REPORT

Huron Landfill Site

2023 Annual Monitoring Report

Submitted to:

TOWNSHIP OF HURON-KINLOSS

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March 31, 2024

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1.0 INTRODUCTION

1.1 Background

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

The landfill operates in accordance with Certificate of Approval No. A272601 (the ECA or CofA) issued on October 15, 1991, most recently amended in March 2012. The Certificate of Approval and amendments are enclosed in **APPENDIX A**.

The Township of Huron-Kinloss consists of the former Township of Huron, the former Township of Kinloss and the former Village of Lucknow. In 2023, the Huron Landfill serviced a population of approximately 7,000 residents in the Township.

On December 20, 2023, the Township applied for an amendment to the existing CofA to reflect the installation of a leachate collection system and tank at the Site.

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

As of July 2018, waste from the Village of Lucknow is also being landfilled at the Huron Landfill. This landfilling arrangement was reached prior to amalgamation. The Mid-Huron Landfill, located in Central Huron, closed on June 30, 2018. The Township of Huron-Kinloss had inquired as to waste from the Village of Lucknow could be landfilled at the Huron Landfill. The MECP has indicated that the inclusion of waste from the Village of Lucknow (in addition to waste from the former Township of Kinloss 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.

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 2023. The annual monitoring report (AMR) is required by Condition 11.1 of the Certificate of Approval (**APPENDIX A**).

1.3 MECP Review of Annual Report

The MECP provided comment via email on the 2022 Monitoring Report on June 12, 2023 regarding the surface water monitoring data (**APPENDIX B**). The MECP was in agreement that water quality at surface water stations SW1 and SW2 do not suggest significant impact from landfill activities. Water quality monitoring continues for the ponded water (SW3). The surface water monitoring program and reporting continue as per the existing ECA requirements.

The application for approval of the Stormwater Management System submitted September 2019 (**APPENDIX B**) was accepted by the MECP in 2021.

The MECP completed an inspection of the Huron Landfill on August 23, 2023. A copy of the inspection report is included in **APPENDIX B**. A Provincial Officer's Order No. 1-228594023 also accompanied the inspection report the Township received on August 23, 2023 (**APPENDIX B**).

The actions required from this inspection included the following:

1. *The Owner shall immediately start complying with condition 3.5 of the ECA.*
2. *On or before September 1, 2023, the Owner shall comply with their Design and Operations Plan (Revised) and compact the working face at least two periods per open day. The Owner shall also comply with condition 3.3 of the ECA and compact the entire working face at the end of each working day.*
3. *The Owner shall immediately cease the burning of restricted items, burning at the leaf and yard waste site and unsupervised burning.*
4. *On or before September 6, 2023, the Owner shall remove the installed PVC pipe located behind the scrap metal area.*
5. *The Owner shall immediately comply with Condition 10.1 of the ECA and ensure daily records of site operations are maintained for each operating day.*

The above referenced items were addressed by the Township at follows:

1. The Township revised section 3.21 of the contract with the waste collection company to have waste collected on Wednesday to be held for disposal on Thursdays of the corresponding week to reflect working hours of Township staff on site.
2. With the purchase of the new compactor the Township is implementing end of day compaction to the entire working face to comply with condition 3.3 of the ECA.
3. Township staff is ensuring that no burning of restricted items is occurring and only supervised burning of approved leaf and yard waste in the designated area ensuring the burning operations are extinguished at the end of day operations.
4. The Township removed the PVC pipe located behind the scrap metal area shortly after the request was received to the Township from the MECP in the inspection report.
5. The Township is ensuring daily records are being kept up to date for daily cover and are submitting weekly reports to the MECP as per Item No. 1 of the Provincial Order N. 1-228594023 listed below.

Provincial Officer's Order No. 1-228594023 required the following:

Item No. 1: Commencing August 29, 2023, and on each Tuesday thereafter, submit a weekly report including the following; A statement confirming cover was applied as per condition 3.3 of the ECA, if cover was not applied, a statement as to why cover was not applied would be needed.

Item No. 2: Retain the services of a Qualified Person to carry out the work as described in Item Nos. 4 and 6 of this Provincial Order.

Item No. 3: By September 29, 2023 submit to the Provincial Officer written confirmation from the Qualified Person that they have (1) received a copy of the Order; (2) been retained to carry out the work as described in Work Ordered Item Nos. 4 and 6; and (3) the experience and qualifications to carry out such work.

Item No. 4: By October 29, 2023, have the Qualified Person prepare a work plan to implement the actions described in the Stormwater Management Plan, that shall include, at a minimum, the following: (a) a description of any outstanding actions or recommendations described in the Stormwater Management Plan for leachate and surface water control that have not yet been implemented or completed; and (b) a detailed plan which describes how any actions or recommendations, will be implemented and a detailed schedule.

Item No. 5: By October 29, 2023, submit to the Provincial Officer a copy of the work plan prepared by the Qualified Person as required in work ordered Item No. 4.

Item No. 6: By November 29, 2023, have the Qualified Person complete and submit and application for an amendment to the waste ECA to include any leachate collection tank being used at the site, with all necessary supporting documentation and applicable fess.

The Township addressed the Provincial Order as follows:

Item No. 1: The Township is submitting the weekly reports with the required information.

Item No. 2: The Township retained WSP to address Items 2 to 6.

For Items 3 to 5, a Workplan was submitted to the MECP by WSP on behalf of the Township on October 29, 2023 in regards to the Stormwater Management Plan. The MECP provided comments on the Workplan, with a revised submission requested by January 12, 2024. The Township requested an extension and a revised Workplan was submitted via email on January 26, 2024.

2.0 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 2023 as recorded in the weigh scale records.

The site incorporated the trench method of landfilling until 2010, when landfilling commenced above the original ground surface, utilizing the “area method” of operation. This type of landfilling operation continues to date. The estimated landfilled volume for 2023 is 5,258 m^3. The method of calculating the volume of refuse landfilled in 2023 is based on the volumetric difference between the site surveys completed on January 9, 2023 and on December 23, 2023. The 2023 volume landfilled (5,258 m^3) is marginally below the 5 year average (2019 to 2023) of 7,752 m^3, as shown in **Table 2-1**.

The estimated compaction densities from 2003 to 2023 are summarized in **Table 2-1**. The Township used a 2006, 816K CAT compactor for compaction and cover operations until mid 2023 when a new compactor was purchased. A 2017, 816K CAT compactor is now in use for compaction and cover operations, along with a John Deere 544K loader to move material around the site. The calculated compaction density for 2023 operations is

676 kg/m^3 and includes 20% cover material. Future compaction densities will continue to be estimated through topographic survey data and Digital Terrain Model (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
2021	2,569	10,443	308
2022	2,568	6,176	603
2023	2,843	5,258	676
5-year Average (2019–2023)	2,703	7,752	481

Note: 2011 estimated waste compaction density includes approximately 20% daily cover material. Estimated waste compaction density would be about 436 kg/m^3 if cover materials were not included, as it has not been in previous years.

2.1.2 Remaining Capacity and Site Life

Trenching operations at the Huron Landfill have been limited historically 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 MECP 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 MECP issued an amendment to the Certificate of Approval to allow above ground landfilling operations to be conducted and to allow the maximum approved capacity. Above ground landfilling commenced shortly after the final trench was closed in July 2010. The Township was required to submit an updated Design and Operations Plan. Pryde Schropp McComb, Inc. (now a part of WSP Canada Inc.) was retained to complete the Design and Operations Plan, which was submitted to the MECP in January 2010. The previous Design and Operation Plan was submitted to the MECP Approvals Branch on August 14, 2008 in support of an application to amend the Certificate of Approval to facilitate above-ground landfilling and regain the previously approved landfill capacity. The Township received comments from the MOE Approvals Branch regarding hydrogeological and surface water aspects of the Design and Operations Plan on December 22, 2008 (**APPENDIX B**). Pryde Schropp McComb, Inc. provided responses to these comments dated May 29 and August 26, 2009 (**APPENDIX B**). As per a request made in Section 4 of the amended CofA, 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 was 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.

A request for Fill Beyond Approved 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 December 2023, the total landfilled volume for the Huron Landfill since 2007 has been estimated to be 111,896 m^3 . This would change the estimated closure date to March 2031, using a 5-year average annual airspace of 7,752m^3.

It should be noted that these closure dates calculations are estimated projections based on a number of assumptions, will vary based on the actual rate of landfilling, and are subject to revision.

2.2 Burning Operations

The designated area for burning is illustrated in **Figure 2**, Existing Conditions (enclosed). As shown, the burn area is far removed from active landfilling, approximately 200 metres (m) southeast. In accordance with MECP Guideline C-7 *Burning at Landfill Sites*, only segregated brush, lumber and clean wood may be burned at the site. Burning is conducted in accordance with Condition 4 of the Certificate of Approval (**APPENDIX A**) which states the following:

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

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

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 2023 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. . In 2023, 128.2 tonnes of scrap metal were removed from the site by AOR metals.

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 2023, 3,308 tires were collected at the Huron and Kinloss landfill sites, with an estimated mass of 29.11 tonnes. As part of the Ontario Tire Stewardship Program, these tires were removed from the Huron and Kinloss landfill sites in 2023.

2.3.3 E-Waste and Mattresses

E-waste was segregated at the Huron Landfill in 2023 and stockpiled beside the main building in a sea container. The total E-waste diverted from the landfill in 2023 was 20.93 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 shipping container. The total number of mattresses shipped off site in 2023 was 537 (18.26 tonnes) for the Huron Landfill.

2.3.4 Expanded Polystyrene (EPS)

The Township began diverting Expanded Polystyrene (EPS) from the Huron and Kinloss sites in 2021. EPS was collected and stored in a shipping container located by the main building. Second Wind Recycling removed 0.43 tonnes of EPS from the site in 2023.

2.3.5 Recyclable Materials

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

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

The 2023 BASWR recycling data summary for the Township is enclosed in **APPENDIX CPPENDIX B**.

2.3.6 Summary of Waste Diversion

Table 2-2 summarizes the recycling and diverted materials data for the Township (both the Kinloss and Huron Landfills are represented) over the past five years. As shown in **Table 2-2** the recyclable tonnages have been relatively consistent over time. The 2023 tonnage of recyclables (404.21 tonnes) are higher compared to the 2022 tonnage (223.66 tonnes). When segregated materials (200.25 tonnes) are included, the total tonnage diverted from both Township landfills (Kinloss and Huron) is 604.46 tonnes in 2023. This tonnage represents an 18% diversion rate for the Township. The estimated saving in landfill space is 1,208.92 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 2023.

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

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

The weigh scales and attendant office are located inside the entrance gate of the landfill. Weigh scale monitoring provides the Township with data regarding incoming waste and allowing the fair assessment of tipping fees. Weigh scale records are maintained by the site attendant. The 2023 monthly breakdown of accepted waste has been provided in **Table 2-3**.

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

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

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

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

The Township indicated that no complaints relating to landfill operations were received for the 2023 operating season.

2.5 Training

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

The training sessions for 2023 were held commencing in January 2023 and running monthly until December 2023.The monthly landfill training reviews for 2023 and additional Health & Safety training documentation are also provided in **APPENDIX B**.

3.0 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 interpret the lateral or horizontal groundwater gradient and flow patterns within the overburden aquifer beneath the landfill, water level measurements were taken at the site on May 16, 2023 and September 28, 2023. A summary of the water table elevation data is presented in **Table D-1**. **Figure D-1** is the hydrograph for the following upgradient and cross-gradient wells: OW3, OW4, OW5, OW10S and OW10D. **Figure D-2** is the hydrograph for the following downgradient and leachate wells: OW1, OW6, OW7S, OW7D, OW8S and OW11.

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

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

Two cross-sections, which present ground stratigraphy and monitor construction, are shown on **Figure 3.** Section A-A’ shows conditions perpendicular to flow, section B-B’ represents conditions parallel to groundwater flow. It is noted that the elevations presented in the cross-section reflect a site survey completed in December 2023 where the elevations were established compared to sea level.

Based on the groundwater elevations for May 2023, the inferred shallow groundwater flow configuration is shown in **Figure 4**. Groundwater flow lines drawn perpendicular to groundwater contours indicate that the inferred flow direction is generally toward the west, as shown in **Figure 4**. The May 2023 flow pattern was generally consistent with previous year’s results. The May 2023 horizontal hydraulic gradient varied between 0.0002 m/m and 0.05 within the eastern portion of the site, to 0.05 m/m within the central portion of the site. Based on the observed water level elevations at the monitoring points, the hydraulic gradient increases in the south and west where the topography slopes down to the South Pine River.

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

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

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

Table 3-1: Vertical Gradients

Well Nest	Date	Gradient
OW7	May 2023 September 2023	0.90 downward 1.14 downward
OW8	May 2023 September 2023	1.16 downward 1.29 downward
OW10	May 2023 September 2023	0.14 downward 0.56 downward

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

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.

4.0 MONITORING PROGRAM AND RESULTS

4.1 Current Monitoring Program

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

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

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

In 2023, water level measurements, purging and sampling were conducted on May 16 and September 28. Methane monitoring was completed on February 16, 2023 under winter conditions.

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

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

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

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

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

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

Surface water samples are obtained from one upstream station (SW1) and one downstream station (SW2) on the South Pine River. The ponded water (SW3), located in the south western portion of the site was added to the sampling program in 2019. SW3 was added to the program in response to the 2018 AMR MECP comments. WSP recommends that sampling continue at SW3.

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

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

4.2 Groundwater Quality

The 2023 groundwater monitoring results are summarized in **APPENDIX E**. Historical groundwater chemistry results are also included for comparison. The laboratory Certificates of Analyses are enclosed in **APPENDIX G**.

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

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

Chloride, hardness, DOC, and conductivity are leachate indicator parameters as these are typically elevated within the leachate and are mobile within the groundwater. **Figures E-1 to E-6** present spring and fall 2023 results for these parameters for well groups as follows:

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

Figure E-2 – Downgradient Wells - Spring

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

Figure E-4 – Downgradient Wells – Fall

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

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

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

Two monitoring wells were constructed as leachate wells: OW6 and OW11. As noted in the borehole logs in **APPENDIX D**, both wells are screened in the landfilled waste. In **Figures E-1** to **E-4**, the results from OW11 were included for comparison. In general, concentrations of leachate indicator parameters in OW6 are higher than in OW11 and have increased since 2013. The following is a summary of the characteristic parameters from leachate wells OW6 and OW11 from the May and September 2023 sampling events. The results from monitoring well OW5 are also included and represent background groundwater conditions.

	Leachate Indicator Parameters historic range (OW6 and OW11)	OW6		OW11		OW5 (background)	
		May	Sep	May	Sep	May	Sep
Chloride	14.8 - 547	535	507	275	273	122	126
Hardness	220 – 2410	1190	1150	943	914	483	454
DOC	1.3 – 650	49.4	17.8	1.8	8.4	<0.2	2.3
Conductivity	695 – 5280	3,880	3,980	2,460	2,300	1,060	1,070
Arsenic	nd – 0.772	0.0106	0.0129	0.0024	0.0018	0.0015	0.0013
Barium	0.081 – 0.921	0.934	0.943	0.266	0.257	0.121	0.111
Iron	nd – 46.3	7.85	7.00	11.2	8.12	<0.005	<0.005
Sodium	49 - 445	443	412	121	96.3	39.9	37.5

Notes: (i) All concentrations are in mg/L, except conductivity in us/cm.
(ii) nd = parameter below detection limit in lab analysis

The 2023 monitoring data for OW6 and OW11 indicate that leachate at the Site is elevated compared to background conditions for the following parameters: chloride, hardness, DOC, TKN and conductivity. In groundwater monitoring well OW11, other parameters which are elevated compared to background groundwater conditions 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**. These elevated parameters are considered to be suitable leachate indicator parameters for this Site.

Based on these time-concentration graphs, the following trends are noted:

- While having increased at background monitor OW5 since 2011, chloride is generally stable, fluctuating between 40 and 126 mg/L. A historic high concentration was reached in September 2023. The increases observed at OW5 may indicate off-site impacts from road salting activities migrating onto the site.

The chloride concentrations for leachate monitor OW6 decreased significantly from levels of over 400 mg/L in the late 1990's and remained relatively constant at approximately 20 mg/L from 2003 until 2011. The chloride concentrations have subsequently increased between 2013 and 2023. Chloride concentrations reported in the spring and fall of 2023 have shown an increase in concentrations. This increase may indicate some influence from road salting activities, in addition to landfill leachate, due to the proximity of the access road which is now adjacent to the monitoring well.

- The chloride results for leachate monitor OW11 appear to reflect some seasonal fluctuations and an increase in 2014 followed by a decrease from late 2015 to 2017, followed by another increase in 2018 through 2023, reaching a historic high in spring 2021. Spring and fall 2023 sampling events show chloride results on trend in the high 200 mg/L range. This pattern is likely attributed to the proximity of the active landfill area. The pattern of seasonal fluctuations may indicate some influence from road salt as well as landfill leachate, as the well is adjacent to the access road to the segregation area.

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 generally similar to the cross-gradient wells.

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

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

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

In summary, based on the monitoring results collected to date, the wells interpreted to be in upgradient and cross-gradient locations demonstrate water quality generally similar to background, with the exception of chloride concentrations at OW3 which may be attributed to road salt impacts and has also been observed in background well OW5. These analytical 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 at this location. **Figure E-6** shows chloride concentrations over time. The chloride for OW1 increased to 102 mg/L in October 2000 but had remained relatively constant at approximately 30 mg/L until the fall 2015 monitoring event (96.6 mg/L) with the increasing trend continuing through 2017 with a historical maximum of 153 mg/L in November 2016. Chloride concentrations at OW1 were reported at 59.4 mg/L and 62.0 mg/L in the spring and fall of 2023, respectively. Field notes in 2023 indicated that the protective casing at OW1 may be exposed due to erosion of the adjacent gully. This may be influencing analytical results in 2015 - 2023. The 2023 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 generally 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 below the silt unit monitored by OW7S. The results indicate leachate impacts have likely not migrated laterally or vertically in the area of OW7S and OW7D.

Monitoring wells OW8S and OW8D are located in the central area of the site, approximately 10 m downgradient of trench T2. **Figures E-2** and **E-4** indicate OW8D well continues to show near background water quality, with OW8S exhibiting upward trends for leachate parameter chloride in the fall 2023 sampling event, expected to be due to nearby landfilling activities. The wells exhibit elevated levels of sulphate compared to background 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 deep and is screened in a deeper silt unit. Based on the results fromOW8S andOW8D leachate impacts have likely not migrated laterally or downward, with the chloride increase in OW8S continued monitoring is recommended.

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 water quality generally similar to background 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 is interpreted to be generally limited in both lateral and vertical directions.

4.2.3 Water Quality Compliance Assessment

(1) Reasonable Use

In accordance with the Ministry of the Environment, Conservation and Parks (MECP's) reasonable use criteria, 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.

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

Where:

C_m = maximum concentration accepted

C_b = background concentration

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

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

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

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

The monitoring wells chosen for Reasonable Use Criteria (RUC) monitors are located at or near the downgradient landfill boundaries. The following monitoring wells were selected as RUC monitors: OW1, OW7S, OW7D, OW8S, OW8D and OW9. The locations of these wells are shown in **Figure 4**. The 2023 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 2023, the RUC were exceeded for DOC at monitors OW1 and OW7S during the fall monitoring event. DOC has exceeded the RUC at OW1 since 2012. OW1 and OW3 exceeded the RUC for iron in the fall monitoring event. No other leachate indicator parameters were elevated compared to the RUC at these monitoring locations in 2023.

Based on the 2023 monitoring results at the selected RUC monitors, leachate influence is not anticipated to be present beyond that allowable under MECP Guideline B-7 at or beyond the landfill boundary, with the exception of concentrations of DOC and iron exceeding the RUC at OW1. WSP recommends that monitoring be continued at the boundary groundwater monitoring wells in 2024.

(2) Trigger Levels

The groundwater triggers for the contingency plan are based on the RUC, that is reviewed on an annual basis in the AMR, and were approved in the 2010 Revised Design and Operation Plan. 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 are interpreted to be indicative of leachate at the Huron Landfill. The 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 monitoring well and the property boundary.

In 2023, concentrations of DOC were above the 85% RUC at monitor OW1 and OW7S during the fall event. Concentrations of iron at OW1 were above the 85% RUC during the fall event. Based on these results and in the absence of other elevated leachate indicator parameters, no supplemental monitoring or investigation is interpreted to be required and 'Stage 1 – Routine monitoring' will continue for 2024.

4.3 Surface Water Quality

4.3.1 South Pine River

The surface water samples during the 2023 annual monitoring program were collected on May 16 and September 28, 2023. The laboratory analytical 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 2023 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 May and September sampling events. In comparison, the results for SW1 and SW2 indicate similar water quality.

In fall 2023, the concentration for phosphorus at station SW1, 0.06 mg/L, exceeded the PWQO. Since this station is upstream of the landfill site, the presence of phosphorus at this location is attributed to non-landfill sources and is not interpreted to be related to landfill operations.

Aluminum exceeded the 0.075 mg/L PWQO at the upstream station SW1 and downstream station SW2 in the fall 2023 samples. The concentration of aluminum was 0.14 and 0.17 mg/L (respectively). This exceeds MECP Policy 2 (PWQO) where the concentration of aluminum in the surface water has increased beyond the PWQO limit downstream of the landfill. Historically, the upstream location SW1 has shown elevated concentrations of aluminum. The elevated concentrations are not interpreted to be attributed to landfill operations.

The exceedances of the PWQO at the downstream station SW2 are similar to the concentration at the upstream station, SW1. Ammonia exceeded the PWQO at the SW1 sampling location in the spring and fall 2023 samples and at SW2 in the spring 2023 sample. There are interpreted to be no measurable landfill influences on the surface water quality of the South Pine River.

The monitoring results indicate that the presence of downstream impacts from the leachate on the surface water are unlikely.

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** for the spring monitoring event; the location was dry during the fall monitoring event.

Results show exceedances of the PWQO for phosphorus, iron, boron for the spring2023monitoring event.. The monitoring results indicate evidence of potential leachate impact at the SW3 location. The proposed stormwater management system should focus on mitigation in this area. Interim and final cover should be used daily, as needed, to ensure proper grading over the site and minimize the possibility of 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 may not provide an accurate determination of methane migration.

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

In 2023, methane monitoring was conducted on February 15, 2023 under frozen conditions by WSP. **Table 4-1** summarizes the results of methane monitoring between 2007 and 2022. As shown in **Table 4-1**, methane was also detected in GP3 in July 2007 at near the LEL, as is consistent with historical monitoring at this location. February 15, 2023, GP3 measured 9.3% volume gas in air.

It is recommended that methane monitoring continue in 2024 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 2021 the methane gas detector was stolen from the scale house. The Township replaced the gas detector in 2022 with an Amprobe model GSD600 gas leak detector and monitoring began again in September 2022.

Table 4-1: Summary of Methane Monitoring

Date	GP1	GP2	GP3		GP4	Scale house
Jul 2007	0	0	4	0.2% vol. g.	0	
Dec 2007	0	0	0		0	

Jan 2008	0	0	0		0	
Jul 2008	0	0	49	2.5% vol. g.	0	
Dec 2008	0	0	0		0	
Jan 2009	0	0	0		0	
Mar 2010	0	0	0		0	0
Feb 2011	0	0	>100	9% vol. gas	0	0
Mar 2012	0	0	>100	16% vol. gas	0	0
Feb 2013	0	0	>100	77% vol. gas	0	0
Jan 2014	0	0	>100	35% vol. gas	0	0
Jan 2015	0	0	>100	24% vol. gas	0	0
Feb 2016	0	0	>100	10% vol. gas	0	0
Feb 2017	0	0	90	4.5% vol.gas	0	
Feb 2018	0	0	>100	52% vol. gas	0	
Mar 2019	0	0	>100	41% vol. gas	0	
Feb 2020	0	0	>100	15% vol. gas	0	
Feb 2021	0	0	>100	26% vol. gas	0	
Feb 2022	0	0	34		0	
Feb 2023	0	0	>100	9.3% vol. gas	0	

Notes:
1. All results shown in % of lower explosive limit of methane unless otherwise noted.
2. Shaded cell indicates methane exceeded Lower Explosive Limit of 5%.
3. The 2007 and 2008 monitoring was conducted using a GMI Landsurveyor 1 gas monitor.

5.0 FUTURE MONITORING PROGRAM

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

All surface water stations will be sampled twice per year, including the “ponded water” (SW3) until impacts reported in this area are addressed. 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 2024	Proposed Sampling Fall 2024
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 (Surface Water stations only)
   - DOC
   - Hardness
   - Phenols
   - pH
   - TKN
3. At all monitoring wells and SW stations the following field measurements should be recorded:
   - Temperature
   - pH
   - Conductivity
4. Methane measurements from GP1, GP2, GP3, GP4 and the scale house will be under frozen conditions.

6.0 CONCLUSIONS

1) Approximately 2,843 tonnes of waste were received at the site in 2023, which equated to a landfilled volume of about 5,258 m^3 in 2023.

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 estimated to be about March 2031.

2) The Township considers security and control of the site to be sufficient in 2023, with chain link fencing installed along the North property line.

3) A total of 404.21 tonnes of recyclable materials were recycled through the Blue Box Recycling Program and on-site collection bins in 2023. There were 128.20 tonnes of scrap metal, 29.11 tonnes of tires collected, 20.93 tonnes of E-waste and 18.26 tonnes of mattresses removed from the Huron and Kinloss Landfills for a total of 200.25 tonnes of non-blue box materials diverted from landfilling.

4) Based on groundwater elevation monitoring, the interpreted shallow groundwater flow is toward the west.

5) Leachate indicator parameters in leachate monitor OW6 have increased since 2013 and are generally higher compared to the concentration in leachate monitor OW11.

6) Based on monitoring results to date, wells located in interpreted upgradient and cross-gradient locations demonstrated water quality generally similar to background water quality, with the exception of minor influences at monitor OW3 which may be attributed to road salt. Downgradient monitoring indicates the migration of leachate impacts is limited both in lateral and vertical directions.

7) The Reasonable Use Criteria was exceeded for DOC in monitors OW1 and OW7S during the fall event. Iron exceeded the RUC at OW1 and OW3 during the fall sampling event in 2023. The parameter concentrations within the remaining site boundary monitors met the Guideline B-7 criteria. The RUC trigger criteria for DOC was exceeded at monitor OW1 and OW7S during the fall event. OW1 exceeded the trigger for iron during the fall event, in 2023. Based on these results and in the absence of other elevated leachate indicator parameters, no supplemental monitoring or investigation is interpreted to be required.

8) Surface water monitoring on the South Pine River indicates that the presence of downstream influences from the landfill site are unlikely. Exceedances of PWQO at the downstream station are attributed to agricultural and/or other upgradient sources.

9) Combustible gas monitoring indicated no detections of methane between 2018 and 2023 at monitoring points GP1, GP2, GP4. Combustible gas was detected at a concentration of 9.3% vol. gas at gas probe GP3 in 2023. Gas probe GP3 is located at the south end of the landfill site where there are no structures or subsurface infrastructure. The combustible gas results indicate that potential landfill gas hazards within the area of on-site structures were unlikely during the monitoring events. A gas detector is installed in the scale house.

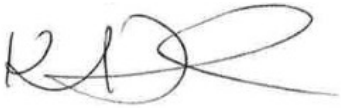
7.0 RECOMMENDATIONS

The following recommendations are provided:

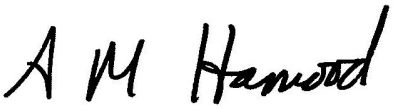
- Based on the RUC trigger criteria results, no supplemental monitoring or investigation is interpreted to be required and ‘Stage 1 – Routine monitoring’ should be continued in 2024.
- The monitoring program should continue and should consist of semi-annual sampling of the 13 monitoring wells and three surface water stations. The four gas probes should be monitored for combustible gas under frozen conditions.
- WSP recommends the replacement of OW1 as the current location is in a significantly eroded section of stream bank.
- This report should be submitted to the MECP for review and comment as required by CofA 272601.

Signature Page

WSP Canada Inc.



Kaurel Tamasauskas
Environmental Technologist, Earth & Environment



Andrew Hardwood
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Tables

TABLE 2-2
SUMMARY OF RECYCLING DATA
HURON and KINLOSS LANDFILLS

Recyclable Product	2019		2020		2021		2022		2023	
	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	130.31	260.62	128.74	257.48	99.79	199.58	49.60	99.20	79.68	159.36
Steel (Cans, etc.)	27.57	55.14	32.66	65.32	31.38	62.76	15.60	31.20	25.39	50.78
Aluminum	8.51	17.02	16.00	32.00	16.41	32.82	8.16	16.32	17.22	34.44
Glass (Flint & Coloured)	56.33	112.66	80.74	161.48	73.00	146.00	36.28	72.56	80.95	161.90
Plastic (HDPE & PET)	63.52	127.04	76.25	152.50	78.10	156.20	38.81	77.62	35.67	71.34
White Paper	4.45	8.90	3.15	6.30	6.77	13.54	3.37	6.74		0.00
Boxboard	44.62	89.24	44.65	89.30	54.97	109.94	27.32	54.64	62.31	124.62
Corrugated Cardboard	94.48	188.96	94.26	188.52	107.12	214.24	44.52	89.04	102.99	205.98
Total Recyclables	**429.79**	**859.58**	**476.45**	**952.90**	**467.54**	**935.08**	**223.66**	**447.32**	**404.21**	**808.42**
Tires	63.13	126.25	110.50	221.00	135.38	270.76	69.71	139.42	29.11	58.22
Scrap Metal	167.96	335.92	148.35	296.70	177.77	355.54	150.59	301.18	128.20	256.40
Bale Wrap	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.75	7.50
E-waste	14.95	29.90	11.37	22.74	8.36	16.72	11.45	22.90	20.93	41.86
Mattresses	15.88	31.76	17.17	34.34	35.29	70.58	53.34	106.68	18.26	36.52
Total Segregated	**261.92**	**523.83**	**287.39**	**574.78**	**356.80**	**713.60**	**285.09**	**570.18**	**200.25**	**400.50**
Total Diverted	**691.71**	**1383.41**	**763.84**	**1527.68**	**824.34**	**1648.68**	**508.75**	**1017.50**	**604.46**	**1208.92**

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. 3,308 tires received in 2023, weights provided by e-tracks (AOR)
7. 537 mattresses received in 2023 at 29.4 mattresses/tonne
8. Volume Saved - defined as waste diverted from the landfill through recycling programs.

TABLE 4-2
REASONABLE USE CRITERIA FOR 2023 GROUNDWATER MONITORING
HURON LANDFILL SITE

Parameter	Background Concentration	Standard / Objective	Type	RUC	On Site		PROPERTY BOUNDARY			
					OW9		OW1		OW4	
					May-23	Sep-23	May-23	Sep-23	May-23	Sep-23
Chloride	7	250	OG	129	3	2.8	59.4	62	13.2	13.7
Nitrate	0.145	10	IMAC	2.61	0.12	0.1	<0.5	0.05	0.06	0.07
DOC	2.6	5	AO	3.8	1.5	2.3	3.0	4.3	2.5	3.6
Arsenic	0.004	0.025	AO	0.009	0.0039	0.0036	0.0009	0.0022	0.0004	0.0005
Barium	0.0775	1	AO	0.308	0.023	0.022	0.099	0.096	0.073	0.074
Iron	0.05	0.3	OG	0.175	<0.005	<0.005	0.006	0.402	<0.005	<0.005
Sodium	25.9	250	AO	113	77.3	73.4	42.1	40.3	18.0	17.2

Parameter	Background Concentration	Standard / Objective	Type	RUC	PROPERTY BOUNDARY							
					OW7S		OW7D		OW8S		OW8D	
					May-23	Sep-23	May-23	Sep-23	May-23	Sep-23	May-23	Sep-23
Chloride	7	250	OG	129	28.6	28.6	10.3	10.3	58.3	58.2	8.5	8.6
Nitrate	0.145	10	IMAC	2.61	0.17	0.09	0.26	0.25	0.1	0.05	0.18	0.16
DOC	2.6	5	AO	3.8	1.0	4.2	1.7	2.8	<0.2	1.9	0.8	2.6
Arsenic	0.004	0.025	AO	0.009	0.0007	0.0007	0.0004	0.0005	0.0007	0.0009	0.0002	0.0003
Barium	0.0775	1	AO	0.308	0.037	0.035	0.039	0.037	0.053	0.052	0.028	0.027
Iron	0.05	0.3	OG	0.175	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	25.9	250	AO	113	59.0	54.8	69.3	67.3	67.0	64.3	83.0	78.3

Parameter	Background Concentration	Standard / Objective	Type	RUC	PROPERTY BOUNDARY				DOWNGRADIENT	
					OW10S		OW10D		OW3	
					May-23	Sep-23	May-23	Sep-23	May-23	Sep-23
Chloride	7	250	OG	129	2.4	2.2	7.6	3.6	94.7	88.9
Nitrate	0.145	10	IMAC	2.61	0.25	0.18	1.19	<0.05	<0.5	0.06
DOC	2.6	5	AO	3.8	1.4	2.1	0.6	2.8	0.4	3.2
Arsenic	0.004	0.025	AO	0.009	0.0002	0.0002	0.0004	0.0004	0.0008	0.0029
Barium	0.0775	1	AO	0.308	0.027	0.027	0.116	0.095	0.102	0.096
Iron	0.05	0.3	OG	0.175	<0.005	<0.005	<0.005	<0.005	<0.005	0.222
Sodium	25.9	250	AO	113	40.7	39.1	19.4	26.8	42.3	39.6

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, 2023 GROUNDWATER MONITORING
HURON LANDFILL SITE

Parameter	Background Values Cb mg/L	ODWQS	RUC Values			OW1 (85% RUC) May-23 mg/L	OW3 (85% RUC) May-23 mg/L	OW7S (85% RUC) May-23 mg/L	OW7D (85% RUC) May-23 mg/L	OW8S (80% RUC) May-23 mg/L	OW8D (80% RUC) May-23 mg/L	OW9 (100% RUC) May-23 mg/L
			100% mg/L	85% mg/L	80% mg/L							
Chloride	7	250	129	111	105	59.4	94.7	28.6	10.3	58.3	8.5	3
Nitrate	0.145	10	2.61	2.2	2.1	<0.5	<0.5	0.17	0.26	0.1	0.18	0.12
DOC	2.6	5	3.8	3.6	3.6	3.0	0.4	1	1.7	<0.2	0.8	1.5
Arsenic	0.004	0.025	0.009	0.008	0.008	0.0009	0.0008	0.0007	0.0004	0.0007	0.0002	0.0039
Barium	0.0775	1	0.308	0.27	0.26	0.099	0.102	0.037	0.039	0.053	0.028	0.023
Iron	0.05	0.3	0.175	0.16	0.15	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	25.9	250	113	100	96	42.1	42.3	59.0	69.3	67	83.0	77.3

Parameter	Background Values Cb mg/L	ODWQS	RUC Values			OW1 (85% RUC) Sep-23 mg/L	OW3 (85% RUC) Sep-23 mg/L	OW7S (85% RUC) Sep-23 mg/L	OW7D (85% RUC) Sep-23 mg/L	OW8S (80% RUC) Sep-23 mg/L	OW8D (80% RUC) Sep-23 mg/L	OW9 (100% RUC) Sep-23 mg/L
			100% mg/L	85% mg/L	80% mg/L							
Chloride	7	250	129	111	105	62.0	88.9	28.6	10.3	58.2	8.6	2.8
Nitrate	0.145	10	2.61	2.2	2.1	0.05	0.06	0.09	0.25	0.05	0.16	0.1
DOC	2.6	5	3.8	3.6	3.6	4.3	3.2	4.2	2.8	1.9	2.6	2.3
Arsenic	0.004	0.025	0.009	0.008	0.008	0.0022	0.0029	0.0007	0.0005	0.0009	0.0003	0.0036
Barium	0.0775	1	0.308	0.27	0.26	0.096	0.096	0.035	0.037	0.052	0.027	0.022
Iron	0.05	0.3	0.175	0.16	0.15	0.402	0.222	0.009	<0.005	<0.005	<0.005	<0.005
Sodium	25.9	250	113	100	96	40.3	39.6	54.8	67.3	64.3	78.3	73.4

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 - 2023

Surface Water Station			SW3/18	SW3/18
Date			May-23	Sep-23
	Units	PWQO mg/L		DRY - NO SAMPLE
Calculated Parameters				
Hardness (CaCO3)	mg/L		247	
Inorganics				
Ammonia-N	mg/L		0.13	
Un-ionized Ammonia	mg/L	0.020 (10)	0.002	
Conductivity	umho/cm		883	
Total Kjeldahl Nitrogen (TKN)	mg/L		1.8	
Dissolved Organic Carbon	mg/L		11.4	
pH	pH	6.5 - 8.5	8.00	
Phenols	mg/L	0.001	<0.001	
Phosphorus	mg/L	0.030(9)	0.05	
Sulphate (SO4)	mg/L		33	
Alkalinity	mg/L	(7)	296	
Chloride (Cl)	mg/L		85.1	
Nitrite (N)	mg/L		<0.05	
Nitrate (N)	mg/L		<0.05	

Surface Water Station			SW3/18	SW3/18
Date			May-23	Sep-23
	Units	PWQO mg/L		
Metals				
Aluminum (Al)	mg/L	0.075 (8)	0.07	
Arsenic (As)	mg/L	0.100 (11)	0.0022	
Beryllium (Be)	mg/L	1.100 (12)	<0.0001	
Boron (B)	mg/L	0.200 (1)	0.83	
Cadmium (Cd)	mg/L	0.0002 (3)	<0.000015	
Calcium (Ca)	mg/L		62.3	
Chromium (Cr)	mg/L	0.001 (13)	0.001	
Cobalt (Co)	mg/L	0.0009	0.0006	
Copper (Cu)	mg/L	0.005 (4)	0.0018	
Iron (Fe)	mg/L	0.300	0.72	
Lead (Pb)	mg/L	0.025 (5)	0.00019	
Magnesium (Mg)	mg/L		22.3	
Manganese (Mn)	mg/L		0.138	
Molybdenum (Mo)	mg/L	0.040 (1)	0.0006	
Nickel (Ni)	mg/L	0.025	0.0028	
Potassium (K)	mg/L		16.6	
Silver (Ag)	mg/L	0.0001	<0.0001	
Sodium (Na)	mg/L		72.9	
Vanadium (V)	mg/L	0.006 (1)	<0.005	
Zinc (Zn)	mg/L	0.030 (6)	0.050	

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

Surface Water Station		SW3/18	SW3/18
Date		May-23	Sep-23
FIELD MEASUREMENTS	Units		
Temperature	Degrees C	15.5	
Conductivity	µmhos	781	
pH		7.74	

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 = ^{o}C +273.16
15. [ ] value exceeds PWQO.

Figures

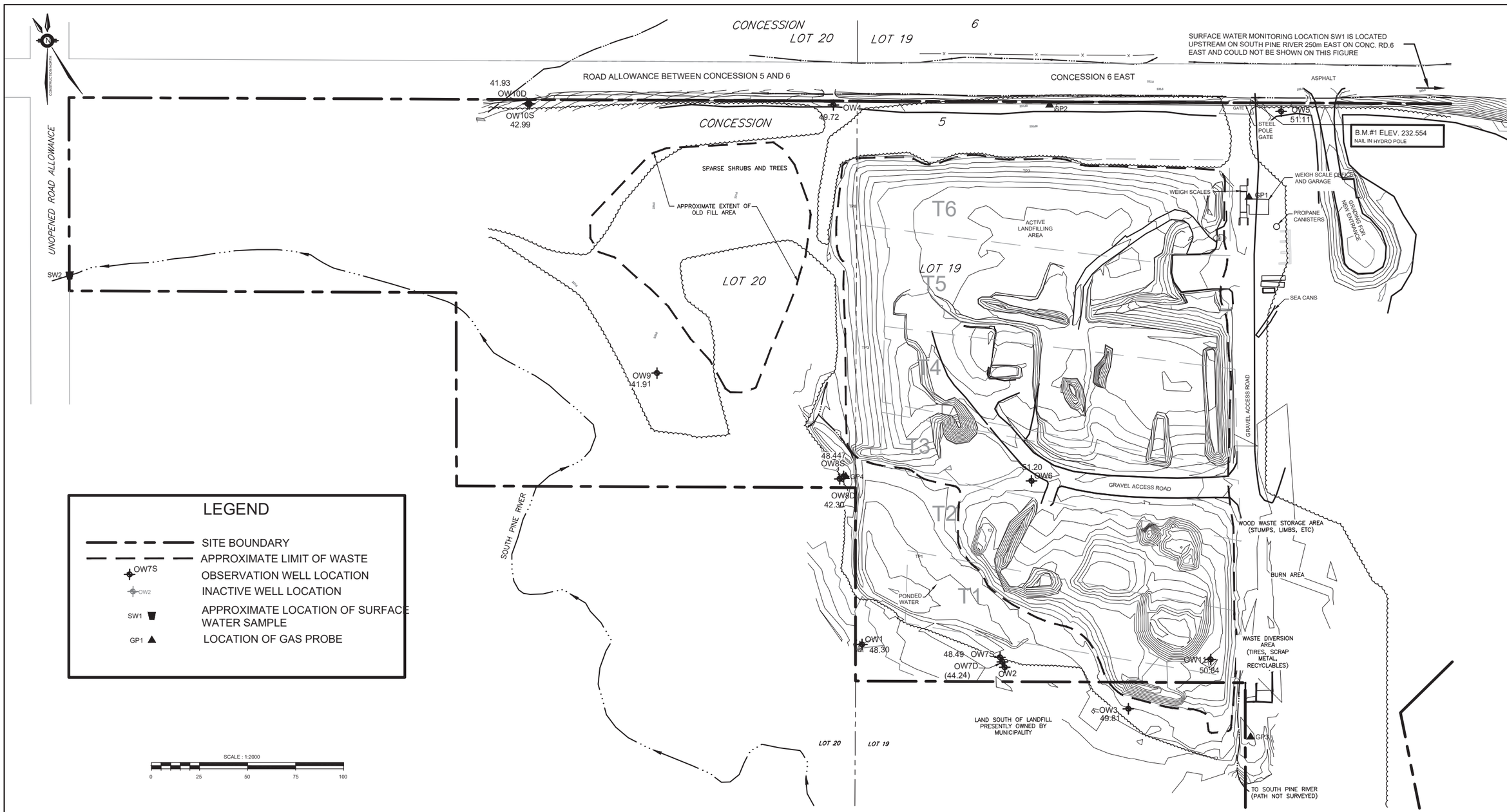
SOURCE: MAPART CORP. 1:250,000 MAP OF WEST CENTRAL ONTARIO 1990/1991

REGIONAL LOCATION MAP
HURON LANDFILL SITE
TOWNSHIP OF HURON-KINLOSS

DESIGN	– – –
DRAWN	TCG
APPROVED	S L H
DATE	MARCH 2024
SCALE	1:200,000
FILE No.	121–60020–22
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

X:\vol\2022\221–60020–22 Huron Landfill Annual Hydrog Report\DRAWING\2023 AMR\121–60020–22–FIG 1 2023 REPORT FOR 2023.dwg



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

IS.	RV.	DATE	DESCRIPTION

SEAL:

CLIENT: **TOWNSHIP OF HURON-KINLOSS**

CLIENT REF. #: --

PROJECT: **HURON LANDFILL DECEMBER 2022 EXISTING CONDITIONS**

PROJECT NO: 121-60020-22	DATE / DATE: MARCH 2024
DESIGNED BY: --	
DRAWN BY: C.H.	
CHECKED BY: A.H.	
DRAWING NO: FIGURE 2	SCALE: 1:2000

TITLE: **MONITORING WELL LOCATIONS**

DISCIPLINE: **ENVIRONMENT**

ISSUE: -- DATE OF: **MARCH 2024**

RV. # **0**

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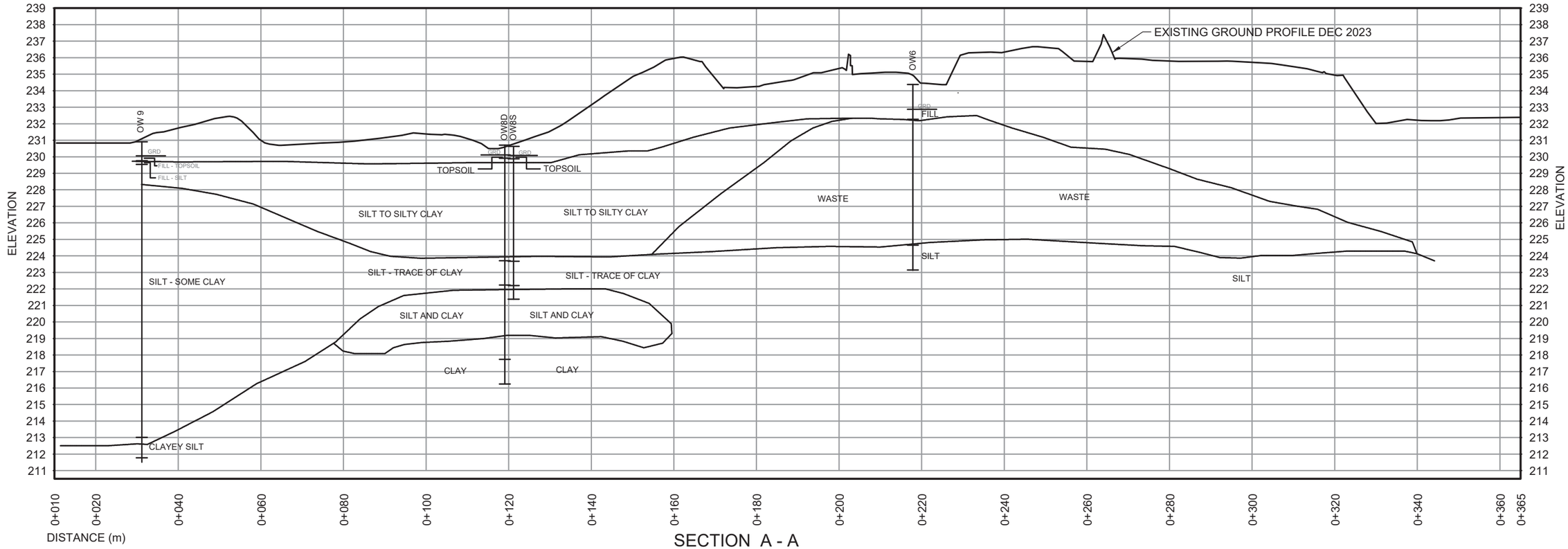
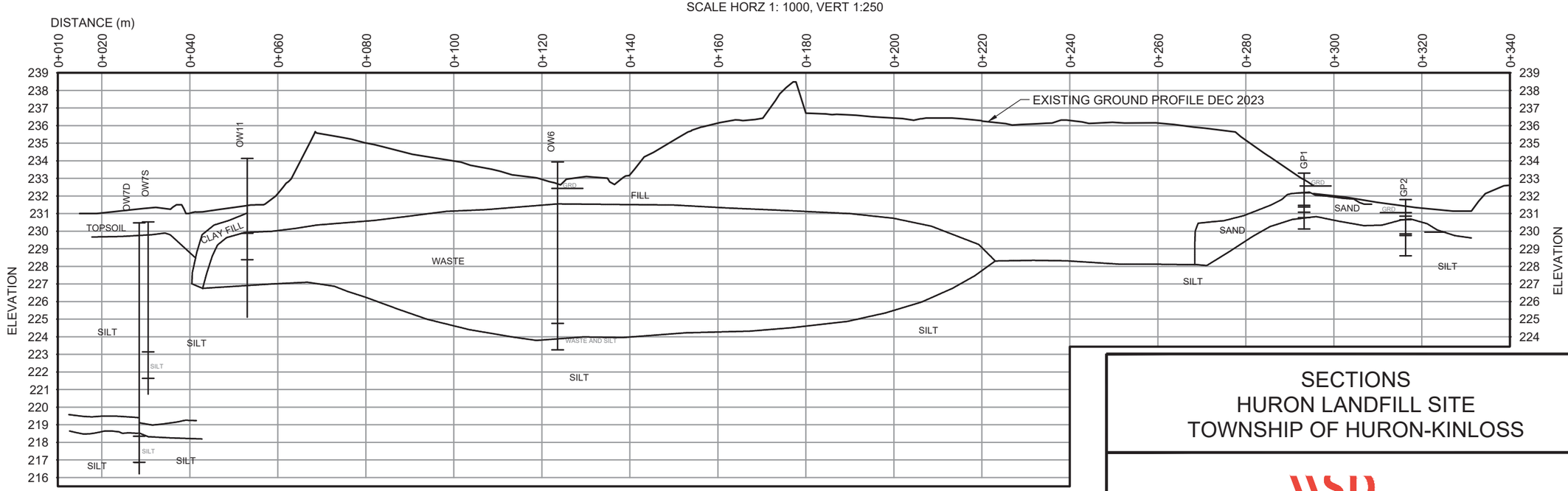


SECTION A - A

SCALE HORZ 1: 1000, VERT 1:250



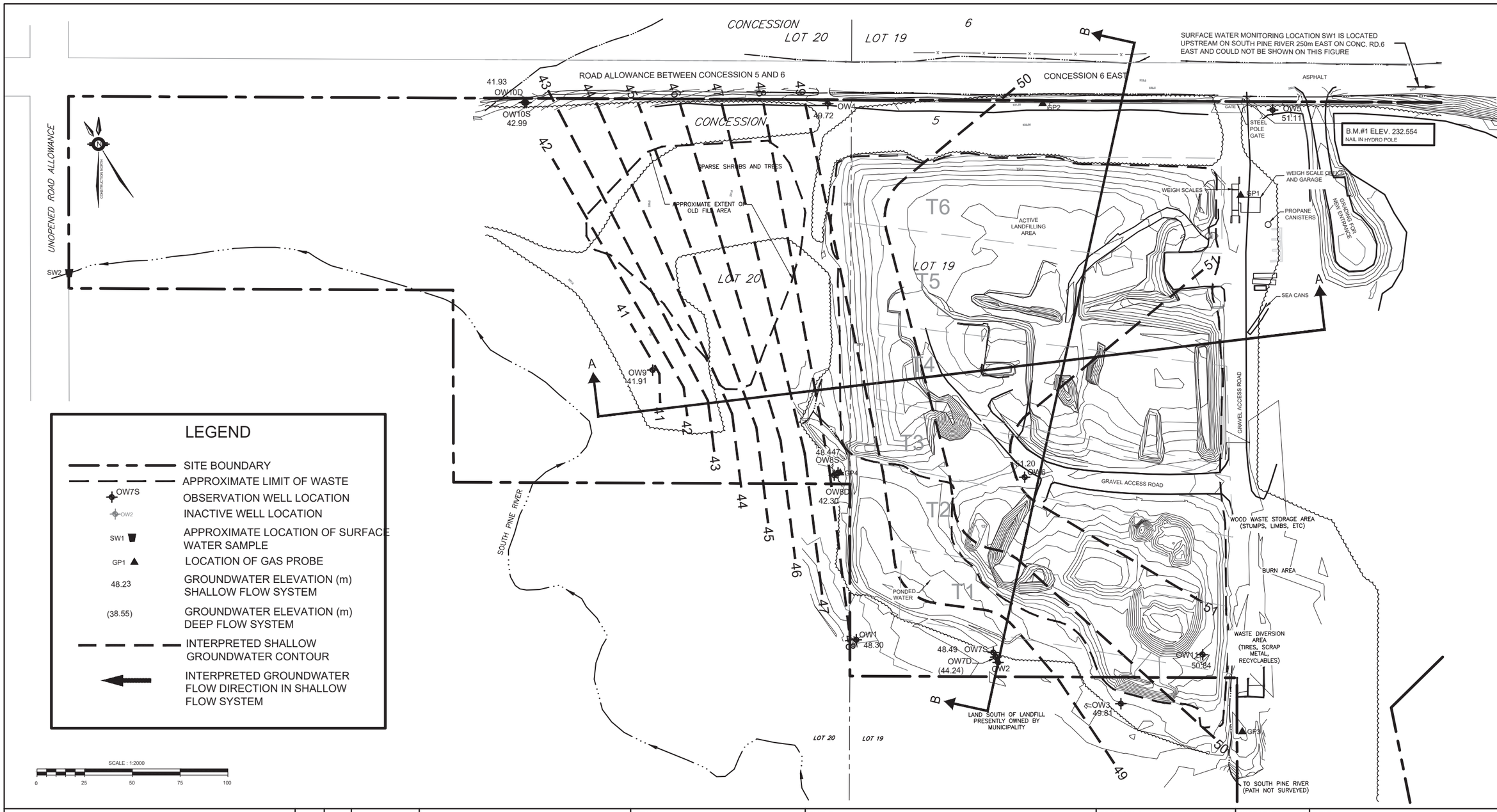
SECTION B - B

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	C H
APPROVED	A.H.
DATE	MARCH 2024
SCALE	AS SHOWN
FILE No.	101–16945–00
FIG. No.	3



LEGEND

- SITE BOUNDARY
- APPROXIMATE LIMIT OF WASTE
- OW7S — OBSERVATION WELL LOCATION
- OW2 — INACTIVE WELL LOCATION
- SW1 — APPROXIMATE LOCATION OF SURFACE WATER SAMPLE
- GP1 — LOCATION OF GAS PROBE
- 48.23 — GROUNDWATER ELEVATION (m) SHALLOW FLOW SYSTEM
- (38.55) — GROUNDWATER ELEVATION (m) DEEP FLOW SYSTEM
- INTERPRETED SHALLOW GROUNDWATER CONTOUR
- INTERPRETED GROUNDWATER FLOW DIRECTION IN SHALLOW FLOW SYSTEM

SCALE : 1:2000

0 25 50 75 100

wsp

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

IS.	RV.	DATE	DESCRIPTION

SEAL:

CLIENT: **TOWNSHIP OF HURON-KINLOSS**

CLIENT REF. #: --

PROJECT: **HURON LANDFILL**

PROJECT NO: 121-60020-22

DATE / DATE: MARCH 2024

DESIGNED BY: --

DRAWN BY: C.H.

CHECKED BY: A.H.

DRAWING NO: FIGURE 4

SCALE: 1:2000

TITLE: **GROUNDWATER FLOW SHALLOW FLOW SYSTEM MAY 16, 2023**

DISCIPLINE: **ENVIRONMENT**

ISSUE: --

DATE OF: **MARCH 2024**

RV. # **0**

Ansi B-SCE, C:\Users\chad.haines\OneDrive - WSP O365\Desktop\Working from Home\Kaurel\Huron Dec 2023 Survey - CH.dwg, 2024-03-27 7:57:05 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 October, 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

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 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/

c: 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
Toronto ON M4V 1L5
Télécopieur: (416)314-8452
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. A272601: Huron Landfill Site
Huron-Kinloss Township, County of Bruce
MOE Reference Number 7333-6ZV8GY

I am writing in response to your later 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,

Tes Gebrezghi

Tesfaye Gebrezghi
Waste Unit Supervisor

c: Helmut Pfeiffer EO, Owen Sound

Ministry of the Environment
Environmental Assessment and
Approvals Branch
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Telephone: (416) 314-7029

Ministère de l'Environnement
Direction des évaluations et des
autorisations environnementales
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Téléphone : (416) 314-7029

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. A172601: Huron Landfill Site
Huron-Kinloss Township, County of Bruce
MOE Reference Number 7335-62VSGY

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

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

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

Final Contours and Capacity Calculation: The original supporting documentation package did not include any capacity calculations needed for reviewing the revised final contours. Subsequent to my telephone conversation with Mr. Bob 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 Guideline, assessment of the adequacy of the current monitoring program including trigger parameters and contingency plans.

4. Cell preparation: There is a brief discussion on initial stripping of topsoil and overburden material from the work area and placement of 0.5 meter of ???? (it is not clear what this 0.5 meter thick material is) to form the working face of the cell. Depending on the groundwater conditions, including the leachate impact, current and future compliance with Reasonable Use Guideline, and subsurface soil conditions, there 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 Pourhassani, P. Eng.
Senior Approvals Engineer

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

Ministry of the Environment
Environmental Assessment and
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Téléphone : (416) 314-8274

Ontario

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 evidensed 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 Odame-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: 416-314-4285
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

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

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

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

Stormwater Management

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

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

Environmental Monitoring and Triggers

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

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

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

Groundwater

It was recommended that comments raised by the MOE review of the 2006 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. A272601
Huron Landfill Site, Township of Huron-Kinloss
MOE Reference Number 7021-7HJKZP

6. Remedial Action Plan in the Area of OW11

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

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

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

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

Sincerely,

PRYDE SCHROPP McCOMB, INC.

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

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

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PRYDE SCHROPP McCOMB INC.

August 26, 2009
File: 00941

BY FAX ONLY – 5 Pages

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

Tel: 416-314-4075
Fax: 416-314-4283
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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Ontario

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

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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

June 3, 2010

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

Dear Mr. McNichol,

RE: Huron Landfill Site, 2009 Annual Monitoring Report

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

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

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

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

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

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

Yours truly,

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

File Storage Number: SI BR HK C5 610

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

101- 16942-01

RECEIVED APR 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.
/nrm/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

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 #: 4545-4MERDZ, 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 6 Road. The site is open year round for the public on Tuesday, Friday and Saturday between 10:00 a.m. to 4:00 p.m.

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

2.5 COVER MATERIAL:

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

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

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

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

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

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

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

*** See Section 5.0 Actions Required.**

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

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

At the time of the inspection, a large volume of wind 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 5.0 Actions Required.

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

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

Item not resolved.

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

Item not resolved.

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

Item completed.

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

Item completed.

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

Item completed.

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

Item not resolved.

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

Item completed.

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

Item completed.

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

Item not resolved.

4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate?
No

Specifics:
Not Applicable
Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?
No

Specifics:
Not Applicable
Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment ?
Yes

Specifics:
1. Failure to apply cover material in accordance with the Condition 3.3 of the Notice No. 2.
2. Failure to contain and clean up wind blown litter.
3. Failure to handle and store appliances containing CFCs in an environmentally responsible manner.

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?
No

Specifics:
Not Applicable
Was there any indication of minor administrative non-compliance?
No

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

5.0 ACTION(S) REQUIRED

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

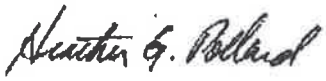
Applicable
8657-9GNRVM

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: 2014/02/26

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.

WSP Canada Inc.
101 14th Avenue
Hanover, ON N4N 3W1
T 519-364-5700
F 519-364-8937
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)

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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

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 Gass, MOE, Owen Sound
Stephen Cobean, WSP, Owen Sound

WSP

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.
1450 1st Ave. W.
Suite 101
Owen Sound, ON N4K 6W2

Phone: 519-376-7612
Fax: 519-376-6006
www.wspgroup.com

MEETING NOTES

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

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

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

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

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

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

The weather was overcast with intermittent rain.

The following provides a summary of the training session:

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

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

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wsp.com

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

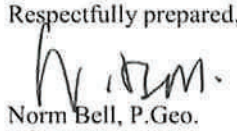
Please let me know if you have any questions regarding this year's training session.

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

NEXT MEETING

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

Respectfully prepared,



Norm Bell, P.Geo.

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:

- [x] Health & Safety Policy: HKHS 1 – Individual Responsibilities
- [x] Health & Safety Procedure(s): HKHS 2.1 - General Safety Rules, SOP ALL 2 Extension Ladder SOP ALL 5 Battery Boosting
- [x] MSDS: Degreasers
- [x] Emergency Procedures: What to do if there is a chemical spill on-site or close to site
- [x] Documentation: MOE Certificate of Approval
- [x] Resources: Health & Safety Manual, MSDS Binder, EP-001 Spills, C of A

Name: Please Print	Signature	Position
TERRY EDMISTON		OPERATOR-IN-CHARGE
IAN Mc GUGAN		WORKER
SARAH FARRELL LOTTON	Sarah Farrell-Lotton	WORKER

Date(s): January 27, 2017 D Howe

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:

- [x] Health & Safety Policy: HKHS 2 – Committees
- [x] Health & Safety Procedure(s): HKHS 2.2 – Personal Protective Equipment, SOP ALL 3 Backing Up, SOP PW 10 Half-ton Pickup Truck
- [x] MSDS: Gasoline
- [x] Environmental concerns: Ontario Electronic Stewardship – handling electronic waste
- [x] Resources: Health & Safety Manual, MSDS Binder, Ontario Electronic Stewardship agreement

Name: Please Print	Signature	Position
TERRY EDMISTON	T H Edmiston	OPERATOR IN CHARGE
Sarah Farrell-Lotton	Sarah Farrell-Lotton	Worker
Ian McGuan		Attendant

Date(s): February 25, 2017 D 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:

- [x] Health & Safety Policy: HKHS 3 – Workplace Inspections
- [x] Health & Safety Procedure(s): HKHS 2.3 – Lockout/Block-out, SOP ALL 7 Power Tools, SOP ALL 8 Hand Tools, SOP PW Pressure Washer
- [x] MSDS: RATAK Rodenticide
- [x] Environmental concerns: *EPA* Reg. 347: Section 1 Definitions
- [x] Resources: Health & Safety Manual, MSDS Binder *Environmental Protection Act*

Name: Please Print	Signature	Position
TERRY EDMISTON		OPERATOR IN CHARGE
Tom McTaggart		Attendant
Sarah Farrell-Lotton	Sarah Farrell-Lotton	Worker

Date(s): March 25, 2017 Howe

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, SOP ALL 9 Entering and Exiting Building (Vehicle Op)
- [ ] MSDS: RAID Flying Insect Killer NO MSDS COPY
- [x] Environmental concerns: *EPA* Reg. 347: Sections 2 – 3 Designation and Exemption
- [x] Emergency Procedures: What to do if there is an explosion on-site or close to site
- [x] Resources: Health & Safety Manual, MSDS Binder, *Environmental Protection Act*, Landfill EP-002 Explosion

Name: Please Print	Signature	Position
TERRY EDMISTON		OPERATOR IN CHARGE
Ian McGugan		Attendant
Samantha Cleave	Samantha Cleave	Landfill Attendant

Date(s): August 25, 2017 D Howe

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, SOP ALL 13 Sunblock/Sunscreen and Insect Repellent
- [x] MSDS: Sunscreen, Insect Repellent
- [x] Environmental concerns: *EPA* Reg. 347: Sections 4 – 10 Disposal Sites and Systems
- [x] Emergency Procedures: What to do if there is a severe weather conditions (i.e. wind, flood, earthquake, tornado, extreme snow squalls)
- [x] Resources: Health & Safety Manual, MSDS Binder *Environmental Protection Act*, Landfill EP-003 Weather Event, Township of Huron-Kinloss Emergency Response Plan (ERP) Section 8.7 Winter Storms

Name: Please Print	Signature	Position
TERRY EDMISTON		OPERATOR IN CHARGE
Samantha Cleave	Samantha Cleave	Landfill Attendant
Ian McGugan		Attendant

Date(s): August 25, 2017

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:

- [x] Health & Safety Policy: HKHS 6 – Modified Work
- [x] Health & Safety Procedure(s): HKHS 2.8 – Visitors to Site ~~NO COPY~~, SOP ALL 11 Handling Fuel, SOP PW 29 Burning Brush
- [x] MSDS: WD-40
- [x] Environmental concerns: *EPA* Reg. 347: Sections 11 – 16.1 Standards for Sites
- [ ] Emergency Procedures: What to do if there is a fire on-site or close to site NO COPY
- [x] Resources: Health & Safety Manual, MSDS Binder, *Environmental Protection Act*, Landfill EP-004 Fire

Name: Please Print	Signature	Position
TERRY EDMISTON		OPERATOR IN CHARGE
Samantha Cleave		Landfill Attendant
Tom McGuggan		Attendant

Date(s): August 25, 2017 L Howe

Township of Huron-Kinloss

LANDFILL TRAINING

Monthly Review - July

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position and signature in the section below. The supervisor shall record the date the training was conducted.

Topics Covered:

- [x] Health & Safety Policy: HKHS 7 – Refusal to Work
- [ ] Health & Safety Procedure(s): HKHS 2.9 – Handling Cash, SOP ALL 10 Lifting and Handling - NO COPY ✓ SOP ALL 16B Portable Eyewash ✓, SOP ALL 20 Dog Bite/Attack Prevention ✓
- [x] MSDS: Glass Cleaner
- [x] Environmental concerns: *EPA* Reg. 347: Section 17 – Management of Asbestos Waste
- [x] Emergency Procedures: What to do if a severe or critical injury occurs on-site
- [x] Resources: Health & Safety Manual, MSDS Binder, *Environmental Protection Act,* Landfill EP-005 – Severe/Critical Injury

Name: Please Print	Signature	Position
TERRY EDMISTON		OPERATOR IN CHARGE
Samantha Cleave	Samantha Cleave	Landfill Attendant
Ian McGoogan		Attendant

Date(s): August 26, 2017 K Howe

Township of Huron-Kinloss

LANDFILL TRAINING

Monthly Review - August

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position and signature in the section below. The supervisor shall record the date the training was conducted.

Topics Covered:

- [x] Health & Safety Policy: HKHS 8 – Health and Safety Training ✓
- [x] Health & Safety Procedure(s): SOP ALL 21 Needle Collection/Disposal, ✓ PW 26 CAT 816F Compactor, SOP PW 27 Bulldozer
- [x] MSDS: Diesel Fuel
- [x] Environmental concerns: *EPA* Reg. 347: Sections 27 - Refusals
- [x] Resources: Health & Safety Manual, MSDS Binder, *Environmental Protection Act*

Name: Please Print	Signature	Position
TERRY EDMISTON		OPERATOR IN CHARGE
Tod McGugan		Attendant
Samantha Cleave	Samantha Cleave	Landfill Attendant

Date(s): August 26, 2017

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:

- [x] Health & Safety Policy: HKHS 9 – Hazardous Conditions Reporting, HKHS 11 – Disciplinary Policy
- [x] Health & Safety Procedure(s): SOP ALL 18 Fire Extinguisher, SOP PW 31 Methane Detector
- [x] MSDS: Fire Extinguisher
- [x] Environmental concerns: *EPA* Reg. 347: Sections 29.1 – 29.5 – Field Operations
- [x] Resources: Health & Safety Manual, MSDS Binder, *Environmental Protection Act*

Name: Please Print	Signature	Position
TERRY EDMISTON		OPERATOR IN CHARGE
Ian McGugan		Attendant
Samantha Cleave	Samantha Cleave	Booth Attendant

Date(s): September 22, 2017 K Howe

Township of Huron-Kinloss

LANDFILL TRAINING

Monthly Review - October

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position and signature in the section below. The supervisor shall record the date the training was conducted.

Topics Covered:

- [x] Health & Safety Policy: HKHS 10 – Standard Operating Procedures
- [x] Health & Safety Procedure(s): SOP ALL 23 Hand-held Communication Devices, SOP PW 14A Portable Generator
- [x] MSDS: Dymel
- [x] Resources: Health & Safety Manual, MSDS Binder

Name: Please Print	Signature	Position
TERRY EDMISTON		OPERATOR INCHARGE?
Tom McGuigan		Attendant
Samantha Cleave		Booth Attendant

Date(s): October 27, 2017 K Howe

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:

- [x] Health & Safety Policy: HKHS 12 – Ergonomics Policy
- [x] Health & Safety Procedure(s): HKHS 2.6 – Emergency Procedures
- [x] MSDS: Instant Hand Sanitizer
- [ ] Emergency Procedures: ERP Review Parts 2, 4, 6 and Appendix F – Emergency Notification
- [ ] Resources: Health & Safety Manual, MSDS Binder, Township of Huron-Kinloss Emergency Response Plan (ERP)

Name: Please Print	Signature	Position
TERRY EDMISTON		OPERATOR IN CHARGE ?
Ian McGowan		Attendant
Samantha Cleave	Samantha Cleave	Booth Attendant

Date(s): November 24, 2017

Township of Huron-Kinloss

LANDFILL TRAINING

Monthly Review - December

Please discuss/review the following Health & Safety, environmental and emergency procedures/policies relevant to the landfill site. Upon completion, each employee shall fill in their name, position and signature in the section below. The supervisor shall record the date the training was conducted.

Topics Covered:

☑ Health & Safety Policy: HKHS 13 – Violence and Harassment in the Workplace Policy

☑ Health & Safety Procedure(s): SOP ALL 25 Dealing with Aggressive or Violent People, SOP ALL 27 Safe Visits, SOP PW 30 Restricting Access at Public Works Buildings

☑ MSDS: Printer Ink

☑ Resources: Health & Safety Manual, MSDS Binder

Name: Please Print	Signature	Position
TERRY EDMISTON		OPERATOR-IN-CHARGE?
Ian McGuan		Attendant
Samantha Cleave		Booth Attendant.

Date(s): December 22, 2017

The Corporation of the Township of Huron-Kinloss

Landfill Staff & Crossing Guard

Health & Safety Training

Description: Workplace Harassment & Violence

Date: 23 March 2017

Trainer: Tracey Howe

Approval: By-Law 2002-113

Topics Covered:

- [x] Health & Safety Policy
- [x] Human Resources Policy
- [x] Internal Procedures
- [x] Investigations
- [x] Forms
- [x] Communications

Participants:

Name	Department	Signature
Ian McGugan	Landfill	
JAMES LIND	LANDFILL	
TERRY EDMISTON	LANDFILL	
Sarah Farrell-Lotton	Landfill	Sarah Farrell-Lotton
Darlene Whitehead	Crossing guard	Darlene Whitehead

The Corporation of the Township of Huron-Kinloss

Health & Safety Training

Description: Kinloss Landfill Labourer

Dates: 23 March 2017

Approval: By-Law 2002-113

Trainer: Tracey Howe

Topics Covered:

- [x] Accessibility
- [x] Accident/Incident Reporting
- [x] Disciplinary & Dismissal Policy
- [x] Emergency Procedures
- [x] General Safety Rules
- [x] Hazardous Conditions Reporting
- [x] Individual Responsibilities
- [x] Personal Protective Equipment
- [x] Refusal to Work
- [x] Timesheets
- [x] Workplace Harassment & Violence
- [x] WHMIS 2015
- [x] SOP ALL 21 Needle Collection

Name	Department	Signature
JAMES LIND	PUBLIC WORKS	

The Corporation of the Township of Huron-Kinloss

Health & Safety Training

Description: Employee Orientation

Date: 12 July 2017

Approval: By-Law 2002-113

Trainer: Tracey Howe

Topics Covered:

- [x] Accessibility
- [x] Accident/Incident Reporting
- [x] Disciplinary & Dismissal Policy
- [x] Emergency Procedures
- [x] Equipment
- [x] Fire Extinguisher
- [x] General Safety Rules
- [x] Hazardous Conditions Reporting
- [x] Individual Responsibilities
- [x] Personal Protective Equipment
- [x] Refusal to Work
- [x] Training
- [x] WHMIS 2015
- [x] Workplace Harassment & Violence

Participants:

Name	Department	Signature
Samantha Cleave	Public Works – Landfill	Samantha Cleave

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

Solid Non-Hazardous Waste Disposal Site Inspection Report

Client:	The Corporation of the Township of Huron-Kinloss Mailing Address: 21 Queen St, Post Office Box, 130, Ripley, Ontario, Canada, N0G 2R0 Physical Address: 21 Queen St Ripley, Huron-Kinloss, Township, County of Bruce, Ontario, Canada, N0G 2R0 Telephone: (519)395-3735, Extension: 130, FAX: (519)395-4107, email: hnichol@huronkinloss.com Client #: 4545-4MERDZ, Client Type: Municipal Government, NAICS: 22131 Additional Address Info: Ripley		
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:	Hugh Nichol	**Title:**	Public Works Superintendant
Contact Telephone:	(519)395-3735 **ext**	**Contact Fax:**	
Last Inspection Date:	2014/02/20		
Inspection Start Date:	2018/01/16	**Inspection Finish Date:**	2018/01/16
Region:	Southwestern		

1.0 INTRODUCTION

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

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

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

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

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

institutional sectors located within the service area.

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

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

2.0 INSPECTION OBSERVATIONS

Certificate of Approval Number(s):
Environmental Compliance Approval A272601 was issued October 15, 1991 and amended in 2007, 2010 and 2012.

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

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

- A272601 Notice No. 2, issued on July 6, 2010 - ECA was amended to change the landfilling operation at the Landfill from trench method to area method, for disposal of domestic, commercial and solid non-hazardous industrial wastes and to approve the establishment and operation of waste segregation/recycling centre and WEEE program at the landfill, for acceptance, temporary storage and transfer of non-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:
There is no financial assurance required for this landfill site as it is a municipally owned landfill.

2.2 APPROVED AREA OF THE SITE:

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

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

2.3 APPROVED CAPACITY:

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

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

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

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

2.4 ACCESS CONTROL:

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

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

2.5 COVER MATERIAL:

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

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

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

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

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

2.6 WASTE BURNING:

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

2.7 GROUNDWATER/SURFACEWATER IMPACT:

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

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

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

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

2.8 LEACHATE CONTROL SYSTEM:

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

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

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

2.9 METHANE GAS CONTROL SYSTEM:

Specifics:
There is no methane gas collection system at this site.

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

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

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

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

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

2.10 OTHER WASTES:

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

According to the 2016 Annual Report, Huron Landfill accepted the following items:
- clean burnable wood,
- scrap metal,
- refrigeration units,
- e-waste,
- mattresses and,
- tires.

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

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

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

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

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

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

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

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

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

4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate?
No

Specifics:

Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?
No

Specifics:

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

Yes

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

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

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

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

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?
No

Specifics:

Was there any indication of minor administrative non-compliance?
No

Specifics:

5.0 ACTION(S) REQUIRED

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

6.0 OTHER INSPECTION FINDINGS

There were no other inspection findings associated with this inspection.

7.0 INCIDENT REPORT

Applicable
3187-AVHRNS

8.0 ATTACHMENTS

IMG_20180116_135607.jpg; IMG_20180116_135645.jpg; IMG_20180116_140110.jpg; IMG_20180116_140123.jpg; IMG_20180116_140125.jpg; IMG_20180116_140200.jpg; IMG_20180116_140416.jpg; IMG_20180116_140440.jpg; IMG_20180116_140444.jpg; IMG_20180116_140511.jpg; IMG_20180116_140622.jpg; IMG_20180116_140709.jpg; IMG_20180116_140735.jpg; IMG_20180116_140908.jpg; IMG_20180116_141306.jpg; IMG_20180116_141310.jpg; IMG_20180116_141322.jpg; IMG_20180116_141942.jpg

PREPARED BY:
Environmental Officer:
Name: Natasha Munn
District Office: Southwestern Region
Date: 2018/01/25
Signature

REVIEWED BY:
District Supervisor:
Name: Andrew Barton
District Office: Owen Sound District Office
Date: 2018/01/31

Signature:

File Storage Number: BR HK C5 610

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

March 8, 2018

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

Dear Ms. Munn:

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

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

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

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

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

SECTION 2.5 – COVER MATERIAL

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

SECTION 2.8 – LEACHATE CONTROL SYSTEM

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

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

SECTION 2.10 – OTHER WASTES

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

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

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wsp.com

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.

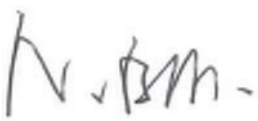
   Given the past issue with the high water table at the Site, the effect of shallow groundwater will be considered.

   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

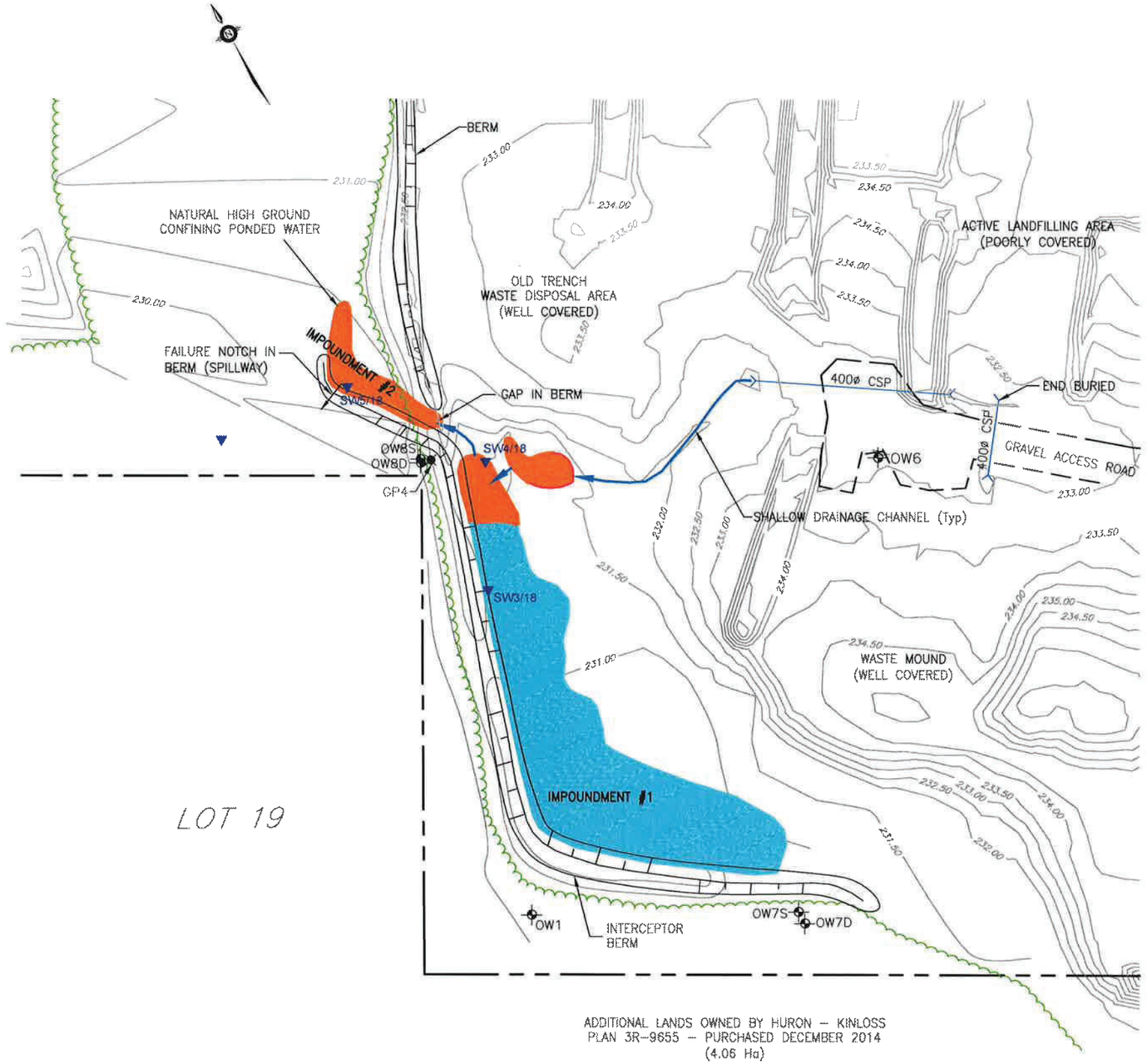
Surface Water Station			SW 1 (Upstream)	SW 1 (Upstream)	SW 2 (Downstream)	SW 2 (Downstream)	SW3/18	SW4/18	SW5/18
Date			12-Jun-17	30-Oct-17	12-Jun-17	30-Oct-17	23-Apr-18	23-Apr-18	23-Apr-18
	Units	**PWQO mg/L**							
Calculated Parameters									
Hardness (CaCO3)	mg/L		218	357	262	339	181	1200	859
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.



LOT 19

ADDITIONAL LANDS OWNED BY HURON – KINLOSS
PLAN 3R–9655 – PURCHASED DECEMBER 2014
(4.06 Ha)

SCALE : 1:1000
0 25 50m

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.

4 HUGHSON STREET SOUTH, SUITE 305
HAMILTON, ONTARIO L8N 3Z1
TEL: 905.529.4414 | FAX: 905.521.2965 | WWW.WSPGROUP.COM

Huron - Kinloss

EXISTING CONDITIONS - SURFACE WATER IMPOUNDMENTS

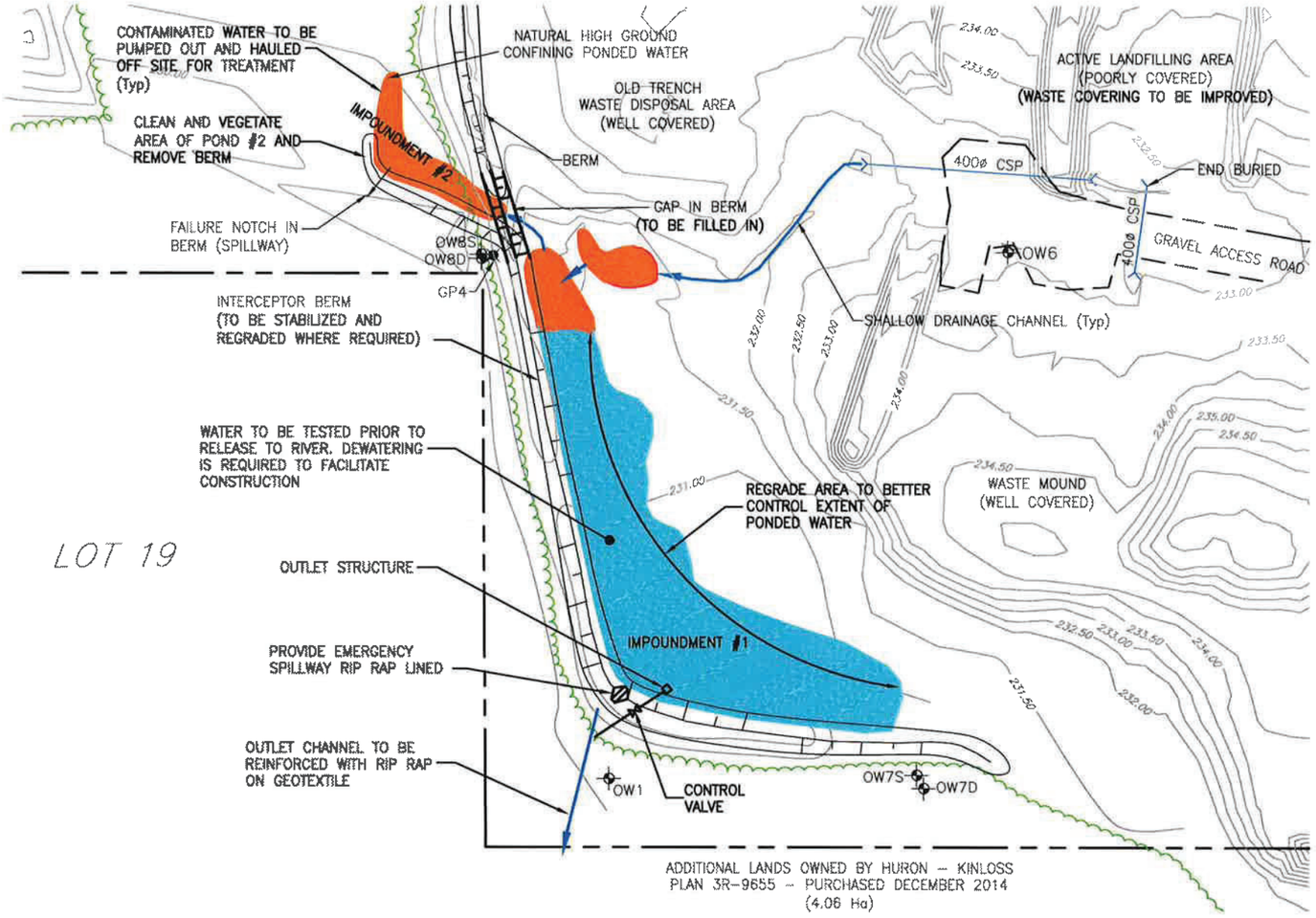
HURON LANDFILL SITE

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

TOWNSHIP OF HURON-KINLOSS

DRAWING NO. 101-16942-00 - 1

SHEET 1



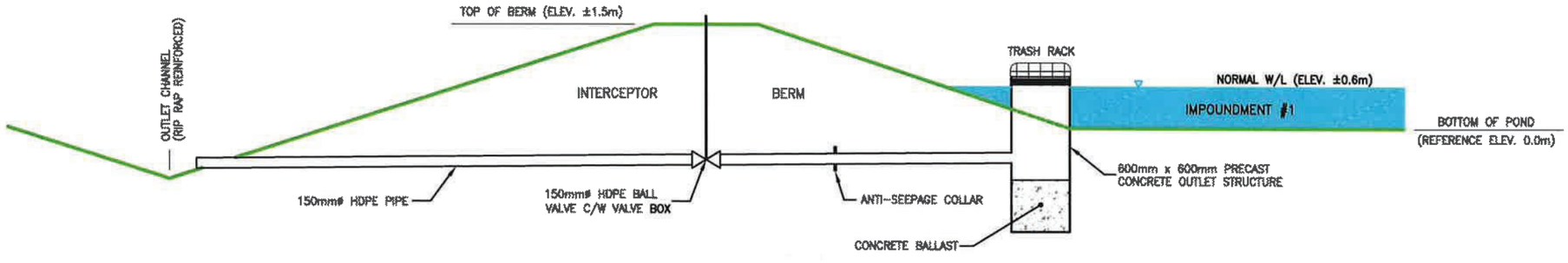
LEGEND :

- 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.

SCALE : 1:1000
0 25 50m



OUTLET SCHEMATIC

N T S

WSP
4 HUGHSON STREET SOUTH, SUITE 300
HAMILTON (ONTARIO) CANADA L8N 3Z1
TEL: 905-528-4414 | FAX: 905-527-2686 | WWW.WSPGROUP.COM

PROPOSED REMEDIATION WORK

HURON LANDFILL SITE

DWN BY: T C G
CHK BY: P S B

DATE: APRIL 19 2018
SCALE: SEE BAR SCALE

TOWNSHIP OF HURON-KINLOSS

DRAWING NO. 101-16942-00 - 2

SHEET 2

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

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	).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	

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

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

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DATE RECEIVED: 24-Apr-18
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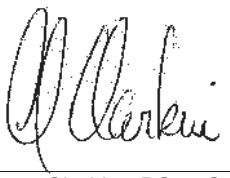
SAMPLE MATRIX: Surface Water

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

MEMO

TO: File #101-16942-00

FROM: Kaurel Tamasauskas., Environmental Technologist

SUBJECT: **Spring Monitoring – May 23, 2018 – Huron Landfill**

DATE: **June 1, 2018**

The following notes were completed after the spring monitoring event at the Huron landfill:

- → Kaurel Tamasauskas and Nicole Collins measured water levels and collected water samples on May 23, 2018.
- → The weather was sunny, hot and a high of 28°C.
- → All groundwater monitors were purged to remove three (3) well volumes of water or were purged dry and allowed to recover prior to sampling.
- → Sampling locations included the following groundwater monitors: OW1, OW3, OW4, OW5, OW6, OW7S, OW7D, OW8S, OW8D, OW9, OW10S, OW10D and OW11.
- → Sampling locations for surface waters included: SW1 and SW2.
- → SW1 is located in an upstream location on the South Pine River at the bridge on Concession Road 6.
- → SW2 is located in a downstream location approximately 380 m west of active landfilling.
- → Duplicate samples were collected at OW7S and SW2.
- → GWC, metals, nutrients, phenols and DOC samples were collected at all groundwater and surface water locations (with the addition of total phosphorus for surface water samples only).
- → Groundwater samples for nutrients, metals and DOC were field filtered at the time of collection. Surface water samples for metals (specifically aluminum) should also be field filtered.
- → Field measurements of pH, conductivity and temperature were taken at all sampling locations.
- → The cells being actively landfilled are the southeast side of cells T3 and T2.

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- → The channel/gully beside OW1 is being eroded and the edge of it is very close to monitor OW1, as the protective casing/culvert is exposed on the bank of the gully (see photos in directory).
- → Rain water has also collected south of monitors OW8S and OW8D (west end of Cell T2). The water in this area appears to be dark grey to black in colour and a sheen is present on the surface (see photos in directory).
- → OW3 and OW9 require a 2" PVC slip-on cap.
- → No methane measurements were required during this round of sampling.
- → Field notes are in HG 120 pages 28 - 33.
- → Digital photos were taken of the site, and can be found in the project directory.

Prepared by:

Kaurel Tamasauskas
Environmental Technologist
KMT/
Encl.
cc Norm Bell. P.Geo., WSP

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

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

Ontario

June 8, 2018

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

Via email and mail

Dear Mr. Nichol,

RE: Huron Landfill – Stormwater/Leachate Management

We have received the letter dated April 30, 2018 and prepared by WSP, responding to the MOECC's January 2018 inspection of the Huron Landfill. Leachate has been identified draining from the landfill site through a gap in a berm. The WSP letter proposes remedial measures including pumping out contaminated water, raising the berm, regrading impoundment areas, and installing a pipe outlet with an isolation valve.

On June 7, 2018, we met with you and Peter Brodzikowski (WSP) on site. Hugh Geurts, our regional surface water specialist also attended the site meeting. Based on the WSP letter and our site visit on June 7, 2018, we provide the following comments.

It is evident that there is no clear separation of on-site landfill generated leachate and stormwater. Landfill leachate must remain separate from landfill stormwater. All precipitation that comes into contact with the open face of the landfill footprint is to be treated as leachate. The Municipality must promptly take measures to prevent leachate from draining off the landfill site and to separate leachate from stormwater.

During the site visit a corrugated steel pile was observed near the toe of the open face of the landfill, draining towards the onsite bermed pond area. Flow from the active face into stormwater must the stopped, as mentioned above.

The existing stormwater collection berm does not appear to be sufficient to provide adequate water quality for discharge to the Pine River. The Municipality should review the stormwater

management collection and containment options that would allow for improved collection and management before off site discharge.

Please note that Condition 6.6 of Notice No. 2 of Environmental Compliance Approval # A272601 issued July 6, 2010 states:

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

We have reviewed our files and cannot locate an ECA stormwater application for this site, as required by Condition 6.6. This is non-compliance with the ECA.

The municipality must take the following actions:

- immediately take steps to prevent leachate from draining off the active landfill site area;
- immediately separate landfill leachate from landfill stormwater; and
- prepare and submit an ECA application as required by Condition 6.6 of ECA # A272601.

Please submit to this office by June 15, 2018 confirmation in writing that actions listed above are being undertaken, with details of the measures being taken

If you have any questions concerning this letter, please contact Natasha Munn at (519) 371-6582 or the undersigned at (519) 371-6191.

Yours truly,

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

File Storage Number: BR HK C5 610

cc. Norm Bell/Peter Brodzikowski, WSP, Owen Sound via email
Natasha Munn, MOECC, Owen Sound
Hugh Geurts, MOECC, London

MEMO

TO: File #101-16942-00

FROM: Kaurel Tamasauskas, Environmental Technologist

SUBJECT: **Fall Monitoring – October 25, 2018 – Huron Landfill**

DATE: **November 6, 2018**

The following notes were completed after the fall monitoring event at the Huron landfill:

- → Kaurel Tamasauskas and Nicole Collins measured water levels and collected water samples on October 25, 2018.
- → The weather was overcast, cool and a high of 9°C.
- → All groundwater monitors were purged to remove three (3) well volumes of water or were purged dry and allowed to recover prior to sampling.
- → Sampling locations included the following groundwater monitors: OW1, OW3, OW4, OW5, OW6, OW7S, OW7D, OW8S, OW8D, OW9, OW10S, OW10D and OW11.
- → Sampling locations for surface waters included: SW1 and SW2.
- → SW1 is located in an upstream location on the South Pine River at the bridge on Concession Road 6.
- → SW2 is located in a downstream location approximately 380 m west of active landfilling.
- → Duplicate samples were collected at OW10D and SW1.
- → GWC, metals, nutrients, phenols and DOC samples were collected at all groundwater and surface water locations (with the addition of total phosphorus for surface water samples only).
- → Groundwater samples for nutrients, metals and DOC were field filtered at the time of collection. Surface water samples for metals (specifically aluminum) should also be field filtered.
- → Field measurements of pH, conductivity and temperature were taken at all sampling locations.
- → The cell that is being actively landfilled is the north east side of cell T4.

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- → The channel/gully beside OW1 is being eroded and the edge of it is very close to monitor OW1, as the protective casing/culvert is exposed on the bank of the gully (see photos in directory).
- → Rain water has collected west of monitor OW11. Many mattresses were also observed in this wet area.
- → Rain water has also collected south of monitors OW8S and OW8D (west end of Cell T2). The water in this area appears to be dark grey to black in colour and a sheen is present on the surface (see photos in directory).
- → Monitors OW4, OW7S and OW8S need new tubing next monitoring round.
- → OW3 and OW9 require a 2" PVC slip-on cap.
- → No methane measurements were required during this round of sampling.
- → Field notes are in HG 120 pages 34 - 39.
- → Digital photos were taken of the site, and can be found in the project directory.

Prepared by:

Kaurel Tamasauskas
Environmental Technologist
KMT/
Encl.
cc Norm Bell. P.Geo., WSP

Ontario

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

Solid Non-Hazardous Waste Disposal Site 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: hnichol@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:**	Public Works Superintendent
Contact Telephone:	(519)395-3735 **ext**	**Contact Fax:**	519-395-4107
Last Inspection Date:	2018/01/16		
Inspection Start Date:	2019/01/16	**Inspection Finish Date:**	2019/01/16
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) 2018/2019 inspection program.

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

This inspection included an unannounced site visit conducted on January 16, 2019 to inspect the operational activities of the landfill site. At the time of inspection the landfill site was closed and landfill attendants were unavailable at the site.

A copy of the 2017 Annual Report (AR) was previously forwarded to the Ministry's Technical Support; therefore, a detailed review of the monitoring data for the site was not conducted as part of this inspection. The 2017 Annual Report, as per Condition 11 of the ECA is required by March 31st of each year, prepared by WSP Canada Inc., dated March 2018, was reviewed as part of the inspection.

A previous MECP inspection was conducted at this site on January 16, 2018. The landfill is owned and operated by the Township of Huron-Kinloss and services the residential and industrial, commercial and institutional sectors located within the service area.

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

According to the AR, the Township is home to a total of approximately 7,000 residents that are serviced by the Huron Landfill. Additionally, waste from the former Township of Huron, the former Township of Kinloss and the Village of Lucknow is landfilled at the Huron Landfill. The Mid-Huron Landfill was closed June 30, 2018, and therefore, as granted in the amended ECA from 2010, waste from the Village of Lucknow is now landfilled at the Huron Landfill.

2.0 INSPECTION OBSERVATIONS

Certificate of Approval Number(s):
Environmental Compliance Approval A272601 was issued October 15, 1991 and amended in 2007, 2010 and 2012.

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

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

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

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

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

2.1 FINANCIAL ASSURANCE:

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

2.2 APPROVED AREA OF THE SITE:

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

At the time of inspection the Landfill footprint appeared defined by site topography and access roads. Wastes intended for landfilling were observed to be deposited into the approved area with the exception of historic waste that was filled beyond the approved limits. It is the ministry's position that the waste can likely be left where it is provided it is not causing issues and is deducted from the overall approved capacity of the site **(See Section 5.0 Action(s) Required)**.

2.3 APPROVED CAPACITY:

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

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

According to the AR, the average landfilled volume over the past five years is 7,440 cubic metres including waste and cover material. The estimated landfill volume for 2017 is 10,927 cubic metres which is a historic annual maximum fill rate compared to previous years. WSP used the above average fill rate and remaining capacity determined in the Design and Operational Plan to result in a site closure date of 2031. Formerly, the former Village of Lucknow's waste

was received by the Mid-Huron Landfill. However, this landfill closed on June 30, 2018. Since this closure, waste from the former Village of Lucknow is landfilled at the Huron Landfill. The above estimate of reaching maximum capacity in 2031 does not account for waste received from the former Village of Lucknow.

2.4 ACCESS CONTROL:

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

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

2.5 COVER MATERIAL:

Specifics:
ECA A272601 Condition 3.3 of the Notice No. 2 states:

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

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

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

Cover on the landfill has been improved since the 2018 MECP inspection. Most sections of the landfill have adequate interim cover and solely one section is open for landfilling. However, daily cover was not observed on the open face of the waste fill area during the inspection in contravention to Condition 3.3 of the ECA **(See Section 5.0 Action(s) Required)**. Landfill staff have previously indicated that cover material stock is clay based and forms clumps making it difficult for the site equipment to apply the required material. It is recommended that the municipality uses cover material that is more easily used in winter **(See Section 6.0 Other Inspection Findings)**.

2.6 WASTE BURNING:

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

2.7 GROUNDWATER/SURFACEWATER IMPACT:

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

The 2017 AR identifies that groundwater and surface water sampling occur twice annually, in the spring and fall. At the time of inspection, snow conditions caused only a few monitoring wells to be observed. All monitoring wells observed appeared to be in good condition with locks to control access. However, the Annual Report detailed that Well OW2 was damaged and has been filled with bentonite and fitted with a temporary cap. A report received by the Owen Sound District Office indicated that the well was removed on March 12, 2018 as required by Section 21(3) of O. Reg. 903, the well shall be properly abandoned.

According to the 2017 AR, surface water monitoring samples are obtained from an upstream and downstream station on South Pine River. Surface water monitoring results have not indicated any landfill related impacts.

The District Office has forwarded a copy of the 2017 Annual Report to the Ministry's Technical Support Section for

review. Any comments regarding groundwater or surface water impacts will be dealt with under a letter separate from this report.

2.8 LEACHATE CONTROL SYSTEM:

Specifics:

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

However, during the previous 2018 MECP landfill inspection, it came to the attention of the Environmental Officer that leachate was ponding at the interceptor berm toward Pine River. A Leachate Contingency Plan is currently underway from consultants WSP as per Section 9.2 of the Design and Operation Plan **(See Section 5.0 Action(s) Required)**.

An additional site visit was conducted in conjunction with the MECP's district staff, MECP's Surface Water Specialist, municipal staff and WSP consultants on June 7, 2018. It was observed that a catch basin was located at the base of the berm and corrugated steel piping was located on the downhill, near the open face of the landfill. This pipe appeared to direct overland flow toward the stormwater collection berm. Leachate coloured runoff was observed to be flowing off the approved landfill footprint with no collection or containment structures. Since these observations took place, the corrugated steel pipe was reported by the municipality to have been covered over with both ends blocked. It no longer functions as a corrugated steel pipe and is unable to transmit runoff or leachate on the site.

WSP consultants reported that material was delivered to the landfill site on June 22, 2018, to fill in the gap in the interceptor berm. It was reported that the area where leachate was ponding and trickling off site has been levelled off and there was no sign of leachate.

Additionally, the operator has created two berm-like structures extending from the outside limits of the existing fill area that will direct any runoff from the waste across the access road to a small collection area where it can infiltrate into the ground. The berms are small enough to allow traffic to still cross over when accessing the pit. During the time of the inspection, the berms were observed and it was noted that they appear to be intercepting runoff.

In 2018, it came to the ministry's attention that an ECA (stormwater) failed to be submitted by the municipality as required by Condition 6.6 of ECA # A272601 **(See Section 5.0 Action(s) Required)**. WSP Consultants have proposed to develop a plan to accommodate a stormwater pond within the footprint of the landfill and submit an ECA application. Specific dates on workplan and timelines have not yet been submitted to the MECP.

2.9 METHANE GAS CONTROL SYSTEM:

Specifics:

There is no methane gas collection system at this site.

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

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

According to the AR, methane monitoring indicated no detections of methane in 2017-2018 at monitoring points GP1, GP2, GP4 and at the scale house. However, at GP3 methane was detected at 100 percent of its lower explosive limit. The shed in close proximity to GP3 has been removed from the site as per previous MECP suggestion. In response to the detection of methane at the Landfill, the Township purchased a Sensit Model HXG-2D gas detector and trained the site attendants on the operation of the instrument. When working in the vicinity of GP3 the gas detector was reported to be utilized by staff. In 2017, there were no reports of the lower explosive limit being greater than zero.

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

2.10 OTHER WASTES:

Specifics:

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

According to the 2017 Annual Report, Huron Landfill accepted the following items:
- recyclable materials
- clean burnable wood,
- scrap metal,

- refrigeration units,
- e-waste,
- mattresses and,
- tires.

Recyclable Materials
A series of signed bins are located near the entrance for recyclable materials including paper, cardboard and plastic/metal containers. Recycling tonnages removed from the site have increased in recent years with 2017 diverting 429.82 tonnes from the landfill, as stated in the AR.

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

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

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

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

Scrap Metal
Scrap metal is collected on-site in a separate area for recycling. Scrap metal is removed by AOR and Triple M Metal LP on a regular basis as needed.

Mattresses
Mattresses were collected onsite in a separate area as of 2015 and were shipped from the landfill on a regular basis. As previously noted in this inspection report, several mattresses were observed outside of the current working landfill area and were not covered by daily cover **(See Section 6.0 Other Inspection Findings)**.

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

The following previous non-compliance issues were noted in the January 2018 inspection;

The Owner/Operator shall ensure daily cover is maintained on the open face of the waste fill area as required by Condition 3.3 of the ECA.
- daily cover remained a non-compliance issue during this site inspection

The Owner/Operator shall properly abandon Well OW2 as per Section 21(3) of O. Reg. 903.
- complete

On or before April 30, 2018 the Owner/Operator shall implement the Leachate Contingency Plan as per Section 9.2 of the Design and Operation Plan to address the pond-like formation of leachate to the south western corner of the landfill area near to the interceptor berm and provide notification of completion to the undersigned Provincial Officer.
- a Leachate Contingency Plan is currently being worked on by consultants WSP. It has not been submitted to the MECP to this date.

In 2018, it came to the ministry's attention that a stormwater ECA was not submitted in contravention to Condition 6.6 of ECA # A272601.
- consultants WSP have been hired and they are currently going over different options for stormwater pond placement

4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate?
No

Specifics:

Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?
No

Specifics:

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

Specifics:
Historic waste deposited beyond the approved landfill limits.

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

An ECA (stormwater) was not submitted by the municipality as required by Condition 6.6 of ECA # A272601.

A Leachate Contingency Plan must be completed as per Section 9.2 of the Design and Operation Plan.

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

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?
No

Specifics:

Was there any indication of minor administrative non-compliance?
No

Specifics:

5.0 ACTION(S) REQUIRED

1. The Owner/Operator shall ensure daily cover is maintained on the open face of the waste fill area as required by Condition 3.3 of the ECA.

2. The Owner/Operator shall ensure refrigeration units are stored in segregated, in an upright position until CFCs are removed and tagged by a licensed technician as required by Section 41(1) of O. Reg. 463/10.

3. The Owner/Operator shall contact the MECP's Client Services and Permissions Branch to ensure that historic waste that was filled beyond the approved limits of the landfill can remain where it is provided it is not causing issues and is deducted from the overall approved capacity of the site, at Client Services and Permissions Branch 2 St. Clair Avenue West, Floor 12A, Toronto, Ontario, M4V 1L7, with a copy to the MECP Owen Sound District Office at 101-17th Street East, Owen Sound, Ontario, N4K 0A5.

4. On or before March 1, 2019 the owner shall provide a written response to the undersigned Provincial Officer detailing the actions to be taken to address the above listed Action Items.

5. On or before April 30, 2019, the Owner/Operator shall complete a Leachate Contingency Plan as per Section 9.2 of the Design and Operation Plan.

6. On or before April 30, 2019, the Owner/Operator shall submit an Application for ECA (stormwater) to the MECP as required by Condition 6.6 of ECA # A272601, made under the EPA, accompanied by all necessary supporting documentation and fees, to the Director of Client Services and Permissions Branch, 2 St. Clair Avenue West, Floor 12A, Toronto, Ontario, M4V 1L7, with a copy to the MECP Owen Sound District Office at 101-17th Street East, Owen Sound, Ontario, N4K 0A5.

6.0 OTHER INSPECTION FINDINGS

During the site inspection ponding water was observed in the open face of the landfill. It appeared that garbage was iced into the ponded areas on the site. Waste should not be placed in water and water should be diverted from the open face of the landfill.

Additionally, 2 large piles of mattresses were observed towards the south of the landfill. The mattresses were piled on top of the berm with some spilling over the berm. The ministry was concerned that these mattresses were place outside of the landfill area and were without daily cover as required by Condition 3.3 of the ECA.

7.0 INCIDENT REPORT

Applicable
6011-B8MTVQ

8.0 ATTACHMENTS

Huron LF Jan 16 19 10.JPG; Huron LF Jan 16 19 11.JPG; Huron LF Jan 16 19 12.JPG; Huron LF Jan 16 19 13.JPG; Huron LF Jan 16 19 14.JPG; Huron LF Jan 16 19 15.JPG; Huron LF Jan 16 19 16.JPG; Huron LF Jan 16 19 1.JPG; Huron LF Jan 16 19 2.JPG; Huron LF Jan 16 19 3.JPG; Huron LF Jan 16 19 4.JPG; Huron LF Jan 16 19 5.JPG; Huron LF Jan 16 19 6.JPG; Huron LF Jan 16 19 7.JPG; Huron LF Jan 16 19 8.JPG; Huron LF Jan 16 19 9.JPG

PREPARED BY:
Environmental Officer:
Name: **Natasha Munn**
District Office: **Southwestern Region**
Date: **2019/01/28**
Signature

REVIEWED BY:
District Supervisor:
Name: **Scott Gass**
District Office: **Owen Sound District Office**
Date: **2019/01/29**

Signature:

File Storage Number: BR HK QU 610

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

MEMO

TO: File #101-16942-00

FROM: Kaurel Tamasauskas, Environmental Technologist

SUBJECT: **Methane Monitoring – March 11, 2019 – Huron Landfill**

DATE: **March 14, 2019**

The following notes were completed after the methane monitoring event at the Huron Landfill:

→ On March 11, 2019, methane gas monitoring was completed by Kaurel Tamasauskas at the Huron Landfill. In conjunction with methane monitoring, static water level readings were obtained from all of the gas probes. Methane gas readings were taken using the Gasurveyor 3-5000 methane meter at the following locations:

Location	Methane
GP1	0.0% LEL
GP2	0.0% LEL
GP3	41.0% VOL. GAS
GP4	0.0% LEL

→ The weather was overcast with a high of -5°C.

→ Field notes are in HG 120, page 40.

Prepared by:

Kaurel Tamasauskas
Environmental Technologist
KMT/
Encl.

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

Tel.: +1 519 376-7612
Fax: +1 519 376-8008
wsp.com

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:

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

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

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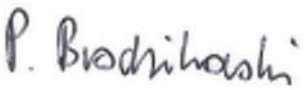
wsp.com

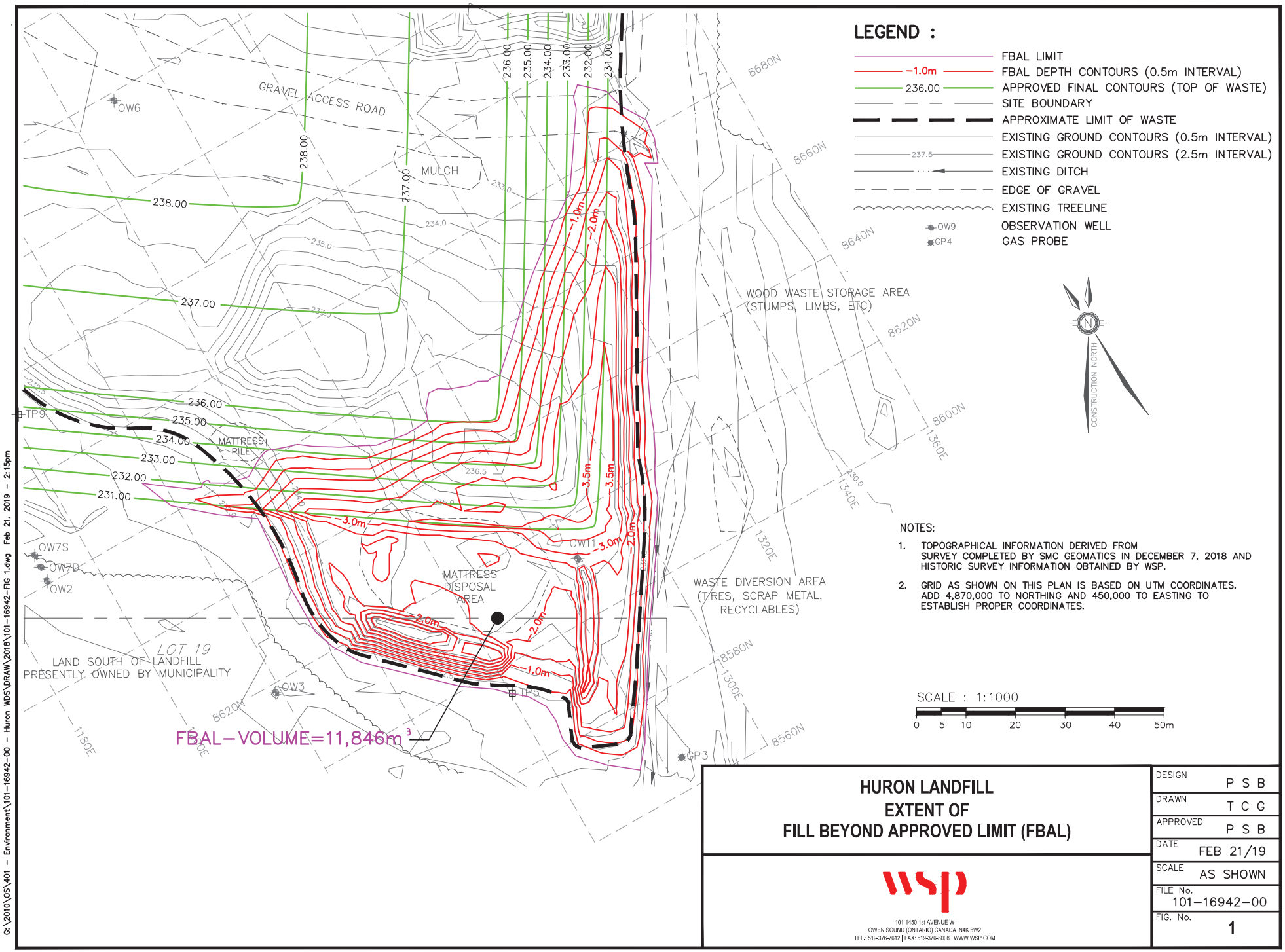
Accounting for calculations accuracy, this volume is almost the same as the overfill volume (11,846 m^3) within the FBAL area. The proposed change in the final top of waste contours is adequate to compensate for the overfill identified within the FBAL area.

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:



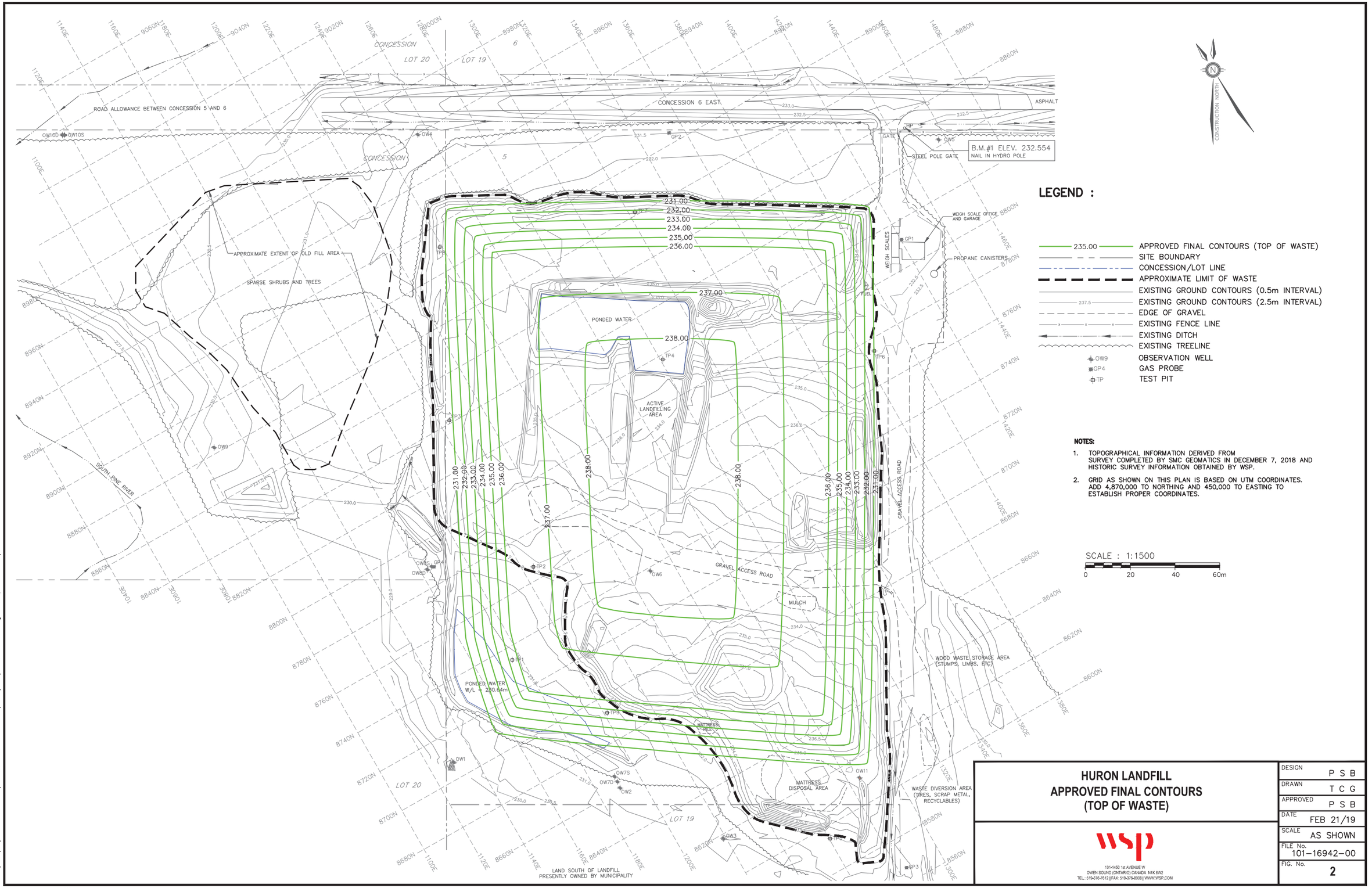
Peter Brodzikowski, P.Eng.
Senior Environmental Engineer
PSB/dlw
Encl.



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: 519-376-8008 | WWW.WSP.COM



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.: 519-376-7612 | FAX: 519-376-8008 | WWW.WSP.COM

DESIGN	P S B
DRAWN	T C G
APPROVED	P S B
DATE	FEB 21/19
SCALE	AS SHOWN
FILE No.	101-16942-00
FIG. No.	2

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

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.: 519-376-7612 | FAX: 519-376-8008 | WWW.WSP.COM

DESIGN	P S B
DRAWN	T C G
APPROVED	P S B
DATE	FEB 21/19
SCALE	AS SHOWN
FILE No.	101-16942-00
FIG. No.	3

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

Ministry of the Environment, Conservation and Parks

Owen Sound District Office
101 17th Street East, 3rd Floor
Owen Sound ON N4K 0A5
Tel.: 519-371-2901
Fax.: 519-371-2905

Ministère de l'Environnement de la Protection de la nature et des Parcs

Bureau de district d'Owen Sound
101 17ème rue Est, 3e étage
Owen Sound ON N4K 0A5
Tél. : 519-371-2901
Téléc. : 519-371-2905

Ontario

August 23, 2023

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

RE: Inspection of Huron Landfill at 2087 Concession Rd 6 E, Ripley, ON, on July 25, 2023 | Event No. 1-216548108

The ministry undertakes inspections of the regulated community including industry, businesses and individuals. The primary focus of this inspection is to confirm compliance with ministry legislation as well as evaluating compliance and conformance with related permissions, policies and guidelines.

Attached to this letter is the report for the inspection completed at Huron Landfill at 2087 Concession 6 Rd E, ON, on July 25, 2023. This report provides an assessment of compliance and conformance based on observations and information available during the inspection review period only. As always, please refer to the applicable legislative requirements, permissions, policies, guidelines and best management practices to clarify your specific obligations.

Instances of non-compliance and/or non-conformance were identified during the inspection. Please refer to the "NON-COMPLIANCE/NON-CONFORMANCE ITEMS" section within the report to determine the actions required and take any necessary steps by the date(s) prescribed to bring the system/facility into compliance/conformance.

Additional findings and applicable comments, where provided, will be found within the report. If you have questions or concerns, please contact me by email at lisa.hines@ontario.ca or by telephone at 519-270-6627.

L Hines

Lisa Hines
Senior Environmental Officer
Badge No. 1876
Drinking Water and Environmental Compliance Division

HURON LANDFILL
2087 CONCESSION 6 E, HURON-KINLOSS, ON,

INSPECTION REPORT

Entity:	THE CORPORATION OF THE TOWNSHIP OF HURON-KINLOSS
Inspection Start Date:	June 28, 2023
Inspection End Date:	August 04, 2023
Inspected By:	Lisa Hines
Badge #:	1876

(signature)

NON-COMPLIANCE

The following item(s) have been identified as non-compliance, based on a "No" response captured for a legislative question(s). For additional information on each question see the Inspection Details section of the report.

Ministry Program: WASTE | **Regulated Activity:** Landfills

Item	Question	Compliance Response/Corrective Action(s)
NC-1	**Question ID:** NOL 14 Is site access limited to times when an attendant is on duty?	Actions required are documented under the question "Are all disposal operations at the site adequately and continually supervised?".
NC-2	**Question ID:** NOL 36 Is proper equipment available for the compaction of waste and applying cover material?	No actions required at this time.
NC-3	**Question ID:** NOL 38 Are all disposal operations at the site adequately and continually supervised?	Action Item No. 1 The Owner shall immediately start complying with condition 3.5 of the ECA.
NC-4	**Question ID:** NOL 41 Is the waste being compacted adequately?	Action Item No. 2 On or before September 1, 2023, the Owner shall comply with their Design and Operations Plan (Revised) and compact the working face at least two periods per open day. The Owner shall also comply with condition 3.3 of the ECA and compact the entire working face at the end of each working day.
NC-5	**Question ID:** NOL 42 Is Daily cover applied to the waste at the end of each working day or as otherwise specified in the ECA?	See Provincial Officer's Order No. 1-224312016 for actions required.

NC-6	**Question ID:** 949100 Were the inspection questions sufficient to address other identified non-compliance items?	Action Item No. 3 The Owner shall immediately cease the burning of restricted items, burning at the leaf and yard waste site and unsupervised burning. Action Item No. 4 On or before September 6, 2023, the Owner shall remove the installed PVC pipe located behind the scrap metal area. See Provincial Officer's Order No. 1-224312016 for action items regarding the Stormwater Management Plan and the leachate collection tank.
NC-7	**Question ID:** NOL 46 Are daily records of site operations available at the site for at least the past 2 years or as otherwise required by the ECA?	Action Item No. 5 The Owner shall immediately comply with Condition 10.1 of the ECA and ensure daily records of site operations are maintained for each operating day. The Owner shall provide written verification to Provincial Officer Lisa Hines when each of the above action items have been completed.

RECOMMENDATIONS

This should not be construed as a confirmation of full conformance with all potential applicable BMPs. These inspection findings are limited to the components and/or activities that were assessed, and the legislative framework(s) that were applied. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements.

If you have any questions related to this inspection, please contact the signed Provincial Officer.

INSPECTION DETAILS

This section includes all questions that were assessed during the inspection.

Ministry Program: WASTE | **Regulated Activity:** Landfills

Question ID	NOL 1	**Question Type**	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Does the Open landfill site have an Environmental Compliance Approval (ECA)?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

ECA #A272601 was issued on April 16, 2020.

Question ID	NOL 2	**Question Type**	Information

Legislative Requirement(s):
Not Applicable

Question:
Is this landfill on Crown land?

Compliance Response(s)/Corrective Action(s)/Observation(s):
No

Question ID	NOL 3	**Question Type**	Legislative

Legislative Requirement(s):
EPA | 27 | (1); EPA | O. Reg. 232/98 | 3;

Question:
Does the holder of the landfill ECA own the entire site?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 4	**Question Type**	Information

Legislative Requirement(s):
Not Applicable

Question:
Does the landfill have a Contaminant Attenuation Zone (CAZ)?

Compliance Response(s)/Corrective Action(s)/Observation(s):

No

Question ID	NOL 12	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Does the landfill have a large enough Buffer Area as specified in the ECA or Regulation 232/98?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 13	Question Type	Information

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Are access roads and on-site roads provided so that vehicles hauling waste to and on the site may travel readily on any day under all normal weather conditions?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 14	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Is site access limited to times when an attendant is on duty?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Actions required are documented under the question "Are all disposal operations at the site adequately and continually supervised?".

Question ID	NOL 15	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Does the site only receive waste from within its approved service area?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 16	Question Type	Information

Legislative Requirement(s):
Not Applicable

Question:
Is the site required to have a ground water monitoring program by the ECA?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 17	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Is the site implementing the groundwater monitoring program as required by the ECA?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 18	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1); EPA | O. Reg. 232/98 | 25;

Question:
Are monitoring well samples taken and tested to determine the quality of the ground water?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 21	Question Type	Information

Legislative Requirement(s):
Not Applicable

Question:
Is the site required to manage leachate by the ECA?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 23	Question Type	Legislative

Legislative Requirement(s):

EPA | 27 | (1); EPA | O. Reg. 232/98 | 26;

Question:
Are samples taken to monitor leachate quality?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 24	**Question Type**	Information

Legislative Requirement(s):
Not Applicable

Question:
Is the ministry concerned with the leachate quality?

Compliance Response(s)/Corrective Action(s)/Observation(s):
No

Question ID	NOL 26	**Question Type**	Information

Legislative Requirement(s):
Not Applicable

Question:
Is the site required to manage landfill gas by the ECA?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 27	**Question Type**	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Is the site implementing the landfill gas manangement requirements in the ECA?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 29	**Question Type**	Information

Legislative Requirement(s):
Not Applicable

Question:
Is the ministry concerned with landfill gas at this site?

Compliance Response(s)/Corrective Action(s)/Observation(s):
No

Question ID	NOL 31	Question Type	Information

Legislative Requirement(s):
Not Applicable

Question:
Is the site required to have a surface water monitoring program by the ECA?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 32	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Is the site implementing the surface water monitoring program as required by the ECA?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 34	Question Type	Information

Legislative Requirement(s):
Not Applicable

Question:
Are there water quality concerns with the results of the samples that have been tested?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

The below comments were provided by the ministry's tech support unit after reviewing the 2022 surface water monitoring results.

1. Surface water quality measured for both river monitoring locations (SW1, SW2) is similar and do not suggest significant impact from landfill activities. Slight exceedances of aluminum and iron at the downstream location do not require any action.
2. Water quality measured for the ponded water (SW3) showed exceedances of several parameters, indicative of leachate impacts. It is recommended to continue monitoring SW3 location and track changes in contamination level in future monitoring efforts.

Question ID	NOL 35	Question Type	Information

Legislative Requirement(s):
Not Applicable

Question:
Is there ongoing abatement to address any concerns the ministry has with the surface water monitoring?

Compliance Response(s)/Corrective Action(s)/Observation(s):
No

Question ID	NOL 36	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Is proper equipment available for the compaction of waste and applying cover material?

Compliance Response(s)/Corrective Action(s)/Observation(s):
No actions required at this time.

During the announced inspection on July 25, 2023, John Yungblut and Lisa Kreller stated the compactor can't be used during the day in the summer as it will overheat. They have purchased another compactor; however no approximate date was given as to when they would be receiving the new compactor. During several conversations in 2022, John stated the loader isn't the ideal piece of equipment for applying and removing daily cover.

Question ID	NOL 37	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Is the landfill able to accurately determine the amount of waste received?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 38	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Are all disposal operations at the site adequately and continually supervised?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Action Item No. 1
The Owner shall immediately start complying with condition 3.5 of the ECA.

On June 28, 2023, an unannounced site visit was completed while the landfill was closed. During the site visit a Bruce Area Solid Waste Recycling truck entered the site and deposited waste into the active landfill area and the recycling bins. During the announced inspection on July 25, 2023, John Yungblut and Lisa Kreller stated the truck drivers have keys and let themselves in when needed. They weigh the trucks themselves and provide those records to the municipality.

Condition 3.5 of the ECA states "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."

Question ID	NOL 39	**Question Type**	Information

Legislative Requirement(s):
Not Applicable

Question:
Does the landfill operator have a site inspection program as required by the ECA?

Compliance Response(s)/Corrective Action(s)/Observation(s):
No

Question ID	NOL 40	**Question Type**	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Does the landfill operator have a procedure in place to address issues identified by staff during the site inspection?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 41	**Question Type**	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Is the waste being compacted adequately?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Action Item No. 2
On or before September 1, 2023, the Owner shall comply with their Design and Operations Plan (Revised) and compact the working face at least two periods per open day. The Owner shall

also comply with condition 3.3 of the ECA and compact the entire working face at the end of each working day.

During the announced inspection on July 25, 2023, Lisa Kreller stated they compact the active working face every Thursday, Saturday and Monday mornings. Lisa stated they only operate the compactor in the mornings during the summer months because the compactor will overheat if operated throughout the day.

As per the Design and Operations Plan (Revised) compaction is to occur at a frequency of at least two periods per open day. The second compaction event should be as close to the end of the working day as possible. As per condition 3.3.a. of the ECA, "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."

Question ID	NOL 42	**Question Type**	Legislative

Legislative Requirement(s):
EPA | 27 | (1); EPA | O. Reg. 232/98 | 7;

Question:
Is Daily cover applied to the waste at the end of each working day or as otherwise specified in the ECA?

Compliance Response(s)/Corrective Action(s)/Observation(s):
See Provincial Officer's Order No. 1-224312016 for actions required.

Unannounced site visits were conducted on June 8 and 28, 2023, and daily cover had not been applied on the active working face. During the announced inspection on July 25, 2023, John Yungblut and Lisa Kreller stated they apply daily cover as often as they can. They are currently using clay soil for cover but are researching and considering using a product called "Top Coat" to use as an alternative daily cover.

As per condition 3.3 of the ECA, daily cover is to be applied "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."

Question ID	NOL 44	**Question Type**	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Is site access restricted by use of a gate, fence, or physical barrier when the site is not operating?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 45	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Is the waste disposal area adequately screened from public view?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 46	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1); EPA | O. Reg. 232/98 | 21;

Question:
Are daily records of site operations available at the site for at least the past 2 years or as otherwise required by the ECA?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Action Item No. 5
The Owner shall immediately comply with Condition 10.1 of the ECA and ensure daily records of site operations are maintained for each operating day.

The Owner shall provide written verification to Provincial Officer Lisa Hines when each of the above action items have been completed.

During the announced inspection on July 25, 2023, John Yungblut and Lisa Kreller stated there has been multiple break-ins and theft of items such as the computer, gas monitor and paper files from the weigh scale office in recent years. Because of this, they are no longer keeping paper records at the office. Records are entered in the computer system and are stored on the computers at the municipal office. I requested John email the daily log book records for January - June 2023 and the site inspections for June 2023. The municipality was unable to provide such records.

Question ID	NOL 47	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Has the annual operations report been submitted to MECP or available on site as required by the ECA?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 48	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1); EPA | O. Reg. 232/98 | 23;

Question:
Is scavenging being prevented?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 49	Question Type	Information

Legislative Requirement(s):
Not Applicable

Question:
Has a closure plan been submitted to the MECP?

Compliance Response(s)/Corrective Action(s)/Observation(s):
No

Question ID	NOL 51	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Is the landfill only accepting the types of waste that they are approved to receive?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 52	Question Type	Information

Legislative Requirement(s):
Not Applicable

Question:
Does the landfill have a waste refusal procedure in place to manage waste that arrives at the site that the site is not approved the accept?

Compliance Response(s)/Corrective Action(s)/Observation(s):
No

Question ID	NOL 54	Question Type	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Does the landfill have a procedure in place to address and document spills and fires?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 55	**Question Type**	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Does the landfill have emergency contingency plan as required by the ECA?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 56	**Question Type**	Information

Legislative Requirement(s):
Not Applicable

Question:
Is there an ECA condition requiring financial assurance?

Compliance Response(s)/Corrective Action(s)/Observation(s):
No

Question ID	NOL 59	**Question Type**	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Does the landfill have a procedure in place to address complaints?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 60	**Question Type**	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:

Has the landfill operator addressed the complaints to the satisfaction of the ministry?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 61	**Question Type**	Information

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Has the landfill operator developed a Design and Operations Manual?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 62	**Question Type**	Information

Legislative Requirement(s):
Not Applicable

Question:
Is the Design and Operations Manual up to date?

Compliance Response(s)/Corrective Action(s)/Observation(s):
No

Question ID	NOL 63	**Question Type**	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Does the landfill operator have training procedures for site personnel?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	NOL 65	**Question Type**	Legislative

Legislative Requirement(s):
EPA | 27 | (1);

Question:
Has the Certificate of Requirement been registered on Title?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Yes

Question ID	949100	Question Type	Legislative

Legislative Requirement(s):
Not Applicable

Question:
Were the inspection questions sufficient to address other identified non-compliance items?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Action Item No. 3
The Owner shall immediately cease the burning of restricted items, burning at the leaf and yard waste site and unsupervised burning.

Action Item No. 4
On or before September 6, 2023, the Owner shall remove the installed PVC pipe located behind the scrap metal area.

See Provincial Officer's Order No. 1-224312016 for action items regarding the Stormwater Management Plan and the leachate collection tank.

On June 28, 2023, an unannounced site visit was completed while the landfill was closed, and no staff were present. During the site visit two burn piles were identified to be actively burning. One of the burn areas was located at the back (South end) of the leaf and yard waste site, which is located to the East of the landfill and currently open to the public 24 hours a day, 7 days a week. The other burn area was inside the landfill site and was closed to the public. Both burn piles appeared to have been burning brush and mattresses, as mattress springs could be identified.

As per the Design and Operations Plan (Revised) the Township of Huron-Kinloss adopted an "Operations Program for Burning" which states the following:

"Only segregated brush, scrap lumber and associated wood by-products will be included in the burning program. All other wastes and unsegregated wastes received at the site will be disposed of on the active working face".

"Access to the landfill site by the public and other unauthorized personnel will be prohibited when burning is carried out. Supervision of the burning operation will be provided by the operating authority."

The Design and Operations Plan (Revised) also provides a designated burning area which is illustrated in Map 2 of the plan. The designated burning area is located within the landfill area, not the leaf and yard waste site.

During the unannounced site visit on June 28, 2023, the ministry's Surface Water Specialist (Hugh Geurts) identified several leachate and surface water management concerns. Some of their comments included the lack of vegetation, large open face that lacked daily cover, defined channels near the open face that is directing leachate offsite and berm failure in the swale

located in the southwest corner is offering a route for leachate to travel offsite. These comments were relayed to John Yungblut and Lisa Kreller during the announced inspection on July 25, 2023. Also a PVC pipe installed in the ground to encourage the flow of potential leachate off site was discovered behind the scrap metal area.

A Stormwater Management Plan dated April 2019 was developed for the site to address several of the above concerns and was to be implemented in 2019, with site maintenance performed as required. To date the Stormwater Management Plan has not been implemented.

During the announced inspection on July 25, 2023, John Yungblut stated the leachate collection tank was installed in 2019 and is approximately 28 m3. The exact size is unknown. When asked if there was any communication with MECP or an approval issued for the installation of the tank, John stated no. The municipality discussed it with their engineers and decided to install it as a type of "pilot project" without MECP approval.

Director's Order

Director's Order Number

1-228594023

Director's Order Issued To

THE CORPORATION OF THE TOWNSHIP OF HURON-KINLOSS
21 QUEEN ST , HURON-KINLOSS, ON, N0G 2R0

Site

Huron Landfill
2087 CONCESSION 6 E, HURON-KINLOSS, ON,

Refer to the Definitions section in Part B of this Director's Order for the meaning of all capitalized terms that are used in this Director's Order.

PART A - WORK ORDERED

Pursuant to my authority under **EPA | 157**;

I order you to do the following;

Item No. 1 **Compliance Due Date:** August 29, 2023

Commencing on August 29, 2023, and on each Tuesday thereafter, submit a weekly report to the Provincial Officer by email at lisa.hines@ontario.ca and to environment.owensound@ontario.ca detailing actions taken from Monday through Sunday of the previous week to apply daily cover as per condition 3.3 of the ECA. A weekly report shall be provided until the ministry provides notice that the reports are no longer required.

The report shall include at a minimum, the following:

1. A statement confirming cover was applied as per condition 3.3 of the ECA including:
a) The date and time-of-day cover was applied,
b) Thickness of cover that was applied and total quantity of cover applied,
c) The type of cover that was applied and,
d) Name of individual who applied the cover.

2. If cover was not applied, a statement why cover was not applied including:
a) Date and,
b) Reasons why

Item No. 2 **Compliance Due Date:** September 29, 2023

By September 29, 2023, retain the services of a Qualified Person to carry out the work as described in Work Ordered Item Nos. 4 and 6.

Item No. 3 **Compliance Due Date:** September 29, 2023

By September 29, 2023, submit to the Provincial Officer written confirmation from the Qualified Person(s) by email to lisa.hines@ontario.ca and environment.owensound@ontario.ca that they have, (1) received a copy of the Order; (2) been retained to carry out the work as described in Work Ordered Item Nos. 4 and 6; and (3) the experience and qualifications to carry out such work.

Item No. 4 **Compliance Due Date:** October 29, 2023

By October 29, 2023, have the Qualified Person prepare a work plan to implement the actions described in the Stormwater Management Plan, that shall include, at a minimum, the following:

(a) a description of any outstanding actions or recommendations described in the Stormwater Management Plan for leachate and surface water control that have not yet been implemented or completed; and
(b) a detailed plan which describes how any actions or recommendations described in (a) will be implemented; and
(c) a detailed schedule, with timelines, for the implementation of any actions or recommendations described in (a).

Item No. 5 **Compliance Due Date:** October 29, 2023

By October 29, 2023, submit to the Provincial Officer by email to lisa.hines@ontario.ca and to environment.owensound@ontario.ca a copy of the work plan prepared by the Qualified Person as required in Work Ordered Item No. 4.

Item No. 6 **Compliance Due Date:** November 29, 2023

By November 29, 2023, have the Qualified Person complete and submit an application for an amendment to the waste ECA to include any leachate collection tank being used at the Site, with all necessary supporting documentation and applicable fees, to the Director, Environmental Approvals Access and Service Integration Branch, of the Ministry by email to ECA.submissions@ontario.ca, or online through a My Ontario Account.

Item No. 7 **Compliance Due Date:** November 29, 2023

By November 29, 2023, submit a copy of the completed ECA amendment application described in Work Ordered Item No. 6 to the Provincial Officer by email to lisa.hines@ontario.ca and to environment.owensound@ontario.ca.

PART B - BACKGROUND AND REASONS

Definitions

For the purposes of this Director's Order, the capitalized terms shall have the meanings set out in the original Order with the addition or alteration of the following capitalized terms set out below:

"Director" means the undersigned director or, in the event that the undersigned is unable to act, any other director appointed under the **EPA.**

"Request for Review" means the request that the Order be reviewed by the Director sent on August 23, 2023.

Request for Review of the Order

I have reviewed the Order and have considered the Request for Review and accompanied submissions with the Issuing Officer, **Lisa Hines**.

For convenience and ease of reference I have attached a copy of the Order. The Review and Appeal Information and Additional Information sections in the Order are not relevant to this Director's Order.

The Work Ordered Items set out above replace all the Work Ordered Items in the Order and may include, as described below, items in the Order that were not requested to be reviewed.

The Provincial Officer's Report in the Order is hereby incorporated into, and forms part of, this Director's Order except as may be noted below.

In response to your Request for Review, the following summarizes the Work Ordered Items set out in this Director's Order and describes the decision that I have made to confirm or alter the Order:

On August 23, 2023, I received a request for review of Item 1 of Provincial Officer's Order No. 1-224312016 (Order) from John Yungblut. The Order was issued on August 23, 2023, by Lisa Hines, Provincial Officer with the Ministry of the Environment, Conservation and Parks (Ministry). On August 28, 2023, I received a further request for review of Items No. 2-7 of the Order from John Yungblut. On August 30, 2023, further reasoning for the request for review was provided my Mary Rose Walden. After reviewing all information available to myself, either produced by ministry staff and/or yourself (on behalf of The Corporation of the Township of Huron-Kinloss), I have completed my review.

I have amended Ordered Item No. 1.

I have extended the compliance dates for each of the Ordered Items which are illustrated below.

Ordered Item No. 2, with previous compliance date of September 15, 2023, has been amended to have a new compliance date of September 29, 2023.

Ordered Item No. 3, with previous compliance date of September 15, 2023, has been amended to have a new compliance date of September 29, 2023.

Ordered Item No. 4, with previous compliance date of October 15, 2023, has been amended to have a new compliance date of October 29, 2023.

Ordered Item No. 5, with previous compliance date of October 15, 2023, has been amended to have a new compliance date of October 29, 2023.

Ordered Item No. 6, with previous compliance date of November 15, 2023, has been amended to have a new compliance date of November 29, 2023.

Ordered Item No. 7, with previous compliance date of November 15, 2023, has been amended to have a new compliance date of November 29, 2023.

Reasons for the Response

The following sets out a summary of the Request for Review submissions and my responses to them and the reasons for such responses.

I have amended Ordered Item No. 1 to require a weekly report to be submitted on each Tuesday until the ministry provides notice that the reports are no longer required. The amendment also lists what the reports shall include at a minimum.

You requested an extension of dates for compliance by four weeks for Ordered Item Nos. 2-7, due to your anticipated timeline for retaining a Qualified Person. I have amended the compliance dates for ordered Items Number 2, 3, 4, 5, 6, and 7, by two weeks. During the onsite inspection on July 25, 2023, Provincial Officer Lisa Hines discussed the deficiencies of the Stormwater Management Plan with the Director of Public Works John Yungblut and provided notice that a Provincial Officer's Order would be issued. It is my opinion that an extension of 14 days, in addition to the time that has elapsed since you were made aware of the non-compliance during the inspection, provides sufficient time to retain a Qualified Person to carry out the work as described in the Order.

I am of the opinion that requirements of the Order were both reasonable and necessary to achieve regulatory compliance with applicable environmental legislation and to provide for the protection of the natural environment and human health.

Attachments

The attachments listed below form part of this Director's Order:
(1) 1-224312016 signed August 23, 2023.

ISSUING DIRECTOR

Name: John Ritchie

Job Title: District Manager

Badge Number: 1157

Address: 101 17TH ST E 3RD FLR, OWEN SOUND, ON, N4K 0A5

Director Email: john.s.ritchie@ontario.ca

Office Email: Environment.OwenSound@ontario.ca

Date: Aug 30, 2023

Signature:

APPEAL TO THE ONTARIO LAND TRIBUNAL INFORMATION

REQUEST FOR HEARING

You may require a hearing before the Ontario Land Tribunal if, within 15 days of service of this Director's Order, you serve written notice of your appeal on the Ontario Land Tribunal and the Director as indicated in the Contact Information below. Your notice of appeal must state the portions of this Director's Order for which a hearing is required and the grounds on which you intend to rely at the hearing. Unless you receive leave (permission) from the Ontario Land Tribunal, you are not entitled to appeal a portion of this Director's Order or to rely on grounds of appeal that are not stated in the notice of appeal.

CONTACT INFORMATION

The contact information for the Director and the Ontario Land Tribunal is the following:

Registrar
Ontario Land Tribunal
655 BAY STREET, SUITE 1500
TORONTO, ON M5G 1E5
Email: OLT.Registrar@ontario.ca

and

Director
Ministry of the Environment, Conservation and Parks
Owen Sound District Office
101 17TH ST E, 3RD FLR
OWEN SOUND, ON N4K 0A5
Office Email: Environment.OwenSound@ontario.ca
Fax: (519) 371-2905

The contact information for the Ontario Land Tribunal and further information regarding its appeal requirements can be obtained directly from the Tribunal at:

Tel: (416) 212-6349, Toll Free: 1 (866) 448-2248 or www.olt.gov.on.ca

SERVICE INFORMATION

Service of the documentation referred to above can be made personally, by mail, by fax (in the case of the Director only), by commercial courier or by email in accordance with the legislation under which this Director's Order is made and any corresponding Service Regulation.

ADDITIONAL INFORMATION

Unless stayed by the Director or the Ontario Land Tribunal, this Director's Order is effective from the date of service.

Failure to comply with a requirement of this Director's Order constitutes an offence. Unless otherwise indicated, the obligation to comply with a requirement of this Director's Order continues on each day after the specified compliance date until the obligation has been satisfied.

The requirements of this Director's Order are minimum requirements only and do not mean that you are not required to comply with any other applicable legal requirements, including any:

- statute, regulation, or by-law;
- federal, provincial, or municipal law; or
- applicable requirements that are not addressed in this Director's Order.

The requirements of this Director's Order are severable. If any requirement of this Director's Order, or the application of any requirement to any circumstance, is held invalid, such finding does not invalidate or render unenforceable the requirement in other circumstances. It also does not invalidate or render unenforceable the other requirements of this Director's Order.

Further orders may be issued in accordance with the legislation as circumstances require.

This Director's Order is binding upon any successors or assignees of the persons to whom this Director's Order is issued.

The procedures to request a hearing and an appeal of this Director's Order and other information provided above are intended as a guide. The legislation should be consulted for additional details and accurate reference. Further information can be obtained from e-Laws at www.ontario.ca/laws.

Director's Order

Director's Order Number

1-228594023

Director's Order Issued To

THE CORPORATION OF THE TOWNSHIP OF HURON-KINLOSS
21 QUEEN ST , HURON-KINLOSS, ON, N0G 2R0

Site

Huron Landfill
2087 CONCESSION 6 E, HURON-KINLOSS, ON,

Refer to the Definitions section in Part B of this Director's Order for the meaning of all capitalized terms that are used in this Director's Order.

PART A - WORK ORDERED

Pursuant to my authority under **EPA | 157**;

I order you to do the following;

Item No. 1 **Compliance Due Date:** August 29, 2023

Commencing on August 29, 2023, and on each Tuesday thereafter, submit a weekly report to the Provincial Officer by email at lisa.hines@ontario.ca and to environment.owensound@ontario.ca detailing actions taken from Monday through Sunday of the previous week to apply daily cover as per condition 3.3 of the ECA. A weekly report shall be provided until the ministry provides notice that the reports are no longer required.

The report shall include at a minimum, the following:

1. A statement confirming cover was applied as per condition 3.3 of the ECA including:
a) The date and time-of-day cover was applied,
b) Thickness of cover that was applied and total quantity of cover applied,
c) The type of cover that was applied and,
d) Name of individual who applied the cover.

2. If cover was not applied, a statement why cover was not applied including:
a) Date and,
b) Reasons why

Item No. 2 **Compliance Due Date:** September 29, 2023

By September 29, 2023, retain the services of a Qualified Person to carry out the work as described in Work Ordered Item Nos. 4 and 6.

Item No. 3 **Compliance Due Date:** September 29, 2023

By September 29, 2023, submit to the Provincial Officer written confirmation from the Qualified Person(s) by email to lisa.hines@ontario.ca and environment.owensound@ontario.ca that they have, (1) received a copy of the Order; (2) been retained to carry out the work as described in Work Ordered Item Nos. 4 and 6; and (3) the experience and qualifications to carry out such work.

Item No. 4 **Compliance Due Date:** October 29, 2023

By October 29, 2023, have the Qualified Person prepare a work plan to implement the actions described in the Stormwater Management Plan, that shall include, at a minimum, the following:

(a) a description of any outstanding actions or recommendations described in the Stormwater Management Plan for leachate and surface water control that have not yet been implemented or completed; and
(b) a detailed plan which describes how any actions or recommendations described in (a) will be implemented; and
(c) a detailed schedule, with timelines, for the implementation of any actions or recommendations described in (a).

Item No. 5 **Compliance Due Date:** October 29, 2023

By October 29, 2023, submit to the Provincial Officer by email to lisa.hines@ontario.ca and to environment.owensound@ontario.ca a copy of the work plan prepared by the Qualified Person as required in Work Ordered Item No. 4.

Item No. 6 **Compliance Due Date:** November 29, 2023

By November 29, 2023, have the Qualified Person complete and submit an application for an amendment to the waste ECA to include any leachate collection tank being used at the Site, with all necessary supporting documentation and applicable fees, to the Director, Environmental Approvals Access and Service Integration Branch, of the Ministry by email to ECA.submissions@ontario.ca, or online through a My Ontario Account.

Item No. 7 **Compliance Due Date:** November 29, 2023

By November 29, 2023, submit a copy of the completed ECA amendment application described in Work Ordered Item No. 6 to the Provincial Officer by email to lisa.hines@ontario.ca and to environment.owensound@ontario.ca.

PART B - BACKGROUND AND REASONS

Definitions

For the purposes of this Director's Order, the capitalized terms shall have the meanings set out in the original Order with the addition or alteration of the following capitalized terms set out below:

"Director" means the undersigned director or, in the event that the undersigned is unable to act, any other director appointed under the **EPA.**

"Request for Review" means the request that the Order be reviewed by the Director sent on August 23, 2023.

Request for Review of the Order

I have reviewed the Order and have considered the Request for Review and accompanied submissions with the Issuing Officer, **Lisa Hines**.

For convenience and ease of reference I have attached a copy of the Order. The Review and Appeal Information and Additional Information sections in the Order are not relevant to this Director's Order.

The Work Ordered Items set out above replace all the Work Ordered Items in the Order and may include, as described below, items in the Order that were not requested to be reviewed.

The Provincial Officer's Report in the Order is hereby incorporated into, and forms part of, this Director's Order except as may be noted below.

In response to your Request for Review, the following summarizes the Work Ordered Items set out in this Director's Order and describes the decision that I have made to confirm or alter the Order:

On August 23, 2023, I received a request for review of Item 1 of Provincial Officer's Order No. 1-224312016 (Order) from John Yungblut. The Order was issued on August 23, 2023, by Lisa Hines, Provincial Officer with the Ministry of the Environment, Conservation and Parks (Ministry). On August 28, 2023, I received a further request for review of Items No. 2-7 of the Order from John Yungblut. On August 30, 2023, further reasoning for the request for review was provided my Mary Rose Walden. After reviewing all information available to myself, either produced by ministry staff and/or yourself (on behalf of The Corporation of the Township of Huron-Kinloss), I have completed my review.

I have amended Ordered Item No. 1.

I have extended the compliance dates for each of the Ordered Items which are illustrated below.

Ordered Item No. 2, with previous compliance date of September 15, 2023, has been amended to have a new compliance date of September 29, 2023.

Ordered Item No. 3, with previous compliance date of September 15, 2023, has been amended to have a new compliance date of September 29, 2023.

Ordered Item No. 4, with previous compliance date of October 15, 2023, has been amended to have a new compliance date of October 29, 2023.

Ordered Item No. 5, with previous compliance date of October 15, 2023, has been amended to have a new compliance date of October 29, 2023.

Ordered Item No. 6, with previous compliance date of November 15, 2023, has been amended to have a new compliance date of November 29, 2023.

Ordered Item No. 7, with previous compliance date of November 15, 2023, has been amended to have a new compliance date of November 29, 2023.

Reasons for the Response

The following sets out a summary of the Request for Review submissions and my responses to them and the reasons for such responses.

I have amended Ordered Item No. 1 to require a weekly report to be submitted on each Tuesday until the ministry provides notice that the reports are no longer required. The amendment also lists what the reports shall include at a minimum.

You requested an extension of dates for compliance by four weeks for Ordered Item Nos. 2-7, due to your anticipated timeline for retaining a Qualified Person. I have amended the compliance dates for ordered Items Number 2, 3, 4, 5, 6, and 7, by two weeks. During the onsite inspection on July 25, 2023, Provincial Officer Lisa Hines discussed the deficiencies of the Stormwater Management Plan with the Director of Public Works John Yungblut and provided notice that a Provincial Officer's Order would be issued. It is my opinion that an extension of 14 days, in addition to the time that has elapsed since you were made aware of the non-compliance during the inspection, provides sufficient time to retain a Qualified Person to carry out the work as described in the Order.

I am of the opinion that requirements of the Order were both reasonable and necessary to achieve regulatory compliance with applicable environmental legislation and to provide for the protection of the natural environment and human health.

Attachments

The attachments listed below form part of this Director's Order:
(1) 1-224312016 signed August 23, 2023.

ISSUING DIRECTOR

Name: John Ritchie

Job Title: District Manager

Badge Number: 1157

Address: 101 17TH ST E 3RD FLR, OWEN SOUND, ON, N4K 0A5

Director Email: john.s.ritchie@ontario.ca

Office Email: Environment.OwenSound@ontario.ca

Date: Aug 30, 2023

Signature:

APPEAL TO THE ONTARIO LAND TRIBUNAL INFORMATION

REQUEST FOR HEARING

You may require a hearing before the Ontario Land Tribunal if, within 15 days of service of this Director's Order, you serve written notice of your appeal on the Ontario Land Tribunal and the Director as indicated in the Contact Information below. Your notice of appeal must state the portions of this Director's Order for which a hearing is required and the grounds on which you intend to rely at the hearing. Unless you receive leave (permission) from the Ontario Land Tribunal, you are not entitled to appeal a portion of this Director's Order or to rely on grounds of appeal that are not stated in the notice of appeal.

CONTACT INFORMATION

The contact information for the Director and the Ontario Land Tribunal is the following:

Registrar
Ontario Land Tribunal
655 BAY STREET, SUITE 1500
TORONTO, ON M5G 1E5
Email: OLT.Registrar@ontario.ca

and

Director
Ministry of the Environment, Conservation and Parks
Owen Sound District Office
101 17TH ST E, 3RD FLR
OWEN SOUND, ON N4K 0A5
Office Email: Environment.OwenSound@ontario.ca
Fax: (519) 371-2905

The contact information for the Ontario Land Tribunal and further information regarding its appeal requirements can be obtained directly from the Tribunal at:

Tel: (416) 212-6349, Toll Free: 1 (866) 448-2248 or www.olt.gov.on.ca

SERVICE INFORMATION

Service of the documentation referred to above can be made personally, by mail, by fax (in the case of the Director only), by commercial courier or by email in accordance with the legislation under which this Director's Order is made and any corresponding Service Regulation.

ADDITIONAL INFORMATION

Unless stayed by the Director or the Ontario Land Tribunal, this Director's Order is effective from the date of service.

Failure to comply with a requirement of this Director's Order constitutes an offence. Unless otherwise indicated, the obligation to comply with a requirement of this Director's Order continues on each day after the specified compliance date until the obligation has been satisfied.

The requirements of this Director's Order are minimum requirements only and do not mean that you are not required to comply with any other applicable legal requirements, including any:

- statute, regulation, or by-law;
- federal, provincial, or municipal law; or
- applicable requirements that are not addressed in this Director's Order.

The requirements of this Director's Order are severable. If any requirement of this Director's Order, or the application of any requirement to any circumstance, is held invalid, such finding does not invalidate or render unenforceable the requirement in other circumstances. It also does not invalidate or render unenforceable the other requirements of this Director's Order.

Further orders may be issued in accordance with the legislation as circumstances require.

This Director's Order is binding upon any successors or assignees of the persons to whom this Director's Order is issued.

The procedures to request a hearing and an appeal of this Director's Order and other information provided above are intended as a guide. The legislation should be consulted for additional details and accurate reference. Further information can be obtained from e-Laws at www.ontario.ca/laws.

From: Hines, Lisa (MECP)
To: John Yungblut
Subject: RE: Huron Landfill Inspection Report
Date: February 1, 2024 10:51:02 AM

Thanks John!

Lisa Hines
Environmental Compliance Officer
Ministry of the Environment, Conservation and Parks
Owen Sound District Office
101-17th Street East, 3rd Floor, Owen Sound, ON N4K 0A5
E: Lisa.Hines@ontario.ca
P: 519-270-6627
F: 519-371-2905

From: John Yungblut <jyungblut@huronkinloss.com>
Sent: February 1, 2024 10:48 AM
To: Hines, Lisa (MECP) <Lisa.Hines@ontario.ca>
Cc: Lisa Kreller <lkreller@huronkinloss.com>; Gass, Scott (MECP) <Scott.gass@ontario.ca>; Hutchesson, Sarah <sarah.hutchesson@wsp.com>; Tamasauskas, Kaurel <Kaurel.Tamasauskas@wsp.com>
Subject: RE: Huron Landfill Inspection Report

The new agreement is attached, with a revised section 3.21. We don't typically have staff on site on Wednesdays, so they are now holding garbage collected on Wednesdays and disposing of it on Thursdays. The new agreement does not technically come into effect until April 1st, but it's the same contractor we have currently, and they have agreed to comply with the new agreement immediately rather than waiting until April 1st. Our contractor has not disposed of garbage on a Wednesday since Jan. 10, 2024.

John Yungblut, C.E.T.
Director of Public Works
Township of Huron-Kinloss
(519) 395-3735

From: Hines, Lisa (MECP) <Lisa.Hines@ontario.ca>

Sent: Thursday, February 1, 2024 10:37 AM
To: John Yungblut <jyungblut@huronkinloss.com>
Cc: Lisa Kreller <lkreller@huronkinloss.com>; Gass, Scott (MECP) <Scott.gass@ontario.ca>; Hutchesson, Sarah <sarah.hutchesson@wsp.com>; Tamasauskas, Kaurel <Kaurel.Tamasauskas@wsp.com>
Subject: RE: Huron Landfill Inspection Report

Good morning John,

Thank you for the email. Can you please expand on the changes that have been made to bring the Site into compliance? Also, can you email me a copy of the amended contract?

Regards,

Lisa Hines
Environmental Compliance Officer
Ministry of the Environment, Conservation and Parks
Owen Sound District Office
101-17th Street East, 3rd Floor, Owen Sound, ON N4K 0A5
E: Lisa.Hines@ontario.ca
P: 519-270-6627
F: 519-371-2905

From: John Yungblut <jyungblut@huronkinloss.com>
Sent: February 1, 2024 10:32 AM
To: Hines, Lisa (MECP) <Lisa.Hines@ontario.ca>
Cc: Lisa Kreller <lkreller@huronkinloss.com>; Gass, Scott (MECP) <Scott.gass@ontario.ca>; Hutchesson, Sarah <sarah.hutchesson@wsp.com>; Tamasauskas, Kaurel <Kaurel.Tamasauskas@wsp.com>
Subject: RE: Huron Landfill Inspection Report

Good morning Lisa,

We have amended our contract with our waste collection contractor, so we are now in compliance with Item NC-3, Action Item No. 1.

Regards,

John Yungblut, C.E.T.
Director of Public Works
Township of Huron-Kinloss
(519) 395-3735

From: Hines, Lisa (MECP) <Lisa.Hines@ontario.ca>
Sent: Wednesday, August 23, 2023 1:33 PM
To: John Yungblut <jyungblut@huronkinloss.com>
Cc: Lisa Kreller <lkreller@huronkinloss.com>; Gass, Scott (MECP) <Scott.gass@ontario.ca>
Subject: Huron Landfill Inspection Report

Good afternoon John,

See attached inspection report from the site inspection conducted on July 25, 2023, at the Huron Landfill. Please let me know if you have any questions or concerns.

Note: The Provincial Officer's Order referenced in the Inspection report will be issued in a separate email.

Regards,

Lisa Hines
Senior Environmental Officer
Ministry of the Environment, Conservation and Parks
Owen Sound District Office
101-17th Street East, 3rd Floor, Owen Sound, ON N4K 0A5
E: Lisa.Hines@ontario.ca
P: 519-270-6627
F: 519-371-2905

Tamasauskas, Kaurel

From: Hines, Lisa (MECP) <Lisa.Hines@ontario.ca>
Sent: December 11, 2023 9:32 AM
To: Hutchesson, Sarah
Cc: John Yungblut; Tamasauskas, Kaurel
Subject: RE: Huron Landfill - Stormwater Management Workplan

Hi Sarah,

See below Memorandum from the ministry's surface water specialist, Hugh Geurts.

MEMORANDUM – December 11, 2023

TO: **Lisa Hines**
Abatement, Owen Sound District Office

FROM: **Hugh Geurts**
Southwest Regional Water Assessment Unit

RE: **Surface Water Review - Huron Landfill – Stormwater Management Workplan. Township of Huron-Kinloss. Submitted by WSP consultants and dated October 30, 2023**

I have reviewed the above noted report and I offer the following comments. (Please also refer to my comments at the bottom of this E-mail from our June 28th, site inspection)

Section 2.1 . The workplan notes that the township has not undertaken vegetative cover as it is their opinion that natural vegetation has established on its own. I find this response unacceptable. Further to our June 28th site visit. The cover is sporadic at best with annual weeds predominate and resulting in substantial bare spots of exposed soils. Vegetative cover should have been and should be done as soon as possible with perennial grasses and legumes recognized for establishing good cover of cap soils.

Section 2.3 The workplan notes the following . The SWMP recommends the systematic open / close of one (1) year's worth of landfilling space. The vegetation
and cover is removed from the selected area as landfilling progresses. The Township has implemented this recommendation. Further to our site visit of June 28th , 2023, I saw zero evidence of vegetation management to substantiate this claim.

Section 2.4. The workplan notes that final cover on the North slope is vegetating naturally and that further work is unnecessary. Similar to my comments for Section 2.1 , my observations from June 28th, 20223 suggest the vegetative cover is substandard as to what would be expected for an area of final cover.

Section 2.5 . The workplan notes that the Municipality has not undertaken recommended water sampling as per the April 2019 stormwater plan . The report offers no explanation as to why the sampling was not undertaken.

Overall Comment: Further to my summary below, I find that lack of proper vegetative cover at this site is a significant contributor to the issues of surface water management at this site. If runoff from the open face and footprint continues to show evidence of running of the site in an unacceptable manner, I would support the district taking further abatement actions as warranted.

MEMORANDUM – JUNE 28, 2023, site inspection

To: **Lisa Hines**
Abatement, Owen Sound District Office

From: **Hugh Geurts**
Water Assessment Unit, West Central Regional Office

RE: Regional Surface Water Review. Inspection of Huron Landfill on June 28, 2023. Landfill located at – 2087 Conc. Rd 6 E. Ripley in Huron-Kinloss

Upon Completion of our on-site inspection of the Landfill on June 28th, I offer the following.

From my observations there has been little improvement to the stormwater management of the site since my last involvement of 2018-2019. Based on my observations - little to no action was taken with respect to the attached stormwater Management Plan

My main observations of note are.

1. There has been little to no active planting of vegetation on exposed soils on the site which in my view has limited the ability of the site to encourage precipitation infiltration and as a result has encouraged visible runoff and erosion.

2. The open Face of waste was considerably larger than I would expect based on my experience and lacked daily cover offering a significant opportunity for the generation of open face leachate runoff.

3. There were at least two defined channels at or near the open face that would direct landfill leachate away and off site (red lines in below diagram). Visual observation of runoff channel from the open face to the southeast suggest that runoff was by-passing a possible subsurface leachate collection and management unit (to be confirmed)

4. The depression/swale located in the southwest corner of the site that would otherwise retain stormwater runoff from the majority of the active footprint shows no signs of maintenance and

at least one berm failure was identified in the swale that would suggest the swale has little to no capability to retain water (in red below). This failure accordingly offers a second route for leachate to exit the site.

I find the management of stormwater and leachate at the site to be inconsistent with Ministry expectations for reasonably limiting off site impact to water resources.

5. 

Based on the above comments, the submitted Stormwater Management Workplan is determined to be unacceptable. Submit a revised workplan by January 12, 2024.

Regards,

Lisa Hines
Environmental Compliance Officer
Ministry of the Environment, Conservation and Parks
Owen Sound District Office
101-17th Street East, 3rd Floor, Owen Sound, ON N4K 0A5
E: Lisa.Hines@ontario.ca
P: 519-270-6627
F: 519-371-2905

applicable law, and is intended for the use of the recipient(s) named above. If you have received this communication in error, please notify the sender immediately by return email and permanently delete the copy you received. Thank you.

From: Hutchesson, Sarah <sarah.hutchesson@wsp.com>
Sent: October 30, 2023 5:23 PM
To: Hines, Lisa (MECP) <Lisa.Hines@ontario.ca>
Cc: John Yungblut <jyungblut@huronkinloss.com>; Tamasauskas, Kaurel <Kaurel.Tamasauskas@wsp.com>
Subject: Huron Landfill - Stormwater Management Workplan

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi Lisa,
Attached please find the work plan to implement the Stormwater Management tasks for Huron Landfill.
Sincerely,
Sarah

Sarah Hutchesson
Environmental Engineer
M.Sc., P.Eng.
She/Her

T+ 1 705-712-0185
M+ 1 705-441-6016

WSP Canada Inc.
121 Commerce Park Drive, Unit L
Barrie, Ontario
L4N 8X1 Canada

wsp.com

-LAEmHhHzdJzBlTWfa4Hgs7pbKI

THE ONTARIO CHAPTER OF THE
SOLID WASTE ASSOCIATION OF
NORTH AMERICA

Awards this certificate to

LISA KRELLER

In recognition of attending the SWANA
Landfill Operations Basics Course
April 18-20, 2023

Annette Synowiec

Annette Synowiec
President
SWANA Ontario Chapter

SWANA
ONTARIO CHAPTER

THE ONTARIO CHAPTER OF THE
SOLID WASTE ASSOCIATION OF
NORTH AMERICA

Awards this certificate to

JIM LEFEUVRE

In recognition of attending the SWANA
Landfill Operations Basics Course
April 18-20, 2023

Annette Synowiec

Annette Synowiec
President
SWANA Ontario Chapter

SWANA
ONTARIO CHAPTER

Township of Huron-Kinloss

LANDFILL TRAINING
Monthly Review

Topics Covered:

Policy: Inspections
Procedure(s): Loader, Hardlig Cloth
SDS: Lock de-icer
Resources:

Name: Please Print	Position	Signature
Hoggarth, Tamara	Landfill	
Kreller, Lisa	N/A	N/A
LeFeuvre, Jim	Landfill Worker	

Date(s): Jun 27/23 **Trainer:** Mel Moulton

Township of Huron-Kinloss

LANDFILL TRAINING
Monthly Review

Topics Covered:

Policy: ~~Committees~~
Procedure(s): SOP PW 31 Methane Log
SDS: ——
Resources: High Visibility Handout
Video: Heart Health - Wellness 101

Name: Please Print	Position	Signature
Hoggarth, Tamara	Landfill	
Kreller, Lisa	Operator In Charge	
LeFeuvre, Jim	Snow Removal	

Date(s): Feb 24/23 **Trainer:** Mel Moulton

Township of Huron-Kinloss

LANDFILL TRAINING
Monthly Review

Topics Covered:

Policy: HKHS-13 Workplace Violence & Harassment
Procedure(s): 7.24 Workplace Violence & Harassment
SDS:
Resources: CBC Article - Toxic Workplace

Name: Please Print	Position	Signature
Hoggarth, Tamara	landfill attendant	
Kreller, Lisa	O.I.C.	
LeFeuvre, Jim	Landfill Worker	

Date(s): March 24/23 **Trainer:** Mel Moulton

Township of Huron-Kinloss

LANDFILL TRAINING
Monthly Review

Topics Covered:

Policy:
Procedure(s): Ladders + Stools, Tick Safety, Safe arrival + departure from site
SDS:
Resources:

Name: Please Print	Position	Signature
Kreller, Lisa	AKA Kreller	
LeFeuvre, Jim	Landfill Work.	

Date(s): April 28/23 **Trainer:** Mel Moulton

Township of Huron-Kinloss

LANDFILL TRAINING
Monthly Review

Topics Covered:

Policy: HKHS-12 Ergonomics
Procedure(s): SOP-All 13- Sunscreen, SOP-All 36 Poisonous Plants
SDS:
Resources:

* We also discussed landfill breakins and shoes & bras pulled out of pit overnight

Name: Please Print	Position	Signature
Kreller, Lisa	Operator In Charge	L Kreller
LeFeuvre, Jim	Landfill worker	

Date(s): May 9/23 **Trainer:** Mel Moulton

Township of Huron-Kinloss

LANDFILL TRAINING
Monthly Review

Topics Covered:

Policy: HKHS-8 Health and Safety Training
Procedure(s): SOP ALL Sick Animal, SOP ALL 45 Heat Stress & Illness, SOP ALL 25 Dealing with Aggressive or Violent People
SDS: Milk Jug Fly Bait
Resources:

Name: Please Print	Position	Signature
Fidler, Patricia	Landfill attendant	Patricia Fidler
Kreller, Lisa	Operator In Charge	LKreller
LeFeuvre, Jim	Landfill worker	

Date(s): June 27 2023 **Trainer:** Mel Moulton

Township of Huron-Kinloss

LANDFILL TRAINING
Monthly Review

Topics Covered:

Policy: HKHS-09 Hazardous Conditions Reporting
Procedure(s): HKHS 2.1 General Safety Rules
SOP: SOP ALL 06 2-way Radio Operations, SOP ALL 07 Power Tools, SOP ALL 08 Hand Tools
SDS: Windex
Resources:

Name: Please Print	Position	Signature
Fidler, Patricia	Patricia Fidler	→ landfill attendant
Kreller, Lisa	L Kreller	Operator In Charge
LeFeuvre, Jim	Landfill Worker	

Date(s): July 11 2023 **Trainer:** Mel Moulton

Township of Huron-Kinloss

LANDFILL TRAINING
Monthly Review

Topics Covered:

Policy: HKHS-12 Ergonomics
Procedure(s): HKHS 2.5 Trenching
SOP: SOP ALL 47 Portable Grinder
SDS:
Resources:

Name: Please Print	Position	Signature
Fidler, Patricia	Patricia Fidler	Landfill worker
Kreller, Lisa	Operator In Charge	L Kreller
LeFeuvre, Jim	Landfill Worker	

Date(s): Sept 19 2023 **Trainer:** Mel Moulton

Township of Huron-Kinloss

LANDFILL TRAINING
Monthly Review

Topics Covered:

Policy: Committee HKHS-2
Procedure(s): Handling Cash 2.9
SOP: ~~SOP PW 34 Installation of Leate Chain~~ SOP PW 29 - Burn Brush
SDS:
Resources: SOP-PW-38 Tarp

Name: Please Print	Position	Signature
Fidler, Patricia	Landfill attendant	Patricia Fidler
Kreller, Lisa	Landfill op in charge	LKreller
LeFeuvre, Jim	Landfill worker	JLeFeuvre

Date(s): Oct 10 2023 **Trainer:** Mel Moulton

Township of Huron-Kinloss

LANDFILL TRAINING
Monthly Review

Topics Covered:

Policy: Standard Operating Procedures
Procedure(s): Personal Protective Equipment
SOP: Hand Tools
SDS:
Resources: Slips, trips and falls

Name: Please Print	Position	Signature
Fidler, Patricia	Landfill Attendant	Patricia Fidler
Kreller, Lisa	Operator In Charge	Kreller
LeFeuvre, Jim	Landfill Worker	

Date(s): Nov 14 2023 **Trainer:** Mel Moulton

Huron Landfill Daily Log

Address: 2087 Concession 6, Ripley N0G 2R0

Owner: Township of Huron-Kinloss

Contact: John Yungblut, Director of Public Works

Operator-in-Charge: Lisa Kreller

Date: *

9/9/2023

Inspection completed by: *

- (•) Lisa Kreller
- ( ) Jim Lefeuvre
- ( ) Other

1. Was any litter collected from premises? *

- ( ) Yes
- (•) No

2. Was any waste rejected? *

- ( ) Yes
- (•) No

3. Was any waste shipped/removed from Site? *

- ( ) Yes
- (•) No

4. Was any leachate removed from the Site? *

- ( ) Yes
- (•) No

5. Was a contractor hired to complete work on Site? *

- ( ) Yes
- (•) No

6. Was there a controlled brush fire set and put out? *

- (•) Yes
- ( ) No

Location & Observations ie. time of day set, time/method extinguished: *

Yardwaste/brush site. Gates were closed to the public 10-2. Fire was extinguished and dirt applied over the area

7. Were there any spills, unintended fires, problems on Site? *

- ○ Yes
- ○ No

8. Was there any loss of service? *

- ○ Yes
- ○ No

9. Were any complaints received from the public? *

- ○ Yes
- ○ No

Details-include name/license plate, issue *

Kate David who lives across from the landfill entered the landfill on 3 occasions, twice going over the scale and paying for garbage, and once she voiced concerns to John Yungblut outside the office door. Her concern was that we are not permitted to burn brush at the yardwaste site-even when closed to the public. She insisted on showing me an order on her phone in which she had received via email from Lisa Hines stating we didn't have a permit to burn at that site. During her 3rd visit she also made it clear that since her and Jim are no longer together, she doesn't need to protect him/his job. Her encounters were not pleasant, I listened to what she said had to say, and told her that it was my understanding that we could burn brush so long as gates are closed to the public and that it's supervised and completely extinguished before leaving at the end of the day. To be clear, John Stannard was working at the landfill and was burning and monitoring the burn. John Yungblut did have John extinguish the burn and we opened back up to the public shortly after 2pm.

Actions Taken: *

See above

10. Did any staff member experience violence/harassment from the public? *

- ( ) Yes
- ( ) No

Details of issue. Please include staff member, identity of complainant if possible, issue of dispute: *

Jim was monitoring the seacan and recycling areas when he noticed a customer dropping off sytrofoam that isn't part of the styrofoam recycling program. Jim asked the customer to take the items to the pit and the customer became angry. The customer didn't remove his items. He told Jim and I that it was up to us to clean his mess. I was working the scale and Jim came to let me know what was happening. The customer approached the scale and exited his vehicle and started yelling to me saying that I didn't tell him that his styrofoam wasn't part of the program-that he was putting it where I told him to. I replied that there are clear signs on the doors at the opening of the seacan stating what was acceptable and what wasn't, and that there are signs throughout the landfill to assist customers with their garbage. I also added that Jim was there for customer assistance where needed. He repeated several times that he was just doing what I told him to do. I told him that he was going to be charged for the items, which irritated him and I responded that he could take the items home with him if he didn't want to pay for them. Customers that were waiting to exit the landfill exited their vehicles telling him to pay for his load and leave. The customer in question started yelling several times 'Are you threatening me?' To the best of my knowledge zero threats were made by the waiting customers. I was really upset by this altercation as the customer kept yelling. I did tell him that he was being inappropriate and that he could be banned from the landfill. I handed him a complaint card as I wasn't comfortable continuing the conversation. I told him he needed to pay and leave the site. Again he started yelling about payment so I told him I was calling the police. He told me to do so that he'd wait at the gate for them. I called John to let him know what was happening and he directed me to call OPP. The customer then paid the minimum fee of $10 and left the site turning left-west on con 6. I called OPP and an officer visited the site. We were able to identify the customer in question, John and I provided the officer with video clips of the customers vehicle. The officer told us that he was going to be visiting the customer.

Actions Taken: *

See above

11. Was the working face of the landfill covered at the end of the day? *

- ( ) Yes
- ( ) No

If no - Why? *

I was working the scale. Jim is injured and is not able to use the packer.

12. Additional Notes:

Provide supporting documents (if necessary). Upload Photo 1

Upload Photo 2

Signature Required: *

Do you want a copy of this log sent to the Director of Public Works? (Send if there is something significant to report.) *

- (•) Yes
- ( ) No

Email address:

jyungblut@huronkinloss.com

Thank You

Change the text for this message.

APPENDIX C

BASWR Recycling data

Municipality of HURON-KINLOSS

December 2023 BASWR Tons Diverted from Landfill

	TOTAL TONS	TOTAL TONS TO DATE	TOTAL MT TO DATE
Newspaper	6.33	87.85	79.68
Steel Cans	2.02	27.99	25.39
Aluminum	1.37	18.98	17.22
Mixed Glass	6.43	89.25	80.95
HDPE Plastic	2.84	39.33	35.67
PET Plastic	4.20	58.28	52.86
Boxboard	4.95	68.70	62.31
Cardboard	9.52	113.55	102.99

TOTAL	37.67	503.93	457.07
TOTAL TO DATE	503.93		

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

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													
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
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
Jun-21	48.11	49.52	49.35	50.36	50.93	48.11	44.06	48.04	41.01	38.97	42.58	39.15	50.40
Nov-21	48.55	50.46	50.57	51.22	51.00	48.49	43.23	47.74	40.65	42.43	43.13	43.67	50.35
May-22	48.27	49.64	49.54	50.78	51.13	48.35	44.61	48.32	42.77	40.72	42.82	40.62	50.53
Nov-22	48.42	49.75	49.75	51.07	50.84	48.24	42.74	46.72	40.09	38.66	41.91	38.60	50.20
May-23	48.30	49.81	49.72	51.11	51.20	48.49	44.24	48.45	42.30	41.91	42.99	41.93	50.84
Sep-23	48.09	48.92	49.02	50.15	50.87	48.04	42.62	47.06	40.23	37.94	42.51	38.24	50.22

NOTES: 1) Water elevations are metres (above arbitrary site datum).
2) Well pipe was cut off to allow for well cap/casing security (0.075 m) July, 2014.
3) Well pipe extensions were added on November 18, 2015 (OW6 +1.52 m and OW11 +2.45 m).

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

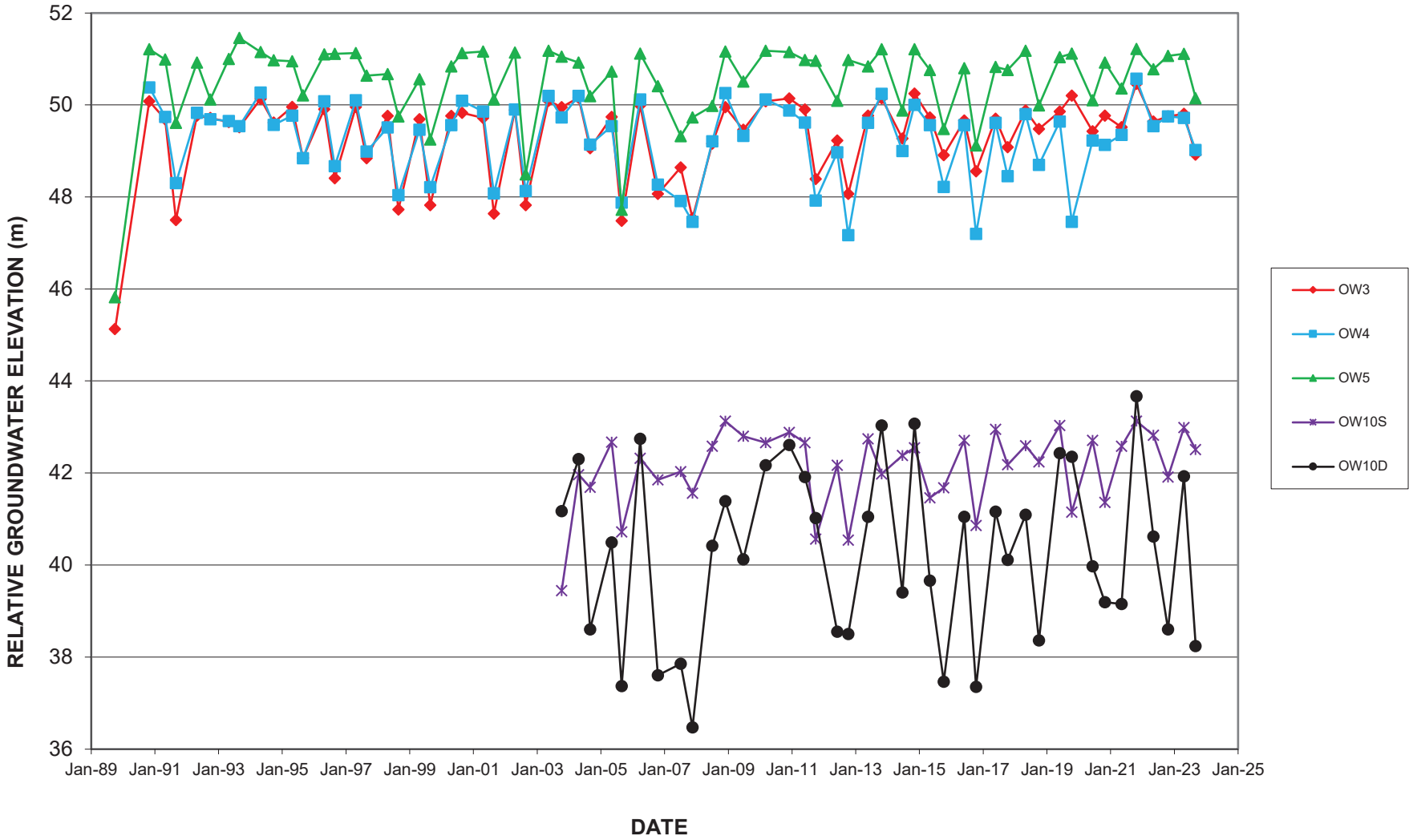


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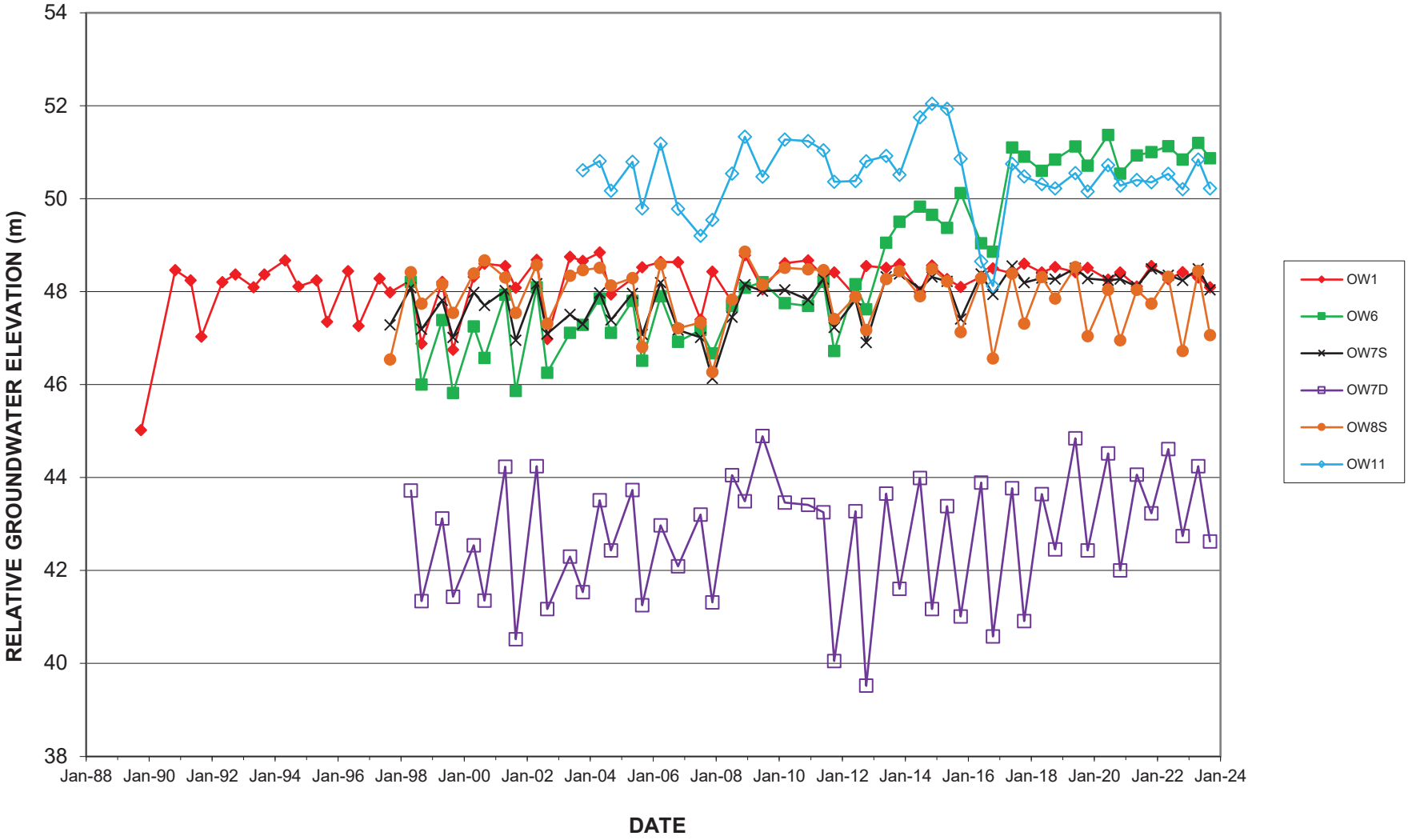
FIGURE D-2
GROUNDWATER HYDROGRAPH OF LEACHATE & DOWNGRADIENT WELLS
HURON LANDFILL



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MONITORING HOLE LOGS
from Tim 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

ii 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
1.37 - 49.94 1.83	grey SILT with some sand and clay
1.83 - 47.11 3.66	grey, dense SILT with some clay and traces of sand
3.66 - 49.67 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

51.22 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.

OW6

Log of Drilling Operations

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

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

ng Co.: Lantech Drilling Drilling Method: CME 750 Hollow Stem Augers with S/S

nole Location: See Figure 1 Date Started: 7/2/97 Date Completed: 7/2/97

Stratigraphic Description	Strat. Plot	Elev. / Depth (m)	Monitoring Well Construction	SAMPLES Num.	Type	Tot.	N Val.	Depth Scale (ft) (m)
Surface Elevation (m): 91.09								
Fill - silt, sand and clay, brown, dense, damp, no apparent odour		90.48 / 0.61	Cement Seal					
Fill - garbage, grey, wet to saturated, strong putrid odour			Bentonite Grout; Bentonite Seal; 51B slot screen in silica sand pack; All well components 50mm schedule 40 PVC					
		89.88						
Silt - some sand and clay, grey, dense, cohesive, slight putrid odour		89.58 / 1.52		1	SS			
End of Borehole		89.34 / 1.75	July 3/97					

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
[illegible] TOWNLINE, ORANGEVILLE, ONTARIO L9W 3R4 TEL [illegible]

OW7S

Log of Drilling Operations

t: Maitland Engineering Services Ltd. Project: Huron Tonwship Landfill
t 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: 7/2/97 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		[illegible]	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		49.81 / 8.14							

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

A Division of R.J. Burnside & Associates Limited

Log of Drilling Operations

t: Maitland Engineering Services Ltd. Project: Huron Tonwship Landfill
ct No.: H-1275 Location: Huron Township Supervised by: S.Wheelden
g 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	Ext.	N Val.	Depth Scale (ft) (m)
Surface Elevation (m): 40.96								
Topsoil - organics, silt, dark brown, dense, dry, no apparent odour		40.66 / 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				6	SS			
		30.48						
Sand and Gravel - silty, brown, dense, saturated, no apparent odour		11.37 / 29.52	Bentonite Seal #10 slot screen in silica sand pack All well components 50mm schedule 40 PVC	7	SS			
Silt - trace of clay, occasional coarse grained sand, brown, dense, damp, no apparent odour		12.03 / 28.93						
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 Division of R.J. Burnside & Associates Limited

OW8S

Log of Drilling Operations

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

t 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

Stratigraphic Description Surface Elevation (mk 49.83	Strat. Plot	Elev. / Depth (m)		SAMPLE Num.	SAMPLE Type	SAMPLE Int.	SAMPLE N Val.	Depth Scale (ft) (m)
Topsoil - organics, silt, dark brown, compact, dry, no apparent odour		0.00	Cement Seal					
Silt to Silty Clay - scattered sand and gravel, fine to coarse grained, light brown, dense, dry, no apparent odour		0.30	Well Dry as of July 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 components 50mm schedule 40 PVC					
		49.37						
Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent odour		0.46						
		49.78						
Silt and Clay - scattered sand and gravel, brown, mottled grey, moist to wet, no apparent odour		7.16						
End of Borehole		8.68						

Water found (dd/mm/yr)

Static Water Level (dd/mm/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

Log of Drilling Operations

: Maitland Engineering Services Ltd.	Project: Huron Township Landfill		
ct No.: H-1275	Location: Huron Township	Supervised by: S.Wheeldon	
g Co.: Lantech Drilling	Drilling Method: CME 750 Hollow Stem Augers with S/S		
ole Location: See Figure 1	Date Started: 7/3/97	Date Completed: 7/3/97	

Stratigraphic Description	Elev. / Depth (m)		SAMPLES				Depth Scale (m)
Surface Elevation (m): 18.87			Numb.	Type	Rec.	N Val.	
Topsoil - organics, silt, dark brown, compact, dry, no apparent odour	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	1	SS			
@ 3.81 becomes moist			2	SS			
@ 5.33m becomes wet and grey in colour		Bentonite Grout	3	SS			
	13.37		4	SS			
Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent odour	5.48		5	SS			
	11.78						
Silt and Clay - scattered sand and gravel, brown, mottled grey, moist to wet, no apparent odour	7.37	Bentonite Seal	6	SS			
			7	SS			
	11.37						
Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent odour	11.48	#10 slot screen in silica sand pack. All well components 50mm schedule 40 PVC	8	SS			
End of Borehole	11.11						

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

A Division of R.J. Burnside & Associates Limited

OW9

Log of Drilling Operations

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

ct No.: H-1278 Location: Huron Township Supervised by: S.Wheeldon

g Co.: Lantech Drilling Drilling Method: CME 750 Hollow Stem Augers with 9/8

hole Location: See Figure 1 Date Started: 7/3/97 Date Completed: 7/3/97

Stratigraphic Description	Elev. / Depth (m)	Completion
Surface Elevation (m): 58.18		
Fill- topsoil, organics, dark brown, dry, dense, no apparent odour	58.18 / 0.00	Cement Seal
Fill - silt and small amount of debris, porcelain plate, wood, ashes, dry, brown, no apparent odour	56.97 / 1.21	Bentonite Seal
Silt - some clay, occasional sand and gravel, fine grained, cohesive, dense, damp to moist, no apparent odour		
@ 12.95m becomes very dense		Bentonite Grout
		Bentonite Seal
		#10 slot screen in silica sand pack. All well components 50mm schedule 40 PVC
ivey Silt - occasional sand and gravel se, light brown, mottled grey, saturated, mpact to dense, no apparent odour	45.23 / 12.95	
End of Borehole	45.01 / 13.18	July 3/97

SAMPLES				Depth Scale (ft) (m)
Numb.	Type	Ins.	N Val.	
1	SS	X		
2	SS	X		
3	SS	X		
4	SS	X		
5	SS	X		
6	SS	X		
7	SS	X		
8	SS	X		
9	SS	X		
10	SS	X		

Water found (dd/mm/yr)

Static Water Level (dd/mm/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

Page 1 of 1

Client: Township of Huron-Kinloss	Project Name: Monitoring Well Installation	Logged by: S Quinlan
Project No.: W99609	Location: Huron Landfill	Ground (m amsl):
Drilling Co.: Lantech Drilling Services Inc.	Date Started: 22/07/2003	Static Water Level (m amsl):
Drilling Method: Hollow Stem Auger	Date Completed: 22/07/2003	Sand Pack (m amsl):

Depth Scale (ft)	Depth Scale (m)	Stratigraphic Description	Strat. Plot	Depth (m)		SAMPLE Num.	SAMPLE Type	SAMPLE Ins.	SAMPLE %Recov.	Depth Scale (ft)	Depth Scale (m)
		TOPSOIL - Black, Organics & Moist.			cement						
		CLAY - Brown, Dense, with some Gravel and Sand & Dry			bentonite seal						
		CLAY - Grey, Dense, with some Gravel and Sand & Moist.			silica sand pack						
		CLAY - Grey, Dense, with some Gravel and Sand & Wet.									

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

borehole log was prepared for hydrogeological and/or environmental purposes and does not necessarily contain information ile for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by R. J. Burnside & dates Limited personnel before use by others.

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

LOG OF DRILLING OPERATIONS

OW10 D

BURNSIDE

R. J. Burnside & Associates Limited
[illegible]

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 Num.	SAMPLE Type	SAMPLE Int.	SAMPLE %Recov.
		TOPSOIL- Black, Organics & Moist.			cement				
		CLAY - Brown, Dense, with some Gravel and Sand & Dry							
		CLAY - Grey, Dense, with some Gravel and Sand & Moist.							
		CLAY - Grey, Dense, with some Gravel and Sand & Wet.			grout				
		CLAY - Grey, Dense, with some Gravel and Sand & Dry.							
		CLAY - Grey, Dense, with some Gravel and Sand & Moist.			bentonite seal				
		GRAVEL & SAND - with some Clay and Silt, sample is Saturated.			silica sand pack				

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

ehole log was prepared for hydrogeological and/or environmental purposes and does not necessarily contain information for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by R. J. Burnside & ates Limited personnel before use by others.

found @ time of drilling

Water Level -

MONITORING WELL DATA

Pipe: 51 mm dia. PVC

Screen: 51 mm dia. PVC #10 slot

SAMPLE TYPE AC Auger Cutting SS Split Spoon

CS Continuous AR Air Rotary

RC Rock Core WC Wash Cuttings

LOG OF DRILLING OPERATIONS

OW 11- Leachate

BURNSIDE

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.
		CLAY FILL - Dense, Brown & Dry					
		WASTE FILL - Black, Strong Odour, Plastic in Cuttings & Wet					
		CLAY - Native, grey, with some fine gravel and sand, dense & wet.					

cement
bentonite seal
silica sand pack

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

rehole log was prepared for hydrogeological and/or environmental purposes and does not necessarily contain information for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by R. J. Burnside & tes Limited personnel before use by others.

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

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				

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

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	986	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				613	533	586	4960	427	624	723	534	1840	856	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	5	5	179	8	3	4	3	2	31
Colour	TCU				11	< 5	12	110	9	11	11	< 5	45	< 5	< 5	< 5	< 5	< 5	< 5
Calculated Hardness (as CaCO3)	mg/L				294	273	328	1800	135	280	225	278	628	263	121	256	21	188	468
Total Cations	meq/L																		
Total Anions	meq/L																		
Ion Balance	% diff.																		
Calculated T.D.S.	mg/L																		
Trace Metals																			
Aluminum, Al	mg/L																		
Barium, Ba	mg/L	0.53	0.54	0.54															
Boron, B	mg/L	2.52	2.55	2.54	0.1	0.11	0.19	1.42	0.37	0.45	0.51	0.13	0.7	0.43	0.29	0.55	0.4	0.46	0.11
Cadmium, Cd	mg/L	0.0015	0.0016	0.0016	< 0.003	< 0.0003	< 0.005	< 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	0.06	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	OW5	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	0.06	0.13	0.14	0.19	0.23	< 0.05	0.08	< 0.02	0.08	17.1	< 0.05	< 0.05	< 0.05
Ammonia (un-ionized)	mg/L																		
Total Kjeldahl Nitrogen (as N)	mg/L				0.79	16.2	0.94	0.4	0.39	0.87	0.44	0.18	5.34	0.27	0.13	13.4	0.53	0.16	2.08
Nitrate (as N)	mg/L	2.59	2.60	2.60	0.14	< 0.1	0.37	< 0.1	0.32	0.11	0.1	< 0.1	0.16	0.28	0.2	0.13	0.13	0.12	0.2
Nitrite (as N)	mg/L				< 0.02	< 0.02	< 0.02	< 0.02	< 0.03	0.03	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Nitrate + Nitrite (as N)	mg/L																		
Dissolved Organic Carbon (as C)	mg/L	3.39	3.97	3.68	2.6	44.7	1.6	1	2.2	1.1	1.8	3	2.4	1.4	3.3	25.8	1.8	0.8	2
Conductivity	us/cm				498	1660	863	443	853	663	707	844	756	649	571	1270	682	413	795
Conductivity (Field)	us/cm																		
Sulphate (as SO4)	mg/L	288	266	276	11	93	229	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	145	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	5	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	76.5	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	162	110	46.9	82.6	57.3	68.6	28.2	15.1	9.62	22.6	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-00	OW3 May-00	OW4 May-00	OW5 May-00	OW6 May-00
Vadose Zone Monitoring																			
Methane	% LEL																		
Oxygen	% Vol/Vol																		
General Chemistry																			
pH Value	pH units				8.17	8.13	7.58	7.7	7.67	7.82	7.52	8.06	7.97	8.09	7.19	7.29	7.42	7.34	7.5
pH Value (Field)	pH units																		
Temperature (Field)	°C																		
Ammonia as N	mg/L				< 0.05	0.15	0.16	0.17	< 0.05	0.13	7.36	0.1	0.13	0.24	< 0.05	0.12	4.86	0.05	0.11
Ammonia (un-ionized)	mg/L																		
Total Kjeldahl Nitrogen (as N)	mg/L				0.46	0.87	0.81	0.61	0.4	2.19	8.75	0.43	1.03	0.45	0.16	0.2	5.56	0.17	0.12
Nitrate (as N)	mg/L	2.59	2.60	2.60	0.37	0.2	< 0.1	0.35	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Nitrite (as N)	mg/L				< 0.02	< 0.02	< 0.02	0.04	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02
Nitrate + Nitrite (as N)	mg/L														< 0.1	0.1	< 0.1	< 0.1	< 0.1
Dissolved Organic Carbon (as C)	mg/L	3.39	3.97	3.68	1.1	1.9	2.7	2.4	1.8	3.4	19.7	1.1	1.2	1.4	2.6	2.2	1.5	2.2	10.6
Conductivity	us/cm				609	854	824	742	605	560	1300	440	611	662	810	826	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	0.06	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	108	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	18.6	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	16.8	10.4	20.4	126
Zinc, Zn	mg/L	2.508	2.525	2.515	0.18	0.08	0.02	0.03	0.03	0.03	0.03	0.03	0.02	0.05	0.1	0.08	0.09	0.05	0.13

Note:
Exceedance of RUC for historical data (1996-2003) based on 2001 - 2003
Exceedance of RUC has been noted with highlighting, unless exceedance is
NA - No Value Collected

Appendix D
Historical Groundwater Analytical Results
Huron Landfill Site
Database 1/2: (September 1996 - October 2003)

Parameter	Units	Reasonable Use Criteria[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	4.48	< 0.05	< 0.05	< 0.05	0.06	< 0.05
Ammonia (un-ionized)	mg/L																		
Total Kjeldahl Nitrogen (as N)	mg/L				0.14	0.11	0.24	0.36	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	587	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	8.67	7.28	7.07
Total Anions	meq/L				6.7	5.04	9.3	6.97	7.84	15.88	11	8.31	8	14.56	6.22	4.87	8.05	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	1.15	0.83	0.98	0.8	0.72	0.34	0.6	0.44
Boron, B	mg/L	2.52	2.55	2.54	0.52	0.35	0.62	0.48	0.57	0.36	0.14	0.29	0.19	0.54	0.55	0.39	0.61	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	82.2	70.2	54.9	30.1	27.9	50.2	38.1	37.8
Chromium, Cr	mg/L	0.016	0.016	0.016	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Copper, Cu	mg/L	0.501	0.501	0.501	< 0.01	0.01	0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	0.01	0.01	0.01	< 0.01	< 0.01	< 0.01
Iron, Fe	mg/L	0.168	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	2.58	1.64	1.74	9.34	1.55	1.69	2.13	1.99	1.86
Silica, Reactive (as SiO2)	mg/L				6.44	7.16	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	79.6
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	8.28	8.19	8.21	8.12	8.21	7.72	7.77	7.97	7.79	7.91
pH Value (Field)	pH units																		
Temperature (Field)	°C																		
Ammonia as N	mg/L				0.55	< 0.05	0.08	0.07	3.33	< 0.05	< 0.05	< 0.05	< 0.05	0.09	0.06	< 0.05	< 0.05	< 0.05	1.98
Ammonia (un-ionized)	mg/L																		
Total Kjeldahl Nitrogen (as N)	mg/L				0.64	0.34	0.51	0.32	3.25	0.24	0.16	1.37	0.09	0.25	0.26	0.13	0.08	0.35	2.39
Nitrate (as N)	mg/L	2.59	2.60	2.60	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.46	< 0.1	< 0.1	4.21	0.39	< 0.1	< 0.1	1.16
Nitrite (as N)	mg/L				< 0.02	< 0.02	0.02	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.08	< 0.02	< 0.02	< 0.02	0.13
Nitrate + Nitrite (as N)	mg/L				< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.46	< 0.1	< 0.1	4.29	0.39	< 0.1	< 0.1	1.29
Dissolved Organic Carbon (as C)	mg/L	3.39	3.97	3.68	2.9	2.1	1.8	3.3	5.9	1.8	1.1	2	0.8	1.4	2.5	2	1.5	2.7	4.5
Conductivity	us/cm				1060	805	657	701	1050	548	435	738	593	663	1070	803	682	708	1170
Conductivity (Field)	us/cm																		
Sulphate (as SO4)	mg/L	288	266	276	50	33	65	24	63	125	45	229	96	226	84	28	59	18	66
Alkalinity (CaCO3)	mg/L				508	420	319	390	501	167	183	158	243	108	417	348	294	351	465
Chloride (as Cl)	mg/L	128	128	127	70	23	2	7	42	3	2	2	1	2	39	24	2	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	8.69	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	4.65	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	380	381	677
Trace Metals																			
Aluminum, Al	mg/L				0.06	0.06	< 0.03	0.08	16.7	0.95	0.04	< 0.03	< 0.03	< 0.03	< 0.01	< 0.01	0.029	< 0.01	< 0.01
Barium, Ba	mg/L	0.53	0.54	0.54	0.11	0.12	0.07	0.11	0.29	0.07	0.05	0.04	0.06	0.04	0.116	0.084	0.072	0.082	0.172
Boron, B	mg/L	2.52	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	8.88	7.08	6.09	5.5	5.11	9.59	4.99
Sodium, Na	mg/L	105	112	108	42.9	15.6	9.85	21.8	112	89.1	54.8	92.8	83.1	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	0.08	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	7.96	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	453	606	744	660	771
Conductivity (Field)	us/cm									840	670	650	570	1000	430	590	720	660	NA
Sulphate (as SO4)	mg/L	286	266	276	54	116	92	191	256	24	33	68	26	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	487	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	6.84	9.26
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	3.35	1.59
Calculated T.D.S.	mg/L				259	338	358	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	0.081	0.081	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	0.06	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	0.0005	< 0.0001	< 0.0001
Calcium, Ca	mg/L				27.8	29.6	37.8	58.7	41.7	102	113	92.5	77.7	63.7	28.2	37	48.3	42.2	97
Chromium, Cr	mg/L	0.016	0.016	0.016	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper, Cu	mg/L	0.501	0.501	0.501	0.002	< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Iron, Fe	mg/L	0.168	0.189	0.178	< 0.03	< 0.03	< 0.03	0.88	< 0.03	< 0.03	< 0.03	< 0.03	0.07	0.1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Lead, Pb	mg/L	0.005	0.005	0.005	< 0.0005	< 0.0005	< 0.0005	0.0012	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Magnesium, Mg	mg/L				16.3	12.8	29.9	25	19.4	35.7	44.9	34.8	42	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	0.063	0.08	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	8.11	4.31	3.55	4.08	3.18	3.85	4.88
Sodium, Na	mg/L	105	112	108	47.8	76	53.6	78.4	72.6	24	13.8	7.7	19.3	88.2	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-03	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	0.05	< 0.05	0.08	< 0.05	< 0.05	< 0.05	0.11	0.79	0.06
Ammonia (un-ionized)	mg/L				0.0004	< 0.0004	0.0007	0.0021	< 0.0006	< 0.0007	0.0007	< 0.0008	0.0016	< 0.0001	< 0.0001	< 0.0003	0.0002	0.0015	< 0.0001
Total Kjeldahl Nitrogen (as N)	mg/L				0.28	0.24	0.34	0.96	0.19	0.27	0.25	0.35	0.27	0.23	0.18	0.18	0.44	1.09	0.14
Nitrate (as N)	mg/L	2.59	2.60	2.60	0.13	0.14	0.2	1.42	0.12	0.2	< 0.1	0.82	< 0.1	< 0.1	0.41	< 0.1	0.13	0.25	< 0.1
Nitrite (as N)	mg/L				0.02	< 0.02	< 0.02	0.1	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.03	< 0.02
Nitrate + Nitrite (as N)	mg/L				0.15	0.14	0.2	1.52	0.12	0.2	< 0.1	0.82	< 0.1	< 0.1	0.41	< 0.1	0.13	0.28	< 0.1
Dissolved Organic Carbon (as C)	mg/L	3.39	3.97	3.68	2.1	2	2.8	3.5	0.7	1.2	0.8	1.8	5.4	3.1	1.8	1.8	3.1	3	1
Conductivity	us/cm				714	608	605	962	448	550	606	736	853	929	759	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	48	84	53
Alkalinity (CaCO3)	mg/L				361	299	341	483	187	164	244	161	102	315	322	291	342	461	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	488	409	361	337	368	139
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	7.64	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.				0.69	0.17	0.11	3.34	1.11	3.58	0.72	1.17	1.09	0.45	2.68	2.84	0.51	0.12	0.63
Calculated T.D.S.	mg/L				445	392	387	748	334	414	429	568	492	616	474	426	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	0.084	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	2.52	2.55	2.54	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	86	61.8	90.2	31.7	28.8	41.8	51.1	42.9	128	92.5	87.4	68.5	69.1	29.9
Chromium, Cr	mg/L	0.016	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	0.04	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	< 0.0005	< 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	34.6	40.2	47.6	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	1.6	1.6	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	6.21	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	23.6	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	0.006	0.145	0.005	0.006	0.026	0.015

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-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	20.8	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	1.6	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	5.95	7.04	8.16
Ion Balance	% diff.				1.19	1.64	1.98	2.18	1.41	1.2	2.14	3.86	0.02	4.74	3.55	0.75	2.6	0.97	2.81
Calculated T.D.S.	mg/L				404	451	581	531	438	429	521	431	375	420	668	321	411	433	566
Trace Metals																			
Aluminum, Al	mg/L				< 0.005	0.028	0.021	< 0.005	< 0.005	< 0.005	< 0.005	0.007	0.009	< 0.005	< 0.005	< 0.005	< 0.005	0.02	< 0.005
Barium, Ba	mg/L	0.53	0.54	0.54	0.051	0.055	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	0.105	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	108	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	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Copper, Cu	mg/L	0.501	0.501	0.501	0.0005	0.0008	0.0008	0.0005	0.0005	0.0005	0.0008	0.0011	0.0008	0.0008	0.0005	0.0005	0.0005	0.0005	0.0005
Iron, Fe	mg/L	0.168	0.189	0.178	0.03	0.03	0.03	0.03	0.03	0.07	0.03	0.03	0.11	0.03	0.08	0.03	0.03	0.03	0.03
Lead, Pb	mg/L	0.005	0.005	0.005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0033	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Magnesium, Mg	mg/L				11.3	29.9	22.2	19.1	29.9	40.4	36.5	35.8	31.2	36.5	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	1.8	1.3	1.5	1.4	1.7	1.6	1.4	1.4	4.8	1	1.1	1.4	1.5
Silica, Reactive (as SiO2)	mg/L				2.85	3.84	3.18	3.34	3.82	6.24	8.8	10	8.6	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	28.8	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	0.006	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				20.6	20.4	20.8	20.6	NA
General Chemistry									
pH Value	pH units				8.03	7.47	7.94	6.88	8.07
pH Value (Field)	pH units				8.01	7.09	7.58	6.53	NA
Temperature (Field)	°C				12.4	13.5	11.9	14.2	NA
Ammonia as N	mg/L				0.13	0.36	< 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	0.16
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	0.16
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	15	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	% diff.				2.49	2.36	3.23	1.93	2.41
Calculated T.D.S.	mg/L				522	858	369	1494	411
Trace Metals									
Aluminum, Al	mg/L				< 0.005	0.009	< 0.005	< 0.005	0.007
Barium, Ba	mg/L	0.53	0.54	0.54	0.033	0.021	0.107	0.081	0.05
Boron, B	mg/L	2.52	2.56	2.54	0.468	0.398	0.094	0.444	0.447
Cadmium, Cd	mg/L	0.0015	0.0016	0.0016	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001
Calcium, Ca	mg/L				44.3	117	73.5	160	28.7
Chromium, Cr	mg/L	0.016	0.016	0.016	0.005	0.005	0.005	0.005	0.005
Copper, Cu	mg/L	0.501	0.501	0.501	0.0005	0.0005	0.0005	0.0005	0.0005
Iron, Fe	mg/L	0.168	0.189	0.178	0.03	5.8	0.03	0.14	0.03
Lead, Pb	mg/L	0.005	0.005	0.005	0.0005	0.0005	0.0005	0.0005	0.0005
Magnesium, Mg	mg/L				17.8	53.7	22.8	117	10.9
Manganese, Mn	mg/L	0.039	0.042	0.040	0.017	0.32	0.041	0.169	0.005
Potassium, K	mg/L				1.2	3.8	1.3	40.9	1.2
Silica, Reactive (as SiO2)	mg/L				7.5	12	10.9	19.7	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 is
NA - No Value Collected

Appendix D
Historical Groundwater Analytical Results
Huron Landfill Site
Database 2/2: (May 2004 - September 2004)

Parameter	Units	Reasonable Use Criteria[1] OW4	OW5	Ave	OW1 May-04	OW3 May-04	OW4 May-04	OW5 May-04	OW6 Leachi May-04	OW7S May-04	OW7D May-04	OW8S May-04	OW8D May-04	OW9 May-04	OW10S May-04	OW10D May-04	OW11 Leach May-04	OW7DS-04 May-04 (replicate)	OW10DS May-04 (replicate)
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				0.16	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	816	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				365	317	283	335	415	183	176	244	162	109	290	236	1110	175	239
Chloride (as Cl)	mg/L	127	128	127	32	29	4	7	23	8	4	4	4	3	3	9	117	4	9
Colour	TCU				3.5	2.7	3.5	4.2	2.7	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	16.3	< 2.5	16.8	< 2.5	< 2.5
Calculated Hardness (as CaCO3)	mg/L				429	359	345	314	330	136	112	224	211	191	513	284	1040	113	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	26.99	5.62	6.93
Total Anions	meq/L				9.36	8.05	7.34	7.7	10.62	5.01	5.89	7.18	8	7.3	12.35	6.78	26.56	5.85	6.82
Ion Balance	% diff.				0.98	0.15	0.51	1.66	0.6	0.39	1.27	1.48	0.48	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	1360	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	0.06	0.07	0.06	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				108	76.9	78	83.7	61.8	28.3	28.7	39.9	48.5	44.7	112	71.3	222	26.5	79.5
Chromium, Cr	mg/L	0.015	0.016	0.015	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Copper, Cu	mg/L	0.500	0.501	0.500	< 0.0005	0.0008	0.0010	0.0005	0.0014	< 0.0005	< 0.0005	< 0.0005	0.0005	< 0.0005	< 0.0005	0.0008	< 0.0005	< 0.0005	0.0387
Iron, Fe	mg/L	0.166	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	40.6	36.4	37.8	42.7	15.8	11	30.1	21.9	19.2	56.7	25.7	119	11.3	26
Manganese, Mn	mg/L	0.037	0.033	0.035	0.010	< 0.005	< 0.005	< 0.005	0.020	0.006	< 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	2.95	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	20.6	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	0.15	< 0.05	0.21	0.12	< 0.05	44.5	0.13
Ammonia (un-ionized)	mg/L				0.0003	0.0001	0.0002	< 0.0001	0.0011	< 0.0005	< 0.0009	0.0004	< 0.0001	0.0041	0.0006	< 0.0006	0.1277	NA
Total Kjeldahl Nitrogen (as N)	mg/L				< 0.05	< 0.05	0.11	< 0.05	0.31	< 0.05	< 0.05	< 0.05	< 0.05	0.31	0.13	< 0.05	47.8	< 0.05
Nitrate (as N)	mg/L	2.65	2.63	2.64	0.18	0.28	0.46	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				867	791	670	671	912	464	509	636	737	697	966	559	2330	468
Conductivity (Field)	us/cm				745	684	601	589	837	412	453	576	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	486	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	7.6	7.62	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	62	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	< 0.0005	0.0008	0.0006	0.0009	0.0010	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0008	< 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	19.6	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	0.006	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
Huron Landfill Site

Parameter	Units	RLC	TDL	OW1 3/24/2005	OW2 3/24/2005	OW4 3/24/2005	OW5 3/24/2005	OW6 LEACHATE 3/24/2005	OW7R 3/24/2005	OW10 3/24/2005	OW11 3/24/2005	OW12 3/24/2005	OW13 3/24/2005	OW14 3/24/2005	OW15 3/24/2005	OW16 3/24/2005	OW11 LEACHATE 3/24/2005	OW15 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	0	
Oxygen	mg/L		N/A	20.9	20.9	20.9	20.6	20.9	20.9	20.7	21.0	20.7	21.0	21.0	21.0	21.0	20.9	
Temperature	°C		N/A	8.5	8.4	8.5	8.6	9.2	8.1	8.3	10.9	12.9	12.7	11.3	10.6	9.9		
pH	pH		N/A	7.16	7.01	7.26	7.06	7.20	7.14	7.01	7.29	7.58	7.41	7.13	7.37	6.50		
Conductivity	µS/cm		N/A	708	648	672	661	708	488	486	508	641	691	644	467	2271		
LABORATORY																		
Dissolved Aluminum (Calculated)	mg/L		N/A	ND	N/A	N/A	N/A	0.0008	N/A	N/A	0.0004	N/A	0.003	0.0004	0.0008	0.0005	N/A	
Total Ammonia-N	mg/L		0.05	0.06	ND	ND	ND	0.23	ND	ND	0.11	ND	0.21	0.19	0.16	0.43	ND	
Conductivity	µS/cm		1	708	648	672	661	708	488	486	508	641	691	644	467	2271	513	
Total Kjeldahl Nitrogen (TKN)	mg/L		0.5	1.3	0.8	0.8	0.9	1.7	0.7	0.4	0.7	0.6	0.7	0.7	0.7	3.8	0.4	
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	0.34	0.1	1.3	1.4	1.7	1.8	2.1	0.7	0.8	0.7	0.8	1.3	1	0.8	14.7	0.8	
pH	pH		0.01	6.98	6.98	7.04	6.98	6.93	7.03	7.03	6.94	6.96	6.96	6.85	6.97	7.02	6.98	
Alkalinity (total as CaCO3)	mg/L		1	367	348	354	358	368	178	180	201	196	194	184	182	1260	182	
Chloride (Cl)	mg/L	1.29	1	38.2	34.4	3.44	7.56	11.6	4.59	4.65	1.48	3.10	1.79	7.35	4.82	158	3.78	
Fluoride	mg/L		1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dissolved Iron - Hardy	mg/L	1.65	0.1	0.1	0.1	0.3	0.2	0.3	0.05	0.2	0.05	0.1	0.1	0.1	0.2	0.5	0.2	
Nitrate (N)	mg/L	1.65	0.1	0.1	0.1	0.3	0.2	0.3	0.05	0.2	0.05	0.1	0.1	0.1	0.2	0.5	0.2	
Sulphate (SO4)	mg/L	ND	1	11	0.2	38.3	15.2	7.8	38.4	34.4	38.9	20.8	2.1	22.0	10.4	48.5	38	
CALCULATED VALUES																		
Anion Sum	meq/L		N/A	8.21	7.31	7.30	7.4	9.83	5.73	5.4	5.62	7.38	6.07	7.9	6.88	35.1	6.79	
Cation Balance (cation - anion)/(cation + anion)	%		1	365	308	302	326	361	276	263	280	434	284	291	266	1260	260	
Conductivity (Ion)	µS/cm	467	1	444	378	398	373	457	267	269	281	425	417	381	291	1570	279	
Cation Balance (cation - anion)/(cation + anion)	%		1	4	4	4	4	4	3	3	3	4	4	4	4	4	3	
Cation Sum	meq/L		N/A	7.86	7.08	7.03	7.01	9.61	5.47	5.13	5.39	7.01	7.01	7.52	6.35	35	6.45	
Hardness (CaCO3)	mg/L		N/A	370	360	360	358	359	166	158	160	200	195	188	140	1350	136	
Ion Balance (% Difference)	%		N/A	0.71	4.41	0.76	3.51	2.32	1.34	4.94	1.81	3.62	1.53	0.416	0.3	1.11	0.41	
Langelier Index (@ 20C)	N/A		N/A	1.23	0.977	0.998	1.08	0.984	0.598	0.545	0.742	0.54	0.574	0.305	0.803	1.08	0.648	
Langelier Index (@ 4C)	N/A		N/A	0.987	0.731	0.758	0.831	0.743	0.36	0.307	0.503	0.302	0.336	0.068	0.565	0.837	0.411	
Saturation pH (@ 20C)	N/A		N/A	5.97	7.43	6.91	7.11	7.11	7.08	7.05	7.17	7.23	7.23	7.08	7.38	8.24	7.31	
Saturation pH (@ 4C)	N/A		N/A	7.17	7.49	7.06	7.36	7.39	7.01	7.08	7.22	7.17	7.19	7.03	7.82	8.4	8.06	
METALS																		
Dissolved Aluminum (Al)	mg/L		0.0004	ND	0.0009	0.0009	0.013	ND	ND	ND	ND	ND	ND	ND	0.0007	ND	ND	
Dissolved Antimony (Sb)	mg/L	0.0006	0.0001															
Dissolved Arsenic (As)	mg/L	0.3	0.0001	0.0004	0.0012	0.0005	0.0011	0.008	0.0005	0.0003	0.0005	0.0005	0.0009	0.0003	0.158	0.135	0.0003	
Dissolved Barium (Ba)	mg/L	1.34	0.01	0.07	0.04	0.07	0.14	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.11	0.14	0.07	
Dissolved Cadmium (Cd)	mg/L	0.00114	0.00001	ND	0.00009	0.00004	0.00003	ND	0.00004	0.00004	ND	0.0001	ND	0.00001	0.00007	ND	0.00004	
Dissolved Calcium (Ca)	mg/L		0.1	108	98.1	94.7	88.7	88.1	36.8	37.3	41	45.8	44	46	37.5	157	37.1	
Dissolved Chromium (Cr)	mg/L	0.0014	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dissolved Cobalt (Co)	mg/L	0.001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0008	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	
Dissolved Copper (Cu)	mg/L	0.001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0008	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	
Dissolved Iron (Fe)	mg/L	0.18	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dissolved Lead (Pb)	mg/L	0.0008	0.00005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dissolved Magnesium (Mg)	mg/L	0.03	0.01	44.1	43.8	41.1	38.4	41.7	14.1	13.3	15.3	20.1	18.4	14.8	12.8	152	14.3	
Dissolved Manganese (Mn)	mg/L	0.002	0.0001	0.014	ND	ND	ND	0.051	ND	ND	0.005	ND	0.017	0.119	0.004	0.062	ND	
Dissolved Molybdenum (Mo)	mg/L		0.1	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.8	0.2	
Dissolved Nickel (Ni)	mg/L		0.05	0.05	0.07	0.07	0.07	0.09	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.01	
Dissolved Potassium (K)	mg/L	11.3.8	0.1	23	23	23	23	24.3	11.1	10.9	11.4	10.9	10.7	10.3	10.7	11.1	10.8	
Dissolved Zinc (Zn)	mg/L	0.1	0.005	0.004	0.007	0.011	ND	ND	ND	ND	ND	ND	ND	ND	0.008	ND	0.008	

N/A = Not Applicable
ND = Not detected
TDL = Typical Detection Limit. Actual detection limit varies with concentration of each sample.
Refer to Table 5 for dates relating to landfill gas measurements.
Reasonable Limit Checks (RLC) were calculated in accordance with MOEE Guideline B-7 using 3 years of data for Ow4 and Ow5 and applying the detection limit when a non-detect is reported. The higher of the two RLC values (Ow4 or Ow5) is shown here.

Appendix D
Historical Groundwater Quality Data
Hampa Landfill Site

Parameter	Units	RLC	TDL	OMH	OMG	OMH	OMS	OMS LEACHATE	OMT8	OMT0	OMH3	OMS0	OMB	OMH4	OMH0	OMH LEACHATE	OMH LEACHATE<Rep
FIELD MONITORING RESULTS																	
Methane	%LEL or (%Vol)		N/A	0	0	0	0	0	0	1	2	1	1	2	1	1	
Oxygen	%Vol		N/A	20.9	20.9	20.9	20.1	20.9	20.8	20.9	20.9	20.8	20.7	20.7	20.7	20.7	
Temperature	°C		N/A	13.4	13.3	13.4	12.4	13.1	13.3	13.1	13.1	13.3	13.2	13.2	13.4	13.8	
pH	pH		N/A	7.11	7.44	7.11	7.33	7.37	7.32	7.23	7.38	7.33	7.15	6.94	6.94	6.94	
Conductivity	mS/cm		N/A	772	771	688	670	641	647	465	644	647	691	691	655	644	
LABORATORY RESULTS																	
Ammoniacal 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	0.016	ND
Total Ammonia-N	mg/L		0.05	ND	ND	ND	ND	0.47	0.07	0.08	0.17	ND	0.17	0.14	0.07	34	30.3
Conductivity	mS/cm		1	736	760	688	647	611	641	615	634	686	681	680	644	7130	7130
Total Kjeldahl Nitrogen (TKN)	mg/L		0.5	0.8	0.8	1.3	0.8	1.4	0.5	0.4	0.7	0.3	0.4	0.2	0.7	65	67
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	1.54	0.1	2.7	2.1	1.9	1.7	1	0.4	1.4	0.8	1.1	1.1	0.8	0.1	31.9	34.6
pH	pH		0.01	6.99	6.99	6.99	6.98	6.96	6.99	6.99	6.99	6.99	6.99	6.99	6.99	7.00	7.00
Alkalinity (Total as CaCO3)	mg/L		1	118	124	200	134	166	141	161	180	161	114	138	191	1260	1226
Chloride (Cl)	mg/L	129	1	35.6	35.8	6.98	7.08	170	160	6.98	1.00	1.00	1.00	1.00	1.00	138	138
Fluoride (F)	mg/L		1	ND	ND	ND	ND	ND	ND	1	ND	ND	ND	ND	ND	ND	ND
Combined Nitrite + Nitrate	mg/L	2.48	0.1	0.8	1.4	ND	1.8	0.4	ND	1.8	ND	ND	ND	ND	ND	ND	ND
Nitrate (N)	mg/L	2.48	0.1	0.8	1.4	ND	1.8	0.4	ND	1.4	ND	ND	ND	ND	ND	ND	ND
Sulphate (SO4)	mg/L	291	1	44	37	84	31	68	41	78	71	388	287	216	180	24	1
CALCULATED VALUES																	
Anion Sum	me/L		N/A	8.14	8.36	7.68	7.55	6.58	6.80	6.3	7.3	7.51	7.11	6.73	6.16	28.1	33.1
Cation Alkalinity (calc. as CaCO3)	mg/L		1	118	124	200	134	166	141	161	180	161	114	138	191	1260	1226
Carbonate, TDS	mg/L	447	1	427	443	588	456	1000	861	1140	1061	1440	1240	1060	1320	13900	13900
Cation Alkalinity (calc. as CaCO3)	mg/L		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cation Sum	me/L		N/A	8.04	8.24	7.60	7.44	6.54	6.8	6.58	7.38	7.52	6.98	6.53	6.19	28.7	27.1
Hardness (CaCO3)	mg/L		N/A	360	366	340	316	306	288	316	340	366	338	330	340	966	950
Ion Balance (% Difference)	%		N/A	0.7	0.0004	0.55	1.4	0.3	3.27	0.982	2.61	0.121	1.8	0.385	0.347	0.464	7.88
Langelier Index (@ 20C)	N/A		N/A	1.18	1.1	1.11	1.13	1.1	0.984	0.843	0.98	0.984	0.838	1.04	0.884	1.05	1.19
Langelier Index (@ 4C)	N/A		N/A	0.911	0.83	0.843	0.865	0.841	0.597	0.557	0.711	0.743	0.531	0.773	0.588	0.844	0.944
Saturation pH (@ 20C)	N/A		N/A	6.97	7.08	7.88	7.6	7.74	7.79	7.77	7.44	7.51	7.19	7.69	7.36	6.36	6.11
Saturation pH (@ 4C)	N/A		N/A	7.73	7.94	7.98	7.94	7.96	7.68	7.68	7.68	7.68	7.52	7.83	7.68	6.84	6.95
METALS																	
Dissolved Aluminum (Al)	mg/L		0.005	0.008	0.007	0.007	0.05	ND	ND	0.008	0.007	0.011	ND	0.013	0.009	0.036	ND
Dissolved Arsenic (As)	mg/L	0.008	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.002	ND	0.004	0.002	ND	0.008	0.007
Dissolved Barium (Ba)	mg/L	0.3	0.004	0.018	0.018	0.018	0.016	0.018	0.018	0.014	0.018	0.018	0.014	0.013	0.013	0.047	0.044
Dissolved Boron (B)	mg/L	1.3	0.01	0.1	0.08	0.08	0.08	0.1	0.1	0.1	0.1	0.1	0.1	0.07	0.08	0.04	0.03
Dissolved Cadmium (Cd)	mg/L	0.00016	0.00001	0.00001	0.00001	ND	0.00002	ND	ND	ND	ND	0.00002	ND	ND	ND	ND	ND
Dissolved Calcium (Ca)	mg/L	0.1	0.1	94.1	91.8	77.8	71.4	67.1	63.4	70.8	73.8	77.2	73.1	71.1	73.1	195	192
Dissolved Chromium (Cr)	mg/L	0.012	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.007	0.004
Dissolved Copper (Cu)	mg/L	0.009	0.001	0.001	0.013	0.001	0.002	0.002	0.002	0.001	0.001	0.002	ND	ND	ND	0.008	0.001
Dissolved Iron (Fe)	mg/L	0.16	0.05	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND	0.14	ND	1.17	1.46
Dissolved Lead (Pb)	mg/L	0.065	0.0005	ND	0.0007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dissolved Magnesium (Mg)	mg/L		0.05	17.1	14.4	10.1	10.1	30.1	14.3	11	13	11.5	14.1	13.1	23.3	135	178
Dissolved Manganese (Mn)	mg/L	0.052	0.002	0.007	0.008	0.013	ND	0.458	0.009	ND	0.015	0.009	0.019	0.197	0.003	0.158	0.151
Dissolved Potassium (K)	mg/L		0.3	3	1.7	1.3	1.4	1.4	1.3	1.1	1.4	1.4	1.3	1.2	1.3	37.5	34.1
Dissolved Silicon (Si)	mg/L		0.05	4.64	5.31	4.48	4.58	4.41	3.38	3.78	4.45	3.09	3.43	4.08	3.43	1.15	1.16
Dissolved Sodium (Na)	mg/L	173	0.1	36.1	31	12.3	36.4	85.6	31.2	27.7	36.3	77.4	41.1	121	100	158	158
Dissolved Zinc (Zn)	mg/L	0.3	0.005	0.007	0.011	ND	0.007	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 Table 5 for notes relating to leachate and methane/gas.
Assessment Limit Criteria (ALC) were calculated in accordance with MOE Guideline B-7 using 3 years of data for OMH and OMS and applying the detection limit when a non-detect is reported. The higher of the two RLC values (OMH or OMS) is shown here.

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	OW1	OW2
Well Case						Down	Down	Down	Background	Background	Leachate	Down	Down	Down	Down	Down	Down	Down	Leachate	Down	Down	Down
Well Owner						Town	Town	Town	Town	Town	Town	Town	Town	Town	Town	Town	Town	Town	Town	Town	Town	Town
Date of Sampling						18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	18-Apr-06	4-Oct-06	4-Oct-06
FIELD MONITORING RESULTS																						
Temperature		°C	°C			9.8	DRY	9.5	9.4	11.8	13.1	9.8	10.3	13.1	12.7	14.8	11.8	11.4	10.8	14.8	12.4	DRY
pH		pH	N/A			7.43	DRY	7.51	7.39	7.8	7.36	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	882	683	672	840	450	512	849	684	700	985	662	2378	709	782	DRY
INORGANICS																						
pH		pH	N/A		N/A	8.04	DRY	8.18	8.2	8.16	8.08	8.2	8.29	8.19	8.18	8.1	8.02	8.16	7.26	8.11	7.67	DRY
Chloride		Cl	mg/L	130	250	0.10	27.8	DRY	34.1	2.36	7.23	19.3	10.9	4.31	4.82	3.54	1.38	1.07	9.18	191	1.86	28	DRY
Electrical Conductivity		Th. Cond.	uS/cm			2	776	DRY	876	673	647	858	466	517	636	713	848	842	608	2130	891	810	DRY
Total Hardness (as CaCO3)		Hard(Calc)	mg/L			10	383	DRY	324	366	318	309	136	105	223	192	175	440	258	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	568	498	412	514	332	320	444	538	628	648	484	1418	564	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	0.84	24	0.08	0.04	DRY
Nitrate as N		NO_3-N	mg/L	2.84	10	0.06	0.89	DRY	0.29	0.2	0.18	0.54	<0.06	0.17	0.1	0.18	0.16	0.08	2.23	0.06	0.36	0.74	DRY
Nitrite as N		NO_2-N	mg/L	0.31	1	0.06	<0.06	DRY	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	DRY
(Nitrate + Nitrite) as N		NO_2+NO_3	mg/L	2.84	10	0.10	0.89	DRY	0.29	0.2	0.18	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	0.18	0.29	0.56	0.17	0.21	0.24	0.14	0.36	0.24	0.12	28.7	0.26	0.38	DRY
Bromide		Br^-	mg/L			0.06	0.07	DRY	0.12	<0.06	<0.06	0.08	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.63	<0.06	0.08	DRY
Fluoride		F^-	mg/L	1.08	1.5	0.06	0.82	DRY	0.77	0.81	0.98	1.3	1.2	1.23	1.06	1.08	1.43	0.57	1.38	<0.06	1.48	0.82	DRY
Sulphate		$SO4^{2-}$	mg/L	294	500	0.10	56.3	DRY	47.5	82.2	47.2	84.3	47.5	82.7	105	218	284	287	71.4	74	243	46.8	DRY
Orthophosphate as P		PO_4^{-3}	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	8.8	DRY	8.93	8.86	8.86	8.82	7.49	7.83	7.15	7.40	7.83	8.83	7.08	8.86	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	282	274	312	357	174	186	231	150	104	280	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	22.1	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	10.6	6.88	28.3	8.61	8.62	DRY
% Difference/Ion Balance		CAB	%			NA	8.8	DRY	8.6	9.2	8.8	8.9	8.2	8.1	8.8	2.4	0.8	1.5	4	8.7	2.2	5	DRY
Carbonate (as CaCO3)		$CO3^{2-}$	mg/L			10	<10	DRY	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<5	DRY
Bicarbonate (as CaCO3)		$HCO3^-$	mg/L			10	323	DRY	282	274	312	357	174	183	231	150	104	280	226	1070	108	360	DRY
Langner Index		L.I.	N/A			N/A	1.34	DRY	1.25	1.34	1.32	1.26	0.71	0.67	1.04	0.75	0.47	1.19	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	12.5	12.9	12.8	12.4	13.1	12.9	13.3	12.4	12.8	DRY
Ryznar Stability Index		R.S.I.	N/A			NA	5.56	DRY	5.58	5.52	5.64	5.56	6.78	6.96	6.11	6.86	7.16	6.84	6.03	4.46	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	0.045	0.004	0.005	<0.004	<0.004	0.006	<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	0.005	0.005	<0.003	<0.003	<0.003	0.864	0.005	<0.003	DRY
Boron		B	mg/L	1.38	5	0.010	0.094	DRY	0.086	0.048	0.135	0.38	0.328	0.448	0.458	0.846	0.581	0.331	0.078	0.274	0.461	0.098	DRY
Barium		Ba	mg/L	0.30	1	0.002	0.067	DRY	0.064	0.05	0.064	0.101	0.034	0.037	0.041	0.025	0.029	0.028	0.12	0.398	0.025	0.053	DRY
Calcium		Ca	mg/L			0.05	96.4	DRY	82.6	84.3	82.8	87.3	38.3	34.8	58	42.4	38.4	92.3	61.8	197	37.8	94.8	DRY
Cadmium		Cd	mg/L	0.003	0.005	0.002	<0.002	DRY	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	DRY
Chromium		Cr	mg/L	0.01	0.05	0.003	<0.003	DRY	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	DRY
Copper		Cu	mg/L	0.50	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	8.675	DRY	8.426	8.891	8.418	8.484	0.2	0.182	8.384	8.384	8.31	8.716	8.462	48.7	8.334	0.286	DRY
Potassium		K	mg/L			0.05	2.2	DRY	1.73	1.53	1.89	4.26	1.11	1.18	1.82	1.48	1.38	2.34	1.53	23.2	1.33	2.16	DRY
Magnesium		Mg	mg/L			0.05	26.1	DRY	40.6	37.4	38.3	40.4	15.9	10.7	30.5	20.8	19.2	50.9	28.5	128	18.8	33.5	DRY
Manganese		Mn	mg/L	0.04	0.05	0.002	0.014	DRY	<0.002	<0.002	0.003	0.015	0.003	<0.002	<0.002	0.005	0.02	0.044	0.028	8.334	0.019	0.046	DRY
Sodium		Na	mg/L	114	200	0.05	22.3	DRY	22.2	11.9	28.7	78.2	31	74.3	83.6	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	<0.034	<0.004	<0.004	DRY
Silicon		Si	mg/L			0.05	4.43	DRY	5.46	4.33	6.67	4.05	4.05	3.14	4.46	3.56	3.88	4.24	5.56	8.58	3.78	4.52	DRY
Zinc		Zn	mg/L	2.50	5	0.004	0.008	DRY	0.008	0.007	0.006	0.009	0.006	0.007	0.006	0.007	0.004	0.01	0.005	0.007	0.006	0.034	DRY
EXTENDED ANALYSIS																						
Phenols		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 I.D.	Unit	RUC Max (OW4 & OW5)	OW3	OW4	OW5	OW6	OW7S	OW7D	OW8S	OW8D	OW9	OW10S	OW10D	OW11	OW75-REP
			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	7.55	8.43	8.35	7.91	7.91	8.17	7.47	8.2	7.55
Th. Cond.	uS/cm		677	635	640	640	781	442	470	613	970	667	879	525	781
pH	N/A		7.36	7.95	8.09	7.94	8.25	8.25	8.15	8.18	8.22	7.96	8.25	8.88	8.24
Cl	mg/L	133	30.3	2.74	10.7	16.8	13.1	4.56	5.66	3.76	1.42	1.23	2.77	127	2.69
Th. Cond.	uS/cm		648	651	670	810	464	491	627	704	979	896	550	2250	648
Hard.(Calc.)	mg/L		305	329	300	272	126	93	207	182	181	369	189	841	188
DOC	mg/L	3.7	2	1.8	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	262	290	364	440	434	868	358	1898	364
NH_3	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		0.06	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	0.08	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		0.28	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	1.46	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	82.6	45.9	99.8	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		6.9	6.88	6.89	6.87	7.48	7.68	7.17	7.41	7.62	6.87	7.32	5.93	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		299	283	315	368	179	184	236	153	107	289	186	1120	180
Anion	mg/L		6.48	6.45	6.47	7.84	4.28	4.5	6.12	6.96	6.86	6.59	5.3	22	5.22
Cation	mg/L		7.14	7.08	7.12	8.69	4.58	4.81	6.54	6.8	6.37	6.48	4.92	25.6	4.86
CAB	%		4.9	4.4	4.8	5.2	3.8	3.4	3.3	0.4	3.7	0.5	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		298	283	316	366	177	183	235	153	107	288	185	1120	180
L.I.	N/A		1.06	1.06	1.2	1.07	0.77	0.8	0.99	0.77	0.8	1.09	0.93	0.95	0.91
A.I.	N/A		12.9	12.9	13.1	12.9	12.5	12.4	12.8	12.8	12.5	13	12.8	12.9	12.8
R.S.I.	N/A		5.86	5.83	5.89	5.8	6.71	7.06	6.16	6.84	7.82	5.78	6.39	4.98	6.42
Al	mg/L		0.005	0.006	0.004	0.005	0.006	0.005	0.004	0.006	0.005	0.004	0.007	0.144	0.008
As	mg/L	0.010	<0.003	<0.003	0.005	<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	0.061	0.158	0.335	0.284	0.452	0.459	0.561	0.586	0.484	0.184	0.503	0.173
Ba	mg/L	0.30	0.07	0.071	0.068	0.084	0.035	0.038	0.043	0.027	0.023	0.03	0.066	0.21	0.069
Ca	mg/L		84.8	77.8	81.3	60.3	36.2	21.8	36.2	40.3	35.4	82.5	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	0.006	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	44.8	0.134
K	mg/L		1.58	1.41	1.8	3.82	1.11	1.09	1.54	1.52	1.35	2.32	1.28	21.8	1.28
Mg	mg/L		35	32.7	35.8	30.8	14.8	8.47	28.2	18.8	17.8	44.8	20.8	118	20.7
Mn	mg/L	0.04	0.017	0.038	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	64.8	74.2	71.7	36	25.2	80	25.8
Pb	mg/L	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	<0.002
Se	mg/L	0.006	<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
Si	mg/L		4.96	4.58	5.18	3.99	3.22	2.81	4.01	3	3.3	4.32	4.75	9.84	4.82
Zn	mg/L	2.50	0.008	0.01	0.007	0.007	0.006	0.006	0.006	0.006	0.008	<0.004	0.008	0.027	0.005
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

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	27.6	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										249	426
Jun-90	422	234	335	163										242	229
Nov-90	569		328	321										288	295
May-91	491	326	347	295										260	258
Sep-91	447	265	307	224										217	197
May-92	513	399	379	318										257	258
Oct-92	580	408	382											314	306
Jun-93	555	366	372											257	257
Oct-93	534	591	357	317										297	304
May-94	548	545	366	266										259	266
Oct-94	529	521	391	293										256	300
May-95	427	617	369	252										272	283
Sep-95	521	405	363	252										233	226
May-96	494	377	339											241	237
Sep-96	446	366	347	294										302	292
May-97	496	469	305	273										269	275
Sep-97	433	311	456	328	1800	135		260		225				262	193
May-98	559	558	387	278	628	121	263	221	296	188				262	242
Oct-98	498	376	357	287	589	126	184	223	242	172				205	169
May-99	529	536	386	320	457	129	149	235	231	184				239	249
Oct-99	471	426	375	295	510	153		246		193					
May-00	390	422	356	384	453	147	149	242	246	203				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

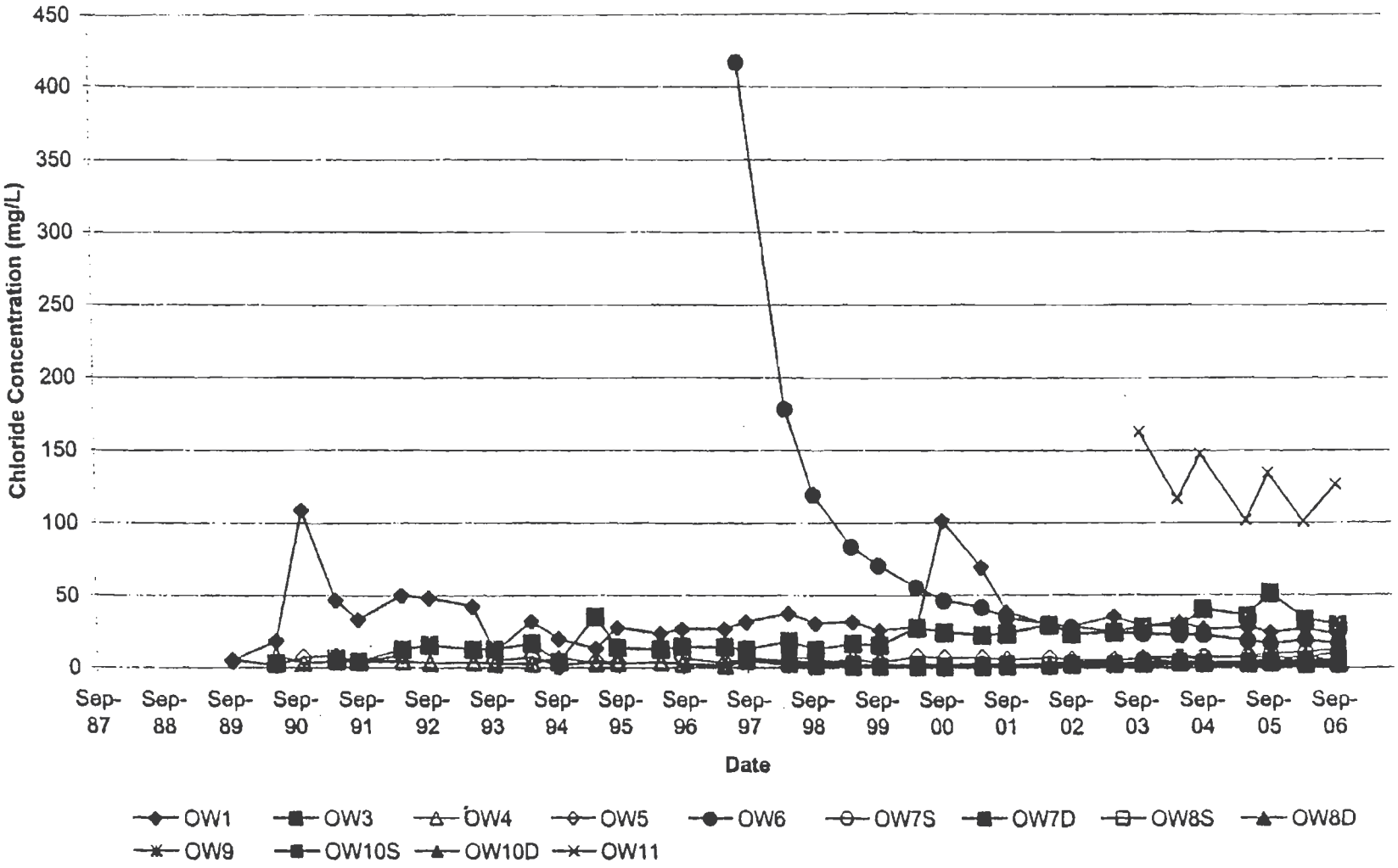
Note: Surface water samples listed for November 1990 were collected January 1991.

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).

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



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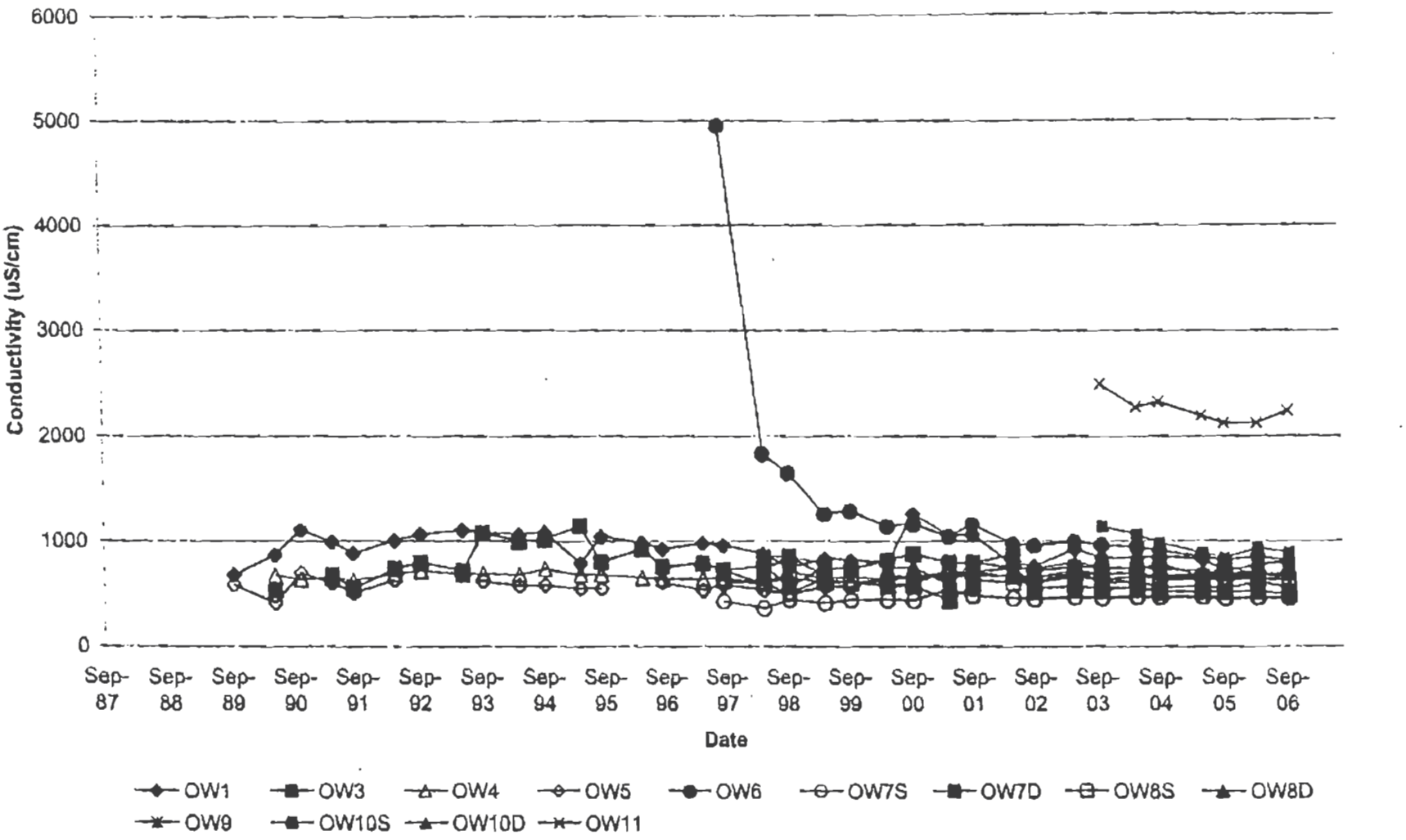
HURON LANDFILL SITE
Conductivity (uS/cm) vs. Time



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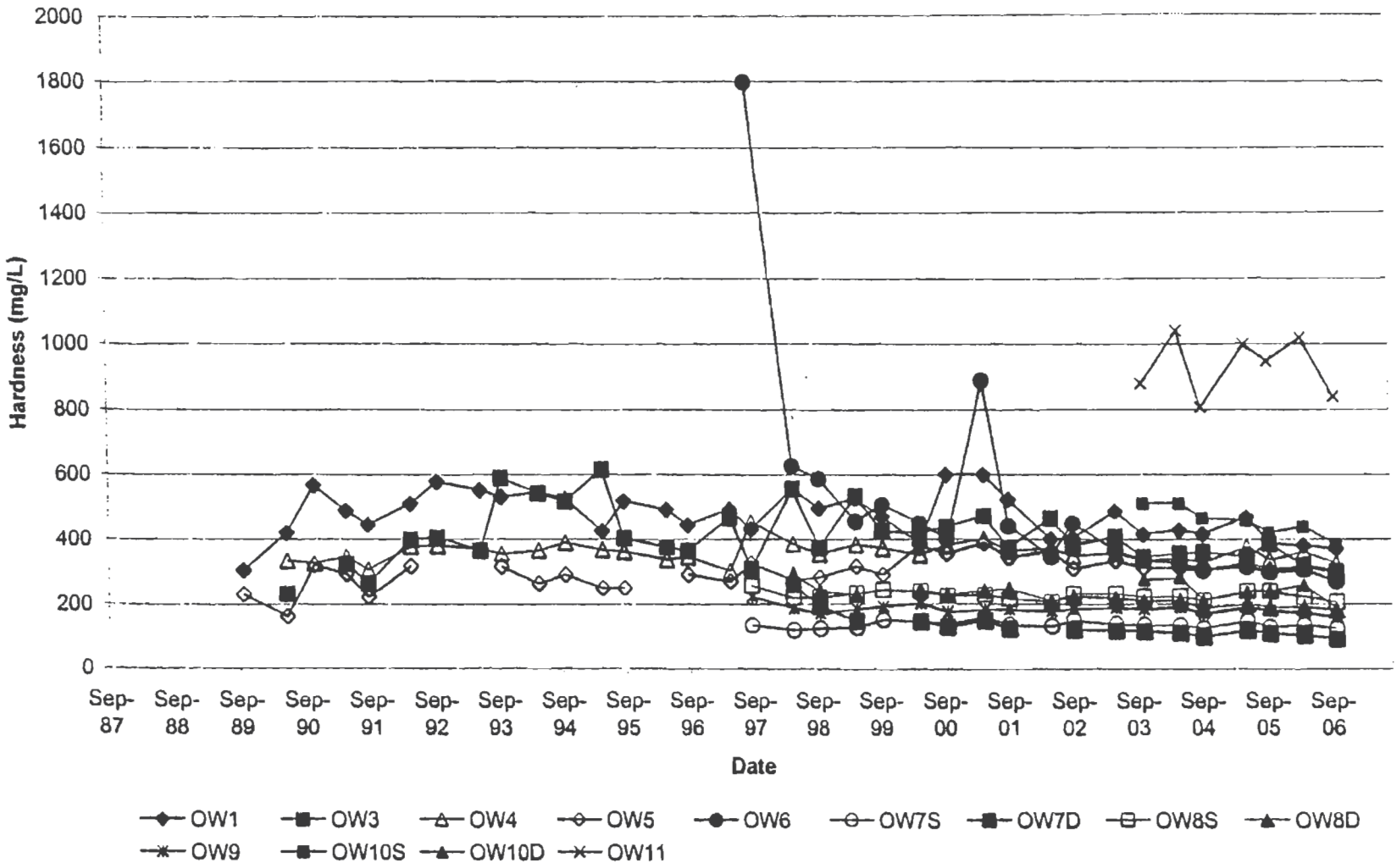
Project File: LNE08507

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



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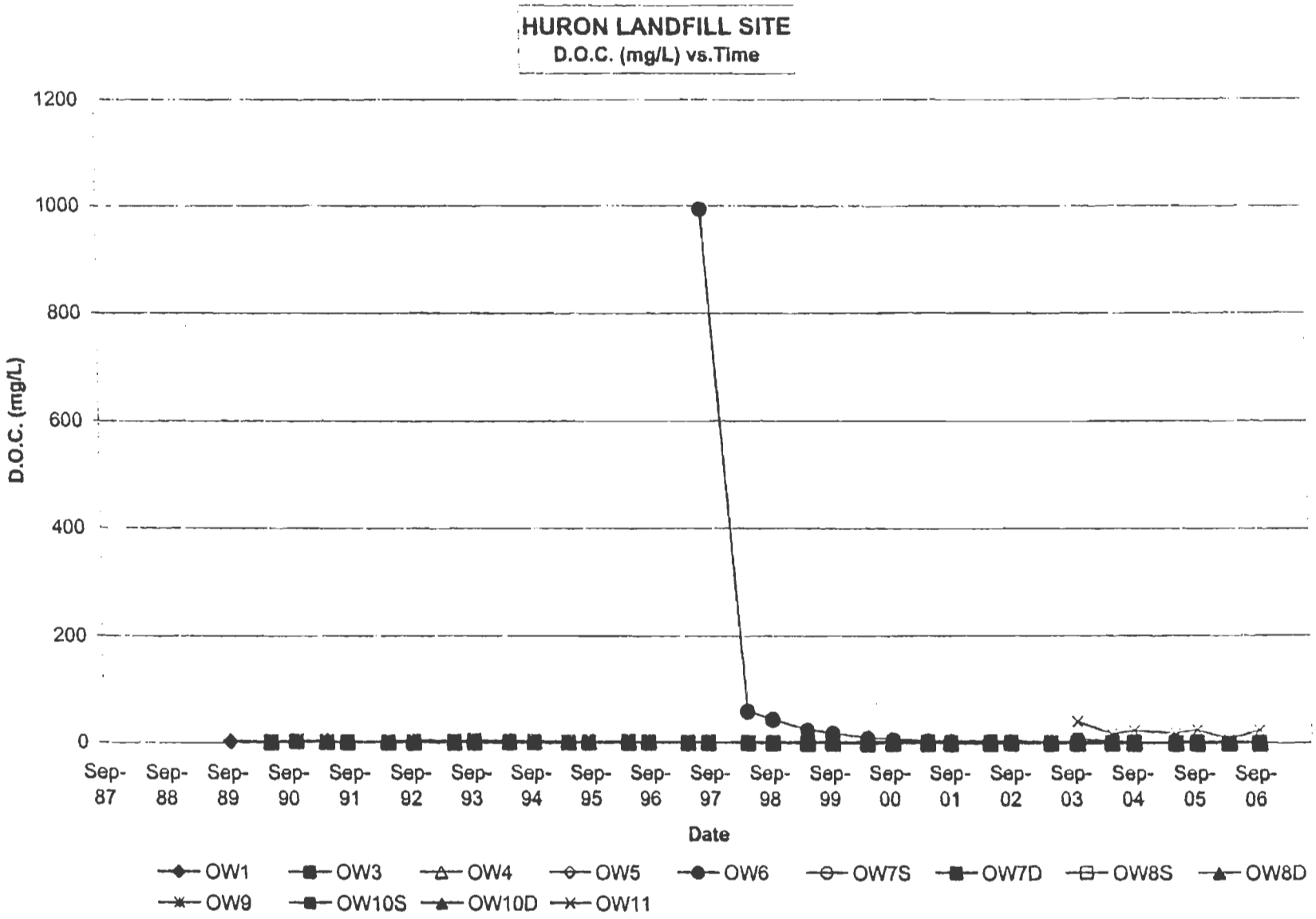
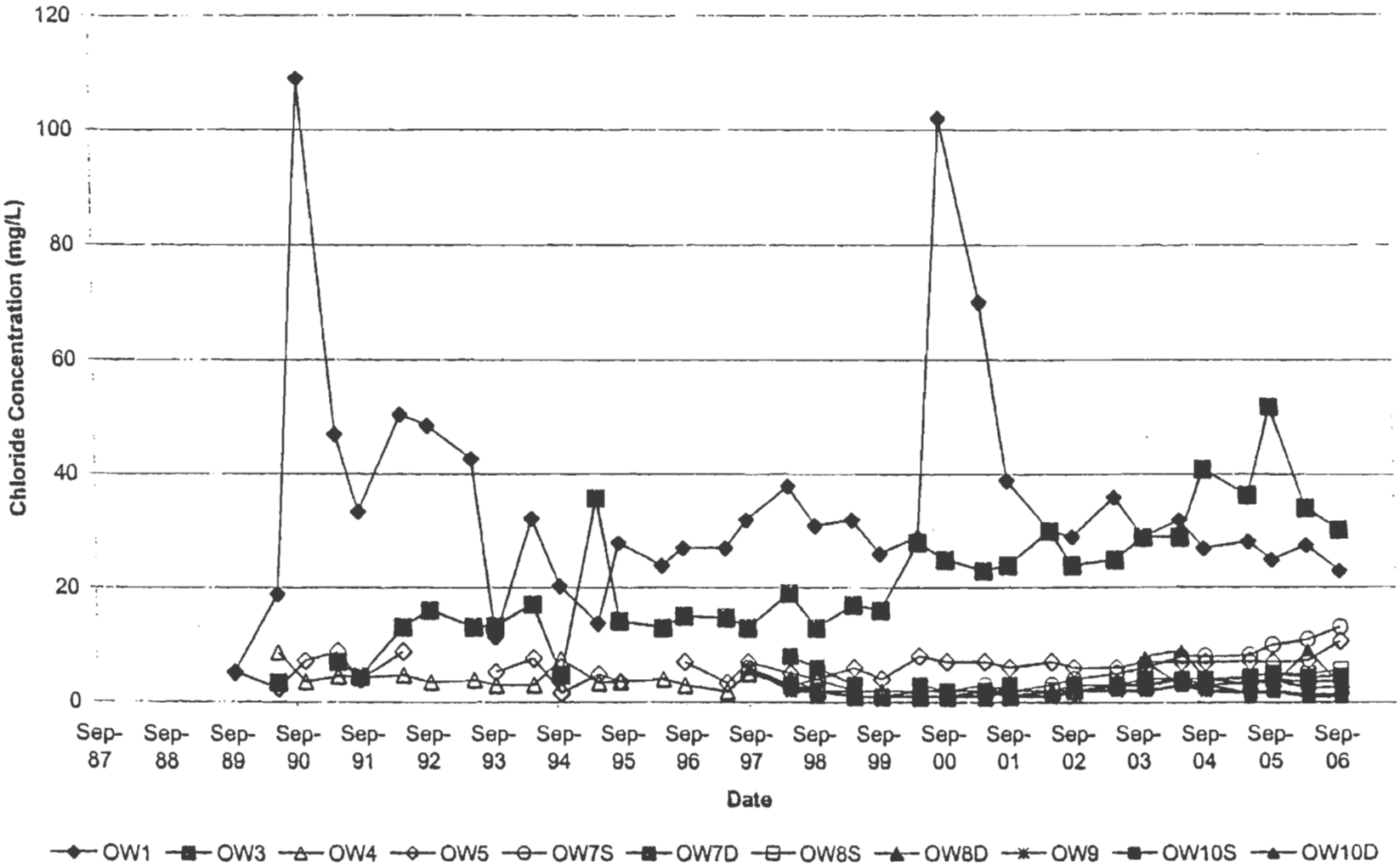

HURON LANDFILL SITE
D.O.C. (mg/L) vs.Time
1200
1000
800
600
400
200
0
D.O.C. (mg/L)
Sep-87
Sep-88
Sep-89
Sep-90
Sep-91
Sep-92
Sep-93
Sep-94
Sep-95
Sep-96
Sep-97
Sep-98
Sep-99
Sep-00
Sep-01
Sep-02
Sep-03
Sep-04
Sep-05
Sep-06
Date
OW1
OW3
OW4
OW5
OW6
OW7S
OW7D
OW8S
OW8D
OW9
OW10S
OW10D
OW11

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



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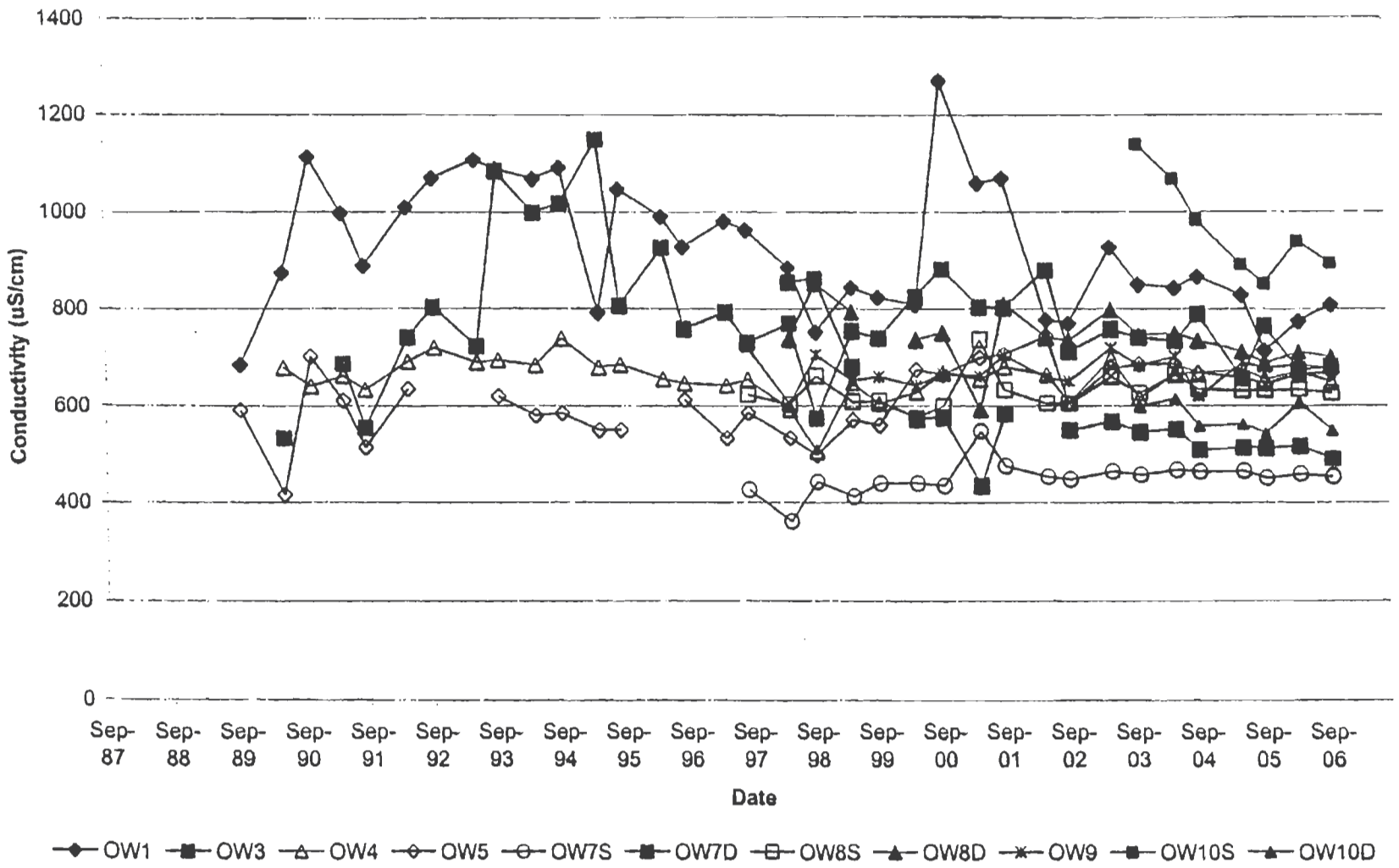
HURON LANDFILL SITE
Conductivity (uS/cm) vs. Time



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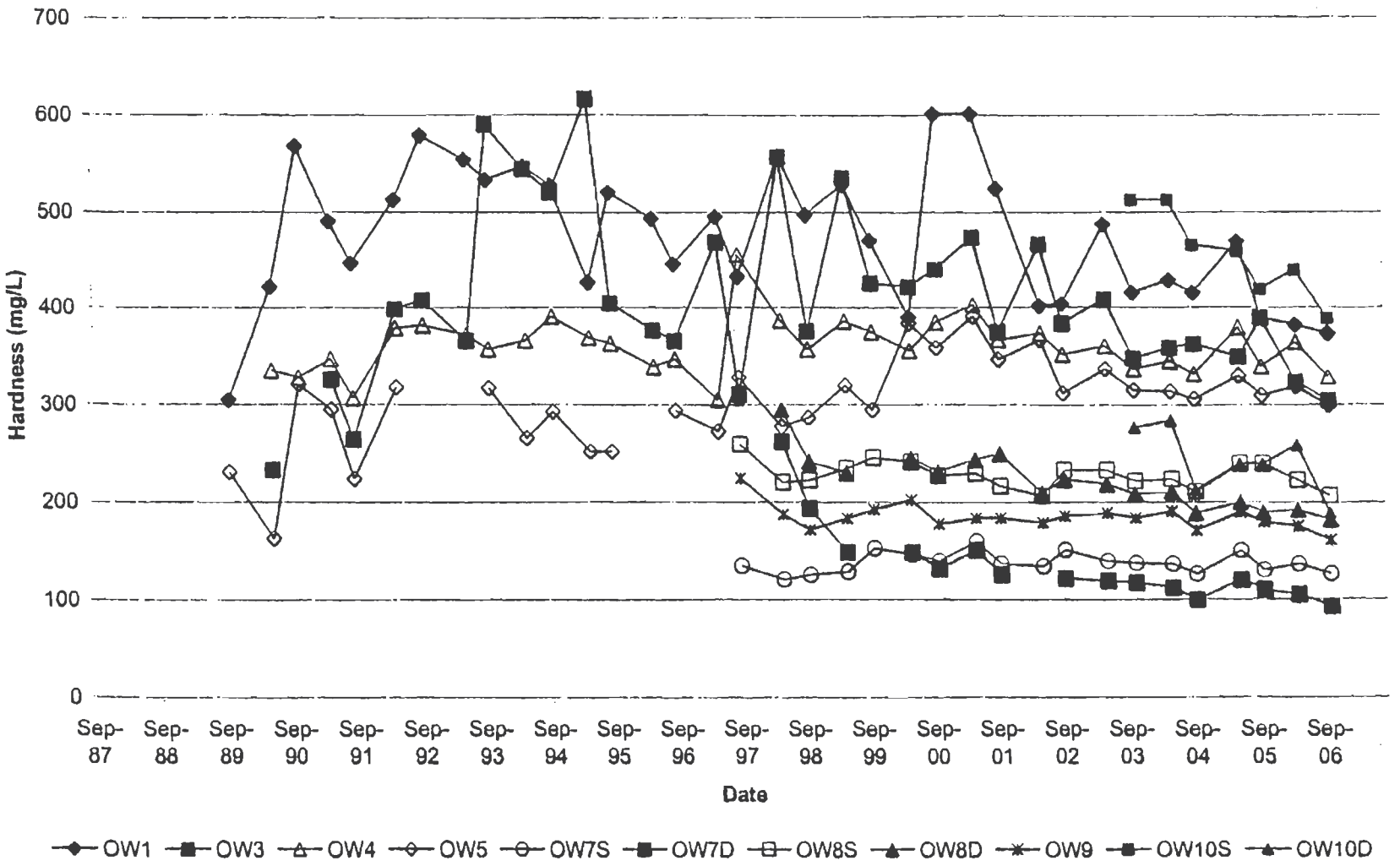
Project File: LNE08507

HURON LANDFILL SITE

Hardness (mg/L) vs. Time



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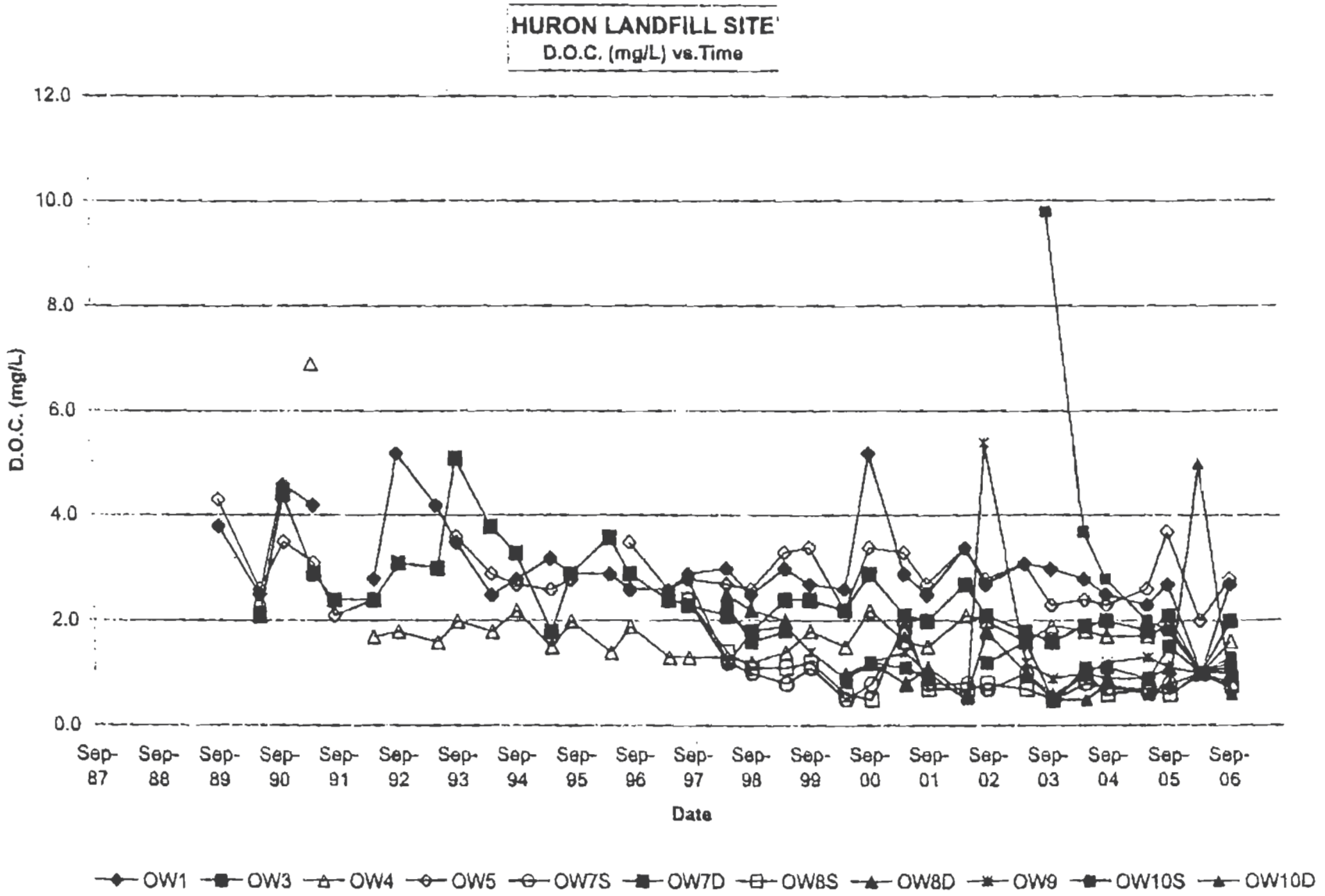

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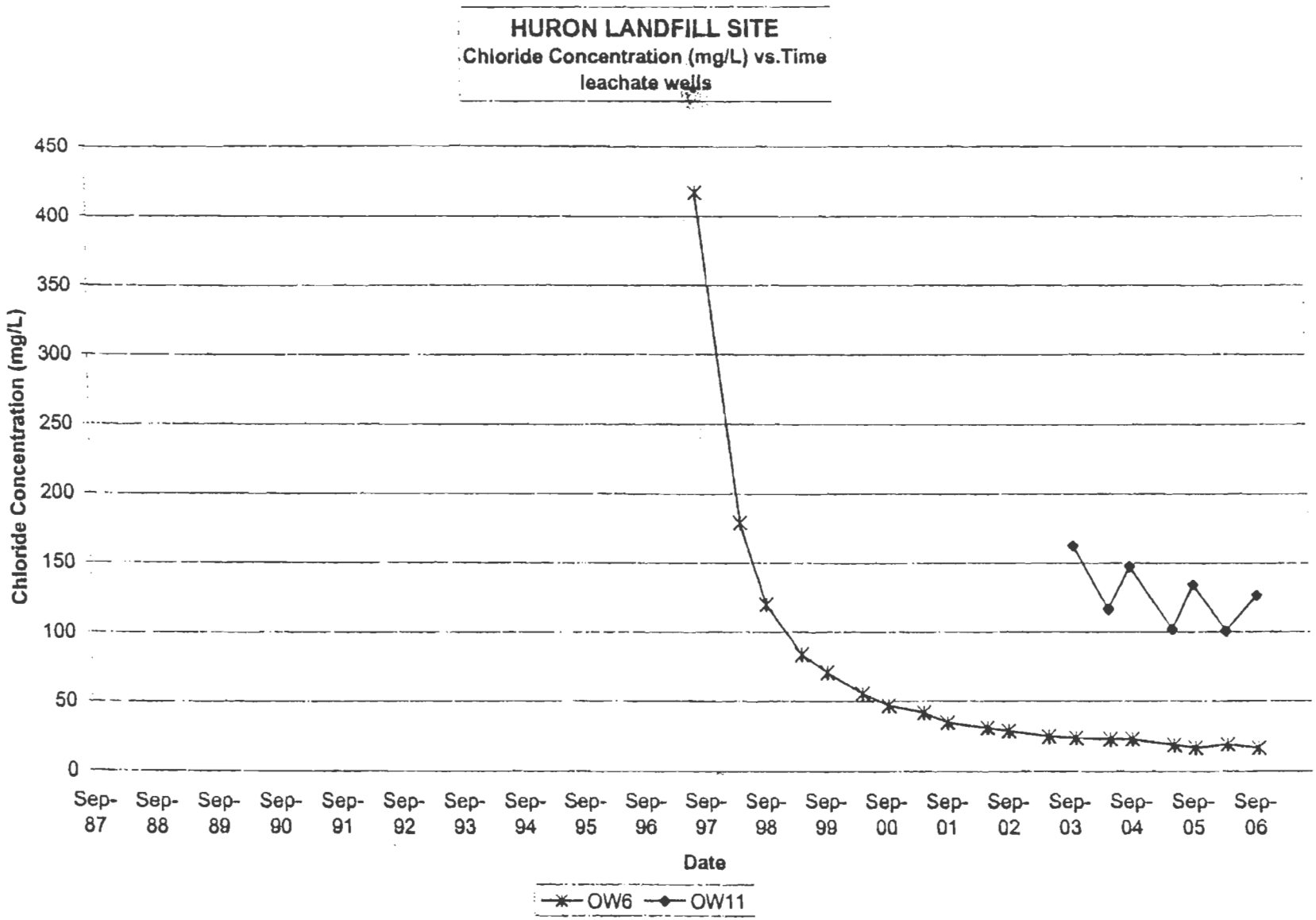

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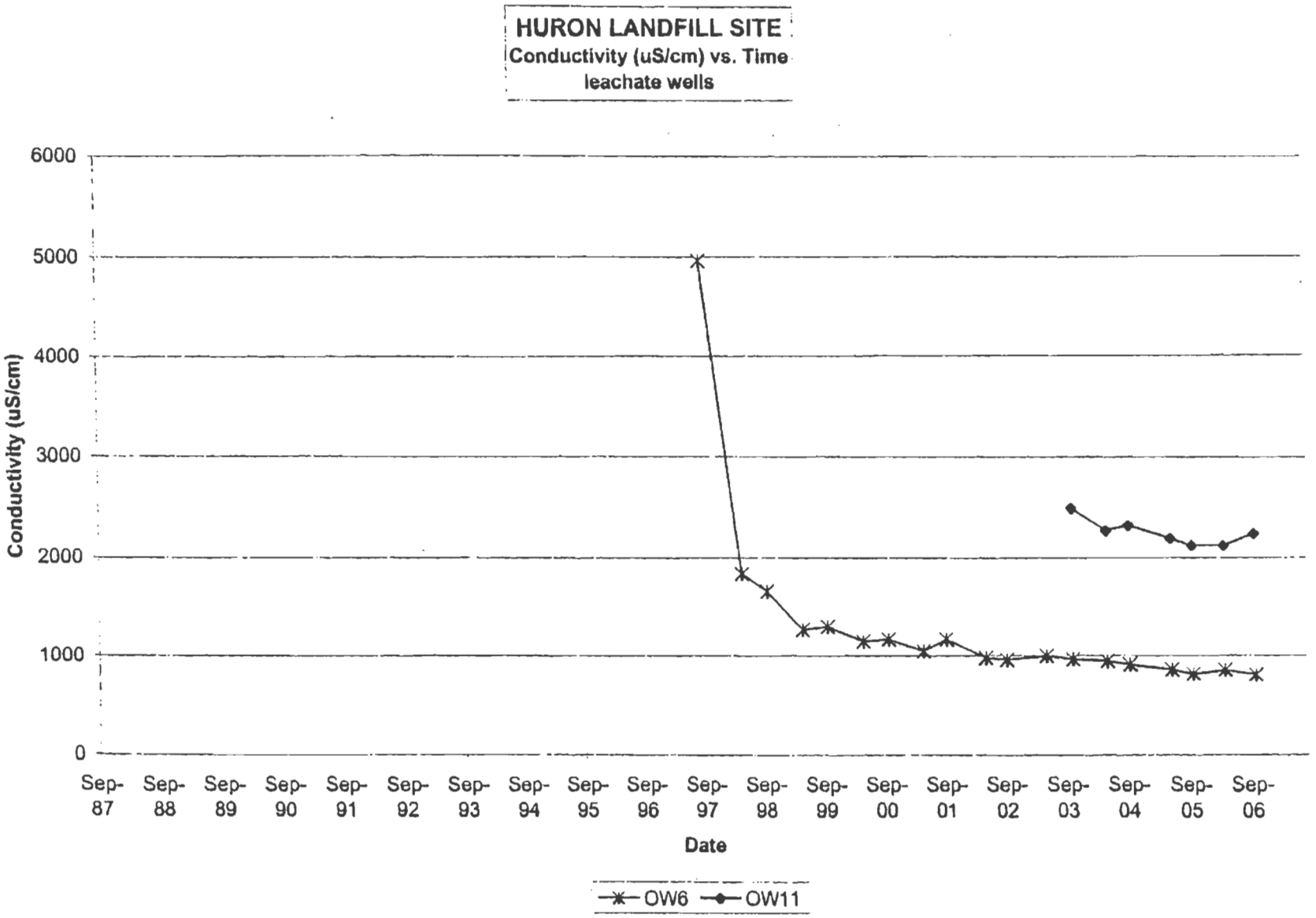

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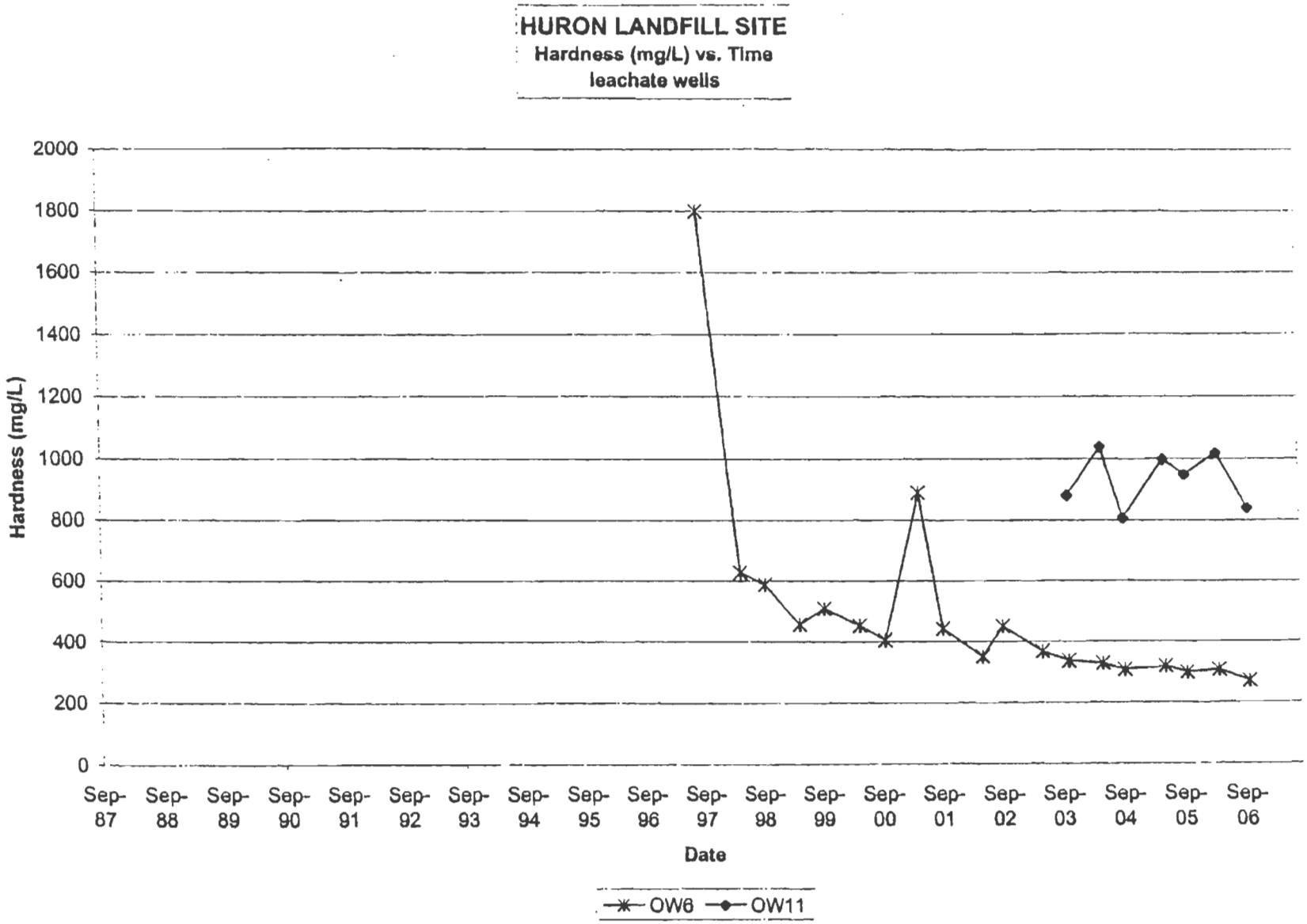

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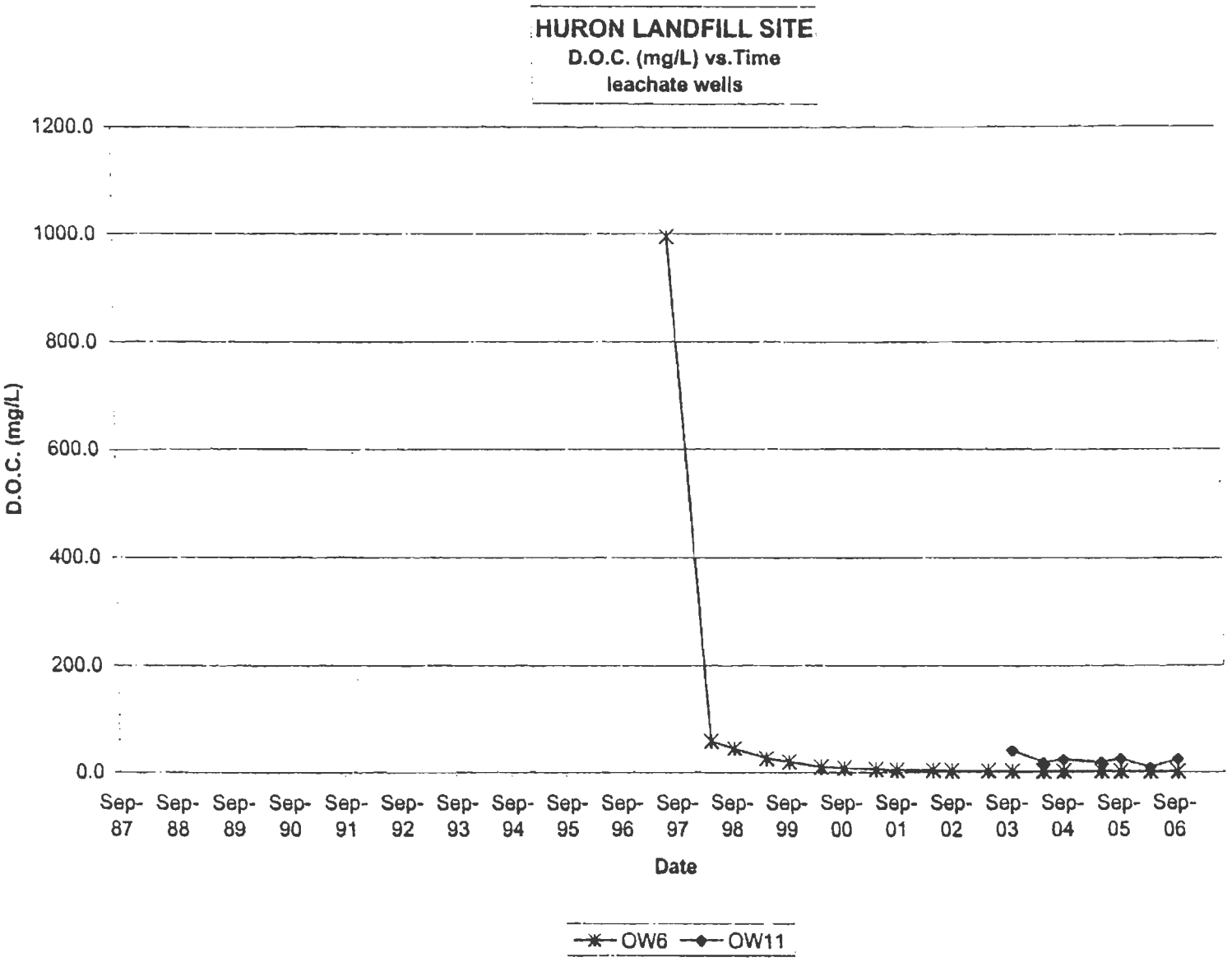

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R. J. Burnside & Associates Limited
Project File: LNE08507

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

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

Chemical Parameter	ODWQS	OW1 Jul-20	OW1 Nov-20	OW1 Jun-21	OW1 Nov-21	OW1 May-22	OW1 Nov-22	OW1 May-23	OW1 Sep-23
Alkalinity(as CaCO3)	30 - 500 [OG]	383	373	385	385	390	397	381	402
Chloride	250 [AO]	58.7	72.3	68.2	62.8	56.9	58.3	59.4	62.0
Nitrate(as N)	10 (MAC) d	0.19	0.22	0.17	0.12	0.4	<0.05	<0.5	0.05
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.5	<0.05
Ammonia(as N)		0.15	0.04	0.03	0.28	0.02	0.19	0.04	<0.05
Total Kjeldahl Nitrogen(as N)		0.5	1.0	0.6	1.2	0.5	1.4	0.4	0.4
Phenols		<0.002	<0.002	0.006	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	5.0	4.9	5.4	4.3	4.1	3.7	3.0	4.3
Conductivity (us/cm)		1020	1090	1070	1060	985	1030	1000	1020
pH		7.82	7.77	8.03	8.00	7.99	7.70	7.9	7.89
Sulphate (as SO4)	250 (AO)	105	96	100	85	80	82	76	79
Hardness(as CaCO3)	80-100 [OG]	474	508	544	507	452	466	460	449
Aluminum	0.1 [OG]	0.04	0.06	0.08	0.03	0.03	0.03	0.06	0.06
Arsenic	0.010 (IMAC)	0.0011	0.0008	0.0009	0.0021	0.0010	0.0013	0.0009	0.0022
Barium	1 [MAC]	0.102	0.106	0.119	0.110	0.094	0.097	0.099	0.096
Boron	5 [IMAC]	0.407	0.442	0.444	0.411	0.393	0.358	0.384	0.315
Cadmium	0.005 (MAC)	0.000030	0.000040	0.000018	<0.000028	0.000051	<0.000015	<0.000015	<0.000015
Calcium	-	101	113	121	107	95.4	98.0	100	97.6
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.001	<0.001
Copper	1 [AO]	<0.002	0.0023	0.003	<0.002	<0.002	0.0006	0.0026	0.0009
Iron	0.3 [AO]	0.041	0.011	0.015	0.257	0.005	0.035	0.006	0.402
Lead	0.01 (MAC)c	0.00005	0.00008	0.00007	0.00004	0.00010	0.00002	0.00004	<0.00002
Magnesium	-	53.8	54.9	58.7	58.3	51.8	53.8	51.0	49.8
Manganese	0.05 [AO]	0.040	0.004	0.005	0.059	<0.001	0.018	0.004	0.212
Potassium	-	3.0	3.0	2.9	3.0	2.7	2.7	2.6	2.3
Sodium	200 [AO]	50.1	51.3	53.2	47.9	42.1	40.8	42.1	40.3
Zinc	5 [AO]	0.013	0.011	0.019	0.009	0.02	0.008	0.018	0.009

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

Chemical Parameter	ODWQS	OW3 Jul-07	OW3 Dec-07	OW3 Jul-08	OW3 Dec-08	OW3 Jul-09	OW3 Nov-09	OW3 Mar-10	OW3 Dec-10	OW3 Jun-11	OW3 Oct-11	OW3 Jun-12	OW3 Oct-12	OW3 Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	292	274	268	283	271	266	272	412	381	367	307	313	329
Chloride	250 [AO]	45	34	62	53	48	44	49	59	77.2	40.5	44.8	54.0	62.4
Nitrate(as N)	10 (MAC) d	0.3	0.1	0.1	0.2	0.2	0.1	0.1	0.3	<0.1	<0.1	0.4	<0.1	0.2
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	nd	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		0.06	0.1	nd	0.06	nd	nd	<0.05	<0.05	<0.01	0.01	0.04	<0.01	0.02
Total Kjeldahl Nitrogen(as N)		0.3	0.4	0.5	1	1.4	0.8	0.5	0.4	9.77	0.98	0.32	0.98	2.17
Phenols		nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	1.7	1.9	1.8	1.8	1.6	2.1	2.2	2.6	2.6	2.3	2.1	2.3	4.7
Conductivity (us/cm)		741	686	768	730	712	687	714	978	910	831	736	727	800
pH		8.2	8.1	8	8.1	8	7.9	8.0	7.74	7.58	7.64	7.95	9.00	7.63
Sulphate (as SO4)	250 (AO)	51	42	39	40	-	33	31	20	19	16	26	21	26
Hardness(as CaCO3)	80-100 [OG]	390	340	330	330	340	320	450	500	371	410	368	347	346
Aluminum	0.1 [OG]	nd	nd	nd	nd	nd	nd	<0.005	<0.005	0.02	0.04	0.02	0.03	0.03
Arsenic	0.010 (IMAC)	0.001	0.001	nd	nd	0.001	0.001	<0.001	0.001	0.0029	0.0036	0.0013	0.0034	0.0018
Barium	1 [MAC]	0.08	0.072	0.075	0.07	0.073	0.068	0.097	0.098	0.079	0.082	0.090	0.079	0.083
Boron	5 [IMAC]	0.088	0.081	0.07	0.074	0.078	0.075	0.047	0.056	0.084	0.044	0.084	0.066	0.078
Cadmium	0.005 (MAC)	0.0008	0.00008	0.0002	0.0001	0.0005	0.068	0.0004	0.0002	0.00004	<0.00002	<0.00002	<0.00002	0.00005
Calcium	-	77	70	67	68	72	68	110	120	72.2	92.0	76.7	74.4	72.2
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	0.001	nd	0.001	0.001	0.001	0.001	0.002	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0011
Iron	0.3 [AO]	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.008	0.057	<0.005	0.068	<0.005
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00005	<0.00002	0.00003	0.00003	0.00003
Magnesium	-	48	36	38	38	39	36	43	48	46.4	43.9	42.8	39.3	40.3
Manganese	0.05 [AO]	nd	0.015	nd	nd	nd	0.017	0.053	0.097	0.019	0.088	0.002	0.036	0.004
Potassium	-	1.9	1.7	3.1	1.8	1.6	1.7	1.7	1.9	1.5	1.8	1.8	1.5	1.5
Sodium	200 [AO]	26	23	24	23	23	22	22	22	24.8	24.8	23.1	22.0	23.5
Zinc	5 [AO]	nd	nd	0.006	nd	nd	nd	0.006	0.008	<0.005	<0.005	<0.005	<0.005	<0.005

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

Chemical Parameter	ODWQS	OW3 Nov-13	OW3 Jul-14	OW3 Nov-14	OW3 May-15	OW3 Oct-15	OW3 Jun-16	OW3 Nov-16	OW3 Jun-17	OW3 Oct-17	OW3 May-18	OW3 Oct-18	OW3 Jun-19	OW3 Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	413	295	417	421	366	415	355	280	324	347	378	374	400
Chloride	250 [AO]	46.8	49.8	52.4	77.4	55.8	113	75.1	52.2	68.3	107	89.4	106	93.4
Nitrate(as N)	10 (MAC) d	0.4	0.1	0.4	<0.25	<0.25	0.1	0.4	0.06	0.1	<0.05	0.12	0.09	<0.05
Nitrite(as N)	1 (MAC) d	<0.1	<0.1	<0.1	<0.25	<0.25	<0.1	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05
Ammonia(as N)		0.03	0.01	0.07	<0.02	0.06	0.44	0.04	<0.01	0.04	0.11	0.17	0.14	0.11
Total Kjeldahl Nitrogen(as N)		0.45	0.62	0.5	0.30	0.45	0.32	0.43	0.2	0.40	2.0	1.1	0.9	0.5
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	5.6	4.2	5.8	4.2	3.9	2.7	2.9	2.4	4.2	2.9	3.7	4.2	3.8
Conductivity (us/cm)		770	726	853	1020	854	1080	864	738	865	954	1020	1050	1030
pH		7.73	7.96	7.70	8.11	7.97	7.78	7.94	8.09	7.90	7.88	7.80	7.95	7.79
Sulphate (as SO4)	250 (AO)	16	17	16	17.2	19.5	32	24	19	20	23	20	19	16
Hardness(as CaCO3)	80-100 [OG]	431	372	419	543	395	446	364	368	416	368	410	374	451
Aluminum	0.1 [OG]	0.04	0.02	0.03	0.013	<0.004	0.03	0.03	0.02	0.06	0.05	0.05	0.05	0.07
Arsenic	0.010 (IMAC)	0.0030	0.0020	0.0016	<0.003	0.003	0.0013	0.0021	0.00153	0.0037	0.0015	0.0024	0.0015	0.0024
Barium	1 [MAC]	0.082	0.076	0.067	0.108	0.095	0.102	0.086	0.091	0.103	0.093	0.104	0.086	0.100
Boron	5 [IMAC]	0.075	0.084	0.064	0.054	0.075	0.069	0.078	0.088	0.099	0.093	0.100	0.111	0.071
Cadmium	0.005 (MAC)	<0.00002	0.00002	<0.00002	<0.001	<0.001	<0.00002	<0.00002	<0.0001	<0.000014	<0.000015	<0.000015	<0.000015	<0.000015
Calcium	-	101	80.4	97.8	133	88.0	97.2	77.1	72.2	90.5	70.1	90.2	72.1	95.8
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Copper	1 [AO]	<0.002	0.0004	<0.002	<0.003	<0.003	<0.002	0.0004	<0.002	<0.002	0.002	<0.002	0.0008	<0.002
Iron	0.3 [AO]	0.017	0.010	0.045	0.099	<0.010	0.044	0.040	0.010	0.188	0.005	0.030	<0.005	0.031
Lead	0.01 (MAC)c	<0.00002	<0.00002	<0.00002	<0.002	<0.002	<0.00002	<0.00002	0.00008	0.00004	0.00003	0.00006	<0.00002	0.00003
Magnesium	-	43.8	41.6	42.4	51.2	42.6	49.4	41.7	45.5	46.1	46.8	45.0	47.2	51.4
Manganese	0.05 [AO]	0.024	0.018	0.050	0.098	0.075	0.040	0.060	0.012	0.056	0.003	0.054	0.003	0.064
Potassium	-	1.8	1.6	1.6	1.85	1.82	1.7	1.7	1.6	1.8	1.7	1.8	1.6	1.7
Sodium	200 [AO]	22.0	24.1	21.0	22.6	26.0	31.9	27.4	30.5	33.8	35.5	39.6	40.1	38.2
Zinc	5 [AO]	<0.005	<0.005	<0.005	0.006	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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

Chemical Parameter	ODWQS	OW3 Jul-20	OW3 Nov-20	OW3 Jun-21	OW3 Nov-21	OW3 May-22	OW3 Nov-22	OW3 May-23	OW3 Sep-23
Alkalinity(as CaCO3)	30 - 500 [OG]	359	359	341	390	397	387	384	395
Chloride	250 [AO]	103	102	99.1	97.8	116	97.1	94.7	88.9
Nitrate(as N)	10 (MAC) d	0.42	0.20	0.25	<0.05	0.2	<0.05	<0.5	0.06
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.5	<0.05
Ammonia(as N)		0.08	0.04	0.03	0.13	<0.01	0.11	0.03	0.14
Total Kjeldahl Nitrogen(as N)		0.5	0.5	0.5	0.6	0.4	0.4	0.5	0.5
Phenols		<0.002	<0.002	0.003	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	2.6	3.1	2.8	2.9	2.3	1.3	0.4	3.2
Conductivity (us/cm)		992	1040	951	1060	1060	1040	1030	1000
pH		7.84	7.64	8.04	7.53	7.88	7.67	7.9	7.81
Sulphate (as SO4)	250 (AO)	18	18	17	15	14	13	22	16
Hardness(as CaCO3)	80-100 [OG]	373	407	475	454	456	433	427	422
Aluminum	0.1 [OG]	0.05	0.05	0.06	0.03	0.03	0.04	0.06	0.05
Arsenic	0.010 (IMAC)	0.0016	0.0016	0.0013	0.0017	0.0011	0.0017	0.0008	0.0029
Barium	1 [MAC]	0.096	0.090	0.115	0.101	0.108	0.100	0.102	0.096
Boron	5 [IMAC]	0.121	0.113	0.127	0.114	0.122	0.111	0.114	0.063
Cadmium	0.005 (MAC)	<0.000015	<0.000028	<0.000015	0.000078	0.000016	<0.000015	<0.000015	<0.000015
Calcium	-	74.2	87.0	102	95.8	96.8	91.1	92.4	91.6
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Copper	1 [AO]	<0.002	0.0092	0.006	<0.002	<0.002	0.0003	0.0004	0.0006
Iron	0.3 [AO]	0.023	0.014	<0.005	0.111	<0.005	0.100	<0.005	0.222
Lead	0.01 (MAC)c	0.00007	0.00012	0.00008	0.00006	0.00008	0.00004	0.00002	<0.00002
Magnesium	-	45.7	46.2	53.6	52.3	52.1	49.9	47.7	47.0
Manganese	0.05 [AO]	0.002	0.018	0.006	0.098	0.014	0.123	0.016	0.090
Potassium	-	1.9	2.0	2.0	2.0	1.9	1.8	1.9	1.6
Sodium	200 [AO]	40.2	35.6	45.1	38.3	43.7	38.3	42.3	39.6
Zinc	5 [AO]	<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-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

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

Chemical Parameter	ODWQS	OW4 Nov-13	OW4 Jul-14	OW4 Dec-14	OW4 May-15	OW4 Oct-15	OW4 Jun-16	OW4 Nov-16	OW4 Jun-17	OW4 Oct-17	OW4 May-18	OW4 Oct-18	OW4 Jun-19	OW4 Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	363	288	316	315	296	318	309	363	341	318	318	293	282
Chloride	250 [AO]	9.1	9.1	11.3	16.1	14.1	8.5	12.0	11.3	9.1	9.4	10.3	8.9	9.6
Nitrate(as N)	10 (MAC) d	<0.1	0.1	0.1	<0.25	<0.25	0.1	0.2	<0.05	0.1	<0.05	<0.05	0.05	0.06
Nitrite(as N)	1 (MAC) d	<0.1	<0.1	<0.1	<0.25	<0.25	<0.1	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05
Ammonia(as N)		<0.01	<0.01	0.06	<0.02	<0.02	<0.01	<0.01	<0.01	0.02	0.06	0.06	0.10	0.20
Total Kjeldahl Nitrogen(as N)		0.56	0.58	0.2	0.17	0.14	0.18	0.23	0.2	0.43	0.4	0.3	0.4	0.8
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	6.2	3.7	3.2	2.4	2.5	1.8	4.2	3.2	5.5	2.0	3.7	5.0	4.6
Conductivity (us/cm)		654	724	749	772	721	772	718	821	770	756	803	791	766
pH		7.69	7.90	7.98	8.16	7.95	7.90	8.02	7.82	7.96	7.95	7.78	8.07	7.88
Sulphate (as SO4)	250 (AO)	60	101	104	82.0	86.7	120	82	62	64	112	105	126	106
Hardness(as CaCO3)	80-100 [OG]	366	406	398	389	360	402	353	442	423	430	396	397	408
Aluminum	0.1 [OG]	0.040	0.03	0.03	<0.004	<0.004	0.04	0.03	0.03	0.06	0.06	0.05	0.05	0.06
Arsenic	0.010 (IMAC)	0.0009	0.0007	0.0007	<0.003	<0.003	0.0011	0.0011	<0.0007	0.0019	<0.0001	0.0005	0.0003	0.0011
Barium	1 [MAC]	0.071	0.071	0.075	0.060	0.063	0.081	0.074	0.096	0.087	0.083	0.073	0.071	0.078
Boron	5 [IMAC]	0.04	0.042	0.042	0.020	0.064	0.046	0.049	0.037	0.055	0.045	0.040	0.043	0.019
Cadmium	0.005 (MAC)	<0.00002	0.00005	<0.00002	<0.001	<0.001	<0.00002	<0.00002	<0.0001	<0.000014	0.000035	0.000025	<0.000015	<0.000015
Calcium	-	87.2	96.0	93.9	95.4	84.5	90.4	81.9	103	98.6	97.9	90.2	88.1	89.9
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Copper	1 [AO]	<0.002	0.0009	0.0008	<0.003	<0.003	<0.002	0.0003	<0.002	<0.002	<0.002	<0.002	0.0019	<0.002
Iron	0.3 [AO]	0.014	0.009	<0.005	<0.010	<0.010	0.017	0.012	<0.005	0.246	0.005	0.043	<0.005	0.038
Lead	0.01 (MAC)c	<0.00002	<0.00002	<0.00002	<0.002	<0.002	<0.00002	<0.00002	<0.00005	<0.00002	<0.00002	0.00011	0.00008	0.00003
Magnesium	-	36.1	40.4	39.8	36.5	36.1	42.9	36.0	45.2	43.0	45.1	41.5	43.1	44.5
Manganese	0.05 [AO]	0.033	0.003	0.010	0.003	0.016	0.011	0.039	0.023	0.128	0.001	0.032	<0.001	0.096
Potassium	-	1.3	1.4	1.4	1.26	1.46	1.4	1.3	1.6	1.7	1.6	1.5	1.4	1.6
Sodium	200 [AO]	15.2	14.3	15.1	14.1	17.6	19.6	18.9	20.9	19.2	18.2	17.9	17.1	19.1
Zinc	5 [AO]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005

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

Chemical Parameter	ODWQS	OW4 Jul-20	OW4 Nov-20	OW4 Jun-21	OW4 Nov-21	OW4 May-22	OW4 Nov-22	OW4 May-23	OW4 Sep-23
Alkalinity(as CaCO3)	30 - 500 [OG]	294	296	299	325	320	338	318	336
Chloride	250 [AO]	12.4	15.9	15.1	18.2	16.5	14.7	13.2	13.7
Nitrate(as N)	10 (MAC) d	0.16	0.08	0.08	0.12	0.2	<0.05	0.06	0.07
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05
Ammonia(as N)		0.06	0.03	0.07	0.03	0.02	<0.01	0.02	<0.05
Total Kjeldahl Nitrogen(as N)		0.2	0.2	0.7	0.5	0.8	0.7	0.7	0.8
Phenols		<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	4.2	3.0	4.2	2.8	3.3	2.9	2.5	3.6
Conductivity (us/cm)		769	845	801	878	783	880	803	836
pH		7.88	7.71	8.06	7.64	7.97	7.65	8.01	7.77
Sulphate (as SO4)	250 (AO)	124	130	121	125	99	132	109	118
Hardness(as CaCO3)	80-100 [OG]	417	441	489	472	392	422	412	406
Aluminum	0.1 [OG]	0.04	0.06	0.08	0.06	0.03	0.05	0.06	0.05
Arsenic	0.010 (IMAC)	0.0005	0.0006	0.0004	0.0004	0.0003	0.0004	0.0004	0.0005
Barium	1 [MAC]	0.085	0.086	0.089	0.085	0.069	0.081	0.073	0.074
Boron	5 [IMAC]	0.046	0.055	0.047	0.049	0.035	0.051	0.049	0.006
Cadmium	0.005 (MAC)	0.000074	0.000041	0.000019	0.000020	<0.000015	<0.000015	<0.000015	<0.000015
Calcium	-	92.6	101	114	108	89.7	94.8	92.8	92.5
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Copper	1 [AO]	<0.002	0.0033	0.003	0.003	<0.002	0.0028	0.001	0.0010
Iron	0.3 [AO]	<0.005	0.005	0.020	0.029	<0.005	0.029	<0.005	<0.005
Lead	0.01 (MAC)c	0.00006	0.00006	0.00007	0.00009	0.00005	0.00009	0.00002	<0.00002
Magnesium	-	45.2	45.9	49.6	49.3	40.8	45.0	43.8	42.5
Manganese	0.05 [AO]	<0.001	0.006	0.002	0.006	<0.001	0.004	<0.001	0.002
Potassium	-	1.7	1.7	1.6	1.8	1.4	1.7	1.5	1.3
Sodium	200 [AO]	18.0	19.0	20.2	18.8	16.9	17.4	18.0	17.2
Zinc	5 [AO]	0.006	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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

Chemical Parameter	ODWQS	OW5 Jul-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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TABLE E-2
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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TABLE E-2
GROUNDWATER CHEMICAL DATA (2007-Present)
HURON LANDFILL SITE

Chemical Parameter	ODWQS	OW5 Jul-20	OW5 Nov-20	OW5 Jun-21	OW5 Nov-21	OW5 May-22	OW5 Nov-22	OW5 May-23	OW5 Sep-23
Alkalinity(as CaCO3)	30 - 500 [OG]	320	298	320	314	333	325	346	357
Chloride	250 [AO]	59.4	60.8	77.2	67.9	107	102	122	126
Nitrate(as N)	10 (MAC) d	0.16	0.09	0.10	0.10	0.2	<0.05	0.15	<0.05
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05
Ammonia(as N)		0.05	0.05	0.05	0.03	<0.01	0.03	<0.01	<0.05
Total Kjeldahl Nitrogen(as N)		0.2	0.2	2.0	0.4	0.7	0.4	0.2	0.2
Phenols		<0.002	<0.002	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	3.8	2.5	2.7	2.2	2.7	0.7	<0.2	2.3
Conductivity (us/cm)		839	858	911	890	974	994	1060	1070
pH		8.08	7.95	8.08	7.84	8.14	7.93	7.98	7.94
Sulphate (as SO4)	250 (AO)	57	55	59	50	46	41	37	36
Hardness(as CaCO3)	80-100 [OG]	413	409	483	425	451	443	483	454
Aluminum	0.1 [OG]	0.04	0.05	0.07	0.02	0.04	0.02	0.07	0.06
Arsenic	0.010 (IMAC)	0.0018	0.0020	0.0017	0.0017	0.0017	0.0016	0.0015	0.0013
Barium	1 [MAC]	0.102	0.099	0.119	0.102	0.112	0.108	0.121	0.111
Boron	5 [IMAC]	0.104	0.109	0.114	0.116	0.107	0.113	0.116	0.065
Cadmium	0.005 (MAC)	0.000021	0.000030	0.000017	0.000021	0.000020	0.000017	<0.000015	0.000018
Calcium	-	85.8	87.7	105	87.4	95.7	92.5	105	95.7
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Copper	1 [AO]	<0.002	0.0064	0.008	<0.002	<0.002	0.0014	0.0015	0.0008
Iron	0.3 [AO]	<0.005	0.007	0.006	0.006	0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	0.00003	0.00005	0.00009	0.00003	0.00007	0.00005	0.00003	<0.00002
Magnesium	-	48.3	46.2	53.7	50.2	51.5	51.5	53.6	52.2
Manganese	0.05 [AO]	<0.001	0.006	0.001	0.002	<0.001	0.001	<0.001	<0.001
Potassium	-	1.7	1.5	1.8	1.8	1.8	1.7	1.8	1.5
Sodium	200 [AO]	33.9	33.5	38.3	35.8	37.0	36.8	39.9	37.5
Zinc	5 [AO]	<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-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	OW6 Jun-21	OW6 Nov-21	OW6 May-22	OW6 Nov-22	OW6 May-23	OW6 Sep-23
Alkalinity(as CaCO3)	30 - 500 [OG]	1410	1430	1430	1430	1470	1570	1420	1210
Chloride	250 [AO]	458	520	535	547	480	485	535	507
Nitrate(as N)	10 (MAC) d	0.70	<0.5	<0.5	<0.05	<1	<0.5	<0.5	<0.05
Nitrite(as N)	1 (MAC) d	<0.5	<0.5	<0.5	<0.05	<1	<0.5	<0.5	<0.05
Ammonia(as N)		25.2	27.9	29.7	23.8	40.9	43.0	32.3	36.3
Total Kjeldahl Nitrogen(as N)		47.0	52.7	42.4	32.6	<0.1	56.6	41.1	53.2
Phenols		<0.002	0.004	0.017	0.002	0.002	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	107	82.4	22.1	83.2	16.5	81.4	49.4	17.8
Conductivity (us/cm)		3610	3960	3860	3780	3720	4150	3880	3980
pH		7.39	7.25	7.32	7.24	7.59	7.24	7.52	7.43
Sulphate (as SO4)	250 (AO)	<10	<10	<10	1	<10	<10	11	4
Hardness(as CaCO3)	80-100 [OG]	1170	1250	1180	1190	1150	1260	1190	1150
Aluminum	0.1 [OG]	0.07	0.08	0.10	0.06	0.06	0.13	0.09	0.08
Arsenic	0.010 (IMAC)	0.0072	0.0049	0.0037	0.0123	0.0106	0.0114	0.0106	0.0129
Barium	1 [MAC]	0.746	0.769	0.816	0.794	0.749	0.921	0.934	0.943
Boron	5 [IMAC]	0.607	0.637	0.637	0.637	0.640	0.663	0.662	0.613
Cadmium	0.005 (MAC)	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070	<0.000030
Calcium	-	152	165	151	149	144	157	152	147
Chromium	0.05 (MAC)	0.003	0.004	0.004	0.002	<0.002	0.004	0.003	0.003
Copper	1 [AO]	<0.002	0.0019	<0.002	<0.002	<0.002	0.0010	0.0015	0.0033
Iron	0.3 [AO]	3.02	3.08	7.67	8.51	4.98	7.97	7.85	7.00
Lead	0.01 (MAC)c	0.00020	0.00017	0.00010	0.00011	0.00021	0.00018	<0.0001	<0.00009
Magnesium	-	191	203	196	200	192	212	197	190
Manganese	0.05 [AO]	0.028	0.024	0.029	0.023	0.020	0.026	0.025	0.024
Potassium	-	21.5	25.8	23.7	23.5	22.1	27.0	26.6	25.8
Sodium	200 [AO]	414	445	439	416	407	442	443	412
Zinc	5 [AO]	<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-07	OW7S Dec-07	OW7S Jul-08	OW7S Dec-08	OW7S Jul-09	OW7S Nov-09	OW7S Mar-10	OW7S Dec-10	OW7S Jun-11	OW7S Oct-11	OW7S Jun-12	OW7S Oct-12	OW7S Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	187	176	172	174	169	167	167	168	174	172	175	177	177
Chloride	250 [AO]	15	14	18	17	18	17	20	21	19.7	20.9	21.4	22.1	22.6
Nitrate(as N)	10 (MAC) d	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.1	<0.1	<0.1	0.1	0.1
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	nd	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		nd	0.07	nd	nd	0.26	nd	<0.05	<0.05	<0.01	<0.01	0.03	<0.01	<0.01
Total Kjeldahl Nitrogen(as N)		0.2	0.3	0.2	0.2	0.3	1	0.5	<0.5	0.13	0.43	0.08	0.19	0.21
Phenols		nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	0.6	0.8	0.6	0.8	0.7	0.6	0.8	0.9	0.7	3.9	1.4	8.3	8.5
Conductivity (us/cm)		480	473	467	457	455	450	448	463	473	501	497	500	497
pH		8.2	8.2	8.2	8.2	8	8	8.1	8.21	7.97	8.00	8.10	7.99	7.96
Sulphate (as SO4)	250 (AO)	47	48	45	41	-	37	36	37	40	43	46	52	52
Hardness(as CaCO3)	80-100 [OG]	160	140	130	130	130	120	130	130	131	135	142	134	141
Aluminum	0.1 [OG]	nd	0.015	nd	nd	nd	nd	<0.005	<0.005	0.07	0.02	<0.01	0.02	0.02
Arsenic	0.010 (IMAC)	nd	nd	nd	0.001	nd	nd	<0.001	0.001	0.0014	0.0016	0.0018	0.0016	0.0014
Barium	1 [MAC]	0.04	0.038	0.039	0.035	0.037	0.035	0.035	0.036	0.036	0.030	0.039	0.036	0.038
Boron	5 [IMAC]	0.31	0.3	0.28	0.28	0.29	0.29	0.29	0.30	0.300	0.262	0.312	0.265	0.286
Cadmium	0.005 (MAC)	0.001	0.0017	0.0004	0.0017	0.0005	0.0003	0.0004	0.0002	0.00017	0.00009	0.0001	0.00014	0.00011
Calcium	-	31	28	26	27	26	25	26	27	27.0	27.8	29.0	27.6	28.9
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	nd	nd	nd	0.001	nd	0.001	0.002	<0.0005	0.003	<0.002	<0.002	<0.002	0.0006
Iron	0.3 [AO]	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.025	<0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00008	<0.00002	0.00003	<0.00002	<0.00002
Magnesium	-	19	16	16	16	15	14	15	15	15.6	15.9	16.8	15.9	16.7
Manganese	0.05 [AO]	nd	0.004	nd	nd	nd	0.007	<0.002	0.012	0.002	0.001	<0.001	0.002	<0.001
Potassium	-	1.2	1.1	0.97	1.1	1	1	1.1	0.97	1.0	0.9	1.0	1.0	0.9
Sodium	200 [AO]	59	53	51	51	52	49	53	52	52.8	57.5	55.3	52.7	56.1
Zinc	5 [AO]	nd	nd	nd	nd	nd	nd	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005

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

Chemical Parameter	ODWQS	OW7S Nov-13	OW7S Jul-14	OW7S Nov-14	OW7S May-15	OW7S Oct-15	OW7S Jun-16	OW7S Nov-16	OW7S Jun-17	OW7S Oct-17	OW7S May-18	OW7S Oct-18	OW7S Jun-19	OW7S Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	178	169	184	176	177	181	181	179	173	168	174	166	161
Chloride	250 [AO]	23.6	23.6	24.3	25.7	26.9	24.4	26.0	22.0	20.8	27.6	26.7	27.1	28.0
Nitrate(as N)	10 (MAC) d	0.1	<0.1	0.1	<0.25	<0.10	0.1	0.1	<0.05	0.1	0.09	<0.05	0.07	<0.05
Nitrite(as N)	1 (MAC) d	<0.1	<0.1	<0.1	<0.25	<0.10	<0.1	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05
Ammonia(as N)		<0.01	<0.01	0.05	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	0.09	0.12	0.12	0.01
Total Kjeldahl Nitrogen(as N)		0.13	0.07	0.1	<0.10	<0.10	0.13	0.05	0.2	0.07	0.3	0.2	0.2	0.4
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	3.8	1.8	4.1	1.5	1.3	0.4	1.5	2.0	3.5	2.1	3.2	5.6	2.4
Conductivity (us/cm)		448	497	487	510	528	520	546	529	517	507	536	508	541
pH		8.12	8.07	8.01	8.32	7.51	8.10	8.04	8.13	8.06	8.22	7.84	7.92	7.73
Sulphate (as SO4)	250 (AO)	54	51	52	50.6	58.0	54	60	45	42	54	54	50	49
Hardness(as CaCO3)	80-100 [OG]	133	150	125	139	145	153	140	156	149	152	151	144	145
Aluminum	0.1 [OG]	0.02	0.01	<0.01	<0.004	<0.004	<0.01	0.01	<0.01	0.03	0.02	0.03	0.02	0.03
Arsenic	0.010 (IMAC)	0.0021	0.0016	0.0013	<0.003	<0.003	0.0008	0.0008	0.00079	0.0009	<0.0001	0.0011	0.0005	0.0007
Barium	1 [MAC]	0.036	0.036	0.031	0.033	0.034	0.039	0.037	0.039	0.038	0.037	0.038	0.033	0.033
Boron	5 [IMAC]	0.267	0.308	0.235	0.249	0.280	0.280	0.263	0.306	0.308	0.274	0.290	0.286	0.249
Cadmium	0.005 (MAC)	0.00028	0.00008	0.00009	<0.001	<0.001	0.00009	0.00008	<0.0001	0.000069	0.000068	0.000047	0.000029	0.000053
Calcium	-	27.3	31.4	25.5	29.5	30.0	31.1	28.6	32.0	30.5	31.4	31.6	29.2	28.8
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Copper	1 [AO]	<0.002	0.0005	<0.002	<0.003	<0.003	<0.002	0.0006	<0.002	<0.002	<0.002	<0.002	0.0022	0.002
Iron	0.3 [AO]	<0.005	<0.005	<0.005	<0.010	<0.010	0.012	0.006	<0.005	0.008	0.012	0.011	0.016	<0.005
Lead	0.01 (MAC)c	<0.00002	<0.00002	<0.00002	<0.002	<0.002	<0.00002	<0.00002	<0.00005	<0.00002	<0.00002	0.00004	0.00010	<0.00002
Magnesium	-	15.7	17.4	14.9	15.9	17.0	18.3	16.7	18.5	17.7	17.8	17.4	17.3	17.8
Manganese	0.05 [AO]	0.004	0.006	0.002	<0.002	<0.002	<0.001	<0.001	0.002	0.001	<0.001	0.002	<0.001	0.001
Potassium	-	0.9	1.0	0.8	0.97	1.06	1.0	0.9	1.0	1.0	0.9	0.9	0.9	0.9
Sodium	200 [AO]	52.5	56.8	48.3	52.8	57.6	59.0	54.4	61.5	60.8	61.7	61.0	59.0	57.4
Zinc	5 [AO]	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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

Chemical Parameter	ODWQS	OW7S Jul-20	OW7S Nov-20	OW7S Jun-21	OW7S Nov-21	OW7S May-22	OW7S Nov-22	OW7S May-23	OW7S Sep-23
Alkalinity(as CaCO3)	30 - 500 [OG]	168	155	164	166	176	167	178	180
Chloride	250 [AO]	27.8	29.2	29.1	27.4	30.6	27.7	28.6	28.6
Nitrate(as N)	10 (MAC) d	0.13	<0.05	0.15	<0.05	0.3	<0.05	0.17	0.09
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05
Ammonia(as N)		0.02	0.01	0.07	0.02	0.17	0.15	0.15	0.10
Total Kjeldahl Nitrogen(as N)		<0.1	<0.1	0.2	0.1	<0.1	0.1	0.2	<0.1
Phenols		<0.002	<0.002	<0.002	<0.001	<0.001	0.003	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	3.6	2.5	3.4	1.7	16.5	1.7	1.0	4.2
Conductivity (us/cm)		507	512	505	506	508	512	510	517
pH		8.01	8.03	8.15	7.93	7.95	8.00	7.92	7.72
Sulphate (as SO4)	250 (AO)	50	51	48	46	47	46	46	46
Hardness(as CaCO3)	80-100 [OG]	145	146	158	144	144	140	141	133
Aluminum	0.1 [OG]	0.02	0.01	0.03	<0.01	<0.01	<0.01	0.02	0.02
Arsenic	0.010 (IMAC)	0.0006	0.0008	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
Barium	1 [MAC]	0.040	0.036	0.039	0.035	0.036	0.035	0.037	0.035
Boron	5 [IMAC]	0.292	0.298	0.324	0.306	0.303	0.300	0.302	0.252
Cadmium	0.005 (MAC)	0.000036	0.000052	0.000030	0.000037	0.000031	0.000043	0.000023	0.000029
Calcium	-	28.9	29.6	31.8	28.4	28.8	28.0	29.1	27.1
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Copper	1 [AO]	<0.002	0.0031	<0.002	<0.002	<0.002	0.0003	0.0012	0.0007
Iron	0.3 [AO]	<0.005	0.011	<0.005	0.005	<0.005	<0.005	<0.005	0.009
Lead	0.01 (MAC)c	0.00006	0.00006	0.00002	0.00003	0.00004	0.00050	0.00003	<0.00002
Magnesium	-	17.7	17.4	19.0	17.6	17.6	17.1	16.6	15.8
Manganese	0.05 [AO]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Potassium	-	1.1	1.0	1.1	1.1	1.1	1.1	1.0	0.8
Sodium	200 [AO]	57.7	56.2	64.3	56.8	58.6	56.1	59.0	54.8
Zinc	5 [AO]	<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	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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TABLE E-2
GROUNDWATER CHEMICAL DATA (2007-Present)
HURON LANDFILL SITE

Chemical Parameter	ODWQS	OW7D Jul-20	OW7D Nov-20	OW7D Jun-21	OW7D Nov-21	OW7D May-22	OW7D Nov-22	OW7D May-23	OW7D Sep-23
Alkalinity(as CaCO3)	30 - 500 [OG]	165	151	157	155	166	158	162	176
Chloride	250 [AO]	10.9	10.2	10.3	10.2	11.0	9.1	10.3	10.3
Nitrate(as N)	10 (MAC) d	0.34	0.31	0.29	0.21	0.4	0.25	0.26	0.25
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05
Ammonia(as N)		0.01	0.03	0.02	0.02	<0.01	<0.01	<0.01	<0.05
Total Kjeldahl Nitrogen(as N)		0.1	0.1	0.2	0.1	0.2	<0.1	<0.1	<0.1
Phenols		<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	2.3	3.4	1.6	1.7	2.0	0.7	1.7	2.8
Conductivity (us/cm)		465	473	468	471	458	456	456	460
pH		8.08	8.09	8.23	7.49	8.12	8.02	7.94	7.43
Sulphate (as SO4)	250 (AO)	60	61	60	57	54	54	55	55
Hardness(as CaCO3)	80-100 [OG]	89	91	96	88	84	83	83	78.6
Aluminum	0.1 [OG]	<0.01	0.02	0.03	<0.01	<0.01	<0.01	0.02	0.01
Arsenic	0.010 (IMAC)	0.0004	0.0004	0.0004	0.0004	0.0005	0.0004	0.0004	0.0005
Barium	1 [MAC]	0.042	0.039	0.042	0.038	0.037	0.038	0.039	0.037
Boron	5 [IMAC]	0.448	0.468	0.492	0.464	0.470	0.467	0.463	0.425
Cadmium	0.005 (MAC)	0.000108	0.000117	0.000080	0.000082	0.000153	0.000087	0.000123	0.000089
Calcium	-	20.1	21.2	22.1	19.7	18.7	18.4	19.2	17.9
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Copper	1 [AO]	<0.002	0.0006	0.002	<0.002	<0.002	0.0008	0.0006	0.0010
Iron	0.3 [AO]	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	0.00007	0.00002	0.00003	<0.00002	0.00003	0.00006	0.00002	<0.00002
Magnesium	-	9.5	9.36	9.95	9.50	9.01	8.92	8.47	8.23
Manganese	0.05 [AO]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001
Potassium	-	1.0	0.9	1.0	1.1	1.0	1.0	0.9	0.7
Sodium	200 [AO]	73.6	70.8	79.4	72.3	70.8	69.7	69.3	67.3
Zinc	5 [AO]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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

Chemical Parameter	ODWQS	OW8S Jul-07	OW8S Dec-07	OW8S Jul-08	OW8S Dec-08	OW8S Jul-09	OW8S Nov-09	OW8S Mar-10	OW8S Dec-10	OW8S Jun-11	OW8S Oct-11	OW8S Jun-12	OW8S Oct-12	OW8S Jun-13
Alkalinity(as CaCO3)	30 - 500 [OG]	244	238	233	246	233	230	231	226	231	233	233	237	234
Chloride	250 [AO]	10	9	9	9	9	10	13	12	12.3	13.1	16.4	17.1	20.1
Nitrate(as N)	10 (MAC) d	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.1	<0.1	0.1	<0.1	0.1
Nitrite(as N)	1 (MAC) d	nd	nd	nd	nd	nd	nd	0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia(as N)		0.07	0.1	nd	nd	0.06	0.06	<0.05	0.09	<0.01	<0.01	0.02	<0.01	0.01
Total Kjeldahl Nitrogen(as N)		0.2	0.3	0.2	nd	0.7	0.2	0.3	<0.5	0.59	0.31	0.08	0.13	0.10
Phenols		nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	0.8	0.6	0.5	0.7	0.5	0.6	0.6	0.8	0.6	1.1	1.3	1.7	3.5
Conductivity (us/cm)		667	654	637	668	634	634	634	634	646	685	678	662	666
pH		8.2	8.2	8.2	8.1	8	8	8.1	8.07	7.86	7.95	8.20	8.04	7.99
Sulphate (as SO4)	250 (AO)	102	97	100	101	-	88	89	83	100	106	106	109	104
Hardness(as CaCO3)	80-100 [OG]	240	220	230	220	220	210	200	210	220	234	243	228	228
Aluminum	0.1 [OG]	nd	nd	nd	nd	nd	nd	<0.005	<0.005	0.04	0.03	0.02	0.02	0.02
Arsenic	0.010 (IMAC)	0.001	0.002	0.002	0.001	nd	0.002	<0.001	0.003	0.0015	0.0016	0.0015	0.0022	0.0017
Barium	1 [MAC]	0.048	0.046	0.049	0.044	0.044	0.044	0.048	0.045	0.047	0.043	0.052	0.049	0.049
Boron	5 [IMAC]	0.4	0.41	0.41	0.4	0.39	0.4	0.39	0.42	0.416	0.388	0.436	0.384	0.396
Cadmium	0.005 (MAC)	0..0006	0.0001	0.0004	0.0003	0.0004	0.0002	0.0002	<0.0001	0.00011	0.00013	0.00013	0.00009	0.00008
Calcium	-	42	38	38	37	37	36	35	37	37.7	40.4	41.8	39.5	39.1
Chromium	0.05 (MAC)	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1 [AO]	nd	nd	0.001	0.001	nd	0.001	0.002	<0.0005	0.008	<0.002	<0.002	<0.002	0.0010
Iron	0.3 [AO]	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.014	<0.005	0.007	<0.005	<0.005
Lead	0.01 (MAC)c	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00007	<0.00002	0.00003	<0.00002	<0.00002
Magnesium	-	34	30	32	30	31	29	28	29	30.7	32.5	33.7	31.4	31.5
Manganese	0.05 [AO]	0.004	0.035	nd	nd	0.004	0.027	<0.002	0.022	0.002	0.009	0.007	0.011	0.004
Potassium	-	1.6	1.5	3.2	1.5	1.6	1.5	1.4	1.4	1.4	1.5	1.6	1.5	1.3
Sodium	200 [AO]	64	57	65	60	61	57	58	59	60.5	62.7	63.1	59.2	62.6
Zinc	5 [AO]	nd	nd	3.2	nd	0.007	nd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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

Chemical Parameter	ODWQS	OW8S Nov-13	OW8S Jul-14	OW8S Nov-14	OW8S May-15	OW8S Oct-15	OW8S Jun-16	OW8S Nov-16	OW8S Jun-17	OW8S Oct-17	OW8S May-18	OW8S Oct-18	OW8S Jun-19	OW8S Nov-19
Alkalinity(as CaCO3)	30 - 500 [OG]	235	220	236	223	228	256	232	225	149	215	222	235	206
Chloride	250 [AO]	21.3	22.9	25.0	28.2	29.4	30.3	30.5	29.0	5.7	40.1	40.7	43.6	46.4
Nitrate(as N)	10 (MAC) d	<0.1	<0.1	0.1	<0.25	<0.10	0.1	<0.1	<0.05	0.2	<0.05	<0.05	<0.05	<0.05
Nitrite(as N)	1 (MAC) d	<0.1	<0.1	<0.1	<0.25	<0.10	<0.1	<0.1	<0.05	0.1	<0.05	<0.05	<0.05	<0.05
Ammonia(as N)		0.01	0.02	0.04	0.02	<0.02	<0.01	<0.01	<0.01	<0.01	0.04	0.03	0.05	0.02
Total Kjeldahl Nitrogen(as N)		0.06	0.11	<0.1	<0.10	<0.10	<0.05	0.11	<0.1	0.25	0.2	0.2	0.2	0.1
Phenols		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002
Dissolved Organic Carbon(DOC)	5 [AO]	4.8	1.9	2.3	1.5	0.9	<0.2	1.4	0.9	2.2	1.0	1.3	4.3	2.2
Conductivity (us/cm)		590	664	667	689	701	709	714	719	689	710	740	717	729
pH		8.06	8.08	8.03	8.34	8.07	8.16	8.10	8.15	8.20	8.17	8.00	8.14	8.04
Sulphate (as SO4)	250 (AO)	103	101	104	97.3	103	103	108	86	164	100	99	97	94
Hardness(as CaCO3)	80-100 [OG]	215	239	197	228	234	245	229	259	180	253	246	244	242
Aluminum	0.1 [OG]	0.02	0.01	0.01	<0.004	<0.004	0.01	0.01	0.01	0.04	0.03	0.03	0.03	0.04
Arsenic	0.010 (IMAC)	0.0022	0.0017	0.0013	<0.003	<0.003	0.0007	0.0010	0.00076	0.0003	<0.0001	0.0014	0.0008	0.0012
Barium	1 [MAC]	0.048	0.048	0.042	0.048	0.048	0.051	0.049	0.054	0.028	0.052	0.053	0.047	0.049
Boron	5 [IMAC]	0.387	0.423	0.333	0.395	0.381	0.388	0.379	0.427	0.523	0.387	0.399	0.393	0.360
Cadmium	0.005 (MAC)	0.00003	0.00006	0.00003	<0.001	<0.001	0.00008	0.00004	<0.0001	0.000113	0.000052	0.000025	0.000025	0.000034
Calcium	-	37.3	42.3	33.9	40.8	41.5	42.2	39.1	44.7	38.6	44.3	42.9	41.5	39.9
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002
Copper	1 [AO]	<0.002	0.0006	<0.002	<0.003	<0.003	<0.002	0.0005	<0.002	<0.002	<0.002	0.002	0.0020	<0.002
Iron	0.3 [AO]	<0.005	<0.005	<0.005	<0.010	<0.010	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	<0.00002	<0.00002	<0.00002	<0.002	<0.002	<0.00002	<0.00002	0.00006	<0.00002	<0.00002	<0.00002	0.00018	0.00003
Magnesium	-	29.6	32.3	27.4	30.6	31.7	33.9	31.9	35.9	20.4	34.7	33.7	34.1	34.6
Manganese	0.05 [AO]	0.014	0.013	0.003	<0.002	0.012	<0.001	0.005	<0.001	0.004	<0.001	0.002	<0.001	0.002
Potassium	-	1.3	1.4	1.2	1.44	1.47	1.4	1.3	1.4	1.3	1.4	1.4	1.3	1.3
Sodium	200 [AO]	57.2	63.4	52.2	60.2	64.1	64.7	61.3	69.3	87.5	69.5	69.0	65.9	64.0
Zinc	5 [AO]	<0.005	<0.005	<0.005	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

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

Chemical Parameter	ODWQS	OW8S Jul-20	OW8S Nov-20	OW8S Jun-21	OW8S Nov-21	OW8S May-22	OW8S Nov-22	OW8S May-23	OW8S Sep-23
Alkalinity(as CaCO3)	30 - 500 [OG]	216	199	214	212	222	210	218	230
Chloride	250 [AO]	47.5	49.7	54.7	50.3	57.8	55.0	58.3	58.2
Nitrate(as N)	10 (MAC) d	0.10	<0.05	0.12	<0.05	0.2	<0.05	0.10	0.05
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05
Ammonia(as N)		0.03	0.02	0.02	0.03	<0.01	<0.01	<0.01	<0.05
Total Kjeldahl Nitrogen(as N)		0.1	0.1	0.2	0.2	0.1	0.1	<0.1	<0.1
Phenols		<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	1.2	0.7	1.8	1.0	0.7	<0.2	<0.2	1.9
Conductivity (us/cm)		726	737	745	745	743	749	765	757
pH		8.07	8.06	8.17	7.90	8.11	8.01	8.06	7.67
Sulphate (as SO4)	250 (AO)	98	99	99	93	93	96	95	94
Hardness(as CaCO3)	80-100 [OG]	252	258	278	257	255	247	252	245
Aluminum	0.1 [OG]	0.02	0.03	0.04	<0.01	0.02	0.03	0.04	0.03
Arsenic	0.010 (IMAC)	0.0007	0.0010	0.0007	0.0011	0.0008	0.0009	0.0007	0.0009
Barium	1 [MAC]	0.053	0.053	0.056	0.052	0.053	0.054	0.053	0.052
Boron	5 [IMAC]	0.401	0.429	0.455	0.431	0.424	0.416	0.426	0.392
Cadmium	0.005 (MAC)	0.000030	0.000023	0.000026	0.000028	0.000025	0.000029	0.000023	0.000023
Calcium	-	41.8	44.7	47.5	42.3	42.4	41.0	43.8	42.0
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Copper	1 [AO]	<0.002	0.0021	<0.002	<0.002	0.01	0.0010	0.0004	0.0009
Iron	0.3 [AO]	0.005	0.006	<0.005	<0.005	0.008	0.013	<0.005	<0.005
Lead	0.01 (MAC)c	0.00004	0.00008	0.00002	0.00003	0.00081	0.00005	<0.00002	<0.00002
Magnesium	-	35.8	35.5	38.7	36.9	36.1	35.2	34.6	34.0
Manganese	0.05 [AO]	<0.001	0.001	<0.001	0.009	<0.001	0.003	<0.001	<0.001
Potassium	-	1.6	1.5	1.6	1.7	1.5	1.6	1.5	1.3
Sodium	200 [AO]	66.8	65.2	73.8	67.2	67.1	64.9	67.0	64.3
Zinc	5 [AO]	<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	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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TABLE E-2
GROUNDWATER CHEMICAL DATA (2007-Present)
HURON LANDFILL SITE

Chemical Parameter	ODWQS	OW8D Jul-20	OW8D Nov-20	OW8D Jun-21	OW8D Nov-21	OW8D May-22	OW8D Nov-22	OW8D May-23	OW8D Sep-23
Alkalinity(as CaCO3)	30 - 500 [OG]	152	140	149	148	154	145	150	165
Chloride	250 [AO]	8.6	7.9	8.0	8.0	8.5	7.3	8.5	8.6
Nitrate(as N)	10 (MAC) d	0.28	0.24	0.36	0.14	0.3	0.16	0.18	0.16
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05
Ammonia(as N)		0.01	0.01	<0.01	0.11	<0.01	<0.01	<0.01	<0.05
Total Kjeldahl Nitrogen(as N)		0.1	0.1	<0.1	0.2	0.2	<0.1	<0.1	<0.1
Phenols		<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	4	0.9	1.6	1.0	1.9	0.8	0.8	2.6
Conductivity (us/cm)		700	703	703	709	683	684	695	684
pH		8.09	8.07	8.16	7.88	8.03	8.02	8.00	7.40
Sulphate (as SO4)	250 (AO)	194	192	200	191	182	188	189	187
Hardness(as CaCO3)	80-100 [OG]	187	187	213	185	176	173	173	165
Aluminum	0.1 [OG]	0.02	0.02	0.04	<0.01	<0.01	<0.01	0.03	0.02
Arsenic	0.010 (IMAC)	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003
Barium	1 [MAC]	0.030	0.028	0.033	0.027	0.026	0.028	0.028	0.027
Boron	5 [IMAC]	0.515	0.522	0.562	0.526	0.527	0.52	0.530	0.487
Cadmium	0.005 (MAC)	0.000136	0.00010	0.000214	0.000164	0.000318	0.000179	0.000174	0.000106
Calcium	-	39.7	41.1	47.3	38.7	37.4	36.7	37.8	35.9
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Copper	1 [AO]	<0.002	0.0025	0.006	<0.002	<0.002	0.0012	0.0005	0.0020
Iron	0.3 [AO]	<0.005	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	<0.00002	0.00005	0.00005	<0.00002	0.00003	0.00003	<0.00002	0.00010
Magnesium	-	21.3	20.6	23.1	21.5	20.2	19.8	19.1	18.3
Manganese	0.05 [AO]	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Potassium	-	1.5	1.3	1.4	1.5	1.4	1.4	1.3	1.1
Sodium	200 [AO]	85.2	82.3	91.1	84.4	81.0	79.5	83.0	78.3
Zinc	5 [AO]	<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-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	OW9 Jun-21	OW9 Nov-21	OW9 May-22	OW9 Nov-22	OW9 May-23	OW9 Sep-23
Alkalinity(as CaCO3)	30 - 500 [OG]	101	90	98	100	102	99	107	107
Chloride	250 [AO]	2.2	2.4	2.5	1.9	1.7	2.0	3.0	2.8
Nitrate(as N)	10 (MAC) d	0.27	0.09	0.17	0.12	0.3	0.09	0.12	0.10
Nitrite(as N)	1 (MAC) d	<0.05	0.07	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05
Ammonia(as N)		0.10	0.05	0.01	0.06	0.05	0.05	<0.01	<0.05
Total Kjeldahl Nitrogen(as N)		0.3	0.2	0.1	0.4	0.2	0.1	<0.1	<0.1
Phenols		<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	1.7	1.1	1.5	1.3	2.3	1.0	1.5	2.3
Conductivity (us/cm)		674	677	678	689	675	676	686	679
pH		8.05	8.05	8.13	7.59	7.98	7.91	7.59	7.08
Sulphate (as SO4)	250 (AO)	234	228	246	240	229	233	243	255
Hardness(as CaCO3)	80-100 [OG]	174	171	189	174	161	166	167	162
Aluminum	0.1 [OG]	0.01	0.02	0.03	<0.01	<0.01	<0.01	0.03	0.02
Arsenic	0.010 (IMAC)	0.0037	0.0046	0.0032	0.0036	0.0071	0.0038	0.0039	0.0036
Barium	1 [MAC]	0.025	0.022	0.024	0.023	0.023	0.022	0.023	0.022
Boron	5 [IMAC]	0.486	0.486	0.523	0.492	0.490	0.489	0.504	0.469
Cadmium	0.005 (MAC)	0.000063	0.000080	0.000069	0.000090	0.000081	0.000067	0.000051	0.000048
Calcium	-	37.2	37.1	41.3	36.8	33.9	35.1	36.5	35.2
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Copper	1 [AO]	<0.002	0.0008	0.008	<0.002	<0.002	0.0008	0.0033	0.0005
Iron	0.3 [AO]	<0.005	0.010	0.006	0.016	<0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	<0.00002	0.00003	0.00007	<0.00002	0.00007	0.00002	0.00002	<0.00002
Magnesium	-	19.8	19.0	20.8	20.0	18.6	19.0	18.5	17.9
Manganese	0.05 [AO]	0.014	0.012	0.002	0.009	0.005	0.013	0.002	0.003
Potassium	-	1.3	1.1	1.2	1.3	1.1	1.2	1.2	0.9
Sodium	200 [AO]	78.2	74.7	83.3	78.2	73.3	75.1	77.3	73.4
Zinc	5 [AO]	<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	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	OW10S Jun-21	OW10S Nov-21	OW10S May-22	OW10S Nov-22	OW10S May-23	OW10S Sep-23
Alkalinity(as CaCO3)	30 - 500 [OG]	238	245	237	244	250	253	257	258	276
Chloride	250 [AO]	<0.5	1.2	1.8	1.9	1.0	1.0	1.4	2.4	2.2
Nitrate(as N)	10 (MAC) d	0.11	0.30	0.26	0.32	0.12	0.5	0.22	0.25	0.18
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05
Ammonia(as N)		0.01	0.07	0.02	0.03	0.04	<0.01	<0.01	0.03	<0.05
Total Kjeldahl Nitrogen(as N)		0.1	<0.1	<0.1	0.4	1.5	0.2	0.2	0.5	0.2
Phenols		<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	3.2	1.3	1.6	1.8	1.2	3.0	0.7	1.4	2.1
Conductivity (us/cm)		821	785	824	804	806	780	813	810	805
pH		8.01	8.01	7.93	8.12	7.74	8.08	7.92	8.04	7.71
Sulphate (as SO4)	250 (AO)	195	192	197	198	184	178	189	188	183
Hardness(as CaCO3)	80-100 [OG]	375	368	385	417	385	355	370	369	350
Aluminum	0.1 [OG]	0.06	0.04	0.05	0.06	0.03	0.05	0.03	0.06	0.03
Arsenic	0.010 (IMAC)	0.0002	0.0003	0.0002	0.0002	0.0002	0.0004	0.0003	0.0002	0.0002
Barium	1 [MAC]	0.025	0.028	0.028	0.030	0.028	0.024	0.030	0.027	0.027
Boron	5 [IMAC]	0.316	0.333	0.379	0.341	0.39	0.341	0.379	0.326	0.364
Cadmium	0.005 (MAC)	<0.000015	0.000017	0.000020	<0.000015	0.000016	0.000024	0.000016	<0.000015	<0.000015
Calcium	-	73.6	71.8	78.9	85.1	76.0	69.4	73.3	75.6	71.1
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Copper	1 [AO]	0.002	<0.002	0.0009	0.011	<0.002	<0.002	0.0006	0.0008	0.0005
Iron	0.3 [AO]	<0.005	0.014	0.010	0.008	0.007	0.045	0.019	<0.005	<0.005
Lead	0.01 (MAC)c	<0.00002	0.00003	0.00004	0.00009	0.00005	0.00011	0.00003	<0.00002	<0.00002
Magnesium	-	46.5	45.8	45.6	49.7	47.4	44.3	45.5	43.8	41.9
Manganese	0.05 [AO]	<0.001	<0.001	0.001	<0.001	<0.001	0.002	0.001	<0.001	<0.001
Potassium	-	1.8	1.8	1.9	1.9	2.2	1.7	2.0	1.8	1.6
Sodium	200 [AO]	40.1	41.6	40.1	44.3	41.7	40.3	40.2	40.7	39.1
Zinc	5 [AO]	<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-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

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

Chemical Parameter	ODWQS	OW10D Jul-20	OW10D Nov-20	OW10D Jun-21	OW10D Nov-21	OW10D May-22	OW10D Nov-22	OW10D May-23	OW10D Sep-23
Alkalinity(as CaCO3)	30 - 500 [OG]	200	165	183	231	201	185	218	193
Chloride	250 [AO]	6.2	3.6	4.4	10.1	5.1	3.6	7.6	3.6
Nitrate(as N)	10 (MAC) d	0.78	<0.05	0.17	2.59	0.4	0.21	1.19	<0.05
Nitrite(as N)	1 (MAC) d	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05
Ammonia(as N)		0.03	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.05
Total Kjeldahl Nitrogen(as N)		<0.1	<0.1	0.2	0.2	0.1	<0.1	<0.1	<0.1
Phenols		<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	1.5	1.4	3.1	1.3	1.3	0.4	0.6	2.8
Conductivity (us/cm)		566	551	559	621	566	561	599	557
pH		8.01	8.08	8.10	8.06	8.06	7.98	8.06	7.55
Sulphate (as SO4)	250 (AO)	91	108	103	70	94	104	89	108
Hardness(as CaCO3)	80-100 [OG]	231	207	244	278	223	212	250	195
Aluminum	0.1 [OG]	0.01	0.03	0.03	0.02	0.01	0.01	0.03	0.03
Arsenic	0.010 (IMAC)	0.0003	0.0005	0.0004	0.0003	0.0004	0.0004	0.0004	0.0004
Barium	1 [MAC]	0.115	0.097	0.113	0.125	0.104	0.100	0.116	0.095
Boron	5 [IMAC]	0.135	0.181	0.177	0.079	0.152	0.175	0.117	0.162
Cadmium	0.005 (MAC)	<0.000015	0.000018	0.000066	0.000015	<0.000015	<0.000015	<0.000015	0.000015
Calcium	-	51.0	44.0	53.8	64.3	48.4	44.3	57.4	41.2
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
Copper	1 [AO]	<0.002	0.0006	<0.002	<0.002	<0.002	0.0006	0.0010	0.0006
Iron	0.3 [AO]	<0.005	0.007	<0.005	<0.005	0.005	<0.005	<0.005	<0.005
Lead	0.01 (MAC)c	<0.00002	0.00003	<0.00002	0.00003	0.00005	0.00003	<0.00002	<0.00002
Magnesium	-	25.2	23.6	26.6	28.6	24.7	24.7	25.8	22.4
Manganese	0.05 [AO]	0.019	0.015	0.029	0.018	0.015	0.020	0.019	0.019
Potassium	-	1.4	1.1	1.3	1.5	1.4	1.3	1.4	1.0
Sodium	200 [AO]	22.2	27.5	28.7	14.4	24.0	26.0	19.4	26.8
Zinc	5 [AO]	<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	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	OW11 Jun-21	OW11 Nov-21	OW11 May-22	OW11 Nov-22	OW11 May-23	OW11 Sep-23
Alkalinity(as CaCO3)	30 - 500 [OG]	991	858	859	917	916	894	876	869
Chloride	250 [AO]	260	287	308	306	306	300	275	273
Nitrate(as N)	10 (MAC) d	0.07	<0.05	0.21	<0.05	<1	<0.5	<0.05	<0.05
Nitrite(as N)	1 (MAC) d	0.16	<0.05	<0.05	<0.05	<1	<0.5	<0.05	<0.05
Ammonia(as N)		56.4	30.9	44.8	32.9	49.2	40.0	35.3	28.5
Total Kjeldahl Nitrogen(as N)		66.1	39.7	43.3	47.8	53.6	45.9	36.5	36.0
Phenols		0.003	<0.002	0.002	0.002	0.002	<0.001	<0.001	<0.001
Dissolved Organic Carbon(DOC)	5 [AO]	14.9	14.6	11.1	7.6	8.2	5.1	1.8	8.4
Conductivity (us/cm)		2490	2450	2450	2480	2430	2420	2460	2300
pH		7.25	7.27	7.55	7.52	7.45	7.31	7.54	7.37
Sulphate (as SO4)	250 (AO)	2	2	3	2	<10	<10	5	11
Hardness(as CaCO3)	80-100 [OG]	988	965	962	999	928	942	943	914
Aluminum	0.1 [OG]	0.22	0.09	0.11	0.06	0.06	0.05	0.09	0.09
Arsenic	0.010 (IMAC)	0.0110	0.0050	0.0010	0.0034	0.0027	0.0023	0.0024	0.0018
Barium	1 [MAC]	0.233	0.287	0.247	0.338	0.244	0.257	0.266	0.257
Boron	5 [IMAC]	0.729	0.565	0.559	0.551	0.554	0.505	0.516	0.419
Cadmium	0.005 (MAC)	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070	<0.000015
Calcium	-	177	179	176	177	165	174	175	175
Chromium	0.05 (MAC)	<0.002	<0.002	<0.002	<0.002	<0.002	0.001	<0.001	<0.001
Copper	1 [AO]	<0.002	0.0019	<0.002	<0.002	<0.002	0.0007	0.0006	0.0010
Iron	0.3 [AO]	35.3	0.036	12.9	11.6	14.6	12.0	11.2	8.12
Lead	0.01 (MAC)c	0.00081	0.00380	<0.0001	<0.0001	0.00023	<0.0001	<0.0001	<0.00004
Magnesium	-	133	126	127	135	125	123	123	116
Manganese	0.05 [AO]	0.24	0.182	0.260	0.195	0.226	0.241	0.234	0.229
Potassium	-	42.7	28.1	29.3	27.2	30.1	27.0	26.9	21.7
Sodium	200 [AO]	111	111	117	113	111	106	121	96.3
Zinc	5 [AO]	0.007	0.016	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

NOTES:
1. All results expresses in mg/L unless otherwise noted.
2. ODWQS is the Ontario Drinking Water Quality Standards, MOE, revised 2006.
3. MAC maximum acceptable concentration ODWQS.
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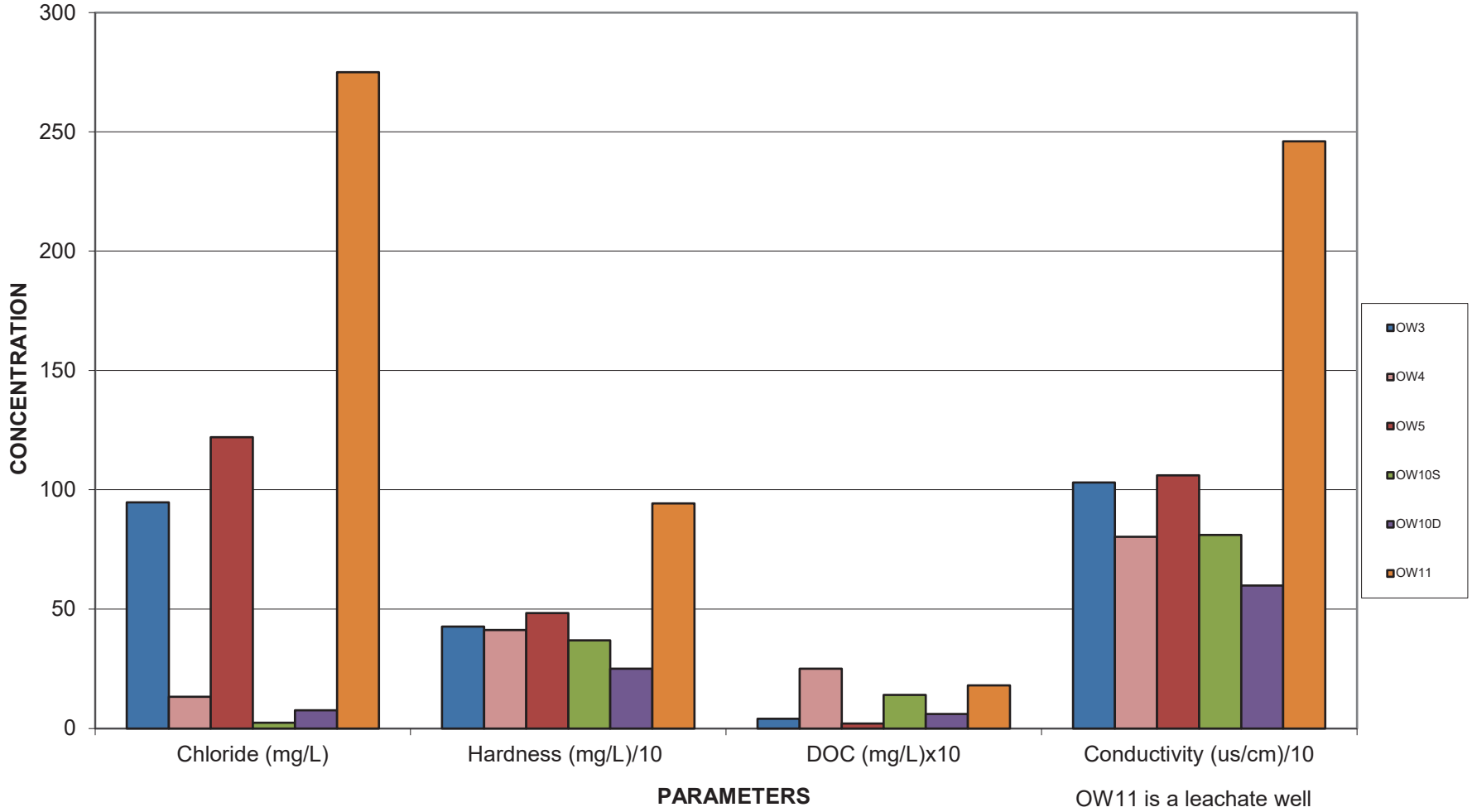
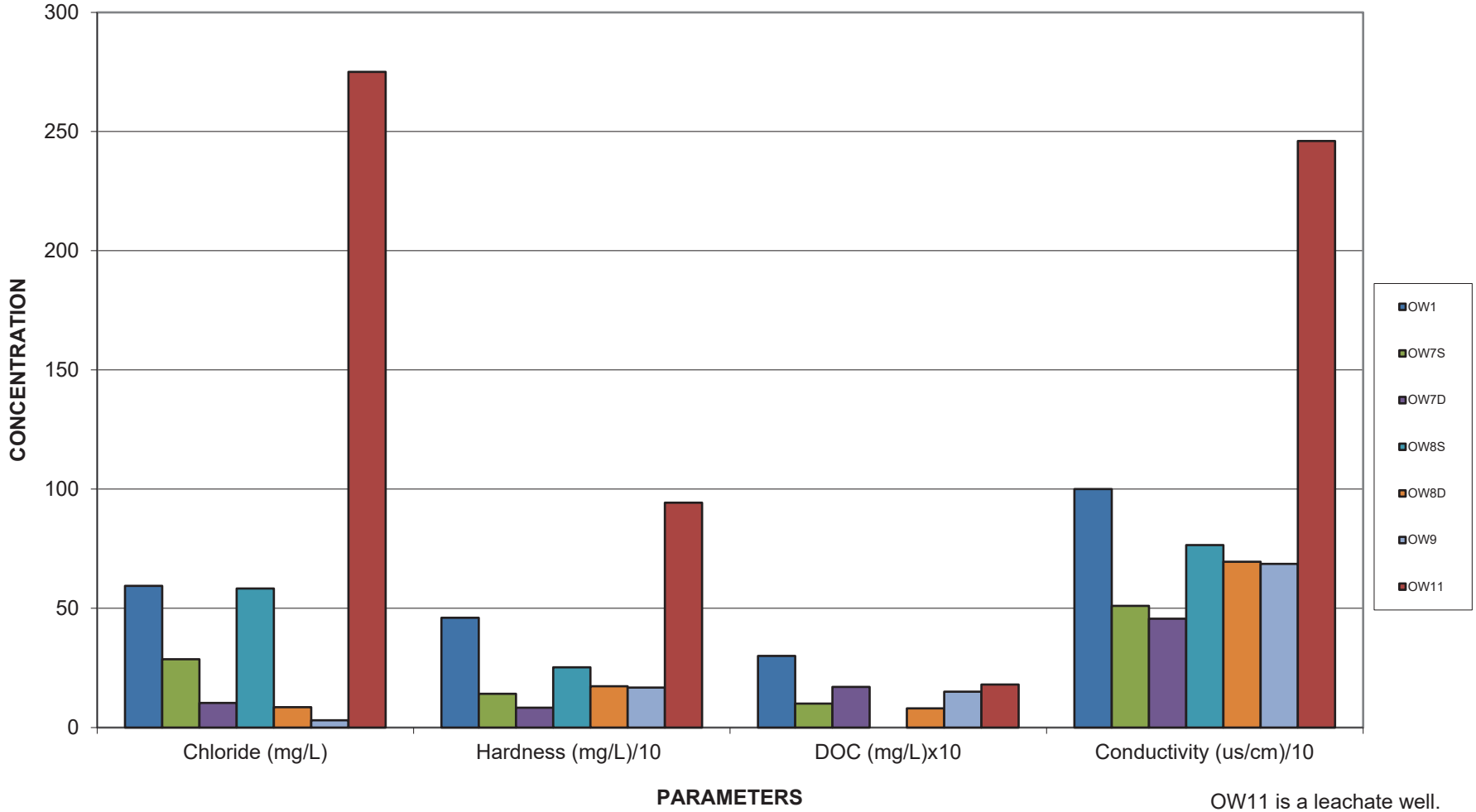
11. S.E. indicates a sampling error.
12. nd indicates parameter not detected.

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



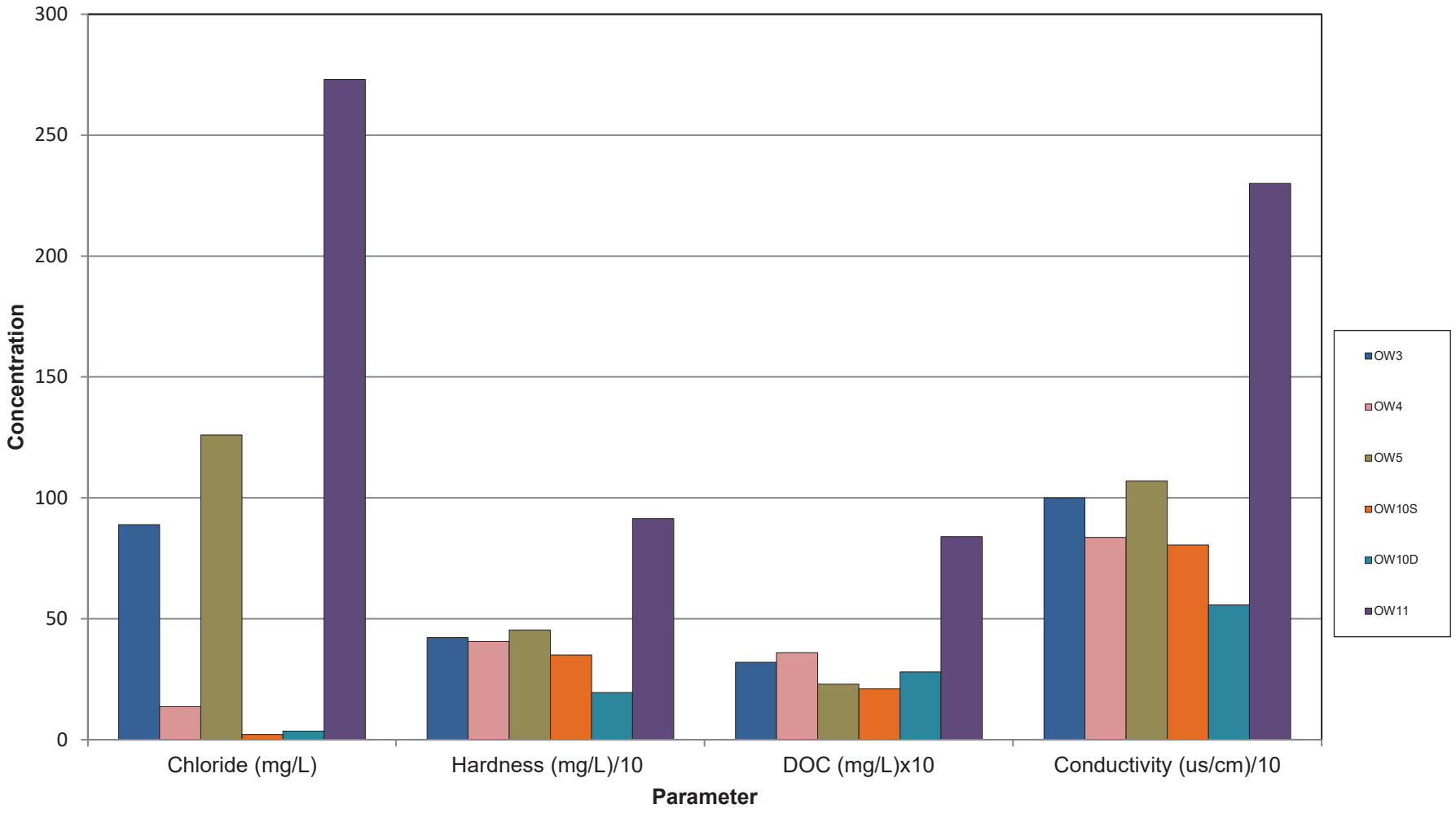
OW11 is a leachate well

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



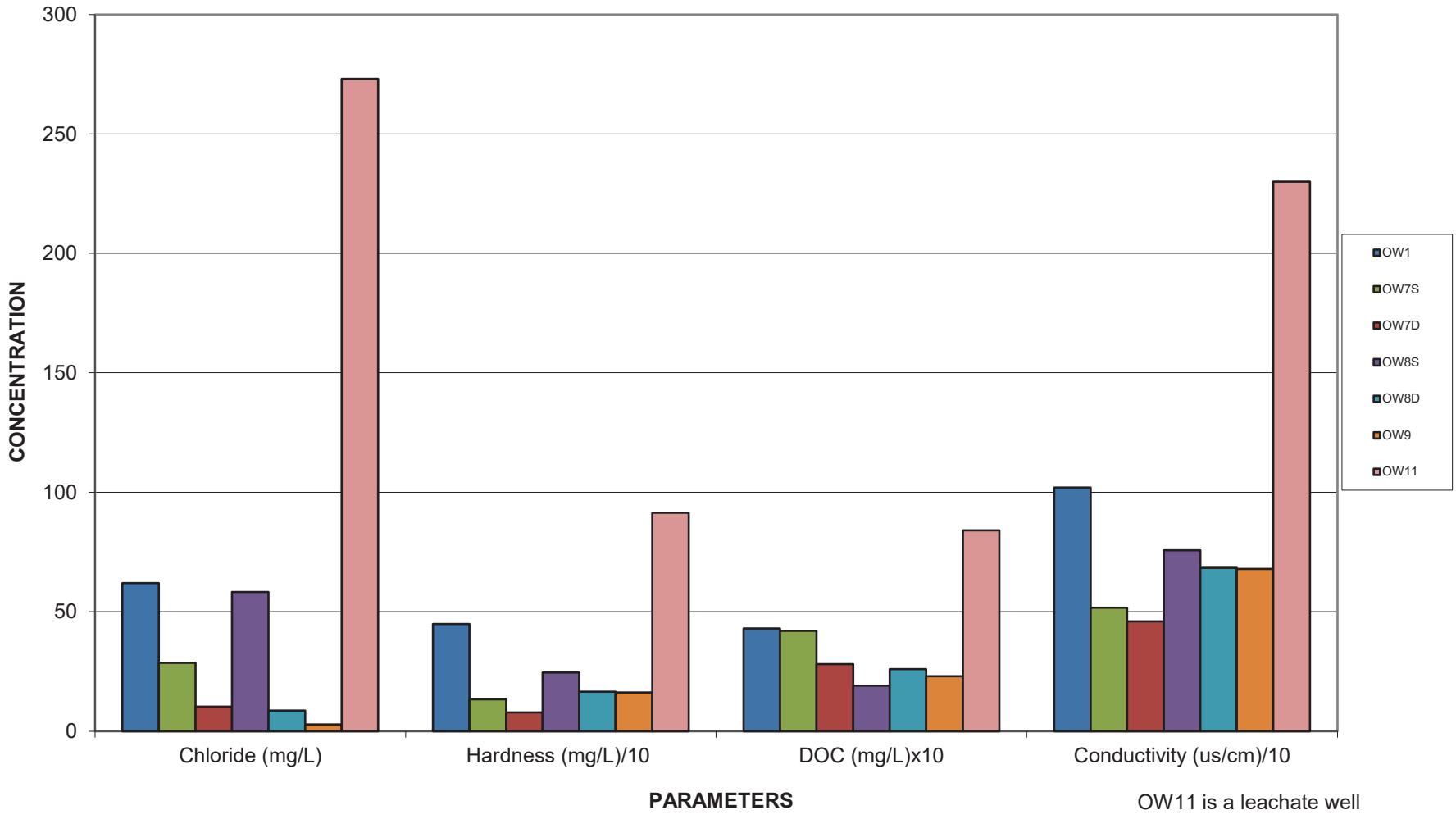
OW11 is a leachate well.

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



OW11 is a leachate well.

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



OW11 is a leachate well

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

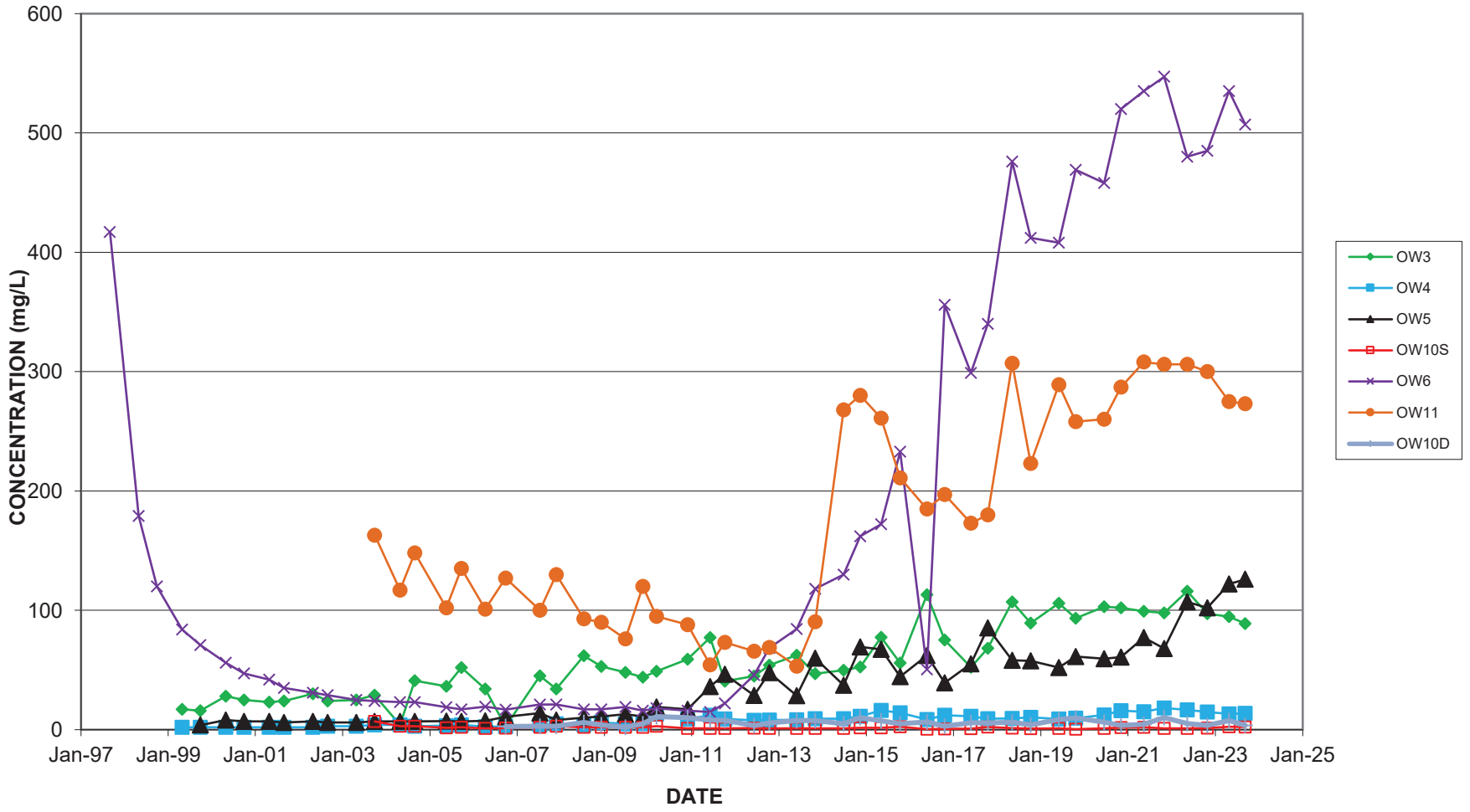
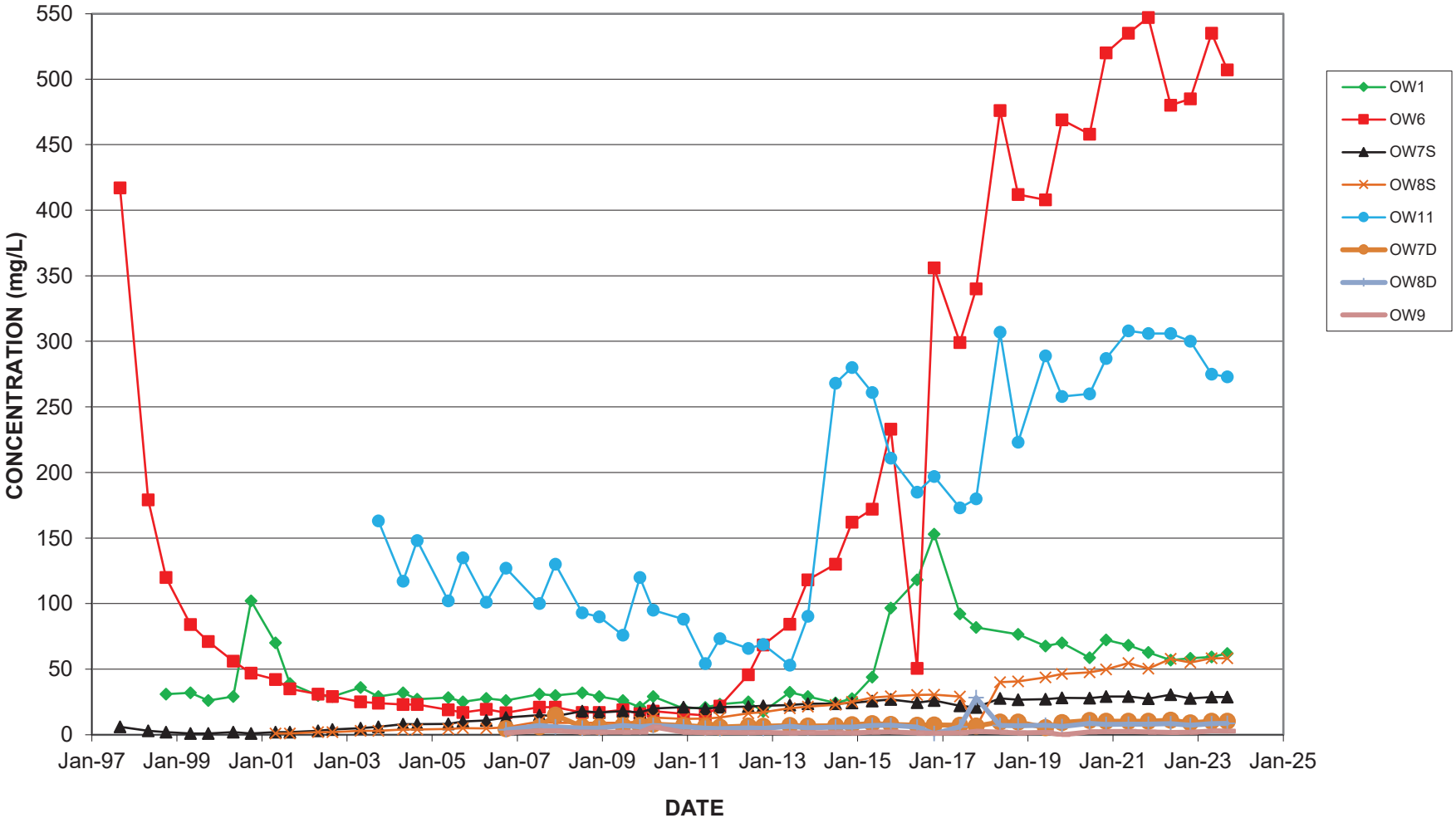


FIGURE E-6
CHLORIDE VS TIME - DOWNGRADIENT WELLS
HURON LANDFILL



APPENDIX F

Surface Water Chemical Results

GROUNDWATER SAMPLING
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL # SW-1

	OCT 98	MAY 99	MAY 00	OCT 00		
pH	8.39	8.29	7.84	8.31		
conductivity	401	425.	423	573		
chloride	8.	14.	10	9		
hardness	205.	239.	249	346		
D.O.C.	3.7	4.6	5.3	4.3		
phenols	<1	<1	<1	<1		
colour	17	16.	16	14		
alkalinity	166	205.	203	302		
iron	0.62	0.21	0.81	0.42		
potassium	4.33	1.85	1.99	2.57		
magnesium	23.3	21.8	24.2	28.2		
calcium	43.6	59.6	59.8	91.9		
sodium	5.75	10.0	5.98	5.14		
sulphate	20.	20.	13	17		
nitrite	<0.02	0.03	0.04	<0.02		
ammonia	<0.05	<0.05	<0.05	<0.05		
TKN(nitrogen)	-	-	-	-		
nitrate	<0.1	1.51	1.64	3.91		
Nickel	<0.05	<0.05	<0.05	<0.05		
Arsenic	-	-	-	-		
Cadmium	<0.002	<0.002	<0.0001	<0.0001		
Chromium	<0.02	<0.02	<0.01	<0.01		
Copper	<0.01	<0.01	0.002	0.002		
Mercury	-	-	-	-		
Manganese	-	-	-	-		
Boron	0.30	0.13	<0.02	0.03		
Lead	<0.03	<0.03	<0.0005	<0.0005		
Selenium	-	-	-	-		
Zinc	<0.01	<0.01	<0.01	0.03		
Cyanide	-	-	-	-		

GROUNDWATER SAMPLING
HURON TOWNSHIP LANDFILL SITE (W99609)

OBSERVATION WELL # SW-2

	OCT 98	MAY 99	MAY 00	OCT 00		
pH	8.3	8.14	8.03	8.33		
conductivity	314.	421.	425	597		
chloride	6.	13.	8	9		
hardness	169.	249.	247	356		
D.O.C.	6.7	4.4	4.4	4.9		
phenols	2.	<1	<1	1		
colour	25.	18.	16	53		
alkalinity	139.	200.	204	297		
iron	1.03	0.14	0.52	0.85		
potassium	4.63	2.04	1.84	2.63		
magnesium	18.8	22.4	24.3	28.8		
calcium	36.5	62.6	58.8	94.9		
sodium	3.92	9.71	4.86	5.37		
sulphate	9.	22.	13	18		
nitrite	<0.02	0.03	0.05	<0.02		
ammonia	0.05	<0.05	<0.05	<0.05		
TKN(nitrogen)	-	-	-	-		
nitrate	<0.1	1.31	1.73	3.78		
Nickel	<0.05	<0.05	<0.05	<0.05		
Arsenic	-	-	-	-		
Cadmium	0.002	0.007	0.00040	0.00210		
Chromium	<0.02	<0.02	<0.01	<0.01		
Copper	<0.01	<0.01	0.003	0.002		
Mercury	-	-	-	-		
Manganese	-	-	-	-		
Boron	0.19	0.10	<0.02	0.03		
Lead	<0.03	<0.03	0.0006	<0.0005		
Selenium	-	-	-	-		
Zinc	0.02	0.10	0.01	0.03		
Cyanide	-	-	-	-		