TOWNSHIP OF HURON-KINLOSS

HURON LANDFILL SITE – 2020 ANNUAL MONITORING REPORT

JUNE 2021

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TOWNSHIP OF HURON-KINLOSS

PROJECT NO.: 101-16942-00 (121-60020-00)
DATE: JUNE 2021

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June 14, 2021

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

Dear Mr. Yungblut:

Subject: Huron Landfill Site, Township of Huron-Kinloss
2020 Annual Monitoring Report

Please find enclosed a copy of the report entitled, "Huron Landfill Site, Township of Huron-Kinloss, Annual Monitoring Report – 2020", dated March 2021.

By copy of this letter, we are forwarding an electronic copy of the above-mentioned annual report to Mr. Ian Mitchell, District Engineer, Ministry of the Environment, Conservation and Parks (MECP), Owen Sound, for their review.

If you have any questions, please contact me at this office.

Yours truly,

Stephen Taziar, P.Eng., DCE
Senior Project Engineer

KT/ST/dlw
Encl.
cc: Mr. Ian Mitchell, District Engineer, Ministry of the Environment, Conservation and Parks (MECP), Owen Sound
WSP ref.: 101-16942-00 (121-60020-00)

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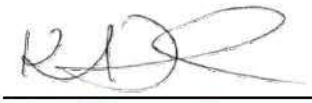

Kaurel Tamasauskas
Environmental Technologist

REVIEWED BY

Stephen Taziar, P.Eng., DCE
Senior Project 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.

WSP disclaims any obligation to update this report if, after the date of this report, any conditions appear to differ significantly from those presented in this report; however, WSP reserves the right to amend or supplement this report based on additional information, documentation or evidence.

WSP makes no other representations whatsoever concerning the legal significance of its findings.

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In preparing this report, WSP has relied in good faith on information provided by others, as noted in the report. WSP has reasonably assumed that the information provided is correct and WSP is not responsible for the accuracy or completeness of such information.

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

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, Bruce County. 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, last 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 2020, 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 MECP to allow landfilling of waste from the former Township of Kinloss at the Huron Landfill. As of August 1, 2002, and onward, waste from the former Kinloss Township was landfilled at the Huron Landfill.

Waste from the Village of Lucknow is currently being landfilled at the Huron Landfill as of July 2018. 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.

The Kinloss Landfill currently receives only recyclable materials and burnable material from the former Township of Kinloss and former Village of Lucknow.

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 2020. The AMR is required by Condition 11.1 of the Certificate of Approval (**Appendix A**).

1.3 MECP REVIEW OF ANNUAL REPORT

MECP has not provided comments on the 2019 Monitoring Report.

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

The MECP completed an inspection of the Huron Landfill on August 26, 2020. A copy of the inspection report is included in **Appendix B**.

The actions required from this inspection included the following:

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.

All items were addressed in a timely manner as outlined in the submitted letter dated November 2, 2020 (**Appendix B**). The letter included photo documentation for Actions 1 and 2 stated above. Action 3 was satisfied through submittal of the letter to the MECP, dated November 2, 2020 (**Appendix B**).

No other MECP inspections were completed in 2020.

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 2020 as collected from weigh scale records.

The site incorporated the trench method of landfilling until 2010, when landfilling commenced above the original ground, utilizing the "area method" of operation. This type of operation continues to date. The estimated landfilled volume for 2020 is 8,795 m^3. The method of calculating the volume of refuse landfilled over 2020 is based on the volumetric difference between the site surveys completed in December 2019 and on January 9, 2021. The 2020 volume (8,795 m^3) is below the 5 year average (2016 to 2020) of 9,822 m^3, as shown in **Table 2-1**.

The estimated compaction densities from 2003 to 2020 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 2020 operations is 410 kg/m^3 and does not include 20% cover material. Future compaction densities will continue to be determined through topographic survey data and DTM.

Table 2-1
Summary of Annual Waste Tonnages, Volumes and Densities

Year	Annual Waste Received (tonnes)	Estimated Annual Landfilled Volume (m^3)	Estimated Waste Compaction Density (kg/m^3)
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
Average (2016–2020)		9,822	

Note: 2011 estimated waste compaction density includes 20% cover material. Value would be 436 if cover materials was 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 still 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 lost 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^3 as of the end of 2003. This calculation was based on a Maximum Theoretical Capacity of 204,600 m^3. When the Maximum Theoretical Capacity was revised to 288,000 m^3 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^3. In the Design and Operation Plan the remaining capacity was calculated to be 170,400 m^3 (as of the end of 2007). This estimation is relatively close to MOE estimation of 163,190 m^3; therefore, the remaining capacity as of the end of 2007 was assumed to be 170,400 m^3.

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 2020, the total landfilled volume for the Huron landfill has been estimated to be 80,303 m^3. This would change the estimated closure date from 2030 to August 2029, with an average annual airspace of 8,303 m^3.

It should be noted that these closure dates calculations are projections into the future and are subject to change as circumstances change.

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.

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 2020 are combined for all Township landfills.

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 2020, AOR Metals removed 148.35 tonnes of scrap metal from the site.

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 2020, 1,768 tires were collected at the Huron and Kinloss landfill sites, with an estimated mass of 110.50 tonnes. As part of the Ontario Tire Stewardship Program, 1,768 tires (approximately 110.50 tonnes) were removed from the Huron and Kinloss landfill sites in 2020.

2.3.3 E-WASTE AND MATTRESSES

E-waste was segregated at the Huron Landfill in 2020 and stockpiled beside the main building in a sea container. The total E-waste diverted from the landfill in 2020 was 11.37 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 2020 was 505 (17.17 tonnes) for the Huron Landfill.

2.3.4 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 2020 BASWR recycling data summary for the Township is enclosed in **Appendix C**.

2.3.5 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 2020 tonnage of recyclables (476.45 tonnes) was higher compared to the 2019

tonnage (429.79 tonnes). When segregated materials (287.39 tonnes) are included, the total tonnage diverted from both Township landfills (Kinloss and Huron) is 763.84 tonnes in 2020. This tonnage represents a 29% diversion rate for the Township. The estimated saving in landfill space is 1527.68 m^3.

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 2020.

The access road is gravel and well maintained by the Township. Access to the site is controlled by a lockable steel gate. Fencing is in place across the front boundary 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 2020 monthly breakdown of accepted waste has been provided in **Table 2-3**.

Upon exiting the weigh scales, residents may deliver recyclables, segregated or burnable materials to the south end of the site. Household waste is delivered to the trenches to be landfilled.

Waste collection is provided to the entire Township on a weekly basis. Currently the tender for waste collection belongs to 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 one complaint was received in 2020 for litter migrating off site.

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 2020 was held January 21, 2020. The meeting notes which provide an overview of training is attached in **Appendix B**. The monthly landfill training reviews for 2020 and additional Health & Safety training documentation are also provided in **Appendix B**.

3 PHYSICAL SETTING

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.

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 July 2, 2020 and November 20, 2020. A summary of the water table elevation data is presented in **Table D-1**. **Figure D-1** is the hydrograph for the upgradient and cross-gradient wells: OW3, OW4, OW5, OW10S and OW10D. **Figure D-2** is the hydrograph for the 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 January 2021, whereby the elevations were established compared to sea level.

Based on the groundwater elevations for July 2020, the inferred shallow groundwater flow configuration is shown in **Figure 4**. It should be noted that the contours are considered reliable only in the vicinity of the wells, however a reasonable interpretation of the contours can be made on the basis that the water table is generally a subdued reflection of surface topography. 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 flow pattern was consistent with previous year's results. The July 2020 horizontal hydraulic gradient varied between 0.0003 m/m and 0.004 within the eastern portion of the site, to 0.04 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 1 - 2 m, but up to a maximum of approximately 3 m between the spring and fall monitoring events. This data suggests that the overburden aquifer monitored by the existing well network is susceptible to seasonal variation.

Three of the monitoring wells were installed as well nests: OW7, OW8 and OW10. The construction of these well nests allows for the determination of vertical hydraulic gradients.

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

Table 3-1
Vertical Gradients

Well Nest	Date	Gradient
OW7	July 2020	0.79 downward
	November 2020	1.33 downward
OW8	July 2020	1.18 downward
	November 2020	1.57 downward
OW10	July 2020	0.36 downward
	November 2020	0.28 downward

As shown in the table, the well nests typically exhibit a downward gradient. The vertical gradients are orders of magnitude greater than the horizontal gradients calculated for the site; therefore, there is a relatively strong downward component to the groundwater flow.

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 RESULTS

4.1 CURRENT MONITORING PROGRAM

The monitoring of the groundwater and surface water at the Huron Landfill enables the determination of the flow direction and concentration of the landfill generated leachate plume. The monitoring program is also a requirement of the Certificate of Approval for the site. 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 monitoring program has been in existence since 1989.

The monitoring program dictates that each observation well sampled shall be purged prior to actual sampling, to obtain the most representative groundwater sample possible. Well purging consisted 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.

Each sample obtained from an observation well is simultaneously field filtered, as required. The sampling and filtering device utilized is the Waterra pumping unit equipped with a disposable high turbidity 0.45 micron in-line filter.

In 2020, water level measurements, purging and sampling were conducted on July 2 and November 20. Methane monitoring was completed on February 7, 2020 under frozen 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. Most wells were found to be in good condition, with the exception of OW1 which is at risk of falling into the adjacent stream due to erosion. It is noted that OW2 is no longer monitored and was decommissioned on March 12, 2018 by landfill staff under direction of WSP.

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 monitor. All monitoring wells have dedicated Waterra sampling tubes.

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.

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

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

4.2 GROUNDWATER QUALITY

The 2020 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 analyse the monitoring results more effectively, the monitoring wells are categorized into three groups:

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

Chloride, hardness, DOC, and conductivity are leachate diagnostic 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 examine 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, the leachate strength in OW6 is greater than in OW11 and has increased since 2013.

The following is a summary of the characteristic parameters from leachate wells OW6 and OW11 from the July and November 2020 sampling events. Background monitoring well OW5 results are also included to indicate background conditions.

	OW6		OW11		OW5	
	July	Nov.	July	Nov.	July	Nov.
Chloride	458	520	260	287	59.4	60.8
Hardness	1170	1250	988	965	413	409
DOC	107	82.4	14.9	14.6	3.8	2.5
Conductivity	3610	3960	2490	2450	839	858

Notes:

1. All concentrations are in mg/L except conductivity in us/cm.
2. nd = parameter not detected in lab analysis.

Based on the 2020 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 reasonably stable, fluctuating between 40 and 85 mg/L.
- The chloride concentrations for OW6 have decreased dramatically 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 2020.
- 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 2020. 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. The increases observed at OW5 may indicate off-site impacts from road salting activities migrating onto the site.

4.2.1 GROUNDWATER CHEMISTRY – UPGRADIENT 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. Although the well 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 than the other cross-gradient wells. As stated above, it appears that OW11 could be impacted by road salt. 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 concur with 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 5.64 m in depth and screened in clay. OW10D is 13.41 m in depth and is screened in a gravel and sand unit underlying the clay. Both wells indicate 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.

4.2.2 GROUNDWATER CHEMISTRY – DOWNGRADIENT 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 spikes 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 an historical maximum of 153 mg/L in November 2016. Chloride reported at 58.7 mg/L and 72.3 mg/L in the spring and fall of 2020, 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 - 2020. The 2020 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 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 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 been limited in both lateral and vertical directions.

4.2.3 WATER QUALITY COMPLIANCE

(1) REASONABLE USE

In accordance with the appropriate criteria for particular reasonable uses, 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 accessing 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.

Cm	=	Cb + x (Cr-Cb)
Where Cm	=	maximum concentration accepted
Cb	=	background concentration
Cr	=	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 2020 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 2020, the RUC exceeded for DOC at monitor OW1 during the spring and fall monitoring events. DOC has exceeded the RUC at OW1 since 2012. DOC concentrations also exceeded the criteria for Reasonable Use at monitors OW4 and OW8D during the spring event. No other leachate indicator parameters were elevated at these monitoring locations in 2020. It is considered unlikely that leachate impacts are present at all RUC monitors, further observation of this is warranted in 2021 due to the frequent recent exceedances at monitor OW1.

(2) TRIGGER LEVELS

In accordance with the appropriate criteria

The groundwater triggers for the contingency plan will be based on the RUC detailed in Section 8.3.3. The RUC 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 2020, DOC was above the 85% RUC at monitor OW1 during the spring and fall events, and at monitor OW8D for the spring event. Based on these results, no supplemental monitoring or investigation is required and 'Stage 1 – Routine monitoring' will continue for 2021.

4.3 SURFACE WATER QUALITY

4.3.1 SOUTH PINE RIVER

The surface water samples during the recent annual monitoring program were obtained on July 2 and November 20, 2020. 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 2020 monitoring results for SW1 and SW2 are summarized in **Table F-2**. The MECP PWQO is also included for reference. Any exceedance of a PWQO is indicted 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 July and November sampling events. In comparison, the results for SW1 and SW2 indicate very similar conditions.

In July 2020, the concentration for phosphorus at station SW1 was 0.03 mg/L, which exceeds the PWQO. Since this station is upstream of the landfill site, the presence of phosphorus at this location is likely related to agriculture and/or sediment within the sample and is not attributed to the landfill site.

Aluminum exceeds the 0.075 mg/L PWQO at the upstream location, SW1, in the spring and fall 2020 samples, and the downstream location, SW2, in the spring 2020 sample. The elevated concentration within the upstream station, SW1, indicates an off-site source of aluminum.

The exceedances of the PWQO at the downstream station SW2 are similar to, or lower than the concentration at the upstream station, SW1, there are no measurable landfill influences on the water quality of the South Pine River.

The monitoring results indicate no evidence of downstream impacts from the leachate.

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 aluminum, boron and iron for the Spring and Fall 2020 monitoring events. The monitoring results indicate evidence of leachate impact. The proposed Stormwater management System should mitigate this area along with proper daily use of interim and final cover practices to ensure proper grading over the site to prevent leachate run off.

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 does 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 2020, methane monitoring was conducted on February 7, 2020, under frozen conditions by WSP. **Table 4-5** summarizes the results of methane monitoring between 2007 and 2020. As shown in **Table 4-5**, methane was also detected in GP3 in July 2007 at near the LEL. In July 2008, methane was detected at GP3 above explosive levels. Methane levels at GP3 was observed at zero during monitoring in 2009 and 2010 however methane at this location was reported to be at 100% of the LEL in February 2011 (9% volume gas in air) and March 2012 (16% volume gas in air). This trend continued in 2013 - 2016, with GP3 reporting 10% volume gas in air on February 9, 2016. On February 22, 2018, GP3 measured 52% volume gas in air. On March 11, 2019, GP3 measured 41% volume gas in air. February 7, 2020, GP3 measured 15% volume gas in air.

It is recommended that methane monitoring continue in 2021 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 MECP 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 2020, there were no reported days where the LEL was greater than zero.

Table 4-5
Summary of Methane Monitoring

Date	GP1	GP2	GP3		GP4	Scalehouse
Jul 2007	0	0	4.2	0.2% vol. g.	0	
Dec 1007	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	0.9	4.5% vol. g.	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	

Notes: 1. All results shown in % of lower explosive limit of methane.
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 usual 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, this will now include the "ponded water" (SW3) until the problem area is rectified. Combustible gas monitoring will also be conducted once annually under frozen conditions.

Table 5-1
Huron Landfill Site
Proposed Monitoring Program

Monitoring Location	Proposed Sampling Spring 2021	Proposed Sampling Fall 2021
OW1	✓	✓
OW3	✓	✓
OW4	✓	✓
OW5	✓	✓
OW6	✓	✓
OW7S	✓	✓
OW7D	✓	✓
OW8S	✓	✓
OW8D	✓	✓
OW9	✓	✓
OW10S	✓	✓
OW10D	✓	✓
OW11	✓	✓
SW1	✓	✓
SW2	✓	✓
SW3	✓	✓

Notes:

1. ✓ indicates to be sampled.
2. The lab parameters to be tested for groundwater and surface water will include:
   - Alkalinity
   - Ammonia
   - Anions – Cl, NO2, NO3, SO4
   - Conductivity
   - Dissolved metals by ICPMS
   - Total phosphorus (SW's only)
   - DOC
   - Hardness
   - Phenols
   - pH
   - TKN
3. At all monitoring wells and SW stations the following field measurements should be obtained:
   - Temperature
   - pH
   - Conductivity
4. Methane measurements from GP1, GP2, GP3, GP4 and the scalehouse will be under frozen conditions.

6 CONCLUSIONS

1. Approximately 2,887 tonnes of waste was received at the site in 2020, which equated to a landfilled volume of 8,795 m^3.
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 mid to late 2029.
3. Security and control of the site in 2020 continued to be sufficient.
4. A total of 476.45 tonnes of recyclable materials were recycled through the Blue Box Recycling Program and on-site collection bins in 2020. There were 148.35 tonnes of scrap metal, 110.15 tonnes of tires collected, 11.37 tonnes of E-waste and 17.17 tonnes of mattresses removed from the Huron and Kinloss Landfills for a total of 287 tonnes of non-blue box materials diverted from landfilling.
5. Based on groundwater elevation monitoring, the interpreted shallow groundwater flow is toward the west and southwest.
6. 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 background or near 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. Surface water monitoring on the South Pine River indicates no measurable downstream influences from the landfill site. Exceedances of PWQO at the downstream station are attributed to agricultural and/or other upgradient sources.
9. The Reasonable Use Criteria was exceeded for DOC in monitor OW1 during both sampling events in 2020, and at monitors OW4 and OW8D during the July event. The parameter concentrations within the remaining site boundary monitors satisfied the Guideline B-7 criteria. The RUC trigger criteria for DOC was exceeded at monitor OW1 during both events, and at monitor 8D during the spring event, in 2020.
10. Combustible gas monitoring indicated no detections of methane between 2018 and 2020 at monitoring points GP1, GP2, GP4 and at the scale house. Combustible gas was detected at a concentration greater than 100% of its lower explosive limit at gas probe GP3. 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 there was no potential hazard within the area of on-site structures during the monitoring events during this time frame.

7 RECOMMENDATIONS

Based on the foregoing, the following is recommended:

- → The Township continues to promote recycling both at home and at the landfill site.
- → Based on the RUC trigger criteria results, no supplemental monitoring or investigation is required and 'Stage 1 – Routine monitoring' should be continued in 2021.
- → 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.
- → A topographic survey be completed at the end of the calendar year to accurately determine the annual landfilled volume. The topographic survey is also recommended to survey the elevation of the monitoring wells to complete groundwater flow measurements in accurate geodetic (metres above sea level) format.
- → Litter fence be installed along the north east boundary of the active landfilling area, south of OW4, this area has a break in the tree line where litter is migrating off site.
- → This report 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	2016		2017		2018		2019		2020	
	Weight (Tonnes)	Volume Saved (m^3)	Weight (Tonnes)	Volume Saved (m^3)	Weight (Tonnes)	Volume Saved (m^3)	Weight (Tonnes)	Volume Saved (m^3)	Weight (Tonnes)	Volume Saved (m^3)
Newspaper	103.14	206.28	153.86	307.72	152.21	304.42	130.31	260.62	128.74	257.48
Steel (Cans, etc.)	22.04	44.08	23.89	47.78	32.20	64.40	27.57	55.14	32.66	65.32
Aluminum	9.12	18.24	9.90	19.80	9.94	19.88	8.51	17.02	16.00	32.00
Glass (Flint & Coloured)	41.96	83.92	48.57	97.14	65.80	131.60	56.33	112.66	80.74	161.48
Plastic (HDPE & PET)	54.85	109.70	58.61	117.22	74.20	148.40	63.52	127.04	76.25	152.50
White Paper	13.21	26.42	12.29	24.58	5.20	10.40	4.45	8.90	3.15	6.30
Boxboard	29.88	59.76	40.95	81.90	52.12	104.24	44.62	89.24	44.65	89.30
Corrugated Cardboard	44.70	89.40	81.75	163.50	111.83	223.66	94.48	188.96	94.26	188.52
Total Recyclables	**318.90**	**637.80**	**429.82**	**859.64**	**503.50**	**1007.00**	**429.79**	**859.58**	**476.45**	**952.90**
Tires	182.69	365.38	101.75	203.50	45.88	91.76	63.13	126.25	110.50	221.00
Scrap Metal	132.60	265.21	159.16	318.31	114.71	229.42	167.96	335.92	148.35	296.70
Bale Wrap	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E-waste	20.19	40.37	15.17	30.33	18.85	37.70	14.95	29.90	11.37	22.74
Mattresses	11.76	23.53	11.32	22.64	15.54	31.08	15.88	31.76	17.17	34.34
Total Segregated	**347.24**	**694.48**	**287.39**	**574.79**	**194.98**	**389.96**	**261.92**	**523.83**	**287.39**	**574.78**
Total Diverted	**666.14**	**1332.28**	**717.21**	**1434.43**	**698.48**	**1396.96**	**691.71**	**1383.41**	**763.84**	**1527.68**

Notes:

1. Data obtained from BASWRA and Township.
2. Assumed compaction density is 500 kg/m^3.
3. Tires are converted to a volume by a factor of 8 tires/m^3.
4. Recyclable tonnages are for the entire Township excluding Lucknow.
5. Tonnages of scrap metal and tires are combined totals for Kinloss and Huron Landfills.
6. 1,768 tires received in 2020 @ 8/tires/m^3
7. 505 mattresses received in 2020 at 29.4 mattresses/tonne
8. Volume Saved - defined as waste diverted from the landfill through recycling programs.

Table 2-3
2020 Huron Landfill Accepted Waste Summary

Month	Commercial Accounts	BASWR (Tonnes)	Residential (Tonnes)	Yardwaste (Tonnes)	Totals (Tonnes)	Brush (Tonnes)	Mattresses (#)
January	41.18	30.61	60.57	1.15	133.51	3.22	25
February	30.63	24.45	61.64	1.41	118.13	2.46	17
March	43.24	36.14	41.68	11.86	132.92	3.90	17
April	55.28	27.81	60.20	30.72	174.01	1.39	1
May	63.76	43.79	94.31	28.60	230.46	6.39	45
June	75.51	59.94	151.45	6.81	293.71	7.85	70
July	73.75	51.64	144.91	13.03	283.33	13.92	100
August	67.25	52.95	133.64	4.45	258.29	27.28	67
September	61.08	54.68	126.83	3.81	246.40	9.91	76
October	64.22	29.40	126.32	7.13	227.07	3.69	45
November	56.64	31.95	101.67	2.83	193.09	3.04	25
December	51.97	39.78	91.14	0.00	182.89	4.27	17
TOTAL	684.51	483.14	1,194.36	111.80	2,473.81	87.32	505

Notes:

BASWR noted here is waste portion, not recyclables collected by BASWR. See Table 2 for recycling portion totals.

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		
OW1	26/09/89	230.13	229.43	5.99	6.69	4.49	5.99	224.94	223.44	Silt	
OW3	26/09/89	233.63	231.87	5.79	6.55	4.29	5.79	227.58	226.08	Silt	
OW4	26/09/89	230.88	230.08	4.02	4.82	2.52	4.02	227.56	226.06	Silt	
OW5	26/09/89	232.88	231.81	4.72	5.54	3.22	4.72	228.59	227.09	Silt	
OW6	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
OW7S	02/07/97	231.91	230.98	8.89	9.19	7.39	8.89	223.59	222.09	Silt	
OW7D	02/07/97	231.22	230.92	13.63	14.56	12.13	13.63	218.79	217.29	Silt	
OW8S	03/07/97	230.69	230.08	8.58	9.13	7.08	8.58	223.00	221.50	Silt & Silt and Clay	
OW8D	03/07/97	230.71	230.11	13.87	14.47	12.37	13.87	217.74	216.24	Clay	
OW9	03/07/97	230.90	230.06	18.55	19.40	17.05	18.55	213.01	211.51	Clayey Silt	
****OW10S**	22/07/03	225.48	224.55	5.64	6.57	4.14	5.64	220.41	218.91	Clay	
****OW10D**	22/07/03	225.22	224.50	13.28	14.00	11.78	13.28	212.72	211.22	Clay & Gravel and Sand	
OW11	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 2020 GROUNDWATER MONITORING
HURON LANDFILL SITE

Parameter	Background Concentration	Standard / Objective	Type	RUC	On Site		PROPERTY BOUNDARY			
					OW9		OW1		OW4	
					Jul-20	Nov-20	Jul-20	Nov-20	Jul-20	Nov-20
Chloride	7	250	OG	129	2.2	2.4	58.7	72.3	12.4	15.9
Nitrate	0.145	10	IMAC	2.61	0.27	0.09	0.19	0.22	0.16	0.08
DOC	2.6	5	AO	3.8	1.7	1.1	5.0	4.9	4.2	3.0
Arsenic	0.004	0.025	AO	0.009	0.0037	0.0046	0.0011	0.0008	0.0005	0.0006
Barium	0.0775	1	AO	0.308	0.025	0.022	0.102	0.106	0.085	0.086
Iron	0.05	0.3	OG	0.175	<0.005	0.01	0.041	0.011	<0.005	0.005
Sodium	25.9	250	AO	113	78.2	74.7	50.1	51.3	18.0	19.0

Parameter	Background Concentration	Standard / Objective	Type	RUC	PROPERTY BOUNDARY								
					OW7S		OW7D		OW8S			OW8D	
					Jul-20	Nov-20	Jul-20	Nov-20	Jul-20	Nov-20	Nov-20 (dup)	Jul-20	Nov-20
Chloride	7	250	OG	129	27.8	29.2	10.9	10.2	47.5	49.7	49.9	8.6	7.9
Nitrate	0.145	10	IMAC	2.61	0.13	<0.05	0.34	0.31	0.1	<0.05	<0.05	0.28	0.24
DOC	2.6	5	AO	3.8	3.6	2.5	2.3	3.4	1.2	0.7	1.3	4.0	0.9
Arsenic	0.004	0.025	AO	0.009	0.0006	0.0008	0.0004	0.0004	0.0007	0.0010	0.0011	0.0002	0.0003
Barium	0.0775	1	AO	0.308	0.04	0.036	0.042	0.039	0.053	0.053	0.051	0.030	0.028
Iron	0.05	0.3	OG	0.175	<0.005	0.011	<0.005	0.006	0.005	0.006	<0.005	<0.005	0.008
Sodium	25.9	250	AO	113	57.7	56.2	73.6	70.8	66.8	65.2	64.4	85.2	82.3

Parameter	Background Concentration	Standard / Objective	Type	RUC	PROPERTY BOUNDARY					DOWNGRADIENT	
					OW10S			OW10D		OW3	
					Jul-20	Jul-20 (dup)	Nov-20	Jul-20	Nov-20	Jul-20	Nov-20
Chloride	7	250	OG	129	1.2	1.5	1.8	6.2	3.6	103	102
Nitrate	0.145	10	IMAC	2.61	0.3	0.31	0.26	0.78	<0.05	0.42	0.2
DOC	2.6	5	AO	3.8	1.3	1.7	1.6	1.5	1.4	2.6	3.1
Arsenic	0.004	0.025	AO	0.009	0.0003	0.0003	0.0002	0.0003	0.0005	0.0016	0.0016
Barium	0.0775	1	AO	0.308	0.028	0.027	0.028	0.115	0.097	0.096	0.09
Iron	0.05	0.3	OG	0.175	0.014	0.015	0.01	<0.005	0.007	0.023	0.014
Sodium	25.9	250	AO	113	41.6	41.7	40.1	22.2	27.5	40.2	35.6

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, 2020 GROUNDWATER MONITORING
HURON LANDFILL SITE

Parameter	Background Values Cb mg/L	ODWQS	RUC Values			OW1 (85% RUC) July-20 mg/L	OW3 (85% RUC) July-20 mg/L	OW7S (85% RUC) July-20 mg/L	OW7D (85% RUC) July-20 mg/L	OW8S (80% RUC) July-20 mg/L	OW8D (80% RUC) July-20 mg/L	OW9 (100% RUC) July-20 mg/L
			100% mg/L	85% mg/L	80% mg/L							
Chloride	7	250	129	111	105	58.7	103	27.8	10.9	47.5	8.6	2.2
Nitrate	0.145	10	2.61	2.2	2.1	0.19	0.42	0.13	0.34	0.1	0.28	0.27
DOC	2.6	5	3.8	3.6	3.6	5.0	2.6	3.6	2.3	1.2	4.0	1.7
Arsenic	0.004	0.025	0.009	0.008	0.008	0.0011	0.0016	0.0006	0.0004	0.0007	0.0002	0.0037
Barium	0.0775	1	0.308	0.27	0.26	0.102	0.096	0.04	0.042	0.053	0.030	0.025
Iron	0.05	0.3	0.175	0.16	0.15	0.041	0.023	<0.005	<0.005	0.005	<0.005	<0.005
Sodium	25.9	250	113	100	96	50.1	40.2	57.7	73.6	66.8	85.2	78.2

Parameter	Background Values Cb mg/L	ODWQS	RUC Values			OW1 (85% RUC) November-20 mg/L	OW3 (85% RUC) November-20 mg/L	OW7S (85% RUC) November-20 mg/L	OW7D (85% RUC) November-20 mg/L	OW8S (80% RUC) November-20 mg/L	OW8D (80% RUC) November-20 mg/L	OW9 (100% RUC) November-20 mg/L
			100% mg/L	85% mg/L	80% mg/L							
Chloride	7	250	129	111	105	72.3	102	29.2	10.2	49.7	7.9	2.4
Nitrate	0.145	10	2.61	2.2	2.1	0.22	0.2	<0.05	0.31	<0.05	0.24	0.09
DOC	2.6	5	3.8	3.6	3.6	4.9	3.1	2.5	3.4	0.7	0.9	1.1
Arsenic	0.004	0.025	0.009	0.008	0.008	0.0008	0.0016	0.0008	0.0004	0.0010	0.0003	0.0046
Barium	0.0775	1	0.308	0.27	0.26	0.106	0.09	0.036	0.039	0.053	0.028	0.022
Iron	0.05	0.3	0.175	0.16	0.15	0.011	0.014	0.011	0.006	0.006	0.008	0.01
Sodium	25.9	250	113	100	96	51.3	35.6	56.2	70.8	65.2	82.3	74.7

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 - 2020

Surface Water Station			SW3/18	SW3/18	SW3/18
Date			7-Nov-19	Jul-20	Nov-20
	Units	PWQO mg/L			
Calculated Parameters					
Hardness (CaCO3)	mg/L		191	100	228
Inorganics					
Ammonia-N	mg/L		3.74	0.13	1.9
Un-ionized Ammonia	mg/L	0.020 (10)	0.00	0.118	0.036
Conductivity	umho/cm		636	689	756
Total Kjeldahl Nitrogen (TKN)	mg/L		5.1	4.6	3.2
Dissolved Organic Carbon	mg/L		11.8	38.8	11.9
pH	pH	6.5 - 8.5	8.05	10.00	7.95
Phenols	mg/L	0.001	<0.002	<0.002	<0.002
Phosphorus	mg/L	0.030 (9)	0.1	0.16	0.06
Sulphate (SO4)	mg/L		55	7	74
Alkalinity	mg/L	(7)	172	176	174
Chloride (Cl)	mg/L		55.8	102.0	82.2
Nitrite (N)	mg/L		<0.05	<0.05	0.08
Nitrate (N)	mg/L		0.68	0.06	0.36

Surface Water Station			SW3/18	SW3/18	SW3/18
Date			7-Nov-19	2-Jul-20	20-Nov-20
	Units	PWQO mg/L			
Metals					
Aluminum (Al)	mg/L	0.075 (8)	0.57	0.63	0.37
Arsenic (As)	mg/L	0.100 (11)	0.0016	0.0151	0.0015
Beryllium (Be)	mg/L	1.100 (12)	<0.002	<0.002	<0.0001
Boron (B)	mg/L	0.200 (1)	0.339	1.500	0.487
Cadmium (Cd)	mg/L	0.0002 (3)	0.00003	<0.000015	<0.000015
Calcium (Ca)	mg/L		52.1	12.2	61.9
Chromium (Cr)	mg/L	0.001 (13)	<0.002	0.002	0.001
Cobalt (Co)	mg/L	0.0009	<0.005	<0.005	0.0006
Copper (Cu)	mg/L	0.005 (4)	0.004	<0.002	0.0016
Iron (Fe)	mg/L	0.300	0.848	1.100	0.855
Lead (Pb)	mg/L	0.025 (5)	0.00079	0.00127	0.00049
Magnesium (Mg)	mg/L		14.90	16.80	17.80
Manganese (Mn)	mg/L		0.055	0.087	0.127
Molybdenum (Mo)	mg/L	0.040 (1)	0.0005	0.0009	0.0009
Nickel (Ni)	mg/L	0.025	<0.01	<0.01	0.0028
Potassium (K)	mg/L		11.4	22.5	18.3
Silver (Ag)	mg/L	0.0001	<0.0001	<0.0001	<0.0001
Sodium (Na)	mg/L		44.8	106	54.2
Vanadium (V)	mg/L	0.006 (1)	<0.005	<0.005	0.001
Zinc (Zn)	mg/L	0.030 (6)	0.009	<0.005	0.013

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

Surface Water Station		SW3/18	SW3/18	SW3/18
Date		7-Nov-19	2-Jul-20	20-Nov-20
FIELD MEASUREMENTS	Units			
Temperature	Degrees C	2.6	32.0	8.2
Conductivity	µmhos	635	666	925
pH		7.51	10.04	8.08

NOTES:
1. PWQO indicates Provincial Water Quality Objectives.
2. (I) indicates interim PWQO
3. 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).
4. Copper Interim PWQO = 5 µg/L(for Hardness >20 mg/L)
5. Revised Interim PWQO = 5 µg/L (for Alkalinity > 80 mg/L (as CaCO3)
6. Zinc Revised Interim PWQO = 20 µg/L
7. Alkalinity should not be decreased by more than 25 % of the natural concentration.
8. Interim PWQO = 75 ug/L for pH >6.5 to 9.0.
9. 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
10. PWQO for un-ionized ammonia
11. Interim PWQO for arsenic is 5 ug/L
12. For hardness < 7 mg/L: PWQO = 11 µg/L; for hardness > 75 mg/L: PWQO = 1100 µg/L.
13. Chromium: PWQO - 1 µg/L for hesavalent chromium, 8.9 µg/L for trivalent chromium.
14. Unionized Ammonia Fraction (f) where $f = 1/(10^{pka - pH} + 1)$; pka = 0.09018 + 2729.92/T; T = °C +273.16
15. [ ] - value exceeds PWQO.

FIGURES

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

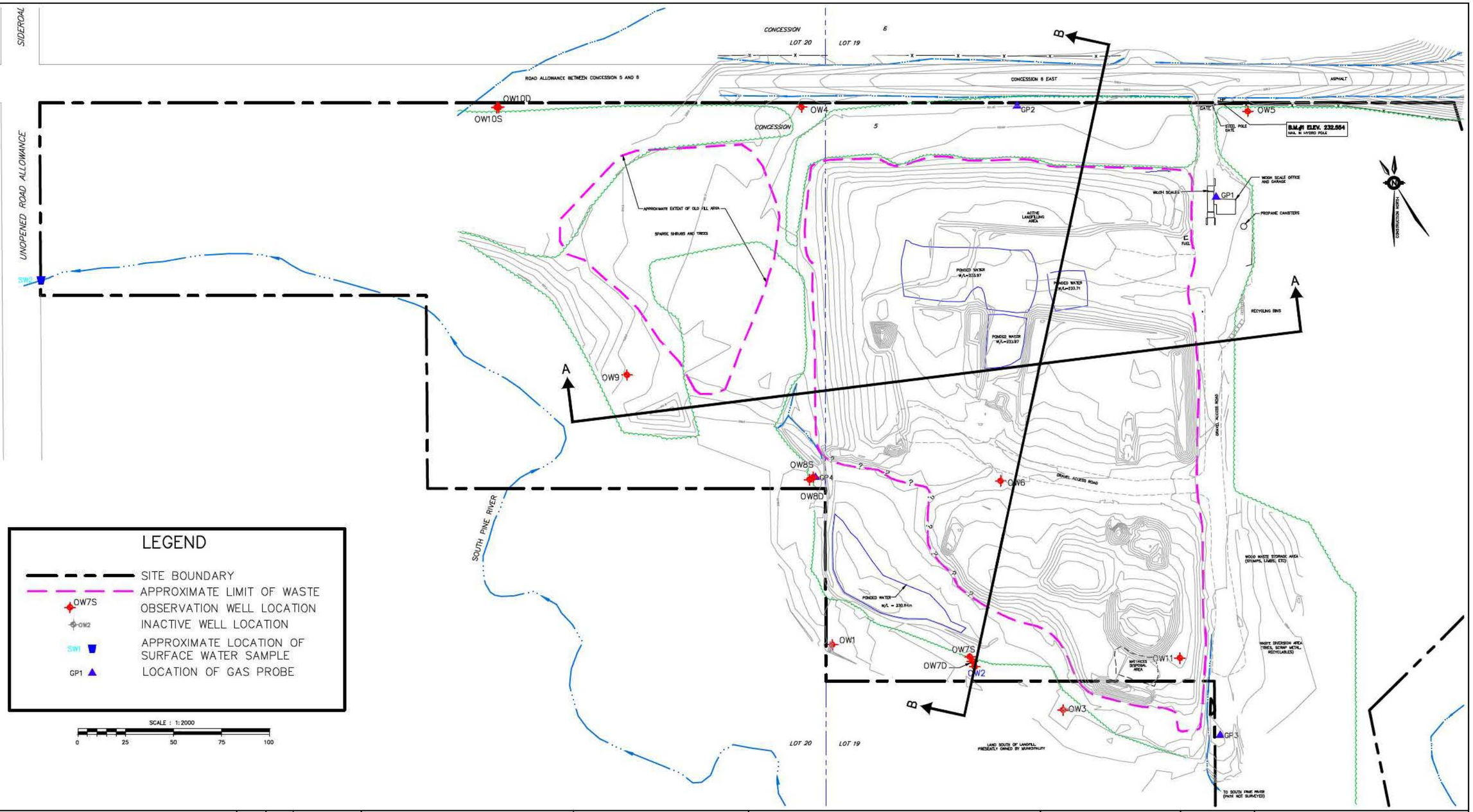
REGIONAL LOCATION MAP
HURON LANDFILL SITE
TOWNSHIP OF HURON-KINLOSS

DESIGN	– – –
DRAWN	TCG
APPROVED	– – –
DATE	MARCH 2021
SCALE	1:200,000
FILE No.	101–16942–00
FIG. No.	FIGURE 1

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

C:\2010\05\401 – Environment\101–16942–00 – Huron WDS\DRAW\2020\101–16942–FIG 1.dwg

COPYRIGHT © WSP



wsp
185 EAST STREET
SAULT STE.MARIE ONTARIO CANADA P6A 3C8
TEL.: 705-942-2070 | FAX: 705-942-3532 | WWW.WSP.COM

IS.	RV.	DATE	DESCRIPTION

SEAL:

CLIENT: TOWNSHIP OF HURON-KINLOSS

CLIENT REF. #: --

PROJECT: HURON LANDFILL

PROJECT NO: 101-16942-00

DATE / DATE: MARCH 2021

DESIGNED BY: --

DRAWN BY: TCG

CHECKED BY: LAL

DRAWING NO: FIGURE 2

SCALE: 1:2000

TITLE: MONITORING WELL LOCATIONS

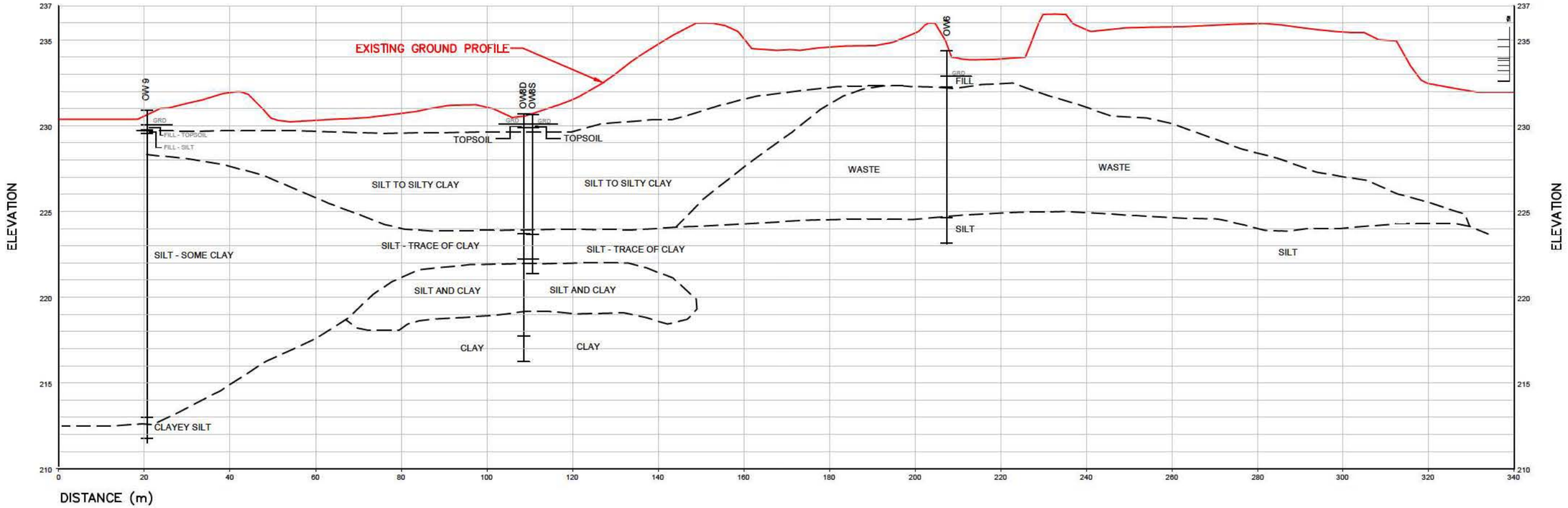
DISCIPLINE: ENVIRONMENT

ISSUE: --

DATE OF: MARCH 2021

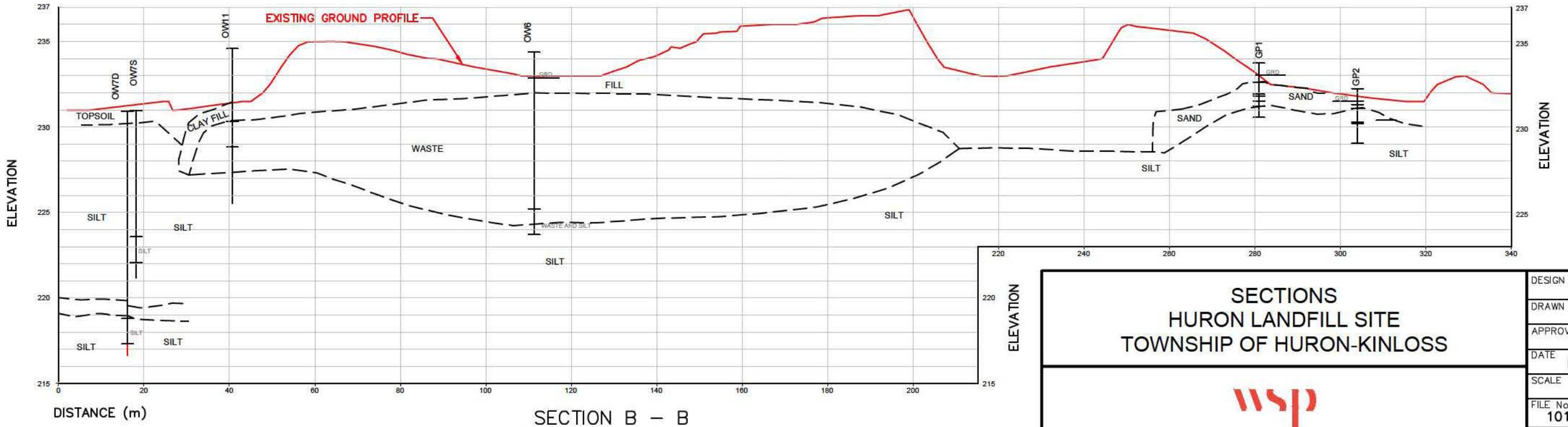
RV. # 0

Ansi B-SCE, G:\2010\OS\401 - Environment\101-16942-00 - Huron WDS\DRAW\2020\HURON FIGURE 2 AND 4-SAMPLING LOCATIONS AND GW CONTOURS.dwg, 3/22/2021 11:26:20 AM



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	L A L
DATE	MARCH 2021
SCALE	AS SHOWN
FILE No.	101-16945-00
FIG. No.	3

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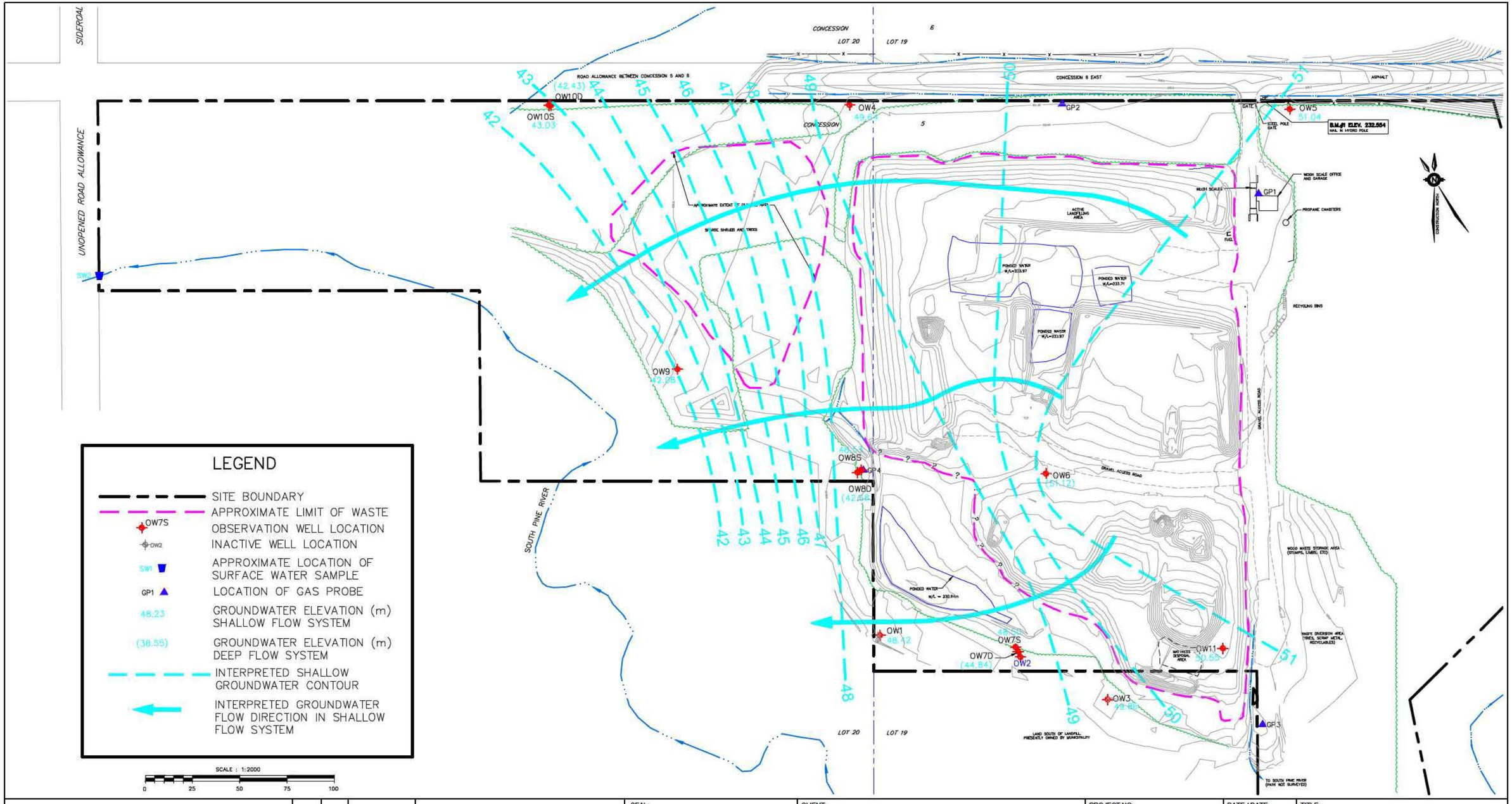

wsp
185 EAST STREET
SAULT STE.MARIE ONTARIO CANADA P6A 3C8
TEL.: 705-942-2070 | FAX: 705-942-3532 | WWW.WSP.COM

IS.	RV.	DATE	DESCRIPTION

SEAL:

CLIENT: TOWNSHIP OF HURON-KINLOSS

CLIENT REF. #: --

PROJECT: HURON LANDFILL

PROJECT NO: 101-16942-00	DATE / DATE: MARCH 2021
DESIGNED BY: --	
DRAWN BY: TCG	
CHECKED BY: LAL	
DRAWING NO: FIGURE 4	SCALE: 1:2000

TITLE: GROUNDWATER CONTOURS

DISCIPLINE: ENVIRONMENT

ISSUE: -- DATE OF: MARCH 2021

RV. # 0

Ansi B-SCE, G:\2010\OS\401 - Environment\101-16942-00 - Huron WDS\DRAW\2020\HURON FIGURE 2 AND 4-SAMPLING LOCATIONS AND GW CONTOURS.dwg, 3/22/2021 11:16:33 AM

APPENDIX

A PROVISIONAL CERTIFICATE OF APPROVAL

Ontario

of the Environment

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

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 13 day of August 19 91
date de jour de

Ontario

of the Environment / 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

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 5.1.5 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 5.1.5 (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 _____ day of _____ 19 _____
date de jour de

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.

092702

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
Suite 502
Toronto, Ontario.
M4V 1N3

AND

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

Dated at ~~Toronto~~ London this 15th day of October, 1991

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

MAITLAND ENGINEERING SERVICES LTD.

November 5, 1985

ADDENDUM NUMBER 1
to
Plan of Development and Operation
Township of Huron Waste Disposal Site
Township of Huron
County of Bruce

Introduction: Initially the depth of excavation for disposal purposes was to be 3 m (10 feet) due to the restrictions imposed by the method of excavation ie. a bulldozer. The method now used is a hydraulic hoe which can effectively excavate to 5 m without difficulty.

A review of a preliminary submission of the plan indicated that the 5 m depth would only be permitted if the original application for site approval contained information indicating a desire to use that depth. Township files did not contain a copy of the original application however, Ministry files did reveal that the original application indicates a trench depth of 10 feet and a depth from original ground to top of fill of 2 feet.

This addenda modifies the plan to conform to the original application.

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

Ramifications: The operational method is not affected; however, the capacity calculations are reduced due to the shallower disposal trenches. Since the potential trench volume has been reduced by 40%, the life expectancy has likewise been reduced by 40% and now is estimated to be between 10 years and 12 years.

Per _____
A. W. Clark, P. Eng.
Maitland Engineering Services Ltd.

The Corporation of the Township of Huron-Kinloss

P.O. Box 130
21 Queen Street
Ripley, Ontario
N0G 2R0

PHONE (519) 395-3735
FAX (519) 395-4101

e-mail: huronkin@huronkinloss.com

December 19, 2001

File No. 300-Huron Landfill

Environmental Assessment and Approvals Branch
Waste Unit
2 St. Clair Avenue, West
12A Floor
Toronto, Ontario
M4V 1L5

Dear Sir:

On January 1st, 1999, the Village of Lucknow, the Township of Huron, and the Township of Kinloss amalgamated to become the Township of Huron-Kinloss. One of the objectives of the Council for the new municipality is to establish a consistent, financially responsible, environmentally sound, long term strategy for the management and disposal of household waste generated within the new Township.

In an attempt to achieve the above goal we are requesting a site service area change to Huron Certificate No. A-272601 to include the residents of the former Township of Kinloss.

The Huron Landfill site currently services the former Township of Huron, a permanent population of 3792, plus an additional seasonal population of 3154 for a total of 6948. Presently the residents receive weekly mixed waste curbside collection, and while blue box collection is not provided, recycle depots are available at various locations throughout the Township.

The Landfill site is open Tuesday, Friday, and Saturday to meet the requirements of the local residents who prefer to transport their own.

The former Township of Kinloss has a population of 1277, however unlike Huron, it is predominantly a rural agricultural community and is home to a large number of Mennonite families. The Landfill site is open on Saturdays only. There is neither curbside, nor blue box collection, however a recycle depot is available on site.

Both Townships use the bag tag system.

It is our intent to provide curbside mixed waste collection to all Township residents as of April 1st, 2002 as well as the implementation of a blue box collection system by June 1st, 2002.

In our opinion the change of service area makes economical and environmental sense. The change in the rate of fill would be relatively insignificant and would allow us to focus on improving our existing waste management procedures. A single disposal site would not only reduce duplication of expenditures but would allow us to identify opportunities for operational efficiency. Collection would be consistent for all residents, money could be saved on collection as the contractor would have a direct haul to one site, and tipping fees could become standardized. Environmentally we would have better overall site supervision, better monitoring of materials entering the site, and more efficient waste compaction and covering techniques.

The Township of Huron-Kinloss views its landfill capacity as a beneficial asset to its ratepayers. By extending curbside pickup to all rural residents and implementing a Township wide blue box collection we believe we have taken the initiative to conserve this asset.

We ask that you consider our request for a site service area change to help in our quest for long term utilization of our landfill sites.

If you have any questions, please do not hesitate to contact me.

Sincerely,

Hugh Nichol

Hugh Nichol,
Public Works Superintendent.

c.c. Mary Rose Walden, Administrator

The Corporation of the Township of Huron-Kinloss

P.O. Box 130
21 Queen Street
Ripley, Ontario
N0G 2R0

PHONE (519) 395-3735
FAX (519) 395-4107

e-mail: huronkwp@huronkinloss.com

February 8, 2002

Environmental Assessment and Approvals Branch,
Waste Unit,
2 St. Clair Avenue, West,
12A Floor,
Toronto, Ontario,
M4V 1L5

Attention: John Gasbarri

In a letter dated December 19th, 2001, the Township of Huron-Kinloss requested a site service area change to Huron Certificate No. A-272601 to include the residents of the former Township of Kinloss. Our wording stated the change in the rate of fill would be "relatively insignificant".

Per your request I submit the following information regarding volume of waste received based on the Township of Kinloss Landfill Site Annual Report prepared by Maitland Engineering. In the report Maitland Engineering notes that the Plan of Development and Operation estimated a generation rate of 1.5kg per person per day for an annual disposal rate of 557 tonne. However it was also noted that experience at other rural landfill sites has indicated that an assumed rate of 1.5kg per person per day requiring disposal is too high.

If you have any additional questions please do not hesitate to contact me.

Hugh Nichol

Yours truly,
Hugh Nichol,
Public Works Superintendent

Ministry of the Environment
Ministère de l'Environnement
Ontario

Environmental Assessment and Approvals Branch
2 St. Clair Ave. West, 12th Floor
Toronto ON M4V 1L5

Direction des évaluations environnementales et des autorisations
2, avenue St. Clair Ouest, 12e étage
Toronto ON M4V 1L5

Tel/Tél (416) 314-8317
Fax/Télec (416) 314-8452

8.

February 13, 2002

Mr. Hugh Nichol
Public Works Supervisor
The Corporation of the
Township of Huron-Kinloss
P.O. Box 130
21 Queen Street
Ripley, Ontario
N0G 2R0

300
Certificate of Approval

Dear Mr. Nichol:

Re: Township of Huron-Kinloss
Huron Landfill Site
Provisional Certificate of Approval No. A271601

This office has received and reviewed your letters dated December 19, 2001 and February 6, 2002. I am also advised that you discussed these letters and provided additional clarification to John Gasbarri, Senior Engineer, in the Waste Unit.

Your request to alter the above mentioned landfill's presently approved service area, to include the Former Township of Kinloss, does not require a specific approval by the Director. This particular type of change is addressed by Section 5.2, of Regulation 347. The Ministry's implementation procedures of this Section considers the increase in the population to be served. In your case it is less than 25% of that presently being served (approx. 18%) therefore, it does not constitute a rate increase that requires approval. For future references, this threshold is regarded a cumulative amount.

If you have any further queries please contact John Gasbarri at (416) 314-8286.

Sincerely,

Ian Parrott, P. Eng.,
Director, Section 39
Environmental Protection Act

c.c. District Manager, Owen Sound

Ministry of Environment and Energy
Ministère de l'Environnement et de l'Énergie

2 St. Clair Avenue West
Floor 12A
Toronto, ON M4V 1L5

2, avenue St. Clair Ouest
Étage 12A
Toronto, ON M4V 1L5

Environmental Assessment and Approvals Branch

Tel: (416) 314-8001
Fax: (416) 314-8452

Ontario

June 10, 2002

RECEIVED
JUN 24 2002
TOWNSHIP OF HURON-KINLOSS

Hugh Nichol, Public Works Superintendent
Township of Huron-Kinloss
P.O. Box 130
21 Queen Street
Ripley, Ontario
N0G 2R0

Dear Mr. Nichol:

Re: **Request for approval to allow residents of the former Village of Lucknow to use the former Township of Kinloss Landfill Site (service area expansion)**

This letter is further to our telephone conversation of June 5, 2002. The Ministry has reviewed your letter dated May 16, 2002. Your request to alter the former Township of Kinloss Landfill Site's presently approved service to include the former Village of Lucknow does not require a specific approval by the Director.

This type of alteration is addressed by Section 5.2 of Ontario Regulation 347. The Ministry's implementation of this Section considers the increase in the population to be served. The increase you are proposing is less than 25% (approximately 15%), and therefore does not constitute a rate increase requiring approval. For future reference, all such increases are cumulative.

If you have any questions, please contact Andrew Neill of this office by phone at (416) 314-8438 or by e-mail at andrew.neill@utoronto.ca.

Sincerely,

Ian Parrott, P. Eng.
Director, Section 39
Environmental Protection Act

DISTRIBUTION		
Appl Dir Req'd		Public Works
Appl No Dir		Water
Appl Copied		Building
Appl Reports	✓	Planning
Clerk	✓	Treasurer

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

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 :

Ontario

April 30, 2003

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

Dear Sir/Madam:

Re: Notification of Change of Name/Address
MOE Reference Number 7945-5M4GNT

The Ministry of the Environment (the "Ministry") acknowledges receipt of your letter dated April 10, 2003 requesting a change in company name/address:

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

TO: The Corporation of the Township of Huron-Kinloss
PO Box 130
Ripley, Ontario
N0G 2R0

By this letter, the Ministry advises you that your notification of change in company name/address has been registered in our records for the following Certificate(s) of Approval:

Certificate(s) of Approval for Waste Disposal Sites, Section 27, EPA:

A272601

The Ministry will not be providing you with an amended certificate(s) to reflect the change in company name/address. Therefore, this letter must be appended to its corresponding Certificate(s) of Approval. The name/address change will be included in any future amended Certificate(s) of Approval.

...agement Branch

SUPPORTING INFORMATION TO AN APPLICATION FOR APPROVAL OF A LANDFILL DISPOSAL SITE

...ANT TO COMPLETE ITEMS 1-4 INCLUSIVE

SITE DETAILS

TOWNSHIP OF HURON

...ion Lot 20; Con. 5.

Huron Township (Bruce Co.)

...of Site	30	Acres
...le area for waste disposal	25	Acres
...d Lifetime	30	Years
... nearest watercourse	400	ft.
... nearest potable well water supply	2000	ft.
...all noted above	20	ft.
... dwelling	2000	ft.
... public road measured from ...area	550	ft.
... cemetery	6000	ft.
... original surface to bottom of waste	10	ft.
... original surface to top of fill	2	ft.

...ditions encountered measured from ...surface

... From	top	To	10 ft.
... From		To	
... From		To	
... From		To	

...tertable below surface 10 ft.

July 3 1972

...cription of site ...ography etc.)

...ta, we consider is excellent due ...ne living within 2000 feet and ...g within 3000 feet. The soil is ...with practically no soakage from

...e of land after site fully utilized

...be Disposed of Comprise

...lic	90 %
...rcial	5 %
...al Waste	%
...Liquid Industrial Waste	%
...ural Waste	5 %
...us Waste	%
Sewage	%
	%
	100%

...mposition of Principal Components of Waste ...mestic and commercial)

...arm fences and other farm scrap

...DEPARTMENTAL USE

For Head Office Use

File A

FOR REGIONAL USE

Authorities Consulted:

Health Unit	☐ Objection	☐ No Objection
O.W.R.C.	☐ Objection	☐ No Objection
A.M.B.	☐ Objection	☐ No Objection
Municipality	☐ Objection	☐ No Objection
Conservation Authority	☐ Objection	☐ No Objection

Other

Inspection Record Forms Attached Yes ☑ No ☐ letter to [illegible] dated [illegible]

Number of Forms

Regional Engineer's Report Attached ☑ Memo to file [illegible] dated July [illegible]

Ground water monitoring Yes ☐ No ☑

Surface water monitoring Yes ☐ No ☑

3. Quantities

Total Tons per Day 1

Total Gallons per Day 0

Estimated ☑ or Measured ☐

Site operated 6 days from 9 to 5

Population served 650

Names of Municipalities served plus 1000 cottag

Huron Township

Official Plan ☐ Zoning Bylaw ☐

Site land zoned

Adjacent land zoned

Equipment Owned ☐ Rented ☑

The Following Documents are Attached

Prepared by

Earl Tout,

Clerk-Twp. of Huron

DATED July 13, 1972

Earl Tout

Signature of Owner (Applicant)

The Corporation of the Township of Huron Kinloss

RR1 Box 130
21 Queen Street
Ripley, Ontario
N0G 2R0

PHONE: (519) 395-3735
FAX: (519) 395-4101

e-mail: hnichol@huronkinloss.com

File: CofA Amendment

August 24, 2005

Nafiseh Pourhassani, P. Eng.
Senior Review Engineer
Ministry of Environment
Environmental Assessment and
Approvals Branch
2 St. Clair Ave. W, Floor 12A
Toronto, ON
M4V 1L5

Dear Ms. Pourhassani:

Re: Application for Approval of Waste Disposal Sites
Amendment to C of A No. A272601: Huron Landfill Site
Township of Huron-Kinloss, County of Bruce
MOE Reference Number 7335-62VSGY

Your letter dated July 14, 2005 was presented to Council for discussion on August 3, 2005.

At this time, we respectfully request the MOE delay the issuing of a new Certificate of Approval to allow for further review of our options. As you are aware, landfill capacity is a valued commodity and we want to ensure all issues have been thoroughly discussed between ourselves, our engineering firm and your office.

Trusting this is satisfactory; please be assured we will be in contact.

Yours truly,

Hugh Nichol

Hugh Nichol
Public Works Superintendent

HN/dh

FAXED
Pg 1 Date 24 Aug 05
& mailed origina

RECEIVED
JUL 16 2010
orig - BRP
MW copy - file 00944

Ontario

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 or 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 concurence 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 appproximately 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 minmum, 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.

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 unauthourized 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 concurence 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 licencesed 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 addidtion 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**

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

THIS CERTIFICATE WAS MAILED
ON July 9, 2010
TC
(Signed)

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

DO/

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

Ontario

Ministry of Environment

2 St. Clair Avenue West, 12th Floor
Toronto, Ontario M4V 1L5

TELECOPIER/FAX COVER SHEET

Date: July 12, 2010

To	City/Town
Telecopier/Fax No.: (519) 389-4728	
Ministry/Company: Township of Huron-Kinloss	Branch/Dept.
Name: Brad Pryde/Stephen Cobean	Position

Please contact the sender:

- If you do not receive the number of pages specified, or if you have trouble reading the copy.
- If you have received this facsimile in error. This facsimile is intended solely for the person/organization to whom it is addressed.

FROM

Telecopier/Fax No.	Telephone No.	No. of Pages (including this sheet)
(416) 314-8452	(416) 314-8274	4

Message

Branch	Section
Environmental Assessment and Approvals	Application Evaluation - Waste Unit
Name: Dickson Odame-Osafo	Position: Senior Engineer, Waste Unit

Re: Huron Landfill Site – C/A

Attached is a Notice of Approval to expand the service area to include all townships and villages under Huron-Kinloss Township.

jg:08/98

Ontario

Ministry of the Environment
Ministère de l'Environnement

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

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**

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

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
Approvals 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
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Téléphone : (416) 314-7029

Ontario

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 CofA No. A271601: Huron Landfill Site
Huron-Kinloss Township, County of Bruce
MOE Reference Number 7335-62V8GY

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 issues 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 Nafiseh Pourhassani at 416-314-7029.

Yours truly,

Tesfaye Gebrezghi
Waste Unit Supervisor

c: Helmut Pfeiffer EO, Owen Sound

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Ministère de l'Environnement
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Ontario

August 13, 2004

Mary Rose 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 CofA No. A372601: 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 Kearse, a capacity calculation package was submitted on August 3, 2004. This calculation has made reference to the capacity of 0,000 tonnes (calculated to be 555,600 cu. m. using 0.45 t/m3 for density) in the original plication and items referenced in the Schedule A of the certificate of approval. However ng 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 Guidelines, 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 Guidelins, and subsurface soil conditions, there may be 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. High 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 port since the site is nearing its capacity. Typically closure reports are required one year prior the closure of the site or when the site has reached 90% of its capacity.

nsidering 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 Poudbaband, P. Eng.
Senior Approvals Engineer

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

TOTAL PAGE.05

Ministry of the Environment
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Ontario

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 288,000 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 Odartle-Osafo
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: 416-314-4288
Email: dickson.odameosafo@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

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 7021-7HJKZ5

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 Burnside 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.

Reference: **MOE Review of the Design and Operation Plan**
Amendment to Certificate of Approval No. A372601
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

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Tel: 416-314-4075
Fax: 416-314-4285
Email: dickson.odameosafo@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.

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
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101 rue 17th, 3ème étage
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Ontario

RECEIVED
FEB 0 3 2010
00946
Copy - file

January 29, 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, 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 is 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

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Ontario

February 8, 2010

RECEIVED
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a my S.C./J.S.
Copy - file

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

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,

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

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Ontario

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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

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

File Storage Number: SI BR HK CS 610

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

101- 16942-0

RECEIVED APR 2 7 2011

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Ontario

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 17th Street, 3rd 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 were 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.
/nm/dlw
cc: Mr. Hugh Nichol, Director of Public Works, Township of Huron-Kinloss

1450 1st Avenue West, Suite 101, Owen Sound, Ontario N4K 6W2
Telephone: 519.376.7812 • Fax: 519.376.8008 • www.genivar.com

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Ontario

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

Ontario

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HURON - KINLOSS

Ministry of the Environment
Ministère de l'Environnement

Solid Non-Hazardous Waste Disposal Site Inspection Report

Client:	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 #: 4548-4MERDZ, Client Type: Municipal Government Additional Address Info: Ripley		
Inspection Site Address:	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		
Contact Name:	Hugh Nichol	**Title:**	Public Works Superintendent
Contact Telephone:	(519)395-3735 ext	**Contact Fax:**	
Last Inspection Date:	2012/11/16		
Inspection Start Date:	2014/02/20	**Inspection Finish Date:**	2014/02/20
Region:	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-putricible 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-putricible 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 10-6cm/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 blow 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 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.

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 6.0 Actions Required.

5.0 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

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 requirments 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.

6.0 OTHER INSPECTION FINDINGS

7.0 INCIDENT REPORT

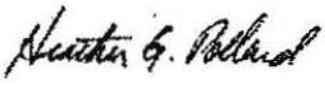
Applicable
8657-9GNRVM

8.0 ATTACHMENTS

PREPARED BY:
Environmental Officer:
Name: Andrew Torrie
District Office: Owen Sound District Office
Date: 2014/02/25
Signature

REVIEWED BY:
District Supervisor:
Name: Heather Pollard
District Office: Owen Sound District Office
Date: 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 17th Street, 3rd Floor
Owen Sound, ON N4N 0A5

Tel: 519-371-2901
Fax: 519-371-2905
Email: 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.

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www.wspgroup.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 28th, 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:\PSMI\Clerical\00941 Huron Landfill Site\Correspondence\Letters\2014-03-28 le lorne site inspection response sjc 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

Ontario

May 21, 2014

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

RECEIVED
MAY 26 2014

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 4th 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,

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

File Storage Number: SI BR KB HK 610

cc. Scott Guss, 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 17th 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.
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Suite 101
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Phone: 519-376-7812
Fax: 519-376-6006
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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'.

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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 reponsible 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^2. The low area defined by the 231 mASL contour is 1,026 m^2. Based on a 1 m depth, a volume of 424 to 1,026 m^3 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.

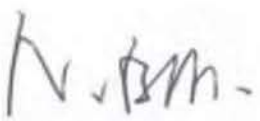
   Given the past issue with the high water table at the Site, the effect of shallow groundwater will be considered.

   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.

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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:

1	Impoundment #1 (SW3/18) – South portion	370 uS/cm	8.69
2	Impoundment #1 (SW4/18) – North portion	2,787 uS/cm	7.14
3	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,

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

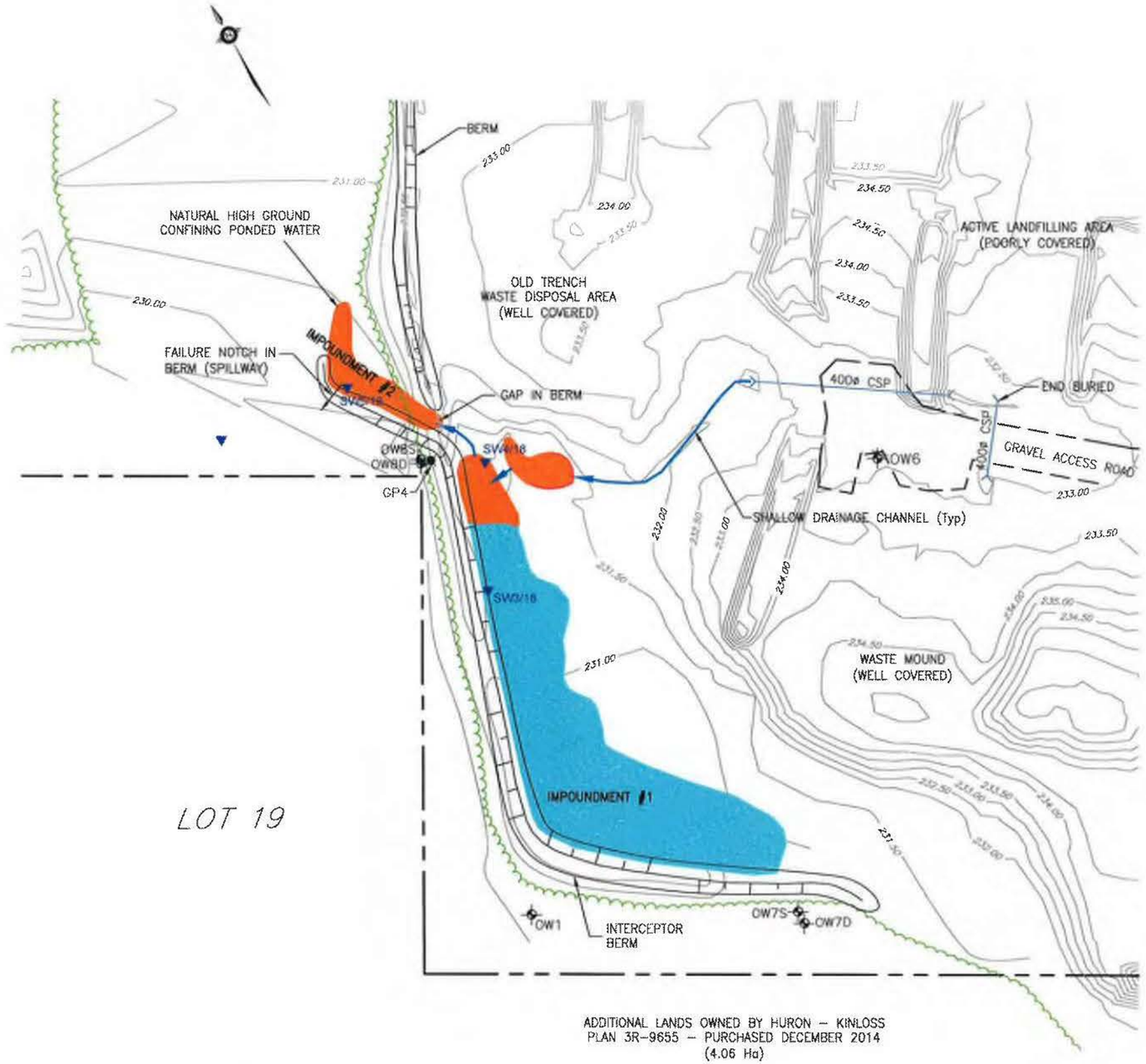
Surface Water Station			SW 1 (Upstream)	SW 1 (Upstream)	SW 2 (Downstream)	SW 2 (Downstream)	SW3/18	SW4/18	SW5/18
Date			12-Jun-17	30-Oct-17	12-Jun-17	30-Oct-17	23-Apr-18	23-Apr-18	23-Apr-18
	Units	PWQO mg/L							
Calculated Parameters									
Hardness (CaCO3)	mg/L		218	357	262	339	181	1200	859
Inorganics									
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 (10)	<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 (9)	0.02	0.07	0.07	0.06	0.09	0.98	0.53
Dissolved Sulphate (SO4)	mg/L		13	12	13	12	23	179	151
Alkalinity (Total as CaCO3)	mg/L	(7)	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 (Upstream)	SW 1 (Upstream)	SW 2 (Downstream)	SW 2 (Downstream)	SW3/18	SW4/18	SW5/18
Date			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							
Metals									
Total Aluminum (Al)	mg/L	0.075 (8)	0.09	0.15	0.12	0.13	0.90	0.34	0.23
Total Arsenic (As)	mg/L	0.100 (11)	0.0006	<0.0005	0.0006	<0.0005	0.0014	0.0113	0.0083
Total Beryllium (Be)	mg/L	1.100 (12)	<0.0001	<0.002	<0.0001	<0.002	<0.0001	<0.0001	<0.0001
Total Boron (B)	mg/L	0.200 (1)	0.008	0.012	0.023	0.014	0.190	4.57	3.33
Total Cadmium (Cd)	mg/L	0.0002 (3)	<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 (13)	<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 (4)	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 (5)	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 (1)	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 (1)	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.005
Total Zinc (Zn)	mg/L	0.030 (6)	<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		SW 1 (Upstream)	SW 1 (Upstream)	SW 2 (Downstream)	SW 2 (Downstream)	SW3/18	SW4/18	SW5/18
Date		12-Jun-17	30-Oct-17	12-Jun-17	30-Oct-17	23-Apr-18	23-Apr-18	23-Apr-18
FIELD MEASUREMENTS	**Units**							
Temperature	Degrees C	21.2	8.8	20.0	8.8	16.4	16.7	18.0
Conductivity	µmhos	463	705	478	702	370	2787	2100
pH		7.85	8.08	7.60	8.02	8.69	7.14	7.54

NOTES:
1. PWQO indicates Provincial Water Quality Objectives.
2. (I) indicates interim PWQO
3. 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).
4. Copper Interim PWQO = 5 µg/L(for Hardness >20 mg/L)
5. Revised Interim PWQO = 5 µg/L (for Alkalinity > 80 mg/L (as CaCO3)
6. Zinc Revised Interim PWQO = 20 µg/L
7. Alkalinity should not be decreased by more than 25 % of the natural concentration.
8. Interim PWQO = 75 ug/L for pH >6.5 to 9.0.
9. 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
10. PWQO for un-ionized ammonia
11. Interim PWQO for arsenic is 5 ug/L
12. For hardness < 7 mg/L: PWQO = 11 µg/L; for hardness > 75 mg/L: PWQO = 1100 µg/L.
13. Chromium: PWQO - 1 µg/L for hesavalent chromium, 8.9 µg/L for trivalent chromium.
14. Unionized Ammonia Fraction (f) where $f = 1/(10^{pka - pH} + 1)$; pka = 0.09018 + 2729.92/T; T = °C +273.16
15. [ ] - value exceeds PWQO.



LEGEND :

- RELATIVELY CLEAN WATER NOT SHOWING DISCOLORATION
- PONDED WATER DISCOLORED
- LANDFILL PROPERTY LINE
- EXISTING GROUND CONTOURS
- EXISTING TREELINE
- GP4 — EXISTING GAS PROBE
- OW8S — EXISTING OBSERVATION WELL
- SW3/18 — SURFACE WATER SAMPLE APRIL 23, 2018

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.

wsp
4 HUGHSON STREET SOUTH, SUITE 300
HAMILTON (ONTARIO) CANADA L8N 3Z1
TEL 905.529.4414 | FAX 905.521.2693 | WWW.WSPGROUP.COM

Huron - Kinloss

EXISTING CONDITIONS - SURFACE WATER IMPOUNDMENTS

HURON LANDFILL SITE

DWN BY: T C G
CHK BY: P S B
DATE: APRIL 27 2018
SCALE: SEE BAR SCALE

TOWNSHIP OF HURON-KINLOOS

DRAWING NO. 101-16942-00 - 1

SHEET 1

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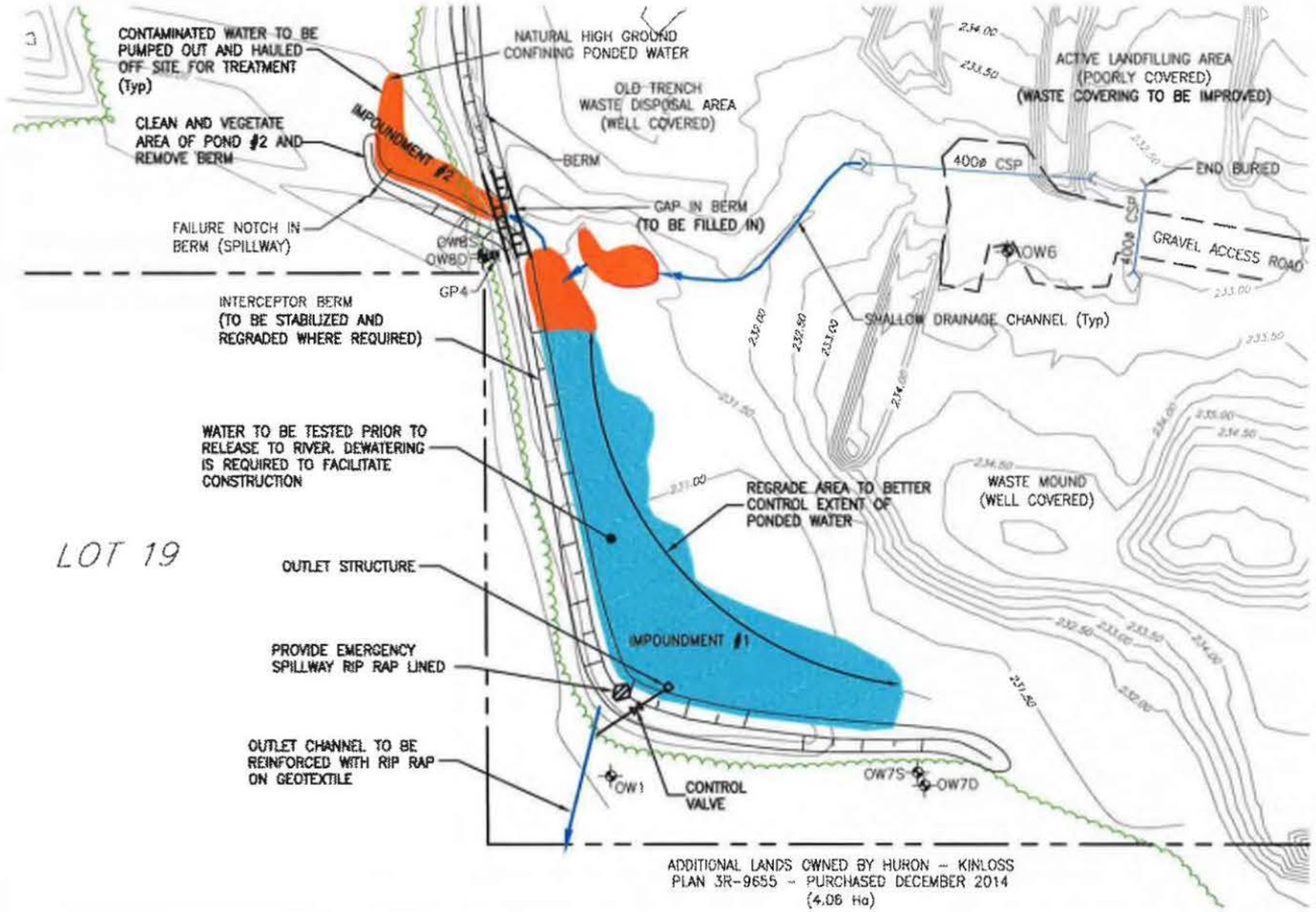
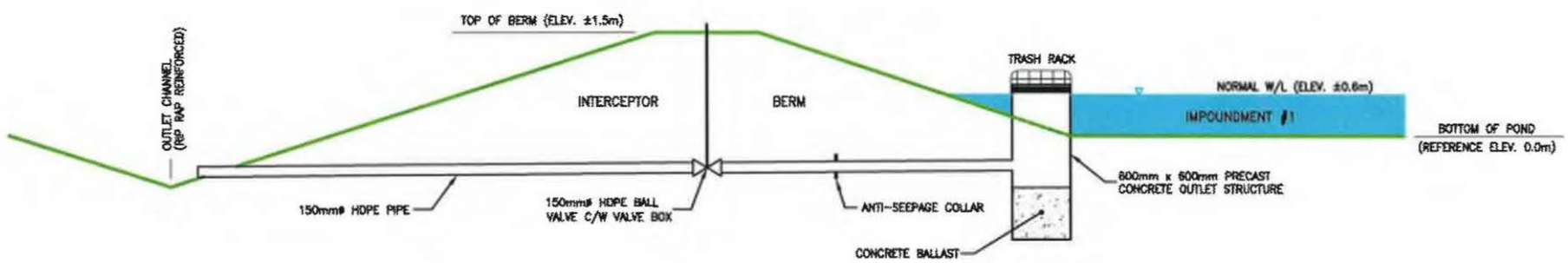


LEGEND :

- RELATIVELY CLEAN WATER NOT SHOWING DISCOLORATION
- PONDED WATER DISCOLORED
- LANDFILL PROPERTY LINE
- EXISTING GROUND CONTOURS
- EXISTING TREELINE
- GP4 EXISTING GAS PROBE
- OW8S 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

PROPOSED REMEDIATION WORK

HURON LANDFILL SITE

TOWNSHIP OF HURON-KINLOOS

DRAWING NO. 101-16942-00 - 2

DWN BY: T C G
CHK BY: P S B
DATE: APRIL 19 2018
SCALE: SEE BAR SCALE

SHEET 2

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

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
DATE REPORTED: 25-Apr-18
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Huron Landfill
P.O. NUMBER: 121.60020.05
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 CaCO3)	mg/L	1	SM 3120	24-Apr-18/O	181	1200	859	
Alkalinity(CaCO3) 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.

CADUCEON™ ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

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
DATE REPORTED: 25-Apr-18
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Huron Landfill
P.O. NUMBER: 121.60020.05
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 1	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	

1 Outside of 10% Acceptance Criteria, solids present

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

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 (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^3 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:

$$201 \text{ m} \times 144 \text{ m} \times 0.4 \text{ m} - 11{,}578 \text{ m}^3$$

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

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F: +1 519 376-8008
wsp.com

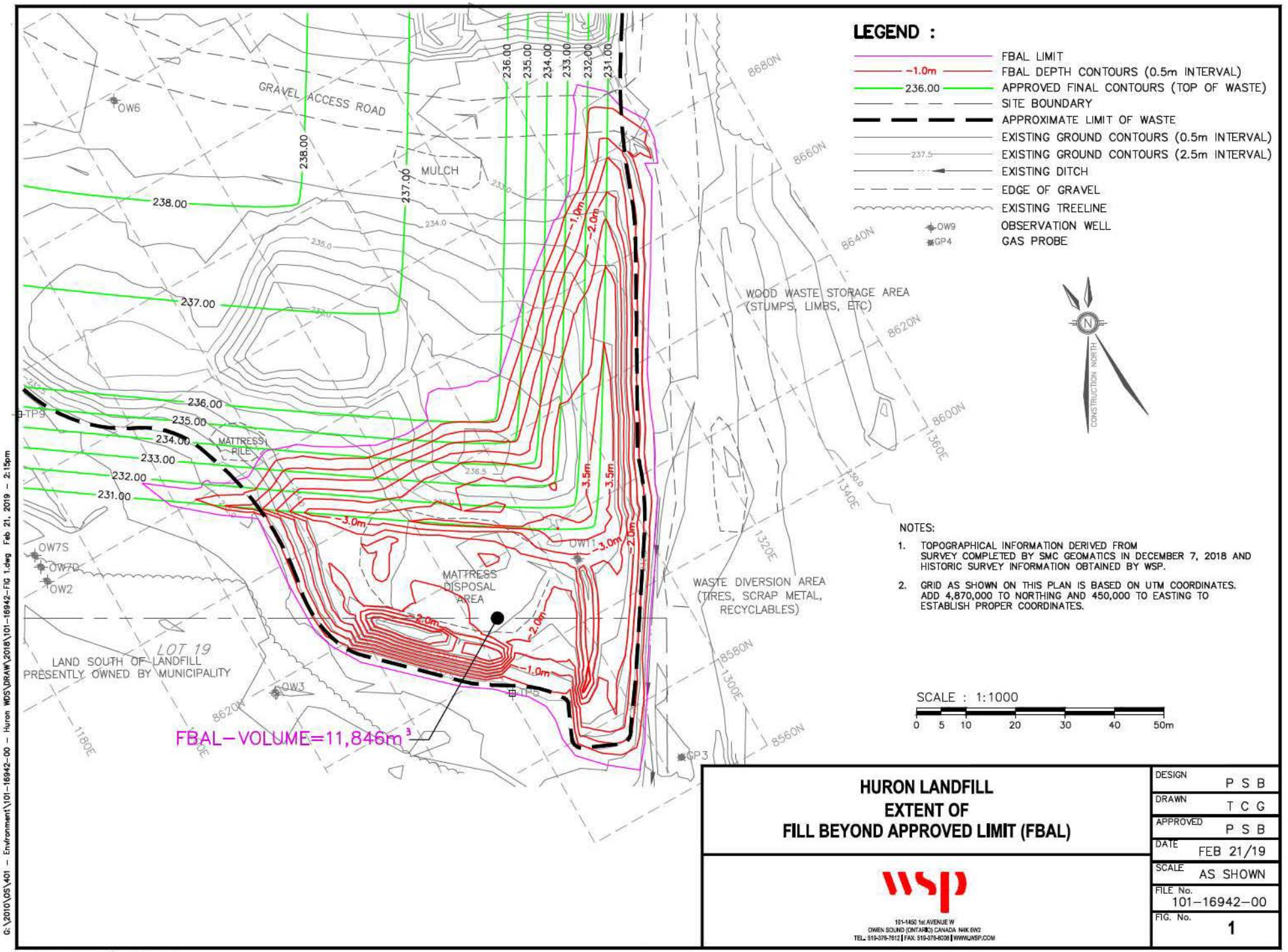
Accounting for calculations accuracy, this volume is almost the same as the overfill volume (11,846 m^3) within the FBAL area. The proposed change in the final top of waste contours is adequate to compensate for the overfill identified within the FBAL area.

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:

P. Brodzikowski

Peter Brodzikowski, P.Eng.
Senior Environmental Engineer
PSB/dlw
Encl.



HURON LANDFILL
EXTENT OF
FILL BEYOND APPROVED LIMIT (FBAL)

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.	1

wsp
101-1450 1st AVENUE W
OWEN SOUND (ONTARIO) CANADA N4K 6W2
TEL: 519-376-7612 | FAX: 519-376-8206 | WWW.WSP.COM

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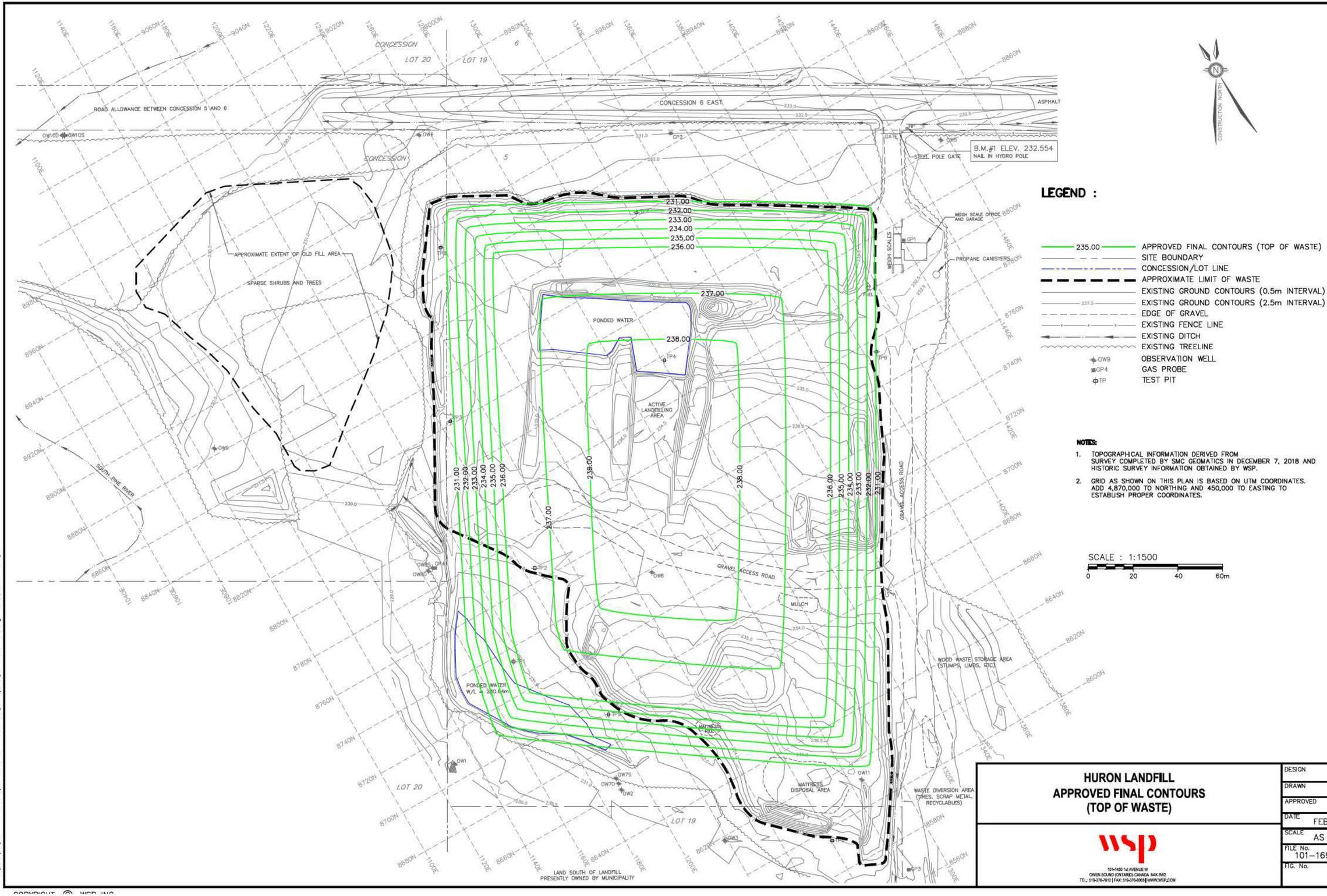
G:\2010\05\401 - Environment\101-16942-00 - Huron WDS\DRAW\2018\101-16942-Fig 1.dwg Feb 21, 2019 - 2:15pm



LEGEND :

- 235.00 — APPROVED FINAL CONTOURS (TOP OF WASTE)
- SITE BOUNDARY
- CONCESSION/LOT LINE
- APPROXIMATE LIMIT OF WASTE
- EXISTING GROUND CONTOURS (0.5m INTERVAL)
- 237.5 — EXISTING GROUND CONTOURS (2.5m INTERVAL)
- EDGE OF GRAVEL
- EXISTING FENCE LINE
- EXISTING DITCH
- EXISTING TREELINE
- OW9 — OBSERVATION WELL
- GP4 — GAS PROBE
- TP — TEST PIT

NOTES:

1. TOPOGRAPHICAL INFORMATION DERIVED FROM SURVEY COMPLETED BY SMC GEOMATICS IN DECEMBER 7, 2018 AND HISTORIC SURVEY INFORMATION OBTAINED BY WSP.
2. 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

0 20 40 60m

HURON LANDFILL
APPROVED FINAL CONTOURS (TOP OF WASTE)

wsp
101-1450 1st AVENUE W
OWEN SOUND (ONTARIO) CANADA N4K 6W2
TEL.: 519-376-7812 | FAX: 519-376-8005 | 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

G:\2010\05\401 - Environment\101-16942-00 - Huron WDS\DRAW\2018\101-16942-FIG 2.dwg Feb 21, 2019 - 2:16pm

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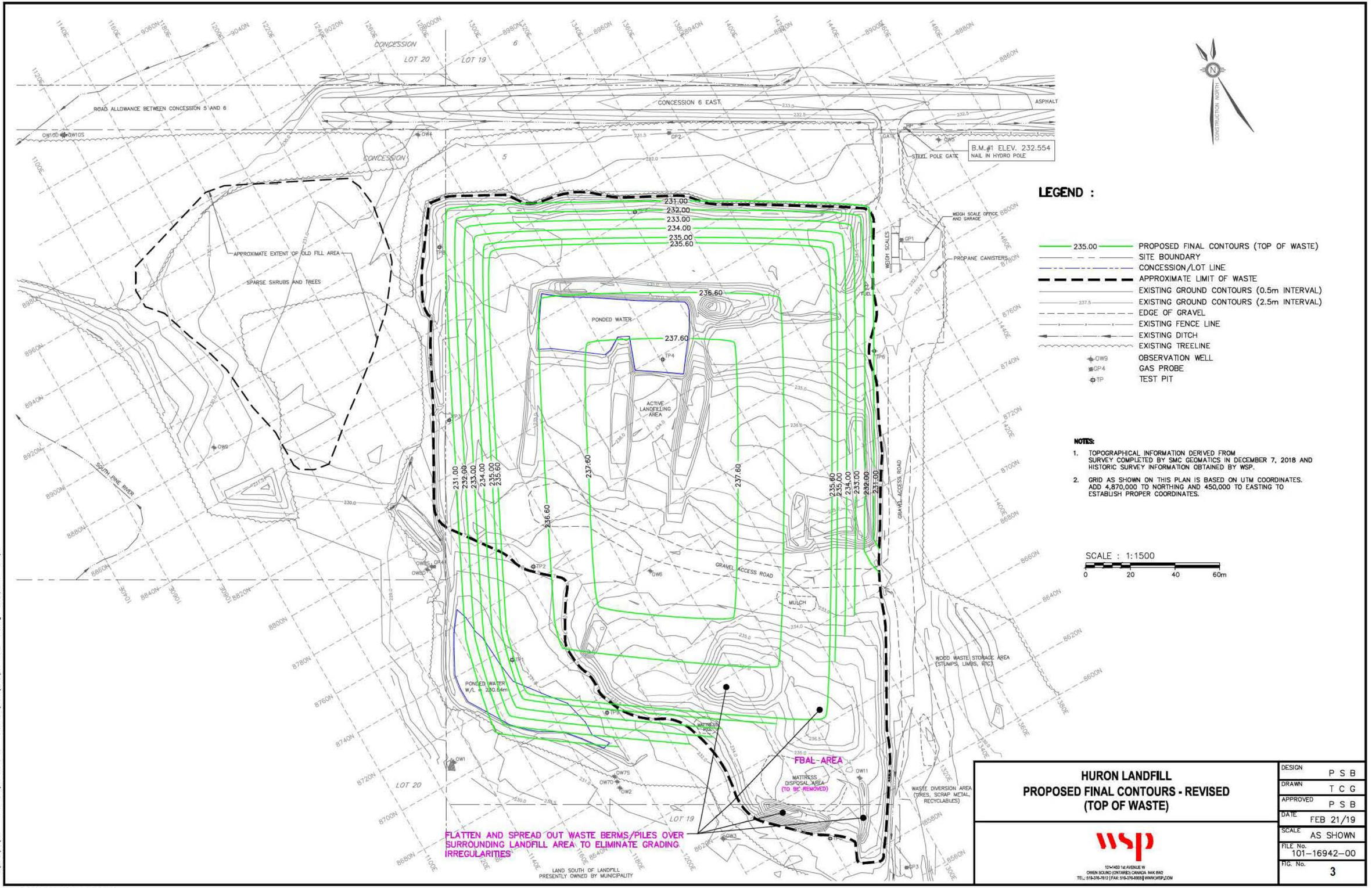

LEGEND :

- 235.00 — PROPOSED FINAL CONTOURS (TOP OF WASTE)
- SITE BOUNDARY
- CONCESSION/LOT LINE
- APPROXIMATE LIMIT OF WASTE
- EXISTING GROUND CONTOURS (0.5m INTERVAL)
- 237.5 — EXISTING GROUND CONTOURS (2.5m INTERVAL)
- EDGE OF GRAVEL
- EXISTING FENCE LINE
- EXISTING DITCH
- EXISTING TREELINE
- OW9 — OBSERVATION WELL
- GP4 — GAS PROBE
- TP — TEST PIT

NOTES:

1. TOPOGRAPHICAL INFORMATION DERIVED FROM SURVEY COMPLETED BY SMC GEOMATICS IN DECEMBER 7, 2018 AND HISTORIC SURVEY INFORMATION OBTAINED BY WSP.
2. 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

0 20 40 60m

HURON LANDFILL
PROPOSED FINAL CONTOURS - REVISED (TOP OF WASTE)

wsp
101-1450 1st AVENUE W
OWEN SOUND (ONTARIO) CANADA N4K 6W2
TEL.: 519-376-7812 | FAX: 519-376-8005 | 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

G:\2010\05\401 - Environment\101-16942-00 - Huron WDS\DRAW\2018\101-16942-FIG 3.dwg Feb 21, 2019 - 2:17pm

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DRAFT

ENVIRONMENTAL COMPLIANCE APPROVAL

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

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

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

stormwater management system consisting of approximately 4.5 hectares of the open area (with exception of active landfill area) of Huron Landfill Site covered with grass vegetation for surface water management, discharging surface water via overland sheet flow northerly to a roadside ditch, southerly and westerly to South Pine River, and easterly via an existing onsite ditch to South Pine River;

all in accordance with the submitted supporting documents listed in Schedule A.

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

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

2. "Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;

3. "District Manager" means the District Manager of the appropriate local District Office of the Ministry, where the Works are geographically located;

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

5. "Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;

6. "MNRF" means the Ministry of Natural Resources and Forestry of the government of Ontario and

includes all officials, employees or other persons acting on its behalf;

7. "Owner" means The Corporation of the Township of Huron-Kinloss, and includes its successors and assignees;

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

9. "Works" means the sewage Works described in the Owner's application, and this Approval.

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

TERMS AND CONDITIONS

1. GENERAL CONDITIONS

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

2. Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Works in accordance with the description given in this Approval, and the application for approval of the Works.

3. Where there is a conflict between a provision of any document in the schedule referred to in this Approval and the conditions of this Approval, the conditions in this Approval shall take precedence, and where there is a conflict between the documents in the schedule, the document bearing the most recent date shall prevail.

4. Where there is a conflict between the documents listed in Schedule A and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

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

6. The issuance of, and compliance with the conditions of, this Approval does not:

   a. relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement, including, but not limited to, the obligation to obtain approval from the local conservation authority/MNRF necessary to construct or operate the sewage works; or

   b. limit in any way the authority of the Ministry to require certain steps be taken to require the

Owner to furnish any further information related to compliance with this Approval.

2. EXPIRY OF APPROVAL

1. This Approval will cease to apply to those parts of the Works which have not been constructed within five (5) years of the date of this Approval.

2. In the event that completion and commissioning of any portion of the Works is anticipated to be delayed beyond the specified expiry period, the Owner shall submit an application of extension to the expiry period, at least twelve (12) months prior to the end of the period. The application for extension shall include the reason(s) for the delay, whether there is any design change(s) and a review of whether the standards applicable at the time of Approval of the Works are still applicable at the time of request for extension, to ensure the ongoing protection of the environment.

3. CHANGE OF OWNER

1. The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within thirty (30) days of the change occurring:

   a. change of Owner;

   b. change of address of the Owner;

   c. change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Business Names Act,* R.S.O. 1990, c.B17 shall be included in the notification to the District Manager; or

   d. change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the *Corporations Information Act,* R.S.O. 1990, c. C39 shall be included in the notification to the District Manager.

2. In the event of any change in ownership of the Works, other than a change to a successor municipality, the Owner shall notify in writing the succeeding owner of the existence of this Approval, and a copy of such notice shall be forwarded to the District Manager and the Director.

3. The Owner shall ensure that all communications made pursuant to this condition refer to the number at the top of this Approval.

4. OPERATION AND MAINTENANCE

1. The Owner shall make all necessary investigations, take all necessary steps and obtain all necessary approvals so as to ensure that the physical structure, siting and operations of the Works do not constitute a safety or health hazard to the general public.

2. The Owner shall undertake an inspection of the condition of the Works, at least once a year, and

undertake any necessary cleaning and maintenance to ensure that sediment, debris and excessive decaying vegetation are removed from the Works to prevent the excessive build-up of sediment, oil/grit, debris and/or decaying vegetation, to avoid reduction of the capacity of the Works. The Owner shall also regularly inspect and clean out the inlet to and outlet from the Works to ensure that these are not obstructed.

3. The Owner shall ensure that the effluent from the Works is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film, sheen or foam on the receiving waters.

4. The Owner shall ensure that the operation and maintenance program is carried out as per the Stormwater Management Plan referred to in the submitted supporting documents forming part of this Approval.

5. The Owner shall prepare an operations manual prior to the commencement of operation of the Works, to the satisfaction of the District Manager, that includes, but not necessarily limited to, the following information:

   a. operating and maintenance procedures for routine operation of the Works;

   b. inspection programs, including frequency of inspection, for the Works and the methods or tests employed to detect when maintenance is necessary;

   c. repair and maintenance programs, including the frequency of repair and maintenance for the Works;

   d. contingency plans and procedures for dealing with potential spill, bypasses and any other abnormal situations and for notifying the District Manager; and

   e. procedures for receiving, responding and recording public complaints, including recording any follow-up actions taken.

6. The Owner shall maintain the operations manual up to date through revisions undertaken from time to time and retain a copy at the Owner's administrative office. Upon request, the Owner shall make the manual available for inspection and copying by Ministry personnel.

5. MONITORING AND RECORDING

1. The Owner shall, upon commencement of operation of the Works, carry out a monitoring program and all samples and measurements taken for the purposes of this Approval are to be taken at a time and in a location characteristic of the quality of the surface water over the time period being monitored.

2. The Owner shall complete once every week inspections of the open working face of the site in March and April of each year and observe for leachate/runoff migration from the open working face that is leaving the site as runoff. Such runoff observed exiting the property shall be sampled

on the day of the inspection and shall be sampled at the point(s) where the runoff exits the landfill property.

3. Samples shall be collected at the sampling point(s), at the sampling frequencies specified, by means of the specified sample type and analyzed for each parameter listed in the monitoring table included in Schedule B.

4. All samples collected under this Condition shall be submitted to a laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA) and results of these efforts, and discussion with respect to leachate/runoff influence from the working face to the property boundary, shall be provided in the annual report.

5. The methods and protocols for sampling, analysis, toxicity testing, and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

    a. the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (January 1999), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions;

    b. the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition) as amended from time to time by more recently published editions;

    c. in respect of any parameters not mentioned in (a) - (b), the written approval of the District Manager, which approval shall be obtained prior to sampling.

6. The Owner shall record the dates and times of these inspections, and whether samples were collected. These records shall form part of Condition 7.3.

7. The Owner may, after three (3) years of monitoring in accordance with this Condition, apply to the District Manager in writing to amend or remove this Condition.

6. TEMPORARY EROSION AND SEDIMENT CONTROL

1. The Owner shall install and maintain temporary sediment and erosion control measures during construction and conduct inspections once every two (2) weeks and after each significant storm event (a significant storm event is defined as a minimum of 25 millimetres of rain in any 24 hours period). The inspections and maintenance of the temporary sediment and erosion control measures shall continue until they are no longer required and at which time they shall be removed and all disturbed areas reinstated properly.

2. The Owner shall maintain records of inspections and maintenance which shall be made available for inspection by the Ministry, upon request. The record shall include the name of the inspector, date of inspection, and the remedial measures, if any, undertaken to maintain the temporary sediment and erosion control measures.

7. REPORTING

1. One (1) week prior to the start-up of the operation of the Works, the Owner shall notify the District Manager (in writing) of the pending start-up date.

2. The Owner shall, upon request, make all reports, manuals, plans, records, data, procedures and supporting documentation available to Ministry staff.

3. The Owner shall prepare a performance report within ninety (90) days following the end of the period being reported upon, and submit the report(s) to the District Manager when requested. The first such report shall cover the first annual period following the commencement of operation of the Works and subsequent reports shall be prepared to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:

    a. a summary and interpretation of all monitoring data, including an overview of the success and adequacy of the Works;

    b. a description of any operating problems encountered and corrective actions taken;

    c. a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works, including an estimate of the quantity of any materials removed from the Works;

    d. a summary of any effluent quality assurance or control measures undertaken in the reporting period;

    e. a summary of the calibration and maintenance carried out on monitoring equipment;

    f. a summary of any complaints received during the reporting period and any steps taken to address the complaints;

    g. a summary of all spill or abnormal discharge events; and

    h. any other information the District Manager requires from time to time.

8. SPILL CONTINGENCY PLAN

1. Prior to construction of the Works, the Owner shall implement a spill contingency plan - that is a set of procedures describing how to mitigate the impacts of a spill within the area serviced by the Works. The Owner shall, upon request, make this plan available to Ministry staff. This plan shall include as a minimum:

    a. the name, job title and location (address) of the Owner, person in charge, management or person(s) in control of the facility;

b. the name, job title and 24-hour telephone number of the person(s) responsible for activating the spill contingency plan;

c. a site plan drawn to scale showing the facility, nearby buildings, streets, catch-basins and manholes, drainage patterns (including direction(s) of flow in storm sewers), any receiving body(ies) of water that could potentially be significantly impacted by a spill and any features which need to be taken into account in terms of potential impacts on access and response (including physical obstructions and location of response and clean-up equipment);

d. steps to be taken to report, contain, clean up and dispose of contaminants following a spill;

e. a listing of telephone numbers for: local clean-up company(ies) who may be called upon to assist in responding to spills; local emergency responders including health institution(s); and Ministry Spills Action Centre 1-800-268-6060;

f. Safety Data Sheets (SDS) for each hazardous material which may be transported or stored within the area serviced by the Works;

g. the means (internal corporate procedures) by which the spill contingency plan is activated;

h. a description of the spill response training provided to employees assigned to work in the area serviced by the Works, the date(s) on which the training was provided and by whom;

i. an inventory of response and clean-up equipment available to implement the spill contingency plan, location and, date of maintenance/replacement if warranted; and

j. the date on which the contingency plan was prepared and subsequently, amended.

2. The spill contingency plan shall be kept in a conspicuous, readily accessible location on-site.

3. The spill contingency plan shall be amended from time to time as required by changes in the operation of the facility.

9. RECORD KEEPING

1. The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the operation, maintenance and monitoring activities required by this Approval.

Schedule A

1. Application for Environmental Compliance Approval, September 17, 2020, submitted by The Corporation of the Township of Huron-Kinloss;

2. Stormwater Management Plan, dated April 2019, including plans and all additional supporting information and documentation, prepared by WSP Canada Inc.

Schedule B

Surface Water Monitoring

Sampling Point(s) - Property Boundary

Frequency	Weekly in March and April of each year when runoff from the working face reaching the property boundary
Sample Type	Grab
Parameters	Ammonia, Dissolved organic carbon, Chloride, Alkalinity, Conductivity, Total Phenols, Total Kjeldahl Nitrogen (TKN)

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

1. Condition 1 is imposed to ensure that the Works are constructed and operated in the manner in which they were described and upon which approval was granted. This condition is also included to emphasize the precedence of conditions in the Approval and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. Condition 1.6 is included to emphasize that the issuance of this Approval does not diminish any other statutory and regulatory obligations to which the Owner is subject in the construction, maintenance and operation of the Works. The Condition specifically highlights the need to obtain any necessary conservation authority approvals. The Condition also emphasizes the fact that this Approval doesn't limit the authority of the Ministry to require further information.

2. Condition 2 is included to ensure that, when the Works are constructed, the Works will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to the approved Works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

4. Condition 4 is included as regular inspection and necessary removal of sediment and excessive decaying vegetation from the Works are required to mitigate the impact of sediment, debris and/or decaying vegetation on the treatment capacity of the Works. The Condition also ensures that the Works are operated and maintained to function as designed.

5. Condition 5 is included to require the Owner to evaluate and demonstrate the performance of the Works, and that the Works does not cause any impairment to the natural environment.

6. Condition 6 is included as installation, regular inspection and maintenance of the temporary sediment and erosion control measures is required to mitigate the impact on the downstream receiving watercourse during construction until they are no longer required.

7. Condition 7 is included to provide a performance record for future references, to ensure that the Ministry is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this Approval, so that the Ministry can work with the Owner in resolving any problems in a timely manner.

8. Condition 8 is included to ensure that the Owner will implement the Spill Contingency Plan, such that the environment is protected and deterioration, loss, injury or damage to any person(s) or property is prevented.

9. Condition 9 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the Works.

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

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

The Notice should also include:

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

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

This Notice must be served upon:

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

AND

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

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

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

DATED AT TORONTO this .....

DRAFT

Signature
....., P.Eng.
Director
Section .....

LW/
c: District Manager, DWECD, MECP Owen Sound
Peter Brozikowski, P.Eng, WSP Canada Inc.

Ontario

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A272601
Issue Date: April 16, 2020

The Corporation of the Township of Huron-Kinloss
21 Queen St
Huron-Kinloss, 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 have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

a waste disposal Site, consisting of 8.0 hectares Waste Fill Area within a total Site Area of 17.7 hectare.

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

a. "Approval" and "ECA" means this entire Environmental Compliance 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. "Minister" means the Minister of the Ontario Ministry of the Environment, Conservation and Parks;

f. "Ministry" and "MECP" means the Ontario Ministry of the Environment, Conservation and Parks;

g. "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;

h. "Owner" means any person that is responsible for the establishment or operation of the site being approved by this ECA, and includes the Township of Huron-Kinloss, its successors and assigns;

i. "FBAL" means Fill Beyond Approved Limits;

j. "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;

k. "Regional Director" means the Regional Director of the Southwestern Regional Office of the Ministry or the Environment;

l. "Regulation 232" or "Reg. 232" means Regulation 232/98 (New Landfill Standards) made under the EPA, as amended from time to time;

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

n "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 ECA;

o. "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 ECA.

p. "OWRA" means Ontario Water Resources Act, R. S. O. 1990; and

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

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

TERMS AND CONDITIONS

1.0 GENERAL

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 ECA are the requirements under the Environmental Protection Act, R.S.O. 1990. The issuance of this ECA 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 ECA are severable. If any requirement of this ECA, or the application of any requirement of this ECA to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this ECA shall not be affected in any way.

1.4 The Owner/Operator shall ensure compliance with all the terms and conditions of this ECA. 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 EPA), furnish any information requested by such persons with respect to compliance with this ECA, including but not limited to, any records required to be kept under this ECA; and

(b) In the event the Owner/Operator provides the Ministry with information, records, documentation or notification in accordance with this ECA (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 ECA 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 ECA 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 ECA relates; and, without restricting the generality of the foregoing, to:

a. enter upon the premises where the records required by the conditions of this ECA are kept;

b. have access to and copy, at reasonable times, any records required by the conditions of this ECA;

c. inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this ECA; and
d. sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this ECA.

1.7 (a) Where there is a conflict between a provision of any document referred to in Schedule "A", and the conditions of this ECA, the conditions in this ECA 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 ECA includes reference to the Environmental Compliance 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 ECA, and a copy of such notice shall be forwarded to the Director.

1.11 Any information relating to this ECA 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 ECA 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 ECA 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 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.

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 ECA.

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 ECA.

2.7 The Ministry acknowledges that waste was placed outside of the approved limit, known as FBAL, as documented in Item 16, in Schedule "A", attached to this ECA. To accommodate the FBAL and maintain the total waste disposal capacity of the Site, the final waste contours and the approved waste footprint fill area have been changed as shown on Figure No. 3 "Huron Landfill, Proposed Final Contours - Revised (Top of Waste)", dated February 21, 2019, in Item 16, in Schedule "A", attached to this ECA. 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.

2.8 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 ECA. 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 ECA, 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 ECA. 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.

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 ECA. 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 ECA. 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 ECA;
(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 The Waste Segregation/Recycling Centre and WEEE program at the Huron Landfill Site, for the acceptance, temporary storage, and transfer of non-putricible recyclable waste, shall be operated in accordance with the Design and Operation Manual, Item 15 in Schedule "A", attached to this Approval.

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 labelled 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 licensed 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 equipment 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 ECA, 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 ECA.

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.

Landfill Gas Monitoring

6.6 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.

6.7 The Owner/Operator shall ensure that any proposed changes to the monitoring programs under this ECA 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 ECA, 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 ECA.

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 ECA, 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 5.3 above;

(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

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 ECA, 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 ECA, including the inspection, monitoring and reporting requirements in the conditions of this ECA;
k. The extent to which the monitoring results indicate compliance with the conditions of this ECA, 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 Environmental Compliance Approval No. A272601. If there is a conflict between documents listed in Schedule "A", the document bearing the most recent date shall apply:

Documentation

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.

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).

14. Letter dated December 23, 2010, from Stephen J. Cobean, Pryde Schropp McComb Inc., to the Director of Approvals, Ministry of the Environment, Re: Township of Huron-Kinloss Huron Landfill Approval, No. A272601, with attached completed Application for a Certificate of Approval for a Waste Disposal Site, dated December 22, 2010, signed by Hugh Nichol, Director of Public Works, Township of Huron-Kinloss. (MOE Ref # 9904-8CMUJL).

15. Report entitled "Design and Operation Manual, Huron Waste Disposal Site, Township of Huron-Kinloss", dated December, 2010, prepared by Pryde Schropp McComb Inc.

16. Environmental Compliance Approval application and supporting documents dated May 27, 2019 and signed by John Yungblut, Director of Public Works. Supporting documents include:
    Attachment A: Memorandum Re: Fill Beyond Approved Limit, dated February 21, 2019.
    Attachment B: Georeferencing Plan
    Attachment C: Zoning Map
    Attachment D: Solid Non-Hazardous Waste Disposal Site Inspection Report

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 ECA. 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 ECA is properly identified by the ECA 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 ECA.*

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 ECA.*

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 ECA, 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 ECA, 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.*

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A272601

issued on July 31, 1989

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

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

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

The Notice should also include:

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

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

This Notice must be served upon:

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

AND

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

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

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

DATED AT TORONTO this 16th day of April, 2020

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

CM/
c: District Manager, MECP Owen Sound
Peter Brodzikowski, P. Eng., WSP

Ontario

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

Compliance Summary Inspection Report

Client:	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		
Inspection Site Address:	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		
Contact Name:	John Yungblut	**Title:**	Director of Public Works
Contact Telephone:	519-395-3735 **ext**	**Contact Fax:**	
Last Inspection Date:	2019/01/16		
Inspection Start Date:	2020/08/26	**Inspection Finish Date:**	2020/08/26
Region:	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-BEVLY3). - **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-BTGGEL

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

File: 300 Huron Landfill

November 2, 2020

Mr. Ian Mitchell
Ministry of Environment, Conservation and Parks
101-17th Street East
3rd 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
P.O. Box 130
Ripley, Ontario
N0G 2R0

519-395-3735
Fax: 519-395-4107
info@huronkinloss.com
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
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Yours truly,

John R. Yungblut, C.E.T.
Director of Public Works
Township of Huron-Kinloss
519-395-3735 ext. 130
jyungblut@huronkinloss.com

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 signature in the section below. The supervisor shall record the date the training was conducted and send the form into the Municipal Office.

Topics Covered:

- ☐ Health & Safety Policy: HKHS 13 – Violence and Harassment in the Workplace Policy
- ☐ Internal Procedure: 7.24 Harassment and Violence Complaints
- ☐ Health & Safety Procedure(s): SOP ALL 25 Dealing with Aggressive or Violent People, SOP PW 30 Restricting Access at Public Works Buildings
- ☐ SDS: Printer Ink
- ☐ Resources: Health & Safety Manual, SDS Binder, Internal Procedures – Human Resources

Name: Please Print	Signature	Position
Edmiston, Terry		Operator-in-Charge
Kreller, Lisa		Landfill Attendant
Louther, Chris		Landfill Worker

Date(s): Dec 19/20

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: Emergency Notification
- ☐ Resources: Health & Safety Manual, SDS Binder, Township of Huron-Kinloss Emergency Response Plan (ERP)

Name: Please Print	Position	Signature
Edmiston, Terry	Landfill Operator in Charge	
Kreller, Lisa	Landfill Attendant	
Louther, Chris	Landfill Worker	

Date(s): November 27, 2020

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 sign this form beside their name. The supervisor shall record the date the training was conducted and send the completed sheet to the Municipal Office.

Topics Covered:

- ☐ Health & Safety Policy: HKHS 10 – Standard Operating Procedures
- ☐ Health & Safety Procedure(s): SOP ALL 23 Hand-held Communication Devices
- ☐ 5.3.24 – Severe Weather
- ☐ Video: Cold Stress (20 min)
- ☐ SDS: Dymel
- ☐ Resources: H&S Manual, SDS Binder, Emergency Procedures, Internal Procedures

Name: Please Print	Signature	Position
Edmiston, Terry	completed	
Kreller, Lisa	"	
Louther, Chris	Chris Louther	landfill worker.

Date(s): October 27, 2020 L Howe

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 29 Burning Brush, 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
Louther, Chris		Landfill Worker

Date(s): Sept 19/2020

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 sign their name in the correct signature box below. The Health & Safety Coordinator shall record the date the training was conducted.

Topics Covered:

Health & Safety Policy: HKHS 8 – Health & Safety Training

Health & Safety Procedure(s): 12.2 Pandemic Guidelines for Landfill Staff, SOP ALL 21 Needle Collection/Disposal, SOP PW 6 Loader, SOP PW 26 Compactor

SDS: Diesel Fuel

Resources: Health & Safety Manual, SDS Binder, Internal Procedures

Name: Please Print	Position	Signature
Dakin, Les	Landfill Worker - Kinloss	
Edmiston, Terry	Landfill Operator in Charge	
Louther, Chris	Landfill Worker – Huron	
MacDonald, Shari	Landfill Attendant	Shari MacDonald

Date(s): Aug. 19, 2020

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 sign their name in the correct signature box below. The Health & Safety Coordinator shall record the date the training was conducted.

Topics Covered:

Health & Safety Policy: HKHS 7 – Refusal to Work, Pandemic – Social Distancing Rev1

Health & Safety Procedure(s): SOP ALL 10 Lifting & Handling, 16B Portable Eyewash

SDS: Glass Cleaner

Emergency Procedures: What to do if a severe or critical injury occurs on-site: IP 5.3.26

Resources: Health & Safety Manual, SDS Binder, Internal Procedures, Strong Minds by Beacon

Name: Please Print	Position	Signature
Dakin, Les	Landfill Worker - Kinloss	
Edmiston, Terry	Landfill Operator in Charge	
Louther, Chris	Landfill Worker – Huron	
MacDonald, Shari	Landfill Attendant	S. MacDonald

Date(s): July 21, 2020

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:

- [x] Health & Safety Policy: HKHS 5 – WSIB Reporting
- [x] Health & Safety Procedure(s): SOP PW 1 Traffic Control, SOP ALL12 West Nile Virus & Lyme, SOP ALL 13 Sunblock/Sunscreen and Insect Repellent
- [x] MSDS: Sunscreen, Insect Repellent
- [x] Emergency Procedures: What to do if there is severe weather conditions (i.e. wind, flood, earthquake, tornado)
- [x] Resources: Health & Safety Manual, SDS Binder, 5.3.24 Severe Weather Event

Name: Please Print	Signature	Position
Edmiston, Terry		Landfill Operator in Charge
Dakin, Les		Landfill Worker - Casual
Louther, Chris		Landfill Worker
MacDonald, Shari		Landfill Attendant

Date(s): May 19, 2020

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:

- [x] Health & Safety Policy: HKHS 4 – Employee Accident/Incident Reporting Guidelines
- [x] Health & Safety Procedure(s): HKHS 2.7 – Hearing Protection
- [x] SDS: RAID Flying Insect Killer
- [x] Emergency Procedures: What to do if there is an explosion on-site or close to site
- [x] Resources: Health & Safety Manual, SDS Binder, Landfill EP-002 Explosion

Name: Please Print	Signature	Position
Edmiston, Terry		OP - IN - CHARGE
Louther, Chris		Landfill worker.
MacDonald, Shari April 24/20	S. MacDonald	Landfill Attendant

Date(s): April 24 /20 L Howe

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:

☐ HR Downloads Video - Violence and Harassment in the Workplace Refresher (31 min)

In an effort to practice social distancing due to Covid-19, an in-person training session was canceled. Staff completed the video individually.

Name: Please Print	Signature	Position
Edmiston, Terry	Completed by Self-Study	Operator-in-Charge
Louther, Chris	" " "	Landfill Worker
MacDonald, Shari	" " "	Landfill Attendant

Date(s): March 24 2020 K Howe

hand sanitizer w 60% alcohol

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
- ☐ Environmental concerns: Ontario Electronic Stewardship – handling electronic waste
- ☐ 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
Louther, Chris		Landfill Worker
MacDonald, Shari	S. MacDonald	Landfill Attendant

Date(s): February 18, 2020 K Howe

SAFELY HANDLING ELECTRONIC WASTE

Electronics are now as much a part of our daily lives as any other consumer product. As each new product comes to the market, our old electronics, spent batteries, and other accessories become electronic waste (e-waste), and head to the waste pile.

Most companies have an area to stockpile equipment and supplies before final disposal. Some companies and public entities even specialize in handling e-waste for re-use and recycling. There are risks to handling e-waste, including physical injuries due to lifting, cuts from sharps, and exposure to hazardous dusts and chemicals that can pose health effects. To minimize injury, it is important to learn how to store, handle, and process e-waste safely.

The first concern with e-waste is potential exposure to chemical dusts and vapors, if the products are damaged or broken apart. Exposures to lead, mercury, cadmium, beryllium, and flame retardant compounds pose both short and long-term health effects. The risks include damage to the nervous system, reproductive system, birth defects, lung disease, and thyroid problems. In particular, use extra caution with the following equipment types and hazards:

Lead Dust	Mercury Vapor	Cadmium Dust	Beryllium Dust	Flame Retardant Dust
Cathode Ray Tubes Batteries Solder Circuit Boards	Batteries Switches Thermostats Fluorescent Tubes	Ni-Cad Batteries Circuit Boards Cathode Ray Tubes	Circuit Boards	Plastic Cases and Parts

Always wear your Personal Protective Equipment (PPE) when you work with e-waste:

- **Sturdy work gloves** protect your hands from cuts and scrapes while you move and store equipment.
- **Chemical-resistant disposable gloves** prevent skin contact with harmful dusts and chemicals.
- **Safety glasses** prevent dust and flying objects from damaging your eyes.
- **Coveralls** protect your skin and clothing.
- **Sturdy work boots** protect your feet from sharp punctures and heavy objects that might crush your toes.
- Consider using a **respirator**, depending on the area ventilation and type of operation, to protect against harmful dusts and fumes.

Minimize e-waste dust in the workplace by using good housekeeping practices. Keep the work area clean by storing items properly to minimize breakage or leaking; store batteries in sealed plastic containers and keep equipment neatly

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
- ☐ Emergency Procedures: What to do if there is a chemical spill on-site or close to site
- ☐ Video: Slips, Trips & Falls (17 min.)
- ☐ Resources: Health & Safety Manual, SDS Binder, EP-001 Spills, HR Downloads

Name: Please Print	Signature	Position
Edmiston, Terry	T. Edmiston	Operator-in-Charge
Louther, Chris	Chris Louther	Landfill Worker
MacDonald, Shari	S. MacDonald	Landfill Attendant

Date(s): January 21, 2020 D Howe

The Corporation of the Township of Huron-Kinloss

Health & Safety Training/Admin Training

Description: Employee Orientation

Approval: By-Law 2002-113 Dates: 28 September 2020

Topics Covered:

- ☐ Accessibility*
- ☐ Accident/Incident Reporting
- ☐ COVID-19 Pandemic
- ☐ Customer Complaints
- ☐ Disciplinary & Dismissal Policy
- ☐ Emergency Procedures
- ☐ Employment Standards*
- ☐ Equipment
- ☐ Fire Extinguisher*
- ☐ General Safety Rules
- ☐ Hazardous Conditions Reporting
- ☐ Individual Responsibilities*
- ☐ Payroll
- ☐ Personal Protective Equipment
- ☐ Printer
- ☐ Refusal to Work*
- ☐ Time Sheet
- ☐ Training
- ☐ WHMIS 2015*
- ☐ Workplace Harassment & Violence*

Participant(s):

Name	Department/Title	Signature
Lisa Kreller	Public Works/Landfill Attendant	L Kreller

Trainer(s):

Name	Department/Title	Signature
Howe, Tracey	Health & Safety Coordinator	
Lush, Kelly	Deputy Clerk	
Scott, Leanne	Payroll & Asset Management Coordinator	

*Some information is presented via HR Downloads video & quiz program

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:

- ☐ Health & Safety Policy: HKHS 6 – Modified Work
- ☐ Health & Safety Procedure(s): SOP ALL 11 Handling Fuel, SOP PW 29 Burning Brush
- ☐ SDS: WD-40
- ☐ Emergency Procedures: Internal Procedure 5.3.25
- ☐ Resources: Health & Safety Manual, SDS Binder, Landfill Internal Procedure - Fire

Name: Please Print	Position	Signature
Dakin, Les	Landfill Worker - Kinloss	
Edmiston, Terry	Landfill Operator in Charge	
Louther, Chris	Landfill Worker - Huron	
MacDonald, Shari	Landfill Attendant	S. MacDonald June 19/20

Date(s): Wed June 17/2020.

APPENDIX

C BASWR RECYCLING DATA

Municipality of HURON-KINLOSS

December 2020 BASWR Tons Diverted from Landfill

	TOTAL TONS	TOTAL TONS TO DATE	TOTAL MT TO DATE
Newspaper	10.53	141.95	128.74
Steel Cans	2.67	36.01	32.66
Aluminum	1.31	17.65	16.00
Mixed Glass	6.60	89.02	80.74
HDPE Plastic	2.63	35.47	32.17
PET Plastic	3.63	48.90	44.35
White Paper	0.26	3.48	3.15
Boxboard	3.65	49.23	44.65
Cardboard	9.34	103.92	94.26

TOTAL	40.61	525.61	476.73
TOTAL TO DATE	525.61		

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	4267	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
Dec-07	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

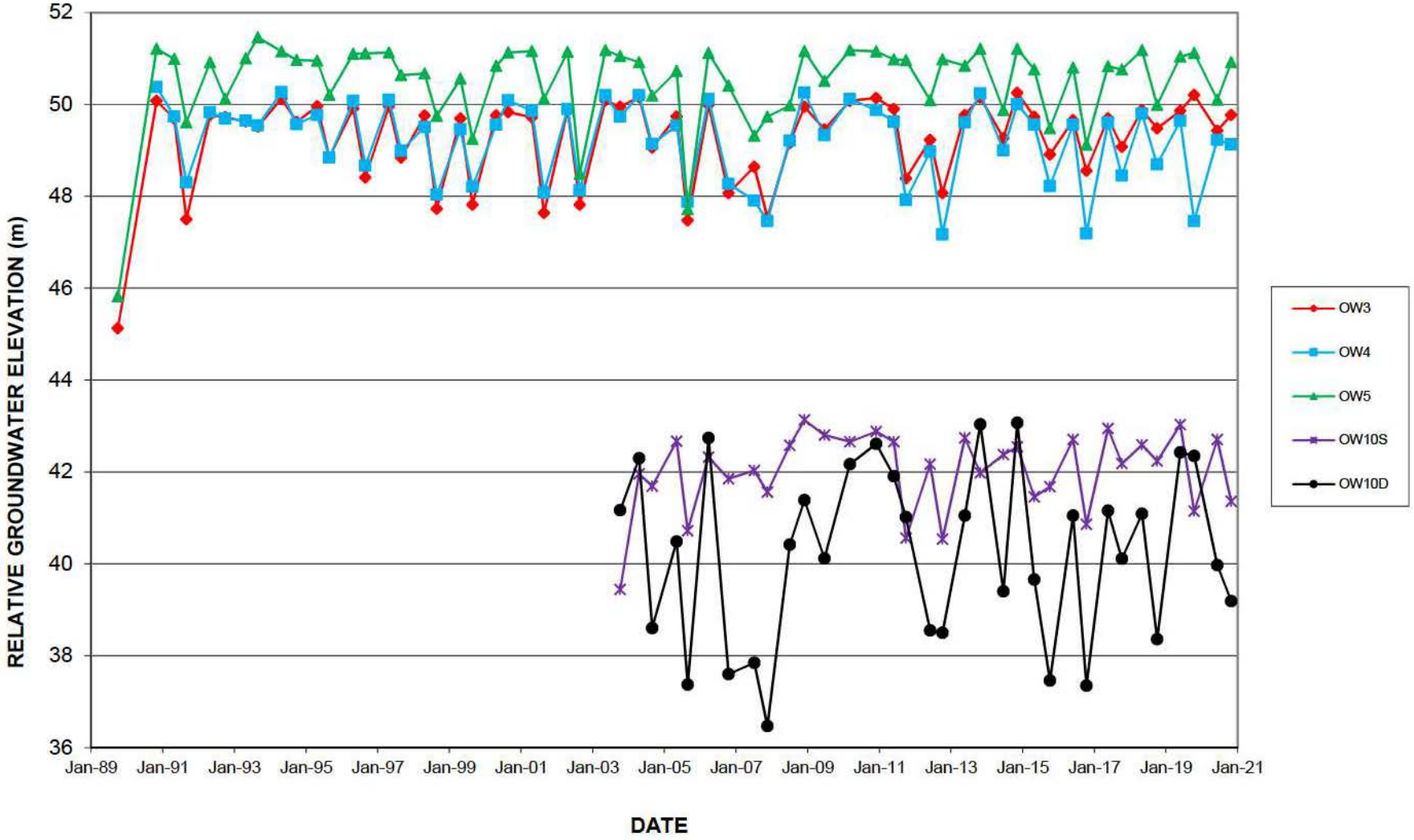
TABLE D-1
GROUNDWATER ELEVATIONS
HURON LANDFILL SITE

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													
Jul-08	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
Dec-08	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
Jul-09	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
Mar-10	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
Dec-10	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
Jun-11	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
Oct-11	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
Jun-12	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
Oct-12	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
Jun-13	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
Nov-13	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
Jul-14	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
Nov-14	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
May-15	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
Oct-15	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
Jun-16	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
Nov-16	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
Jun-17	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
Oct-17	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
May-18	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
Oct-18	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
Jun-19	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
Nov-19	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
Jul-20	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
Nov-20	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

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).

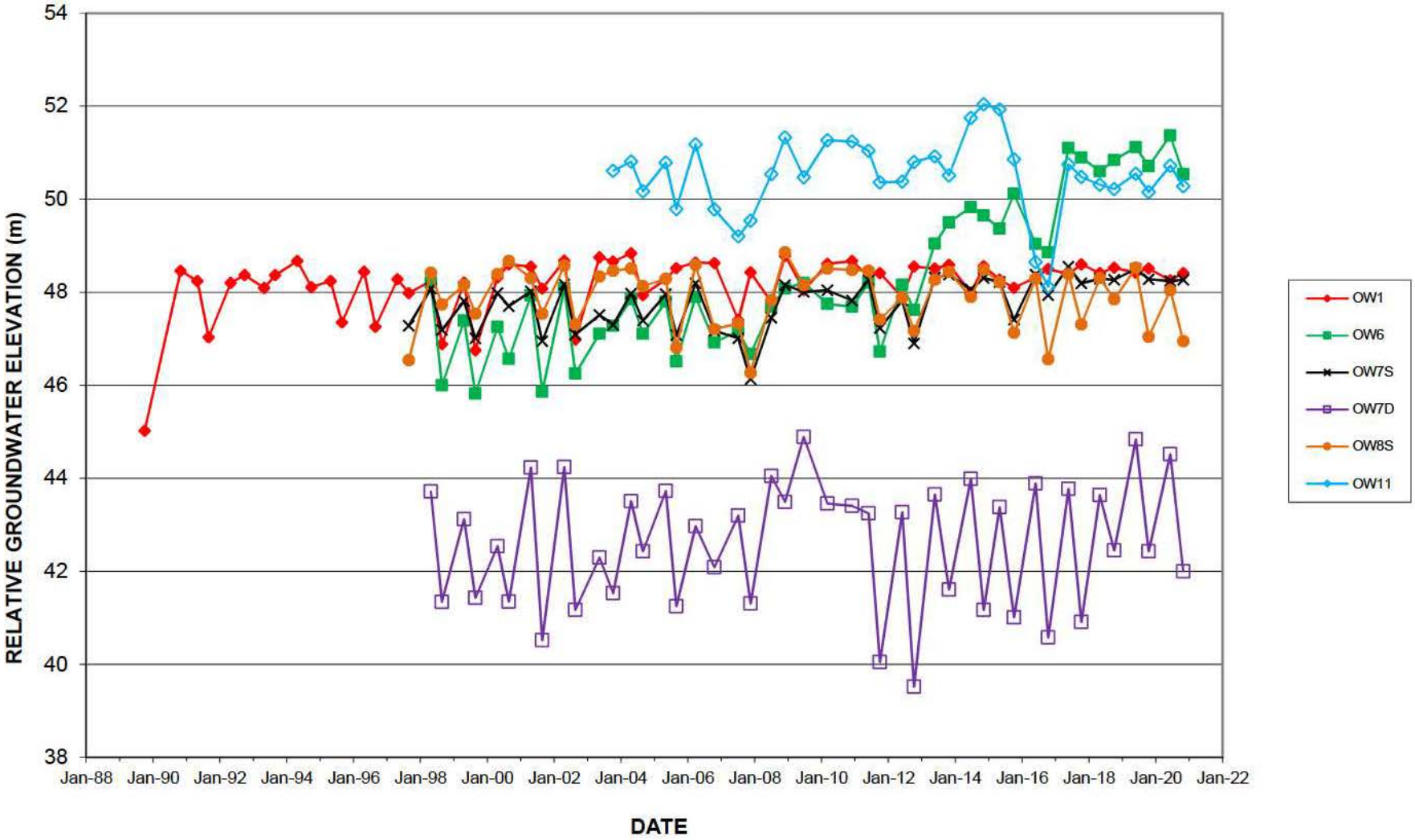
Water elevations are metres (above arbitrary site datum).
Well pipe was cut off to allow for well cap/casing security (0.075 m) July, 2014.
Well pipe extensions were added on November 18, 2015 (OW6 +1.52 m and OW11 +2.45 m).

FIGURE D-1
GROUNDWATER HYDROGRAPH OF UPGRADIENT & CROSS-GRADIENT WELLS
HURON LANDFILL



G:\2010\OS\401 - Environment\101-16942-00 - Huron WDS\Reports\Monitoring 2020\Table-D-1_2020.xls

FIGURE D-2
GROUNDWATER HYDROGRAPH OF LEACHATE & DOWNGRADIENT WELLS
HURON LANDFILL



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MONITORING HOLE LOGS
from IAN WILSON REPORT

Constructed September 26, 1989

Monitoring Hole	Depths (m)	Materials
1	49.42 49.22 0 - 0.20	TOPSOIL
	48.51 0.20 - 0.91	brown, dry silty SAND
	48.35 0.91 - 1.07	brown, dry GRAVEL and SAND with traces of silt
	47.59 1.07 - 1.83	brown, dry sandy SILT
	47.13 1.83 - 2.29	brown, moist sandy SILT with some clay
	46.07 2.29 - 3.35	grey, moist SILT with some clay and traces of sand
	43.32 3.35 - 6.10	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 $9X10^{-7}$ cm/sec.

2	49.81 48.90 0 - 0.91	brown, dry silty SAND
	48.29 0.91 - 1.52	brown, dry SILT with some clay and sand

Monitoring hole dry

i Sample 2 - 0.30m
silt - 33%
sand - 67%

iii Estimated coefficient of permeability $2X10^{-4}$ 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 $6X10^{-7}$ cm/sec.

3

50.77 49.40
0 - 1.37 brown, dry fine SAND

48.94
1.37 - 1.83 grey SILT with some sand and clay

47.11
1.83 - 3.66 grey, dense SILT with some clay and traces of sand

49.67
3.66 - 6.10 grey, 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 $5X10^{-6}$ cm/sec.

4

50.56 50.43

0 - 0.13 TOPSOIL

49.49

0.13 - 1.07 brown, dry GRAVEL and SAND with traces of silt

49.04

1.07 - 1.52 brown, dry fine SAND with some silt and traces of clay

46.29

1.52 - 4.27 grey, 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 $1X10^{-2}$ cm/sec.

5

57.22 51.02

0 - 0.20 TOPSOIL

50.61

0.20 - 0.61 brown, dry fine SAND with some silt

47.56

0.61 - 3.66 grey, dense SILT with some sand and clay with traces of stones

45.12

3.66 - 6.10 grey, 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 $5X10^{-4}$ cm/sec.

13 TOWNLINE, ORANGEVILLE, ONTARIO L9W 3R4 TEL:(519) 941-5331

Log of Drilling Operations

t: Maitland Engineering Services Ltd. Project: Huron Tonwship Landfill

ct No.: H-1275 Location: Huron Township Supervised by: S.Wheeldon

ling 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

th / n) Stratigraphic Description	Strat. Plot	Elev. / Depth (m)		SAMPLE Num.	Type	Int.	N Val.	Depth Scale (ft)	(m)
Surface Elevation (m): 51.09									
Fill - silt, sand and clay, brown, dense, damp, no apparent odour		50.48 / 0.61	Cement Seal						
Fill - garbage, grey, wet to saturated, strong putrid odour			Bentonite Grout; Bentonite Seal; #10 slot screen in silica sand pack; All well componets 50mm schedule 40 PVC						
		42.86							
Silt - some sand and clay, grey, dense, cohesive, slight putrid odour		8.23 / 41.34		1	SS				
End of Borehole		9.75	July 3/97						

Water found (dd/m/yr)

Static Water Level (dd/m/yr)

SAMPLE TYPE AC Auger Cutting; CS Continuous; RC Rock Core; SS Split Spoon; ST Shelby Tube; WC Wash Cuttings

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15 TOWNLINE, ORANGEVILLE, ONTARIO L9W 3R4 TEL:(519) 941-5551

OW7S

Log of Drilling Operations

t: Maitland Engineering Services Ltd. Project: Huron Tonwship Landfill
ct No.: H-1275 Location: Huron Township Supervised by: S.Wheeldon
ing 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	Strat. Plot	Elev. Depth (m)		SAMPLE Num.	Type	Int.	N Val.	Depth Scale (ft)	(m)
Surface Elevation (m): 49.95									
Topsoil - organics, silt, dark brown, dense, dry, no apparent odour		49.65 / 0.30	Cement Seal						
Silt - trace of clay, occasional coarse grained sand, brown, dense, damp, no apparent odour			Well Dry as of July 3/97						
			Bentonite Grout						
			Bentonite Seal						
			#10 slot screen in silica sand pack						
			All well componets 50mm schedule 40 PVC						
@ 8.38m becomes saturated									
End of Borehole		40.81 / 9.14							

Water found (dd/m/yr)
Static Water Level (dd/m/yr)

SAMPLE TYPE AC Auger Cutting SS Split Spoon
CS Continuous ST Shelby Tube
RC Rock Core WC Wash Cuttings

A Divison of R.J. Burnside & Associates Limited
15 TOWNLINE, ORANGEVILLE, ONTARIO L9W 3R4 TEL:(519) 941-3331

OW7D

Log of Drilling Operations

t: Maitland Engineering Services Ltd. Project: Huron Tonwship Landfill

ject No.: H-1275 Location: Huron Township Supervised by: S.Wheeldon

ng 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

h e (m)	Stratigraphic Description	Strat. Plot	Elev. / Depth (m)		SAMPLE Num.	Type	Int.	N Val.	Depth Scale (ft)	(m)
	Surface Elevation (m): 49.95									
	Topsoil - organics, silt, dark brown, dense, dry, no apparent odour		49.65 / 0.30	Cement Seal						
	Silt - trace of clay, occasional coarse grained sand, brown, dense, damp, no apparent odour			Well Dry as of July 3/97	1	SS				
					2	SS				
					3	SS				
				Bentonite Grout						
					4	SS				
					5	SS				
	@ 8.38m becomes saturated									
			38.68		6	SS				
	Sand and Gravel - silty, brown, dense, saturated, no apparent odour		11.27 / 37.92	Bentonite Seal #10 slot screen in silica sand pack All well componets 50mm schedule 40 PVC	7	SS				
	Silt - trace of clay, occasional coarse grained sand, brown, dense, damp, no apparent odour		12.03							
			36.25							
	End of Borehole		13.70							

Water found (dd/m/yr)

Static Water Level (dd/m/yr)

SAMPLE TYPE AC Auger Cutting SS Split Spoon

CS Continuous ST Shelby Tube

RC Rock Core WC Wash Cuttings

A Divison of R.J. Burnside & Associates Limited
13 TOWNLINE, ORANGEVILLE, ONTARIO L9W 3R4 TEL:(519) 941-5331

OW8S

Log of Drilling Operations

t: Maitland Engineering Services Ltd. Project: Huron Tonwship Landfill
ect No.: H-1275 Location: Huron Township Supervised by: S.Wheeldon
g 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

(m)	Stratigraphic Description	Strat. Plot	Elev. / Depth (m)		SAMPLE Num.	Type	Int.	N Val.	Depth Scale (ft)	(m)
	Surface Elevation (m): 49.67									
	Topsoil - organics, silt, dark brown, compact, dry, no apparent odour		49.47 / 0.20	Cement Seal						
	Silt to Silty Clay - scattered sand and gravel, fine to coarse grained, light brown, dense, dry, no apparent odour			Well Dry as of July 3/97						
	@ 3.81 becomes moist			Bentonite Grout						
	@ 5.33m becomes wet and grey in colour			Bentonite Seal #10 slot screen in silica sand pack All well componets 50mm schedule 40 PVC						
	Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent odour		43.27 / 6.40							
	Silt and Clay - scattered sand and gravel, brown, mottled grey, moist to wet, no apparent odour		41.75 / 7.92							
	End of Borehole		41.17 / 8.50							

Water found (dd/m/yr)
Static Water Level (dd/m/yr)

SAMPLE TYPE AC Auger Cutting SS Split Spoon
CS Continuous ST Shelby Tube
RC Rock Core WC Wash Cuttings

A Divison of R.J. Burnside & Associates Limited
15 TOWNLINE, ORANGEVILLE, ONTARIO L9W 3R4 TEL:(519) 941-5331

OW8D

Log of Drilling Operations

t: Maitland Engineering Services Ltd. Project: Huron Tonwship Landfill
ect No.: H-1275 Location: Huron Township Supervised by: S.Wheeldon
g 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

(m) Stratigraphic Description	Strat. Plot	Elev. / Depth (m)		SAMPLE Num.	Type	Int.	N Val.	Depth Scale (ft)	(m)
Surface Elevation (m): 49.67		49.47	Cement Seal						
Topsoil - organics, silt, dark brown, compact, dry, no apparent odour		0.20							
Silt to Silty Clay - scattered sand and gravel, fine to coarse grained, light brown, dense, dry, no apparent odour			Well Dry as of July 3/97	1	SS				
				2	SS				
@ 3.81 becomes moist				3	SS				
@ 5.33m becomes wet and grey in colour			Bentonite Grout	4	SS				
		43.27							
Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent odour		8.40		5	SS				
		41.76							
Silt and Clay - scattered sand and gravel, brown, mottled grey, moist to wet, no apparent odour		7.92	Bentonite Seal	6	SS				
				7	SS				
		38.27							
Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent odour		11.40	#10 slot screen in silica sand pack All well componets 50mm schedule 40 PVC	8	SS				
		35.98							
End of Borehole		13.71							

Water found (dd/m/yr)
Static Water Level (dd/m/yr)

SAMPLE TYPE AC Auger Cutting SS Split Spoon
CS Continuous ST Shelby Tube
RC Rock Core WC Wash Cuttings

A Division of R.J. Burnside & Associates Limited
15 TOWNLINE, ORANGEVILLE, ONTARIO L9W 5R4 TEL:(519) 941-5331

OW9

Log of Drilling Operations

t: Maitland Engineering Services Ltd. Project: Huron Tonwship Landfill

ject No.: H-1275 Location: Huron Township Supervised by: S.Wheeldon

ng 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

(m) Stratigraphic Description	Strat. Plot	Elev. / Depth (m)		SAMPLE Num.	Type	Int.	N Val.	Depth Scale (ft)	(m)
Surface Elevation (m): 50.89									
Fill- topsoil, organics, dark brown, dry, dense, no apparent odour		50.59 / 0.30	Cement Seal						
Fill - silt and small amount of debris, porcelain plate, wood, ashes, dry, brown, no apparent odour		49.37 / 1.52	Bentonite Seal	1	SS				
Silt - some clay, occasional sand and gravel, fine grained, cohesive, dense, damp to moist, no apparent odour				2	SS				
				3	SS				
				4	SS				
			Bentonite Grout	5	SS				
				6	SS				
				7	SS				
@ 12.95m becomes very dense				8	SS				
			Bentonite Seal						
		33.83	#10 slot screen in silica sand pack. All well componets 50mm schedule 40 PVC	9	SS				
Clayey Silt - occasional sand and gravel sizes, light brown, mottled grey, saturated, compact to dense, no apparent odour		17.06 / 32.61							
End of Borehole		18.28	July 3/97	10	SS				

Water found (dd/m/yr)

Static Water Level (dd/m/yr)

SAMPLE TYPE AC Auger Cutting SS Split Spoon

CS Continuous ST Shelby Tube

RC Rock Core WC Wash Cuttings

LOG OF DRILLING OPERATIONS

OW10 S

BURNSIDE

R.J. Burnside & Associates Limited
292 Speedvale Avenue West, Guelph, Ontario N1H 1C4
telephone (519) 823 4995 fax (519) 826-5477

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 Num.	Type	Int.	%Recov.
	TOPSOIL- Black, Organics & Moist.		0.05		SS		60
	CLAY - Brown, Dense, with some Gravel and Sand & Dry				AC		
1.0					SS		60
5.0					AC		
2.0					SS		80
					AC		
					SS		0
10.0 3.0					AC		
	CLAY - Grey, Dense, with some Gravel and Sand & Moist.		3.05		SS		70
4.0					AC		
					SS		90
15.0					AC		
	CLAY - Grey, Dense, with some Gravel and Sand & Wet.		4.57		SS		90
5.0					AC		
					SS		95
			5.64				

Prepared 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 suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by R. J. Burnside & Associates Limited personnel before use by others.

LEGEND	MONITORING WELL DATA	SAMPLE TYPE			
▼ Water found @ time of drilling	Pipe: **51 mm dia. PVC**	AC	Auger Cutting	SS	Split Spoon
▽ Static Water Level	Screen: **51 mm dia. PVC #10 slot**	CS	Continuous	AR	Air Rotary
		RC	Rock Core	WC	Wash Cuttings

BRLOG GUELPH P:\WW\99609\HURON\GPJ TEMPLATE.GDT 07/25/03

LOG OF DRILLING OPERATIONS

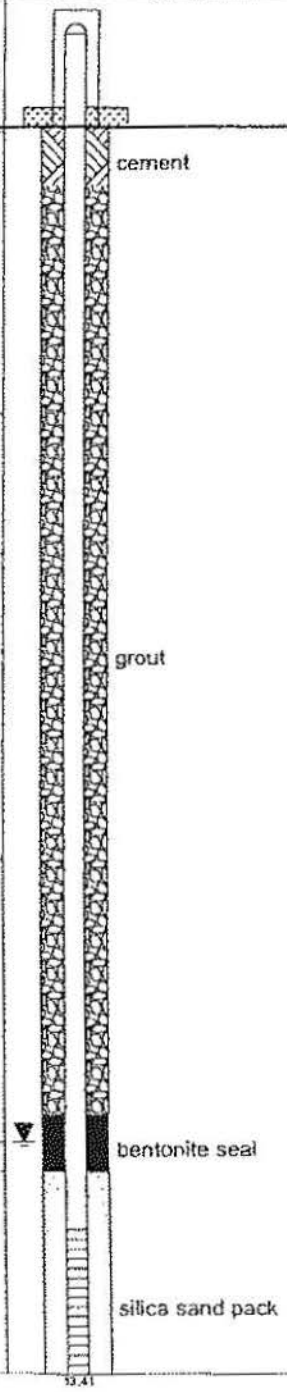
OW10 D

BURNSIDE

R. J. Burnside & Associates Limited
792 Speedvale Avenue West, Guelph, Ontario N1H 1C4
Telephone (519) 822-4955 fax (519) 836-5477

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)	Depth Scale (m)	Stratigraphic Description	Strat. Plot	Depth (m)	Sample Type	Sample Num.	Sample Int.	%Recov.
		TOPSOIL- Black, Organics & Moist.		0.05				
		CLAY - Brown, Dense, with some Gravel and Sand & Dry						
5.0	1.0							
	2.0							
10.0	3.0	CLAY - Grey, Dense, with some Gravel and Sand & Moist.		3.05				
	4.0							
15.0	5.0	CLAY - Grey, Dense, with some Gravel and Sand & Wet.		4.57				
20.0	6.0							
	7.0							
25.0	8.0	CLAY - Grey, Dense, with some Gravel and Sand & Dry.		7.92				
30.0	9.0							
	10.0							
35.0	11.0	CLAY - Grey, Dense, with some Gravel and Sand & Moist.		10.97				
		GRAVEL & SAND - with some Clay and Silt, sample is Saturated.		11.28				
40.0	12.0							
	13.0			13.41				



Sample Type	Sample Num.	Sample Int.	%Recov.
SS			60
AC			
SS			60
AC			
SS			80
AC			
SS			0
AC			
SS			70
AC			
SS			90
AC			
SS			90
AC			
SS			95
AC			
SS			95
AC			
SS			10
AC			
SS			15
AC			
SS			90
AC			
SS			30
AC			

Prepared By: **S. Quinlan** Checked By: **D. Hopkins** Date Prepared: **July 25, 03**

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LEGEND	MONITORING WELL DATA	SAMPLE TYPE			
Water found @ time of drilling	Pipe: **51 mm dia. PVC**	AC	Auger Cutting	SS	Split Spoon
Static Water Level -	Screen: **51 mm dia. PVC #10 slot**	CS	Continuous	AR	Air Rotary
		RC	Rock Core	WC	Wash Cuttings

LOG OF DRILLING OPERATIONS

OW 11- Leachate

BURNSIDE

R.J. Burnside & Associates Limited
282 Speedvale Avenue West, Guelph, Ontario N1H 1C4
Telephone (519) 822 4031 Fax (519) 836 5477

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: 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)	Depth Scale (m)	Stratigraphic Description	Strat. Plot	Depth (m)		SAMPLE Num.	SAMPLE Type	SAMPLE Int.	Depth Scale (ft)	Depth Scale (m)
5.0	1.0	CLAY FILL - Dense, Brown & Dry			cement				5.0	1.0
10.0	2.0	WASTE FILL - Black, Strong Odour, Plastic in Cuttings & Wet.		1.52	bentonite seal		AC		10.0	2.0
15.0	3.0				silica sand pack				15.0	3.0
	4.0									4.0
	5.0	CLAY - Native, grey, with some fine gravel and sand, dense & wet.		4.72			SS	100		5.0
				5.79	5.79		AC			

Prepared 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 suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by R. J. Burnside & Associates Limited personnel before use by others.

LEGEND
- Water found @ time of drilling
- Static Water Level

MONITORING WELL DATA
- Pipe: 51 mm dia. PVC
- Screen: 51 mm dia. PVC #10 slot

SAMPLE TYPE
- AC Auger Cutting
- CS Continuous
- RC Rock Core
- SS Split Spoon
- AR Air Rotary
- WC Wash Cuttings

Client: Township of Huron-Kinloss
Project: Huron Landfill

Project No.: LNE08507
Location: Part Lots 19 & 20, Concession 5, Huron Township
Drilling Company: Noll Drilling Inc.
Drilling Method: Geoprobe
Sampling Interval: Continuous
Supervised by: J. Rutherford
Construction: 25 mm diameter threaded-joint PVC pipe with 10 slot PVC screen
capped with slip-on labcock valve
lockable steel protective casing

GP1 Depth	Soil Description	Concrete		Sand	Screen
0.0 - 0.40	Light brown gravelly fine to medium SAND; massive; compact; moist	0 - 0.5		0.5 - 2.4	0.5 - 2
0.40 - 1.10	Medium grey SILT, some clay, trace sand, trace gravel; weathered to 0.7 m; stiff; moist				
1.10 - 1.20	Black SAND; partly organic; moist				
1.20 - 1.50	Medium brown fine SAND; massive; loose; saturated				
1.50 - 1.80	Medium grey fine SAND, some silt; massive; compact; saturated				
1.80 - 2.40	Medium grey SILT, some clay; occasional 2 to 5 cm thick seams of silty fine sand; stiff; saturated				
2.40 - 2.45	Medium grey SILT, some clay, trace sand, trace gravel; very still; moist				
Borehole Location:	North side of gatehouse and scales				
Date Started:	Jun 13, 2006				
Date Completed:	Jun 13, 2006				

Client: Township of Huron-Kinloss
Project: Huron Landfill

GP2 Depth	Soil Description	Concrete	Bentonite	Sand	Screen
0.0 - 0.20	Dark brown SILT, some sand; partly organic; loose; moist (topsoil)	0 - 0.5	0.5 - 0.6	0.6 - 2.4	0.6 - 2.1
0.20 - 0.40	Light red-brown fine SAND, trace silt; loose; moist				
0.40 - 0.70	Light grey-brown SILT, some clay, trace fine sand; red iron staining; weathered; very stiff; moist				
0.70 - 0.95	Light grey-brown SILT, some very fine sand; non-plastic; red iron staining; saturated seams				
0.95 - 1.20	Light grey-brown SILT, trace clay, trace sand, trace gravel; very stiff; wet				
1.20 - 1.30	Medium red-brown silty fine SAND; loose; moist				
1.30 - 2.45	Medium grey-brown clayey SILT, trace sand, trace gravel; very stiff; moist				

Borehole Location: North edge of landfill area
Date Started: Jun 13, 2006
Date Completed: Jun 13, 2006

GP3 Depth	Soil Description	Concrete	Bentonite	Sand	Screen
0.0 - 0.15	Light brown silty fine SAND, some gravel; trace organic matter; loose; dry	0 - 0.5	0.5 - 0.6	0.6 - 2.4	0.9 - 2.4
0.15 - 0.35	Medium brown SILT, some clay, some sand, some gravel; wood fragments; stiff; moist (fill)				
0.35 - 0.45	Light brown silty fine SAND; layered with layers of dark brown partly organic silt; moist (fill)				
0.45 - 1.00	Medium grey-brown SILT, some clay, some sand, some gravel; weathered to 0.68 m; very stiff; moist				
1.00 - 1.35	Dark brown to black SILT, some clay, some sand, some gravel; sandy seams; stiff; moist (fill)				
1.35 - 1.55	Dark brown to medium grey-brown silty SAND, some gravel; loose; saturated				
1.55 - 2.45	Medium grey-brown SILT, some clay, some sand, some gravel; grading to medium brown then medium red-brown; firm becoming very stiff below 2.0 m; moist, wet becoming moist below 2.0 m				

Borehole Location: Southeast corner of fill area, north side of shed
Date Started: Jun 14, 2006
Date Completed: Jun 14, 2006

Client: Township of Huron-Kinloss
Project: Huron Landfill

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; grey 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 #8S

	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 (W99609)

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[1] OW4	OW5	Ave	OW5 Sep-96	OW5 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
Vadose Zone Monitoring																			
Methane	% LEL																		
Oxygen	% Vol/Vol																		
General Chemistry																			
pH Value	pH units				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
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				0.64	0.65	0.34	122	0.68	0.62	0.44	0.36	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	0.15	< 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	4960	427	624	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	260	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	< 0.005	< 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	60.3	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	0.06	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

Note:
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[1] OW4	OW8	Ave	OW5 Oct-96	OW6 Oct-96	OW7D Oct-96	OW7S Oct-96	OW8D Oct-96	OW8S Oct-96	OW9 Oct-96	OW1 May-96	OW3 May-96	OW4 May-96	OW5 May-96	OW6 May-96	OW7D May-96	OW7S May-96	OW8D May-96
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	7.98	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	0.08	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	61	253	87	161	63	52	94	17	23	185	60	268
Alkalinity (CaCO3)	mg/L				300	750	146	184	152	228	108	425	348	258	330	600	146	168	158
Chloride (as Cl)	mg/L	128	128	127	4	120	6	2	2	2	2	32	17	2	6	84	3	1	2
Colour	TCU				< 5	27	< 5	< 5	< 5	< 5	< 5	8	< 5	< 5	8	20	< 5	< 5	6
Calculated Hardness (as CaCO3)	mg/L				287	589	194	126	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	0.61	0.57	0.55	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	75.5	35.9	28	53.1
Chromium, Cr	mg/L	0.016	0.016	0.016	< 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	36.6	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	1.96	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	46.9	82.8	57.3	68.6	28.2	15.1	9.62	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	0.06	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[1] OW4	OW5	Ave	OW8S May-96	OW9 May-96	OW1 Oct-96	OW3 Oct-96	OW4 Oct-96	OW5 Oct-96	OW6 Oct-96	OW7S Oct-96	OW8S Oct-96	OW9 Oct-96	OW1 May-99	OW3 May-99	OW4 May-99	OW5 May-99	OW6 May-99
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	8.08	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	us/cm				609	654	824	742	605	560	1300	440	611	662	810	828	830	676	1150
Conductivity (Field)	us/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	26	16	2	4	71	1	1	1	29	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	510	153	246	193	390	422	356	384	453
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.														1.83	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	0.56	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				46.3	43.2	106	95.2	90	58	86	31.6	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	0.168	0.189	0.178	< 0.02	0.02	9.31	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	50.1	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	0.06	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	60.4	77.5	33.1	23.1	12.6	32.5	136	54.4	62.6	80.7	28.7	15.8	10.4	20.4	126
Zinc, Zn	mg/L	2.508	2.525	2.515	0.18	0.06	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[1] OW4	OW5	Ave	OW7D May-00	OW7S May-00	OW8D May-00	OW8S May-00	OW9 May-00	OW1 Oct-00	OW3 Oct-00	OW4 Oct-00	OW5 Oct-00	OW6 Oct-00	OW7D Oct-00	OW7S Oct-00	OW8D Oct-00	OW8S Oct-00	OW9 Oct-00
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	7.85	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	4.46	< 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	0.36	0.27	0.14	< 0.05	< 0.05	0.05	5.05	< 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	644	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	386	386	567	156	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	602	441	385	359	405	132	140	232	228	178
Total Cations	meq/L				7.14	5.36	9.11	7.63	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	6.97	7.84	15.86	11	8.31	8	14.56	6.22	4.87	8.06	7.01	6.95
Ion Balance	% diff.				3.12	3.03	1.04	4.63	0.07	2.83	6.67	1.84	1.92	1.63	2.58	3.25	3.69	1.88	0.83
Calculated T.D.S.	mg/L				417	287	574	395	499	809	523	414	410	750	384	278	507	391	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	0.56	0.36	0.79	0.68	1.45	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	0.36	0.62	0.48	0.57	0.36	0.14	0.29	0.19	0.54	0.55	0.39	0.61	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	92.2	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	0.168	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	57.6	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	0.06	0.04	0.06	< 0.02	< 0.02	< 0.02	0.03	0.02
Potassium, K	mg/L				1.72	1.2	2.07	1.7	1.63	2.55	2.56	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	6.75	7.51	6.81	8.73	7.41
Sodium, Na	mg/L	105	112	108	94.4	54.8	94.9	63	86	66.7	17	7.07	24.8	125	88.9	54	91.2	61.2	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[1] OW4	OW5	Ave	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
Vadose Zone Monitoring																			
Methane	% LEL																		
Oxygen	% Vol/Vol																		
General Chemistry																			
pH Value	pH units				7.81	7.87	7.98	7.92	7.96	8.26	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				0.64	0.34	0.51	0.32	3.25	0.24	0.16	1.37	0.09	0.25	0.26	0.13	0.06	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	4.6
Conductivity	us/cm				1060	805	657	701	1050	548	435	738	593	663	1070	803	682	708	1170
Conductivity (Field)	us/cm																		
Sulphate (as SO4)	mg/L	288	268	278	50	33	85	24	63	125	45	229	96	226	84	28	59	18	86
Alkalinity (CaCO3)	mg/L				508	420	319	390	501	167	183	158	243	108	417	348	294	351	485
Chloride (as Cl)	mg/L	126	128	127	70	23	2	7	42	3	2	2	1	2	39	24	2	6	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	8.59	7.67	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	7.16	7.56	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	4.6
Calculated T.D.S.	mg/L				685	494	414	434	891	384	270	505	392	442	812	412	360	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	0.06	0.04	0.116	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	0.52	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	216	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	46.5	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	0.61	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	1.83	1.89	12.8	1.92	1.3	1.96	1.73	1.48	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	63.1	80	33.5	19.9	12.2	21.8	106
Zinc, Zn	mg/L	2.506	2.525	2.515	0.2	0.17	0.04	0.27	0.2	0.06	0.05	0.01	0.02	0.02	0.006	< 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[1] OW4	OW5	Ave	OW7s 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	OW7S May-02	OW8S May-02	OW8D May-02	OW9 May-02	OW-1 Sep-02
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	20.6	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	2.60	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	1.06	0.42	0.29	0.72	0.26	< 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	0.6	0.5	2.7
Conductivity	us/cm				475	585	634	812	706	778	880	667	746	980	463	506	744	660	771
Conductivity (Field)	us/cm									840	670	650	570	1000	430	580	720	650	NA
Sulphate (as SO4)	mg/L	286	266	276	64	116	92	191	256	24	33	68	28	83	57	96	249	237	41
Alkalinity (CaCO3)	mg/L				176	160	230	159	103	397	458	322	406	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	467	374	367	352	134	207	210	179	404
Total Cations	meq/L				4.83	6.85	6.71	8.48	6.87	9.11	9.98	7.86	8.22	11.02	4.72	6.41	7.59	6.64	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	3.86	1.04	3.51	0.51	3.71	2.44	2.45	3.02	6.03	3.36	1.59
Calculated T.D.S.	mg/L				259	338	368	460	458	480	526	408	437	676	309	411	579	503	496
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	0.061	0.061	0.137	0.04	0.047	0.032	0.032	0.08
Boron, B	mg/L	2.52	2.55	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	0.86	< 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	46.8	15.4	27.8	21.6	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	0.06	0.006	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				3.62	3.21	4.3	3.7	3.8	4.51	4.77	4.05	6.11	4.31	3.55	4.08	3.18	3.85	4.86
Sodium, Na	mg/L	105	112	108	47.8	76	53.6	78.4	72.6	24	13.6	7.7	19.3	86.2	46.5	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[1] OW4	OW5	Ave	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
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	7.6	7.3	7.8	7.8	7.7	7.8	7.9	6.83	6.24	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	0.06	< 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	< 0.0005	< 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	0.16	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	us/cm				714	606	605	962	448	550	606	736	853	929	769	700	679	1000	464
Conductivity (Field)	us/cm				NA	NA	NA	NA	NA	NA	NA	NA	NA	854	733	668	663	909	439
Sulphate (as SO4)	mg/L	286	266	276	37	69	21	100	69	126	97	230	222	173	73	106	46	84	53
Alkalinity (CaCO3)	mg/L				361	299	341	463	187	164	244	161	102	315	322	291	342	451	185
Chloride (as Cl)	mg/L	126	128	127	24	3	6	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	468	409	361	337	368	159
Total Cations	meq/L				8.56	7.48	7.42	13.11	5.18	5.59	7.06	7.94	6.86	10.82	9.17	7.84	7.94	11.52	5.01
Total Anions	meq/L				8.68	7.51	7.44	12.27	5.3	6	6.95	8.13	6.71	10.91	8.69	8.09	8.02	11.49	4.94
Ion Balance	% diff.				0.89	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	746	334	414	429	568	492	618	474	425	424	666	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	0.064	0.064	0.075	0.16	0.043	0.053	0.051	0.034	0.032	0.093	0.1	0.065	0.078	0.138	0.043
Boron, B	mg/L	2.62	2.65	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	0.0016	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	61.8	90.2	31.7	28.8	41.8	51.1	42.9	126	92.5	87.4	68.5	69.1	29.9
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	0.006	0.006	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	0.0006
Iron, Fe	mg/L	0.168	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	0.062	0.006
Potassium, K	mg/L				1.7	1.4	1.5	6.2	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	3.82	3.65	4.88	3.47	8.21	4.05	3.32
Sodium, Na	mg/L	105	112	108	19.1	9.6	26.5	90.2	48.9	71.7	54	78.8	71.5	23.8	21.8	9.2	26.8	91.2	50.4
Zinc, Zn	mg/L	2.506	2.525	2.516	< 0.005	< 0.005	< 0.005	0.008	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.096	0.145	0.005	0.006	0.025	0.015

Note:
Exceedance of RUC for historical data (1996-2003) based on 2001 - 2003
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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[1] OW4	OW8	Ave	OW7D May-03	OW8S May-03	OW8D May-03	OW9 May-03	OW8S (Rep May-03	OW5 (Rep) May-03	OW1 Oct-03	OW3 Oct-03	OW4 Oct-03	OW5 Oct-03	OW6 Oct-03	OW7S Oct-03	OW7D Oct-03	OW8S Oct-03	OW8D Oct-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	20.6	20.7	20.7	20.8
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				6.38	6.29	6.9	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	0.09	< 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	0.62	< 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	688	967	457	546	627	748
Conductivity (Field)	us/cm				509	586	704	663	NA	NA	748	662	563	638	874	424	525	574	690
Sulphate (as SO4)	mg/L	286	266	276	102	106	236	245	99	51	97	48	65	50	91	55	106	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	416	348	337	315	338	137	117	222	209
Total Cations	meq/L				5.65	7.16	8.02	7.1	6.96	7.96	9.3	7.79	7.18	7.43	10.67	4.98	5.66	6.91	7.74
Total Anions	meq/L				5.79	7.4	8.34	7.41	7.16	8.16	9.71	8.41	7.18	8.17	11.45	5.05	6.96	7.04	8.16
Ion Balance	% diff.				1.19	1.84	1.96	2.18	1.41	1.2	2.14	3.86	0.02	4.74	3.55	0.75	2.6	0.97	2.81
Calculated T.D.S.	mg/L				404	451	561	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	0.066	0.035	0.034	0.05	0.079	0.083	0.081	0.065	0.078	0.126	0.042	0.049	0.05	0.032
Boron, B	mg/L	2.52	2.55	2.54	0.442	0.398	0.493	0.464	0.395	0.114	0.106	0.068	0.037	0.116	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	106	80.5	83.7	66	84	29.4	28.8	42.1	49.1
Chromium, Cr	mg/L	0.016	0.016	0.016	0.005	0.005	0.005	0.005	0.005	0.006	0.005	0.005	0.006	0.005	0.005	0.005	0.005	0.005	0.006
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	0.0006	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	35.8	31.2	38.5	43.3	15.4	11.1	28.3	21
Manganese, Mn	mg/L	0.039	0.042	0.040	0.009	0.008	0.005	0.018	0.005	0.027	0.028	0.01	0.089	0.007	0.06	0.005	0.005	0.02	0.005
Potassium, K	mg/L				1.1	1.5	1.5	1.3	1.5	1.4	1.7	1.5	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	8.6	10	8.6	13.9	9.1	7.5	6.4	8.7	8.5
Sodium, Na	mg/L	105	112	108	74.7	56.5	83	75.5	57	26.8	21.7	18.4	9.1	25.3	86.3	50.9	75.4	58	80.9
Zinc, Zn	mg/L	2.506	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[1] OW4	OW5	Ave	OW9 Oct-03	OW10S Oct-03	OW10D Oct-03	OW11 Oct-03	OW7D (I Oct-03
Vadose Zone Monitoring									
Methane	% LEL				1.00	0.00	0.00	14.00	NA
Oxygen	% Vol/Vol				20.8	20.4	20.8	20.8	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	13.5	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	0.0496	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	398	78	16	108
Alkalinity (CaCO3)	mg/L				111	259	237	1180	179
Chloride (as Cl)	mg/L	126	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	6.32	27.43	5.84
Total Anions	meq/L				7.3	13.66	6.74	28.51	5.92
Ion Balance	% dif.				2.49	2.35	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	2.55	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	0.016	0.016	0.005	0.005	0.006	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	6.4
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 i
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[1] OW4	OW5	Ave	OW1 May-04	OW3 May-04	OW4 May-04	OW5 May-04	OW6 Leachate May-04	OW7S May-04	OW7D May-04	OW8S May-04	OW8D May-04	OW9 May-04	OW10S May-04	OW10D May-04	OW11 Leachate May-04	OW7DS-04 May-04 (replicate)	OW10DS May-04 (replicate)
Vadose Zone Monitoring																			
Methane	% LEL				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	20.6	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	7.96	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	6.60	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				< 0.05	< 0.05	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	0.05	0.24	0.41	0.08	32.6	0.09	0.06
Nitrate (as N)	mg/L	2.65	2.63	2.64	0.13	0.39	0.13	0.14	0.10	< 0.10	0.21	0.10	0.17	< 0.10	< 0.10	1.68	< 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	1.68	< 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	635
Conductivity (Field)	us/cm				798	681	625	649	872	434	522	613	686	700	989	574	2312	NA	NA
Sulphate (as SO4)	mg/L	288	268	278	56	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	15.6	< 2.5	< 2.5
Calculated Hardness (as CaCO3)	mg/L				429	359	345	314	330	136	112	224	211	191	513	284	1040	113	306
Total Cations	meq/L				9.54	8.08	7.42	7.45	10.49	4.97	5.54	6.97	7.93	7.17	12.23	6.49	25.99	5.62	6.93
Total Anions	meq/L				9.36	8.06	7.34	7.7	10.62	5.01	5.59	7.18	8	7.3	12.35	6.78	26.58	5.65	6.82
Ion Balance	% dif.				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	568	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	0.03	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	0.46	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				106	76.9	78	63.7	61.8	28.3	29.7	39.9	48.5	44.7	112	71.3	222	26.5	78.5
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	56.7	25.7	119	11.3	28
Manganese, Mn	mg/L	0.037	0.033	0.035	0.010	< 0.005	< 0.005	< 0.005	0.020	0.006	< 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	8.59	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	56.8	84.3	76.2	43.5	18.0	61.0	76.7	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)

Parameter	Units	Reasonable Use Criteria[1] OW4	OW5	Ave	-04 OW1 Sep-04	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 LEAC Sep-04	OW7S-04 Sep-04 (replicate)
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	20.8	NA
General Chemistry																		
pH Value	pH units				7.76	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	0.16	< 0.05	0.21	0.12	< 0.05	44.5	0.13
Ammonia (un-ionized)	mg/L				0.0093	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	0.46	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	0.46	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	0.60	0.90	1.20	2.80	0.80	23.40	0.60
Conductivity	us/cm				567	791	670	671	912	464	509	636	737	697	986	559	2330	468
Conductivity (Field)	us/cm				745	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				416	363	332	306	309	126	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	7.82	10.56	4.99	5.45	7.24	8.08	7.24	11.52	6.11	27.17	4.7
Ion Balance	% dif.				3.78	4.39	3.26	2.81	5.64	5.07	5.25	5.49	7.16	4.47	2.24	5.9	7.53	2.09
Calculated T.D.S.	mg/L				507	445	392	393	598	306	366	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	152	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	< 0.0006	0.0006	0.0006	0.0009	0.0010	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0006	< 0.0005	< 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	19.6	17.6	10.3	24.4	71.6	45.3	66.0	51.2	73.2	72.4	37.2	26.3	76.2	44.6
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

Note:
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

Appendix D
Historical Groundwater Quality Data
Hance Landfill Site

Parameter	Units	RLUC	TDL	OW1 3/24/2005	OW2 3/24/2005	OW4 3/24/2005	OW5 3/24/2005	OW5 LEACHATE 3/24/2005	OW7S 3/24/2005	OW7D 3/24/2005	OW8S 3/24/2005	OW8D 3/24/2005	OW9 3/24/2005	OW10S 3/24/2005	OW10D 3/24/2005	OW11 LEACHATE 3/24/2005	OW11 Dup 3/24/2005
FIELD MEASUREMENTS																	
Landfill Gas	Volume (%LEL)		N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	
Oxygen	mg/L		N/A	20.9	20.8	20.8	20.6	20.3	20.8	20.7	18.8	20.7	21.0	21.1	11.0	20.6	
Temperature	°C		N/A	8.5	8.4	8.8	10.6	12.7	10.1	8.4	10.8	12.9	12.7	10.3	10.6	14.0	
pH	pH		N/A	7.19	7.01	7.26	7.80	7.20	7.74	7.81	7.20	7.68	7.81	7.13	7.37	6.50	
Conductivity	µS/cm		N/A	908	648	672	465	628	495	486	408	841	881	844	481	2271	
LABORATORY																	
Dissolved Ammonia (Colorimetric)	mg/L		N/A	ND	N/A	N/A	N/A	0.0098	N/A	N/A	0.0004	N/A	0.0003	0.0004	0.0008	0.0008	N/A
Total Ammonia-N	mg/L		0.05	0.06	ND	ND	ND	0.31	ND	ND	0.11	ND	0.21	0.16	0.16	0.43	ND
Conductivity	µS/cm		1	908	648	672	465	628	495	486	408	714	881	844	481	2040	813
Total Kjeldahl Nitrogen (TKN)	mg/L		0.5	1.3	0.8	0.8	0.8	1.7	0.7	0.7	0.7	0.6	2.1	1.3	0.9	3.8	0.6
Nitrate (N)	mg/L	0.27	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dissolved Organic Carbon	mg/L	3.84	0.1	1.3	1.6	1.7	1.6	2.1	0.7	0.8	0.7	0.8	1.3	1	0.8	1.0.7	0.8
pH	pH		0.01	6.19	6.18	7.26	6.19	6.12	6.20	6.20	6.14	6.14	6.46	6.66	6.17	7.32	6.19
Alkalinity (Total as CaCO3)	mg/L		1	367	308	324	228	309	173	186	231	195	308	284	182	1260	262
Chloride (Cl)	mg/L	179	1	38.2	36.4	3.44	7.30	18.6	4.30	4.40	1.46	5.10	4.79	7.36	4.02	165	3.70
F, Inorganic	mg/L		1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dissolved Heavy - Metals	mg/L	7.80	0.1	0.1	0.1	0.1	0.2	0.2	ND	0.2	ND	0.2	0.1	0.1	0.2	ND	0.1
Nitrate (N)	mg/L	7.80	0.1	0.1	0.1	0.1	0.1	0.2	ND	0.2	ND	0.2	0.1	0.1	0.2	ND	0.2
Sulphate (SO4)	mg/L	351	1	11	0.1	36.3	15.2	18.9	38.6	39.9	28.9	208	171	222	97.4	48.5	38
FIELD MEASUREMENTS																	
Action Level	mg/L		N/A	8.21	7.31	7.30	7.4	8.52	8.03	8.2	8.02	7.28	8.09	8.9	8.88	8.21	8.39
Metals, Alkalinity (calc. as CaCO3)	mg/L		1	366	308	262	226	309	176	186	230	194	308	284	168	1260	262
Conductivity (Lab)	mg/L	447	1	444	378	398	279	363	207	220	261	242	417	381	221	1570	313
Metals, Alkalinity (calc. as CaCO3)	mg/L		1	4	4	4	4	4	3	3	3	3	4	4	4	4	4
Colour Bum	mg/L		N/A	16.6	7.84	2.93	7.91	19.1	1.47	4.48	7.57	7.61	7.81	11.2	8.55	64	4.45
Hardness (CaCO3)	mg/L		N/A	270	360	300	230	330	166	198	240	300	190	465	240	1800	330
Ion Balance (% Difference)	%		N/A	8.78	4.41	6.76	5.31	7.30	1.34	1.54	4.98	1.87	3.88	1.53	0.410	8.2	5.11
Langelier Index (@ 20C)	N/A		N/A	1.23	0.979	0.968	1.08	0.984	0.609	0.645	0.512	0.55	0.764	0.329	0.809	1.06	0.847
Langelier Index (@ 4C)	N/A		N/A	0.964	0.731	0.718	0.871	0.743	0.36	0.394	0.466	0.3502	0.498	0.198	0.553	0.817	0.584
Saturation pH (@ 20C)	N/A		N/A	6.97	7.13	7.1	7.11	7.15	7.08	7.05	7.07	7.53	7.28	7.08	7.39	7.34	7.33
Saturation pH (@ 4C)	N/A		N/A	7.57	7.51	7.48	7.38	7.34	7.01	7.08	7.12	7.81	7.63	7.52	7.81	8.7	8.02
DISSOLVED																	
Dissolved Aluminum (Al)	mg/L		0.0006	ND	0.0008	0.0009	0.0013	ND	ND	ND	ND	ND	ND	ND	0.0007	ND	ND
Dissolved Arsenic (As)	mg/L	0.006	0.0001														
Dissolved Barium (Ba)	mg/L	0.3	0.0005	0.0284	0.0272	0.0252	0.0371	0.0391	0.0208	0.0203	0.0245	0.0205	0.0209	0.0233	0.0168	0.0132	0.0243
Dissolved Boron (B)	mg/L	1.34	0.05	0.1	0.07	0.04	0.12	0.14	0.29	0.2	0.27	0.44	0.28	0.18	0.17	0.14	0.17
Dissolved Cadmium (Cd)	mg/L	0.00016	0.00001	ND	0.00009	0.00004	0.00008	ND	0.00004	0.00004	ND	0.0001	ND	0.00018	0.00007	ND	0.00004
Dissolved Calcium (Ca)	mg/L		0.3	108	88.1	74.9	64.7	88.1	36.6	37.8	41	42.1	64	85	45	187	77.1
Dissolved Chromium (Cr)	mg/L	0.0214	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dissolved Cobalt (Co)	mg/L	0.0021	0.0001	0.0002	0.0002	0.0002	0.0003	0.0008	0.0001	0.0001	0.0002	0.0001	0.0001	0.0002	0.0002	0.0001	0.0002
Dissolved Copper (Cu)	mg/L	0.09	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.002	ND	ND	ND
Dissolved Iron (Fe)	mg/L	0.18	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.07	ND	1.92	ND
Dissolved Lead (Pb)	mg/L	0.0048	0.00005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dissolved Magnesium (Mg)	mg/L		0.02	34.1	43.8	37.1	30.8	41.7	18.1	21.3	29.3	28.1	24.8	34.8	21.8	732	44.8
Dissolved Manganese (Mn)	mg/L	0.052	0.002	0.014	ND	ND	ND	0.051	ND	ND	0.005	ND	0.017	0.119	0.024	0.362	ND
Dissolved Potassium (K)	mg/L		0.3	2.3	3.1	1.7	1.8	4.3	1.2	1.3	1.8	1.8	1.3	2.1	1.3	23.8	1.3
Dissolved Silicon (Si)	mg/L		0.05	4.85	5.87	5.07	5.71	5.58	3.31	3.16	4.74	3.65	2.41	4.82	5.58	8.1	3.11
Dissolved Sodium (Na)	mg/L	113.6	0.1	38	33.6	15	14.3	41.1	16.9	17.5	16.4	80.9	74.7	47.7	33.3	76.8	31.6
Dissolved Zinc (Zn)	mg/L	3.3	0.005	0.008	0.007	0.011	ND	ND	ND	0.006	ND	ND	ND	ND	0.028	ND	0.008

N/A = Not Applicable
ND = Not detected
TDL = Typical Detection Limit. Actual detection may vary with concentration of each sample.
Refer to Table 5 for detail relating to landfill gas measurements.
Recommended Use Criteria (RLUC) were established in accordance with MOEE Guideline B-7 using 5 years of data for OW4 and OW5 and applying the detection limit when a non-detect is reported. The higher of the two RLUC values (OW4 or OW5) is shown here.

F:\Documents\2005\Hance\Report\Hance LF\[HANCE2005.xls]Table 1 - 2005 Groundwater Data
R. J. Burnside & Associates Limited
Project Number: 05301467

Appendix D
Historical Groundwater Quality Data
Horse Landfill Site

Parameter	Units	RLC	TDL	OW1 6/21/2005	OW2 6/21/2005	OW4 6/21/2005	OW5 6/21/2005	OW5 LEACHATE 6/21/2005	OW7S 6/21/2005	OW7D 6/21/2005	OW8S 6/21/2005	OW8D 6/21/2005	OW9 6/21/2005	OW10S 6/21/2005	OW10D 6/21/2005	OW11 LEACHATE 6/21/2005	OW11 LEACHATE Follow 6/21/2005
FIELD MONITORING RESULTS																	
Elevation	m.a.s.l. or (m bgs)		N/A	0	0	0	0	0	0	1	2	2	1	2	1	1	
Oxygen	mg/L		N/A	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.7	20.7	20.7	
Temperature	°C		N/A	13.4	13.3	15.4	12.4	13.1	12.3	10.1	13.1	11.4	12.3	12.3	11.3	13.4	
pH	pH		N/A	7.11	7.44	7.16	7.33	7.21	7.37	7.58	7.73	7.38	7.62	7.62	7.15	6.98	
Conductivity	uS/cm		N/A	772	771	688	670	641	647	460	648	647	697	697	691	643	
INORGANICS																	
Dissolved Ammonia (Calculated)	mg/L		N/A	N/A	N/A	N/A	N/A	0.0000	0.0011	0.0013	0.0013	N/A	0.0004	0.0011	0.0002	0.048	ND
Total Ammonia-N	mg/L		0.05	ND	ND	ND	ND	0.47	0.07	0.08	0.17	ND	0.17	0.08	0.07	56	20.3
Conductivity	uS/cm		1	774	780	688	647	613	641	643	634	688	681	680	644	7130	7130
Total Kjeldahl Nitrogen (TKN)	mg/L		0.5	0.8	0.8	1.3	0.8	1.4	0.8	0.4	0.4	0.3	0.4	0.4	0.7	85	57
Nitrate (N)	mg/L	0.77	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dissolved Organic Carbon	mg/L	1.66	0.1	3.7	3.1	1.9	1.7	1	0.4	1.4	0.8	1.1	1.1	0.8	0.4	34.8	34.8
pH	pH		0.01	6.19	6.19	6.58	6.38	6.76	6.39	6.46	6.39	6.39	6.39	6.39	6.56	7.56	7.56
Alkalinity (Total as CaCO3)	mg/L		1	318	324	308	348	308	308	181	280	461	314	308	191	1258	1258
Chloride (Cl)	mg/L	139	1	36.6	35.6	6.66	7.88	17.9	14.6	5.68	1.00	1.00	1.00	1.00	1.00	138	138
Fluoride	mg/L		1	ND	ND	ND	ND	ND	ND	1	ND	ND	ND	ND	ND	ND	ND
Dissolved Nitrite + Nitrate	mg/L	1.66	0.1	0.8	1.8	ND	1.8	0.1	ND	1.8	ND	ND	ND	ND	ND	ND	ND
Nitrate (N)	mg/L	2.63	0.1	0.8	1.8	ND	1.8	0.1	ND	1.4	ND	ND	ND	ND	ND	ND	ND
Sulphate (SO4)	mg/L	291	1	64	37	84	31	83	41	78	74	288	287	316	185	34	7
CALCULATED VALUES																	
Anion Sum	me/L		N/A	8.16	8.38	7.68	7.80	8.48	8.00	5.3	7.3	7.61	7.17	7.2	6.16	24.4	23.7
Cation Alkalinity (mg/L as CaCO3)	mg/L		1	318	324	308	348	308	308	181	280	461	314	308	191	1258	1258
Carbonated TDS	mg/L	447	1	427	443	388	396	388	388	231	334	391	448	424	259	1269	1269
Cation Alkalinity (mg/L as CaCO3)	mg/L		1	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Cation Sum	me/L		N/A	8.04	8.34	7.40	7.44	8.04	7.8	5.46	7.84	7.82	7.52	8.08	10.3	6.19	24.1	22.4
Hardness (CaCO3)	mg/L		N/A	360	366	344	316	360	338	198	346	346	388	388	326	360	360
Ion Balance (% Difference)	%		N/A	1.17	0.0896	3.45	1.19	1.13	1.27	0.963	2.81	0.531	1.8	0.592	0.247	0.444	1.88
Langelier Index (@ 20C)	N/A		N/A	1.18	1.17	1.11	1.13	1.1	0.484	0.0613	0.79	0.0884	0.0458	1.28	1.0884	1.05	1.18
Langelier Index (@ 4C)	N/A		N/A	0.941	0.93	0.863	0.885	0.861	0.247	0.207	0.511	0.241	0.211	0.828	0.673	0.846	0.944
Saturation pH (@ 20C)	N/A		N/A	6.67	7.04	7.48	7.25	7.17	7.73	7.77	7.44	7.61	7.78	7.68	7.46	6.36	7.33
Saturation pH (@ 4C)	N/A		N/A	7.24	7.37	7.58	7.58	7.39	7.87	7.93	7.68	7.85	8.04	7.96	7.86	6.94	7.82
METALS																	
Dissolved Aluminum (Al)	mg/L		0.005	0.006	0.007	0.007	0.009	ND	ND	0.008	0.007	0.011	ND	0.013	0.009	0.004	ND
Dissolved Arsenic (As)	mg/L	0.508	0.001	ND	0.001	ND	0.002	ND	0.001	ND	0.002	ND	0.0004	0.002	ND	0.196	0.149
Dissolved Barium (Ba)	mg/L	0.3	0.004	0.019	0.048	0.049	0.056	0.058	0.038	0.054	0.048	0.021	0.004	0.053	0.133	0.047	0.068
Dissolved Boron (B)	mg/L	1.3	0.01	0.1	0.08	0.08	0.12	0.11	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.14	0.13
Dissolved Cadmium (Cd)	mg/L	0.0018	0.0001	0.0001	0.00019	ND	0.0002	ND	ND	ND	ND	0.0002	ND	ND	ND	ND	ND
Dissolved Calcium (Ca)	mg/L	0.3	0.4	84.6	87.8	79.8	77.4	84.1	80.3	48.8	79.8	44.1	87.3	84.3	84.5	86	86
Dissolved Chromium (Cr)	mg/L	0.011	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.007	0.006
Dissolved Copper (Cu)	mg/L	0.009	0.001	0.001	0.013	0.001	0.002	0.003	0.002	0.001	0.001	0.002	ND	ND	ND	0.008	0.001
Dissolved Iron (Fe)	mg/L	0.19	0.05	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND	0.14	ND	1.1	1.08
Dissolved Lead (Pb)	mg/L	0.005	0.0005	ND	0.0007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dissolved Magnesium (Mg)	mg/L		0.05	17.4	18.4	14.1	14.1	16.3	14.3	11	15	11.8	18.1	17.1	20.9	125	124
Dissolved Manganese (Mn)	mg/L	0.054	0.002	0.007	0.008	0.013	ND	0.013	0.009	ND	0.015	0.009	0.019	0.187	0.009	0.198	0.191
Dissolved Potassium (K)	mg/L		0.3	1	1.2	1.2	1.2	1.1	1.4	1.1	1.6	1.2	1.2	1.2	1.3	27.8	26.1
Dissolved Silicon (Si)	mg/L		0.05	4.44	4.33	4.48	4.38	4.31	4.38	3.38	3.78	4.48	2.09	3.03	4.88	8.13	8.16
Dissolved Sodium (Na)	mg/L	173.4	0.1	36.3	31	12.3	36.4	45.6	31.2	21.7	34.3	28.3	27.4	43.3	32.8	109	108
Dissolved Zinc (Zn)	mg/L	2.8	0.005	0.005	0.011	ND	0.005	ND	ND	ND	ND	0.011	ND	0.008	ND	0.006	ND

N/A = Not Applicable
ND = Not detected
TDL = Typical Detection Limit. Actual detection limit varies with concentration of each sample.
Refer to Tables 5 for notes relating to historic gas exceedances.
Reasonable Use Criteria (RUC) were calculated in accordance with MOE Guideline B-7 using 3 years of data for OW4 and OW8 and applying the detection limit when a zero result is reported. The higher of the two RUC values (OW4 or OW8) is shown here.

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R. J. Burnside & Associates Limited
Project Number: UHORSE1

Huron Landfill Site
Standard Groundwater Quality Package

Parameter	Short I.D.	Unit	RUC Max (OW4 & OW6)	ODWS	M.D.L.	OW1	OW2	OW3	OW4	OW5	OW6	OW7S	OW7D	OW8A	OW8D	OW9	OW10S	OW10D	OW11	OW8-Rep	Dup1	Dup2
Well Class						Down Town	Down Town	Down Town	Background Town	Background Town	Leachate Town	Down Town	Down Town	Down Town	Down Town	Down Town	Down Town	Down Town	Leachate Town	Down Town	Down Town	Down Town
Well Owner																						
Date of Sampling						16-Apr-06	16-Apr-06	16-Apr-06	16-Apr-06	16-Apr-06	16-Apr-06	16-Apr-06	16-Apr-06	16-Apr-06	16-Apr-06	16-Apr-06	16-Apr-06	16-Apr-06	16-Apr-06	16-Apr-06	4-Oct-06	4-Oct-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	10.6	14.8	12.4	DRY
pH	pH	N/A				7.43	DRY	7.51	7.39	7.8	7.36	7.77	8.06	7.85	7.69	7.9	7.2	7.48	6.76	7.9	7.42	DRY
Electrical Conductivity	Th. Cond.	uS/cm				786	DRY	862	883	672	840	450	512	846	684	709	986	660	2378	709	762	DRY
INORGANICS																						
pH	pH	N/A			N/A	8.04	DRY	8.18	8.2	8.18	8.08	8.2	8.29	8.19	8.18	8.1	8.02	8.16	7.26	8.11	7.87	DRY
Chloride	Cl	mg/L	130	250	0.10	27.8	DRY	34.1	2.38	7.33	18.3	10.9	4.31	4.82	3.54	1.38	1.07	9.16	191	1.86	28	DRY
Electrical Conductivity	Th. Cond.	uS/cm			2	776	DRY	876	673	667	868	468	517	836	713	668	842	608	2130	691	810	DRY
Total Hardness (as CaCO3)	Hard(Calc)	mg/L			10	563	DRY	324	366	318	309	136	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	<5	9	<1	2.7	DRY
Total Dissolved Solids	Th. TDS	mg/L	487	500	20	548	DRY	564	498	412	514	332	320	444	436	525	648	484	1490	464	492	DRY
Ammonia (un-ionized)	$NH_{3(aq)}$	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	0.0268	0.0013	0.0002	DRY
Ammonia as N	NH_3-N	mg/L			0.02	0.08	DRY	<0.02	<0.02	<0.02	0.08	<0.02	<0.02	<0.02	<0.02	0.08	0.06	0.64	34	0.08	0.04	DRY
Nitrate as N	NO_3-N	mg/L	2.64	10	0.05	0.89	DRY	0.29	0.3	0.14	0.54	<0.05	0.17	0.1	0.18	0.16	0.09	2.23	0.06	0.36	0.74	DRY
Nitrite as N	NO_2-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_3+NO_2	mg/L	2.64	10	0.10	0.89	DRY	0.29	0.3	0.14	0.54	<0.10	0.17	0.1	0.18	0.16	<0.10	2.23	<0.10	0.36	0.74	DRY
Total Kjeldahl Nitrogen	TKN	mg/L			0.10	0.46	DRY	0.27	0.14	0.29	0.66	0.17	0.21	0.24	0.14	0.26	0.24	0.12	28.7	0.26	0.38	DRY
Bromide	Br	mg/L			0.05	0.07	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	mg/L	1.08	1.5	0.05	0.82	DRY	0.77	0.81	0.98	1.3	1.2	1.33	1.05	1.08	1.43	0.57	1.38	<0.05	1.48	0.82	DRY
Sulphate	SO_4	mg/L	294	500	0.10	66.3	DRY	47.5	82.2	47.2	84.3	67.5	82.7	105	218	264	287	71.4	74	243	46.8	DRY
Orthophosphate as P	PO_4	mg/L			0.10	<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
Saturation pH	pHs	N/A			N/A	8.6	DRY	8.93	8.88	8.86	8.62	7.49	7.83	7.15	7.43	7.83	8.83	7.08	6.86	7.64	8.73	DRY
p-Alkalinity (as CaCO3)	Alk 8.3	mg/L			5	<5	DRY	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	DRY
t-Alkalinity (as CaCO3)	Alk 4.2	mg/L			10	323	DRY	362	274	312	367	174	186	231	150	164	260	226	1070	108	360	DRY
CALCULATED VALUES																						
Anion Sum	Anion	mg/L			NA	7.3	DRY	8.29	8.62	6.56	8.15	4.21	4.84	5.16	7.15	7.09	10.3	6.53	32.1	6.9	7.71	DRY
Cation Sum	Cation	mg/L			NA	8.68	DRY	7.47	7.83	7.7	9.73	4.87	5.36	7.06	7.51	8.98	10.8	5.88	38.3	8.81	8.62	DRY
% Difference/Ion Balance	CAB	%			NA	8.8	DRY	8.6	9.2	8.8	8.9	8.2	8.1	6.8	2.4	9.8	1.5	4	8.7	2.2	5	DRY
Carbonate (as CaCO3)	CO_3	mg/L			10	<10	DRY	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<5	DRY
Bicarbonate (as CaCO3)	HCO_3	mg/L			10	323	DRY	362	274	312	367	174	183	231	150	164	260	226	1070	108	360	DRY
Langyer Index	L.I.	N/A			N/A	1.34	DRY	1.25	1.34	1.22	1.28	0.71	0.87	1.04	0.75	0.47	1.18	1.08	1.4	0.47	0.84	DRY
Aggressive Index	A.I.	N/A			N/A	13.1	DRY	13.1	13.2	13.2	13.1	12.6	12.9	12.9	12.8	12.4	13.1	12.9	13.3	12.4	12.8	DRY
Ryzner Stability Index	R.S.I.	N/A			N/A	5.56	DRY	5.58	5.52	5.64	5.56	6.76	6.56	6.11	6.84	7.16	6.84	6.03	4.48	7.17	6.78	DRY
METALS																						
Aluminum	Al	mg/L			0.004	0.004	DRY	0.004	<0.004	0.005	0.006	0.004	0.005	0.046	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	0.844	0.005	<0.003	DRY
Boron	B	mg/L	1.38	5	0.010	0.094	DRY	0.095	0.048	0.135	0.38	0.328	0.468	0.468	0.346	0.581	0.201	0.078	0.274	0.461	0.098	DRY
Barium	Ba	mg/L	0.30	1	0.002	0.087	DRY	0.064	0.05	0.094	0.101	0.034	0.037	0.041	0.035	0.026	0.028	0.12	0.368	0.026	0.083	DRY
Calcium	Ca	mg/L			0.05	86.4	DRY	62.8	64.3	62.9	87.3	38.3	34.8	39	42.4	38.4	92.3	81.8	197	37.8	84.8	DRY
Cadmium	Cd	mg/L	0.003	0.005	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
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	0.50	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	0.006	0.671	DRY	0.425	0.881	0.418	0.484	0.2	0.182	0.364	0.384	0.31	0.716	0.492	48.7	0.334	0.266	DRY
Potassium	K	mg/L			0.05	2.2	DRY	1.73	1.63	1.88	4.26	1.11	1.18	1.82	1.48	1.38	2.34	1.83	23.3	1.32	2.16	DRY
Magnesium	Mg	mg/L			0.05	36.1	DRY	40.8	37.4	38.3	40.4	15.9	10.7	30.8	20.8	16.3	50.9	35.5	128	18.8	33.6	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	0.03	0.044	0.028	8.334	0.019	0.046	DRY
Sodium	Na	mg/L	114	200	0.05	22.3	DRY	22.2	11.9	28.7	79.2	31	74.3	83.8	83.6	79.3	40.4	18.7	84	72.6	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	4.43	DRY	5.46	4.33	6.67	4.05	4.86	3.14	4.46	3.58	3.88	4.24	8.58	8.66	3.78	4.52	DRY
Zinc	Zn	mg/L	2.50	5	0.004	0.008	DRY	0.006	0.007	0.008	0.009	0.006	0.007	0.008	0.007	0.004	0.01	0.006	0.007	0.006	0.034	DRY
EXTENDED ANALYSIS																						
Phenol	Phenol	mg/L			0.001	<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	0.006	<0.001	<0.001	DRY

This table is to be reviewed with the comments in Appendix D

Short LD.	Unit	RUC Max (OW4 & OW5)	OW2	OW4	OW5	OW6	OW7S	OW7D	OW8S	OW8D	OW9	OW10S	OW10D	OW11	OW7S-REF
			Down Town 4-Oct-06	Background Town 4-Oct-06	Up Town 4-Oct-06	Leachate Town 4-Oct-06	Down Town 4-Oct-06	Down Town 4-Oct-06	Down Town 4-Oct-06	Down Town 4-Oct-06	Down Town 4-Oct-06	Down Town 4-Oct-06	Down Town 4-Oct-06	Leachate Town 4-Oct-06	Down Town 4-Oct-06
°C	°C		12.9	12.5	12.1	12.1	12	12	12.1	11.8	11.8	11	12.8	10.8	12
pH	N/A		7.73	7.44	7.43	7.43	7.56	8.43	8.36	7.01	7.01	8.17	7.47	8.2	7.56
Th. Cond.	µS/cm		677	535	540	540	781	442	470	613	970	667	679	525	781
pH	N/A		7.36	7.96	8.08	7.94	8.25	8.25	8.16	8.18	8.22	7.96	8.25	8.88	8.24
Cl	mg/L	130	30.3	2.74	10.7	16.8	13.1	4.56	5.66	3.75	1.42	1.23	2.77	127	2.68
Th. Cond.	µS/cm		683	551	570	810	464	491	627	704	979	894	550	2250	648
Hard.(CaCO3)	mg/L		300	329	300	272	126	93	207	182	161	369	189	841	186
DOC	mg/L	3.7	2	1.6	2.8	1.8	0.7	1.1	0.8	1	1.2	1.3	0.8	34.3	0.9
Th. TDS	mg/L	467	370	370	368	470	362	290	364	440	634	864	356	1880	364
$NH_{3\,(free)}$	mg/L		0.0008	<0.0001	<0.0001	0.0033	0.0002	0.0011	0.0037	<0.0001	0.0003	0.0012	0.0024	1.808	0.0044
NH_3-N	mg/L		0.05	0.02	<0.02	0.57	<0.02	<0.02	0.08	<0.02	0.14	0.04	0.36	58.5	0.57
NO_2-N	mg/L	2.84	<0.05	<0.05	0.18	0.42	0.19	0.13	0.09	0.18	<0.05	0.09	0.26	<0.05	0.27
NO_3-N	mg/L	0.31	<0.05	0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
NO_2+NO_3	mg/L	2.84	<0.10	0.12	0.18	0.42	0.19	0.13	<0.10	0.18	<0.10	<0.10	0.26	0.42	0.27
TKN	mg/L		0.26	0.23	0.47	0.7	0.14	<0.10	0.18	0.37	0.3	0.31	0.22	57.2	0.23
Br	mg/L		0.1	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.12	<0.05
F	mg/L	1.66	0.78	0.78	0.89	1.28	1.24	1.48	1.25	1.06	1.36	0.9	1.84	<0.05	1.83
SO_4^{2-}	mg/L	284	34.9	82.8	45.9	59.8	44.4	77.7	98.3	208	240	246	101	4.57	101
PO_4^{3-}	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
pHs	N/A		8.9	8.89	8.89	8.67	7.48	7.88	7.17	7.41	7.62	8.67	7.32	8.93	7.33
Alk 8.3	mg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Alk 4.2	mg/L		266	283	315	368	178	164	236	163	107	269	186	1120	180
Anion	mg/L		6.48	6.46	6.47	7.84	4.26	4.5	6.12	6.96	6.86	8.56	5.3	22	5.22
Cation	mg/L		7.14	7.08	7.12	8.69	4.58	4.81	6.54	6.8	8.37	8.48	4.92	25.6	4.96
CAB	%		4.9	4.4	4.8	5.2	3.8	3.4	3.3	0.4	3.7	0.8	3.8	7.3	2.8
CO_3^{2-}	mg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
HCO_3^-	mg/L		266	283	316	368	177	163	235	163	107	269	186	1120	180
L.I.	N/A		1.06	1.06	1.2	1.07	0.77	0.6	0.89	0.77	0.6	1.09	0.93	0.95	0.91
A.I.	N/A		12.9	12.9	13.1	12.9	12.8	12.4	12.8	13.8	13.6	13	12.8	12.9	12.8
R.S.I.	N/A		5.86	5.83	5.89	5.8	6.71	7.06	6.19	6.84	7.82	5.79	6.39	4.96	6.42
Al	mg/L		0.005	0.006	0.004	0.005	0.006	0.006	0.004	0.006	0.005	0.004	0.007	0.144	0.006
As	mg/L	0.010	<0.003	<0.003	0.006	<0.003	<0.003	<0.003	0.004	<0.003	0.004	<0.003	<0.003	1.36	<0.003
B	mg/L	1.36	0.079	0.081	0.158	0.336	0.284	0.462	0.459	0.461	0.588	0.484	0.184	0.503	0.173
Ba	mg/L	0.30	0.07	0.071	0.068	0.084	0.036	0.038	0.043	0.027	0.023	0.03	0.068	0.21	0.066
Ca	mg/L		84.8	77.6	81.3	80.3	36.2	21.8	36.2	40.3	35.4	82.8	41.7	147	41.5
Cd	mg/L	0.003	<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
Cr	mg/L	0.01	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.012	<0.003
Cu	mg/L	0.50	0.02	<0.003	<0.003	0.009	0.008	0.01	<0.003	0.014	0.011	0.008	0.004	<0.003	<0.003
Fe	mg/L	0.40	0.144	0.202	0.144	0.183	0.066	0.043	0.079	0.089	0.079	0.184	0.097	64.8	0.134
K	mg/L		1.58	1.41	1.8	3.92	1.11	1.09	1.04	1.52	1.35	2.32	1.28	21.8	1.26
Mg	mg/L		35	32.7	36.8	36.8	14.8	8.47	28.2	18.6	17.8	44.5	20.8	116	20.7
Mn	mg/L	0.04	0.017	0.036	0.027	0.035	0.003	<0.002	0.016	<0.002	0.014	0.078	0.036	0.479	0.026
Na	mg/L	114	22.9	10.8	25.2	71.7	47	87.3	84.8	74.2	71.7	38	25.2	90	35.8
Pb	mg/L	0.004	<0.002	<0.002	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Se	mg/L	0.008	<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
Sr	mg/L		4.86	4.58	5.18	3.98	3.22	2.81	4.01	3	3.3	4.32	4.75	5.84	4.82
Zn	mg/L	2.50	0.009	0.01	0.007	0.007	0.006	0.006	0.006	0.006	0.008	<0.004	0.008	0.027	0.006
Phenol	mg/L		<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.016	<0.001

This table is to be reviewed with the comments in Appendix D

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	7.0	8.0	163.0	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	3.0	9.0	117.0	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	4.0	148.0	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

	Conductivity (uS/cm)														
Date	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										555	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	962	448	550	606	736	653				437	348
May-03	929	759	700	679	1000	464	568	662	799	721				500	506
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	667	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

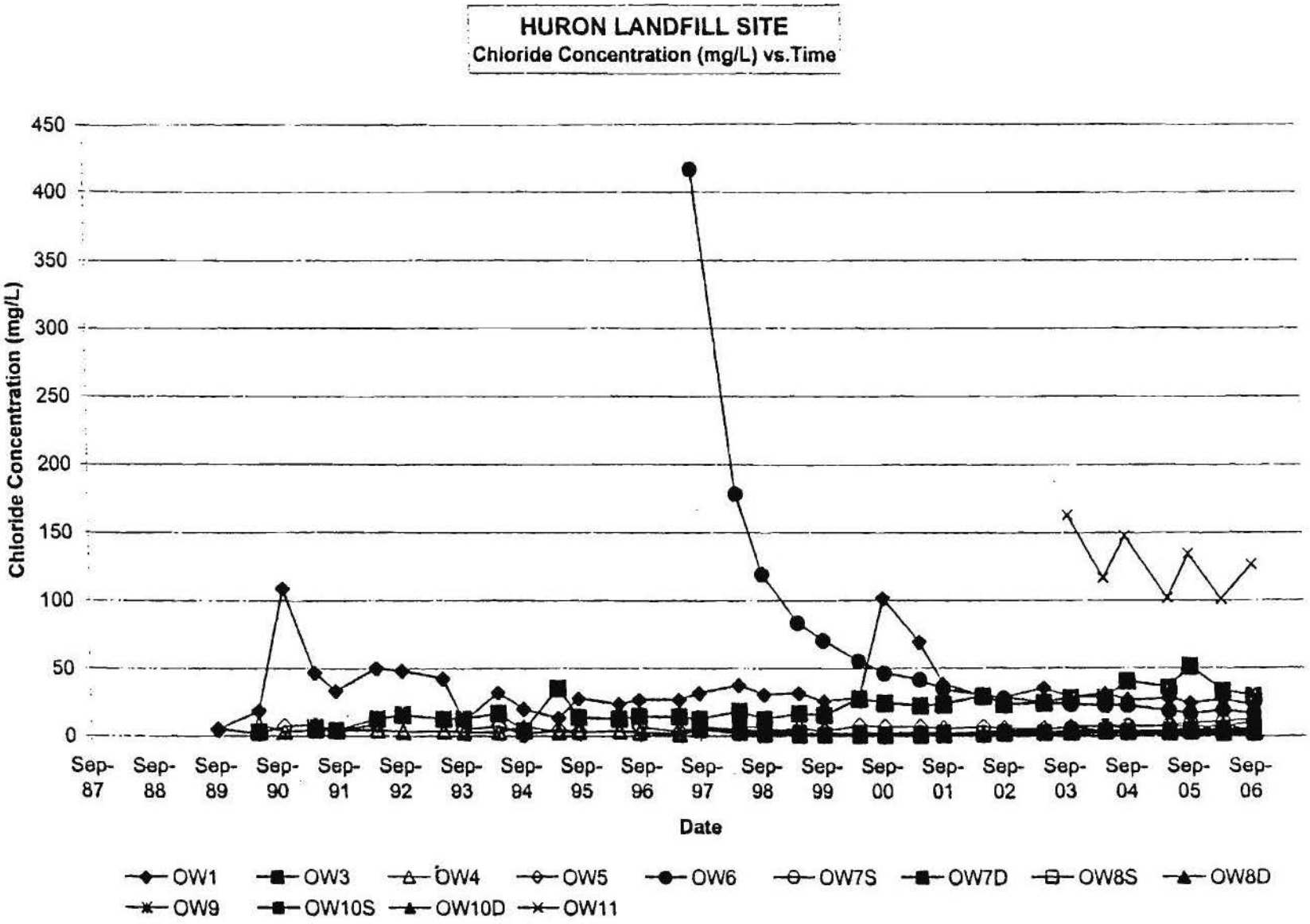
Hardness (mg/L)															
Date	OW1	OW3	OW4	OW5	OW6	OW7S	OW7D	OW8S	OW8D	OW9	OW10S	OW10D	OW11	SW1	SW2
Oct-89	305			231											
Jun-90	422	234	335	163										249	426
Nov-90	569		328	321										242	229
May-91	491	326	347	295										288	295
Sep-91	447	265	307	224										260	258
May-92	513	399	379	318										217	197
Oct-92	580	408	382											257	258
Jun-93	555	366	372											314	306
Oct-93	534	591	357	317										257	257
May-94	548	545	366	266										297	304
Oct-94	529	521	391	293										259	266
May-95	427	617	369	252										256	300
Sep-95	521	405	363	252										272	283
May-96	494	377	339											233	226
Sep-96	446	366	347	294										241	237
May-97	496	469	305	273										302	292
Sep-97	433	311	456	328	1800	135		260		225				269	275
May-98	559	558	387	278	628	121	263	221	296	188				262	193
Oct-98	498	376	357	287	589	126	194	223	242	172				262	242
May-99	529	536	386	320	457	129	149	235	231	184				205	169
Oct-99	471	426	375	295	510	153		246		193				239	249
May-00	390	422	356	384	453	147	149	242	246	203				249	247
Oct-00	602	441	385	359	405	140	132	228	232	178				346	356
May-01	602	474	403	391	891	160	151	230	244	184				329	317
Sep-01	525	375	367	347	442	137	126	217	250	184				267	274
May-02	402	467	374	367	352	134		207	210	179				209	251
Sep-02	404	384	352	312	450	151	122	233	224	186				221	200
May-03	488	409	361	337	368	139	119	233	219	189				263	264
Oct-03	416	348	337	315	338	137	117	222	209	184	513	277	881	331	338
May-04	429	359	345	314	330	136	112	224	211	191	513	284	1040	285	265
Sep-04	416	363	332	306	309	126	100	211	189	171	466	213	808	236	241
May-05	470	350	380	330	320	150	120	240	200	190	460	240	1000	260	260
Sep-05	390	390	340	310	300	130	110	240	190	180	420	240	950	200	150
Apr-06	383	324	365	319	309	136	105	223	192	175	440	259	1020	246	255
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

	D.O.C. (mg/L)													
Date	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 January 1991.
** Fall 2005 concentrations for SW1 and SW2 are reported as Total Organic Carbon (TOC).



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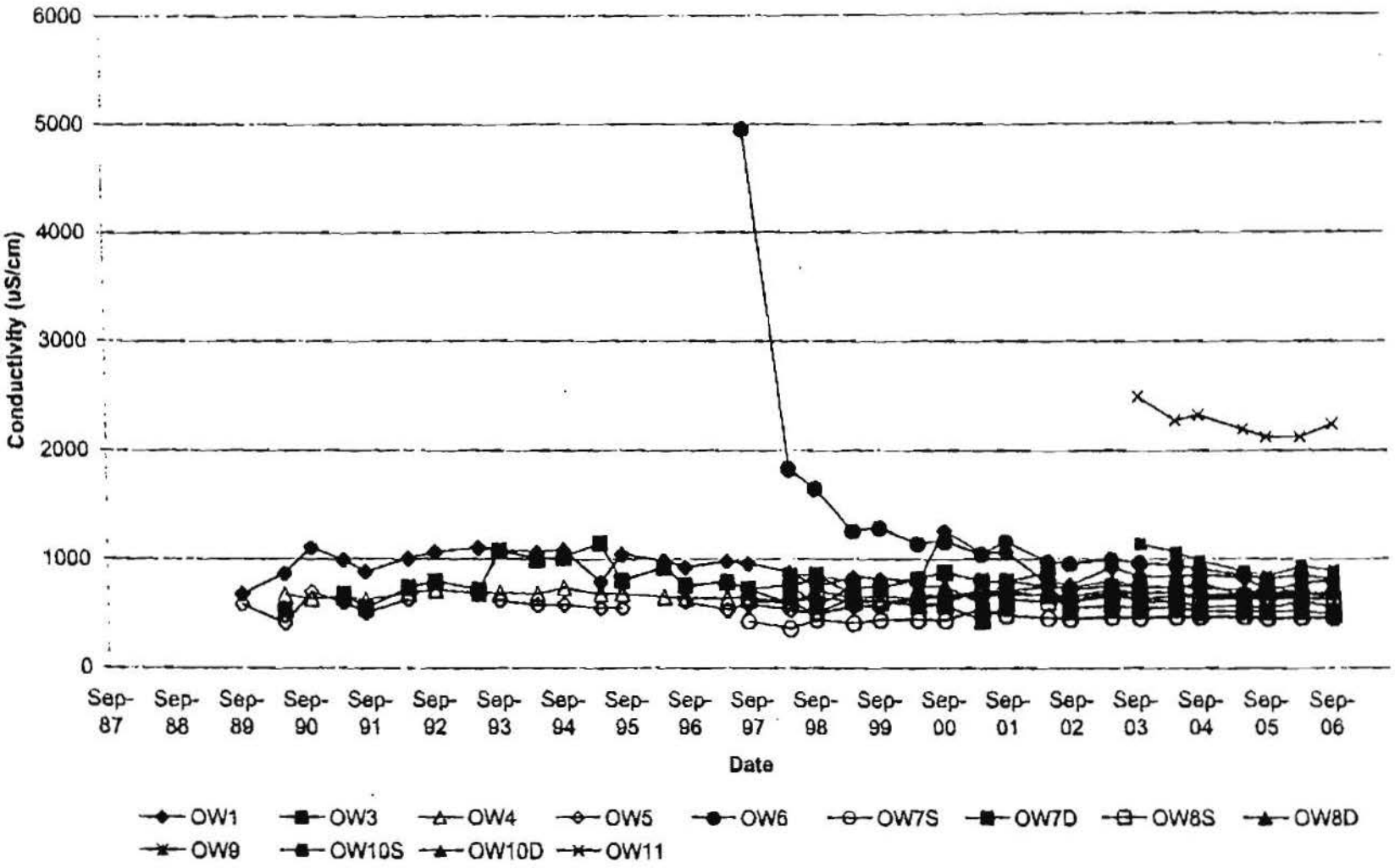
HURON LANDFILL SITE
Conductivity (uS/cm) vs. Time



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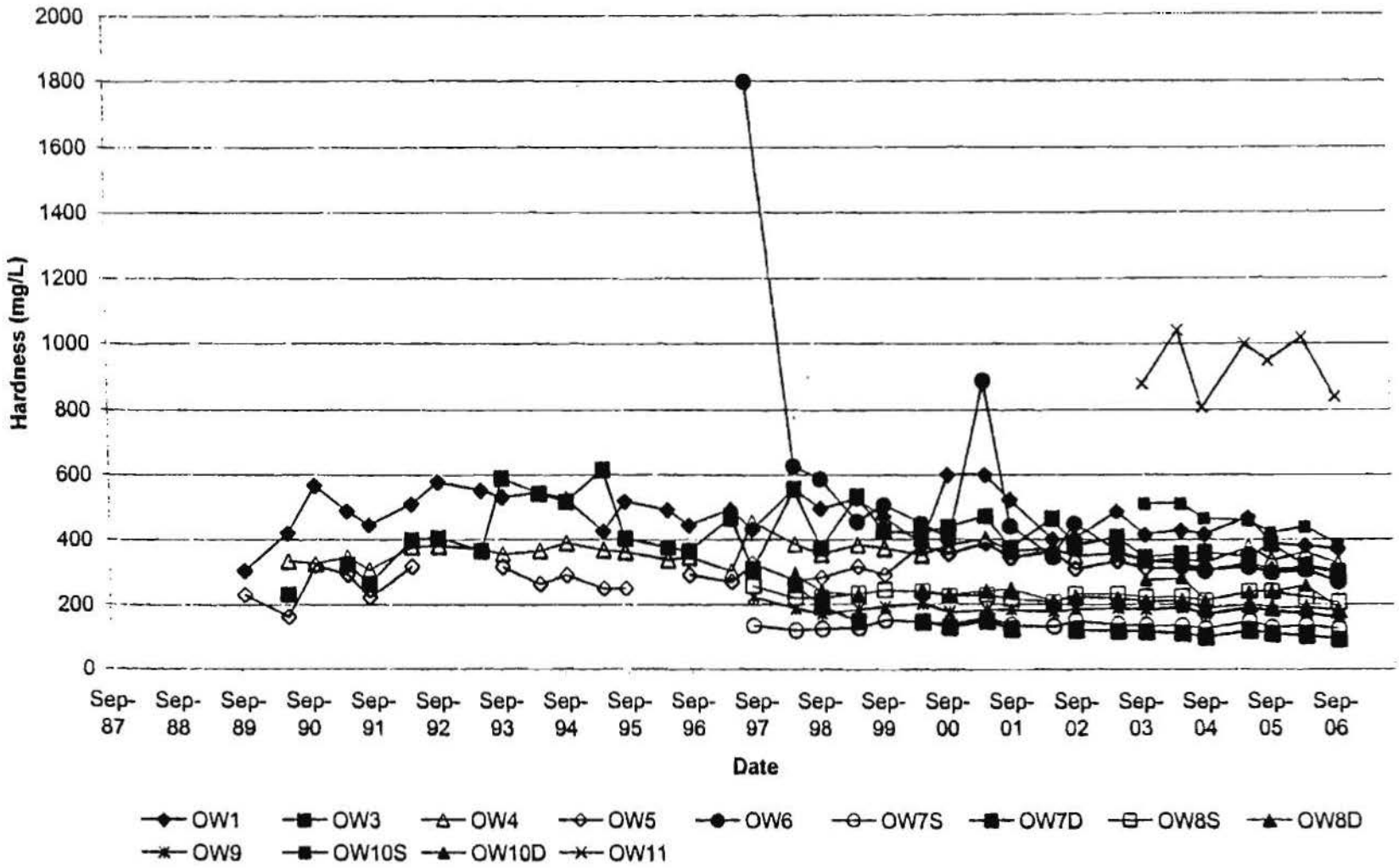
Project File: LNE08507

HURON LANDFILL SITE
Hardness (mg/L) vs. Time



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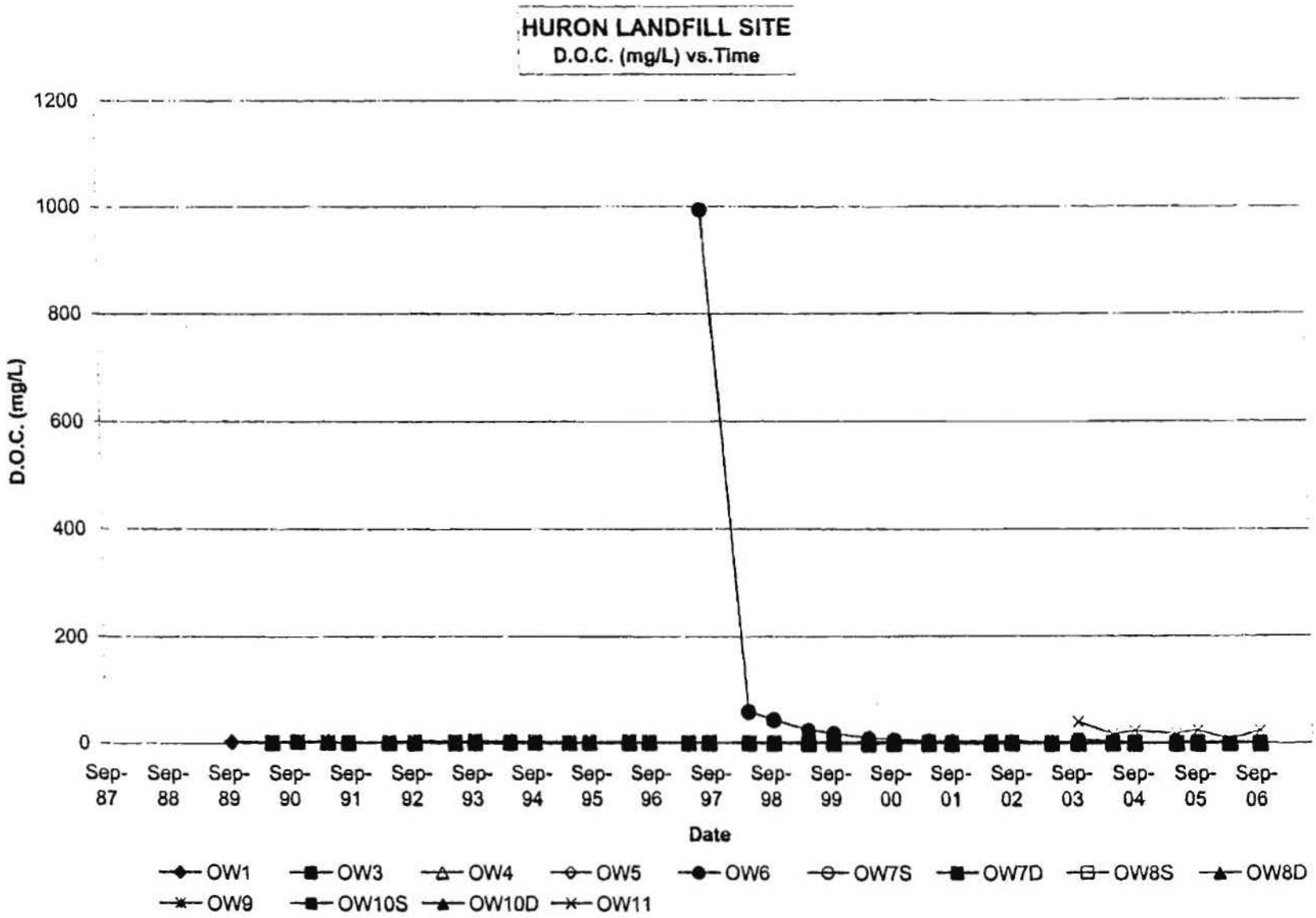

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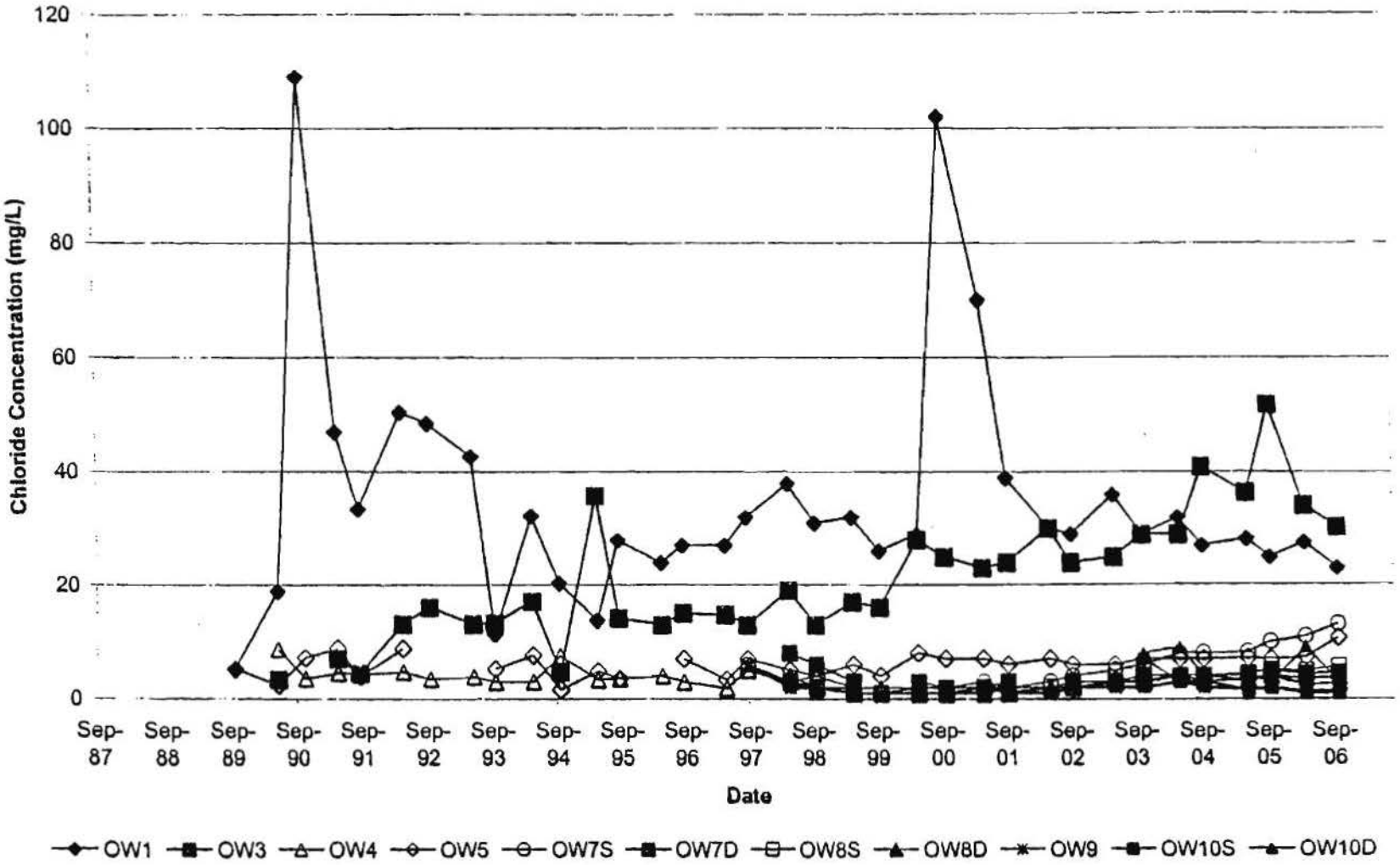
HURON LANDFILL SITE
Chloride Concentration (mg/L) vs.Time



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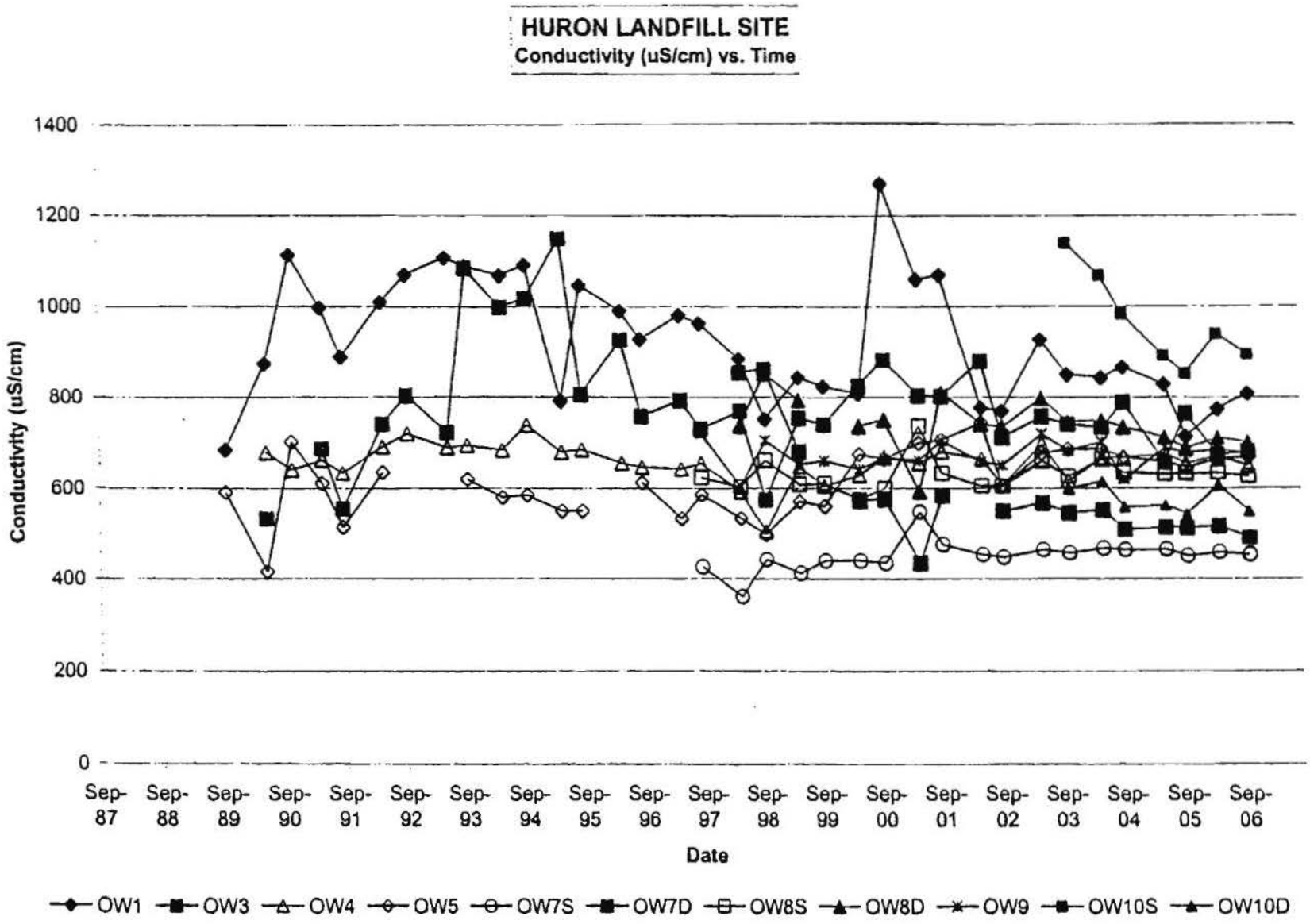

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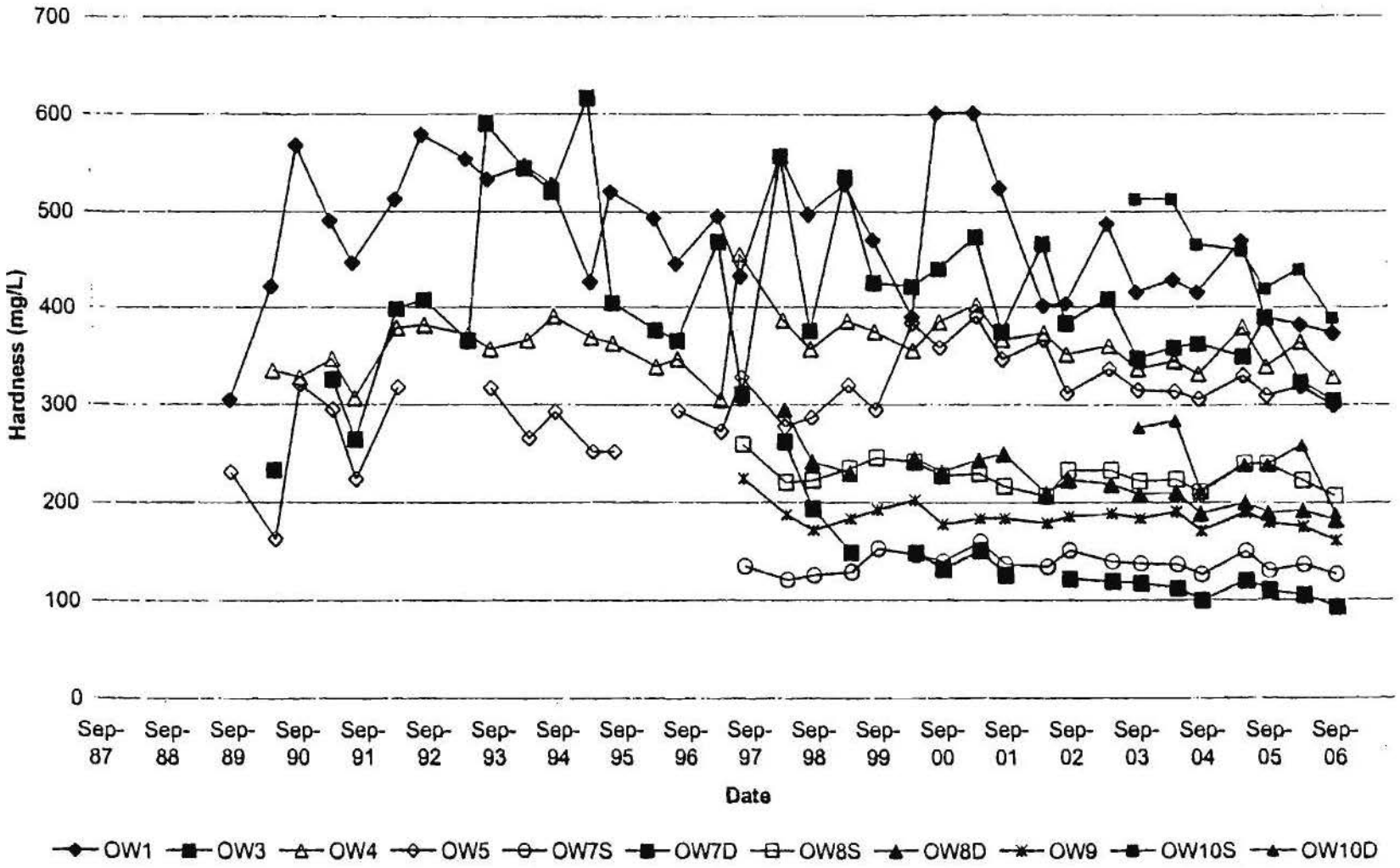
HURON LANDFILL SITE
Hardness (mg/L) vs. Time



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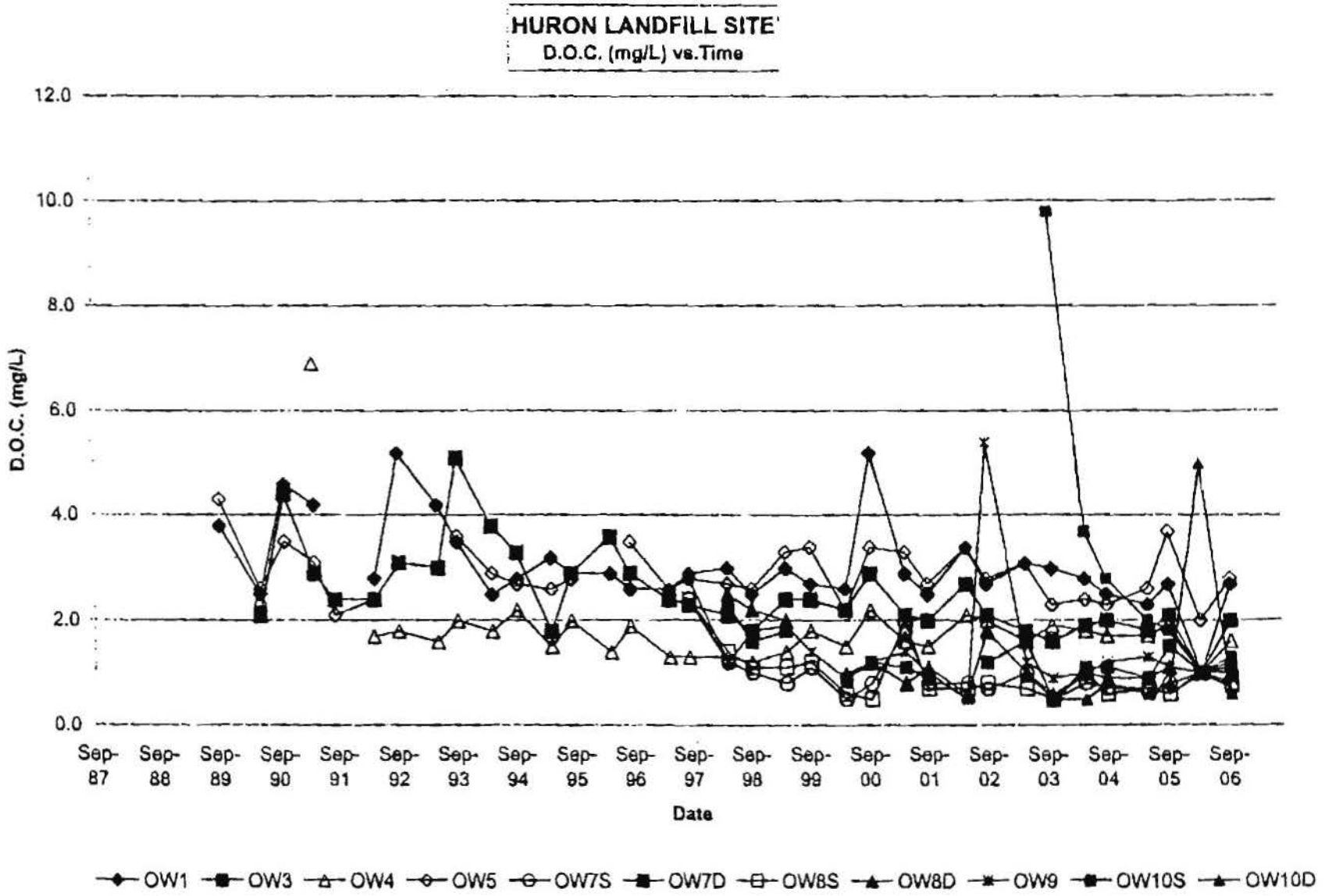

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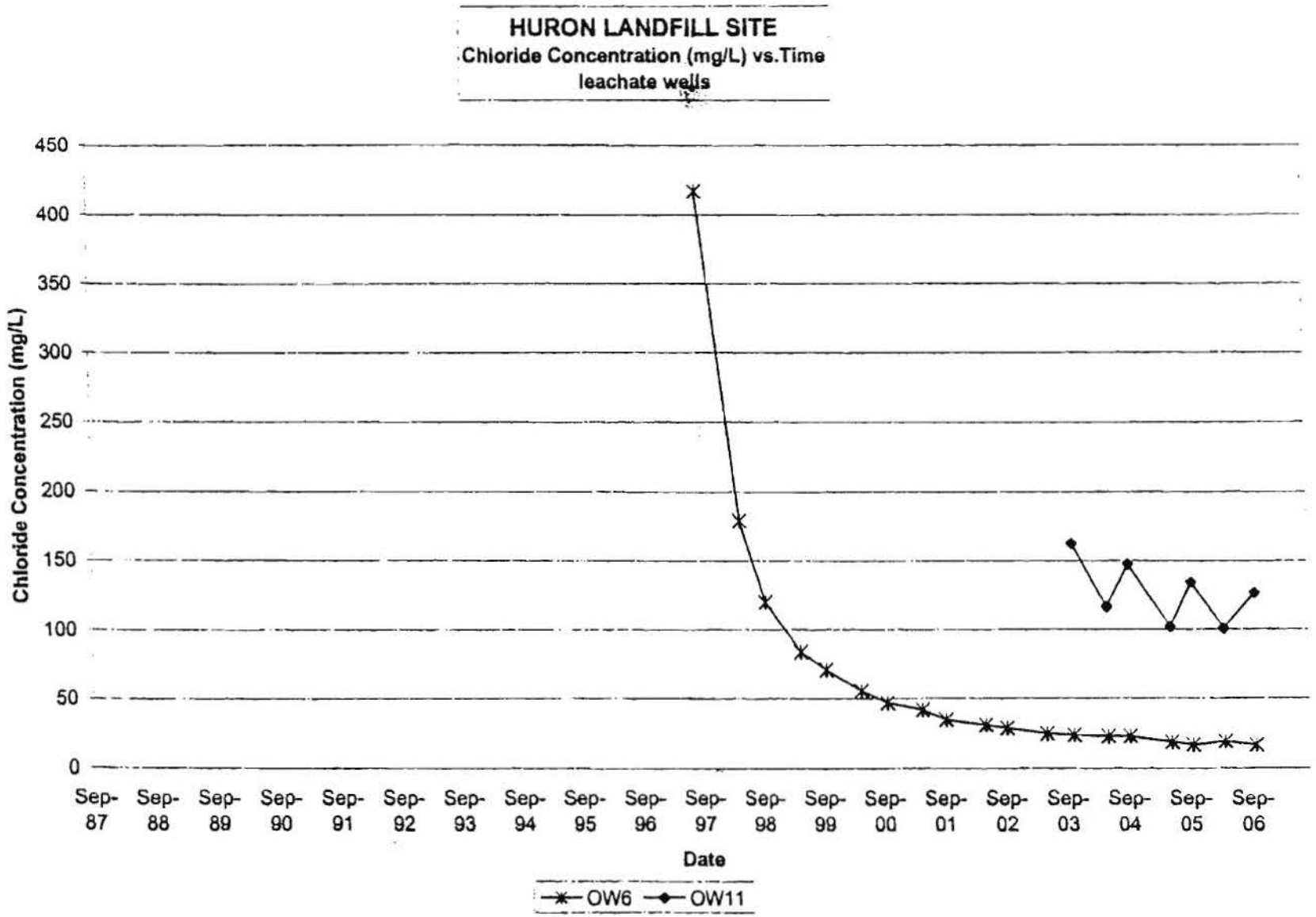

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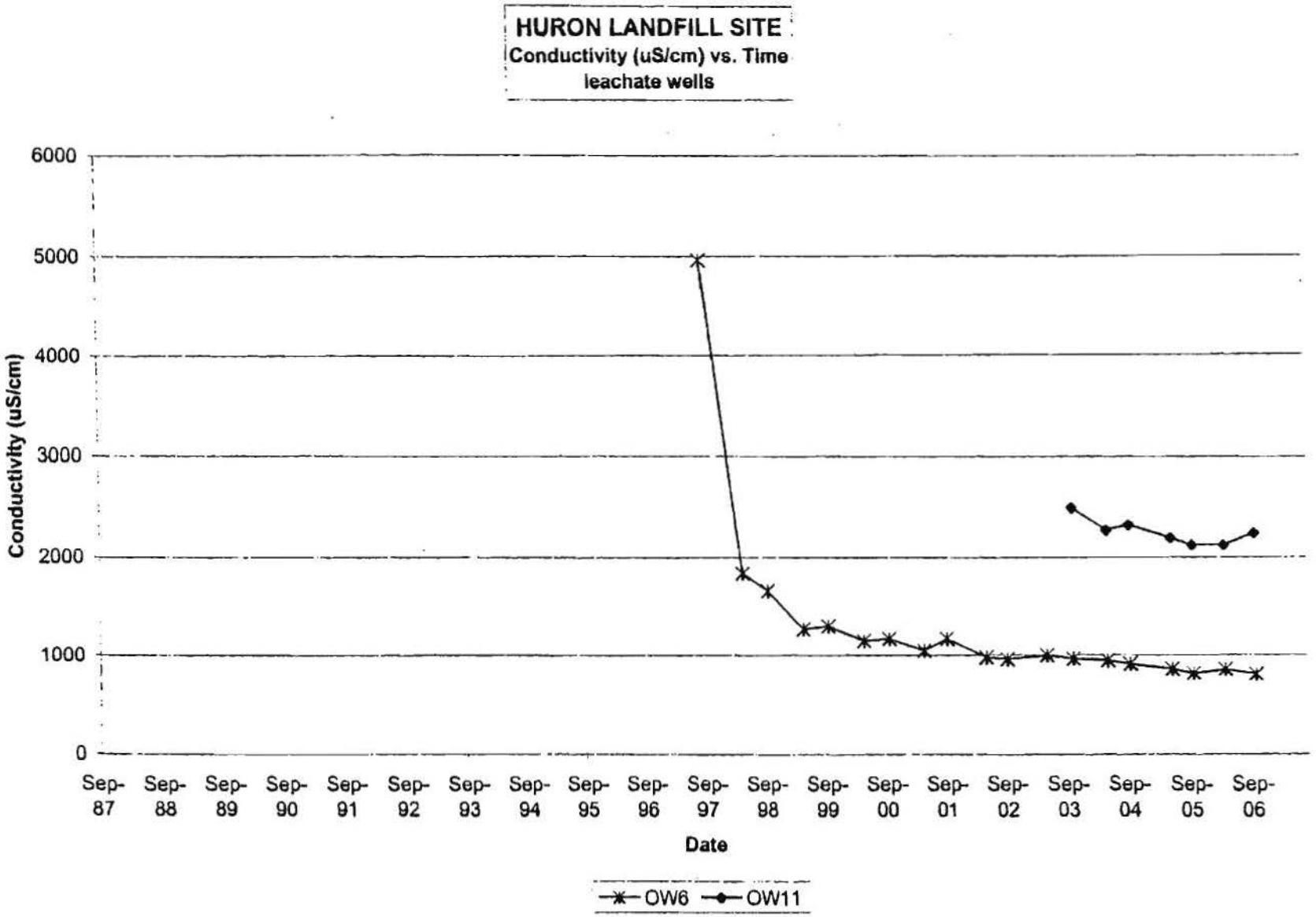

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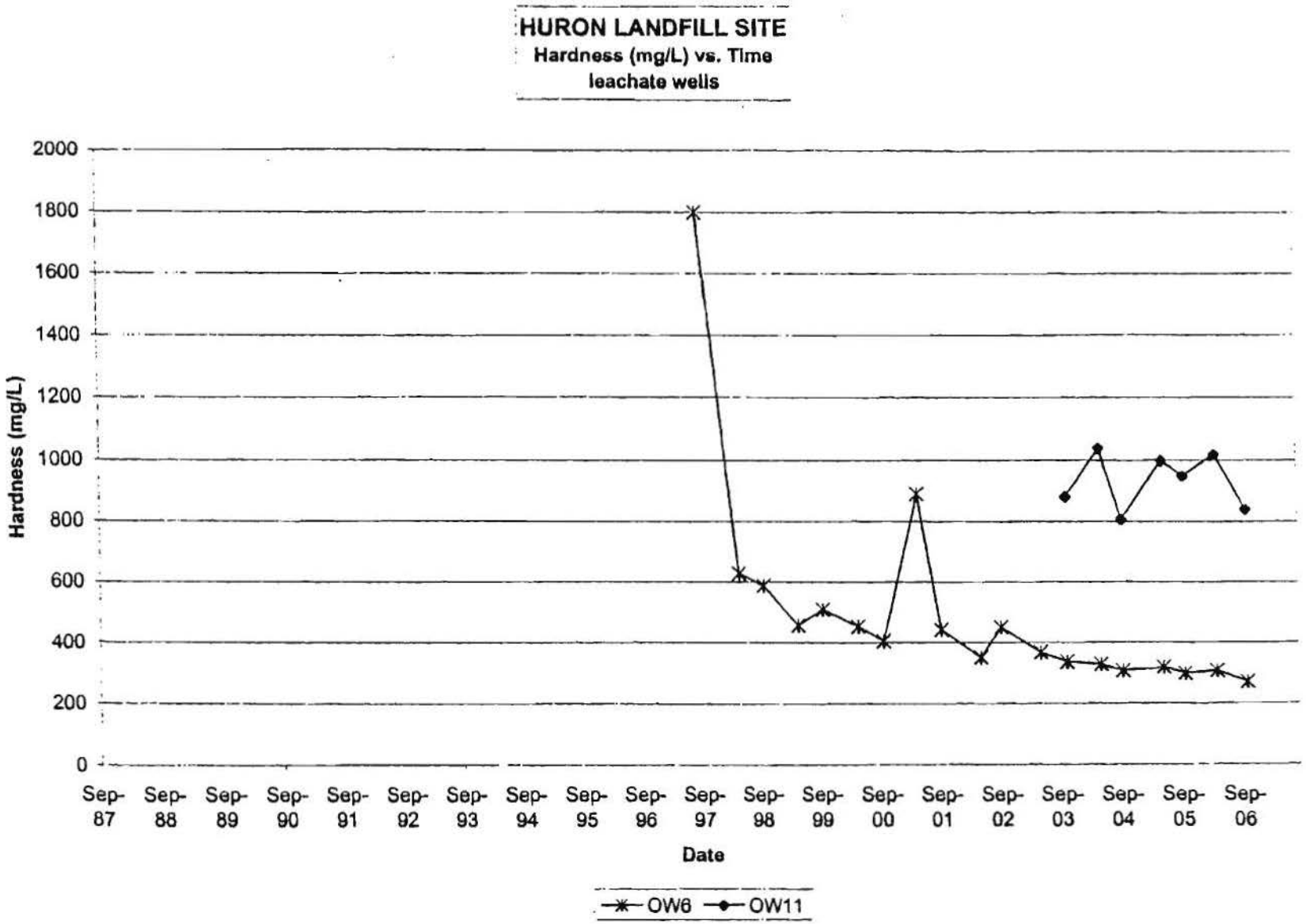

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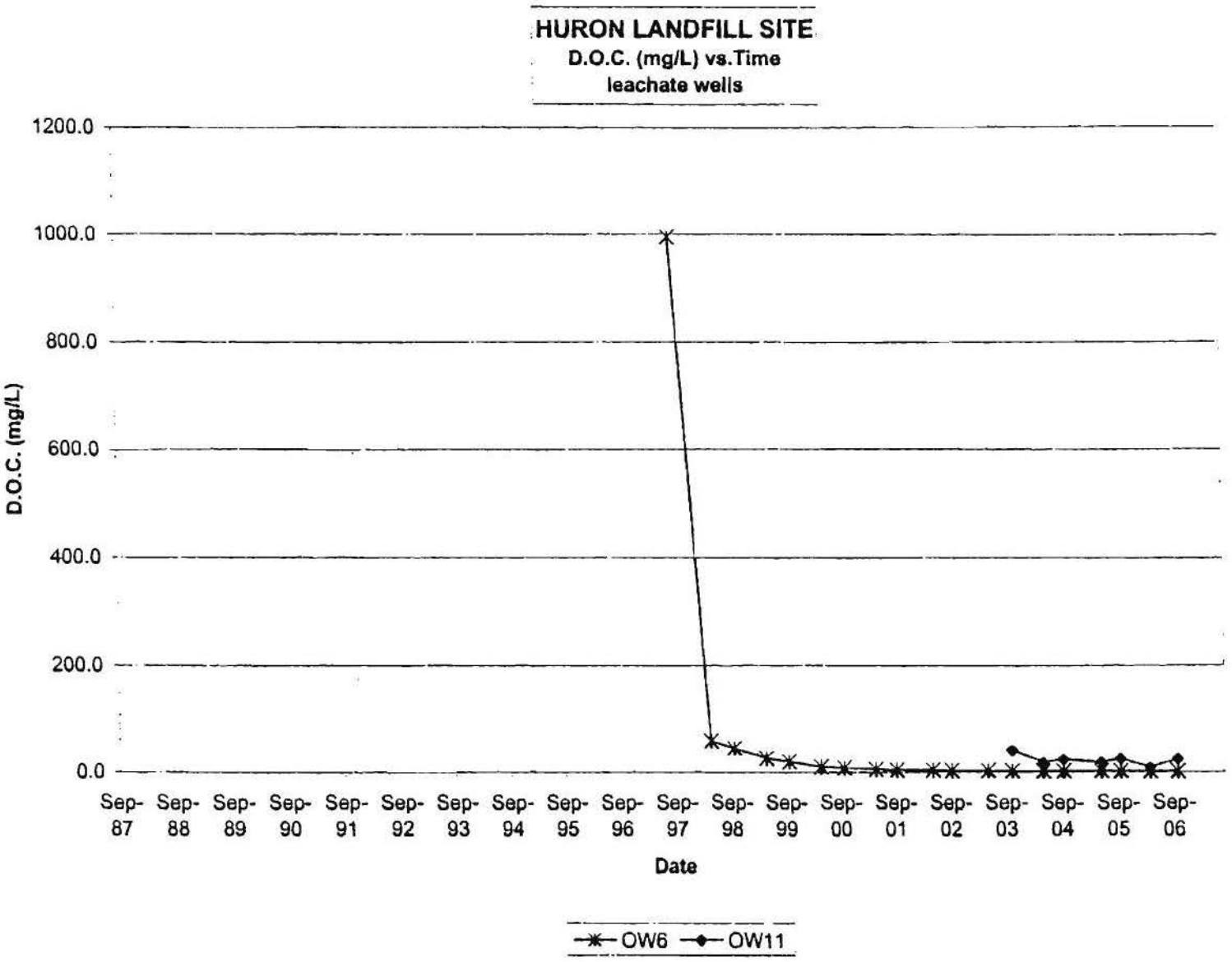

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TABLE E-2
GROUNDWATER CHEMICAL DATA (2007-Present)
HURON LANDFILL SITE

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 (MAC) 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

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6. OG indicates an operational guideline ODWQS, not health related.
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TABLE E-2
GROUNDWATER CHEMICAL DATA (2007-Present)
HURON LANDFILL SITE

Chemical Parameter	ODWQS	OW1 Jul-20	OW1 Nov-20
Alkalinity(as CaCO3)	30 - 500 [OG]	383	373
Chloride	250 [AO]	58.7	72.3
Nitrate(as N)	10 (MAC) d	0.19	0.22
Nitrite(as N)	1 (MAC) d	<0.05	<0.05
Ammonia(as N)		0.15	0.04
Total Kjeldahl Nitrogen(as N)		0.5	1.0
Phenols		<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	5.0	4.9
Conductivity (us/cm)		1020	1090
pH		7.82	7.77
Sulphate (as SO4)	250 (AO)	105	96
Hardness(as CaCO3)	80-100 [OG]	474	508
Aluminum	0.1 [OG]	0.04	0.06
Arsenic	0.010 (IMAC)	0.0011	0.0008
Barium	1 [MAC]	0.102	0.106
Boron	5 [IMAC]	0.407	0.442
Cadmium	0.005 (MAC)	0.000030	0.000040
Calcium	-	101	113
Chromium	0.05 (MAC)	<0.002	<0.002
Copper	1 [AO]	<0.002	0.0023
Iron	0.3 [AO]	0.041	0.011
Lead	0.01 (MAC)c	0.00005	0.00008
Magnesium	-	53.8	54.9
Manganese	0.05 [AO]	0.040	0.004
Potassium	-	3.0	3.0
Sodium	200 [AO]	50.1	51.3
Zinc	5 [AO]	0.013	0.011

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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
Alkalinity(as CaCO3)	30 - 500 [OG]	359	359
Chloride	250 [AO]	103	102
Nitrate(as N)	10 (MAC) d	0.42	0.20
Nitrite(as N)	1 (MAC) d	<0.05	<0.05
Ammonia(as N)		0.08	0.04
Total Kjeldahl Nitrogen(as N)		0.5	0.5
Phenols		<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	2.6	3.1
Conductivity (us/cm)		992	1040
pH		7.84	7.64
Sulphate (as SO4)	250 (AO)	18	18
Hardness(as CaCO3)	80-100 [OG]	373	407
Aluminum	0.1 [OG]	0.05	0.05
Arsenic	0.010 (IMAC)	0.0016	0.0016
Barium	1 [MAC]	0.096	0.090
Boron	5 [IMAC]	0.121	0.113
Cadmium	0.005 (MAC)	<0.000015	<0.000028
Calcium	-	74.2	87.0
Chromium	0.05 (MAC)	<0.002	<0.002
Copper	1 [AO]	<0.002	0.0092
Iron	0.3 [AO]	0.023	0.014
Lead	0.01 (MAC)c	0.00007	0.00012
Magnesium	-	45.7	46.2
Manganese	0.05 [AO]	0.002	0.018
Potassium	-	1.9	2.0
Sodium	200 [AO]	40.2	35.6
Zinc	5 [AO]	<0.005	<0.005

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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
Alkalinity(as CaCO3)	30 - 500 [OG]	294	296
Chloride	250 [AO]	12.4	15.9
Nitrate(as N)	10 (MAC) d	0.16	0.08
Nitrite(as N)	1 (MAC) d	<0.05	<0.05
Ammonia(as N)		0.06	0.03
Total Kjeldahl Nitrogen(as N)		0.2	0.2
Phenols		<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	4.2	3.0
Conductivity (us/cm)		769	845
pH		7.88	7.71
Sulphate (as SO4)	250 (AO)	124	130
Hardness(as CaCO3)	80-100 [OG]	417	441
Aluminum	0.1 [OG]	0.04	0.06
Arsenic	0.010 (IMAC)	0.0005	0.0006
Barium	1 [MAC]	0.085	0.086
Boron	5 [IMAC]	0.046	0.055
Cadmium	0.005 (MAC)	0.000074	0.000041
Calcium	-	92.6	101
Chromium	0.05 (MAC)	<0.002	<0.002
Copper	1 [AO]	<0.002	0.0033
Iron	0.3 [AO]	<0.005	0.005
Lead	0.01 (MAC)c	0.00006	0.00006
Magnesium	-	45.2	45.9
Manganese	0.05 [AO]	<0.001	0.006
Potassium	-	1.7	1.7
Sodium	200 [AO]	18.0	19.0
Zinc	5 [AO]	0.006	0.006

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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 (MAC) 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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GROUNDWATER CHEMICAL DATA (2007-Present)
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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HURON LANDFILL SITE

Chemical Parameter	ODWQS	OW5 Jul-20	OW5 Nov-20
Alkalinity(as CaCO3)	30 - 500 [OG]	320	298
Chloride	250 [AO]	59.4	60.8
Nitrate(as N)	10 (MAC) d	0.16	0.09
Nitrite(as N)	1 (MAC) d	<0.05	<0.05
Ammonia(as N)		0.05	0.05
Total Kjeldahl Nitrogen(as N)		0.2	0.2
Phenols		<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	3.8	2.5
Conductivity (us/cm)		839	858
pH		8.08	7.95
Sulphate (as SO4)	250 (AO)	57	55
Hardness(as CaCO3)	80-100 [OG]	413	409
Aluminum	0.1 [OG]	0.04	0.05
Arsenic	0.010 (IMAC)	0.0018	0.0020
Barium	1 [MAC]	0.102	0.099
Boron	5 [IMAC]	0.104	0.109
Cadmium	0.005 (MAC)	0.000021	0.000030
Calcium	-	85.8	87.7
Chromium	0.05 (MAC)	<0.002	<0.002
Copper	1 [AO]	<0.002	0.0064
Iron	0.3 [AO]	<0.005	0.007
Lead	0.01 (MAC)c	0.00003	0.00005
Magnesium	-	48.3	46.2
Manganese	0.05 [AO]	<0.001	0.006
Potassium	-	1.7	1.5
Sodium	200 [AO]	33.9	33.5
Zinc	5 [AO]	<0.005	<0.005

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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 (MAC) 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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TABLE E-2
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
Alkalinity(as CaCO3)	30 - 500 [OG]	1410	1430
Chloride	250 [AO]	458	520
Nitrate(as N)	10 (MAC) d	0.70	<0.5
Nitrite(as N)	1 (MAC) d	<0.5	<0.5
Ammonia(as N)		25.2	27.9
Total Kjeldahl Nitrogen(as N)		47.0	52.7
Phenols		<0.002	0.004
Dissolved Organic Carbon(DOC)	5 [AO]	107	82.4
Conductivity (us/cm)		3610	3960
pH		7.39	7.25
Sulphate (as SO4)	250 (AO)	<10	<10
Hardness(as CaCO3)	80-100 [OG]	1170	1250
Aluminum	0.1 [OG]	0.07	0.08
Arsenic	0.010 (IMAC)	0.0072	0.0049
Barium	1 [MAC]	0.746	0.769
Boron	5 [IMAC]	0.607	0.637
Cadmium	0.005 (MAC)	<0.000070	<0.000070
Calcium	-	152	165
Chromium	0.05 (MAC)	0.003	0.004
Copper	1 [AO]	<0.002	0.0019
Iron	0.3 [AO]	3.02	3.08
Lead	0.01 (MAC)c	0.00020	0.00017
Magnesium	-	191	203
Manganese	0.05 [AO]	0.028	0.024
Potassium	-	21.5	25.8
Sodium	200 [AO]	414	445
Zinc	5 [AO]	<0.005	0.005

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TABLE E-2
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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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

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TABLE E-2
GROUNDWATER CHEMICAL DATA (2007-Present)
HURON LANDFILL SITE

Chemical Parameter	ODWQS	OW7S Jul-20	OW7S Nov-20
Alkalinity(as CaCO3)	30 - 500 [OG]	168	155
Chloride	250 [AO]	27.8	29.2
Nitrate(as N)	10 (MAC) d	0.13	<0.05
Nitrite(as N)	1 (MAC) d	<0.05	<0.05
Ammonia(as N)		0.02	0.01
Total Kjeldahl Nitrogen(as N)		<0.1	<0.1
Phenols		<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	3.6	2.5
Conductivity (us/cm)		507	512
pH		8.01	8.03
Sulphate (as SO4)	250 (AO)	50	51
Hardness(as CaCO3)	80-100 [OG]	145	146
Aluminum	0.1 [OG]	0.02	0.01
Arsenic	0.010 (IMAC)	0.0006	0.0008
Barium	1 [MAC]	0.040	0.036
Boron	5 [IMAC]	0.292	0.298
Cadmium	0.005 (MAC)	0.000036	0.000052
Calcium	-	28.9	29.6
Chromium	0.05 (MAC)	<0.002	<0.002
Copper	1 [AO]	<0.002	0.0031
Iron	0.3 [AO]	<0.005	0.011
Lead	0.01 (MAC)c	0.00006	0.00006
Magnesium	-	17.7	17.4
Manganese	0.05 [AO]	<0.001	<0.001
Potassium	-	1.1	1.0
Sodium	200 [AO]	57.7	56.2
Zinc	5 [AO]	<0.005	<0.005

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TABLE E-2
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 (MAC) 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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TABLE E-2
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 (MAC) 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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GROUNDWATER CHEMICAL DATA (2007-Present)
HURON LANDFILL SITE

Chemical Parameter	ODWQS	OW7D Jul-20	OW7D Nov-20
Alkalinity(as CaCO3)	30 - 500 [OG]	165	151
Chloride	250 [AO]	10.9	10.2
Nitrate(as N)	10 (MAC) d	0.34	0.31
Nitrite(as N)	1 (MAC) d	<0.05	<0.05
Ammonia(as N)		0.01	0.03
Total Kjeldahl Nitrogen(as N)		0.1	0.1
Phenols		<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	2.3	3.4
Conductivity (us/cm)		465	473
pH		8.08	8.09
Sulphate (as SO4)	250 (AO)	60	61
Hardness(as CaCO3)	80-100 [OG]	89	91
Aluminum	0.1 [OG]	<0.01	0.02
Arsenic	0.010 (IMAC)	0.0004	0.0004
Barium	1 [MAC]	0.042	0.039
Boron	5 [IMAC]	0.448	0.468
Cadmium	0.005 (MAC)	0.000108	0.000117
Calcium	-	20.1	21.2
Chromium	0.05 (MAC)	<0.002	<0.002
Copper	1 [AO]	<0.002	0.0006
Iron	0.3 [AO]	<0.005	0.006
Lead	0.01 (MAC)c	0.00007	0.00002
Magnesium	-	9.5	9.36
Manganese	0.05 [AO]	<0.001	<0.001
Potassium	-	1.0	0.9
Sodium	200 [AO]	73.6	70.8
Zinc	5 [AO]	<0.005	<0.005

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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

NOTES:
1. All results expresses in mg/L unless otherwise noted.
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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.
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TABLE E-2
GROUNDWATER CHEMICAL DATA (2007-Present)
HURON LANDFILL SITE

Chemical Parameter	ODWQS	OW8S Jul-20	OW8S Nov-20
Alkalinity(as CaCO3)	30 - 500 [OG]	216	199
Chloride	250 [AO]	47.5	49.7
Nitrate(as N)	10 (MAC) d	0.10	<0.05
Nitrite(as N)	1 (MAC) d	<0.05	<0.05
Ammonia(as N)		0.03	0.02
Total Kjeldahl Nitrogen(as N)		0.1	0.1
Phenols		<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	1.2	0.7
Conductivity (us/cm)		726	737
pH		8.07	8.06
Sulphate (as SO4)	250 (AO)	98	99
Hardness(as CaCO3)	80-100 [OG]	252	258
Aluminum	0.1 [OG]	0.02	0.03
Arsenic	0.010 (IMAC)	0.0007	0.0010
Barium	1 [MAC]	0.053	0.053
Boron	5 [IMAC]	0.401	0.429
Cadmium	0.005 (MAC)	0.000030	0.000023
Calcium	-	41.8	44.7
Chromium	0.05 (MAC)	<0.002	<0.002
Copper	1 [AO]	<0.002	0.0021
Iron	0.3 [AO]	0.005	0.006
Lead	0.01 (MAC)c	0.00004	0.00008
Magnesium	-	35.8	35.5
Manganese	0.05 [AO]	<0.001	0.001
Potassium	-	1.6	1.5
Sodium	200 [AO]	66.8	65.2
Zinc	5 [AO]	<0.005	<0.005

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TABLE E-2
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 (MAC) 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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TABLE E-2
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 (MAC) 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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GROUNDWATER CHEMICAL DATA (2007-Present)
HURON LANDFILL SITE

Chemical Parameter	ODWQS	OW8D Jul-20	OW8D Nov-20
Alkalinity(as CaCO3)	30 - 500 [OG]	152	140
Chloride	250 [AO]	8.6	7.9
Nitrate(as N)	10 (MAC) d	0.28	0.24
Nitrite(as N)	1 (MAC) d	<0.05	<0.05
Ammonia(as N)		0.01	0.01
Total Kjeldahl Nitrogen(as N)		0.1	0.1
Phenols		<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	4	0.9
Conductivity (us/cm)		700	703
pH		8.09	8.07
Sulphate (as SO4)	250 (AO)	194	192
Hardness(as CaCO3)	80-100 [OG]	187	187
Aluminum	0.1 [OG]	0.02	0.02
Arsenic	0.010 (IMAC)	0.0002	0.0003
Barium	1 [MAC]	0.030	0.028
Boron	5 [IMAC]	0.515	0.522
Cadmium	0.005 (MAC)	0.000136	0.00010
Calcium	-	39.7	41.1
Chromium	0.05 (MAC)	<0.002	<0.002
Copper	1 [AO]	<0.002	0.0025
Iron	0.3 [AO]	<0.005	0.008
Lead	0.01 (MAC)c	<0.00002	0.00005
Magnesium	-	21.3	20.6
Manganese	0.05 [AO]	0.002	<0.001
Potassium	-	1.5	1.3
Sodium	200 [AO]	85.2	82.3
Zinc	5 [AO]	<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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TABLE E-2
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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TABLE E-2
GROUNDWATER CHEMICAL DATA (2007-Present)
HURON LANDFILL SITE

Chemical Parameter	ODWQS	OW9 Jul-20	OW9 Nov-20
Alkalinity(as CaCO3)	30 - 500 [OG]	101	90
Chloride	250 [AO]	2.2	2.4
Nitrate(as N)	10 (MAC) d	0.27	0.09
Nitrite(as N)	1 (MAC) d	<0.05	0.07
Ammonia(as N)		0.10	0.05
Total Kjeldahl Nitrogen(as N)		0.3	0.2
Phenols		<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	1.7	1.1
Conductivity (us/cm)		674	677
pH		8.05	8.05
Sulphate (as SO4)	250 (AO)	234	228
Hardness(as CaCO3)	80-100 [OG]	174	171
Aluminum	0.1 [OG]	0.01	0.02
Arsenic	0.010 (IMAC)	0.0037	0.0046
Barium	1 [MAC]	0.025	0.022
Boron	5 [IMAC]	0.486	0.486
Cadmium	0.005 (MAC)	0.000063	0.000080
Calcium	-	37.2	37.1
Chromium	0.05 (MAC)	<0.002	<0.002
Copper	1 [AO]	<0.002	0.0008
Iron	0.3 [AO]	<0.005	0.010
Lead	0.01 (MAC)c	<0.00002	0.00003
Magnesium	-	19.8	19.0
Manganese	0.05 [AO]	0.014	0.012
Potassium	-	1.3	1.1
Sodium	200 [AO]	78.2	74.7
Zinc	5 [AO]	<0.005	<0.005

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TABLE E-2
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 (MAC) 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
Alkalinity(as CaCO3)	30 - 500 [OG]	238	245	237
Chloride	250 [AO]	<0.5	1.2	1.8
Nitrate(as N)	10 (MAC) d	0.11	0.30	0.26
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05
Ammonia(as N)		0.01	0.07	0.02
Total Kjeldahl Nitrogen(as N)		0.1	<0.1	<0.1
Phenols		<0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	3.2	1.3	1.6
Conductivity (us/cm)		821	785	824
pH		8.01	8.01	7.93
Sulphate (as SO4)	250 (AO)	195	192	197
Hardness(as CaCO3)	80-100 [OG]	375	368	385
Aluminum	0.1 [OG]	0.06	0.04	0.05
Arsenic	0.010 (IMAC)	0.0002	0.0003	0.0002
Barium	1 [MAC]	0.025	0.028	0.028
Boron	5 [IMAC]	0.316	0.333	0.379
Cadmium	0.005 (MAC)	<0.000015	0.000017	0.000020
Calcium	-	73.6	71.8	78.9
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002
Copper	1 [AO]	0.002	<0.002	0.0009
Iron	0.3 [AO]	<0.005	0.014	0.010
Lead	0.01 (MAC)c	<0.00002	0.00003	0.00004
Magnesium	-	46.5	45.8	45.6
Manganese	0.05 [AO]	<0.001	<0.001	0.001
Potassium	-	1.8	1.8	1.9
Sodium	200 [AO]	40.1	41.6	40.1
Zinc	5 [AO]	<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-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 (MAC) 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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TABLE E-2
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
Alkalinity(as CaCO3)	30 - 500 [OG]	200	165
Chloride	250 [AO]	6.2	3.6
Nitrate(as N)	10 (MAC) d	0.78	<0.05
Nitrite(as N)	1 (MAC) d	<0.05	<0.05
Ammonia(as N)		0.03	<0.01
Total Kjeldahl Nitrogen(as N)		<0.1	<0.1
Phenols		<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	1.5	1.4
Conductivity (us/cm)		566	551
pH		8.01	8.08
Sulphate (as SO4)	250 (AO)	91	108
Hardness(as CaCO3)	80-100 [OG]	231	207
Aluminum	0.1 [OG]	0.01	0.03
Arsenic	0.010 (IMAC)	0.0003	0.0005
Barium	1 [MAC]	0.115	0.097
Boron	5 [IMAC]	0.135	0.181
Cadmium	0.005 (MAC)	<0.000015	0.000018
Calcium	-	51.0	44.0
Chromium	0.05 (MAC)	<0.002	<0.002
Copper	1 [AO]	<0.002	0.0006
Iron	0.3 [AO]	<0.005	0.007
Lead	0.01 (MAC)c	<0.00002	0.00003
Magnesium	-	25.2	23.6
Manganese	0.05 [AO]	0.019	0.015
Potassium	-	1.4	1.1
Sodium	200 [AO]	22.2	27.5
Zinc	5 [AO]	<0.005	<0.005

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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

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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

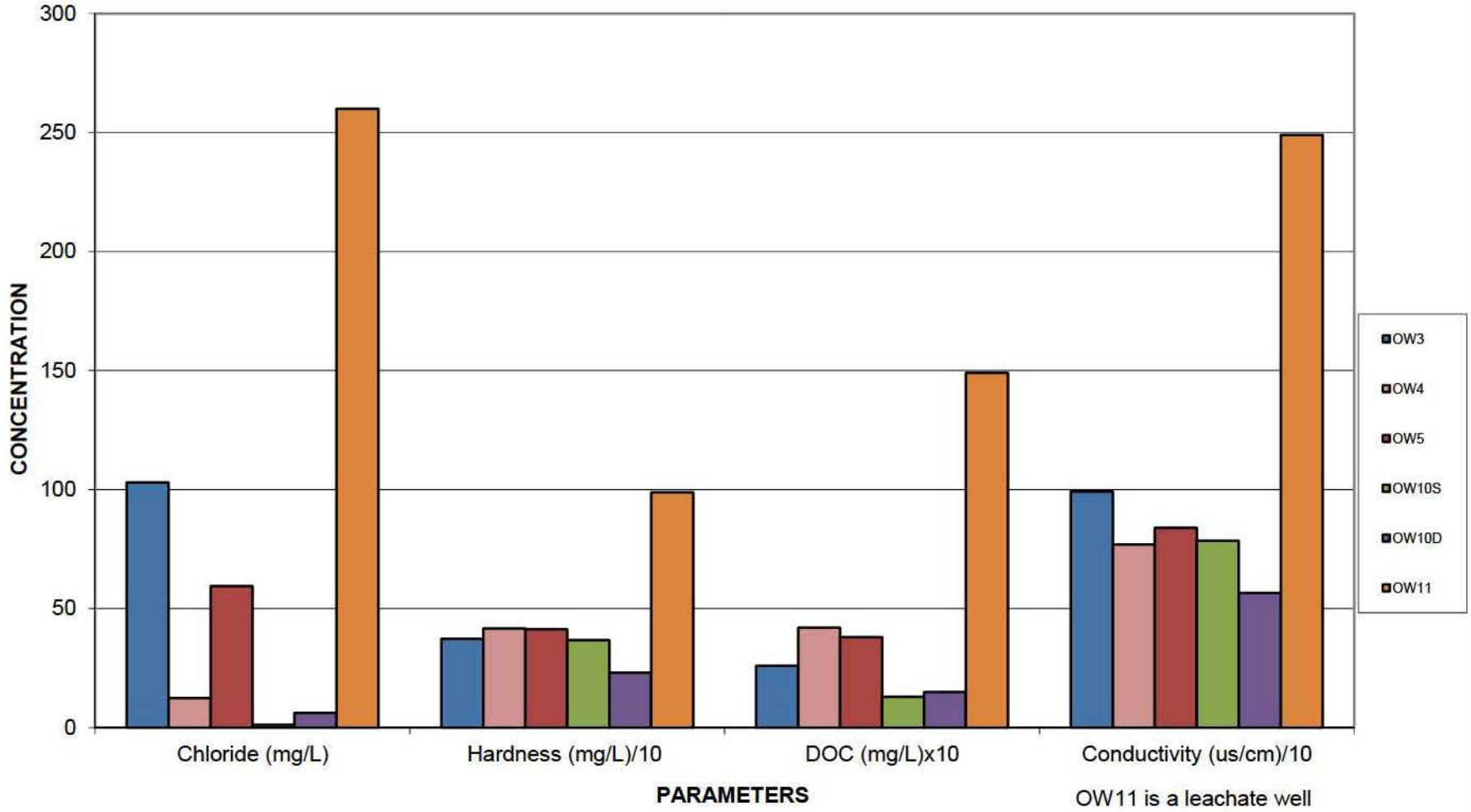
NOTES:
1. All results expresses in mg/L unless otherwise noted.
2. ODWQS is the Ontario Drinking Water Quality Standards, MOE, revised 2006.
3. MAC maximum acceptable concentration ODWQS.
4. IMAC indicates an interim maximum acceptable concentration ODWQS.
5. AO indicates an aesthetic objective ODWQS, 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.
10. <T indicates a detection of a Trace amount less than the method detection limit.
11. S.E. indicates a sampling error.
12. nd indicates parameter not detected.

TABLE E-2
GROUNDWATER CHEMICAL DATA (2007-Present)
HURON LANDFILL SITE

Chemical Parameter	ODWQS	OW11 Jul-20	OW11 Nov-20
Alkalinity(as CaCO3)	30 - 500 [OG]	991	858
Chloride	250 [AO]	260	287
Nitrate(as N)	10 (MAC) d	0.07	<0.05
Nitrite(as N)	1 (MAC) d	0.16	<0.05
Ammonia(as N)		56.4	30.9
Total Kjeldahl Nitrogen(as N)		66.1	39.7
Phenols		0.003	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	14.9	14.6
Conductivity (us/cm)		2490	2450
pH		7.25	7.27
Sulphate (as SO4)	250 (AO)	2	2
Hardness(as CaCO3)	80-100 [OG]	988	965
Aluminum	0.1 [OG]	0.22	0.09
Arsenic	0.010 (IMAC)	0.0110	0.0050
Barium	1 [MAC]	0.233	0.287
Boron	5 [IMAC]	0.729	0.565
Cadmium	0.005 (MAC)	<0.000070	<0.000070
Calcium	-	177	179
Chromium	0.05 (MAC)	<0.002	<0.002
Copper	1 [AO]	<0.002	0.0019
Iron	0.3 [AO]	35.3	0.036
Lead	0.01 (MAC)c	0.00081	0.00380
Magnesium	-	133	126
Manganese	0.05 [AO]	0.24	0.182
Potassium	-	42.7	28.1
Sodium	200 [AO]	111	111
Zinc	5 [AO]	0.007	0.016

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.
10. <T indicates a detection of a Trace amount less than the method detection limit.
11. S.E. indicates a sampling error.
12. nd indicates parameter not detected.

FIGURE E-1
INDICATOR PARAMETERS - UPGRADIENT & CROSS-GRADIENT WELLS - SPRING
HURON LANDFILL



OW11 is a leachate well

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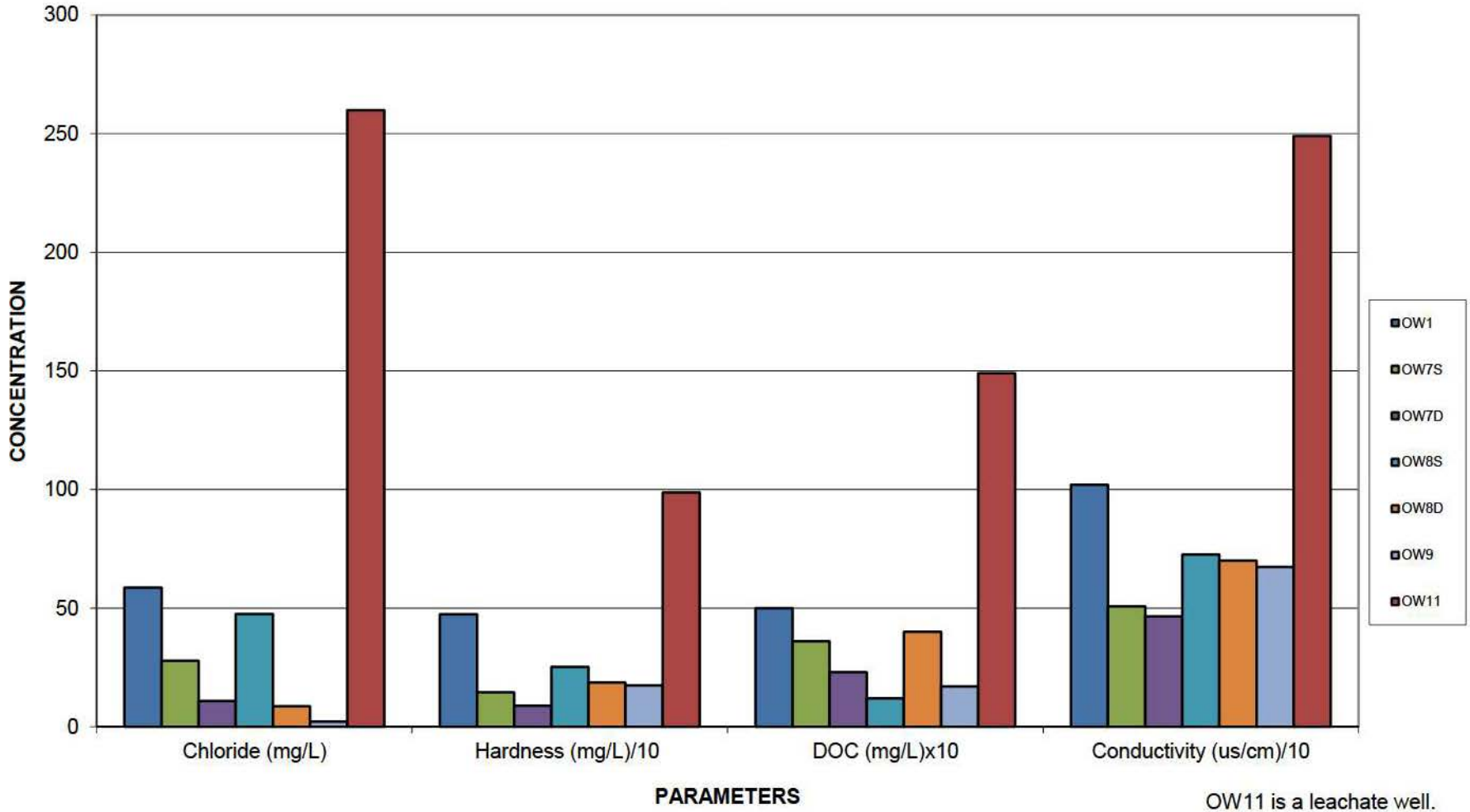
FIGURE E-2
INDICATOR PARAMETERS - DOWNGRADIENT WELLS - SPRING
HURON LANDFILL



OW11 is a leachate well.

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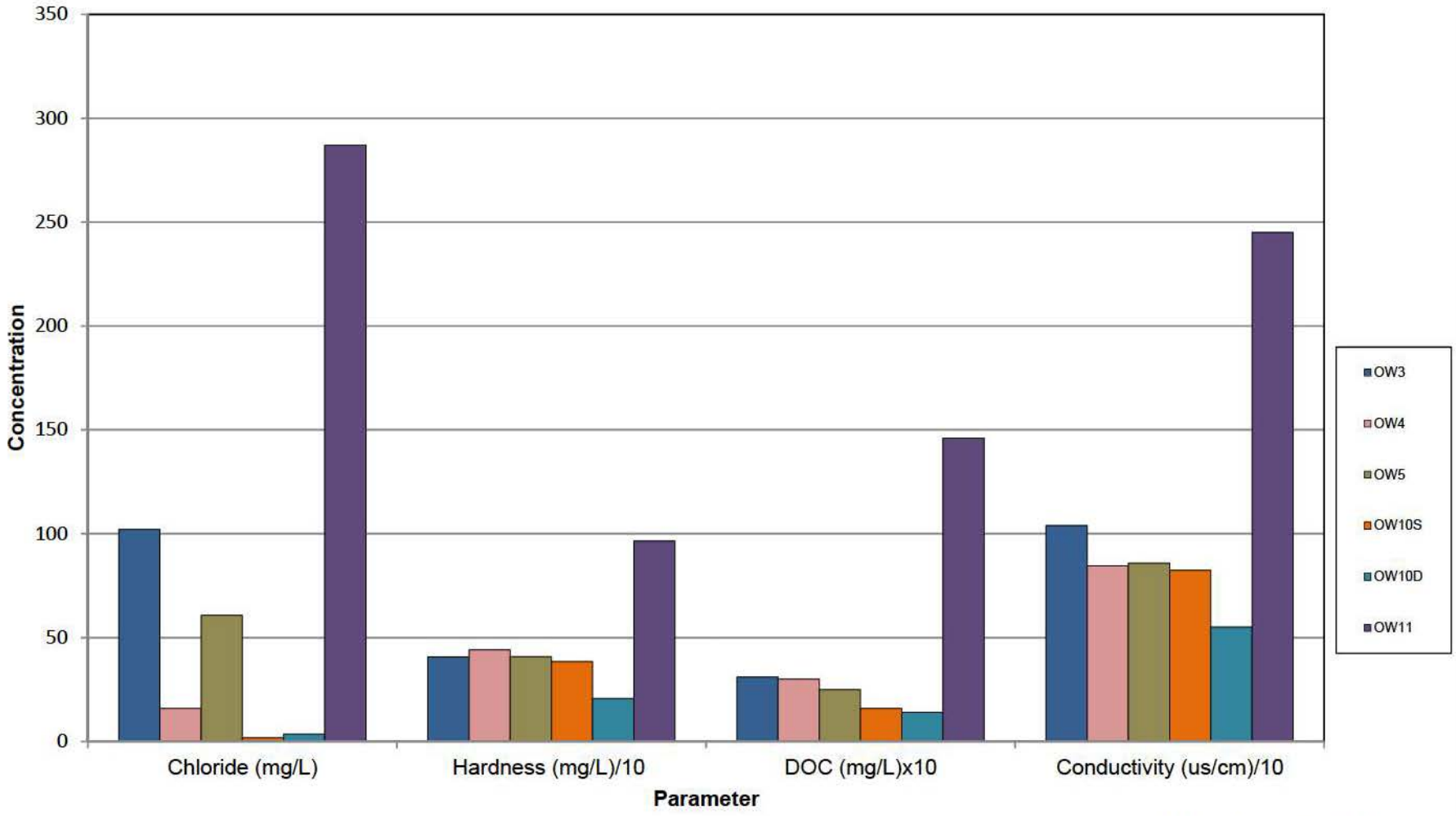
FIGURE E-3
INDICATOR PARAMETERS - UPGRADIENT & CROSS-GRADIENT WELLS - FALL
HURON LANDFILL



OW11 is a leachate well.

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FIGURE E-4
INDICATOR PARAMETERS - DOWNGRADIENT WELLS - FALL
HURON LANDFILL

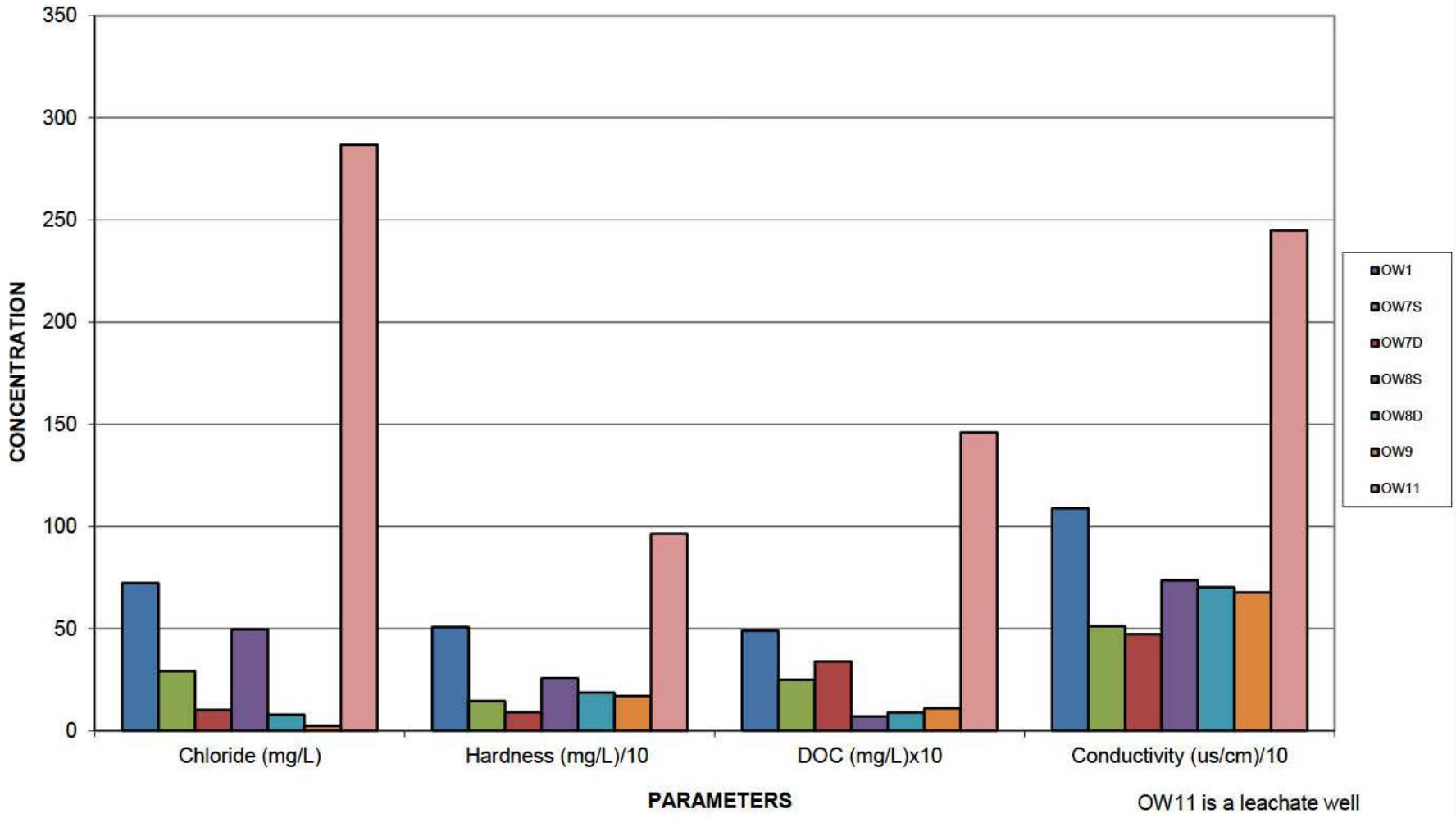

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FIGURE E-5
CHLORIDE VS TIME - UPGRADIENT & CROSS-GRADIENT WELLS
HURON LANDFILL

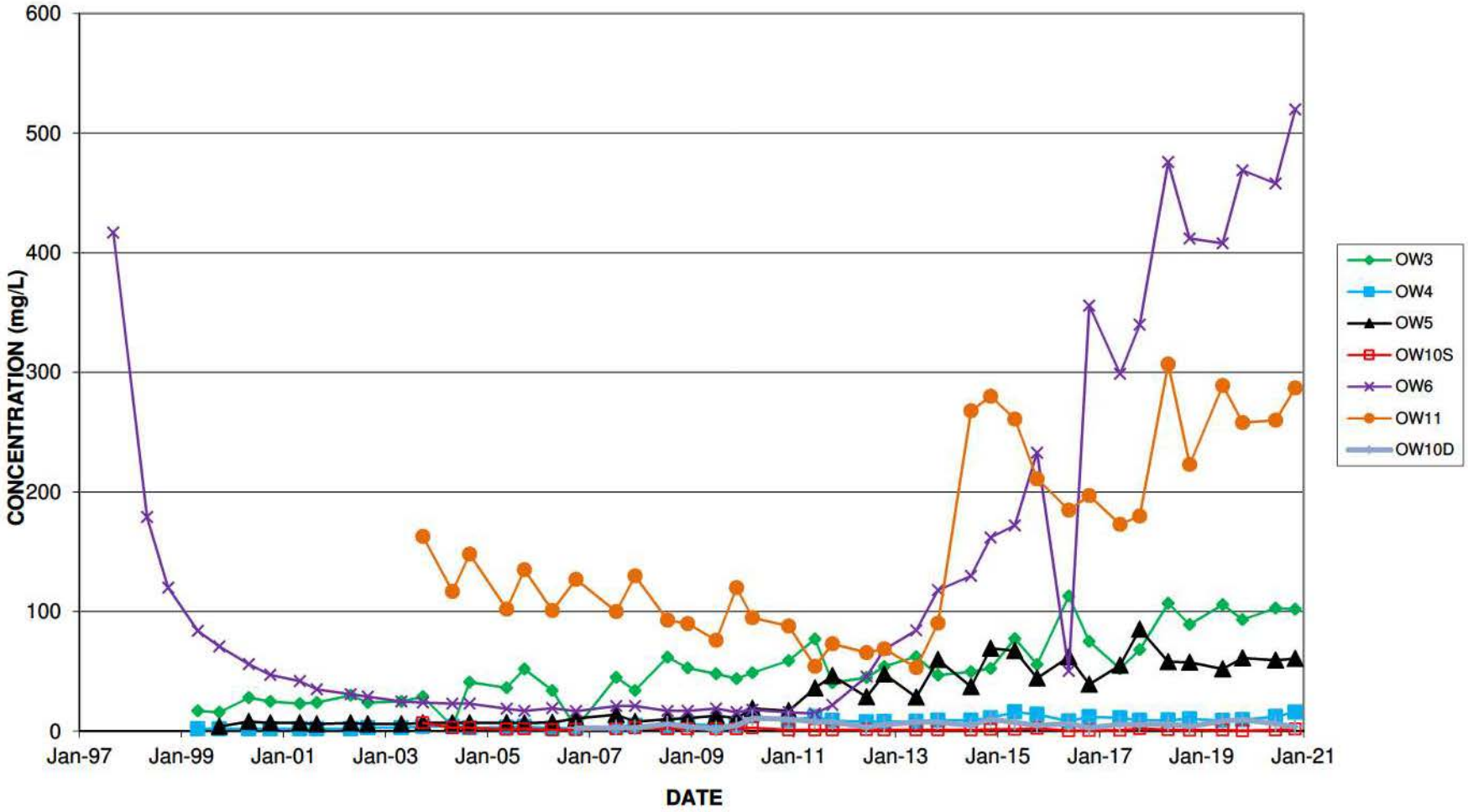

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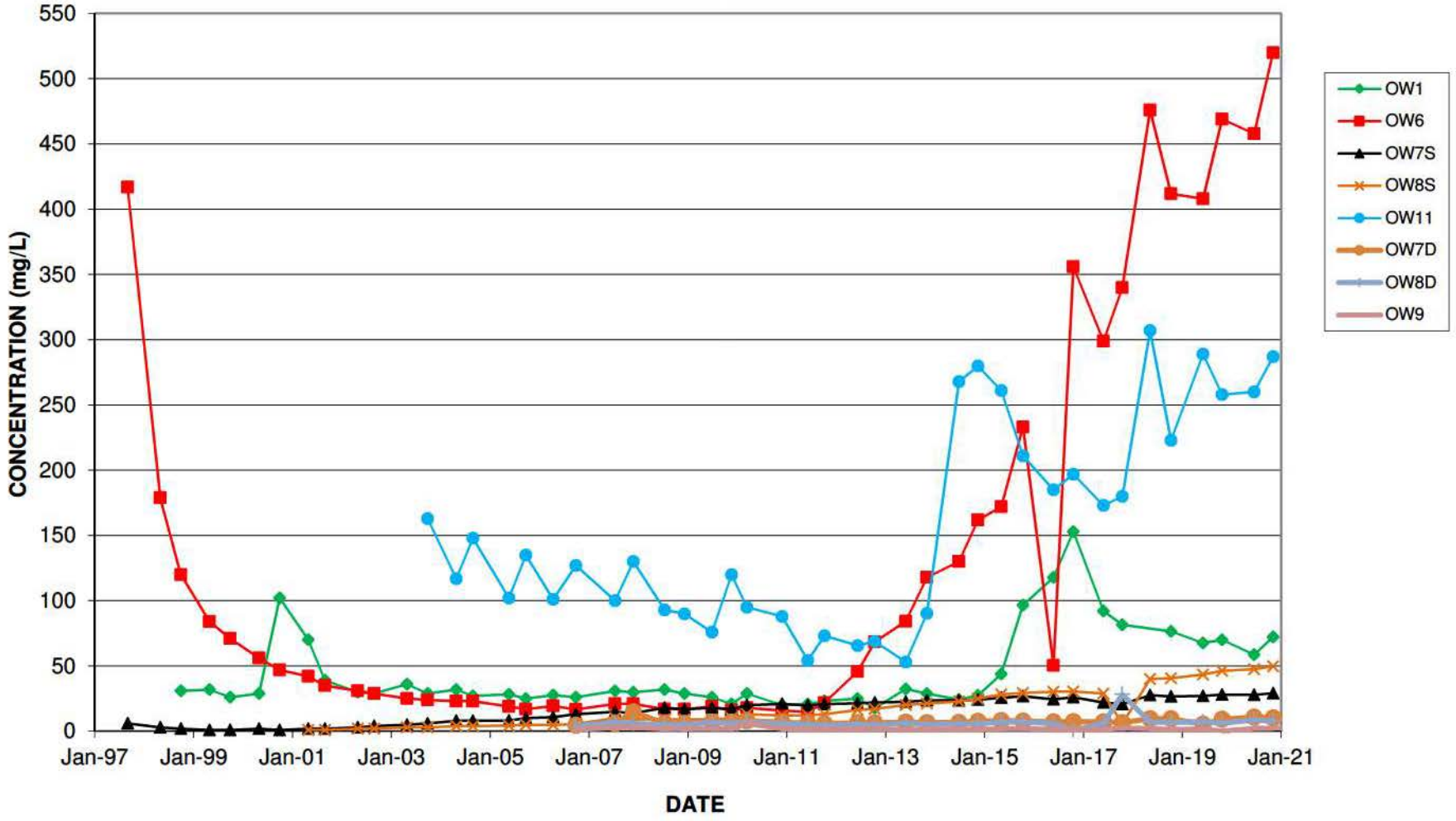
FIGURE E-6
CHLORIDE VS TIME - DOWNGRADIENT WELLS
HURON LANDFILL



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APPENDIX

F

SURFACE WATER CHEMICAL RESULTS

TABLE F-1: SURFACE WATER QUALITY RESULTS (PRE-2007) – R. J. BURNSIDE

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	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	< 0.05	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	< 0.46	0.54	< 0.1	< 0.1	10.6	< 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						1.68	1.78	3.91	3.78	6.86	6.36	6.12	7.42	< 0.46	0.54	< 0.1	< 0.1	10.6	< 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	3.6	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	0.069	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	536	532	533	574	< 358	436	437	348	500	506	596	605
Conductivity (Field)	us/cm														460	470	NA	NA	456	457	NA	NA
Sulphate (as SO4)	mg/L		20	9	20	22	13	13	17	18	16	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	196	192	200	201	269	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	267	274	209	251	221	200	263	264	331	338
Turbidity	NTU						14	15.4	8.04	4.03	3.89	3.63	6.55	4.64	0.16	0.2	5.56	13.5	3.88	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	6.62	5.84	6	< 4.2	5.11	5.13	4.39	5.47	5.5	6.92	7.08
Total Anions	meq/L						4.73	4.7	6.93	6.84	6.2	6.19	5.23	5.67	4.18	5.1	5	4.3	5.48	4.66	6.73	6.92
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						246	242	360	381	338	331	294	318	205	252	262	216	300	251	359	369
Trace Metals																						
Aluminum, Al	mg/L	0.075					0.74	0.51	0.34	0.65	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	0.03	0.033	< 0.001	< 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	0.0026	0.0001	0.0156	< 0.0001	< 0.0001	0.0004	0.0019	< 0.0001	< 0.0001	< 0.0001	0.0001
Calcium, Ca	mg/L		43.6	36.5	59.8	62.6	59.8	58.8	91.9	94.9	86.4	83.8	68.3	71.8	57	67.9	46.4	42.6	73.6	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	0.0009					< 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	0.005	< 0.01	< 0.01	< 0.01	< 0.01	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.007	< 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	0.26	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	< 0.0006	< 0.0005	< 0.0006	0.0005	0.0006	0.0005	0.0006
Magnesium, Mg	mg/L		23.3	18.8	21.8	22.4	24.2	24.3	28.2	28.8	27.8	26.2	23.5	22.9	16.1	19.9	28.1	22.7	19.3	19.6	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	1.86	2.04	1.99	1.84	2.67	2.83	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	2.98	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	3.92	10	9.71	5.98	4.86	5.14	5.37	5.61	5.44	8.7	9	0.8	1.9	7.5	5.5	3.9	4	5.6	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
FIELD MONITORING RESULTS							
Temperature	°C		N/A	15.5	14.9	18.5	19.6
pH	pH		N/A	7.96	7.76	7.86	7.85
Conductivity	uS/cm		N/A	471	463	456	301
INORGANICS							
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	0.06	ND	ND
Conductivity	uS/cm		2	476	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	6.2
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	0.006	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
CALCULATED VALUES							
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	262	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	260	260	200	150
Ion Balance (% Difference)	%		N/A	3.6	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	7.26	7.5	7.67
Saturation pH (@ 4C)	N/A		N/A	7.51	7.5	7.75	7.92
METALS							
Dissolved Aluminum (Al)	mg/L	0.075	0.005	0.009	0.006		
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	66.6	64.8	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	0.0060	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 5/24/2005	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		0.005			0.043	0.041
Total Beryllium (Be)	mg/L	1.1	0.0005			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	0.0009	0.0005			ND	0.0017
Total Copper (Cu)	mg/L	0.005	0.001			0.002	0.097
Total Iron (Fe)	mg/L	0.3	0.05			0.57	3.2
Total Lead (Pb)	mg/L	0.005	0.0005			ND	0.0063
Total Magnesium (Mg)	mg/L		0.05			21	16
Total Molybdenum (Mo)	mg/L	0.04	0.001			ND	ND
Total Nickel (Ni)	mg/L	0.025	0.001			0.002	0.006
Total Potassium (K)	mg/L		0.2			4.2	5.3
Total Silicon (Si)	mg/L		0.05			2	6.3
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	0.006	0.001			0.001	0.005
Total Zinc (Zn)	mg/L	0.02	0.005			0.011	0.089

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.

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-06	18-Apr-06
FIELD MONITORING RESULTS						
Temperature	°C	°C			13	12.3
pH	pH	N/A			8.13	8.16
Electrical Conductivity	Th. Cond.	uS/cm			438	468
INORGANICS						
pH	pH	N/A		N/A	8.52	8.48
Chloride	Cl^-	mg/L		0.10	8.33	8.58
Electrical Conductivity	Th. Cond.	uS/cm		2	468	482
Total Hardness (as CaCO3)	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)	$NH_{3\text{-}union}$	mg/L	0.02		0.0006	0.0006
Ammonia as N	NH_3-N	mg/L		0.02	<0.02	<0.02
Nitrate as N	NO_3-N	mg/L		0.05	4.32	4.27
Nitrite as N	NO_2-N	mg/L		0.05	<0.05	<0.05
(Nitrate + Nitrite) as N	NO_2+NO_3	mg/L		0.10	4.32	4.27
Bromide	Br^-	mg/L		0.05	<0.05	<0.05
Sulphate	$SO4^{=}$	mg/L		0.10	14.7	15.3
Phosphate as P	PO_4^{-3}	mg/L		0.10	<0.10	<0.10
pH, Saturation	pHs	N/A		N/A	7.16	7.16
Phenols	Phenol	mg/L	0.001	0.001	<0.001	<0.001
Turbidity	Turbidity	NTU		0.5	1.6	1.5
p-Alkalinity (as CaCO3)	Alk 8.3	mg/L		5	8	6
t-Alkalinity (as CaCO3)	Alk 4.2	mg/L		10	205	212
CALCULATED VALUES						
Anion Sum	Anion	mg/L		NA	4.24	4.32
Cation Sum	Cation	mg/L		NA	5.14	5.33
Ion Balance	CAB	%		NA	9.6	10.4
Carbonate (as CaCO3)	$CO3^{=}$	mg/L		5	15	13
Bicarbonate (as CaCO3)	$HCO3^-$	mg/L		5	190	199
Langlier Index	L.I.	N/A		NA	1.38	1.3
Aggressive Index	A.I.	N/A		N/A	13.2	13.2
Ryznar Stability Index	R.S.I.	N/A		N/A	5.8	5.86
METALS						
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	0.016	0.017
Beryllium	Be	mg/L	0.011	0.002	<0.002	<0.002
Calcium	Ca	mg/L		0.05	65.8	68.5
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	0.564	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	0.01	0.08	0.08
Lead	Pb	mg/L	0.005	0.001	<0.001	<0.001
Vanadium	V	mg/L	0.006	0.002	<0.002	<0.002
Zinc	Zn	mg/L	0.03	0.004	0.004	0.007

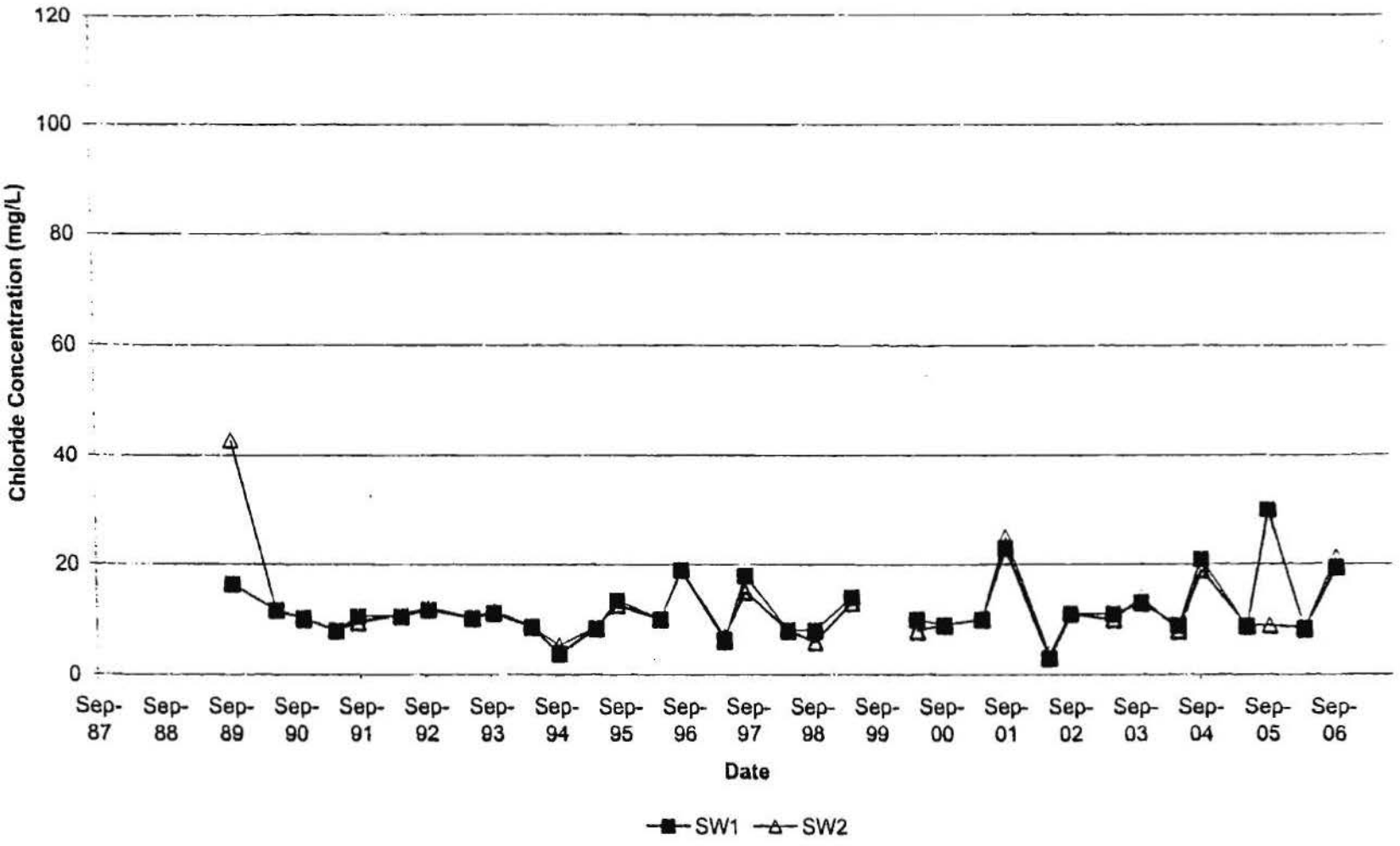
This table is to be reviewed with the comments in Appendix D

Short I.D.	Unit	PWQO	SW1 Up 4-Oct-06	SW2 Down 4-Oct-06
°C	°C		14	13.6
pH	N/A		7.88	7.59
Th. Cond.	uS/cm		464	442
pH	N/A		8.28	8.02
Cl⁻	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_3 Union	mg/L	0.02	0.0004	0.0002
NH_3-N	mg/L		<0.02	<0.02
NO_3-N	mg/L		0.19	0.18
NO_2-N	mg/L		<0.05	<0.05
NO_2+NO_3	mg/L		0.19	0.18
Br⁻	mg/L		<0.05	<0.05
$SO4^{=}$	mg/L		17.7	24.5
PO_4^{-3}	mg/L		<0.10	<0.10
pHs	N/A		7.17	7.27
Phenol	mg/L	0.001	<0.001	<0.001
Turbidity	NTU		16	30
Alk 8.3	mg/L		6	<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
$CO3^{=}$	mg/L		13	<5
$HCO3^{-}$	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	0.658
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	0.0009	<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	0.668	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 (TotL)	mg/L	0.01	0.08	0.11
Pb	mg/L	0.005	<0.001	0.002
V	mg/L	0.006	<0.002	<0.002
Zn	mg/L	0.03	0.021	0.015

This table is to be reviewed with the comments in Appendix D

HURON LANDFILL SITE

Chloride Concentration (mg/L) vs.Time
Surface Water Monitoring



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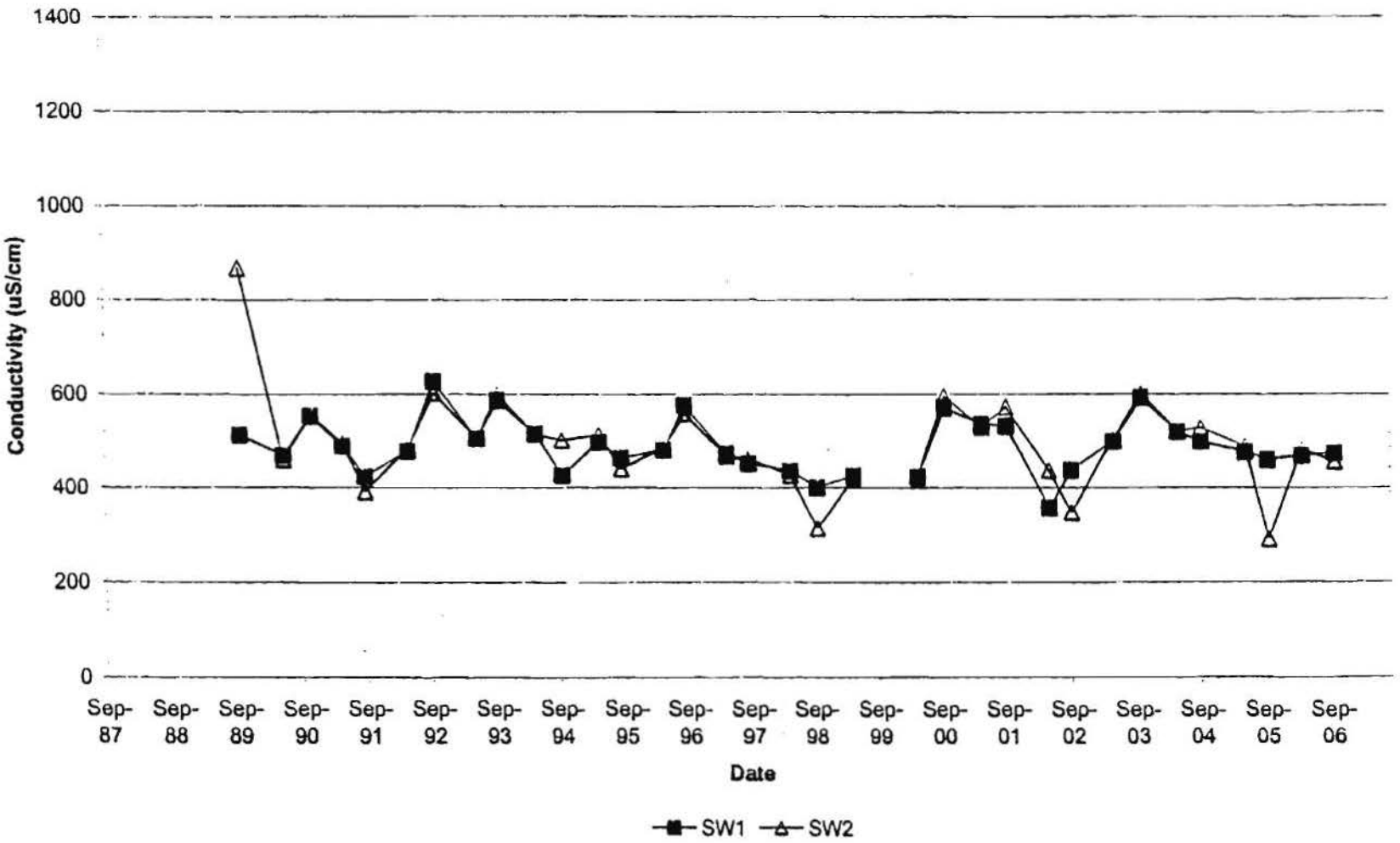
Project File: LNE08507

HURON LANDFILL SITE
Conductivity (uS/cm) vs. Time
Surface Water Monitoring



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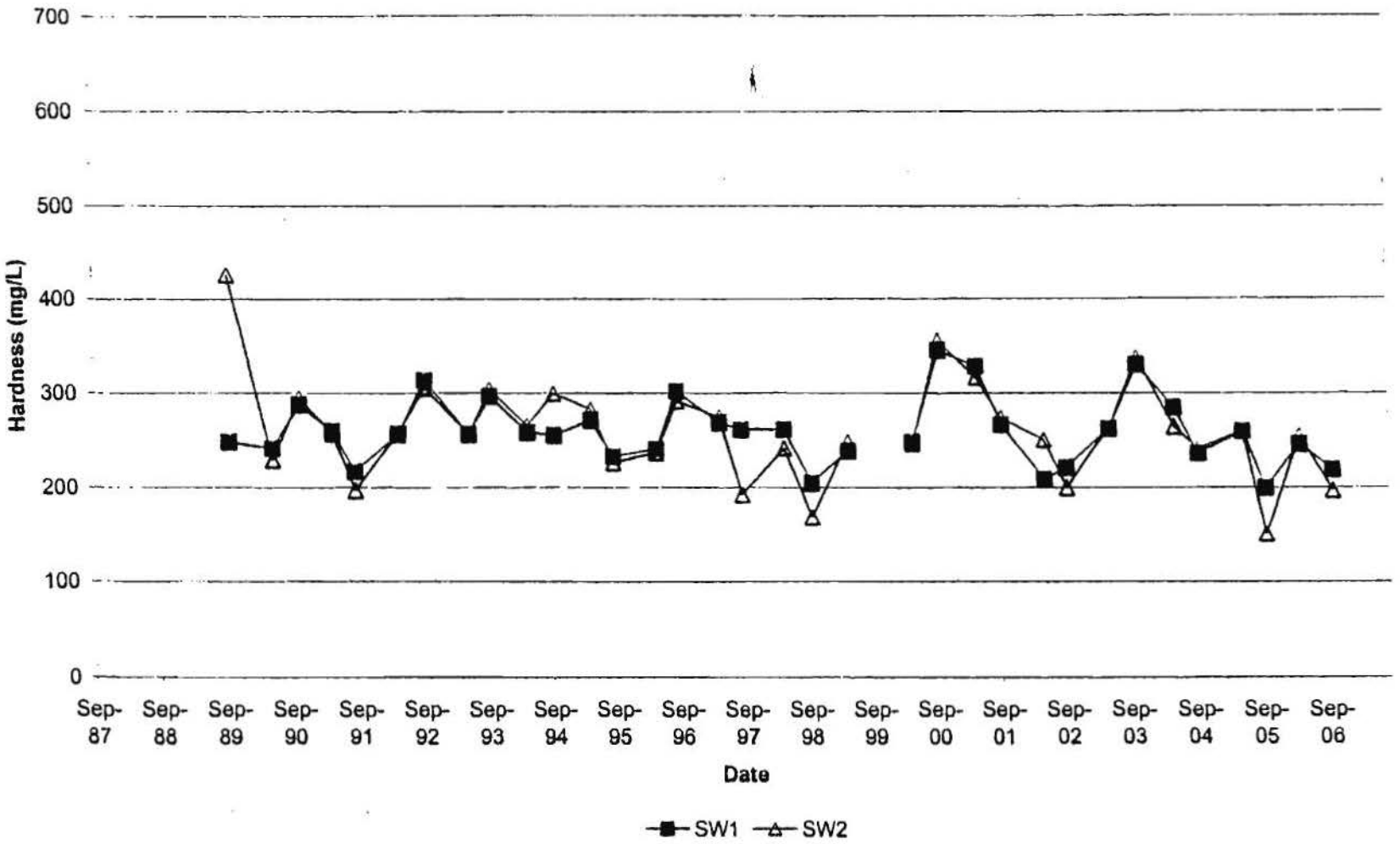
R. J. Burnside & Associates Limited
Project File: LNE08507

HURON LANDFILL SITE
Hardness (mg/L) vs. Time
Surface Water Monitoring



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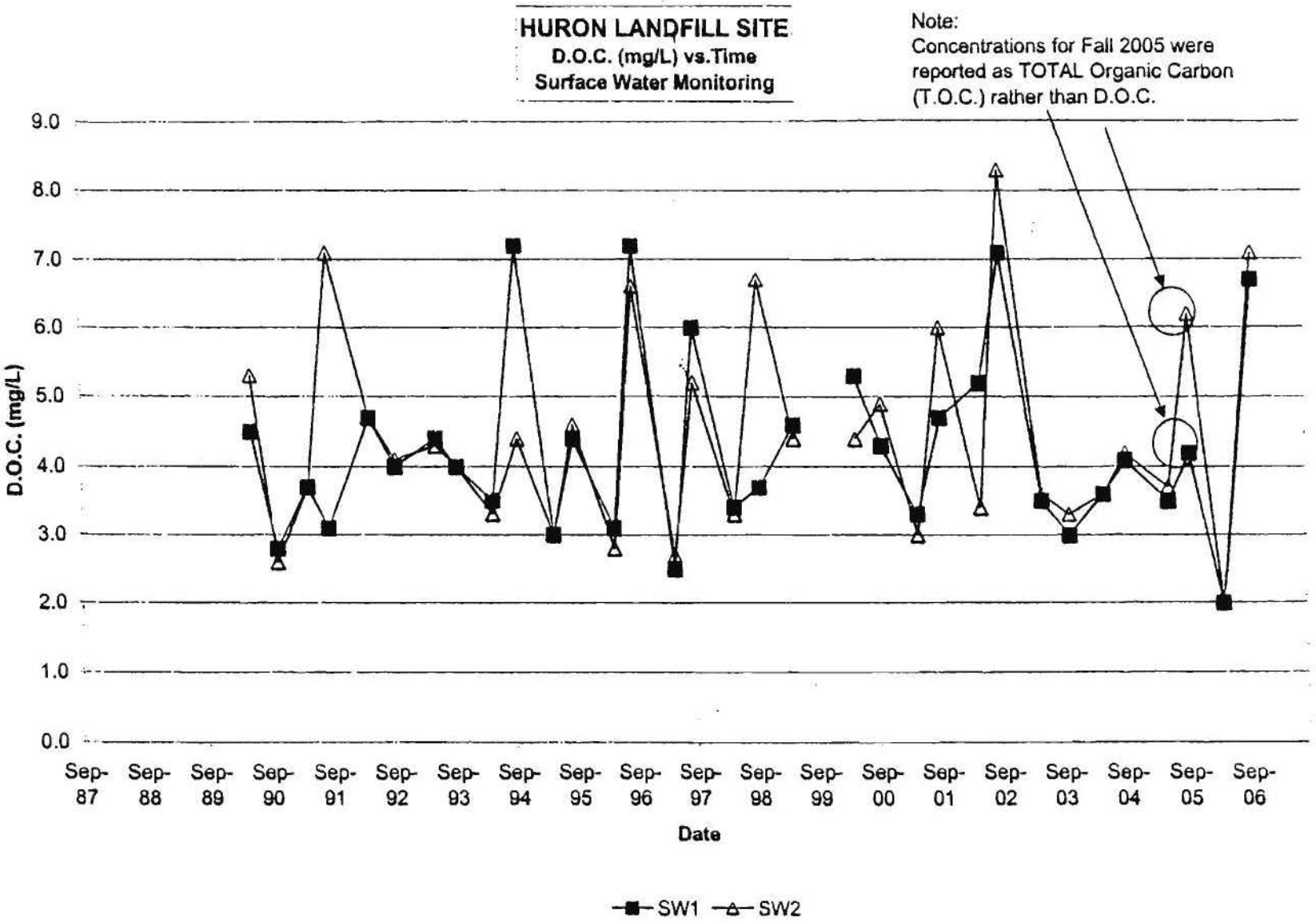
Project File: LNE08507



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Project File: LNE08507

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	SW1 Dup #2 Oct-11
Alkalinity(as CaCO3)	(16)	188	223	228	267	234	255	255	271	278	249	212	252
Chloride		14	36	12	9	11	18	11	13	9.3	20.1	11.4	20.2
Nitrate(as N)		nd	11	0.8	3.2	0.8	4.6	4.1	5.5	5.6	7.8	0.5	7.8
Nitrite(as N)		nd	nd	0.02	0.01	nd	0.01	0.01	<0.01	<0.1	<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	<0.01
Total Kjeldahl Nitrogen(as N)		0.7	-	-	0.5	0.6	0.7	0.6	0.5	0.49	0.73	0.61	0.73
Phosphorus, Total	(19)	-	-	-	0.027	0.029	0.02	0.016	0.036	0.03	0.05	0.03	0.05
Orthophosphate (as P)		0.03	nd	nd	-	-	-	-	-	-	-	-	-
Phenols		0.002	nd	nd	nd	nd	nd	nd	<0.001	<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	5.4
Conductivity		425	673	488	548	491	578	539	595	591	640	459	645
pH		8.2	8.2	8.2	8.2	8.1	8.1	8.2	8.19	8.13	8.10	8.15	8.12
Sulphate (as SO4)		21	40	18	13	-	17	18	14	14	18	14	18
Hardness(as CaCO3)		200	310	250	280	240	300	270	300	352	314	238	324
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	0.25
Arsenic	0.1 (22)	0.001	nd	nd	nd	nd	nd	nd	<0.001	0.0005	0.0004	0.0020	0.0022
Beryllium	1.1 (10)	nd	nd	nd	nd	nd	nd	nd	<0.005	<0.002	<0.002	<0.0001	<0.002
Boron	0.200 (l)	0.028	0.013	0.019	nd	0.021	0.022	0.011	<0.01	0.024	0.126	0.023	0.121
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	0.00005
Calcium		50	85	60	79	62	77	84	84	94.4	86.4	53.9	89.3
Chromium	0.1	nd	nd	nd	nd	nd	nd	nd	<0.005	0.006	<0.002	0.0008	<0.002
Cobalt	0.0006 (l)	nd	nd	nd	nd	nd	nd	nd	<0.0005	0.0001	0.0002	0.0001	0.0006
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	<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	0.265
Lead	0.025 (14)	nd	nd	nd	nd	nd	nd	nd	<0.0005	0.00011	0.00018	0.00008	0.00071
Magnesium		26	25	25	23	23	21	24	25	28.3	23.8	25.2	24.6
Manganese		0.056	0.004	0.013	0.02	0.021	0.006	0.032	0.012	0.016	0.014	0.025	0.014
Molybdenum	0.010 (l)	nd	nd	nd	nd	nd	nd	nd	<0.001	0.0003	0.0004	0.0004	0.0005
Nickel	0.025	0.001	nd	nd	nd	nd	nd	nd	<0.001	<0.01	<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	3.4
Silver	0.0001	nd	nd	nd	nd	nd	nd	nd	<0.0001	<0.00002	<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	11.2
Vanadium	0.007 (l)	0.002	0.001	nd	0.002	0.001	0.001	nd	<0.001	<0.005	<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	<0.005
Tubidity (NTU)		21.2	3.9	-	-	-	-	-	-	-	-	-	-

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 Provicial 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. Undissassociated 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

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
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	686	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	<0.002	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.002	<0.002
Boron	0.200 (I)	0.011	0.010	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	<0.005
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
Tubidity (NTU)		-	-	-	-	-	-	-	-	-	-	-	-

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 Provicial 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. Undissassociated 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

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
Alkalinity(as CaCO3)	(16)	269	243	220	203	273
Chloride		20.3	14.4	17.8	18.8	23
Nitrate(as N)		1.57	9.73	14.2	4.69	7.53
Nitrite(as N)		<0.05	<0.05	<0.05	0.06	<0.05
Ammonia(as N)	0.02 (21)	0.03	0.11	0.05	0.09	0.04
Total Kjeldahl Nitrogen(as N)		0.5	0.6	0.7	0.7	0.5
Phosphorus, Total	(19)	0.02	0.04	0.06	0.04	0.02
Orthophosphate (as P)		-	-	-	-	-
Phenols		<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)		7.1	5.5	5.3	4.7	4
Conductivity		625	587	626	495	684
pH		8.32	8.26	8.29	8.15	8.29
Sulphate (as SO4)		17	13	16	16	17
Hardness(as CaCO3)		338	328	307	270	350
Aluminum	0.075 (17)	0.07	0.06	0.17	0.11	0.07
Arsenic	0.1 (22)	0.0005	0.0003	0.0003	0.0006	0.0003
Beryllium	1.1 (10)	<0.002	<0.002	<0.002	<0.002	<0.0001
Boron	0.200 (I)	0.02	0.015	0.005	0.022	0.01
Cadmium	0.0002 (11)	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015
Calcium		87.6	87.6	82.2	60.3	95.3
Chromium	0.1	<0.002	<0.001	<0.002	<0.002	<0.001
Cobalt	0.0006 (I)	0.005	0.0003	<0.005	<0.005	0.0001
Copper	0.005 (12)	0.006	0.0012	0.002	<0.002	0.0012
Iron	0.3	0.113	0.086	0.207	0.139	0.098
Lead	0.025 (14)	0.00006	0.00006	0.00015	0.00010	0.00007
Magnesium		28.9	26.6	24.8	29	27.3
Manganese		0.007	0.007	0.010	0.011	0.005
Molybdenum	0.010 (I)	0.0004	0.0003	0.0002	0.0003	0.0002
Nickel	0.025	<0.01	<0.01	<0.01	<0.01	0.0005
Potassium		4.8	2.0	2.9	2.5	2.1
Silver	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium		9.8	5.1	5.8	6	6.6
Vanadium	0.007 (I)	<0.005	0.0007	<0.005	<0.005	0.0006
Zinc	0.030 (15)	0.008	0.012	0.006	<0.005	0.006
Tubidity (NTU)		-	-	-	-	-

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 Provicial 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. Undissassociated 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

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	SW2 Oct-12
Alkalinity(as CaCO3)	(16)	190	227	232	272	232	254	250	270	287	250	211	233
Chloride		13	37	11	14	12	22	11	13	9.4	19.4	10.0	22.4
Nitrate(as N)		nd	10	0.01	3.2	0.6	4.7	4.5	5.5	5.5	8.1	0.2	11.8
Nitrite(as N)		nd	nd	0.5	0.01	0.01	0.02	nd	<0.01	<0.1	<0.1	<0.1	0.2
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	<0.01
Total Kjeldahl Nitrogen(as N)		0.7	-	-	0.4	0.7	0.8	0.5	0.5	0.54	0.71	0.65	0.81
Phosphorus, Total	(19)	-	-	-	0.024	0.048	0.041	0.013	0.041	0.04	0.04	0.05	0.02
Orthophosphate (as P)		0.02	nd	nd	-	-	-	-	-	-	-	-	-
Phenols		0.002	nd	nd	nd	nd	nd	nd	nd	<0.001	<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	5.4
Conductivity		407	687	488	554	489	590	534	598	603	636	446	618
pH		8.2	8.2	8.3	8.2	8.1	8.2	8.2	8.28	8.00	8.10	8.09	8.21
Sulphate (as SO4)		16	44	19	14	17	17	19	14	15	18	12	21
Hardness(as CaCO3)		200	310	230	290	230	290	270	280	392	356	224	353
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	0.16
Arsenic	0.1 (22)	0.001	nd	nd	nd	nd	nd	nd	<0.001	0.0005	0.0015	0.0022	0.0006
Beryllium	1.1 (10)	nd	nd	nd	nd	nd	nd	nd	<0.005	<0.002	<0.002	<0.0001	<0.0001
Boron	0.200 (l)	0.025	0.014	0.021	nd	0.021	0.019	0.013	<0.01	0.023	0.125	0.023	0.011
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	<0.00002
Calcium		47	91	64	80	61	77	79	85	106	98.1	50.6	97.8
Chromium	0.1	nd	nd	nd	nd	nd	nd	nd	<0.005	<0.002	<0.002	0.0006	<0.002
Cobalt	0.0006 (l)	nd	nd	nd	nd	nd	nd	nd	<0.0005	0.0001	0.0016	0.0002	0.0001
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	0.0023
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	0.070
Lead	0.025 (14)	0.0005	nd	nd	nd	nd	nd	nd	<0.0005	0.00010	0.00084	0.00011	0.00007
Magnesium		23	26	26	24	23	21	24	25	30.7	27.0	23.8	26.5
Manganese		0.041	0.003	0.039	0.018	0.036	0.009	0.014	0.012	0.014	0.014	0.054	0.004
Molybdenum	0.010 (l)	nd	nd	nd	nd	nd	nd	nd	<0.001	0.0003	0.0004	0.0004	0.0012
Nickel	0.025	0.002	nd	nd	nd	0.001	nd	nd	<0.001	<0.01	<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	4.4
Silver	0.0001	nd	nd	nd	nd	nd	nd	nd	<0.0001	<0.00002	<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	8.1
Vanadium	0.007 (l)	0.002	0.001	nd	0.002	0.001	0.002	nd	<0.001	<0.005	<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	<0.005
Tubidity (NTU)		6	8.7	-	-	-	-	-	-	-	-	-	-

NOTES:
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10. For hardness > 75 mg/L (as CaCO3)
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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

TABLE F-2
SURFACE WATER CHEMICAL RESULTS (2007-Present)
HURON LANDFILLSITE

Chemical Parameter	PWQO	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	SW2 Oct-18
Alkalinity(as CaCO3)	(16)	219	255	191	255	240	231	247	234	220	297	228	262
Chloride		10.6	11.1	9.7	11.7	11.4	18.7	16.2	17.5	10.4	15.0	13.1	19.6
Nitrate(as N)		4.4	5.1	1.0	5.9	1.16	<0.10	14.1	<0.1	3.23	9.69	3.82	1.05
Nitrite(as N)		<0.1	<0.1	<0.1	<0.1	<0.25	<0.10	0.2	<0.1	0.20	<0.05	<0.05	<0.05
Ammonia(as N)	0.02 (21)	0.01	<0.01	0.04	0.09	<0.02	<0.02	0.02	<0.01	0.04	0.02	0.08	0.05
Total Kjeldahl Nitrogen(as N)		0.48	0.49	0.53	0.9	0.44	0.93	0.81	0.57	0.9	0.66	0.5	0.5
Phosphorus, Total	(19)	0.01	0.03	0.04	0.09	0.02	0.08	0.02	0.03	0.07	0.06	0.03	0.03
Orthophosphate (as P)		-	-	-	-	-	-	-	-	-	-	-	-
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	0.003
Dissolved Organic Carbon(DOC)		6.0	6.1	4.9	6.0	4.1	10.4	4.2	9.9	4.7	5.4	4.5	7.7
Conductivity		478	493	429	509	497	498	588	514	486	688	510	602
pH		8.01	8.19	8.15	8.18	8.45	7.97	8.24	7.94	8.05	8.29	8.37	8.22
Sulphate (as SO4)		14	13	13	11	14.3	7.07	15	16	13	12	12	17
Hardness(as CaCO3)		231	252	238	284	255	228	295	267	262	339	265	335
Aluminum	0.075 (17)	0.16	0.21	0.28	0.49	<0.004	<0.004	0.10	0.08	0.12	0.13	0.15	0.06
Arsenic	0.1 (22)	0.0004	0.0003	0.0006	<0.0001	<0.003	<0.003	0.0003	0.0007	0.0006	<0.0005	0.0004	0.0005
Beryllium	1.1 (10)	<0.0001	<0.002	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002
Boron	0.200 (l)	0.012	0.009	0.024	<0.005	0.014	0.035	0.016	0.022	0.023	0.014	0.013	0.024
Cadmium	0.0002 (11)	<0.00002	<0.00002	<0.00002	0.00010	<0.0001	<0.0001	0.00002	<0.00002	0.000033	<0.000070	<0.000015	0.000016
Calcium		56.4	68.7	56.1	78.1	62.4	55.6	79.7	66.7	64.1	91.3	67.6	86.4
Chromium	0.1	0.0003	<0.002	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
Cobalt	0.0006 (l)	0.0001	<0.0001	0.0003	0.0002	<0.0005	0.0008	<0.0001	<0.0001	0.0002	<0.0005	<0.005	0.008
Copper	0.005 (12)	0.0019	0.0015	0.0017	0.0092	<0.002	<0.002	0.0013	0.0008	0.0022	0.0009	<0.002	0.008
Iron	0.3	0.143	0.186	0.300	0.507	0.07	1.07	0.080	0.242	0.164	0.119	0.146	0.138
Lead	0.025 (14)	0.00012	0.00009	0.00029	0.00103	<0.001	<0.001	0.00006	0.00004	0.00022	<0.0001	0.00007	0.00021
Magnesium		22.0	19.4	23.7	21.6	24.0	21.6	23.4	24.4	24.9	26.9	23.4	29
Manganese		0.011	0.015	0.028	0.037	0.023	0.824	0.006	0.070	0.020	0.005	0.008	0.018
Molybdenum	0.010 (l)	0.0004	0.0003	0.0005	0.0004	<0.001	<0.001	0.0003	0.0003	0.0004	<0.0005	0.0003	0.0004
Nickel	0.025	<0.01	<0.01	<0.01	0.0047	<0.003	<0.003	0.0018	0.0024	0.0019	0.003	<0.01	<0.01
Potassium		1.5	1.8	2.7	3.2	1.89	8.29	2.1	7.9	2.2	2.6	2.0	5.3
Silver	0.0001	<0.00002	<0.00002	<0.00002	<0.00002	<0.0001	<0.0001	<0.00002	<0.00002	<0.00002	<0.0001	<0.0001	<0.0001
Sodium		4.9	5.7	5.2	6.1	5.32	9.26	4.4	10.0	6.7	5.7	6.2	10.4
Vanadium	0.007 (l)	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.030 (15)	<0.005	<0.005	0.007	0.021	<0.005	<0.005	<0.005	<0.005	0.054	<0.005	<0.005	0.013
Tubidity (NTU)		-	-	-	-	-	-	-	-	-	-	-	-

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 Provicial Water Quality Objectives.
9. (l) 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. Undissassociated 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

TABLE F-2
SURFACE WATER CHEMICAL RESULTS (2007-Present)
HURON LANDFILLSITE

Chemical Parameter	PWQO	SW2 Jun-19	SW2 Nov-19	SW2 Jul-20	SW2 Nov-20
Alkalinity(as CaCO3)	(16)	239	219	213	271
Chloride		14.9	18.6	20	24
Nitrate(as N)		9.93	14.3	5.85	7.81
Nitrite(as N)		<0.05	<0.05	0.06	<0.05
Ammonia(as N)	0.02 (21)	0.22	0.03	0.08	0.02
Total Kjeldahl Nitrogen(as N)		0.7	0.6	0.6	0.5
Phosphorus, Total	(19)	0.04	0.05	0.03	0.02
Orthophosphate (as P)		-	-	-	-
Phenols		<0.002	<0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)		4.3	5.3	4.6	3.9
Conductivity		584	630	517	678
pH		8.21	8.26	8.21	8.31
Sulphate (as SO4)		14	16	17	17
Hardness(as CaCO3)		316	323	273	369
Aluminum	0.075 (17)	0.09	0.19	0.08	0.09
Arsenic	0.1 (22)	0.0004	0.0003	0.0006	0.0003
Beryllium	1.1 (10)	<0.002	<0.002	<0.002	<0.0001
Boron	0.200 (l)	0.014	0.009	0.022	0.011
Cadmium	0.0002 (11)	<0.000015	<0.000015	<0.000015	<0.000015
Calcium		83.7	86.3	62.8	99.9
Chromium	0.1	<0.001	<0.002	<0.002	<0.001
Cobalt	0.0006 (l)	0.0003	<0.005	<0.005	0.0001
Copper	0.005 (12)	0.0012	0.003	<0.002	0.0011
Iron	0.3	0.113	0.203	0.101	0.140
Lead	0.025 (14)	0.00007	0.00019	0.00016	0.00014
Magnesium		25.9	26.1	28.1	28.9
Manganese		0.008	0.012	0.009	0.007
Molybdenum	0.010 (l)	0.0003	0.0002	0.0004	0.0002
Nickel	0.025	<0.01	<0.01	<0.01	0.0005
Potassium		2.2	3.1	2.6	2.3
Silver	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium		5.1	6.2	6	7
Vanadium	0.007 (l)	0.0007	<0.005	<0.005	0.0006
Zinc	0.030 (15)	0.007	0.009	<0.005	0.01
Tubidity (NTU)		-	-	-	-

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 Provicial Water Quality Objectives.
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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. Undissassociated 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

FIGURE F-1
CHLORIDE - SURFACE WATER
HURON LANDFILL

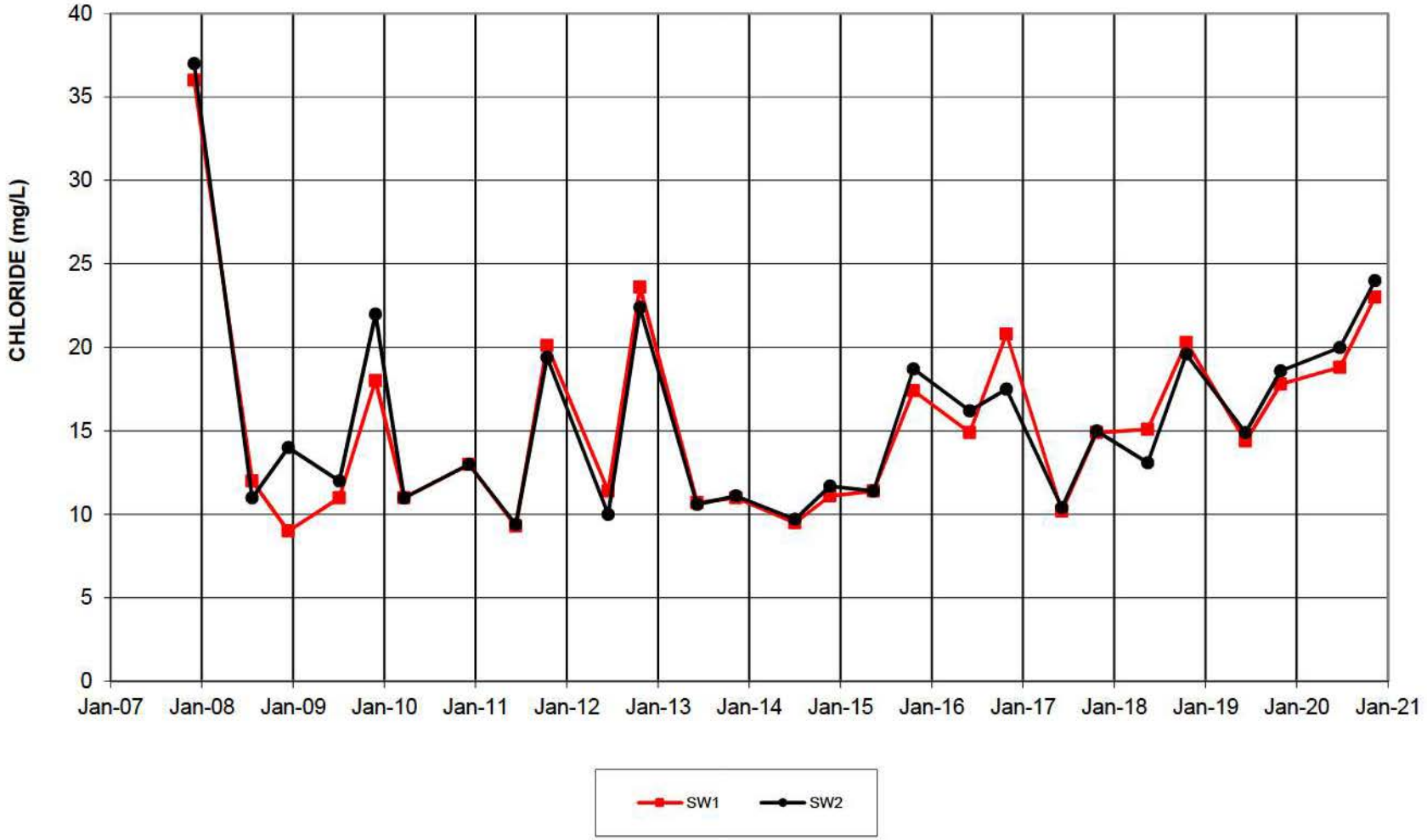

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FIGURE F-2
HARDNESS - SURFACE WATER
HURON LANDFILL

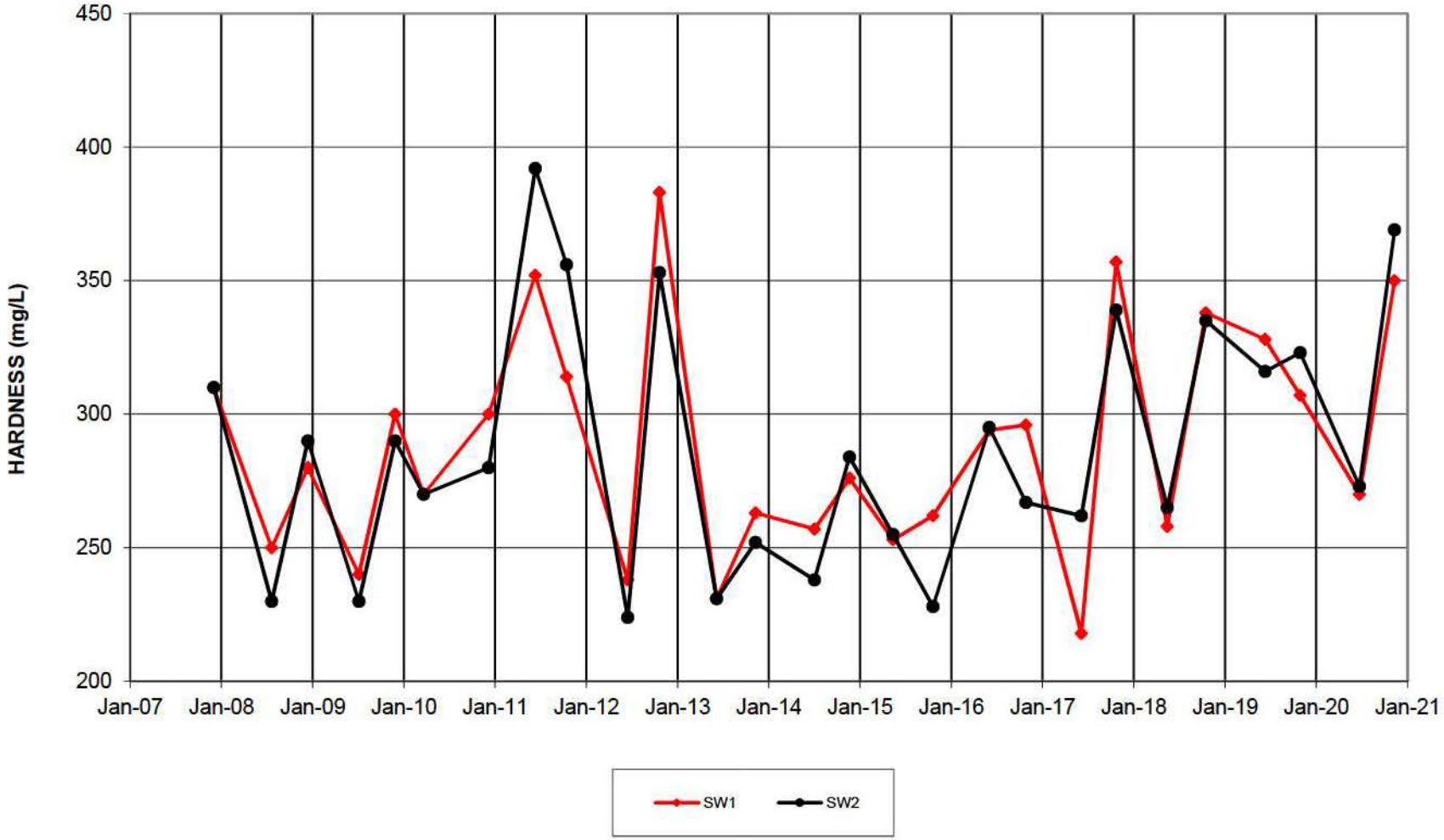

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FIGURE F-3
DOC - SURFACE WATER
HURON LANDFILL

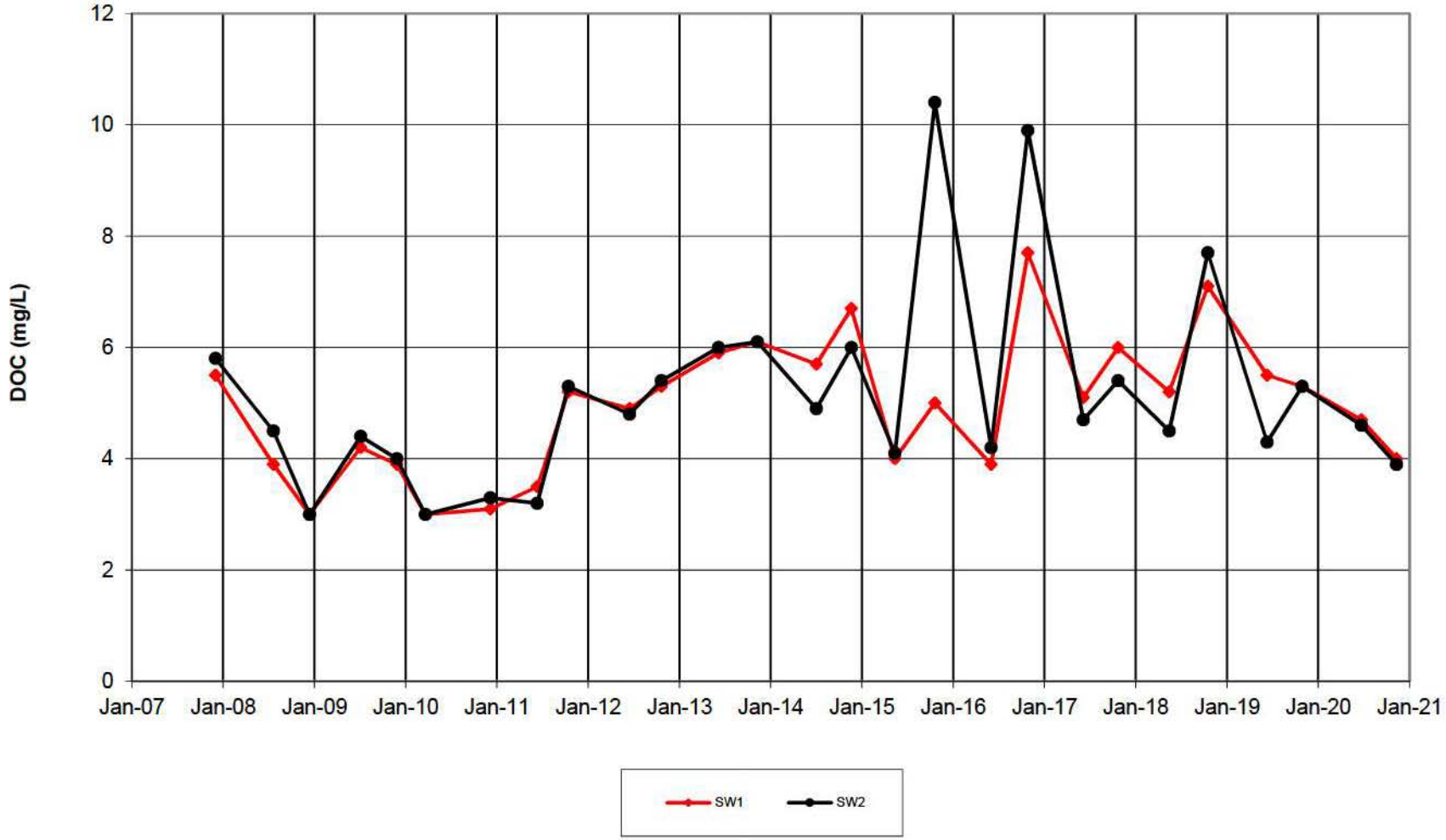

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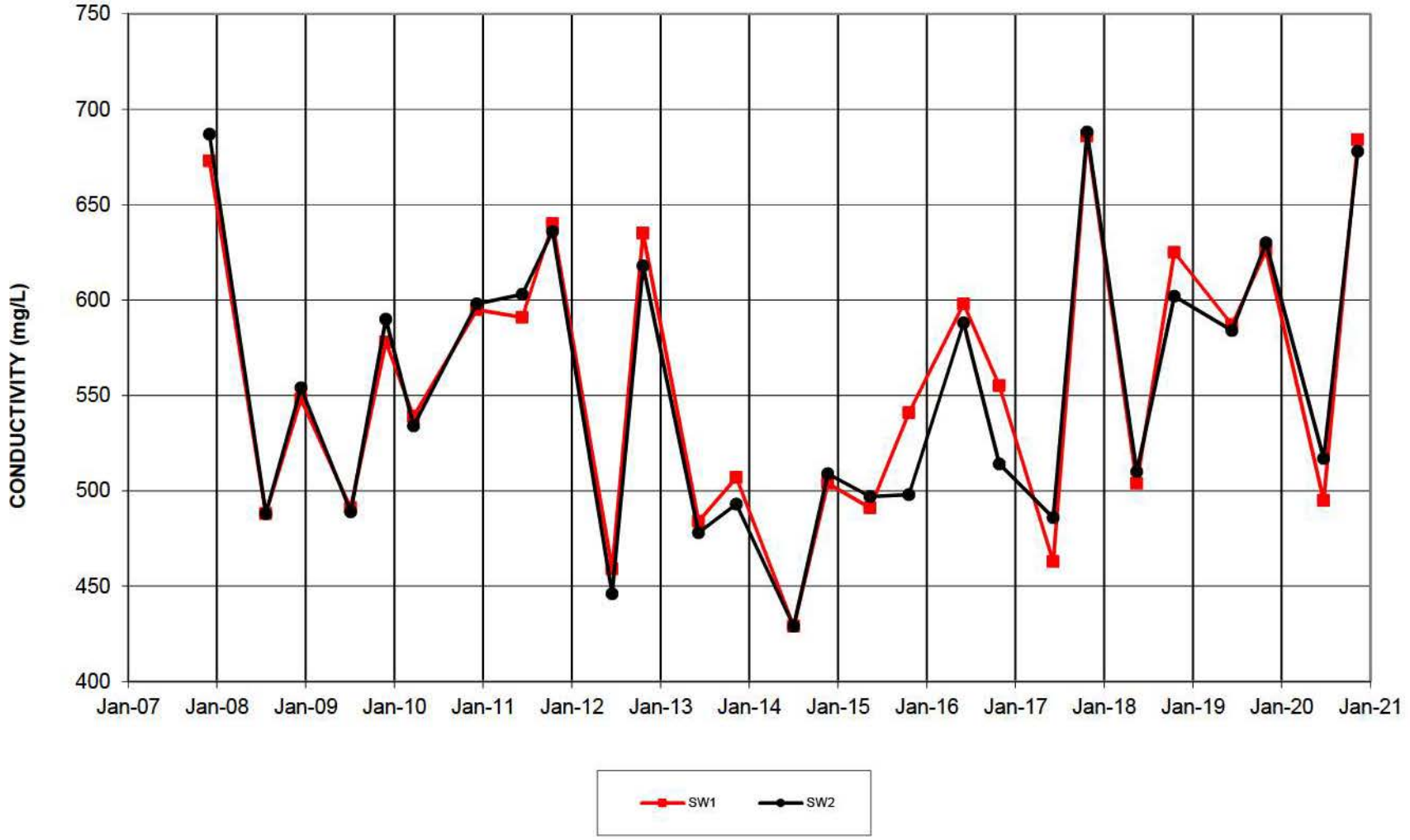
FIGURE F-4
CONDUCTIVITY - SURFACE WATER
HURON LANDFILL



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APPENDIX

G CERTIFICATES OF ANALYSIS AND LABORATORY RESULTS

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G95060, G95061 **REPORT No. B20-18630**

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WSP Canada Inc.
1450 1st Ave. West, Suite 101
Owen Sound ON N4K 6W2 Canada
Attention: Kaurel Tamasauskas

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 06-Jul-20
DATE REPORTED: 10-Jul-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-13
WATERWORKS NO.

			Client I.D.		OW1	OW3	OW4	OW5
			Sample I.D.		B20-18630-1	B20-18630-2	B20-18630-3	B20-18630-4
			Date Collected		02-Jul-20	02-Jul-20	02-Jul-20	02-Jul-20
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
pH @25°C	pH Units		SM 4500H	07-Jul-20/O	7.82	7.84	7.88	8.08
Conductivity @25°C	µmho/cm	1	SM 2510B	07-Jul-20/O	1020	992	769	839
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	07-Jul-20/O	383	359	294	320
Hardness (as CaCO3)	mg/L	1	SM 3120	08-Jul-20/O	474	373	417	413
Chloride	mg/L	0.5	SM4110C	07-Jul-20/O	58.7	103	12.4	59.4
Nitrite (N)	mg/L	0.05	SM4110C	07-Jul-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	07-Jul-20/O	0.19	0.42	0.16	0.16
Sulphate	mg/L	1	SM4110C	07-Jul-20/O	105	18	124	57
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	07-Jul-20/O	5.0	2.6	4.2	3.8
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Jul-20/K	0.15	0.08	0.06	0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	07-Jul-20/K	0.5	0.5	0.2	0.2
Phenolics	mg/L	0.002	MOEE 3179	08-Jul-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Calcium	mg/L	0.02	SM 3120	08-Jul-20/O	101	74.2	92.6	85.8
Magnesium	mg/L	0.02	SM 3120	08-Jul-20/O	53.8	45.7	45.2	48.3
Potassium	mg/L	0.1	SM 3120	08-Jul-20/O	3.0	1.9	1.7	1.7
Sodium	mg/L	0.2	SM 3120	08-Jul-20/O	50.1	40.2	18.0	33.9
Aluminum	mg/L	0.01	SM 3120	08-Jul-20/O	0.04	0.05	0.04	0.04
Arsenic	mg/L	0.0001	EPA 200.8	08-Jul-20/O	0.0011	0.0016	0.0005	0.0018
Barium	mg/L	0.001	SM 3120	08-Jul-20/O	0.102	0.096	0.085	0.102
Boron	mg/L	0.005	SM 3120	08-Jul-20/O	0.407	0.121	0.046	0.104
Cadmium	mg/L	).000015	EPA 200.8	08-Jul-20/O	0.000030	< 0.000015	0.000074	0.000021
Chromium	mg/L	0.002	SM 3120	08-Jul-20/O	< 0.002	< 0.002	< 0.002	< 0.002
Copper	mg/L	0.002	SM 3120	08-Jul-20/O	< 0.002	< 0.002	< 0.002	< 0.002
Iron	mg/L	0.005	SM 3120	08-Jul-20/O	0.041	0.023	< 0.005	< 0.005

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

Steve Garrett
Director of Laboratory Services

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G95060, G95061 **REPORT No. B20-18630**

Report To:

WSP Canada Inc.
1450 1st Ave. West, Suite 101
Owen Sound ON N4K 6W2 Canada
Attention: Kaurel Tamasauskas

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 06-Jul-20
DATE REPORTED: 10-Jul-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-13
WATERWORKS NO.

			Client I.D.		OW1	OW3	OW4	OW5
			Sample I.D.		B20-18630-1	B20-18630-2	B20-18630-3	B20-18630-4
			Date Collected		02-Jul-20	02-Jul-20	02-Jul-20	02-Jul-20
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Lead	mg/L	0.00002	EPA 200.8	08-Jul-20/O	0.00005	0.00007	0.00006	0.00003
Manganese	mg/L	0.001	SM 3120	08-Jul-20/O	0.040	0.002	< 0.001	< 0.001
Zinc	mg/L	0.005	SM 3120	08-Jul-20/O	0.013	< 0.005	0.006	< 0.005
Anion Sum	meq/L		Calc.	09-Jul-20/O	11.5	10.5	8.82	9.27
Cation Sum	meq/L		Calc.	09-Jul-20/O	11.7	9.27	9.17	9.78
% Difference	%		Calc.	09-Jul-20/O	1.02	6.13	1.94	2.68
Ion Ratio	AS/CS		Calc.	09-Jul-20/O	0.980	1.13	0.962	0.948
Sodium Adsorption Ratio	-		Calc.	09-Jul-20/O	1.00	0.906	0.384	0.726
TDS(ion sum calc.)	mg/L	1	Calc.	09-Jul-20/O	602	498	471	478
Conductivity (calc.)	µmho/cm		Calc.	09-Jul-20/O	1041	920	817	874
TDS(calc.)/EC(actual)	-		Calc.	09-Jul-20/O	0.587	0.502	0.612	0.570
EC(calc.)/EC(actual)	-		Calc.	09-Jul-20/O	1.02	0.928	1.06	1.04
Langelier Index(25°C)	S.I.		Calc.	09-Jul-20/O	0.935	0.803	0.852	1.06

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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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Fax: 705-252-5746

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JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-13
WATERWORKS NO.

			Client I.D.		OW6	OW7S	OW7D	OW8S
			Sample I.D.		B20-18630-5	B20-18630-6	B20-18630-7	B20-18630-8
			Date Collected		02-Jul-20	02-Jul-20	02-Jul-20	02-Jul-20
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
pH @25°C	pH Units		SM 4500H	07-Jul-20/O	7.39	8.01	8.08	8.07
Conductivity @25°C	µmho/cm	1	SM 2510B	07-Jul-20/O	3610	507	465	726
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	07-Jul-20/O	1410	168	165	216
Hardness (as CaCO3)	mg/L	1	SM 3120	08-Jul-20/O	1170	145	89	252
Chloride	mg/L	0.5	SM4110C	07-Jul-20/O	458	27.8	10.9	47.5
Nitrite (N)	mg/L	0.05	SM4110C	07-Jul-20/O	< 0.5	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	07-Jul-20/O	0.70	0.13	0.34	0.10
Sulphate	mg/L	1	SM4110C	07-Jul-20/O	< 10	50	60	98
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	07-Jul-20/O	107	3.6	2.3	1.2
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Jul-20/K	25.2	0.02	0.01	0.03
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	07-Jul-20/K	47.0	< 0.1	0.1	0.1
Phenolics	mg/L	0.002	MOEE 3179	08-Jul-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Calcium	mg/L	0.02	SM 3120	08-Jul-20/O	152	28.9	20.1	41.8
Magnesium	mg/L	0.02	SM 3120	08-Jul-20/O	191	17.7	9.50	35.8
Potassium	mg/L	0.1	SM 3120	08-Jul-20/O	21.5	1.1	1.0	1.6
Sodium	mg/L	0.2	SM 3120	08-Jul-20/O	414	57.7	73.6	66.8
Aluminum	mg/L	0.01	SM 3120	08-Jul-20/O	0.07	0.02	< 0.01	0.02
Arsenic	mg/L	0.0001	EPA 200.8	08-Jul-20/O	0.0072	0.0006	0.0004	0.0007
Barium	mg/L	0.001	SM 3120	08-Jul-20/O	0.746	0.040	0.042	0.053
Boron	mg/L	0.005	SM 3120	08-Jul-20/O	0.607	0.292	0.448	0.401
Cadmium	mg/L	0.000015	EPA 200.8	08-Jul-20/O	< 0.000070	0.000036	0.000108	0.000030
Chromium	mg/L	0.002	SM 3120	08-Jul-20/O	0.003	< 0.002	< 0.002	< 0.002
Copper	mg/L	0.002	SM 3120	08-Jul-20/O	< 0.002	< 0.002	< 0.002	< 0.002
Iron	mg/L	0.005	SM 3120	08-Jul-20/O	3.02	< 0.005	< 0.005	0.005

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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P.O. NUMBER: 121-60020-13
WATERWORKS NO.

			Client I.D.		OW6	OW7S	OW7D	OW8S
			Sample I.D.		B20-18630-5	B20-18630-6	B20-18630-7	B20-18630-8
			Date Collected		02-Jul-20	02-Jul-20	02-Jul-20	02-Jul-20
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Lead	mg/L	0.00002	EPA 200.8	08-Jul-20/O	0.00020	0.00006	0.00007	0.00004
Manganese	mg/L	0.001	SM 3120	08-Jul-20/O	0.028	< 0.001	< 0.001	< 0.001
Zinc	mg/L	0.005	SM 3120	08-Jul-20/O	< 0.005	< 0.005	< 0.005	< 0.005
Anion Sum	meq/L		Calc.	09-Jul-20/O	41.2	5.20	4.88	7.70
Cation Sum	meq/L		Calc.	09-Jul-20/O	43.8	5.43	5.01	7.98
% Difference	%		Calc.	09-Jul-20/O	3.09	2.17	1.37	1.80
Ion Ratio	AS/CS		Calc.	09-Jul-20/O	0.940	0.958	0.973	0.965
Sodium Adsorption Ratio	-		Calc.	09-Jul-20/O	5.27	2.09	3.39	1.83
TDS(ion sum calc.)	mg/L	1	Calc.	09-Jul-20/O	2118	284	274	421
Conductivity (calc.)	µmho/cm		Calc.	09-Jul-20/O	3377	514	474	747
TDS(calc.)/EC(actual)	-		Calc.	09-Jul-20/O	0.587	0.561	0.590	0.580
EC(calc.)/EC(actual)	-		Calc.	09-Jul-20/O	0.935	1.01	1.02	1.03
Langelier Index(25°C)	S.I.		Calc.	09-Jul-20/O	1.20	0.254	0.159	0.564

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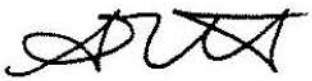
1450 1st Ave. West, Suite 101
Owen Sound ON N4K 6W2 Canada
Attention: Kaurel Tamasauskas

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 06-Jul-20
DATE REPORTED: 10-Jul-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-13
WATERWORKS NO.

	Client I.D.				OW8D	OW9	OW10S	OW10D
	Sample I.D.				B20-18630-9	B20-18630-10	B20-18630-11	B20-18630-12
	Date Collected				02-Jul-20	02-Jul-20	02-Jul-20	02-Jul-20
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
pH @25°C	pH Units		SM 4500H	07-Jul-20/O	8.09	8.05	8.01	8.01
Conductivity @25°C	µmho/cm	1	SM 2510B	07-Jul-20/O	700	674	785	566
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	07-Jul-20/O	152	101	245	200
Hardness (as CaCO3)	mg/L	1	SM 3120	08-Jul-20/O	187	174	368	231
Chloride	mg/L	0.5	SM4110C	07-Jul-20/O	8.6	2.2	1.2	6.2
Nitrite (N)	mg/L	0.05	SM4110C	07-Jul-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	07-Jul-20/O	0.28	0.27	0.30	0.78
Sulphate	mg/L	1	SM4110C	07-Jul-20/O	194	234	192	91
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	07-Jul-20/O	4.0	1.7	1.3	1.5
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Jul-20/K	0.01	0.10	0.07	0.03
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	07-Jul-20/K	0.1	0.3	< 0.1	< 0.1
Phenolics	mg/L	0.002	MOEE 3179	08-Jul-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Calcium	mg/L	0.02	SM 3120	08-Jul-20/O	39.7	37.2	71.8	51.0
Magnesium	mg/L	0.02	SM 3120	08-Jul-20/O	21.3	19.8	45.8	25.2
Potassium	mg/L	0.1	SM 3120	08-Jul-20/O	1.5	1.3	1.8	1.4
Sodium	mg/L	0.2	SM 3120	08-Jul-20/O	85.2	78.2	41.6	22.2
Aluminum	mg/L	0.01	SM 3120	08-Jul-20/O	0.02	0.01	0.04	0.01
Arsenic	mg/L	0.0001	EPA 200.8	08-Jul-20/O	0.0002	0.0037	0.0003	0.0003
Barium	mg/L	0.001	SM 3120	08-Jul-20/O	0.030	0.025	0.028	0.115
Boron	mg/L	0.005	SM 3120	08-Jul-20/O	0.515	0.486	0.333	0.135
Cadmium	mg/L	0.000015	EPA 200.8	08-Jul-20/O	0.000136	0.000063	0.000017	< 0.000015
Chromium	mg/L	0.002	SM 3120	08-Jul-20/O	< 0.002	< 0.002	< 0.002	< 0.002
Copper	mg/L	0.002	SM 3120	08-Jul-20/O	< 0.002	< 0.002	< 0.002	< 0.002



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

Steve Garrett
Director of Laboratory Services

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G95060, G95061 **REPORT No. B20-18630**

Report To:

WSP Canada Inc.
1450 1st Ave. West, Suite 101
Owen Sound ON N4K 6W2 Canada
Attention: Kaurel Tamasauskas

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 06-Jul-20
DATE REPORTED: 10-Jul-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-13
WATERWORKS NO.

			Client I.D.		OW8D	OW9	OW10S	OW10D
			Sample I.D.		B20-18630-9	B20-18630-10	B20-18630-11	B20-18630-12
			Date Collected		02-Jul-20	02-Jul-20	02-Jul-20	02-Jul-20
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Iron	mg/L	0.005	SM 3120	08-Jul-20/O	< 0.005	< 0.005	0.014	< 0.005
Lead	mg/L	0.00002	EPA 200.8	08-Jul-20/O	< 0.00002	< 0.00002	0.00003	< 0.00002
Manganese	mg/L	0.001	SM 3120	08-Jul-20/O	0.002	0.014	< 0.001	0.019
Zinc	mg/L	0.005	SM 3120	08-Jul-20/O	< 0.005	< 0.005	< 0.005	< 0.005
Anion Sum	meq/L		Calc.	09-Jul-20/O	7.34	6.97	8.94	6.13
Cation Sum	meq/L		Calc.	09-Jul-20/O	7.48	6.92	9.21	5.62
% Difference	%		Calc.	09-Jul-20/O	0.954	0.376	1.44	4.36
Ion Ratio	AS/CS		Calc.	09-Jul-20/O	0.981	1.01	0.972	1.09
Sodium Adsorption Ratio	-		Calc.	09-Jul-20/O	2.71	2.58	0.944	0.637
TDS(ion sum calc.)	mg/L	1	Calc.	09-Jul-20/O	442	434	501	317
Conductivity (calc.)	µmho/cm		Calc.	09-Jul-20/O	728	708	835	555
TDS(calc.)/EC(actual)	-		Calc.	09-Jul-20/O	0.631	0.643	0.638	0.561
EC(calc.)/EC(actual)	-		Calc.	09-Jul-20/O	1.04	1.05	1.06	0.980
Langelier Index(25°C)	S.I.		Calc.	09-Jul-20/O	0.408	0.160	0.792	0.576

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Steve Garrett
Director of Laboratory Services

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G95060, G95061 **REPORT No. B20-18630**

Report To:

WSP Canada Inc.
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Attention: Kaurel Tamasauskas

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Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 06-Jul-20
DATE REPORTED: 10-Jul-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-13
WATERWORKS NO.

			Client I.D.		OW11	DUPLICATE #1		
			Sample I.D.		B20-18630-13	B20-18630-14		
			Date Collected		02-Jul-20	02-Jul-20		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
pH @25°C	pH Units		SM 4500H	07-Jul-20/O	7.25	8.00		
Conductivity @25°C	µmho/cm	1	SM 2510B	07-Jul-20/O	2490	789		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	07-Jul-20/O	991	243		
Hardness (as CaCO3)	mg/L	1	SM 3120	08-Jul-20/O	988	367		
Chloride	mg/L	0.5	SM4110C	07-Jul-20/O	260	1.5		
Nitrite (N)	mg/L	0.05	SM4110C	07-Jul-20/O	0.16	< 0.05		
Nitrate (N)	mg/L	0.05	SM4110C	07-Jul-20/O	0.07	0.31		
Sulphate	mg/L	1	SM4110C	07-Jul-20/O	2	192		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	07-Jul-20/O	14.9	1.7		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Jul-20/K	56.4	0.04		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	07-Jul-20/K	66.1	< 0.1		
Phenolics	mg/L	0.002	MOEE 3179	08-Jul-20/K	0.003	< 0.002		
Calcium	mg/L	0.02	SM 3120	08-Jul-20/O	177	71.7		
Magnesium	mg/L	0.02	SM 3120	08-Jul-20/O	133	45.7		
Potassium	mg/L	0.1	SM 3120	08-Jul-20/O	42.7	1.8		
Sodium	mg/L	0.2	SM 3120	08-Jul-20/O	111	41.7		
Aluminum	mg/L	0.01	SM 3120	08-Jul-20/O	0.22	0.03		
Arsenic	mg/L	0.0001	EPA 200.8	08-Jul-20/O	0.0110	0.0003		
Barium	mg/L	0.001	SM 3120	08-Jul-20/O	0.233	0.027		
Boron	mg/L	0.005	SM 3120	08-Jul-20/O	0.729	0.332		
Cadmium	mg/L	0.000015	EPA 200.8	08-Jul-20/O	< 0.000070	0.000018		
Chromium	mg/L	0.002	SM 3120	08-Jul-20/O	< 0.002	< 0.002		

Steve Garrett
Director of Laboratory Services

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G95060, G95061 **REPORT No. B20-18630**

Report To:

WSP Canada Inc.
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Owen Sound ON N4K 6W2 Canada
Attention: Kaurel Tamasauskas

Caduceon Environmental Laboratories
112 Commerce Park Drive
Barrie ON L4N 8W8
Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 06-Jul-20
DATE REPORTED: 10-Jul-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-13
WATERWORKS NO.

			Client I.D.		OW11	DUPLICATE #1		
			Sample I.D.		B20-18630-13	B20-18630-14		
			Date Collected		02-Jul-20	02-Jul-20		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Copper	mg/L	0.002	SM 3120	08-Jul-20/O	< 0.002	< 0.002		
Iron	mg/L	0.005	SM 3120	08-Jul-20/O	35.3	0.015		
Lead	mg/L	0.00002	EPA 200.8	08-Jul-20/O	0.00081	0.00002		
Manganese	mg/L	0.001	SM 3120	08-Jul-20/O	0.240	< 0.001		
Zinc	mg/L	0.005	SM 3120	08-Jul-20/O	0.007	< 0.005		
Anion Sum	meq/L		Calc.	09-Jul-20/O	27.2	8.93		
Cation Sum	meq/L		Calc.	09-Jul-20/O	31.5	9.20		
% Difference	%		Calc.	09-Jul-20/O	7.39	1.49		
Ion Ratio	AS/CS		Calc.	09-Jul-20/O	0.862	0.971		
Sodium Adsorption Ratio	-		Calc.	09-Jul-20/O	1.54	0.946		
TDS(ion sum calc.)	mg/L	1	Calc.	09-Jul-20/O	1429	501		
Conductivity (calc.)	µmho/cm		Calc.	09-Jul-20/O	2417	835		
TDS(calc.)/EC(actual)	-		Calc.	09-Jul-20/O	0.574	0.634		
EC(calc.)/EC(actual)	-		Calc.	09-Jul-20/O	0.971	1.06		
Langelier Index(25°C)	S.I.		Calc.	09-Jul-20/O	0.980	0.779		

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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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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G95061A **REPORT No. B20-18631**

Report To:

WSP Canada Inc.
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Owen Sound ON N4K 6W2 Canada
Attention: Kaurel Tamasauskas

Caduceon Environmental Laboratories
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Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 06-Jul-20
DATE REPORTED: 10-Jul-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-30060-13
WATERWORKS NO.

	Client I.D.				SW1	SW2	SW3	DUPLICATE #2
	Sample I.D.				B20-18631-1	B20-18631-2	B20-18631-3	B20-18631-4
	Date Collected				02-Jul-20	02-Jul-20	02-Jul-20	02-Jul-20
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
pH @25°C	pH Units		SM 4500H	07-Jul-20/O	8.15	8.21	10.0	8.25
Conductivity @25°C	µmho/cm	1	SM 2510B	07-Jul-20/O	495	517	689	518
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	07-Jul-20/O	203	213	176	209
Hardness (as CaCO3)	mg/L	1	SM 3120	07-Jul-20/O	270	273	100	268
Chloride	mg/L	0.5	SM4110C	07-Jul-20/O	18.8	20.0	102	20.1
Nitrite (N)	mg/L	0.05	SM4110C	07-Jul-20/O	0.06	0.06	< 0.05	0.06
Nitrate (N)	mg/L	0.05	SM4110C	07-Jul-20/O	4.69	5.85	0.06	5.84
Sulphate	mg/L	1	SM4110C	07-Jul-20/O	16	17	7	16
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	07-Jul-20/O	4.7	4.6	38.8	5.5
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Jul-20/K	0.09	0.08	0.13	0.06
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	07-Jul-20/K	0.7	0.6	4.6	0.6
Phosphorus-Total	mg/L	0.01	E3199A.1	07-Jul-20/K	0.04	0.03	0.16	0.04
Phenolics	mg/L	0.002	MOEE 3179	08-Jul-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Calcium	mg/L	0.02	SM 3120	07-Jul-20/O	60.3	62.8	12.2	61.6
Magnesium	mg/L	0.02	SM 3120	07-Jul-20/O	29.0	28.1	16.8	27.8
Potassium	mg/L	0.1	SM 3120	07-Jul-20/O	2.5	2.6	22.5	2.6
Sodium	mg/L	0.2	SM 3120	07-Jul-20/O	6.0	6.0	106	5.9
Aluminum (total)	mg/L	0.01	SM 3120	07-Jul-20/O	0.11	0.08	0.63	0.08
Arsenic	mg/L	0.0001	EPA 200.8	08-Jul-20/O	0.0006	0.0006	0.0151	0.0006
Beryllium	mg/L	0.002	SM 3120	07-Jul-20/O	< 0.002	< 0.002	< 0.002	< 0.002
Boron	mg/L	0.005	SM 3120	07-Jul-20/O	0.022	0.022	1.50	0.024
Cadmium	mg/L	0.000015	EPA 200.8	08-Jul-20/O	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Chromium	mg/L	0.002	SM 3120	07-Jul-20/O	< 0.002	< 0.002	0.002	< 0.002

Steve Garrett
Director of Laboratory Services

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G95061A **REPORT No. B20-18631**

Report To:

WSP Canada Inc.
1450 1st Ave. West, Suite 101
Owen Sound ON N4K 6W2 Canada
Attention: Kaurel Tamasauskas

Caduceon Environmental Laboratories
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Tel: 705-252-5743
Fax: 705-252-5746

DATE RECEIVED: 06-Jul-20
DATE REPORTED: 10-Jul-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-30060-13
WATERWORKS NO.

			Client I.D.		SW1	SW2	SW3	DUPLICATE #2
			Sample I.D.		B20-18631-1	B20-18631-2	B20-18631-3	B20-18631-4
			Date Collected		02-Jul-20	02-Jul-20	02-Jul-20	02-Jul-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Cobalt	mg/L	0.005	SM 3120	07-Jul-20/O	< 0.005	< 0.005	< 0.005	< 0.005
Copper	mg/L	0.002	SM 3120	07-Jul-20/O	< 0.002	< 0.002	< 0.002	< 0.002
Iron	mg/L	0.005	SM 3120	07-Jul-20/O	0.139	0.101	1.10	0.103
Lead	mg/L	0.00002	EPA 200.8	08-Jul-20/O	0.00010	0.00016	0.00127	0.00012
Manganese	mg/L	0.001	SM 3120	07-Jul-20/O	0.011	0.009	0.087	0.008
Molybdenum	mg/L	0.0001	EPA 200.8	08-Jul-20/O	0.0003	0.0004	0.0009	0.0004
Nickel	mg/L	0.01	SM 3120	07-Jul-20/O	< 0.01	< 0.01	< 0.01	< 0.01
Silver	mg/L	0.0001	EPA 200.8	08-Jul-20/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Vanadium	mg/L	0.005	SM 3120	07-Jul-20/O	< 0.005	< 0.005	< 0.005	< 0.005
Zinc	mg/L	0.005	SM 3120	07-Jul-20/O	< 0.005	< 0.005	< 0.005	< 0.005
Anion Sum	meq/L		Calc.	09-Jul-20/O	5.26	5.60	6.53	5.50
Cation Sum	meq/L		Calc.	09-Jul-20/O	5.73	5.78	7.24	5.69
% Difference	%		Calc.	09-Jul-20/O	4.30	1.63	5.10	1.75
Ion Ratio	AS/CS		Calc.	09-Jul-20/O	0.918	0.968	0.903	0.966
Sodium Adsorption Ratio	-		Calc.	09-Jul-20/O	0.160	0.157	4.60	0.156
TDS(ion sum calc.)	mg/L	1	Calc.	09-Jul-20/O	255	264	373	260
Conductivity (calc.)	µmho/cm		Calc.	09-Jul-20/O	499	512	699	504
TDS(calc.)/EC(actual)	-		Calc.	09-Jul-20/O	0.515	0.511	0.541	0.501
EC(calc.)/EC(actual)	-		Calc.	09-Jul-20/O	1.01	0.990	1.01	0.973
Langelier Index(25°C)	S.I.		Calc.	09-Jul-20/O	0.804	0.904	1.91	0.926

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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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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B20-37410

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
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DATE RECEIVED: 26-Nov-20
DATE REPORTED: 09-Dec-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-20-100-2
WATERWORKS NO.

			Client I.D.		OW1	OW3	OW4	OW5
			Sample I.D.		B20-37410-1	B20-37410-2	B20-37410-3	B20-37410-4
			Date Collected		20-Nov-20	20-Nov-20	20-Nov-20	20-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	30-Nov-20/O	508	407	441	409
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	27-Nov-20/O	373	359	296	298
pH @25°C	pH Units		SM 4500H	27-Nov-20/O	7.77	7.64	7.71	7.95
Conductivity @25°C	µmho/cm	1	SM 2510B	27-Nov-20/O	1090	1040	845	858
Chloride	mg/L	0.5	SM4110C	27-Nov-20/O	72.3	102	15.9	60.8
Nitrite (N)	mg/L	0.05	SM4110C	27-Nov-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	27-Nov-20/O	0.22	0.20	0.08	0.09
Sulphate	mg/L	1	SM4110C	27-Nov-20/O	96	18	130	55
Calcium	mg/L	0.02	SM 3120	30-Nov-20/O	113	87.0	101	87.7
Magnesium	mg/L	0.02	SM 3120	30-Nov-20/O	54.9	46.2	45.9	46.2
Potassium	mg/L	0.1	SM 3120	30-Nov-20/O	3.0	2.0	1.7	1.5
Sodium	mg/L	0.2	SM 3120	30-Nov-20/O	51.3	35.6	19.0	33.5
Aluminum	mg/L	0.01	SM 3120	30-Nov-20/O	0.06	0.05	0.06	0.05
Arsenic	mg/L	0.0001	EPA 200.8	07-Dec-20/O	0.0008	0.0016	0.0006	0.0020
Barium	mg/L	0.001	SM 3120	30-Nov-20/O	0.106	0.090	0.086	0.099
Boron	mg/L	0.005	SM 3120	30-Nov-20/O	0.442	0.113	0.055	0.109
Cadmium	mg/L	).000015	EPA 200.8	07-Dec-20/O	0.000040	< 0.000028	0.000041	0.000030
Chromium	mg/L	0.002	SM 3120	30-Nov-20/O	< 0.002	< 0.002	< 0.002	< 0.002
Copper	mg/L	0.0001	EPA 200.8	07-Dec-20/O	0.0023	0.0092	0.0033	0.0064
Iron	mg/L	0.005	SM 3120	30-Nov-20/O	0.011	0.014	0.005	0.007
Lead	mg/L	0.00002	EPA 200.8	07-Dec-20/O	0.00008	0.00012	0.00006	0.00005
Manganese	mg/L	0.001	SM 3120	30-Nov-20/O	0.004	0.018	0.006	0.006
Zinc	mg/L	0.005	SM 3120	30-Nov-20/O	0.011	< 0.005	0.006	< 0.005
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	30-Nov-20/K	0.04	0.04	0.03	0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	01-Dec-20/K	1.0	0.5	0.2	0.2
Phenolics	mg/L	0.002	MOEE 3179	30-Nov-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	27-Nov-20/O	4.9	3.1	3.0	2.5

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Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Final Report

C.O.C.: ---

REPORT No. B20-37410

Report To:

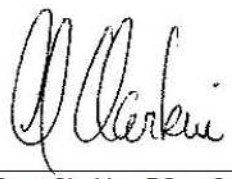
WSP Canada Inc.
1450 1st Ave. West, Suite 101
Owen Sound ON N4K 6W2 Canada
Attention: Kaurel Tamasauskas

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 26-Nov-20
DATE REPORTED: 09-Dec-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-20-100-2
WATERWORKS NO.

			Client I.D.		OW1	OW3	OW4	OW5
			Sample I.D.		B20-37410-1	B20-37410-2	B20-37410-3	B20-37410-4
			Date Collected		20-Nov-20	20-Nov-20	20-Nov-20	20-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Anion Sum	meq/L		Calc.	01-Dec-20/O	11.5	10.4	9.08	8.82
Cation Sum	meq/L		Calc.	01-Dec-20/O	12.5	9.74	9.69	9.68
% Difference	%		Calc.	01-Dec-20/O	4.05	3.45	3.22	4.61
Ion Ratio	AS/CS		Calc.	01-Dec-20/O	0.922	1.07	0.938	0.912
Sodium Adsorption Ratio	-		Calc.	01-Dec-20/O	0.990	0.767	0.394	0.721
TDS(ion sum calc.)	mg/L	1	Calc.	01-Dec-20/O	614	506	491	464
Conductivity (calc.)	µmho/cm		Calc.	01-Dec-20/O	1080	941	852	857
TDS(calc.)/EC(actual)	-		Calc.	01-Dec-20/O	0.564	0.486	0.582	0.540
EC(calc.)/EC(actual)	-		Calc.	01-Dec-20/O	0.992	0.903	1.01	0.999
Langelier Index(25°C)	S.I.		Calc.	01-Dec-20/O	0.922	0.672	0.723	0.905



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Lab Manager - Ottawa District

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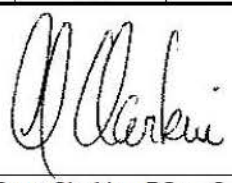
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-20-100-2
WATERWORKS NO.

			Client I.D.		OW6	OW7S	OW7D	OW8S
			Sample I.D.		B20-37410-5	B20-37410-6	B20-37410-7	B20-37410-8
			Date Collected		20-Nov-20	20-Nov-20	20-Nov-20	20-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	30-Nov-20/O	1250	146	91	258
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	27-Nov-20/O	1430	155	151	199
pH @25°C	pH Units		SM 4500H	27-Nov-20/O	7.25	8.03	8.09	8.06
Conductivity @25°C	µmho/cm	1	SM 2510B	27-Nov-20/O	3960	512	473	737
Chloride	mg/L	0.5	SM4110C	27-Nov-20/O	520	29.2	10.2	49.7
Nitrite (N)	mg/L	0.05	SM4110C	27-Nov-20/O	< 0.5	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	27-Nov-20/O	< 0.5	< 0.05	0.31	< 0.05
Sulphate	mg/L	1	SM4110C	27-Nov-20/O	< 10	51	61	99
Calcium	mg/L	0.02	SM 3120	30-Nov-20/O	165	29.6	21.2	44.7
Magnesium	mg/L	0.02	SM 3120	30-Nov-20/O	203	17.4	9.36	35.5
Potassium	mg/L	0.1	SM 3120	30-Nov-20/O	25.8	1.0	0.9	1.5
Sodium	mg/L	0.2	SM 3120	30-Nov-20/O	445	56.2	70.8	65.2
Aluminum	mg/L	0.01	SM 3120	30-Nov-20/O	0.08	0.01	0.02	0.03
Arsenic	mg/L	0.0001	EPA 200.8	07-Dec-20/O	0.0049	0.0008	0.0004	0.0010
Barium	mg/L	0.001	SM 3120	30-Nov-20/O	0.769	0.036	0.039	0.053
Boron	mg/L	0.005	SM 3120	30-Nov-20/O	0.637	0.298	0.468	0.429
Cadmium	mg/L	).000015	EPA 200.8	07-Dec-20/O	< 0.000070	0.000052	0.000117	0.000023
Chromium	mg/L	0.002	SM 3120	30-Nov-20/O	0.004	< 0.002	< 0.002	< 0.002
Copper	mg/L	0.0001	EPA 200.8	07-Dec-20/O	0.0019	0.0031	0.0006	0.0021
Iron	mg/L	0.005	SM 3120	30-Nov-20/O	3.08	0.011	0.006	0.006
Lead	mg/L	0.00002	EPA 200.8	07-Dec-20/O	0.00017	0.00006	0.00002	0.00008
Manganese	mg/L	0.001	SM 3120	30-Nov-20/O	0.024	< 0.001	< 0.001	0.001
Zinc	mg/L	0.005	SM 3120	30-Nov-20/O	0.005	< 0.005	< 0.005	< 0.005
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	30-Nov-20/K	27.9	0.01	0.03	0.02
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	01-Dec-20/K	52.7	< 0.1	0.1	0.1
Phenolics	mg/L	0.002	MOEE 3179	30-Nov-20/K	0.004	< 0.002	< 0.002	< 0.002
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	27-Nov-20/O	82.4	2.5	3.4	0.7



Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Fax: 613-526-1244

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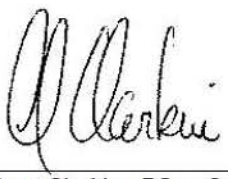
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-20-100-2
WATERWORKS NO.

			Client I.D.		OW6	OW7S	OW7D	OW8S
			Sample I.D.		B20-37410-5	B20-37410-6	B20-37410-7	B20-37410-8
			Date Collected		20-Nov-20	20-Nov-20	20-Nov-20	20-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Anion Sum	meq/L		Calc.	01-Dec-20/O	43.3	4.99	4.60	7.43
Cation Sum	meq/L		Calc.	01-Dec-20/O	47.1	5.38	4.93	8.03
% Difference	%		Calc.	01-Dec-20/O	4.14	3.72	3.52	3.83
Ion Ratio	AS/CS		Calc.	01-Dec-20/O	0.920	0.928	0.932	0.926
Sodium Adsorption Ratio	-		Calc.	01-Dec-20/O	5.48	2.03	3.22	1.77
TDS(ion sum calc.)	mg/L	1	Calc.	01-Dec-20/O	2258	278	264	415
Conductivity (calc.)	µmho/cm		Calc.	01-Dec-20/O	3592	506	460	741
TDS(calc.)/EC(actual)	-		Calc.	01-Dec-20/O	0.570	0.543	0.558	0.563
EC(calc.)/EC(actual)	-		Calc.	01-Dec-20/O	0.907	0.988	0.972	1.01
Langelier Index(25°C)	S.I.		Calc.	01-Dec-20/O	1.10	0.249	0.162	0.547



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Lab Manager - Ottawa District

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DATE RECEIVED: 26-Nov-20
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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-20-100-2
WATERWORKS NO.

			Client I.D.		OW8D	OW9	OW10S	OW10D
			Sample I.D.		B20-37410-9	B20-37410-10	B20-37410-11	B20-37410-12
			Date Collected		20-Nov-20	20-Nov-20	20-Nov-20	20-Nov-20
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	30-Nov-20/O	187	171	385	207
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	27-Nov-20/O	140	90	237	165
pH @25°C	pH Units		SM 4500H	27-Nov-20/O	8.07	8.05	7.93	8.08
Conductivity @25°C	µmho/cm	1	SM 2510B	27-Nov-20/O	703	677	824	551
Chloride	mg/L	0.5	SM4110C	27-Nov-20/O	7.9	2.4	1.8	3.6
Nitrite (N)	mg/L	0.05	SM4110C	27-Nov-20/O	< 0.05	0.07	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	27-Nov-20/O	0.24	0.09	0.26	< 0.05
Sulphate	mg/L	1	SM4110C	27-Nov-20/O	192	228	197	108
Calcium	mg/L	0.02	SM 3120	30-Nov-20/O	41.1	37.1	78.9	44.0
Magnesium	mg/L	0.02	SM 3120	30-Nov-20/O	20.6	19.0	45.6	23.6
Potassium	mg/L	0.1	SM 3120	30-Nov-20/O	1.3	1.1	1.9	1.1
Sodium	mg/L	0.2	SM 3120	30-Nov-20/O	82.3	74.7	40.1	27.5
Aluminum	mg/L	0.01	SM 3120	30-Nov-20/O	0.02	0.02	0.05	0.03
Arsenic	mg/L	0.0001	EPA 200.8	07-Dec-20/O	0.0003	0.0046	0.0002	0.0005
Barium	mg/L	0.001	SM 3120	30-Nov-20/O	0.028	0.022	0.028	0.097
Boron	mg/L	0.005	SM 3120	30-Nov-20/O	0.522	0.486	0.379	0.181
Cadmium	mg/L	).000015	EPA 200.8	07-Dec-20/O	0.00010	0.000080	0.000020	0.000018
Chromium	mg/L	0.002	SM 3120	30-Nov-20/O	< 0.002	< 0.002	< 0.002	< 0.002
Copper	mg/L	0.0001	EPA 200.8	07-Dec-20/O	0.0025	0.0008	0.0009	0.0006
Iron	mg/L	0.005	SM 3120	30-Nov-20/O	0.008	0.010	0.010	0.007
Lead	mg/L	0.00002	EPA 200.8	07-Dec-20/O	0.00005	0.00003	0.00004	0.00003
Manganese	mg/L	0.001	SM 3120	30-Nov-20/O	< 0.001	0.012	0.001	0.015
Zinc	mg/L	0.005	SM 3120	30-Nov-20/O	< 0.005	< 0.005	< 0.005	< 0.005
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	30-Nov-20/K	0.01	0.05	0.02	< 0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	01-Dec-20/K	0.1	0.2	< 0.1	< 0.1
Phenolics	mg/L	0.002	MOEE 3179	30-Nov-20/K	< 0.002	< 0.002	< 0.002	< 0.002

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WATERWORKS NO.

			Client I.D.		OW8D	OW9	OW10S	OW10D
			Sample I.D.		B20-37410-9	B20-37410-10	B20-37410-11	B20-37410-12
			Date Collected		20-Nov-20	20-Nov-20	20-Nov-20	20-Nov-20
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	27-Nov-20/O	0.9	1.1	1.6	1.4
Anion Sum	meq/L		Calc.	01-Dec-20/O	7.02	6.63	8.91	5.65
Cation Sum	meq/L		Calc.	01-Dec-20/O	7.36	6.70	9.48	5.36
% Difference	%		Calc.	01-Dec-20/O	2.32	0.507	3.11	2.58
Ion Ratio	AS/CS		Calc.	01-Dec-20/O	0.955	0.990	0.940	1.05
Sodium Adsorption Ratio	-		Calc.	01-Dec-20/O	2.62	2.49	0.889	0.832
TDS(ion sum calc.)	mg/L	1	Calc.	01-Dec-20/O	429	417	508	307
Conductivity (calc.)	µmho/cm		Calc.	01-Dec-20/O	710	684	848	534
TDS(calc.)/EC(actual)	-		Calc.	01-Dec-20/O	0.610	0.615	0.616	0.557
EC(calc.)/EC(actual)	-		Calc.	01-Dec-20/O	1.01	1.01	1.03	0.969
Langelier Index(25°C)	S.I.		Calc.	01-Dec-20/O	0.366	0.111	0.739	0.499

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P.O. NUMBER: 121-60020-20-100-2
WATERWORKS NO.

			Client I.D.		OW11	DUP#1		
			Sample I.D.		B20-37410-13	B20-37410-14		
			Date Collected		20-Nov-20	20-Nov-20		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	30-Nov-20/O	965	252		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	27-Nov-20/O	858	199		
pH @25°C	pH Units		SM 4500H	27-Nov-20/O	7.27	8.02		
Conductivity @25°C	µmho/cm	1	SM 2510B	27-Nov-20/O	2450	730		
Chloride	mg/L	0.5	SM4110C	27-Nov-20/O	287	49.9		
Nitrite (N)	mg/L	0.05	SM4110C	27-Nov-20/O	< 0.05	< 0.05		
Nitrate (N)	mg/L	0.05	SM4110C	27-Nov-20/O	< 0.05	< 0.05		
Sulphate	mg/L	1	SM4110C	27-Nov-20/O	2	98		
Calcium	mg/L	0.02	SM 3120	30-Nov-20/O	179	43.1		
Magnesium	mg/L	0.02	SM 3120	30-Nov-20/O	126	35.2		
Potassium	mg/L	0.1	SM 3120	30-Nov-20/O	28.1	1.5		
Sodium	mg/L	0.2	SM 3120	30-Nov-20/O	111	64.4		
Aluminum	mg/L	0.01	SM 3120	30-Nov-20/O	0.09	0.03		
Arsenic	mg/L	0.0001	EPA 200.8	07-Dec-20/O	0.0050	0.0011		
Barium	mg/L	0.001	SM 3120	30-Nov-20/O	0.287	0.051		
Boron	mg/L	0.005	SM 3120	30-Nov-20/O	0.565	0.419		
Cadmium	mg/L	).000015	EPA 200.8	07-Dec-20/O	< 0.000070	0.000020		
Chromium	mg/L	0.002	SM 3120	30-Nov-20/O	< 0.002	< 0.002		
Copper	mg/L	0.0001	EPA 200.8	07-Dec-20/O	0.0019	0.0007		
Iron	mg/L	0.005	SM 3120	30-Nov-20/O	0.036	< 0.005		
Lead	mg/L	0.00002	EPA 200.8	07-Dec-20/O	0.00380	0.00003		
Manganese	mg/L	0.001	SM 3120	30-Nov-20/O	0.182	0.001		
Zinc	mg/L	0.005	SM 3120	30-Nov-20/O	0.016	< 0.005		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	30-Nov-20/K	30.9	0.02		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	01-Dec-20/K	39.7	0.1		
Phenolics	mg/L	0.002	MOEE 3179	30-Nov-20/K	< 0.002	< 0.002		

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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Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B20-37410

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: 26-Nov-20
DATE REPORTED: 09-Dec-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-20-100-2
WATERWORKS NO.

			Client I.D.		OW11	DUP#1		
			Sample I.D.		B20-37410-13	B20-37410-14		
			Date Collected		20-Nov-20	20-Nov-20		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	27-Nov-20/O	14.6	1.3		
Anion Sum	meq/L		Calc.	01-Dec-20/O	25.3	7.44		
Cation Sum	meq/L		Calc.	01-Dec-20/O	27.0	7.89		
% Difference	%		Calc.	01-Dec-20/O	3.34	2.93		
Ion Ratio	AS/CS		Calc.	01-Dec-20/O	0.935	0.943		
Sodium Adsorption Ratio	-		Calc.	01-Dec-20/O	1.55	1.76		
TDS(ion sum calc.)	mg/L	1	Calc.	01-Dec-20/O	1288	412		
Conductivity (calc.)	µmho/cm		Calc.	01-Dec-20/O	2272	736		
TDS(calc.)/EC(actual)	-		Calc.	01-Dec-20/O	0.526	0.564		
EC(calc.)/EC(actual)	-		Calc.	01-Dec-20/O	0.927	1.01		
Langelier Index(25°C)	S.I.		Calc.	01-Dec-20/O	0.944	0.492		

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Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B20-37411

Report To:

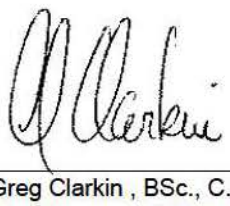
WSP Canada Inc.
1450 1st Ave. West, Suite 101
Owen Sound ON N4K 6W2 Canada
Attention: Kaurel Tamasauskas

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 26-Nov-20
DATE REPORTED: 04-Dec-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-20-100-2
WATERWORKS NO.

			Client I.D.		SW1	SW2	SW3	Dup #2
			Sample I.D.		B20-37411-1	B20-37411-2	B20-37411-3	B20-37411-4
			Date Collected		20-Nov-20	20-Nov-20	20-Nov-20	20-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	30-Nov-20/O	350	369	228	369
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	27-Nov-20/O	273	271	174	274
pH @25°C	pH Units		SM 4500H	27-Nov-20/O	8.29	8.31	7.95	8.31
Conductivity @25°C	µmho/cm	1	SM 2510B	27-Nov-20/O	684	678	756	680
Chloride	mg/L	0.5	SM4110C	27-Nov-20/O	23.0	24.0	82.2	23.2
Nitrite (N)	mg/L	0.05	SM4110C	27-Nov-20/O	< 0.05	< 0.05	0.08	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	27-Nov-20/O	7.53	7.81	0.36	7.59
Sulphate	mg/L	1	SM4110C	27-Nov-20/O	17	17	74	17
Calcium	mg/L	0.02	SM 3120	30-Nov-20/O	95.3	99.9	61.9	99.8
Magnesium	mg/L	0.02	SM 3120	30-Nov-20/O	27.3	28.9	17.8	29.1
Potassium	mg/L	0.1	SM 3120	30-Nov-20/O	2.1	2.3	18.3	2.3
Sodium	mg/L	0.2	SM 3120	30-Nov-20/O	6.6	7.0	54.2	7.0
Aluminum	mg/L	0.01	SM 3120	30-Nov-20/O	0.07	0.09	0.37	0.08
Arsenic	mg/L	0.0001	EPA 200.8	02-Dec-20/O	0.0003	0.0003	0.0015	0.0003
Beryllium	mg/L	0.0001	EPA 200.8	02-Dec-20/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Boron	mg/L	0.005	SM 3120	30-Nov-20/O	0.010	0.011	0.487	0.014
Cadmium	mg/L	).000015	EPA 200.8	02-Dec-20/O	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Chromium	mg/L	0.001	EPA 200.8	03-Dec-20/O	< 0.001	< 0.001	0.001	< 0.001
Cobalt	mg/L	0.0001	EPA 200.8	02-Dec-20/O	0.0001	0.0001	0.0006	0.0002
Copper	mg/L	0.0001	EPA 200.8	02-Dec-20/O	0.0012	0.0011	0.0016	0.0013
Iron	mg/L	0.005	SM 3120	30-Nov-20/O	0.098	0.140	0.855	0.094
Lead	mg/L	0.00002	EPA 200.8	02-Dec-20/O	0.00007	0.00014	0.00049	0.00008
Manganese	mg/L	0.001	SM 3120	30-Nov-20/O	0.005	0.007	0.127	0.006
Molybdenum	mg/L	0.0001	EPA 200.8	02-Dec-20/O	0.0002	0.0002	0.0009	0.0002
Nickel	mg/L	0.0002	EPA 200.8	02-Dec-20/O	0.0005	0.0005	0.0028	0.0005
Silver	mg/L	0.0001	EPA 200.8	02-Dec-20/O	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Vanadium	mg/L	0.0001	EPA 200.8	03-Dec-20/O	0.0006	0.0006	0.0010	0.0007



Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B20-37411

Report To:

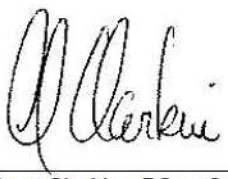
WSP Canada Inc.
1450 1st Ave. West, Suite 101
Owen Sound ON N4K 6W2 Canada
Attention: Kaurel Tamasauskas

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 26-Nov-20
DATE REPORTED: 04-Dec-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Huron Landfill - #101.16942.00
P.O. NUMBER: 121-60020-20-100-2
WATERWORKS NO.

			Client I.D.		SW1	SW2	SW3	Dup #2
			Sample I.D.		B20-37411-1	B20-37411-2	B20-37411-3	B20-37411-4
			Date Collected		20-Nov-20	20-Nov-20	20-Nov-20	20-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Zinc	mg/L	0.005	SM 3120	30-Nov-20/O	0.006	0.010	0.013	0.006
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	30-Nov-20/K	0.04	0.02	1.90	0.02
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	01-Dec-20/K	0.5	0.5	3.2	0.5
Phosphorus-Total	mg/L	0.01	E3199A.1	01-Dec-20/K	0.02	0.02	0.06	0.02
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	26-Nov-20/O	4.0	3.9	11.9	4.2
Phenolics	mg/L	0.002	MOEE 3179	30-Nov-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Anion Sum	meq/L		Calc.	01-Dec-20/O	7.00	7.00	7.36	7.02
Cation Sum	meq/L		Calc.	01-Dec-20/O	7.35	7.74	7.56	7.74
% Difference	%		Calc.	01-Dec-20/O	2.44	4.98	1.33	4.88
Ion Ratio	AS/CS		Calc.	01-Dec-20/O	0.952	0.905	0.974	0.907
Sodium Adsorption Ratio	-		Calc.	01-Dec-20/O	0.153	0.159	1.56	0.158
TDS(ion sum calc.)	mg/L	1	Calc.	01-Dec-20/O	335	342	416	343
Conductivity (calc.)	µmho/cm		Calc.	01-Dec-20/O	635	652	754	653
TDS(calc.)/EC(actual)	-		Calc.	01-Dec-20/O	0.490	0.504	0.551	0.504
EC(calc.)/EC(actual)	-		Calc.	01-Dec-20/O	0.928	0.962	0.997	0.961
Langelier Index(25°C)	S.I.		Calc.	01-Dec-20/O	1.25	1.29	0.519	1.29



Greg Clarkin , BSc., C. Chem
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.

Monitoring Report and Site Information	
Waste Disposal Site Name	Huron Waste Disposal Site
Location (e.g. street address, lot, concession)	Part Lots 19 and 20, Concession 5, in the Former Township of Huron,Township of Huron-Kinloss, County of Bruce
GPS Location (taken within the property boundary at front gate/ front entry)	451437 m E, 4878860 m N
Municipality	Township of Huron-Kinloss
Client and/or Site Owner	Township of Huron-Kinloss
Monitoring Period (Year)	2020
This Monitoring Report is being submitted under the following:	
Certificate of Approval No.:	A272601
Director's Order No.:	
Provincial Officer's Order No.:	
Other:	

Report Submission Frequency	◉ **Annual** ○ **Other**	Specify (Type Here):
The site is:	◉ **Active** ○ **Inactive** ○ **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?	○ **Yes** ◉ **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)	○ Yes ◉ 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:	(●) **Yes** ( ) **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):	(●) **Yes** ( ) **No** ( ) **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.	○ **Yes** ◉ **No** ○ **Not Applicable**	
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:	○ **Yes** ○ **No** ◉ **Not Applicable**	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

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):	◉ **Yes** ○ **No**	If no, specify (Type Here):

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

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.	◉ **Yes** ○ **No**		
6) The site meets compliance and assessment criteria.	○ **Yes** ◉ **No**	Reasonable Use Criteria (RUC) exceeded for DOC, as outlined in Section 4.2.3 of report	
7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.	◉ **Yes** ○ **No**		
1) Is one or more of the following risk reduction practices in place at the site: ***(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** ***(b)*** **There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or** ***(c)*** **The site meets the following two conditions (typically achieved after 15 years or longer of site operation):** ***i.*** **The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and** ***ii.*** **Seasonal and annual water levels and water quality fluctuations are well understood.**	◉ **Yes** ○ **No**	**Note which practice(s):**	☐ **(a)** ☐ **(b)** ☒ **(c)**
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	○ **Yes** ○ **No** ◉ **Not Applicable**	If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here):	

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:	Stephen J. Taziar, P. Eng		
Seal:	Add Image		
Signature:		**Date:**	1-Jun-2021
CEP Contact Information:	126 Don Hillock Drive, Unit 2 Aurora, ON L4G 0G9		
Company:	WSP Canada Inc.		
Address:	126 Don Hillock Drive, Unit 2 Aurora, ON L4G 0G9		
Telephone No.:	(289) 984-0426	Fax No. :	(905) 727-0463
E-mail Address:	stephen.taziar@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:	◉ Yes ○ 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):	◉ Yes ○ No ○ **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.	○ **Yes** ◉ **No** ○ **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:	○ **Yes** ○ **No** ◉ **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):	◉ **Yes** ○ **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)?	◉ **Yes** ○ **No**	Exceedances of PWQO at the downstream station are attributed to agricultural or upgradient sources.

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.	◉ **Yes** ○ **No**	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)
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)):	○ Yes ○ No ◉ Not Known ○ Not Applicable	If yes, provide details and whether remedial measures are necessary (Type Here)
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	○ **Yes** ○ **No** ◉ **Not Applicable**	If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here)

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:

◉ **No Changes to the monitoring program are recommended**	Type Here
○ **The following change(s) to the monitoring program is/are recommended:**	
◉ **No changes to the site design and operation are recommended**	Type Here
○ **The following change(s) to the site design and operation is/are recommended:**	

CEP Signature	
Relevant Discipline	Engineer
Date:	1-Jun-2021
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