effect resulting from this situation. Localized small berms/piles located within and near the FBAL area shall be flattened and spread out evenly nearby to eliminate the existing grading irregularities. Ultimately, the FBAL area shall be final covered in the same way as the remaining part of the site in accordance with the D&O requirements.

The approved top of waste contours for the entire site are shown on **Figure 2**.

In order to compensate for the FBAL we have adjusted (lowered) the approved final top of waste contours within the central part of the site. The revised final top of waste contours are presented on **Figure 3**. Top of waste contours in the central, top part of the site, sloping at approximately 5%, were lowered by 0.40 m. Volume reduction resulting from such a change is calculated as follows:

$$201 \text{ m} \times 144 \text{ m} \times 0.4 \text{ m} = 11,578 \text{ m}^3$$



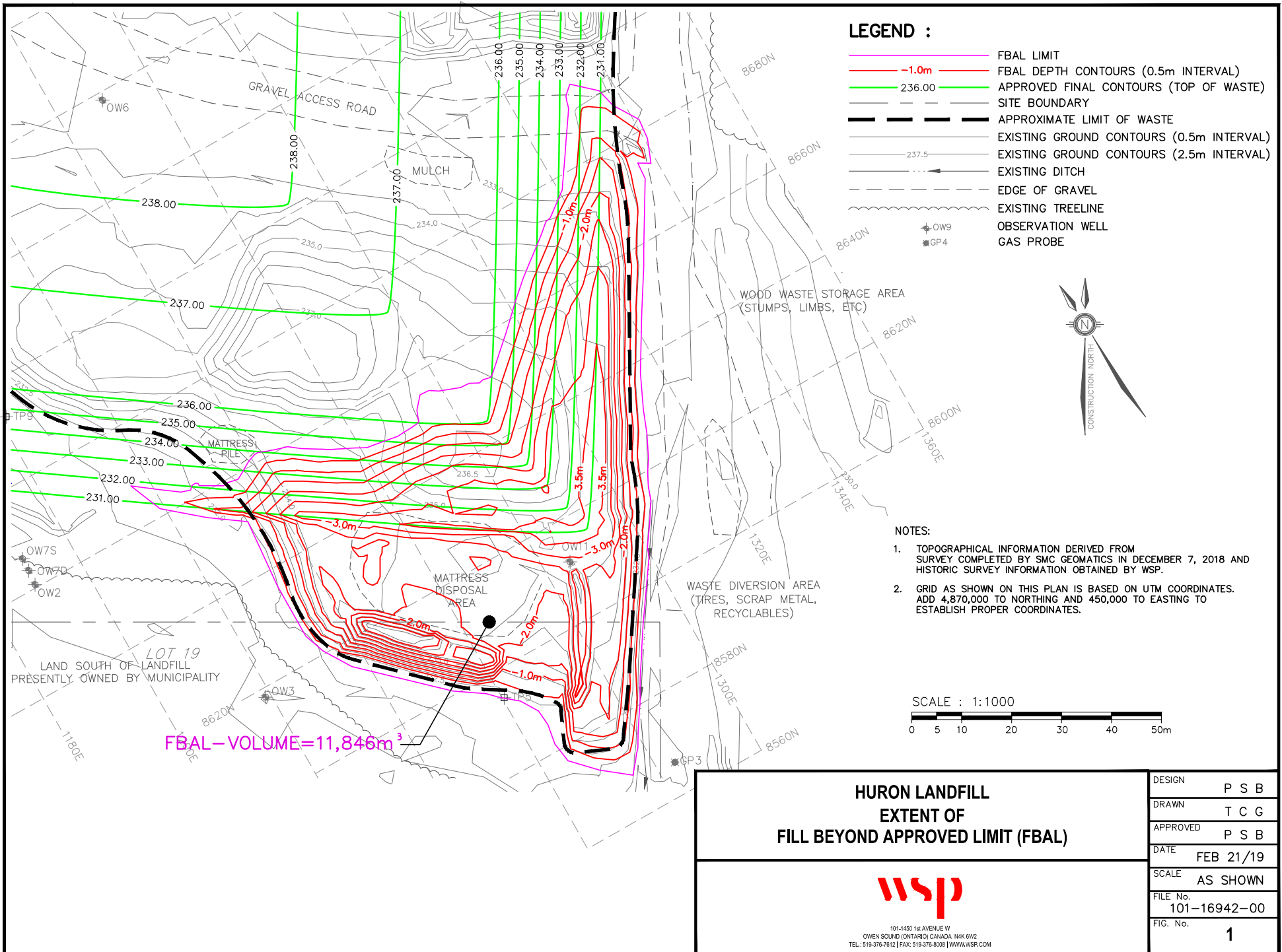
Accounting for calculations accuracy, this volume is almost the same as the overfill volume (11,846 m<sup>3</sup>) within the FBAL area. The proposed change in the final top of waste contours is adequate to compensate for the overfill identified within the FBAL area.

In order to avoid similar problems (waste overfill), the Township will improve their grade control for landfilling operations. This is critical when landfilling takes place near exterior side slopes and close to final top grades. Grade stakes shall be planted regularly to guide the operator when placing waste in such critical areas.

Prepared by:

A handwritten signature in black ink that reads 'P. Brodzikowski'.

Peter Brodzikowski, P.Eng.  
Senior Environmental Engineer  
PSB/dlw  
Encl.







LEGEND :

- 235.00 APPROVED FINAL CONTOURS (TOP OF WASTE)
- SITE BOUNDARY
- CONCESSION/LOT LINE
- APPROXIMATE LIMIT OF WASTE
- EXISTING GROUND CONTOURS (0.5m INTERVAL)
- EXISTING GROUND CONTOURS (2.5m INTERVAL)
- EDGE OF GRAVEL
- EXISTING FENCE LINE
- EXISTING DITCH
- EXISTING TREELINE
- OBSERVATION WELL
- GAS PROBE
- TEST PIT

NOTES:

- TOPOGRAPHICAL INFORMATION DERIVED FROM SURVEY COMPLETED BY SMC GEOMATICS IN DECEMBER 7, 2018 AND HISTORIC SURVEY INFORMATION OBTAINED BY WSP.
- GRID AS SHOWN ON THIS PLAN IS BASED ON UTM COORDINATES. ADD 4,870,000 TO NORTHING AND 450,000 TO EASTING TO ESTABLISH PROPER COORDINATES.

SCALE : 1:1500

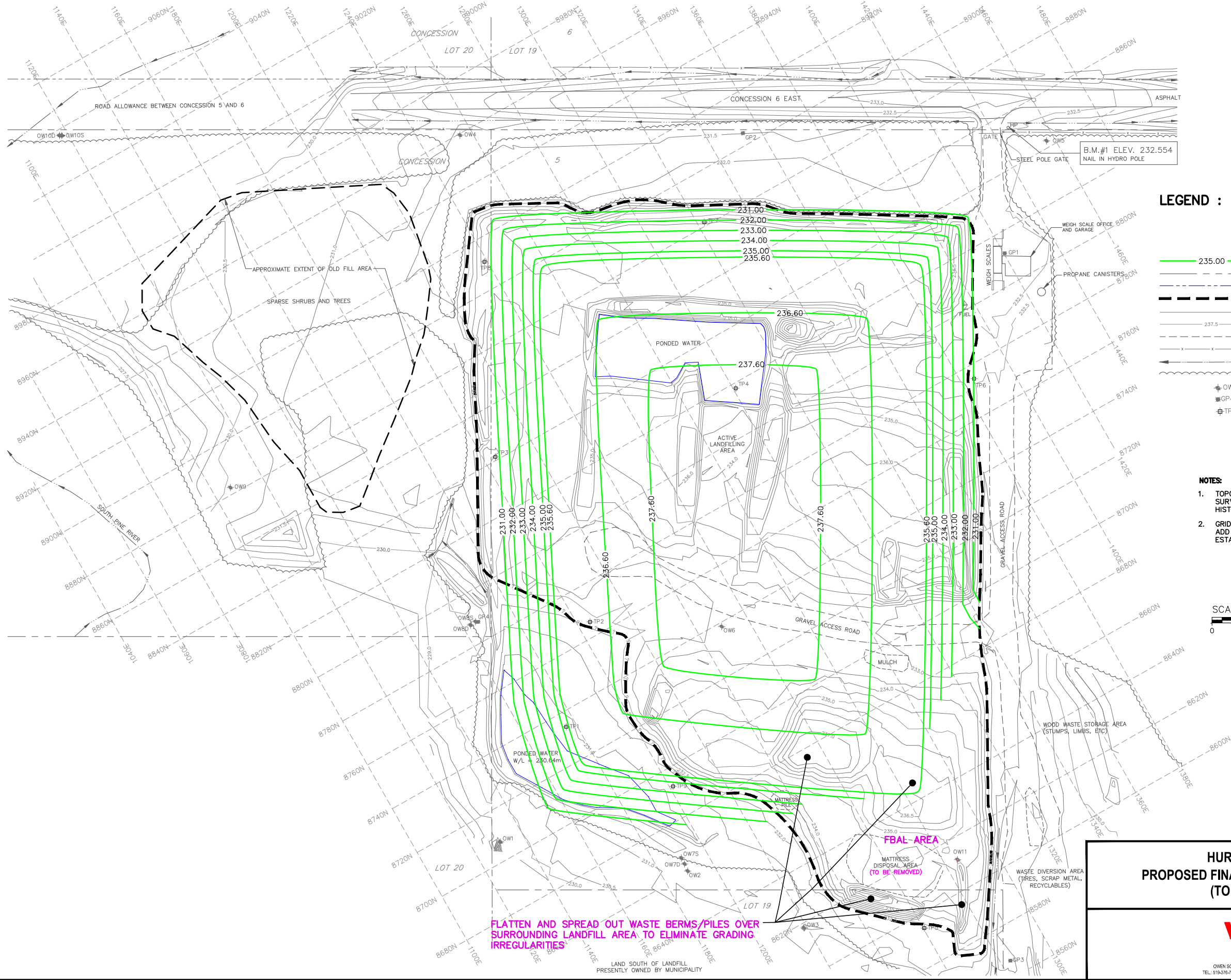


HURON LANDFILL  
APPROVED FINAL CONTOURS  
(TOP OF WASTE)



101-1490 1st AVENUE W  
OWEN SOUND (ONTARIO) CANADA N4K 6W2  
TEL: 519-376-7612 | FAX: 519-376-8008 | WWW.WSP.COM

DESIGN	P S B
DRAWN	T C G
APPROVED	P S B
DATE	FEB 21/19
SCALE	AS SHOWN
FILE No.	101-16942-00
FIG. No.	2



LEGEND :

- 235.00 PROPOSED FINAL CONTOURS (TOP OF WASTE)
- SITE BOUNDARY
- CONCESSION/LOT LINE
- APPROXIMATE LIMIT OF WASTE
- EXISTING GROUND CONTOURS (0.5m INTERVAL)
- EXISTING GROUND CONTOURS (2.5m INTERVAL)
- EDGE OF GRAVEL
- EXISTING FENCE LINE
- EXISTING DITCH
- EXISTING TREELINE
- OBSERVATION WELL
- GAS PROBE
- TEST PIT

NOTES:

- TOPOGRAPHICAL INFORMATION DERIVED FROM SURVEY COMPLETED BY SMC GEOMATICS IN DECEMBER 7, 2018 AND HISTORIC SURVEY INFORMATION OBTAINED BY WSP.
- GRID AS SHOWN ON THIS PLAN IS BASED ON UTM COORDINATES. ADD 4,870,000 TO NORTHING AND 450,000 TO EASTING TO ESTABLISH PROPER COORDINATES.

SCALE : 1:1500



HURON LANDFILL  
PROPOSED FINAL CONTOURS - REVISED  
(TOP OF WASTE)



101-1490 1st AVENUE W  
OWEN SOUND (ONTARIO) CANADA N4K 6W2  
TEL: 519-376-7612 | FAX: 519-376-8008 | WWW.WSP.COM

DESIGN	P S B
DRAWN	T C G
APPROVED	P S B
DATE	FEB 21/19
SCALE	AS SHOWN
FILE No.	101-16942-00
FIG. No.	3





## Compliance Summary Inspection Report

<b>Client:</b>	The Corporation of the Township of Huron-Kinloss Mailing Address: 21 Queen St, Huron-Kinloss, Ontario, Canada, N0G 2R0 Physical Address: 21 Queen St, Huron-Kinloss, Township, County of Bruce, Ontario, Canada, N0G 2R0 Telephone: (519)395-3735, Extension: 130, FAX: (519)395-4107, email: jyungblut@huronkinloss.com Client #: 4545-4MERDZ, Client Type: Municipal Government, NAICS: 22131		
<b>Inspection Site Address:</b>	Huron Landfill Site Address: Lot: 19, 20, Concession: 5, Concession Road 6, Geographic Township: BRUCE, Huron-Kinloss, Township, County of Bruce, N0G 2R0 District Office: Owen Sound GeoReference: Map Datum: NAD27, Zone: 17, Accuracy Estimate: 1-10 metres eg. Good Quality GPS, Method: GPS, UTM Easting: 451457, UTM Northing: 4878824, UTM Location Description: Entrance gate., LIO GeoReference: Zone: , UTM Easting: , UTM Northing: , Latitude: 44.2708, Longitude: -81.433 Site #: 3678-5Q8L7L		
<b>Contact Name:</b>	John Yungblut	<b>Title:</b>	Director of Public Works
<b>Contact Telephone:</b>	519-395-3735 ext	<b>Contact Fax:</b>	
<b>Last Inspection Date:</b>	2019/01/16		
<b>Inspection Start Date:</b>	2020/08/26	<b>Inspection Finish Date:</b>	2020/08/26
<b>Region:</b>	Southwestern		

### 1.0 INTRODUCTION

The Huron Landfill Site waste disposal facility was inspected as part of the Ministry of the Environment, Conservation and Parks (MECP) 2020/2021 Regional Landfill Project. The purpose of this inspection was to assess the Huron Landfill for leachate generation, leachate controls and run-off conditions.

This inspection included an unannounced site visit conducted on August 26, 2020, to inspect stormwater and leachate management at the site and operations that may impact leachate quantity and quality. At the time of the inspection the landfill site was open and the landfill attendant was available at the site.

A previous MECP inspection was conducted at this site on January 16, 2019. The landfill is owned and operated by the Township of Huron-Kinloss and services the residential and industrial, commercial and institutional sectors located within the service area.

The landfill is located on Part Lots 19 and 20, Concession 5, in the former Township of Huron in the amalgamated Township of Huron-Kinloss, at 2087 Concession 6 East Road; southwest of the community of Ripley.

### 2.0 INSPECTION OBSERVATIONS

During the site inspection on August 26, 2020, there was light rain. It had been raining for about an hour before the site

visit. No leachate or stormwater was observed flowing off the site during the inspection. A ditch along the landfill access road that flows to the south had signs of significant run-off based on the eroded depth of the ditch at the south end. A very deep eroded ditch was also observed in the south-west corner of the landfill. No stormwater or leachate flow was observed at the time of the inspection at either of these locations. The landfill operator also stated that he has not observed any leachate run-off from the site.

There was a large active working face of exposed waste. In addition, there was exposed waste along the sides of the access road to the working face. Waste was poorly covered in some closed or inactive landfill areas.



*Photo showing exposed waste along active area access road and large active face of landfill.*

Leachate ponding was evident near exposed waste in an apparent inactive fill area



*Photo showing ponded water and leachate in waste .*

There was a lack of vegetation on berms and inactive landfill areas. Litter was observed along the base of the slope to the north.





*Photo showing litter.*

A large number of turkey vultures and some seagulls were observed during the site visit. A large ponded area was also observed by the wood waste and metals area in the south-eastern portion of the landfill site.

Surface water and leachate flows eastward along the south side of the fill area access road. There is a tank that collects leachate near the south-west corner of the fill area access road and landfill site access road. According to the landfill operator, this tank is regularly pumped out.

## **2.1 AREA OF FOCUS**

**This inspection is being conducted under the following Ministry of Environment and Climate Change program(s) and/or activities:**

Waste – Solid Non-Hazardous

### **Specifics:**

The purpose of this inspection was to focus on stormwater and leachate management at the site and operations that may impact leachate quantity and quality.

## **2.2 COMPLIANCE OVERVIEW**

### **Approval(s) and/or permit(s)**

Provisional Certificate of Approval # A272601 was issued on July 31, 1989, and replaced all terms and conditions in any prior Certificate # A272601.

Environmental Compliance Approval (ECA) A272601 was issued October 15, 1991 and replaced all terms and

conditions in any prior Certificate # A272601.

-ECA A272601, issued on October 15, 1991 - required registration of the ECA on the title; submission of an annual report to the MOE, monitoring of groundwater and surface water quality and imposed terms/conditions of onsite burning.

- A272601 Notice No. 1, issued on August 14, 2007 - ECA was amended to include changes to operational plans to clarify theoretical capacity and to require a new Design and Operations Plan within one year of issuance

- A272601 Notice No. 2, issued on July 6, 2010 - ECA was amended to change the landfilling operation at the Landfill from trench method to area method, for disposal of domestic, commercial and solid non-hazardous industrial wastes and to approve the establishment and operation of waste segregation/recycling centre and WEEE program at the landfill, for acceptance, temporary storage and transfer of recyclable waste.

- A272601 Notice No. 3, issued on July 9, 2010 - ECA was amended to approve expansion of the service area of the landfill site to include the Village of Lucknow.

- A272601 Notice No. 4, issued on March 2, 2012 - ECA was amended to approve operation of a Waste Segregation/Recycling Centre and WEEE program at the Landfill, for the acceptance, temporary storage, and transfer of recyclable waste.

- Amended Environmental Compliance Approval # A272601 was issued on April 16, 2020, and revokes Approval No. A272601 issued on July 31, 1989. This amendment was to address Fill Beyond Approved Limit (FBAL).

**Specifics:**

### 3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

Action was required as a result of a past inspection or incident (related)

**Specifics:**

The following previous non-compliance issues were noted in the January 2019 inspection;

Daily cover was a non-compliance issue during both the 2019 and 2018 site inspections. The Owner/Operator shall ensure daily cover is maintained on the open face of the waste fill area as required by Condition 3.3 of the ECA. - **See below.**

On or before April 30, 2019, the Owner/Operator shall implement the Leachate Contingency Plan as per Section 9.2 of the Design and Operation Plan to address the pond-like formation of leachate to the south western corner of the landfill area near to the interceptor berm and provide notification of completion to the undersigned Provincial Officer. The consultant responded that the Leachate Contingency Plan outlined in Section 9.2 of the Design and Operation Plan is applicable to exceedance of groundwater trigger levels. The environmental monitoring program has not detected any excessive groundwater impacts and as such, there is no need to implement any identified leachate control contingency measure in the form of an interceptor trench, toe drain or purge wells. However, surface water impacts which were observed at the site will be addressed through various operational procedures and presented in the Stormwater Management Plan Report. - **Complete**

In 2018, it came to the ministry's attention that a stormwater ECA was not submitted in contravention to Condition 6.6 of ECA # A272601. An ECA application was received by the MECP on August 9, 2019, for a stormwater management facility as per condition 6.6 of Environmental Compliance Approval No. A272601 (MECP Reference # 2988-BEVL3). - **Complete**

### 4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

**Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate?**

No

**Specifics:**

**Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?**

No

**Specifics:**

**Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment ?**

Yes

**Specifics:**

During the inspection it was observed that the working face of the landfill did not appear to be covered in accordance with Condition 3.3 of the ECA. The entire working face waste did not appear to be covered regularly and waste is exposed in other areas of the site. Numerous scavenging birds (including gulls and numerous turkey vultures) were present at the site and debris and litter observed outside of the active area of the landfill.

**Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?**

No

**Specifics:**

**Was there any indication of minor administrative non-compliance?**

No

**Specifics:**

## 5.0 ACTION(S) REQUIRED

1. By October 26, 2020, cover all exposed waste outside the active face and ensure daily cover as described in condition 3.3 of ECA # A272601
2. By October 26, 2020, collect litter from around the site and deposit in the active fill area.
3. By November 6, 2020, submit a written report to the Ministry, Owen Sound District Office, to the attention of the undersigned, that outlines the details of the actions taken to complete items 1 and 2.

## 6.0 OTHER INSPECTION FINDINGS

**Specifics:**

Every effort should be made to divert water away from the open face of the landfill. It appeared that the active, or working, face was large. Waste should be disposed of in a manner that minimizes the area of exposed waste and waste is to be covered at the end of each working day.

At the time of the inspection visit, waste coverage appeared to be inefficient, incomplete, and was not acceptable. The landfill was open at the time of the inspection and so the working face was not covered, however, it appeared the working face may not have been covered daily based on the amount of exposed waste. There is the potential for increased vermin and vector control issues with the exposed waste. In addition, more exposed waste would likely lead

to increase leachate generation. As noted in section 3.0 above, the issue of inadequate waste coverage was also raised at the time of the last inspection.

Efforts to control and collect windblown and scattered debris is an ongoing need. The consultant's recommendation in the Design and Operations Manual to install fencing to prevent wind-blown litter should be considered. The daily operator's log should include details of any litter control efforts (which may be scrutinized in a future inspection).

## 7.0 INCIDENT REPORT

Applicable  
8534-BTGEL 

## 8.0 ATTACHMENTS

### PREPARED BY:

Environmental Officer:

Name: None Assigned

District Office:

Date:

Signature

### REVIEWED BY:

District Supervisor:

Name: Ian Mitchell  
District Office: Owen Sound District Office, P.Eng.

Date: 2020/09/17

Signature:



File Storage Number: SI BR HK C5 610

### Note:

This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements.

We want to hear from you. Please tell us about the quality of your interaction with our staff. You can provide feedback at 1-888-745-8888.





## The Corporation of the Township of Huron-Kinloss

21 Queen Street  
P.O. Box 130  
Ripley, Ontario  
N0G 2R0

519-395-3735  
Fax: 519-395-4107  
info@huronkinloss.com  
[www.huronkinloss.com](http://www.huronkinloss.com)

File: 300 Huron Landfill

November 2, 2020

Mr. Ian Mitchell  
Ministry of Environment, Conservation and Parks  
101-17<sup>th</sup> Street East  
3<sup>rd</sup> Floor  
Owen Sound, ON  
N4K 0A5

Dear Mr. Mitchell,

This letter is in response to the action items described in the Solid Non-Hazardous Waste Disposal Site Inspection Report, dated Sept. 17, 2020 in reference to the Huron Landfill Site. Our response is in the same order as presented in Section 5.0 Action(s) Required, of the MECP Report.

### ITEM 1

*"By October 26, 2020, cover all exposed waste outside the active face and ensure daily cover as described in condition 3.3 of ECA #A272601"*

As shown in the photos below, the exposed waste has now been covered.







## **The Corporation of the Township of Huron-Kinloss**

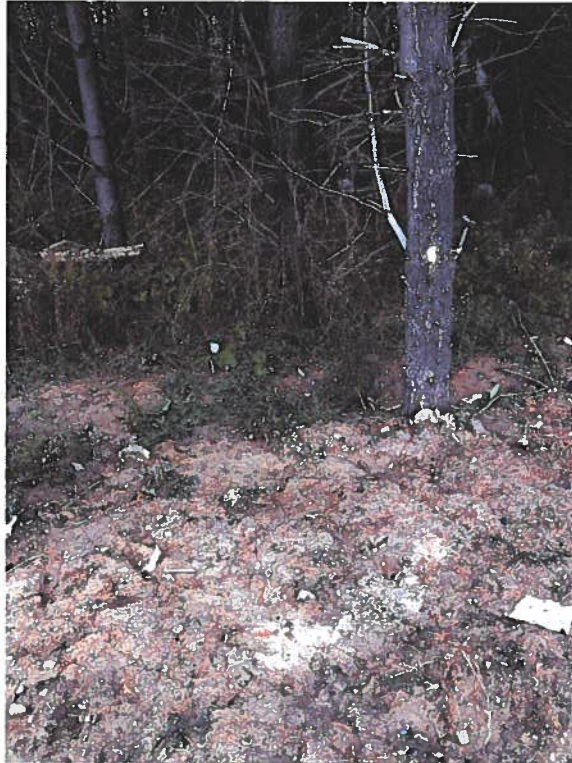
21 Queen Street  
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N0G 2R0

519-395-3735  
Fax: 519-395-4107  
info@huronkinloss.com  
[www.huronkinloss.com](http://www.huronkinloss.com)

### **ITEM 2**

*"By October 26, 2020, collect litter from around the site and deposit in the active fill area."*

As shown in the photo below, the litter around the site has been collected.



### **ITEM 3**

*"By November 6, 2020, submit a written report to the Ministry, Owen Sounds District Office, to the attention of the undersigned, that outlines the details of the actions taken to complete items 1 and 2."*

This letter is intended to satisfy Action Item 3.



## **The Corporation of the Township of Huron-Kinloss**

21 Queen Street  
P.O. Box 130  
Ripley, Ontario  
N0G 2R0

519-395-3735  
Fax: 519-395-4107  
info@huronkinloss.com  
**www.huronkinloss.com**

Yours truly,

John R. Yungblut, C.E.T.  
Director of Public Works  
Township of Huron-Kinloss  
519-395-3735 ext. 130  
[jyungblut@huronkinloss.com](mailto:jyungblut@huronkinloss.com)



## Township of Huron-Kinloss

### Landfill Training

### Monthly Review - January

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position and signature in the section below. The supervisor shall record the date the training was conducted.

#### Topics Covered:

- ☐ Health & Safety Policy: HKHS 1 – Individual Responsibilities
- ☐ Health & Safety Procedure(s): HKHS 2.1 - General Safety Rules, SOP ALL 2 Extension Ladder  
SOP ALL 5 Battery Boosting
- ☐ SDS: De-icer
- ☐ Internal Procedure: 5.3.22 Handling Chemical and Fuel Spills/Leaks
- ☐ Video: Slips, Trips & Falls
- ☐ Resources: Health & Safety Manual, SDS Binder, IPs, HR Downloads

Name: Please Print	Signature	Position
Edmiston, Terry		Operator-in-Charge
Kreller, Lisa		Landfill Attendant
Louther, Chris		Landfill Worker

**Date(s):** \_\_\_\_\_



## Township of Huron-Kinloss

### LANDFILL TRAINING

### Monthly Review - February

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position and signature in the section below. The supervisor shall record the date the training was conducted.

#### Topics Covered:

- ☐ Health & Safety Policy: HKHS 2 – Committees
- ☐ Health & Safety Procedure(s): HKHS 2.2 – Personal Protective Equipment, SOP ALL 3  
Backing Up, SOP PW 10 Half-ton Pickup Truck
- ☐ SDS: Gasoline
- ☐ Video: Infection Prevention & Control (18 min)
- ☐ Resources: Health & Safety Manual, SDS Binder, Ontario Electronic Stewardship agreement,

Name: Please Print	Signature	Position
Edmiston, Terry		Operator-in-Charge
Kreller, Lisa		Landfill Attendant
Louther, Chris		Landfill Worker

**Date(s):** \_\_\_\_\_



## Township of Huron-Kinloss

### LANDFILL TRAINING

### Monthly Review - March

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position and signature in the section below. The supervisor shall record the date the training was conducted.

#### Topics Covered:

- ☐ Health & Safety Policy: HKHS 3 – Workplace Inspections
- ☐ Health & Safety Procedure(s): HKHS 2.3 – Lockout/Block-out, SOP ALL 7 Power Tools, SOP ALL 8 Hand Tools, SOP PW 22 Pressure Washer
- ☐ SDS: RATAK Rodenticide
- ☐ Video: Recognition, Evaluation and Control of Hazards
- ☐ Resources: Health & Safety Manual, SDS Binder *Environmental Protection Act*

Name: Please Print	Signature	Position
Edmiston, Terry		
Kreller, Lisa		Landfill Attendant
Louther, Chris		Landfill Worker

Date(s): \_\_\_\_\_



## Township of Huron-Kinloss

### LANDFILL TRAINING

### Monthly Review - April

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position and signature in the section below. The supervisor shall record the date the training was conducted.

#### Topics Covered:

- ☐ Health & Safety Policy: HKHS 4 – Employee Accident/Incident Reporting Guidelines
- ☐ Health & Safety Procedure(s): HKHS 2.7 – Hearing Protection
- ☐ SDS: RAID Flying Insect Killer
- ☐ Emergency Procedures: What to do if there is an explosion on-site or close to site
- ☐ Resources: Health & Safety Manual, SDS Binder, Landfill EP-002 Explosion

Name: Please Print	Signature	Position
Edmiston, Terry		
Kreller, Lisa		Landfill Attendant
Louther, Chris		Landfill Worker

**Date(s):** \_\_\_\_\_



## Township of Huron-Kinloss LANDFILL TRAINING

### Monthly Review - May

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position, and signature in the section below. The supervisor shall record the date the training was conducted.

#### Topics Covered:

Policy: HKHS 5 – WSIB Reporting  
Procedure: SOP PW 1 Traffic Control, SOP ALL 12 West Nile Virus,  
SOP ALL 13 Sunblock/Sunscreen and Insect Repellent  
Safety Data Sheet(s): Sunscreen, Insect Repellent  
Emergency Procedure:  
  
Resources: Health & Safety Manual, SDS Binder, Policies & Procedures Manual

☐ Emergency Procedures: What to do if there is a severe weather conditions (i.e. wind, flood, earthquake, tornado, extreme snow squalls)

Name: Please Print	Signature	Position
Dakin, Les		Landfill Worker Kinloss
Edmiston, Terry		Operator in Charge
Kreller, Lisa		Landfill Attendant
Louther, Chris		Landfill Worker Huron

**Date(s):** \_\_\_\_\_



## Township of Huron-Kinloss LANDFILL TRAINING

### Monthly Review - June

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position, and signature in the section below. The supervisor shall record the date the training was conducted.

#### Topics Covered:

Policy: HKHS 6 – Modified Work  
Procedure: HKHS 2.8 – Visitors to Site, SOP ALL 11 Handling Fuel, SOP PW 29 Burning Brush  
Safety Data Sheet(s): WD-40  
Emergency Procedure: 5.3.25 Fire  
Environmental Concerns: EPA Reg. 347: Sections 11 – 16.1 Standards for Sites  
  
Resources: Health & Safety Manual, SDS Binder, Policies & Procedures Manual  
*Environmental Protection Act*

Name: Please Print	Signature	Position
Dakin, Les		Landfill Worker Kinloss
Edmiston, Terry		Operator in Charge
Kreller, Lisa		Landfill Attendant
Louther, Chris		Landfill Worker Huron

**Date(s):** \_\_\_\_\_





## Township of Huron-Kinloss

### LANDFILL TRAINING

### Monthly Review - July

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position and signature in the section below. The supervisor shall record the date the training was conducted.

#### Topics Covered:

- ☐ Health & Safety Policy: HKHS 7 – Refusal to Work
- ☐ Health & Safety Procedure(s): SOP ALL 10 Lifting and Handling, SOP ALL 16B Eyewash
- ☐ Video: Heat Stress & Prevention
- ☐ Emergency Procedures: What to do if a severe or critical injury occurs on-site
- ☐ Resources: Health & Safety Manual, HR Downloads, Landfill EP-005 – Severe/Critical Injury

Name: Please Print	Signature	Position
Edmiston, Terry		
Kreller, Lisa		Landfill Attendant
Louther, Chris		Landfill Worker

Date(s): \_\_\_\_\_



## Township of Huron-Kinloss

### LANDFILL TRAINING

### Monthly Review - August

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position and signature in the section below. The supervisor shall record the date the training was conducted.

#### Topics Covered:

- ☐ Health & Safety Policy: HKHS 8 – Health and Safety Training
- ☐ Health & Safety Procedure(s): SOP ALL 21 Needle Collection/Disposal,  
PW 26 CAT 816F Compactor
- ☐ Video & Quiz: WHMIS 2015 Refresher
- ☐ Resources: Health & Safety Manual, HR Downloads

Name: Please Print	Signature	Position
Dakin, Les		Casual Landfill Worker
Edmiston, Terry		Operator-in-Charge
Kreller, Lisa		Landfill Attendant
Louther, Chris		Landfill Worker

Date(s): \_\_\_\_\_



## Township of Huron-Kinloss

### LANDFILL TRAINING

#### Monthly Review - September

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position and signature in the section below. The supervisor shall record the date the training was conducted.

#### Topics Covered:

- ☐ Health & Safety Policy: HKHS 9 – Hazardous Conditions Reporting, HKHS 11 – Disciplinary Policy
- ☐ Health & Safety Procedure(s): SOP ALL 18 Fire Extinguisher, SOP PW 31 Methane Detector
- ☐ SDS: Fire Extinguisher
- ☐ Video: Fire Safety
- ☐ Resources: Health & Safety Manual, SDS Binder

Name: Please Print	Signature	Position
Edmiston, Terry		Landfill Operator in Charge
Kreller, Lisa		Landfill Attendant
Louther, Chris		Landfill Worker

**Date(s):** \_\_\_\_\_



## Township of Huron-Kinloss

### LANDFILL TRAINING

### Monthly Review - October

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position and signature in the section below. The supervisor shall record the date the training was conducted.

#### Topics Covered:

- ☐ Health & Safety Policy: HKHS 10 – Standard Operating Procedures
- ☐ Health & Safety Procedure(s): SOP ALL 23 Hand-held Communication Devices
- ☐ EP03 – Severe Weather, IP – Vehicle Use
- ☐ Video: Cold Stress (20 min)
- ☐ SDS: Dymel
- ☐ Resources: H&S Manual, SDS Binder, Emergency Procedures, Internal Procedures

Name: Please Print	Signature	Position
Edmiston, Terry		Landfill Operator in Charge
Kreller, Lisa		Landfill Attendant
Louther, Chris		Landfill Worker

**Date(s):** \_\_\_\_\_



## Township of Huron-Kinloss

### LANDFILL TRAINING Monthly Review - November

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position, and signature in the section below. The supervisor shall record the date the training was conducted.

#### Topics Covered:

- ☐ Health & Safety Policy: HKHS 12 – Ergonomics Policy
- ☐ Health & Safety Procedure(s): HKHS 2.6 – Emergency Procedures
- ☐ Internal Procedure(s): 5.3.19 Power Outage, 5.3.20 Close Due to Severe Weather,  
5.3.21 No Internet
- ☐ SDS: Instant Hand Sanitizer
- ☐ Emergency Procedures: Appendix F – Emergency Notification
- ☐ Resources: Health & Safety Manual, SDS Binder, Township of Huron-Kinloss Emergency  
Response Plan (ERP)

Name: Please Print	Signature	Position
Edmiston, Terry		Landfill Operator in Charge
Kreller, Lisa		Landfill Attendant
Louther, Chris		Landfill Worker

**Date(s):** \_\_\_\_\_



## Township of Huron-Kinloss

### LANDFILL TRAINING

#### Monthly Review - December

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position and signature in the section below. The supervisor shall record the date the training was conducted.

#### Topics Covered:

- ☐ Health & Safety Policy: HKHS 13 – Violence and Harassment in the Workplace Policy
- ☐ Health & Safety Procedure(s): SOP ALL 25 Dealing with Aggressive or Violent People,  
SOP ALL 27 Safe Visits, SOP PW 30 Restricting Access at  
Public Works Buildings
- ☐ SDS: Printer Ink
- ☐ Resources: Health & Safety Manual, SDS Binder, Scenarios

Name: Please Print	Signature	Position
Edmiston, Terry		Operator-in-Charge
Kreller, Lisa		Landfill Attendant
Louther, Chris		Landfill Worker

**Date(s):** \_\_\_\_\_

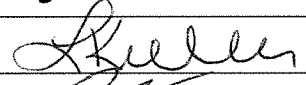
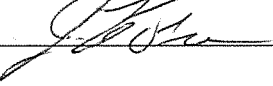


## Township of Huron-Kinloss

### LANDFILL TRAINING Monthly Review – April

#### Topics Covered:

- ☐ Health & Safety Policy: Workplace Violence and Harassment Policy
- ☐ Health & Safety Procedure(s): Workplace Violence and Harassment Procedure
- ☐ Internal Procedure(s): N/A
- ☐ SDS: N/A
- ☐ Resource Video: HR Download (Lisa watched video, Mark and Jim had completed recently in orientation)

Name: Please Print	Position	Signature
Kreller, Lisa	Operator In Charge	
LeFeuvre, Jim	Landfill Worker	
Elroy, Mark		

Date(s): \_\_\_\_\_ Trainer: \_\_\_\_\_



## Township of Huron-Kinloss

### LANDFILL TRAINING Monthly Review – May

#### Topics Covered:

**Policy:** HKHS-12 Ergonomics

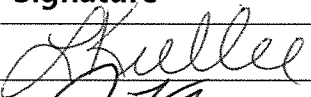
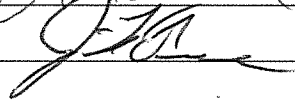
**Procedure(s):** SOP All 10 Lifting and Handling, SOP All 13 Sunblock/Sunscreen Insect repellent

**SDS:** Sunscreen, Insect Repellent

**Other:** Best Practices Stacking Boxes

**Videos:** Lifting from the Floor - YouTube Why do we have to wear sunscreen? - Kevin P. Boyd - YouTube Bonus video How the sun sees you - YouTube

**Resources:** Health and Safety Manual, You Tube

Name: Please Print	Position	Signature
Kreller, Lisa	Operator In charge	
LeFeuvre, Jim	Landfill worker	

**Date(s):** May 27 2022 **Trainer:** Mel Moulton





## Township of Huron-Kinloss

### LANDFILL TRAINING Monthly Review – June

#### Topics Covered:

**Policy:** HKHS-04 Employee Accident/Incident Reporting

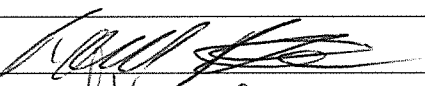

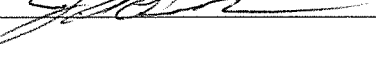
**Procedure(s):** SOP ALL 11 Handling of Fuel/Refueling of Vehicles

**SDS:** Diesel Fuel, Gasoline, Milk Jugg Fly trap

**Other:**

**Videos:**

**Resources:** Health and Safety Manual

Name: Please Print	Position	Signature
Hoggarth, Tamara	land fill attendant	
Kreller, Lisa	Operator in charge	
LeFeuvre, Jim	Landfill Worker	

**Date(s):** June 23, 2022 **Trainer:** Mel Moulton



## Township of Huron-Kinloss

### LANDFILL TRAINING Monthly Review – July

#### Topics Covered:

**Policy:** HKHS 6 Modified Work

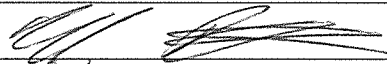

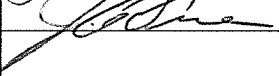
**Procedure(s):** SOP PW 29 Burning Brush, SOP PW 33 Yard Waste Disposal

**SDS:** WD-40

**Other:** IHSA Heat Stress safety talk

**Videos:**

**Resources:** Health and Safety Manual, IHSA

Name: Please Print	Position	Signature
Hoggarth, Tamara	Landfill Attender	
Kreller, Lisa	Operator In Charge	
LeFeuvre, Jim	Landfill Worker	

**Date(s):** July 26, 2022 **Trainer:** Mel Moulton



## Township of Huron-Kinloss

### LANDFILL TRAINING Monthly Review – September

#### Topics Covered:

**Policy:**




**Procedure(s):**

**SDS:**

**Other:** Sharps safety talk, Workplace Violence and Harassment Risk Assessment

**Videos:**

**Resources:** IHSA

Name: Please Print	Position	Signature
Hoggarth, Tamara	Attendant	
Kreller, Lisa	Operator In Charge	
LeFeuvre, Jim	Landfill Worker	

**Date(s):** September 23 2022 **Trainer:** Mel Moulton



## Township of Huron-Kinloss

### LANDFILL TRAINING Monthly Review – September

#### Topics Covered:

**Policy:**

**Procedure(s):** SOP ALL 46 Loading and unloading trailers

**SDS:**

**Other:**

**Videos:**

**Resources:**

Name: Please Print	Position	Signature
Kreller, Lisa	Operator In Charge	<i>Lisa Kreller</i>
LeFeuvre, Jim	Landfill Worker	<i>Jim LeFeuvre</i>

**Date(s):** September 29 2022 **Trainer:** Mel Moulton

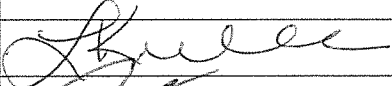



## Township of Huron-Kinloss

### LANDFILL TRAINING Monthly Review

#### Topics Covered:

Policy: HKHS-1 Individual Responsibilities  
Procedure(s): Wastewater Pumping SOP PW 37  
SDS: WD-40  
Other:  
Videos:  
Resources:

Name: Please Print	Position	Signature
Hoggarth, Tamara		
Kreller, Lisa	Operator In Charge	
LeFeuvre, Jim	Landfill Worker	

**Date(s):** October 27 2022 **Trainer:** Mel Moulton


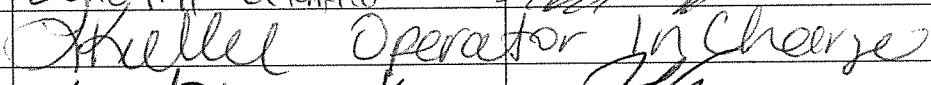



## Township of Huron-Kinloss

### LANDFILL TRAINING Monthly Review

#### Topics Covered:

Policy: HKHS -1 HKHS -2  
Procedure(s):  
SDS:  
Resources:

Name: Please Print	Position	Signature
Hoggarth, Tamara	Landfill attended	
Kreller, Lisa	Operator in Charge	
LeFeuvre, Jim	Landfill worker	

**Date(s):** Nov 25 2022 **Trainer:** Mel Moulton






## Township of Huron-Kinloss

### LANDFILL TRAINING Monthly Review

#### Topics Covered:

**Policy:** HKHS - 3 Workplace inspection, 4 Incident Reporting, 5-WSIB Reporting  
**Procedure(s):** 6- Modified work, 7- Refusal to work  
**SDS:**  
**Resources:**

Name: Please Print	Position	Signature
Hoggarth, Tamara	Landfill	
Kreller, Lisa	Operator In Charge	
LeFeuvre, Jim	Landfill Worker	

**Date(s):** Dec 13/22 **Trainer:** Mel Moulton

# Methane Detection Log

DATE	TIME	LOCATION	ppm	LEL%
Sept 29/22	7:30am	office/shed	840	
Oct 1/22	8am	office/shed	<40	
Oct 3/22	7am	office/shed	<40	
Oct 4/22	8:15am	office/shed	<40	
Oct 13/22	7:15am	office/shed	<40	
Oct 14/22	8:30am	office/shed	<40	
Oct 15/22	8:15am	office/shed	<40	
Oct 17/22	8am	office/shed	<40	
Oct 18/2022	8:15am	office/shed	<40	
Oct 20/2022	7:15am	office/shed	<40	
Oct 21/2022	8am	office/shed	<40	
Oct 22/2022	8:15am	office/shed	<40	
Oct 24/2022	7:10am	office/shed	<40	
Oct 25/2022	9:45am	office/shed	<40	
Oct 27/2022	7:30am	office/shed	<40	
Oct 28/2022	8:30am	office/shed	<40	
Oct 29/2022	9:45am	office/shed	<40	
Oct 31/2022	7:30am	office/shed	<40	
Nov 1/2022	8:10am	office/shed	<40	
Nov 3/2022	7:15am	office/shed	<40	
Nov 4/2022	8:30am	office/shed	<40	
Nov 5/2022	8:15am	office/shed	<40	
Nov 7/2022	7:15am	office/shed	<40	
Nov 8/2022	8am	office/shed	<40	
Nov 10/2022	7:30am	office/shed	<40	
Nov 14/2022	7am	office/shed	<40	
Nov 15/2022	8:15am	office/shed	<40	
Nov 17/2022	8am	office/shed	<40	
Nov 24/2022	7:30am	office/shed	<40	

ppm = parts per million  
LEL = lower explosive limit

W:\Tracey\PW\Landfill\Methane Log



# Methane Detection Log

DATE	TIME	LOCATION	ppm	LEL%
Nov 28/22	7:15am	Shed/office	<40	
Dec 1/2022	7:30am	Shed/office	<40	
Dec 2/2022	7:39am	Shed/office	<40	
Dec 3/2022	7:45am	shed/office	<40	
Dec 5/2022	7am	shed/office	<40	
Dec 6/2022	8:30am	Shed/office	<40	
Dec 8/2022	11am	shed/office	<40	
Dec 9/2022	8am	shed/office	<40	
Dec 12/2022	7am	shed/office	<40	
Dec 30/22	8am	Shed/office	<40	
Dec 31/22	8am	Shed/office	<40	
Jan 2/23	10pm	Shed/office	<40	
Jan 3/23	7am	shed/office	<40	
Jan 5/23	7am	shed/office	<40	
Jan 6/2023	7am	shed/office	<40	
Jan 7/2023	8am	shed/office	<40	
Jan 9/2023	7am	Shed/office	<40	
Jan 12/2023	7am	shed/office	<40	
Jan 13/2023	8am	shed/office	<40	
Jan 14/2023	8am	shed/office	<40	
Jan 16/2023	7am	shed/office	<40	
Jan 17/2023	8:15am	shed/office	<40	
Jan 19/2023	10:00am	shed/office	<40	
Jan 20/2023	8:15am	Shed/office	<40	
Jan 21/2023	9:00am	Shed/office	<40	
Jan 23/2023	8:15	Shed/office	<40	
Jan 24/2023	8:15	Shed/office	<40	
Jan 25/23	8am	shed/office	<40	
Jan 26/23	7am	shed/office	<40	

ppm = parts per million  
LEL = lower explosive limit

## Methane Detection Log

[illegible]

ppm = parts per million  
LEL = lower explosive limit

W:\Tracey\PW\Landfill\Methane Log



Huron Landfill  
2087 CONCESSION 6 E, HURON-KINLOSS, ON,  
**Inspection Report**

System Number:

Entity: THE CORPORATION OF THE  
TOWNSHIP OF HURON-KINLOSS

Inspection Start Date: 05/10/2022

Inspection End Date: 05/17/2022

Inspected By: Lisa Hines

Badge #: 1876



---

(signature)

### **NON-COMPLIANCE/NON-CONFORMANCE ITEMS**

The following item(s) have been identified as non-compliance/non-conformance, based on a "No" response captured for a legislative or best management practice (BMP) question (s), respectively.

#### **Question Group: Operations**

Question ID	NOL 42	Question Type	Legislative
<b>Question:</b> Is Daily cover applied to the waste at the end of each working day or as otherwise specified in the ECA?			
<b>Legislative Requirement</b>	EPA   27   (1); EPA   O. Reg. 232/98   7;		
<b>Observation/Corrective Action(s)</b> No As per Condition 3.3 of ECA #A272601, "At the end of each working day, after deposition of waste into the waste fill area, the entire working face shall be compacted and covered with a minimum thickness of 150 mm of soil cover or an approved thickness of alternative cover material such as compost, wood-chips or foundry sand." At the time of the inspection daily cover was not observed on a large part of the open face of the waste fill area.			

#### **Question Group: Other Inspection Findings**

Question ID	949100	Question Type	Legislative
<b>Question:</b> Were the inspection questions sufficient to address other identified non-compliance items?			
Legislative Requirement	Not Applicable		
<b>Observation/Corrective Action(s)</b> The following instances of non-compliance were also noted during the inspection:  As per Condition 3.8 (a) of ECA #A272601, "The Owner/Operator shall ensure that wind-blown litter originating from the waste management activities at the Site is picked up regularly along the Site perimeter roads and access roads." At the time of the inspection, a large volume of wind-blown litter was observed along the northeastern site perimeter and along the ditches of Concession Rd 6 E.  As per the Company's Design and Operations Manual, access to the landfill site by the			

public and other unauthorized personnel will be prohibited when burning is carried out. At the time of the inspection, burning of brush was occurring while the landfill was open, and a member of the public was observed approximately 20 feet away from the burning operations.

**Actions Required:**

By June 17, 2022, the Owner shall collect all wind-blown litter from around the site and deposit in the active fill area.

The Company shall immediately comply with their Design and Operations Manual and restrict access to the site while burning operations are occurring.

The Company shall immediately comply with Condition 3.3 of ECA #A272601 by ensuring daily cover is maintained on the entire working face area.

The Company shall provide written verification to Provincial Officer Lisa Hines when each of the above action items have been completed.

## INSPECTION DETAILS

This section includes all questions that were assessed during the inspection.

**Ministry Program:** WASTE | **Regulated Activity:**

Question ID	NOL 1	Question Type	Legislative
<b>Question:</b> Does the Open landfill site have an Environmental Compliance Approval (ECA)?			
Legislative Requirement	EPA   27   (1);		
<b>Observation</b> Yes Amendment of ECA #A272601 was issued on April 16, 2020, revoking ECA #A272601 issued on July 31, 1989.			

Question ID	NOL 42	Question Type	Legislative
<b>Question:</b> Is Daily cover applied to the waste at the end of each working day or as otherwise specified in the ECA?			
<b>Legislative Requirement</b>		EPA   27   (1); EPA   O. Reg. 232/98   7;	
<b>Observation</b>  No As per Condition 3.3 of ECA #A272601, "At the end of each working day, after deposition of waste into the waste fill area, the entire working face shall be compacted and covered with a minimum thickness of 150 mm of soil cover or an approved thickness of alternative cover material such as compost, wood-chips or foundry sand." At the time of the inspection daily cover was not observed on a large part of the open face of the waste fill area.			

Question ID	949100	Question Type	Legislative
<b>Question:</b> Were the inspection questions sufficient to address other identified non-compliance items?			
<b>Legislative Requirement</b>		Not Applicable	
<b>Observation</b>			
The following instances of non-compliance were also noted during the inspection:			

As per Condition 3.8 (a) of ECA #A272601, "The Owner/Operator shall ensure that wind-blown litter originating from the waste management activities at the Site is picked up regularly along the Site perimeter roads and access roads." At the time of the inspection, a large volume of wind-blown litter was observed along the northeastern site perimeter and along the ditches of Concession Rd 6 E.

As per the Company's Design and Operations Manual, access to the landfill site by the public and other unauthorized personnel will be prohibited when burning is carried out. At the time of the inspection, burning of brush was occurring while the landfill was open, and a member of the public was observed approximately 20 feet away from the burning operations.

**Actions Required:**

By June 17, 2022, the Owner shall collect all wind-blown litter from around the site and deposit in the active fill area.

The Company shall immediately comply with their Design and Operations Manual and restrict access to the site while burning operations are occurring.

The Company shall immediately comply with Condition 3.3 of ECA #A272601 by ensuring daily cover is maintained on the entire working face area.

The Company shall provide written verification to Provincial Officer Lisa Hines when each of the above action items have been completed.

## Hutchesson, Sarah

---

**From:** John Yungblut <jyungblut@huronkinloss.com>  
**Sent:** June 16, 2022 2:28 PM  
**To:** Hines, Lisa (MECP)  
**Cc:** Mary Rose Walden; Huron Kinloss Landfill; Hutchesson, Sarah; Sarah Phelan  
**Subject:** RE: Huron Landfill Inspection  
**Attachments:** Huron Landfill Inspection Report.pdf

Hi Lisa,

We are requesting some more time to complete the areas of non-compliance included in the Huron Landfill inspection report.

Here is the anticipated timeline:

June 24 – finish placing cover material on the working face  
July 8 – collect litter that has recently migrated from the working face  
Nov. 15 – collect litter within the bush along the north side of the property

Thanks,

John Yungblut, C.E.T.  
Director of Public Works  
Township of Huron-Kinloss  
(519) 395-3735 ext. 130

---

**From:** Hines, Lisa (MECP) <Lisa.Hines@ontario.ca>  
**Sent:** June 9, 2022 2:41 PM  
**To:** John Yungblut <jyungblut@huronkinloss.com>  
**Cc:** Mary Rose Walden <mrwalden@huronkinloss.com>  
**Subject:** RE: Huron Landfill Inspection

Hi John and Mary Rose,



As discussed yesterday, please see attached Inspection Report for Huron Landfill, for the inspection conducted on May 10, 2022. Please read through it and let me know if you have any questions or concerns.

Regards,

Lisa Hines  
Senior Environmental Officer  
*Ministry of the Environment, Conservation and Parks*  
Owen Sound District Office  
101-17<sup>th</sup> Street East, 3<sup>rd</sup> Floor, Owen Sound, ON N4K 0A5  
E: [Lisa.Hines@ontario.ca](mailto:Lisa.Hines@ontario.ca)  
P: 519-270-6627  
F: 519-371-2905

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**From:** John Yungblut <[jyungblut@huronkinloss.com](mailto:jyungblut@huronkinloss.com)>  
**Sent:** June 7, 2022 11:02 AM  
**To:** Hines, Lisa (MECP) <[Lisa.Hines@ontario.ca](mailto:Lisa.Hines@ontario.ca)>  
**Cc:** Mary Rose Walden <[mrwalden@huronkinloss.com](mailto:mrwalden@huronkinloss.com)>  
**Subject:** RE: Huron Landfill Inspection

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Hi Lisa,

I'm going to be tied up from 9am-3:30pm tomorrow, but you can stop by anytime outside of those hours.

Thanks,

John

---

**From:** Hines, Lisa (MECP) <[Lisa.Hines@ontario.ca](mailto:Lisa.Hines@ontario.ca)>  
**Sent:** June 7, 2022 10:37 AM  
**To:** John Yungblut <[jyungblut@huronkinloss.com](mailto:jyungblut@huronkinloss.com)>  
**Cc:** Mary Rose Walden <[mrwalden@huronkinloss.com](mailto:mrwalden@huronkinloss.com)>  
**Subject:** Huron Landfill Inspection

Hi John,

Ian Mitchell and myself conducted an inspection of the Huron Landfill on May 10, 2022. This inspection focused mainly on proper daily cover and blown litter, as the ministry received a complaint about the blown litter along Concession 6.

I will be in the Ripley area tomorrow and would like to stop in at the Township office and have a quick meeting with you (or anyone else who oversees the landfill operations) to discuss the inspection findings. Let me know if you are available tomorrow and at what time.

Thank you,

Lisa Hines  
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**Hutchesson, Sarah**

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**From:** John Yungblut <jyungblut@huronkinloss.com>  
**Sent:** July 8, 2022 11:15 AM  
**To:** Hines, Lisa (MECP)  
**Cc:** Mary Rose Walden; Huron Kinloss Landfill; Hutchesson, Sarah  
**Subject:** RE: Huron Landfill Inspection

Hi Lisa,

We finished placing interim cover on the area outside the working face and covered the working face as well. The litter outside the property has been collected as well as everything that is not contained within the trees along the north side of the landfill area. The litter that has settled in the trees over many years is being collected as well, although as I said earlier, it's going to take a while due to the volume of litter in that area.





Thanks,

John Yungblut, C.E.T.  
Director of Public Works  
Township of Huron-Kinloss  
(519) 395-3735 ext. 130

---

**From:** Hines, Lisa (MECP) <Lisa.Hines@ontario.ca>

**Sent:** June 24, 2022 11:08 AM

**To:** John Yungblut <jyungblut@huronkinloss.com>

**Cc:** Mary Rose Walden <mrwalden@huronkinloss.com>; Huron Kinloss Landfill <landfill@huronkinloss.com>; Hutchesson, Sarah <sarah.hutchesson@wsp.com>; Sarah Phelan <sphelan@huronkinloss.com>

**Subject:** RE: Huron Landfill Inspection

Hi John,

Thank you for the update. Please keep me updated on the progress of the covering of the working face and let me know once it's completed.

Have a great weekend.

Regards,

Lisa Hines  
Senior Environmental Officer  
*Ministry of the Environment, Conservation and Parks*  
Owen Sound District Office  
101-17<sup>th</sup> Street East, 3<sup>rd</sup> Floor, Owen Sound, ON N4K 0A5  
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---

**From:** John Yungblut <[jyungblut@huronkinloss.com](mailto:jyungblut@huronkinloss.com)>

**Sent:** June 23, 2022 11:36 AM

**To:** Hines, Lisa (MECP) <[Lisa.Hines@ontario.ca](mailto:Lisa.Hines@ontario.ca)>

**Cc:** Mary Rose Walden <[mrwalden@huronkinloss.com](mailto:mrwalden@huronkinloss.com)>; Huron Kinloss Landfill <[landfill@huronkinloss.com](mailto:landfill@huronkinloss.com)>; Hutchesson, Sarah <[sarah.hutchesson@wsp.com](mailto:sarah.hutchesson@wsp.com)>; Sarah Phelan <[sphelan@huronkinloss.com](mailto:sphelan@huronkinloss.com)>

**Subject:** RE: Huron Landfill Inspection

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hi Lisa,

I have just been informed by our excavation contractor that they won't be able to make it to our site until early next week, unfortunately. Landfill staff will continue to cover what they can in the meantime, but we won't likely be finished until June 30<sup>th</sup>.

Thanks,

John

---

**From:** Hines, Lisa (MECP) <[Lisa.Hines@ontario.ca](mailto:Lisa.Hines@ontario.ca)>

**Sent:** June 20, 2022 11:40 AM

**To:** John Yungblut <[jyungblut@huronkinloss.com](mailto:jyungblut@huronkinloss.com)>

**Cc:** Mary Rose Walden <[mrwalden@huronkinloss.com](mailto:mrwalden@huronkinloss.com)>; Huron Kinloss Landfill <[landfill@huronkinloss.com](mailto:landfill@huronkinloss.com)>; Hutchesson, Sarah <[sarah.hutchesson@wsp.com](mailto:sarah.hutchesson@wsp.com)>; Sarah Phelan <[sphelan@huronkinloss.com](mailto:sphelan@huronkinloss.com)>

**Subject:** RE: Huron Landfill Inspection

Hi John,

Thank you for the email. The below provided dates are acceptable to the ministry. Please send me an email once each item below is completed.

Also, as per our phone conversation, the attached photos are the areas of most concern for windblown litter. When cleaning up the windblown litter, the municipality should start picking up any offsite litter and then work inwards towards the active working face.

If you have any questions please let me know.

Regards,

Lisa Hines

Senior Environmental Officer

*Ministry of the Environment, Conservation and Parks*

Owen Sound District Office

101-17<sup>th</sup> Street East, 3<sup>rd</sup> Floor, Owen Sound, ON N4K 0A5

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Hi Lisa,

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Here is the anticipated timeline:

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Director of Public Works

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# APPENDIX

## C BASWR RECYCLING DATA

## Village of LUCKNOW

December 2022 BASWR Tons Diverted from Landfill

	DATE	STOPS	TOTAL TONS	TOTAL TONS TO DATE	TOTAL MT TO DATE
	7-Dec-22	379			
Newspaper	21-Dec-23	364	1.61	22.92	20.79
Steel Cans			0.51	7.21	6.54
Aluminum			0.27	3.77	3.42
Mixed Glass			1.18	16.77	15.21
HDPE Plastic			0.52	7.35	6.66
PET Plastic			0.75	10.59	9.61
White Paper			0.11	1.56	1.41
Boxboard			0.89	12.63	11.45
Cardboard			3.57	44.47	40.33
TOTAL		743	9.39	127.26	115.43
TOTAL TO DATE		10367	127.26		

## HURON-KINLOSS 1,6,7

December 2022 BASWR Tons Diverted from Landfill

	DATE	STOPS	TOTAL TONS	TOTAL TONS TO DATE	TOTAL MT TO DATE
	7-Dec-22	400			
Newspaper	21-Dec-23	509	2.27	30.24	27.42
Steel Cans			0.71	9.51	8.62
Aluminum			0.37	4.97	4.51
Mixed Glass			1.66	22.12	20.06
HDPE Plastic			0.73	9.69	8.79
PET Plastic			1.05	13.97	12.67
White Paper			0.15	2.05	1.86
Boxboard			1.25	16.65	15.11
Cardboard			2.19	31.98	29.01
TOTAL		909	10.38	141.19	128.06
TOTAL TO DATE		13314	141.19		

## HURON-KINLOSS 2,3,4,5

*December 2022 BASWR Tons Diverted from Landfill*

	DATE	STOPS			
			TOTAL TONS	TOTAL TONS TO DATE	TOTAL MT TO DATE
Newspaper	2-Dec-22	329	5.84	54.69	49.60
Steel Cans	1-Dec-22	504	1.84	17.20	15.60
Aluminum	15-Dec-22	259	0.96	9.00	8.16
Mixed Glass	16-Dec-22	303	4.27	40.00	36.28
HDPE Plastic	30-Dec-23	369	1.87	17.52	15.89
PET Plastic	29-Dec-23	303	2.70	25.27	22.92
White Paper			0.40	3.71	3.37
Boxboard			3.22	30.12	27.32
Cardboard			4.77	49.08	44.52
TOTAL		2067	25.87	246.60	223.67
TOTAL TO DATE		23091	246.60		

# APPENDIX

D

GROUNDWATER  
REGIME

**TABLE D-1  
GROUNDWATER ELEVATIONS  
HURON LANDFILL SITE**

MONITOR	OW1	OW3	OW4	OW5	OW6	OW7S	OW7D	OW8S	OW8D	OW9	OW10S	OW10D	OW11
Ground Elevation (m)	49.54	51.01	50.80	51.30	51.11	49.84	49.88	49.66	49.80	50.88	43.83	43.78	51.79
Top of Casing (m)	50.24	51.76	51.60	52.12	51.95	50.77	50.81	50.21	50.40	51.73 (2)	44.76	44.50	52.61
Top of Casing (m) Nov 18, 2015					53.47 (3)								55.06 (3)
Date of Water Level Measurement													
Oct-89	45.02	45.13		45.82									
Nov-90	48.46	50.08	50.38	51.21									
May-91	48.24	49.69	49.74	50.99									
Sep-91	47.03	47.5	48.3	49.61									
May-92	48.2	49.77	49.83	50.92									
Oct-92	48.37	49.72	49.69	50.12									
May-93	48.09	49.63	49.65	51									
Sep-93	48.37	49.52	49.54	51.46									
May-94	48.67	50.13	50.27	51.15									
Oct-94	48.11	49.62	49.57	50.97									
May-95	48.24	49.96	49.77	50.95									
Sep-95	47.35	48.85	48.84	50.21									
May-96	48.44	49.91	50.08	51.1									
Sep-96	47.26	48.41	48.67	51.11									
May-97	48.28	49.96	50.1	51.13									
Sep-97	47.98	48.84	48.99	50.64	49.95	47.28		46.54		38.63			
May-98	48.24	49.76	49.51	50.67	48.21	48.08	43.72	48.42	44.36	40.69			
Sep-98	46.88	47.73	48.04	49.75	46	47.19	41.34	47.74	38.09	37.76			
May-99	48.21	49.69	49.46	50.56	47.39	47.81	43.12	48.16	40.9	39.22			
Sep-99	46.75	47.82	48.21	49.25	45.82	47.01	41.43	47.54	37.62	37.01			
May-00	48.32	49.76	49.56	50.84	47.25	47.98	42.54	48.39	40.93	40.11			
Sep-00	48.6	49.83	50.09	51.13	46.57	47.7	41.35	48.67	39.15	39.79			
May-01	48.55	49.72	49.86	51.16	47.93	48.02	44.23	48.3	42.44	39.85			
Sep-01	48.08	47.64	48.08	50.12	45.86	46.95	40.52	47.54	37.55	37.8			
May-02	48.68	49.89	49.9	51.14	48.09	48.17	44.24	48.57	42.72	40.98			
Sep-02	46.98	47.82	48.13	48.49	46.25	47.09	41.17	47.31	38.64	37.55			
May-03	48.75	50.09	50.2	51.18	47.11	47.51	42.3	48.34	40.24	41.21			
Oct-03	48.66	49.95	49.73	51.05	47.28	47.3	41.53	48.46	39.42	40.64	39.44	41.17	50.61
May-04	48.84	50.16	50.2	50.92	47.85	47.97	43.51	48.51	42	41.3	41.96	42.3	50.81
Sep-04	47.94	49.06	49.14	50.19	47.11	47.39	42.43	48.13	40.69	38.55	41.69	38.6	50.17
May-05	48.28	49.74	49.54	50.73	47.8	47.96	43.73	48.29	42.12	40.7	42.67	40.49	50.79
Sep-05	48.52	47.48	47.88	47.72	46.51	47.08	41.25	46.81	39.45	37.11	40.72	37.37	49.79
Apr-06	48.64	49.99	50.12	51.12	47.9	48.19	42.97	48.59	41.52	42.11	42.32	42.74	51.18
Oct-06	48.63	48.07	48.27	50.41	46.92	47.17	42.09	47.21	39.17	37.12	41.85	37.6	49.78
Jul-07	47.4	48.64	47.91	49.32	47.17	47.01	43.2	47.33	41.69	37.75	42.03	37.85	49.2

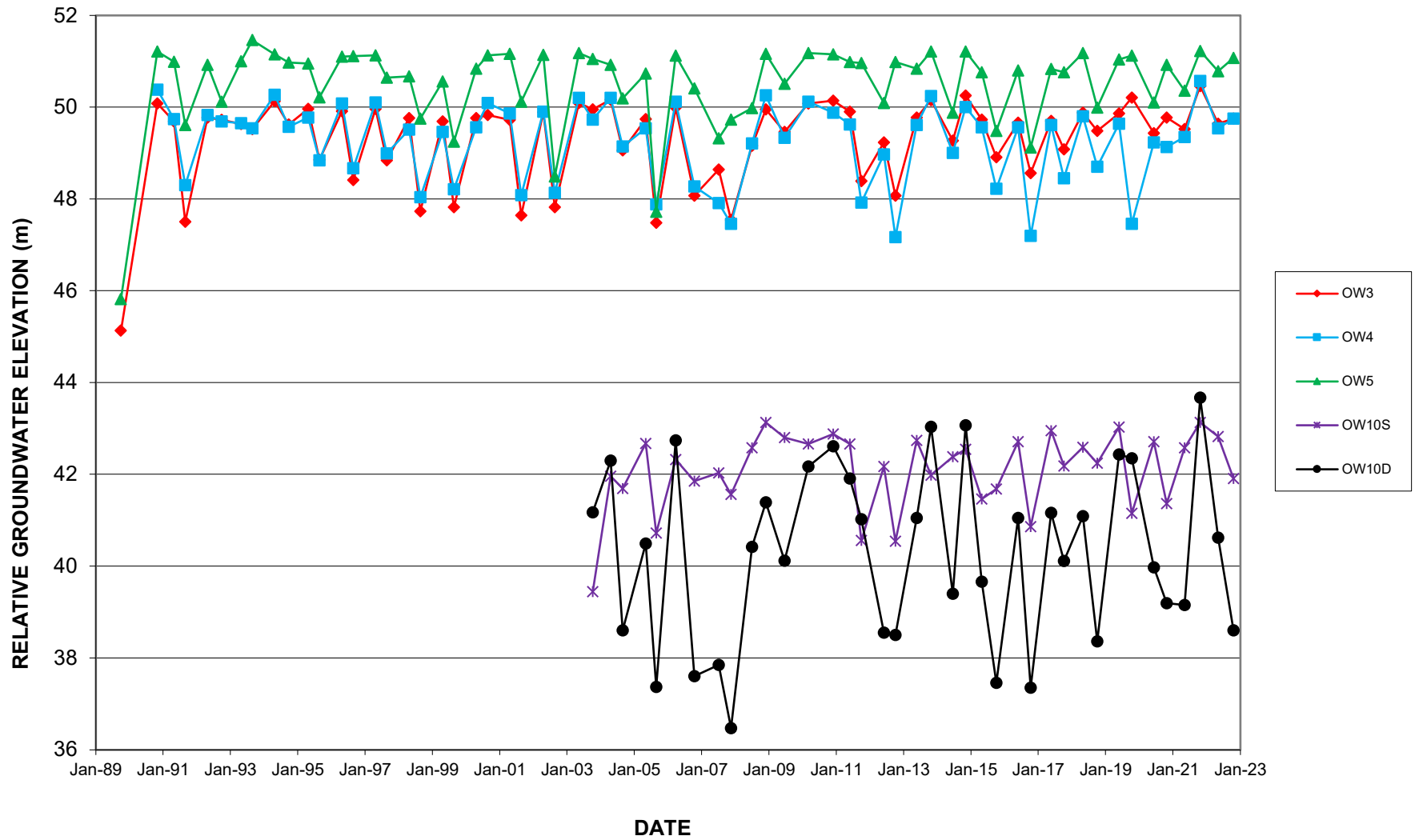
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HURON LANDFILL SITE**

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Top of Casing (m)	50.24	51.76	51.60	52.12	51.95	50.77	50.81	50.21	50.40	51.73 (2)	44.76	44.50	52.61
Top of Casing (m) Nov 18, 2015					53.47 (3)								55.06 (3)
Date of Water Level Measurement													
<b>Dec-07</b>	48.43	47.54	47.46	49.73	46.67	46.13	41.31	46.27	39.85	36.22	41.56	36.47	49.54
<b>Jul-08</b>	47.78	49.16	49.21	49.98	47.69	47.45	44.05	47.83	42.62	40.81	42.58	40.42	50.54
<b>Dec-08</b>	48.78	49.95	50.26	51.16	48.08	48.15	43.49	48.86	41.85	42.81	43.13	41.39	51.33
<b>Jul-09</b>	48.05	49.46	49.33	50.51	48.2	48.01	44.89	48.15	43.24	40.09	42.8	40.12	50.47
<b>Mar-10</b>	48.61	50.08	50.12	51.18	47.75	48.04	43.46	48.51	41.69	41.42	42.66	42.17	51.27
<b>Dec-10</b>	48.67	50.14	49.88	51.15	47.69	47.82	43.41	48.48	41.46	41.9	42.88	42.61	51.24
<b>Jun-11</b>	48.33	49.90	49.62	50.98	48.21	48.27	43.25	48.46	42.34	41.81	42.66	41.91	51.04
<b>Oct-11</b>	48.41	48.39	47.92	50.96	46.72	47.23	40.05	47.41	37.32	38.91	40.56	41.02	50.36
<b>Jun-12</b>	47.90	49.23	48.97	50.09	48.16	47.82	43.27	47.89	41.24	38.23	42.17	38.55	50.38
<b>Oct-12</b>	48.55	48.07	47.17	50.98	47.62	46.90	39.52	47.17	37.08	37.42	40.54	38.50	50.80
<b>Jun-13</b>	48.51	49.77	49.61	50.84	49.05	48.32	43.65	48.27	41.62	40.99	42.74	41.05	50.92
<b>Nov-13</b>	48.59	50.15	50.24	51.21	49.50	48.38	41.61	48.44	38.51	42.46	41.98	43.04	50.51
<b>Jul-14</b>	47.99	49.27	49.00	49.88	49.83	48.06	43.99	47.90	41.74	39.30	42.38	39.40	51.75
<b>Nov-14</b>	48.56	50.25	50.00	51.21	49.65	48.31	41.17	48.49	40.41	42.66	42.55	43.07	52.04
<b>May-15</b>	48.27	49.73	49.56	50.76	49.37	48.22	43.38	48.22	41.98	38.83	41.46	39.66	51.93
<b>Oct-15</b>	48.10	48.91	48.22	49.48	50.12	47.41	41.01	47.13	39.61	37.20	41.68	37.46	50.86
<b>Jun-16</b>	48.32	49.66	49.56	50.80	50.56	48.38	43.89	48.29	42.80	40.60	42.71	41.05	51.10
<b>Nov-16</b>	48.50	48.56	47.20	49.12	50.38	47.94	40.58	46.56	37.82	37.07	40.86	37.35	50.57
<b>Jun-17</b>	48.39	49.70	49.61	50.83	51.10	48.55	43.77	48.39	42.36	41.40	42.95	41.16	50.75
<b>Oct-17</b>	48.60	49.08	48.45	50.76	50.90	48.19	40.91	47.31	39.97	38.99	42.18	40.11	50.48
<b>May-18</b>	48.41	49.88	49.80	51.18	50.60	48.29	43.64	48.31	41.71	41.23	42.59	41.09	50.31
<b>Oct-18</b>	48.53	49.48	48.70	49.99	50.84	48.27	42.45	47.85	38.67	38.08	42.24	38.36	50.22
<b>Jun-19</b>	48.42	49.86	49.64	51.04	51.12	48.50	44.84	48.53	42.63	42.08	43.03	42.43	50.55
<b>Nov-19</b>	48.51	50.21	47.46	51.12	50.71	48.28	42.43	47.04	38.89	40.43	41.15	42.35	50.15
<b>Jul-20</b>	48.26	49.43	49.23	50.10	51.37	48.24	44.52	48.04	41.97	39.99	42.71	39.97	50.72
<b>Nov-20</b>	48.41	49.77	49.13	50.92	50.54	48.27	42.00	46.95	38.88	38.44	41.36	39.19	50.28
<b>Jun-21</b>	48.11	49.52	49.35	50.36	50.93	48.11	44.06	48.04	41.01	38.97	42.58	39.15	50.40
<b>Nov-21</b>	48.55	50.46	50.57	51.22	51.00	48.49	43.23	47.74	40.65	42.43	43.13	43.67	50.35
<b>May-22</b>	48.27	49.64	49.54	50.78	51.13	48.35	44.61	48.32	42.77	40.72	42.82	40.62	50.53
<b>Nov-22</b>	48.42	49.75	49.75	51.07	50.84	48.24	42.74	46.72	40.09	38.66	41.91	38.60	50.20

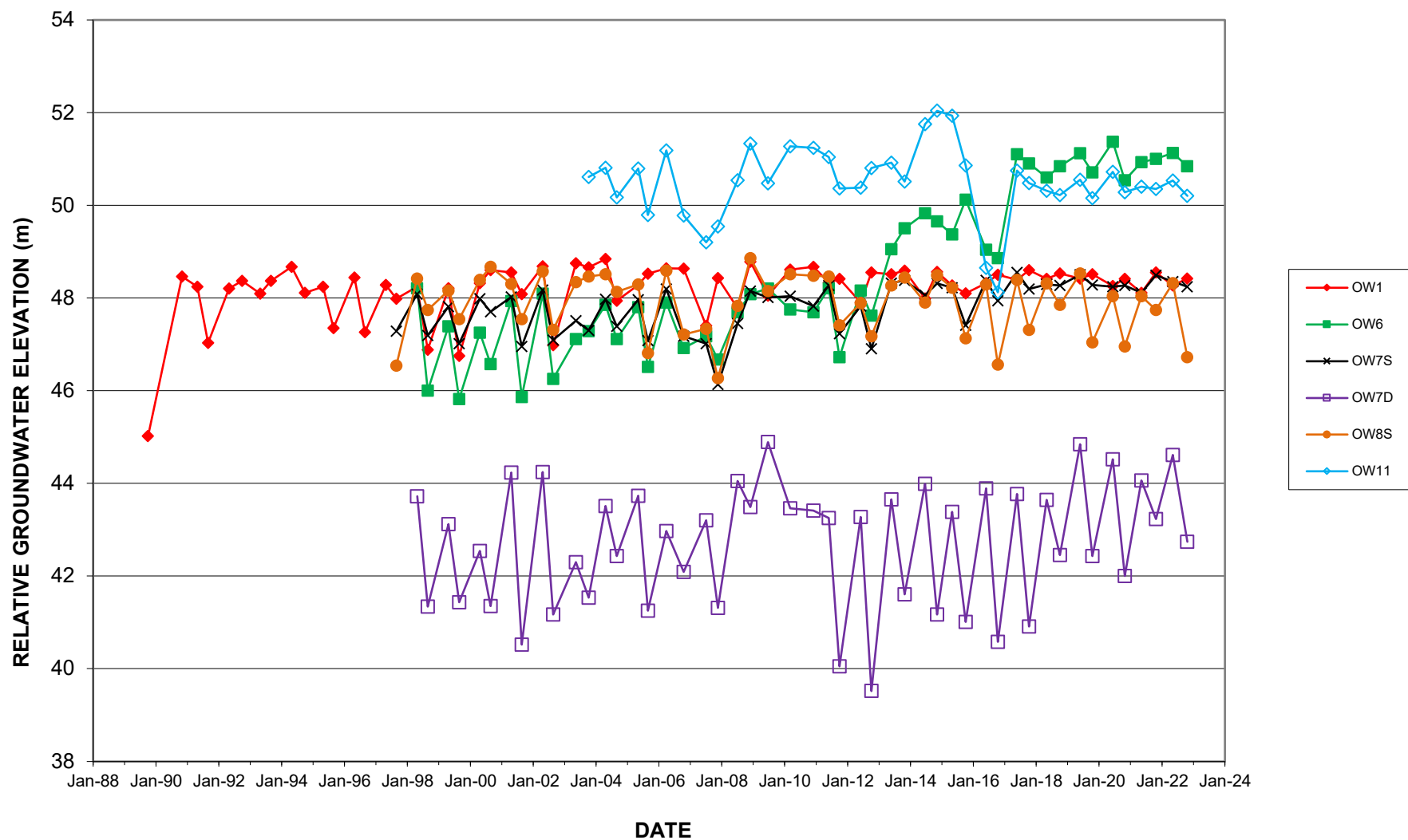
- NOTES: 1) Water elevations are metres (above arbitrary site datum).  
2) Well pipe was cut off to allow for well cap/casing security (0.075 m) July, 2014.  
3) Well pipe extensions were added on November 18, 2015 (OW6 +1.52 m and OW11 +2.45 m).



**FIGURE D-1**  
**GROUNDWATER HYDROGRAPH OF UPGRADIENT & CROSS-GRADIENT WELLS**  
**HURON LANDFILL**



**FIGURE D-2**  
**GROUNDWATER HYDROGRAPH OF LEACHATE & DOWNGRADIENT WELLS**  
**HURON LANDFILL**



MONITORING HOLE LOGS  
from Ian Wilson REABT

Constructed September 26, 1989

<u>Monitoring Hole</u>	<u>Depths (m)</u>
<u>1</u>	49.42 - 49.22
	0 - 0.20
	48.51
	0.20 - 0.91
	48.35
	0.91 - 1.07
	47.59
	1.07 - 1.83
	47.13
	1.83 - 2.29
	46.07
	2.29 - 3.35
	43.32
	3.35 - 6.10

Materials

TOPSOIL

brown, dry silty SAND

brown, dry GRAVEL and  
 SAND with traces of silt

brown, dry sandy SILT

brown, moist sandy SILT  
 with some clay

grey, moist SILT with  
 some clay and traces of  
 sand

grey, dense SILT with  
 some sand and clay with  
 some stones

45.02

i Water level at 4.40m below ground level  
 (Oct. 27, 1989)

ii Sample 1 - 4.57m

clay - 20%

silt - 61%

sand - 19%

iii Estimated coefficient of permeability  
 $9 \times 10^{-7}$  cm/sec.

2

49.81	48.90
0 - 0.91	
0.91 - 1.52	48.29

brown, dry silty SAND

brown, dry SILT with some  
 clay and sand

Monitoring hole dry

ii Sample 2 - 0.30m

silt - 33%

sand - 67%

iii Estimated coefficient of permeability  
 $2 \times 10^{-4}$  cm/sec.

iv M.H. 2 could not be advanced further  
 because of refusal (probably a rock)

v Sample 3 - 1.22m

clay - 20%

silt - 61%

sand - 19%

v Estimated coefficient of permeability  
 $6 \times 10^{-7}$  cm/sec.

3

50.77 49.40

0 - 1.37

1.37 - 1.83

1.83 - 3.66

3.66 - 6.10

brown, dry fine SAND

gray SILT with some sand  
 and clay

gray, dense SILT with  
 some clay and traces of  
 sand

gray, dense SILT with  
 some sand and clay

i Water level at 5.64m below ground level  
 (Oct. 27, 1989) 45.13

ii Sample 4 - 3.05m

clay - 13%

silt - 78%

sand - 9%

iii Estimated coefficient of permeability  
 $5 \times 10^{-6}$  cm/sec.

4

50.56 50.43

0 - 0.13

0.13 - 1.07

49.04

1.07 - 1.52

46.29

1.52 - 4.27

TOPSOIL

brown, dry GRAVEL and

SAND with traces of silt

brown, dry fine SAND with  
some silt and traces of  
clay

gray, dry, dense SILT

with some sand and clay

i Monitoring hole dry

ii Sample 5 - 0.76m

silt - 7%

sand - 43%

gravel - 50%

Estimated coefficient of  
permeability  $1 \times 10^{-2}$  cm/sec.

5

51.22 51.02

0 - 0.20

0.20 - 0.61

47.56

0.61 - 3.66

45.12

3.66 - 6.10

TOPSOIL

brown, dry, fine SAND with  
some silt

gray, dense SILT with  
some sand and clay with  
traces of stones

gray, dense SILT with  
some sand and clay

45.78

i Water level at 5.44m below ground level  
(Oct. 27, 1989)

ii Sample 6 - 0.30m

silt - 22%

sand - 78%

iii Estimated coefficient of permeability  
 $5 \times 10^{-4}$  cm/sec.

## Log of Drilling Operations

Client: Meland Engineering Services Ltd. Project: Huron Township Landfill  
 Plot No.: H-1275 Location: Huron Township Supervised by: S. Wheeldon  
 Drilling Co.: Lantech Drilling Drilling Method: CME-750 Hollow Stem Augers with S/S  
 Pole Location: See Figure 1 Date Started: 7/2/97 Date Completed: 7/2/97

Stratigraphic Description		Strat. Plot	Elev. Depth bms	D	SAMPLE				Depth Scale			
					Num.	Type	Lat	N Val	Met	ft		
Surface Elevation bms 51.00												
Fill - silt, sand and clay, brown, dense, damp, no apparent odour			50.48		Current Seal							
Fill - garbage, gray, wet to saturated, strong putrid odour			50.57									
					Bentonite Grout							
					Bentonite Seal 210 slot screen in slits sand pack All well components 80mm schedule 40 PVC							
			51.00									
			51.33									
It - some sand and clay, gray, dense, heavy, slight putrid odour			51.34									
End of Borehole			51.75				1	50	X			

Water found (dd/m/yyyy)

Station	Water Level (m)	Water Level (ft)	Water Level (in)
1	1.2	3.9	39.4
2	1.5	4.9	49.0
3	1.8	5.9	59.1
4	2.1	6.9	68.8
5	2.4	7.9	78.7
6	2.7	8.9	88.6
7	3.0	9.8	98.4
8	3.3	10.8	108.3
9	3.6	11.8	118.1
10	3.9	12.8	127.9
11	4.2	13.8	137.8
12	4.5	14.8	147.6
13	4.8	15.8	157.5
14	5.1	16.8	167.3
15	5.4	17.8	177.2
16	5.7	18.8	187.0
17	6.0	19.8	196.9
18	6.3	20.8	206.7
19	6.6	21.8	216.6
20	6.9	22.8	226.4
21	7.2	23.8	236.3
22	7.5	24.8	246.1
23	7.8	25.8	256.0
24	8.1	26.8	265.8
25	8.4	27.8	275.7
26	8.7	28.8	285.5
27	9.0	29.8	295.4
28	9.3	30.8	305.2
29	9.6	31.8	315.1
30	9.9	32.8	324.9
31	10.2	33.8	334.8
32	10.5	34.8	344.6
33	10.8	35.8	354.5
34	11.1	36.8	364.3
35	11.4	37.8	374.2
36	11.7	38.8	384.0
37	12.0	39.8	393.9
38	12.3	40.8	403.7
39	12.6	41.8	413.6
40	12.9	42.8	423.4
41	13.2	43.8	433.3
42	13.5	44.8	443.1
43	13.8	45.8	453.0
44	14.1	46.8	462.8
45	14.4	47.8	472.7
46	14.7	48.8	482.5
47	15.0	49.8	492.4
48	15.3	50.8	502.2
49	15.6	51.8	512.1
50	15.9	52.8	521.9
51	16.2	53.8	531.8
52	16.5	54.8	541.6
53	16.8	55.8	551.5
54	17.1	56.8	561.3
55	17.4	57.8	571.2
56	17.7	58.8	581.0
57	18.0	59.8	590.9
58	18.3	60.8	600.7
59	18.6	61.8	610.6
60	18.9	62.8	620.4
61	19.2	63.8	630.3
62	19.5	64.8	640.1
63	19.8	65.8	650.0
64	20.1	66.8	659.8
65	20.4	67.8	669.7
66	20.7	68.8	679.5
67	21.0	69.8	689.4
68	21.3	70.8	699.2
69	21.6	71.8	709.1
70	21.9	72.8	718.9
71	22.2	73.8	728.8
72	22.5	74.8	738.6
73	22.8	75.8	748.5
74	23.1	76.8	758.3
75	23.4	77.8	768.2
76	23.7	78.8	778.0
77	24.0	79.8	787.9
78	24.3	80.8	797.7
79	24.6	81.8	807.6
80	24.9	82.8	817.4
81	25.2	83.8	827.3
82	25.5	84.8	837.1
83	25.8	85.8	847.0
84	26.1	86.8	856.8
85	26.4	87.8	866.7
86	26.7	88.8	876.5
87	27.0	89.8	886.4
88	27.3	90.8	896.2
89	27.6	91.8	906.1

**SAMPLE TYPE**

AC 

CS 1121

RC 

### Auger Cutting

**Continuous**

## Rock Core

59 ☒

ST [REDACTED]

WE 

### Split Spoon

### Shelby Tube

### Wash Cuttings



# Log of Drilling Operations

Client: Maitland Engineering Services Ltd. Project: Huron Township Landfill  
 Well No.: H-1275 Location: Huron Township Supervised by: S. Wheeldon  
 Drilling Co.: Lantech Drilling Drilling Method: CME 750 Hollow Stem Augers with S/S  
 Well Location: See Figure 1 Date Started: 7/2/97 Date Completed: 7/2/97

Stratigraphic Description	Strat. Plot	Elev. Depth (m)		SAMPLE				Depth Scale (ft) (m)
				Num.	Type	Int.	N Val.	
Surface Elevation (m): <u>49.95</u>								
Topsoil - organics, silt, dark brown, dense, dry, no apparent odour		49.95						
Silt - trace of clay, occasional coarse grained sand, brown, dense, damp, no apparent odour		49.38						
			Cement Seal					
			Well Dry as of July 3/97					
			Bentonite Grout					
			Bentonite Seal					
			#10 slot screen in silica sand pack					
			All well components 50mm schedule 40 PVC					
© 8.38m becomes saturated		49.81						
End of Borehole		51.14						

Water found (dd/m/yr)

Static Water Level (dd/m/yr)

SAMPLE TYPE AC



Auger Cutting



Continuous



Rock Core



Split Spoon



Shelby Tube



Wash Cuttings

# Log of Drilling Operations

Client: Maldand Engineering Services Ltd. Project: Huron Township Landfill  
 Job No.: H-1275 Location: Huron Township Supervised by: S. Wheelton  
 Drilling Co.: Lantech Drilling Drilling Method: CME 750 Hollow Stem Augers with S/S  
 Hole Location: See Figure 1 Date Started: 7/2/97 Date Completed: 7/2/97

Stratigraphic Description	Surf. Elev. (m)	Elev. Depth (m)	Casing	Remarks	SAMPLE				Depth Scale (m)
					Num.	Type	Int.	N Val.	
Surface Elevation (m) 48.38		18.38		Cement Seal					
Topsoil - organics, silt, dark brown, dense, dry, no apparent odour		0.30		Well Dry as of July 3/97	1	SS	X		
Silt - trace of clay, occasional coarse grained sand, brown, dense, damp, no apparent odour					2	SS	X		
					3	SS	X		
				Bentonite Grout	4	SS	X		
					5	SS	X		
@ 8.38m becomes saturated					6	SS	X		
		28.42							
Sand and Gravel - silty, brown, dense, saturated, no apparent odour		11.37		Bentonite Seal	7	SS	X		
Silt - trace of clay, occasional coarse grained sand, brown, dense, damp, no apparent odour		37.52		#10 size screen in silt and pack					
		12.03		All well components 50mm schedule 40 PVC					
		38.78							
End of Borehole		12.79							

Water found (dd/m/yr)

Static Water Level (dd/m/yr)

SAMPLE TYPE AC



Auger Cutting



Continuous



Rock Core



Split Spoon



Shallow Tube



Wash Cuttings



# Log of Drilling Operations

Client: **Maitland Engineering Services Ltd.** Project: **Huron Township Landfill**  
 Job No.: **H-1275** Location: **Huron Township** Supervised by: **S. Wheelon**  
 Drilling Co.: **Lantech Drilling** Drilling Method: **CME 750 Hollow Stem Augers with S/S**  
 Hole Location: **See Figure 1** Date Started: **7/3/97** Date Completed: **7/3/97**

Stratigraphic Description	Surf. Elev. (m)	Elev. Depth (m)	Well Diagram	SAMPLE				Depth Scale	
				Material	Type	Int.	N. Val.	ft	m
Surface Elevation (m) <b>48.67</b>									
Topsoil - organics, silt, dark brown, compact, dry, no apparent odour		48.67							
Silt to Silty Clay - scattered sand and gravel, fine to coarse grained, light brown, dense, dry, no apparent odour		48.38							
@ 3.81 becomes moist									
@ 5.33m becomes wet and grey in colour									
Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent odour		48.37							
		4.40							
		41.78							
Silt and Clay - scattered sand and gravel, brown, mottled grey, moist to wet, no apparent odour		7.53							
		41.43							
		4.88							
End of Borehole									

Water found (dd/m/y)

Static Water Level (dd/m/y)

SAMPLE TYPE AC

CS

RC



Auger Cutting

Continuous

Rock Core

SS

ST

WC



Split Spoon

Shelby Tube

Wash Cuttings

# Log of Drilling Operations

Contract No.: H-1275 Location: Huron Township Project: Huron Township Landfill  
Drilling Co.: Lantech Drilling Drilling Method: CME 750 Hollow Stem Augers with S/S Supervised by: S. Wheelton  
Borehole Location: See Figure 1 Date Started: 7/3/97 Date Completed: 7/3/97

Stratigraphic Description	Depth (m)	Elev. (m)	Remarks	SAMPLES				Depth Scale (m)
				Num.	Type	Int.	N.Val.	
Surface Elevation (m) <u>19.87</u>								
Topsoil - organics, silt, dark brown, compact, dry, no apparent odour	0.00	19.87	Cement Seal					
Silt to Silty Clay - scattered sand and gravel, fine to coarse grained, light brown, dense, dry, no apparent odour	0.30		Well Dry as of July 2/97	1	SS	X		
				1	SS	X		
@ 3.81 becomes moist				1	SS	X		
@ 5.33m becomes wet and grey in colour			Bentonite Grout	4	SS	X		
	5.37							
Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent odour	6.18			5	SS	X		
	6.78							
Silt and Clay - scattered sand and gravel, brown, mottled grey, moist to wet, no apparent odour	7.33		Bentonite Seal	6	SS	X		
				7	SS	X		
	11.77							
Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent odour	11.78		810 slot screen in silica sand pack All well components 50mm schedule 40 PVC	8	SS	X		
	12.40							
End of Borehole	12.41							

Water found (dd/m/yr)

Static Water Level (dd/m/yr)

SAMPLE TYPE AC

CS

RC

Auger Cutting

Continuous

Rock Core

SS

ST

WC

Split Spoon

Shelly Tube

Wash Cuttings



1: Mattand Engineering Services Ltd. Project: Huron Township Landfill  
 2: Job No.: H-1278 Location: Huron Township Supervised by: S. Wheelon  
 3: Drilling Co.: Lantech Drilling Drilling Method: CME 750 Hollow Stem Augers with S/S  
 4: Hole Location: See Figure 1 Date Started: 7/3/97 Date Completed: 7/3/97

[illegible]

Station Water Level (dd/m/y)

### Spiral Spoon

### Shallow Tubes

### Wash Cuttings

# LOG OF DRILLING OPERATIONS

OW10S



BURNSIDE

21. Inspection & Assessment Section  
1611 Burnside Avenue West, Burnaby, B.C. V5C 4S8  
Tel: 604-673-8888 Fax: 604-673-8889

Page 1 of 1

Client: Township of Huron-Kinloss		Project Name: Monitoring Well Installation		Logged by: S. Quinlan	
Project No.: W99609		Location: Huron Landfill		Ground (m amsl):	
Drilling Co.: Lantech Drilling Services Inc.		Date Started: 22/07/2003		Static Water Level (m amsl):	
Drilling Method: Hollow Stem Auger		Date Completed: 22/07/2003		Sand Pack (m amsl):	

Depth Scale (ft) (m)	Stratigraphic Description	Strat. Plot	Depth (m)	SAMPLE				Depth Scale (ft) (m)
				Num.	Type	Int.	% Recov.	
0.0	TOPSOIL - Black, Organics & Moist		0.0					0.0
1.0	CLAY - Brown, Dense, with some Gravel and Sand & Dry		1.0					1.0
2.0			2.0					2.0
3.0			3.0					3.0
4.0			4.0					4.0
5.0	CLAY - Grey, Dense, with some Gravel and Sand & Moist		5.0					5.0
6.0			6.0					6.0
7.0			7.0					7.0
8.0			8.0					8.0
9.0	CLAY - Grey, Dense, with some Gravel and Sand & Wet		9.0					9.0
10.0			10.0					10.0

Prepared By: S. Quinlan Checked By: D. Hopkins Date Prepared: July 25, 03

Borehole log was prepared for hydrogeological and/or environmental purposes and does not necessarily contain information for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by R. J. Burnside & Associates Limited personnel before use by others.

0 1st found @ time of drilling Static Water Level	MONITORING WELL DATA		SAMPLE TYPE					
	Pipe:	51 mm dia. PVC	AC	<input checked="" type="checkbox"/>	Auger Cutting	SS	<input checked="" type="checkbox"/>	Spill Spoon
	Screen:	51 mm dia. PVC #10 slot	CS	<input type="checkbox"/>	Continuous	AR	<input checked="" type="checkbox"/>	Air Rotary
			RC	<input type="checkbox"/>	Rock Core	WC	<input checked="" type="checkbox"/>	Wash Cuttings

## LOG OF DRILLING OPERATIONS


OW10 D



R. J. Burnside & Associates Limited  
117 Spadina Avenue, Suite 200, Toronto, Ontario M5S 2B1  
Telephone: (416) 593-4995 Fax: (416) 593-5427

Page 1 of 1

Client: Township of Huron-Kinloss	Project Name: Monitoring Well Installation	Logged by: S. Quinlan
Project No.: W99809	Location: Huron Landfill	Ground (m amsl):
Drilling Co.: Lantech Drilling Services Inc.	Date Started: 22/07/2003	Static Water Level (m amsl):
Drilling Method: Hollow Stem Auger	Date Completed: 22/07/2003	Sand Pack (m amsl):

Depth Scale (ft) (m)	Stratigraphic Description	Strat. Plot	Depth (m)		SAMPLE				Depth Scale (ft) (m)
					Num.	Type	Int.	%Recov.	
1.0	TOPSOIL- Black, Organics & Moist.		1.0		38		X	0	1.0
1.5	CLAY - Brown, Dense, with some Gravel and Sand & Dry		1.5		37		X	0	1.5
2.0			2.0		36		X	0	2.0
2.5			2.5		35		X	0	2.5
3.0			3.0		34		X	0	3.0
3.5			3.5		33		X	0	3.5
4.0			4.0		32		X	0	4.0
4.5			4.5		31		X	0	4.5
5.0	CLAY - Grey, Dense, with some Gravel and Sand & Moist.		5.0		30		X	70	5.0
5.5			5.5		29		X	0	5.5
6.0			6.0		28		X	10	6.0
6.5			6.5		27		X	0	6.5
7.0	CLAY - Grey, Dense, with some Gravel and Sand & Wet.		7.0		26		X	0	7.0
7.5			7.5		25		X	0	7.5
8.0			8.0		24		X	0	8.0
8.5			8.5		23		X	0	8.5
9.0			9.0		22		X	0	9.0
9.5			9.5		21		X	0	9.5
10.0			10.0		20		X	0	10.0
10.5			10.5		19		X	0	10.5
11.0	CLAY - Grey, Dense, with some Gravel and Sand & Dry.		11.0		18		X	10	11.0
11.5			11.5		17		X	0	11.5
12.0			12.0		16		X	0	12.0
12.5			12.5		15		X	0	12.5
13.0			13.0		14		X	0	13.0
13.5			13.5		13		X	0	13.5
14.0			14.0		12		X	0	14.0
14.5			14.5		11		X	0	14.5
15.0			15.0		10		X	0	15.0
15.5			15.5		9		X	0	15.5
16.0			16.0		8		X	0	16.0
16.5			16.5		7		X	0	16.5
17.0			17.0		6		X	0	17.0
17.5			17.5		5		X	0	17.5
18.0			18.0		4		X	0	18.0
18.5			18.5		3		X	0	18.5
19.0			19.0		2		X	0	19.0
19.5			19.5		1		X	0	19.5
20.0			20.0		0		X	0	20.0
20.5			20.5		0		X	0	20.5
21.0			21.0		0		X	0	21.0
21.5			21.5		0		X	0	21.5
22.0			22.0		0		X	0	22.0
22.5			22.5		0		X	0	22.5
23.0			23.0		0		X	0	23.0
23.5			23.5		0		X	0	23.5
24.0			24.0		0		X	0	24.0
24.5			24.5		0		X	0	24.5
25.0			25.0		0		X	0	25.0
25.5			25.5		0		X	0	25.5
26.0			26.0		0		X	0	26.0
26.5			26.5		0		X	0	26.5
27.0			27.0		0		X	0	27.0
27.5			27.5		0		X	0	27.5
28.0			28.0		0		X	0	28.0
28.5			28.5		0		X	0	28.5
29.0			29.0		0		X	0	29.0
29.5			29.5		0		X	0	29.5
30.0			30.0		0		X	0	30.0
30.5			30.5		0		X	0	30.5
31.0			31.0		0		X	0	31.0
31.5			31.5		0		X	0	31.5
32.0			32.0		0		X	0	32.0
32.5			32.5		0		X	0	32.5
33.0			33.0		0		X	0	33.0
33.5			33.5		0		X	0	33.5
34.0			34.0		0		X	0	34.0
34.5			34.5		0		X	0	34.5
35.0			35.0		0		X	0	35.0
35.5			35.5		0		X	0	35.5
36.0			36.0		0		X	0	36.0
36.5			36.5		0		X	0	36.5
37.0			37.0		0		X	0	37.0
37.5			37.5		0		X	0	37.5
38.0			38.0		0		X	0	38.0
38.5			38.5		0		X	0	38.5
39.0			39.0		0		X	0	39.0
39.5			39.5		0		X	0	39.5
40.0			40.0		0		X	0	40.0
40.5			40.5		0		X	0	40.5
41.0			41.0		0		X	0	41.0
41.5			41.5		0		X	0	41.5
42.0			42.0		0		X	0	42.0
42.5			42.5		0		X	0	42.5
43.0			43.0		0		X	0	43.0
43.5			43.5		0		X	0	43.5
44.0			44.0		0		X	0	44.0
44.5			44.5		0		X	0	44.5
45.0			45.0		0		X	0	45.0
45.5			45.5		0		X	0	45.5
46.0			46.0		0		X	0	46.0
46.5			46.5		0		X	0	46.5
47.0			47.0		0		X	0	47.0
47.5			47.5		0		X	0	47.5
48.0			48.0		0		X	0	48.0
48.5			48.5		0		X	0	48.5
49.0			49.0		0		X	0	49.0
49.5			49.5		0		X	0	49.5
50.0			50.0		0		X	0	50.0
50.5			50.5		0		X	0	50.5
51.0			51.0		0		X	0	51.0
51.5			51.5		0		X	0	51.5
52.0			52.0		0		X	0	52.0
52.5			52.5		0		X	0	52.5
53.0			53.0		0		X	0	53.0
53.5			53.5		0		X	0	53.5
54.0			54.0		0		X	0	54.0
54.5			54.5		0		X	0	54.5
55.0			55.0		0		X	0	55.0
55.5			55.5		0		X	0	55.5
56.0			56.0		0		X	0	56.0
56.5			56.5		0		X	0	56.5
57.0			57.0		0		X	0	57.0
57.5			57.5		0		X	0	57.5
58.0			58.0		0		X	0	58.0
58.5			58.5		0		X	0	58.5
59.0			59.0		0		X	0	59.0
59.5			59.5		0		X	0	59.5
60.0			60.0		0		X	0	60.0
60.5			60.5		0		X	0	60.5
61.0			61.0		0		X	0	61.0
61.5			61.5		0		X	0	61.5
62.0			62.0		0		X	0	62.0
62.5			62.5		0		X	0	62.5
63.0			63.0		0		X	0	63.0
63.5			63.5		0		X	0	63.5
64.0			64.0		0		X	0	64.0
64.5			64.5		0		X	0	64.5
65.0			65.0		0		X	0	65.0
65.5			65.5		0		X	0	65.5
66.0			66.0		0		X	0	66.0
66.5			66.5		0		X	0	66.5
67.0			67.0		0		X	0	67.0
67.5			67.5		0		X	0	67.5
68.0			68.0		0		X	0	68.0
68.5			68.5		0		X	0	68.5
69.0			69.0		0		X	0	69.0
69.5			69.5		0		X	0	69.5
70.0			70.0		0		X	0	70.0
70.5			70.5		0		X	0	70.5
71.0			71.0		0		X	0	71.0
71.5			71.5		0		X	0	71.5
72.0			72.0		0		X	0	72.0
72.5			72.5		0		X	0	72.5
73.0			73.0		0		X	0	73.0
73.5			73.5		0		X	0	73.5
74.0			74.0		0		X	0	74.0
74.5			74.5		0		X	0	74.5
75.0			75.0		0		X	0	75.0
75.5			75.5		0		X	0	75.5
76.0			76.0		0		X	0	76.0
76.5			76.5		0		X	0	76.5
77.0			77.0		0		X	0	77.0
77.5			77.5		0		X	0	77.5
78.0			78.0		0		X	0	78.0
78.5			78.5		0		X	0	78.5
79.0			79.0		0		X	0	79.0
79.5			79.5		0		X	0	79.5
80.0			80.0		0		X	0	80.0
80.5			80.5		0		X	0	80.5
81.0			81.0		0		X	0	81.0
81.5			81.5		0		X	0	81.5
82.0			82.0		0		X	0	82.0
82.5			82.5		0		X	0	82.5
83.0			83.0		0		X	0	83.0
83.5			83.5		0		X	0	83.5
84.0			84.0						

## LOG OF DRILLING OPERATIONS

OW 11- Leachate





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BURNSIDE









R. J. Burnside & Associates Limited  
 114 Burnside Avenue East, Aurora, Ontario M1G 1S5  
 Telephone: (416) 709-1000 Fax: (416) 709-1001

Client: Township of Huron-Kinloss	Project Name: Monitoring Well Installation	Logged by: S. Quinlan
Project No.: W99608	Location: Huron Landfill	Ground (m amsl):
Drilling Co.: Lantech Drilling Services Inc.	Date Started: 23/07/2003	Static Water Level (m amsl):
Drilling Method: Hollow Stem Auger	Date Completed: 23/07/2003	Sand Pack (m amsl):

Depth Scale (ft) (m)	Stratigraphic Description	Strat. Plot	Depth (m)		SAMPLE			Depth Scale (ft) (m)
					Num.	Type	In.	
1.0	CLAY FILL - Dense, Brown & Dry							1.0
1.5	WASTE FILL - Black, Strong Odour, Plastic in Cuttings & Wet		1.38					1.5
2.0								2.0
2.5								2.5
3.0								3.0
3.5								3.5
4.0								4.0
4.5								4.5
5.0	CLAY - Native, grey, with some fine gravel and sand, dense & wet		4.75					5.0

Logged By: S. Quinlan Checked By: D. Hopkins Date Prepared: July 25, 03

This borehole log was prepared for hydrogeological and/or environmental purposes and does not necessarily contain information for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by R. J. Burnside & Associates Limited personnel before use by others.

MONITORING WELL DATA		SAMPLE TYPE		AC		Auger Cutting	SS		Split Spoon
r found @ time of drilling	Pipe: 51 mm dia. PVC	CS		Continuous	AR		AR		Air Rotary
: Water Level -	Screen: 51 mm dia. PVC #10 slot	RC		Rock Core	WC		WC		Wash Cuttings







GP4	Depth	Soil Description	Concrete	Bentonite	Sand	Screen
	0.0 - 0.35	Medium brown to red-brown silty fine SAND; some organic matter; layered; loose; moist	0 - 0.5	0.5 - 0.8	0.8 - 2.4	0.9 - 2.4
	0.35 - 0.65	Light red-brown sandy SILT; layered; firm; wet				
	0.65 - 1.20	Light red-brown SILT, some clay, trace fine sand; weathered to 0.75 m; gray discolouration along fractures; firm; moist				
	1.20 - 1.80	Medium brown SILT, trace clay, trace sand, trace gravel; layered with saturated fine sand seams; firm; moist				
	1.80 - 2.45	Medium brown clayey SILT, trace sand, trace gravel; very stiff; moist				
Borehole Location:		Southwest of OW8				
Date Started:		Jun 14, 2006				
Date Completed:		Jun 14, 2006				

# APPENDIX

E

GROUNDWATER  
CHEMICAL RESULTS

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL # 1

	OCT 98	MAY 99	OCT 99	MAY 00	OCT 00	
pH	7.87	7.73	7.58	7.19	7.30	
conductivity	754.	844.	824	810	1270	
chloride	31.	32.	26	29	102	
hardness	498.	529.	471	390	602	
D.O.C.	2.5	3.0	2.7	2.6	5.2	
phenols	-	-	-	-	-	
colour	<5	8.	<5	<5	<5	
alkalinity	460.	425.	388	388	561	
iron	0.23	0.11	0.31	0.04	0.17	
potassium	2.16	1.86	2.04	1.57	2.55	
magnesium	53.6	45.5	50.1	43.9	57.6	
calcium	111.	137.	106	83.6	146	
sodium	30.0	28.2	33.1	26.7	66.7	
sulphate	24.	63.	49	34	85	
nitrite	0.02	<0.02	<0.02	<0.02	<0.02	
ammonia	0.22	<0.05	0.16	<0.05	<0.05	
TKN(nitrogen)	1.75	0.18	0.61	0.16	0.14	
nitrate	0.18	<0.1	<0.1	<0.1	<0.1	
Nickel	-	-	-	-	-	
Arsenic	-	-	-	-	-	
Cadmium	<0.002	<0.002	<0.002	<0.002	<0.002	
Chromium	<0.02	<0.02	<0.01	<0.01	<0.01	
Copper	<0.01	<0.01	0.01	<0.01	<0.01	
Mercury	-	-	-	-	-	
Manganese	0.08	0.11	0.08	0.06	0.13	
Boron	0.11	0.05	0.14	0.12	0.36	
Lead	<0.03	<0.03	<0.03	<0.03	<0.03	
Selenium	-	-	-	-	-	
Zinc	<0.01	0.06	0.02	0.10	0.41	
Cyanide	-	-	-	-	-	

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL # 3

	MAY 99	OCT 99	MAY 00	OCT 00		
pH	7.73	7.70	7.29	7.60		
conductivity	756.	742	826	883		
chloride	17.	16	28	25		
hardness	536.	426	422	441		
D.O.C.	2.4	2.4	2.2	2.9		
phenols	-	-	-	-		
colour	<5	<5	<5	<5		
alkalinity	348.	364	340	473		
iron	<0.02	0.07	<0.02	0.04		
potassium	2.14	2.05	1.64	2.56		
magnesium	44.7	45.7	51.0	52.2		
calcium	141.	95.2	84.9	90.6		
sodium	15.1	23.1	15.8	17.0		
sulphate	52.	52	37	40		
nitrite	<0.02	0.04	<0.02	<0.02		
ammonia	0.08	0.17	0.12	<0.05		
TKN (nitrogen)	5.34	0.61	0.20	<0.05		
nitrate	0.16	0.35	0.10	<0.1		
Nickel	-	-	-	-		
Arsenic	-	-	-	-		
Cadmium	<0.002	<0.002	0.002	<0.002		
Chromium	<0.02	<0.01	<0.01	<0.01		
Copper	<0.01	<0.01	0.01	0.01		
Mercury	-	-	-	-		
Manganese	0.11	0.03	0.09	0.16		
Boron	0.05	0.12	0.06	0.14		
Lead	<0.03	<0.03	<0.03	<0.03		
Selenium	-	-	-	-		
Zinc	0.03	0.03	0.08	0.16		
Cyanide	-	-	-	-		

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL # 4

	MAY 99	OCT 99	MAY 00	OCT 00		
pH	7.96	7.67	7.42	7.65		
conductivity	649.	605	630	671		
chloride	2.	2	2	2		
hardness	386.	375	356	385		
D.O.C.	1.4	1.8	1.5	2.2		
phenols	-	-	-	-		
colour	<5	<5	<5	<5		
alkalinity	258.	276	286	366		
iron	<0.02	0.16	0.02	0.03		
potassium	1.54	1.67	0.89	1.64		
magnesium	35.6	36.6	38.3	37.6		
calcium	96.0	90.0	79.6	92.2		
sodium	9.62	12.6	10.4	7.07		
sulphate	94.	69	80	45		
nitrite	<0.02	<0.02	<0.02	<0.02		
ammonia	<0.05	<0.05	4.86	<0.05		
TKN (nitrogen)	0.27	0.40	5.56	<0.05		
nitrate	0.28	<0.1	<0.1	<0.1		
Nickel	-	-	-	-		
Arsenic	-	-	-	-		
Cadmium	<0.002	<0.002	0.003	<0.002		
Chromium	<0.02	<0.01	<0.01	<0.01		
Copper	<0.01	<0.01	<0.01	<0.01		
Mercury	-	-	-	-		
Manganese	<0.02	0.03	<0.02	0.06		
Boron	0.03	0.08	0.05	0.29		
Lead	<0.03	<0.03	<0.03	<0.03		
Selenium	-	-	-	-		
Zinc	0.10	0.03	0.09	0.48		
Cyanide	-	-	-	-		

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL # 5

	OCT 99	MAY 00	OCT 00			
pH	7.82	7.34	7.82			
conductivity	560	676	667			
chloride	4	8	7			
hardness	295	384	359			
D.O.C.	3.4	2.2	3.4			
phenols	-	-	-			
colour	<5	<5	<5			
alkalinity	298	304	366			
iron	0.11	0.07	0.32			
potassium	1.55	1.33	1.74			
magnesium	36.5	47.2	44.7			
calcium	58.0	76.1	70.2			
sodium	32.5	20.4	24.8			
sulphate	13	36	23			
nitrite	<0.02	<0.02	<0.02			
ammonia	0.13	0.05	0.06			
TKN(nitrogen)	2.19	0.17	<0.05			
nitrate	<0.1	<0.1	<0.1			
Nickel	-	-	-			
Arsenic	-	-	-			
Cadmium	<0.002	<0.002	<0.002			
Chromium	<0.01	<0.01	<0.01			
Copper	<0.01	<0.01	<0.01			
Mercury	-	-	-			
Manganese	0.04	0.04	0.04			
Boron	0.17	0.10	0.19			
Lead	<0.03	<0.03	<0.03			
Selenium	-	-	-			
Zinc	0.03	0.05	0.33			
Cyanide	-	-	-			

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL #5

	SEP 96	MAY 97	SEP 97	MAY 98	OCT 98	MAY 99
pH	7.6	7.75	7.87	8.17	8.30	8.06
conductivity	613	533	586	534	498.	571.
chloride	7	3.3	7	5	4.	6.
hardness	294	273	328	278	287.	320.
D.O.C.	3.5	2.6	2.8	2.7	2.6	3.3
phenols					-	-
colour	11	<5	12	<5	<5	8.
alkalinity	341	286	307	304	300.	330.
iron	0.220	0.05	0.21	0.05	0.12	0.06
potassium	1.80	1.2	1.65	1.37	1.21	1.49
magnesium	32.7	35.7	38.4	32.9	33.9	36.9
calcium	64.0	50.3	67.9	57.1	59.0	67.2
sodium	19.9	25.9	23.7	21.5	25.3	22.6
sulphate	18	18	11	10	11.	17.
nitrite	0.09	0.01	0.02	<0.02	<0.02	<0.02
ammonia	0.13	0.68	0.22	0.10	0.18	0.08
TKN (nitrogen)	0.64	0.65	0.34	0.36	0.79	0.13
nitrate	0.05	0.15	0.10	<0.1	0.14	0.20
Nickel					-	-
Arsenic					-	-
Cadmium	<0.003	<.0003	<0.005	<0.002	0.002	<0.002
Chromium	<0.005	<.002	<0.02	<0.02	<0.02	<0.02
Copper	<0.003	<.002	<0.02	<0.01	<0.01	<0.01
Mercury					-	-
Manganese	0.067	0.036	0.05	0.04	0.03	0.04
Boron	0.10	0.11	0.19	0.13	0.15	0.10
Lead	<0.025	.00001	<0.04	<0.03	0.03	<0.03
Selenium					-	-
Zinc	<0.005	.005	<0.01	0.10	,0.01	0.02
Cyanide					-	-

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL #6

	OCT 00					
pH	7.80					
conductivity	1170					
chloride	47					
hardness	405					
D.O.C.	8.7					
phenols	-					
colour	6					
alkalinity	567					
iron	0.40					
potassium	9.34					
magnesium	65.1					
calcium	54.9					
sodium	125					
sulphate	91					
nitrite	<0.02					
ammonia	4.46					
TKN(nitrogen)	5.05					
nitrate	<0.1					
Nickel	-					
Arsenic	-					
Cadmium	<0.002					
Chromium	<0.01					
Copper	0.01					
Mercury	-					
Manganese	0.08					
Boron	0.54					
Lead	<0.03					
Selenium	-					
Zinc	0.29					
Cyanide	-					



GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL #6

	SEP 97	MAY 98	OCT 98	MAY 99	OCT 99	MAY 00
pH	7.29	7.97	8.23	7.75	7.52	7.50
conductivity	4960	1840	1660.	1270	1300	1150
chloride	417	179	120.	84.	71	56
hardness	1800	628	589.	457.	510	453
D.O.C.	995	58.8	44.7	25.8	19.7	10.5
phenols			-	-	-	-
colour	110	45	27.	20.	10	<5
alkalinity	2350	950	750.	600.	648	512
iron	13.3	4.48	6.72	1.85	0.94	1.10
potassium	141	24.5	19.2	13.7	13.1	10.7
magnesium	303	98.7	90.2	65.2	71.8	66.4
calcium	220	88.7	87.2	75.5	86.0	71.8
sodium	516	185	162.	136.	136	126
sulphate	11	<2	93.	23.	64	68
nitrite	0.02	<0.02	<0.02	<0.02	<0.02	0.02
ammonia	120	23.3	15.4	17.1	7.36	0.11
TKN (nitrogen)	122	30.1	16.2	13.4	8.75	0.12
nitrate	<0.05	<0.1	<0.1	0.13	<0.1	<0.1
Nickel			-	-	-	-
Arsenic			-	-	-	-
Cadmium	<0.005	0.002	<0.002	<0.002	<0.002	<0.002
Chromium	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01
Copper	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury			-	-	-	-
Manganese	0.07	0.05	0.04	0.04	0.05	0.06
Boron	1.42	0.70	0.65	0.58	0.56	0.55
Lead	<0.04	<0.03	<0.03	<0.03	<0.03	<0.03
Selenium			-	-	-	-
Zinc	0.01	0.38	<0.01	0.02	0.03	0.13
Cyanide			-	-	-	-

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL # 7D

	MAY 98	OCT 98	MAY 99	MAY 00	OCT 00	
pH	8.25	8.32	8.15	7.91	8.23	
conductivity	855	863.	682.	573	577	
chloride	8	6.	3.	3	2	
hardness	263	194.	149.	149	132	
D.O.C.	2.3	1.6	1.8	0.9	1.2	
phenols		-	-	-	-	
colour	<5	<5	<5	<5	<5	
alkalinity	144	146.	145.	160	155	
iron	0.16	<0.02	<0.02	0.71	0.19	
potassium	2.72	1.96	1.70	1.72	1.55	
magnesium	21.4	18.2	14.5	15.0	13.9	
calcium	69.9	47.5	35.9	35.0	30.1	
sodium	121	110.	99.2	94.4	88.9	
sulphate	375	229.	185.	163	147	
nitrite	<0.02	<0.02	<0.02	0.02	<0.02	
ammonia	0.10	0.06	<0.05	0.08	<0.05	
TKN (nitrogen)	0.55	0.94	0.53	0.14	<0.05	
nitrate	0.15	0.37	0.13	0.40	0.13	
Nickel		-	-	-	-	
Arsenic		-	-	-	-	
Cadmium	<0.002	<0.002	<0.002	<0.002	<0.002	
Chromium	<0.02	<0.02	<0.02	<0.01	0.01	
Copper	<0.01	<0.01	<0.01	<0.01	0.01	
Mercury		-	-	-	-	
Manganese	0.06	<0.02	<0.02	<0.02	<0.02	
Boron	0.43	0.74	0.45	0.52	0.55	
Lead	<0.03	<0.03	<0.03	<0.03	0.03	
Selenium		-	-	-	-	
Zinc	0.72	0.01	0.01	0.09	0.11	
Cyanide		-	-	-	-	

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL #7S

	OCT 00					
pH	8.12					
conductivity	435					
chloride	2					
hardness	140					
D.O.C.	0.8					
phenols	-					
colour	<5					
alkalinity	177					
iron	0.03					
potassium	1.69					
magnesium	17.1					
calcium	27.9					
sodium	54.0					
sulphate	61					
nitrite	<0.02					
ammonia	<0.05					
TKN (nitrogen)	<0.05					
nitrate	<0.1					
Nickel	-					
Arsenic	-					
Cadmium	<0.002					
Chromium	<0.01					
Copper	0.01					
Mercury	-					
Manganese	<0.02					
Boron	0.39					
Lead	<0.03					
Selenium	-					
Zinc	0.12					
Cyanide	-					

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL #7S

	SEP 97	MAY 98	OCT 98	MAY 99	OCT 99	MAY 00
pH	8.01	8.27	8.37	8.40	8.06	7.94
conductivity	427	363	443.	413.	440	440
chloride	6	3	2.	1.	1	2
hardness	135	121	126.	129.	153	147
D.O.C.	2.4	1.2	1.0	0.8	1.1	0.5
phenols			-	-	-	-
colour	9	<5	<5	<5	16	<5
alkalinity	165	137	164.	168.	180	182
iron	0.10	0.05	0.03	<0.02	0.02	<0.02
potassium	2.77	1.75	1.22	1.32	1.39	1.20
magnesium	14.0	13.5	14.5	14.3	18.1	17.6
calcium	31.1	26.3	26.7	28.0	31.6	29.9
sodium	44.1	43.8	46.9	49.4	54.4	54.6
sulphate	45	49	61.	60.	65	64
nitrite	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02
ammonia	0.19	0.12	0.13	<0.05	0.10	0.14
TKN(nitrogen)	0.68	0.38	0.40	0.16	0.43	0.11
nitrate	0.06	<0.1	<0.1	0.12	<0.1	0.19
Nickel			-	-	-	-
Arsenic			-	-	-	-
Cadmium	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01
Copper	<0.02	<0.01	<0.01	<0.01	<0.01	0.01
Mercury			-	-	-	-
Manganese	0.07	0.04	0.03	<0.02	<0.02	<0.02
Boron	0.37	0.29	0.32	0.32	0.34	0.35
Lead	<0.04	<0.03	<0.03	<0.03	<0.03	<0.03
Selenium			-	-	-	-
Zinc	0.02	0.10	<0.01	0.03	0.03	0.16
Cyanide			-	-	-	-

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL #89

	OCT 00					
pH	8.11					
conductivity	600					
chloride	1					
hardness	228					
D.O.C.	0.5					
phenols	-					
colour	<5					
alkalinity	244					
iron	0.02					
potassium	1.99					
magnesium	32.3					
calcium	38.1					
sodium	61.2					
sulphate	101					
nitrite	<0.02					
ammonia	0.06					
TKN (nitrogen)	<0.05					
nitrate	<0.1					
Nickel	-					
Arsenic	-					
Cadmium	<0.002					
Chromium	<0.01					
Copper	<0.01					
Mercury	-					
Manganese	0.03					
Boron	0.46					
Lead	<0.03					
Selenium	-					
Zinc	0.16					
Cyanide	-					

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL #8S

	SEP 97	MAY 98	OCT 98	MAY 99	OCT 99	MAY 00
pH	7.97	8.31	8.49	8.17	7.97	7.68
conductivity	624	603	663.	609.	611	575
chloride	5	3	2.	1.	1	1
hardness	260	221	223.	235.	246	242
D.O.C.	2.4	1.4	1.1	1.1	1.2	0.6
phenols			-	-	-	-
colour	11	<5	<5	6.	14	<5
alkalinity	219	234	228.	300.	246	244
iron	0.06	0.04	0.02	<0.02	0.02	<0.02
potassium	3.30	2.06	1.77	1.97	1.92	1.70
magnesium	32.8	30.7	29.3	29.1	32.5	34.4
calcium	49.9	37.7	41.0	46.3	45.1	40.2
sodium	53.3	60.1	57.3	60.4	62.6	63.0
sulphate	120	128	87.	96.	103	98
nitrite	<0.01	<0.02	0.03	<0.02	<0.02	0.02
ammonia	0.24	0.16	0.19	<0.05	0.13	0.14
TKN (nitrogen)	0.62	0.39	0.87	0.46	1.03	0.36
nitrate	<0.05	<0.1	0.11	0.37	<0.1	0.30
Nickel			-	-	-	-
Arsenic			-	-	-	-
Cadmium	<0.005	<0.002	<0.002	0.002	<0.002	0.002
Chromium	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01
Copper	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury			-	-	-	-
Manganese	0.08	0.04	0.04	<0.02	0.05	<0.02
Boron	0.45	0.40	0.57	0.41	0.45	0.48
Lead	<0.04	<0.03	<0.03	<0.03	<0.03	<0.03
Selenium			-	-	-	-
Zinc	0.08	0.01	0.02	0.18	0.02	0.16
Cyanide			-	-	-	-

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99509)

OBSERVATION WELL # 8D

	MAY 98	OCT 98	MAY 99	MAY 00	OCT 00	
pH	8.21	8.34	8.09	7.88	8.18	
conductivity	740	853.	795.	739	753	
chloride	4	2.	2.	1	1	
hardness	296	242.	231.	246	232	
D.O.C.	2.5	2.2	2.0	1.0	1.2	
phenols		-	-	-	-	
colour	<5	<5	6.	<5	<5	
alkalinity	138	152.	158.	159	157	
iron	0.19	0.10	0.03	0.07	0.03	
potassium	2.87	2.26	2.21	2.07	2.13	
magnesium	26.3	24.2	24.0	26.5	26.0	
calcium	75.1	57.0	53.1	54.9	50.2	
sodium	93.2	82.6	90.9	94.9	91.2	
sulphate	313	253.	268.	290	233	
nitrite	<0.02	0.03	<0.02	<0.02	<0.02	
ammonia	0.22	0.14	<0.05	0.10	<0.05	
TKN (nitrogen)	0.67	0.39	2.08	0.24	<0.05	
nitrate	<0.1	0.32	0.20	0.85	0.49	
Nickel		-	-	-	-	
Arsenic		-	-	-	-	
Cadmium	0.003	<0.002	<0.002	0.004	<0.002	
Chromium	<0.02	<0.02	<0.02	<0.01	<0.01	
Copper	<0.01	0.01	<0.01	0.01	<0.01	
Mercury		-	-	-	-	
Manganese	0.09	0.02	<0.02	<0.02	<0.02	
Boron	0.55	0.61	0.51	0.62	0.61	
Lead	<0.03	<0.03	<0.03	<0.03	<0.03	
Selenium		-	-	-	-	
Zinc	0.74	<0.01	0.02	0.15	0.06	
Cyanide		-	-	-	-	

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL #9

	OCT 00					
pH	8.14					
conductivity	668					
chloride	1					
hardness	178					
D.O.C.	1.2					
phenols	-					
colour	<5					
alkalinity	108					
iron	0.04					
potassium	1.86					
magnesium	20.3					
calcium	37.8					
sodium	79.6					
sulphate	229					
nitrite	<0.02					
ammonia	<0.05					
TKN (nitrogen)	<0.05					
nitrate	<0.1					
Nickel	-					
Arsenic	-					
Cadmium	<0.002					
Chromium	<0.01					
Copper	<0.01					
Mercury	-					
Manganese	0.02					
Boron	0.52					
Lead	<0.03					
Selenium	-					
Zinc	0.09					
Cyanide	-					



GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL #9

	SEP 97	MAY 98	OCT 98	MAY 99	OCT 99	MAY 00
pH	7.97	8.22	8.21	8.13	8.09	7.81
conductivity	723	604	707.	654.	662	644
chloride	6	2	2.	1.	1	1
hardness	225	188	172.	184.	193	203
D.O.C.	2.8	1.2	1.8	1.9	1.4	0.9
phenols			-	-	-	-
colour	11	<5	<5	<5	12	<5
alkalinity	121	99	108.	111.	104	110
iron	<0.04	0.07	0.02	0.02	0.02	0.02
potassium	3.03	1.70	1.74	1.59	1.58	1.63
magnesium	23.1	18.1	17.8	18.5	20.2	22.3
calcium	52.2	45.3	39.6	43.2	44.0	44.6
sodium	71.2	67.1	68.6	77.5	80.7	86.0
sulphate	280	245	161.	233.	240	268
nitrite	<0.01	<0.02	<0.02	<0.02	0.02	<0.02
ammonia	0.33	0.19	0.23	0.15	0.24	0.14
TKN (nitrogen)	0.44	0.42	0.44	0.87	0.45	0.27
nitrate	0.05	<0.1	0.10	0.20	<0.1	0.55
Nickel			-	-	-	-
Arsenic			-	-	-	-
Cadmium	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01
Copper	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury			-	-	-	-
Manganese	0.08	0.04	0.02	0.03	0.02	0.02
Boron	0.51	0.46	0.55	0.68	0.51	0.57
Lead	0.04	<0.03	<0.03	<0.03	<0.03	<0.03
Selenium			-	-	-	-
Zinc	0.01	0.37	0.02	0.08	0.05	0.08
Cyanide			-	-	-	-

Appendix D  
Historical Groundwater Analytical Results  
Huron Landfill Site  
Database 1/2: (September 1996 - October 2003)

Parameter	Units	Reasonable Use Criteria <sup>1</sup>			OW5 Sep-96	OW6 May-97	OW5 Sep-97	OW6 Sep-97	OW7S Sep-97	OW8S Sep-97	OW9 Sep-97	OW5 May-98	OW6 May-98	OW7D May-98	OW7S May-98	OW8D May-98	OW8S May-98	OW9 May-98	OW1 Oct-98
		OW4	OW6	Ave															
Vadose Zone Monitoring																			
Methane	% LEL				7.6	7.75	7.87	7.29	8.01	7.97	7.97	8.17	7.97	8.25	8.27	8.21	8.31	8.22	7.87
Oxygen	% Vol/Vol																		
General Chemistry																			
pH Value	pH units																		
pH Value (Field)	pH units																		
Temperature (Field)	°C																		
Ammonia as N	mg/L				0.13	0.68	0.22	120	0.19	0.24	0.33	0.1	23.3	0.1	0.12	0.2	0.16	0.19	0.22
Ammonia (un-ionized)	mg/L																		
Total Kjeldahl Nitrogen (as N)	mg/L				0.84	0.85	0.34	122	0.68	0.62	0.44	0.38	30.1	0.55	0.38	0.67	0.39	0.42	1.75
Nitrate (as N)	mg/L	2.59	2.60	2.60	0.05	0.15	0.1	< 0.05	0.06	< 0.05	0.05	< 0.1	< 0.1	0.16	< 0.1	< 0.1	< 0.1	< 0.1	0.18
Nitrite (as N)	mg/L				0.09	0.01	0.02	0.02	< 0.01	< 0.01	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02
Nitrate + Nitrite (as N)	mg/L																		
Dissolved Organic Carbon (as C)	mg/L	3.39	3.97	3.68	3.5	2.6	2.8	995	2.4	2.4	2.8	2.7	58.8	2.3	1.2	2.5	1.4	1.2	2.5
Conductivity	us/cm				813	533	586	4980	427	824	723	534	1840	855	363	740	603	604	754
Conductivity (Field)	us/cm																		
Sulphate (as SO4)	mg/L	286	266	276	18	18	11	11	45	120	280	10	< 2	375	49	313	128	245	24
Alkalinity (CaCO3)	mg/L				341	286	307	2350	165	219	121	304	950	144	137	138	234	99	460
Chloride (as Cl)	mg/L	128	128	127	7	3.3	7	417	6	5	6	5	179	8	3	4	3	2	31
Colour	TCU				11	< 5	12	110	9	11	11	< 5	45	< 5	< 5	< 5	< 5	< 5	< 5
Calculated Hardness (as CaCO3)	mg/L				294	273	328	1800	135	280	225	278	628	263	121	256	21	188	468
Total Cations	meq/L																		
Total Anions	meq/L																		
Ion Balance	% diff.																		
Calculated T.D.S.	mg/L																		
Trace Metals																			
Aluminum, Al	mg/L																		
Barium, Ba	mg/L	0.53	0.54	0.54															
Boron, B	mg/L	2.52	2.55	2.54	0.1	0.11	0.19	1.42	0.37	0.45	0.51	0.13	0.7	0.43	0.29	0.55	0.4	0.46	0.11
Cadmium, Cd	mg/L	0.0015	0.0016	0.0016	< 0.003	< 0.0003	< 0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.002	0.002	< 0.002	< 0.002	0.003	< 0.002	< 0.002	< 0.002
Calcium, Ca	mg/L				64	50.3	67.9	220	31.1	49.9	52.2	57.1	88.7	69.9	26.3	75.1	37.7	45.3	111
Chromium, Cr	mg/L	0.016	0.016	0.016	< 0.005	< 0.002	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Copper, Cu	mg/L	0.501	0.501	0.501	< 0.003	< 0.002	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Iron, Fe	mg/L	0.168	0.189	0.178	0.22	0.05	0.21	13.3	0.1	0.06	< 0.04	0.05	4.48	0.16	0.06	0.19	0.04	0.07	0.23
Lead, Pb	mg/L	0.005	0.005	0.005	< 0.025	1E-05	< 0.04	< 0.04	< 0.04	< 0.04	0.04	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Magnesium, Mg	mg/L				32.7	35.7	38.4	303	14	32.8	23.1	32.9	98.7	21.4	13.5	26.3	30.7	18.1	53.8
Manganese, Mn	mg/L	0.039	0.042	0.040	0.067	0.036	0.05	0.07	0.07	0.08	0.08	0.04	0.05	0.06	0.04	0.09	0.04	0.04	0.08
Potassium, K	mg/L				1.8	1.2	1.65	141	2.77	3.3	3.03	1.37	24.5	2.72	1.75	2.87	2.06	1.7	2.16
Silica, Reactive (as SiO2)	mg/L																		
Sodium, Na	mg/L	105	112	108	19.9	25.9	23.7	516	44.1	53.3	71.2	21.5	185	121	42.3	93.2	60.1	67.1	30
Zinc, Zn	mg/L	2.508	2.525	2.515	< 0.005	0.005	< 0.01	0.01	0.02	0.08	0.01	0.1	0.38	0.72	0.1	0.74	0.01	0.37	< 0.01

Notes:

Exceedance of RUC for historical data (1996-2003) based on 2001 - 2003 results.

Exceedance of RUC has been noted with highlighting, unless exceedance is due to method detection limit (data reported as "<").

NA - No Value Collected

Appendix D  
Historical Groundwater Analytical Results  
Huron Landfill Site  
Database 1/2: (September 1996 - October 2003)

Parameter	Units	Reasonable Use Criteria <sup>1</sup>			OW5 Oct-96	OW6 Oct-96	OW7D Oct-96	OW7S Oct-96	OW8D Oct-96	OW8S Oct-96	OW9 Oct-96	OW1 May-98	OW3 May-98	OW4 May-98	OW5 May-98	OW6 May-98	OW7D May-98	OW7S May-98	OW8D May-98
		OW4	OW5	Ave															
Vadose Zone Monitoring																			
Methane	% LEL																		
Oxygen	% Vol/Vol																		
General Chemistry																			
pH Value	pH units				8.3	8.23	8.32	8.37	8.34	8.49	8.21	7.73	7.73	7.96	8.06	7.76	8.15	8.4	8.09
pH Value (Field)	pH units																		
Temperature (Field)	°C																		
Ammonia as N	mg/L				0.18	15.4	0.06	0.13	0.14	0.19	0.23	< 0.05	0.08	< 0.02	0.08	17.1	< 0.05	< 0.05	< 0.05
Ammonia (un-ionized)	mg/L																		
Total Kjeldahl Nitrogen (as N)	mg/L				0.79	16.2	0.94	0.4	0.39	0.87	0.44	0.18	5.34	0.27	0.13	13.4	0.53	0.16	2.08
Nitrate (as N)	mg/L	2.59	2.60	2.60	0.14	< 0.1	0.37	< 0.1	0.32	0.11	0.1	< 0.1	0.16	0.28	0.2	0.13	0.13	0.12	0.2
Nitrite (as N)	mg/L				< 0.02	< 0.02	< 0.02	< 0.02	< 0.03	0.03	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Nitrate + Nitrite (as N)	mg/L																		
Dissolved Organic Carbon (as C)	mg/L	3.39	3.97	3.68	2.6	44.7	1.6	1	2.2	1.1	1.8	3	2.4	1.4	3.3	25.8	1.8	0.8	2
Conductivity	uS/cm				498	1660	863	443	853	663	707	844	756	649	571	1270	682	413	795
Conductivity (Field)	uS/cm																		
Sulphate (as SO4)	mg/L	288	266	276	11	93	229	81	253	87	161	63	62	94	17	23	185	60	268
Alkalinity (CaCO3)	mg/L				300	750	148	164	162	228	108	425	348	258	330	800	145	168	158
Chloride (as Cl)	mg/L	128	128	127	4	120	8	2	2	2	2	32	17	2	8	84	3	1	2
Colour	TCU				< 5	27	< 5	< 5	< 5	< 5	< 5	8	< 5	< 5	8	20	< 5	< 5	8
Calculated Hardness (as CaCO3)	mg/L				287	589	194	128	242	223	172	529	536	386	320	457	149	129	231
Total Cations	meq/L																		
Total Anions	meq/L																		
Ion Balance	% diff.																		
Calculated T.D.S.	mg/L																		
Trace Metals																			
Aluminum, Al	mg/L																		
Barium, Ba	mg/L	0.53	0.54	0.54															
Boron, B	mg/L	2.52	2.55	2.54	0.16	0.65	0.74	0.32	0.81	0.57	0.56	0.05	0.05	0.03	0.1	0.58	0.45	0.32	0.51
Cadmium, Cd	mg/L	0.0015	0.0016	0.0016	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Calcium, Ca	mg/L				59	87.2	47.5	28.7	57	41	39.8	137	141	98	87.2	76.5	36.9	28	53.1
Chromium, Cr	mg/L	0.018	0.016	0.018	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Copper, Cu	mg/L	0.501	0.501	0.501	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Iron, Fe	mg/L	0.168	0.189	0.178	0.12	6.72	< 0.02	0.03	0.1	0.02	0.02	0.11	< 0.02	< 0.02	0.08	1.86	< 0.02	< 0.02	0.03
Lead, Pb	mg/L	0.005	0.005	0.005	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Magnesium, Mg	mg/L				33.9	90.2	18.2	14.5	24.3	29.3	17.8	45.5	44.7	36.8	36.9	65.2	14.5	14.3	24
Manganese, Mn	mg/L	0.039	0.042	0.040	0.03	0.04	< 0.02	0.03	0.02	0.04	0.02	0.11	0.11	< 0.02	0.04	0.04	< 0.02	< 0.02	< 0.02
Potassium, K	mg/L				1.21	19.2	1.98	1.22	2.26	1.77	1.74	1.88	2.14	1.54	1.49	13.7	1.7	1.32	2.21
Silica, Reactive (as SiO2)	mg/L																		
Sodium, Na	mg/L	105	112	108	25.3	182	110	48.9	82.8	57.3	68.6	28.2	15.1	8.62	22.8	136	99.2	49.4	90.9
Zinc, Zn	mg/L	2.508	2.525	2.515	0.01	< 0.01	0.01	< 0.01	0.01	0.02	0.02	0.08	0.03	0.1	0.02	0.02	0.01	0.03	0.02

Note:  
Exceedance of RUC for historical data (1996-2003) based on 2001 - 2003  
Exceedance of RUC has been noted with highlighting, unless exceedance is  
NA - No Value Collected

Appendix D  
Historical Groundwater Analytical Results  
Huron Landfill Site  
Database 1/2: (September 1996 - October 2003)

Parameter	Units	Reasonable Use Criteria <sup>1</sup>			OW8S May-98	OW9 May-98	OW1 Oct-98	OW3 Oct-98	OW4 Oct-98	OW5 Oct-98	OW6 Oct-98	OW7S Oct-98	OW8S Oct-98	OW9 Oct-98	OW1 May-99	OW3 May-99	OW4 May-99	OW5 May-99	OW6 May-99
		OW4	OW5	Ave															
Vadose Zone Monitoring																			
Methane	% LEL																		
Oxygen	% Vol/Vol																		
General Chemistry																			
pH Value	pH units				8.17	8.13	7.58	7.7	7.67	7.82	7.52	8.06	7.97	8.09	7.19	7.29	7.42	7.34	7.5
pH Value (Field)	pH units																		
Temperature (Field)	°C																		
Ammonia as N	mg/L				< 0.05	0.15	0.16	0.17	< 0.05	0.13	7.36	0.1	0.13	0.24	< 0.05	0.12	4.86	0.05	0.11
Ammonia (un-ionized)	mg/L																		
Total Kjeldahl Nitrogen (as N)	mg/L				0.46	0.87	0.81	0.61	0.4	2.19	8.75	0.43	1.03	0.45	0.16	0.2	5.56	0.17	0.12
Nitrate (as N)	mg/L	2.59	2.60	2.60	0.37	0.2	< 0.1	0.35	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Nitrite (as N)	mg/L				< 0.02	< 0.02	< 0.02	0.04	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02
Nitrate + Nitrite (as N)	mg/L														< 0.1	0.1	< 0.1	< 0.1	< 0.1
Dissolved Organic Carbon (as C)	mg/L	3.39	3.97	3.68	1.1	1.9	2.7	2.4	1.8	3.4	19.7	1.1	1.2	1.4	2.6	2.2	1.5	2.2	10.6
Conductivity	µS/cm				609	854	824	742	805	560	1300	440	611	662	810	828	630	676	1150
Conductivity (Field)	µS/cm																		
Sulphate (as SO4)	mg/L	286	266	276	96	233	49	52	69	13	64	65	103	240	34	37	80	36	68
Alkalinity (CaCO3)	mg/L				300	111	388	364	276	298	648	180	246	104	388	340	286	304	512
Chloride (as Cl)	mg/L	126	128	127	1	1	28	18	2	4	71	1	1	1	28	28	2	8	56
Colour	TCU				8	< 5	< 5	< 5	< 5	< 5	10	16	14	12	< 5	< 5	< 5	< 5	< 5
Calculated Hardness (as CaCO3)	mg/L				235	184	471	428	375	295	610	153	246	193	390	422	356	384	463
Total Cations	meq/L														8.99	9.17	7.95	8.61	14.81
Total Anions	meq/L														9.28	8.37	7.44	7.05	13.23
Ion Balance	% diff.														1.63	4.59	3.29	9.91	5.62
Calculated T.D.S.	mg/L														462	433	397	389	719
Trace Metals																			
Aluminum, Al	mg/L														< 0.03	< 0.03	< 0.03	< 0.03	0.63
Barium, Ba	mg/L	0.53	0.54	0.54											0.51	0.45	0.45	0.4	0.79
Boron, B	mg/L	2.52	2.55	2.54	0.41	0.68	0.14	0.12	0.08	0.17	0.66	0.34	0.45	0.51	0.12	0.08	0.05	0.1	0.56
Cadmium, Cd	mg/L	0.0015	0.0016	0.0016	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002	0.003	< 0.002	< 0.002
Calcium, Ca	mg/L				48.3	43.2	108	95.2	90	58	86	31.8	45.1	44	83.6	84.9	79.8	76.1	71.8
Chromium, Cr	mg/L	0.016	0.016	0.016	< 0.02	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Copper, Cu	mg/L	0.501	0.501	0.501	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Iron, Fe	mg/L	0.188	0.189	0.178	< 0.02	0.02	0.31	0.07	0.16	0.11	0.94	0.02	0.02	0.02	0.04	< 0.02	0.02	0.07	1.1
Lead, Pb	mg/L	0.005	0.005	0.005	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Magnesium, Mg	mg/L				29.1	18.5	60.1	45.7	36.8	36.5	71.8	18.1	32.5	20.2	43.9	51	38.3	47.2	68.4
Manganese, Mn	mg/L	0.039	0.042	0.040	< 0.02	0.03	0.08	0.03	0.03	0.04	0.05	< 0.02	0.05	0.02	0.06	0.09	< 0.02	0.04	0.06
Potassium, K	mg/L				1.97	1.59	2.04	2.05	1.87	1.56	13.1	1.39	1.92	1.58	1.57	1.84	0.89	1.33	10.7
Silica, Reactive (as SiO2)	mg/L														9.89	10.2	7.15	16.8	12.3
Sodium, Na	mg/L	105	112	108	80.4	77.5	33.1	23.1	12.6	32.5	136	54.4	62.8	80.7	26.7	15.8	10.4	20.4	126
Zinc, Zn	mg/L	2.508	2.525	2.515	0.18	0.08	0.02	0.03	0.03	0.03	0.03	0.03	0.02	0.05	0.1	0.08	0.09	0.05	0.13

Note:

Exceedance of RUC for historical data (1996-2003) based on 2001 - 2003  
Exceedance of RUC has been noted with highlighting, unless exceedance is  
NA - No Value Collected

Appendix D  
Historical Groundwater Analytical Results  
Huron Landfill Site  
Database 1/2: (September 1996 - October 2003)

Parameter	Units	Reasonable Use Criteria <sup>1</sup>			OW7D May-99	OW7S May-99	OW8D May-99	OW8S May-99	OW9 May-99	OW1 Oct-99	OW3 Oct-99	OW4 Oct-99	OW5 Oct-99	OW6 Oct-99	OW7D Oct-99	OW7S Oct-99	OW8D Oct-99	OW8S Oct-99	OW9 Oct-99
		OW4	OW5	Ave															
Vadose Zone Monitoring																			
Methane	% LEL																		
Oxygen	% Vol/Vol																		
General Chemistry																			
pH Value	pH units				7.91	7.94	7.88	7.68	7.81	7.3	7.6	7.65	7.82	7.8	8.23	8.12	8.18	8.11	8.14
pH Value (Field)	pH units																		
Temperature (Field)	°C																		
Ammonia as N	mg/L				0.08	0.14	0.1	0.14	0.14	< 0.05	< 0.05	< 0.05	0.06	4.48	< 0.05	< 0.05	< 0.05	0.06	< 0.05
Ammonia (un-ionized)	mg/L																		
Total Kjeldahl Nitrogen (as N)	mg/L				0.14	0.11	0.24	0.38	0.27	0.14	< 0.05	< 0.05	0.05	5.06	< 0.05	< 0.05	< 0.05	0.05	< 0.05
Nitrate (as N)	mg/L	2.59	2.60	2.60	0.4	0.19	0.85	0.3	0.55	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.13	< 0.1	0.49	< 0.1	< 0.1
Nitrite (as N)	mg/L				0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Nitrate + Nitrite (as N)	mg/L				0.42	0.19	0.85	0.32	0.55	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.13	< 0.1	0.49	< 0.1	< 0.1
Dissolved Organic Carbon (as C)	mg/L	3.39	3.97	3.68	0.9	0.5	1	0.8	0.9	5.2	2.9	2.2	3.4	8.7	1.2	0.8	1.2	0.5	1.2
Conductivity	us/cm				573	440	739	575	844	1270	883	671	667	1170	577	435	753	600	668
Conductivity (Field)	us/cm																		
Sulphate (as SO4)	mg/L	286	266	276	183	64	290	98	268	85	40	45	23	91	147	61	233	101	229
Alkalinity (CaCO3)	mg/L				160	182	159	244	110	561	473	368	368	587	155	177	157	244	108
Chloride (as Cl)	mg/L	126	128	127	3	2	1	1	1	102	25	2	7	47	2	2	1	1	1
Colour	TCU				< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	6	< 5	< 5	< 5	< 5	< 5
Calculated Hardness (as CaCO3)	mg/L				149	147	246	242	203	802	441	385	359	405	132	140	232	228	178
Total Cations	meq/L				7.14	5.36	9.11	7.83	7.85	14.99	9.62	8.04	8.31	14.09	6.55	5.19	8.87	7.28	7.07
Total Anions	meq/L				6.7	5.04	9.3	8.97	7.84	15.88	11	8.31	8	14.58	6.22	4.87	8.06	7.01	6.95
Ion Balance	% diff.				3.12	3.03	1.04	4.53	0.07	2.83	6.67	1.64	1.82	1.63	2.58	3.25	3.69	1.88	0.63
Calculated T.D.S.	mg/L				417	287	574	395	499	809	523	414	410	750	384	278	507	381	442
Trace Metals																			
Aluminum, Al	mg/L				0.94	0.03	0.17	< 0.03	0.03	0.03	< 0.03	< 0.03	< 0.03	0.31	0.25	0.04	< 0.03	< 0.03	0.03
Barium, Ba	mg/L	0.53	0.54	0.54	0.43	0.5	0.55	0.58	0.38	0.79	0.68	1.15	0.83	0.98	0.8	0.72	0.34	0.6	0.44
Boron, B	mg/L	2.52	2.55	2.54	0.52	0.35	0.62	0.48	0.57	0.36	0.14	0.29	0.19	0.54	0.55	0.39	0.81	0.46	0.52
Cadmium, Cd	mg/L	0.0015	0.0016	0.0016	< 0.002	< 0.002	0.004	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Calcium, Ca	mg/L				35	29.9	54.9	40.2	44.8	148	90.8	82.2	70.2	54.9	30.1	27.9	50.2	38.1	37.8
Chromium, Cr	mg/L	0.016	0.016	0.016	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Copper, Cu	mg/L	0.501	0.501	0.501	< 0.01	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.01	0.01	< 0.01	< 0.01	< 0.01
Iron, Fe	mg/L	0.188	0.189	0.178	0.71	< 0.02	0.07	< 0.02	0.02	0.17	0.04	0.03	0.32	0.4	0.19	0.03	0.03	0.02	0.04
Lead, Pb	mg/L	0.005	0.005	0.005	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Magnesium, Mg	mg/L				15	17.6	28.5	34.4	22.3	57.8	52.2	37.8	44.7	65.1	13.9	17.1	28	32.3	20.3
Manganese, Mn	mg/L	0.039	0.042	0.040	< 0.02	< 0.02	< 0.02	< 0.02	0.02	0.13	0.16	0.08	0.04	0.08	< 0.02	< 0.02	< 0.02	0.03	0.02
Potassium, K	mg/L				1.72	1.2	2.07	1.7	1.83	2.55	2.66	1.64	1.74	9.34	1.55	1.69	2.13	1.99	1.86
Silica, Reactive (as SiO2)	mg/L				6.44	7.15	5.52	8.7	0.9	11.7	11.8	8.79	18.5	10.9	8.75	7.51	6.81	8.73	7.41
Sodium, Na	mg/L	105	112	108	94.4	54.8	94.9	63	86	68.7	17	7.07	24.8	125	88.9	54	91.2	81.2	79.8
Zinc, Zn	mg/L	2.506	2.525	2.515	0.09	0.16	0.15	0.16	0.08	0.41	0.16	0.48	0.33	0.29	0.11	0.12	0.06	0.16	0.09

Note:

Exceedance of RUC for historical data (1996-2003) based on 2001 - 2003

Exceedance of RUC has been noted with highlighting, unless exceedance is

NA - No Value Collected

Appendix D  
Historical Groundwater Analytical Results  
Huron Landfill Site  
Database 1/2: (September 1996 - October 2003)

Parameter	Units	Reasonable Use Criteria <sup>1</sup>			OW1 May-01	OW3 May-01	OW4 May-01	OW5 May-01	OW6 May-01	OW7d May-01	OW7s May-01	OW8d May-01	OW8s May-01	OW9 May-01	OW1 Sep-01	OW3 Sep-01	OW4 Sep-01	OW5 Sep-01	OW6 Sep-01
		OW4	OW5	Ave															
Vadose Zone Monitoring																			
Methane	% LEL																		
Oxygen	% Vol/Vol																		
General Chemistry																			
pH Value	pH units				7.81	7.87	7.98	7.82	7.96	8.28	8.19	8.21	8.12	8.21	7.72	7.77	7.97	7.79	7.91
pH Value (Field)	pH units																		
Temperature (Field)	°C																		
Ammonia as N	mg/L				0.55	< 0.05	0.08	0.07	3.33	< 0.05	< 0.05	< 0.05	< 0.05	0.09	0.06	< 0.05	< 0.05	< 0.05	1.98
Ammonia (un-ionized)	mg/L																		
Total Kjeldahl Nitrogen (as N)	mg/L				0.54	0.34	0.51	0.32	3.25	0.24	0.16	1.37	0.09	0.25	0.26	0.13	0.08	0.35	2.39
Nitrate (as N)	mg/L	2.59	2.60	2.60	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.46	< 0.1	< 0.1	4.21	0.39	< 0.1	< 0.1	1.16
Nitrite (as N)	mg/L				< 0.02	< 0.02	0.02	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.08	< 0.02	< 0.02	< 0.02	0.13
Nitrate + Nitrite (as N)	mg/L				< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.46	< 0.1	< 0.1	4.29	0.39	< 0.1	< 0.1	1.29
Dissolved Organic Carbon (as C)	mg/L	3.39	3.97	3.68	2.9	2.1	1.8	3.3	5.9	1.8	1.1	2	0.8	1.4	2.5	2	1.5	2.7	4.5
Conductivity	uS/cm				1060	805	857	701	1060	548	435	738	593	663	1070	803	682	708	1170
Conductivity (Field)	uS/cm																		
Sulphate (as SO4)	mg/L	286	266	276	50	33	86	24	63	125	45	229	96	226	84	28	59	18	86
Alkalinity (CaCO3)	mg/L				508	420	319	390	501	187	183	158	243	108	417	348	294	351	465
Chloride (as Cl)	mg/L	128	128	127	70	23	2	7	42	3	2	2	1	2	39	24	2	8	35
Colour	TCU				13	9	9	13	11	9	7	7	7	9	< 5	7	< 5	< 5	< 5
Calculated Hardness (as CaCO3)	mg/L				602	474	403	391	891	160	151	230	244	184	525	375	367	347	442
Total Cations	meq/L				13.99	10.21	8.52	8.81	23.24	7.12	5.44	8.69	7.87	7.2	12	8.4	7.91	7.93	13.78
Total Anions	meq/L				13.17	9.74	7.79	8.5	12.51	6.02	4.85	8.01	6.88	6.92	11.49	8.21	7.18	7.58	12.57
Ion Balance	% diff				2.99	2.39	4.51	1.79	30	8.34	7.82	4.05	5.37	1.99	2.14	1.17	4.95	2.37	4.8
Calculated T.D.S.	mg/L				685	494	414	434	891	384	270	505	392	442	812	412	380	381	677
Trace Metals																			
Aluminum, Al	mg/L				0.06	0.06	< 0.03	0.08	16.7	0.95	0.04	< 0.03	< 0.03	< 0.03	< 0.01	< 0.01	0.029	< 0.01	< 0.01
Barium, Ba	mg/L	0.53	0.54	0.54	0.11	0.12	0.07	0.11	0.29	0.07	0.05	0.04	0.05	0.04	0.118	0.084	0.072	0.082	0.172
Boron, B	mg/L	2.62	2.55	2.54	0.14	0.06	0.04	0.1	0.32	0.49	0.33	0.55	0.45	0.5	0.16	0.08	0.05	0.11	0.44
Cadmium, Cd	mg/L	0.0015	0.0016	0.0016	< 0.002	< 0.002	< 0.002	0.002	< 0.002	0.003	0.002	0.003	< 0.002	< 0.002	< 0.0001	< 0.0001	0.0002	< 0.0001	< 0.0001
Calcium, Ca	mg/L				144	108	95	79.8	218	39.8	31.1	49.5	41	39	128	81.7	85.8	72.2	78.4
Chromium, Cr	mg/L	0.016	0.016	0.016	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper, Cu	mg/L	0.501	0.501	0.501	< 0.01	< 0.01	< 0.01	< 0.01	0.03	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.002	< 0.002	< 0.002	< 0.002	0.002
Iron, Fe	mg/L	0.168	0.189	0.178	0.04	< 0.02	< 0.02	0.11	22.4	2.14	< 0.02	< 0.02	< 0.02	< 0.02	0.07	< 0.03	< 0.03	0.19	0.05
Lead, Pb	mg/L	0.005	0.005	0.005	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Magnesium, Mg	mg/L				58.8	49.8	40.2	48.5	85.4	14.7	17.9	25.9	34.4	21	49.8	41.5	37.3	40.8	59.9
Manganese, Mn	mg/L	0.039	0.042	0.040	0.13	0.14	0.02	0.07	0.81	0.05	< 0.02	< 0.02	< 0.02	0.02	0.075	0.022	0.031	0.036	0.072
Potassium, K	mg/L				2.19	2.38	1.63	1.69	12.8	1.82	1.3	1.96	1.73	1.46	1.9	1.7	1.5	1.5	7.3
Silica, Reactive (as SiO2)	mg/L				11.4	10.4	8.65	18.8	55.1	10	7.46	8.78	8.68	7.08	6.09	5.5	5.11	9.59	4.99
Sodium, Na	mg/L	105	112	108	42.9	15.8	9.85	21.8	112	89.1	54.8	92.8	83.1	80	33.5	19.9	12.2	21.8	108
Zinc, Zn	mg/L	2.506	2.525	2.515	0.2	0.17	0.04	0.27	0.2	0.08	0.05	0.01	0.02	0.02	0.008	< 0.005	< 0.005	< 0.005	0.008

Note:

Exceedance of RUC for historical data (1996-2003) based on 2001 - 2003  
Exceedance of RUC has been noted with highlighting, unless exceedance is  
NA - No Value Collected

Appendix D  
Historical Groundwater Analytical Results  
Huron Landfill Site  
Database 1/2: (September 1996 - October 2003)

Parameter	Units	Reasonable Use Criteria <sup>1</sup>			OW7a Sep-01	OW7d Sep-01	OW8s Sep-01	OW8d Sep-01	OW9 Sep-01	OW1 May-02	OW3 May-02	OW4 May-02	OW5 May-02	OW6 May-02	OW7B May-02	OW8S May-02	OW8D May-02	OW9 May-02	OW-1 Sep-02
		OW4	OW5	Ave															
Vadose Zone Monitoring																			
Methane	% LEL									0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Oxygen	% Vol/Vol									20.9	21	21	21	20.8	20.5	20.8	20.8	21.2	20.7
General Chemistry																			
pH Value	pH units				8.15	8.16	8.1	8.14	8.13	7.96	7.98	7.99	7.89	8.04	8.14	8.14	8.18	8.03	7.74
pH Value (Field)	pH units									7.5	7.9	7.9	8	7.5	8.1	7.9	8	8.1	7.4
Temperature (Field)	°C									7.3	7.4	7.4	7.3	10.3	8.1	8.8	9.6	10	12.7
Ammonia as N	mg/L				< 0.05	< 0.05	0.08	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.14	1.38	< 0.05	< 0.05	< 0.05	0.05	0.12
Ammonia (un-ionized)	mg/L									< 0.0008	< 0.0007	< 0.0007	0.0021	0.0083	< 0.0011	< 0.0007	< 0.0009	0.0009	0.0007
Total Kjeldahl Nitrogen (as N)	mg/L				0.25	0.29	0.27	0.26	0.36	0.42	0.33	0.17	0.28	1.7	0.15	0.22	0.61	0.3	0.46
Nitrate (as N)	mg/L	2.59	2.50	2.60	< 0.1	0.13	< 0.1	0.79	0.1	0.23	0.21	0.22	0.17	1.01	0.42	0.29	0.72	0.26	< 0.1
Nitrite (as N)	mg/L				< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Nitrate + Nitrite (as N)	mg/L				< 0.1	0.13	< 0.1	0.79	0.1	0.23	0.21	0.22	0.17	1.08	0.42	0.29	0.72	0.28	< 0.1
Dissolved Organic Carbon (as C)	mg/L	3.39	3.97	3.68	0.8	0.9	0.7	1.1	1	3.4	2.7	2.1	3.4	4.5	0.8	0.7	0.8	0.5	2.7
Conductivity	us/cm				475	585	634	812	708	778	880	667	748	980	463	806	744	660	771
Conductivity (Field)	us/cm									840	670	650	570	1000	430	590	720	660	NA
Sulphate (as SO4)	mg/L	286	266	276	54	116	92	191	256	24	33	68	28	83	57	98	249	237	41
Alkalinity (CaCO3)	mg/L				176	160	230	159	103	397	458	322	405	445	183	237	164	106	394
Chloride (as Cl)	mg/L	126	128	127	2	3	1	2	1	30	30	2	7	31	3	2	2	1	29
Colour	TCU				< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Calculated Hardness (as CaCO3)	mg/L				137	126	217	250	184	402	487	374	387	352	134	207	210	179	404
Total Cations	meq/L				4.83	6.85	6.71	8.46	6.87	9.11	9.98	7.86	8.22	11.02	4.72	6.41	7.59	6.84	9.25
Total Anions	meq/L				4.7	6.71	6.54	7.27	7.42	9.3	10.71	7.93	8.85	11.58	4.96	6.81	8.57	7.1	9.55
Ion Balance	% diff.				1.41	1.2	1.27	7.74	3.88	1.04	3.51	0.51	3.71	2.44	2.45	3.02	6.03	3.35	1.59
Calculated T.D.S.	mg/L				259	338	358	460	458	480	526	408	437	676	309	411	579	503	498
Trace Metals																			
Aluminum, Al	mg/L				< 0.01	< 0.01	< 0.01	0.219	< 0.01	0.062	< 0.01	< 0.01	< 0.01	0.016	< 0.01	0.035	< 0.01	< 0.01	< 0.01
Barium, Ba	mg/L	0.53	0.54	0.54	0.043	0.053	0.048	0.043	0.037	0.07	0.098	0.081	0.081	0.137	0.04	0.047	0.032	0.032	0.08
Boron, B	mg/L	2.52	2.65	2.54	0.3	0.45	0.41	0.5	0.48	0.1	0.05	0.02	0.08	0.37	0.27	0.35	0.45	0.42	0.12
Cadmium, Cd	mg/L	0.0015	0.0016	0.0016	0.0001	< 0.0001	< 0.0001	0.0006	< 0.0001	0.0003	0.0002	0.0008	0.0002	< 0.0001	< 0.0001	< 0.0001	0.0006	< 0.0001	< 0.0001
Calcium, Ca	mg/L				27.8	29.5	37.8	58.7	41.7	102	113	92.5	77.7	63.7	28.2	37	48.3	42.2	97
Chromium, Cr	mg/L	0.016	0.016	0.016	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper, Cu	mg/L	0.501	0.501	0.501	0.002	< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Iron, Fe	mg/L	0.168	0.189	0.178	< 0.03	< 0.03	< 0.03	0.88	< 0.03	< 0.03	< 0.03	< 0.03	0.07	0.1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Lead, Pb	mg/L	0.005	0.005	0.005	< 0.0005	< 0.0005	< 0.0005	0.0012	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Magnesium, Mg	mg/L				16.3	12.8	29.9	25	19.4	35.7	44.9	34.8	42	48.8	15.4	27.8	21.8	17.9	39.4
Manganese, Mn	mg/L	0.039	0.042	0.040	< 0.005	< 0.005	0.019	0.03	0.013	0.083	0.08	0.008	0.047	0.037	< 0.005	< 0.005	< 0.005	0.01	0.068
Potassium, K	mg/L				1	1.2	1.4	1.7	1.3	1.5	1.8	1.2	1.3	5.7	1	1.4	1.5	1.2	1.8
Silica, Reactive (as SiO2)	mg/L				3.82	3.21	4.3	3.7	3.8	4.51	4.77	4.05	8.11	4.31	3.55	4.08	3.18	3.85	4.88
Sodium, Na	mg/L	105	112	108	47.8	78	53.8	78.4	72.8	24	13.8	7.7	19.3	88.2	48.5	51.6	77.4	69.5	25.6
Zinc, Zn	mg/L	2.508	2.525	2.515	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.055	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

Note:

Exceedance of RUC for historical data (1996-2003) based on 2001 - 2003

Exceedance of RUC has been noted with highlighting, unless exceedance is

NA - No Value Collected

Appendix D  
Historical Groundwater Analytical Results  
Huron Landfill Site  
Database 1/2: (September 1996 - October 2003)

Parameter	Units	Reasonable Use Criteria <sup>1</sup>			OW-3 Sep-02	OW-4 Sep-02	OW-5 Sep-02	OW-6 Sep-02	OW-7S Sep-02	OW-7D Sep-02	OW-8S Sep-02	OW-8D Sep-02	OW-9 Sep-02	OW1 May-03	OW3 May-03	OW4 May-03	OW5 May-03	OW6 May-03	OW7S May-03
		OW4	OW5	Ave															
Vadose Zone Monitoring																			
Methane	% LEL				0.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00	2.00	1.00
Oxygen	% Vol/Vol				20.8	20.8	20.8	20.3	20.8	20.8	20.8	20.8	20.8	20.8	21	21	20.9	20.6	20.7
General Chemistry																			
pH Value	pH units				7.84	7.85	7.9	7.8	7.94	8.05	8	7.96	8	7.83	8.02	7.94	7.76	7.87	8.12
pH Value (Field)	pH units				7.5	7.5	7.8	7.3	7.8	7.8	7.7	7.8	7.9	5.83	8.24	7.48	7.02	6.91	6.55
Temperature (Field)	°C				11.7	15.2	12.3	12.3	9.7	10.2	12.7	11.7	12.7	10.1	10.1	11.5	11.1	13.3	10.7
Ammonia as N	mg/L				0.06	< 0.05	0.07	0.41	< 0.05	< 0.05	0.05	< 0.05	0.08	< 0.05	< 0.05	< 0.05	0.11	0.79	0.06
Ammonia (un-ionized)	mg/L				0.0004	< 0.0004	0.0007	0.0021	< 0.0006	< 0.0007	0.0007	< 0.0008	0.0016	< 0.0001	< 0.0001	< 0.0003	0.0002	0.0015	< 0.0001
Total Kjeldahl Nitrogen (as N)	mg/L				0.28	0.24	0.34	0.98	0.19	0.27	0.25	0.35	0.27	0.23	0.18	0.18	0.44	1.09	0.14
Nitrate (as N)	mg/L	2.59	2.60	2.60	0.13	0.14	0.2	1.42	0.12	0.2	< 0.1	0.82	< 0.1	< 0.1	0.41	< 0.1	0.13	0.25	< 0.1
Nitrite (as N)	mg/L				0.02	< 0.02	< 0.02	0.1	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.03	< 0.02
Nitrate + Nitrite (as N)	mg/L				0.15	0.14	0.2	1.52	0.12	0.2	< 0.1	0.82	< 0.1	< 0.1	0.41	< 0.1	0.13	0.28	< 0.1
Dissolved Organic Carbon (as C)	mg/L	3.39	3.97	3.68	2.1	2	2.8	3.5	0.7	1.2	0.8	1.8	5.4	3.1	1.8	1.8	3.1	3	1
Conductivity	µS/cm				714	808	605	962	448	550	606	736	853	929	750	700	679	1000	464
Conductivity (Field)	µS/cm				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulphate (as SO4)	mg/L	286	266	276	37	69	21	100	69	128	97	230	222	173	73	106	48	84	53
Alkalinity (CaCO3)	mg/L				361	299	341	463	187	164	244	161	102	315	322	291	342	461	185
Chloride (as Cl)	mg/L	126	128	127	24	3	8	29	4	3	2	3	2	36	25	3	6	25	5
Colour	TCU				< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Calculated Hardness (as CaCO3)	mg/L				384	362	312	450	151	122	233	224	186	488	408	361	337	368	159
Total Cations	meq/L				8.58	7.48	7.42	13.11	5.18	5.59	7.06	7.94	6.88	10.82	9.17	7.64	7.94	11.52	5.01
Total Anions	meq/L				8.68	7.51	7.44	12.27	5.3	6	8.95	8.13	6.71	10.91	8.69	8.09	8.02	11.49	4.94
Ion Balance	% diff				0.99	0.17	0.11	3.34	1.11	3.58	0.72	1.17	1.09	0.45	2.68	2.84	0.51	0.12	0.63
Calculated T.D.S.	mg/L				445	392	387	748	334	414	429	568	492	616	474	425	424	668	317
Trace Metals																			
Aluminum, Al	mg/L				< 0.01	< 0.01	< 0.01	0.206	< 0.01	0.036	< 0.01	0.03	< 0.01	0.009	0.04	< 0.005	< 0.005	0.014	0.008
Barium, Ba	mg/L	0.53	0.54	0.54	0.084	0.064	0.075	0.16	0.043	0.053	0.051	0.034	0.032	0.083	0.1	0.065	0.078	0.138	0.043
Boron, B	mg/L	2.62	2.55	2.64	0.07	0.04	0.13	0.42	0.3	0.44	0.41	0.5	0.46	0.086	0.078	0.029	0.111	0.391	0.296
Cadmium, Cd	mg/L	0.0015	0.0018	0.0016	0.0001	0.0002	0.0001	0.0002	< 0.0001	0.0004	< 0.0001	0.0002	< 0.0001	< 0.0001	0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001
Calcium, Ca	mg/L				84.8	85	81.8	90.2	31.7	28.8	41.8	51.1	42.9	128	92.5	87.4	68.5	69.1	29.9
Chromium, Cr	mg/L	0.018	0.016	0.016	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	0.005	0.006	0.005	0.005	0.005
Copper, Cu	mg/L	0.501	0.501	0.501	< 0.002	< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0009	0.0011	0.0007	0.0005	0.0011	0.0005
Iron, Fe	mg/L	0.188	0.189	0.178	< 0.03	< 0.03	< 0.03	0.08	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.03	0.03	0.03	0.04	0.03	0.03
Lead, Pb	mg/L	0.005	0.005	0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Magnesium, Mg	mg/L				41.9	33.9	38.2	54.7	17.5	12.1	31.3	23.4	19.1	42	43.3	34.8	40.2	47.5	15.7
Manganese, Mn	mg/L	0.039	0.042	0.040	0.047	0.007	0.013	0.107	< 0.005	0.007	0.009	< 0.005	0.014	0.012	0.008	0.016	0.025	0.082	0.006
Potassium, K	mg/L				1.7	1.4	1.5	8.2	1.2	1.3	1.8	1.8	1.3	1.8	1.7	1.3	1.4	5.4	1
Silica, Reactive (as SiO2)	mg/L				5.09	4.1	7.01	4.56	3.34	3.08	3.97	3.11	3.62	3.65	4.88	3.47	6.21	4.05	3.32
Sodium, Na	mg/L	105	112	108	19.1	9.8	28.5	90.2	48.9	71.7	54	78.8	71.5	23.6	21.8	9.2	28.8	91.2	50.4
Zinc, Zn	mg/L	2.506	2.525	2.515	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.096	0.145	0.005	0.006	0.025	0.015

Notes:

Exceedance of RUC for historical data (1996-2003) based on 2001 - 2003  
Exceedance of RUC has been noted with highlighting, unless exceedance is  
NA - No Value Collected



Appendix D  
Historical Groundwater Analytical Results  
Huron Landfill Site  
Database 1/2: (September 1996 - October 2003)

Parameter	Units	Reasonable Use Criteria <sup>1</sup>			OW7D May-03	OW8S May-03	OW8D May-03	OW9 May-02	OW8S (Rep OWS (Rep))		OW1 Oct-03	OW3 Oct-03	OW4 Oct-03	OW5 Oct-03	OW6 Oct-03	OW7S Oct-03	OW7D Oct-03	OW8S Oct-03	OW6D Oct-03
		OW4	OW5	Ave					May-03	May-03									
Vadose Zone Monitoring																			
Methane	% LEL				1.00	0.00	1.00	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00
Oxygen	% Vol/Vol				20.9	18.3	20.8	21	NA	NA	20.8	20.8	20.9	20.7	20.6	20.8	20.7	20.7	20.6
General Chemistry																			
pH Value	pH units				8.19	8.11	8.19	8.03	8.18	8.15	7.86	7.94	7.97	7.99	7.9	8.07	8.04	8.02	8.07
pH Value (Field)	pH units				8.38	8.29	8.9	7.11	NA	NA	7.38	7.54	7.52	7.67	7.42	7.85	8.04	7.7	7.83
Temperature (Field)	°C				10.2	12.8	13.6	13.6	NA	NA	11.4	12.3	13.7	13	12.2	10.1	11.9	11.9	12.6
Ammonia as N	mg/L				< 0.05	< 0.05	< 0.05	0.16	< 0.05	0.13	< 0.05	< 0.05	< 0.05	< 0.05	0.47	0.05	< 0.05	0.08	< 0.05
Ammonia (un-ionized)	mg/L				< 0.0001	< 0.0001	< 0.0001	0.0005	NA	NA	< 0.0002	< 0.0004	< 0.0004	< 0.0006	0.0027	0.0007	< 0.0012	0.0010	< 0.0008
Total Kjeldahl Nitrogen (as N)	mg/L				0.23	0.09	0.17	0.33	0.14	0.47	< 0.05	< 0.05	< 0.05	< 0.05	0.82	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (as N)	mg/L	2.59	2.60	2.60	< 0.1	0.1	0.15	< 0.1	< 0.1	0.11	0.14	0.52	0.19	0.22	0.28	< 0.1	0.17	< 0.1	0.22
Nitrite (as N)	mg/L				< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.04	< 0.02	< 0.02	< 0.02	< 0.02
Nitrate + Nitrite (as N)	mg/L				< 0.1	0.1	0.15	< 0.1	< 0.1	0.11	0.14	0.52	0.19	0.22	0.32	< 0.1	0.17	< 0.1	0.22
Dissolved Organic Carbon (as C)	mg/L	3.39	3.97	3.68	1.8	0.7	1	1.2	0.5	3.1	3	1.8	1.9	2.3	2.3	< 0.5	0.5	< 0.5	0.8
Conductivity	us/cm				568	662	799	721	652	710	850	743	817	888	967	457	548	627	748
Conductivity (Field)	us/cm				509	586	704	663	NA	NA	748	662	563	838	874	424	525	574	690
Sulphate (as SO4)	mg/L	286	268	276	102	108	236	245	99	51	97	48	85	60	91	55	108	99	228
Alkalinity (CaCO3)	mg/L				179	256	167	113	251	346	343	328	285	346	443	187	181	245	167
Chloride (as Cl)	mg/L	128	128	127	3	3	3	2	3	8	29	29	4	7	24	6	4	3	3
Colour	TCU				< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Calculated Hardness (as CaCO3)	mg/L				119	233	219	189	223	338	418	348	337	315	338	137	117	222	209
Total Cations	meq/L				5.85	7.18	8.02	7.1	6.98	7.98	9.3	7.79	7.18	7.43	10.67	4.88	5.66	8.91	7.74
Total Anions	meq/L				5.79	7.4	8.34	7.41	7.16	8.18	9.71	8.41	7.18	8.17	11.45	5.05	5.95	7.04	8.18
Ion Balance	% diff				1.19	1.64	1.98	2.18	1.41	1.2	2.14	3.86	0.02	4.74	3.55	0.75	2.8	0.97	2.81
Calculated T.D.S.	mg/L				404	451	581	531	438	429	521	431	375	420	668	321	411	433	566
Trace Metals																			
Aluminum, Al	mg/L				< 0.005	0.028	0.021	< 0.005	< 0.005	< 0.005	< 0.005	0.007	0.009	< 0.005	< 0.005	< 0.005	< 0.005	0.02	< 0.005
Barium, Ba	mg/L	0.53	0.54	0.54	0.051	0.065	0.035	0.034	0.05	0.079	0.083	0.081	0.065	0.078	0.128	0.042	0.049	0.05	0.032
Boron, B	mg/L	2.52	2.55	2.54	0.442	0.398	0.483	0.464	0.395	0.114	0.106	0.068	0.037	0.118	0.388	0.297	0.443	0.404	0.499
Cadmium, Cd	mg/L	0.0015	0.0016	0.0016	< 0.0001	0.0004	0.0004	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0007	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	0.0002
Calcium, Ca	mg/L				28.9	44.1	51	44	39.8	68.7	108	80.5	83.7	68	84	29.4	28.8	42.1	48.1
Chromium, Cr	mg/L	0.016	0.016	0.016	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Copper, Cu	mg/L	0.501	0.501	0.501	0.0005	0.0008	0.0008	0.0005	0.0005	0.0005	0.0008	0.0011	0.0008	0.0008	0.0005	0.0005	0.0005	0.0005	0.0005
Iron, Fe	mg/L	0.168	0.189	0.178	0.03	0.03	0.03	0.03	0.03	0.07	0.03	0.03	0.11	0.03	0.08	0.03	0.03	0.03	0.03
Lead, Pb	mg/L	0.005	0.005	0.005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0033	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Magnesium, Mg	mg/L				11.3	29.9	22.2	19.1	29.9	40.4	36.5	36.8	31.2	38.5	43.3	15.4	11.1	28.3	21
Manganese, Mn	mg/L	0.039	0.042	0.040	0.008	0.008	0.005	0.018	0.005	0.027	0.028	0.01	0.089	0.007	0.08	0.005	0.005	0.02	0.005
Potassium, K	mg/L				4.1	1.5	1.8	1.3	1.5	1.4	1.7	1.8	1.4	1.4	4.8	1	1.1	1.4	1.5
Silica, Reactive (as SiO2)	mg/L				2.85	3.84	3.18	3.34	3.82	6.24	8.8	10	8.8	13.9	9.1	7.5	8.4	8.7	8.5
Sodium, Na	mg/L	105	112	108	74.7	56.5	83	75.5	57	28.8	21.7	18.4	9.1	25.3	86.3	50.9	75.4	58	80.9
Zinc, Zn	mg/L	2.508	2.525	2.515	0.01	0.074	0.005	0.005	0.005	0.005	0.045	0.027	0.014	0.01	0.008	0.005	0.005	0.049	0.005

Note:  
Exceedance of RUC for historical data (1996-2003) based on 2001 - 2003  
Exceedance of RUC has been noted with highlighting, unless exceedance is  
NA - No Value Collected

Appendix D  
Historical Groundwater Analytical Results  
Huron Landfill Site  
Database 1/2: (September 1996 - October 2003)

Parameter	Units	Reasonable Use Criteria <sup>1</sup>			OW9 Oct-03	OW10S Oct-03	OW10D Oct-03	OW11 Oct-03	OW7D (f) Oct-03
		OW4	OW5	Ave					
Vadose Zone Monitoring									
Methane	% LEL				1.00	0.00	0.00	14.00	NA
Oxygen	% Vol/Vol				20.6	20.4	20.8	20.6	NA
General Chemistry									
pH Value	pH units				8.03	7.47	7.94	6.88	8.07
pH Value (Field)	pH units				8.01	7.09	7.58	6.53	NA
Temperature (Field)	°C				12.4	13.6	11.9	14.2	NA
Ammonia as N	mg/L				0.13	0.38	< 0.05	57	< 0.05
Ammonia (un-ionized)	mg/L				0.0029	0.0011	< 0.0004	0.0486	NA
Total Kjeldahl Nitrogen (as N)	mg/L				0.05	0.82	< 0.05	67.4	< 0.05
Nitrate (as N)	mg/L	2.59	2.60	2.60	0.12	< 0.1	2.05	< 0.1	0.18
Nitrite (as N)	mg/L				< 0.02	< 0.02	0.05	< 0.02	< 0.02
Nitrate + Nitrite (as N)	mg/L				0.12	< 0.1	2.1	< 0.1	0.18
Dissolved Organic Carbon (as C)	mg/L	3.39	3.97	3.68	0.9	9.8	< 0.5	40.5	1.4
Conductivity	uS/cm				685	1140	599	2500	540
Conductivity (Field)	uS/cm				638	1028	532	2250	NA
Sulphate (as SO4)	mg/L	286	266	276	241	394	78	16	108
Alkalinity (CaCO3)	mg/L				111	259	237	1180	179
Chloride (as Cl)	mg/L	128	128	127	2	7	8	183	3
Colour	TCU				< 5	32	< 5	22	< 5
Calculated Hardness (as CaCO3)	mg/L				184	513	277	881	117
Total Cations	meq/L				6.94	13.03	8.32	27.43	5.84
Total Anions	meq/L				7.3	13.66	8.74	28.51	5.92
Ion Balance	% diff.				2.49	2.36	3.23	1.93	2.41
Calculated T.D.S.	mg/L				522	858	369	1494	411
Trace Metals									
Aluminum, Al	mg/L				< 0.005	0.009	< 0.005	< 0.005	0.007
Barium, Ba	mg/L	0.53	0.54	0.54	0.033	0.021	0.107	0.081	0.05
Boron, B	mg/L	2.52	2.56	2.54	0.468	0.398	0.094	0.444	0.447
Cadmium, Cd	mg/L	0.0015	0.0016	0.0016	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001
Calcium, Ca	mg/L				44.3	117	73.5	180	28.7
Chromium, Cr	mg/L	0.016	0.018	0.016	0.005	0.005	0.005	0.005	0.005
Copper, Cu	mg/L	0.501	0.501	0.501	0.0005	0.0005	0.0005	0.0005	0.0005
Iron, Fe	mg/L	0.168	0.189	0.178	0.03	5.8	0.03	0.14	0.03
Lead, Pb	mg/L	0.005	0.005	0.005	0.0005	0.0005	0.0005	0.0005	0.0005
Magnesium, Mg	mg/L				17.8	53.7	22.8	117	10.9
Manganese, Mn	mg/L	0.039	0.042	0.040	0.017	0.32	0.041	0.169	0.005
Potassium, K	mg/L				1.2	3.8	1.3	40.9	1.2
Silica, Reactive (as SiO2)	mg/L				7.5	12	10.9	19.7	8.4
Sodium, Na	mg/L	105	112	108	74.2	60.9	17	108	75.5
Zinc, Zn	mg/L	2.506	2.525	2.515	0.005	0.01	0.005	0.005	0.005

Note:

Exceedance of RUC for historical data (1996-2003) based on 2001 - 2003  
Exceedance of RUC has been noted with highlighting, unless exceedance is  
NA - No Value Collected

Appendix D  
Historical Groundwater Analytical Results  
Huron Landfill Site  
Database 2/2: (May 2004 - September 2004)

Parameter	Units	Reasonable Use Criteria <sup>1</sup>			OW1 May-04	OW3 May-04	OW4 May-04	OW5 May-04	OW6 Leach May-04	OW7S May-04	OW7D May-04	OW8S May-04	OW8D May-04	OW9 May-04	OW10S May-04	OW10D May-04	OW11 Leach May-04	OW7DS-04 May-04 (replicate)	OW10DS May-04 (replicate)
		OW4	OW5	Ave															
Vadose Zone Monitoring																			
Methane	% LEI				1.00	0.00	0.00	0.00	0.00	0.00	0.00	alarm	0.00	1.00	0.00	0.00	1.00	NA	NA
Oxygen	% Vol/Vol				20.7	21.0	21.0	20.8	20.3	20.7	20.7	alarm	20.8	20.3	20.7	20.8	20.7	NA	NA
General Chemistry																			
pH Value	pH units				7.70	8.00	7.76	7.99	7.83	8.00	8.09	7.99	7.98	7.96	7.80	7.94	6.91	8.03	7.83
pH Value (Field)	pH units				7.49	7.82	7.15	7.15	7.15	7.15	8.00	7.15	7.15	7.15	7.15	7.15	6.50	NA	NA
Temperature (Field)	°C				10.5	11.7	11.3	10.2	13.4	10.0	12.1	14.4	12.8	15.5	11.4	10.9	11.1	NA	NA
Ammonia as N	mg/L				< 0.06	< 0.06	0.14	< 0.05	0.35	0.06	0.05	0.07	< 0.05	0.13	0.15	< 0.05	29	< 0.05	< 0.05
Ammonia (un-ionized)	mg/L				< 0.0003	< 0.0004	0.0004	< 0.0001	0.0012	0.0002	0.0011	0.0003	< 0.0002	0.0005	0.0004	< 0.0001	0.0233	NA	NA
Total Kjeldahl Nitrogen (as N)	mg/L				0.18	0.15	0.34	0.13	0.47	< 0.05	0.11	0.2	0.06	0.24	0.41	0.08	32.6	0.09	0.08
Nitrate (as N)	mg/L	2.65	2.63	2.64	0.13	0.38	0.13	0.14	0.10	< 0.10	0.21	0.10	0.17	< 0.10	< 0.10	1.88	< 0.10	0.21	1.41
Nitrite (as N)	mg/L				< 0.02	< 0.02	< 0.02	< 0.02	0.03	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02
Nitrate + Nitrite (as N)	mg/L				0.13	0.39	0.13	0.14	0.13	< 0.1	0.21	0.1	0.17	< 0.1	< 0.1	1.88	< 0.1	0.21	1.43
Dissolved Organic Carbon (as C)	mg/L	3.43	3.86	3.64	2.80	1.90	1.80	2.40	2.00	0.80	1.10	1.00	1.00	1.00	3.70	0.50	18.10	1.20	0.90
Conductivity	uS/cm				843	735	669	688	949	467	552	668	752	703	1070	616	2280	551	636
Conductivity (Field)	uS/cm				798	881	625	649	872	434	522	613	686	700	989	574	2312	NA	NA
Sulphate (as SO4)	mg/L	288	268	278	55	42	75	38	80	54	98	105	223	242	311	81	51	97	81
Alkalinity (CaCO3)	mg/L				366	317	283	335	415	183	176	244	162	109	290	236	1110	175	239
Chloride (as Cl)	mg/L	127	128	127	32	29	4	7	23	8	4	4	4	3	3	9	117	4	9
Colour	TCU				3.5	2.7	3.5	4.2	2.7	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	16.3	< 2.5	16.8	< 2.5	< 2.5
Calculated Hardness (as CaCO3)	mg/L				429	359	345	314	330	136	112	224	211	191	513	284	1040	113	366
Total Cations	meq/L				9.54	8.08	7.42	7.45	10.49	4.97	5.54	8.97	7.93	7.17	12.23	6.49	25.99	5.62	6.93
Total Anions	meq/L				9.36	8.08	7.34	7.7	10.82	5.01	5.89	7.18	8	7.3	12.35	6.78	28.58	5.85	6.82
Ion Balance	% diff.				0.98	0.15	0.51	1.66	0.6	0.39	1.27	1.48	0.46	0.9	0.51	2.14	1.09	0.25	0.77
Calculated T.D.S.	mg/L				497	422	388	402	635	320	398	441	566	529	747	374	1350	369	383
Trace Metals																			
Aluminum, Al	mg/L				< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.007	< 0.005	0.005	0.009	< 0.005	< 0.005	< 0.005	< 0.005	0.045
Barium, Ba	mg/L	0.53	0.54	0.54	0.09	0.08	0.07	0.08	0.11	0.04	0.05	0.05	0.03	0.03	0.11	0.13	0.05	0.11	
Boron, B	mg/L	2.52	2.56	2.54	0.11	0.08	0.04	0.13	0.39	0.31	0.48	0.42	0.55	0.50	0.34	0.09	0.21	0.46	0.09
Cadmium, Cd	mg/L	0.0014	0.0014	0.0014	< 0.0001	< 0.0001	0.0002	0.0003	< 0.0001	< 0.0001	0.0002	< 0.0001	0.0018	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0002	< 0.0001
Calcium, Ca	mg/L				108	78.9	78	83.7	81.8	28.3	28.7	39.9	48.5	44.7	112	71.3	222	26.5	79.5
Chromium, Cr	mg/L	0.015	0.016	0.015	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper, Cu	mg/L	0.500	0.501	0.500	< 0.0005	0.0008	0.0010	0.0005	0.0014	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0008	< 0.0005	< 0.0005	0.0387
Iron, Fe	mg/L	0.168	0.167	0.167	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.14	< 0.03	2.08	< 0.03	< 0.03
Lead, Pb	mg/L	0.003	0.003	0.003	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Magnesium, Mg	mg/L				39.8	40.8	36.4	37.8	42.7	15.8	11	30.1	21.9	19.2	68.7	25.7	119	11.3	26
Manganese, Mn	mg/L	0.037	0.033	0.035	0.010	< 0.005	< 0.005	< 0.005	0.020	0.008	< 0.005	< 0.005	< 0.005	0.019	0.181	0.030	0.343	< 0.005	0.037
Potassium, K	mg/L				1.90	1.70	1.40	1.50	4.60	1.00	1.20	1.50	1.60	1.30	2.70	1.50	15.30	1.10	1.60
Silica, Reactive (as SiO2)	mg/L				4.33	4.79	3.89	6.28	3.7	3.17	2.68	3.67	2.96	3.26	4.2	4.82	8.58	2.68	4.8
Sodium, Na	mg/L	105	112	109	21.3	19.8	11.1	26.1	86.3	51.2	75.2	58.8	84.3	76.2	43.5	18.0	81.0	78.7	17.9
Zinc, Zn	mg/L	2.503	2.503	2.503	0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.11

Note:

Exceedance of RUC for historical data (2004 - ) based on 2002-2004 analytical results.

Exceedance of RUC has been noted with highlighting, unless exceedance is due to method detection limit (data reported as "<").

NA - No Value Collected

Appendix D  
Historical Groundwater Analytical Results  
Huron Landfill Site  
Database 2/2: (May 2004 - September 2004)

Parameters	Units	Reasonable Use Criteria <sup>1</sup>				OW3 Sep-04	OW4 Sep-04	OW5 Sep-04	OW6 LEACH Sep-04	OW7S Sep-04	OW7D Sep-04	OW8S Sep-04	OW8D Sep-04	OW9 Sep-04	OW10S Sep-04	OW10D Sep-04	OW11 LEACH Sep-04	OW7S-04 Sep-04 (replicate)
		OW4	OW5	Ave	-04 OW1 Sep-04													
Vadose Zone Monitoring																		
Methane	% LEL				0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00	NA
Oxygen	% Vol/Vol				20.9	20.9	20.9	20.9	20.8	20.9	20.9	20.9	20.9	20.5	20.6	20.9	20.6	NA
General Chemistry																		
pH Value	pH units				7.78	7.87	7.87	7.91	7.85	8.02	8.15	8.17	7.94	7.95	7.75	8.01	6.98	8.09
pH Value (Field)	pH units				8.98	7.00	7.00	7.00	7.00	7.72	7.88	7.00	7.00	7.85	7.25	7.75	7.00	NA
Temperature (Field)	°C				12.3	13.3	15.6	14.7	14.1	10.7	12.8	13.3	12.2	15.3	15.2	11.8	15.7	NA
Ammonia as N	mg/L				0.12	0.05	0.06	< 0.05	0.44	< 0.05	< 0.05	0.15	< 0.05	0.21	0.12	< 0.05	44.5	0.13
Ammonia (un-ionized)	mg/L				0.0003	0.0001	0.0002	< 0.0001	0.0011	< 0.0005	< 0.0009	0.0004	< 0.0001	0.0041	0.0006	< 0.0006	0.1277	NA
Total Kjeldahl Nitrogen (as N)	mg/L				< 0.05	< 0.05	0.11	< 0.05	0.31	< 0.05	< 0.05	< 0.05	< 0.05	0.31	0.13	< 0.05	47.8	< 0.05
Nitrate (as N)	mg/L	2.65	2.63	2.64	0.18	0.28	0.48	0.17	0.15	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Nitrite (as N)	mg/L				< 0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Nitrate + Nitrite (as N)	mg/L				0.18	0.28	0.48	0.17	0.17	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dissolved Organic Carbon (as C)	mg/L	3.43	3.86	3.64	2.50	2.00	1.70	2.30	2.00	0.70	1.10	0.80	0.90	1.20	2.80	0.80	23.40	0.60
Conductivity	uS/cm				867	791	670	671	912	464	509	538	737	697	968	559	2330	468
Conductivity (Field)	uS/cm				746	684	601	589	837	412	453	578	640	621	890	504	2200	NA
Sulphate (as SO4)	mg/L	288	268	278	55	43	75	38	85	56	92	109	232	251	268	102	< 2	41
Alkalinity (CaCO3)	mg/L				401	337	296	331	406	180	171	243	157	98	293	194	1150	181
Chloride (as Cl)	mg/L	127	128	127	27	41	3	7	23	8	4	4	4	2	3	4	148	8
Colour	TCU				< 2.5	< 2.5	3.2	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	11.8	< 2.5	20.4	< 2.5
Calculated Hardness (as CaCO3)	mg/L				418	363	332	306	309	128	100	211	189	171	466	213	808	126
Total Cations	meq/L				9.22	8.07	7.12	7.20	9.42	4.51	4.90	6.49	7.00	6.62	11.01	5.43	23.37	4.51
Total Anions	meq/L				9.94	8.81	7.8	7.62	10.56	4.99	5.45	7.24	8.08	7.24	11.52	6.11	27.17	4.7
Ion Balance	% diff				3.78	4.39	3.28	2.81	5.64	5.07	5.25	6.49	7.16	4.47	2.24	5.9	7.53	2.09
Calculated T.D.S.	mg/L				507	445	392	393	598	306	368	429	542	516	678	349	1335	290
Trace Metals																		
Aluminum, Al	mg/L				< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.009	< 0.005
Barium, Ba	mg/L	0.53	0.54	0.54	0.08	0.08	0.07	0.07	0.10	0.04	0.04	0.04	0.03	0.03	0.03	0.09	0.14	0.04
Boron, B	mg/L	2.52	2.56	2.54	0.11	0.06	0.04	0.11	0.37	0.28	0.43	0.38	0.48	0.44	0.35	0.15	0.34	0.28
Cadmium, Cd	mg/L	0.0014	0.0014	0.0014	< 0.0001	0.0001	< 0.0001	0.0006	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0002	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Calcium, Ca	mg/L				104	82.3	79.2	82	57	27.1	24.7	37.9	43.9	40.6	102	53	162	27.3
Chromium, Cr	mg/L	0.015	0.016	0.015	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper, Cu	mg/L	0.500	0.501	0.500	< 0.0005	0.0006	0.0006	0.0009	0.0010	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0008	< 0.0005	< 0.0005	< 0.0005
Iron, Fe	mg/L	0.168	0.167	0.167	0.13	< 0.03	< 0.03	< 0.03	0.06	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	1.14	< 0.03	40.40	< 0.03
Lead, Pb	mg/L	0.003	0.003	0.003	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Magnesium, Mg	mg/L				37.9	38.3	32.5	36.8	40.4	14.1	9.4	28.2	19.3	17	51.4	19.8	104	14.1
Manganese, Mn	mg/L	0.037	0.033	0.035	0.052	0.111	0.025	< 0.005	0.035	< 0.005	< 0.005	0.016	0.008	0.012	0.132	0.035	0.164	< 0.005
Potassium, K	mg/L				1.90	1.80	1.50	1.40	4.20	1.00	1.00	1.40	1.40	1.10	2.60	1.20	28.60	1.00
Silica, Reactive (as SiO2)	mg/L				4.77	4.8	4.25	6.45	4.07	3.15	2.82	3.98	2.85	3.63	4.8	4.74	8.09	3.16
Sodium, Na	mg/L	105	112	109	19.8	17.8	10.3	24.4	71.6	45.3	66.0	51.2	73.2	72.4	37.2	26.3	76.2	44.8
Zinc, Zn	mg/L	2.503	2.503	2.503	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01

Notes:

Exceedance of RUC for historical data (2004 - ) based on 2002-2004 a  
Exceedance of RUC has been noted with highlighting, unless exceedanc  
NA - No Value Collected

**Keywords:** *Self-esteem, self-esteem threat, self-esteem threat sensitivity, self-esteem threat sensitivity scale, self-esteem threat sensitivity scale-2*

NSA = Not Applicable

ND = Not dangerous

TDL = Typical Detection Limit. Actual detection limit varies with concentration of each nutrient.

Major to Yarn & for doing nothing to write the Constitution.

Pharmacokinetic data (PKC) were collected in accordance with MOE (section 8.7) using 3 years of data for Ome and Ome and applying the algorithm until a significant difference is observed. The highest of the two PKC values (Ome or Ome) is taken as the PKC.

Historical Census-Enumerator Quality Data  
Using Linked File

MIA = Most Applicable  
 MD = Most Damaged  
 TDE = Typical Detection Limit. Actual detection limit varies with characteristics of each sample.  
 Refer to Table 5 for ranges relating to industrial gas measurements.  
 Background Line Criteria (BLC) were calculated in accordance with MDEQ Guidance 6-1 every 3 years of tests for CH<sub>4</sub> and CH<sub>2</sub> and applying the detection limit when a non-detect is reported. The value of the new BLC versus CH<sub>4</sub> or CH<sub>2</sub> is shown here.

Huron Landfill Site  
Standard Groundwater Quality Package

Parameter	Short ID	Unit	RUC Max (OW4 & OW6)	OW5	M.D.L.	OW1	OW2	OW3	OW4	OW5	OW6	OW7S	OW7D	OW8S	OW8D	OW9	OW10S	OW10D	OW11	OW12-Rep	OW13	OW14	
Well Casing						Down Team	Down Team	Down Team	Background Team	Background Team	Leachate Team	Down Team	Down Team	Down Team	Down Team	Down Team	Down Team	Down Team	Leachate Team	Down Team	Down Team	Down Team	
Well Owner						16-Apr-06	16-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	
Date of Sample						16-Apr-06	16-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	
FIELD MONITORING RESULTS																							
Temperature	°C	°C				8.8	DRY	8.5	8.4	11.8	13.1	8.8	10.3	13.1	12.7	14.8	11.8	11.4	10.8	14.8	12.4	DRY	
pH	pH	N/A				7.43	DRY	7.51	7.39	7.8	7.77	8.06	7.85	7.89	7.8	7.2	7.49	8.78	7.8	7.42	DRY		
Electrical Conductivity	Th. Cond.	uS/cm				786	DRY	862	863	872	840	850	812	849	884	700	985	882	2378	700	782	DRY	
INORGANICS																							
pH	pH	N/A				8.04	DRY	8.18	8.2	8.18	8.08	8.2	8.29	8.18	8.18	8.1	8.02	8.16	7.28	8.11	7.67	DRY	
Chloride	Cl <sup>-</sup>	mg/L	130	250		27.8	DRY	34.1	2.38	7.33	18.3	10.9	4.31	4.82	3.54	1.38	1.07	9.18	101	1.88	28	DRY	
Electrical Conductivity	Th. Cond.	uS/cm				776	DRY	876	873	867	858	868	817	830	713	848	842	608	2130	881	810	DRY	
Total Hardness (as CaCO3)	Hard(Calc)	mg/L				10	DRY	324	286	318	308	138	105	223	192	175	440	268	1020	171	374	DRY	
Dissolved Organic Carbon (DOC)	DOC	mg/L	3.7	5	1	1	DRY	1	1	2	1	1	1	1	1	1	1	1	1	1	2.7	DRY	
Total Dissolved Solids	Th. TDS	mg/L	487	800	20	848	DRY	368	498	412	314	332	330	444	838	838	484	848	848	884	402	DRY	
Ammonia (un-ionized)	NH <sub>3</sub> -Free	mg/L				0.0003	DRY	<0.0001	<0.0001	0.0003	0.0004	0.0002	0.0004	0.0002	0.0002	0.0017	0.0002	0.0041	0.0048	0.0013	0.0002	DRY	
Ammonia as N	NH <sub>3</sub> -N	mg/L				0.02	DRY	0.08	<0.02	<0.02	0.08	<0.02	<0.02	<0.02	<0.02	0.08	0.08	0.84	34	0.08	0.04	DRY	
Nitrate as N	NO <sub>3</sub> -N	mg/L	2.84	10	0.05	0.88	DRY	0.29	0.2	0.18	0.54	<0.05	0.17	0.1	0.18	0.18	0.08	2.23	0.08	0.36	0.74	DRY	
Nitrite as N	NO <sub>2</sub> -N	mg/L	0.31	1	0.05	<0.05	DRY	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	DRY	
(Nitrate + Nitrite) as N	NO <sub>3</sub> +NO <sub>2</sub>	mg/L	2.84	10	0.10	0.88	DRY	0.28	0.2	0.18	0.54	<0.10	0.17	0.1	0.18	0.18	<0.10	2.23	<0.10	0.36	0.74	DRY	
Total Kjeldahl Nitrogen	TKN	mg/L				0.46	DRY	0.27	0.18	0.28	0.58	0.17	0.21	0.24	0.14	0.26	0.24	0.12	26.7	0.38	0.38	DRY	
Bromide	Br <sup>-</sup>	mg/L				0.08	DRY	0.12	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.83	<0.05	0.08	DRY	
Fluoride	F <sup>-</sup>	mg/L	1.08	1.5	0.05	0.82	DRY	0.77	0.81	0.88	1.3	1.2	1.23	1.05	1.08	1.43	0.57	1.28	<0.08	1.48	0.82	DRY	
Sulphate	SO <sub>4</sub> <sup>2-</sup>	mg/L	294	800	0.10	66.3	DRY	47.5	82.2	47.2	84.3	47.5	82.7	105	218	284	287	71.4	74	243	46.8	DRY	
Orthophosphate as P	PO <sub>4</sub> <sup>3-</sup>	mg/L				<0.10	DRY	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	DRY	
Seawater pH	pH <sub>s</sub>	N/A				8.8	DRY	8.93	8.88	8.88	8.82	7.48	7.82	7.16	7.43	7.83	7.08	8.88	7.84	8.73	DRY		
p-Alkalinity (as CaCO3)	Alk 8.3	mg/L				5	DRY	45	45	45	45	45	45	45	45	45	45	45	45	45	45	DRY	
p-Alkalinity (as CaCO3)	Alk 4.2	mg/L				10	DRY	323	274	312	357	174	186	231	180	104	280	228	1070	108	360	DRY	
CALCULATED VALUES																							
Anion Sum	Anion	mg/L				NA	DRY	8.29	8.82	8.58	8.15	4.21	4.84	5.18	7.15	7.09	10.3	8.53	22.1	8.9	7.71	DRY	
Cation Sum	Cation	mg/L				NA	DRY	7.47	7.83	7.7	8.73	4.87	5.38	7.05	7.31	8.88	10.8	8.88	28.3	8.81	8.82	DRY	
% Difference/Anion Balance	CAB	%				NA	DRY	8.8	9.2	8.8	8.9	8.2	8.1	8.8	2.4	0.8	1.5	4	8.7	2.2	5	DRY	
Carbonate (as CaCO3)	CO <sub>3</sub> <sup>2-</sup>	mg/L				10	DRY	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	DRY	
Bicarbonate (as CaCO3)	HCO <sub>3</sub> <sup>-</sup>	mg/L				10	DRY	323	282	274	312	357	174	183	231	180	104	280	228	1070	108	360	DRY
Langelier Index	L.I.	N/A				NA	DRY	1.24	1.34	1.32	1.28	0.71	0.87	1.04	0.75	0.47	1.18	1.08	1.4	0.47	0.84	DRY	
Aggressiveness Index	A.I.	N/A				NA	DRY	13.1	13.2	13.2	13.1	12.6	12.5	12.9	12.4	13.1	12.8	12.4	12.4	12.4	12.8	DRY	
Ryznar Stability Index	R.S.I.	N/A				NA	DRY	5.58	5.52	5.54	5.58	6.78	6.96	6.11	6.88	7.18	6.84	6.03	4.48	7.17	6.79	DRY	
METALS																							
Aluminum	Al	mg/L				0.004	DRY	0.004	0.004	0.004	0.006	0.004	0.006	0.006	0.004	0.005	<0.004	<0.004	0.008	<0.004	0.005	DRY	
Arsenic	As	mg/L	0.010	0.025	0.003	<0.003	DRY	<0.003	<0.003	0.005	<0.003	<0.003	<0.003	<0.003	<0.003	0.006	<0.003	<0.003	8.884	0.006	<0.003	DRY	
Boron	B	mg/L	1.38	5	0.010	0.094	DRY	0.098	0.098	0.136	0.38	0.328	0.488	0.488	0.581	0.331	0.878	0.274	0.461	0.098	0.098	DRY	
Barium	Be	mg/L	0.30	1	0.002	0.087	DRY	0.084	0.08	0.094	8.101	0.034	0.037	0.041	0.035	0.038	0.038	0.12	0.388	0.038	0.083	DRY	
Calcium	Ca	mg/L				88.4	DRY	82.8	84.3	82.8	87.3	28.3	34.8	38	42.4	38.4	82.3	81.8	197	37.8	84.8	DRY	
Chromium	Cr	mg/L	0.003	0.005	0.002	<0.002	DRY	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	DRY	
Chromium	Cr	mg/L	0.01	0.05	0.003	<0.003	DRY	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	DRY	
Copper	Cu	mg/L	0.80	1	0.003	<0.003	DRY	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	DRY	
Iron	Fe	mg/L	0.40	0.3	0.005	0.005	DRY	8.871	8.871	8.871	8.871	8.871	8.871	8.871	8.871	8.871	8.871	8.871	8.871	8.871	8.871	DRY	
Potassium	K	mg/L				0.05	DRY	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	DRY	
Magnesium	Mg	mg/L				0.05	DRY	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	26.1	DRY	
Manganese	Mn	mg/L	0.04	0.05	0.002	0.014	DRY	<0.002	<0.002	0.003	0.015	0.003	<0.002	<0.002	0.005	0.02	0.044	0.028	0.334	0.018	0.048	DRY	
Sodium	Na	mg/L	114	200	0.05	22.3	DRY	22.2	11.8	28.7	78.2	31	74.3	83.8	83.8	79.3	40.4	18.7	84	72.5	22.8	DRY	
Lead	Pb	mg/L	0.004	0.01	0.002	<0.002	DRY	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	DRY	
Selenium	Se	mg/L	0.008	0.01	0.004	<0.004	DRY	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	DRY	
Silicon	Si	mg/L				0.05	DRY	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	DRY	
Zinc	Zn	mg/L	2.50	5	0.004	0.088	DRY	0.088	0.088	0.088	0.088	0.088	0.088	0.088	0.088	0.088	0.088	0.088	0.088	0.088	0.088	DRY	
EXTENDED ANALYSIS																							
Phenols	Phenol	mg/L				<0.001	DRY	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	DRY	

This letter is to be returned with the candidate's response.



Appendix D  
Leachate Indicator Parameters - Historical Results  
Huron Landfill Site

Chloride Concentration (mg/L)															
Date	OW1	OW3	OW4	OW5	OW6	OW7S	OW7D	OW8S	OW8D	OW9	OW10S	OW10D	OW11	SW1	SW2
Oct-89	5.3			5.2										16.4	42.8
Jun-90	18.9	3.4	8.7	2.4										11.6	11.6
Nov-90	109.0		3.5	7.2										10.2	10.0
May-91	47.1	7.1	4.5	8.9										7.9	8.0
Sep-91	33.5	4.5	4.3	3.9										10.5	9.4
May-92	50.5	13.1	4.7	8.8										10.5	10.8
Oct-92	48.6	16.0	3.4											11.7	12.1
Jun-93	42.7	13.1	3.8											10.2	10.2
Oct-93	11.4	13.3	2.9	5.2										11.1	11.5
May-94	32.2	17.1	3.0	7.6										8.6	8.6
Oct-94	20.3	4.6	7.5	1.6										3.8	5.3
May-95	13.7	35.9	3.3	4.8										8.4	8.6
Sep-95	27.9	14.1	3.5	3.5										13.4	12.6
May-96	24.0	13.0	4.0											10.0	10.0
Sep-96	27.0	15.0	3.0	7.0										19.0	19.0
May-97	27.0	14.7	1.9	3.3										6.2	7.0
Sep-97	32.0	13.0	5.0	7.0	417.0	6.0		5.0		6.0				18.0	15.0
May-98	38.0	19.0	3.0	5.0	179.0	3.0	8.0	3.0	4.0	2.0				8.0	8.0
Oct-98	31.0	13.0	4.0	4.0	120.0	2.0	6.0	2.0	2.0	2.0				8.0	6.0
May-99	32.0	17.0	2.0	6.0	84.0	1.0	3.0	1.0	2.0	1.0				14.0	13.0
Oct-99	26.0	16.0	2.0	4.0	71.0	1.0		1.0		1.0					
May-00	29.0	28.0	2.0	8.0	56.0	2.0	3.0	1.0	1.0	1.0				10.0	8.0
Oct-00	102.0	25.0	2.0	7.0	47.0	2.0	2.0	1.0	1.0	1.0				9.0	9.0
May-01	70.0	23.0	2.0	7.0	42.0	3.0	2.0	2.0	1.0	2.0				10.0	10.0
Sep-01	39.0	24.0	2.0	6.0	35.0	2.0	3.0	1.0	2.0	1.0				23.0	25.0
May-02	30.0	30.0	2.0	7.0	31.0	3.0		2.0	2.0	1.0				3.0	4.0
Sep-02	29.0	24.0	3.0	6.0	29.0	4.0	3.0	2.0	3.0	2.0				11.0	11.0
May-03	36.0	25.0	3.0	6.0	25.0	5.0	3.0	3.0	3.0	2.0				11.0	10.0
Oct-03	29.0	29.0	4.0	7.0	24.0	6.0	4.0	3.0	3.0	2.0				13.0	14.0
May-04	32.0	29.0	4.0	7.0	23.0	8.0	4.0	4.0	4.0	3.0	7.0	8.0	163.0	9.0	8.0
Sep-04	27.0	41.0	3.0	7.0	23.0	8.0	4.0	4.0	4.0	2.0	3.0	9.0	117.0	21.0	19.0
May-05	28.2	36.4	3.4	7.2	18.9	8.2	4.4	4.4	3.1	1.7	1.5	4.0	102.0	8.8	8.9
Sep-05	25.0	52.0	4.0	7.0	17.0	10.0	5.0	5.0	4.0	2.0	2.0	3.0	135.0	30.0	9.0
Apr-06	27.8	34.1	2.4	7.3	19.3	10.9	4.3	4.8	3.5	1.4	1.1	9.2	101.0	8.3	8.6
Oct-06	23.0	30.3	2.7	10.7	16.8	13.1	4.6	5.7	3.8	1.4	1.0	2.8	127.0	19.5	21.4

Note: Surface water samples listed for November 1990 were collected January 1991.

Appendix D

Leachate Indicator Parameters - Historical Results  
Huron Landfill Site

Date	Conductivity (uS/cm)														
	OW1	OW3	OW4	OW5	OW6	OW7S	OW7D	OW8S	OW8D	OW9	OW10S	OW10D	OW11	SW1	SW2
Oct-89	686			591										514	868
Jun-90	876	534	680	416										470	460
Nov-90	1113		642	703										556	557
May-91	999	688	663	611										490	496
Sep-91	891	555	634	514										424	392
May-92	1011	743	693	636										478	484
Oct-92	1071	805	722											628	603
Jun-93	1108	725	691											506	507
Oct-93	1089	1084	696	620										588	601
May-94	1069	1000	686	580										517	515
Oct-94	1092	1019	741	585										426	502
May-95	793	1150	681	550										498	514
Sep-95	1048	807	687	550										463	440
May-96	992	929	657											481	485
Sep-96	930	760	648	613										577	560
May-97	982	794	644	533										473	469
Sep-97	965	732	656	586	4960	427		624		723				452	462
May-98	886	771	593	534	1840	363	855	603	740	604				436	426
Oct-98	754	575	505	498	1660	443	863	663	853	707				401	314
May-99	844	756	649	571	1270	413	682	609	795	654				425	421
Oct-99	824	742	605	560	1300	440		611		662					
May-00	810	826	630	676	1150	440	573	575	739	644				423	425
Oct-00	1270	883	671	667	1170	435	577	600	753	668				573	597
May-01	1060	805	657	701	1050	548	435	738	593	663				538	532
Sep-01	1070	803	682	708	1170	475	585	634	812	706				533	574
May-02	778	880	667	748	980	453		606	744	660				358	436
Sep-02	771	714	608	605	982	448	550	606	736	653				437	348
May-03	929	759	700	679	1000	464	568	662	799	721				500	508
Oct-03	850	743	617	688	967	457	546	627	748	685	1140	599	2500	595	605
May-04	843	735	669	688	949	467	552	666	752	703	1070	616	2280	521	522
Sep-04	867	791	670	671	912	464	509	636	737	621	986	559	2330	499	530
May-05	829	659	678	660	860	465	514	633	714	691	893	563	2200	476	489
Sep-05	716	767	656	647	819	451	513	634	690	681	853	544	2130	460	291
Apr-06	776	676	673	687	858	459	517	636	713	688	942	608	2130	468	482
Oct-06	810	683	651	670	810	454	491	627	704	679	896	550	2250	473	455

Note: Surface water samples listed for November 1990 were collected January 1991.

# Appendix D

## Leachate Indicator Parameters - Historical Results Huron Landfill Site

Date	Hardness (mg/L)														
	OW1	OW3	OW4	OW5	OW6	OW7S	OW7D	OW8S	OW8D	OW9	OW10S	OW10D	OW11	SW1	SW2
Oct-89	305			231										249	426
Jun-90	422	234	335	163										242	229
Nov-90	569		328	321										288	295
May-91	491	326	347	295										260	258
Sep-91	447	265	307	224										217	197
May-92	513	399	379	318										257	258
Oct-92	580	408	382											314	306
Jun-93	555	366	372											257	257
Oct-93	534	591	357	317										297	304
May-94	548	545	366	266										259	266
Oct-94	529	521	391	293										256	300
May-95	427	617	369	252										272	283
Sep-95	521	405	363	252										233	226
May-96	494	377	339											241	237
Sep-96	446	366	347	294										302	292
May-97	496	469	305	273										269	275
Sep-97	433	311	456	328	1800	135		260		225				262	193
May-98	559	558	387	278	628	121	263	221	296	188				262	242
Oct-98	498	376	357	287	589	126	194	223	242	172				205	169
May-99	529	536	386	320	457	129	149	235	231	184				239	249
Oct-99	471	426	375	295	510	153		246		193					
May-00	390	422	356	384	453	147	149	242	246	203					
Oct-00	602	441	385	359	405	140	132	228	232	178				249	247
May-01	602	474	403	391	891	160	151	230	244	184				346	356
Sep-01	525	375	367	347	442	137	126	217	250	184				329	317
May-02	402	467	374	367	352	134		207	210	179				267	274
Sep-02	404	384	352	312	450	151	122	233	224	186				209	251
May-03	488	409	361	337	368	139	119	233	219	189				221	200
Oct-03	416	348	337	315	338	137	117	222	209	184				283	284
May-04	429	359	345	314	330	138	112	224	211	191	513	277	881	331	338
Sep-04	416	363	332	306	309	126	100	211	189	171	513	284	1040	285	265
May-05	470	350	380	330	320	150	120	240	200	190	466	213	808	236	241
Sep-05	390	390	340	310	300	130	110	240	190	180	460	240	1000	260	260
Apr-06	383	324	365	319	309	138	105	223	192	175	440	259	950	200	150
Oct-06	374	305	329	300	272	126	93	207	182	161	389	189	841	219	197

Note: Surface water samples listed for November 1990 were collected January 1991.

# Appendix D

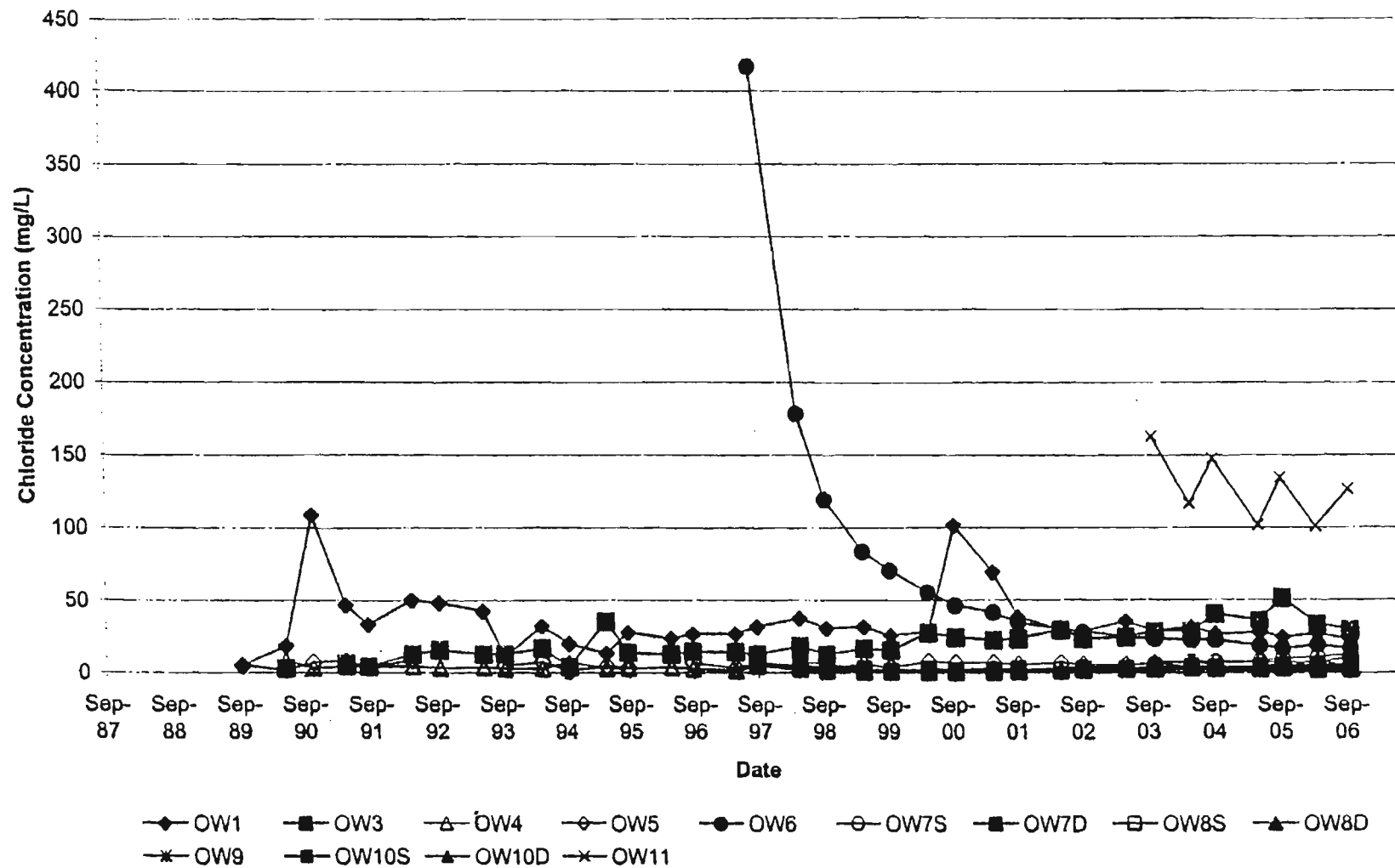
## Leachate Indicator Parameters - Historical Results Huron Landfill Site

Date	D.O.C. (mg/L)														
	OW1	OW3	OW4	OW5	OW6	OW7S	OW7D	OW8S	OW8D	OW9	OW10S	OW10D	OW11	SW1	SW2
Oct-89	3.8			4.3											
Jun-90	2.5	2.1	2.4	2.6										4.5	5.3
Nov-90	4.6	4.4		3.5										2.8	2.6
May-91	4.2	2.9	6.9	3.1										3.7	3.7
Sep-91		2.4		2.1										3.1	7.1
May-92	2.8	2.4	1.7	2.4										4.7	4.7
Oct-92	5.2	3.1	1.8											4.0	4.1
Jun-93	4.2	3.0	1.6											4.4	4.3
Oct-93	3.5	5.1	2.0	3.6										4.0	4.0
May-94	2.5	3.8	1.8	2.9										3.5	3.3
Oct-94	2.8	3.3	2.2	2.7										7.2	4.4
May-95	3.2	1.8	1.5	2.6										3.0	3.0
Sep-95	2.9	2.9	2.0	2.8										4.4	4.6
May-96	2.9	3.6	1.4											3.1	2.8
Sep-96	2.6	2.9	1.9	3.5										7.2	6.6
May-97	2.6	2.4	1.3	2.6										2.5	2.7
Sep-97	2.9	2.3	1.3	2.8	995.0	2.4		2.4		2.8				6.0	5.2
May-98	3.0	2.1	1.3	2.7	58.8	1.2	2.3	1.4	2.5	1.2				3.4	3.3
Oct-98	2.5	1.8	1.2	2.6	44.7	1.0	1.6	1.1	2.2	1.8				3.7	6.7
May-99	3.0	2.4	1.4	3.3	25.8	0.8	1.8	1.1	2.0	1.9				4.6	4.4
Oct-99	2.7	2.4	1.8	3.4	19.7	1.1		1.2		1.4					
May-00	2.6	2.2	1.5	2.2	10.5	0.5	0.9	0.6	1.0	0.9				5.3	4.4
Oct-00	5.2	2.9	2.2	3.4	8.7	0.8	1.2	0.5	1.2	1.2				4.3	4.9
May-01	2.9	2.1	1.6	3.3	5.9	1.8	1.1	2.0	0.8	1.4				3.3	3.0
Sep-01	2.5	2.0	1.5	2.7	4.5	0.8	0.9	0.7	1.1	1.0				4.7	6.0
May-02	3.4	2.7	2.1	3.4	4.5	0.8		0.7	0.6	0.5				5.2	3.4
Sep-02	2.7	2.1	2.0	2.8	3.5	0.7	1.2	0.8	1.8	5.4				7.1	8.3
May-03	3.1	1.8	1.6	3.1	3.0	1.0	1.6	0.7	1.0	1.2				3.5	3.6
Oct-03	3.0	1.6	1.9	2.3	2.3	0.5	0.5	0.5	0.6	0.9	9.8	0.5	40.5	3.0	3.3
May-04	2.8	1.9	1.8	2.4	2.0	0.8	1.1	1.0	1.0	1.0	3.7	0.5	18.1	3.6	3.6
Sep-04	2.5	2.0	1.7	2.3	2.0	0.7	1.1	0.6	0.9	1.2	2.8	0.8	23.4	4.1	4.2
May-05	2.3	1.8	1.7	2.6	2.1	0.7	0.9	0.7	0.9	1.3	2.0	0.6	18.7	3.5	3.7
Sep-05	2.7	2.1	1.9	3.7	2.0	0.8	1.5	0.6	1.1	1.1	1.8	0.8	24.9	4.2 **	6.2 **
Apr-06	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	5.0	9.0	2.0	2.0
Oct-06	2.7	2.0	1.6	2.8	1.6	0.7	1.1	0.8	1.0	1.2	1.3	0.6	24.3	6.7	7.1
Note: Surface water samples listed for November 1990 were collected. Leaves 1001															

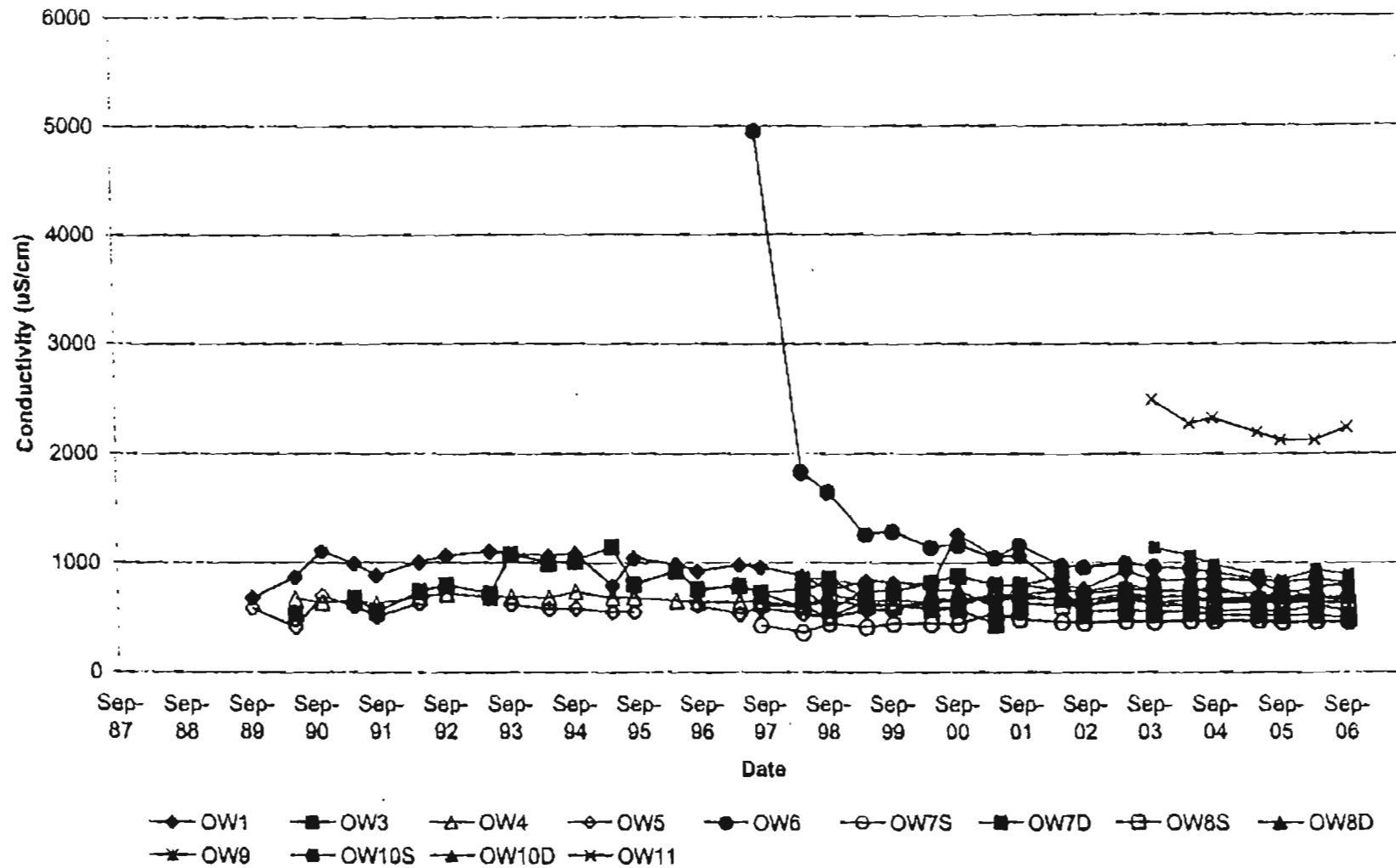
Note: Surface water samples listed for November 1990 were collected January 1991.

\*\* Fall 2005 concentrations for SW1 and SW2 are reported as Total Organic Carbon (TOC).

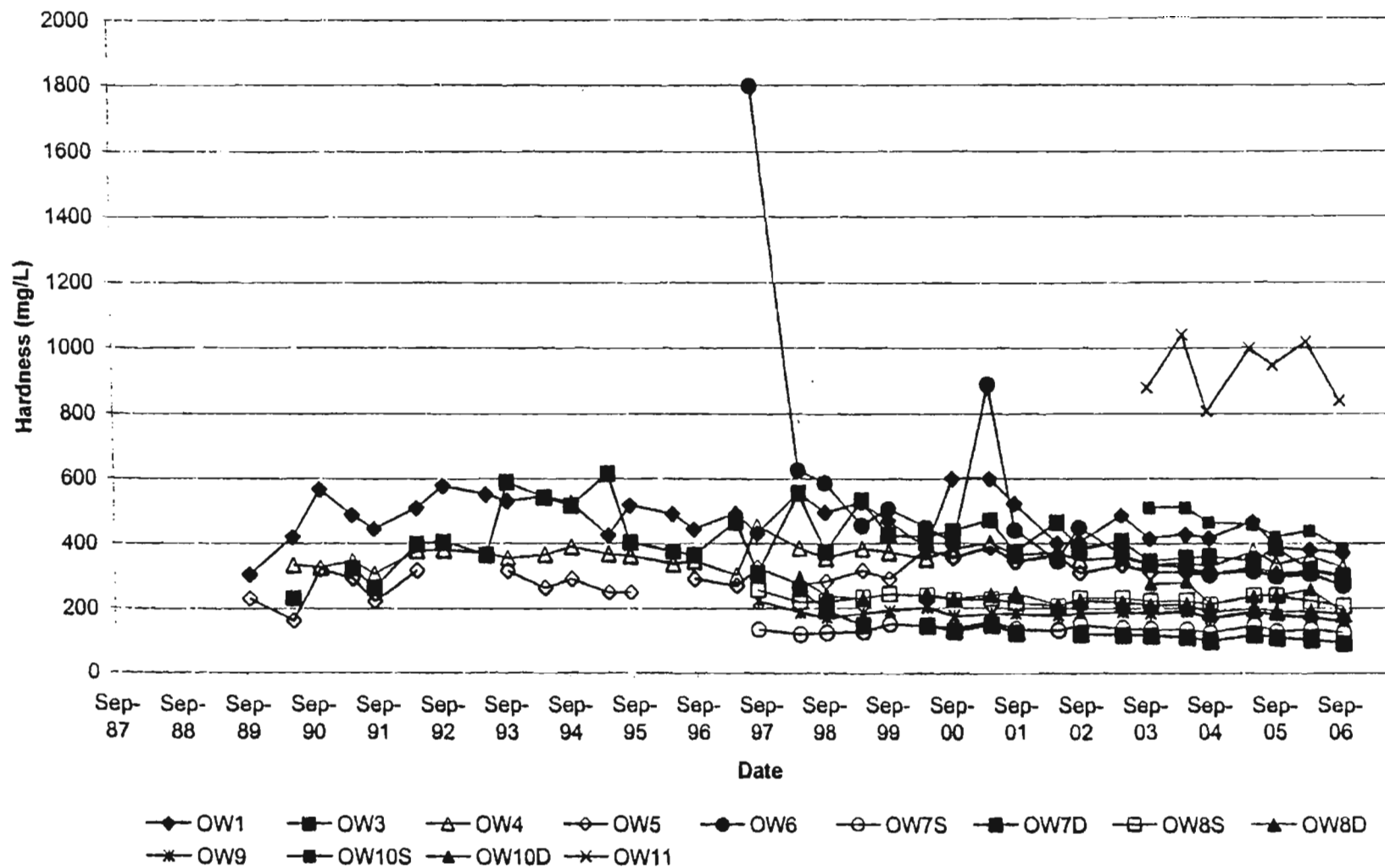
# **HURON LANDFILL SITE** Chloride Concentration (mg/L) vs. Time

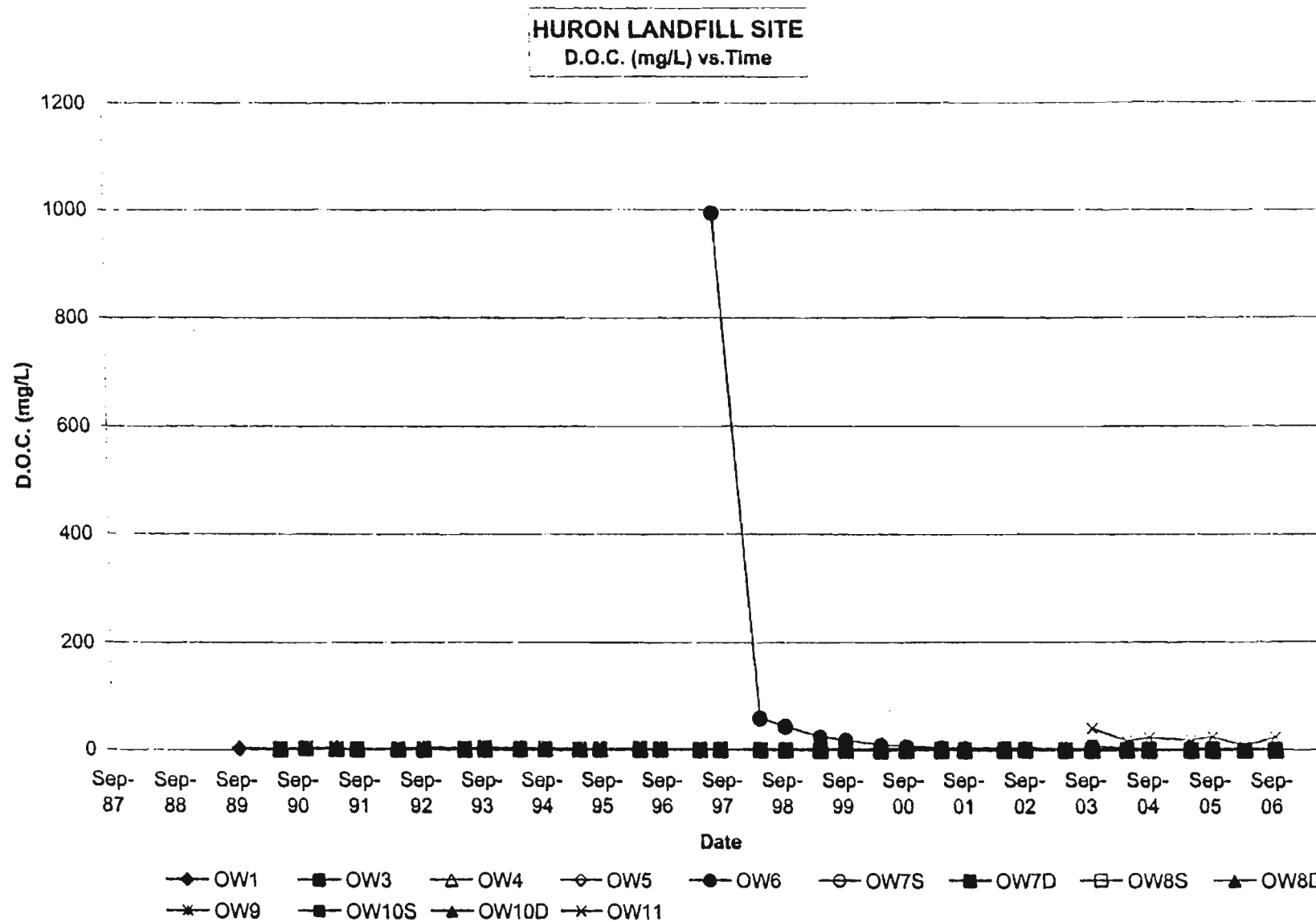


# HURON LANDFILL SITE Conductivity (uS/cm) vs. Time



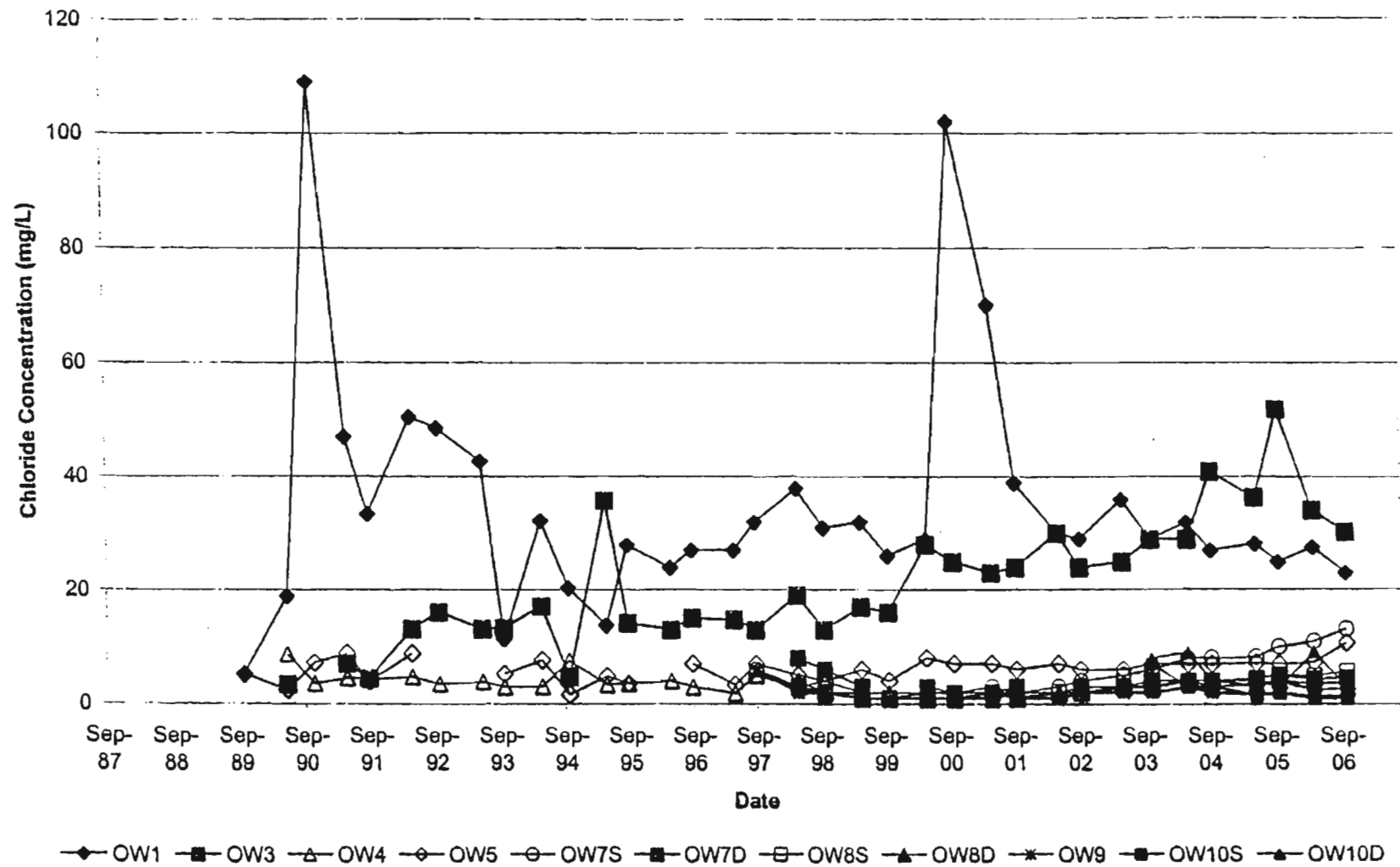
# **HURON LANDFILL SITE** Hardness (mg/L) vs. Time



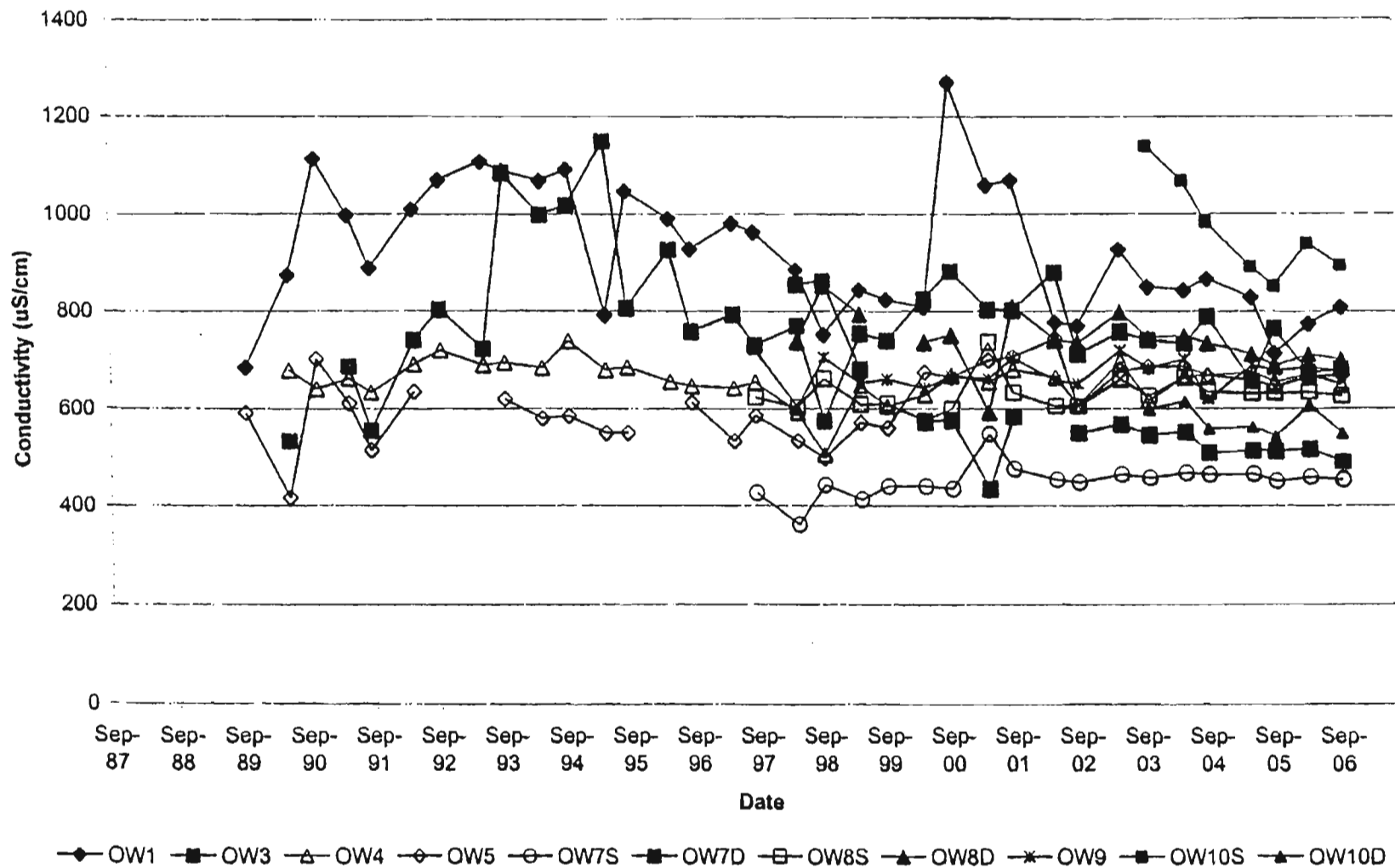




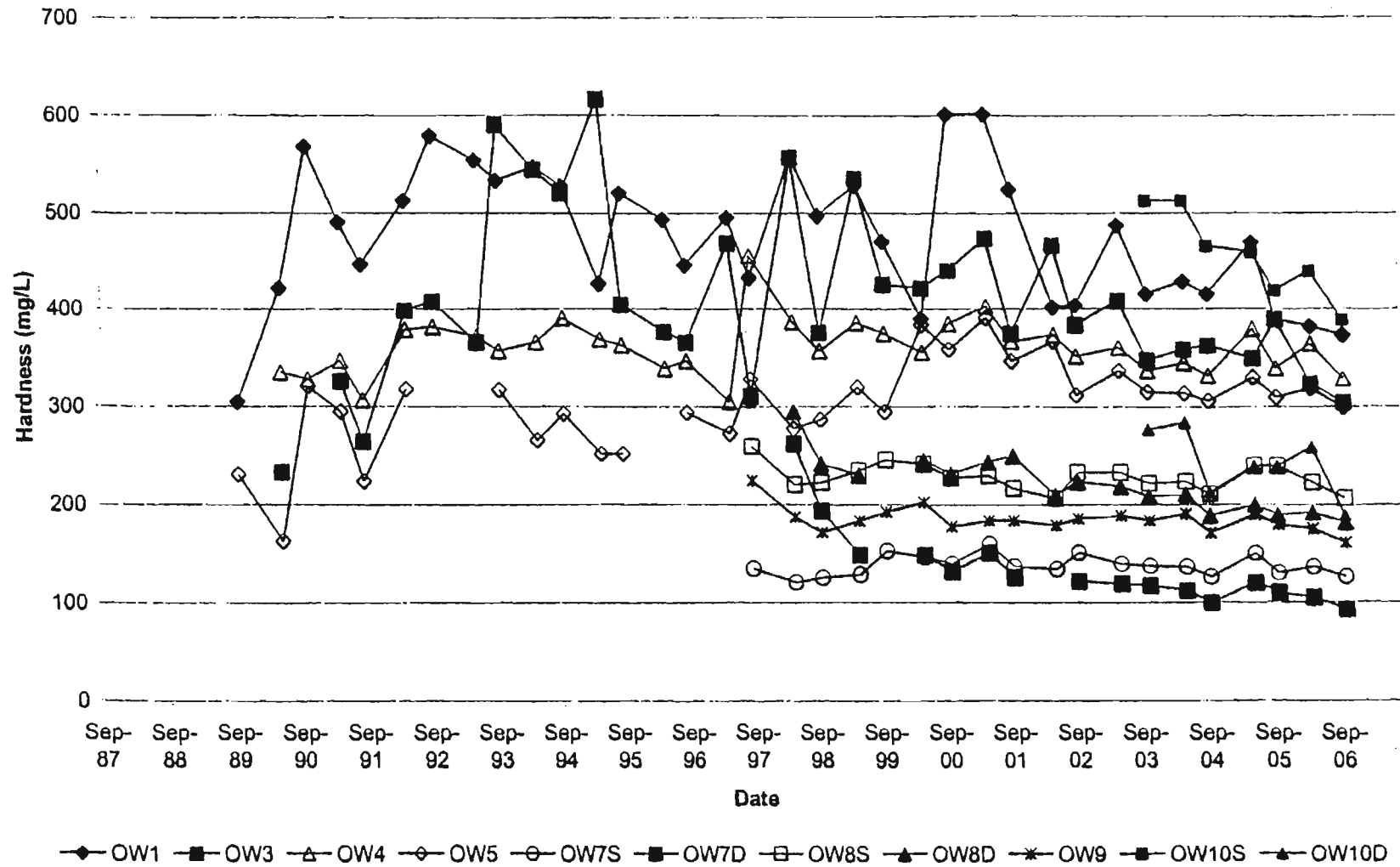
# **HURON LANDFILL SITE** Chloride Concentration (mg/L) vs. Time



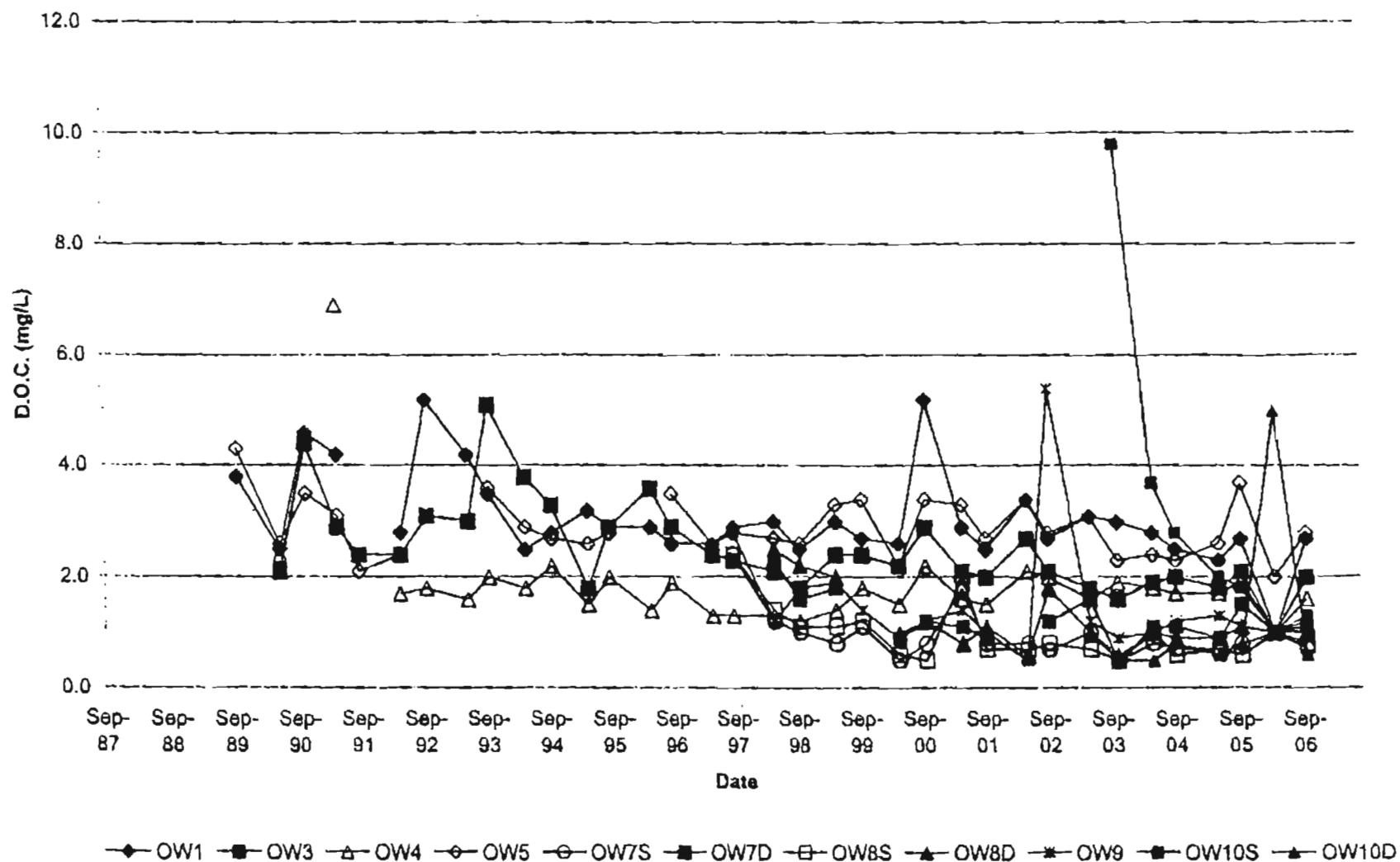
**HURON LANDFILL SITE**  
Conductivity (uS/cm) vs. Time



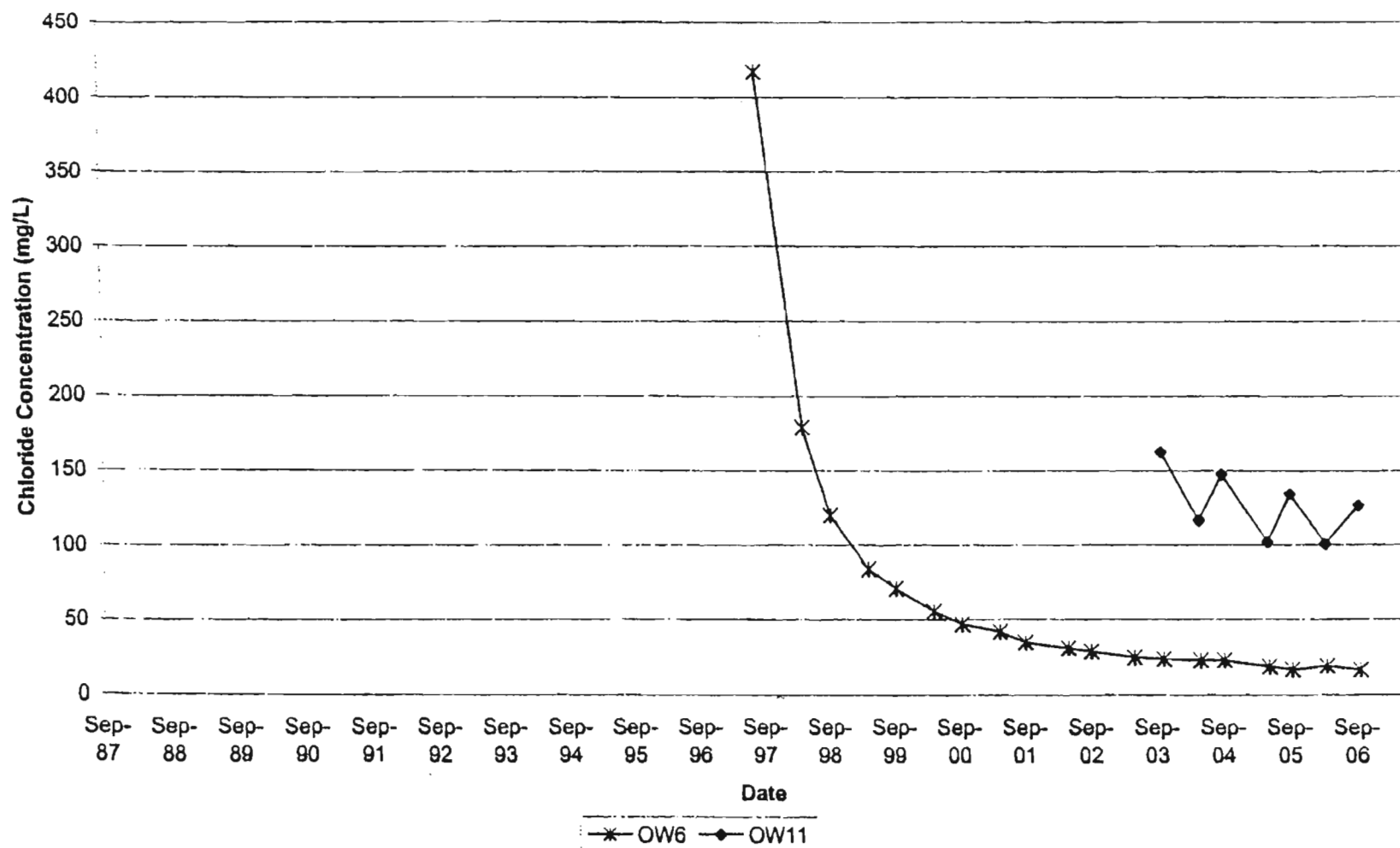
**HURON LANDFILL SITE**  
Hardness (mg/L) vs. Time



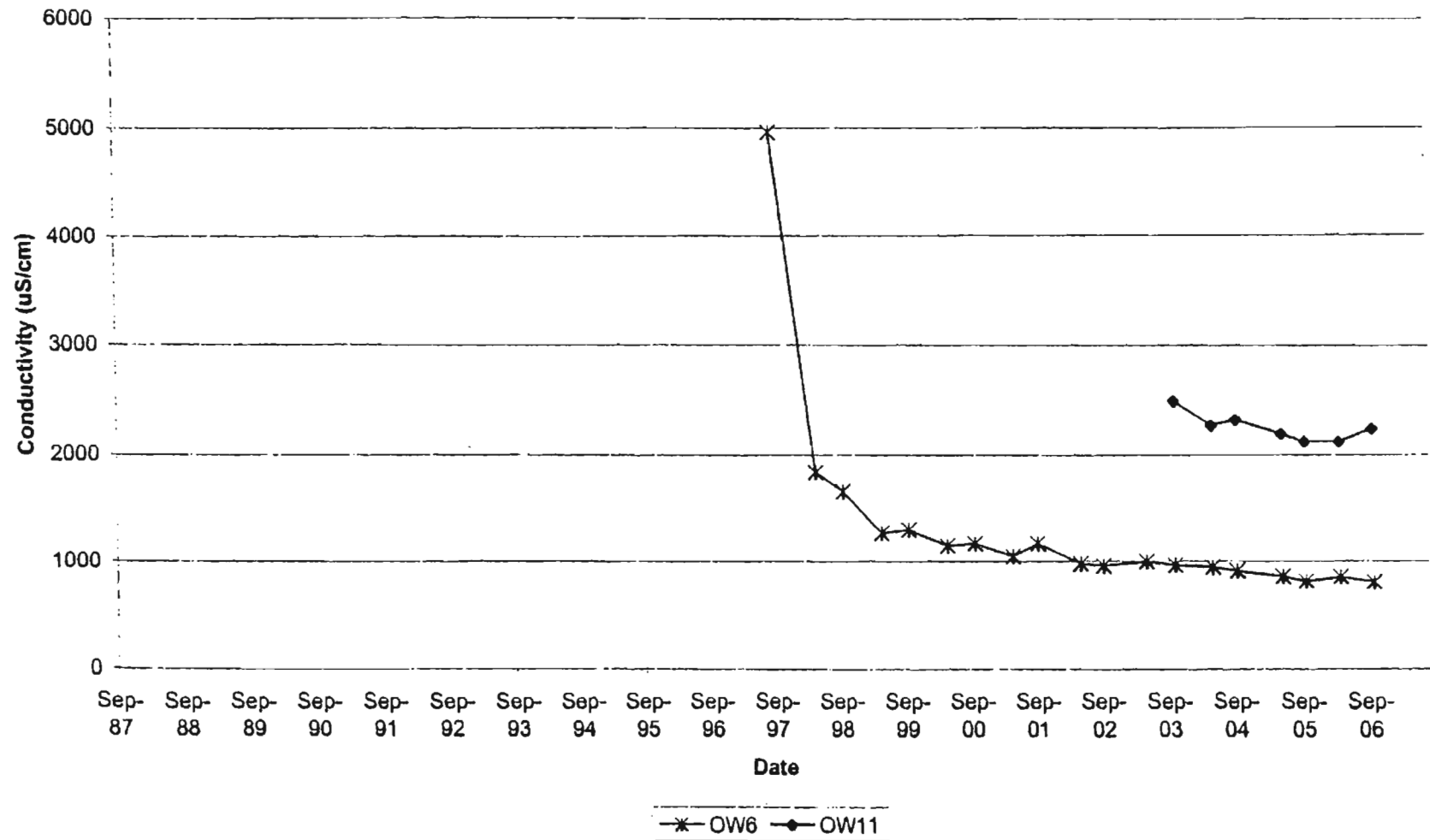
**HURON LANDFILL SITE**  
D.O.C. (mg/L) vs. Time



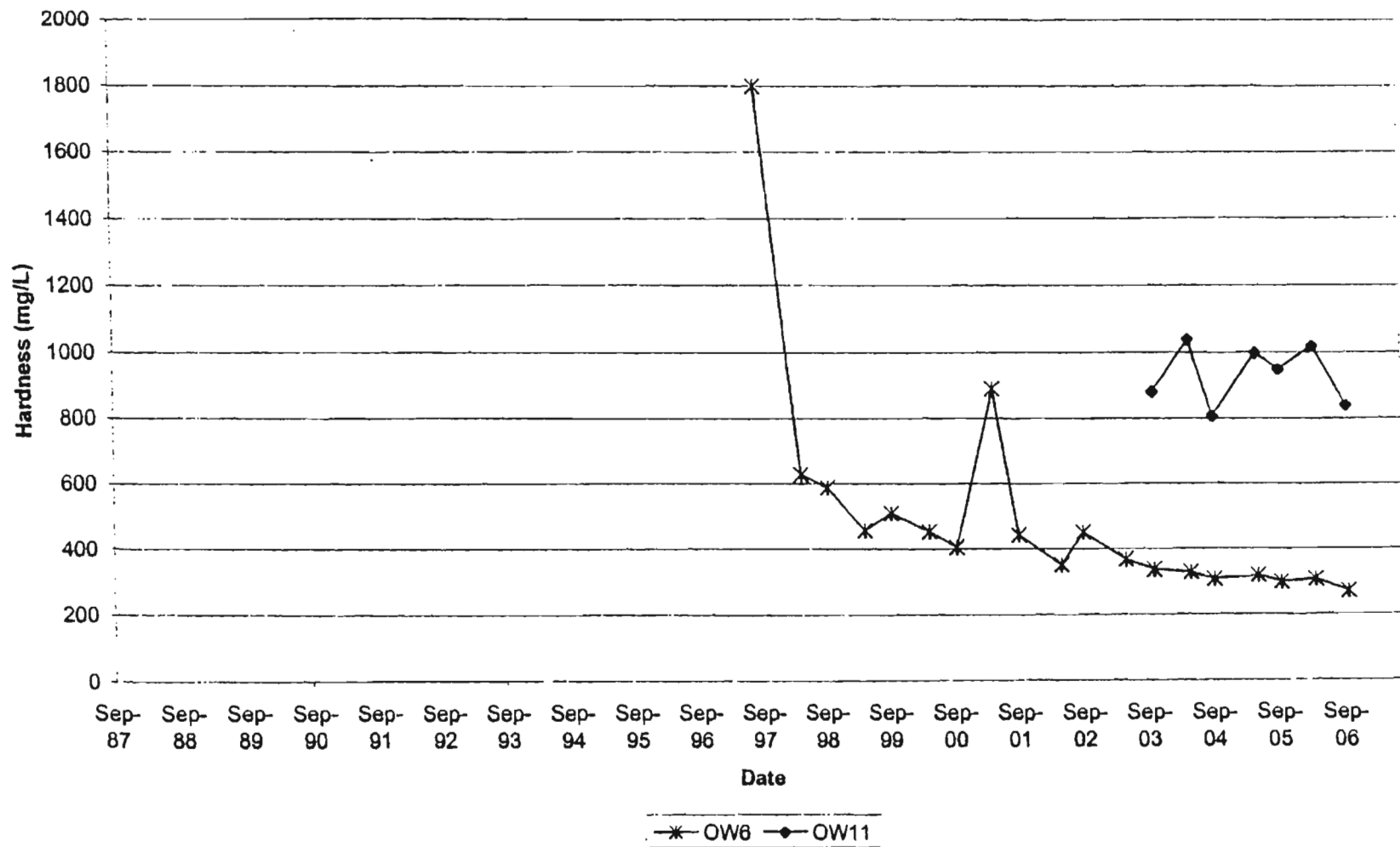
**HURON LANDFILL SITE**  
**Chloride Concentration (mg/L) vs. Time**  
**leachate wells**

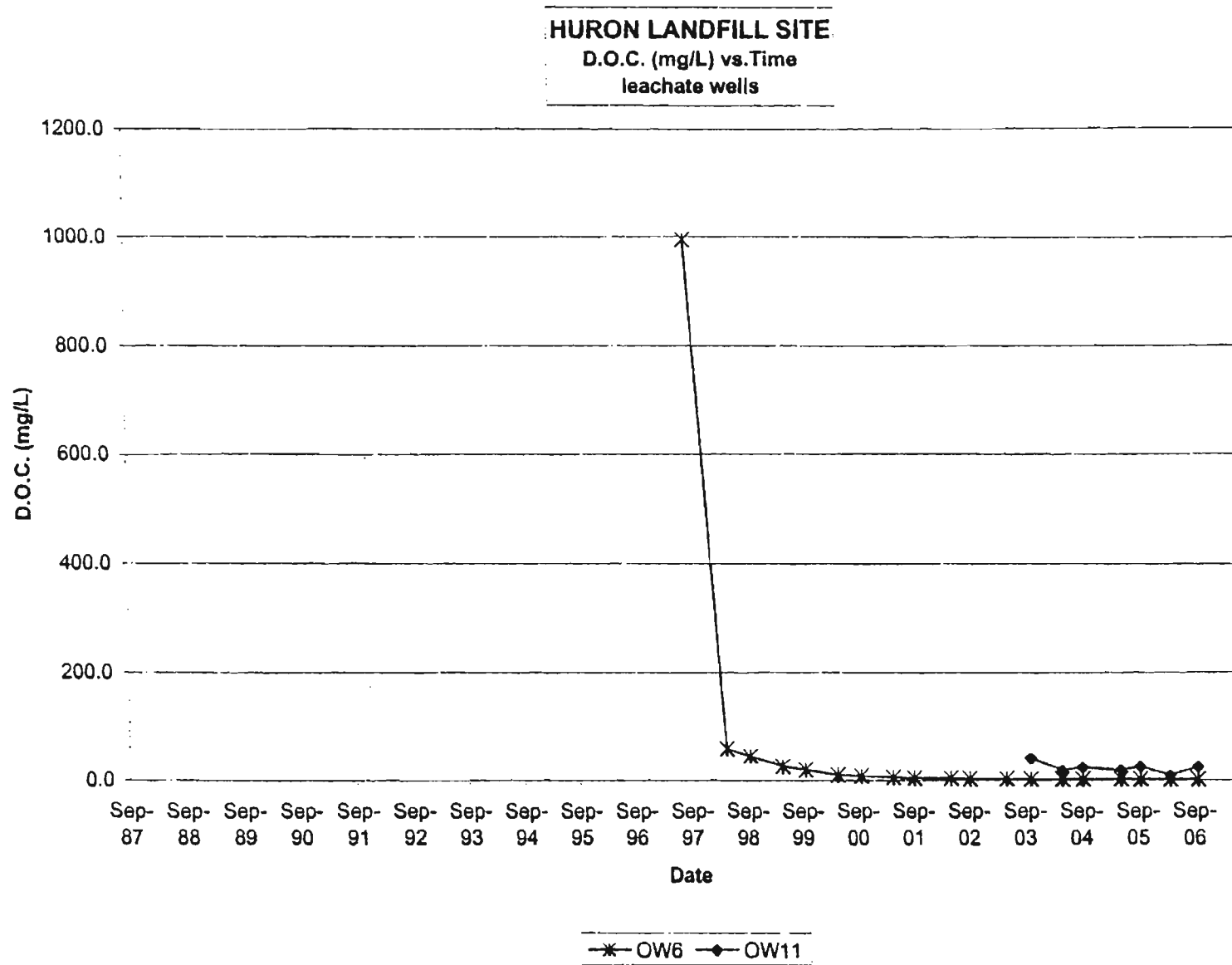


**HURON LANDFILL SITE**  
**Conductivity (uS/cm) vs. Time**  
**leachate wells**



**HURON LANDFILL SITE**  
**Hardness (mg/L) vs. Time**  
**leachate wells**







**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW1 Jul-07	OW1 Dec-07	OW1 Jul-08	OW1 Dec-08	OW1 Jul-09	OW1 Nov-09	OW1 Mar-10	OW1 Dec-10	OW1 Jun-11	OW1 Oct-11	OW1 Jun-12	OW1 Oct-12	OW1 Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	366	327	324	365	375	353	339	449	441	402	375	320	355
Chloride	250 [AO]	31	30	32	29	26	21	29	20	20.7	23.2	25.1	17.7	32.3
Nitrate(as N)	10 (IMAC) d	0.4	1.4	0.1	0.4	0.2	0.5	0.2	0.9	0.1	1.5	0.5	0.7	0.2
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	nd	0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		0.14	0.07	0.07	nd	0.12	nd	<0.05	0.06	<0.01	0.01	0.06	<0.01	0.03
Total Kjeldahl Nitrogen(as N)		0.3	0.5	0.5	0.3	1.2	1	1.0	0.9	0.53	1.31	0.25	1.24	1.32
Phenols		nd	nd	nd	nd	0.004	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	2.6	2.8	2.3	2.4	2.5	2.5	2.4	2.6	2.9	2.9	2.9	2.0	10.1
Conductivity (us/cm)		813	809	796	824	829	792	775	922	886	922	848	745	818
pH		8.1	8.2	8.1	8.1	7.7	7.9	8.0	7.66	7.40	7.56	7.92	7.81	7.65
Sulphate (as SO4)	250 (AO)	48	73	59	56	-	49	47	34	33	59	67	88	65
Hardness(as CaCO3)	80-100 [OG]	460	390	380	400	420	380	420	490	450	463	450	410	417
Aluminum	0.1 [OG]	nd	nd	nd	nd	nd	nd	<0.005	<0.005	0.03	0.04	0.03	0.04	0.04
Arsenic	0.010 (IMAC)	nd	nd	nd	nd	nd	nd	<0.001	<0.001	0.0010	0.0014	0.0007	0.0007	0.0020
Barium	1 [MAC]	0.083	0.079	0.08	0.08	0.086	0.08	0.074	0.094	0.090	0.097	0.098	0.085	0.073
Boron	5 [IMAC]	0.11	0.097	0.083	0.1	0.11	0.11	0.081	0.11	0.103	0.098	0.130	0.100	0.129
Cadmium	0.005 (MAC)	0.0001	0.001	0.0014	0.0005	0.0006	0.0002	0.0002	<0.0001	0.00004	<0.00002	<0.00002	<0.00002	0.00002
Calcium	-	100	96	94	97	100	91	110	120	109	113	105	98.4	103
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	0.001	0.002	0.003	0.002	0.002	0.002	0.002	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0018
Iron	0.3 [AO]	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.014	0.045	0.006	<0.005	0.009
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00004	<0.00002	<0.00002	0.00002	0.00003
Magnesium	-	49	36	35	40	42	36	36	44	43.3	44.0	45.6	39.9	38.8
Manganese	0.05 [AO]	0.009	nd	nd	nd	nd	nd	0.011	0.024	0.027	0.031	0.011	0.016	0.028
Potassium	-	2.4	2.2	3.5	4	2.2	2	2.3	2.5	2.3	2.5	2.7	2.1	2.2
Sodium	200 [AO]	27	24	25	27	24	20	25	26	22.3	24.0	24.7	20.5	24.4
Zinc	5 [AO]	0.047	0.088	0.092	0.052	0.073	0.057	0.076	0.06	0.063	0.011	0.034	0.018	0.036

NOTES:

1. All results expresses in mg/L unless otherwise noted.
2. ODWQS is the Ontario Drinking Water Quality Standards, MOE, revised 2006.
3. MAC maximum acceptable concentration ODWQS.
4. IMAC indicates an interim maximum acceptable concentration ODWQS.
5. AO indicates an aesthetic objective ODWQS, not health related.

6. OG indicates an operational guideline ODWQS, not health related.
7. c indicates that the guideline applies to water at the point of consumption.
8. d, where nitrate and nitrite are present the total of the two should not exceed 10 mg/L.
9. nd indicates parameter not detected; < indicates parameter not detected above method detection limit.

**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW1 Nov-13	OW1 Jul-14	OW1 Nov-14	OW1 May-15	OW1 Oct-15	OW1 Jun-16	OW1 Nov-16	OW1 Jun-17	OW1 Oct-17	OW1 May-18	OW1 Oct-18	OW1 Jun-19	OW1 Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	397	359	429	446	524	505	472	449	486	435	437	418	400
Chloride	250 [AO]	29.0	24.2	27.4	43.9	96.6	118	153	92.1	81.7	87.3	76.6	67.7	70.0
Nitrate(as N)	10 (MAC) d	<0.1	0.2	1.2	<0.25	<0.25	0.1	<0.1	<0.05	0.1	0.14	<0.05	0.06	<0.05
Nitrite(as N)	1 (MAC) d	<0.1	<0.1	<0.1	<0.25	<0.25	<0.1	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05
Ammonia(as N)		0.08	0.05	0.09	<0.02	0.08	0.13	0.35	0.13	0.20	0.11	0.24	0.22	0.26
Total Kjeldahl Nitrogen(as N)		0.67	0.54	0.7	0.33	3.80	2.49	1.97	1.0	0.92	0.9	0.7	0.8	0.7
Phenols		<0.001	<0.001	<0.001	<0.001	0.030	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	10.0	4.5	7.6	5.3	74.5	22.0	10.7	7.6	9.1	6.3	6.1	10	6.3
Conductivity (us/cm)		764	809	870	985	1240	1290	1860	1440	1310	1170	1180	1100	1110
pH		7.81	7.94	7.75	8.17	8.05	7.95	7.70	7.79	7.66	7.86	7.75	7.92	7.8
Sulphate (as SO4)	250 (AO)	56	61	49	36.5	22.6	55	402	174	90	104	85	78	87
Hardness(as CaCO3)	80-100 [OG]	410	439	394	503	555	587	721	715	591	559	519	471	489
Aluminum	0.1 [OG]	0.04	0.03	0.03	<0.004	0.004	0.04	0.05	0.07	0.07	0.08	0.07	0.06	0.07
Arsenic	0.010 (IMAC)	0.0029	0.0014	0.0034	<0.003	0.004	0.0045	0.0054	0.00112	0.0041	0.0012	0.0034	0.0006	0.0042
Barium	1 [MAC]	0.082	0.084	0.092	0.095	0.100	0.140	0.179	0.147	0.139	0.114	0.117	0.095	0.112
Boron	5 [IMAC]	0.140	0.155	0.112	0.135	1.19	1.05	0.961	0.706	0.672	0.522	0.475	0.473	0.382
Cadmium	0.005 (MAC)	<0.00002	<0.00002	<0.00002	<0.001	<0.001	<0.00002	<0.00002	<0.0001	<0.000014	<0.000015	<0.000015	0.000019	<0.000028
Calcium	-	94.1	98.9	86.0	124	129	122	159	162	129	123	118	101	105
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.003	0.008	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Copper	1 [AO]	<0.002	0.0004	<0.002	<0.003	<0.003	<0.002	0.0006	<0.002	<0.002	<0.002	<0.002	0.0010	<0.002
Iron	0.3 [AO]	0.143	0.058	0.162	0.265	2.52	1.80	2.00	2.33	1.23	0.247	1.29	<0.005	0.475
Lead	0.01 (MAC)c	<0.00002	<0.00002	<0.00002	<0.002	<0.002	<0.00002	0.00004	0.00013	<0.00002	<0.00002	0.00002	<0.00002	<0.00004
Magnesium	-	42.4	46.7	43.7	46.9	56.5	68.4	78.3	75.2	65.3	61.2	54.6	53.2	55.1
Manganese	0.05 [AO]	0.057	0.049	0.046	0.155	0.125	0.066	0.115	0.159	0.149	0.024	0.177	0.003	0.117
Potassium	-	2.0	2.3	2.0	2.13	2.49	2.8	3.6	3.6	3.8	3.5	3.0	2.8	2.7
Sodium	200 [AO]	26.1	28.4	24.0	25.5	59.1	74.2	79.3	74.8	71.3	73.1	62.4	57.9	48.1
Zinc	5 [AO]	<0.005	0.006	0.008	0.051	<0.005	<0.005	<0.005	0.005	<0.005	0.010	<0.005	0.017	<0.005

NOTES:

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**TABLE E-2**  
**GROUNDWATER CHEMICAL DATA (2007-Present)**  
**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW1 Jul-20	OW1 Nov-20	OW1 Jun-21	OW1 Nov-21	OW1 May-22	OW1 Nov-22
Alkalinity(as CaCO3)	30 - 500 [OG]	383	373	385	385	390	397
Chloride	250 [AO]	58.7	72.3	68.2	62.8	56.9	58.3
Nitrate(as N)	10 (MAC) d	0.19	0.22	0.17	0.12	0.4	<0.05
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05
Ammonia(as N)		0.15	0.04	0.03	0.28	0.02	0.19
Total Kjeldahl Nitrogen(as N)		0.5	1.0	0.6	1.2	0.5	1.4
Phenols		<0.002	<0.002	0.006	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	5.0	4.9	5.4	4.3	4.1	3.7
Conductivity (us/cm)		1020	1090	1070	1060	985	1030
pH		7.82	7.77	8.03	8.00	7.99	7.70
Sulphate (as SO4)	250 (AO)	105	96	100	85	80	82
Hardness(as CaCO3)	80-100 [OG]	474	508	544	507	452	466
Aluminum	0.1 [OG]	0.04	0.06	0.08	0.03	0.03	0.03
Arsenic	0.010 (IMAC)	0.0011	0.0008	0.0009	0.0021	0.0010	0.0013
Barium	1 [MAC]	0.102	0.106	0.119	0.110	0.094	0.097
Boron	5 [IMAC]	0.407	0.442	0.444	0.411	0.393	0.358
Cadmium	0.005 (MAC)	0.000030	0.000040	0.000018	<0.000028	0.000051	<0.000015
Calcium	-	101	113	121	107	95.4	98.0
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	0.002
Copper	1 [AO]	<0.002	0.0023	0.003	<0.002	<0.002	0.0006
Iron	0.3 [AO]	0.041	0.011	0.015	0.257	0.005	0.035
Lead	0.01 (MAC)c	0.00005	0.00008	0.00007	0.00004	0.00010	0.00002
Magnesium	-	53.8	54.9	58.7	58.3	51.8	53.8
Manganese	0.05 [AO]	0.040	0.004	0.005	0.059	<0.001	0.018
Potassium	-	3.0	3.0	2.9	3.0	2.7	2.7
Sodium	200 [AO]	50.1	51.3	53.2	47.9	42.1	40.8
Zinc	5 [AO]	0.013	0.011	0.019	0.009	0.02	0.008

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**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW3 Jul-07	OW3 Dec-07	OW3 Jul-08	OW3 Dec-08	OW3 Jul-09	OW3 Nov-09	OW3 Mar-10	OW3 Dec-10	OW3 Jun-11	OW3 Oct-11	OW3 Jun-12	OW3 Oct-12	OW3 Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	292	274	268	283	271	266	272	412	381	367	307	313	329
Chloride	250 [AO]	45	34	62	53	48	44	49	59	77.2	40.5	44.8	54.0	62.4
Nitrate(as N)	10 (MAC) d	0.3	0.1	0.1	0.2	0.2	0.1	0.1	0.3	<0.1	<0.1	0.4	<0.1	0.2
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	nd	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		0.06	0.1	nd	0.06	nd	nd	<0.05	<0.05	<0.01	0.01	0.04	<0.01	0.02
Total Kjeldahl Nitrogen(as N)		0.3	0.4	0.5	1	1.4	0.8	0.5	0.4	9.77	0.98	0.32	0.98	2.17
Phenols		nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	1.7	1.9	1.8	1.8	1.6	2.1	2.2	2.6	2.6	2.3	2.1	2.3	4.7
Conductivity (us/cm)		741	686	768	730	712	687	714	978	910	831	736	727	800
pH		8.2	8.1	8	8.1	8	7.9	8.0	7.74	7.58	7.64	7.95	9.00	7.63
Sulphate (as SO4)	250 (AO)	51	42	39	40	-	33	31	20	19	16	26	21	26
Hardness(as CaCO3)	80-100 [OG]	390	340	330	330	340	320	450	500	371	410	368	347	346
Aluminum	0.1 [OG]	nd	nd	nd	nd	nd	nd	<0.005	<0.005	0.02	0.04	0.02	0.03	0.03
Arsenic	0.010 (IMAC)	0.001	0.001	nd	nd	0.001	0.001	<0.001	0.001	0.0029	0.0036	0.0013	0.0034	0.0018
Barium	1 [MAC]	0.08	0.072	0.075	0.07	0.073	0.068	0.097	0.098	0.079	0.082	0.090	0.079	0.083
Boron	5 [IMAC]	0.088	0.081	0.07	0.074	0.078	0.075	0.047	0.056	0.084	0.044	0.084	0.066	0.078
Cadmium	0.005 (MAC)	0.0008	0.00008	0.0002	0.0001	0.0005	0.068	0.0004	0.0002	0.00004	<0.00002	<0.00002	<0.00002	0.00005
Calcium	-	77	70	67	68	72	68	110	120	72.2	92.0	76.7	74.4	72.2
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	0.001	nd	0.001	0.001	0.001	0.001	0.002	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0011
Iron	0.3 [AO]	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.008	0.057	<0.005	0.068	<0.005
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00005	<0.00002	0.00003	0.00003	0.00003
Magnesium	-	48	36	38	38	39	36	43	48	46.4	43.9	42.8	39.3	40.3
Manganese	0.05 [AO]	nd	0.015	nd	nd	nd	0.017	0.053	0.097	0.019	0.088	0.002	0.036	0.004
Potassium	-	1.9	1.7	3.1	1.8	1.6	1.7	1.7	1.9	1.5	1.8	1.8	1.5	1.5
Sodium	200 [AO]	26	23	24	23	23	22	22	22	24.8	24.8	23.1	22.0	23.5
Zinc	5 [AO]	nd	nd	0.006	nd	nd	nd	0.006	0.008	<0.005	<0.005	<0.005	<0.005	<0.005

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**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW3 Nov-13	OW3 Jul-14	OW3 Nov-14	OW3 May-15	OW3 Oct-15	OW3 Jun-16	OW3 Nov-16	OW3 Jun-17	OW3 Oct-17	OW3 May-18	OW3 Oct-18	OW3 Jun-19	OW3 Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	413	295	417	421	366	415	355	280	324	347	378	374	400
Chloride	250 [AO]	46.8	49.8	52.4	77.4	55.8	113	75.1	52.2	68.3	107	89.4	106	93.4
Nitrate(as N)	10 (MAC) d	0.4	0.1	0.4	<0.25	<0.25	0.1	0.4	0.06	0.1	<0.05	0.12	0.09	<0.05
Nitrite(as N)	1 (MAC) d	<0.1	<0.1	<0.1	<0.25	<0.25	<0.1	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05
Ammonia(as N)		0.03	0.01	0.07	<0.02	0.06	0.44	0.04	<0.01	0.04	0.11	0.17	0.14	0.11
Total Kjeldahl Nitrogen(as N)		0.45	0.62	0.5	0.30	0.45	0.32	0.43	0.2	0.40	2.0	1.1	0.9	0.5
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	5.6	4.2	5.8	4.2	3.9	2.7	2.9	2.4	4.2	2.9	3.7	4.2	3.8
Conductivity (us/cm)		770	726	853	1020	854	1080	864	738	865	954	1020	1050	1030
pH		7.73	7.96	7.70	8.11	7.97	7.78	7.94	8.09	7.90	7.88	7.80	7.95	7.79
Sulphate (as SO4)	250 (AO)	16	17	16	17.2	19.5	32	24	19	20	23	20	19	16
Hardness(as CaCO3)	80-100 [OG]	431	372	419	543	395	446	364	368	416	368	410	374	451
Aluminum	0.1 [OG]	0.04	0.02	0.03	0.013	<0.004	0.03	0.03	0.02	0.06	0.05	0.05	0.05	0.07
Arsenic	0.010 (IMAC)	0.0030	0.0020	0.0016	<0.003	0.003	0.0013	0.0021	0.00153	0.0037	0.0015	0.0024	0.0015	0.0024
Barium	1 [MAC]	0.082	0.076	0.067	0.108	0.095	0.102	0.086	0.091	0.103	0.093	0.104	0.086	0.100
Boron	5 [IMAC]	0.075	0.084	0.064	0.054	0.075	0.069	0.078	0.088	0.099	0.093	0.100	0.111	0.071
Cadmium	0.005 (MAC)	<0.00002	0.00002	<0.00002	<0.001	<0.001	<0.00002	<0.00002	<0.0001	<0.000014	<0.000015	<0.000015	<0.000015	<0.000015
Calcium	-	101	80.4	97.8	133	88.0	97.2	77.1	72.2	90.5	70.1	90.2	72.1	95.8
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Copper	1 [AO]	<0.002	0.0004	<0.002	<0.003	<0.003	<0.002	0.0004	<0.002	<0.002	0.002	<0.002	0.0008	<0.002
Iron	0.3 [AO]	0.017	0.010	0.045	0.099	<0.010	0.044	0.040	0.010	0.188	0.005	0.030	<0.005	0.031
Lead	0.01 (MAC)c	<0.00002	<0.00002	<0.00002	<0.002	<0.002	<0.00002	<0.00002	0.00008	0.00004	0.00003	0.00006	<0.00002	0.00003
Magnesium	-	43.8	41.6	42.4	51.2	42.6	49.4	41.7	45.5	46.1	46.8	45.0	47.2	51.4
Manganese	0.05 [AO]	0.024	0.018	0.050	0.098	0.075	0.040	0.060	0.012	0.056	0.003	0.054	0.003	0.064
Potassium	-	1.8	1.6	1.6	1.85	1.82	1.7	1.7	1.6	1.8	1.7	1.8	1.6	1.7
Sodium	200 [AO]	22.0	24.1	21.0	22.6	26.0	31.9	27.4	30.5	33.8	35.5	39.6	40.1	38.2
Zinc	5 [AO]	<0.005	<0.005	<0.005	0.006	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW3 Jul-20	OW3 Nov-20	OW3 Jun-21	OW3 Nov-21	OW3 May-22	OW3 Nov-22
Alkalinity(as CaCO3)	30 - 500 [OG]	359	359	341	390	397	387
Chloride	250 [AO]	103	102	99.1	97.8	116	97.1
Nitrate(as N)	10 (MAC) d	0.42	0.20	0.25	<0.05	0.2	<0.05
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05
Ammonia(as N)		0.08	0.04	0.03	0.13	<0.01	0.11
Total Kjeldahl Nitrogen(as N)		0.5	0.5	0.5	0.6	0.4	0.4
Phenols		<0.002	<0.002	0.003	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	2.6	3.1	2.8	2.9	2.3	1.3
Conductivity (us/cm)		992	1040	951	1060	1060	1040
pH		7.84	7.64	8.04	7.53	7.88	7.67
Sulphate (as SO4)	250 (AO)	18	18	17	15	14	13
Hardness(as CaCO3)	80-100 [OG]	373	407	475	454	456	433
Aluminum	0.1 [OG]	0.05	0.05	0.06	0.03	0.03	0.04
Arsenic	0.010 (IMAC)	0.0016	0.0016	0.0013	0.0017	0.0011	0.0017
Barium	1 [MAC]	0.096	0.090	0.115	0.101	0.108	0.100
Boron	5 [IMAC]	0.121	0.113	0.127	0.114	0.122	0.111
Cadmium	0.005 (MAC)	<0.000015	<0.000028	<0.000015	0.000078	0.000016	<0.000015
Calcium	-	74.2	87.0	102	95.8	96.8	91.1
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001
Copper	1 [AO]	<0.002	0.0092	0.006	<0.002	<0.002	0.0003
Iron	0.3 [AO]	0.023	0.014	<0.005	0.111	<0.005	0.100
Lead	0.01 (MAC)c	0.00007	0.00012	0.00008	0.00006	0.00008	0.00004
Magnesium	-	45.7	46.2	53.6	52.3	52.1	49.9
Manganese	0.05 [AO]	0.002	0.018	0.006	0.098	0.014	0.123
Potassium	-	1.9	2.0	2.0	2.0	1.9	1.8
Sodium	200 [AO]	40.2	35.6	45.1	38.3	43.7	38.3
Zinc	5 [AO]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW4 Jul-07	OW4 Dec-07	OW4 Jul-08	OW4 Dec-08	OW4 Jul-09	OW4 Nov-09	OW4 Mar-10	OW4 Dec-10	OW4 Jun-11	OW4 Oct-11	OW4 Jun-12	OW4 Oct-12	OW4 Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	262	271	287	306	289	277	298	333	330	292	291	292	296
Chloride	250 [AO]	4	5	4	6	5	5	13	9	12.0	9.0	7.8	8.0	8.2
Nitrate(as N)	10 (MAC) d	nd	nd	nd	nd	0.1	0.1	0.2	<0.1	<0.1	0.2	<0.1	0.2	0.1
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	nd	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		0.05	0.07	0.08	0.05	0.06	nd	<0.05	<0.05	<0.01	<0.01	0.03	<0.01	<0.01
Total Kjeldahl Nitrogen(as N)		0.2	0.4	0.5	nd	1.8	2	1.2	0.4	0.27	0.51	0.16	0.75	0.39
Phenols		nd	IS	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	1.6	1.6	1.3	1.5	1.8	1.9	2.0	2.4	2.0	8.7	2.6	2.0	9.7
Conductivity (us/cm)		668	685	725	735	717	704	733	727	763	694	721	662	734
pH		7.9	8.2	8.1	8.1	7.9	7.9	8.0	7.73	7.64	7.85	7.83	7.96	7.68
Sulphate (as SO4)	250 (AO)	106	100	110	101	-	100	96	49	86	70	100	86	123
Hardness(as CaCO3)	80-100 [OG]	370	340	350	380	380	360	400	380	343	352	398	354	364
Aluminum	0.1 [OG]	nd	nd	nd	0.005	nd	nd	<0.005	<0.005	0.02	0.04	0.02	0.30	0.03
Arsenic	0.010 (IMAC)	nd	0.001	nd	nd	nd	nd	<0.001	0.001	0.0019	0.0027	0.0009	0.0015	0.0012
Barium	1 [MAC]	0.074	0.071	0.072	0.074	0.07	0.07	0.060	0.070	0.065	0.059	0.080	0.075	0.077
Boron	5 [IMAC]	0.047	0.066	0.04	0.048	0.046	0.054	0.033	0.044	0.047	0.016	0.043	0.052	0.051
Cadmium	0.005 (MAC)	0.0014	0.0005	0.0009	0.0003	0.0006	nd	0.0003	<0.0001	0.00016	0.00027	0.00003	0.00034	0.00005
Calcium	-	80	76	82	88	85	83	97	90	77.4	81.5	92.0	80.7	80.6
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	nd	nd	0.002	0.001	0.001	0.002	0.002	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0009
Iron	0.3 [AO]	nd	nd	nd	nd	nd	nd	<0.1	<0.1	<0.005	<0.005	<0.005	0.123	<0.005
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00003	<0.00002	<0.00002	0.00032	<0.00002
Magnesium	-	40	38	36	39	41	37	38	39	36.3	36.1	40.9	37.1	39.6
Manganese	0.05 [AO]	nd	0.002	nd	nd	nd	nd	<0.002	0.026	0.005	0.019	0.009	0.006	0.003
Potassium	-	1.5	1.5	2.8	1.6	1.6	1.5	1.4	1.3	1.3	1.5	1.5	1.5	1.4
Sodium	200 [AO]	13	15	15	13	14	13	13	12	14.1	16.2	13.9	16.2	16.5
Zinc	5 [AO]	nd	nd	0.007	nd	0.009	nd	0.006	<0.005	0.006	0.009	<0.005	<0.005	<0.005

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**TABLE E-2**  
**GROUNDWATER CHEMICAL DATA (2007-Present)**  
**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW4 Nov-13	OW4 Jul-14	OW4 Dec-14	OW4 May-15	OW4 Oct-15	OW4 Jun-16	OW4 Nov-16	OW4 Jun-17	OW4 Oct-17	OW4 May-18	OW4 Oct-18	OW4 Jun-19	OW4 Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	363	288	316	315	296	318	309	363	341	318	318	293	282
Chloride	250 [AO]	9.1	9.1	11.3	16.1	14.1	8.5	12.0	11.3	9.1	9.4	10.3	8.9	9.6
Nitrate(as N)	10 (MAC) d	<0.1	0.1	0.1	<0.25	<0.25	0.1	0.2	<0.05	0.1	<0.05	<0.05	0.05	0.06
Nitrite(as N)	1 (MAC) d	<0.1	<0.1	<0.1	<0.25	<0.25	<0.1	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05
Ammonia(as N)		<0.01	<0.01	0.06	<0.02	<0.02	<0.01	<0.01	<0.01	0.02	0.06	0.06	0.10	0.20
Total Kjeldahl Nitrogen(as N)		0.56	0.58	0.2	0.17	0.14	0.18	0.23	0.2	0.43	0.4	0.3	0.4	0.8
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	6.2	3.7	3.2	2.4	2.5	1.8	4.2	3.2	5.5	2.0	3.7	5.0	4.6
Conductivity (us/cm)		654	724	749	772	721	772	718	821	770	756	803	791	766
pH		7.69	7.90	7.98	8.16	7.95	7.90	8.02	7.82	7.96	7.95	7.78	8.07	7.88
Sulphate (as SO4)	250 (AO)	60	101	104	82.0	86.7	120	82	62	64	112	105	126	106
Hardness(as CaCO3)	80-100 [OG]	366	406	398	389	360	402	353	442	423	430	396	397	408
Aluminum	0.1 [OG]	0.040	0.03	0.03	<0.004	<0.004	0.04	0.03	0.03	0.06	0.06	0.05	0.05	0.06
Arsenic	0.010 (IMAC)	0.0009	0.0007	0.0007	<0.003	<0.003	0.0011	0.0011	<0.0007	0.0019	<0.0001	0.0005	0.0003	0.0011
Barium	1 [MAC]	0.071	0.071	0.075	0.060	0.063	0.081	0.074	0.096	0.087	0.083	0.073	0.071	0.078
Boron	5 [IMAC]	0.04	0.042	0.042	0.020	0.064	0.046	0.049	0.037	0.055	0.045	0.040	0.043	0.019
Cadmium	0.005 (MAC)	<0.00002	0.00005	<0.00002	<0.001	<0.001	<0.00002	<0.00002	<0.0001	<0.000014	0.000035	0.000025	<0.000015	<0.000015
Calcium	-	87.2	96.0	93.9	95.4	84.5	90.4	81.9	103	98.6	97.9	90.2	88.1	89.9
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Copper	1 [AO]	<0.002	0.0009	0.0008	<0.003	<0.003	<0.002	0.0003	<0.002	<0.002	<0.002	<0.002	0.0019	<0.002
Iron	0.3 [AO]	0.014	0.009	<0.005	<0.010	<0.010	0.017	0.012	<0.005	0.246	0.005	0.043	<0.005	0.038
Lead	0.01 (MAC)c	<0.00002	<0.00002	<0.00002	<0.002	<0.002	<0.00002	<0.00002	<0.00005	<0.00002	<0.00002	0.00011	0.00008	0.00003
Magnesium	-	36.1	40.4	39.8	36.5	36.1	42.9	36.0	45.2	43.0	45.1	41.5	43.1	44.5
Manganese	0.05 [AO]	0.033	0.003	0.010	0.003	0.016	0.011	0.039	0.023	0.128	0.001	0.032	<0.001	0.096
Potassium	-	1.3	1.4	1.4	1.26	1.46	1.4	1.3	1.6	1.7	1.6	1.5	1.4	1.6
Sodium	200 [AO]	15.2	14.3	15.1	14.1	17.6	19.6	18.9	20.9	19.2	18.2	17.9	17.1	19.1
Zinc	5 [AO]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005

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**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW4 Jul-20	OW4 Nov-20	OW4 Jun-21	OW4 Nov-21	OW4 May-22	OW4 Nov-22
Alkalinity(as CaCO3)	30 - 500 [OG]	294	296	299	325	320	338
Chloride	250 [AO]	12.4	15.9	15.1	18.2	16.5	14.7
Nitrate(as N)	10 (MAC) d	0.16	0.08	0.08	0.12	0.2	<0.05
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05
Ammonia(as N)		0.06	0.03	0.07	0.03	0.02	<0.01
Total Kjeldahl Nitrogen(as N)		0.2	0.2	0.7	0.5	0.8	0.7
Phenols		<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	4.2	3.0	4.2	2.8	3.3	2.9
Conductivity (us/cm)		769	845	801	878	783	880
pH		7.88	7.71	8.06	7.64	7.97	7.65
Sulphate (as SO4)	250 (AO)	124	130	121	125	99	132
Hardness(as CaCO3)	80-100 [OG]	417	441	489	472	392	422
Aluminum	0.1 [OG]	0.04	0.06	0.08	0.06	0.03	0.05
Arsenic	0.010 (IMAC)	0.0005	0.0006	0.0004	0.0004	0.0003	0.0004
Barium	1 [MAC]	0.085	0.086	0.089	0.085	0.069	0.081
Boron	5 [IMAC]	0.046	0.055	0.047	0.049	0.035	0.051
Cadmium	0.005 (MAC)	0.000074	0.000041	0.000019	0.000020	<0.000015	<0.000015
Calcium	-	92.6	101	114	108	89.7	94.8
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001
Copper	1 [AO]	<0.002	0.0033	0.003	0.003	<0.002	0.0028
Iron	0.3 [AO]	<0.005	0.005	0.020	0.029	<0.005	0.029
Lead	0.01 (MAC)c	0.00006	0.00006	0.00007	0.00009	0.00005	0.00009
Magnesium	-	45.2	45.9	49.6	49.3	40.8	45.0
Manganese	0.05 [AO]	<0.001	0.006	0.002	0.006	<0.001	0.004
Potassium	-	1.7	1.7	1.6	1.8	1.4	1.7
Sodium	200 [AO]	18.0	19.0	20.2	18.8	16.9	17.4
Zinc	5 [AO]	0.006	0.006	<0.005	<0.005	<0.005	<0.005

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**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW5 Jul-07	OW5 Dec-07	OW5 Jul-08	OW5 Dec-08	OW5 Jul-09	OW5 Nov-09	OW5 Mar-10	OW5 Dec-10	OW5 Jun-11	OW5 Oct-11	OW5 Jun-12	OW5 Oct-12	OW5 Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	320	340	310	324	333	313	323	336	441	386	357	393	329
Chloride	250 [AO]	14	8	10	11	13	11	19	17	36.1	46.5	28.8	47.7	28.5
Nitrate(as N)	10 (IMAC) d	0.2	nd	0.1	0.2	0.1	0.3	0.3	0.1	0.1	<0.1	0.1	<0.1	0.2
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	nd	<0.01	0.02	0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		0.15	0.15	nd	0.08	0.17	nd	<0.05	0.10	0.04	0.06	0.18	0.04	0.06
Total Kjeldahl Nitrogen(as N)		0.3	0.3	0.3	0.6	1.4	1.1	0.4	0.6	0.67	0.51	0.19	0.18	0.45
Phenols		nd	nd	nd	nd	nd	nd	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	2.4	2.2	1.9	2.1	nd	2.2	2.0	2.2	2.2	6.5	3.3	2.3	7.3
Conductivity (us/cm)		676	817	718	712	735	681	722	723	932	976	809	944	755
pH		8.2	8.1	8.1	8.1	8	8	8.0	7.94	7.55	7.52	7.84	7.66	7.79
Sulphate (as SO4)	250 (AO)	41	106	79	62	-	45	42	38	37	63	49	85	60
Hardness(as CaCO3)	80-100 [OG]	320	380	350	330	350	310	430	340	495	380	381	465	370
Aluminum	0.1 [OG]	nd	nd	nd	nd	0.006	nd	<0.005	<0.005	0.03	0.04	0.02	0.04	0.03
Arsenic	0.010 (IMAC)	0.005	0.005	0.003	0.004	0.003	0.003	0.002	0.004	0.0032	0.0035	0.0032	0.0043	0.0045
Barium	1 [MAC]	0.075	0.09	0.089	0.077	0.08	0.071	0.100	0.076	0.112	0.076	0.090	0.107	0.091
Boron	5 [IMAC]	0.12	0.14	0.12	0.12	0.14	0.13	0.069	0.13	0.058	0.060	0.113	0.073	0.104
Cadmium	0.005 (MAC)	0.0012	0.0005	0.0029	0.0024	0.002	0.0014	0.0019	<0.0001	0.00038	0.00013	0.00016	0.00008	0.00014
Calcium	-	63	76	70	65	70	63	95	66	113	80.4	78.5	107	76.3
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	0.001	nd	0.002	0.002	0.002	0.002	0.002	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0009
Iron	0.3 [AO]	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.082	<0.005	<0.005	0.147	<0.005
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	<0.00002	<0.00002	0.00003	0.00003	<0.00002
Magnesium	-	40	47	42	40	42	38	47	42	51.6	43.6	45.0	48.1	43.7
Manganese	0.05 [AO]	0.002	0.046	nd	0.01	nd	nd	0.071	0.010	0.068	0.009	<0.001	0.029	0.003
Potassium	-	1.6	1.7	3	1.8	2	1.7	1.5	1.6	1.6	1.6	1.7	1.7	1.5
Sodium	200 [AO]	30	30	31	29	32	29	23	31	22.8	30.0	31.8	26.7	31.7
Zinc	5 [AO]	nd	nd	0.01	0.012	0.027	0.007	0.014	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW5 Nov-13	OW5 Jul-14	OW5 Dec-14	OW5 May-15	OW5 Oct-15	OW5 Jun-16	OW5 Nov-16	OW5 Jun-17	OW5 Oct-17	OW5 May-18	OW5 Oct-18	OW5 Jun-19	OW5 Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	416	347	430	425	368	392	367	370	380	311	351	301	317
Chloride	250 [AO]	59.8	37.2	69.3	67.3	44.4	62.2	39.3	55.1	85.3	58.0	57.7	52.1	61.2
Nitrate(as N)	10 (MAC) d	<0.1	<0.1	0.1	<0.25	<0.25	0.1	<0.1	<0.05	<0.1	0.06	<0.05	0.12	<0.05
Nitrite(as N)	1 (MAC) d	<0.1	<0.1	<0.1	<0.25	<0.25	<0.1	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05
Ammonia(as N)		0.09	0.10	0.12	0.04	0.08	0.08	0.12	<0.01	0.07	0.07	0.09	0.10	0.13
Total Kjeldahl Nitrogen(as N)		0.26	0.28	0.2	0.18	0.22	0.25	0.23	0.2	0.25	0.3	0.4	0.4	0.3
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	5.9	3.7	4.3	2.3	3.6	5.0	2.7	2.2	3.8	2.0	3.3	6.9	3.3
Conductivity (us/cm)		891	838	1020	1030	845	942	859	989	1090	796	882	788	881
pH		7.67	7.85	7.72	8.07	8.02	7.88	7.96	7.91	7.76	8.14	7.94	8.21	8.01
Sulphate (as SO4)	250 (AO)	67	50	46	36.9	41.0	47	52	62	55	53	49	43	49
Hardness(as CaCO3)	80-100 [OG]	422	425	462	514	383	398	374	457	461	410	421	369	413
Aluminum	0.1 [OG]	0.04	0.03	0.03	0.006	<0.004	0.03	0.03	0.04	0.07	0.06	0.05	0.05	0.06
Arsenic	0.010 (IMAC)	0.0038	0.0034	0.0028	<0.003	0.004	0.0013	0.0019	0.0015	0.0016	0.0012	0.0019	0.0020	0.0024
Barium	1 [MAC]	0.102	0.100	0.080	0.119	0.086	0.086	0.087	0.106	0.111	0.098	0.102	0.087	0.091
Boron	5 [IMAC]	0.083	0.100	0.059	0.058	0.094	0.107	0.100	0.098	0.097	0.099	0.085	0.099	0.062
Cadmium	0.005 (MAC)	0.00010	0.00007	0.00025	<0.001	<0.001	0.00005	<0.00002	<0.0001	0.000020	0.000033	0.000062	0.000033	0.000028
Calcium	-	93.9	92.0	108	118	80.5	80.4	76.3	97.4	101	88.2	89.5	76.6	85.9
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.003	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Copper	1 [AO]	<0.002	0.0004	0.0005	<0.003	<0.003	<0.002	0.0004	<0.002	<0.002	<0.002	<0.002	0.0019	<0.002
Iron	0.3 [AO]	0.069	0.014	<0.005	0.186	0.097	<0.005	0.010	0.020	0.013	0.013	0.011	<0.005	0.028
Lead	0.01 (MAC)c	<0.00002	<0.00002	<0.00002	<0.002	<0.002	<0.00002	<0.00002	0.00009	<0.00002	0.00004	0.00003	0.00010	<0.00002
Magnesium	-	45.5	47.5	47.1	53.3	44.3	47.9	44.5	51.9	50.8	46.2	48.0	43.1	48.2
Manganese	0.05 [AO]	0.031	0.034	0.062	0.070	0.036	0.141	0.061	0.032	0.095	0.002	0.013	0.001	0.034
Potassium	-	1.5	1.5	1.5	1.60	1.64	1.6	1.5	1.6	1.7	1.5	1.5	1.4	1.4
Sodium	200 [AO]	29.8	30.0	31.6	31.2	32.7	37.3	33.5	35.1	34.7	36.1	35.3	33.0	33.0
Zinc	5 [AO]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW5 Jul-20	OW5 Nov-20	OW5 Jun-21	OW5 Nov-21	OW5 May-22	OW5 Nov-22
Alkalinity(as CaCO3)	30 - 500 [OG]	320	298	320	314	333	325
Chloride	250 [AO]	59.4	60.8	77.2	67.9	107	102
Nitrate(as N)	10 (MAC) d	0.16	0.09	0.10	0.10	0.2	<0.05
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05
Ammonia(as N)		0.05	0.05	0.05	0.03	<0.01	0.03
Total Kjeldahl Nitrogen(as N)		0.2	0.2	2.0	0.4	0.7	0.4
Phenols		<0.002	<0.002	0.002	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	3.8	2.5	2.7	2.2	2.7	0.7
Conductivity (us/cm)		839	858	911	890	974	994
pH		8.08	7.95	8.08	7.84	8.14	7.93
Sulphate (as SO4)	250 (AO)	57	55	59	50	46	41
Hardness(as CaCO3)	80-100 [OG]	413	409	483	425	451	443
Aluminum	0.1 [OG]	0.04	0.05	0.07	0.02	0.04	0.02
Arsenic	0.010 (IMAC)	0.0018	0.0020	0.0017	0.0017	0.0017	0.0016
Barium	1 [MAC]	0.102	0.099	0.119	0.102	0.112	0.108
Boron	5 [IMAC]	0.104	0.109	0.114	0.116	0.107	0.113
Cadmium	0.005 (MAC)	0.000021	0.000030	0.000017	0.000021	0.000020	0.000017
Calcium	-	85.8	87.7	105	87.4	95.7	92.5
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001
Copper	1 [AO]	<0.002	0.0064	0.008	<0.002	<0.002	0.0014
Iron	0.3 [AO]	<0.005	0.007	0.006	0.006	0.005	<0.005
Lead	0.01 (MAC)c	0.00003	0.00005	0.00009	0.00003	0.00007	0.00005
Magnesium	-	48.3	46.2	53.7	50.2	51.5	51.5
Manganese	0.05 [AO]	<0.001	0.006	0.001	0.002	<0.001	0.001
Potassium	-	1.7	1.5	1.8	1.8	1.8	1.7
Sodium	200 [AO]	33.9	33.5	38.3	35.8	37.0	36.8
Zinc	5 [AO]	<0.005	<0.005	0.005	<0.005	<0.005	<0.005

NOTES:

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**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW6 Jul-07	OW6 Dec-07	OW6 Jul-08	OW6 Dec-08	OW6 Jul-09	OW6 Nov-09	OW6 Mar-10	OW6 Dec-10	OW6 Jun-11	OW6 Oct-11	OW6 Jun-12	OW6 Oct-12	OW6 Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	369	353	338	346	327	321	322	317	343	370	416	491	510
Chloride	250 [AO]	21	21	17	17	19	16	18	16	14.8	21.9	45.8	68.4	84.3
Nitrate(as N)	10 (IMAC) d	0.2	nd	0.2	0.2	0.2	0.3	<0.1	0.4	0.2	0.3	<0.1	0.1	0.1
Nitrite(as N)	1 (MAC) d	nd	nd	0.01	0.08	nd	0.03	0.03	0.03	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		0.1	0.4	0.09	0.29	0.06	0.19	0.36	0.43	<0.01	<0.01	0.24	<0.01	0.40
Total Kjeldahl Nitrogen(as N)		0.3	0.7	0.7	0.7	1.2	1.2	2.0	1.1	1.69	3.52	0.86	2.32	2.56
Phenols		nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	1.4	1.6	1.4	1.3	1.3	1.3	1.5	1.6	1.5	2.5	4.4	7.5	16.2
Conductivity (us/cm)		837	805	762	751	726	706	695	707	774	915	1040	1220	1260
pH		8.2	8.2	8.1	8.1	8	7.9	8.1	8.14	7.81	7.83	8.07	7.88	7.71
Sulphate (as SO4)	250 (AO)	79	61	49	48	-	38	36	42	67	90	92	106	94
Hardness(as CaCO3)	80-100 [OG]	330	270	260	250	240	220	230	250	267	299	322	333	347
Aluminum	0.1 [OG]	0.33	0.014	nd	nd	nd	nd	<0.005	<0.005	0.02	0.03	0.02	0.03	0.02
Arsenic	0.010 (IMAC)	nd	nd	nd	nd	nd	nd	<0.001	<0.001	0.0008	0.0004	0.0012	0.0009	0.0014
Barium	1 [MAC]	0.093	0.09	0.1	0.091	0.087	0.081	0.086	0.087	0.101	0.103	0.131	0.135	0.138
Boron	5 [IMAC]	0.37	0.33	0.34	0.31	0.36	0.33	0.33	0.35	0.355	0.313	0.365	0.319	0.349
Cadmium	0.005 (MAC)	0.0001	0.0001	0.0002	0.0002	0.0003	nd	0.0002	<0.0001	0.00003	<0.00002	<0.00002	0.00004	0.00008
Calcium	-	60	49	47	46	43	40	41	45	48.3	54.9	57.6	59.9	61.4
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	0.002	nd	0.002	0.002	0.002	0.007	0.002	<0.0005	<0.002	<0.002	<0.002	0.004	0.0037
Iron	0.3 [AO]	0.22	0.12	nd	nd	nd	0.1	<0.1	<0.1	0.033	<0.005	0.080	<0.005	<0.005
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00002	<0.00002	<0.00002	0.00006	0.00007
Magnesium	-	44	36	34	32	31	28	30	33	35.7	39.5	43.3	44.5	47.0
Manganese	0.05 [AO]	0.017	0.085	nd	0.05	nd	0.026	0.017	0.039	0.023	0.028	0.042	0.037	0.083
Potassium	-	4.3	3.8	4.8	3.5	3.4	3.1	3.1	3.3	3.4	3.6	4.0	3.9	3.9
Sodium	200 [AO]	93	83	76	76	74	74	71	71	73.3	95.4	127	176	166
Zinc	5 [AO]	nd	nd	0.007	nd	nd	0.005	0.005	0.006	<0.005	0.015	<0.005	<0.005	<0.005

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GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW6 Nov-13	OW6 Jul-14	OW6 Nov-14	OW6 May-15	OW6 Oct-15	OW6 Jun-16	OW6 Nov-16	OW6 Jun-17	OW6 Oct-17	OW6 May-18	OW6 Oct-18	OW6 Jun-19	OW6 Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	697	653	893	890	1050	1350	1460	1110	1440	1330	1360	1280	1380
Chloride	250 [AO]	118	130	162	172	233	50.5	356	299	340	476	412	408	469
Nitrate(as N)	10 (MAC) d	<0.1	<0.1	<0.1	<0.5	<1.0	<0.1	<0.5	<0.5	<1	<0.5	<0.5	<0.05	<0.5
Nitrite(as N)	1 (MAC) d	<0.1	<0.1	<0.1	<0.5	<1.0	<0.1	<0.5	<0.5	<1	<0.5	<0.5	<0.05	<0.5
Ammonia(as N)		0.56	0.81	1.28	1.19	1.37	3.57	7.02	9.26	14.3	15.4	16.5	17.9	20.7
Total Kjeldahl Nitrogen(as N)		3.95	4.88	6.9	7.09	9.75	15.2	19.1	23.0	29.2	32.6	32.1	29.0	35.3
Phenols		<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.002	0.001	0.004	0.003	0.020	0.004	0.004
Dissolved Organic Carbon(DOC)	5 [AO]	22.0	19.2	25.9	38.0	59.9	65.0	22.9	106	26.2	115	22.3	110	29.0
Conductivity (us/cm)		1450	1630	1960	2110	2450	2490	3140	3050	3520	3240	3630	3400	3680
pH		7.78	7.78	7.71	8.13	7.93	7.68	7.58	7.78	7.52	7.56	7.5	7.6	7.57
Sulphate (as SO4)	250 (AO)	91	75	68	52.4	36.1	3	<5	<10	13	<10	<10	<1	<10
Hardness(as CaCO3)	80-100 [OG]	426	483	580	703	780	845	937	995	1170	1080	1110	1080	1190
Aluminum	0.1 [OG]	0.04	0.03	0.03	0.005	<0.004	0.04	0.05	0.05	0.05	0.08	0.08	0.07	0.09
Arsenic	0.010 (IMAC)	0.0032	0.0111	0.0091	<0.003	0.005	0.0082	0.0063	0.0154	0.0053	0.0172	0.0102	0.0091	0.0043
Barium	1 [MAC]	0.167	0.177	0.215	0.252	0.227	0.292	0.343	0.509	0.531	0.513	0.637	0.591	0.598
Boron	5 [IMAC]	0.350	0.389	0.357	0.414	0.410	0.429	0.446	0.507	0.598	0.551	0.559	0.566	0.556
Cadmium	0.005 (MAC)	0.00004	<0.00002	0.00041	<0.001	<0.001	<0.00002	<0.00002	<0.0001	0.000036	<0.000015	<0.000015	0.000016	<0.000070
Calcium	-	77.2	87.1	103	129	136	136	141	141	163	151	155	143	154
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	0.006	0.010	<0.002	0.003	0.003	0.004	0.003	0.003	0.003	0.004
Copper	1 [AO]	0.002	0.0029	<0.002	<0.003	<0.003	<0.002	0.0017	0.007	<0.002	<0.002	<0.002	0.0029	<0.002
Iron	0.3 [AO]	0.251	3.89	6.42	2.11	4.58	6.31	4.59	2.86	2.21	6.72	6.71	5.37	3.33
Lead	0.01 (MAC)c	0.00004	0.00010	0.00005	<0.002	<0.002	<0.00002	0.00005	0.00008	0.00002	<0.00002	0.00007	0.00010	<0.0001
Magnesium	-	56.8	64.6	78.5	92.6	107	123	142	156	185	172	175	175	196
Manganese	0.05 [AO]	0.099	0.086	0.134	0.131	0.115	0.063	0.041	0.031	0.031	0.027	0.027	0.024	0.023
Potassium	-	4.4	4.9	4.9	6.01	7.54	8.6	11.2	15.7	18.8	17.3	18.5	18.8	20.4
Sodium	200 [AO]	205	219	209	238	284	297	337	369	430	414	430	408	420
Zinc	5 [AO]	<0.005	0.006	0.015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005

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**TABLE E-2**  
**GROUNDWATER CHEMICAL DATA (2007-Present)**  
**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW6 Jul-20	OW6 Nov-20	OW6 Jun-21	OW6 Nov-21	OW6 May-22	OW6 Nov-22
Alkalinity(as CaCO3)	30 - 500 [OG]	1410	1430	1430	1430	1470	1570
Chloride	250 [AO]	458	520	535	547	480	485
Nitrate(as N)	10 (MAC) d	0.70	<0.5	<0.5	<0.05	<1	<0.5
Nitrite(as N)	1 (MAC) d	<0.5	<0.5	<0.5	<0.05	<1	<0.5
Ammonia(as N)		25.2	27.9	29.7	23.8	40.9	43.0
Total Kjeldahl Nitrogen(as N)		47.0	52.7	42.4	32.6	<0.1	56.6
Phenols		<0.002	0.004	0.017	0.002	0.002	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	107	82.4	22.1	83.2	16.5	81.4
Conductivity (us/cm)		3610	3960	3860	3780	3720	4150
pH		7.39	7.25	7.32	7.24	7.59	7.24
Sulphate (as SO4)	250 (AO)	<10	<10	<10	1	<10	<10
Hardness(as CaCO3)	80-100 [OG]	1170	1250	1180	1190	1150	1260
Aluminum	0.1 [OG]	0.07	0.08	0.10	0.06	0.06	0.13
Arsenic	0.010 (IMAC)	0.0072	0.0049	0.0037	0.0123	0.0106	0.0114
Barium	1 [MAC]	0.746	0.769	0.816	0.794	0.749	0.921
Boron	5 [IMAC]	0.607	0.637	0.637	0.637	0.640	0.663
Cadmium	0.005 (MAC)	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070
Calcium	-	152	165	151	149	144	157
Chromium	0.05 (MAC)	0.003	0.004	0.004	0.002	<0.002	0.004
Copper	1 [AO]	<0.002	0.0019	<0.002	<0.002	<0.002	0.0010
Iron	0.3 [AO]	3.02	3.08	7.67	8.51	4.98	7.97
Lead	0.01 (MAC)c	0.00020	0.00017	0.00010	0.00011	0.00021	0.00018
Magnesium	-	191	203	196	200	192	212
Manganese	0.05 [AO]	0.028	0.024	0.029	0.023	0.020	0.026
Potassium	-	21.5	25.8	23.7	23.5	22.1	27.0
Sodium	200 [AO]	414	445	439	416	407	442
Zinc	5 [AO]	<0.005	0.005	<0.005	<0.005	<0.005	<0.005

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GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW7S Jul-07	OW7S Dec-07	OW7S Jul-08	OW7S Dec-08	OW7S Jul-09	OW7S Nov-09	OW7S Mar-10	OW7S Dec-10	OW7S Jun-11	OW7S Oct-11	OW7S Jun-12	OW7S Oct-12	OW7S Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	187	176	172	174	169	167	167	168	174	172	175	177	177
Chloride	250 [AO]	15	14	18	17	18	17	20	21	19.7	20.9	21.4	22.1	22.6
Nitrate(as N)	10 (MAC) d	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.1	<0.1	<0.1	0.1	0.1
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	nd	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		nd	0.07	nd	nd	0.26	nd	<0.05	<0.05	<0.01	<0.01	0.03	<0.01	<0.01
Total Kjeldahl Nitrogen(as N)		0.2	0.3	0.2	0.2	0.3	1	0.5	<0.5	0.13	0.43	0.08	0.19	0.21
Phenols		nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	0.6	0.8	0.6	0.8	0.7	0.6	0.8	0.9	0.7	3.9	1.4	8.3	8.5
Conductivity (us/cm)		480	473	467	457	455	450	448	463	473	501	497	500	497
pH		8.2	8.2	8.2	8.2	8	8	8.1	8.21	7.97	8.00	8.10	7.99	7.96
Sulphate (as SO4)	250 (AO)	47	48	45	41	-	37	36	37	40	43	46	52	52
Hardness(as CaCO3)	80-100 [OG]	160	140	130	130	130	120	130	130	131	135	142	134	141
Aluminum	0.1 [OG]	nd	0.015	nd	nd	nd	nd	<0.005	<0.005	0.07	0.02	<0.01	0.02	0.02
Arsenic	0.010 (IMAC)	nd	nd	nd	0.001	nd	nd	<0.001	0.001	0.0014	0.0016	0.0018	0.0016	0.0014
Barium	1 [MAC]	0.04	0.038	0.039	0.035	0.037	0.035	0.035	0.036	0.036	0.030	0.039	0.036	0.038
Boron	5 [IMAC]	0.31	0.3	0.28	0.28	0.29	0.29	0.29	0.30	0.300	0.262	0.312	0.265	0.286
Cadmium	0.005 (MAC)	0.001	0.0017	0.0004	0.0017	0.0005	0.0003	0.0004	0.0002	0.00017	0.00009	0.0001	0.00014	0.00011
Calcium	-	31	28	26	27	26	25	26	27	27.0	27.8	29.0	27.6	28.9
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	nd	nd	nd	0.001	nd	0.001	0.002	<0.0005	0.003	<0.002	<0.002	<0.002	0.0006
Iron	0.3 [AO]	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.025	<0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00008	<0.00002	0.00003	<0.00002	<0.00002
Magnesium	-	19	16	16	16	15	14	15	15	15.6	15.9	16.8	15.9	16.7
Manganese	0.05 [AO]	nd	0.004	nd	nd	nd	0.007	<0.002	0.012	0.002	0.001	<0.001	0.002	<0.001
Potassium	-	1.2	1.1	0.97	1.1	1	1	1.1	0.97	1.0	0.9	1.0	1.0	0.9
Sodium	200 [AO]	59	53	51	51	52	49	53	52	52.8	57.5	55.3	52.7	56.1
Zinc	5 [AO]	nd	nd	nd	nd	nd	nd	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005

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**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW7S Nov-13	OW7S Jul-14	OW7S Nov-14	OW7S May-15	OW7S Oct-15	OW7S Jun-16	OW7S Nov-16	OW7S Jun-17	OW7S Oct-17	OW7S May-18	OW7S Oct-18	OW7S Jun-19	OW7S Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	178	169	184	176	177	181	181	179	173	168	174	166	161
Chloride	250 [AO]	23.6	23.6	24.3	25.7	26.9	24.4	26.0	22.0	20.8	27.6	26.7	27.1	28.0
Nitrate(as N)	10 (MAC) d	0.1	<0.1	0.1	<0.25	<0.10	0.1	0.1	<0.05	0.1	0.09	<0.05	0.07	<0.05
Nitrite(as N)	1 (MAC) d	<0.1	<0.1	<0.1	<0.25	<0.10	<0.1	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05
Ammonia(as N)		<0.01	<0.01	0.05	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	0.09	0.12	0.12	0.01
Total Kjeldahl Nitrogen(as N)		0.13	0.07	0.1	<0.10	<0.10	0.13	0.05	0.2	0.07	0.3	0.2	0.2	0.4
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	3.8	1.8	4.1	1.5	1.3	0.4	1.5	2.0	3.5	2.1	3.2	5.6	2.4
Conductivity (us/cm)		448	497	487	510	528	520	546	529	517	507	536	508	541
pH		8.12	8.07	8.01	8.32	7.51	8.10	8.04	8.13	8.06	8.22	7.84	7.92	7.73
Sulphate (as SO4)	250 (AO)	54	51	52	50.6	58.0	54	60	45	42	54	54	50	49
Hardness(as CaCO3)	80-100 [OG]	133	150	125	139	145	153	140	156	149	152	151	144	145
Aluminum	0.1 [OG]	0.02	0.01	<0.01	<0.004	<0.004	<0.01	0.01	<0.01	0.03	0.02	0.03	0.02	0.03
Arsenic	0.010 (IMAC)	0.0021	0.0016	0.0013	<0.003	<0.003	0.0008	0.0008	0.00079	0.0009	<0.0001	0.0011	0.0005	0.0007
Barium	1 [MAC]	0.036	0.036	0.031	0.033	0.034	0.039	0.037	0.039	0.038	0.037	0.038	0.033	0.033
Boron	5 [IMAC]	0.267	0.308	0.235	0.249	0.280	0.280	0.263	0.306	0.308	0.274	0.290	0.286	0.249
Cadmium	0.005 (MAC)	0.00028	0.00008	0.00009	<0.001	<0.001	0.00009	0.00008	<0.0001	0.000069	0.000068	0.000047	0.000029	0.000053
Calcium	-	27.3	31.4	25.5	29.5	30.0	31.1	28.6	32.0	30.5	31.4	31.6	29.2	28.8
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Copper	1 [AO]	<0.002	0.0005	<0.002	<0.003	<0.003	<0.002	0.0006	<0.002	<0.002	<0.002	<0.002	0.0022	0.002
Iron	0.3 [AO]	<0.005	<0.005	<0.005	<0.010	<0.010	0.012	0.006	<0.005	0.008	0.012	0.011	0.016	<0.005
Lead	0.01 (MAC)c	<0.00002	<0.00002	<0.00002	<0.002	<0.002	<0.00002	<0.00002	<0.00005	<0.00002	<0.00002	0.00004	0.00010	<0.00002
Magnesium	-	15.7	17.4	14.9	15.9	17.0	18.3	16.7	18.5	17.7	17.8	17.4	17.3	17.8
Manganese	0.05 [AO]	0.004	0.006	0.002	<0.002	<0.002	<0.001	<0.001	0.002	0.001	<0.001	0.002	<0.001	0.001
Potassium	-	0.9	1.0	0.8	0.97	1.06	1.0	0.9	1.0	1.0	0.9	0.9	0.9	0.9
Sodium	200 [AO]	52.5	56.8	48.3	52.8	57.6	59.0	54.4	61.5	60.8	61.7	61.0	59.0	57.4
Zinc	5 [AO]	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

NOTES:

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**TABLE E-2**  
**GROUNDWATER CHEMICAL DATA (2007-Present)**  
**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW7S Jul-20	OW7S Nov-20	OW7S Jun-21	OW7S Nov-21	OW7S May-22	OW7S Nov-22
Alkalinity(as CaCO3)	30 - 500 [OG]	168	155	164	166	176	167
Chloride	250 [AO]	27.8	29.2	29.1	27.4	30.6	27.7
Nitrate(as N)	10 (MAC) d	0.13	<0.05	0.15	<0.05	0.3	<0.05
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05
Ammonia(as N)		0.02	0.01	0.07	0.02	0.17	0.15
Total Kjeldahl Nitrogen(as N)		<0.1	<0.1	0.2	0.1	<0.1	0.1
Phenols		<0.002	<0.002	<0.002	<0.001	<0.001	0.003
Dissolved Organic Carbon(DOC)	5 [AO]	3.6	2.5	3.4	1.7	16.5	1.7
Conductivity (us/cm)		507	512	505	506	508	512
pH		8.01	8.03	8.15	7.93	7.95	8.00
Sulphate (as SO4)	250 (AO)	50	51	48	46	47	46
Hardness(as CaCO3)	80-100 [OG]	145	146	158	144	144	140
Aluminum	0.1 [OG]	0.02	0.01	0.03	<0.01	<0.01	<0.01
Arsenic	0.010 (IMAC)	0.0006	0.0008	0.0007	0.0007	0.0007	0.0007
Barium	1 [MAC]	0.040	0.036	0.039	0.035	0.036	0.035
Boron	5 [IMAC]	0.292	0.298	0.324	0.306	0.303	0.300
Cadmium	0.005 (MAC)	0.000036	0.000052	0.000030	0.000037	0.000031	0.000043
Calcium	-	28.9	29.6	31.8	28.4	28.8	28.0
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001
Copper	1 [AO]	<0.002	0.0031	<0.002	<0.002	<0.002	0.0003
Iron	0.3 [AO]	<0.005	0.011	<0.005	0.005	<0.005	<0.005
Lead	0.01 (MAC)c	0.00006	0.00006	0.00002	0.00003	0.00004	0.00050
Magnesium	-	17.7	17.4	19.0	17.6	17.6	17.1
Manganese	0.05 [AO]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Potassium	-	1.1	1.0	1.1	1.1	1.1	1.1
Sodium	200 [AO]	57.7	56.2	64.3	56.8	58.6	56.1
Zinc	5 [AO]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW7D Jul-07	OW7D Dec-07	OW7D Jul-08	OW7D Dec-08	OW7D Jul-09	OW7D Nov-09	OW7D Mar-10	OW7D Dec-10	OW7D Jun-11	OW7D Oct-11	OW7D Jun-12	OW7D Oct-12	OW7D Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	176	177	169	173	169	164	167	166	173	182	176	178	178
Chloride	250 [AO]	6	15	6	6	7	7	8	7	5.9	5.8	6.6	6.4	7.0
Nitrate(as N)	10 (IMAC) d	0.1	nd	0.2	0.1	nd	nd	<0.1	0.1	0.2	0.2	0.2	0.2	0.2
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	nd	0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		0.05	0.07	nd	nd	nd	nd	<0.05	<0.05	<0.01	<0.01	0.01	0.09	<0.01
Total Kjeldahl Nitrogen(as N)		0.2	0.3	0.3	0.2	0.4	0.2	0.7	<0.02	0.27	0.46	0.07	0.11	0.19
Phenols		nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	1.3	0.7	0.9	0.8	0.8	0.9	1.0	1.1	0.9	1.2	1.6	4.1	5.3
Conductivity (us/cm)		517	467	492	487	477	469	463	461	494	533	524	510	511
pH		8.2	8.3	8.2	8.1	8	8	8.1	8.14	7.94	8.00	8.16	8.07	8.02
Sulphate (as SO4)	250 (AO)	87	41	73	66	-	59	56	55	75	84	83	87	82
Hardness(as CaCO3)	80-100 [OG]	110	130	94	120	88	85	88	87	97	105	108	104	105
Aluminum	0.1 [OG]	nd	nd	nd	nd	nd	nd	<0.005	<0.005	0.01	0.06	<0.01	0.02	0.02
Arsenic	0.010 (IMAC)	nd	nd	nd	nd	nd	nd	<0.001	<0.001	0.0006	0.0003	0.0005	0.0006	0.0006
Barium	1 [MAC]	0.044	0.039	0.046	0.037	0.043	0.04	0.041	0.041	0.047	0.054	0.049	0.045	0.045
Boron	5 [IMAC]	0.48	0.29	0.42	0.35	0.45	0.42	0.44	0.42	0.464	0.448	0.478	0.420	0.442
Cadmium	0.005 (MAC)	0.0007	0.0005	0.0007	0.0013	0.0011	0.0005	0.0003	<0.0001	0.00025	0.00056	0.00012	0.00016	0.00019
Calcium	-	26	27	22	24	20	20	21	21	22.5	24.9	25.1	24.2	24.2
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	nd	nd	0.002	0.003	0.001	0.002	0.002	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0016
Iron	0.3 [AO]	nd	nd	nd	nd	nd	nd	<0.1	<0.1	<0.005	0.020	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	<0.00002	0.00009	<0.00002	0.00002	<0.00002
Magnesium	-	12	16	9.7	13	9	8.6	8.9	8.6	9.83	10.5	11.1	10.6	10.7
Manganese	0.05 [AO]	0.005	0.002	nd	nd	nd	nd	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Potassium	-	1.3	1.1	2.5	1	1	0.98	1	0.85	1.0	1.1	1.1	1.0	1.0
Sodium	200 [AO]	87	52	74	60	73	70	73	69	70.5	72.7	76.4	72.1	76.4
Zinc	5 [AO]	nd	nd	0.006	nd	nd	nd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW7D Nov-13	OW7D Jul-14	OW7D Nov-14	OW7D May-15	OW7D Oct-15	OW7D Jun-16	OW7D Nov-16	OW7D Jun-17	OW7D Oct-17	OW7D May-18	OW7D Oct-18	OW7D Jun-19	OW7D Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	179	166	179	172	174	180	197	171	170	164	169	158	153
Chloride	250 [AO]	6.7	6.9	7.6	8.33	7.81	7.2	7.4	7.2	6.7	9.6	9.6	5.4	9.2
Nitrate(as N)	10 (IMAC) d	0.3	0.3	0.3	<0.25	0.18	0.3	0.3	0.21	0.3	0.29	0.27	0.15	0.13
Nitrite(as N)	1 (MAC) d	0.2	<0.1	<0.1	<0.25	<0.10	<0.1	0.3	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05
Ammonia(as N)		<0.01	<0.01	0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	0.06	0.03	0.12	<0.01
Total Kjeldahl Nitrogen(as N)		0.06	0.19	0.1	<0.10	<0.10	0.07	<0.05	<0.1	0.12	0.3	0.2	0.2	<0.1
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	2.7	2.3	5.8	1.7	1.0	0.6	1.6	1.6	2.1	1.5	2.4	5.3	2.9
Conductivity (us/cm)		450	496	498	497	514	506	524	498	502	504	504	477	475
pH		8.10	8.07	8.09	8.31	7.90	8.12	8.07	8.21	8.13	8.21	7.96	8.08	7.94
Sulphate (as SO4)	250 (AO)	81	78	82	69.4	78.4	77	82	60	59	74	68	34	58
Hardness(as CaCO3)	80-100 [OG]	99	108	93	98.9	102	106	99	107	103	103	100	66	90
Aluminum	0.1 [OG]	0.02	0.02	<0.01	<0.004	<0.004	<0.01	<0.01	0.01	0.03	0.02	0.02	0.02	0.03
Arsenic	0.010 (IMAC)	0.0005	0.0004	0.0004	<0.003	<0.003	0.0004	0.0003	<0.0007	0.0004	<0.0001	0.0004	0.0003	0.0004
Barium	1 [MAC]	0.043	0.042	0.038	0.036	0.037	0.043	0.040	0.042	0.042	0.041	0.040	0.021	0.036
Boron	5 [IMAC]	0.426	0.476	0.377	0.382	0.439	0.436	0.401	0.469	0.471	0.430	0.441	0.478	0.409
Cadmium	0.005 (MAC)	0.00020	0.00023	0.00030	<0.001	<0.001	0.00016	0.00011	0.00020	0.000170	0.000376	0.000251	0.000261	0.000177
Calcium	-	22.9	25.4	21.5	22.8	23.6	24.3	22.4	24.3	23.5	23.8	23.2	13.7	20.1
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Copper	1 [AO]	<0.002	0.0008	<0.002	<0.003	<0.003	<0.002	0.0126	<0.002	<0.002	<0.002	<0.002	0.0025	0.004
Iron	0.3 [AO]	<0.005	0.014	<0.005	<0.010	<0.010	<0.005	<0.005	<0.005	0.007	0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	<0.00002	<0.00002	<0.00002	<0.002	<0.002	0.00325	0.00002	<0.00005	<0.00002	<0.00002	0.00012	0.00088	<0.00002
Magnesium	-	10.2	10.9	9.59	10.2	10.5	11.0	10.3	11.2	10.8	10.7	10.1	7.83	9.76
Manganese	0.05 [AO]	<0.001	0.003	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	0.004	0.008	<0.001	<0.001
Potassium	-	0.9	1.0	0.9	0.99	1.07	1.0	0.9	0.9	1.0	1.0	0.9	0.9	0.9
Sodium	200 [AO]	69.5	77.2	65.3	69.6	73.9	76.9	69.6	80.1	77.5	81.0	80.2	80.8	73.0
Zinc	5 [AO]	<0.005	<0.005	0.011	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW7D Jul-20	OW7D Nov-20	OW7D Jun-21	OW7D Nov-21	OW7D May-22	OW7D Nov-22
Alkalinity(as CaCO3)	30 - 500 [OG]	165	151	157	155	166	158
Chloride	250 [AO]	10.9	10.2	10.3	10.2	11.0	9.1
Nitrate(as N)	10 (MAC) d	0.34	0.31	0.29	0.21	0.4	0.25
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05
Ammonia(as N)		0.01	0.03	0.02	0.02	<0.01	<0.01
Total Kjeldahl Nitrogen(as N)		0.1	0.1	0.2	0.1	0.2	<0.1
Phenols		<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	2.3	3.4	1.6	1.7	2.0	0.7
Conductivity (us/cm)		465	473	468	471	458	456
pH		8.08	8.09	8.23	7.49	8.12	8.02
Sulphate (as SO4)	250 (AO)	60	61	60	57	54	54
Hardness(as CaCO3)	80-100 [OG]	89	91	96	88	84	83
Aluminum	0.1 [OG]	<0.01	0.02	0.03	<0.01	<0.01	<0.01
Arsenic	0.010 (IMAC)	0.0004	0.0004	0.0004	0.0004	0.0005	0.0004
Barium	1 [MAC]	0.042	0.039	0.042	0.038	0.037	0.038
Boron	5 [IMAC]	0.448	0.468	0.492	0.464	0.470	0.467
Cadmium	0.005 (MAC)	0.000108	0.000117	0.000080	0.000082	0.000153	0.000087
Calcium	-	20.1	21.2	22.1	19.7	18.7	18.4
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001
Copper	1 [AO]	<0.002	0.0006	0.002	<0.002	<0.002	0.0008
Iron	0.3 [AO]	<0.005	0.006	<0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	0.00007	0.00002	0.00003	<0.00002	0.00003	0.00006
Magnesium	-	9.5	9.36	9.95	9.50	9.01	8.92
Manganese	0.05 [AO]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Potassium	-	1.0	0.9	1.0	1.1	1.0	1.0
Sodium	200 [AO]	73.6	70.8	79.4	72.3	70.8	69.7
Zinc	5 [AO]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

NOTES:

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**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW8S Jul-07	OW8S Dec-07	OW8S Jul-08	OW8S Dec-08	OW8S Jul-09	OW8S Nov-09	OW8S Mar-10	OW8S Dec-10	OW8S Jun-11	OW8S Oct-11	OW8S Jun-12	OW8S Oct-12	OW8S Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	244	238	233	246	233	230	231	226	231	233	233	237	234
Chloride	250 [AO]	10	9	9	9	9	10	13	12	12.3	13.1	16.4	17.1	20.1
Nitrate(as N)	10 (MAC) d	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.1	<0.1	0.1	<0.1	0.1
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	nd	0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		0.07	0.1	nd	nd	0.06	0.06	<0.05	0.09	<0.01	<0.01	0.02	<0.01	0.01
Total Kjeldahl Nitrogen(as N)		0.2	0.3	0.2	nd	0.7	0.2	0.3	<0.5	0.59	0.31	0.08	0.13	0.10
Phenols		nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	0.8	0.6	0.5	0.7	0.5	0.6	0.6	0.8	0.6	1.1	1.3	1.7	3.5
Conductivity (us/cm)		667	654	637	668	634	634	634	634	646	685	678	662	666
pH		8.2	8.2	8.2	8.1	8	8	8.1	8.07	7.86	7.95	8.20	8.04	7.99
Sulphate (as SO4)	250 (AO)	102	97	100	101	-	88	89	83	100	106	106	109	104
Hardness(as CaCO3)	80-100 [OG]	240	220	230	220	220	210	200	210	220	234	243	228	228
Aluminum	0.1 [OG]	nd	nd	nd	nd	nd	nd	<0.005	<0.005	0.04	0.03	0.02	0.02	0.02
Arsenic	0.010 (IMAC)	0.001	0.002	0.002	0.001	nd	0.002	<0.001	0.003	0.0015	0.0016	0.0015	0.0022	0.0017
Barium	1 [MAC]	0.048	0.046	0.049	0.044	0.044	0.044	0.048	0.045	0.047	0.043	0.052	0.049	0.049
Boron	5 [IMAC]	0.4	0.41	0.41	0.4	0.39	0.4	0.39	0.42	0.416	0.388	0.436	0.384	0.396
Cadmium	0.005 (MAC)	0.0006	0.0001	0.0004	0.0003	0.0004	0.0002	0.0002	<0.0001	0.00011	0.00013	0.00013	0.00009	0.00008
Calcium	-	42	38	38	37	37	36	35	37	37.7	40.4	41.8	39.5	39.1
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	nd	nd	0.001	0.001	nd	0.001	0.002	<0.0005	0.008	<0.002	<0.002	<0.002	0.0010
Iron	0.3 [AO]	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.014	<0.005	0.007	<0.005	<0.005
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00007	<0.00002	0.00003	<0.00002	<0.00002
Magnesium	-	34	30	32	30	31	29	28	29	30.7	32.5	33.7	31.4	31.5
Manganese	0.05 [AO]	0.004	0.035	nd	nd	0.004	0.027	<0.002	0.022	0.002	0.009	0.007	0.011	0.004
Potassium	-	1.6	1.5	3.2	1.5	1.6	1.5	1.4	1.4	1.4	1.5	1.6	1.5	1.3
Sodium	200 [AO]	64	57	65	60	61	57	58	59	60.5	62.7	63.1	59.2	62.6
Zinc	5 [AO]	nd	nd	3.2	nd	0.007	nd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW8S Nov-13	OW8S Jul-14	OW8S Nov-14	OW8S May-15	OW8S Oct-15	OW8S Jun-16	OW8S Nov-16	OW8S Jun-17	OW8S Oct-17	OW8S May-18	OW8S Oct-18	OW8S Jun-19	OW8S Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	235	220	236	223	228	256	232	225	149	215	222	235	206
Chloride	250 [AO]	21.3	22.9	25.0	28.2	29.4	30.3	30.5	29.0	5.7	40.1	40.7	43.6	46.4
Nitrate(as N)	10 (MAC) d	<0.1	<0.1	0.1	<0.25	<0.10	0.1	<0.1	<0.05	0.2	<0.05	<0.05	<0.05	<0.05
Nitrite(as N)	1 (MAC) d	<0.1	<0.1	<0.1	<0.25	<0.10	<0.1	<0.1	<0.05	0.1	<0.05	<0.05	<0.05	<0.05
Ammonia(as N)		0.01	0.02	0.04	0.02	<0.02	<0.01	<0.01	<0.01	<0.01	0.04	0.03	0.05	0.02
Total Kjeldahl Nitrogen(as N)		0.06	0.11	<0.1	<0.10	<0.10	<0.05	0.11	<0.1	0.25	0.2	0.2	0.2	0.1
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	4.8	1.9	2.3	1.5	0.9	<0.2	1.4	0.9	2.2	1.0	1.3	4.3	2.2
Conductivity (us/cm)		590	664	667	689	701	709	714	719	689	710	740	717	729
pH		8.06	8.08	8.03	8.34	8.07	8.16	8.10	8.15	8.20	8.17	8.00	8.14	8.04
Sulphate (as SO4)	250 (AO)	103	101	104	97.3	103	103	108	86	164	100	99	97	94
Hardness(as CaCO3)	80-100 [OG]	215	239	197	228	234	245	229	259	180	253	246	244	242
Aluminum	0.1 [OG]	0.02	0.01	0.01	<0.004	<0.004	0.01	0.01	0.01	0.04	0.03	0.03	0.03	0.04
Arsenic	0.010 (IMAC)	0.0022	0.0017	0.0013	<0.003	<0.003	0.0007	0.0010	0.00076	0.0003	<0.0001	0.0014	0.0008	0.0012
Barium	1 [MAC]	0.048	0.048	0.042	0.048	0.048	0.051	0.049	0.054	0.028	0.052	0.053	0.047	0.049
Boron	5 [IMAC]	0.387	0.423	0.333	0.395	0.381	0.388	0.379	0.427	0.523	0.387	0.399	0.393	0.360
Cadmium	0.005 (MAC)	0.00003	0.00006	0.00003	<0.001	<0.001	0.00008	0.00004	<0.0001	0.000113	0.000052	0.000025	0.000025	0.000034
Calcium	-	37.3	42.3	33.9	40.8	41.5	42.2	39.1	44.7	38.6	44.3	42.9	41.5	39.9
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Copper	1 [AO]	<0.002	0.0006	<0.002	<0.003	<0.003	<0.002	0.0005	<0.002	<0.002	<0.002	0.002	0.0020	<0.002
Iron	0.3 [AO]	<0.005	<0.005	<0.005	<0.010	<0.010	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	<0.00002	<0.00002	<0.00002	<0.002	<0.002	<0.00002	<0.00002	0.00006	<0.00002	<0.00002	<0.00002	0.00018	0.00003
Magnesium	-	29.6	32.3	27.4	30.6	31.7	33.9	31.9	35.9	20.4	34.7	33.7	34.1	34.6
Manganese	0.05 [AO]	0.014	0.013	0.003	<0.002	0.012	<0.001	0.005	<0.001	0.004	<0.001	0.002	<0.001	0.002
Potassium	-	1.3	1.4	1.2	1.44	1.47	1.4	1.3	1.4	1.3	1.4	1.4	1.3	1.3
Sodium	200 [AO]	57.2	63.4	52.2	60.2	64.1	64.7	61.3	69.3	87.5	69.5	69.0	65.9	64.0
Zinc	5 [AO]	<0.005	<0.005	<0.005	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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**TABLE E-2**  
**GROUNDWATER CHEMICAL DATA (2007-Present)**  
**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW8S Jul-20	OW8S Nov-20	OW8S Jun-21	OW8S Nov-21	OW8S May-22	OW8S Nov-22
Alkalinity(as CaCO3)	30 - 500 [OG]	216	199	214	212	222	210
Chloride	250 [AO]	47.5	49.7	54.7	50.3	57.8	55.0
Nitrate(as N)	10 (MAC) d	0.10	<0.05	0.12	<0.05	0.2	<0.05
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05
Ammonia(as N)		0.03	0.02	0.02	0.03	<0.01	<0.01
Total Kjeldahl Nitrogen(as N)		0.1	0.1	0.2	0.2	0.1	0.1
Phenols		<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	1.2	0.7	1.8	1.0	0.7	<0.2
Conductivity (us/cm)		726	737	745	745	743	749
pH		8.07	8.06	8.17	7.90	8.11	8.01
Sulphate (as SO4)	250 (AO)	98	99	99	93	93	96
Hardness(as CaCO3)	80-100 [OG]	252	258	278	257	255	247
Aluminum	0.1 [OG]	0.02	0.03	0.04	<0.01	0.02	0.03
Arsenic	0.010 (IMAC)	0.0007	0.0010	0.0007	0.0011	0.0008	0.0009
Barium	1 [MAC]	0.053	0.053	0.056	0.052	0.053	0.054
Boron	5 [IMAC]	0.401	0.429	0.455	0.431	0.424	0.416
Cadmium	0.005 (MAC)	0.000030	0.000023	0.000026	0.000028	0.000025	0.000029
Calcium	-	41.8	44.7	47.5	42.3	42.4	41.0
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001
Copper	1 [AO]	<0.002	0.0021	<0.002	<0.002	0.01	0.0010
Iron	0.3 [AO]	0.005	0.006	<0.005	<0.005	0.008	0.013
Lead	0.01 (MAC)c	0.00004	0.00008	0.00002	0.00003	0.00081	0.00005
Magnesium	-	35.8	35.5	38.7	36.9	36.1	35.2
Manganese	0.05 [AO]	<0.001	0.001	<0.001	0.009	<0.001	0.003
Potassium	-	1.6	1.5	1.6	1.7	1.5	1.6
Sodium	200 [AO]	66.8	65.2	73.8	67.2	67.1	64.9
Zinc	5 [AO]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW8D Jul-07	OW8D Dec-07	OW8D Jul-08	OW8D Dec-08	OW8D Jul-09	OW8D Nov-09	OW8D Mar-10	OW8D Dec-10	OW8D Jun-11	OW8D Oct-11	OW8D Jun-12	OW8D Oct-12	OW8D Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	160	153	149	165	151	145	145	143	147	157	159	164	161
Chloride	250 [AO]	7	6	5	5	7	6	7	6	4.9	4.6	5.2	4.7	6.3
Nitrate(as N)	10 (IMAC) d	nd	nd	0.2	0.1	nd	nd	<0.1	0.2	0.2	0.2	0.1	0.2	0.2
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	nd	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		nd	0.07	nd	nd	nd	nd	<0.05	<0.05	<0.01	<0.01	0.02	<0.01	<0.01
Total Kjeldahl Nitrogen(as N)		0.2	0.3	0.2	0.2	0.3	0.2	0.4	0.4	0.22	0.31	<0.05	0.25	0.07
Phenols		nd	nd	nd	nd	nd	nd	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	0.8	1	0.8	0.8	1	0.9	2.1	1.2	0.8	1.4	1.2	1.4	4.7
Conductivity (us/cm)		730	717	697	686	697	679	679	675	676	747	737	717	755
pH		8.2	8.2	8.2	8.2	8	8	8.1	8.07	7.90	7.95	8.07	8.02	8.09
Sulphate (as SO4)	250 (AO)	195	180	178	183	-	190	190	170	187	204	203	207	206
Hardness(as CaCO3)	80-100 [OG]	200	180	200	180	170	170	170	170	169	201	203	196	191
Aluminum	0.1 [OG]	nd	nd	nd	nd	nd	nd	<0.005	<0.005	0.24	0.03	0.01	0.03	0.07
Arsenic	0.010 (IMAC)	nd	nd	nd	nd	nd	nd	<0.001	<0.001	0.0005	0.0004	0.0003	0.0005	0.0004
Barium	1 [MAC]	0.028	0.027	0.028	0.032	0.03	0.026	0.028	0.029	0.030	0.029	0.034	0.031	0.032
Boron	5 [IMAC]	0.49	0.49	0.49	0.48	0.51	0.49	0.50	0.51	0.512	0.493	0.542	0.474	0.481
Cadmium	0.005 (MAC)	0.0004	0.0009	0.0005	0.0008	nd	0.0003	0.0003	<0.0001	0.00020	<0.00002	0.00011	0.00017	0.00018
Calcium	-	43	39	43	36	38	37	38	38	37.1	44.7	44.5	43.3	41.9
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	nd	nd	0.001	0.002	nd	0.002	0.003	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0014
Iron	0.3 [AO]	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.089	<0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00008	<0.00002	<0.00002	<0.00002	0.00002
Magnesium	-	22	21	22	22	19	18	18	19	18.6	21.8	22.3	21.3	20.9
Manganese	0.05 [AO]	nd	0.002	nd	nd	0.006	nd	<0.002	0.009	0.014	0.007	0.002	0.003	<0.001
Potassium	-	1.5	1.4	3.4	1.5	1.5	1.4	1.6	1.3	1.3	1.4	1.5	1.3	1.3
Sodium	200 [AO]	89	84	92	77	84	79	82	80	77.8	86.0	86.9	80.5	80.9
Zinc	5 [AO]	nd	nd	0.006	0.007	nd	nd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW8D Nov-13	OW8D Jul-14	OW8D Nov-14	OW8D May-15	OW8D Oct-15	OW8D Jun-16	OW8D Nov-16	OW8D Jun-17	OW8D Oct-17	OW8D May-18	OW8D Oct-18	OW8D Jun-19	OW8D Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	167	156	162	153	154	155	159	154	220	148	156	150	145
Chloride	250 [AO]	5.2	5.8	5.8	7.03	7.18	5.8	0.9	5.9	28.3	7.1	6.8	7.3	6.1
Nitrate(as N)	10 (IMAC) d	0.3	0.2	0.2	<0.25	0.17	0.2	0.4	0.21	<0.1	0.17	0.23	0.13	0.11
Nitrite(as N)	1 (MAC) d	0.2	<0.1	<0.1	<0.25	<0.10	<0.1	0.3	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05
Ammonia(as N)		<0.01	<0.01	0.02	0.02	<0.02	<0.01	<0.01	<0.01	<0.01	0.04	0.02	0.06	<0.01
Total Kjeldahl Nitrogen(as N)		0.28	0.12	0.1	<0.10	<0.10	0.09	<0.05	0.1	0.20	0.2	0.2	0.2	0.1
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	3.4	2.0	5.6	1.4	1.9	0.4	1.1	1.1	2.3	1.3	2.5	4.2	3.3
Conductivity (us/cm)		635	731	687	719	713	694	718	707	713	689	732	703	708
pH		8.08	8.09	8.04	8.28	8.06	8.09	8.03	8.14	8.15	8.19	7.91	8.02	7.94
Sulphate (as SO4)	250 (AO)	209	207	203	196	198	191	202	165	83	197	198	199	189
Hardness(as CaCO3)	80-100 [OG]	191	210	166	181	181	179	182	196	246	193	193	191	183
Aluminum	0.1 [OG]	0.03	0.02	0.01	<0.004	<0.004	0.01	0.02	0.02	0.04	0.03	0.03	0.03	0.04
Arsenic	0.010 (IMAC)	0.0004	0.0002	0.0003	<0.003	<0.003	0.0002	0.0002	<0.0007	0.0012	<0.0001	0.0002	0.0002	0.0003
Barium	1 [MAC]	0.031	0.032	0.026	0.027	0.025	0.027	0.029	0.030	0.053	0.029	0.030	0.027	0.026
Boron	5 [IMAC]	0.476	0.535	0.416	0.489	0.475	0.474	0.466	0.528	0.428	0.478	0.491	0.506	0.454
Cadmium	0.005 (MAC)	0.00008	0.00034	0.00019	<0.001	<0.001	0.00011	0.00010	0.00030	0.000051	0.000152	0.000067	0.000097	0.000238
Calcium	-	42.2	46.9	36.0	40.6	39.6	38.7	39.8	42.8	41.8	42.8	42.6	41.2	38.5
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Copper	1 [AO]	<0.002	0.0013	<0.002	<0.003	<0.003	<0.002	0.0007	<0.002	<0.002	<0.002	<0.002	0.0007	<0.002
Iron	0.3 [AO]	<0.005	<0.005	<0.005	<0.010	<0.010	<0.005	<0.005	0.007	0.023	<0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	<0.00002	0.00002	<0.00002	<0.002	<0.002	<0.00002	<0.00002	<0.00005	0.00005	<0.00002	<0.00002	<0.00002	0.00002
Magnesium	-	20.8	22.5	18.4	19.3	19.9	19.9	20.2	21.7	34.5	21.0	21.0	21.3	21.2
Manganese	0.05 [AO]	0.006	<0.001	<0.001	<0.002	<0.002	0.002	0.002	0.003	0.006	<0.001	<0.001	<0.001	<0.001
Potassium	-	1.3	1.5	1.2	1.39	1.44	1.2	1.2	1.3	1.5	1.3	1.3	1.3	1.2
Sodium	200 [AO]	78.4	88.2	70.0	79.6	83.4	83.0	78.6	90.2	68.1	88.8	89.9	87.3	81.7
Zinc	5 [AO]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.052	<0.005	<0.005	<0.005	<0.005

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**TABLE E-2**  
**GROUNDWATER CHEMICAL DATA (2007-Present)**  
**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW8D Jul-20	OW8D Nov-20	OW8D Jun-21	OW8D Nov-21	OW8D May-22	OW8D Nov-22
Alkalinity(as CaCO3)	30 - 500 [OG]	152	140	149	148	154	145
Chloride	250 [AO]	8.6	7.9	8.0	8.0	8.5	7.3
Nitrate(as N)	10 (MAC) d	0.28	0.24	0.36	0.14	0.3	0.16
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05
Ammonia(as N)		0.01	0.01	<0.01	0.11	<0.01	<0.01
Total Kjeldahl Nitrogen(as N)		0.1	0.1	<0.1	0.2	0.2	<0.1
Phenols		<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	4	0.9	1.6	1.0	1.9	0.8
Conductivity (us/cm)		700	703	703	709	683	684
pH		8.09	8.07	8.16	7.88	8.03	8.02
Sulphate (as SO4)	250 (AO)	194	192	200	191	182	188
Hardness(as CaCO3)	80-100 [OG]	187	187	213	185	176	173
Aluminum	0.1 [OG]	0.02	0.02	0.04	<0.01	<0.01	<0.01
Arsenic	0.010 (IMAC)	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002
Barium	1 [MAC]	0.030	0.028	0.033	0.027	0.026	0.028
Boron	5 [IMAC]	0.515	0.522	0.562	0.526	0.527	0.52
Cadmium	0.005 (MAC)	0.000136	0.00010	0.000214	0.000164	0.000318	0.000179
Calcium	-	39.7	41.1	47.3	38.7	37.4	36.7
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001
Copper	1 [AO]	<0.002	0.0025	0.006	<0.002	<0.002	0.0012
Iron	0.3 [AO]	<0.005	0.008	<0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	<0.00002	0.00005	0.00005	<0.00002	0.00003	0.00003
Magnesium	-	21.3	20.6	23.1	21.5	20.2	19.8
Manganese	0.05 [AO]	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Potassium	-	1.5	1.3	1.4	1.5	1.4	1.4
Sodium	200 [AO]	85.2	82.3	91.1	84.4	81.0	79.5
Zinc	5 [AO]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW9 Jul-07	OW9 Dec-07	OW9 Jul-08	OW9 Dec-08	OW9 Jul-09	OW9 Nov-09	OW9 Mar-10	OW9 Dec-10	OW9 Jun-11	OW9 Oct-11	OW9 Jun-12	OW9 Oct-12	OW9 Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	111	107	106	111	108	113	106	103	105	103	103	105	102
Chloride	250 [AO]	3	3	2	2	2	2	6	2	1.6	1.7	1.6	1.7	1.4
Nitrate(as N)	10 (MAC) d	nd	nd	nd	0.1	nd	0.2	<0.1	<0.1	0.1	0.2	0.1	0.1	0.1
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	0.09	0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		0.14	0.07	nd	nd	0.06	0.44	<0.05	<0.05	0.06	<0.01	0.11	0.02	0.15
Total Kjeldahl Nitrogen(as N)		0.5	0.3	0.5	0.2	0.5	0.7	0.5	0.2	0.20	0.26	0.22	0.47	0.24
Phenols		nd	nd	nd	nd	nd	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	1.1	1.2	1.1	1.1	2	1.3	1.2	1.3	1.0	1.3	1.4	1.0	6.7
Conductivity (us/cm)		709	713	694	703	693	694	698	685	685	713	692	664	669
pH		8.1	8.2	8.1	8.1	7.9	7.8	8.0	8.01	7.86	7.92	8.06	8.02	8.00
Sulphate (as SO4)	250 (AO)	230	212	235	246	-	230	240	220	222	228	222	220	219
Hardness(as CaCO3)	80-100 [OG]	190	170	180	170	170	170	170	160	167	174	174	164	163
Aluminum	0.1 [OG]	0.008	nd	nd	nd	nd	nd	<0.005	<0.005	0.02	0.03	0.01	0.03	0.02
Arsenic	0.010 (IMAC)	0.005	0.003	0.003	0.003	0.003	0.005	0.004	0.004	0.0058	0.0052	0.0051	0.0038	0.0085
Barium	1 [MAC]	0.028	0.026	0.027	0.026	0.027	0.025	0.027	0.024	0.025	0.023	0.026	0.024	0.024
Boron	5 [IMAC]	0.48	0.48	0.47	0.47	0.047	0.47	0.45	0.44	0.486	0.452	0.502	0.440	0.459
Cadmium	0.005 (MAC)	0.0002	nd	0.0002	0.0002	0.0001	nd	0.0003	<0.0001	0.00009	<0.00002	0.00005	0.00008	0.00009
Calcium	-	41	37	39	37	37	37	37	36	36.4	38.3	37.8	35.9	35.3
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	nd	nd	0.001	nd	nd	nd	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0007
Iron	0.3 [AO]	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.024	<0.005	<0.005	<0.005	0.028
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	0.0006	<0.0005	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Magnesium	-	21	19	20	19	19	18	19	18	18.5	19.2	19.3	18.1	18.1
Manganese	0.05 [AO]	0.018	0.013	nd	nd	nd	0.02	0.045	0.008	0.017	0.013	0.014	0.014	0.016
Potassium	-	1.3	1.2	3	28	1.3	1.3	1.3	1.1	1.1	1.1	1.2	1.1	1.0
Sodium	200 [AO]	82	74	85	82	78	75	77	75	74.4	80.2	78.0	75.2	76.2
Zinc	5 [AO]	nd	nd	nd	0.008	nd	nd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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**GROUNDWATER CHEMICAL DATA (2007-Present)**  
**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW9 Nov-13	OW9 Jul-14	OW9 Nov-14	OW9 May-15	OW9 Oct-15	OW9 Jun-16	OW9 Nov-16	OW9 Jun-17	OW9 Oct-17	OW9 May-18	OW9 Oct-18	OW9 Jun-19	OW9 Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	104	100	103	98	103	106	105	106	102	97	122	97	94
Chloride	250 [AO]	1.5	1.6	1.4	2.02	2.14	1.3	1.1	1.4	2.5	1.9	1.3	1.7	<0.5
Nitrate(as N)	10 (MAC) d	<0.1	0.1	0.1	<0.25	<0.10	<0.1	0.1	<0.05	0.1	0.08	0.17	<0.05	<0.05
Nitrite(as N)	1 (MAC) d	0.1	0.1	<0.1	<0.25	<0.10	<0.1	0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05
Ammonia(as N)		0.46	0.07	0.19	0.06	0.10	0.11	0.08	<0.01	0.08	0.19	0.15	0.21	0.09
Total Kjeldahl Nitrogen(as N)		0.87	0.25	0.3	0.14	0.14	0.15	0.27	0.2	0.22	0.4	0.3	0.4	0.3
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	3.3	1.8	4.1	1.6	1.6	0.5	1.5	1.3	2.0	2.7	1.6	11.9	2.5
Conductivity (us/cm)		583	672	651	687	696	686	692	692	682	676	694	672	681
pH		8.03	8.06	8.06	8.15	7.81	8.02	7.95	8.10	8.06	8.18	7.86	7.94	7.83
Sulphate (as SO4)	250 (AO)	221	224	224	236	253	227	231	200	201	236	231	239	230
Hardness(as CaCO3)	80-100 [OG]	154	181	147	171	168	173	165	184	174	179	175	174	173
Aluminum	0.1 [OG]	0.02	0.02	0.01	<0.004	<0.004	0.02	0.03	0.01	0.03	0.04	0.04	0.03	0.03
Arsenic	0.010 (IMAC)	0.0089	0.0053	0.0052	0.004	0.005	0.0051	0.0030	0.00448	0.0036	0.0036	0.0041	0.0046	0.0034
Barium	1 [MAC]	0.023	0.025	0.020	0.021	0.022	0.024	0.023	0.024	0.023	0.024	0.023	0.021	0.022
Boron	5 [IMAC]	0.433	0.497	0.388	0.450	0.462	0.440	0.429	0.493	0.487	0.449	0.458	0.468	0.435
Cadmium	0.005 (MAC)	0.00004	0.00009	0.00006	<0.001	<0.001	0.00010	0.00009	0.0001	0.000101	0.000104	0.000023	0.000052	0.000099
Calcium	-	33.4	40.3	31.8	37.7	36.9	37.3	35.6	40.1	37.2	39.3	38.9	37.4	36.2
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Copper	1 [AO]	<0.002	0.0006	<0.002	<0.003	<0.003	<0.002	0.0004	<0.002	<0.002	<0.002	<0.002	0.0012	<0.002
Iron	0.3 [AO]	0.025	0.007	<0.005	<0.010	<0.010	<0.005	<0.005	<0.005	0.006	0.023	0.024	<0.005	<0.005
Lead	0.01 (MAC)c	<0.00002	<0.00002	<0.00002	<0.002	<0.002	<0.00002	<0.00002	<0.00005	<0.00002	0.00004	0.00005	0.00003	0.00004
Magnesium	-	17.2	19.5	16.4	18.6	18.5	19.4	18.4	20.5	19.6	19.6	19.0	19.5	20.0
Manganese	0.05 [AO]	0.024	0.018	0.012	0.014	0.015	0.014	0.013	0.016	0.014	0.016	0.017	0.016	0.011
Potassium	-	1.0	1.2	0.9	1.20	1.22	1.1	1.0	1.1	1.1	1.0	1.0	1.0	1.1
Sodium	200 [AO]	69.4	79.5	65.1	76.5	79.1	75.6	73.2	83.0	80.4	81.2	81.0	80.0	78.0
Zinc	5 [AO]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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**GROUNDWATER CHEMICAL DATA (2007-Present)**  
**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW9 Jul-20	OW9 Nov-20	OW9 Jun-21	OW9 Nov-21	OW9 May-22	OW9 Nov-22
Alkalinity(as CaCO3)	30 - 500 [OG]	101	90	98	100	102	99
Chloride	250 [AO]	2.2	2.4	2.5	1.9	1.7	2.0
Nitrate(as N)	10 (IMAC) d	0.27	0.09	0.17	0.12	0.3	0.09
Nitrite(as N)	1 (MAC) d	<0.05	0.07	<0.05	<0.05	<0.1	<0.05
Ammonia(as N)		0.10	0.05	0.01	0.06	0.05	0.05
Total Kjeldahl Nitrogen(as N)		0.3	0.2	0.1	0.4	0.2	0.1
Phenols		<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	1.7	1.1	1.5	1.3	2.3	1.0
Conductivity (us/cm)		674	677	678	689	675	676
pH		8.05	8.05	8.13	7.59	7.98	7.91
Sulphate (as SO4)	250 (AO)	234	228	246	240	229	233
Hardness(as CaCO3)	80-100 [OG]	174	171	189	174	161	166
Aluminum	0.1 [OG]	0.01	0.02	0.03	<0.01	<0.01	<0.01
Arsenic	0.010 (IMAC)	0.0037	0.0046	0.0032	0.0036	0.0071	0.0038
Barium	1 [MAC]	0.025	0.022	0.024	0.023	0.023	0.022
Boron	5 [IMAC]	0.486	0.486	0.523	0.492	0.490	0.489
Cadmium	0.005 (MAC)	0.000063	0.000080	0.000069	0.000090	0.000081	0.000067
Calcium	-	37.2	37.1	41.3	36.8	33.9	35.1
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001
Copper	1 [AO]	<0.002	0.0008	0.008	<0.002	<0.002	0.0008
Iron	0.3 [AO]	<0.005	0.010	0.006	0.016	<0.005	<0.005
Lead	0.01 (MAC)c	<0.00002	0.00003	0.00007	<0.00002	0.00007	0.00002
Magnesium	-	19.8	19.0	20.8	20.0	18.6	19.0
Manganese	0.05 [AO]	0.014	0.012	0.002	0.009	0.005	0.013
Potassium	-	1.3	1.1	1.2	1.3	1.1	1.2
Sodium	200 [AO]	78.2	74.7	83.3	78.2	73.3	75.1
Zinc	5 [AO]	<0.005	<0.005	0.005	<0.005	<0.005	<0.005

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GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW10S Jul-07	OW10S Dec-07	OW10S Jul-08	OW10S Dec-08	OW10S Jul-09	OW10S Nov-09	OW10S Mar-10	OW10S Dec-10	OW10S Jun-11	OW10S Oct-11	OW10S Jun-12	OW10S Oct-12	OW10S Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	275	281	267	275	266	270	267	269	258	262	259	264	256
Chloride	250 [AO]	2	3	2	2	2	2	3	1	1.2	1.1	1.3	1.0	1.1
Nitrate(as N)	10 (IMAC) d	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.1	0.1	0.1	0.1	0.3
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	nd	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		0.08	0.09	0.05	0.05	0.06	nd	<0.05	<0.05	<0.01	<0.01	0.03	<0.01	<0.01
Total Kjeldahl Nitrogen(as N)		0.2	0.4	0.4	0.5	0.4	1	0.7	<0.5	0.22	0.38	0.07	0.20	0.22
Phenols		nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	1.1	1.1	1	1	0.9	1.4	1.0	1.0	0.9	1.2	0.8	2.2	8.6
Conductivity (us/cm)		884	896	843	842	820	817	802	819	812	912	869	876	860
pH		8.2	8.2	8	8	8	7.9	8.0	8.00	7.72	7.74	8.08	7.95	7.83
Sulphate (as SO4)	250 (AO)	218	199	175	202	-	180	180	170	195	218	214	245	219
Hardness(as CaCO3)	80-100 [OG]	480	390	410	410	380	370	360	370	404	430	419	415	394
Aluminum	0.1 [OG]	0.009	nd	nd	nd	nd	nd	<0.005	<0.005	0.03	0.05	0.02	0.04	0.03
Arsenic	0.010 (IMAC)	nd	nd	nd	nd	nd	nd	<0.001	<0.001	0.0007	0.0006	0.0005	0.0007	0.0008
Barium	1 [MAC]	0.028	0.029	0.03	0.03	0.027	0.029	0.028	0.029	0.029	0.031	0.032	0.033	0.029
Boron	5 [IMAC]	0.35	0.36	0.32	0.36	0.31	0.35	0.31	0.35	0.331	0.366	0.352	0.358	0.323
Cadmium	0.005 (MAC)	0.0013	0.001	0.0024	0.0005	0.0003	nd	<0.0001	<0.0001	0.00006	<0.00002	<0.00002	0.00008	0.00008
Calcium	-	96	82	83	83	78	78	74	75	82.3	88.7	85.6	86.0	80.6
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	nd	nd	nd	0.001	nd	0.001	0.002	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0008
Iron	0.3 [AO]	nd	nd	nd	nd	nd	nd	<0.1	<0.1	<0.005	0.006	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	<0.00002	<0.00002	<0.00002	0.00003	0.00002
Magnesium	-	58	46	49	48	46	44	42	43	48.2	50.7	49.9	48.8	46.7
Manganese	0.05 [AO]	0.099	0.062	nd	nd	0.097	0.024	0.002	0.011	0.002	0.014	0.003	0.004	<0.001
Potassium	-	2.3	2.1	2	3.6	1.9	1.9	1.7	1.8	1.8	2.1	1.9	2.1	1.6
Sodium	200 [AO]	47	37	41	44	40	38	40	38	42.1	45.3	41.7	43.4	41.7
Zinc	5 [AO]	nd	nd	nd	0.01	nd	nd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW10S Nov-13	OW10S Jul-14	OW10S Dec-14	OW10S May-15	OW10S DUP1 May-15	OW10S Oct-15	OW10S Jun-16	OW10S Nov-16	OW10S Jun-17	OW10S Oct-17	OW10S May-18	OW10S Oct-18	OW10S Jun-19
Alkalinity(as CaCO3)	30 - 500 [OG]	261	247	254	242	246	260	255	260	255	251	241	249	234
Chloride	250 [AO]	1.1	1.1	1.6	1.49	1.52	2.40	<0.5	0.7	0.8	2.2	1.4	0.8	1.1
Nitrate(as N)	10 (MAC) d	0.1	0.3	0.1	<0.25	0.25	<0.25	0.3	0.3	0.25	0.2	0.27	0.15	0.25
Nitrite(as N)	1 (MAC) d	0.2	<0.1	<0.1	<0.25	<0.25	<0.25	<0.1	0.3	<0.05	0.1	<0.05	<0.05	<0.05
Ammonia(as N)		<0.01	<0.01	0.06	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	0.05	0.03	0.04
Total Kjeldahl Nitrogen(as N)		0.37	0.12	<0.1	0.11	0.13	<0.10	0.17	0.09	<0.1	0.16	0.3	0.2	0.2
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	3.4	2.2	3.3	1.8	1.2	1.2	<0.2	1.2	0.8	2.3	2.2	1.5	2.4
Conductivity (us/cm)		764	859	837	859	855	873	829	873	844	821	823	840	792
pH		8.07	7.99	8.06	8.34	8.46	8.09	8.14	8.04	8.09	8.14	8.13	8.05	8.12
Sulphate (as SO4)	250 (AO)	220	221	206	228	228	237	206	219	177	175	205	197	198
Hardness(as CaCO3)	80-100 [OG]	371	398	373	384	391	397	387	381	417	379	397	383	371
Aluminum	0.1 [OG]	0.04	0.02	0.02	<0.004	<0.004	<0.004	0.02	0.02	0.03	0.06	0.06	0.06	0.05
Arsenic	0.010 (IMAC)	0.0006	0.0003	0.0004	<0.003	<0.003	<0.003	0.0003	0.0003	<0.0007	0.0004	<0.0001	0.0004	0.0003
Barium	1 [MAC]	0.030	0.019	0.028	0.026	0.026	0.038	0.026	0.029	0.028	0.029	0.027	0.029	0.024
Boron	5 [IMAC]	0.366	0.332	0.355	0.317	0.301	0.468	0.307	0.360	0.329	0.400	0.297	0.375	0.322
Cadmium	0.005 (MAC)	0.00003	<0.00002	<0.00002	<0.001	<0.001	<0.001	0.00005	0.00004	<0.0001	0.000027	0.000019	0.000029	0.000019
Calcium	-	76.2	81.0	76.6	78.9	81.3	81.9	78.2	76.7	85.1	75.0	81.2	78.2	74.0
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001
Copper	1 [AO]	<0.002	0.0005	0.0002	<0.003	<0.003	<0.003	<0.002	0.0008	<0.002	<0.002	<0.002	<0.002	0.0015
Iron	0.3 [AO]	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010	<0.005	<0.005	<0.005	<0.005	0.043	0.036	<0.005
Lead	0.01 (MAC)c	<0.00002	<0.00002	<0.00002	<0.002	<0.002	<0.002	<0.00002	<0.00002	<0.00005	<0.00002	<0.00002	0.00003	0.00004
Magnesium	-	43.9	47.6	44.1	45.3	45.6	46.7	46.7	46.0	49.7	46.5	47.1	45.7	45.2
Manganese	0.05 [AO]	0.007	<0.001	0.003	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001
Potassium	-	1.7	1.8	1.7	1.72	1.76	2.07	1.6	1.8	1.8	1.9	1.7	1.9	1.6
Sodium	200 [AO]	41.2	41.5	41.5	38.8	40.0	42.9	42.7	42.3	44.7	44.9	43.9	45.4	42.6
Zinc	5 [AO]	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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**TABLE E-2**  
**GROUNDWATER CHEMICAL DATA (2007-Present)**  
**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW10S Nov-19	OW10S Jul-20	OW10S Nov-20	OW10S Jun-21	OW10S Nov-21	OW10S May-22	OW10S Nov-22
Alkalinity(as CaCO3)	30 - 500 [OG]	238	245	237	244	250	253	257
Chloride	250 [AO]	<0.5	1.2	1.8	1.9	1.0	1.0	1.4
Nitrate(as N)	10 (MAC) d	0.11	0.30	0.26	0.32	0.12	0.5	0.22
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05
Ammonia(as N)		0.01	0.07	0.02	0.03	0.04	<0.01	<0.01
Total Kjeldahl Nitrogen(as N)		0.1	<0.1	<0.1	0.4	1.5	0.2	0.2
Phenols		<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	3.2	1.3	1.6	1.8	1.2	3.0	0.7
Conductivity (us/cm)		821	785	824	804	806	780	813
pH		8.01	8.01	7.93	8.12	7.74	8.08	7.92
Sulphate (as SO4)	250 (AO)	195	192	197	198	184	178	189
Hardness(as CaCO3)	80-100 [OG]	375	368	385	417	385	355	370
Aluminum	0.1 [OG]	0.06	0.04	0.05	0.06	0.03	0.05	0.03
Arsenic	0.010 (IMAC)	0.0002	0.0003	0.0002	0.0002	0.0002	0.0004	0.0003
Barium	1 [MAC]	0.025	0.028	0.028	0.030	0.028	0.024	0.030
Boron	5 [IMAC]	0.316	0.333	0.379	0.341	0.39	0.341	0.379
Cadmium	0.005 (MAC)	<0.000015	0.000017	0.000020	<0.000015	0.000016	0.000024	0.000016
Calcium	-	73.6	71.8	78.9	85.1	76.0	69.4	73.3
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001
Copper	1 [AO]	0.002	<0.002	0.0009	0.011	<0.002	<0.002	0.0006
Iron	0.3 [AO]	<0.005	0.014	0.010	0.008	0.007	0.045	0.019
Lead	0.01 (MAC)c	<0.00002	0.00003	0.00004	0.00009	0.00005	0.00011	0.00003
Magnesium	-	46.5	45.8	45.6	49.7	47.4	44.3	45.5
Manganese	0.05 [AO]	<0.001	<0.001	0.001	<0.001	<0.001	0.002	0.001
Potassium	-	1.8	1.8	1.9	1.9	2.2	1.7	2.0
Sodium	200 [AO]	40.1	41.6	40.1	44.3	41.7	40.3	40.2
Zinc	5 [AO]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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**TABLE E-2**  
**GROUNDWATER CHEMICAL DATA (2007-Present)**  
**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW10D Jul-07	OW10D Dec-07	OW10D Jul-08	OW10D Dec-08	OW10D Jul-09	OW10D Nov-09	OW10D Mar-10	OW10D Dec-10	OW10D Jun-11	OW10D Oct-11	OW10D Jun-12	OW10D Oct-12	OW10D Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	193	280	202	204	205	204	235	245	255	238	193	215	229
Chloride	250 [AO]	3	3	6	4	5	5	11	10	8.1	7.9	3.4	5.6	7.6
Nitrate(as N)	10 (IMAC) d	nd	nd	0.3	0.3	0.1	0.5	2.4	3.0	2.0	2.4	0.3	1.3	1.6
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	nd	0.02	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		nd	0.07	0.09	nd	0.09	nd	<0.05	<0.05	<0.01	<0.01	0.08	<0.01	<0.01
Total Kjeldahl Nitrogen(as N)		0.2	0.6	0.2	0.3	1.2	1	0.4	<0.5	0.26	0.17	0.09	0.07	0.10
Phenols		nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	0.5	1	0.5	0.5	7.9	0.5	0.7	0.8	0.5	1.2	0.7	1.2	4.7
Conductivity (us/cm)		563	894	583	591	573	576	616	631	620	647	565	569	590
pH		8.2	8.2	8.1	8.2	8	8	8.0	8.00	7.73	6.90	8.06	7.99	7.80
Sulphate (as SO4)	250 (AO)	98	203	94	105	-	90	74	63	79	78	106	91	81
Hardness(as CaCO3)	80-100 [OG]	220	300	210	220	210	210	270	270	275	271	214	227	245
Aluminum	0.1 [OG]	0.04	nd	nd	nd	nd	nd	<0.005	<0.005	0.03	0.04	0.02	0.03	0.03
Arsenic	0.010 (IMAC)	nd	nd	nd	nd	nd	nd	<0.001	<0.001	0.0005	0.0002	0.0003	0.0004	0.0005
Barium	1 [MAC]	0.11	0.069	0.11	0.09	0.1	0.1	0.12	0.12	0.125	0.119	0.111	0.111	0.122
Boron	5 [IMAC]	0.16	0.25	0.14	0.17	0.14	0.13	0.087	0.053	0.097	0.054	0.163	0.110	0.093
Cadmium	0.005 (MAC)	0.0005	0.0002	0.0001	0.0005	0.0006	nd	<0.0001	<0.0001	0.00004	<0.00002	<0.00002	0.00002	0.00006
Calcium	-	48	61	49	47	47	46	63	67	64.8	63.4	47.0	50.6	57.3
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	nd	nd	0.001	0.001	nd	0.001	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0005
Iron	0.3 [AO]	nd	nd	nd	nd	nd	nd	<0.1	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00008	<0.00002	<0.00002	<0.00002	<0.00002
Magnesium	-	24	35	22	24	23	23	26	26	27.5	27.3	23.6	24.3	24.6
Manganese	0.05 [AO]	0.011	0.053	0.004	nd	0.01	0.043	0.020	0.022	0.025	0.022	0.016	0.021	0.017
Potassium	-	1.4	1.7	1.4	1.4	1.4	1.3	1.4	1.3	1.4	1.3	1.2	1.2	1.2
Sodium	200 [AO]	31	38	25	30	27	24	17	13	19.0	16.9	25.3	21.1	17.4
Zinc	5 [AO]	nd	nd	nd	nd	0.001	nd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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**GROUNDWATER CHEMICAL DATA (2007-Present)**  
**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW10D Nov-13	OW10D Jul-14	OW10D Dec-14	OW10D May-15	OW10D Oct-15	OW10D Jun-16	OW10D Nov-16	OW10D Jun-17	OW10D Oct-17	OW10D May-18	OW10D Oct-18	OW10D Jun-19	OW10D Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	237	229	237	211	202	231	187	216	215	199	191	214	226
Chloride	250 [AO]	7.6	4.9	10.1	7.34	5.01	6.6	2.8	5.8	5.5	6.2	4.0	8.5	9.8
Nitrate(as N)	10 (MAC) d	2.2	0.8	2.5	1.33	0.66	1.4	0.2	1.06	1.4	0.75	0.52	1.74	2.83
Nitrite(as N)	1 (MAC) d	<0.1	<0.1	<0.1	<0.25	<0.10	<0.1	0.2	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05
Ammonia(as N)		<0.01	<0.01	0.03	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	0.05	0.030	0.04	<0.01
Total Kjeldahl Nitrogen(as N)		0.08	0.22	<0.1	<0.10	<0.10	0.07	<0.05	0.2	0.27	0.2	<0.1	0.1	<0.1
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	2.7	2.2	1.8	1.5	1.0	<0.2	1.0	0.8	1.8	0.9	1.3	1.3	2.3
Conductivity (us/cm)		537	569	597	589	584	605	563	589	592	579	582	592	620
pH		7.99	8.04	8.01	8.41	7.99	8.07	8.06	8.11	8.08	8.15	7.94	8.11	7.92
Sulphate (as SO4)	250 (AO)	77	95	84	84.0	101	85	112	70	69	88	98	76	65
Hardness(as CaCO3)	80-100 [OG]	248	240	253	234	217	257	195	254	242	240	207	266	256
Aluminum	0.1 [OG]	0.04	0.02	0.03	0.008	<0.004	0.02	0.02	0.02	0.04	0.04	0.04	0.04	0.05
Arsenic	0.010 (IMAC)	0.0003	0.0003	<0.0001	<0.003	<0.003	0.0002	0.0003	<0.0007	0.0003	<0.0001	0.0004	0.0003	0.0003
Barium	1 [MAC]	0.121	0.110	0.119	0.104	0.094	0.124	0.097	0.121	0.116	0.111	0.102	0.121	0.109
Boron	5 [IMAC]	0.072	0.137	0.070	0.110	0.150	0.094	0.156	0.111	0.119	0.117	0.162	0.083	0.045
Cadmium	0.005 (MAC)	<0.00002	<0.00002	<0.00002	<0.001	<0.001	0.00004	0.00002	<0.0001	0.000018	<0.000015	<0.000015	<0.000015	<0.000015
Calcium	-	58.9	55.7	60.2	54.8	48.8	59.5	41.0	58.2	54.2	54.5	45.1	62.8	57.9
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	0.004	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Copper	1 [AO]	<0.002	0.0003	0.0001	<0.003	<0.003	<0.002	0.0003	<0.002	<0.002	0.002	<0.002	0.0005	<0.002
Iron	0.3 [AO]	<0.005	<0.005	<0.005	<0.010	<0.010	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	<0.00002	<0.00002	<0.00002	<0.002	<0.002	<0.00002	<0.00002	<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Magnesium	-	24.6	24.6	24.8	23.5	23.2	26.3	22.5	26.4	25.8	25.3	23.0	26.5	27.1
Manganese	0.05 [AO]	0.021	0.023	0.022	0.015	0.058	0.014	0.022	0.029	0.031	0.013	0.024	0.017	0.015
Potassium	-	1.1	1.2	1.1	1.28	1.32	1.2	1.1	1.3	1.2	1.3	1.1	1.2	1.1
Sodium	200 [AO]	14.1	23.3	14.0	19.0	24.5	20.7	27.3	21.6	20.5	23.9	28.3	16.4	15.9
Zinc	5 [AO]	<0.005	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

NOTES:

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**TABLE E-2**  
**GROUNDWATER CHEMICAL DATA (2007-Present)**  
**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW10D Jul-20	OW10D Nov-20	OW10D Jun-21	OW10D Nov-21	OW10D May-22	OW10D Nov-22
Alkalinity(as CaCO3)	30 - 500 [OG]	200	165	183	231	201	185
Chloride	250 [AO]	6.2	3.6	4.4	10.1	5.1	3.6
Nitrate(as N)	10 (MAC) d	0.78	<0.05	0.17	2.59	0.4	0.21
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05
Ammonia(as N)		0.03	<0.01	0.02	<0.01	<0.01	<0.01
Total Kjeldahl Nitrogen(as N)		<0.1	<0.1	0.2	0.2	0.1	<0.1
Phenols		<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	1.5	1.4	3.1	1.3	1.3	0.4
Conductivity (us/cm)		566	551	559	621	566	561
pH		8.01	8.08	8.10	8.06	8.06	7.98
Sulphate (as SO4)	250 (AO)	91	108	103	70	94	104
Hardness(as CaCO3)	80-100 [OG]	231	207	244	278	223	212
Aluminum	0.1 [OG]	0.01	0.03	0.03	0.02	0.01	0.01
Arsenic	0.010 (IMAC)	0.0003	0.0005	0.0004	0.0003	0.0004	0.0004
Barium	1 [MAC]	0.115	0.097	0.113	0.125	0.104	0.100
Boron	5 [IMAC]	0.135	0.181	0.177	0.079	0.152	0.175
Cadmium	0.005 (MAC)	<0.000015	0.000018	0.000066	0.000015	<0.000015	<0.000015
Calcium	-	51.0	44.0	53.8	64.3	48.4	44.3
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001
Copper	1 [AO]	<0.002	0.0006	<0.002	<0.002	<0.002	0.0006
Iron	0.3 [AO]	<0.005	0.007	<0.005	<0.005	0.005	<0.005
Lead	0.01 (MAC)c	<0.00002	0.00003	<0.00002	0.00003	0.00005	0.00003
Magnesium	-	25.2	23.6	26.6	28.6	24.7	24.7
Manganese	0.05 [AO]	0.019	0.015	0.029	0.018	0.015	0.020
Potassium	-	1.4	1.1	1.3	1.5	1.4	1.3
Sodium	200 [AO]	22.2	27.5	28.7	14.4	24.0	26.0
Zinc	5 [AO]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

NOTES:

1. All results expresses in mg/L unless otherwise noted.
2. ODWQS is the Ontario Drinking Water Quality Standards, MOE, revised 2006.
3. MAC maximum acceptable concentration ODWQS.
4. IMAC indicates an interim maximum acceptable concentration ODWQS.
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**TABLE E-2  
GROUNDWATER CHEMICAL DATA (2007-Present)  
HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW11 Jul-07	OW11 Dec-07	OW11 Jul-08	OW11 Dec-08	OW11 Jul-09	OW11 Nov-09	OW11 Mar-10	OW11 Dec-10	OW11 Jun-11	OW11 Oct-11	OW11 Jun-12	OW11 Oct-12	OW11 Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	1010	1090	967	1010	844	986	1070	1080	961	1170	1050	1120	1070
Chloride	250 [AO]	100	130	93	90	76	120	95	88	54.3	73.2	65.7	68.8	53.1
Nitrate(as N)	10 (MAC) d	nd	nd	nd	nd	nd	nd	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	nd	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		27.6	53	26	22	16	21	31	44	27.4	45.7	33.3	37.5	26.8
Total Kjeldahl Nitrogen(as N)		24	46	22	20	18	23	35	43	34.1	45.8	39.8	51.3	29.6
Phenols		0.006	0.007	0.005	0.001	0.008	0.007	0.003	0.010	0.008	0.011	0.007	0.011	0.005
Dissolved Organic Carbon(DOC)	5 [AO]	11.9	21.2	11.3	11.4	114	11.6	13.0	17.3	13.3	14.9	13.9	17.5	24.0
Conductivity (us/cm)		2040	2210	2090	2020	2100	2130	2190	2230	2080	2250	2030	2010	1930
pH		7.7	7.5	7.3	7.5	7.4	7.3	7.3	7.15	7.00	7.84	7.15	7.17	7.00
Sulphate (as SO4)	250 (AO)	109	2	123	82	-	58	59	39	102	8	31	9	69
Hardness(as CaCO3)	80-100 [OG]	1100	950	1000	1000	1100	1000	920	920	1050	1000	933	1030	918
Aluminum	0.1 [OG]	0.007	0.009	0.006	nd	0.006	nd	0.006	0.008	0.05	0.06	0.05	0.06	0.05
Arsenic	0.010 (IMAC)	0.021	0.098	0.015	0.012	0.006	0.013	0.360	0.390	0.674	0.771	0.419	0.296	0.25
Barium	1 [MAC]	0.23	0.22	0.25	0.2	0.25	0.28	0.21	0.170	0.155	0.166	0.150	0.165	0.171
Boron	5 [IMAC]	0.26	0.45	0.21	0.22	0.17	0.29	0.32	0.40	0.316	0.395	0.318	0.368	0.292
Cadmium	0.005 (MAC)	0.0025	nd	nd	nd	nd	nd	0.0003	<0.0001	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Calcium	-	220	170	210	210	240	190	180	170	183	182	163	202	175
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	nd	nd	nd	nd	nd	nd	0.001	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0006
Iron	0.3 [AO]	17	31	12	4.4	14	8.1	3.3	31	33.1	31.6	29.5	35.4	29.2
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00008	0.00006	0.00007	0.00006	0.00004
Magnesium	-	140	130	120	120	130	120	120	120	145	134	128	127	117
Manganese	0.05 [AO]	0.24	0.16	0.27	0.25	0.31	0.18	0.190	0.140	0.187	0.154	0.173	0.136	0.173
Potassium	-	20	30	17	16	13	18	19	23	20.8	24.8	18.5	20.8	15.0
Sodium	200 [AO]	68	92	62	66	49	69	78	87	76.8	85.4	61.9	70	60.3
Zinc	5 [AO]	nd	nd	0.006	0.007	0.008	0.001	0.006	0.007	<0.005	0.008	0.009	0.007	<0.005

NOTES:

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**TABLE E-2**  
**GROUNDWATER CHEMICAL DATA (2007-Present)**  
**HURON LANDFILL SITE**

Chemical Parameter	ODWQS	OW11 Nov-13	OW11 Jul-14	OW11 Nov-14	OW11 May-15	OW11 Oct-15	OW11 Jun-16	OW11 Nov-16	OW11 Jun-17	OW11 Oct-17	OW11 May-18	OW11 Oct-18	OW11 Jun-19	OW11 Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	1080	2170	2370	1960	1740	1630	1410	1120	1220	1130	1080	987	982
Chloride	250 [AO]	90.4	268	280	261	211	185	197	173	180	307	223	289	258
Nitrate(as N)	10 (MAC) d	<0.1	<0.1	<0.1	<2.5	<1.0	0.1	0.1	0.08	<0.1	<0.5	<0.05	<0.05	<0.05
Nitrite(as N)	1 (MAC) d	<0.1	<1	<0.1	<2.5	<1.0	<0.1	<0.1	<0.05	<0.1	<0.5	0.10	<0.05	<0.05
Ammonia(as N)		38.9	88.5	106	91.7	66.8	46.3	49.8	52.2	44.9	59.1	58.2	54.8	52.3
Total Kjeldahl Nitrogen(as N)		44.2	107	111	110	71.0	58.6	51.6	56.5	53.0	59.1	62.9	49.6	52.0
Phenols		0.005	0.721	0.583	0.168	0.012	0.008	0.006	0.009	0.009	0.009	0.03	0.007	0.009
Dissolved Organic Carbon(DOC)	5 [AO]	28	650	230	90.3	48.5	17.2	14.5	17.0	21.3	19.5	17.1	16.1	10.9
Conductivity (us/cm)		1800	5280	4930	4030	3500	2850	2790	2730	2700	2510	2700	2550	2520
pH		7.14	7.18	7.27	7.65	7.80	7.43	7.48	7.40	8.26	7.39	7.47	7.46	7.41
Sulphate (as SO4)	250 (AO)	21	171	<1	<5.0	9.2	8	4	2	2	<10	<1	2	3
Hardness(as CaCO3)	80-100 [OG]	807	2410	1790	1640	1230	1180	998	1120	1070	1040	970	989	953
Aluminum	0.1 [OG]	0.06	0.12	0.11	0.041	0.011	0.06	0.06	0.07	0.11	0.11	0.09	0.09	0.09
Arsenic	0.010 (IMAC)	0.222	0.122	<0.1	0.030	0.035	0.0362	0.0307	0.0317	0.0260	0.0385	0.0211	0.0147	0.0177
Barium	1 [MAC]	0.144	0.412	0.204	0.284	0.177	0.159	0.169	0.172	0.220	0.21	0.201	0.199	0.227
Boron	5 [IMAC]	0.370	2.60	2.17	1.86	1.42	0.975	0.879	0.967	0.982	0.836	0.834	0.734	0.780
Cadmium	0.005 (MAC)	<0.00002	0.00026	<0.00002	<0.001	<0.001	<0.00002	<0.00002	<0.0001	<0.000014	<0.000015	<0.000015	<0.000015	<0.000070
Calcium	-	149	691	505	435	289	251	203	222	208	195	184	182	169
Chromium	0.05 (MAC)	<0.002	0.017	0.009	0.016	0.010	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.003
Copper	1 [AO]	<0.002	0.0032	<0.002	<0.003	<0.003	<0.002	0.0008	<0.002	<0.002	<0.002	<0.002	0.0012	0.011
Iron	0.3 [AO]	33.3	9.79	8.53	24.2	29.6	46.3	33.5	44.9	36.4	36.1	36.2	30.1	29.6
Lead	0.01 (MAC)c	0.00004	0.00121	0.00042	<0.002	<0.002	0.00003	<0.00002	0.00009	<0.00002	0.00003	0.00003	0.00004	<0.0001
Magnesium	-	106	166	129	135	123	135	119	137	133	134	124	130	129
Manganese	0.05 [AO]	0.144	1.09	0.614	0.614	0.374	0.315	0.246	0.308	0.367	0.294	0.224	0.243	0.213
Potassium	-	17.3	144	125	116	90.4	55.9	50.2	53.2	55.0	50.7	49.1	42.8	45.9
Sodium	200 [AO]	74.3	308	257	259	196	128	111	131	131	137	129	122	116
Zinc	5 [AO]	<0.005	0.013	0.008	0.024	0.010	<0.005	<0.005	0.011	0.014	0.008	<0.005	0.005	<0.005

NOTES:

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**TABLE E-2**  
**GROUNDWATER CHEMICAL DATA (2007-Present)**  
**HURON LANDFILL SITE**

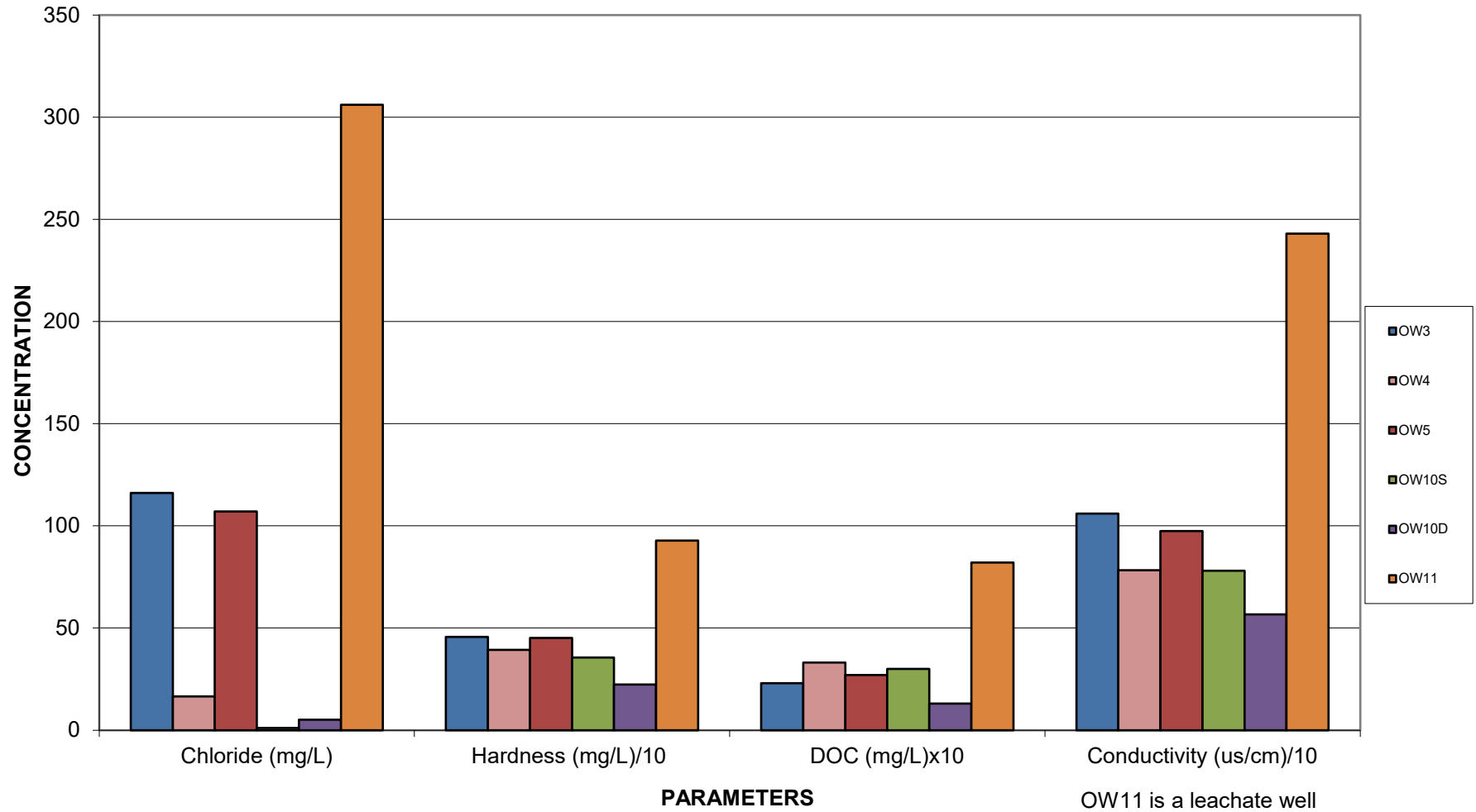
Chemical Parameter	ODWQS	OW11 Jul-20	OW11 Nov-20	OW11 Jun-21	OW11 Nov-21	OW11 May-22	OW11 Nov-22
Alkalinity(as CaCO3)	30 - 500 [OG]	991	858	859	917	916	894
Chloride	250 [AO]	260	287	308	306	306	300
Nitrate(as N)	10 (MAC) d	0.07	<0.05	0.21	<0.05	<1	<0.5
Nitrite(as N)	1 (MAC) d	0.16	<0.05	<0.05	<0.05	<1	<0.5
Ammonia(as N)		56.4	30.9	44.8	32.9	49.2	40.0
Total Kjeldahl Nitrogen(as N)		66.1	39.7	43.3	47.8	53.6	45.9
Phenols		0.003	<0.002	0.002	0.002	0.002	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	14.9	14.6	11.1	7.6	8.2	5.1
Conductivity (us/cm)		2490	2450	2450	2480	2430	2420
pH		7.25	7.27	7.55	7.52	7.45	7.31
Sulphate (as SO4)	250 (AO)	2	2	3	2	<10	<10
Hardness(as CaCO3)	80-100 [OG]	988	965	962	999	928	942
Aluminum	0.1 [OG]	0.22	0.09	0.11	0.06	0.06	0.05
Arsenic	0.010 (IMAC)	0.0110	0.0050	0.0010	0.0034	0.0027	0.0023
Barium	1 [MAC]	0.233	0.287	0.247	0.338	0.244	0.257
Boron	5 [IMAC]	0.729	0.565	0.559	0.551	0.554	0.505
Cadmium	0.005 (MAC)	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070
Calcium	-	177	179	176	177	165	174
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	0.001
Copper	1 [AO]	<0.002	0.0019	<0.002	<0.002	<0.002	0.0007
Iron	0.3 [AO]	35.3	0.036	12.9	11.6	14.6	12.0
Lead	0.01 (MAC)c	0.00081	0.00380	<0.0001	<0.0001	0.00023	<0.0001
Magnesium	-	133	126	127	135	125	123
Manganese	0.05 [AO]	0.24	0.182	0.260	0.195	0.226	0.241
Potassium	-	42.7	28.1	29.3	27.2	30.1	27.0
Sodium	200 [AO]	111	111	117	113	111	106
Zinc	5 [AO]	0.007	0.016	<0.005	<0.005	<0.005	<0.005

NOTES:

1. All results expresses in mg/L unless otherwise noted.
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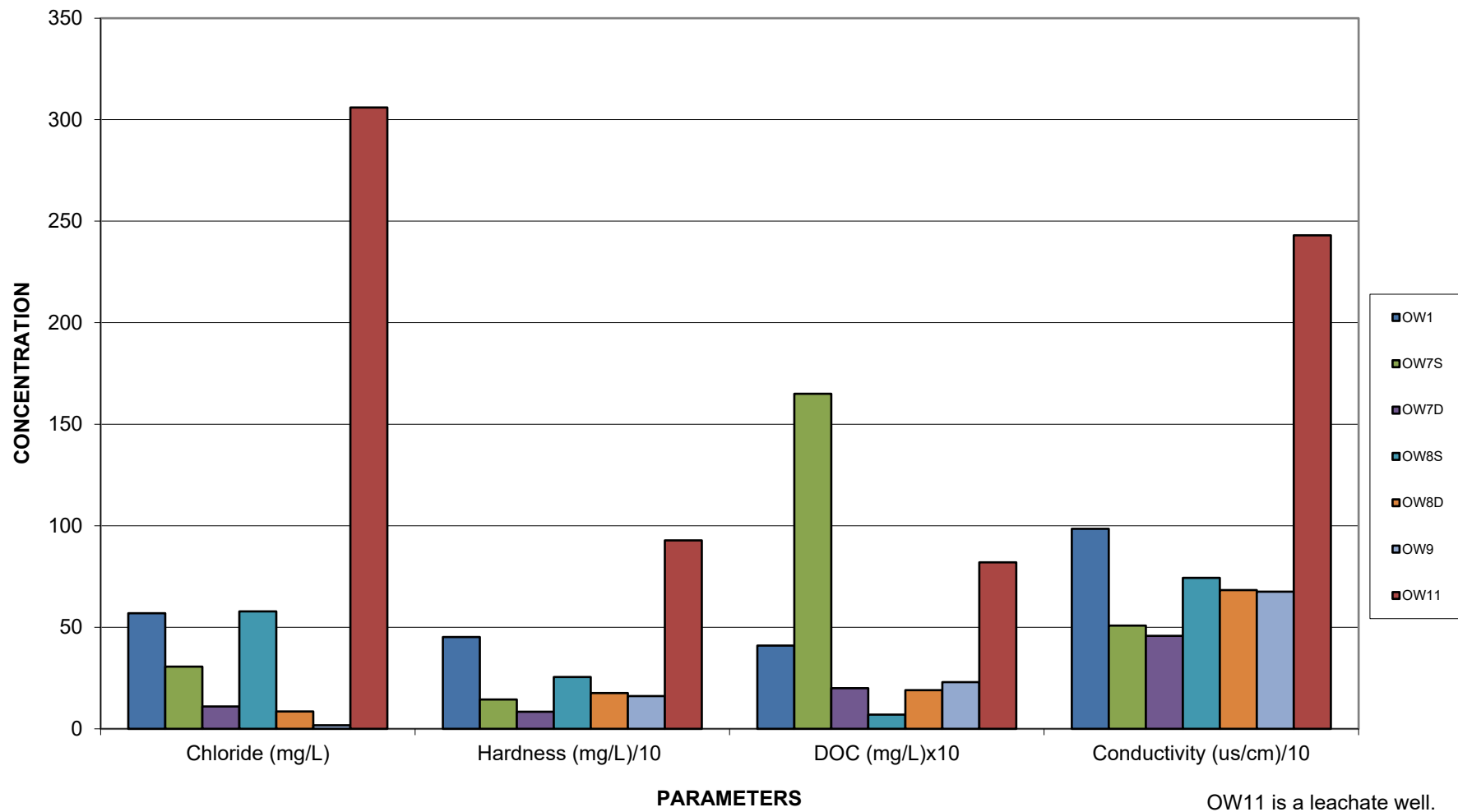
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**FIGURE E-1  
INDICATOR PARAMETERS - UPGRADIENT & CROSS-GRADIENT WELLS - SPRING  
HURON LANDFILL**

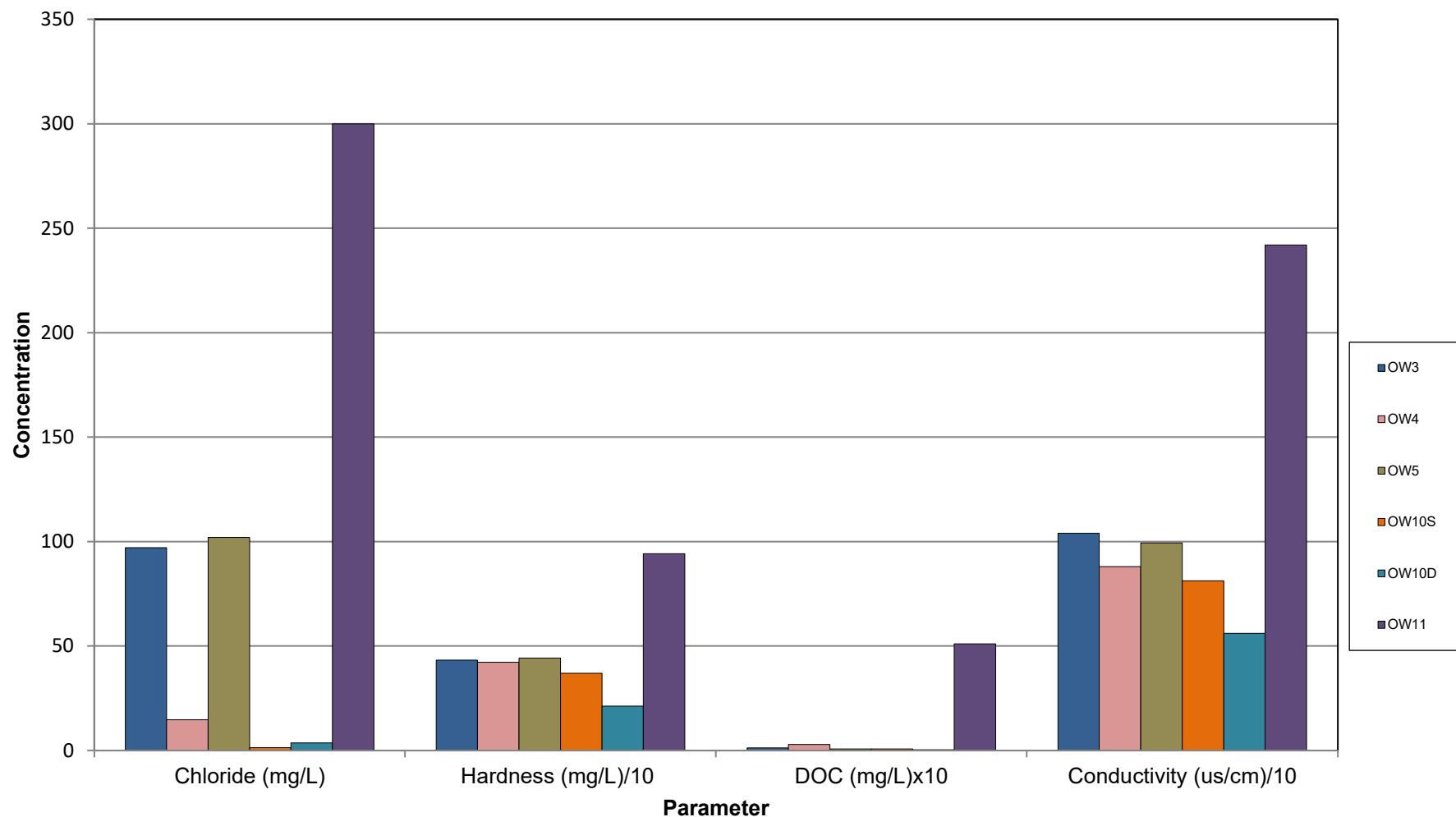




**FIGURE E-2  
INDICATOR PARAMETERS - DOWNGRADIENT WELLS - SPRING  
HURON LANDFILL**

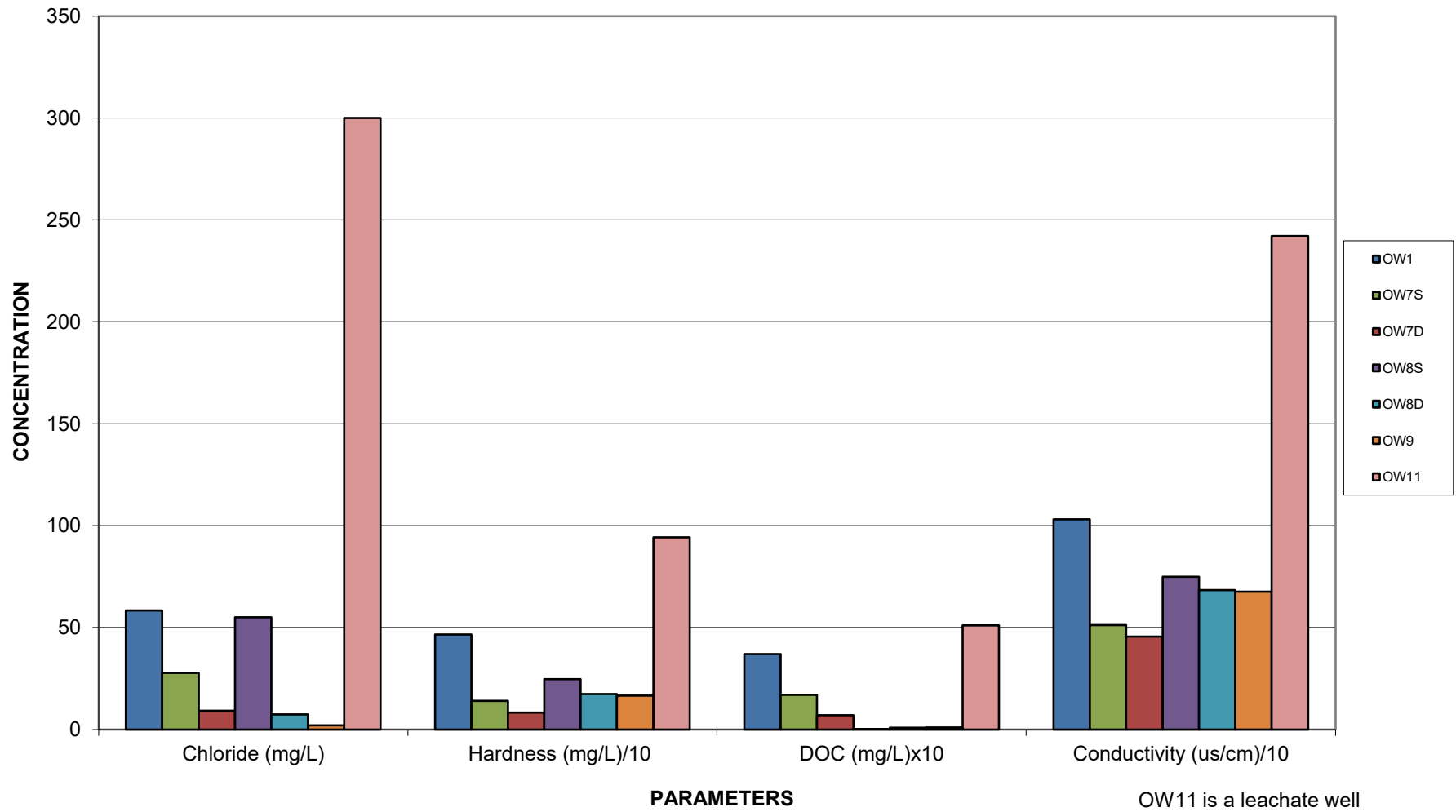


**FIGURE E-3  
INDICATOR PARAMETERS - UPGRADIENT & CROSS-GRADIENT WELLS - FALL  
HURON LANDFILL**

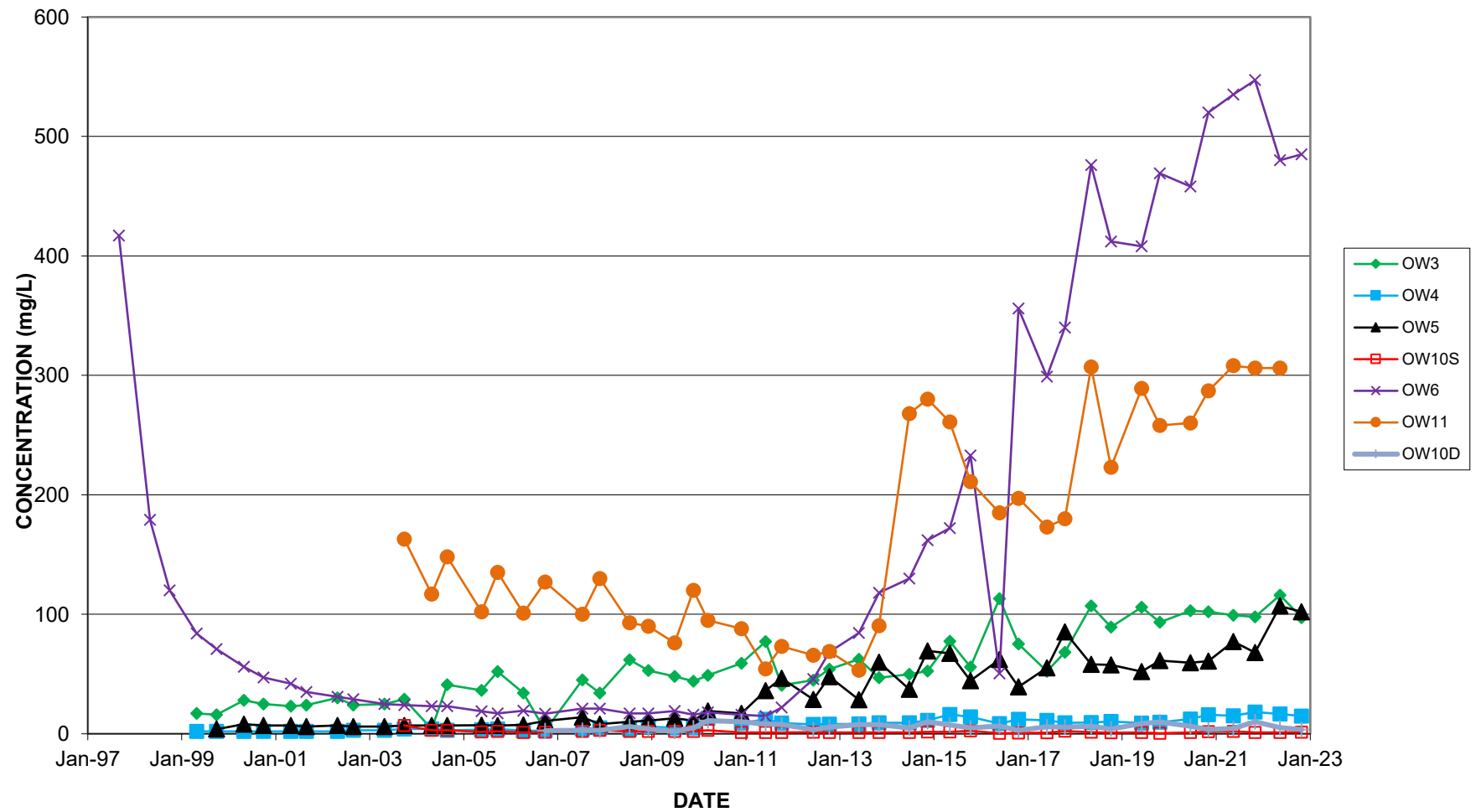


OW11 is a leachate well.

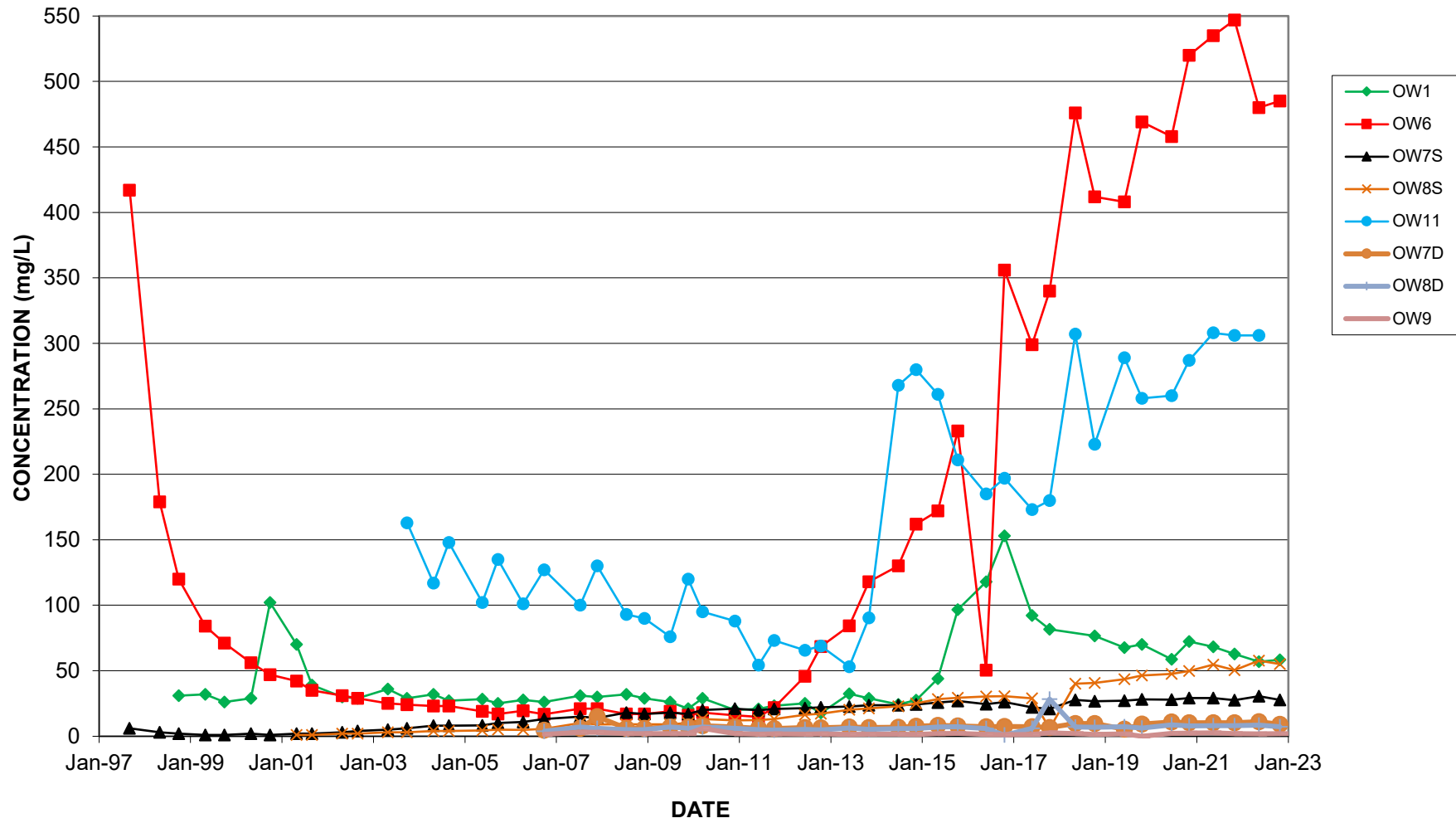
**FIGURE E-4  
INDICATOR PARAMETERS - DOWNGRAIDENT WELLS - FALL  
HURON LANDFILL**



**FIGURE E-5**  
**CHLORIDE VS TIME - UPGRADIENT & CROSS-GRADIENT WELLS**  
**HURON LANDFILL**



**FIGURE E-6**  
**CHLORIDE VS TIME - DOWNGRAIDENT WELLS**  
**HURON LANDFILL**



# APPENDIX

F

SURFACE WATER  
CHEMICAL RESULTS

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL # SW-1

	OCT 98	MAY 99	MAY 00	OCT 00		
pH	8.39	8.29	7.84	8.31		
conductivity	401	425.	423	573		
chloride	8.	14.	10	9		
hardness	205.	239.	249	346		
D.O.C.	3.7	4.6	5.3	4.3		
phenols	<1	<1	<1	<1		
colour	17	16.	16	14		
alkalinity	166	205.	203	302		
iron	0.62	0.21	0.81	0.42		
potassium	4.33	1.85	1.99	2.57		
magnesium	23.3	21.8	24.2	28.2		
calcium	43.6	59.6	59.8	91.9		
sodium	5.75	10.0	5.98	5.14		
sulphate	20.	20.	13	17		
nitrite	<0.02	0.03	0.04	<0.02		
ammonia	<0.05	<0.05	<0.05	<0.05		
TKN(nitrogen)	-	-	-	-		
nitrate	<0.1	1.51	1.64	3.91		
Nickel	<0.05	<0.05	<0.05	<0.05		
Arsenic	-	-	-	-		
Cadmium	<0.002	<0.002	<0.0001	<0.0001		
Chromium	<0.02	<0.02	<0.01	<0.01		
Copper	<0.01	<0.01	0.002	0.002		
Mercury	-	-	-	-		
Manganese	-	-	-	-		
Boron	0.30	0.13	<0.02	0.03		
Lead	<0.03	<0.03	<0.0005	<0.0005		
Selenium	-	-	-	-		
Zinc	<0.01	<0.01	<0.01	0.03		
Cyanide	-	-	-	-		

GROUNDWATER SAMPLING  
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL # SW-2

	OCT 98	MAY 99	MAY 00	OCT 00		
pH	8.3	8.14	8.03	8.33		
conductivity	314.	421.	425	597		
chloride	6.	13.	8	9		
hardness	169.	249.	247	356		
D.O.C.	6.7	4.4	4.4	4.9		
phenols	2.	<1	<1	1		
colour	25.	18.	16	53		
alkalinity	139.	200.	204	297		
iron	1.03	0.14	0.52	0.85		
potassium	4.63	2.04	1.84	2.63		
magnesium	18.8	22.4	24.3	28.8		
calcium	36.5	62.6	58.8	94.9		
sodium	3.92	9.71	4.86	5.37		
sulphate	9.	22.	13	18		
nitrite	<0.02	0.03	0.05	<0.02		
ammonia	0.05	<0.05	<0.05	<0.05		
TKN(nitrogen)	-	-	-	-		
nitrate	<0.1	1.31	1.73	3.78		
Nickel	<0.05	<0.05	<0.05	<0.05		
Arsenic	-	-	-	-		
Cadmium	0.002	0.007	0.00040	0.00210		
Chromium	<0.02	<0.02	<0.01	<0.01		
Copper	<0.01	<0.01	0.003	0.002		
Mercury	-	-	-	-		
Manganese	-	-	-	-		
Boron	0.19	0.10	<0.02	0.03		
Lead	<0.03	<0.03	0.0006	<0.0005		
Selenium	-	-	-	-		
Zinc	0.02	0.10	0.01	0.03		
Cyanide	-	-	-	-		



Appendix D  
Surface Water Analytical Results  
Huron Landfill Site  
(1998 - 2004)

Parameter	Units	PWQO	SW1 Oct-98	SW2 Oct-98	SW1 May-99	SW2 May-99	SW1 May-00	SW2 May-00	SW1 Oct-00	SW2 Oct-00	SW1 May-01	SW2 May-01	SW1 Sep-01	SW2 Sep-01	SW1 May-02	SW2 May-02	SW1 Sep-02	SW2 Sep-02	SW1 May-03	SW2 May-03	SW1 Oct-03	SW2 Oct-03
General Chemistry																						
pH Value	pH units		8.39	8.3	8.29	8.14	7.84	8.03	8.31	8.33	8.44	8.43	8.41	8.22	8.14	8.18	8.03	7.99	8.31	8.28	8.19	8.15
pH Value (Field)	pH units														8.5	8.5	7.7	7.4	8.5	8.86	NA	NA
Temperature	°C														10.3	9.3	17.8	19.6	14.1	14.1	NA	NA
Ammonia as N	mg/L		< 0.05	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	< 0.05	4.01	0.24	< 0.05	< 0.05	< 0.05	< 0.05
Ammonia (un-ionized)	mg/L	0.020													0.0013	< 0.0014	0.0708	0.0036	< 0.0037	< 0.0078	NA	NA
Nitrate (as N)	mg/L		< 0.01	< 0.1	1.51	1.31	1.64	1.73	3.91	3.78	6.83	6.34	6.08	7.37	< 0.48	0.54	< 0.1	< 0.1	10.8	< 0.1	6.77	6.8
Nitrite (as N)	mg/L		< 0.02	< 0.02	0.03	0.03	0.04	0.05	< 0.02	< 0.02	0.02	0.02	0.04	0.05	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02	0.02
Nitrate + Nitrite (as N)	mg/L						1.88	1.78	3.91	3.78	8.86	8.38	8.12	7.42	< 0.48	0.54	< 0.1	< 0.1	10.8	< 0.1	6.79	6.82
Carbon, Diss. Org. as C	mg/L		3.7	6.7	4.8	4.4	5.3	4.4	4.3	4.9	3.3	3	4.7	6	5.2	3.4	7.1	8.3	3.5	3.8	3	3.3
Total Phosphorus (as P)	mg/L						0.035	0.029	0.018	0.037	0.013	0.011	0.016	0.02	0.024	0.004	0.034	0.058	0.018	0.02	0.009	0.014
Diss. Organic Phosphorus (as P)	mg/L						< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Conductivity	us/cm		401	314	425	421	423	425	573	597	538	532	533	574	< 358	438	437	348	500	506	586	805
Conductivity (Field)	us/cm														460	470	NA	NA	458	457	NA	NA
Sulphate (as SO4)	mg/L		20	9	20	22	13	13	17	18	15	16	34	40	7	12	37	7	20	17	24	27
Alkalinity (CaCO3)	mg/L		166	139	205	200	203	204	302	297	256	256	172	180	196	235	186	192	200	201	259	274
Chloride (as Cl)	mg/L		8	6	14	13	10	8	9	9	10	10	23	25	3	4	11	11	11	10	13	14
Colour	TCU		17	25	16	18	16	18	14	53	19	17	20	24	22	18	15	31	14	14	10	12
Calculated Hardness (as CaCO3)	mg/L		205	169	239	249	249	247	348	356	329	317	287	274	209	251	221	200	283	284	331	338
Turbidity	NTU						14	15.4	8.04	4.03	3.89	3.63	5.55	4.84	0.18	0.2	5.56	13.5	3.68	3.85	1.71	2.7
Total Phenolics (4-AAP)	mg/L	0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Total Cations	meq/L						5.29	5.19	7.2	7.41	6.88	6.82	5.84	8	< 4.2	5.11	5.13	4.39	5.47	6.5	6.82	7.08
Total Anions	meq/L						4.73	4.7	6.93	6.84	8.2	6.19	5.23	5.67	4.18	5.1	5	4.3	5.48	4.68	6.73	6.82
Ion Balance	% diff.						5.53	4.95	1.91	3.99	5.15	3.37	5.49	2.83	0.25	0.08	1.25	1.04	0.13	6.28	1.38	1.13
Calculated T.D.S.	mg/L						248	242	360	381	338	331	294	318	205	252	282	218	300	251	359	369
Trace Metals																						
Aluminum, Al	mg/L	0.076					0.74	0.51	0.34	0.66	0.25	0.09	0.178	0.225	< 0.01	0.02	0.18	0.329	0.132	0.181	0.054	0.083
Beryllium, Be	mg/L	1.100					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03	0.033	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Boron, B	mg/L	0.200	0.3	0.19	0.13	0.1	< 0.02	< 0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.01	0.01	0.03	0.04	0.012	0.012	0.016	0.017
Cadmium, Cd	mg/L	0.0005	< 0.002	0.002	< 0.002	0.007	< 0.0001	0.0004	< 0.0001	0.0021	0.0001	0.0028	0.0001	0.0155	< 0.0001	< 0.0001	0.0004	0.0219	< 0.0001	< 0.0001	< 0.0001	0.0001
Calcium, Ca	mg/L		43.6	36.5	59.5	82.6	59.8	58.8	91.9	94.9	86.4	83.8	88.3	71.8	57	87.9	46.4	42.8	73.8	73.5	91.3	93.8
Chromium, Cr	mg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	0.005	0.005	0.005
Cobalt, Co	mg/L						< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.001	0.001	0.003	0.004	0.001	0.001	0.0001	0.0001	0.0001	0.0001
Copper, Cu	mg/L	0.0009	< 0.01	< 0.01	< 0.01	< 0.01	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002	< 0.002	< 0.002	0.002	0.002	0.0013	0.0018	0.0012	0.0019
Iron, Fe	mg/L	0.3	0.62	1.03	0.21	0.14	0.81	0.52	0.42	0.85	0.22	0.08	0.18	0.25	< 0.03	< 0.03	0.28	0.9	0.09	0.12	0.05	0.1
Lead, Pb	mg/L	0.005	< 0.03	< 0.03	< 0.03	< 0.03	< 0.0005	0.0006	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0005	0.0005	0.0005	0.0005
Magnesium, Mg	mg/L		23.3	18.6	21.8	22.4	24.2	24.3	28.2	27.8	28.2	23.5	22.9	18.1	19.9	28.1	22.7	19.3	19.8	24.9	25.3	
Molybdenum, Mo	mg/L	0.040					< 0.02	< 0.02	< 0.02	< 0.02	0.03	< 0.02	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.001	0.001	0.001	0.001
Nickel, Ni	mg/L	0.025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.001	0.001	0.001	0.001
Potassium, K	mg/L		4.33	4.63	1.85	2.04	1.99	1.84	2.67	2.63	1.99	1.78	4.7	5.4	< 1	< 1	3.9	5.3	1.5	1.8	2.3	2.4
Silica, Reactive (as SiO2)	mg/L						1.52	0.85	7.5	7.5	7.14	6.09	1.77	2.88	1.17	1.54	7.5	5.5	2.02	2.1	5.5	5.6
Silver, Ag	mg/L	0.0001					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	0.0001	0.0001	0.0001
Sodium, Na	mg/L		5.76	3.82	10	9.71	5.98	4.88	5.14	5.37	5.61	5.44	8.7	9	0.8	7.5	5.5	3.9	4	5.8	5.9	
Vanadium, V	mg/L	0.0060					< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0008	0.0008	0.0008	0.001
Zinc, Zn	mg/L	0.020	< 0.01	0.02	< 0.01	0.1	< 0.01	0.01	0.03	0.03	0.01	0.03	< 0.005	0.025	< 0.005	< 0.005	< 0.005	0.007	0.011	0.005	0.019	0.017

Note:

Exceedance of PWQO has been noted with highlighting, unless exceedance is due to method detection limit (data reported as "<").

NA - No Value Collected

Appendix D  
Historical Surface Water Quality Data  
Huron Landfill Site

Parameter	Units	PWQO	TDL	SW1 5/24/2005	SW2 5/24/2005	SW1 9/27/2005	SW2 9/27/2005
<b>FIELD MONITORING RESULTS</b>							
Temperature	°C		N/A	15.5	14.9	18.5	19.6
pH	pH		N/A	7.98	7.76	7.88	7.85
Conductivity	uS/cm		N/A	471	483	458	301
<b>INORGANICS</b>							
Unionized Ammonia (Calculated)	mg/L	0.02	N/A	N/A	0.0009	N/A	N/A
Total Ammonia-N	mg/L		0.05	ND	0.08	ND	ND
Conductivity	uS/cm		2	478	489	460	291
Nitrite (N)	mg/L		0.3	ND	ND	ND	ND
Dissolved Organic Carbon	mg/L		0.1	3.5	3.7		
Total Organic Carbon (TOC)	mg/L		0.1			4.2	8.2
Total pH	pH		0.01	8.29	8.38	8.2	8.2
Phenol-4AAP	mg/L	0.001	0.001	ND	ND	ND	0.001
Total Phosphorus	mg/L		0.002	0.008	0.008	0.058	0.2
Turbidity	NTU		0.1	2	2.5	5.9	110
Total Alkalinity (Total as CaCO3)	mg/L		1	217	225	181	140
Chloride (Cl)	mg/L		1	8.8	8.9	30	9.0
Total p-Alkalinity	mg/L		1	ND	3		
Nitrate (N)	mg/L		0.2	2	1.8	1.4	1.4
Phosphate-P	mg/L		1	ND	ND	1	1
Sulphate (SO4)	mg/L		1	15.1	16.2	32	18
<b>CALCULATED VALUES</b>							
Anion Sum	me/L		N/A	5.04	5.21		
Bicarb. Alkalinity (calc. as CaCO3)	mg/L		1	213	220	179	138
Calculated TDS	mg/L		1	258	282	268	177
Carb. Alkalinity (calc. as CaCO3)	mg/L		1	4	5	3	2
Cation Sum	me/L		N/A	5.42	5.4		
Dissolved Hardness (CaCO3)	mg/L		N/A	280	280	200	150
Ion Balance (% Difference)	%		N/A	3.8	1.83		
Langelier Index (@ 20C)	N/A		N/A	1.03	1.11	0.73	0.527
Langelier Index (@ 4C)	N/A		N/A	0.778	0.86	0.481	0.277
Saturation pH (@ 20C)	N/A		N/A	7.26	7.28	7.5	7.87
Saturation pH (@ 4C)	N/A		N/A	7.51	7.5	7.75	7.92
<b>METALS</b>							
Dissolved Aluminum (Al)	mg/L	0.075	0.005	0.009	0.008		
Dissolved Beryllium (Be)	mg/L	1.100	0.0005	ND	ND		
Dissolved Boron (B)	mg/L	0.200	0.01	ND	0.01		
Dissolved Cadmium (Cd)	mg/L	0.0005	0.0001	ND	0.0004		
Dissolved Calcium (Ca)	mg/L		0.2	85.8	84.8	45.5	37.3
Dissolved Chromium (Cr)	mg/L		0.005	ND	ND		
Dissolved Cobalt (Co)	mg/L	0.0009	0.0005	ND	ND		
Dissolved Copper (Cu)	mg/L	0.005	0.001	0.002	0.002		
Dissolved Iron (Fe)	mg/L	0.3	0.05	ND	ND		
Dissolved Lead (Pb)	mg/L	0.005	0.0005	ND	ND		
Dissolved Magnesium (Mg)	mg/L		0.05	23	23.3	20	13
Dissolved Molybdenum (Mo)	mg/L	0.040	0.001	ND	ND		
Dissolved Nickel (Ni)	mg/L	0.025	0.001	ND	ND		
Dissolved Potassium (K)	mg/L		1	1.5	1.8	3	4
Dissolved Silver (Ag)	mg/L	0.0001	0.0005	ND	ND		
Dissolved Sodium (Na)	mg/L		0.5	4.8	4.8	22.7	5.7
Dissolved Vanadium (V)	mg/L	0.0080	0.001	ND	ND		
Dissolved Zinc (Zn)	mg/L	0.020	0.005	ND	0.007		

N/A = Not Applicable

ND = Not detected

TDL = Typical Detection Limit. Actual detection limit varies with the concentration of each sample.

Spring metals samples were erroneously filtered by Maxxam Analytics and thus only the 'dissolved' concentration of each trace metal is reported. The total concentration of trace metals would have been somewhat higher and therefore could have exceed the PWQO, however this information is not known.

Appendix D  
Historical Surface Water Quality Data  
Huron Landfill Site

Parameter	Units	PWQO	TDL	SW1 5/24/2006	SW2 5/24/2005	SW1 9/27/2005	SW2 9/27/2005
Total Aluminum (Al)	mg/L	0.075	0.005			0.4	2.5
Total Arsenic (As)	mg/L	0.005	0.001			ND	0.002
Total Barium (Ba)	mg/L		0.008			0.043	0.041
Total Beryllium (Be)	mg/L	1.1	0.005			ND	ND
Total Boron (B)	mg/L	0.2	0.01			0.052	0.042
Total Cadmium (Cd)	mg/L	0.0005	0.0001			ND	0.0004
Total Calcium (Ca)	mg/L		0.2			51	45
Total Chromium (Cr)	mg/L		0.005			0.006	0.008
Total Cobalt (Co)	mg/L	0.0008	0.0005			ND	0.0017
Total Copper (Cu)	mg/L	0.005	0.001			0.002	0.007
Total Iron (Fe)	mg/L	0.3	0.05			0.57	3.2
Total Lead (Pb)	mg/L	0.005	0.0005			ND	0.0053
Total Magnesium (Mg)	mg/L		0.05			21	18
Total Molybdenum (Mo)	mg/L	0.04	0.001			ND	ND
Total Nickel (Ni)	mg/L	0.025	0.001			0.002	0.005
Total Potassium (K)	mg/L		0.2			4.2	5.3
Total Silicon (Si)	mg/L		0.05			2	5.3
Total Silver (Ag)	mg/L	0.0001	0.0005			ND	ND
Total Sodium (Na)	mg/L		0.1			24	5.4
Total Vanadium (V)	mg/L	0.005	0.001			0.001	0.005
Total Zinc (Zn)	mg/L	0.02	0.005			0.011	0.055

N/A = Not Applicable

ND = Not detected

TDL = Typical Detection Limit. Actual detection limit varies with the concentration of each sample.

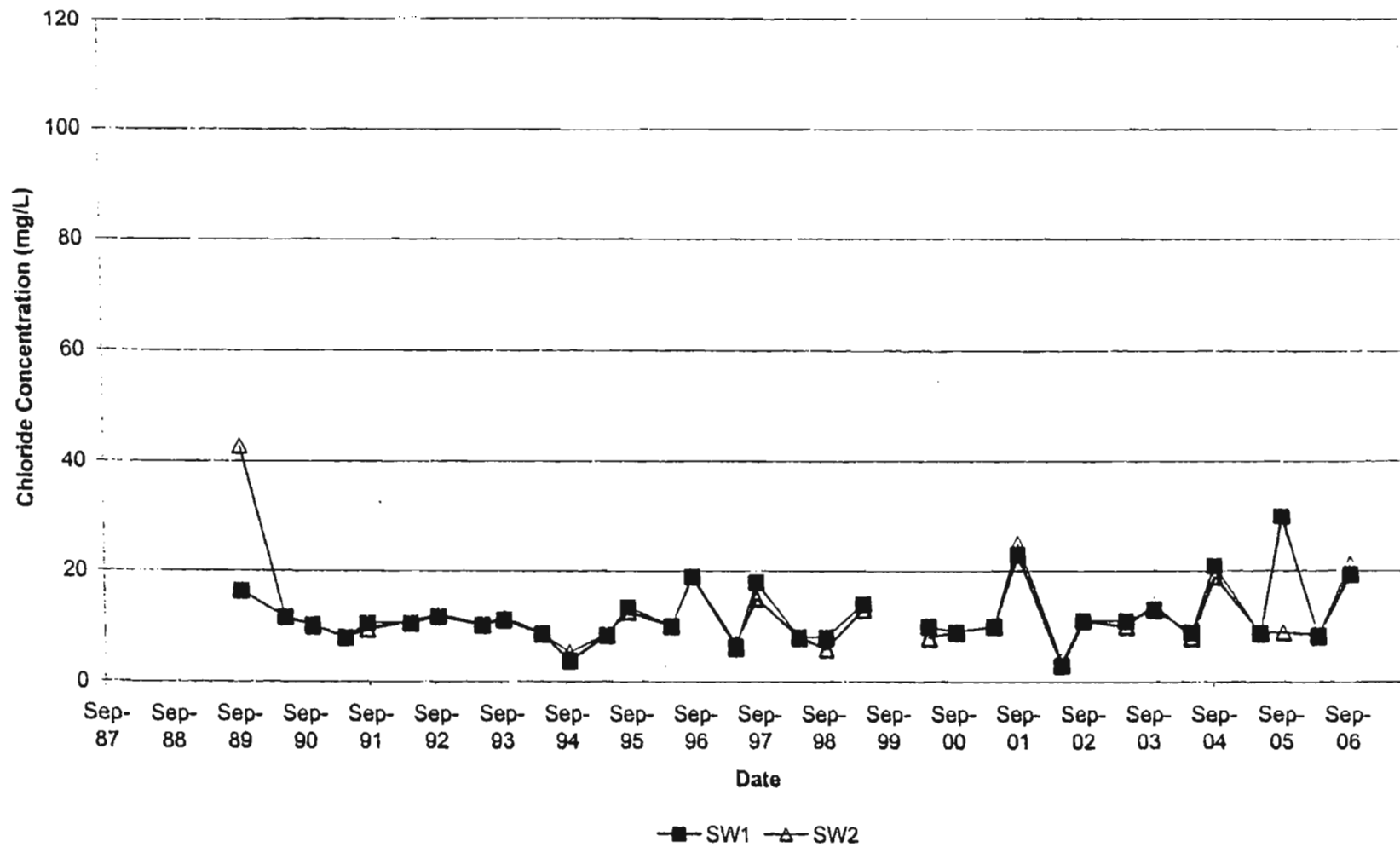
Spring metals samples were erroneously filtered by Maxam Analytics and thus only the "dissolved" concentration of each trace metal is reported. The total concentration of trace metals would have been somewhat higher and therefore could have exceed the PWQO, however this information is not known.

Huron Landfill Site  
Standard Surface Water Quality Package

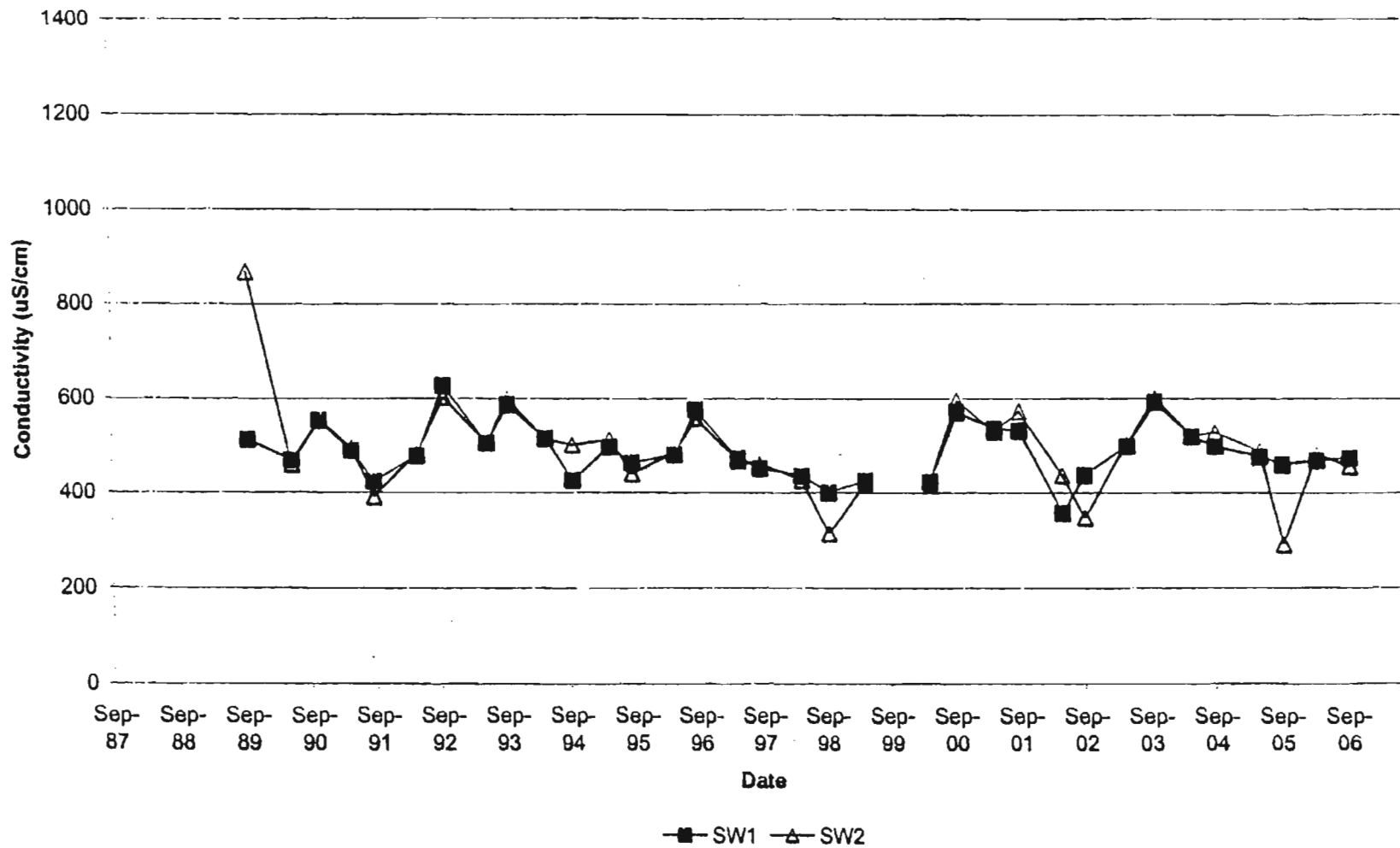
Parameter	Short I.D.	Unit	PWQO	M.D.L	SW1	SW2
Well Class					Up	Down
Date of Sampling					18-Apr-08	18-Apr-08
<b>FIELD MONITORING RESULTS</b>						
Temperature	°C	°C			13	12.3
pH	pH	N/A			8.13	8.18
Electrical Conductivity	Th. Cond.	uS/cm			438	488
<b>INORGANICS</b>						
pH	pH	N/A		N/A	8.52	8.48
Chloride	Cl <sup>-</sup>	mg/L		0.10	8.33	8.58
Electrical Conductivity	Th. Cond.	uS/cm		2	488	482
Total Hardness (as CaCO <sub>3</sub> )	Hard(Calc)	mg/L			248	255
Dissolved Organic Carbon (DOC)	DOC	mg/L		1	2	2
Total Dissolved Solids	Th. TDS	mg/L		20	340	784
Ammonia (un-ionized)	NH <sub>3</sub> -union	mg/L	0.02		0.0008	0.0008
Ammonia as N	NH <sub>3</sub> -N	mg/L		0.02	<0.02	<0.02
Nitrate as N	NO <sub>3</sub> -N	mg/L		0.05	4.32	4.27
Nitrite as N	NO <sub>2</sub> -N	mg/L		0.05	<0.05	<0.05
(Nitrate + Nitrite) as N	NO <sub>3</sub> +NO <sub>2</sub>	mg/L		0.10	4.32	4.27
Bromide	Br <sup>-</sup>	mg/L		0.05	<0.05	<0.05
Sulphate	SO <sub>4</sub> <sup>2-</sup>	mg/L		0.10	14.7	15.3
Phosphate as P	PO <sub>4</sub> <sup>3-</sup>	mg/L		0.10	<0.10	<0.10
pH, Saturation	pHs	N/A		N/A	7.18	7.18
Phenols	Phenol	mg/L	0.001	0.001	<0.001	<0.001
Turbidity	Turbidity	NTU		0.5	1.8	1.5
p-Alkalinity (as CaCO <sub>3</sub> )	Alk 8.3	mg/L		5	8	8
t-Alkalinity (as CaCO <sub>3</sub> )	Alk 4.2	mg/L		10	208	212
<b>CALCULATED VALUES</b>						
Anion Sum	Anion	mg/L		NA	4.24	4.32
Cation Sum	Cation	mg/L		NA	5.14	5.33
Ion Balance	CAB	%		NA	9.8	10.4
Carbonate (as CaCO <sub>3</sub> )	CO <sub>3</sub> <sup>2-</sup>	mg/L		5	15	13
Bicarbonate (as CaCO <sub>3</sub> )	HCO <sub>3</sub> <sup>-</sup>	mg/L		5	190	199
Langlier Index	L.I.	N/A		NA	1.38	1.3
Aggressive Index	A.I.	N/A		NA	13.2	13.2
Ryznar Stability Index	R.S.I.	N/A		NA	5.8	5.88
<b>METALS</b>						
Silver	Ag	mg/L	0.0001	0.0001	<0.0001	<0.0001
Aluminum	Al	mg/L	0.075	0.004	0.085	0.115
Arsenic	As	mg/L	0.005	0.003	<0.003	<0.003
Boron	B	mg/L	0.20	0.010	0.094	0.035
Barium	Ba	mg/L		0.002	0.018	0.017
Beryllium	Be	mg/L	0.011	0.002	<0.002	<0.002
Calcium	Ca	mg/L		0.05	85.8	88.5
Cadmium	Cd	mg/L	0.0005	0.0002	0.0007	0.0033
Cobalt	Co	mg/L	0.0009	0.0005	<0.0005	<0.0005
Chromium	Cr	mg/L	0.0089	0.003	<0.003	<0.003
Copper	Cu	mg/L	0.005	0.002	<0.002	<0.002
Iron	Fe	mg/L	0.3	0.005	0.584	0.602
Potassium	K	mg/L		0.05	1.44	1.57
Magnesium	Mg	mg/L		0.05	19.9	20.4
Molybdenum	Mo	mg/L	0.04	0.002	<0.002	<0.002
Sodium	Na	mg/L		0.05	4.17	4.41
Nickel	Ni	mg/L	0.025	0.003	<0.003	<0.003
Total Phosphorus	P (Tot.)	mg/L		0.01	0.08	0.08
Lead	Pb	mg/L	0.005	0.001	<0.001	<0.001
Vanadium	V	mg/L	0.008	0.002	<0.002	<0.002
Zinc	Zn	mg/L	0.03	0.004	0.004	0.007

Short I.D.	Unit	PWQO	SW1 Up 4-Oct-06	SW2 Down 4-Oct-06
°C	°C		14	13.8
pH	N/A		7.88	7.59
Th. Cond.	uS/cm		464	442
pH	N/A		8.28	8.02
Cl <sup>-</sup>	mg/L		19.5	21.4
Th. Cond.	uS/cm		473	455
Hard(Calc)	mg/L		219	197
DOC	mg/L		8.7	7.1
Th. TDS	mg/L		270	258
NH <sub>3</sub> -N	mg/L	0.02	0.0004	0.0002
NH <sub>3</sub> -N	mg/L		<0.02	<0.02
NO <sub>3</sub> -N	mg/L		0.19	0.18
NO <sub>2</sub> -N	mg/L		<0.05	<0.05
NO <sub>2</sub> +NO <sub>3</sub>	mg/L		0.19	0.18
Br <sup>-</sup>	mg/L		<0.05	<0.05
SO <sub>4</sub> <sup>2-</sup>	mg/L		17.7	24.5
PO <sub>4</sub> <sup>3-</sup>	mg/L		<0.10	<0.10
pHs	N/A		7.17	7.27
Phenol	mg/L	0.001	<0.001	<0.001
Turbidity	NTU		18	30
Alk 8.3	mg/L		8	<5
Alk 4.2	mg/L		210	185
Anion	mg/L		4.6	4.17
Cation	mg/L		4.97	4.68
CAB	%		3.9	5.7
CO <sub>3</sub> <sup>2-</sup>	mg/L		13	<5
HCO <sub>3</sub> <sup>-</sup>	mg/L		197	185
L.I.	N/A		1.11	0.75
A.I.	N/A		12.9	12.6
R.S.I.	N/A		6.06	6.52
Ag	mg/L	0.0001	<0.0001	<0.0001
Al	mg/L	0.075	0.404	0.858
As	mg/L	0.005	<0.003	<0.003
B	mg/L	0.20	0.042	0.047
Ba	mg/L		0.03	0.033
Be	mg/L	0.011	<0.002	<0.002
Ca	mg/L		56.2	50.9
Cd	mg/L	0.0005	0.0003	0.0006
Co	mg/L	0.0008	<0.0005	0.0007
Cr	mg/L	0.0089	<0.003	<0.003
Cu	mg/L	0.005	<0.002	0.003
Fe	mg/L	0.3	0.666	0.784
K	mg/L		5.3	4.9
Mg	mg/L		19	17
Mo	mg/L	0.04	<0.002	<0.002
Na	mg/L		10.8	14.1
Ni	mg/L	0.025	<0.003	<0.003
P (Tot.)	mg/L	0.01	0.08	0.11
Pb	mg/L	0.005	<0.001	0.002
V	mg/L	0.008	<0.002	<0.002
Zn	mg/L	0.03	0.021	0.015

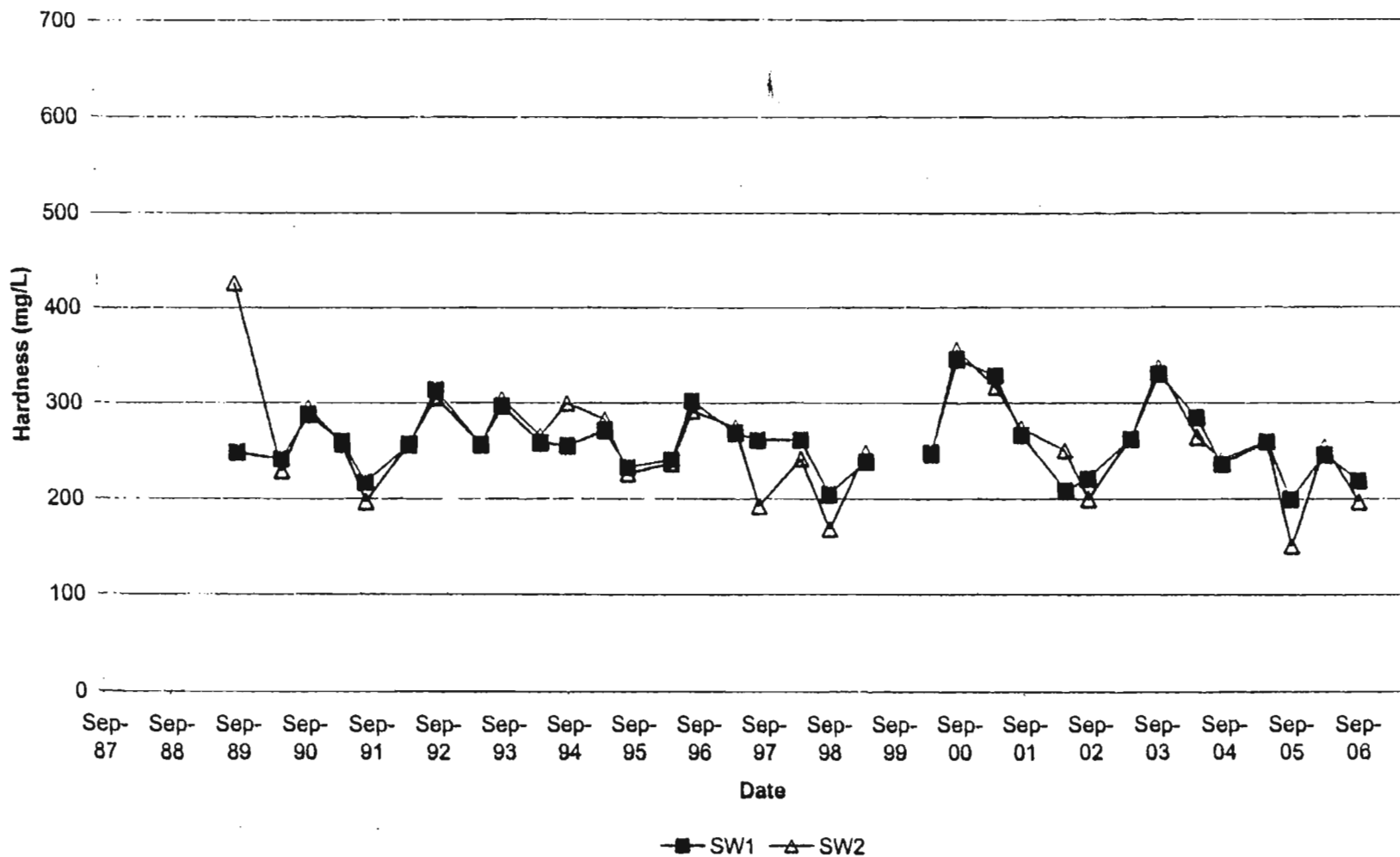
**HURON LANDFILL SITE**  
**Chloride Concentration (mg/L) vs. Time**  
**Surface Water Monitoring**



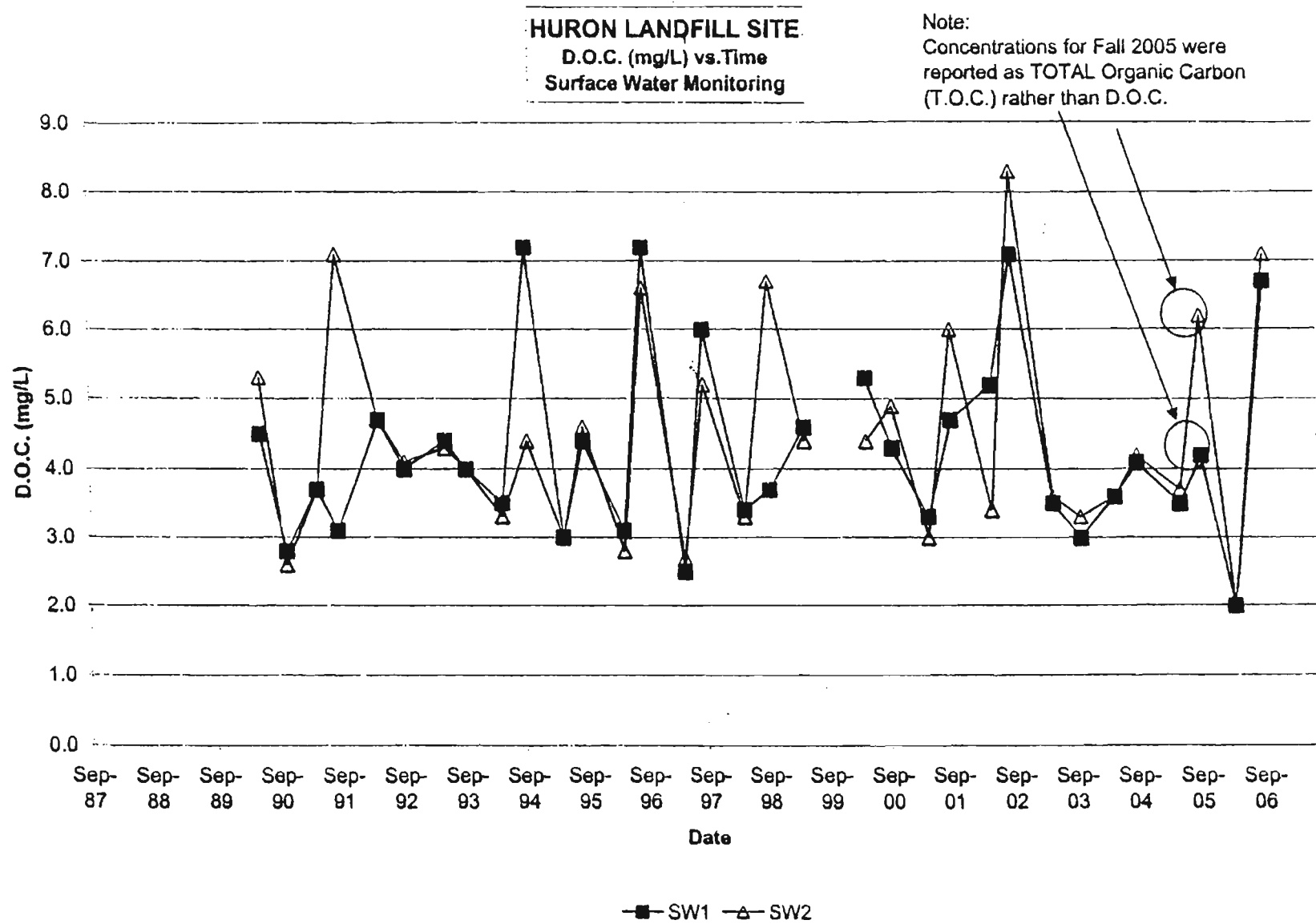
**HURON LANDFILL SITE**  
**Conductivity (uS/cm) vs. Time**  
**Surface Water Monitoring**



**HURON LANDFILL SITE**  
**Hardness (mg/L) vs. Time**  
**Surface Water Monitoring**







**TABLE F-2**  
**SURFACE WATER CHEMICAL RESULTS (2007-Present)**  
**HURON LANDFILLSITE**

Chemical Parameter	PWQO	SW1 Jul-07	SW1 Dec-07	SW1 Jul-08	SW1 Dec-08	SW1 Jul-09	SW1 Nov-09	SW1 Mar-10	SW1 Dec-10	SW1 Jun-11	SW1 Oct-11	SW1 Jun-12
Alkalinity(as CaCO3)	(16)	188	223	228	267	234	255	255	271	278	249	212
Chloride		14	36	12	9	11	18	11	13	9.3	20.1	11.4
Nitrate(as N)		nd	11	0.8	3.2	0.8	4.6	4.1	5.5	5.6	7.8	0.5
Nitrite(as N)		nd	nd	0.02	0.01	nd	0.01	0.01	<0.01	<0.1	<0.1	<0.1
Ammonia(as N)	0.02 (21)	0.08	0.08	0.06	nd	0.06	nd	nd	<0.05	<0.01	<0.01	0.07
Unionized Ammonia as NH <sub>3</sub> (calc)	(23)	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen(as N)		0.7	-	-	0.5	0.6	0.7	0.6	0.5	0.49	0.73	0.61
Phosphorus, Total	(19)	-	-	-	0.027	0.029	0.02	0.016	0.036	0.03	0.05	0.03
Orthophosphate (as P)		0.03	nd	nd	-	-	-	-	-	-	-	-
Phenols		0.002	nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)		4.5	5.5	3.9	3	4.2	3.9	3.0	3.1	3.5	5.2	4.9
Conductivity		425	673	488	548	491	578	539	595	591	640	459
pH		8.2	8.2	8.2	8.2	8.1	8.1	8.2	8.19	8.13	8.10	8.15
Sulphate (as SO4)		21	40	18	13	-	17	18	14	14	18	14
Hardness(as CaCO3)		200	310	250	280	240	300	270	300	352	314	238
Aluminum	0.075 (17)	0.56	0.11	0.13	0.17	0.24	0.14	0.200	0.190	0.48	0.23	0.14
Arsenic	0.1 (22)	0.001	nd	nd	nd	nd	nd	nd	<0.001	0.0005	0.0004	0.0020
Beryllium	1.1 (10)	nd	nd	nd	nd	nd	nd	nd	<0.005	<0.002	<0.002	<0.0001
Boron	0.200 (I)	0.028	0.013	0.019	nd	0.021	0.022	0.011	<0.01	0.024	0.126	0.023
Cadmium	0.0002 (11)	0.0002	0.0001	nd	0.0003	0.2	0.0004	0.0003	<0.0001	<0.00002	<0.00002	<0.00002
Calcium		50	85	60	79	62	77	84	84	94.4	86.4	53.9
Chromium	0.1	nd	nd	nd	nd	nd	nd	nd	<0.005	0.006	<0.002	0.0008
Cobalt	0.0006 (I)	nd	nd	nd	nd	nd	nd	nd	<0.0005	0.0001	0.0002	0.0001
Copper	0.005 (12)	0.002	0.002	0.001	0.002	0.002	nd	0.002	0.001	<0.002	<0.002	<0.002
Iron	0.3	0.61	0.11	0.16	0.2	0.23	nd	0.25	0.17	0.420	0.233	0.180
Lead	0.025 (14)	nd	nd	nd	nd	nd	nd	nd	<0.0005	0.00011	0.00018	0.00008
Magnesium		26	25	25	23	23	21	24	25	28.3	23.8	25.2
Manganese		0.056	0.004	0.013	0.02	0.021	0.006	0.032	0.012	0.016	0.014	0.025
Molybdenum	0.010 (I)	nd	nd	nd	nd	nd	nd	nd	<0.001	0.0003	0.0004	0.0004
Nickel	0.025	0.001	nd	nd	nd	nd	nd	nd	<0.001	<0.01	<0.01	<0.01
Potassium		3	5.9	2.1	1.6	1.8	2.1	1.9	1.9	2.3	3.3	2.7
Silver	0.0001	nd	nd	nd	nd	nd	nd	nd	<0.0001	<0.00002	<0.00002	<0.00002
Sodium		9.8	12	7.1	4.1	6.7	7.7	5.0	4.6	5.2	10.8	6.9
Vanadium	0.007 (I)	0.002	0.001	nd	0.002	0.001	0.001	nd	<0.001	<0.005	<0.005	<0.005
Zinc	0.030 (15)	0.007	nd	nd	0.019	0.011	nd	nd	<0.005	0.006	<0.005	<0.005
Turbidity (NTU)		21.2	3.9	-	-	-	-	-	-	-	-	-
<b>FIELD MEASUREMENTS</b>												
Temperature (°C)						20.1	6.7	8.2	-	18.9	10.8	23.6
Conductivity (umhos)						160	180	490	-	540	592	413
pH						7.97	7.89	8.77	-	8.7	8.32	7.99

**NOTES:**

- All results in mg/L unless otherwise noted.
- > means greater than.
- < means less than.
- <T means a measurable trace amount.
- <W means no measurable response.
- + means improperly preserved.
- means analysis not conducted.
- PWQO indicates Provincial Water Quality Objectives.
- (I) indicates interim PWQO
- For hardness > 75 mg/L (as CaCO3)
- Cadmium Interim PWQO = 0.0005 mg/L (for Hardness >100 mg/L as CaCO3)
- Copper Interim PWQO = 0.005 mg/L (for Hardness >20 mg/L)
- Undissociated Hydrogen Sulphide.
- Revised Interim PWQO = 0.005 mg/L (for Alkalinity > 80 mg/L (as CaCO3))
- Zinc Revised Interim PWQO = 0.020 mg/L
- Alkalinity should not be decreased by more than 25 % of the natural concentration.
- Interim PWQO = 0.075 mg/L for pH >6.5 to 9.0.
- Arsenic Interim PWQO = 0.005 mg/L
- PWQO = 0.020 mg/L to avoid nuisance algae growth, PWQO = 0.010 mg/L for high level of protection  
PWQO = 0.030 mg/L for prevention of excessive plant growth
- Interim PWQO (revised) = 0.005 mg/L.
- PWQO for un-ionized ammonia
- PWQO = 0.1 mg/L. Interim PWQO = 0.005
- Fraction (f) of NH3 where  $f = 1/(10^{pka - pH + 1})$ ;  $pka = 0.09018 + 2729.92/T$ ;  $T = ^\circ C +$

**TABLE F-2**  
**SURFACE WATER CHEMICAL RESULTS (2007-Present)**  
**HURON LANDFILLSITE**

Chemical Parameter	PWQO	SW1 Oct-12	SW1 Jun-13	SW1 Nov-13	SW1 Jul-14	SW1 Nov-14	SW1 May-15	SW1 Oct-15	SW1 Jun-16	SW1 Nov-16	SW1 Jun-17	SW1 Oct-17	SW1 May-18
Alkalinity(as CaCO3)	(16)	235	222	254	193	244	227	252	250	254	229	322	231
Chloride		23.6	10.7	11.0	9.5	11.1	11.4	17.4	14.9	20.8	10.2	14.9	15.1
Nitrate(as N)		12.9	4.6	4.9	1.0	5.9	1.38	<0.10	13.2	0.1	3.27	9.67	4.76
Nitrite(as N)		0.2	<0.1	<0.1	<0.1	<0.1	<0.25	<0.10	<0.1	<0.1	0.26	<0.05	0.05
Ammonia(as N)	0.02 (21)	<0.01	0.03	0.02	0.05	0.03	<0.02	<0.02	0.02	<0.01	0.03	<0.01	0.10
Unionized Ammonia as NH <sub>3</sub> (calc)	(23)	-	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.02
Total Kjeldahl Nitrogen(as N)		0.64	0.51	0.58	0.49	0.8	0.47	0.31	0.83	0.47	0.6	0.67	0.6
Phosphorus, Total	(19)	0.01	0.01	0.04	0.03	0.11	0.01	<0.01	0.02	0.01	0.02	0.07	0.04
Orthophosphate (as P)		-	-	-	-	-	-	-	-	-	-	-	-
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)		5.3	5.9	6.1	5.7	6.7	4.0	5.0	3.9	7.7	5.1	6.0	5.2
Conductivity		635	484	507	429	504	491	541	598	555	463	666	504
pH		8.25	8.08	8.18	8.14	8.16	8.47	7.98	8.27	8.08	8.11	8.28	8.35
Sulphate (as SO4)		21	13	13	13	11	13.7	18.6	14	16	13	12	12
Hardness(as CaCO3)		383	231	263	257	276	253	262	294	296	218	357	258
Aluminum	0.075 (17)	0.15	0.12	0.34	0.23	0.51	0.004	<0.004	0.09	0.06	0.09	0.15	0.21
Arsenic	0.1 (22)	0.0005	0.0004	0.0004	0.0007	<0.0001	<0.003	<0.003	0.0004	0.0005	0.0006	<0.0005	0.0004
Beryllium	1.1 (10)	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002
Boron	0.200 (I)	0.011	0.010	0.009	0.024	<0.005	0.016	0.026	0.015	0.008	0.008	0.012	0.012
Cadmium	0.0002 (11)	<0.00002	<0.00002	<0.00002	<0.00002	0.00010	<0.0001	<0.0001	<0.00002	<0.00002	<0.000014	<0.000070	<0.000015
Calcium		106	56.8	71.6	61.0	75.9	62.2	65.5	79.1	74.9	51.8	96.5	66.3
Chromium	0.1	<0.002	0.0003	<0.002	<0.002	0.004	<0.003	<0.003	<0.002	<0.002	<0.001	<0.001	0.004
Cobalt	0.0006 (I)	0.0001	0.0001	0.0001	0.0002	0.0002	<0.0005	<0.0005	<0.0001	<0.0001	0.0001	<0.0005	<0.0005
Copper	0.005 (12)	0.0021	0.0017	0.0016	0.0014	0.0105	<0.002	<0.002	0.0013	0.0010	0.0016	0.0009	<0.002
Iron	0.3	0.056	0.106	0.341	0.257	0.531	0.11	0.07	0.068	0.094	0.096	0.169	0.200
Lead	0.025 (14)	0.00005	0.00011	0.00015	0.00015	0.00181	<0.001	<0.001	0.00005	0.00004	0.00006	<0.0001	0.00011
Magnesium		28.6	21.7	20.3	25.4	21.1	23.8	23.8	23.5	26.4	21.5	28.2	22.4
Manganese		0.003	0.007	0.026	0.022	0.045	0.023	0.009	0.005	0.009	0.005	0.007	0.009
Molybdenum	0.010 (I)	0.0013	0.0004	0.0003	0.0005	0.0005	<0.001	<0.001	0.0003	0.0004	0.0004	<0.0005	0.0004
Nickel	0.025	<0.01	<0.01	<0.01	<0.01	0.0054	<0.003	<0.003	0.0018	0.0027	0.0017	0.003	<0.01
Potassium		4.6	1.3	1.9	2.6	2.9	1.82	6.02	2.0	8.2	1.9	2.7	2.5
Silver	0.0001	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.0001	<0.0001	<0.00002	<0.00002	<0.00002	<0.0001	<0.0001
Sodium		8.7	4.7	6.2	5.9	6.4	5.10	9.56	4.4	10.1	5.0	5.8	6.7
Vanadium	0.007 (I)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.030 (15)	<0.005	<0.005	0.006	0.009	0.024	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Turbidity (NTU)		-	-	-	-	-	-	-	-	-	-	-	-
<b>FIELD MEASUREMENTS</b>													
Temperature (°C)		12.3	17	4.6	19.5	3.9	15.2	9.9	15.2	10.0	21.2	88	16.6
Conductivity (umhos)		587	535	468	430	562	470	488	602	507	463	705	494
pH		8.45	8.38	8.24	8.13	8.45	8.28	7.66	8.34	7.88	7.85	8.08	7.85

**NOTES:**

1. All results in mg/L unless otherwise noted.
2. > means greater than.
3. < means less than.
4. <T means a measurable trace amount.
5. <W means no measurable response.
6. + means improperly preserved.
7. - means analysis not conducted.
8. PWQO indicates Provincial Water Quality Objectives.
9. (I) indicates interim PWQO
10. For hardness > 75 mg/L (as CaCO3)
11. Cadmium Interim PWQO = 0.0005 mg/L (for Hardness >100 mg/L as CaCO3)
12. Copper Interim PWQO = 0.005 mg/L (for Hardness >20 mg/L)

13. Undissociated Hydrogen Sulphide.
14. Revised Interim PWQO = 0.005 mg/L (for Alkalinity > 80 mg/L (as CaCO3)
15. Zinc Revised Interim PWQO = 0.020 mg/L
16. Alkalinity should not be decreased by more than 25 % of the natural concentration.
17. Interim PWQO = 0.075 mg/L for pH >6.5 to 9.0.
18. Aresenic Interim PWQO = 0.005 mg/L
19. PWQO = 0.020 mg/L to avoid nuisance algae growth, PWQO = 0.010 mg/L for high level of protection  
PWQO = 0.030 mg/L for prevention of excessive plant growth
20. Interim PWQO (revised) = 0.005 mg/L.
21. PWQO for un-ionized ammonia
22. PWQO = 0.1 mg/L. Interim PWQO = 0.005
23. Fraction (f) of NH3 where  $f = 1/(10^{pka - pH + 1})$ ;  $pka = 0.09018 + 2729.92/T$ ;  $T = ^\circ C +$

**TABLE F-2**  
**SURFACE WATER CHEMICAL RESULTS (2007-Present)**  
**HURON LANDFILLSITE**

Chemical Parameter	PWQO	SW1 Oct-18	SW1 Jun-19	SW1 Nov-19	SW1 Jul-20	SW1 Nov-20	SW1 Jun-21	SW1 Nov-21	SW1 May-22	SW1 Nov-22
Alkalinity(as CaCO3)	(16)	269	243	220	203	273	236	181	246	217
Chloride		20.3	14.4	17.8	18.8	23	14.7	11.1	13.9	3.4
Nitrate(as N)		1.57	9.73	14.2	4.69	7.53	1.04	6.81	1.84	0.11
Nitrite(as N)		<0.05	<0.05	<0.05	0.06	<0.05	0.09	<0.05	0.05	<0.05
Ammonia(as N)	0.02 (21)	0.03	0.11	0.05	0.09	0.04	0.04	0.04	0.06	0.18
Unionized Ammonia as NH <sub>3</sub> (calc)	(23)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Total Kjeldahl Nitrogen(as N)		0.5	0.6	0.7	0.7	0.5	0.5	1.1	0.7	0.4
Phosphorus, Total	(19)	0.02	0.04	0.06	0.04	0.02	0.03	0.34	0.04	0.03
Orthophosphate (as P)		-	-	-	-	-	-	-	-	-
Phenols		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
Dissolved Organic Carbon(DOC)		7.1	5.5	5.3	4.7	4	5.6	5.6	7.1	9.8
Conductivity		625	587	626	495	684	491	424	519	421
pH		8.32	8.26	8.29	8.15	8.29	8.32	8.09	8.17	7.85
Sulphate (as SO4)		17	13	16	16	17	15	8	13	2
Hardness(as CaCO3)		338	328	307	270	350	271	236	279	230
Aluminum	0.075 (17)	0.07	0.06	0.17	0.11	0.07	0.09	1.88	0.07	0.02
Arsenic	0.1 (22)	0.0005	0.0003	0.0003	0.0006	0.0003	0.0007	0.0005	0.0007	0.0004
Beryllium	1.1 (10)	<0.002	<0.002	<0.002	<0.002	<0.0001	<0.002	<0.002	<0.0001	<0.0001
Boron	0.200 (I)	0.02	0.015	0.005	0.022	0.01	0.015	0.014	0.013	0.005
Cadmium	0.0002 (11)	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015	0.000046	0.000017	<0.000015
Calcium		87.6	87.6	82.2	60.3	95.3	60.5	63.8	69.5	62.6
Chromium	0.1	<0.002	<0.001	<0.002	<0.002	<0.001	<0.002	0.003	<0.001	<0.001
Cobalt	0.0006 (I)	0.005	0.0003	<0.005	<0.005	0.0001	<0.005	<0.005	0.0002	<0.0001
Copper	0.005 (12)	0.006	0.0012	0.002	<0.002	0.0012	0.005	0.004	0.0017	0.0005
Iron	0.3	0.113	0.086	0.207	0.139	0.098	0.156	2.06	0.131	0.326
Lead	0.025 (14)	0.00006	0.00006	0.00015	0.00010	0.00007	0.00014	0.00125	0.00010	0.00021
Magnesium		28.9	26.6	24.8	29	27.3	29.2	18.6	25.5	17.9
Manganese		0.007	0.007	0.010	0.011	0.005	0.022	0.049	0.016	0.325
Molybdenum	0.010 (I)	0.0004	0.0003	0.0002	0.0003	0.0002	0.0003	0.0002	0.0004	<0.0001
Nickel	0.025	<0.01	<0.01	<0.01	<0.01	0.0005	<0.01	<0.01	0.0007	0.0004
Potassium		4.8	2.0	2.9	2.5	2.1	3.3	4.4	2.1	0.5
Silver	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium		9.8	5.1	5.8	6	6.6	6.7	3.5	6.2	1.6
Vanadium	0.007 (I)	<0.005	0.0007	<0.005	<0.005	0.0006	<0.005	<0.005	<0.005	<0.005
Zinc	0.030 (15)	0.008	0.012	0.006	<0.005	0.006	0.022	0.022	0.018	<0.005
Turbidity (NTU)		-	-	-	-	-	-	-	-	-
FIELD MEASUREMENTS										
Temperature (°C)		6.6	17.8	4.8	21.8	7.5	12.1	5.7	23.1	3.6
Conductivity (umhos)		524	650	636	471	561	496	431	499	578
pH		7.94	8.14	8.27	8.43	8.16	8.0	7.35	7.42	8.31

NOTES:

1. All results in mg/L unless otherwise noted.
2. > means greater than.
3. < means less than.
4. <T means a measurable trace amount.
5. <W means no measurable response.
6. + means improperly preserved.
7. - means analysis not conducted.
8. PWQO indicates Provincial Water Quality Objectives.
9. (I) indicates interim PWQO
10. For hardness > 75 mg/L (as CaCO3)
11. Cadmium Interim PWQO = 0.0005 mg/L (for Hardness >100 mg/L as CaCO3)
12. Copper Interim PWQO = 0.005 mg/L (for Hardness >20 mg/L)
13. Undissociated Hydrogen Sulphide.
14. Revised Interim PWQO = 0.005 mg/L (for Alkalinity > 80 mg/L (as CaCO3)
15. Zinc Revised Interim PWQO = 0.020 mg/L
16. Alkalinity should not be decreased by more than 25 % of the natural concentration.
17. Interim PWQO = 0.075 mg/L for pH >6.5 to 9.0.
18. Aresenic Interim PWQO = 0.005 mg/L
19. PWQO = 0.020 mg/L to avoid nuisance algae growth, PWQO = 0.010 mg/L for high level of protection  
PWQO = 0.030 mg/L for prevention of excessive plant growth
20. Interim PWQO (revised) = 0.005 mg/L.
21. PWQO for un-ionized ammonia
22. PWQO = 0.1 mg/L. Interim PWQO = 0.005
23. Fraction (f) of NH3 where  $f = 1/(10^{pka - pH + 1})$ ;  $pka = 0.09018 + 2729.92/T$ ;  $T = ^\circ C +$

**TABLE F-2**  
**SURFACE WATER CHEMICAL RESULTS (2007-Present)**  
**HURON LANDFILLSITE**

Chemical Parameter	PWQO	SW2 Jul-07	SW2 Dec-07	SW2 Jul-08	SW2 Dec-08	SW2 Jul-09	SW2 Nov-09	SW2 Mar-10	SW2 Dec-10	SW2 Jun-11	SW2 Oct-11	SW2 Jun-12
Alkalinity(as CaCO3)	(16)	190	227	232	272	232	254	250	270	287	250	211
Chloride		13	37	11	14	12	22	11	13	9.4	19.4	10.0
Nitrate(as N)		nd	10	0.01	3.2	0.6	4.7	4.5	5.5	5.5	8.1	0.2
Nitrite(as N)		nd	nd	0.5	0.01	0.01	0.02	nd	<0.01	<0.1	<0.1	<0.1
Ammonia(as N)	0.02 (21)	0.08	0.09	0.12	0.07	0.07	nd	nd	<0.05	<0.01	<0.01	0.23
Unionized Ammonia as NH <sub>3</sub> (calc)	(23)	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen(as N)		0.7	-	-	0.4	0.7	0.8	0.5	0.5	0.54	0.71	0.65
Phosphorus, Total	(19)	-	-	-	0.024	0.048	0.041	0.013	0.041	0.04	0.04	0.05
Orthophosphate (as P)		0.02	nd	nd	-	-	-	-	-	-	-	-
Phenols		0.002	nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)		5.2	5.8	4.5	3	4.4	4	3.0	3.3	3.2	5.3	4.8
Conductivity		407	687	488	554	489	590	534	598	603	636	446
pH		8.2	8.2	8.3	8.2	8.1	8.2	8.2	8.28	8.00	8.10	8.09
Sulphate (as SO4)		16	44	19	14	17	17	19	14	15	18	12
Hardness(as CaCO3)		200	310	230	290	230	290	270	280	392	356	224
Aluminum	0.075 (17)	0.46	0.098	0.18	0.15	0.3	0.29	0.230	0.150	0.33	0.29	0.15
Arsenic	0.1 (22)	0.001	nd	nd	nd	nd	nd	nd	<0.001	0.0005	0.0015	0.0022
Beryllium	1.1 (10)	nd	nd	nd	nd	nd	nd	nd	<0.005	<0.002	<0.002	<0.0001
Boron	0.200 (I)	0.025	0.014	0.021	nd	0.021	0.019	0.013	<0.01	0.023	0.125	0.023
Cadmium	0.0002 (11)	0.0005	0.0018	0.0004	0.0001	0.0061	0.0004	nd	<0.0001	0.00013	0.00004	<0.00002
Calcium		47	91	64	80	61	77	79	85	106	98.1	50.6
Chromium	0.1	nd	nd	nd	nd	nd	nd	nd	<0.005	<0.002	<0.002	0.0006
Cobalt	0.0006 (I)	nd	nd	nd	nd	nd	nd	nd	<0.0005	0.0001	0.0016	0.0002
Copper	0.005 (12)	0.002	0.002	0.0002	nd	0.004	0.001	0.001	0.001	<0.002	<0.002	<0.002
Iron	0.3	0.59	0.11	0.22	0.18	0.35	0.27	0.21	0.14	0.269	0.248	0.235
Lead	0.025 (14)	0.0005	nd	nd	nd	nd	nd	nd	<0.0005	0.00010	0.00084	0.00011
Magnesium		23	26	26	24	23	21	24	25	30.7	27.0	23.8
Manganese		0.041	0.003	0.039	0.018	0.036	0.009	0.014	0.012	0.014	0.014	0.054
Molybdenum	0.010 (I)	nd	nd	nd	nd	nd	nd	nd	<0.001	0.0003	0.0004	0.0004
Nickel	0.025	0.002	nd	nd	nd	0.001	nd	nd	<0.001	<0.01	<0.01	<0.01
Potassium		2.5	5.9	2.4	1.7	1.9	2.3	1.9	2.0	2.6	3.7	2.7
Silver	0.0001	nd	nd	nd	nd	nd	nd	nd	<0.0001	<0.00002	<0.00002	<0.00002
Sodium		6.6	13	6.6	4.2	6.8	7.7	4.6	4.6	5.9	11.5	5.6
Vanadium	0.007 (I)	0.002	0.001	nd	0.002	0.001	0.002	nd	<0.001	<0.005	<0.005	<0.005
Zinc	0.030 (15)	0.008	nd	nd	nd	0.01	nd	nd	<0.005	<0.005	0.009	0.011
Turbidity (NTU)		6	8.7	-	-	-	-	-	-	-	-	-
FIELD MEASUREMENTS												
Temperature (°C)						22	6.9	7.0	-	16.8	10.92	24.5
Conductivity (umhos)						150	200	490	-	560	597	397
pH						7.91	8.12	8.86	-	8.5	8.23	7.98

NOTES:

1. All results in mg/L unless otherwise noted.
2. > means greater than.
3. < means less than.
4. <T means a measurable trace amount.
5. <W means no measurable response.
6. + means improperly preserved.
7. - means analysis not conducted.
8. PWQO indicates Provincial Water Quality Objectives.
9. (I) indicates interim PWQO
10. For hardness > 75 mg/L (as CaCO3)
11. Cadmium Interim PWQO = 0.0005 mg/L (for Hardness >100 mg/L as CaCO3)
12. Copper Interim PWQO = 0.005 mg/L (for Hardness >20 mg/L)
13. Undissociated Hydrogen Sulphide.
14. Revised Interim PWQO = 0.005 mg/L (for Alkalinity > 80 mg/L (as CaCO3))
15. Zinc Revised Interim PWQO = 0.020 mg/L
16. Alkalinity should not be decreased by more than 25 % of the natural concentration.
17. Interim PWQO = 0.075 mg/L for pH >6.5 to 9.0.
18. Aresenic Interim PWQO = 0.005 mg/L
19. PWQO = 0.020 mg/L to avoid nuisance algae growth, PWQO = 0.010 mg/L for high level of protection  
PWQO = 0.030 mg/L for prevention of excessive plant growth
20. Interim PWQO (revised) = 0.005 mg/L.
21. PWQO for un-ionized ammonia
22. PWQO = 0.1 mg/L. Interim PWQO = 0.005
23. Fraction (f) of NH3 where  $f = 1/(10^{pka - pH + 1})$ ;  $pka = 0.09018 + 2729.92/T$ ;  $T = ^\circ C +$

**TABLE F-2**  
**SURFACE WATER CHEMICAL RESULTS (2007-Present)**  
**HURON LANDFILLSITE**

Chemical Parameter	PWQO	SW2 Oct-12	SW2 Jun-13	SW2 Nov-13	SW2 Jul-14	SW2 Nov-14	SW2 May-15	SW2 Oct-15	SW2 Jun-16	SW2 Nov-16	SW2 Jun-17	SW2 Oct-17	SW2 May-18
Alkalinity(as CaCO3)	(16)	233	219	255	191	255	240	231	247	234	220	297	228
Chloride		22.4	10.6	11.1	9.7	11.7	11.4	18.7	16.2	17.5	10.4	15.0	13.1
Nitrate(as N)		11.8	4.4	5.1	1.0	5.9	1.16	<0.10	14.1	<0.1	3.23	9.69	3.82
Nitrite(as N)		0.2	<0.1	<0.1	<0.1	<0.1	<0.25	<0.10	0.2	<0.1	0.20	<0.05	<0.05
Ammonia(as N)	0.02 (21)	<0.01	0.01	<0.01	0.04	0.09	<0.02	<0.02	0.02	<0.01	0.04	0.02	0.08
Unionized Ammonia as NH <sub>3</sub> (calc)	(23)	-	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.02
Total Kjeldahl Nitrogen(as N)		0.81	0.48	0.49	0.53	0.9	0.44	0.93	0.81	0.57	0.9	0.66	0.5
Phosphorus, Total	(19)	0.02	0.01	0.03	0.04	0.09	0.02	0.08	0.02	0.03	0.07	0.06	0.03
Orthophosphate (as P)		-	-	-	-	-	-	-	-	-	-	-	-
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.007	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)		5.4	6.0	6.1	4.9	6.0	4.1	10.4	4.2	9.9	4.7	5.4	4.5
Conductivity		618	478	493	429	509	497	498	588	514	486	688	510
pH		8.21	8.01	8.19	8.15	8.18	8.45	7.97	8.24	7.94	8.05	8.29	8.37
Sulphate (as SO4)		21	14	13	13	11	14.3	7.07	15	16	13	12	12
Hardness(as CaCO3)		353	231	252	238	284	255	228	295	267	262	339	265
Aluminum	0.075 (17)	0.16	0.16	0.21	0.28	0.49	<0.004	<0.004	0.10	0.08	0.12	0.13	0.15
Arsenic	0.1 (22)	0.0006	0.0004	0.0003	0.0006	<0.0001	<0.003	<0.003	0.0003	0.0007	0.0006	<0.0005	0.0004
Beryllium	1.1 (10)	<0.0001	<0.0001	<0.002	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.002	<0.002
Boron	0.200 (I)	0.011	0.012	0.009	0.024	<0.005	0.014	0.035	0.016	0.022	0.023	0.014	0.013
Cadmium	0.0002 (11)	<0.00002	<0.00002	<0.00002	<0.00002	0.00010	<0.0001	<0.0001	0.00002	<0.00002	0.000033	<0.000070	<0.000015
Calcium		97.8	56.4	68.7	56.1	78.1	62.4	55.6	79.7	66.7	64.1	91.3	67.6
Chromium	0.1	<0.002	0.0003	<0.002	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002	<0.001	<0.001	<0.002
Cobalt	0.0006 (I)	0.0001	0.0001	<0.0001	0.0003	0.0002	<0.0005	0.0008	<0.0001	<0.0001	0.0002	<0.0005	<0.005
Copper	0.005 (12)	0.0023	0.0019	0.0015	0.0017	0.0092	<0.002	<0.002	0.0013	0.0008	0.0022	0.0009	<0.002
Iron	0.3	0.070	0.143	0.186	0.300	0.507	0.07	1.07	0.080	0.242	0.164	0.119	0.146
Lead	0.025 (14)	0.00007	0.00012	0.00009	0.00029	0.00103	<0.001	<0.001	0.00006	0.00004	0.00022	<0.0001	0.00007
Magnesium		26.5	22.0	19.4	23.7	21.6	24.0	21.6	23.4	24.4	24.9	26.9	23.4
Manganese		0.004	0.011	0.015	0.028	0.037	0.023	0.824	0.006	0.070	0.020	0.005	0.008
Molybdenum	0.010 (I)	0.0012	0.0004	0.0003	0.0005	0.0004	<0.001	<0.001	0.0003	0.0003	0.0004	<0.0005	0.0003
Nickel	0.025	<0.01	<0.01	<0.01	<0.01	0.0047	<0.003	<0.003	0.0018	0.0024	0.0019	0.003	<0.01
Potassium		4.4	1.5	1.8	2.7	3.2	1.89	8.29	2.1	7.9	2.2	2.6	2.0
Silver	0.0001	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.0001	<0.0001	<0.00002	<0.00002	<0.00002	<0.0001	<0.0001
Sodium		8.1	4.9	5.7	5.2	6.1	5.32	9.26	4.4	10.0	6.7	5.7	6.2
Vanadium	0.007 (I)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.030 (15)	<0.005	<0.005	<0.005	0.007	0.021	<0.005	<0.005	<0.005	<0.005	0.054	<0.005	<0.005
Turbidity (NTU)		-	-	-	-	-	-	-	-	-	-	-	-
<b>FIELD MEASUREMENTS</b>													
Temperature (°C)		12.8	18	4.2	18.9	4.1	15.2	12.0	14.6	11.0	20.0	8.8	16.2
Conductivity (umhos)		567	530	468	432	566	479	438	609	473	478	702	481
pH		8.34	8.24	8.30	8.09	8.30	8.18	7.63	8.31	7.70	7.6	8.02	7.63

**NOTES:**

1. All results in mg/L unless otherwise noted.
2. > means greater than.
3. < means less than.
4. <T means a measurable trace amount.
5. <W means no measurable response.
6. + means improperly preserved.
7. - means analysis not conducted.
8. PWQO indicates Provincial Water Quality Objectives.
9. (I) indicates interim PWQO
10. For hardness > 75 mg/L (as CaCO3)
11. Cadmium Interim PWQO = 0.0005 mg/L (for Hardness >100 mg/L as CaCO3)
12. Copper Interim PWQO = 0.005 mg/L (for Hardness >20 mg/L)
13. Undissociated Hydrogen Sulphide.
14. Revised Interim PWQO = 0.005 mg/L (for Alkalinity > 80 mg/L (as CaCO3)
15. Zinc Revised Interim PWQO = 0.020 mg/L
16. Alkalinity should not be decreased by more than 25 % of the natural concentration.
17. Interim PWQO = 0.075 mg/L for pH >6.5 to 9.0.
18. Aresenic Interim PWQO = 0.005 mg/L
19. PWQO = 0.020 mg/L to avoid nuisance algae growth, PWQO = 0.010 mg/L for high level of protection  
PWQO = 0.030 mg/L for prevention of excessive plant growth
20. Interim PWQO (revised) = 0.005 mg/L.
21. PWQO for un-ionized ammonia
22. PWQO = 0.1 mg/L. Interim PWQO = 0.005
23. Fraction (f) of NH3 where  $f = 1/(10^{pka - pH + 1})$ ;  $pka = 0.09018 + 2729.92/T$ ;  $T = ^\circ C +$

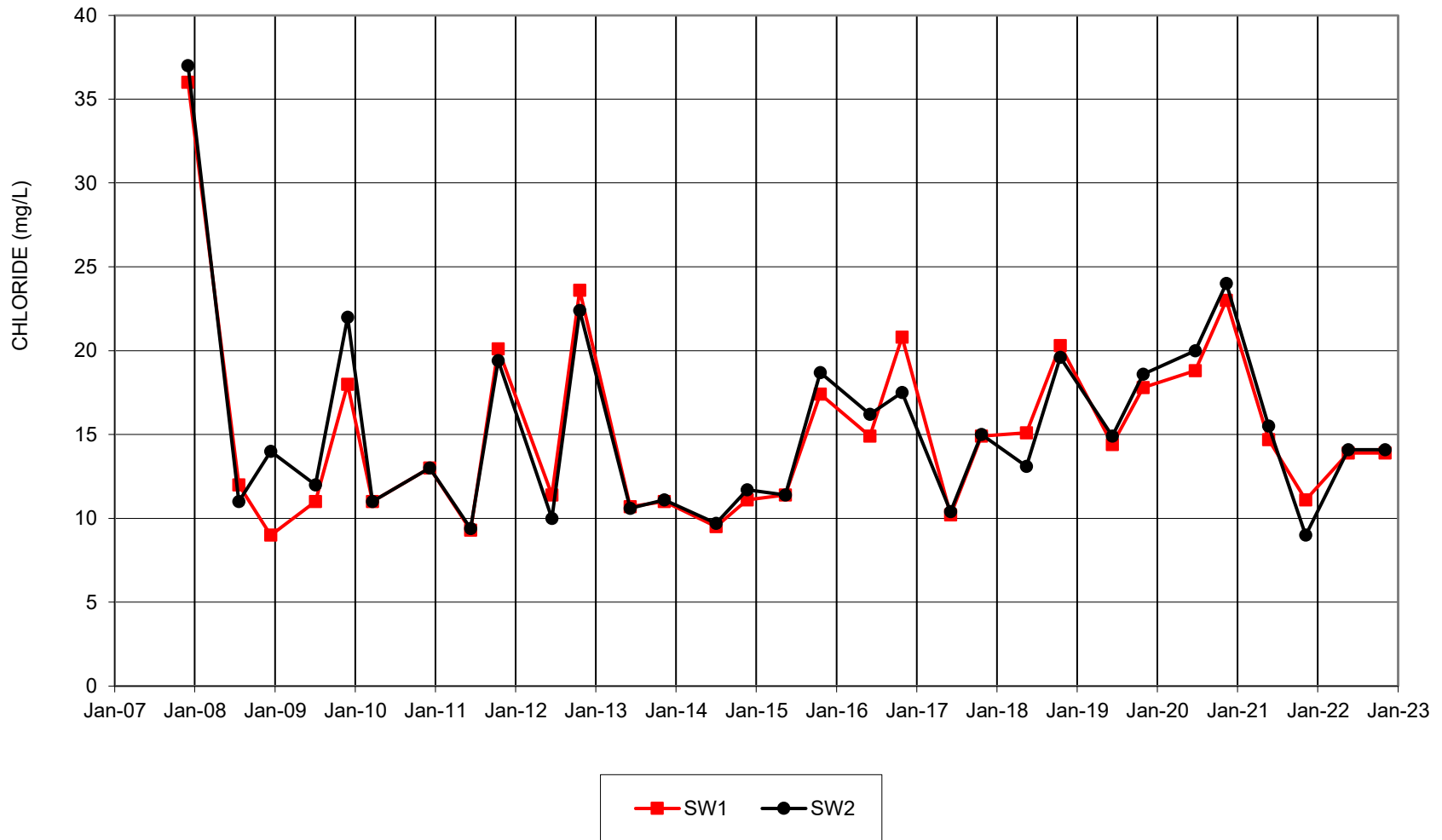
**TABLE F-2**  
**SURFACE WATER CHEMICAL RESULTS (2007-Present)**  
**HURON LANDFILLSITE**

Chemical Parameter	PWQO	SW2 Oct-18	SW2 Jun-19	SW2 Nov-19	SW2 Jul-20	SW2 Nov-20	SW2 Jun-21	SW2 Nov-21	SW2 May-22	SW2 Nov-22
Alkalinity(as CaCO3)	(16)	262	239	219	213	271	231	149	247	269
Chloride		19.6	14.9	18.6	20	24	15.5	9.0	14.1	5.4
Nitrate(as N)		1.05	9.93	14.3	5.85	7.81	0.81	4.88	1.95	0.15
Nitrite(as N)		<0.05	<0.05	<0.05	0.06	<0.05	0.09	<0.05	<0.05	<0.05
Ammonia(as N)	0.02 (21)	0.05	0.22	0.03	0.08	0.02	0.05	0.10	0.07	0.02
Unionized Ammonia as NH <sub>3</sub> (calc)	(23)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Total Kjeldahl Nitrogen(as N)		0.5	0.7	0.6	0.6	0.5	0.7	1.8	0.7	0.2
Phosphorus, Total	(19)	0.03	0.04	0.05	0.03	0.02	0.04	0.59	0.04	0.03
Orthophosphate (as P)		-	-	-	-	-	-	-	-	-
Phenols		0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
Dissolved Organic Carbon(DOC)		7.7	4.3	5.3	4.6	3.9	6.0	6.6	6.0	5.8
Conductivity		602	584	630	517	678	495	345	525	513
pH		8.22	8.21	8.26	8.21	8.31	8.18	8.06	8.10	8.06
Sulphate (as SO4)		17	14	16	17	17	15	6	14	7
Hardness(as CaCO3)		335	316	323	273	369	255	220	271	285
Aluminum	0.075 (17)	0.06	0.09	0.19	0.08	0.09	0.08	4.24	0.08	0.02
Arsenic	0.1 (22)	0.0005	0.0004	0.0003	0.0006	0.0003	0.0007	0.0008	0.0006	0.0003
Beryllium	1.1 (10)	<0.002	<0.002	<0.002	<0.002	<0.0001	<0.002	<0.002	<0.0001	<0.0001
Boron	0.200 (I)	0.024	0.014	0.009	0.022	0.011	0.017	0.017	0.013	0.016
Cadmium	0.0002 (11)	0.000016	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015	0.000087	<0.000015	<0.000015
Calcium		86.4	83.7	86.3	62.8	99.9	56.5	59.1	67.5	76.2
Chromium	0.1	<0.002	<0.001	<0.002	<0.002	<0.001	<0.002	0.008	<0.001	<0.001
Cobalt	0.0006 (I)	0.008	0.0003	<0.005	<0.005	0.0001	<0.005	<0.005	0.0002	<0.0001
Copper	0.005 (12)	0.008	0.0012	0.003	<0.002	0.0011	0.002	0.007	0.0016	0.0005
Iron	0.3	0.138	0.113	0.203	0.101	0.140	0.174	5.01	0.176	0.034
Lead	0.025 (14)	0.00021	0.00007	0.00019	0.00016	0.00014	0.00016	0.00274	0.00019	0.00006
Magnesium		29	25.9	26.1	28.1	28.9	27.7	17.6	24.8	23.0
Manganese		0.018	0.008	0.012	0.009	0.007	0.026	0.120	0.032	0.022
Molybdenum	0.010 (I)	0.0004	0.0003	0.0002	0.0004	0.0002	0.0004	0.0001	0.0004	0.0002
Nickel	0.025	<0.01	<0.01	<0.01	<0.01	0.0005	<0.01	<0.01	0.0007	0.0004
Potassium		5.3	2.2	3.1	2.6	2.3	3.2	5.4	2.0	1.3
Silver	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium		10.4	5.1	6.2	6	7	6.6	3.1	5.9	3.2
Vanadium	0.007 (I)	<0.005	0.0007	<0.005	<0.005	0.0006	<0.005	0.007	<0.005	<0.005
Zinc	0.030 (15)	0.013	0.007	0.009	<0.005	0.01	<0.005	0.044	0.010	<0.005
Turbidity (NTU)		-	-	-	-	-	-	-	-	-
FIELD MEASUREMENTS										
Temperature (°C)		6.9	17.5	4.5	22.8	7.0	14.1	6.3	21.1	2.5
Conductivity (umhos)		512	650	652	488	563	490	363	497	653
pH		8.40	8.22	8.08	8.42	8.13	7.78	7.32	7.4	8.26

NOTES:

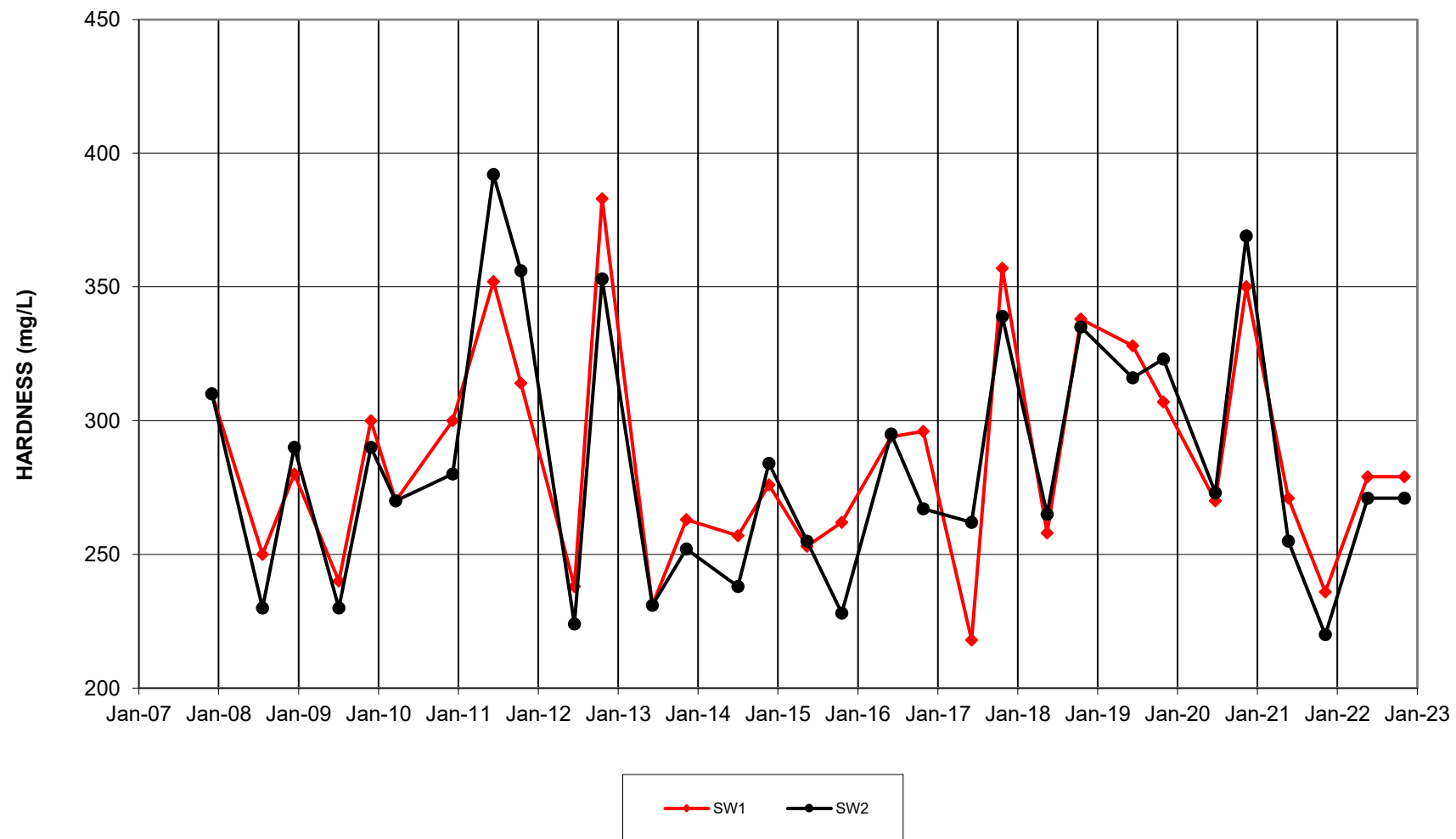
1. All results in mg/L unless otherwise noted.
2. > means greater than.
3. < means less than.
4. <T means a measurable trace amount.
5. <W means no measurable response.
6. + means improperly preserved.
7. - means analysis not conducted.
8. PWQO indicates Provincial Water Quality Objectives.
9. (I) indicates interim PWQO
10. For hardness > 75 mg/L (as CaCO3)
11. Cadmium Interim PWQO = 0.0005 mg/L (for Hardness >100 mg/L as CaCO3)
12. Copper Interim PWQO = 0.005 mg/L(for Hardness >20 mg/L)
13. Undissociated Hydrogen Sulphide.
14. Revised Interim PWQO = 0.005 mg/L (for Alkalinity > 80 mg/L (as CaCO3)
15. Zinc Revised Interim PWQO = 0.020 mg/L
16. Alkalinity should not be decreased by more than 25 % of the natural concentration.
17. Interim PWQO = 0.075 mg/L for pH >6.5 to 9.0.
18. Aresenic Interim PWQO = 0.005 mg/L
19. PWQO = 0.020 mg/L to avoid nuisance algae growth, PWQO = 0.010 mg/L for high level of protection  
PWQO = 0.030 mg/L for prevention of excessive plant growth
20. Interim PWQO (revised) = 0.005 mg/L.
21. PWQO for un-ionized ammonia
22. PWQO = 0.1 mg/L. Interim PWQO = 0.005
23. Fraction (f) of NH3 where  $f = 1/(10^{pka - pH + 1})$ ;  $pka = 0.09018 + 2729.92/T$ ;  $T = ^\circ C +$

**FIGURE F-1  
CHLORIDE - SURFACE WATER  
HURON LANDFILL**

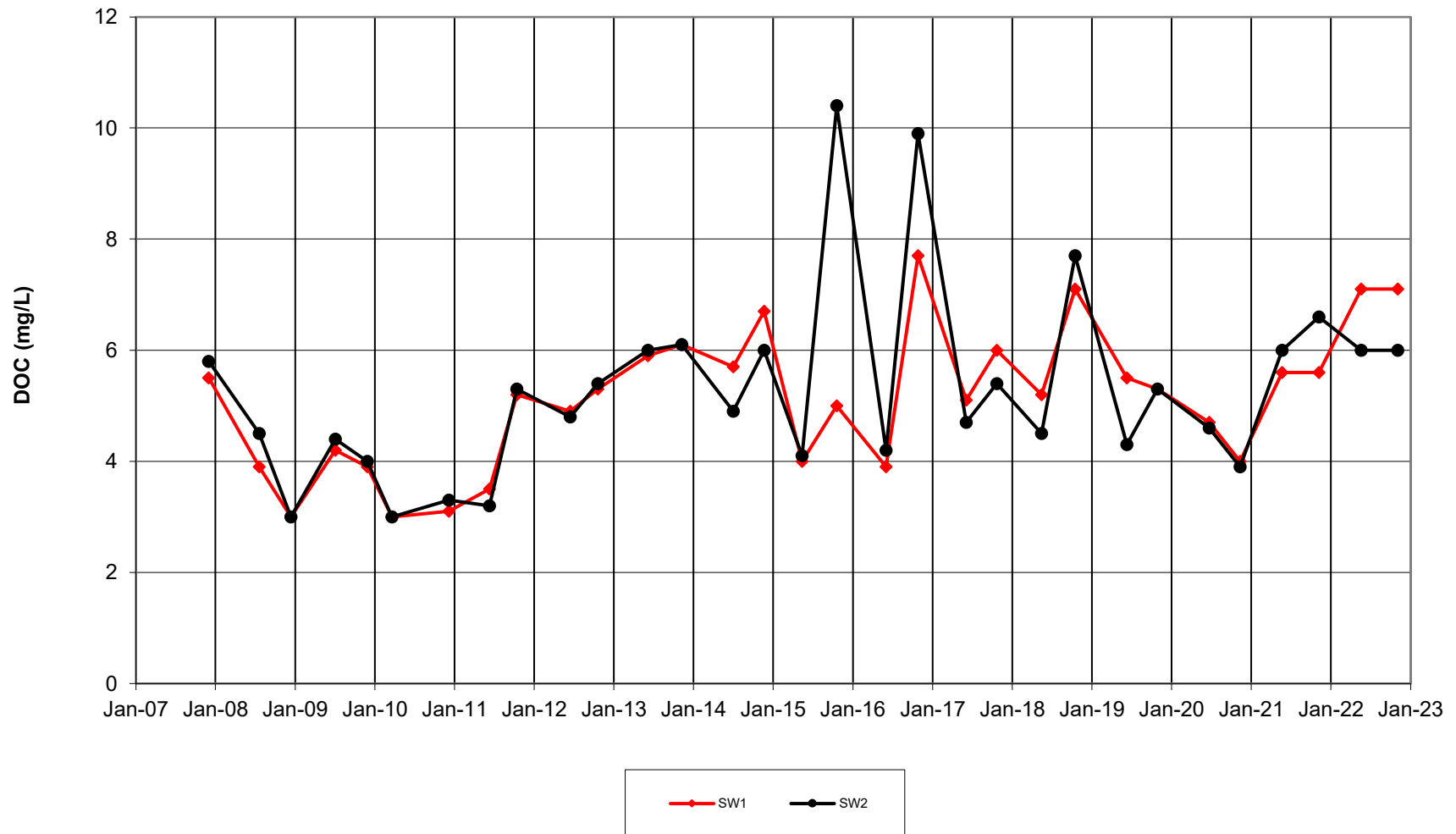




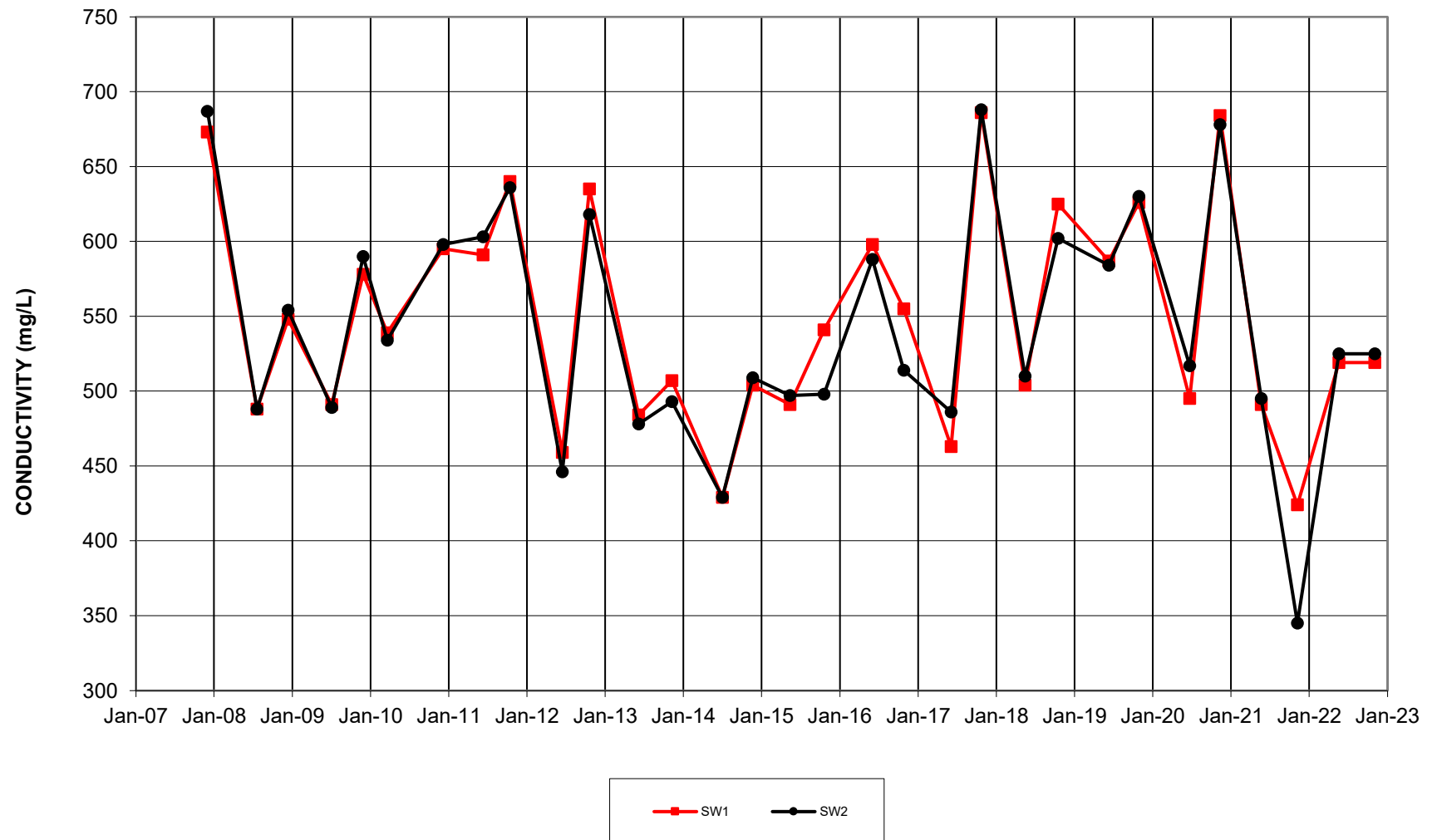
**FIGURE F-2  
HARDNESS - SURFACE WATER  
HURON LANDFILL**



**FIGURE F-3**  
**DOC - SURFACE WATER**  
**HURON LANDFILL**



**FIGURE F-4**  
**CONDUCTIVITY - SURFACE WATER**  
**HURON LANDFILL**



# APPENDIX

G

CERTIFICATES OF  
ANALYSIS AND  
LABORATORY  
RESULTS

**C.O.C.: G098537, 098527**

**REPORT No. B22-16510**

**Report To:**

**WSP Canada Inc.**

1450 1st Ave. West, Suite 101  
Owen Sound ON N4K 6W2 Canada

**Attention:** Sarah Hutchessan

**Caduceon Environmental Laboratories**

2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 01-Jun-22

JOB/PROJECT NO.: Huron WDS - 121-60020-21

DATE REPORTED: 22-Jun-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		OW1	OW3	OW4	OW5
			Sample I.D.		B22-16510-1	B22-16510-2	B22-16510-3	B22-16510-4
			Date Collected		31-May-22	31-May-22	31-May-22	31-May-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	06-Jun-22/O	452	456	392	451
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Jun-22/O	390	397	320	333
pH @25°C	pH Units		SM 4500H	06-Jun-22/O	7.99	7.88	7.97	8.14
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Jun-22/O	985	1060	783	974
Chloride	mg/L	0.5	SM4110C	07-Jun-22/O	56.9	116	16.5	107
Nitrite (N)	mg/L	0.1	SM4110C	07-Jun-22/O	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	0.1	SM4110C	07-Jun-22/O	0.4	0.2	0.2	0.2
Sulphate	mg/L	1	SM4110C	07-Jun-22/O	80	14	99	46
Calcium	mg/L	0.02	SM 3120	06-Jun-22/O	95.4	96.8	89.7	95.7
Magnesium	mg/L	0.02	SM 3120	06-Jun-22/O	51.8	52.1	40.8	51.5
Potassium	mg/L	0.1	SM 3120	06-Jun-22/O	2.7	1.9	1.4	1.8
Sodium	mg/L	0.2	SM 3120	06-Jun-22/O	42.1	43.7	16.9	37.0
Aluminum	mg/L	0.01	SM 3120	06-Jun-22/O	0.03	0.03	0.03	0.04
Arsenic	mg/L	0.0001	EPA 200.8	21-Jun-22/O	0.0010	0.0011	0.0003	0.0017
Barium	mg/L	0.001	SM 3120	06-Jun-22/O	0.094	0.108	0.069	0.112
Boron	mg/L	0.005	SM 3120	06-Jun-22/O	0.393	0.122	0.035	0.107
Cadmium	mg/L	0.000015	EPA 200.8	21-Jun-22/O	0.000051	0.000016	< 0.000015	0.000020
Chromium	mg/L	0.002	SM 3120	06-Jun-22/O	< 0.002	< 0.002	< 0.002	< 0.002
Copper	mg/L	0.002	SM 3120	06-Jun-22/O	< 0.002	< 0.002	< 0.002	< 0.002
Iron	mg/L	0.005	SM 3120	06-Jun-22/O	0.005	< 0.005	< 0.005	0.005
Lead	mg/L	0.00002	EPA 200.8	21-Jun-22/O	0.00010	0.00008	0.00005	0.00007
Manganese	mg/L	0.001	SM 3120	06-Jun-22/O	< 0.001	0.014	< 0.001	< 0.001
Zinc	mg/L	0.005	SM 3120	06-Jun-22/O	0.020	< 0.005	< 0.005	< 0.005
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Jun-22/K	0.02	< 0.01	0.02	< 0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	06-Jun-22/K	0.5	0.4	0.8	0.7
Phosphorus-Total	mg/L	0.01	E3516.2	06-Jun-22/K	0.12	0.08	0.71	0.67
Phenolics	mg/L	0.001	MOEE 3179	16-Jun-22/K	< 0.001	< 0.001	< 0.001	< 0.001



Greg Clarkin, BSc., C. Chem  
Lab Manager - Ottawa District

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an \*

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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JOB/PROJECT NO.: Huron WDS - 121-60020-21

DATE REPORTED: 22-Jun-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		OW1	OW3	OW4	OW5
			Sample I.D.		B22-16510-1	B22-16510-2	B22-16510-3	B22-16510-4
			Date Collected		31-May-22	31-May-22	31-May-22	31-May-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	06-Jun-22/O	4.1	2.3	3.3	2.7
Anion Sum	meq/L		Calc.	08-Jun-22/O	11.1	11.5	8.93	10.7
Cation Sum	meq/L		Calc.	08-Jun-22/O	10.9	11.1	8.60	10.7
% Difference	%		Calc.	08-Jun-22/O	0.657	1.91	1.84	0.0276
Ion Ratio	AS/CS		Calc.	08-Jun-22/O	1.01	1.04	1.04	1.00
Sodium Adsorption Ratio	-		Calc.	08-Jun-22/O	0.862	0.890	0.371	0.757
TDS(ion sum calc.)	mg/L	1	Calc.	08-Jun-22/O	564	563	457	541
Conductivity (calc.)	µmho/cm		Calc.	08-Jun-22/O	988	1044	794	998
TDS(calc.)/EC(actual)	-		Calc.	08-Jun-22/O	0.573	0.533	0.584	0.555
EC(calc.)/EC(actual)	-		Calc.	08-Jun-22/O	1.00	0.987	1.01	1.02
Langelier Index(25°C)	S.I.		Calc.	08-Jun-22/O	1.09	0.992	0.965	1.17

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Lab Manager - Ottawa District

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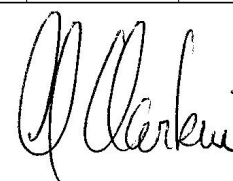
DATE REPORTED: 22-Jun-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		OW6	OW7S	OW8S	OW8D
			Sample I.D.		B22-16510-5	B22-16510-6	B22-16510-7	B22-16510-8
			Date Collected		31-May-22	31-May-22	31-May-22	31-May-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	06-Jun-22/O	1150	144	255	176
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Jun-22/O	1470	176	222	154
pH @25°C	pH Units		SM 4500H	06-Jun-22/O	7.59	7.95	8.11	8.03
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Jun-22/O	3720	508	743	683
Chloride	mg/L	0.5	SM4110C	07-Jun-22/O	480	30.6	57.8	8.5
Nitrite (N)	mg/L	0.1	SM4110C	07-Jun-22/O	< 1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	0.1	SM4110C	07-Jun-22/O	< 1	0.3	0.2	0.3
Sulphate	mg/L	1	SM4110C	07-Jun-22/O	< 10	47	93	182
Calcium	mg/L	0.02	SM 3120	06-Jun-22/O	144	28.8	42.4	37.4
Magnesium	mg/L	0.02	SM 3120	06-Jun-22/O	192	17.6	36.1	20.2
Potassium	mg/L	0.1	SM 3120	06-Jun-22/O	22.1	1.1	1.5	1.4
Sodium	mg/L	0.2	SM 3120	06-Jun-22/O	407	58.6	67.1	81.0
Aluminum	mg/L	0.01	SM 3120	06-Jun-22/O	0.06	< 0.01	0.02	< 0.01
Arsenic	mg/L	0.0001	EPA 200.8	21-Jun-22/O	0.0106	0.0007	0.0008	0.0002
Barium	mg/L	0.001	SM 3120	06-Jun-22/O	0.749	0.036	0.053	0.026
Boron	mg/L	0.005	SM 3120	06-Jun-22/O	0.640	0.303	0.424	0.527
Cadmium	mg/L	0.000015	EPA 200.8	21-Jun-22/O	< 0.000070	0.000031	0.000025	0.000318
Chromium	mg/L	0.002	SM 3120	06-Jun-22/O	< 0.002	< 0.002	< 0.002	< 0.002
Copper	mg/L	0.002	SM 3120	06-Jun-22/O	< 0.002	< 0.002	0.010	< 0.002
Iron	mg/L	0.005	SM 3120	06-Jun-22/O	4.98	< 0.005	0.008	< 0.005
Lead	mg/L	0.00002	EPA 200.8	21-Jun-22/O	0.00021	0.00004	0.00081	0.00003
Manganese	mg/L	0.001	SM 3120	06-Jun-22/O	0.020	< 0.001	< 0.001	< 0.001
Zinc	mg/L	0.005	SM 3120	06-Jun-22/O	< 0.005	< 0.005	< 0.005	< 0.005
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Jun-22/K	40.9	0.17	< 0.01	< 0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	06-Jun-22/K	< 0.1	< 0.1	0.1	0.2
Phosphorus-Total	mg/L	0.01	E3516.2	06-Jun-22/K	0.01	0.02	0.06	0.02
Phenolics	mg/L	0.001	MOEE 3179	16-Jun-22/K	0.002	< 0.001	< 0.001	< 0.001



Greg Clarkin, BSc., C. Chem  
Lab Manager - Ottawa District

R.L. = Reporting Limit

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Ottawa Ontario K1V 7P1  
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Fax: 613-526-1244

DATE RECEIVED: 01-Jun-22

JOB/PROJECT NO.: Huron WDS - 121-60020-21

DATE REPORTED: 22-Jun-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		OW6	OW7S	OW8S	OW8D
			Sample I.D.		B22-16510-5	B22-16510-6	B22-16510-7	B22-16510-8
			Date Collected		31-May-22	31-May-22	31-May-22	31-May-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	06-Jun-22/O	16.5	16.5	0.7	1.9
Anion Sum	meq/L		Calc.	08-Jun-22/O	42.9	5.42	8.02	7.14
Cation Sum	meq/L		Calc.	08-Jun-22/O	41.5	5.46	8.04	7.08
% Difference	%		Calc.	08-Jun-22/O	1.67	0.402	0.162	0.358
Ion Ratio	AS/CS		Calc.	08-Jun-22/O	1.03	0.992	0.997	1.01
Sodium Adsorption Ratio	-		Calc.	08-Jun-22/O	5.23	2.12	1.83	2.65
TDS(ion sum calc.)	mg/L	1	Calc.	08-Jun-22/O	2132	291	432	424
Conductivity (calc.)	µmho/cm		Calc.	08-Jun-22/O	3315	524	767	700
TDS(calc.)/EC(actual)	-		Calc.	08-Jun-22/O	0.573	0.574	0.581	0.621
EC(calc.)/EC(actual)	-		Calc.	08-Jun-22/O	0.891	1.03	1.03	1.03
Langelier Index(25°C)	S.I.		Calc.	08-Jun-22/O	1.39	0.213	0.622	0.329

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SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		OW7D	OW9	OW10S	OW10D
			Sample I.D.		B22-16510-9	B22-16510-10	B22-16510-11	B22-16510-12
			Date Collected		31-May-22	31-May-22	31-May-22	31-May-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	06-Jun-22/O	84	161	355	223
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Jun-22/O	166	102	253	201
pH @25°C	pH Units		SM 4500H	06-Jun-22/O	8.12	7.98	8.08	8.06
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Jun-22/O	458	675	780	566
Chloride	mg/L	0.5	SM4110C	07-Jun-22/O	11.0	1.7	1.0	5.1
Nitrite (N)	mg/L	0.1	SM4110C	07-Jun-22/O	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	0.1	SM4110C	07-Jun-22/O	0.4	0.3	0.5	0.4
Sulphate	mg/L	1	SM4110C	07-Jun-22/O	54	229	178	94
Calcium	mg/L	0.02	SM 3120	06-Jun-22/O	18.7	33.9	69.4	48.4
Magnesium	mg/L	0.02	SM 3120	06-Jun-22/O	9.01	18.6	44.3	24.7
Potassium	mg/L	0.1	SM 3120	06-Jun-22/O	1.0	1.1	1.7	1.4
Sodium	mg/L	0.2	SM 3120	06-Jun-22/O	70.8	73.3	40.3	24.0
Aluminum	mg/L	0.01	SM 3120	06-Jun-22/O	< 0.01	< 0.01	0.05	0.01
Arsenic	mg/L	0.0001	EPA 200.8	21-Jun-22/O	0.0005	0.0071	0.0004	0.0004
Barium	mg/L	0.001	SM 3120	06-Jun-22/O	0.037	0.023	0.024	0.104
Boron	mg/L	0.005	SM 3120	06-Jun-22/O	0.470	0.490	0.341	0.152
Cadmium	mg/L	0.00015	EPA 200.8	21-Jun-22/O	0.000153	0.000081	0.000024	< 0.000015
Chromium	mg/L	0.002	SM 3120	06-Jun-22/O	< 0.002	< 0.002	< 0.002	< 0.002
Copper	mg/L	0.002	SM 3120	06-Jun-22/O	< 0.002	< 0.002	< 0.002	< 0.002
Iron	mg/L	0.005	SM 3120	06-Jun-22/O	< 0.005	< 0.005	0.045	0.005
Lead	mg/L	0.00002	EPA 200.8	21-Jun-22/O	0.00003	0.00007	0.00011	0.00005
Manganese	mg/L	0.001	SM 3120	06-Jun-22/O	< 0.001	0.005	0.002	0.015
Zinc	mg/L	0.005	SM 3120	06-Jun-22/O	< 0.005	< 0.005	< 0.005	< 0.005
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Jun-22/K	< 0.01	0.05	< 0.01	< 0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	06-Jun-22/K	0.2	0.2	0.2	0.1
Phosphorus-Total	mg/L	0.01	E3516.2	06-Jun-22/K	0.04	0.17	0.30	0.21



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Lab Manager - Ottawa District

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WATERWORKS NO.

			Client I.D.	OW7D	OW9	OW10S	OW10D
			Sample I.D.	B22-16510-9	B22-16510-10	B22-16510-11	B22-16510-12
			Date Collected	31-May-22	31-May-22	31-May-22	31-May-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Phenolics	mg/L	0.001	MOEE 3179	16-Jun-22/K	< 0.001	< 0.001	< 0.001
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	06-Jun-22/O	2.0	2.3	1.3
Anion Sum	meq/L		Calc.	08-Jun-22/O	4.81	6.90	8.83
Cation Sum	meq/L		Calc.	08-Jun-22/O	4.78	6.44	8.90
% Difference	%		Calc.	08-Jun-22/O	0.303	3.44	0.450
Ion Ratio	AS/CS		Calc.	08-Jun-22/O	1.01	1.07	0.991
Sodium Adsorption Ratio	-		Calc.	08-Jun-22/O	3.37	2.51	0.931
TDS(ion sum calc.)	mg/L	1	Calc.	08-Jun-22/O	266	420	489
Conductivity (calc.)	µmho/cm		Calc.	08-Jun-22/O	459	684	816
TDS(calc.)/EC(actual)	-		Calc.	08-Jun-22/O	0.582	0.623	0.627
EC(calc.)/EC(actual)	-		Calc.	08-Jun-22/O	1.00	1.01	1.05
Langelier Index(25°C)	S.I.		Calc.	08-Jun-22/O	0.177	0.0562	0.861

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an \*

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie



Greg Clarkin , BSc., C. Chem  
Lab Manager - Ottawa District

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**C.O.C.: G098537, 098527**

**REPORT No. B22-16510**

**Report To:**

**WSP Canada Inc.**

1450 1st Ave. West, Suite 101  
Owen Sound ON N4K 6W2 Canada

**Attention:** Sarah Hutchessan

**Caduceon Environmental Laboratories**

2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 01-Jun-22

JOB/PROJECT NO.: Huron WDS - 121-60020-21

DATE REPORTED: 22-Jun-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		OW11	GW Duplicate #1		
			Sample I.D.		B22-16510-13	B22-16510-14		
			Date Collected		31-May-22	31-May-22		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO <sub>3</sub> )	mg/L	1	SM 3120	06-Jun-22/O	928	1150		
Alkalinity(CaCO <sub>3</sub> ) to pH4.5	mg/L	5	SM 2320B	06-Jun-22/O	916	1470		
pH @25°C	pH Units		SM 4500H	06-Jun-22/O	7.45	7.57		
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Jun-22/O	2430	3740		
Chloride	mg/L	0.5	SM4110C	07-Jun-22/O	306	516		
Nitrite (N)	mg/L	0.1	SM4110C	07-Jun-22/O	< 1	< 1		
Nitrate (N)	mg/L	0.1	SM4110C	07-Jun-22/O	< 1	< 1		
Sulphate	mg/L	1	SM4110C	07-Jun-22/O	< 10	< 10		
Calcium	mg/L	0.02	SM 3120	06-Jun-22/O	165	144		
Magnesium	mg/L	0.02	SM 3120	06-Jun-22/O	125	192		
Potassium	mg/L	0.1	SM 3120	06-Jun-22/O	30.1	22.3		
Sodium	mg/L	0.2	SM 3120	06-Jun-22/O	111	408		
Aluminum	mg/L	0.01	SM 3120	06-Jun-22/O	0.06	0.06		
Arsenic	mg/L	0.0001	EPA 200.8	21-Jun-22/O	0.0027	0.0111		
Barium	mg/L	0.001	SM 3120	06-Jun-22/O	0.244	0.745		
Boron	mg/L	0.005	SM 3120	06-Jun-22/O	0.554	0.637		
Cadmium	mg/L	0.00015	EPA 200.8	21-Jun-22/O	< 0.000070	< 0.000070		
Chromium	mg/L	0.002	SM 3120	06-Jun-22/O	< 0.002	< 0.002		
Copper	mg/L	0.002	SM 3120	06-Jun-22/O	< 0.002	< 0.002		
Iron	mg/L	0.005	SM 3120	06-Jun-22/O	14.6	4.84		
Lead	mg/L	0.00002	EPA 200.8	21-Jun-22/O	0.00023	0.00018		
Manganese	mg/L	0.001	SM 3120	06-Jun-22/O	0.226	0.020		
Zinc	mg/L	0.005	SM 3120	06-Jun-22/O	< 0.005	< 0.005		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH <sub>3</sub> -H	07-Jun-22/K	49.2	31.7		
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	06-Jun-22/K	53.6	49.3		



Greg Clarkin , BSc., C. Chem  
Lab Manager - Ottawa District

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**C.O.C.: G098537, 098527**

**REPORT No. B22-16510**

**Report To:**

**WSP Canada Inc.**

1450 1st Ave. West, Suite 101  
Owen Sound ON N4K 6W2 Canada

**Attention:** Sarah Hutchessan

**Caduceon Environmental Laboratories**

2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 01-Jun-22

JOB/PROJECT NO.: Huron WDS - 121-60020-21

DATE REPORTED: 22-Jun-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		OW11	GW Duplicate #1		
			Sample I.D.		B22-16510-13	B22-16510-14		
			Date Collected		31-May-22	31-May-22		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Phosphorus-Total	mg/L	0.01	E3516.2	06-Jun-22/K	0.76	1.35		
Phenolics	mg/L	0.001	MOEE 3179	16-Jun-22/K	0.002	0.002		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	06-Jun-22/O	8.2	16.6		
Anion Sum	meq/L		Calc.	08-Jun-22/O	26.9	44.0		
Cation Sum	meq/L		Calc.	08-Jun-22/O	24.9	41.6		
% Difference	%		Calc.	08-Jun-22/O	3.89	2.82		
Ion Ratio	AS/CS		Calc.	08-Jun-22/O	1.08	1.06		
Sodium Adsorption Ratio	-		Calc.	08-Jun-22/O	1.58	5.23		
TDS(ion sum calc.)	mg/L	1	Calc.	08-Jun-22/O	1301	2171		
Conductivity (calc.)	µmho/cm		Calc.	08-Jun-22/O	2166	3373		
TDS(calc.)/EC(actual)	-		Calc.	08-Jun-22/O	0.535	0.581		
EC(calc.)/EC(actual)	-		Calc.	08-Jun-22/O	0.891	0.902		
Langelier Index(25°C)	S.I.		Calc.	08-Jun-22/O	1.12	1.37		

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Greg Clarkin , BSc., C. Chem  
Lab Manager - Ottawa District

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**REPORT No. B22-34475**

**Report To:**

**WSP Canada Inc.**

1450 1st Ave. West, Suite 101  
Owen Sound ON N4K 6W2 Canada

**Attention:** Kaurel Tamasauskas

**Caduceon Environmental Laboratories**

2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 16-Nov-22

JOB/PROJECT NO.: Huron WDS - 121-60020-22

DATE REPORTED: 13-Dec-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		OW1	OW3	OW4	OW5
			Sample I.D.		B22-34475-1	B22-34475-2	B22-34475-3	B22-34475-4
			Date Collected		15-Nov-22	15-Nov-22	15-Nov-22	15-Nov-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Sodium Adsorption Ratio	-		Calc.	18-Nov-22/O	0.822	0.801	0.368	0.761
TDS(ion sum calc.)	mg/L	1	Calc.	18-Nov-22/O	574	524	509	521
Conductivity (calc.)	µmho/cm		Calc.	18-Nov-22/O	1005	973	862	970
TDS(calc.)/EC(actual)	-		Calc.	18-Nov-22/O	0.557	0.506	0.578	0.524
EC(calc.)/EC(actual)	-		Calc.	18-Nov-22/O	0.976	0.939	0.979	0.976
Langelier Index(25°C)	S.I.		Calc.	18-Nov-22/O	0.817	0.755	0.693	0.946
Nitrite (N)	mg/L	0.05	SM4110C	21-Nov-22/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	21-Nov-22/O	< 0.05	< 0.05	< 0.05	< 0.05
Chloride	mg/L	0.5	SM4110C	21-Nov-22/O	58.3	97.1	14.7	102
Sulphate	mg/L	1	SM4110C	21-Nov-22/O	82	13	132	41



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Tahir Yapici Ph.D

Lab Manager - Ottawa District

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DATE RECEIVED: 16-Nov-22

JOB/PROJECT NO.: Huron WDS - 121-60020-22

DATE REPORTED: 13-Dec-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		OW6	OW7S	OW7D	OW8S
			Sample I.D.		B22-34475-5	B22-34475-6	B22-34475-7	B22-34475-8
			Date Collected		15-Nov-22	15-Nov-22	15-Nov-22	15-Nov-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	21-Nov-22/O	1260	140	83	247
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	17-Nov-22/O	1570	167	158	210
pH @25°C	pH Units		SM 4500H	17-Nov-22/O	7.24	8.00	8.02	8.01
Conductivity @25°C	µmho/cm	1	SM 2510B	17-Nov-22/O	4150	512	456	749
Calcium	mg/L	0.02	SM 3120	21-Nov-22/O	157	28.0	18.4	41.0
Magnesium	mg/L	0.02	SM 3120	21-Nov-22/O	212	17.1	8.92	35.2
Potassium	mg/L	0.1	SM 3120	21-Nov-22/O	27.0	1.1	1.0	1.6
Sodium	mg/L	0.2	SM 3120	21-Nov-22/O	442	56.1	69.7	64.9
Aluminum	mg/L	0.01	SM 3120	21-Nov-22/O	0.13	< 0.01	< 0.01	0.03
Arsenic	mg/L	0.0001	EPA 200.8	23-Nov-22/O	0.0114	0.0007	0.0004	0.0009
Barium	mg/L	0.001	SM 3120	21-Nov-22/O	0.921	0.035	0.038	0.054
Boron	mg/L	0.005	SM 3120	21-Nov-22/O	0.663	0.300	0.467	0.416
Cadmium	mg/L	0.000015	EPA 200.8	23-Nov-22/O	< 0.000070	0.000043	0.000087	0.000029
Iron	mg/L	0.005	SM 3120	21-Nov-22/O	7.97	< 0.005	< 0.005	0.013
Lead	mg/L	0.00002	EPA 200.8	23-Nov-22/O	0.00018	0.00050	0.00006	0.00005
Copper	mg/L	0.0001	EPA 200.8	23-Nov-22/O	0.0010	0.0003	0.0008	0.0010
Chromium	mg/L	0.001	EPA 200.8	23-Nov-22/O	0.004	< 0.001	< 0.001	< 0.001
Manganese	mg/L	0.001	SM 3120	21-Nov-22/O	0.026	< 0.001	< 0.001	0.003
Zinc	mg/L	0.005	SM 3120	21-Nov-22/O	< 0.005	< 0.005	< 0.005	< 0.005
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	21-Nov-22/K	43.0	0.15	< 0.01	< 0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	28-Nov-22/K	56.6	0.1	< 0.1	0.1
Phenolics	mg/L	0.001	MOEE 3179	12-Dec-22/K	< 0.001	0.003	< 0.001	< 0.001
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	16-Nov-22/O	81.4	1.7	0.7	< 0.2
Anion Sum	meq/L		Calc.	18-Nov-22/O	45.1	5.08	4.56	7.75
Cation Sum	meq/L		Calc.	18-Nov-22/O	45.6	5.28	4.71	7.80
% Difference	%		Calc.	18-Nov-22/O	0.540	1.95	1.57	0.299
Ion Ratio	AS/CS		Calc.	18-Nov-22/O	0.989	0.962	0.969	0.994



R.L. = Reporting Limit

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Tahir Yapici Ph.D

Lab Manager - Ottawa District

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**C.O.C.: ---**

**REPORT No. B22-34475**

**Report To:**

**WSP Canada Inc.**

1450 1st Ave. West, Suite 101  
Owen Sound ON N4K 6W2 Canada

**Attention:** Kaurel Tamasauskas

**Caduceon Environmental Laboratories**

2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 16-Nov-22

JOB/PROJECT NO.: Huron WDS - 121-60020-22

DATE REPORTED: 13-Dec-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		OW6	OW7S	OW7D	OW8S
			Sample I.D.		B22-34475-5	B22-34475-6	B22-34475-7	B22-34475-8
			Date Collected		15-Nov-22	15-Nov-22	15-Nov-22	15-Nov-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Sodium Adsorption Ratio	-		Calc.	18-Nov-22/O	5.40	2.06	3.33	1.80
TDS(ion sum calc.)	mg/L	1	Calc.	18-Nov-22/O	2275	276	256	420
Conductivity (calc.)	µmho/cm		Calc.	18-Nov-22/O	3490	501	444	747
TDS(calc.)/EC(actual)	-		Calc.	18-Nov-22/O	0.548	0.540	0.562	0.561
EC(calc.)/EC(actual)	-		Calc.	18-Nov-22/O	0.841	0.978	0.974	0.997
Langelier Index(25°C)	S.I.		Calc.	18-Nov-22/O	1.11	0.226	0.0522	0.483
Nitrite (N)	mg/L	0.05	SM4110C	21-Nov-22/O	< 0.5	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	21-Nov-22/O	< 0.5	< 0.05	0.25	< 0.05
Chloride	mg/L	0.5	SM4110C	21-Nov-22/O	485	27.7	9.1	55.0
Sulphate	mg/L	1	SM4110C	21-Nov-22/O	< 10	46	54	96



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DATE REPORTED: 13-Dec-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		OW1	OW3	OW4	OW5
			Sample I.D.		B22-34475-1	B22-34475-2	B22-34475-3	B22-34475-4
			Date Collected		15-Nov-22	15-Nov-22	15-Nov-22	15-Nov-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO <sub>3</sub> )	mg/L	1	SM 3120	21-Nov-22/O	466	433	422	443
Alkalinity(CaCO <sub>3</sub> ) to pH4.5	mg/L	5	SM 2320B	17-Nov-22/O	397	387	338	325
pH @25°C	pH Units		SM 4500H	17-Nov-22/O	7.70	7.67	7.65	7.93
Conductivity @25°C	µmho/cm	1	SM 2510B	17-Nov-22/O	1030	1040	880	994
Calcium	mg/L	0.02	SM 3120	21-Nov-22/O	98.0	91.1	94.8	92.5
Magnesium	mg/L	0.02	SM 3120	21-Nov-22/O	53.8	49.9	45.0	51.5
Potassium	mg/L	0.1	SM 3120	21-Nov-22/O	2.7	1.8	1.7	1.7
Sodium	mg/L	0.2	SM 3120	21-Nov-22/O	40.8	38.3	17.4	36.8
Aluminum	mg/L	0.01	SM 3120	21-Nov-22/O	0.03	0.04	0.05	0.02
Arsenic	mg/L	0.0001	EPA 200.8	23-Nov-22/O	0.0013	0.0017	0.0004	0.0016
Barium	mg/L	0.001	SM 3120	21-Nov-22/O	0.097	0.100	0.081	0.108
Boron	mg/L	0.005	SM 3120	21-Nov-22/O	0.358	0.111	0.051	0.113
Cadmium	mg/L	0.000015	EPA 200.8	23-Nov-22/O	< 0.000015	< 0.000015	< 0.000015	0.000017
Iron	mg/L	0.005	SM 3120	21-Nov-22/O	0.035	0.100	0.029	< 0.005
Lead	mg/L	0.00002	EPA 200.8	23-Nov-22/O	0.00002	0.00004	0.00009	0.00005
Copper	mg/L	0.0001	EPA 200.8	23-Nov-22/O	0.0006	0.0003	0.0028	0.0014
Chromium	mg/L	0.001	EPA 200.8	23-Nov-22/O	0.002	< 0.001	< 0.001	< 0.001
Manganese	mg/L	0.001	SM 3120	21-Nov-22/O	0.018	0.123	0.004	0.001
Zinc	mg/L	0.005	SM 3120	21-Nov-22/O	0.008	< 0.005	< 0.005	< 0.005
Ammonia (N)-Total	mg/L	0.01	SM4500-NH <sub>3</sub> -H	21-Nov-22/K	0.19	0.11	< 0.01	0.03
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	28-Nov-22/K	1.4	0.4	0.7	0.4
Phenolics	mg/L	0.001	MOEE 3179	12-Dec-22/K	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	16-Nov-22/O	3.7	1.3	2.9	0.7
Anion Sum	meq/L		Calc.	18-Nov-22/O	11.3	10.8	9.93	10.2
Cation Sum	meq/L		Calc.	18-Nov-22/O	11.2	10.4	9.23	10.5
% Difference	%		Calc.	18-Nov-22/O	0.535	1.84	3.66	1.28
Ion Ratio	AS/CS		Calc.	18-Nov-22/O	1.01	1.04	1.08	0.975



R.L. = Reporting Limit

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Tahir Yapici Ph.D

Lab Manager - Ottawa District

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**Attention:** Kaurel Tamasauskas

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2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 16-Nov-22

JOB/PROJECT NO.: Huron WDS - 121-60020-22

DATE REPORTED: 13-Dec-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		OW8D	OW9	OW10S	OW10D
			Sample I.D.		B22-34475-9	B22-34475-10	B22-34475-11	B22-34475-12
			Date Collected		15-Nov-22	15-Nov-22	15-Nov-22	15-Nov-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	21-Nov-22/O	173	166	370	212
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	17-Nov-22/O	145	99	257	185
pH @25°C	pH Units		SM 4500H	17-Nov-22/O	8.02	7.91	7.92	7.98
Conductivity @25°C	µmho/cm	1	SM 2510B	17-Nov-22/O	684	676	813	561
Calcium	mg/L	0.02	SM 3120	21-Nov-22/O	36.7	35.1	73.3	44.3
Magnesium	mg/L	0.02	SM 3120	21-Nov-22/O	19.8	19.0	45.5	24.7
Potassium	mg/L	0.1	SM 3120	21-Nov-22/O	1.4	1.2	2.0	1.3
Sodium	mg/L	0.2	SM 3120	21-Nov-22/O	79.5	75.1	40.2	26.0
Aluminum	mg/L	0.01	SM 3120	21-Nov-22/O	< 0.01	< 0.01	0.03	0.01
Arsenic	mg/L	0.0001	EPA 200.8	23-Nov-22/O	0.0002	0.0038	0.0003	0.0004
Barium	mg/L	0.001	SM 3120	21-Nov-22/O	0.028	0.022	0.030	0.100
Boron	mg/L	0.005	SM 3120	21-Nov-22/O	0.520	0.489	0.379	0.175
Cadmium	mg/L	0.000015	EPA 200.8	23-Nov-22/O	0.000179	0.000067	0.000016	< 0.000015
Iron	mg/L	0.005	SM 3120	21-Nov-22/O	< 0.005	< 0.005	0.019	< 0.005
Lead	mg/L	0.00002	EPA 200.8	23-Nov-22/O	0.00003	0.00002	0.00003	0.00003
Copper	mg/L	0.0001	EPA 200.8	23-Nov-22/O	0.0012	0.0008	0.0006	0.0006
Chromium	mg/L	0.001	EPA 200.8	23-Nov-22/O	< 0.001	< 0.001	< 0.001	< 0.001
Manganese	mg/L	0.001	SM 3120	21-Nov-22/O	< 0.001	0.013	0.001	0.020
Zinc	mg/L	0.005	SM 3120	21-Nov-22/O	< 0.005	< 0.005	< 0.005	< 0.005
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	21-Nov-22/K	< 0.01	0.05	< 0.01	< 0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	28-Nov-22/K	< 0.1	0.1	0.2	< 0.1
Phenolics	mg/L	0.001	MOEE 3179	12-Dec-22/K	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	16-Nov-22/O	0.8	1.0	0.7	0.4
Anion Sum	meq/L		Calc.	18-Nov-22/O	7.03	6.89	9.13	5.99
Cation Sum	meq/L		Calc.	18-Nov-22/O	6.95	6.61	9.19	5.41
% Difference	%		Calc.	18-Nov-22/O	0.564	2.07	0.372	5.12



R.L. = Reporting Limit

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Site Analyzed=K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill, B-Barrie

Tahir Yapici Ph.D  
Lab Manager - Ottawa District

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**C.O.C.: ---**

**REPORT No. B22-34475**

**Report To:**

**WSP Canada Inc.**

1450 1st Ave. West, Suite 101  
Owen Sound ON N4K 6W2 Canada

**Attention:** Kaurel Tamasauskas

**Caduceon Environmental Laboratories**

2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 16-Nov-22

JOB/PROJECT NO.: Huron WDS - 121-60020-22

DATE REPORTED: 13-Dec-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		OW8D	OW9	OW10S	OW10D
			Sample I.D.		B22-34475-9	B22-34475-10	B22-34475-11	B22-34475-12
			Date Collected		15-Nov-22	15-Nov-22	15-Nov-22	15-Nov-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Ion Ratio	AS/CS		Calc.	18-Nov-22/O	1.01	1.04	0.993	1.11
Sodium Adsorption Ratio	-		Calc.	18-Nov-22/O	2.63	2.54	0.909	0.776
TDS(ion sum calc.)	mg/L	1	Calc.	18-Nov-22/O	420	425	506	315
Conductivity (calc.)	µmho/cm		Calc.	18-Nov-22/O	693	693	841	546
TDS(calc.)/EC(actual)	-		Calc.	18-Nov-22/O	0.614	0.628	0.622	0.562
EC(calc.)/EC(actual)	-		Calc.	18-Nov-22/O	1.01	1.03	1.03	0.973
Langelier Index(25°C)	S.I.		Calc.	18-Nov-22/O	0.283	-0.0135	0.731	0.452
Nitrite (N)	mg/L	0.05	SM4110C	21-Nov-22/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	21-Nov-22/O	0.16	0.09	0.22	0.21
Chloride	mg/L	0.5	SM4110C	21-Nov-22/O	7.3	2.0	1.4	3.6
Sulphate	mg/L	1	SM4110C	21-Nov-22/O	188	233	189	104



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Tahir Yapici Ph.D

Lab Manager - Ottawa District

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**Attention:** Kaurel Tamasauskas

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2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 16-Nov-22

JOB/PROJECT NO.: Huron WDS - 121-60020-22

DATE REPORTED: 13-Dec-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		OW11	GW Duplicate #1		
			Sample I.D.		B22-34475-13	B22-34475-14		
			Date Collected		15-Nov-22	15-Nov-22		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO <sub>3</sub> )	mg/L	1	SM 3120	21-Nov-22/O	942	943		
Alkalinity(CaCO <sub>3</sub> ) to pH4.5	mg/L	5	SM 2320B	17-Nov-22/O	894	940		
pH @25°C	pH Units		SM 4500H	17-Nov-22/O	7.31	7.28		
Conductivity @25°C	µmho/cm	1	SM 2510B	17-Nov-22/O	2420	2470		
Calcium	mg/L	0.02	SM 3120	21-Nov-22/O	174	173		
Magnesium	mg/L	0.02	SM 3120	21-Nov-22/O	123	124		
Potassium	mg/L	0.1	SM 3120	21-Nov-22/O	27.0	27.2		
Sodium	mg/L	0.2	SM 3120	21-Nov-22/O	106	106		
Aluminum	mg/L	0.01	SM 3120	21-Nov-22/O	0.05	0.06		
Arsenic	mg/L	0.0001	EPA 200.8	23-Nov-22/O	0.0023	0.0024		
Barium	mg/L	0.001	SM 3120	21-Nov-22/O	0.257	0.254		
Boron	mg/L	0.005	SM 3120	21-Nov-22/O	0.505	0.509		
Cadmium	mg/L	0.000015	EPA 200.8	23-Nov-22/O	< 0.000070	< 0.000070		
Iron	mg/L	0.005	SM 3120	21-Nov-22/O	12.0	11.9		
Lead	mg/L	0.00002	EPA 200.8	23-Nov-22/O	< 0.0001	< 0.0001		
Copper	mg/L	0.0001	EPA 200.8	23-Nov-22/O	0.0007	< 0.0005		
Chromium	mg/L	0.001	EPA 200.8	23-Nov-22/O	0.001	0.002		
Manganese	mg/L	0.001	SM 3120	21-Nov-22/O	0.241	0.240		
Zinc	mg/L	0.005	SM 3120	21-Nov-22/O	< 0.005	< 0.005		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH <sub>3</sub> -H	21-Nov-22/K	40.0	37.3		
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	28-Nov-22/K	45.9	46.7		
Phenolics	mg/L	0.001	MOEE 3179	12-Dec-22/K	< 0.001	< 0.001		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	16-Nov-22/O	5.1	5.4		
Anion Sum	meq/L		Calc.	18-Nov-22/O	26.3	26.1		
Cation Sum	meq/L		Calc.	18-Nov-22/O	24.8	24.8		



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Tahir Yapici Ph.D

Lab Manager - Ottawa District

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**C.O.C.: ---**

**REPORT No. B22-34475**

**Report To:**

**WSP Canada Inc.**

1450 1st Ave. West, Suite 101  
Owen Sound ON N4K 6W2 Canada

**Attention:** Kaurel Tamasauskas

**Caduceon Environmental Laboratories**

2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 16-Nov-22

JOB/PROJECT NO.: Huron WDS - 121-60020-22

DATE REPORTED: 13-Dec-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

<b>Client I.D.</b>	OW11	GW Duplicate #1		
<b>Sample I.D.</b>	B22-34475-13	B22-34475-14		
<b>Date Collected</b>	15-Nov-22	15-Nov-22		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
% Difference	%		Calc.	18-Nov-22/O	3.01	2.52		
Ion Ratio	AS/CS		Calc.	18-Nov-22/O	1.06	1.05		
Sodium Adsorption Ratio	-		Calc.	18-Nov-22/O	1.50	1.51		
TDS(ion sum calc.)	mg/L	1	Calc.	18-Nov-22/O	1279	1267		
Conductivity (calc.)	µmho/cm		Calc.	18-Nov-22/O	2146	2107		
TDS(calc.)/EC(actual)	-		Calc.	18-Nov-22/O	0.528	0.513		
EC(calc.)/EC(actual)	-		Calc.	18-Nov-22/O	0.887	0.853		
Langelier Index(25°C)	S.I.		Calc.	18-Nov-22/O	0.990	0.979		
Nitrite (N)	mg/L	0.05	SM4110C	21-Nov-22/O	< 0.5	< 0.5		
Nitrate (N)	mg/L	0.05	SM4110C	21-Nov-22/O	< 0.5	< 0.5		
Chloride	mg/L	0.5	SM4110C	21-Nov-22/O	300	260		
Sulphate	mg/L	1	SM4110C	21-Nov-22/O	< 10	< 10		



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Tahir Yapici Ph.D

Lab Manager - Ottawa District

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**C.O.C.: G098526**

**REPORT No. B22-16498**

**Report To:**

**WSP Canada Inc.**

1450 1st Ave. West, Suite 101  
Owen Sound ON N4K 6W2 Canada

**Attention:** Shauna Armstrong

**Caduceon Environmental Laboratories**

2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 01-Jun-22

JOB/PROJECT NO.: Huron WDS - 121-60020-21

DATE REPORTED: 29-Jun-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

			Client I.D.	SW1	SW2	SW3	SW DUP#1
			Sample I.D.	B22-16498-1	B22-16498-2	B22-16498-3	B22-16498-4
			Date Collected	31-May-22	31-May-22	31-May-22	31-May-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
pH @25°C	pH Units		SM 4500H	06-Jun-22/O	8.17	8.10	8.85
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Jun-22/O	519	525	645
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Jun-22/O	246	247	205
Hardness (as CaCO3)	mg/L	1	SM 3120	13-Jun-22/O	279	271	167
Chloride	mg/L	0.5	SM4110C	06-Jun-22/O	13.9	14.1	77.1
Nitrate (N)	mg/L	0.05	SM4110C	06-Jun-22/O	1.84	1.95	< 0.05
Nitrite (N)	mg/L	0.05	SM4110C	06-Jun-22/O	0.05	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	06-Jun-22/O	13	14	17
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	03-Jun-22/O	7.1	6.0	37.3
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Jun-22/K	0.06	0.07	0.07
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	03-Jun-22/K	0.7	0.7	2.8
Phosphorus-Total	mg/L	0.01	E3516.2	03-Jun-22/K	0.04	0.04	0.13
Phenolics	mg/L	0.001	MOEE 3179	16-Jun-22/K	< 0.001	< 0.001	< 0.001
Calcium	mg/L	0.02	SM 3120	13-Jun-22/O	69.5	67.5	33.9
Magnesium	mg/L	0.02	SM 3120	13-Jun-22/O	25.5	24.8	19.9
Sodium	mg/L	0.2	SM 3120	13-Jun-22/O	6.2	5.9	77.4
Potassium	mg/L	0.1	SM 3120	13-Jun-22/O	2.1	2.0	11.9
Aluminum	mg/L	0.01	SM 3120	13-Jun-22/O	0.07	0.08	0.35
Arsenic	mg/L	0.0001	EPA 200.8	28-Jun-22/O	0.0007	0.0006	0.0041
Beryllium	mg/L	0.0001	EPA 200.8	28-Jun-22/O	< 0.0001	< 0.0001	< 0.0001
Boron	mg/L	0.005	SM 3120	13-Jun-22/O	0.013	0.013	0.958
Cadmium	mg/L	0.000015	EPA 200.8	28-Jun-22/O	0.000017	< 0.000015	< 0.000015
Chromium	mg/L	0.001	EPA 200.8	28-Jun-22/O	< 0.001	< 0.001	0.001
Cobalt	mg/L	0.0001	EPA 200.8	28-Jun-22/O	0.0002	0.0002	0.0007
Copper	mg/L	0.0001	EPA 200.8	28-Jun-22/O	0.0017	0.0016	0.0017
Iron	mg/L	0.005	SM 3120	13-Jun-22/O	0.131	0.176	2.06
Lead	mg/L	0.00002	EPA 200.8	28-Jun-22/O	0.00010	0.00019	0.00087



R.L. = Reporting Limit

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett

Director of Laboratory Services

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**C.O.C.: G098526**

**REPORT No. B22-16498**

**Report To:**

**WSP Canada Inc.**

1450 1st Ave. West, Suite 101  
Owen Sound ON N4K 6W2 Canada

**Attention:** Shauna Armstrong

**Caduceon Environmental Laboratories**

2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 01-Jun-22

JOB/PROJECT NO.: Huron WDS - 121-60020-21

DATE REPORTED: 29-Jun-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

			Client I.D.		SW1	SW2	SW3	SW DUP#1
			Sample I.D.		B22-16498-1	B22-16498-2	B22-16498-3	B22-16498-4
			Date Collected		31-May-22	31-May-22	31-May-22	31-May-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Manganese	mg/L	0.001	SM 3120	13-Jun-22/O	0.016	0.032	0.168	0.014
Molybdenum	mg/L	0.0001	EPA 200.8	28-Jun-22/O	0.0004	0.0004	0.0008	0.0004
Nickel	mg/L	0.0002	EPA 200.8	28-Jun-22/O	0.0007	0.0007	0.0036	0.0006
Silver	mg/L	0.0001	EPA 200.8	28-Jun-22/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Vanadium	mg/L	0.005	SM 3120	13-Jun-22/O	< 0.005	< 0.005	< 0.005	< 0.005
Zinc	mg/L	0.005	SM 3120	13-Jun-22/O	0.018	0.010	0.016	0.016
Anion Sum	meq/L		Calc.	13-Jun-22/O	5.72	5.77	6.62	5.72
Cation Sum	meq/L		Calc.	13-Jun-22/O	5.90	5.73	7.12	5.81
% Difference	%		Calc.	13-Jun-22/O	1.52	0.346	3.62	0.766
Ion Ratio	AS/CS		Calc.	13-Jun-22/O	0.970	1.01	0.930	0.985
Sodium Adsorption Ratio	-	1	Calc.	13-Jun-22/O	0.161	0.156	2.61	0.161
TDS(ion sum calc.)	mg/L		Calc.	13-Jun-22/O	278	277	362	277
Conductivity (calc.)	µmho/cm		Calc.	13-Jun-22/O	529	523	671	525
TDS(calc.)/EC(actual)	-		Calc.	13-Jun-22/O	0.536	0.528	0.562	0.531
EC(calc.)/EC(actual)	-		Calc.	13-Jun-22/O	1.02	0.997	1.04	1.01
Langelier Index(25°C)	S.I.		Calc.	13-Jun-22/O	0.961	0.879	1.24	0.974



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Steve Garrett

Director of Laboratory Services

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**C.O.C.: ---**

**REPORT No. B22-34477**

**Report To:**

**WSP Canada Inc.**

1450 1st Ave. West, Suite 101  
Owen Sound ON N4K 6W2 Canada

**Attention:** Kaurel Tamasauskas

**Caduceon Environmental Laboratories**

2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 16-Nov-22

JOB/PROJECT NO.: Huron WDS - 121-60020-22

DATE REPORTED: 13-Dec-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

			Client I.D.		SW1	SW2	SW3	SW DUP#1
			Sample I.D.		B22-34477-1	B22-34477-2	B22-34477-3	B22-34477-4
			Date Collected		15-Nov-22	15-Nov-22	15-Nov-22	15-Nov-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
pH @25°C	pH Units		SM 4500H	17-Nov-22/O	7.85	8.06	7.94	8.08
Conductivity @25°C	µmho/cm	1	SM 2510B	17-Nov-22/O	421	513	1010	515
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	17-Nov-22/O	217	269	262	261
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Nov-22/O	230	285	298	273
Chloride	mg/L	0.5	SM4110C	22-Nov-22/O	3.4	5.4	138	5.6
Nitrate (N)	mg/L	0.05	SM4110C	22-Nov-22/O	0.11	0.15	0.10	0.15
Nitrite (N)	mg/L	0.05	SM4110C	22-Nov-22/O	< 0.05	< 0.05	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	22-Nov-22/O	2	7	57	7
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	16-Nov-22/O	9.8	5.8	9.6	6.0
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	21-Nov-22/K	0.18	0.02	0.48	< 0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	28-Nov-22/K	0.4	0.2	1.9	0.2
Phosphorus-Total	mg/L	0.01	E3516.2	28-Nov-22/K	0.03	0.03	0.06	0.01
Phenolics	mg/L	0.001	MOEE 3179	12-Dec-22/K	< 0.001	< 0.001	< 0.001	< 0.001
Calcium	mg/L	0.02	SM 3120	25-Nov-22/O	62.6	76.2	81.1	73.1
Magnesium	mg/L	0.02	SM 3120	25-Nov-22/O	17.9	23.0	23.2	21.9
Sodium	mg/L	0.2	SM 3120	25-Nov-22/O	1.6	3.2	84.3	3.1
Potassium	mg/L	0.1	SM 3120	25-Nov-22/O	0.5	1.3	21.3	1.2
Aluminum	mg/L	0.01	SM 3120	25-Nov-22/O	0.02	0.02	0.11	0.02
Arsenic	mg/L	0.0001	EPA 200.8	25-Nov-22/O	0.0004	0.0003	0.0010	0.0003
Beryllium	mg/L	0.0001	EPA 200.8	25-Nov-22/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Boron	mg/L	0.005	SM 3120	25-Nov-22/O	0.005	0.016	0.519	0.018
Cadmium	mg/L	0.000015	EPA 200.8	25-Nov-22/O	< 0.000015	< 0.000015	0.000022	< 0.000015
Chromium	mg/L	0.001	EPA 200.8	25-Nov-22/O	< 0.001	< 0.001	0.002	< 0.001
Cobalt	mg/L	0.0001	EPA 200.8	25-Nov-22/O	< 0.0001	< 0.0001	0.0004	< 0.0001
Copper	mg/L	0.0001	EPA 200.8	25-Nov-22/O	0.0005	0.0005	0.0029	0.0005
Iron	mg/L	0.005	SM 3120	25-Nov-22/O	0.326	0.034	0.195	0.031
Lead	mg/L	0.00002	EPA 200.8	25-Nov-22/O	0.00021	0.00006	0.00018	0.00010



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Tahir Yapici Ph.D  
Lab Manager - Ottawa District

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from



**C.O.C.: ---**

**REPORT No. B22-34477**

**Report To:**

**WSP Canada Inc.**

1450 1st Ave. West, Suite 101  
Owen Sound ON N4K 6W2 Canada

**Attention:** Kaurel Tamasauskas

**Caduceon Environmental Laboratories**

2378 Holly Lane  
Ottawa Ontario K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 16-Nov-22

JOB/PROJECT NO.: Huron WDS - 121-60020-22

DATE REPORTED: 13-Dec-22

P.O. NUMBER: 101-16942-00

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

					Client I.D.	SW1	SW2	SW3	SW DUP#1
					Sample I.D.	B22-34477-1	B22-34477-2	B22-34477-3	B22-34477-4
					Date Collected	15-Nov-22	15-Nov-22	15-Nov-22	15-Nov-22
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed					
Manganese	mg/L	0.001	SM 3120	25-Nov-22/O	0.325	0.022	0.038	0.020	
Molybdenum	mg/L	0.0001	EPA 200.8	25-Nov-22/O	< 0.0001	0.0002	0.0007	0.0002	
Nickel	mg/L	0.0002	EPA 200.8	25-Nov-22/O	0.0004	0.0004	0.0029	0.0005	
Silver	mg/L	0.0001	EPA 200.8	25-Nov-22/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001	
Vanadium	mg/L	0.005	SM 3120	25-Nov-22/O	< 0.005	< 0.005	< 0.005	< 0.005	
Zinc	mg/L	0.005	SM 3120	25-Nov-22/O	< 0.005	< 0.005	0.006	< 0.005	
Anion Sum	meq/L		Calc.	18-Nov-22/O	4.48	5.68	10.3	5.53	
Cation Sum	meq/L		Calc.	18-Nov-22/O	4.73	5.87	10.2	5.62	
% Difference	%		Calc.	18-Nov-22/O	2.70	1.65	0.560	0.818	
Ion Ratio	AS/CS		Calc.	18-Nov-22/O	0.947	0.968	1.01	0.984	
Sodium Adsorption Ratio	-		Calc.	18-Nov-22/O	0.0464	0.0829	2.12	0.0808	
TDS(ion sum calc.)	mg/L	1	Calc.	18-Nov-22/O	219	277	563	268	
Conductivity (calc.)	µmho/cm		Calc.	18-Nov-22/O	422	524	1014	507	
TDS(calc.)/EC(actual)	-		Calc.	18-Nov-22/O	0.520	0.541	0.555	0.521	
EC(calc.)/EC(actual)	-		Calc.	18-Nov-22/O	1.00	1.02	1.00	0.984	
Langelier Index(25°C)	S.I.		Calc.	18-Nov-22/O	0.550	0.930	0.795	0.808	



R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an \*

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie


Tahir Yapici Ph.D

Lab Manager - Ottawa District

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# APPENDIX



# H

## MONITORING & SCREENING CHECKLIST

## Appendix D-Monitoring and Screening Checklist

### General Information and Instructions

**General Information: The checklist is to be completed, and submitted with the Monitoring Report.**

**Instructions:** A complete checklist consists of:

- (a) a completed and signed checklist, including any additional pages of information which can be attached as needed to provide further details where indicated.
- (b) completed contact information for the Competent Environmental Practitioner (CEP)
- (c) self-declaration that CEP(s) meet(s) the qualifications as set out below and in Section 1.2 of the Technical Guidance Document.

**Definition of Groundwater CEP:**

For groundwater, the CEP must have expertise in hydrogeology and meet one of the following:

- (a) the person holds a licence, limited licence or temporary licence under the *Professional Engineers Act*; or
- (b) the person holds a certificate of registration under the *Professional Geoscientists Act, 2000* and is a practicing member, temporary, member or limited member of the Association of Professional Geoscientists of Ontario. O. Reg. 66/08, s. 2..

**Definition of Surface water CEP:**

A CEP for surface water assessments is a scientist, professional engineer or professional geoscientist as described in (a) and (b) above with demonstrated experience and post-secondary education, either a diploma or degree, in hydrology, aquatic ecology, limnology, aquatic biology, physical geography with specialization in surface water, and/or water resource management.

The type of scientific work that a CEP performs must be consistent with that person's education and experience. If an individual has appropriate training and credentials in both groundwater and surface water and is responsible for both areas of expertise, the CEP may then complete and validate both sections of the checklist.

<b>Monitoring Report and Site Information</b>	
<b>Waste Disposal Site Name</b>	Huron Waste Disposal Site
<b>Location (e.g. street address, lot, concession)</b>	Part Lots 19 and 20, Concession 5, in the Former Township of Huron, Township of Huron-Kinloss, County of Bruce
<b>GPS Location (taken within the property boundary at front gate/ front entry)</b>	451437 m E, 4878860 m N
<b>Municipality</b>	Township of Huron-Kinloss
<b>Client and/or Site Owner</b>	Township of Huron-Kinloss
<b>Monitoring Period (Year)</b>	2022
This Monitoring Report is being submitted under the following:	
<b>Certificate of Approval No.:</b>	A272601
<b>Director's Order No.:</b>	
<b>Provincial Officer's Order No.:</b>	
<b>Other:</b>	

Report Submission Frequency	<input checked="" type="radio"/> Annual <input type="radio"/> Other	Specify (Type Here):
The site is:	<input checked="" type="radio"/> Active <input type="radio"/> Inactive <input type="radio"/> Closed	
If closed, specify C of A, control or authorizing document closure date:		N/A
Has the nature of the operations at the site changed during this monitoring period?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
If yes, provide details:	Type Here	
Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i. e. exceeded the LEL for methane)	<input checked="" type="radio"/> Yes <input type="radio"/> No	

## Groundwater WDS Verification:

Based on all available information about the site and site knowledge, it is my opinion that:

### Sampling and Monitoring Program Status:

1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:	<input checked="" type="radio"/> Yes <input type="radio"/> No	
2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document(s):	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Applicable	If no, list exceptions below or attach information.

Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date

3) a) Some or all groundwater, leachate and WDS gas sampling and monitoring requirements have been established or defined outside of a ministry C of A, authorizing, or control document.		<div><input type="radio"/> Yes</div> <div><input checked="" type="radio"/> No</div> <div><input type="radio"/> Not Applicable</div>	
b) If yes, the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:		<div><input type="radio"/> Yes</div> <div><input type="radio"/> No</div> <div><input checked="" type="radio"/> Not Applicable</div>	If no, list exceptions below or attach additional information.
Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date	
Type Here	Type Here	Select Date	
Type Here	Type Here	Select Date	
Type Here	Type Here	Select Date	
Type Here	Type Here	Select Date	
Type Here	Type Here	Select Date	
4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/ QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	<div><input checked="" type="radio"/> Yes</div> <div><input type="radio"/> No</div>	If no, specify (Type Here):	

## Sampling and Monitoring Program Results/WDS Conditions and Assessment:

<p>5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.</p>	<p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>		
<p>6) The site meets compliance and assessment criteria.</p>	<p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p>	<p>Reasonable Use Criteria (RUC) exceeded for DOC and Chloride as outlined in Section 4.2.3 of report</p>	
<p>7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.</p>	<p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>		
<p>1) Is one or more of the following risk reduction practices in place at the site:</p> <p>(a) There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/treatment; or</p> <p>(b) There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or</p> <p>(c) The site meets the following two conditions (typically achieved after 15 years or longer of site operation):</p> <p style="margin-left: 20px;"><i>i.</i> The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and</p> <p style="margin-left: 20px;"><i>ii.</i> Seasonal and annual water levels and water quality fluctuations are well understood.</p>	<p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>Note which practice(s):</p>	<p><input type="checkbox"/> (a)</p> <p><input type="checkbox"/> (b)</p> <p><input checked="" type="checkbox"/> (c)</p>
<p>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</p>	<p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> Not Applicable</p>	<p>If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here):</p>	

## Groundwater CEP Declaration:

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended), and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories*, or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

## Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

☒ No changes to the monitoring program are recommended

☐ The following change(s) to the monitoring program is/are recommended:

☒ No Changes to site design and operation are recommended

☐ The following change(s) to the site design and operation is/are recommended:

Name:	Sarah Hutchesson, M.Sc., P.Eng		
Seal:	Add Image		
Signature:		Date:	28-Mar-2023
CEP Contact Information:	561 Bryne Drive, Unit C&D Barrie, ON L4N9Y3		
Company:	WSP Canada Inc.		
Address:	561 Bryne Drive, Unit C&D Barrie, ON L4N9Y3		
Telephone No.:	(705) 712-0185	Fax No. :	(705) 441-6016
E-mail Address:	sarah.hutchesson@wsp.com		
Co-signers for additional expertise provided:			
Signature:		Date:	Select Date
Signature:		Date:	Select Date



Surface Water WDS Verification:		
Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):		
Name (s)	The South Pine River	
Distance(s)	250 m north of landfill	
Based on all available information and site knowledge, it is my opinion that:		
Sampling and Monitoring Program Status:		
1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:	<input checked="" type="radio"/> Yes <input type="radio"/> No	However, there is still ongoing discussion with regard to adding a sampling location near OW15
2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not applicable (No C of A, authorizing / control document applies)	If no, specify below or provide details in an attachment.
Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.		<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Applicable	
b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:		<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Applicable	If no, specify below or provide details in an attachment.
Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)		Date
Type Here	Type Here		Select Date
Type Here	Type Here		Select Date
Type Here	Type Here		Select Date
Type Here	Type Here		Select Date
4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/ outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	<input checked="" type="radio"/> Yes <input type="radio"/> No	If no, specify (Type Here):	

## Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The receiving water body meets surface water-related compliance criteria and assessment criteria: i.e., there are no exceedances of criteria, based on MOE legislation, regulations, Water Management Policies, Guidelines and Provincial Water Quality Objectives and other assessment criteria (e.g., CWQGs, APVs), as noted in Table A or Table B in the Technical Guidance Document (Section 4.6):

☐ Yes

☒ No

If no, list parameters that exceed criteria outlined above and the amount/percentage of the exceedance as per the table below or provide details in an attachment:

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO
Outlined in Section 4.3 of report	Outlined in Section 4.3 of report	Outlined in Section 4.3 of report
6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Exceedances of PWQO at the downstream station are attributed to agricultural or upgradient sources.

<p>7) All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.</p>	<p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>	<p>If no, list parameters and stations that is outside the expected range. Identify whether parameter concentrations show an increasing trend or are within a high historical range (Type Here)</p>
<p>8) For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g. , PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):</p>	<p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p> <p><input type="radio"/> Not Known</p> <p><input type="radio"/> Not Applicable</p>	<p>If yes, provide details and whether remedial measures are necessary (Type Here)</p>
<p>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</p>	<p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> Not Applicable</p>	<p>If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here)</p>

## Surface Water CEP Declaration:

I, the undersigned hereby declare that I am a Competent Environmental Practitioner as defined in Appendix D under Instructions, holding the necessary level of experience and education to design surface water monitoring and sampling programs, conduct appropriate surface water investigations and interpret the related data as it pertains to the site for this monitoring period.

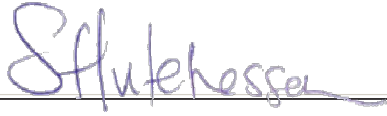
I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended) and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories*, or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

## Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

<p><input checked="" type="radio"/> No Changes to the monitoring program are recommended</p> <p><input type="radio"/> The following change(s) to the monitoring program is/are recommended:</p>	<p>Type Here</p>
<p><input checked="" type="radio"/> No changes to the site design and operation are recommended</p> <p><input type="radio"/> The following change(s) to the site design and operation is/are recommended:</p>	<p>Type Here</p>

<b>CEP Signature</b>		
<b>Relevant Discipline</b>	Engineer	
<b>Date:</b>	28-Mar-2023	
<b>CEP Contact Information:</b>	Sarah Hutchesson, M.Sc., P.Eng.	
<b>Company:</b>	WSP Canada Inc.	
<b>Address:</b>	561 Bryne Drive, Unit C&D Barrie, ON L4N9Y3	
<b>Telephone No.:</b>	(705) 712-0185	
<b>Fax No. :</b>	(705) 441-6016	
<b>E-mail Address:</b>	sarah.hutchesson@wsp.com	
<b>Save As</b>		<b>Print Form</b>

