2020 Groundwater Monitoring Report

Warsaw Road Landfill Site
(PC of A A340902)
Township of Douro-Dummer
County of Peterborough

GHD | 347 Pido Road Unit 29 Peterborough Ontario K9J 6X7 Canada

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Enclosures

1. Introduction

The following report presents the results of the 2020 groundwater monitoring program completed for the Warsaw Road Landfill Site in the Township of Douro-Dummer (formerly Township of Douro), County of Peterborough. The monitoring program was conducted in accordance with the scope of work as presented by our proposal dated January 15, 2009 as well as additional requirements outlined in the Ministry of the Environment, Conservation and Parks (MECP) review of AECOM Canada Ltd. Warsaw Road Landfill Site "2008 Annual Monitoring Report" and subsequent Memorandum dated January 16, 2012.

2. Background

The Warsaw Road Landfill Site is situated along the south side of County Road No. 4, 6 km southwest of the community of Warsaw. The Geologic Plan, Plate 1, illustrates the location of the landfill with respect to surrounding roads and watercourses. The property is described as a 2.0 hectare (ha) refuse footprint situated within a 2.43 ha property in Part of Lot 8, Concession 5 in the Township of Douro-Dummer.

Details regarding the operation of the landfill are outlined in the Provisional Certificate of Approval (PC of A) No. A 340902 dated September 17, 1978, an amendment to the PC of A for continued operation was issued on September 30, 1994. A second PC of A was issued on June 22, 1996 for the final closure of the site. A C of A was issued by the MOE on June 13, 2004 for a passive landfill gas venting system at the Warsaw Road Landfill Site. Copies of the PC of A's are presented in Appendix A along with the aforementioned MECP Memorandum.

Background data pertaining to the site was from the AECOM Canada Ltd. (AECOM) 2008 report obtained late in 2009.

Reference is made to the following background documents associated with the Warsaw Road Landfill Site:

1. Current PC's of A issued by the MECP (Appendix A);
2. Excerpts from a report prepared by Hydroterra Limited regarding details of the monitoring well construction and borehole records (Appendix B);
3. MECP well record abandonment for monitors TW-3-1, TW-4-1 and TW-8-1 (Appendix B);
4. Monitoring program and sampling protocol established for the landfill site by the former Township of Douro (Appendix C); and
5. Reports prepared by AECOM dated 2007 and 2008 and Geo-Logic from 2009 to the present related to past monitoring programs.

3. Site Conditions

3.1 General Geology

The site is situated in an area within the physiographic region known as the Peterborough Drumlin Field (Chapman and Putnam, 1984). This region is characterized by relatively northeast-southwest trending drumlin features. Bedrock underlying the site consists of limestone, with the minor shale of the Middle Ordovician Trenton-Black River Group.

Surface drainage at the site is generally southwest towards a tributary of June's Creek which eventually outlets into the Indian River situated approximately 3.5km southeast of the site.

3.2 Monitoring Program

3.2.1 Groundwater

The groundwater monitoring network consists of eight (8) monitors locations, designated as TW 4 (located up-gradient, northwest of the landfill); TW 7 (located at the southerly refuse perimeter); TW 3, TW 2, TW 6, TW 8 and TW 9 (located within the down-gradient attenuation zone); and TW 5 (located on the east side Douro Fourth Line). Monitor TW 9 has routinely been dry or contains too little water for sampling.

Previously, monitoring locations were multi-depth well installations but over time, the bedrock monitors identified as "–1", were sealed to prevent upward migration of mineralized water. Monitors TW 2 and TW 3-2 are constructed of 32mm diameter PVC pipe while the remaining monitors are 50mm diameter PVC pipe.

Residential wells RW-1, RW-2, RW-3 and RW-4 are included in the sampling circuit every three (3) years including the 2020 monitoring circuits. Installation information and construction particulars for the monitoring wells are presented in Appendix B. Locations of the monitors are depicted on the Site Plan, Plates 2A and 2B. More specific details of the ground surface including topography and vegetation are illustrated on Plates 2C and 2D.

3.2.2 Surface Water

The surface water monitoring network comprises of four stations, DSW 9 (situated southwest of the landfill); DSW 7 and DSW 17 (within the attenuation zone); DSW 11 (an unnamed water course). The location of the surface water locations is depicted on the Site Plan, Plate 2B through to 2D.

3.2.3 Landfill Gas

The landfill gas-monitoring network involves the groundwater monitors listed in section 3.2.1 (sampled twice per year), and six gas probes (GP 1, GP 2, GP 3, GP 4, GP 5, GP 6). The location of the gas probes is depicted on the Site Plan, Plate 2A.

3.3 Pattern of Groundwater Movement

Groundwater monitoring was conducted during two sampling circuits in 2020. The water level data was acquired on May 12 and November 2, 2020. The measurements are presented on Plate 4 and summarized in Table 3.1. Historical elevation data was obtained from the AECOM 2007-2008 monitoring report and Geo-Logic (GHD) 2009-2020 monitoring reports for comparison purposes. The groundwater existed at elevations that ranged from 93.42m (TW 3-2) to 104.52m (TW 4-2) in May 2020 and from 93.29m (TW 3-2) to 102.02 m (TW 4-2) in November 2020.

The groundwater monitoring data for 2020 is presented on Plate 3.1. Based on the data, the pattern of shallow groundwater movement appears to be in a southwesterly direction with higher water levels in TW 4-2 and TW 7 than in the down-gradient attenuation lands. Water levels were relatively similar to other years. Historical data from Cambium Environmental (1997-2006) and AECOM Canada Ltd. (2007-2008) are included in Appendix D.

Table 3.1 2020 Water Level Summary

Monitor Number	Elevation Top of Casing	Water Level Elevation	
		May 12, 2020	November 2, 2020
TW 2	96.96	95.63	95.38
TW 3-2	93.73	93.42	93.29
TW 4-2	105.04	104.52	103.02
TW 5-2	95.98	95.61	95.30
TW 6-2	96.86	95.13	94.67
TW 7	100.35	96.64	95.89
TW 8-2	96.29	95.17	95.17
TW 9-2	96.10	dry	dry

Notes: All measurements are presented in metres. Monitor top of casing elevations provided by TSH. Elevations are referenced to an assumed benchmark of 100.00 metres.

3.4 Hydraulic Conductivity

The hydraulic conductivity of a soil is described as a measure of the soil's ability to transmit water. Slug tests were performed on four (4) wells in order to assess the permeability at the representative elevations on site in 2009. TW 2 and TW 7 are screened in the shallow overburden, TW 6-2 is screened in the mid-level overburden, while TW 5-2 is screened in the deeper overburden. Table 3.2 summarizes the results of slug tests performed at the site.

Table 3.2 Warsaw Road Hydraulic Conductivity

Location	Test Type	Hydraulic Conductivity (cm/s)	Geometric Mean K (cm/s)	Representative Aquifer
TW 2	Rising Head	2.06E-03	2.06E-03	Silty Sand
TW 5-2 TW 5-2	Falling Head Rising Head	9.15E-03 3.23E-03	5.43E-03	Silty Sand Silty Sand
TW 6-2 TW 6-2	Falling Head Rising Head	1.26E-01 4.30E-02	7.37E-02	Clean Sand Silty Sand, Clean Sand
TW 7 TW 7	Falling Head Rising Head	6.60E-03 1.57E-03	3.22E-03	Silty Sand Silty Sand

4. Sampling/Monitoring Program

GHD followed the established sampling and monitoring protocol for the Warsaw Road Landfill Site. Details of this protocol are summarized in Appendix C. An overview of the protocol is presented below.

1. Fieldwork was carried out at all groundwater monitoring stations during the spring and fall season. Monitor TW 9-2 provided insufficient water for sampling during both sampling periods.
2. The five (5) surface water stations were sampled during the spring circuit while two (2) were sampled in the fall as the others were dry.
3. Methane gas and hydrogen sulphide was measured at each monitoring well using a 4 gas meter during both sampling periods. The six gas probes were measured six (6) times during 2020.
4. Water levels were then recorded for each groundwater monitor prior to well purging.
5. Three to five measured casing volumes were then removed from each monitor to ensure that representative groundwater samples were obtained.
6. In-situ chemical analyses were carried out during the purging operation to determine a stabilized water quality condition. The in-situ testing included temperature, conductivity, DO, ORP, H_2S and pH.
7. After the purging operation, representative samples of groundwater were collected in proper containers with appropriate preservatives where needed.
8. The water samples were then delivered to SGS Laboratories in Lakefield for both sampling circuits.
9. Slug testing on representative wells to determine hydraulic conductivity values were completed in 2009. The testing was requested by the (MECP) review (dated December 29, 2008) of the Warsaw Road Landfill 2007 Monitoring Report prepared by AECOM Canada Ltd. Hydraulic Gradients were calculated using well locations and groundwater elevations.

5. Water Quality Data

5.1 General

Representative groundwater samples from each of the monitors were subjected to chemical testing for specified parameters. The parameters tested for included the parameters in Column 3 (Comprehensive List for Surface Water) of Schedule 5 in the Landfill Standards: A Guideline on Regulatory and Approval Requirements for New or Expanding Sites as well as for Column 1 metals. In addition, samples from TW 7 were analyzed for volatile organic compounds to evaluate any trends that may develop over time. Each surface water station was sampled for the parameters listed in Column 3 of Schedule 5 of the Landfill Standards Guideline (Comprehensive List for Surface Water).

5.2 Groundwater Monitors

The sampling monitors are divided into up-gradients background monitor (TW 4-2), landfill monitor (TW 7) and down-gradients monitors (TW 2, TW 3-2, TW 5-2, TW 6-2, TW 8-2 and TW 9-2). Monitor TW 9-2 contained insufficient water for sampling during both sampling circuits. A list of the wells that had parameters that exceeded the Ontario Drinking Water Standards (ODWS or PWQO) for the 2020 spring and fall sampling periods is listed below.

Parameter	
Spring	
TDS	TW 3-2, TW 5, TW 7
Iron	TW 2, TW-3-2
Manganese	TW 2, TW-3-2, TW-8-2
Phenolics	TW-2, TW 3-2, TW 4 (background), TW 5-2, TW 8-2
Phosphorus	TW 2, TW 3-2, TW 5-2, TW 7
Fall	
TDS	All Wells
Iron	TW 3-2, TW 7
Manganese	TW 2, TW 3-2, TW 7
Phenolics	TW-2
Phosphorus	All wells including Background

TW 2, 3, 7 showed exceedances for TDS, Iron, Manganese, Phenolics and Phosphorus. Total dissolved solids (TDS), manganese and iron have been historically elevated in these monitors in the past. Iron has been historically elevated for the general area.

Phosphorus levels in some wells marginally exceeded the PWQO in some wells in the spring and in all wells in the fall. This should be monitored in future monitoring events. Phenolics showed marginal exceedances in five (5) wells in the spring including the background well and one (1) wells in the fall. The chemical results from the monitoring wells have been summarized in Tables 5.1 and 5.2. The data is presented with the ODWS and PWQO criteria for comparison purposes.

The results indicate less parameter exceedances of the ODWS or PWQO as in the previous year. Chemical comparison graphs for iron, manganese, conductivity and chloride are presented in Appendix D and are compared to the background monitor (TW-4-2). The graphs indicate similar results as in previous years. The certificates of analysis are included in Appendix E.

Table 5.1 2020 Spring Groundwater Quality Summary

PARAMETERS	Warsaw Road Landfill Site Monitors							Ontario Drinking Water Standards	PWQO
	TW 2	TW 3-2	TW 5-2	TW 6-2	TW 7	TW 8-2	TW 4-2 Background		
May 12, 2020									
BOD	< 4	< 4	< 4	< 4	< 4	12	< 4	---	---
TSS	533	674	296	25	1600	13200	17	---	---
Alkalinity	313	341	306	333	354	323	253	30-500	---
pH	7.67	7.39	7.53	7.36	7.81	7.74	7.83	6.5-8.5	6.5-8.5
Conductivity	764	876	876	802	914	925	725	---	---
TDS	466	**551**	**509**	471	**560**	571	437	500	---
COD	15	19	8	< 8	10	54	9	---	---
Phosphorus	**0.92**	**0.11**	**0.40**	< 0.03	**0.58**	< 0.03	< 0.03	---	0.03
TKN	< 0.5	< 0.5	< 0.5	< 0.5	0.6	< 0.5	< 0.5	---	---
Ammonia	< 0.1	0.1	< 0.1	0.2	0.4	< 0.1	< 0.1	---	3.3**
Phenolics	**0.002**	**0.002**	**0.002**	< 0.001	0.001	**0.002**	**0.003**	---	0.001
Sulphate	< 2	7	9	7	3	12	5	500	--
Chloride	71	96	140	78	140	140	84	250	---
Nitrite	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	1.0	---
Nitrate	< 0.06	< 0.06	0.23	0.23	0.11	< 0.06	1.16	10	---
Mercury	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.001	
Arsenic	0.0004	0.0007	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.002	0.05
Barium	0.0971	0.107	0.147	0.0983	0.0743	0.217	0.0400	200	---
Boron	0.016	0.103	0.021	0.051	0.148	0.027	0.016	1.0	0.2
Calcium	131	146	123	140	127	131	110	---	---
Cadmium	0.000011	< 0.000003	< 0.000003	0.000009	0.000009	0.000011	0.000004	0.005	0.0002
Chromium	0.00025	0.00030	0.00023	0.00014	0.00015	0.00015	0.00037	0.05	---
Copper	0.0013	0.0005	0.0011	0.0019	0.0014	0.0005	0.0005	1.0	0.005
Iron	**0.718**	**1.36**	< 0.007	0.007	0.023	0.284	0.007	0.3	0.3
Potassium	0.482	5.89	1.27	6.05	3.74	1.69	0.504	---	---
Magnesium	6.94	10.4	8.01	7.02	23.8	11.1	3.32	---	---
Manganese	**0.338**	**0.298**	0.00011	0.0469	0.0171	**0.0569**	0.00012	0.05	0.05
Sodium	43.2	48.1	70.0	39.7	50.4	65.3	53.8	200	---
Lead	0.00005	0.00005	0.00002	< 0.00001	0.00004	0.00001	< 0.00001	0.01	0.005
Zinc	< 0.002	< 0.002	0.003	0.002	0.004	< 0.002	< 0.002	5.0	0.03

Notes: All results in mg/L with the exception of Conuctivity (uS/cm), Mercury (ug/L), and pH
Highlighted indicates an exceedance of the ODWS and/or PWQO.

Table 5.2 2020 Fall Groundwater Quality Summary

PARAMETERS	Warsaw Road Landfill Site Monitors							Ontario Drinking Water Standards	PWQO
	TW 2	TW 3-2	TW 5-2	TW 6-2	TW 7	TW 8-2	TW 4-2 Background		
Nov. 2, 2020									
BOD	< 4	< 4	< 4	< 4	< 4	< 4	< 4	---	---
TSS	2470	475	75	31	1420	7460	461	---	---
Alkalinity	502	400	309	418	469	1180	338	30-500	---
pH	7.90	7.74	7.89	7.73	7.77	7.73	7.73	6.5-8.5	6.5-8.5
Conductivity	892	1020	896	1040	941	978	794	---	---
TDS	**554**	**623**	**537**	**580**	**543**	**571**	411	500	---
COD	31	26	10	< 8	8	< 8	< 8	---	---
Phosphorus	**2.82**	**0.11**	**0.14**	**0.04**	**0.41**	**0.47**	**0.22**	---	0.03
TKN	< 0.5	< 0.5	< 0.5	1.5	1.0	< 0.5	< 0.5	---	---
Ammonia	0.1	0.1	< 0.1	0.8	0.9	0.1	< 0.1	---	3.3**
Phenolics	**0.003**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	---	0.001
Sulphate	22	13	13	< 2	< 2	13	8	500	--
Chloride	83	85	87	86	85	99	69	250	---
Nitrite	< 0.03	< 0.03	< 0.03	0.09	< 0.03	< 0.03	< 0.03	1.0	---
Nitrate	0.13	< 0.06	0.12	1.49	0.07	< 0.06	1.92	10	---
Mercury	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.001	
Arsenic	0.0002	0.0007	< 0.0002	< 0.0002	< 0.0002	0.0005	< 0.0002	0.002	0.05
Barium	0.106	0.117	0.148	0.118	0.104	0.210	0.0471	200	---
Boron	0.013	0.091	0.016	0.058	0.073	0.025	0.010	1.0	0.2
Calcium	126	155	120	135	123	130	118	---	---
Cadmium	0.000033	0.000016	<0.000003	0.000012	0.000009	<0.000003	0.000007	0.005	0.0002
Chromium	0.00024	0.00038	0.00020	0.00013	0.00019	0.00027	0.00023	0.05	---
Copper	0.0016	0.0010	0.0014	0.0019	0.0008	0.0005	0.0008	1.0	0.005
Iron	0.030	**1.00**	< 0.007	< 0.007	**0.066**	**2.91**	0.013	0.3	0.3
Potassium	0.633	6.30	1.25	7.02	3.99	1.64	0.526	---	---
Magnesium	5.94	9.88	7.02	7.16	13.0	9.75	3.56	---	---
Manganese	**0.0783**	**0.278**	0.00052	0.0301	**0.263**	0.0232	0.00055	0.05	0.05
Sodium	42.3	49.0	57.8	56.0	53.5	56.0	40.6	200	---
Lead	0.00009	0.00008	0.00011	0.00009	0.00009	0.00007	0.00007	0.01	0.005
Zinc	0.005	0.003	0.002	0.004	0.004	0.002	< 0.002	5.0	0.03

Notes: All results in mg/L with the exception of Conuctivity (uS/cm) and pH
Highlighted indicates an exceedance of the ODWS and/ or PWQO.

In addition to the above analysis, monitor TW 7 was sampled for volatile organic compounds (VOCs) analysis during both sampling circuits. In both circuits all VOC parameters were reported with values below their respective detection limits. These certificates of analysis are also included in Appendix E.

A MECP memorandum indicated “that any groundwater locations that discharge to surface water should be identified and compared to the PWQO”. The groundwater at all monitoring wells, with the exception of TW 4-2, potentially discharges to surface water. TW 3-2 is immediately up-gradient of DSW-9 while TW-2, TW 5-2 and TW 8-2 are immediately up-gradient of DSW-17, and TW-6-2 is up-gradient of DSW 7. Since TW 4-2 is the background monitor it was also analyzed for Column 3 of Schedule 5 parameters for comparative purposes.

5.3 Surface Water Monitors

Surface water samples were collected during both the May and November sampling period. In-field measurements were taken at the surface water station as presented in Table 5.2. Only DSW 9 and 11 had water in the fall as the remainder were dry. The MECP has recommended their recent review that “If ponded conditions are representative of the nature of the surface water feature, sampling should be undertaken”. The wells were dry not ponded in the fall.

Table 5.2 2020 Surface Water Field Measurements

Parameter	Field Measurement								
	DSW 7		DSW 6	DSW 9		DSW 11		DSW 17	
	May 12, 2020	Nov. 2, 2020	May 12, 2020	May 12, 2020	Nov. 2, 2020	May 12, 2020	Nov. 2, 2020	May 12, 2020	Nov. 2, 2020
Temperature (°C)	6.9	Dry	7.5	10.1	4.4	7.3	4.5	6.9	Dry
pH	7.74		7.73	7.74	8.15	7.71	8.61	7.55	
Conductivity (us/cm)	656		522	672	533	445	565	728	
Dissolved Oxygen (mg/L)	7.52		7.22	8.13	11.46	6.43	6.44	4.79	
Hydrogen Sulphide	0		0	0	0	0	0	0	
ORP	123		264	139	215	264	147	263	

The surface water samples were submitted for analysis of Column 3, Schedule 5 of the Landfill Standards Guideline (Indicator List for Surface Water). All of the parameters tested are within their respective current PWQO with the exception of TDS, Phosphorus, Phenolics, Iron and Manganese. DSW 9 showed the majority of the exceedances. DSW 9 is a pond in the middle of the pasture field that is down-gradient of DSW7 and DSW 11 which did not show similar results. This should be monitored in the future.

There were similar exceedances as historically, especially in DSW 7. Phenols showed minor exceedances more often this year. This should be monitored in the future.

The results of the sampling are summarized on Table 5.3 with the certificates of analysis presented in Appendix E.

Table 5.3 Leachate Indicator Parameters 2020 Surface Water Quality Results

Parameters	Surface Water Locations							Ontario Drinking Water Standards	PWQO
	DSW 6	DSW 7	DSW 9		DSW 11		DSW 17		
	May 12/20	May 12/20	May 12/20	Nov. 2/20	May 12/20	Nov. 2/20	May 12/20		
BOD	< 4	< 4	< 4	13	< 4	< 4	7	---	---
TSS	11	56	< 2	56	< 2	3	6	---	---
Alkalinity	255	239	297	234	216	373	320	30-500	---
pH	8.29	8.28	8.16	7.58	8.05	8.05	8.15	6.5-8.5	6.5-8.5
Conductivity	672	794	762	1020	545	947	894	---	---
TDS	349	466	440	**620**	309	**526**	**529**	500	---
COD	20	29	20	75	27	47	35	---	---
TKN	< 0.5	0.7	1.0	14.7	< 0.5	0.7	0.7	---	---
Ammonia	< 0.1	< 0.1	< 0.1	11.6	< 0.1	< 0.1	< 0.1	---	3.3**
Phenolics	**0.002**	**0.003**	**0.008**	**0.003**	< 0.001	< 0.001	**0.005**	---	0.001
Sulphate	< 2	< 2	< 2	30	< 2	23	< 2	500	--
Chloride	58	86	65	68	41	140	93	250	---
Nitrite	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	1.0	---
Nitrate	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	10	---
Mercury	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	200	---
Arsenic	< 0.0002	0.0004	0.0003	0.0006	0.0002	0.0008	0.0003	1.0	0.2
Barium	0.0389	0.0455	0.0976	0.0358	0.0286	0.0387	0.0828	200	---
Boron	0.013	0.075	0.057	0.010	0.013	0.016	0.071	1.0	0.2
Calcium	115	117	120	109	93.0	114	127		---
Cadmium	0.000012	0.000007	0.000007	0.000011	0.000003	0.000008	0.000008	0.005	0.0002
Chromium	0.00021	0.00015	0.00014	0.00030	0.00015	0.00043	0.00022	0.05	---
Copper	0.0013	0.0005	0.0009	0.0016	0.0004	0.0017	0.0008	1.0	0.005
Iron	0.052	0.025	0.30	**0.400**	0.024	0.150	0.049	0.3	0.3
Potassium	2.32	8.39	9.26	40.3	1.02	1.26	7.24	---	---
Magnesium	4.15	8.09	9.00	10.7	3.57	4.66	9.11	---	---
Manganese	0.0103	0.0177	**0.534**	**0.826**	0.00763	**0.0908**	0.0231	0.05	0.05
Sodium	31.2	47.8	35.8	34.3	21.9	74.9	56.2	200	---
Phosphorus	0.022	**0.103**	**0.068**	**0.933**	0.011	**0.033**	**0.035**	---	0.03
Lead	0.00007	< 0.00001	0.00006	0.00013	< 0.00001	0.00020	< 0.00001	0.01	0.005
Zinc	0.003	0.004	0.004	0.003	0.003	0.010	0.004	5.0	0.03

Notes: All results in mg/L with the exception of Conductivity (uS/cm) and pH.

Highlighted indicates an exceedance of the ODWS and/or PWQO.

5.3.1 Surface Water Trigger Mechanism

Trigger mechanism established for this site is based on 8 consecutive samples that the analysis shows that one of the trigger parameters exceed the 75th percentile of DSW 16 (background sample). DSW 16 values are derived from historical results as it was dry in 2020. Only sample sites DSW 7 and DSW 17 are used as trigger sites. Trigger parameters are set as chloride, conductivity, iron, and manganese. Tables 5.4 and 5.5, compares parameters to values for the trigger sites for the last 8 sampling periods. No parameter has exceeded the trigger value for the 8 consecutive periods. Therefore, the contingency plan is not triggered.

Table 5.4 Surface Water Trigger Mechanism 2017 – 2020 DSW 7

Parameters	Trigger Value	DSW 7							
		June 2017	Sep. 2017	June 2018	Oct. 2018	May 2019	Oct. 2019	May 2020	Nov. 2020
Chloride	310	58	Dry	60	77	64	Dry	86	Dry
Conductivity	1460	575	Dry	797	859	702	Dry	794	Dry
Iron	1.77	0.348	Dry	1.37	0.990	0.03	Dry	0.025	Dry
Manganese	0.696	0.0196	Dry	1.07	1.58	0.0266	Dry	0.0177	Dry

Notes: All results in mg/L with the exception of Conductivity (uS/cm). Trigger value reported as 75th percentile of average past monitoring events.

Table 5.5 Surface Water Trigger Mechanism 2017 – 2020 DSW 17

Parameters	Trigger Value	DSW 17							
		June 2017	Sep. 2017	June 2018	Oct. 2018	May 2019	Oct. 2019	May 2020	Nov. 2020
Chloride	310	96	Dry	90	Dry	100	Dry	93	Dry
Conductivity	1460	810	Dry	829	Dry	881	Dry	894	Dry
Iron	1.77	0.090	Dry	0.598	Dry	0.086	Dry	0.049	Dry
Manganese	0.696	0.0336	Dry	0.150	Dry	0.0784	Dry	0.0231	Dry

Notes: All results in mg/L with the exception of Conductivity (uS/cm). Trigger value reported as 75th percentile of average past monitoring events.

5.4 Residential Wells

The four residential wells are sampled every three (3) years. The wells were sampled in 2020. R-2 was only sampled in the spring as there was no answer the three (3) times we went to the house. The only exceedances were for TDS in R-1, R-3 and R-4 and four Sodium in R-4 in the fall. R-1 showed a minor exceedance for Nitrates in the spring sample but not in the fall sample. This well is in a field with cattle and has shown elevated Nitrates in the past.

The landfill does not appear to have had any impact on the residential wells.

Table 5.6 2020 Residential Groundwater Quality Summary

PARAMETERS	Warsaw Road Landfill Site Monitors							Ontario Drinking Water Standards
	R-1 May 2020	R-1 Nov. 2020	R-2 May 2020	R-3 May 2020	R-3 Nov. 2020	R-4 May 2020	R-4 Nov. 2020	
BOD	< 4	< 4	< 4	< 4	< 4	< 4	< 4	---
TSS	< 2	< 2	2	2	3	< 2	4	---
Alkalinity	348	345	243	255	303	232	198	30-500
pH	7.40	7.67	7.89	7.65	7.67	7.86	7.60	6.5-8.5
Conductivity	951	1000	663	723	940	522	3170	---
TDS	**669**	**591**	391	423	**520**	323	**1740**	500
COD	14	10	< 8	12	< 8	< 8	< 8	---
Phosphorus	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.04	---
TKN	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	---
Ammonia	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	---
Phenolics	0.002	< 0.001	0.002	0.002	< 0.001	< 0.001	0.018	---
Sulphate	75	85	5	6	9	4	4	500
Chloride	55	57	72	79	95	34	830	250
Nitrite	0.06	0.27	< 0.03	< 0.03	< 0.03	< 0.03	< 0.3	1.0
Nitrate	**10.2**	5.35	0.61	1.28	3.26	0.30	0.16	10
Mercury	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0000.01	< 0.00001	0.001
Arsenic	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.002
Barium	0.168	0.0486	0.0448	0.0338	0.00235	0.0366	0.196	200
Boron	0.029	0.065	0.011	0.010	0.009	0.041	0.130	1.0
Calcium	177	42.6	105	115	5.37	67.2	304	---
Cadmium	0.000006	<0.000003	0.000009	0.000004	0.000009	0.000004	0.000022	0.005
Chromium	0.00009	0.00012	0.00022	0.00026	0.00091	0.00017	0.00044	0.05
Copper	0.0572	0.0220	0.0637	0.0411	0.202	0.0309	0.0300	1.0
Iron	< 0.007	< 0.007	0.021	0.007	0.212	0.008	0.067	0.3
Potassium	21.6	8.48	1.06	0.521	0.208	0.887	5.47	---
Magnesium	19.3	5.26	4.05	3.44	0.175	3.55	31.1	---
Manganese	0.0231	0.0194	0.00030	0.00038	0.0110	0.00022	0.0328	0.05
Sodium	14.6	175	42.7	50.8	187	49.0	**246**	200
Lead	0.00021	0.00025	0.00159	0.00183	0.0191	0.00023	0.00054	0.01
Zinc	0.011	0.006	0.027	0.013	0.095	0.031	0.038	5.0

Notes: All results in mg/L with the exception of Conuctivity (uS/cm) and pH
Highlighted indicates an exceedance of the ODWS and/ or PWQO.

5.5 Landfill Gas Monitoring

Landfill gas monitoring was conducted at six gas probe that have been installed within and adjacent to the buried refuse area. The locations of the gas probes are depicted on Plate 2A. Hydrogen sulphide gas was not detected. Methane gas was detected in GP5 for all sampling periods. The readings ranged from 15% to 44% by volume. GP6 which in the past has recorded sporadic methane levels ranging from 0% in May to 4% in November. No methane was detected in any of the other gas probes for the 5 periods. The results of the monitoring are summarized in Table 5.7. Graphs depicting the results of methane gas monitoring for the last nine years are presented in Appendix D.

Table 5.7 2020 Warsaw Landfill Gas Monitoring

Date	GP-1	GP-2	GP-3	GP-4	GP-5	GP-6
January	0	0	0	0	25	1
February	0	0	0	0	30	0
May	0	0	0	0	44	0
October	0	0	0	0	40	2
November	0	0	0	0	38	4
December	0	0	0	0	15	1

6. Conclusions and Recommendations

This report presents the results of the 2020 groundwater monitoring program completed at the Warsaw Road Landfill Site in the Township of Douro-Dummer. It is our professional opinion that the groundwater level and chemical data do not indicate a significant anomaly from the results of the previous years. The majority of the parameters are within their acceptable limits with a few exceedances in the shallow monitors located adjacent to the refuse area. The results are similar to past years.

Future monitoring data should be compiled on an annual basis to evaluate any trends. Surface water sample results were also similar to previous years. The results of sampling at the trigger sampling locations were compared to background concentrations of select parameters. The results indicated that the contingency plan did not need to be activated and will not be for the foreseeable future as all 2020 results were all within the trigger values.

1. The monitoring wells and surface water locations should continue to be monitored for the parameters established in this report. Surface water stations will be sampled even if ponded or stagnant.
2. Water Quality at the residential wells should be tested in 2023 as part of the required frequency, i.e. once every 3rd year testing.
3. Sampling should continue for VOC parameters for monitor TW 7.

6.1 Signatures

We trust that this report meets with your immediate requirements. Should you have any questions, please contact our office.

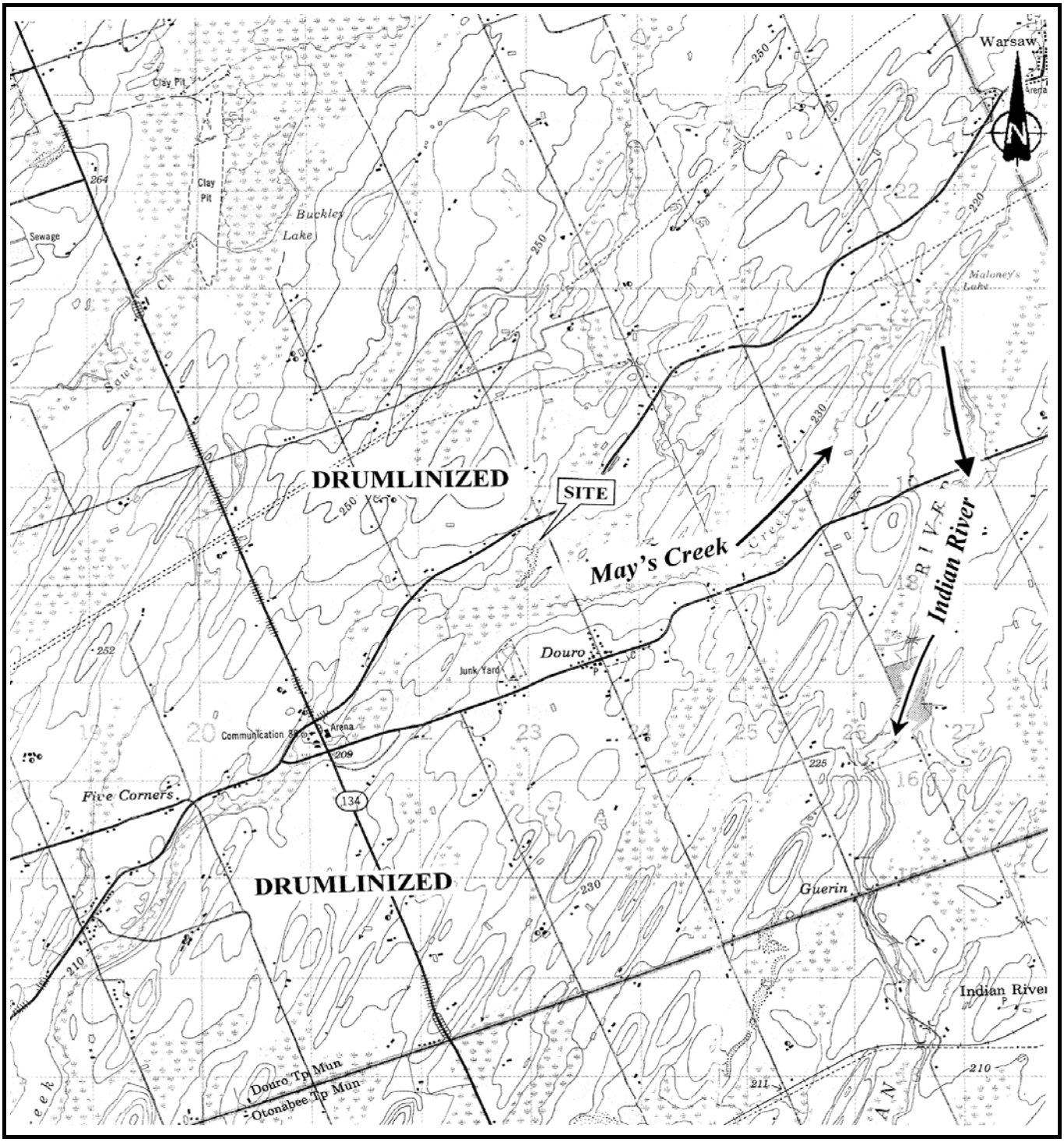
Sincerely,

GHD

Steven Gagne, H.B.Sc.

Nyle McIlveen, P.Eng.

Enclosures



Base map complied from Energy, Mines and Resources Canada Map 31 D/8 dated 1985. Air photography dated 1981.

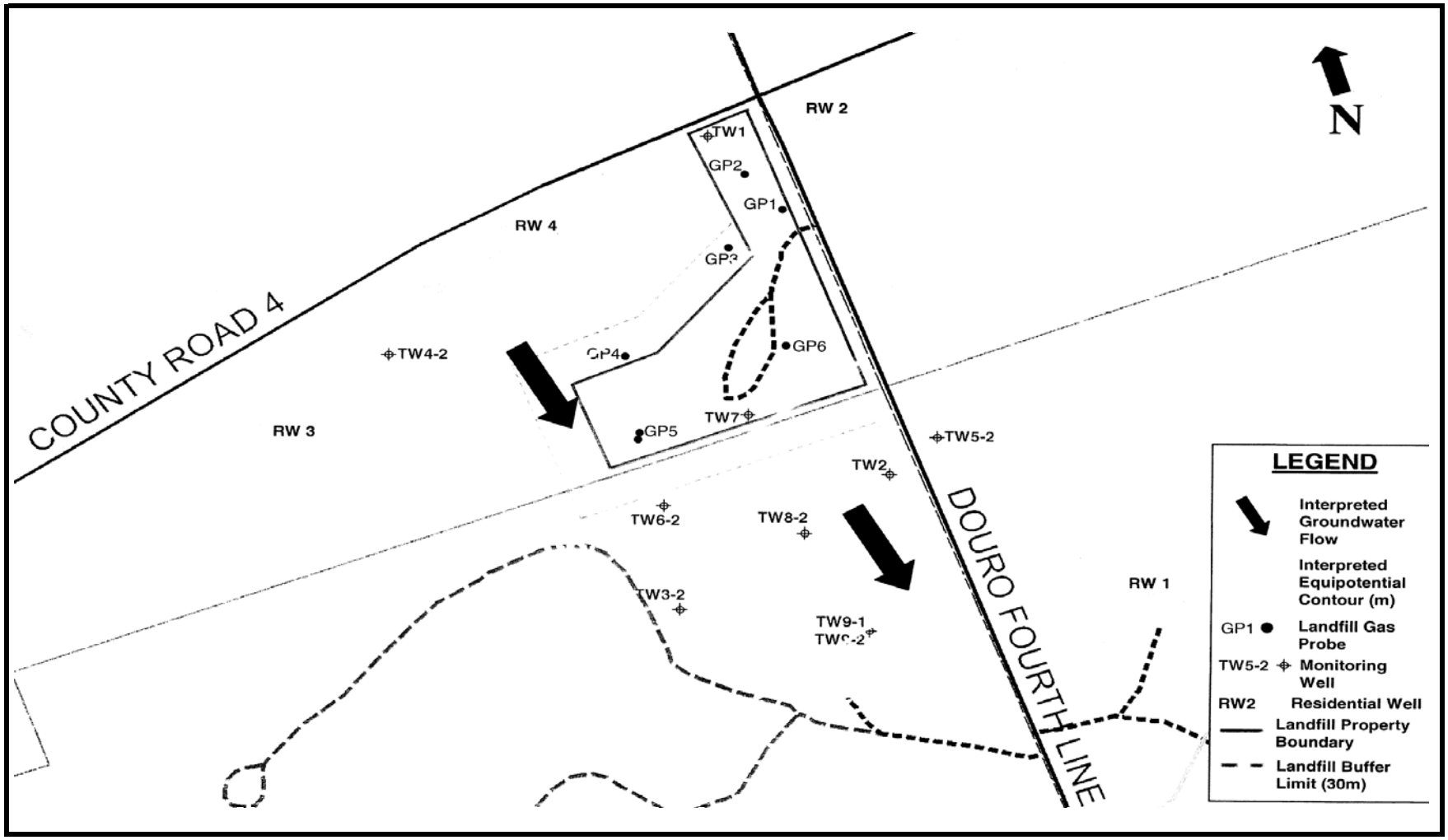
Scale:
1:50000
Coordinate System
NAD 1983 UTM

Warsaw Road Landfill
Part Lot 8, Concession 5
Township of Douro-Dummer

11212878
March 2021

Vicinity Plan

Plate 1



Base Plan Provided By AECOM

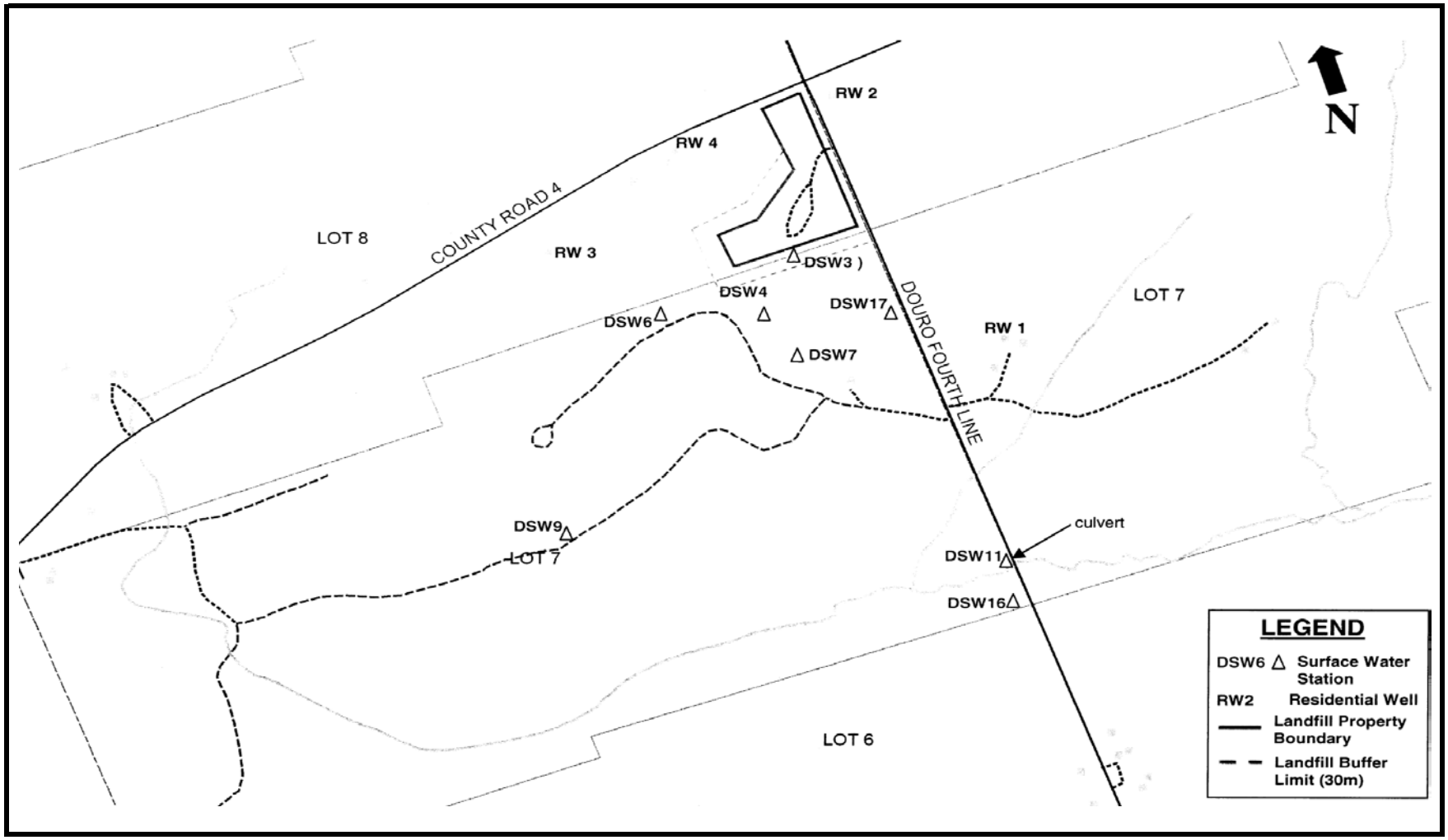
Scale:
Not To Scale
Coordinate System:
NAD 1983 UTM Zone 17

Warsaw Road Landfill
Part Lot 8, Concession 5
Former Township of Douro-Dummer

11212878
March 2021

Plot Plan A

Plate 2A



Base Plan Provided By AECOM

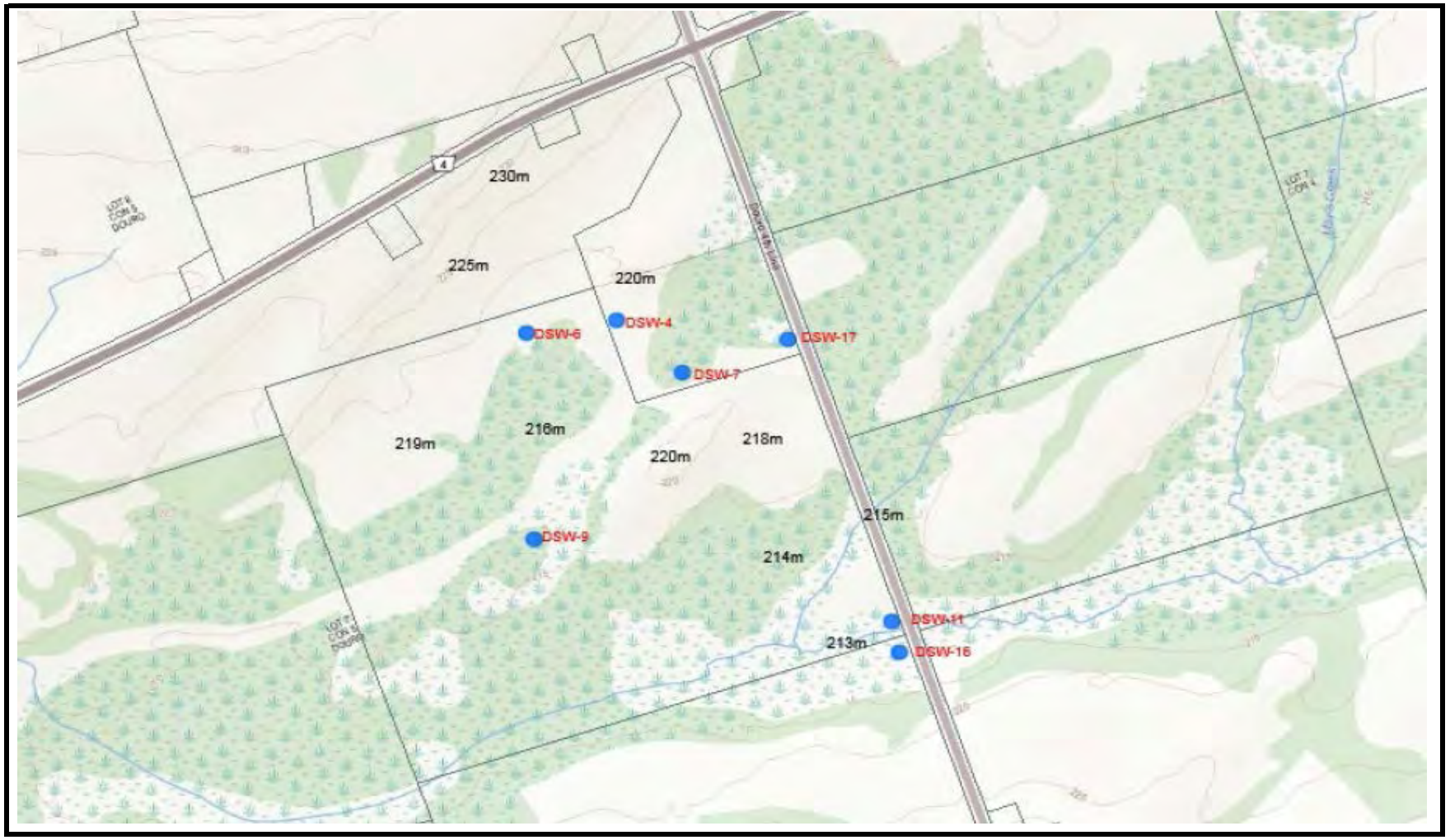
Scale:
Not To Scale
Coordinate System:
NAD 1983 UTM Zone 17

Warsaw Road Landfill
Part Lot 8, Concession 5
Former Township of Douro-Dummer

11212878
March 2021

Plot Plan B

Plate 2B



Base Plan Provided By AECOM

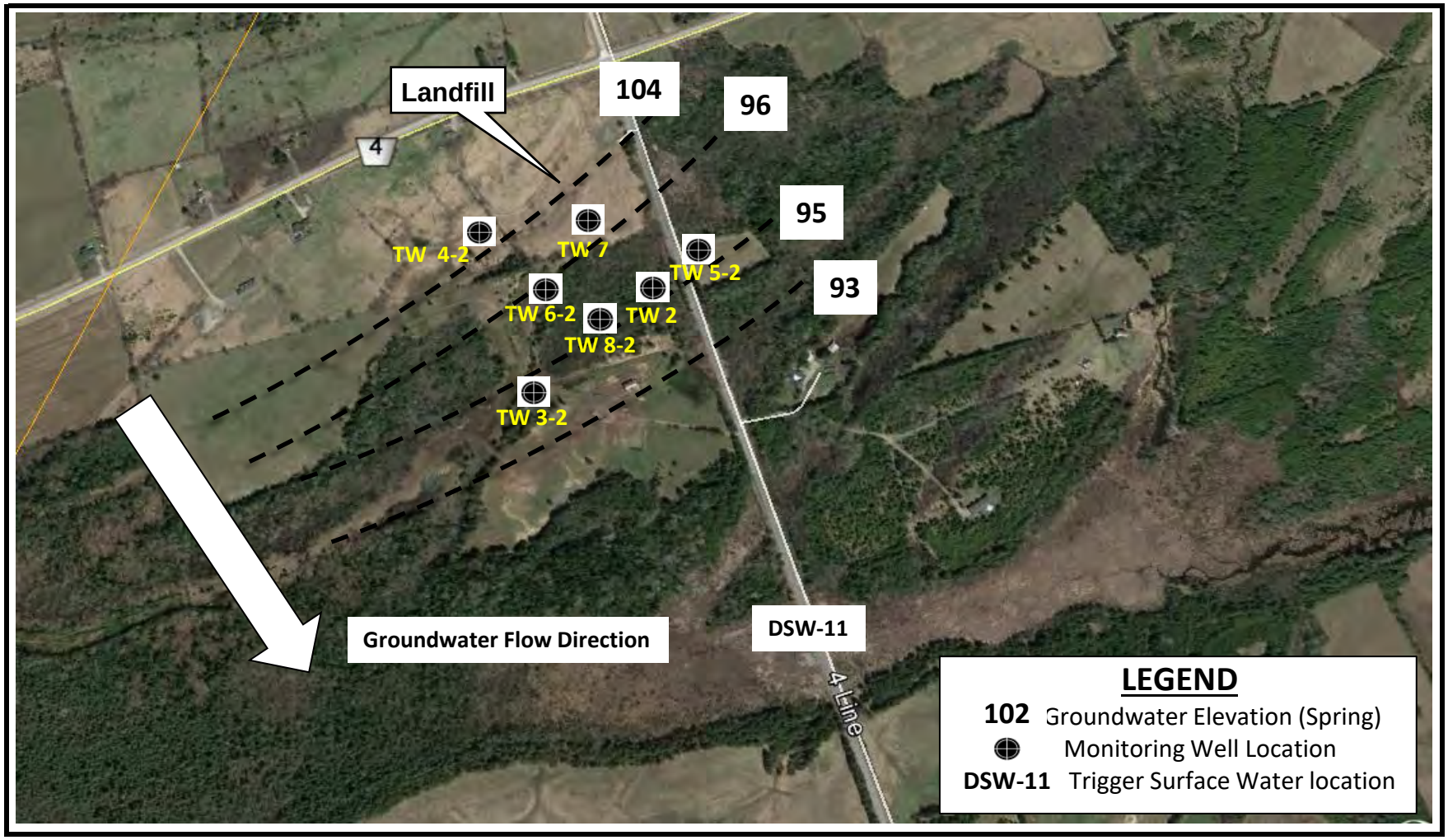
Scale:
Not To Scale
Coordinate System:
NAD 1983 UTM Zone 17

Warsaw Road Landfill
Part Lot 8, Concession 5
Former Township of Douro-Dummer

11212878
March 2021

Surface Elevation Plan

Plate 2C



Base Plan Provided By AECOM

Scale:
Not To Scale
Coordinate System:
NAD 1983 UTM Zone 17

Warsaw Road Landfill
Part Lot 8, Concession 5
Former Township of Douro-Dummer

11212878
March 2021

Groundwater Flow Plan

Plate 2D

2020 FIELD MONITORING SUMMARY

Warsaw Road Landfill Site
Township of Douro-Dummer, County of Peterborough
Project No. 11212878-02

	May 12, 2020						*November 2, 2020*					
MONITORING WELL	**Temp. (°C)**	**EC (uS/cm)**	**Methane H_2S**	**pH**	**DO**	**ORP**	**Temp. (°C)**	**EC (uS/cm)**	**Methane H_2S**	**pH**	**DO**	**ORP**
TW-2	7.2	682	0 / 0	7.64	7.11	256	6.8	547	0 / 0	7.90	10.70	52
TW-3-2	7.7	806	0 / 0	7.44	3.55	128	8.1	627	0 / 0	7.92	6.50	42
TW-4-2	8.8	690	0 / 0	7.37	9.11	268	8.8	498	0 / 0	8.49	10.10	171
TW-5-2	7.7	806	0 / 0	7.68	5.25	258	8.1	583	0 / 0	7.76	4.52	-31
TW-6-2	9.1	761	0 / 0	7.55	3.89	130	8.6	618	0 / 0	7.92	6.01	225
TW-7	9.9	820	0 / 0	7.72	4.47	149	8.0	578	0 / 0	7.70	5.20	58
TW-8-2	6.9	826	0 / 0	7.6	6.07	252	7.7	599	0 / 0	8.02	4.30	-35
R-1	9.9	920		7.15	7.52	123	---	---				
R-2	9.4	638		7.42	8.13	139	5.1	985		7.72	7.20	185
R-3	9.3	686		7.47	6.43	264	4.5	698		8.23	6.44	147
R-4	10.0	543		7.58	4.79	263	4.4	2058		8	11.46	215

Notes:
(---) indicates no data

GHD
PLATE 3

2019 WATER LEVEL MONITORING SUMMARY

Warsaw Road Landfill Site
Township of Douro-Dummer, County of Peterborough
Project No. 11212878

		May 12, 2020		November 2, 2020	
MONITORING WELL	TOP OF CASING ELEVATION (M)	WATER LEVEL FROM TOP OF CASING (M)	WATER LEVEL ELEVATION (M)	WATER LEVEL FROM TOP OF CASING (M)	WATER LEVEL ELEVATION (M)
TW-2	97.08	1.45	95.63	1.70	95.38
TW-3-2	94.83	1.41	93.42	1.54	93.29
TW-4-2	105.99	1.47	104.52	2.97	103.02
TW-5-2	96.63	1.02	95.61	1.33	95.30
TW-6-2	97.66	2.53	95.13	2.99	94.67
TW-7	100.68	4.04	96.64	4.79	95.89
TW-8-2	97.16	1.99	95.17	2.25	95.17
TW-9-2	96.38	dry	na	dry	na

Notes:
All measurments presented in metres.
MP refers to measuring point (top of protective casing) above surrounding ground surface.
(na) - indicates not available

PLATE 4

Appendix A
MOECC Provisional Certificates of Approval and Correspondence

Ministry of the Environment

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Ministère de l'Environnement

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613/549-4000 ou 1-800/267-0974
Fax: 613/548-6908

Ontario

MEMORANDUM

January 16, 2012

TO: Keith Jamieson
Senior Environmental Officer
Peterborough District Office
Eastern Region

FROM: Beth Gilbert
Surface Water Specialist
Technical Support Section
Eastern Region

RE: 2009 & 2010 Annual Monitoring Reports
Warsaw Road Waste Disposal Site (WDS)
Douro-Dummer, Peterborough County
IDS#: 7014-85CMVP and 3120-8FVRRN

I have reviewed the above mentioned monitoring reports prepared by Geo-Logic Inc. for surface water impacts and have the following comments to offer.

Background

Comments were most recently provided on this site in a memorandum (dated July 7, 2010) authored by Mr. Mark Phillips, MOE Surface Water Scientist on the 2007 and 2008 Annual Monitoring Reports (AMR).

The WDS includes a 2 hectare fill area within a larger 2.43 hectare licensed area. The site was operated as a landfill by the Township for approximately 25 years before it was closed in 1996.

The Warsaw WDS is bounded to the south and east by a low-lying area that is wet at ground surface during most of the year. Agriculture pasture land borders the northern and western boundaries of the site. The Provincially Significant Indian River/Warsaw South Wetland surrounds the site. Drainage from the site flows to the south-southeast towards the wetland. Shallow groundwater is described as flowing in a south-easterly direction.

The surface water sampling program involves sampling at 7 locations, twice annually, for chloride, conductivity, iron, manganese, as well as field parameters: pH, temperature, and dissolved oxygen. These parameters are the basis for the trigger mechanism and are used to

determine if the landfill is impacting on surface waters. If the analysis shows that one of these parameters exceeds the 75th percentile of the background sample data (DSW16) then the contingency plan is triggered.

The AMR indicates that surface water sampling location DSW16 (downgradient from the landfill) serves as a background sampling location. DSW4 and DSW7 are located down-gradient from the landfill within the wetland. DSW17 is located downgradient from the landfill within the roadside ditch. DSW6 is located within the wetland to the west of the WDS and DSW9 is located within the wetland to the southwest of the WDS. DSW11 is located a substantial distance south of the WDS on a small creek. DSW3 was located at the foot of the landfill within the wetland, but is no longer active as it was impacted by soils which eroded during final cover placement.

The measured parameters were compared to the Provincial Water Quality Objectives (PWQOs) (MOE 1994).

2010 AMR

In 2010, three surface water stations were sampled in spring (DSW9, DSW11, DSW17) and two stations were sampled in the fall (DSW11 and DSW17). These samples were analyzed for the parameters listed in Column 4, Schedule 5 of the Landfill Standards Guideline (Indicator List for Surface Water). The remaining stations were not sampled as they were either dry or ponded. The AMR does not indicate which stations were dry and which were ponded. The contingency plan was not triggered for 2010.

Boron exceedances of the PWQO (PWQO = 0.002 mg/L) occurred in the spring and fall of 2010. Boron exceedances occurred at all stations sampled (DSW9, DSW11, DSW17). Concentrations were highest at DSW9 (0.043 mg/L). However, comparison with the draft Canadian Water Quality Guideline for boron of 1.5 mg/L (based on more up-to-date toxicolgy information) showed no exceedances and indicates that aquatic toxicity is not anticipated.

Iron concentrations were greater than the PWQO at DSW9, but only marginally greater (0.313 mg/L). With the data provided, the reviewer cannot determine whether the iron PWQO exceedance is greater than the 75th percentile at the background site. There was no explanation offered for this exceedance; however, past memos (September 23, 2004; Dec 4, 2007) indicate that the PWQO for iron has been exceeded at the background site (DSW16).

Phosphorus concentrations exceeded the PWQO of 0.03 mg/L at DSW17 and DSW 11. Concentrations ranged from 0.04-0.05 mg/L at DSW17 and from 0.01 to 0.08 mg/L at DSW11. This is not unexpected given that the site drains a nutrient rich wetland environment where phosphorus concentrations and primary productivity are expected to be high.

2009 AMR

In 2009, two surface water stations were sampled in spring and fall (DSW11 and DSW17). These samples were analyzed for the parameters listed in Column 4, Schedule 5 of the Landfill Standards Guideline (Indicator List for Surface Water). The remaining stations were not sampled as they were either dry or ponded. The AMR does not indicate which stations were dry and which were ponded. The contingency plan was not triggered for 2009.

In 2009, the only PWQO exceedance found was for phosphorus at DSW 17. Phosphorus ranged from <0.01 - 0.04 mg/L.

Comments/Recommendations

With the limited data provided, the waste disposal site does not appear to be having an impact on the water quality measured at the surface water trigger locations at this time. The measured parameters were recorded at levels below PWQO and CWQG with the exception of iron, boron, and phosphorus. Based on the iron PWQO and interim draft guideline for boron, the monitoring data suggests that concentrations of boron and iron are not at levels that are likely to be toxic to aquatic organisms. Similarly for phosphorus, these concentrations are not unexpected for a productive wetland type environment.

In both the 2009 and 2010 AMR, Geo-logic recommends that surface water monitoring locations should continue to be monitored for the parameters established in the 2008 AECOM report. I do not support this recommendation as the parameters analyzed in the 2008 AECOM report did not include a number of the parameters listed in Column 4, Schedule 5 of the Landfill Standards Guideline (Indicator List for Surface Water) including: ammonia, TKN, suspended solids, total dissolved solids, sulphate, phenol, or phosphorus. I recommend that the surface water locations should continue to be analyzed for the parameters established in the 2009 and 2010 Geo-logic AMR.

It should also be noted that the sampling station DSW3 was lost due to erosion of final cover material and has never been replaced with a suitable monitoring station located in close proximity to the waste mound – wetland interface to capture impacts associated with overland flow and/or groundwater discharge as requested in a previous memo from Mr. Mark Phillips, dated December 4, 2007.

The sampling sites are illustrated on Plate 2B. In addition Plate 2B is not sufficient for indicating the extent of hydrologic features at the site. The Plate should show the location of surface water sampling sites (indicated with a dot and a label), groundwater sampling sites, groundwater flow direction, topographic contours, ponds, creeks, roadside ditches, wetlands, direction of flow, etc.

The AMR should provide a description of the sampling sites (nature of the surface water feature, flow, location description, etc.) with an opinion on whether the sites are still appropriate for providing monitoring data to assess impacts from the landfill. Following this review of the monitoring design, the trigger mechanism should be re-visited.

Sampling was not conducted at monitoring locations where water was ponded. It is not known at which locations this occurred. If ponded conditions are representative of the nature of the surface water feature, sampling should be undertaken. Stagnant or ponded waters may represent a potential conduit for contaminants to surface water features at other times of the year.

The AMR provided annual data for the trigger parameters summarized in table form. Although the certificates of analysis are provided in the appendix and include the suite of indicator parameters listed in Schedule 5, Column 4 of the Ministry's "Landfill Standards: A Guideline on the Regulatory and Approval Requirements for New or Expanding Landfill Sites," (OMOE 1998) this data should be presented within the same table as the trigger parameters within the main body of the AMR and compared to PWQOs for a comprehensive view of water quality conditions at the sample locations. The reviewer could not find a description of the trigger mechanism within the documents provided in the AMR. Future reports should contain a copy of the document which outlines the trigger mechanism.

The measured parameters could not be compared to background water quality, as this information was not provided. Future AMR should provide a table summarizing the 75th percentile for the measured parameters at the background site. This data should be a 'running' percentile which incorporates the monitoring data from the previous year in the calculation of percentiles. Any exceedance beyond these values or their respective PWQOs should be explained.

The WDS is surrounded by the Provincially Significant Indian River/Warsaw South Wetland. The report does not indicate whether the levels of parameters being measured at the sampling sites, in particular Iron and Boron, are anticipated to have an impact on the features and functions for which the wetland has been identified.

The consultants need to identify which (if any) groundwater monitoring locations represent groundwater which is discharging to surface water and compare groundwater quality at these locations to the PWQO (OMOE 1994).

Summary of Comments

- With the limited data provided, the WDS does not appear to be having an impact on the water quality at the monitored surface water stations.

- Boron, Iron and phosphorus concentrations exceeded PWQOs. In the case of Boron, concentrations did not exceed the more up-to-date CWQG. In the case of iron, the exceedance of PWQO was minimal and restricted to one date and location. In the case of phosphorus, concentrations in this range are not unusual given the site drains a productive stagnant wetland environment. These parameters should continue to be monitored.

- Sampling should continue for the parameters established in the 2009 & 2010 AMR.

- The design of the surface water monitoring locations should be re-evaluated to determine if the sites are still appropriate for determining surface water impacts from the landfill. After this evaluation, the trigger mechanism should be re-visited.

- Data was not provided for a station representing background water quality conditions. Future AMR should indicate the 75th percentile of measured concentrations at the background monitoring location.

- Future reports should contain a copy of the document which outlines the trigger mechanism.

- Any future AMR should show the extent of hydrologic features at the site including location of surface water sampling sites (indicated with a dot and a label), groundwater sampling sites, groundwater flow direction, topographic contours, ponds, creeks, roadside ditches, wetlands, direction of flow, etc.

- Any groundwater monitoring locations that discharge to surface water should be identified and compared to PWQOs.

Should you have any questions on the above, please do not hesitate to contact me at 613-540-6864.

Beth Gilbert, M.Sc.
BG/gl

c: Mark Phillips, Surface Water Scientist
Beth Gilbert, Surface Water Reviewer
Shawn Kinney, Ground Water Reviewer
Peter Taylor, Water Resources Unit Supervisor
David Bradley, Peterborough District Office Supervisor
SW-PB-DD C5-03-06 (Douro-Dummer) (Warsaw Road (South) Landfill)
GW-PB-DD 01-03-C5 (Warsaw Road Waste Disposal Site)

MAR 0 3 2009

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Direction régionale de l'Est
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Tél:(705) 755-5271

Ontario

February 26, 2009

David Clifford, CAO
The Corporation of the Township of Douro-Dummer
894 South St., PO Box 92
Warsaw, Ontario;
K0L 3A0

Dear Mr. Clifford

RE: Warsaw Road Landfill Site, 2007 Annual Monitoring Report
Reference Number 4647-7DSGUL

The Ministry of the Environment's, Eastern Region Technical Support Section, have completed the technical review associated with the above-stated document. A copy of the comments are attached to this letter for your review and implementation.

Further, it is recommended that the Township provide a copy of the attached comments to their consultant for their review and consideration, as applicable.

Should you have any questions or concerns pertaining to this letter or the attached comments, please do not hesitate to contact Chris Johnston, Senior Environmental Officer, at 705 755-4308.

Yours truly,

Tim Hannah
Peterborough District Office

File Storage Number: SIPBDOCO5 610 - LOT 8

Ministry of the Environment

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Ontario

MEMORANDUM

29 December 2008

TO: Cathy Curlew
Senior Environmental Officer
Peterborough District Office
Eastern Region

FROM: Shawn Kinney
Hydrogeologist
Water Resources Unit
Technical Support Section
Eastern Region

RE: 2008 Annual Monitoring Report
Warsaw Road Closed Waste Disposal Site A340902
Lot 8, Concession 5, Geographic Township of Douro
Township of Douro-Dummer

I have reviewed the hydrogeologic aspects of the following documents entitled:

- "*Warsaw Road Landfill Site, 2007 Annual Monitoring Report*" Totten Sims Hubicki Associates, March 2008.

Appendix B of the report includes the document entitled:

- "*2007 Annual Report, Warsaw Landfill, Township of Douro-Dummer, Provisional Certificate of Approval A 340902*" Hydroterra Limited, February 2008.

I submit the following comments for your consideration.

Summary

1. The site is closed. Guideline B-9 applies. Manganese levels are twice as high as the provincial objective at the existing attenuation zone boundary. Monitoring of this situation should continue.

2. The primary pathway for migration of leachate is reportedly southward through the shallow overburden and bedrock.

3. The potential does not exist for surface water impacts to occur at this time.

4. The proposed groundwater monitoring program is satisfactory.

5. Future monitoring reports should include hydraulic conductivity data for all on-site monitoring wells.

6. Future monitoring reports should include site diagrams depicting a horizontal scale.

Certificate of Approval

The Warsaw Road Waste Disposal Site operates under Certificate of Approval A340902. The site was licensed for the use and operation of a 2.0-hectare landfill site within a total site area of 2.43 hectares. The landfill underwent final closure in 1996. The landfill is a naturally attenuating site.

Geology

Appendix B, the Hydroterra document, describes site geology. Figure 1 of the appended Hydroterra report provides geologic cross sections. Appendix D includes borehole logs for 9 boreholes. Based on this information, the general site geology is as follows:

- Sandy loam, silty sand and sandy gravel: up to 4 metres
- Bedrock: Limestone with minor shale

Overburden in the eastern edge portion of the site differs from this general condition and is comprised of clay till.

Hydrogeologic Conditions

Hydraulic Conductivity

The provided documents do not present hydraulic conductivity data. I therefore cannot advise you on leachate migration rates. Future monitoring reports should include hydraulic conductivity data for all on-site monitoring wells.

Horizontal Hydraulic Gradient

The field notes provided in Appendix D tabulate water level measurements for April and October 2007. Based on the overburden materials and water level data I conclude that the general hydraulic gradient is from the fill area southward towards monitor TW3-2. The provided site diagrams and cross sections do not include a horizontal scale. I am unable to confirm the magnitude of the horizontal gradients.

Vertical Gradient

Monitoring location TW9 appears to be the only remaining multi-level groundwater monitoring location. An upward gradient was observed at TW-9.

The well abandonment log provided in Appendix D indicated that bedrock monitor TW3-1 was historically a flowing well. This suggests that an upward gradient also exists at TW-3, located west of TW-9.

Groundwater Flow Direction

As noted above, the groundwater flow direction within the sandy overburden is from the fill area southward towards monitor TW3-2.

Anomalously low water levels measured in TW9-2 appear to suggest flow towards the TW9 location. I note, however, that TW9-2 is screened in "clayey silt" which is likely less amenable to groundwater flow than the sandy gravel noted at the TW3 location.

Hydrogeologic Units

The sand and gravel overburden existing over most of the site is a shallow aquifer. The clay till material in the south-eastern portion probably functions as an aquitard and may be a confining layer in the vicinity of TW9. The underlying limestone bedrock is also an aquifer which appears to recharge upwards in the southern part of the site.

Conceptual Model

The primary pathway of leachate migration from the waste disposal site is the shallow overburden and fractured bedrock aquifer.

Background Water Quality

TW4-2 is a representative background monitor. In my previous review memorandum dated 29 November 2007 I examined the median values of the 5 recent sample analyses for this well, as provided in Table 5 of the 2007 monitoring report. The water quality at TW4-1 conformed to the Ontario Drinking Water Standards and Objectives with the following exceptions:

- The median *hardness* level was 335 mg/l. This is 3 times greater than the 100 mg/l aesthetic objective.
- The median *total dissolved solids* level was 491 mg/l. This is approximately equal to the 500 mg/l aesthetic objective.

Leachate Water Quality

Monitoring well TW-7 is completed within the fill area. I have examined the most recent water quality data for this well, as presented in Appendix E of the 2008 report. I note the following contaminants of concern:

- The *manganese* concentration ranged from 0.48 mg/l to 1.3 mg/l. These values are 9.6 to 26 times greater than the 0.05 mg/l aesthetic objective.

- The *iron* concentration ranged from 2.4 mg/l to 2.9 mg/L. These values are 8 to 10 times greater than the 0.3 mg/l aesthetic objective.

Overall, manganese concentrations were slightly lower compared to the preceding year, while iron concentrations increased slightly.

Downgradient Water Quality

I am satisfied that the extent of iron and manganese impacts have been determined. Downgradient monitor TW3-2 was impacted by manganese and iron.

Manganese levels were 2.2 to 2.4 times greater than the 0.05 mg/l provincial drinking water criterion. Iron levels slightly exceeded the 0.3 mg/l drinking water criterion during October 2007, but conformed to the criterion in April 2007.

There has been minimal change since the previous year. The situation should continue to be monitored.

GW/SW Interaction

I have previously concluded that no surface water receivers existed downgradient of the fill area in the immediate vicinity of the site. This assessment was based upon an examination of Ontario Base Map #10 17 7200 49150. Mr. Mark Phillips, a Regional Surface Water Scientist, has subsequently advised me that an evaluated wetland exists approximately 350 metres downgradient of the fill area.

The most recent groundwater monitoring data suggests that excessive leachate impacts in groundwater would not extent to the evaluated wetland. I conclude that the potential does not exist for surface water impacts via this pathway at this time.

Guideline B-7

The Warsaw Road Waste Disposal Site is closed. Guideline B-7 does not apply. I note that the manganese levels at downgradient monitor TW3-2 are more than twice the provincial drinking

water objective. Although no residential water wells appear to be under threat, monitoring of this situation should continue.

Groundwater Monitoring Program and Reporting

The existing groundwater monitoring frequency and analytical parameters are satisfactory for this site. I have examined the groundwater monitoring recommendations summarized in Section 8.0 of the appended Hydroterra report.

The consultant recommends abandonment of the last remaining bedrock monitoring well TW9-1. The consultant expressed concern that naturally salty water in the bedrock aquifer may pose a risk to the adjacent private water well. I do not object to the consultant's recommendation. I recommend that historical water level data and water quality data from TW9-1 continue to be provided in future monitoring reports.

The consultant proposes limiting landfill gas monitoring to monitors GP1 to GP6 inclusive, TW5-2 and TW6-2. This is satisfactory.

The consultant proposes continued monitoring of residential water wells designated as R1, R2, R3, and R4. This is satisfactory.

Shawn Kinney, P.Geo
SK/gl

c: Jacqueline Fuller (Peterborough Area Office)
Mark Phillips (Surface Water Scientist)
Peter Taylor (Water Resources Unit)
GW 03-03 (A340902) DODU Warsaw Road Landfill, Township of Duoro
SK #8848-7DSH4T

Ontario

Ministry of the Environment | Ministère de l'Environnement

CERTIFICATE OF APPROVAL
AIR
NUMBER 6001-5YWQSH

The Corporation of the Township of Douro-Dummer
PO Box 92
Warsaw, Ontario
K0L 3A0

Site Location: Warsaw Road Landfill,
Lot 8, Concession 5, Douro Ward
Douro-Dummer Township, County of Peterborough

You have applied in accordance with Section 9 of the Environmental Protection Act for approval of:

a passive landfill gas venting system serving a municipal landfill, consisting of two (2) vents, each having a diameter of 0.05 metre, extending 3.0 metres above grade;

in accordance with the application and all supporting information dated August 21, 2003, signed by D. Clifford.

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 works are located;

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

This Notice must be served upon:

The Secretary
Environmental Review Tribunal

The Director
Section 9, Environmental Protection Act

LAKEFIELD RESEARCH LIMITED
Environmental Services
RECEIVED
2004

2300 Yonge St., 12th Floor
P. Box 2382
nto, Ontario
...4P 1E4

AND

Ministry of Environment and Energy
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 works are approved under Section 9 of the Environmental Protection Act.

DATED AT TORONTO this 13th day of May, 2004

THIS CERTIFICATE WAS MAILED
ON May 17, 2004
QC
(Signed)

Neil Parrish, P.Eng.
Director
Section 9, *Environmental Protection Act*

QN/

District Manager, MOE Peterborough
Linda Elliott, SGS Lakefield Research Limited ✓

Ministry of Environment and Energy
Ministère de l'Environnement et de l'Énergie
2300 Yonge Street? Toronto ON M4S 1B2
APPROVALS BRANCH
3rd Floor
Tel: (416) 440-3544
FAX: (416) 440-6973

May 22, 1996

Clerk Administrator
The Township of Douro
General Delivery
Douro, Ontario
K0L 1S0

RECEIVED MAY 3 0 1996

Dear Sir/Madam:

Re: Notice of Amendment - Site Closure
Provisional Certificate of Approval No. A 340902
Township of Douro Waste Disposal Site

Enclosed is a copy of the Notice of Amendment for the above mentioned Provisional Certificate of Approval. The Notice provides for closure of this waste disposal site. In addition, it should be noted that Conditions 19 and 20 of this Notice require additional information with respect to the Surface Water Monitoring program and contingency plans. As such, for your assistance a copy of the Ministry's document entitled "MOEE Eastern Region - Surface Water Unit, Interim Guidance Document for the Development of Waste Disposal Site Contingency Plan Trigger for Surface Water" dated May 01, 1995 is attached.

Please note that all other terms and conditions as outlined in the original Certificate of Approval and all subsequent Notices remain unchanged.

I trust this document is adequate. If you have any questions, please feel free to contact Mr. J. Kaasalainen at (416) 440-7032.

Sincerely,

A. Dominski, P.Eng., Supervisor
Waste Unit

Encl.
JAK/es
cc: Brian Ward, Director, MOEE Southeastern Region
Richard Raeburn-Gibson, MOEE Peterborough District Office

TO: The Township of Douro
Douro, Ontario
K0L 1S0

You are hereby notified that the terms and conditions of Provisional Certificate of Approval No. A 3409[illegible] dated September 17, 1980, and all subsequent Notices are hereby amended as follows:

The waste disposal site shall be closed in accordance with the followi documents:

i. The document entitled "Leachate Attenuation Zone Assessment, Warsaw Ro (South) Waste Disposal Site, Part of Lot 8, Concession V, Township Douro, County of Peterborough, Certificate of Approval No. A 3409 dated September 29, 1995 by Lakefield Research Limited.

ii. The document entitled "Final Site Closure Plan, Township of Douro War Road (South) Landfill Site" dated October 1995 by Lakefield Reseal Limited.

In addition, the following conditions are added as part of this approval:

Surface Water

9. The Surface Water Monitoring program shall be revised to include th following information:

   a. identification of significant surface watercourses which are to be monitored for compliance;
   b. the establishment of monitoring locations at natural marsh/wetla surface waters; and
   c. the establishment and rationale for locating compliance locati stations.

   This work shall be done in consultation with the Ministry's Region Office.

10. A detailed surface water contingency plan complete with appropria trigger levels shall be submitted to the Regional Director for approv within 120 days of the issuance of this Notice. This contingency plan shall be done in consultation with the Ministry's Regional Office.

Contaminant Attenuation Zone/Buffer Lands

1. a. The Township shall undertake all necessary efforts to acquire or gain access agreements for the contaminant attenuation zone as described in document (i) above. Written documentation of the progress the Township is making in this regard shall be provided to the Regional Director on a monthly basis.

b. Within 120 days of acquiring or gaining access agreements for the contaminant attenuation zone the Township shall have a legal survey conducted of these lands, including all buffer lands, and have this Certificate registered as an Instrument in the appropriate Land Registry Office against the title of those lands. A duplicate registered copy of the Instrument shall be submitted to the Director.

Groundwater

2. a. Within three (3) months of obtaining control and/or access agreements for the contaminant attenuation zone, a multi-level monitoring well shall be constructed close to the new down-gradient property/attenuation zone boundary.

b. Within three (3) months of the issuance of this Notice, an early warning multi-level monitoring well shall be installed between the waste disposal site and the residential well No. 2 as described in the document entitled "Environmental Impact Assessment, Warsaw Road "South" Landfill Site, Township of Douro" dated April 1995 by Lakefield Research Limited.

These new proposed groundwater monitors shall be incorporated into the monitoring program and the groundwater contingency plans.

3. The Groundwater Monitoring program shall be revised as follows:

a. total organic carbon shall be added to the list of parameters to be tested for;
b. a volatile organic compound scan shall be performed on samples from Monitor TW7; and
c. the sampling frequency shall be revised to mid-April and late August/early September and shall include all multi-level monitoring wells.

4. The Township shall notify, in writing, the Regional Director of the abandonment of monitor TW 8 and the upgrade or abandonment of monitor TW3-1.

Landfill Gas

25. The landfill gas monitoring/contingency plan shall be revised follows:

a. If an exceedance of the landfill gas trigger level occurs dur any one of the sampling events, then two additional confirmato sampling events shall be conducted within 60 days of the init exceedance sampling event.

b. One additional gas probe shall be installed along the east property/buffer zone boundary. This gas probe shall incorporated into the monitoring program and the landfill g contingency plans.

The reason for this amendment is to ensure that the site is closed in an environmentally safe manner

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990 c. E-19, a may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, as amended provides the Notice requiring a 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.*

In addition to these legal requirements the Notice should also include:

3. *The name of the appellant;*
4. *The address of the appellant;*
5. *The 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 Appeal Board,
112 St. Clair Avenue West,
Suite 502,
Toronto, Ontario,
M4V 1N3

AND

The Director,
Section 39, Environmental Protection Act,
Ministry of Environment and Energy,
250 Davisville Avenue, 3rd Floor,
Toronto, Ontario,
M4S 1H2

DATED AT TORONTO this 22nd day of May, 1996.

A. Dominski, P. Eng.
Director
Section 39
Environmental Protection Act

Ministry of Environment and Energy

Ministère de l'Environnement et de l'Énergie

250 Davisville Avenue
Toronto ON M4S 1H2

250, avenue Davisville
Toronto ON M4S 1H2

APPROVALS BRANCH
2nd Floor
Tel. (416) 440-3544
Fax (416) 440-6973

September 30, 1994

Clerk Administrator
The Township of Douro
General Delivery
Douro, Ontario
K0L 1S0

Dear Sir/Madam:

Re: Notice of Amendment - Emergency Approval
Provisional Certificate of Approval No. A 340902
Township of Douro Waste Disposal Site

Enclosed is a copy of the Notice of Amendment for the above mentioned Provisional Certificate of Approval. The Notice provides for the continued use and operation of the waste disposal site until March 30, 1996, under Section 31, Emergency Approval, of the Environmental Protection Act.

Please note that all other terms and conditions as outlined in the original Certificate of Approval and all subsequent Notices remain unchanged.

I trust this document is adequate. If you have any questions, please feel free to contact Mr. J. Kassalainen at (416) 440-7032.

Yours truly,

A. Dominski, P.Eng., Acting Supervisor
Waste Sites & Systems Approvals Unit
Industrial Approvals Section

Encl.
JK/es
c.c.: Bryan Ward, Director, MOEE Eastern Region
Jacques Bourque, MOEE Peterborough District Office

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

NOTICE
1 of 4

TO: The Township of Doura
Doura, Ontario
K0L 1S0

You are hereby notified that the terms and conditions of Provisional Certificate of Approval No. A 340502, dated September 17, 1980, and all subsequent Notices are hereby amended as follows:

The Notice dated August 23, 1994 allowing for the continued use and operation of this waste disposal site under Section 31, Emergency Approval, of the Environmental Protection Act is amended by revoking condition 7 and replacing it with the following condition:

7. Waste can be disposed of at the site until March 30, 1996, in accordance with the following plans and specifications:

   i. The Application for a Certificate of Approval for a Waste Disposal Site (Landfill) and supporting documentation dated August 18, 1994.

   ii. The document entitled "The Corporation of the Township of Doura, Warsaw Road Waste Disposal Site, Provisional Certificate of Approval No. A 340502, Interim Site Development Plan and Operations Report", dated August 1994, by the Greer Galloway Group Incorporated.

   iii. Addendum No. 1, dated September 29, 1994, to the "Interim Site Development Plan and Operations Report" by the Greer Galloway Group Inc., dated August 1994.

In addition, the following conditions are included as part of this approval:

11. The Township shall undertake all necessary efforts to acquire or gain permanent control of a minimum 30 metre attenuation/buffer zone along the south, east, and west edges of the site, as mentioned in document (ii) above.

12. By June 30, 1995, the Township shall submit for the Director review an assessment of potential and existing impacts to surface water and groundwater resulting from the operation of the waste disposal site and the assessment shall be comprised of:

a. a surface water drainage and monitoring plan for the site including upstream or off-stream surface water monitoring station(s) for evaluating the background surface water quality;

b. expansion of the surface water monitoring program by including a sampling station at a permanently flowing location on Creek downstream from the waste disposal site to determine the impact of the waste disposal site on the water course and to include ambient water temperature as a sampling parameter

c. a groundwater impact assessment based on the Ministry's Policy 15-08, "The Incorporation of the Reasonable Use Concept into the Groundwater Management Activities of the Ministry of Environment and Energy", which shall include the following.

   i. the installation of a minimum of one up gradient nested groundwater monitor with one piezometer in each of the upper and lower aquifers for evaluating the background groundwater quality; and,

   ii. the installation of additional nested groundwater monitors in order to determine the vertical and horizontal extent of the contaminant plume and determine whether or not the site is in compliance with the Ministry's Reasonable Use Policy (Policy 15-08) at the property boundary or the proposed attenuation zone boundary.

These new proposed groundwater monitors shall be incorporated into the monitoring program.

13. A work plan shall be submitted to the Director, Eastern Region Ontario Ministry of the Environment and Energy, by November 1, 1994 with regards to the scheduling of the installation of the new groundwater monitoring wells as discussed in Condition 12(c).

14. By November 14, 1994, The Township shall submit to the Director for approval contingency plans to address contaminant migration of leachate related parameters at the site/attenuation zone boundary for both surface water and groundwater which do not comply with the Ministry of the Environment and Energy's Reasonable Use objective for groundwater and/or with the Provincial Water Quality Objective for surface water.

Ministry of Environment and Energy

Ministère de l'Environnement et de l'Énergie

Ontario

15. If for any reason(s) the Township fails to establish the attenuation zone as per condition 11 by June 30, 1995, then a detailed plan of mitigation measures to address off-site contaminant migration for both surface and groundwater which do not comply with the Ministry of the Environment and Energy's Reasonable Use objectives for groundwater and/or with the Provincial Water Quality Objectives for surface water shall be submitted to the Director for approval by September 30, 1995.

16. If the continued interim use of the site is required at the end of this emergency period then an application for an interim expansion pursuant to Section 30 of the Environmental Protection Act shall be submitted to the Director for approval by June 30, 1995.

17. If closure of the site is required at the end of this emergency period then a Closure Plan, as per Appendix VII, "Approvals Requirements and Process, Section I, Closure of a Landfill Site" of the Ministry of the Environment and Energy Approvals Branch document entitled "Guide for Applying for Certificates of Approval, Waste Disposal Sites (Landfills, Transfer or Processing)", dated September 1992 shall be submitted to the Director for approval by June 30, 1995.

18. If closure of the site is required at the end of this emergency period then final cover shall be constructed to a final grade of between 5 and 25 percent as per Ministry of the Environment and Energy guidelines.

The reason for this amendment is that an emergency situation with respect to waste disposal exists for the Township of Douro. The continued use of the site is to allow sufficient time for the Township to determine, evaluate, and implement alternative solutions for alleviating the emergency situation.

The conditions added to this certificate are to ensure that the waste disposal site is operated in an environmentally safe manner.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990 c. E-19, 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 142 of the Environmental Protection Act, as amended provides that the Notice requiring a 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.*

Ministry of Environment and Energy

Ministère de l'Environnement et de l'Énergie

NOTICE

In addition to these legal requirements the Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The 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:

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

AND

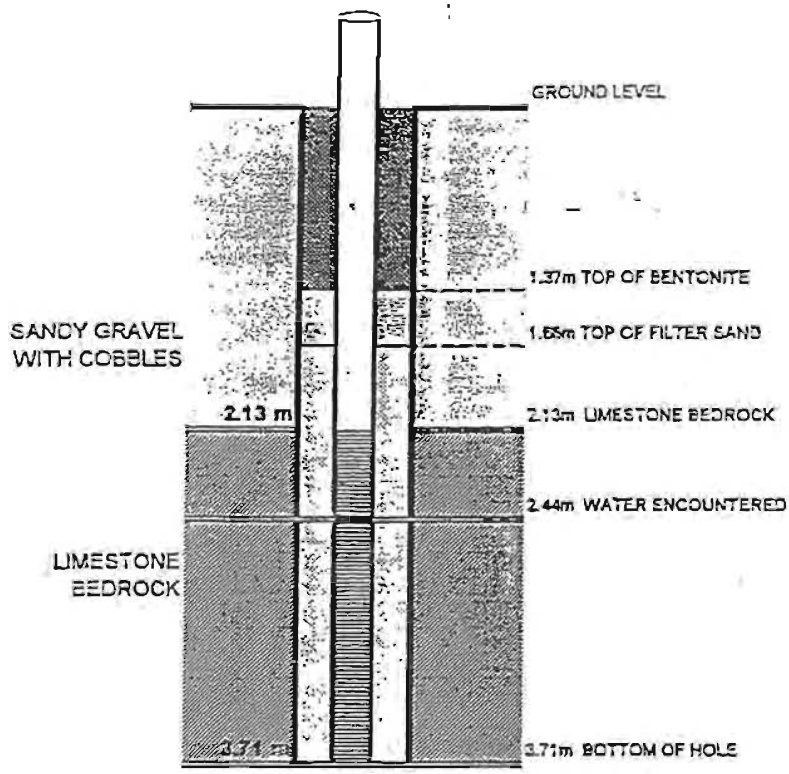
The Director,
Section 39, Environmental Protection Act,
Ministry of Environment and Energy,
250 Davisville Avenue
Toronto, Ontario,
M4S 1H2

DATED AT TORONTO this 30th day of September, 1994.

W. Ng, P.Eng.
Director
Section 39
Environmental Protection Act

Appendix B
Monitoring Well Details and Borehole Data

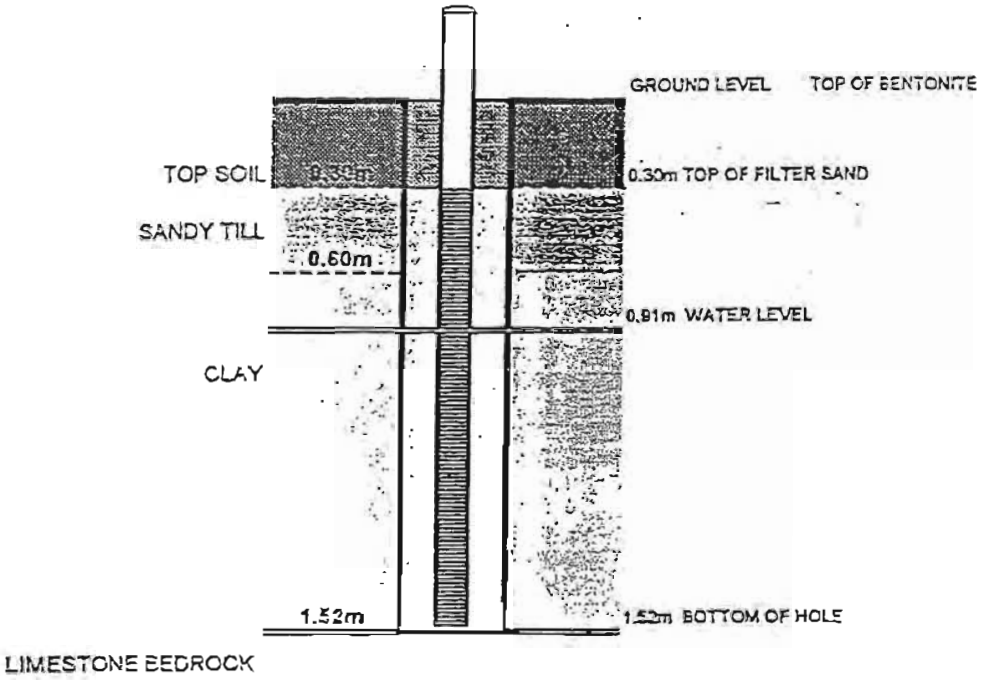
TW - 1 DOURO LANDFILL SOUTH SITE



ENVIRONMENTAL SERVICES
LAKEFIELD, ONTARIO
K0L 2H0, (705) 652-2020

LAKEFIELD RESEARCH LIMITED

TW - 2 DOURO LANDFILL SOUTH SITE



STRATIGRAPHY LEGEND

- TOP SOIL
- SANDY TILL
- CLAY

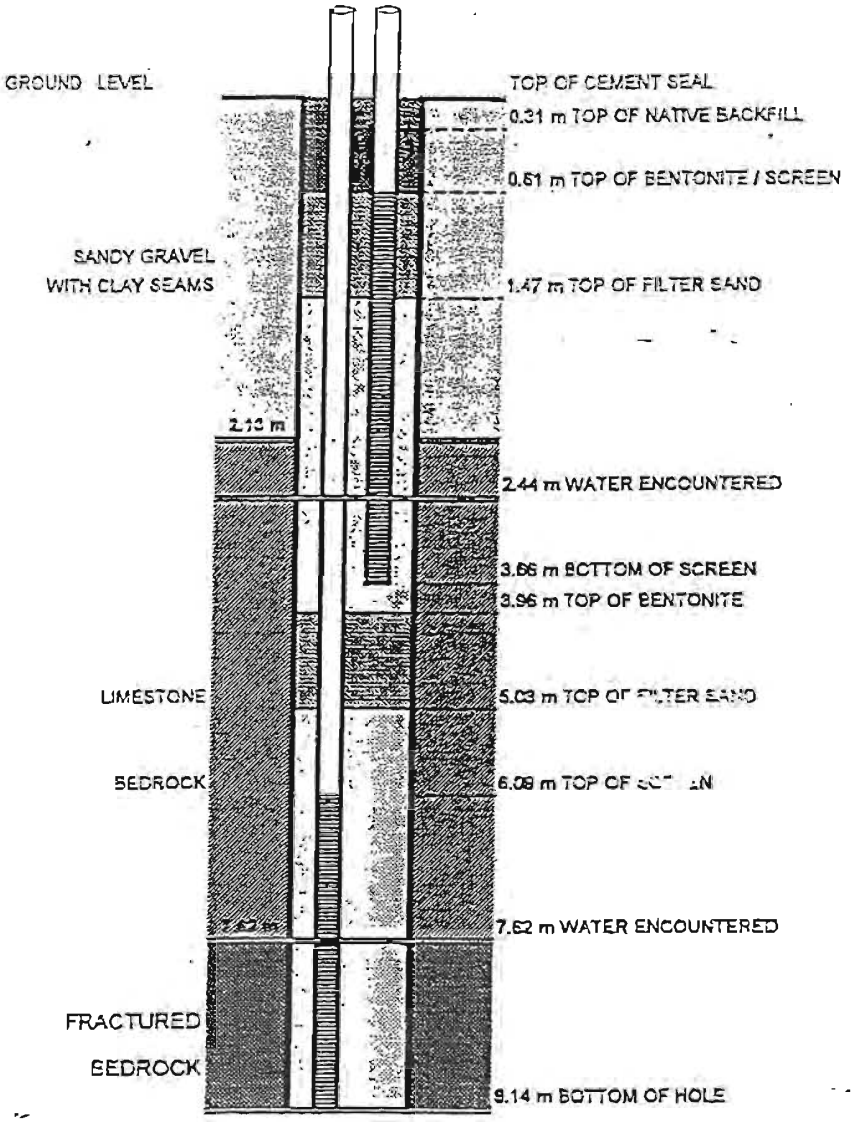
BORE HOLE LEGEND

- SCREEN
- BENTONITE HOLE PLUG
- FILTER SAND

ENVIRONMENTAL SERVICES
LAKEFIELD, ONTARIO
K0L 2H0, (705) 652-2020

LAKEFIELD RESEARCH LIMITED

TW - 3 DOURO LANDFILL SOUTH SITE



STRATIGRAPHY LEGEND

- SANDY GRAVEL WITH CLAY SEAMS
- LIMESTONE BEDROCK
- FRACTURED LIMESTONE BEDROCK

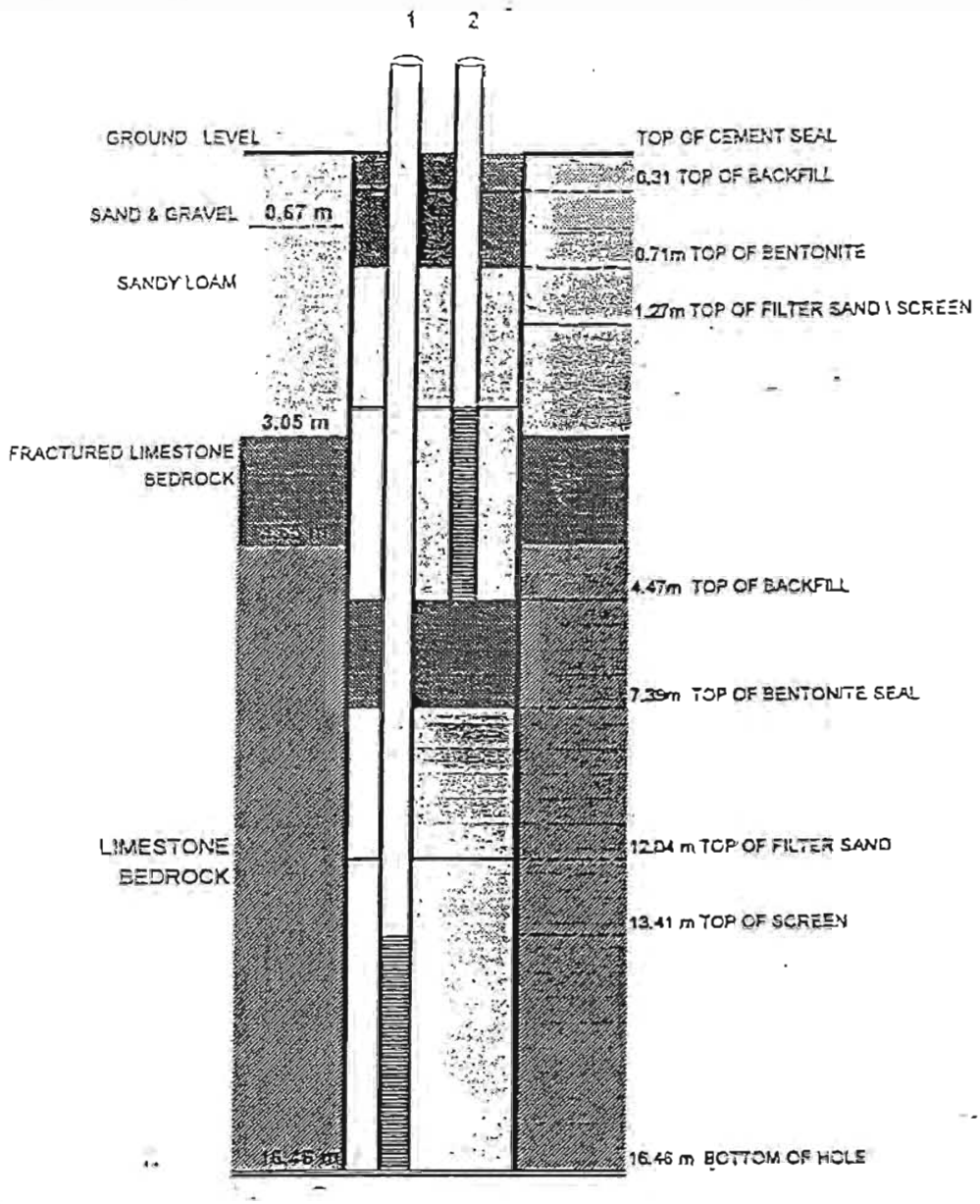
BORE HOLE LEGEND

- CEMENT SEAL
- NATURAL BACKFILL
- BENTONITE HOLE PLUG
- FILTER SAND

ENVIRONMENTAL SERVICES
LAKEFIELD, ONTARIO
K0L 2H0, (705) 652-2020

LAKEFIELD RESEARCH LIMITED

94TW - 4 DOURO LANDFILL SOUTH SITE



STRATIGRAPHY LEGEND

- SAND AND GRAVEL
- SANDY LOAM
- FRACTUERED LIMESTONE BEDROCK
- LIMESTONE BEDROCK

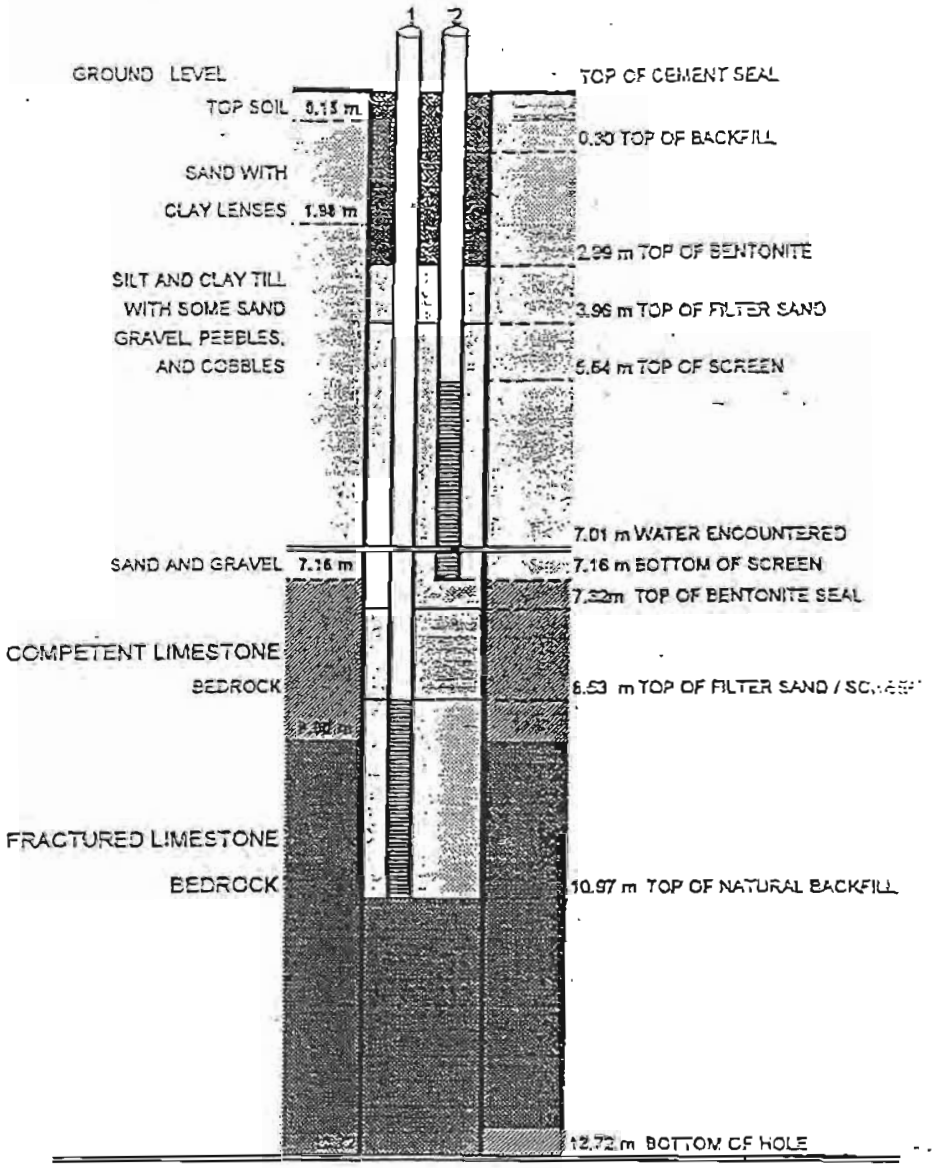
BOREHOLE LEGEND

- CEMENT SEAL
- NATURAL BACKFILL
- BENTONITE HOLE PLUG
- FILTER SAND

ENVIRONMENTAL SERVICES
LAKEFIELD, ONTARIO
K0L 2H0, (705) 652-2020

LAKEFIELD RESEARCH LIMITED

94TW - 5 DOURO LANDFILL SOUTH SITE



STRATIGRAPHY LEGEND

- TOP SOIL
- SILT .....COBBLES
- SAND AND GRAVEL
- COMPETENT LIMESTONE BEDROCK
- FRACTURED LIMESTONE BEDROCK

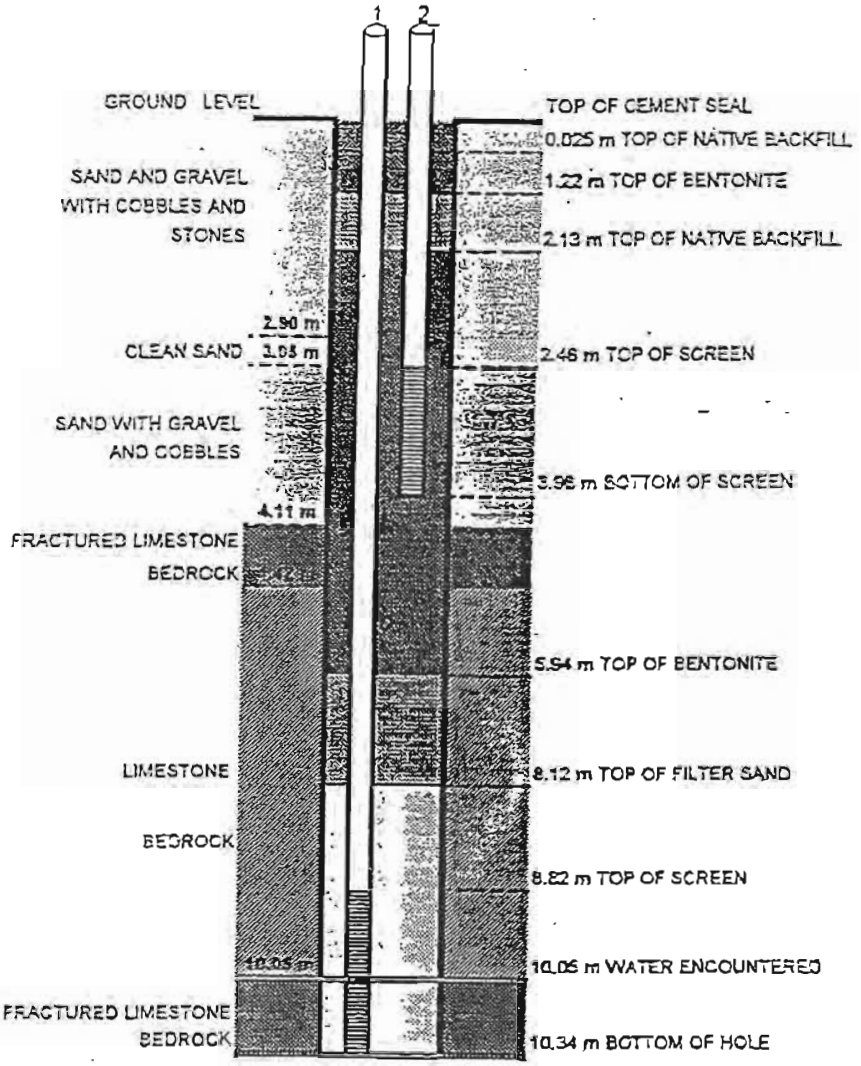
BORE HOLE LEGEND

- CEMENT SEAL
- NATURAL BACKFILL
- BENTONITE HOLE PLUG
- FILTER SAND

ENVIRONMENTAL SERVICES
LAKEFIELD, ONTARIO
K0L 2H0, (705) 652-2020

LAKEFIELD RESEARCH LIMITED

94TW - 6 DOURO LANDFILL SOUTH SITE



STRATIGRAPHY LEGEND

- SAND AND GRAVEL ..... STONES
- CLEAN SAND
- SAND WITH GRAVEL AND COBBLES
- LIMESTONE BEDROCK
- FRACTURED LIMESTONE BEDROCK

BORE HOLE LEGEND

- CEMENT SEAL
- NATURAL BACKFILL
- BENTONITE HOLE PLUG
- FILTER SAND

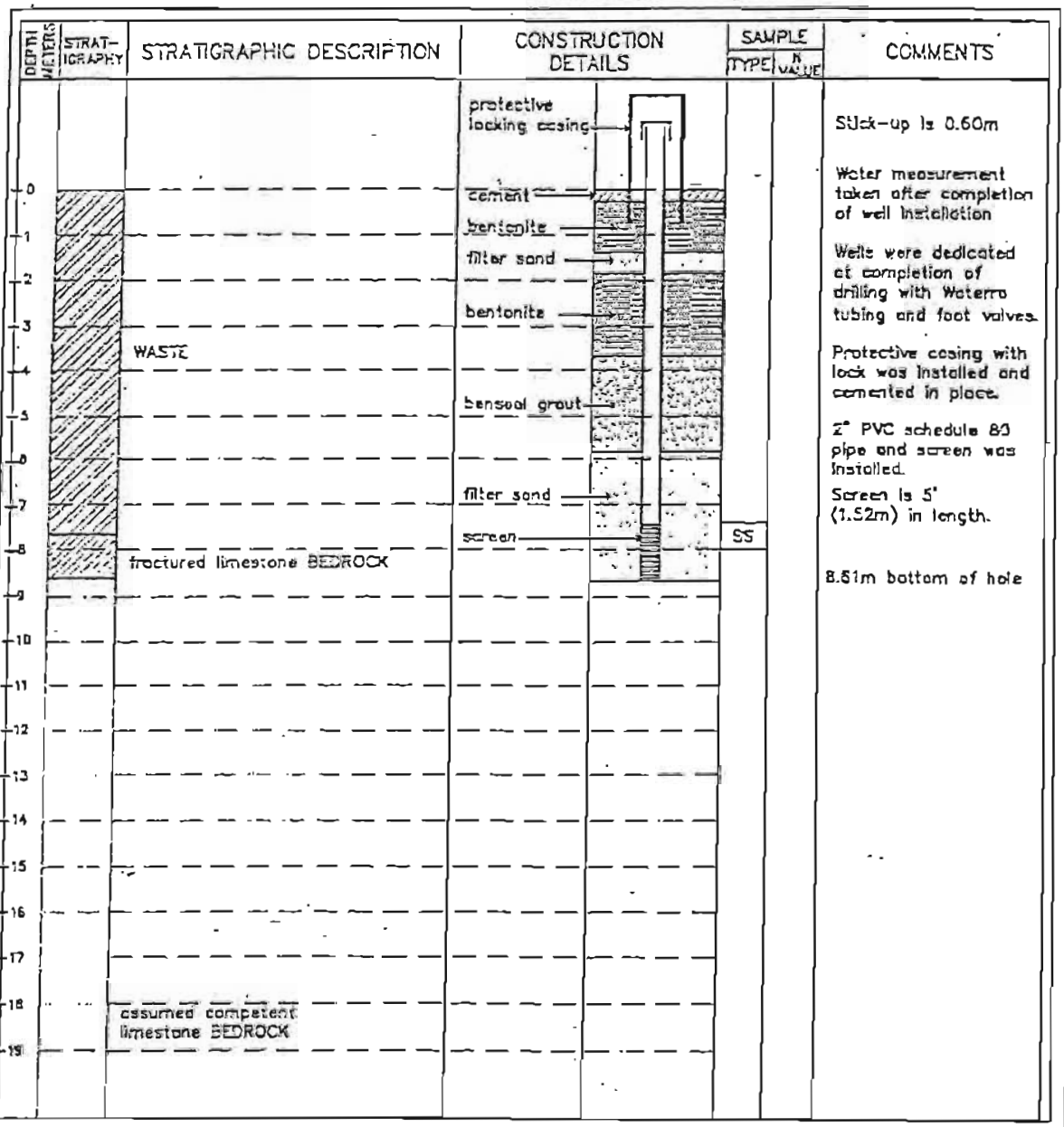
ENVIRONMENTAL SERVICES
LAKEFIELD, ONTARIO
K0L 2H0, (705) 652-2020

LAKEFIELD RESEARCH LIMITED

BOREHOLE LOG # TW 7

PROJECT NAME	LOGGED BY
DOURO SOUTH LANDFILL SITE	D. BUCHOLTZ

DRILLING METHOD	PROJECT No	DATE DRILLED	GROUND ELEV.	SCALE
HOLLOW STEM AUGERS	7777-079	AUG 16, 1995	100.35	1:125



LAKEFIELD RESEARCH

ENVIRONMENTAL SERVICES
LAKEFIELD, ONTARIO
K0L 2H0, (705) 652-2020

BOREHOLE LOG # TW 8-1

PROJECT NAME	LOGGED BY
DOURO SOUTH LANDFILL SITE	D. BUCHOLTZ

DRILLING METHOD	PROJECT No	DATE DRILLED	GROUND ELEV.	SCALE
HOLLOW STEM AUGERS	7777-079	AUG 16, 1995	96.30	1:125

DEPTH METRES	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	CONSTRUCTION DETAILS	SAMPLE TYPE	SAMPLE N VALUE	COMMENTS
0		dark brown organic TOP SOIL light brown SANDY GRAVEL	protective locking casing cement bentonite	SS		Stick-up is 0.84m
1		light brown hard fine SAND with some PEBBLES		SS		
2			water	SS		water measurement taken after completion of well installation
3		grey hard SILTY SAND		SS		
4		grey hard wet SILTY SAND		SS		Wells were dedicated at completion of drilling with Waterra tubing and foot valves.
5		possible gravel, no sample in split spoon		SS		
6		grey hard dry SILTY SAND		SS		Protective casing with lock was installed and cemented in place.
7		grey hard wet SILTY SAND grey hard dry SILTY SAND competent limestone BEDROCK		SS		2" PVC schedule 80 pipe and screen was installed.
8		*fracture zone				
9		competent limestone BEDROCK				SS=split spoon sample samples collected at 2ft (0.61m) intervals
10		*fracture zone	benseal grout			
11		competent limestone BEDROCK				
12						
13		competent limestone BEDROCK	bentonite			Screen is 5' (1.52m) in length.
14						
15			filter sand			
16			screen			16.55m bottom of hole
17						
18		assumed competent limestone BEDROCK				
19						
		*as noted from drill core				

LAKEFIELD RESEARCH

ENVIRONMENTAL SERVICES
LAKEFIELD, ONTARIO
K0L 2H0, (705) 652-2020

LAKEFIELD RESEARCH LIMITED

BOREHOLE LOG

BOREHOLE LOG #	PROJECT NAME	LOGGED BY
TW 8-1	DOURO SOUTH LANDFILL SITE	D. BUCHOLTZ

DRILLING METHOD	PROJECT No	DATE DRILLED	GROUND ELEV.	SCALE
HOLLOW STEM AUGERS	7777-079	AUG 16, 1995	96.30	1:125

DEPTH METERS	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	CONSTRUCTION DETAILS	SAMPLE TYPE	SAMPLE N VALUE	COMMENTS
0			protective locking casing			
0		dark brown organic TOP SOIL	cement	SS		
0		light brown SANDY GRAVEL	bentonite	SS		Stick-up is 0.84m
1		light brown hard fine SAND with some PEBBLES		SS		
2			water	SS		water measurement taken after completion of well installation
3		grey hard SILTY SAND		SS		
3		grey hard wet SILTY SAND		SS		Wells were dedicated at completion of drilling with Waterra tubing and foot valves.
4				SS		
5		possible gravel, no sample in split-spoon		SS		
5		grey hard dry SILTY SAND		SS		Protective casing with lock was installed and cemented in place.
6		grey hard wet SILTY SAND		SS		
7		grey hard dry SILTY SAND		SS		
7		competent limestone BEDROCK				2" PVC schedule 80 pipe and screen was installed.
8		*fracture zone				
8		competent limestone BEDROCK				SS=split spoon sample samples collected at 2ft (0.61m) intervals
9		*fracture zone				
10			benseal grout			
11		competent limestone BEDROCK				
12						
13		competent limestone BEDROCK	bentonite			Screen is 5' (1.52m) in length.
14						
15			filter sand			
15			screen			
16						16.56m bottom of hole
17						
18		assumed competent limestone BEDROCK				
19						
		*as noted from drill core				

LAKEFIELD RESEARCH

ENVIRONMENTAL SERVICES
LAKEFIELD, ONTARIO
K0L 2H0, (705) 652-2020

BOREHOLE LOG — TW 8-2

PROJECT NAME	LOGGED BY
DOURO SOUTH LANDFILL SITE	D. BUCHOLTZ

DRILLING METHOD	PROJECT No	DATE DRILLED	GROUND ELEV.	SCALE
HOLLOW STEM AUGERS	7777-079	AUG 16, 1995	95.29	1:125

DEPTH METERS	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	CONSTRUCTION DETAILS	SAMPLE TYPE	SAMPLE N VALUE	COMMENTS
0		dark brown organic TOP SOIL light brown SANDY GRAVEL	protective locking casing cement bentonite			Stick-up is 0.85m
1		light brown hard fine SAND with some PEBBLES				Water measurement taken after completion of well installation
2						Wells were dedicated at completion of drilling with Waterra tubing and foot valves.
3		grey hard SILTY SAND				
4		grey hard wet SILTY SAND	benseal grout			Protective casing with lock was installed and cemented in place.
5		possible gravel, no sample in split spoon	bentonite			
6		grey hard dry SILTY SAND				2" PVC schedule 80 pipe and screen was installed.
7		grey hard wet SILTY SAND grey hard dry SILTY SAND	screen filter sand			Screen is 5' (1.52m) in length.
8		competent limestone BEDROCK *fracture zone				7.61m bottom of hole
9		competent limestone BEDROCK				
10		*fracture zone				
11						
12						
13						
14		competent limestone BEDROCK (from TW 8-1 well log data)				
15						
16						
17						
18		assumed competent limestone BEDROCK				
19						
		* as note ifom drill core				

LAKEFIELD RESEARCH

ENVIRONMENTAL SERVICES
LAKEFIELD, ONTARIO
K0L 2H0, (705) 652-2020

LAKEFIELD RESEARCH LIMITED

BOREHOLE LOG

BH9-1

PROJECT NAME: TOWNSHIP OF DOURO WARSAW ROAD LANDFILL			LOGGED BY: D. BUCHOLTZ, LAKEFIELD RESEARCH LIMITED
DRILLING METHOD: HOLLOW STEM AUGER	PROJECT No: 7777-369	DATE DRILLED: AUGUST 20, 1997	GROUND ELEV.: N/A
			SCALE: NTS

DEPTH METERS	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	CONSTRUCTION DETAILS	SAMPLE TYPE	SAMPLE N VALUE	COMMENTS
0		ORGANIC, overburden	PROTECTIVE CASING; CEMENT			Drilling commenced 08:00hrs, Aug 20/97. Well instrumented with dedicated inertia pump upon completion. TW9-1 has 50MM PVC Schedule 40 riser pipe and 1.52m No.10 slotted screen
1		SILT, sandy, rocks, brown, wet				
2						
3		SILT, clayey, rocks, grey, moist				
4						
5		SILT, clayey, rocks, grey, dry dense	BENTONITE			
6						
7						
8		BEDROCK, limestone heavily fractured				Water was encountered @ 10.85m (35.6ft) below grade.
9						
10		BEDROCK, limestone	SILCA SAND			Bottom of hole at 11.34m (37.2ft) below grade.
11						
12			BENTONITE			
13						
14						
15						
16						
17						
18						
19						

LAKEFIELD RESEARCH LIMITED
ENVIRONMENTAL SERVICES

185 CONCESSION STREET
LAKEFIELD, ONTARIO, CANADA

21, 1st AVENUE
SCHUMACHER, ONTARIO, CANADA

BOREHOLE LOG BH9-2

PROJECT NAME	LOGGED BY
TOWNSHIP OF DOURO WARSAW ROAD LANDFILL	D. BUCHOLTZ LAKEFIELD RESEARCH LIMITED

DRILLING METHOD	PROJECT No	DATE DRILLED	GROUND ELEV.	SCALE
HOLLOW STEM AUGER	7777-369	AUGUST 20, 1997	N/A	NTS

DEPTH METERS	STRAT-IGRAPHY	STRATIGRAPHIC DESCRIPTION	CONSTRUCTION DETAILS	SAMPLE TYPE	SAMPLE N VALUE	COMMENTS
0		ORGANIC, overburden	PROTECTIVE CASING CEMENT			Drilling commenced 08:00hrs, Aug 20/97 Well instrumented with dedicated inertia pump upon completion. TW9-2 has 50MM PVC Schedule 40 riser pipe and 1.52m No.10 slotted screen Water was encountered @ 3.00m (9.8ft) below grade. Bottom of hole at 6.91m (22.67ft) below grade.
1		SILT, sandy, rocks, brown, wet	BENTONITE			
2						
3		SILT, clayey, rocks, grey, moist				
4			SILCA SAND			
5		SILT, clayey, rocks, grey, dry dense				
6						
7			BENTONITE			
8		BEDROCK, limestone heavily fractured				
9						
10						
11		BEDROCK, limestone				
12						
13						
14						
15						
16						
17						
18						
19						

LAKEFIELD RESEARCH LIMITED
ENVIRONMENTAL SERVICES

185 CONCESSION STREET
LAKEFIELD, ONTARIO, CANADA

21, 1st AVENUE
SCHUMACHER, ONTARIO, CANADA

Ministry of Environment and Energy, Ontario

WATER WELL RECORD

Print only in spaces provided. Mark correct box with a checkmark, where applicable.

Watson Road

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
PETERBOROUGH	DOURO	5	8
Owner's surname: TOWNSHIP OF DOURO	Address: DOURO ONT.	Date: 24 05 97	

LOG OF OVERBURDEN AND BEDROCK MATERIALS

NOTE: WELL ABANDONMENT
T.W.3-1 NORMALLY A FLOWING WELL
WAS NOT FLOWING AT TIME OF
ABANDONMENT.

SOUTH LAND FILL.

CASING & OPEN HOLE RECORD: 2" ... N/A

SCREEN: 2" P.V.C

PLUGGING & SEALING RECORD: #3 130' BENTONITE

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.

PTBO COUNTY RD #4

N

LANDFILL AREA

TW3-1 @ 1000'

TWF ... RD ... HH

171309

FINAL STATUS OF WELL

WATER USE

METHOD OF CONSTRUCTION

Name of Well Contractor: TRINOUR DRILLING — Contractor's Licence No. 6778

Address: RR#2 LAKEFIELD ONT

Name of Well Technician: PATRICK O'BRIEN — T2155

Submission date: 24 05 97

MINISTRY USE ONLY

ENVIRONMENTAL SERVICES
LAKEFIELD, ONTARIO
K0L 2H0, (705) 652-2020

LAKEFIELD RESEARCH LIMITED

WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

'Watson Road

County or District	Township/Borough/City/Town/Village	Con	Lot
PETIT POPOUCH	DOURO	5	8
Owner's surname / First name	Address	Date	
TOWNSHIP OF DOURO	DOURO ONT.	24 08 97	

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	To
NOTE:	WELL	ABANDONMENT.			
	TW 4-1				
	SOUTH LAND FILL.				

WATER RECORD

CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	To
2"		SCH 40		

SCREEN

Slot No.	Diameter	Length
	2"	
Material and type: P.V.C.		

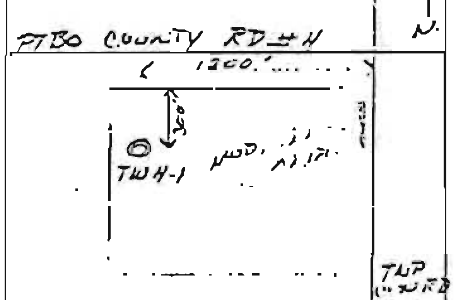
PLUGGING & SEALING RECORD

Depth set at - feet From	To	Material and type (Cement grout, bentonite, etc.)
2	15.4	BENTONITE.

PUMPING TEST

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



371313

FINAL STATUS OF WELL

WATER USE

METHOD OF CONSTRUCTION

Name of Well Contractor	Well Contractor's Licence No.
TRIAQUA DRILLING	6778
Address: RR#2 LAKEFIELD ONT.	
Name of Well Technician: PATRICK O'BRIEN	Well Technician's Licence No.: T2655
Signature of Technician/Contractor	Date: 24 08 97

MINISTRY USE ONLY

OWNER'S COPY

ENVIRONMENTAL SERVICES
LAKEFIELD, ONTARIO
K0L 2H0, (705) 652-2020

LAKEFIELD RESEARCH LIMITED

Ministry of Environment and Energy

WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark where applicable.

Warsaw Road

County or District	Township, Village or Town	Con.	Lot
PETERBOROUGH	DUMMER	5	8
Owner's surname	First name	Address	Date
TOWNSHIP OF DUMMER	DUMMER ONT		24 08 97

LOG OF OVERBURDEN AND BEDROCK MATERIALS

General colour	Most common material	Other materials	Depth - feet
NONE WITH	ABANDONMENT		
TW 8-V			
SOUTH LAND FILL			

WATER RECORD

CASING & OPEN HOLE RECORD

SCREEN

PLUGGING & SEALING RECORD

+3 KHB BENTONITE

PUMPING TEST

FINAL STATUS OF WELL

WATER USE

METHOD OF CONSTRUCTION

LOCATION OF WELL

FILED COUNTY RD = N

LANDFILL AREA

100'

300'

TWS-1

TWP RD = N

171314

Name of Well Contractor	Well Contractor's Licence No.
TRIACTA DRILLING	6778
Address of Well Contractor	
RR 2 LAKEFIELD ONT	
Name of Well Technician	Well Technician's Licence No.
PATRICK O'BRIEN	T 2455
Signature of Well Technician	Date
	24 09 97

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Appendix C
Established Monitoring Program and Sampling Protocol

SECTION I: GROUNDWATER MONITORING AND SAMPLING PROTOCOL

1.0 WATER LEVEL MEASUREMENTS

1. Prior to purging/sampling, water levels shall be measured by the wetted-taped method or with an electric depth gauge to the nearest 0.01 metres (or 0.01 feet).
2. MEASUREMENTS SHALL BE TAKEN WITHOUT THE REMOVAL OF THE DEDICATED SAMPLING DEVICE. (tubing and foot-valve arrangements).
3. MEASUREMENTS SHALL BE TAKEN FROM TOP OF THE MONITORED WELL. IN MOST CASES, THE MEASUREMENT WILL BE TAKEN FROM TOP OF THE PVC CASING AND NOT THE TOP OF THE PROTECTIVE CASING.
4. Measurements shall be recorded on FORM 1 for each specific monitor in the log book, indicating MEASURING POINT.
5. Rinse tip of measuring device with distilled water after taking measurement in each monitor.

2.0 PURGING PROCEDURE

1. Prior to sampling, each well shall be purged to remove the stagnant water within the casing.
2. THREE CASING VOLUMES SHALL BE REMOVED BY THE DEDICATED SAMPLERS OR BY BAILER FROM THE WELLS WITH MODERATE INFLOW. THE PURGED WATER SHALL BE MEASURED INTO A CALIBRATED CONTAINER AND THE VOLUME REMOVED SHALL BE RECORDED ON FORM 2 FOR THE SPECIFIC MONITOR IN THE LOG BOOK.
3. SLOW INFLOW MONITORS SHALL BE PURGED ENTIRELY DRY. THE VOLUME OF PURGED WATER SHALL BE RECORDED IN FORM 2 FOR THE SPECIFIC MONITOR ON THE LOG BOOK.

2.0 PURGING PROCEDURE (cont'd)

4. The volume of standing water in each monitor shall be calculated from the highest recorded static level and the total well depth and recorded on FORM 2. This volume will not appreciably change with seasonal fluctuations and may be used as the uniform standard in determining the purged volume during each sampling survey.

5. Conductivity, temperature and pH values shall be recorded after the removal of each casing volume to confirm stabilized quality conditions. When this field-measurement program is initiated, these quality results may be utilized to determine if the purged volume may be reduced to two casing volumes. Field monitoring equipment shall be calibrated each day prior to use, and results noted on FORM 6.

3.0 SAMPLING/SUBMISSION PROCEDURE

1. Suitable sample bottles (containing premeasured preservatives, as required) and QA/QC blanks shall be obtained from the analyzing laboratory in advance of the sampling program. The number and type of field and spiked blanks shall be determined by prior consultation with the laboratory representative.

2. Samples shall be collected the day following the purging exercise (to permit water-level recovery in the slower responding monitors) by means of the dedicated samplers in all monitor wells.

3. Sample collection shall be undertaken in the following sequence, as necessary:

- Volatile organics
- Pesticides/herbicides
- Phenolics
- Heavy metals
- General chemistry

SECTION I: GROUNDWATER MONITORING AND SAMPLING PROTOCOL

3.0 SAMPLING/SUBMISSION PROCEDURE (cont'd)

4. Samples collected for heavy-metal determinations (which include iron and manganese) shall be field filtered before placement into sample bottle containing the acid preservative. If appreciable sediment occurs in the sample and filtering cannot be undertaken, a sample shall be collected in a bottle without preservative, and the sediment shall be allowed to settle before a sample is decanted into a bottle without preservative for subsequent filtration and analysis by the laboratory.

5. Sample collected for volatile organics shall completely fill the sample bottle, with no air space permitted.

6. PLACE SAMPLES INTO A COOLER WITH PRE-FROZEN ICE PACKS AND DELIVER TO LABORATORY WITHIN 24 HOURS AFTER COMPLETION OF PROGRAM.

7. Sampling information shall be recorded on FORM 3 of the log book.

8. Each sample bottle shall be labelled to indicate the project name, well designation, time of sample collection, preservatives added and analyses to be performed.

9. If submitted to other than the MOE, a chain of custody form shall be completed and submitted together with the samples to the laboratory.

SECTION II: SURFACE WATER MONITORING AND SAMPLING PROTOCOL

1. Water samples shall be collected upstream, opposite and downstream from the landfill side of the watercourse.
2. Sampling shall be preferably undertaken under baseflow conditions (to observe maximum quality impact). Thus, there shall be several days without precipitation antecedent to the sampling survey.
3. Sampling shall be preferably undertaken when the stream has a discernable flow. Sampling of pondings shall be discouraged unless representative of the local conditions.
4. Samples shall be collected at mid-depth in the stream (to prevent the uptake of bottom sediments) and preferably from the middle of the stream. Remove bottle cap when sampling point reached and point bottle opening opposite direction of flow.
5. Samples shall be directly collected into the sample bottles (with or without preservatives, as required) WITHOUT filtering.
6. Field measurements shall be taken of the temperature, conductivity, and pH at each sampling station when samples are collected for chemical analysis. Additionally, the stream and weather conditions shall be noted and the prevailing flow shall be determined by estimation of the stream depth, width and the current velocity.
7. Pertinent information on the stream conditions shall be recorded for each station during each site visit on FORM 4 of the log book.
8. Any digitally-metered instrument used to obtain field measurements (other than temperature) shall be calibrated before and after the sampling survey to ensure reliable results.

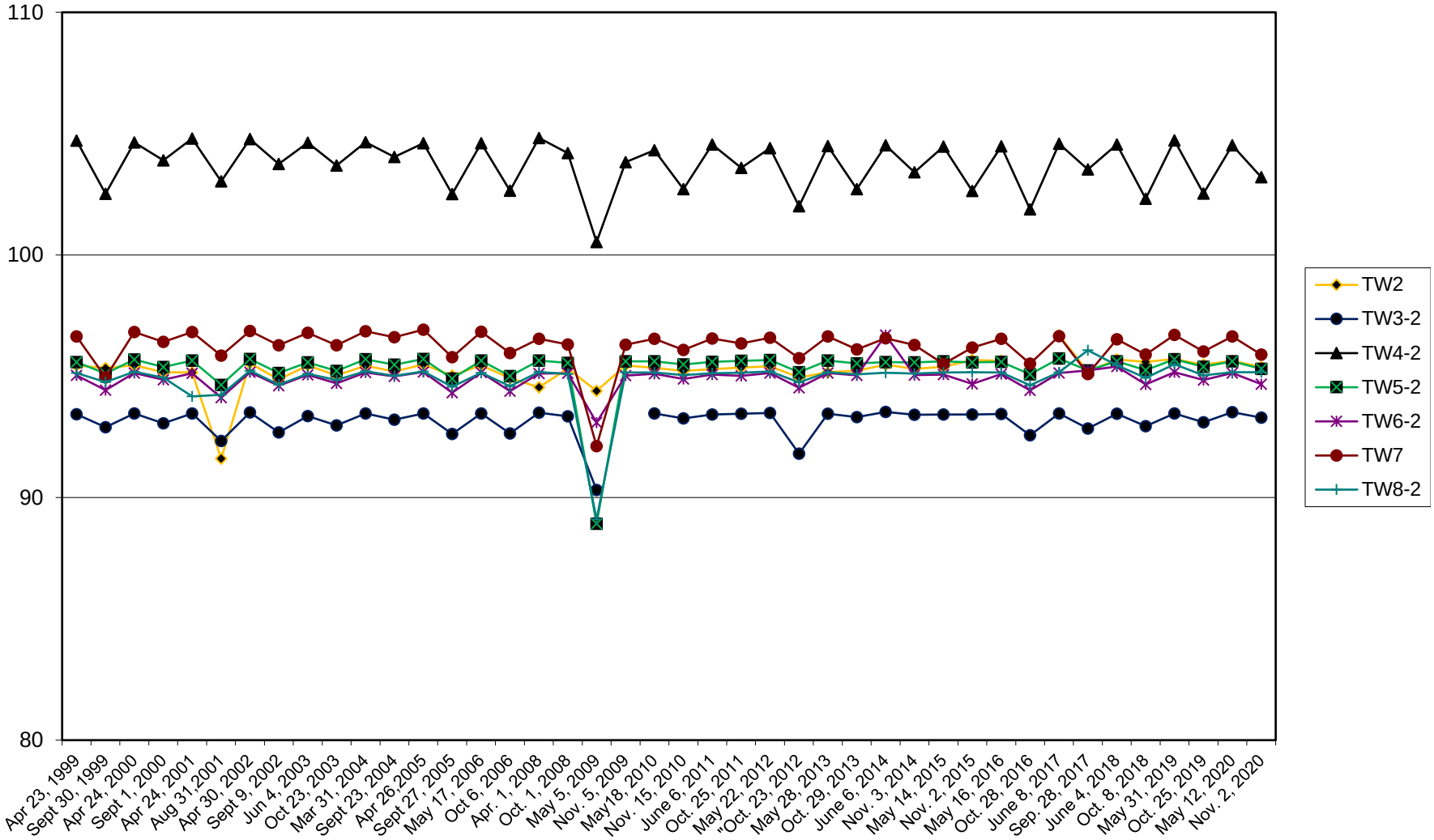
SECTION III: COMBUSTIBLE GAS MONITORING PROTOCOL

1. Prior to the field survey, the combustible gas detector shall be calibrated to ensure acceptable gas measurements.
2. When measuring the gas concentration in any probe, a specific sequence shall be followed:
   - i) Thoroughly purge by aspirating atmospheric air through instrument.
   - ii) Zero high-level (0-100 percent) and low-level (0-5 percent) detection scales.
   - iii) Aspirate gas from probe initially USING THE HIGH SCALE (0-100 percent) until a steady reading is observed on the scale.
   - iv) If a gas concentration below 5 percent is indicated, set to low-level scale (0-5 percent) and aspirate until a steady reading is observed on the scale.
   - v) Conclude test by purging instrument with atmospheric air.
3. Combustible gas presence/absence and concentrations shall be recorded on FORM 5 of the log book.

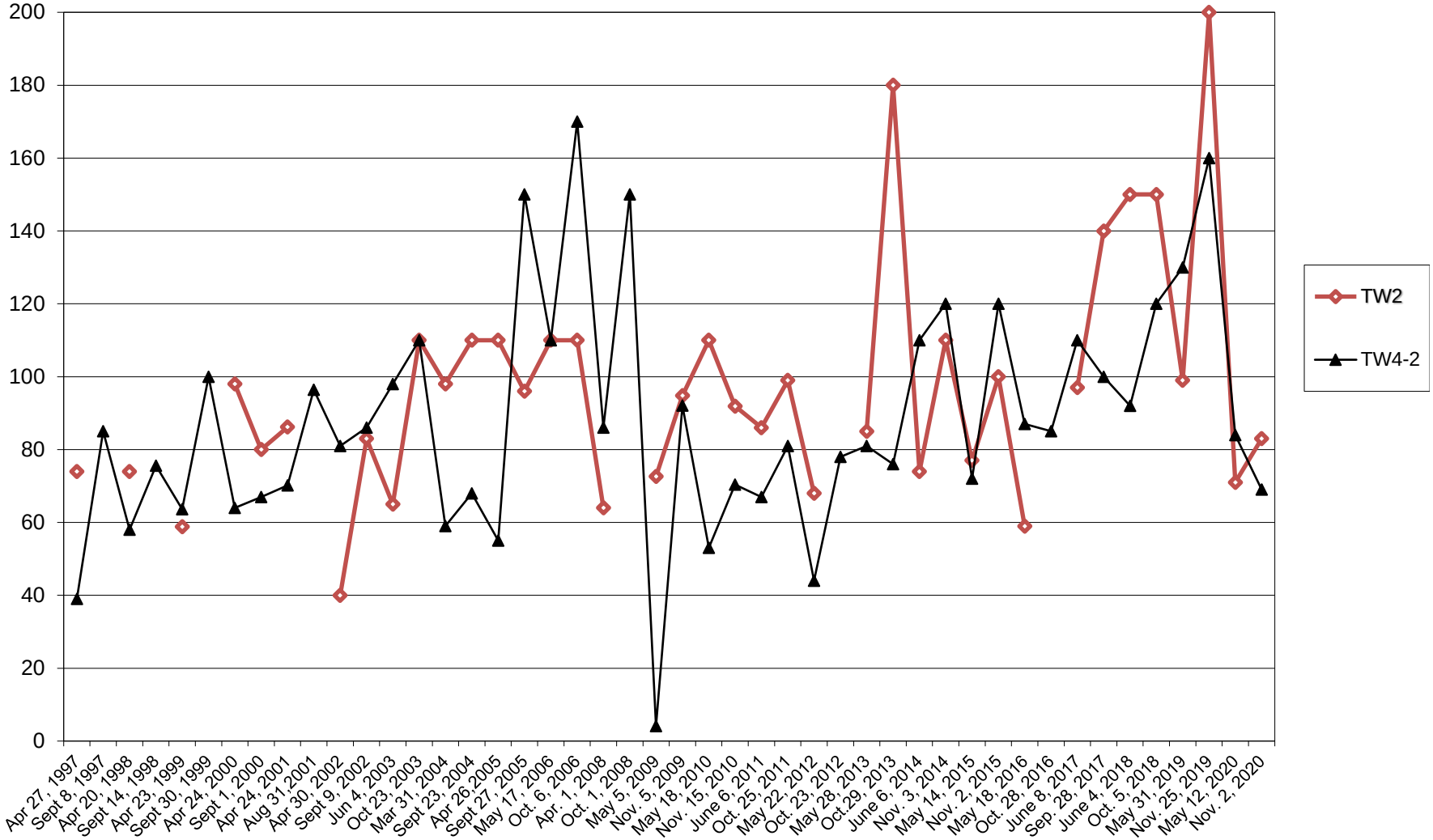
Appendix D

Water Hydrographs, Chemical Comparison Graphs, Hydraulic Conductivity Graphs

WATER LEVELS
WARSAW ROAD LAND FILL SITE



CHLORIDE - WARSAW ROAD LAND FILL SITE



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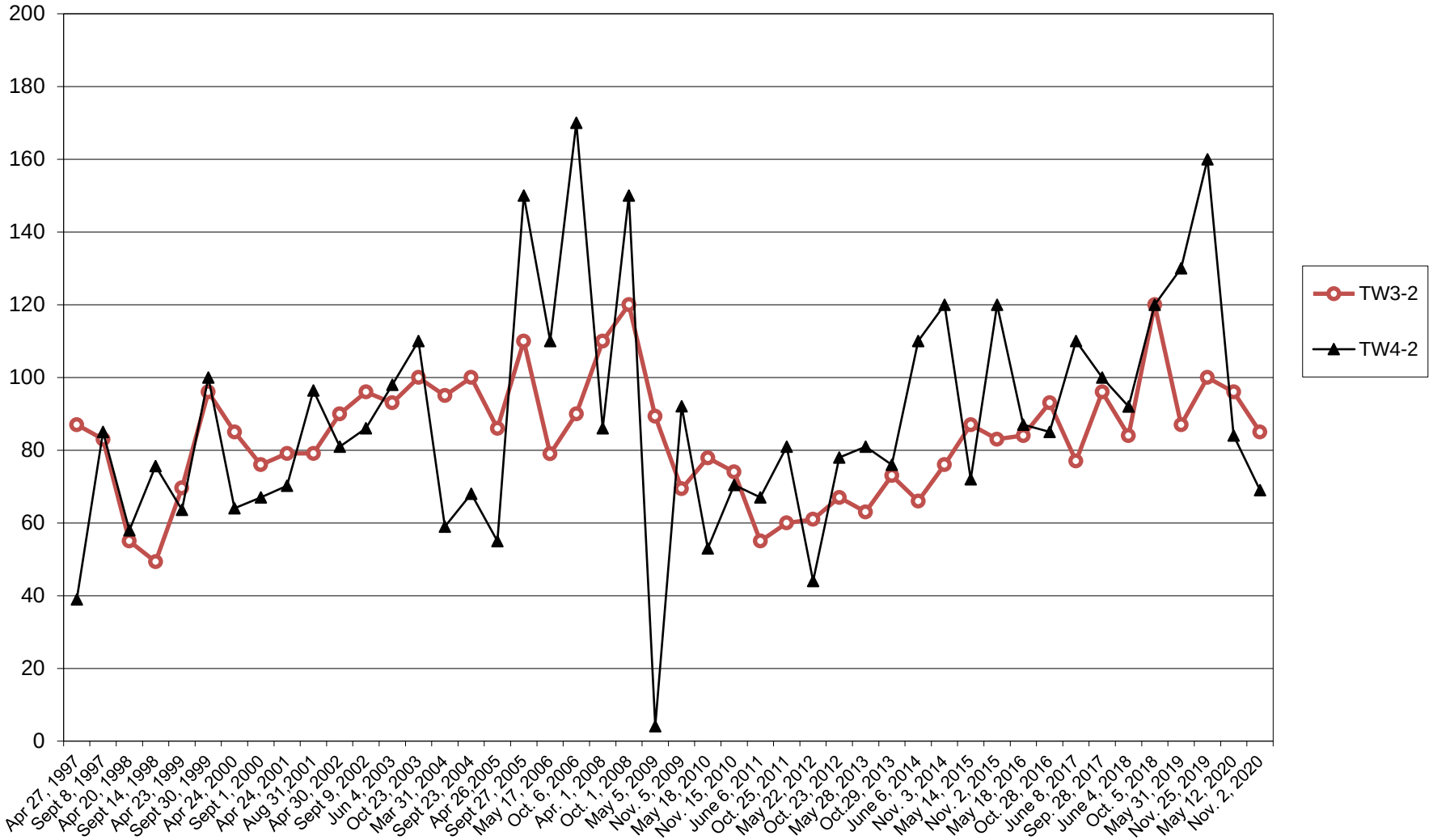

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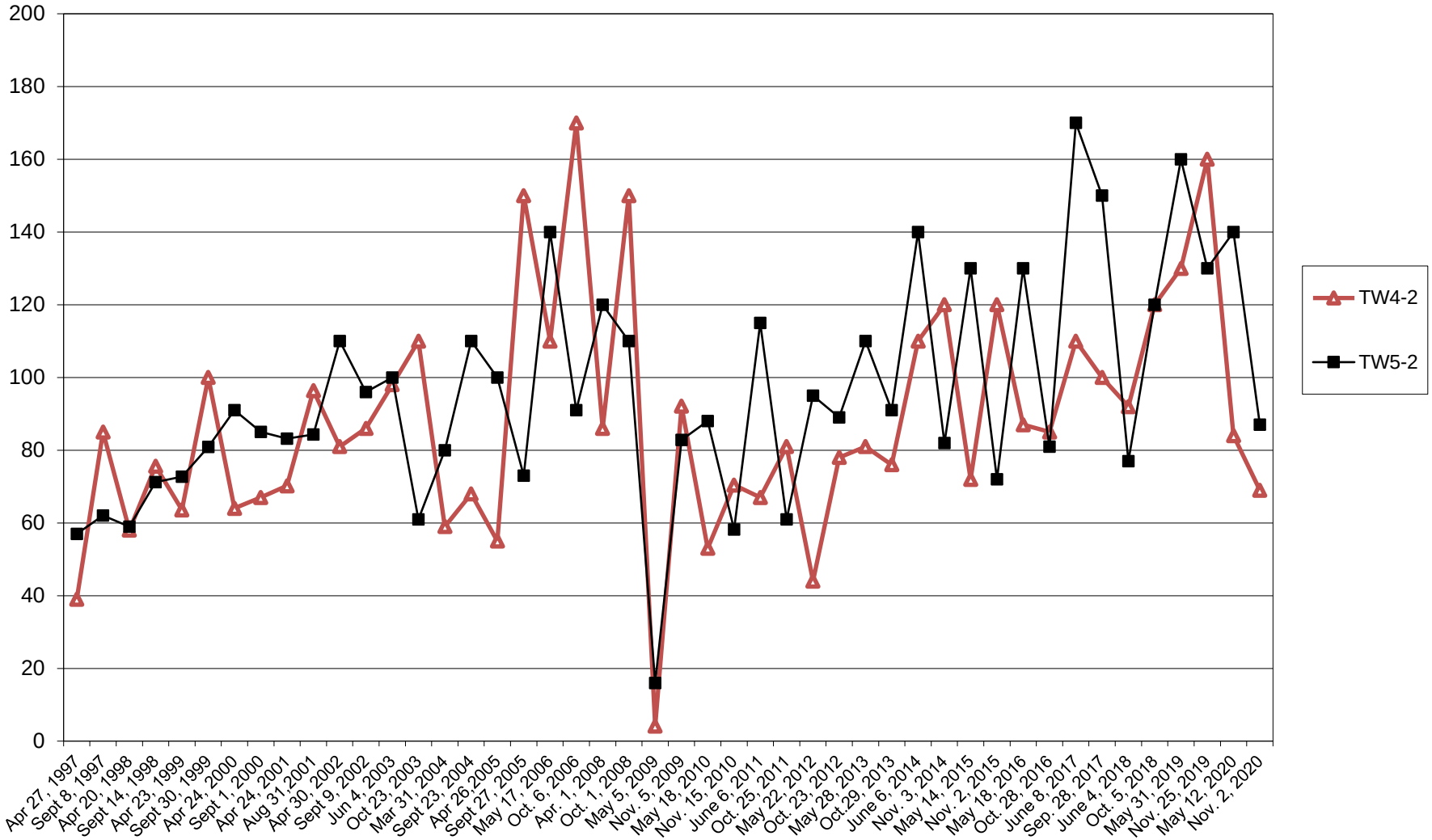

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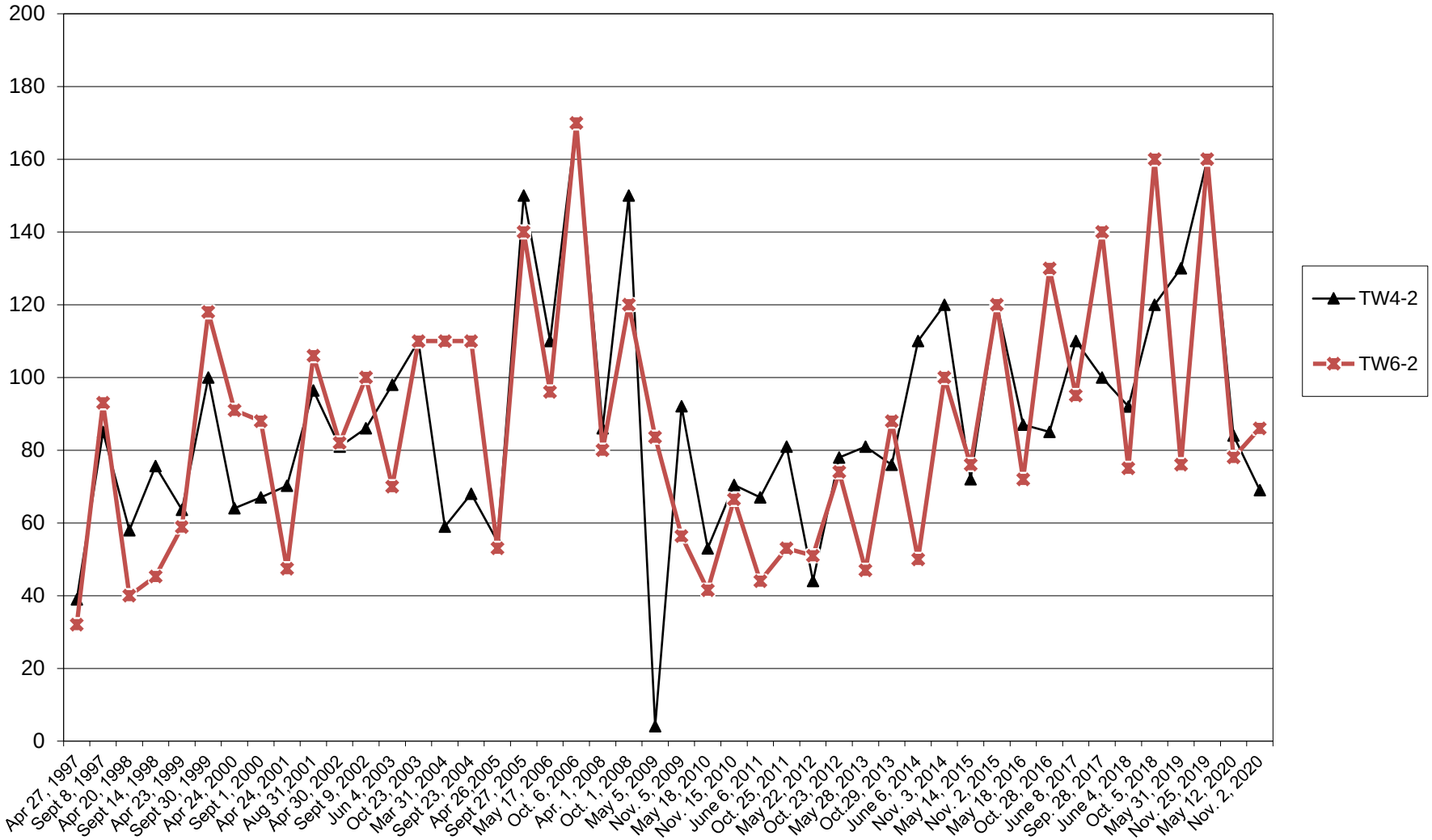

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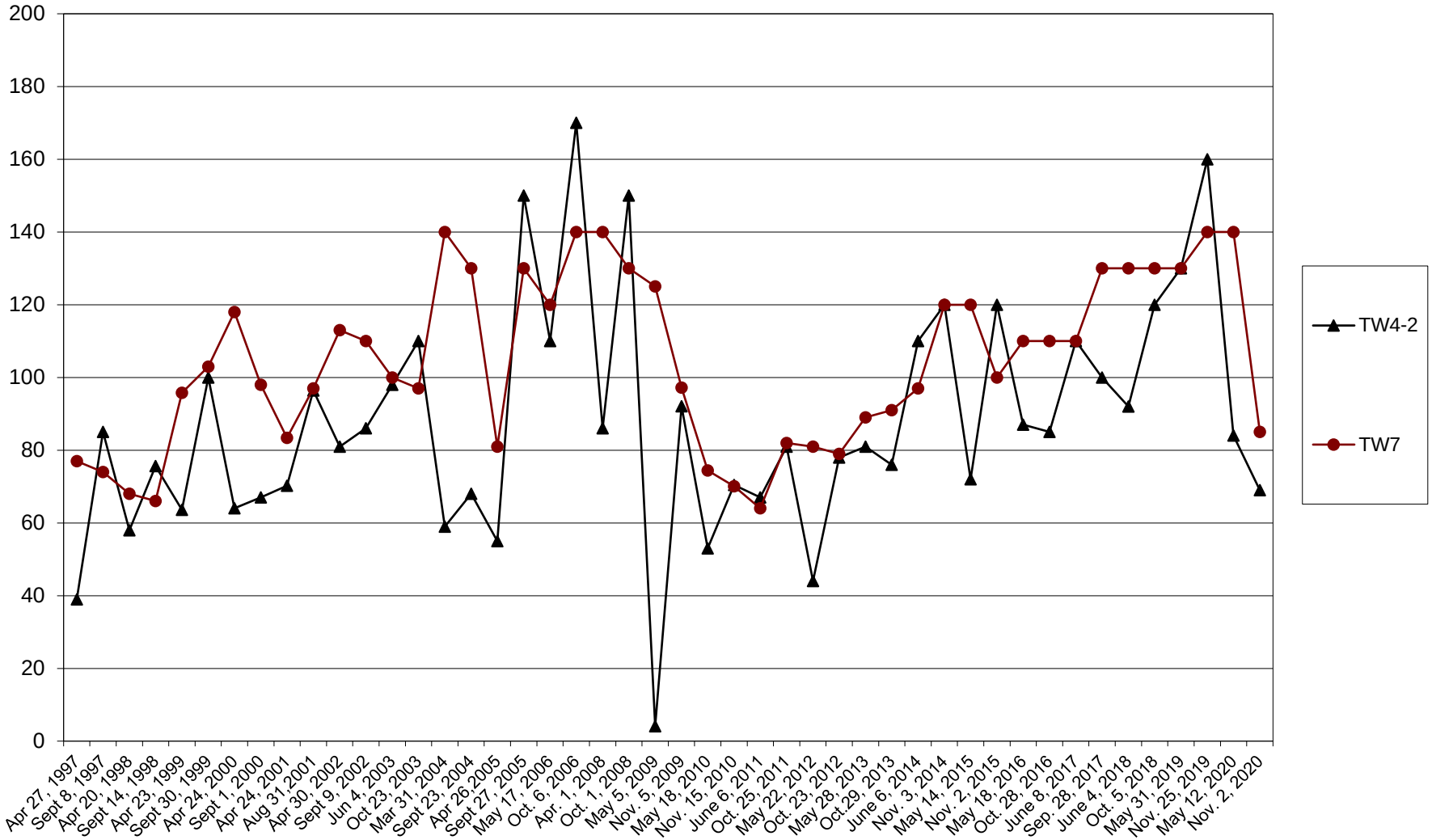

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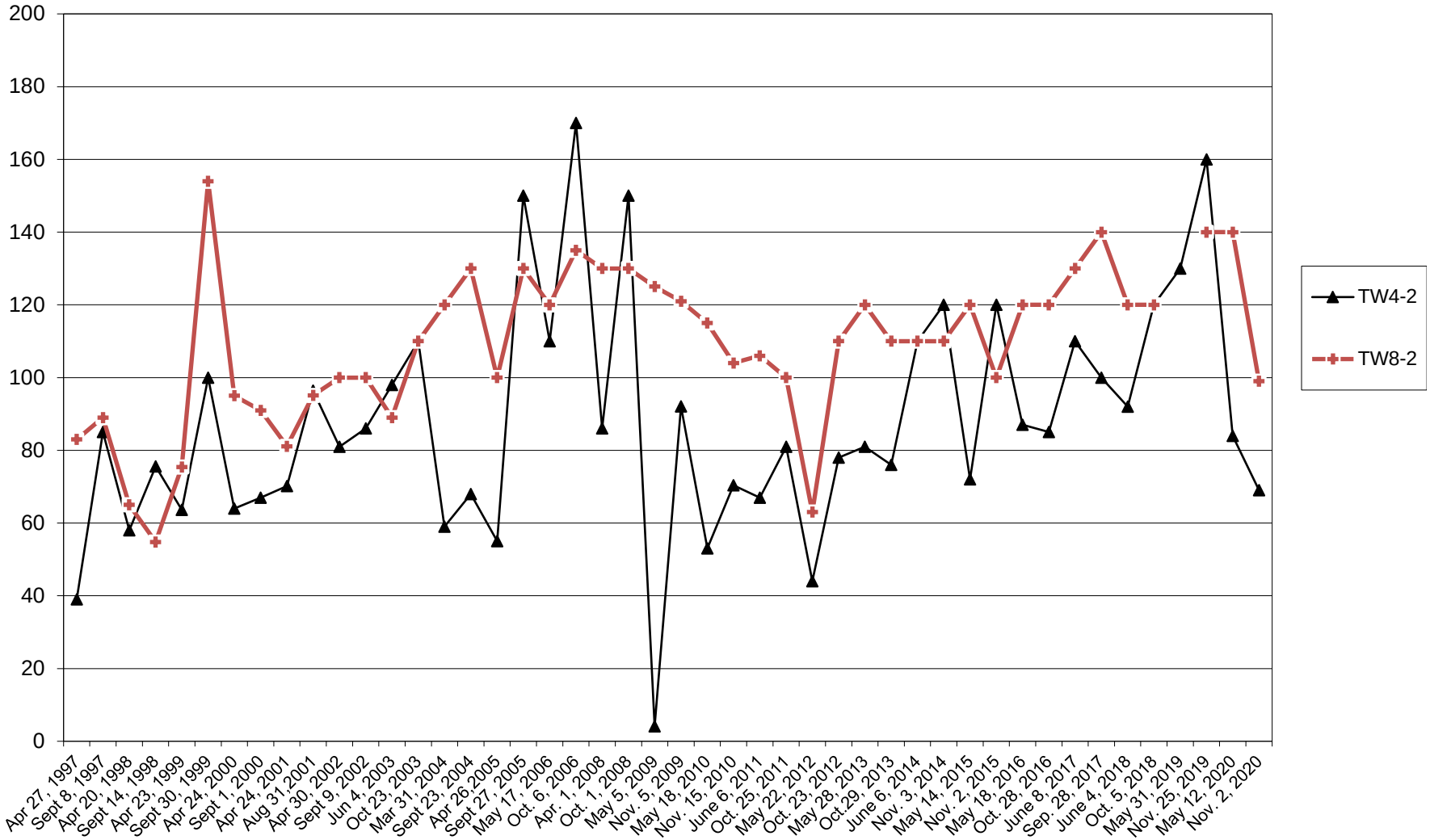
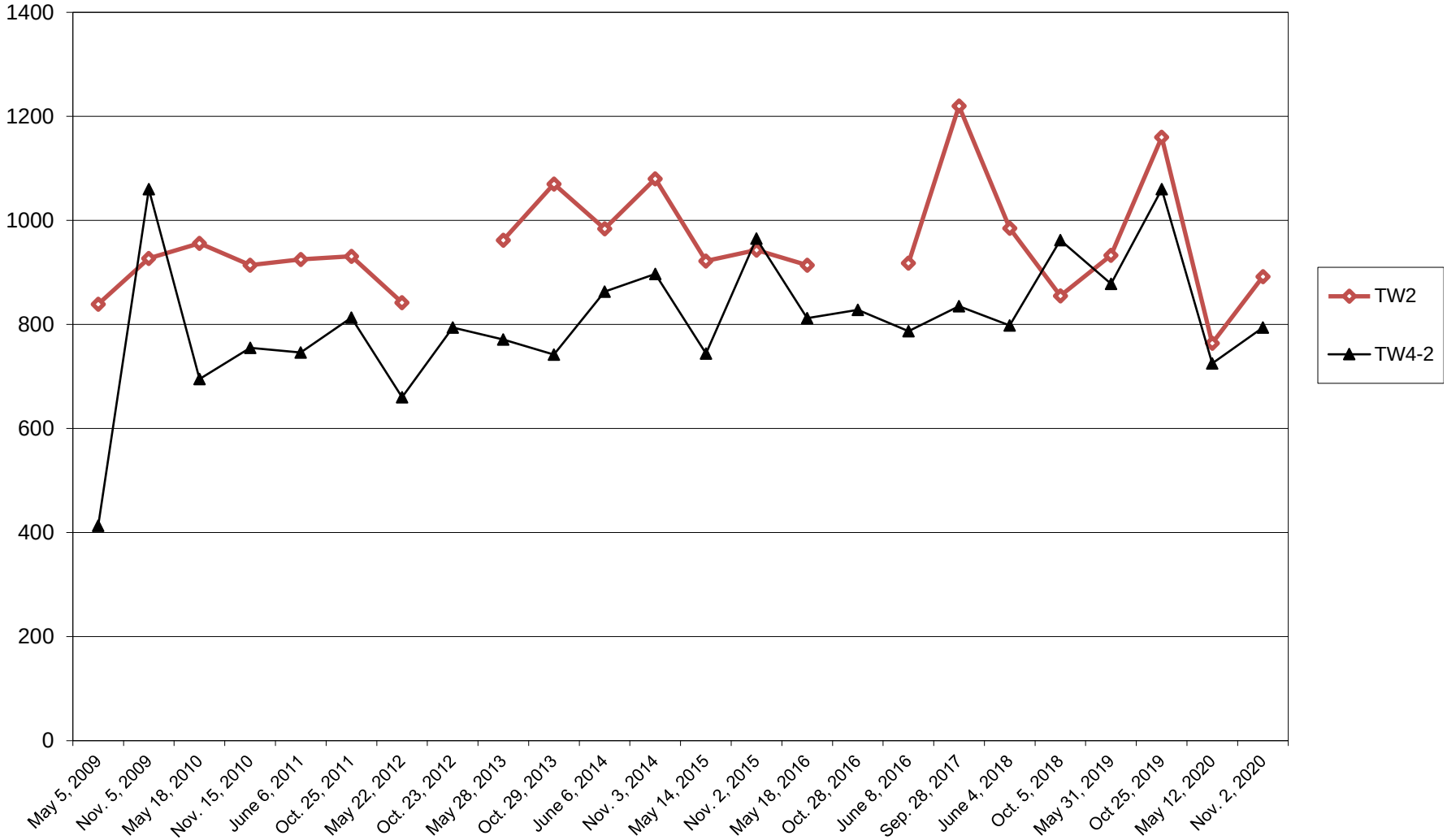


CONDUCTIVITY - WARSAW ROAD LAND FILL SITE



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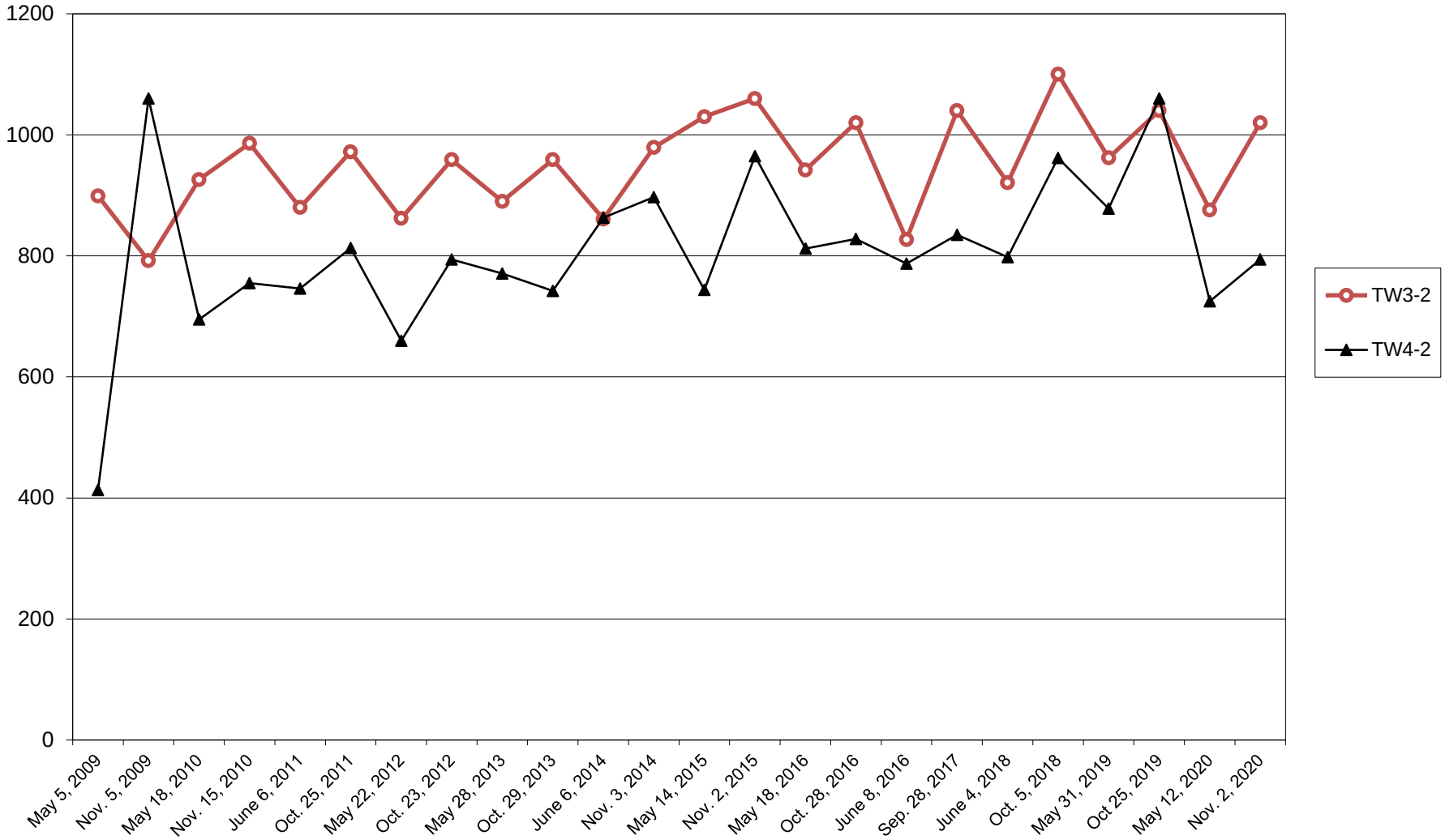

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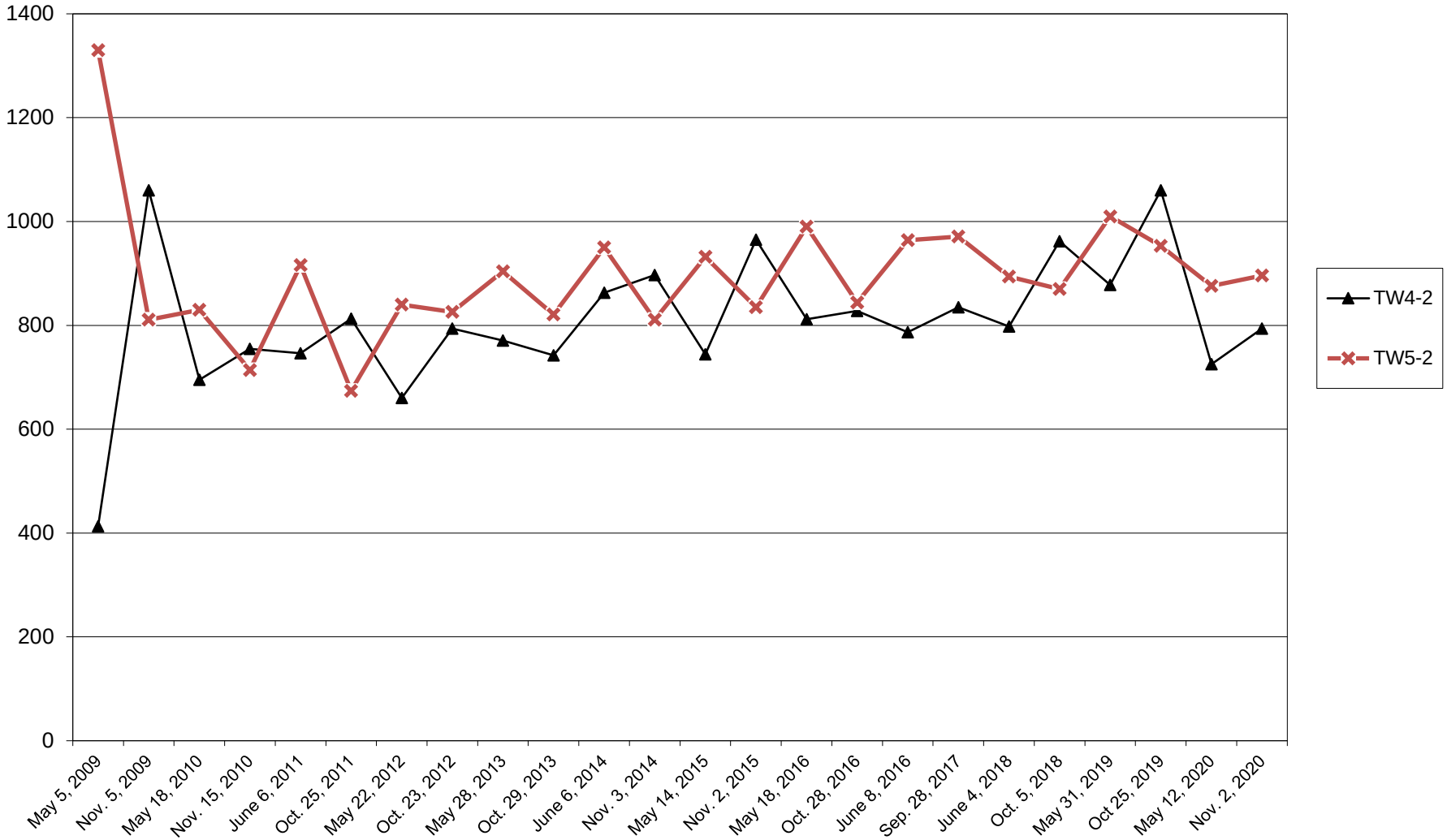

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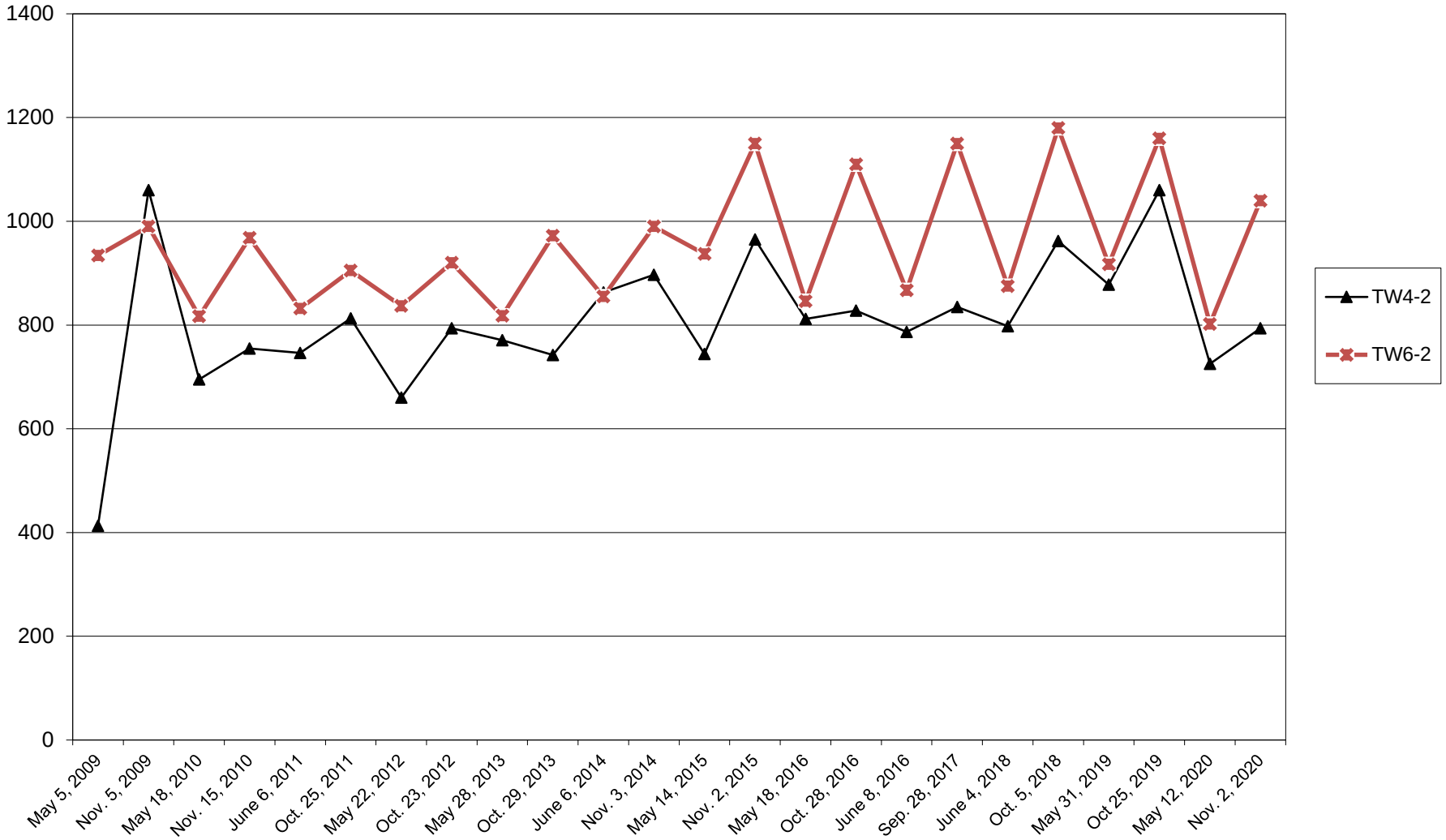

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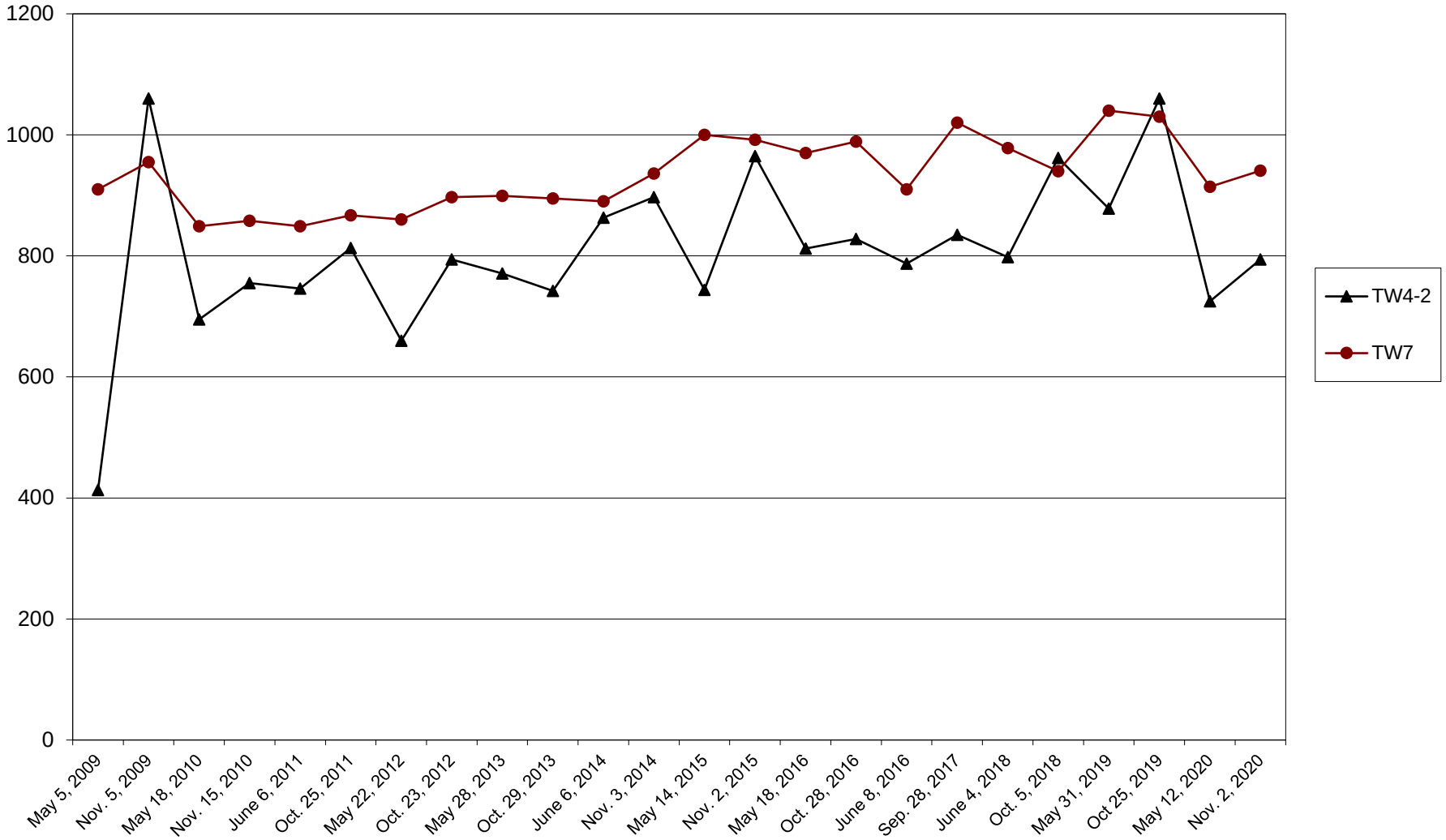

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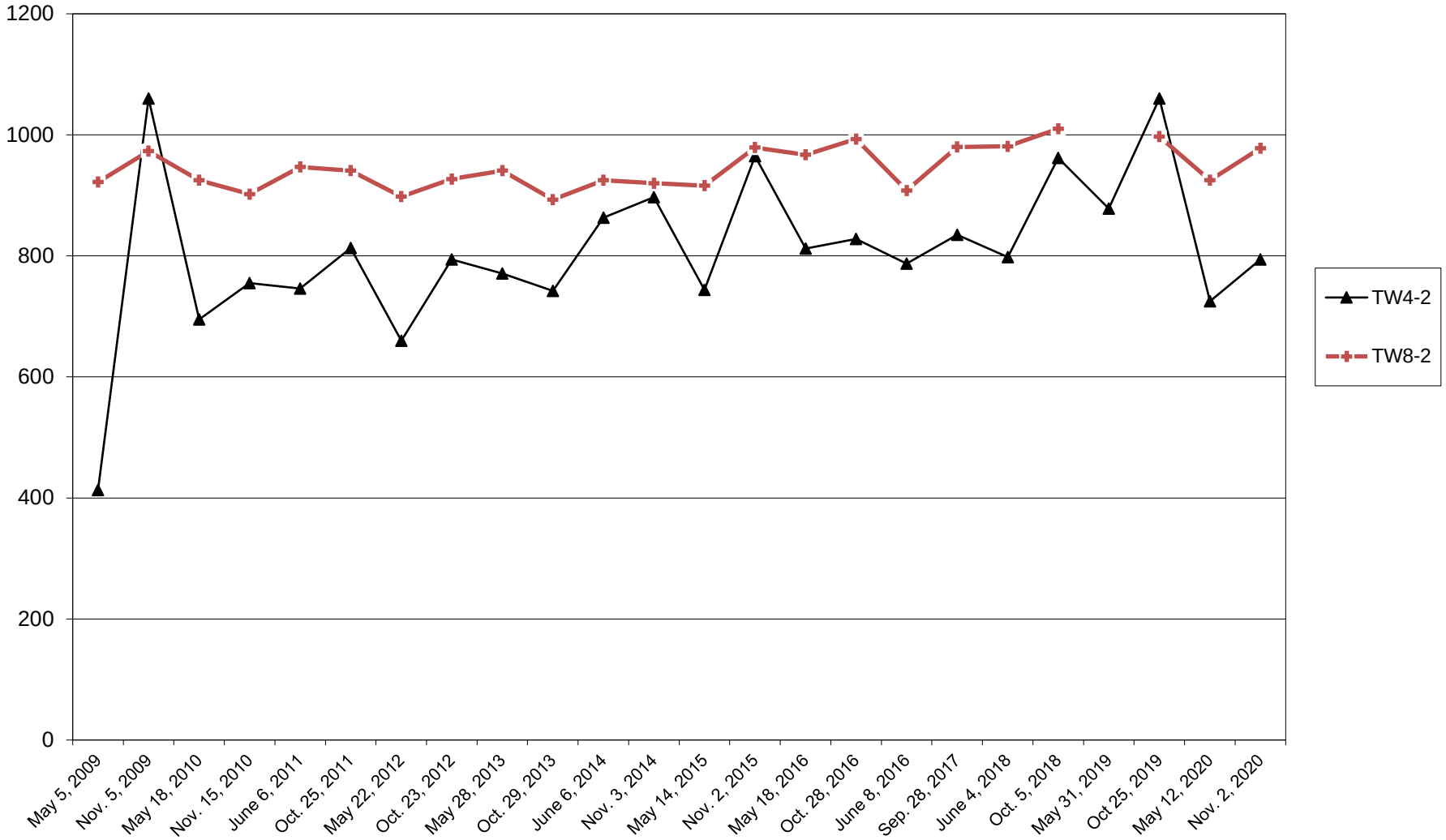
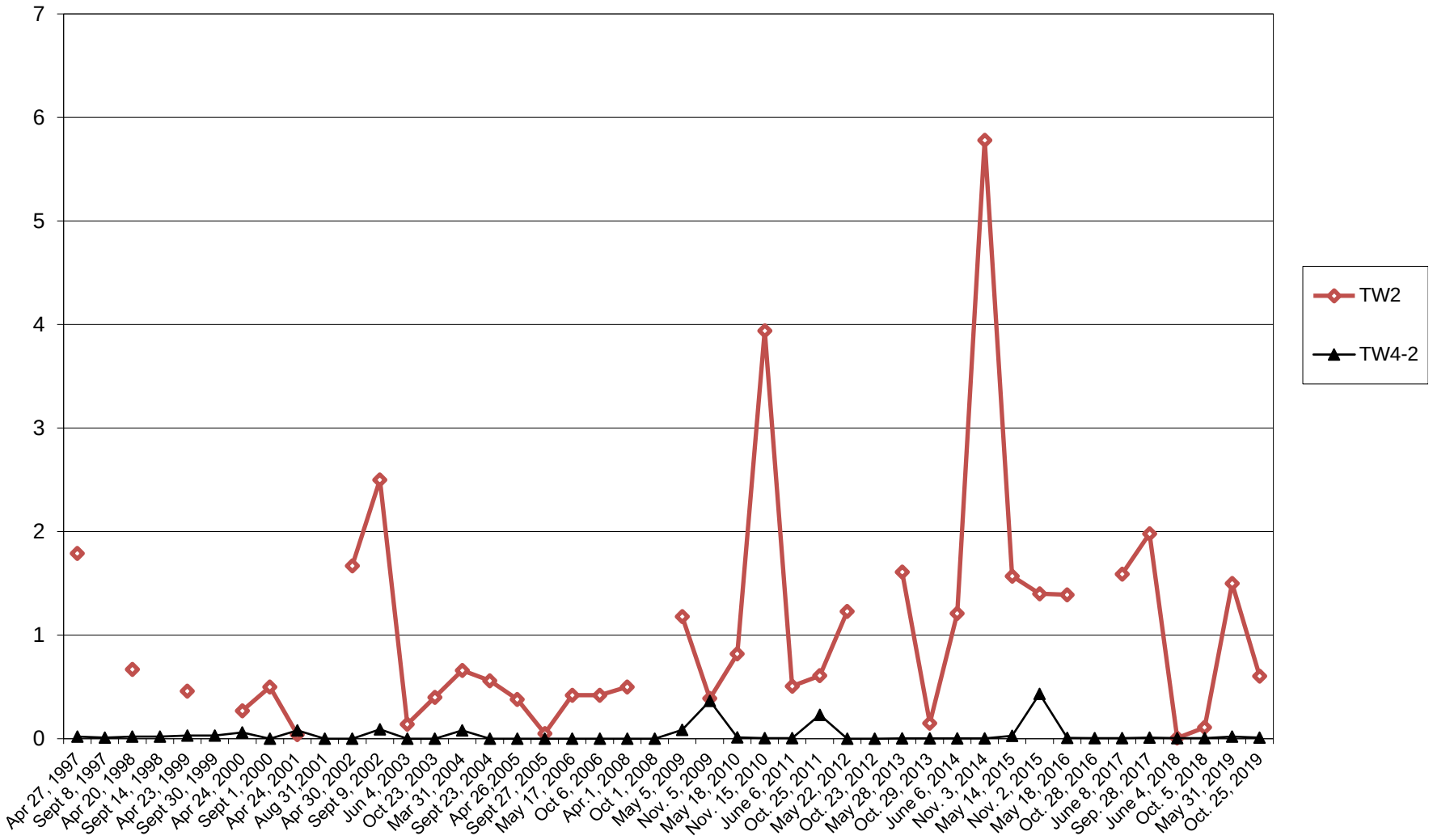
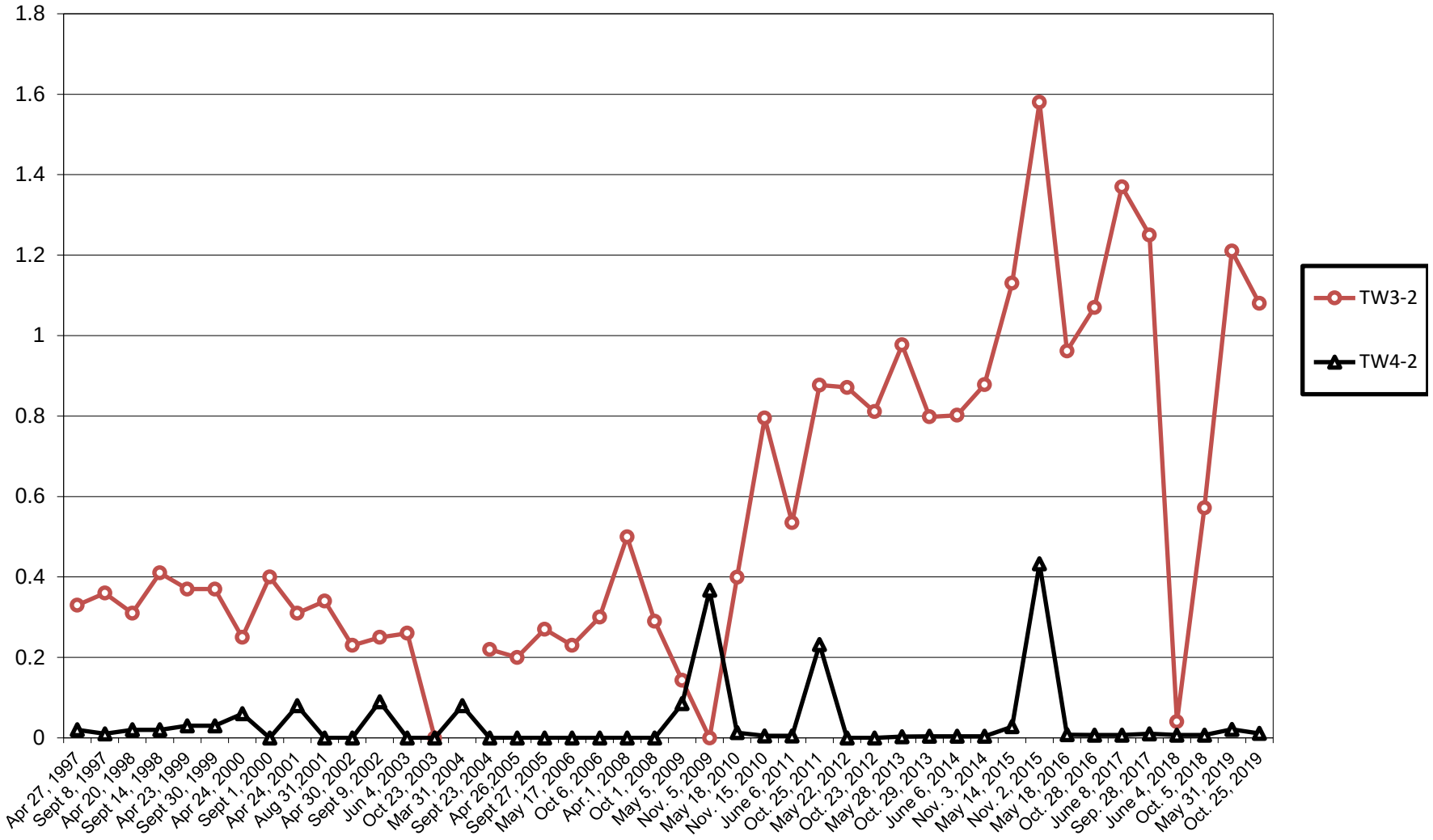


IRON - WARSAW ROAD LAND FILL SITE



IRON - WARSAW ROAD LAND FILL SITE



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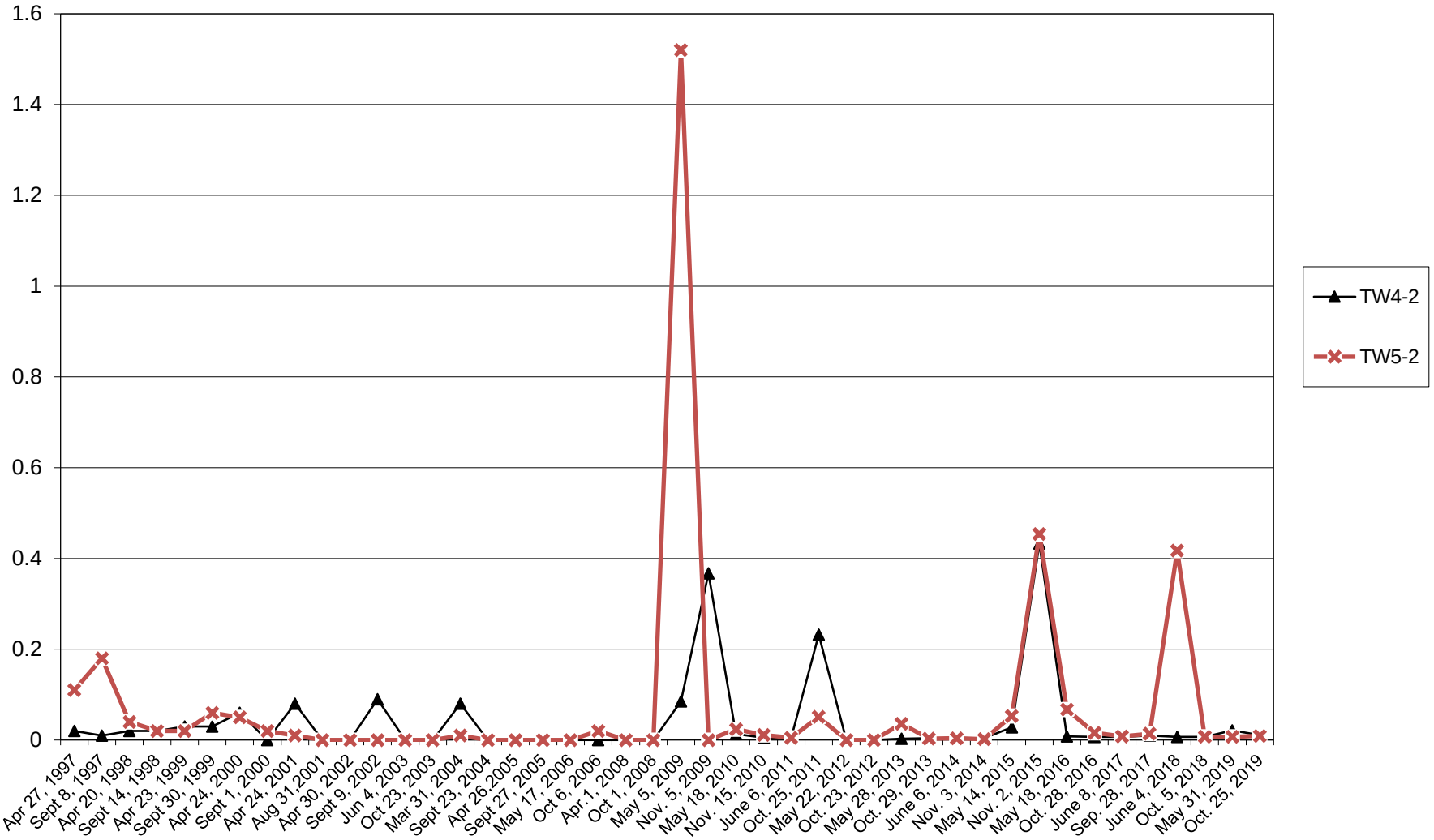
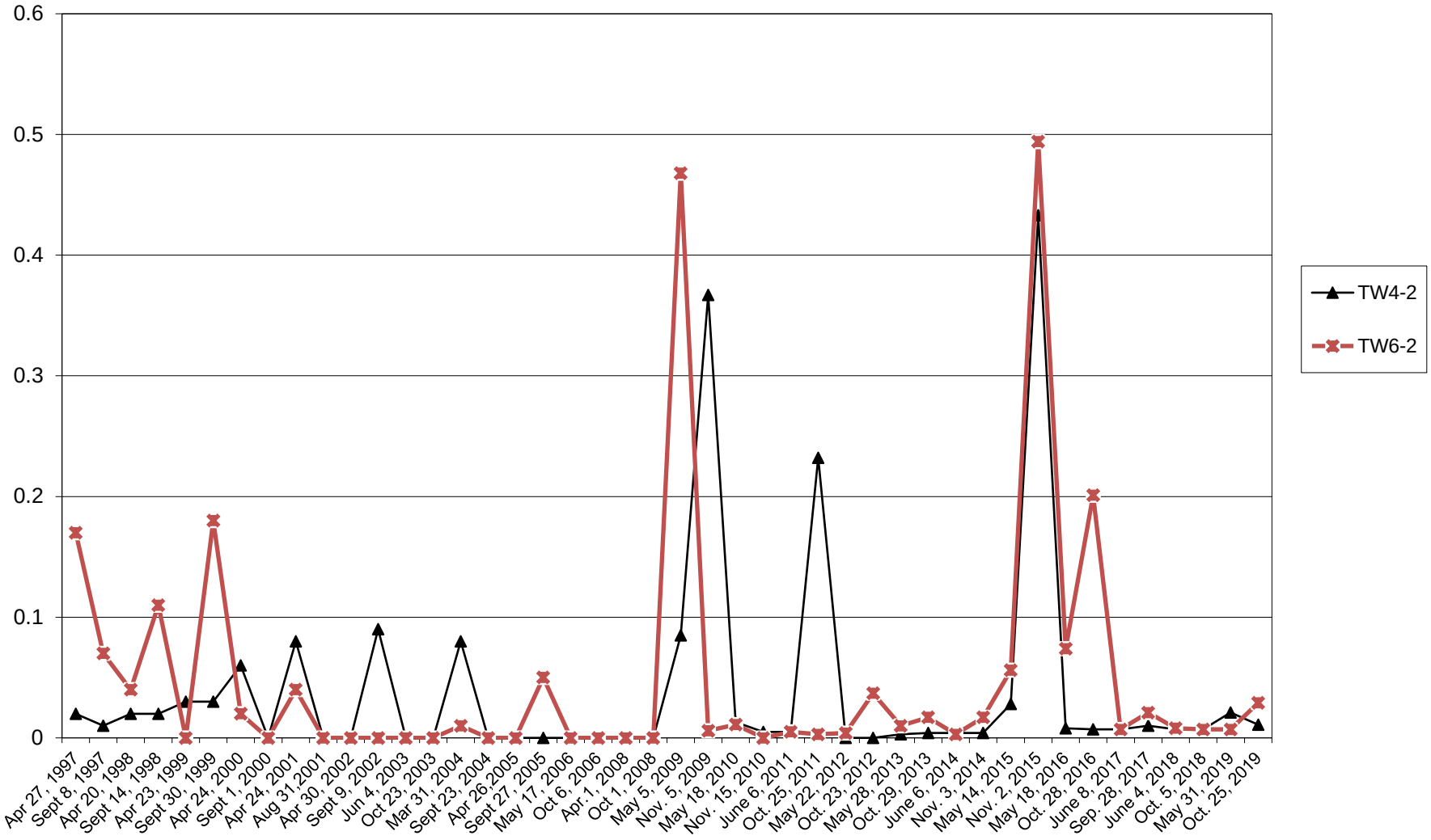
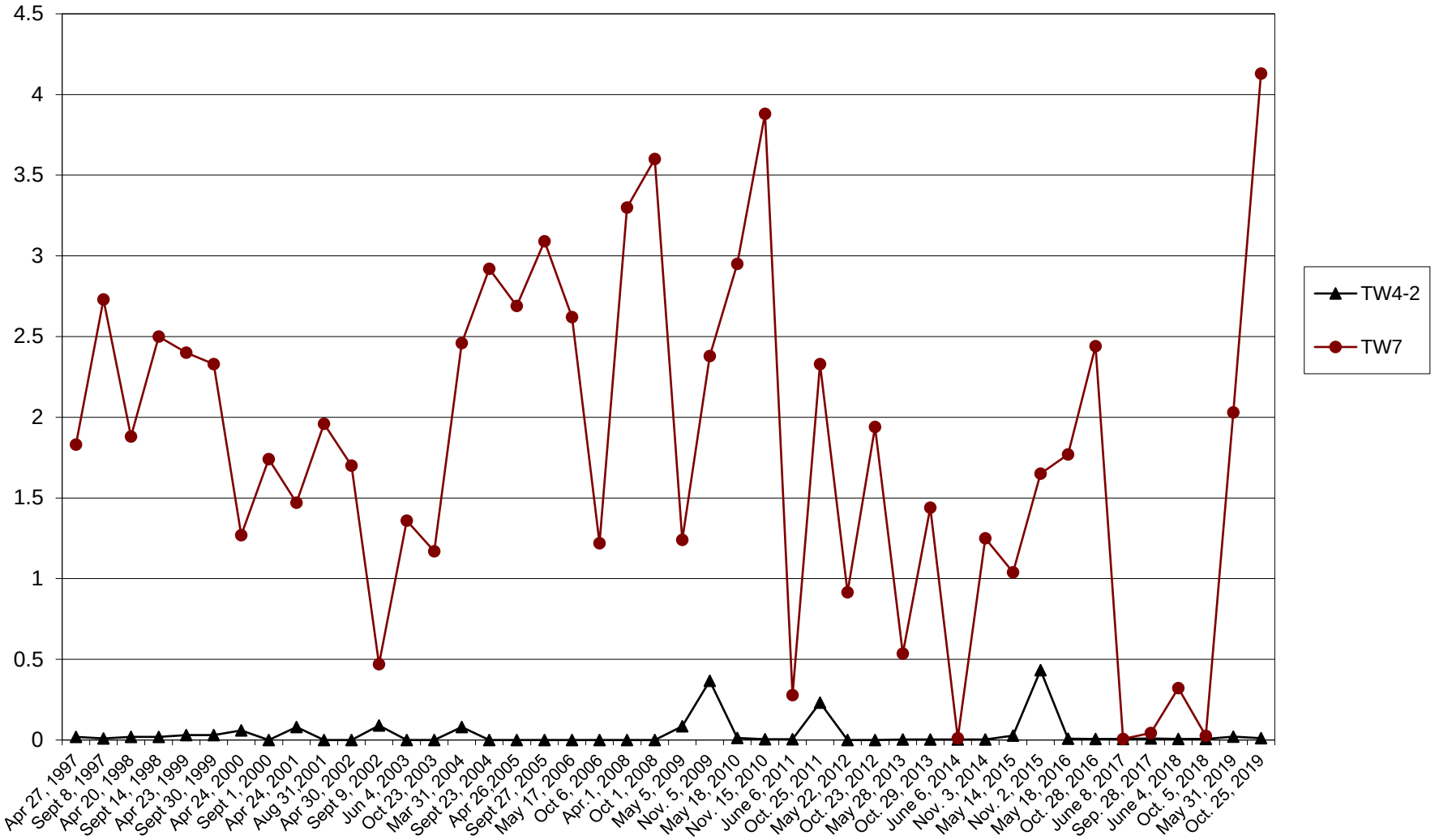


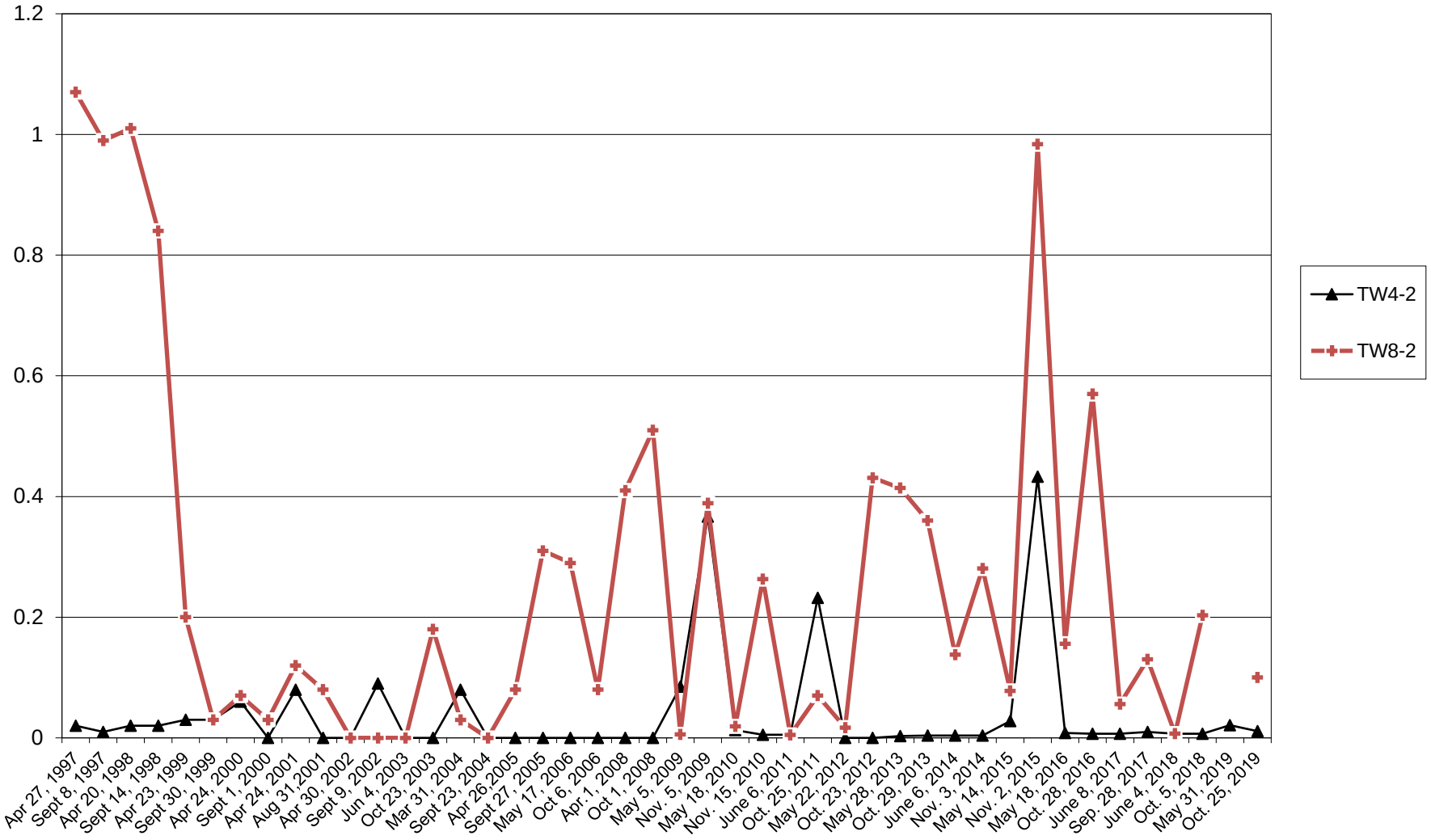
IRON - WARSAW ROAD LAND FILL SITE



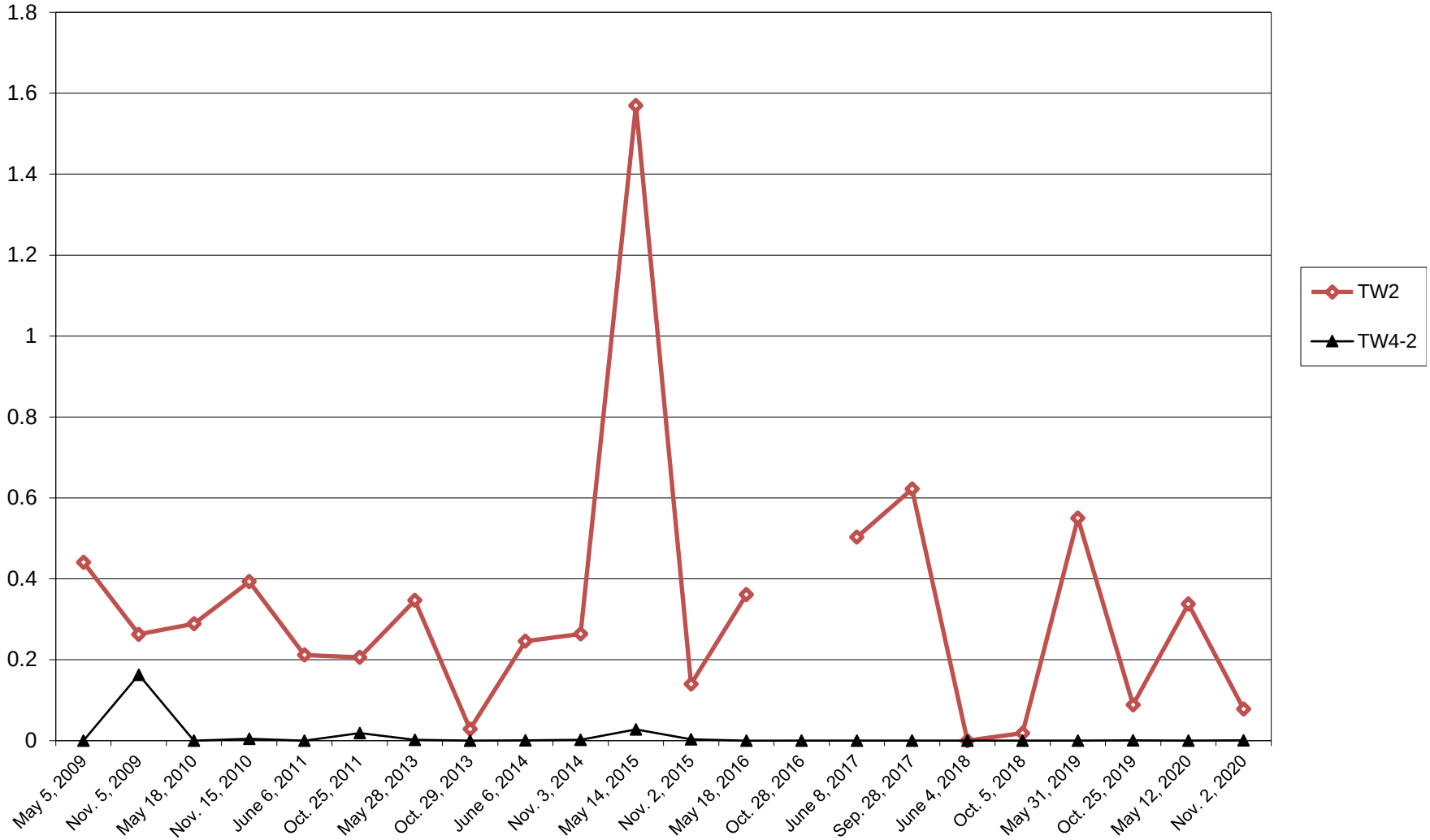
IRON - WARSAW ROAD LAND FILL SITE



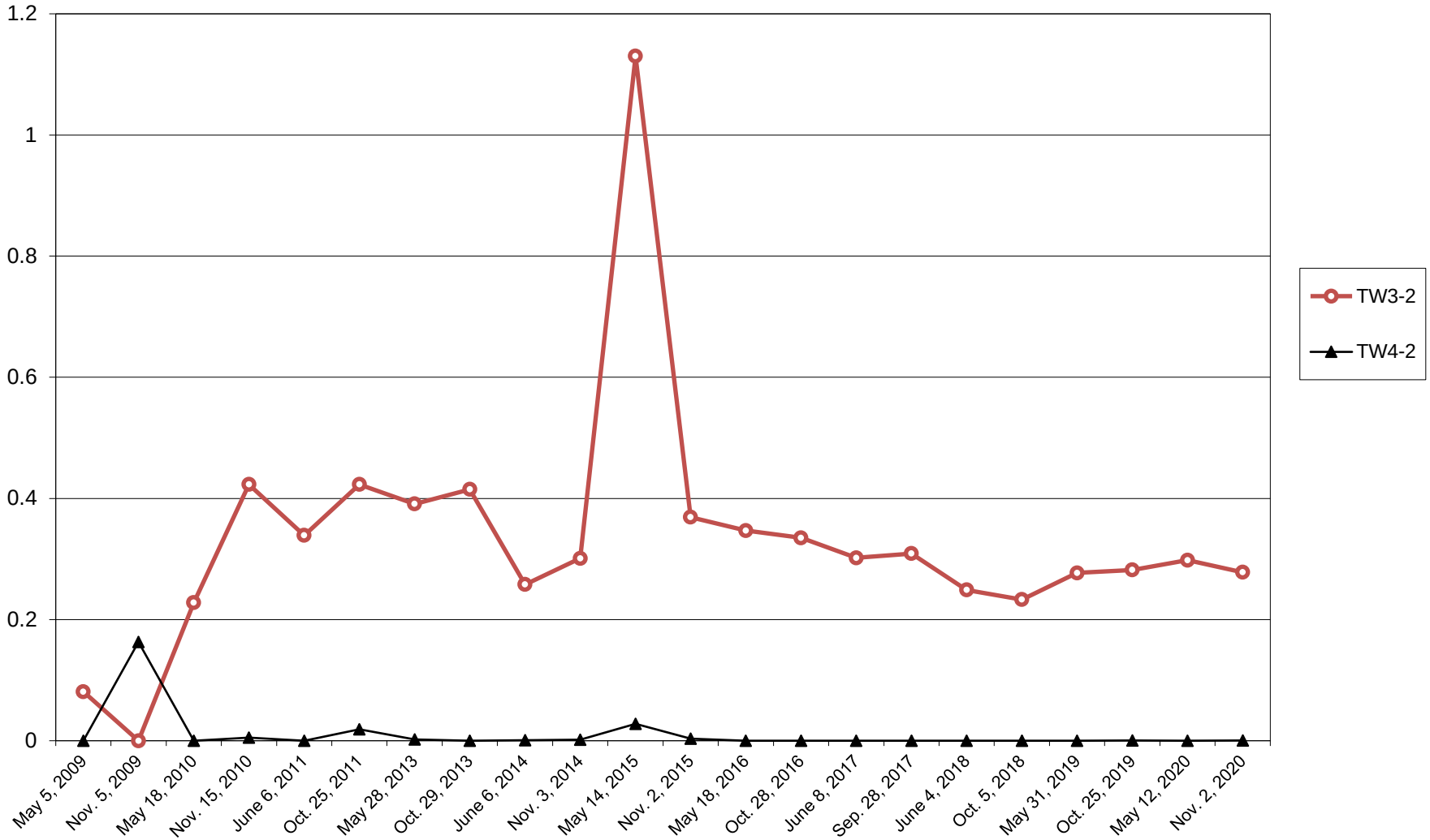
IRON - WARSAW ROAD LAND FILL SITE



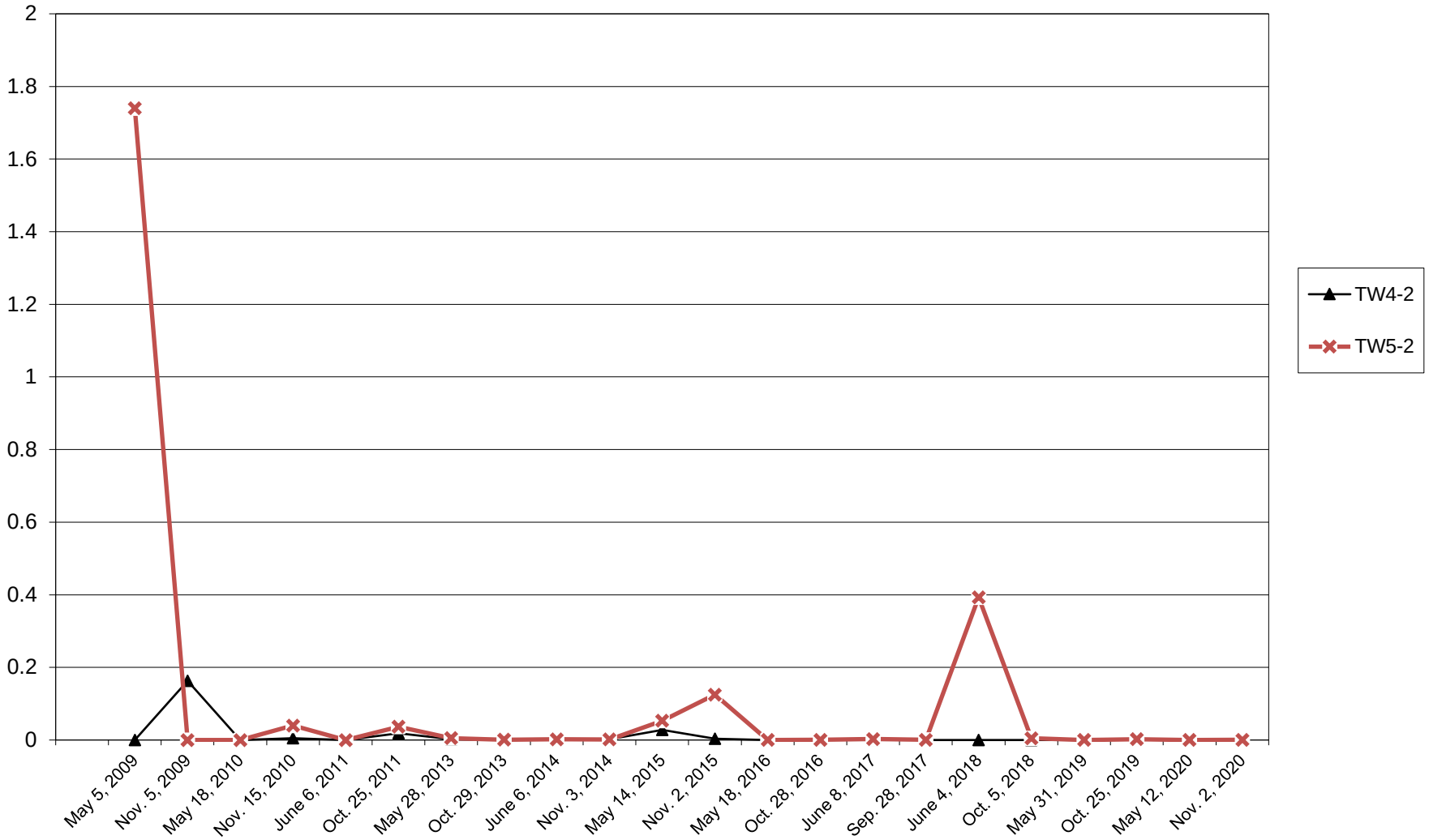
MANGANESE - WARSAW ROAD LAND FILL SITE



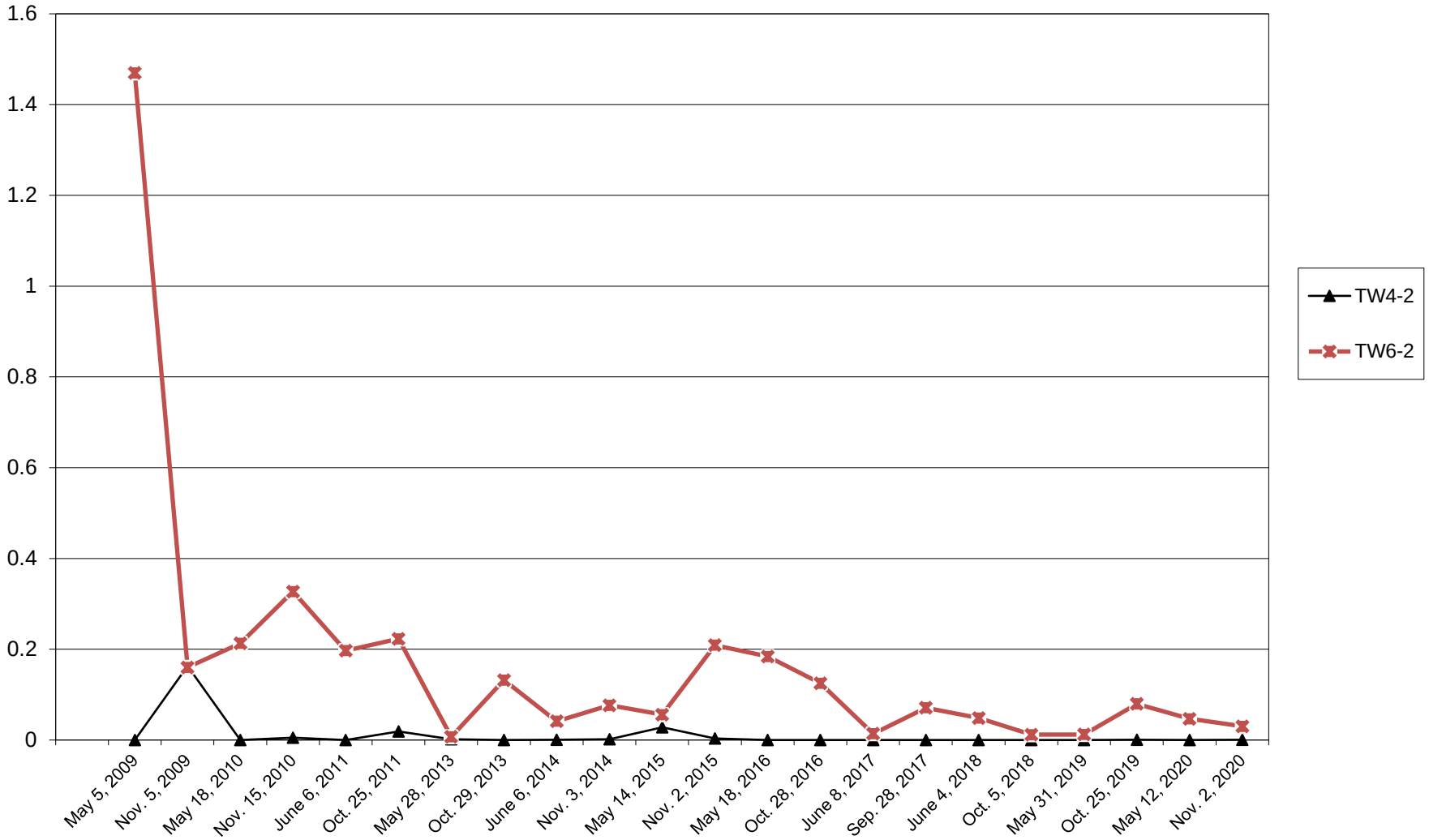
MANGANESE - WARSAW ROAD LAND FILL SITE



MANGANESE - WARSAW ROAD LAND FILL SITE



MANGANESE - WARSAW ROAD LAND FILL SITE



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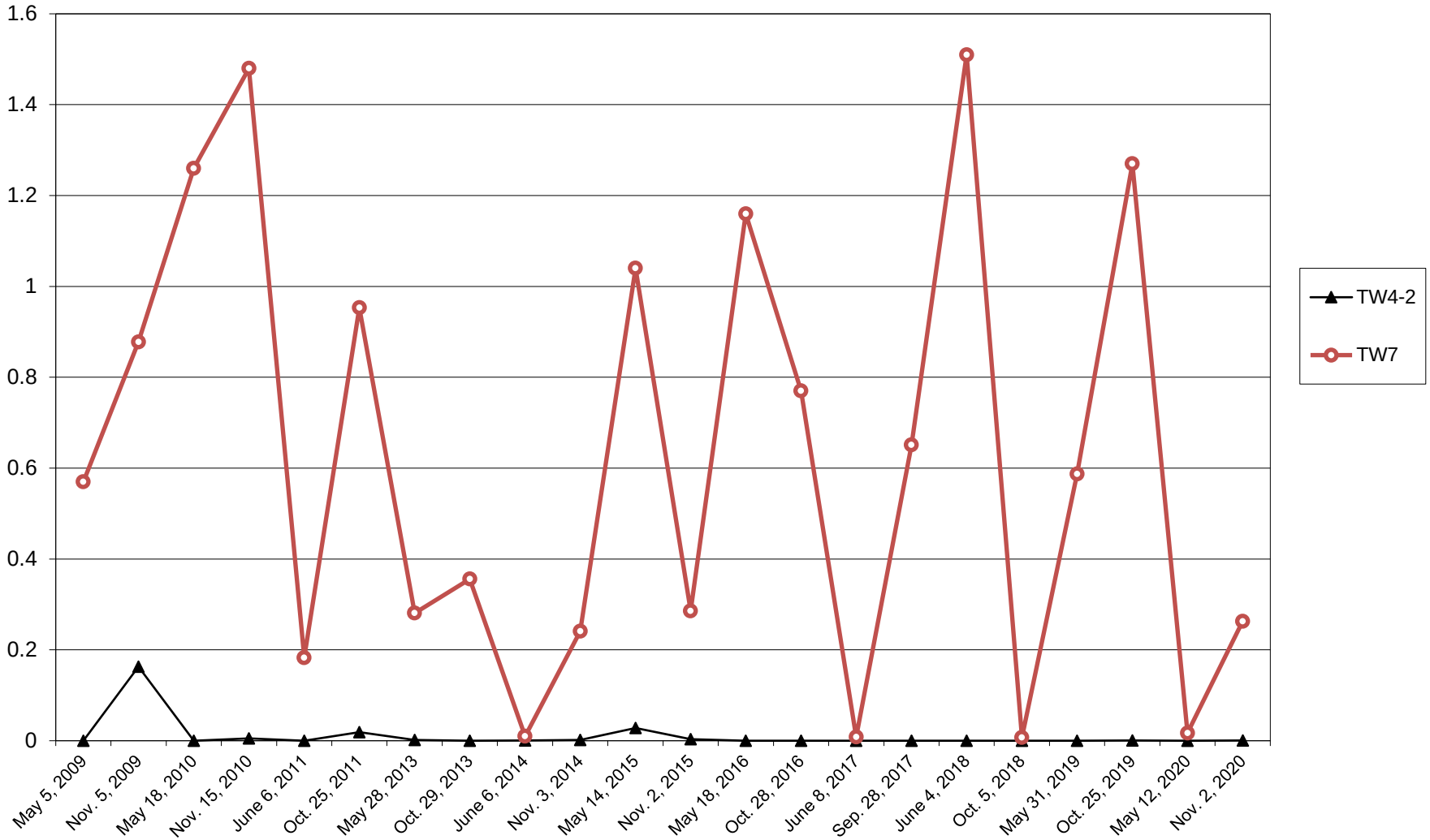
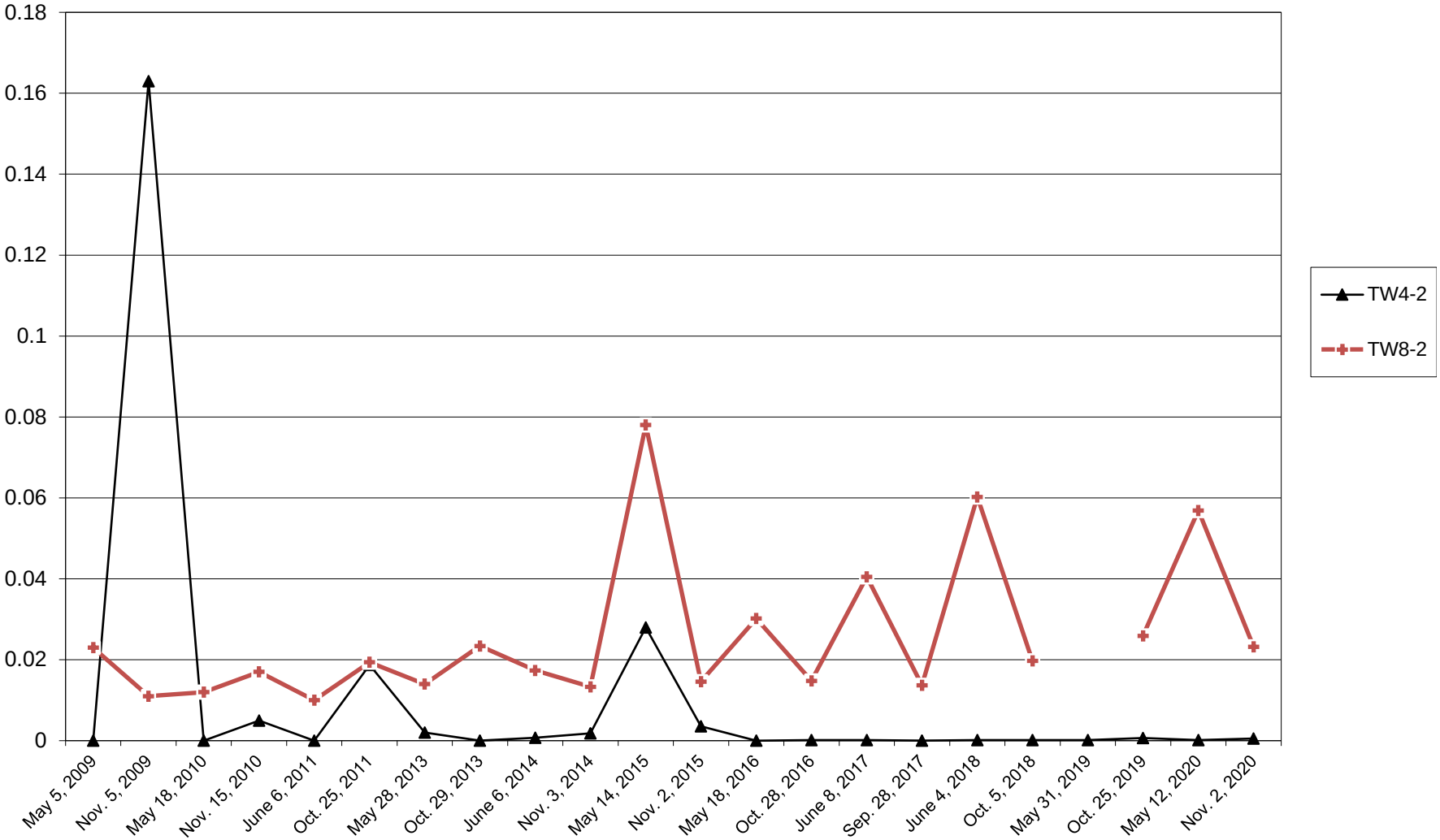
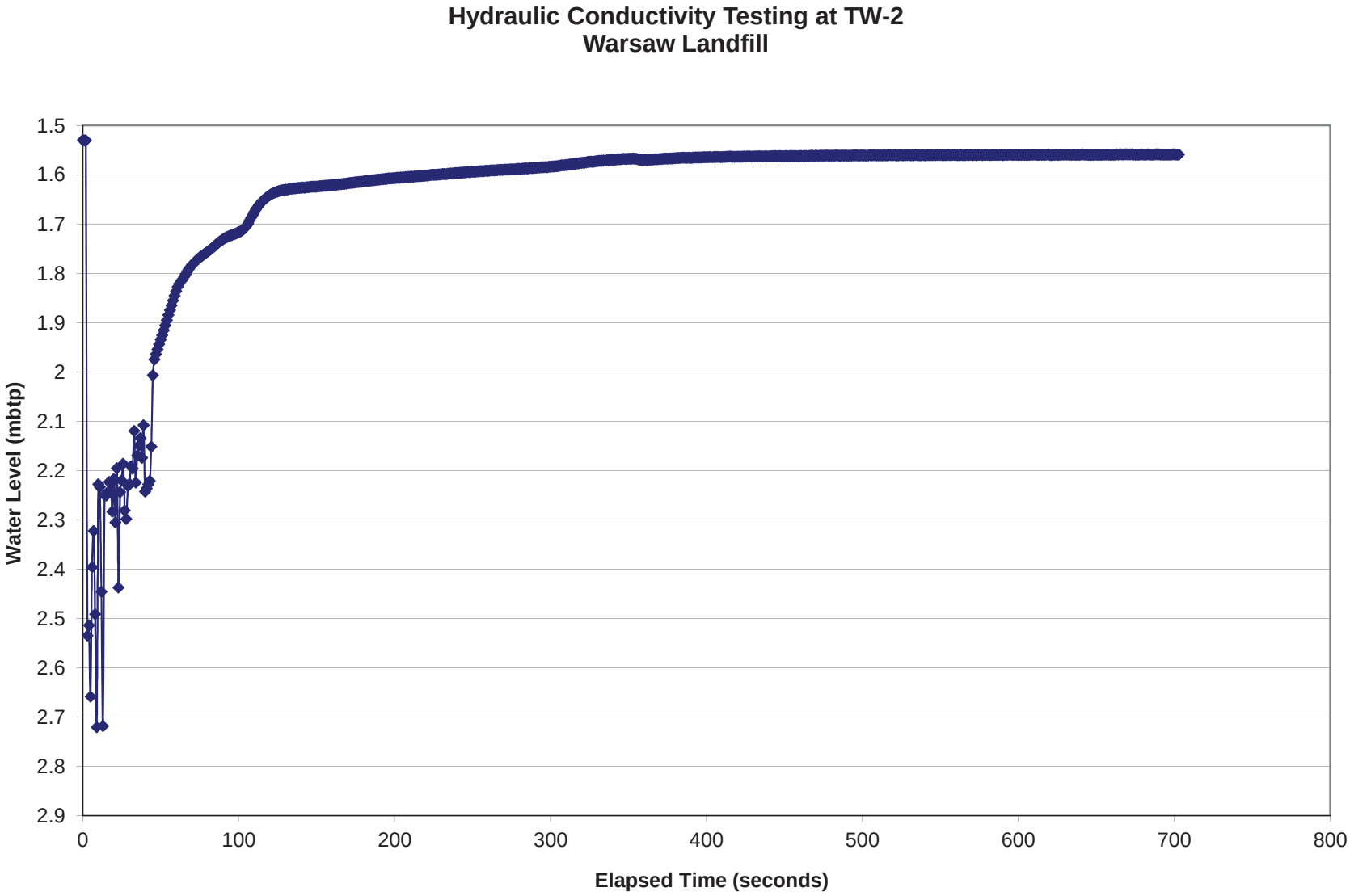
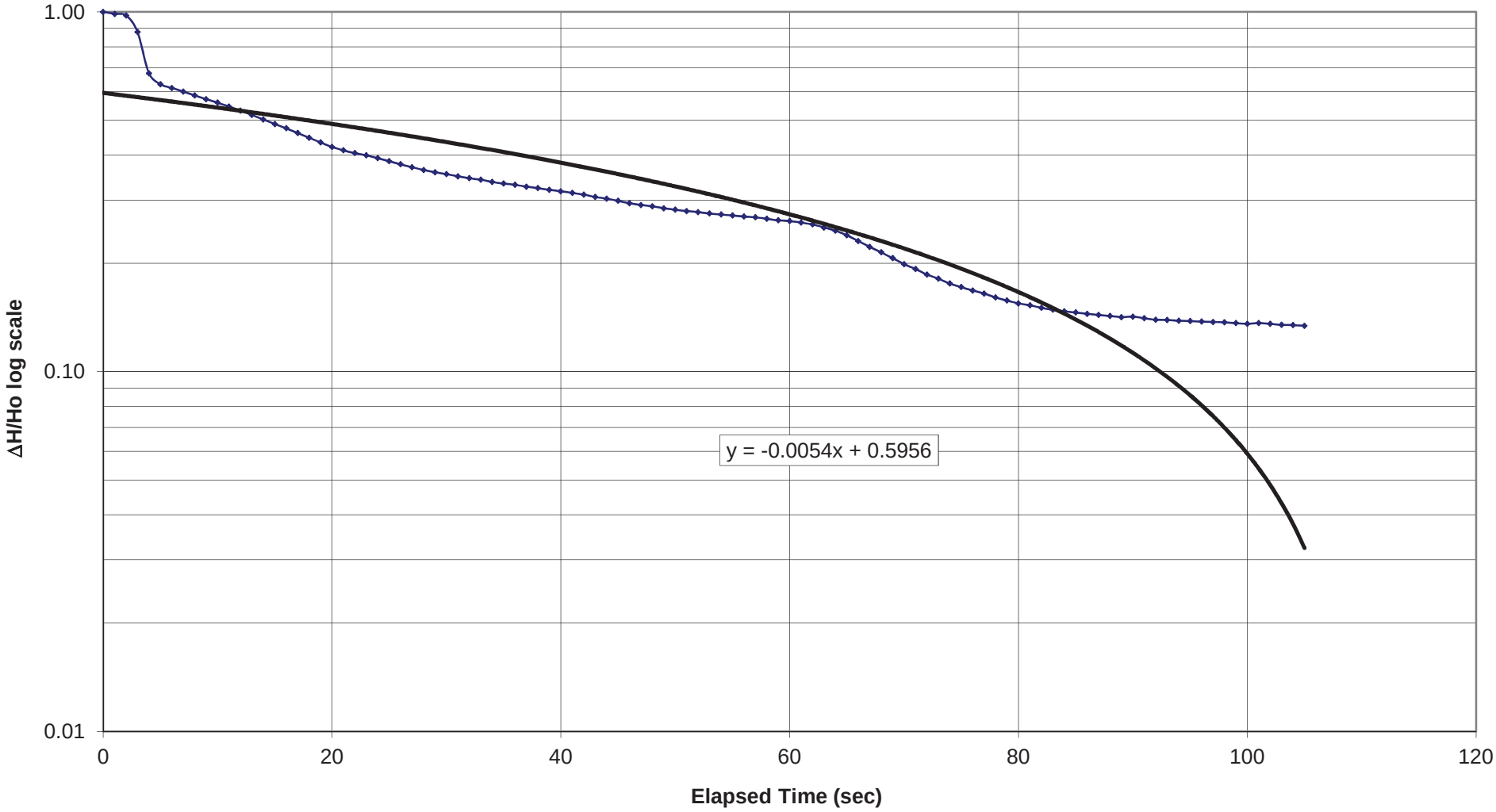


MANGANESE - WARSAW ROAD LAND FILL SITE

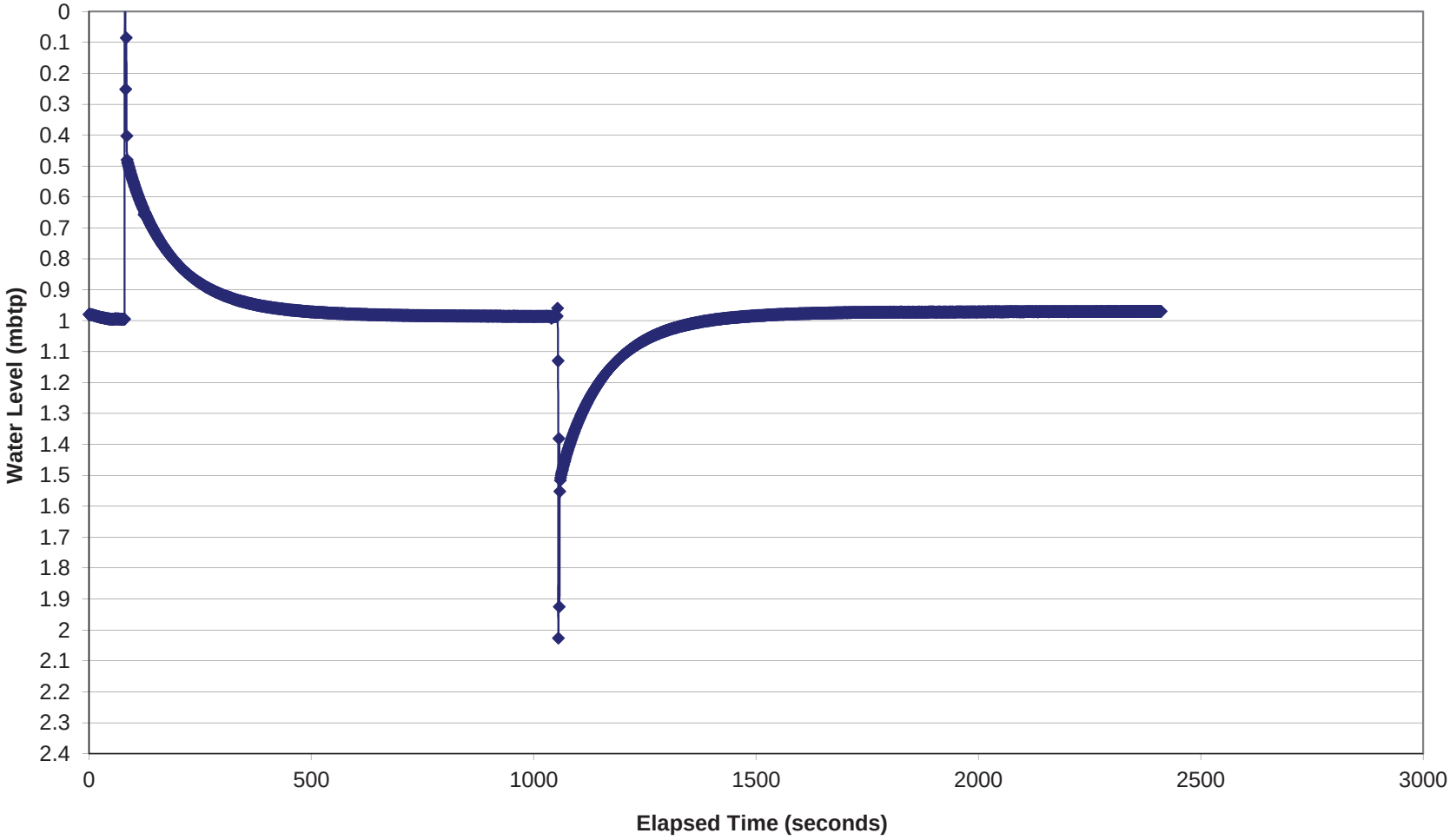



Hydraulic Conductivity Testing at TW-2
Warsaw Landfill
Water Level (mbtp)
1.5
1.6
1.7
1.8
1.9
2
2.1
2.2
2.3
2.4
2.5
2.6
2.7
2.8
2.9
0
100
200
300
400
500
600
700
800
Elapsed Time (seconds)

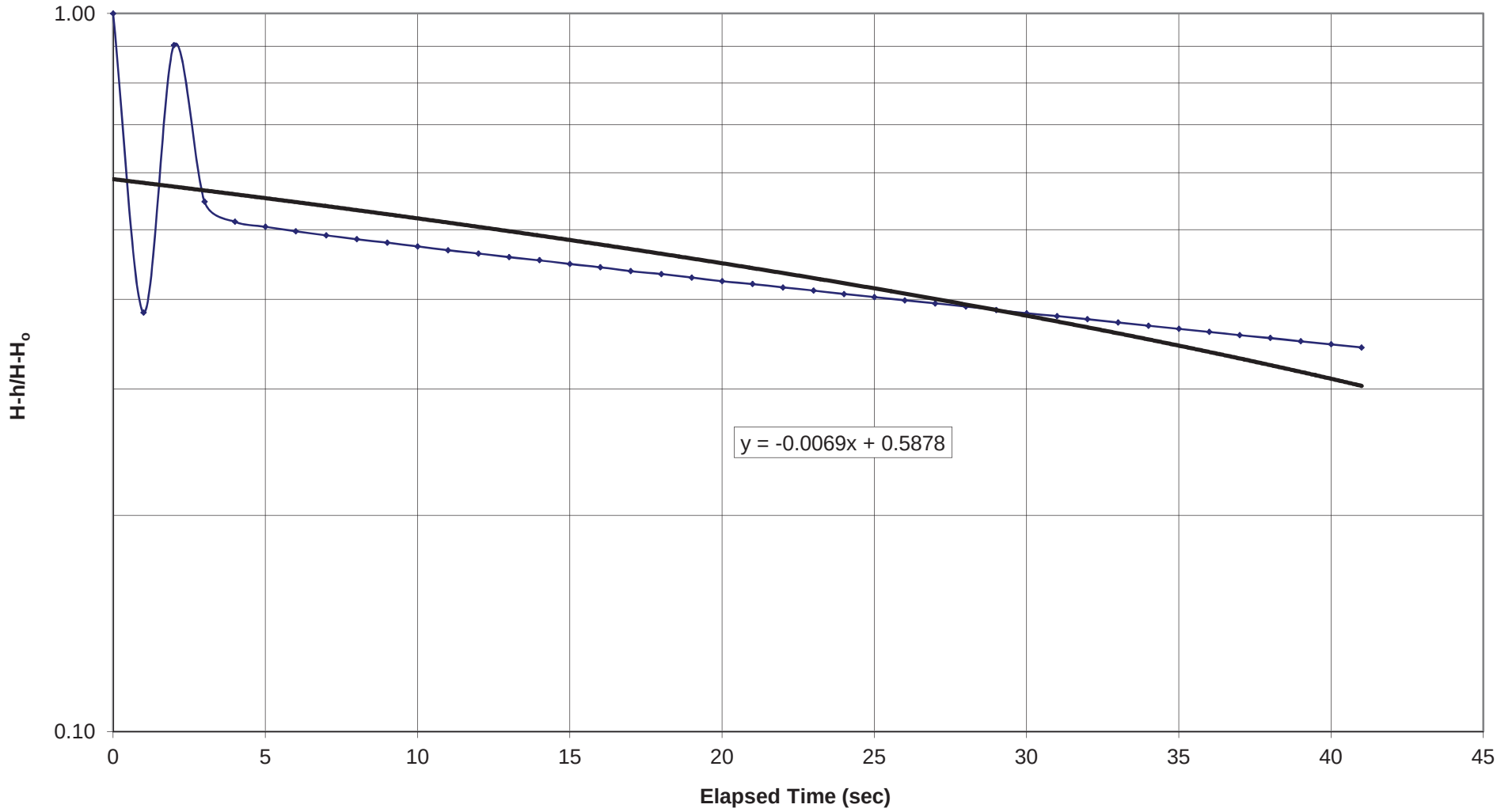
Rising Head Hydraulic Conductivity Analysis at TW-2



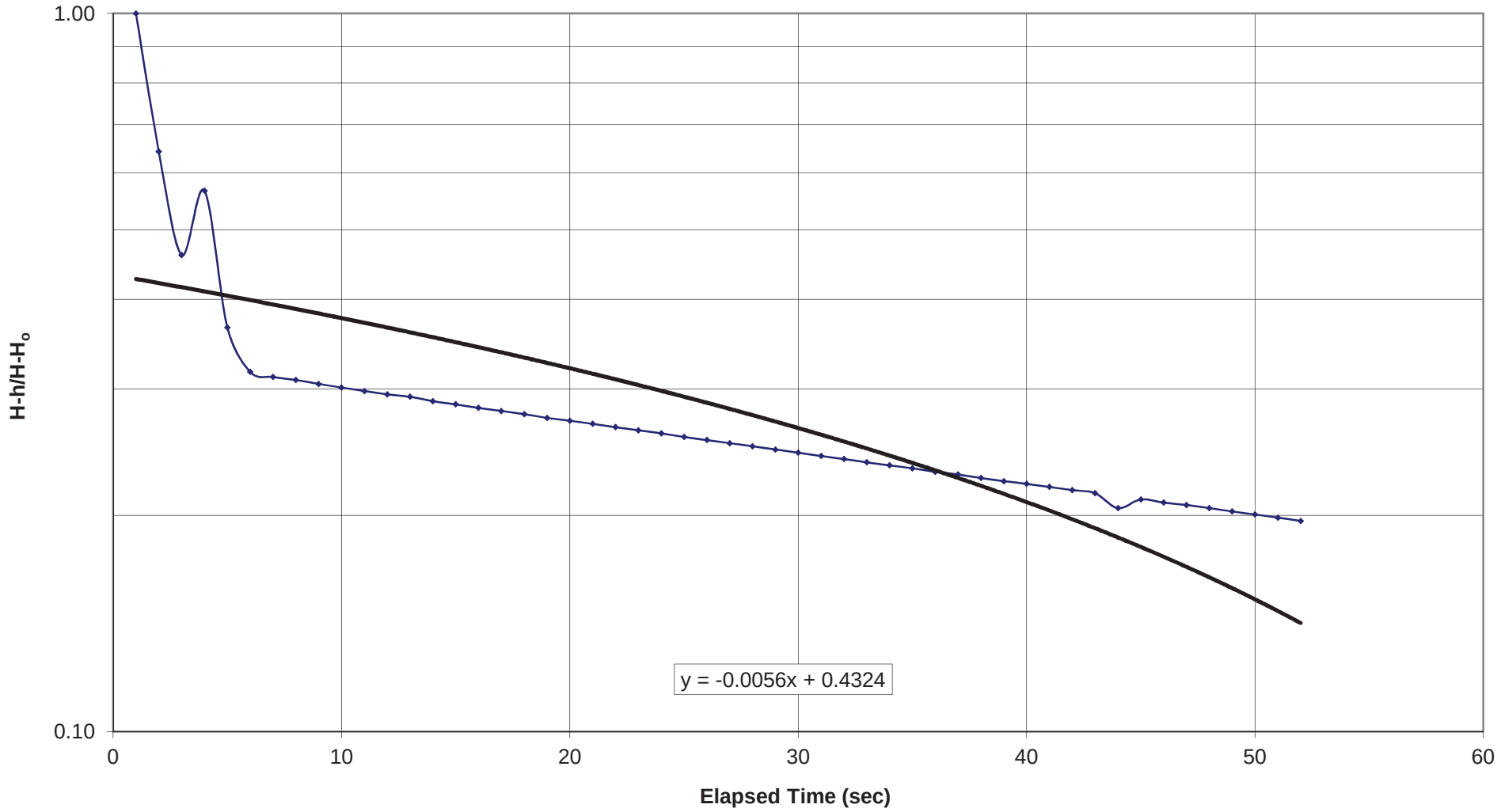
Hydraulic Conductivity Testing at TW-5-2
Warsaw Landfill

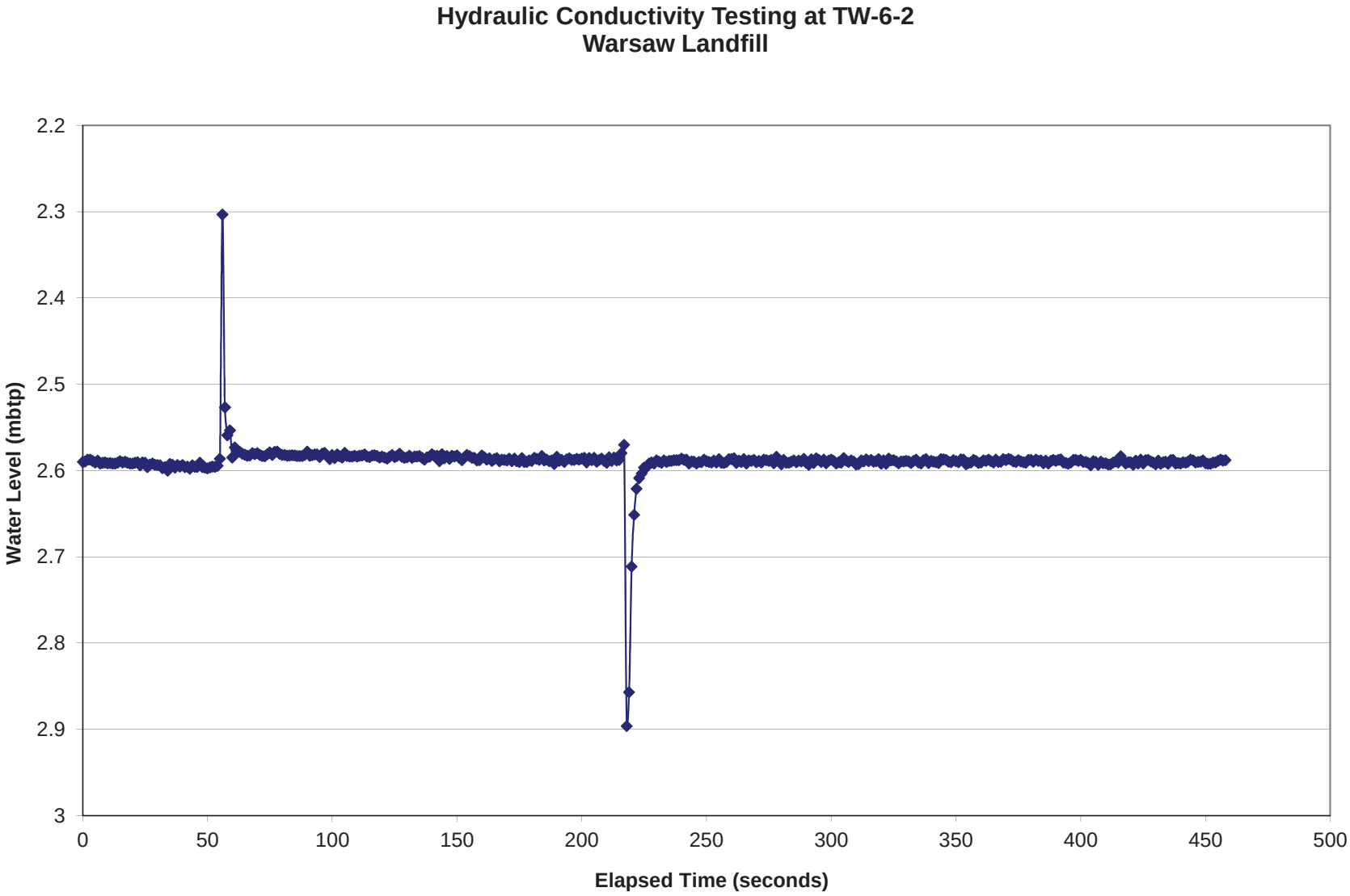


Rising Head Hydraulic Conductivity Analysis at TW-5-2

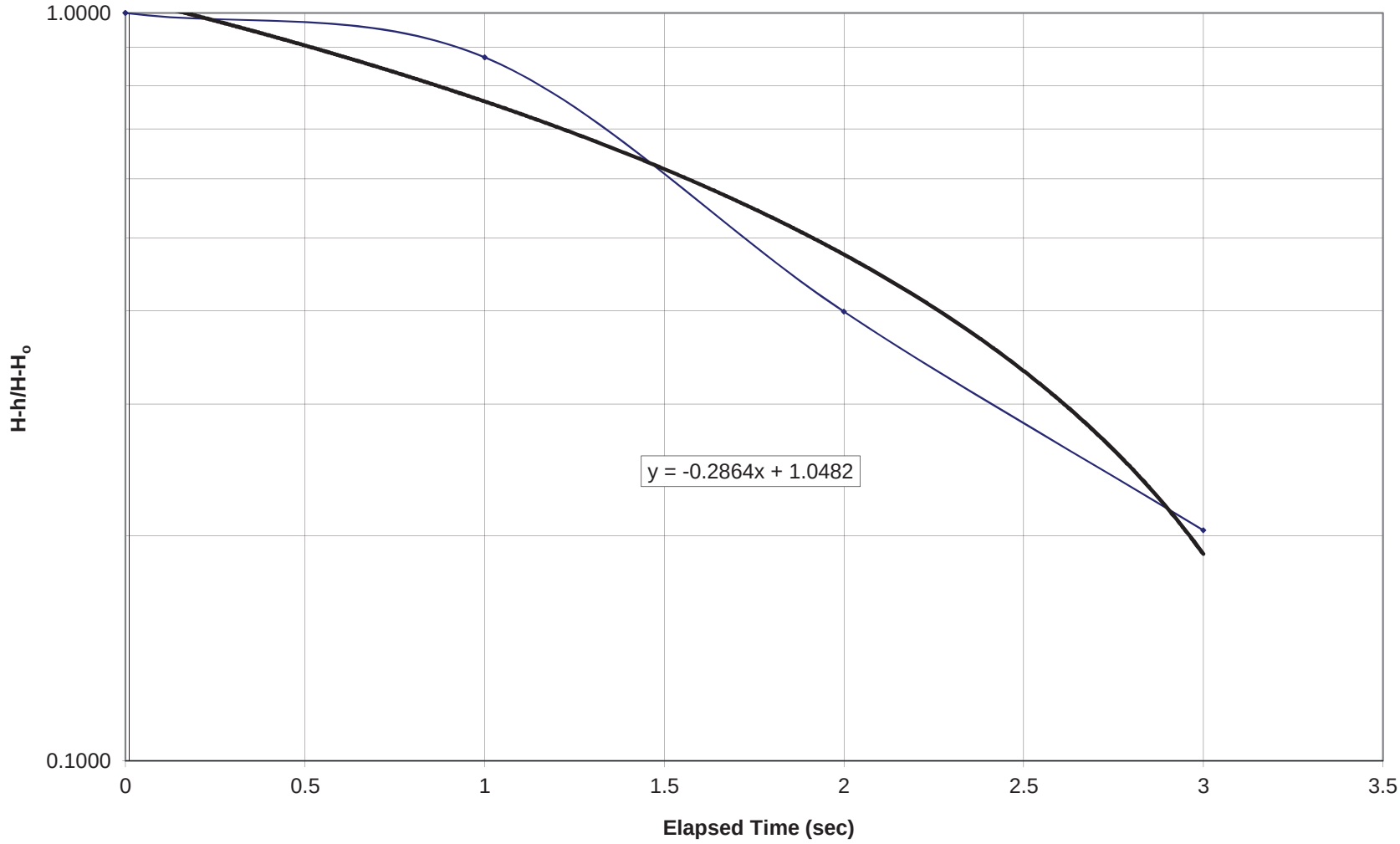


Falling Head Hydraulic Conductivity Analysis at TW-5-2

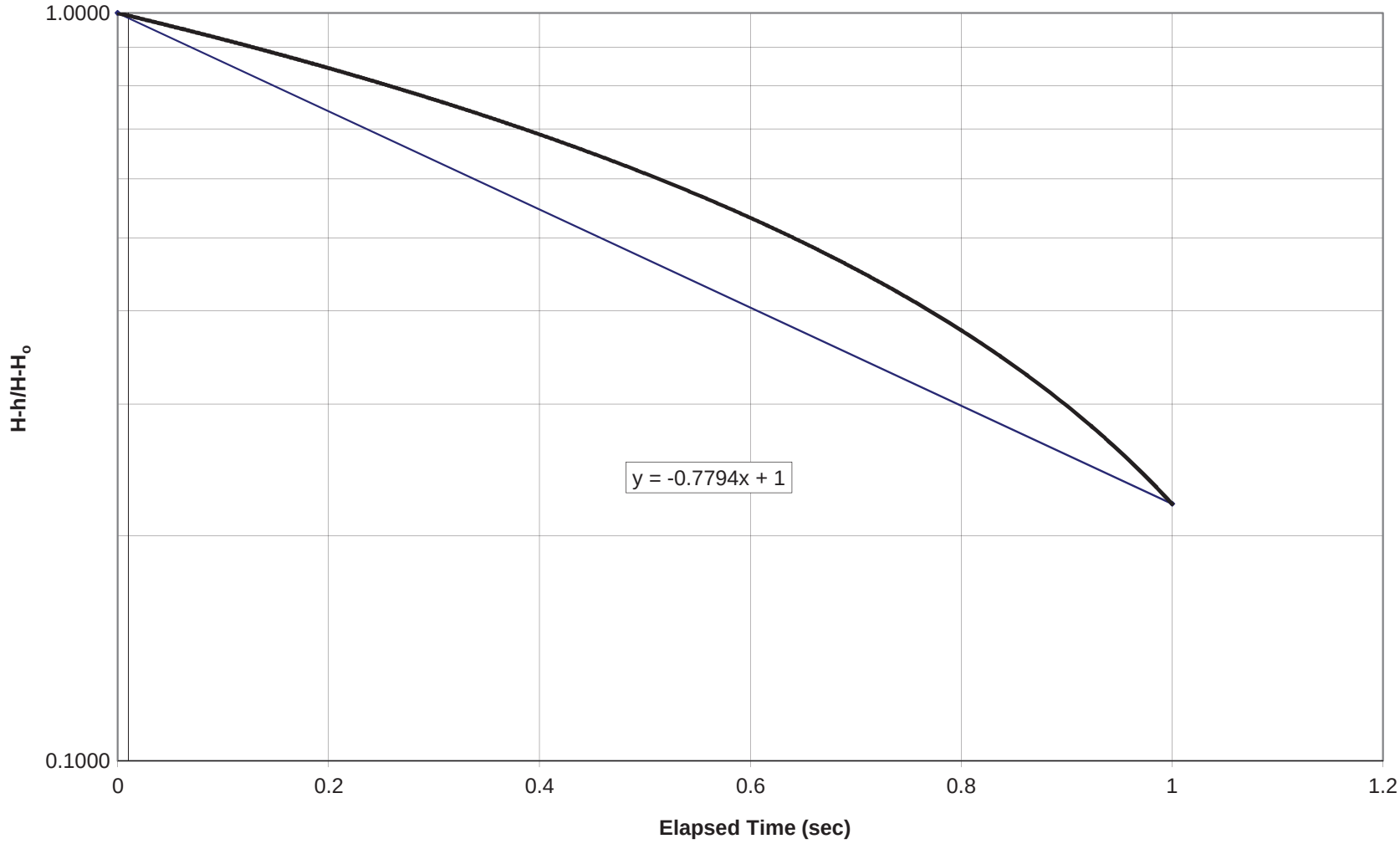


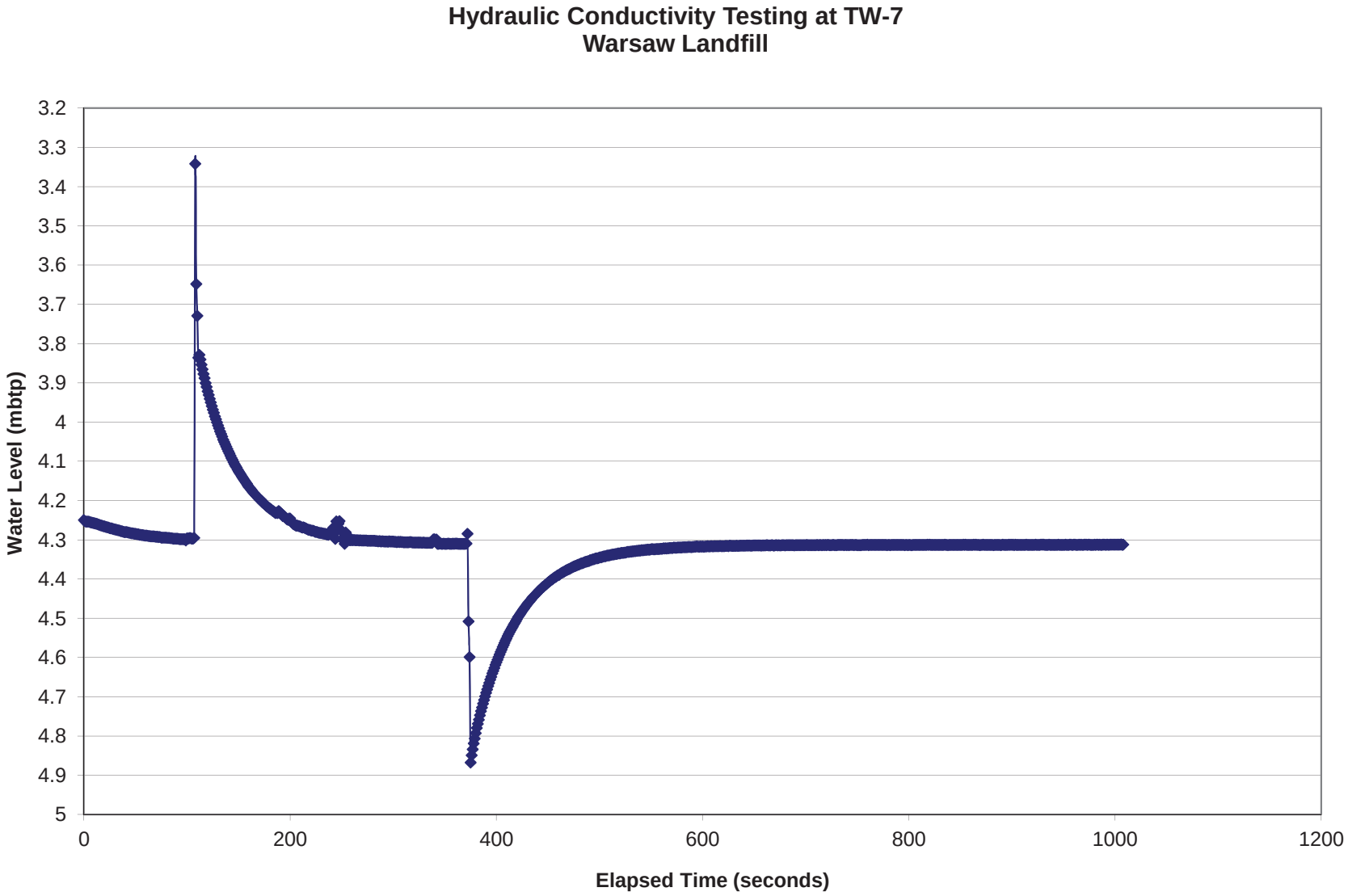

Hydraulic Conductivity Testing at TW-6-2
Warsaw Landfill
Water Level (mbtp)
2.2
2.3
2.4
2.5
2.6
2.7
2.8
2.9
3
0
50
100
150
200
250
300
350
400
450
500
Elapsed Time (seconds)

Rising Head Hydraulic Conductivity Analysis at TW-6-2

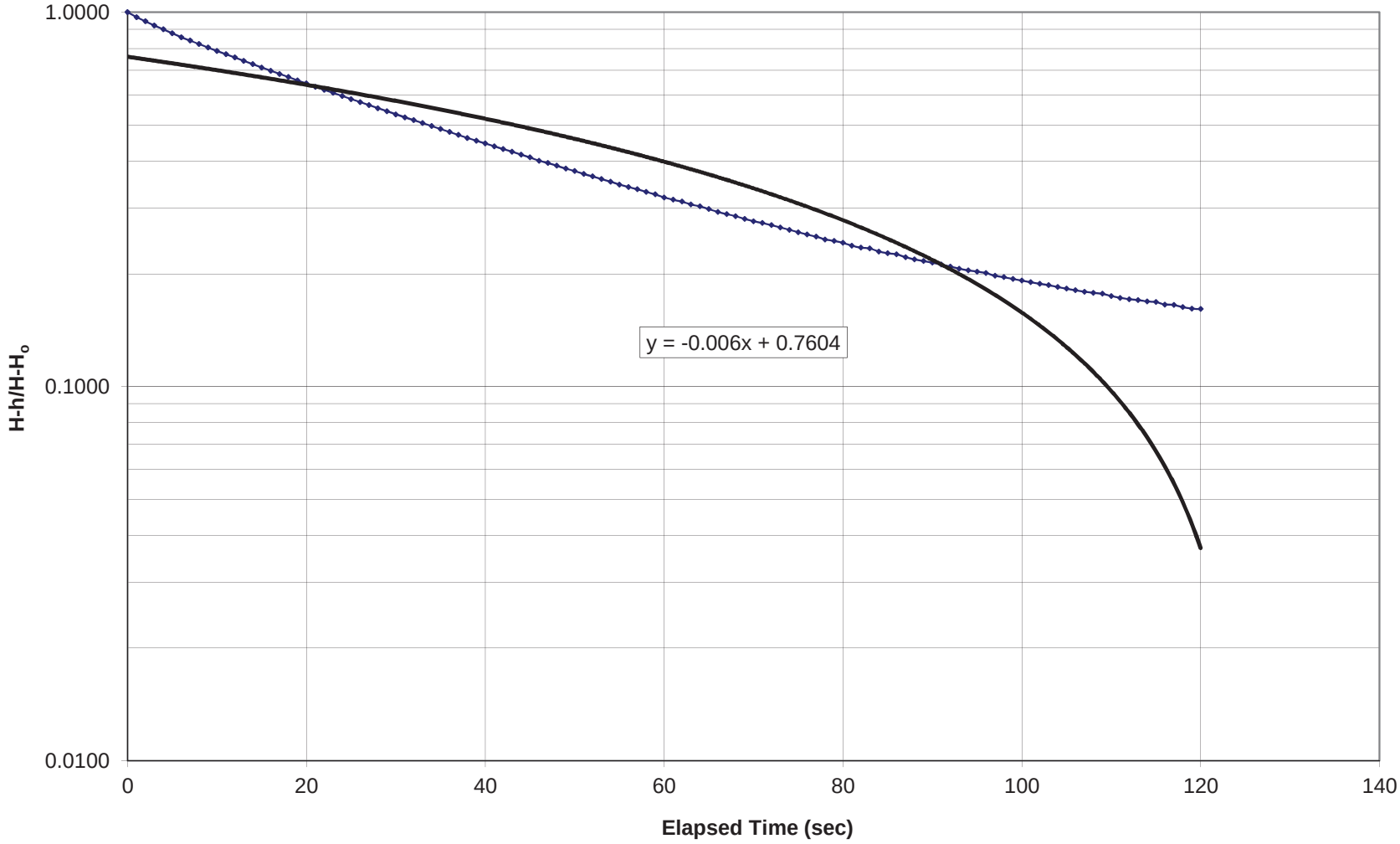


Falling Head Hydraulic Conductivity Analysis at TW-6-2

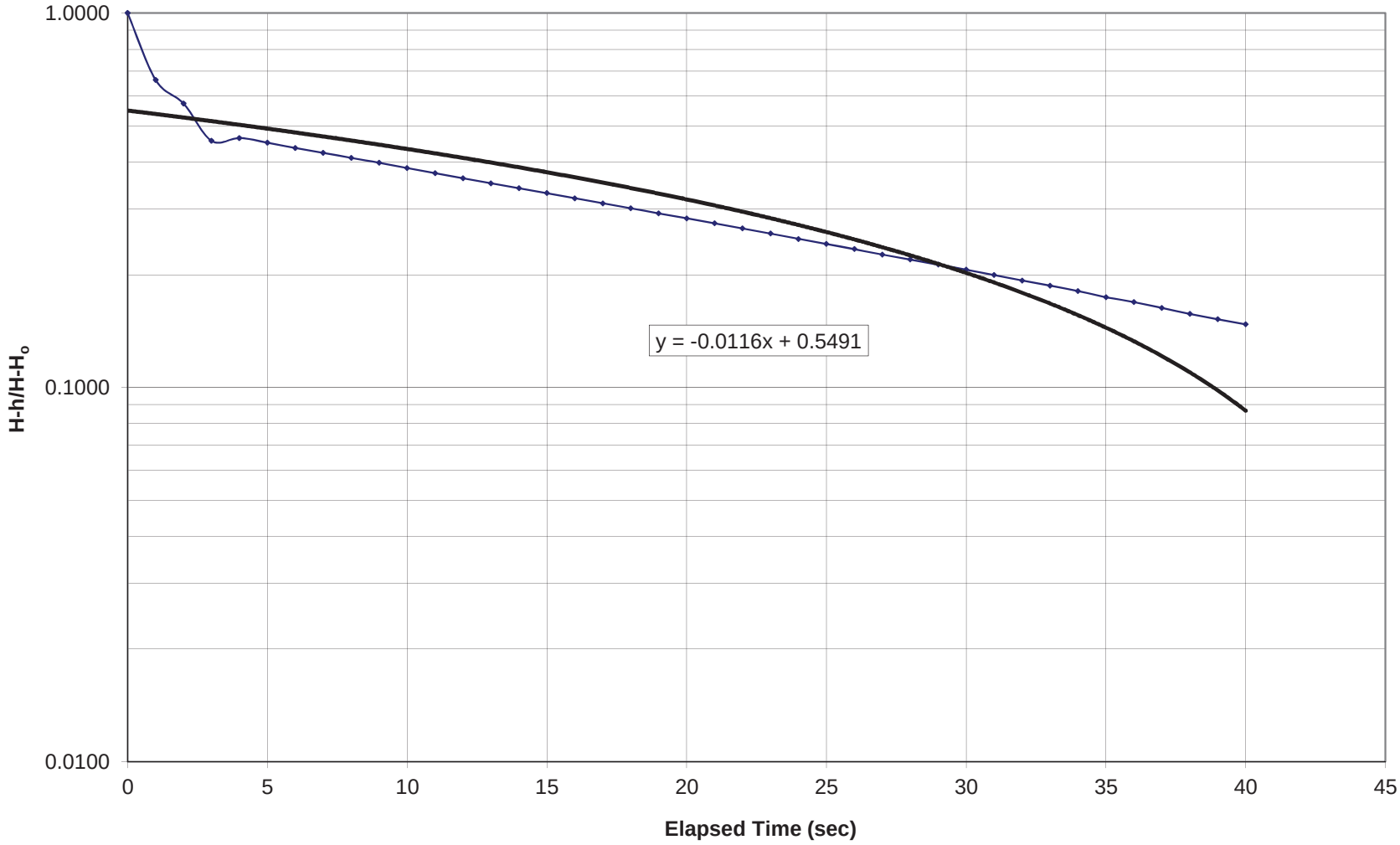



Hydraulic Conductivity Testing at TW-7
Warsaw Landfill
Water Level (mbtp)
3.2
3.3
3.4
3.5
3.6
3.7
3.8
3.9
4
4.1
4.2
4.3
4.4
4.5
4.6
4.7
4.8
4.9
5
0
200
400
600
800
1000
1200
Elapsed Time (seconds)

Rising Head Hydraulic Conductivity Analysis at TW-7



Falling Head Hydraulic Conductivity Analysis at TW-7



Appendix E
2020 Water Quality Data

FINAL REPORT

CA15150-MAY20 R

11212878, Warsaw Road Landfill

Prepared for

GHD

FINAL REPORT

CA15150-MAY20 R

First Page

CLIENT DETAILS

Client	GHD
Address	347 Pido Rd., Unit #29, Peterborough Canada, K9J 6Z8 Phone: 705-749-3317. Fax:
Contact	Gus Bolin
Telephone	705-749-3317
Facsimile	
Email	gus.bolin@ghd.com
Project	11212878, Warsaw Road Landfill
Order Number	
Samples	Ground Water (11)

LABORATORY DETAILS

Project Specialist	Brad Moore Hon. B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2143
Facsimile	705-652-6365
Email	brad.moore@sgs.com
SGS Reference	CA15150-MAY20
Received	05/12/2020
Approved	05/20/2020
Report Number	CA15150-MAY20 R
Date Reported	05/20/2020

COMMENTS

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

Client: GHD

Project: 11212878, Warsaw Road Landfill

Project Manager: Gus Bolin

Samplers: Gus Bolin

PACKAGE: **BTEX** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number					10								
Sample Name					TW-7								
Sample Matrix					Ground Water								
Sample Date					12/05/2020								
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**								
BTEX													
Benzene	ug/L	0.5			< 0.5								
Ethylbenzene	ug/L	0.5			< 0.5								
Toluene	ug/L	0.5			< 0.5								
Xylene (total)	ug/L	0.5			< 0.5								
o-xylene	ug/L	0.5			< 0.5								
m/p-xylene	ug/L	0.5			< 0.5								
General Chemistry													
Biochemical Oxygen Demand (BOD5)	mg/L	2			< 4 ↑	< 4 ↑	< 4 ↑	< 4 ↑	< 4 ↑	< 4 ↑	< 4 ↑	< 4 ↑	
Total Suspended Solids	mg/L	2			533	674	17	296	25	1600	< 2	2	
Alkalinity	mg/L as CaCO3	2	500		313	341	253	306	333	354	348	243	
Conductivity	uS/cm	2			764	876	725	876	802	914	951	663	
Total Dissolved Solids	mg/L	30	500		466	551	437	509	471	560	669	391	
Chemical Oxygen Demand	mg/L	8			15	19	9	8	< 8	10	14	< 8	
Total Kjeldahl Nitrogen	as N mg/L	0.5			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6	< 0.5	< 0.5	
Ammonia+Ammonium (N)	as N mg/L	0.1			< 0.1	0.1	< 0.1	< 0.1	0.2	0.4	< 0.1	< 0.1	

Client: GHD

Project: 11212878, Warsaw Road Landfill

Project Manager: Gus Bolin

Samplers: Gus Bolin

PACKAGE: **Metals and Inorganics** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

					Sample Number	5	6	7	8	9	10	11	12
					Sample Name	TW-2	TW 3-2	TW 4-2	TW 5-2	TW 6-2	TW-7	R-1	R-2
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics													
Phosphorus (total)	mg/L	0.03			0.92	0.11	< 0.03	0.40	< 0.03	0.58	< 0.03	< 0.03
Sulphate	mg/L	2	500		< 2	7	5	9	7	3	75	5
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.06	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	< 0.06	< 0.06	1.16	0.23	0.23	0.11	10.2	0.61
Arsenic (dissolved)	mg/L	0.0002		0.01	0.0004	0.0007	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Barium (dissolved)	mg/L	0.00002		1	0.0971	0.107	0.0400	0.147	0.0983	0.0743	0.168	0.0448
Boron (dissolved)	mg/L	0.002		5	0.016	0.103	0.016	0.021	0.051	0.148	0.029	0.011
Calcium (dissolved)	mg/L	0.01			131	146	110	123	140	127	177	105
Cadmium (dissolved)	mg/L	0.000003		0.005	0.000011	< 0.000003	0.000004	< 0.000003	0.000009	0.000009	0.000006	0.000009
Chromium (dissolved)	mg/L	0.00008		0.05	0.00025	0.00030	0.00037	0.00023	0.00014	0.00015	0.00009	0.00022
Copper (dissolved)	mg/L	0.0002	1		0.0013	0.0005	0.0005	0.0011	0.0019	0.0014	0.0572	0.0637
Iron (dissolved)	mg/L	0.007	0.3		0.718	1.36	0.007	< 0.007	0.007	0.023	< 0.007	0.021
Potassium (dissolved)	mg/L	0.009			0.482	5.89	0.504	1.27	6.05	3.74	21.6	1.06
Magnesium (dissolved)	mg/L	0.001			6.94	10.4	3.32	8.01	7.02	23.8	19.3	4.05
Manganese (dissolved)	mg/L	0.00001	0.05		0.338	0.298	0.00012	0.00011	0.0469	0.0171	0.0231	0.00030
Sodium (dissolved)	mg/L	0.01	200	20	43.2	48.1	53.8	70.0	39.7	50.4	14.6	42.7
Lead (dissolved)	mg/L	0.00001		0.01	0.00005	0.00005	< 0.00001	0.00002	< 0.00001	0.00004	0.00021	0.00159
Zinc (dissolved)	mg/L	0.002	5		< 0.002	< 0.002	< 0.002	0.003	0.002	0.004	0.011	0.027

Client: GHD

Project: 11212878, Warsaw Road Landfill

Project Manager: Gus Bolin

Samplers: Gus Bolin

PACKAGE: **Other (ORP)** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

					Sample Number	5	6	7	8	9	10	11	12
					Sample Name	TW-2	TW 3-2	TW 4-2	TW 5-2	TW 6-2	TW-7	R-1	R-2
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Other (ORP)													
pH	no unit	0.05	8.5		7.67	7.39	7.83	7.53	7.36	7.81	7.40	7.89
Chloride	mg/L	1	250		71	96	84	140	78	140	55	72
Mercury (total)	µg/L	0.01			< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenols													
4AAP-Phenolics	mg/L	0.001			0.002	0.002	0.003	0.002	< 0.001	0.001	0.002	0.002
THMs (VOC)													
Bromodichloromethane	µg/L	0.5			< 0.5							
Bromoform	µg/L	0.5			< 0.5							
Dibromochloromethane	µg/L	0.5			< 0.5							
VOCs													
Bromomethane	µg/L	0.5			< 0.5							
Carbon tetrachloride	µg/L	0.2			< 0.2							
Chloroethane	µg/L	5.0			< 5							
Chloroform	µg/L	0.5			< 0.5							
Chloromethane	µg/L	5.0			< 5							
1,2-Dichlorobenzene	µg/L	0.5			< 0.5							
1,3-Dichlorobenzene	µg/L	0.5			< 0.5							
1,4-Dichlorobenzene	µg/L	0.5			< 0.5							
1,1-Dichloroethane	µg/L	0.5			< 0.5							
1,2-Dichloroethane	µg/L	0.5			< 0.5							
1,1-Dichloroethylene	µg/L	0.5			< 0.5							
1,2-Dichloropropane	µg/L	0.5			< 0.5							
trans-1,2-Dichloroethene	µg/L	0.5			< 0.5							

Client: GHD

Project: 11212878, Warsaw Road Landfill

Project Manager: Gus Bolin

Samplers: Gus Bolin

PACKAGE: **VOCs** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number	10
Sample Name	TW-7
Sample Matrix	Ground Water
Sample Date	12/05/2020

Parameter	Units	RL	L1	L2	Result
VOCs (continued)					
cis-1,2-Dichloroethene	µg/L	0.5			< 0.5
cis-1,3-Dichloropropene	µg/L	0.5			< 0.5
trans-1,3-Dichloropropene	µg/L	0.5			< 0.5
Ethylenedibromide	µg/L	0.2			< 0.2
Dichloromethane	µg/L	0.5			< 0.5
Monochlorobenzene	µg/L	0.5			< 0.5
Styrene	µg/L	0.5			< 0.5
1,1,2,2-Tetrachloroethane	µg/L	0.5			< 0.5
Tetrachloroethene	µg/L	0.5			< 0.5
Trichloroethylene	µg/L	0.5			< 0.5
Vinyl Chloride	µg/L	0.2			< 0.2
Trichlorofluoromethane	µg/L	5.0			< 5
1,1,1-Trichloroethane	µg/L	0.5			< 0.5
1,1,2-Trichloroethane	µg/L	0.5			< 0.5
1,1,1,2-Tetrachloroethane	µg/L	0.5			< 0.5

Client: GHD

Project: 11212878, Warsaw Road Landfill

Project Manager: Gus Bolin

Samplers: Gus Bolin

PACKAGE: **General Chemistry** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	13	14	15
				Sample Name	R-3	R-4	TW 8-2
				Sample Matrix	Ground Water	Ground Water	Ground Water
				Sample Date	12/05/2020	12/05/2020	12/05/2020
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**
General Chemistry							
Biochemical Oxygen Demand (BOD5)	mg/L	2			< 4↑	< 4↑	12
Total Suspended Solids	mg/L	2			2	< 2	13200
Alkalinity	mg/L as CaCO3	2	500		255	232	323
Conductivity	uS/cm	2			723	522	925
Total Dissolved Solids	mg/L	30	500		423	323	571
Chemical Oxygen Demand	mg/L	8			12	< 8	54
Total Kjeldahl Nitrogen	as N mg/L	0.5			< 0.5	< 0.5	< 0.5
Ammonia+Ammonium (N)	as N mg/L	0.1			< 0.1	< 0.1	< 0.1
Metals and Inorganics							
Phosphorus (total)	mg/L	0.03			< 0.03	< 0.03	< 0.03
Sulphate	mg/L	2	500		6	4	12
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	1.28	0.30	< 0.06
Arsenic (dissolved)	mg/L	0.0002		0.01	< 0.0002	< 0.0002	< 0.0002
Barium (dissolved)	mg/L	0.00002		1	0.0338	0.0366	0.217
Boron (dissolved)	mg/L	0.002		5	0.010	0.041	0.027
Calcium (dissolved)	mg/L	0.01			115	67.2	131
Cadmium (dissolved)	mg/L	0.000003		0.005	0.000004	0.000004	0.000011
Chromium (dissolved)	mg/L	0.00008		0.05	0.00026	0.00017	0.00015
Copper (dissolved)	mg/L	0.0002	1		0.0411	0.0309	0.0005
Iron (dissolved)	mg/L	0.007	0.3		0.007	0.008	0.284

Client: GHD
Project: 11212878, Warsaw Road Landfill
Project Manager: Gus Bolin
Samplers: Gus Bolin

PACKAGE: **Metals and Inorganics** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

					Sample Number	13	14	15
					Sample Name	R-3	R-4	TW 8-2
					Sample Matrix	Ground Water	Ground Water	Ground Water
					Sample Date	12/05/2020	12/05/2020	12/05/2020
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)							
Potassium (dissolved)	mg/L	0.009			0.521	0.887	1.69
Magnesium (dissolved)	mg/L	0.001			3.44	3.55	11.1
Manganese (dissolved)	mg/L	0.00001	0.05		0.00038	0.00022	0.0569
Sodium (dissolved)	mg/L	0.01	200	20	50.8	49.0	65.3
Lead (dissolved)	mg/L	0.00001		0.01	0.00183	0.00023	0.00001
Zinc (dissolved)	mg/L	0.002	5		0.013	0.031	< 0.002
Other (ORP)							
pH	no unit	0.05	8.5		7.65	7.86	7.74
Chloride	mg/L	1	250		79	34	140
Mercury (total)	µg/L	0.01			< 0.01	< 0.01	< 0.01
Phenols							
4AAP-Phenolics	mg/L	0.001			0.002	< 0.001	0.002

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
TW-2					
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	0.718	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.338	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	43.2		20
TW 3-2					
Total Dissolved Solids	SM 2540C	mg/L	551	500	
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	1.36	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.298	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	48.1		20
TW 4-2					
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	53.8		20
TW 5-2					
Total Dissolved Solids	SM 2540C	mg/L	509	500	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	70.0		20
TW 6-2					
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	39.7		20
TW-7					
Total Dissolved Solids	SM 2540C	mg/L	560	500	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	50.4		20
R-1					
Nitrate as Nitrogen	EPA300/MA300-Ions1.3	as N mg/L	10.2		10
Total Dissolved Solids	SM 2540C	mg/L	669	500	
R-2					
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	42.7		20
R-3					
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	50.8		20
R-4					
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	49.0		20
TW 8-2					
Total Dissolved Solids	SM 2540C	mg/L	571	500	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.0569	0.05	

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
TW 8-2 (continued)					
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	65.3		20

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0198-MAY20	mg/L as CaCO3	2	< 2	2	20	100	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0101-MAY20	as N mg/L	0.1	<0.1	ND	10	100	90	110	90	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO0314-MAY20	mg/L	1	<1	3	20	104	80	120	102	75	125
Sulphate	DIO0314-MAY20	mg/L	2	<2	1	20	99	80	120	96	75	125
Chloride	DIO0316-MAY20	mg/L	1	<1	2	20	106	80	120	101	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0194-MAY20	mg/L	0.03	<0.03	15	20	99	80	120	100	75	125
Nitrate (as N)	DIO0194-MAY20	mg/L	0.06	<0.06	0	20	104	80	120	97	75	125
Nitrate (as N)	DIO0222-MAY20	mg/L	0.06	<0.06	ND	20	104	80	120	105	75	125
Nitrite (as N)	DIO0223-MAY20	mg/L	0.03	<0.03	2	20	99	80	120	100	75	125
Nitrate (as N)	DIO0223-MAY20	mg/L	0.06	<0.06	0	20	106	80	120	101	75	125
Nitrite (as N)	DIO0294-MAY20	mg/L	0.03	<0.03	6	20	99	80	120	101	75	125

QC SUMMARY

Biochemical Oxygen Demand

Method: SM 5210 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0030-MAY20	mg/L	2	< 2	6	30	105	70	130	87	70	130

Chemical Oxygen Demand

Method: HACH 8000 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0201-MAY20	mg/L	8	<8	10	20	116	80	120	115	75	125
Chemical Oxygen Demand	EWL0249-MAY20	mg/L	8	<8	7	20	94	80	120	103	75	125

Conductivity

Method: SM 2510 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0198-MAY20	uS/cm	2	< 2	2	20	97	90	110	NA		

QC SUMMARY

Mercury by CVAAS

Method: SM 3112/SM 3112B | Internal ref.: ME-CA-[ENV]SPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0010-MAY20	ug/L	0.01	<0.01	11	20	102	80	120	84	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Arsenic (dissolved)	EMS0057-MAY20	mg/L	0.0002	<0.0002	ND	20	101	90	110	105	70	130
Barium (dissolved)	EMS0057-MAY20	mg/L	0.00002	<0.00002	2	20	100	90	110	101	70	130
Boron (dissolved)	EMS0057-MAY20	mg/L	0.002	<0.002	1	20	95	90	110	91	70	130
Calcium (dissolved)	EMS0057-MAY20	mg/L	0.01	<0.01	3	20	99	90	110	100	70	130
Cadmium (dissolved)	EMS0057-MAY20	mg/L	0.000003	<0.000003	ND	20	100	90	110	107	70	130
Chromium (dissolved)	EMS0057-MAY20	mg/L	0.00008	<0.00008	20	20	97	90	110	124	70	130
Copper (dissolved)	EMS0057-MAY20	mg/L	0.0002	<0.0002	3	20	103	90	110	110	70	130
Iron (dissolved)	EMS0057-MAY20	mg/L	0.007	<0.007	0	20	101	90	110	100	70	130
Potassium (dissolved)	EMS0057-MAY20	mg/L	0.009	<0.009	3	20	99	90	110	99	70	130
Magnesium (dissolved)	EMS0057-MAY20	mg/L	0.001	<0.001	2	20	97	90	110	99	70	130
Manganese (dissolved)	EMS0057-MAY20	mg/L	0.00001	<0.00001	ND	20	103	90	110	104	70	130
Sodium (dissolved)	EMS0057-MAY20	mg/L	0.01	<0.01	0	20	103	90	110	95	70	130
Lead (dissolved)	EMS0057-MAY20	mg/L	0.00001	<0.00001	5	20	99	90	110	103	70	130
Zinc (dissolved)	EMS0057-MAY20	mg/L	0.002	<0.002	6	20	101	90	110	119	70	130

QC SUMMARY

pH

Method: SM 4500 I Internal ref.: ME-CA-[ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
pH	EWL0198-MAY20	no unit	0.05	NA	0		101			NA		

Phenols by SFA

Method: SM 5530B-D I Internal ref.: ME-CA-[ENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
4AAP-Phenolics	SKA0127-MAY20	mg/L	0.001	<0.001	ND	10	93	90	110	109	75	125
4AAP-Phenolics	SKA0140-MAY20	mg/L	0.001	<0.001	ND	10	100	90	110	107	75	125

QC SUMMARY

Phosphorus by SFA

Method: SM 4500-P J | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	SKA0104-MAY20	mg/L	0.03	<0.03	0	10	94	90	110	79	75	125
Phosphorus (total)	SKA0110-MAY20	mg/L	0.03	<0.03	ND	10	96	90	110	86	75	125

Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0179-MAY20	mg/L	30	<30	1	20	101	90	110	NA		

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0223-MAY20	mg/L	2	< 2	0	10	93	90	110	NA		

QC SUMMARY

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0102-MAY20	as N mg/L	0.5	<0.5	ND	10	98	90	110	101	75	125

QC SUMMARY

Volatile Organics

Method: EPA 5030B/8260C | Internal ref.: ME-CA-[ENVIGC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
1,1,1,2-Tetrachloroethane	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	99	60	130	100	50	140
1,1,1-Trichloroethane	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	94	60	130	91	50	140
1,1,2,2-Tetrachloroethane	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	98	60	130	104	50	140
1,1,2-Trichloroethane	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	95	60	130	97	50	140
1,1-Dichloroethane	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	94	60	130	61	50	140
1,1-Dichloroethylene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	99	60	130	97	50	140
1,2-Dichlorobenzene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	100	60	130	100	50	140
1,2-Dichloroethane	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	94	60	130	94	50	140
1,2-Dichloropropane	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	96	60	130	97	50	140
1,3-Dichlorobenzene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	100	60	130	99	50	140
1,4-Dichlorobenzene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	99	60	130	98	50	140
Benzene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	98	60	130	95	50	140
Bromodichloromethane	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	97	60	130	98	50	140
Bromoform	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	92	60	130	95	50	140
Bromomethane	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	79	50	140	78	50	140
Carbon tetrachloride	GCM0209-MAY20	ug/L	0.2	<0.2	ND	30	100	60	130	97	50	140
Chloroethane	GCM0209-MAY20	ug/L	5.0	<5	ND	30	122	60	130	116	50	140
Chloroform	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	97	60	130	95	50	140
Chloromethane	GCM0209-MAY20	ug/L	5.0	<5	ND	30	101	60	130	97	50	140
cis-1,2-Dichloroethene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	100	60	130	97	50	140

QC SUMMARY

Volatile Organics (continued)

Method: EPA 5030B/8260C | Internal ref.: ME-CA-[ENVIGC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
cis-1,3-Dichloropropene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	95	60	130	98	50	140
Dibromochloromethane	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	94	60	130	96	50	140
Dichloromethane	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	98	60	130	97	50	140
Ethylbenzene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	99	60	130	99	50	140
Ethylenedibromide	GCM0209-MAY20	ug/L	0.2	<0.2	ND	30	94	60	130	98	50	140
m/p-xylene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	103	60	130	104	50	140
Monochlorobenzene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	99	60	130	99	50	140
o-xylene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	98	60	130	100	50	140
Styrene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	96	60	130	99	50	140
Tetrachloroethene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	93	60	130	94	50	140
Toluene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	95	60	130	95	50	140
trans-1,2-Dichloroethene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	95	60	130	93	50	140
trans-1,3-Dichloropropene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	92	60	130	98	50	140
Trichloroethylene	GCM0209-MAY20	ug/L	0.5	<0.5	ND	30	96	60	130	95	50	140
Trichlorofluoromethane	GCM0209-MAY20	ug/L	5.0	<5	ND	30	107	50	140	102	50	140
Vinyl Chloride	GCM0209-MAY20	ug/L	0.2	<0.2	ND	30	89	60	130	85	50	140

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Samples analysed as received. Solid samples expressed on a dry weight basis. “Temperature Upon Receipt” is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act” published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated. This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

-- End of Analytical Report --

FINAL REPORT

CA15149-MAY20 R

11212878 Warsaw Road Landfill

Prepared for

GHD Limited - 735

FINAL REPORT

CA15149-MAY20 R

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	GHD Limited - 735	Project Specialist	Jill Campbell, B.Sc.,GISAS
		Laboratory	SGS Canada Inc.
Address	347 Pido Rd., Unit #29 Peterborough, ON K9J 6Z8. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Gus Bolin	Telephone	2165
Telephone	705-749-3317	Facsimile	705-652-6365
Facsimile		Email	jill.campbell@sgs.com
Email	gus.bolin@ghd.com	SGS Reference	CA15149-MAY20
Project	11212878 Warsaw Road Landfill	Received	05/12/2020
Order Number		Approved	05/22/2020
Samples	Surface Water (5)	Report Number	CA15149-MAY20 R
		Date Reported	05/22/2020

COMMENTS

Temperature of Sample upon Receipt: 8 degrees C
Cooling Agent Present:Yes
Custody Seal Present:Yes

Chain of Custody Number:NA

SIGNATORIES

Jill Campbell, B.Sc.,GISAS

TABLE OF CONTENTS

Client: GHD Limited - 735

Project: 11212878 Warsaw Road Landfill

Project Manager: Gus Bolin

Samplers: Gus Bolin

PACKAGE: **PWQO - General Chemistry** (WATER)

L1 = PWQO / WATER / - - Table 2 - General - July 1999 PIBS 3303E

			Sample Number	5	6	7	8	9
			Sample Name	SW-7	SW-9	SW-11	SW-17	SW-6
			Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
			Sample Date	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**	**Result**	**Result**
General Chemistry								
Biochemical Oxygen Demand (BOD5)	mg/L	2		< 4 ↑	< 4 ↑	< 4 ↑	7	< 4 ↑
Total Suspended Solids	mg/L	2		56	< 2	< 2	6	11
Alkalinity	mg/L as CaCO3	2		239	297	216	320	255
Conductivity	uS/cm	2		794	762	545	894	672
Total Dissolved Solids	mg/L	30		466	440	309	529	349
Chemical Oxygen Demand	mg/L	8		29	20	27	35	20
Total Kjeldahl Nitrogen	as N mg/L	0.5		0.7	1.0	< 0.5	0.7	< 0.5
Ammonia+Ammonium (N)	as N mg/L	0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

PACKAGE: **PWQO - Metals and Inorganics** (WATER)

L1 = PWQO / WATER / - - Table 2 - General - July 1999 PIBS 3303E

			Sample Number	5	6	7	8	9
			Sample Name	SW-7	SW-9	SW-11	SW-17	SW-6
			Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
			Sample Date	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics								
Sulphate	mg/L	2		< 2	< 2	< 2	< 2	< 2
Nitrite (as N)	as N mg/L	0.03		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Arsenic (total)	mg/L	0.0002	0.005	0.0004	0.0003	0.0002	0.0003	< 0.0002
Barium (total)	mg/L	0.00002		0.0455	0.0976	0.0286	0.0828	0.0389
Boron (total)	mg/L	0.002	0.2	0.075	0.057	0.013	0.071	0.013
Calcium (total)	mg/L	0.01		117	120	93.0	127	115

Client: GHD Limited - 735

Project: 11212878 Warsaw Road Landfill

Project Manager: Gus Bolin

Samplers: Gus Bolin

PACKAGE: **PWQO - Metals and Inorganics** (WATER)

L1 = PWQO / WATER / - - Table 2 - General - July 1999 PIBS 3303E

	Sample Number			5	6	7	8	9
	Sample Name			SW-7	SW-9	SW-11	SW-17	SW-6
	Sample Matrix			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
	Sample Date			12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)								
Cadmium (total)	mg/L	0.000003	0.0001	0.000007	0.000007	0.000003	0.000008	0.000012
Chromium (total)	mg/L	0.00008		0.00015	0.00014	0.00015	0.00022	0.00021
Copper (total)	mg/L	0.0002	0.001	0.0005	0.0009	0.0004	0.0008	0.0013
Iron (total)	mg/L	0.007	0.3	0.025	0.302	0.024	0.049	0.052
Potassium (total)	mg/L	0.009		8.39	9.26	1.02	7.24	2.32
Magnesium (total)	mg/L	0.001		8.09	9.00	3.57	9.11	4.15
Manganese (total)	mg/L	0.00001		0.0177	0.534	0.00763	0.0231	0.0103
Sodium (total)	mg/L	0.01		47.8	35.8	21.9	56.2	31.2
Phosphorus (total)	mg/L	0.003	0.01	0.103	0.068	0.011	0.035	0.022
Lead (total)	mg/L	0.00001	0.001	< 0.00001	0.00006	< 0.00001	< 0.00001	0.00007
Zinc (total)	mg/L	0.002	0.02	0.004	0.004	0.003	0.004	0.003

Client: GHD Limited - 735

Project: 11212878 Warsaw Road Landfill

Project Manager: Gus Bolin

Samplers: Gus Bolin

PACKAGE: **PWQO - Other (ORP)** (WATER)

L1 = PWQO / WATER / - - Table 2 - General - July 1999 PIBS 3303E

			Sample Number	5	6	7	8	9
			Sample Name	SW-7	SW-9	SW-11	SW-17	SW-6
			Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
			Sample Date	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**	**Result**	**Result**
Other (ORP)								
pH	no unit	0.05	8.5	8.28	8.16	8.05	8.15	8.29
Chloride	mg/L	1		86	65	41	93	58
Mercury (total)	µg/L	0.01	0.2	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

PACKAGE: **PWQO - Phenols** (WATER)

L1 = PWQO / WATER / - - Table 2 - General - July 1999 PIBS 3303E

			Sample Number	5	6	7	8	9
			Sample Name	SW-7	SW-9	SW-11	SW-17	SW-6
			Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
			Sample Date	12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	**Result**	**Result**	**Result**
Phenols								
4AAP-Phenolics	mg/L	0.001	0.001	0.003	0.008	< 0.001	0.005	0.002

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	PWQO / WATER / - - Table 2 - General - July 1999 PIBS 3303E L1
SW-7				
Phosphorus	SM 3030/EPA 200.8	µg/L	0.103	0.01
4AAP-Phenolics	SM 5530B-D	mg/L	0.003	0.001
SW-9				
Iron	SM 3030/EPA 200.8	µg/L	0.302	0.3
Phosphorus	SM 3030/EPA 200.8	µg/L	0.068	0.01
4AAP-Phenolics	SM 5530B-D	mg/L	0.008	0.001
SW-11				
Phosphorus	SM 3030/EPA 200.8	µg/L	0.011	0.01
SW-17				
Phosphorus	SM 3030/EPA 200.8	µg/L	0.035	0.01
4AAP-Phenolics	SM 5530B-D	mg/L	0.005	0.001
SW-6				
Copper	SM 3030/EPA 200.8	µg/L	0.0013	0.001
Phosphorus	SM 3030/EPA 200.8	µg/L	0.022	0.01
4AAP-Phenolics	SM 5530B-D	mg/L	0.002	0.001

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0187-MAY20	mg/L as CaCO3	2	< 2	1	20	102	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-[ENV]SFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0101-MAY20	as N mg/L	0.1	<0.1	ND	10	100	90	110	90	75	125
Ammonia+Ammonium (N)	SKA0118-MAY20	as N mg/L	0.1	<0.1	3	10	100	90	110	102	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO0314-MAY20	mg/L	1	<1	3	20	104	80	120	102	75	125
Sulphate	DIO0314-MAY20	mg/L	2	<2	1	20	99	80	120	96	75	125
Chloride	DIO0360-MAY20	mg/L	1	<1	ND	20	106	80	120	103	75	125
Sulphate	DIO0360-MAY20	mg/L	2	<2	2	20	98	80	120	93	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0223-MAY20	mg/L	0.03	<0.03	2	20	99	80	120	100	75	125
Nitrate (as N)	DIO0223-MAY20	mg/L	0.06	<0.06	0	20	106	80	120	101	75	125
Nitrite (as N)	DIO0259-MAY20	mg/L	0.03	<0.03	ND	20	98	80	120	97	75	125
Nitrate (as N)	DIO0259-MAY20	mg/L	0.06	<0.06	0	20	103	80	120	102	75	125

QC SUMMARY

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0030-MAY20	mg/L	2	< 2	6	30	105	70	130	87	70	130

Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0201-MAY20	mg/L	8	<8	10	20	116	80	120	115	75	125
Chemical Oxygen Demand	EWL0249-MAY20	mg/L	8	<8	7	20	94	80	120	103	75	125

Conductivity

Method: SM 2510 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0187-MAY20	uS/cm	2	< 2	0	20	98	90	110	NA		

QC SUMMARY

Mercury by CVAAS

Method: SM 3112/SM 3112B | Internal ref.: ME-CA-[ENV]SPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0010-MAY20	ug/L	0.01	<0.01	11	20	102	80	120	84	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Arsenic (total)	EMS0062-MAY20	mg/L	0.0002	<0.0002	ND	20	107	90	110	104	70	130
Barium (total)	EMS0062-MAY20	mg/L	0.00002	<0.00002	ND	20	101	90	110	101	70	130
Boron (total)	EMS0062-MAY20	mg/L	0.002	<0.002	ND	20	102	90	110	98	70	130
Calcium (total)	EMS0062-MAY20	mg/L	0.01	<0.01	6	20	99	90	110	99	70	130
Cadmium (total)	EMS0062-MAY20	mg/L	0.000003	4e-006	4	20	98	90	110	114	70	130
Chromium (total)	EMS0062-MAY20	mg/L	0.00008	<0.00008	5	20	105	90	110	90	70	130
Copper (total)	EMS0062-MAY20	mg/L	0.0002	<0.0002	8	20	105	90	110	98	70	130
Iron (total)	EMS0062-MAY20	mg/L	0.007	<0.007	7	20	97	90	110	100	70	130
Potassium (total)	EMS0062-MAY20	mg/L	0.009	<0.009	10	20	98	90	110	97	70	130
Magnesium (total)	EMS0062-MAY20	mg/L	0.001	<0.001	6	20	98	90	110	96	70	130
Manganese (total)	EMS0062-MAY20	mg/L	0.00001	<0.00001	6	20	105	90	110	106	70	130
Sodium (total)	EMS0062-MAY20	mg/L	0.01	<0.01	9	20	109	90	110	101	70	130
Lead (total)	EMS0062-MAY20	mg/L	0.00001	<0.00001	3	20	100	90	110	102	70	130
Phosphorus (total)	EMS0062-MAY20	mg/L	0.003	<0.003	12	20	98	90	110	NV	70	130
Zinc (total)	EMS0062-MAY20	mg/L	0.002	<0.002	ND	20	103	90	110	116	70	130

QC SUMMARY

pH

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0187-MAY20	no unit	0.05	NA	0		101			NA		

Phenols by SFA

Method: SM 5530B-D I Internal ref.: ME-CA-IENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0140-MAY20	mg/L	0.001	<0.001	ND	10	100	90	110	107	75	125

Solids Analysis

Method: SM 2540C I Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0211-MAY20	mg/L	30	<30	6	20	99	90	110	NA		

QC SUMMARY

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0235-MAY20	mg/L	2	< 2	7	10	98	90	110	NA		
Total Suspended Solids	EWL0241-MAY20	mg/L	2	< 2	3	10	98	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0102-MAY20	as N mg/L	0.5	<0.5	ND	10	98	90	110	101	75	125
Total Kjeldahl Nitrogen	SKA0106-MAY20	as N mg/L	0.5	<0.5	5	10	98	90	110	100	75	125

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Samples analysed as received. Solid samples expressed on a dry weight basis. “Temperature Upon Receipt” is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act” published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated. This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

-- End of Analytical Report --

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GHD
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Schedule 5 Column 3, Column 1 metals

Project : 11212878, Warsaw Road Landfill

11-November-2020

Date Rec. : 02 November 2020
LR Report: **CA14954-NOV20**
Reference: 11212878 PO#73519804, Gus Bolin

Copy: 1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	3: Analysis Completed Date	4: Analysis Completed Time	5: TW-2	6: TW-3-2	7: TW-4-2	8: TW-5-2	9: TW-6-2	10: TW-7	11: TW-8-2	12: R-3	13: R-4
Sample Date & Time			02-Nov-20	02-Nov-20	02-Nov-20	02-Nov-20	02-Nov-20	02-Nov-20	02-Nov-20	02-Nov-20	02-Nov-20
Temp Upon Receipt [°C]	***	***	***	***	***	***	***	***	***	***	***
BOD5 [mg/L]	09-Nov-20	16:47	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
TSS [mg/L]	05-Nov-20	18:17	2470	475	461	75	31	1420	7460	3	4
Alkalinity [mg/L as CaCO3]	09-Nov-20	18:17	502*	400	338	309	418	469	1180*	303	198
pH [No unit]	09-Nov-20	18:17	7.90	7.74	7.73	7.89	7.73	7.77	7.73	7.67	7.60
Conductivity [uS/cm]	09-Nov-20	18:17	892	1020	794	896	1040	941	978	940	3170
TDS [mg/L]	05-Nov-20	18:17	554*	623*	411	537*	580*	543*	571*	520*	1740*
COD [mg/L]	09-Nov-20	15:22	31	26	< 8	10	< 8	8	< 8	< 8	< 8
Total P [mg/L]	09-Nov-20	20:40	2.82	0.11	0.22	0.14	0.04	0.41	0.47	< 0.03	0.04
TKN [as N mg/L]	06-Nov-20	11:21	< 0.5	< 0.5	< 0.5	< 0.5	1.5	1.0	< 0.5	< 0.5	< 0.5
NH3+NH4 [as N mg/L]	10-Nov-20	14:41	0.1	0.1	< 0.1	< 0.1	0.8	0.9	0.1	< 0.1	0.1
4AAP-Phenolics [mg/L]	06-Nov-20	13:03	0.003	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.018
SO4 [mg/L]	11-Nov-20	16:23	22	13	8	13	< 2	< 2	13	9	4
Cl [mg/L]	11-Nov-20	16:23	83	85	69	87	86	85	99	95	830*
NO2 [as N mg/L]	09-Nov-20	14:14	< 0.03	< 0.03	< 0.03	< 0.03	0.09	< 0.03	< 0.03	< 0.03	< 0.3

OnLine LIMS

0002317965

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Schedule 5 Column 3, Column 1 metals

Project : 11212878, Warsaw Road Landfill

LR Report : **CA14954-NOV20**

Analysis	3: Analysis Completed Date	4: Analysis Completed Time	5: TW-2	6: TW-3-2	7: TW-4-2	8: TW-5-2	9: TW-6-2	10: TW-7	11: TW-8-2	12: R-3	13: R-4
NO3 [as N mg/L]	09-Nov-20	12:31	0.13	< 0.06	1.92	0.12	1.49	0.07	< 0.06	3.26	0.16
Hg (tot) [µg/L]	05-Nov-20	13:48	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
As (diss) [mg/L]	06-Nov-20	15:49	0.0002	0.0007	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0005	< 0.0002	< 0.0002
Ba (diss) [mg/L]	06-Nov-20	15:49	0.106	0.117	0.0471	0.148	0.118	0.104	0.210	0.00235	0.196
B (diss) [mg/L]	06-Nov-20	15:49	0.013	0.091	0.010	0.016	0.058	0.073	0.025	0.009	0.130
Ca (diss) [mg/L]	06-Nov-20	15:49	126	155	118	120	135	123	130	5.37	304
Cd (diss) [mg/L]	06-Nov-20	15:49	0.000033	0.000016	0.000007	< 0.000003	0.000012	0.000009	< 0.000003	0.000009	0.000022
Cr (diss) [mg/L]	06-Nov-20	15:49	0.00024	0.00038	0.00023	0.00020	0.00013	0.00019	0.00027	0.00091	0.00044
Cu (diss) [mg/L]	06-Nov-20	15:49	0.0016	0.0010	0.0008	0.0014	0.0019	0.0008	0.0005	0.202	0.0300
Fe (diss) [mg/L]	06-Nov-20	15:49	0.030	1.00*	0.013	< 0.007	< 0.007	0.066	2.91*	0.212	0.067
K (diss) [mg/L]	06-Nov-20	15:49	0.633	6.30	0.526	1.25	7.02	3.99	1.64	0.208	5.47
Mg (diss) [mg/L]	06-Nov-20	15:49	5.94	9.88	3.56	7.02	7.16	13.0	9.75	0.175	31.1
Mn (diss) [mg/L]	06-Nov-20	15:49	0.0783*	0.278*	0.00055	0.00052	0.0301	0.263*	0.0232	0.0110	0.0328
Na (diss) [mg/L]	06-Nov-20	15:49	42.3*	49.0*	40.6*	57.8*	56.0*	53.5*	56.0*	187*	246*
Pb (diss) [mg/L]	06-Nov-20	15:49	0.00009	0.00008	0.00007	0.00011	0.00009	0.00009	0.00007	0.0191*	0.00054
Zn (diss) [mg/L]	06-Nov-20	15:49	0.005	0.003	< 0.002	0.002	0.004	0.004	0.002	0.095	0.038
Benzene [ug/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
Bromodichloromethane [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
Bromoform [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
Bromomethane [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
Carbon tetrachloride [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.2	---	---	---
Chloroethane [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 5	---	---	---
Chloroform [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
Chloromethane [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 5	---	---	---
Dibromochloromethane [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
1,2-Dichlorobenzene [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
1,3-Dichlorobenzene [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
1,4-Dichlorobenzene [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
1,1-Dichloroethane [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Schedule 5 Column 3, Column 1 metals

Project : 11212878, Warsaw Road Landfill

LR Report : **CA14954-NOV20**

Analysis	3: Analysis Completed Date	4: Analysis Completed Time	5: TW-2	6: TW-3-2	7: TW-4-2	8: TW-5-2	9: TW-6-2	10: TW-7	11: TW-8-2	12: R-3	13: R-4
1,2-Dichloroethane [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
1,1-Dichloroethylene [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
1,2-Dichloropropane [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
trans-1,2-Dichloroet [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
cis-1,2-Dichloroethe [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
cis-1,3-Dichloroprop [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
trans-1,3-Dichloropr [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
Ethylbenzene [ug/L]	11-Nov-20	10:25	---	---	---	---	---	< 0.5	---	---	---
Ethylenedibromide [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.2	---	---	---
Dichloromethane [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
Monochlorobenzene [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
Styrene [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
1,1,2,2-Tetrachloroe [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
Tetrachloroethene [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
Toluene [ug/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
Trichloroethylene [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
Vinyl Chloride [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.2	---	---	---
Trichlorofluorometha [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 5	---	---	---
1,1,1-Trichloroethan [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
1,1,2-Trichloroethan [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---
Xylene (total) [ug/L]	11-Nov-20	10:25	---	---	---	---	---	< 0.5	---	---	---
o-xylene [ug/L]	11-Nov-20	10:25	---	---	---	---	---	< 0.5	---	---	---
m-p-xylene [ug/L]	11-Nov-20	10:25	---	---	---	---	---	< 0.5	---	---	---
1,1,1,2-Tetrachloroe [µg/L]	05-Nov-20	15:25	---	---	---	---	---	< 0.5	---	---	---

Analysis	14: TW-14-2
Sample Date & Time	02-Nov-20

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Schedule 5 Column 3, Column 1 metals

Project : 11212878, Warsaw Road Landfill

LR Report : **CA14954-NOV20**

Analysis	**14: TW-14-2**
Temp Upon Receipt [°C]	***
BOD5 [mg/L]	< 4
TSS [mg/L]	569
Alkalinity [mg/L as CaCO3]	468
pH [No unit]	7.78
Conductivity [uS/cm]	938
TDS [mg/L]	520*
COD [mg/L]	< 8
Total P [mg/L]	0.09
TKN [as N mg/L]	1.1
NH3+NH4 [as N mg/L]	0.4
4AAP-Phenolics [mg/L]	< 0.001
SO4 [mg/L]	< 2
Cl [mg/L]	90
NO2 [as N mg/L]	< 0.03
NO3 [as N mg/L]	0.27
Hg (tot) [µg/L]	< 0.01
As (diss) [mg/L]	< 0.0002
Ba (diss) [mg/L]	0.105
B (diss) [mg/L]	0.070
Ca (diss) [mg/L]	124
Cd (diss) [mg/L]	0.000015
Cr (diss) [mg/L]	0.00025
Cu (diss) [mg/L]	0.0011
Fe (diss) [mg/L]	0.061
K (diss) [mg/L]	4.06
Mg (diss) [mg/L]	13.0
Mn (diss) [mg/L]	0.278*
Na (diss) [mg/L]	53.4*

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Schedule 5 Column 3, Column 1 metals

Project : 11212878, Warsaw Road Landfill

LR Report : **CA14954-NOV20**

Analysis	14: TW-14-2
Pb (diss) [mg/L]	0.00008
Zn (diss) [mg/L]	0.007
Benzene [ug/L]	---
Bromodichloromethane [µg/L]	---
Bromoform [µg/L]	---
Bromomethane [µg/L]	---
Carbon tetrachloride [µg/L]	---
Chloroethane [µg/L]	---
Chloroform [µg/L]	---
Chloromethane [µg/L]	---
Dibromochloromethane [µg/L]	---
1,2-Dichlorobenzene [µg/L]	---
1,3-Dichlorobenzene [µg/L]	---
1,4-Dichlorobenzene [µg/L]	---
1,1-Dichloroethane [µg/L]	---
1,2-Dichloroethane [µg/L]	---
1,1-Dichloroethylene [µg/L]	---
1,2-Dichloropropane [µg/L]	---
trans-1,2-Dichloroet [µg/L]	---
cis-1,2-Dichloroethe [µg/L]	---
cis-1,3-Dichloroprop [µg/L]	---
trans-1,3-Dichloropr [µg/L]	---
Ethylbenzene [ug/L]	---
Ethylenedibromide [µg/L]	---
Dichloromethane [µg/L]	---
Monochlorobenzene [µg/L]	---
Styrene [µg/L]	---
1,1,2,2-Tetrachloroe [µg/L]	---
Tetrachloroethene [µg/L]	---

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Schedule 5 Column 3, Column 1 metals

Project : 11212878, Warsaw Road Landfill

LR Report : **CA14954-NOV20**

Analysis	14: TW-14-2
Toluene [ug/L]	---
Trichloroethylene [µg/L]	---
Vinyl Chloride [µg/L]	---
Trichlorofluorometha [µg/L]	---
1,1,1-Trichloroethan [µg/L]	---
1,1,2-Trichloroethan [µg/L]	---
Xylene (total) [ug/L]	---
o-xylene [ug/L]	---
m-p-xylene [ug/L]	---
1,1,1,2-Tetrachloroe [µg/L]	---

Temperature of Sample upon Receipt: 6 degrees C
Cooling Agent Present:NO
Custody Seal Present:YES

Chain of Custody Number:NA

Jill Campbell, B.Sc.,GISAS
Project Specialist, Environment, Health & Safety

OnLine LIMS

0002317965

FINAL REPORT

CA14017-DEC20 R

11212878-02, Warsaw Road Landfill

Prepared for

GHD Limited - 735

FINAL REPORT

CA14017-DEC20 R

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	GHD Limited - 735	Project Specialist	Jill Campbell, B.Sc.,GISAS
		Laboratory	SGS Canada Inc.
Address	347 Pido Rd., Unit #29 Peterborough, ON K9J 6Z8. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Gus Bolin	Telephone	2165
Telephone	705-749-3317	Facsimile	705-652-6365
Facsimile		Email	jill.campbell@sgs.com
Email	gus.bolin@ghd.com	SGS Reference	CA14017-DEC20
Project	11212878-02, Warsaw Road Landfill	Received	12/01/2020
Order Number		Approved	12/08/2020
Samples	Ground Water (1)	Report Number	CA14017-DEC20 R
		Date Reported	12/08/2020

COMMENTS

Temperature of Sample upon Receipt: 5 degrees C
Cooling Agent Present:Yes
Custody Seal Present:No

Chain of Custody Number:NA

SIGNATORIES

Jill Campbell, B.Sc.,GISAS

TABLE OF CONTENTS

Client: GHD Limited - 735

Project: 11212878-02, Warsaw Road Landfill

Project Manager: Gus Bolin

Samplers: Gus Bolin

PACKAGE: **ODWS_AO_OG - General Chemistry** (WATER)

Sample Number	5
Sample Name	R-1
Sample Matrix	Ground Water
Sample Date	01/12/2020

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result
General Chemistry					
Biochemical Oxygen Demand (BOD5)	mg/L	2			< 4 ↑
Total Suspended Solids	mg/L	2			< 2
Alkalinity	mg/L as CaCO3	2	500		345
Conductivity	uS/cm	2			1000
Total Dissolved Solids	mg/L	30	500		591
Chemical Oxygen Demand	mg/L	8			10
Total Kjeldahl Nitrogen	as N mg/L	0.5			< 0.5
Ammonia+Ammonium (N)	as N mg/L	0.1			< 0.1

PACKAGE: **ODWS_AO_OG - Metals and Inorganics** (WATER)

Sample Number	5
Sample Name	R-1
Sample Matrix	Ground Water
Sample Date	01/12/2020

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics					
Phosphorus (total)	mg/L	0.03			< 0.03
Sulphate	mg/L	2	500		85
Nitrite (as N)	as N mg/L	0.03		1	0.27
Nitrate (as N)	as N mg/L	0.06		10	5.35
Arsenic (dissolved)	mg/L	0.0002		0.01	< 0.0002
Barium (dissolved)	mg/L	0.00002		1	0.0486
Boron (dissolved)	mg/L	0.002		5	0.065

Client: GHD Limited - 735

Project: 11212878-02, Warsaw Road Landfill

Project Manager: Gus Bolin

Samplers: Gus Bolin

PACKAGE: **ODWS_AO_OG - Metals and Inorganics** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number	5
Sample Name	R-1
Sample Matrix	Ground Water
Sample Date	01/12/2020

Metals and Inorganics (continued)

Parameter	Units	RL	L1	L2	Result
Calcium (dissolved)	mg/L	0.01			42.6
Cadmium (dissolved)	mg/L	0.000003		0.005	< 0.000003
Chromium (dissolved)	mg/L	0.00008		0.05	0.00012
Copper (dissolved)	mg/L	0.0002	1		0.0220
Iron (dissolved)	mg/L	0.007	0.3		< 0.007
Potassium (dissolved)	mg/L	0.009			8.48
Magnesium (dissolved)	mg/L	0.001			5.26
Manganese (dissolved)	mg/L	0.00001	0.05		0.0194
Sodium (dissolved)	mg/L	0.01	200	20	175
Lead (dissolved)	mg/L	0.00001		0.01	0.00025
Zinc (dissolved)	mg/L	0.002	5		0.006

PACKAGE: **ODWS_AO_OG - Other (ORP)** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	5
				Sample Name	R-1
				Sample Matrix	Ground Water
				Sample Date	01/12/2020
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**
Other (ORP)					
pH	No unit	0.05	8.5		7.67
Chloride	mg/L	1	250		57
Mercury (total)	µg/L	0.01			< 0.01

PACKAGE: **ODWS_AO_OG - Phenols** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	5
				Sample Name	R-1
				Sample Matrix	Ground Water
				Sample Date	01/12/2020
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**
Phenols					
4AAP-Phenolics	mg/L	0.001			< 0.001

PACKAGE: **ODWS_MAC - General Chemistry** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	5
				Sample Name	R-1
				Sample Matrix	Ground Water
				Sample Date	01/12/2020
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**
General Chemistry					
Biochemical Oxygen Demand (BOD5)	mg/L	2			< 4 ↑
Total Suspended Solids	mg/L	2			< 2
Alkalinity	mg/L as CaCO3	2	500		345
Conductivity	uS/cm	2			1000

PACKAGE: **ODWS_MAC - General Chemistry**

(WATER)

Sample Number	5
Sample Name	R-1
Sample Matrix	Ground Water
Sample Date	01/12/2020

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result
General Chemistry (continued)					
Total Dissolved Solids	mg/L	30	500		591
Chemical Oxygen Demand	mg/L	8			10
Total Kjeldahl Nitrogen	as N mg/L	0.5			< 0.5
Ammonia+Ammonium (N)	as N mg/L	0.1			< 0.1

PACKAGE: **ODWS_MAC - Metals and Inorganics**

(WATER)

Sample Number	5
Sample Name	R-1
Sample Matrix	Ground Water
Sample Date	01/12/2020

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics					
Phosphorus (total)	mg/L	0.03			< 0.03
Sulphate	mg/L	2	500		85
Nitrite (as N)	as N mg/L	0.03		1	0.27
Nitrate (as N)	as N mg/L	0.06		10	5.35
Arsenic (dissolved)	mg/L	0.0002		0.01	< 0.0002
Barium (dissolved)	mg/L	0.00002		1	0.0486
Boron (dissolved)	mg/L	0.002		5	0.065
Calcium (dissolved)	mg/L	0.01			42.6
Cadmium (dissolved)	mg/L	0.000003		0.005	< 0.000003
Chromium (dissolved)	mg/L	0.00008		0.05	0.00012
Copper (dissolved)	mg/L	0.0002	1		0.0220

PACKAGE: **ODWS_MAC - Metals and Inorganics** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number	5
Sample Name	R-1
Sample Matrix	Ground Water
Sample Date	01/12/2020

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics (continued)					
Iron (dissolved)	mg/L	0.007	0.3		< 0.007
Potassium (dissolved)	mg/L	0.009			8.48
Magnesium (dissolved)	mg/L	0.001			5.26
Manganese (dissolved)	mg/L	0.00001	0.05		0.0194
Sodium (dissolved)	mg/L	0.01	200	20	175
Lead (dissolved)	mg/L	0.00001		0.01	0.00025
Zinc (dissolved)	mg/L	0.002	5		0.006

PACKAGE: **ODWS_MAC - Other (ORP)** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number	5
Sample Name	R-1
Sample Matrix	Ground Water
Sample Date	01/12/2020

Parameter	Units	RL	L1	L2	Result
Other (ORP)					
pH	No unit	0.05	8.5		7.67
Chloride	mg/L	1	250		57
Mercury (total)	µg/L	0.01			< 0.01

Client: GHD Limited - 735

Project: 11212878-02, Warsaw Road Landfill

Project Manager: Gus Bolin

Samplers: Gus Bolin

PACKAGE: **ODWS_MAC - Phenols** (WATER)

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

Sample Number	5
Sample Name	R-1
Sample Matrix	Ground Water
Sample Date	01/12/2020

Parameter	Units	RL	L1	L2	Result
Phenols					
4AAP-Phenolics	mg/L	0.001			< 0.001

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
R-1					
Total Dissolved Solids	SM 2540C	mg/L	591	500	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	175		20

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0021-DEC20	mg/L as CaCO3	2	< 2	1	20	100	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-[ENV]SFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0042-DEC20	as N mg/L	0.1	<0.1	ND	10	99	90	110	97	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO5024-DEC20	mg/L	1	<1	6	20	108	80	120	101	75	125
Sulphate	DIO5024-DEC20	mg/L	2	<2	ND	20	102	80	120	107	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0057-DEC20	mg/L	0.03	<0.03	5	20	95	80	120	97	75	125
Nitrate (as N)	DIO0057-DEC20	mg/L	0.06	<0.06	0	20	100	80	120	96	75	125

QC SUMMARY

Biochemical Oxygen Demand

Method: SM 5210 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0006-DEC20	mg/L	2	< 2	15	30	107	70	130	82	70	130

Chemical Oxygen Demand

Method: HACH 8000 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0032-DEC20	mg/L	8	<8	4	20	100	80	120	101	75	125

Conductivity

Method: SM 2510 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0021-DEC20	uS/cm	2	< 2	0	20	100	90	110	NA		

QC SUMMARY

Mercury by CVAAS

Method: SM 3112/SM 3112B | Internal ref.: ME-CA-[ENV]SPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0003-DEC20	ug/L	0.01	0.00	ND	20	118	80	120	128	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-[ENV]SPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Arsenic (dissolved)	EMS0015-DEC20	mg/L	0.0002	<0.0002	1	20	101	90	110	103	70	130
Barium (dissolved)	EMS0015-DEC20	mg/L	0.00002	<0.00002	0	20	98	90	110	105	70	130
Boron (dissolved)	EMS0015-DEC20	mg/L	0.002	<0.002	14	20	99	90	110	104	70	130
Calcium (dissolved)	EMS0015-DEC20	mg/L	0.01	<0.01	3	20	106	90	110	103	70	130
Cadmium (dissolved)	EMS0015-DEC20	mg/L	0.000003	<0.000003	8	20	99	90	110	104	70	130
Chromium (dissolved)	EMS0015-DEC20	mg/L	0.00008	<0.00008	6	20	97	90	110	105	70	130
Copper (dissolved)	EMS0015-DEC20	mg/L	0.0002	<0.0002	1	20	101	90	110	105	70	130
Iron (dissolved)	EMS0015-DEC20	mg/L	0.007	<0.007	ND	20	107	90	110	NV	70	130
Potassium (dissolved)	EMS0015-DEC20	mg/L	0.009	<0.009	1	20	107	90	110	93	70	130
Magnesium (dissolved)	EMS0015-DEC20	mg/L	0.001	<0.001	1	20	108	90	110	104	70	130
Manganese (dissolved)	EMS0015-DEC20	mg/L	0.00001	<0.00001	1	20	99	90	110	104	70	130
Sodium (dissolved)	EMS0015-DEC20	mg/L	0.01	<0.01	0	20	106	90	110	94	70	130
Lead (dissolved)	EMS0015-DEC20	mg/L	0.00001	<0.00001	0	20	97	90	110	100	70	130
Zinc (dissolved)	EMS0015-DEC20	mg/L	0.002	<0.002	1	20	97	90	110	111	70	130

QC SUMMARY

pH

Method: SM 4500 I Internal ref.: ME-CA-[ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0021-DEC20	No unit	0.05	NA	0		100			NA		

Phenols by SFA

Method: SM 5530B-D I Internal ref.: ME-CA-[ENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0024-DEC20	mg/L	0.001	<0.001	ND	10	103	90	110	94	75	125

Phosphorus by SFA

Method: SM 4500-P J I Internal ref.: ME-CA-[ENVISFA-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	SKA0013-DEC20	mg/L	0.03	<0.03	6	10	97	90	110	92	75	125

QC SUMMARY

Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0002-DEC20	mg/L	30	<30	3	20	98	90	110	NA		

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0048-DEC20	mg/L	2	< 2	6	10	99	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0029-DEC20	as N mg/L	0.5	<0.5	4	10	98	90	110	NV	75	125

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Samples analysed as received. Solid samples expressed on a dry weight basis. “Temperature Upon Receipt” is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act” published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated. This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

-- End of Analytical Report --

FINAL REPORT

CA14955-NOV20 R

11212878, Warsaw Road Landfill

Prepared for

GHD Limited - 735

FINAL REPORT

CA14955-NOV20 R

First Page

CLIENT DETAILS

Client	GHD Limited - 735
Address	347 Pido Rd., Unit #29 Peterborough, ON K9J 6Z8. Canada
Contact	Gus Bolin
Telephone	705-749-3317
Facsimile	
Email	gus.bolin@ghd.com
Project	11212878, Warsaw Road Landfill
Order Number	
Samples	Surface Water (2)

LABORATORY DETAILS

Project Specialist	Brad Moore Hon. B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2143
Facsimile	705-652-6365
Email	brad.moore@sgs.com
SGS Reference	CA14955-NOV20
Received	11/02/2020
Approved	11/11/2020
Report Number	CA14955-NOV20 R
Date Reported	11/11/2020

COMMENTS

Temperature of Sample upon Receipt: 6 degrees C
Cooling Agent Present:NO
Custody Seal Present:YES

Chain of Custody Number:NA

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

Client: GHD Limited - 735

Project: 11212878, Warsaw Road Landfill

Project Manager: Gus Bolin

Samplers: Gus Bolin

PACKAGE: **PWQO_L - General Chemistry**

(WATER)

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

			Sample Number	5	6
			Sample Name	SW-9	SW-11
			Sample Matrix	Surface Water	Surface Water
			Sample Date	02/11/2020	02/11/2020
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**
General Chemistry					
Biochemical Oxygen Demand (BOD5)	mg/L	2		13	< 4↑
Total Suspended Solids	mg/L	2		56	3
Alkalinity	mg/L as CaCO3	2		234	373
Conductivity	uS/cm	2		1020	947
Total Dissolved Solids	mg/L	30		620	526
Chemical Oxygen Demand	mg/L	8		75	47
Total Kjeldahl Nitrogen	as N mg/L	0.5		14.7	0.7
Ammonia+Ammonium (N)	as N mg/L	0.1		11.6	< 0.1

PACKAGE: **PWQO_L - Metals and Inorganics**

(WATER)

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

			Sample Number	5	6
			Sample Name	SW-9	SW-11
			Sample Matrix	Surface Water	Surface Water
			Sample Date	02/11/2020	02/11/2020
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**
Metals and Inorganics					
Sulphate	mg/L	2		30	23
Nitrite (as N)	as N mg/L	0.03		< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		< 0.06	< 0.06
Arsenic (total)	mg/L	0.0002	0.005	0.0006	0.0008
Barium (total)	mg/L	0.00002		0.0358	0.0387

Client: GHD Limited - 735

Project: 11212878, Warsaw Road Landfill

Project Manager: Gus Bolin

Samplers: Gus Bolin

PACKAGE: **PWQO_L - Metals and Inorganics**

(WATER)

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	5	6
Sample Name	SW-9	SW-11
Sample Matrix	Surface Water	Surface Water
Sample Date	02/11/2020	02/11/2020

Parameter	Units	RL	L1	Result	Result
Metals and Inorganics (continued)					
Boron (total)	mg/L	0.002	0.2	0.010	0.016
Calcium (total)	mg/L	0.01		109	114
Cadmium (total)	mg/L	0.000003	0.0001	0.000011	0.000008
Chromium (total)	mg/L	0.00008	0.1	0.00030	0.00043
Copper (total)	mg/L	0.0002	0.001	0.0016	0.0017
Iron (total)	mg/L	0.007	0.3	0.400	0.150
Potassium (total)	mg/L	0.009		40.3	1.26
Magnesium (total)	mg/L	0.001		10.7	4.66
Manganese (total)	mg/L	0.00001		0.826	0.0908
Sodium (total)	mg/L	0.01		34.3	74.9
Phosphorus (total)	mg/L	0.003	0.01	0.933	0.033
Lead (total)	mg/L	0.00001	0.025	0.00013	0.00020
Zinc (total)	mg/L	0.002	0.02	0.003	0.010

Client: GHD Limited - 735

Project: 11212878, Warsaw Road Landfill

Project Manager: Gus Bolin

Samplers: Gus Bolin

PACKAGE: **PWQO_L - Other (ORP)** (WATER)

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

				Sample Number	5	6
				Sample Name	SW-9	SW-11
				Sample Matrix	Surface Water	Surface Water
				Sample Date	02/11/2020	02/11/2020
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	
Other (ORP)						
pH	No unit	0.05	8.6	7.58	8.05	
Chloride	mg/L	1		68	140	
Mercury (total)	µg/L	0.01	0.2	< 0.01	< 0.01	

PACKAGE: **PWQO_L - Phenols** (WATER)

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

				Sample Number	5	6
				Sample Name	SW-9	SW-11
				Sample Matrix	Surface Water	Surface Water
				Sample Date	02/11/2020	02/11/2020
Parameter	**Units**	**RL**	**L1**	**Result**	**Result**	
Phenols						
4AAP-Phenolics	mg/L	0.001	0.001	0.003	< 0.001	

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E L1
SW-9				
Copper	SM 3030/EPA 200.8	µg/L	0.0016	0.001
Iron	SM 3030/EPA 200.8	µg/L	0.400	0.3
Phosphorus	SM 3030/EPA 200.8	µg/L	0.933	0.01
4AAP-Phenolics	SM 5530B-D	mg/L	0.003	0.001
SW-11				
Copper	SM 3030/EPA 200.8	µg/L	0.0017	0.001
Phosphorus	SM 3030/EPA 200.8	µg/L	0.033	0.01

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0052-NOV20	mg/L as CaCO3	2	< 2	0	20	109	80	120	NA		
Alkalinity	EWL0066-NOV20	mg/L as CaCO3	2	< 2	1	20	102	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0041-NOV20	as N mg/L	0.1	<0.1	9	10	100	90	110	91	75	125
Ammonia+Ammonium (N)	SKA0059-NOV20	as N mg/L	0.1	<0.1	ND	10	101	90	110	100	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO5039-NOV20	mg/L	1	<1	5	20	90	80	120	97	75	125
Sulphate	DIO5039-NOV20	mg/L	2	<2	2	20	94	80	120	94	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0107-NOV20	mg/L	0.03	<0.03	1	20	100	80	120	101	75	125
Nitrate (as N)	DIO0107-NOV20	mg/L	0.06	<0.06	0	20	100	80	120	93	75	125

QC SUMMARY

Biochemical Oxygen Demand

Method: SM 5210 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0005-NOV20	mg/L	2	< 2	4	30	100	70	130	128	70	130

Chemical Oxygen Demand

Method: HACH 8000 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0048-NOV20	mg/L	8	<8	5	20	96	80	120	102	75	125

Conductivity

Method: SM 2510 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0052-NOV20	uS/cm	2	< 2	0	20	99	90	110	NA		
Conductivity	EWL0066-NOV20	uS/cm	2	< 2	0	20	99	90	110	NA		

QC SUMMARY

Mercury by CVAAS

Method: SM 3112/SM 3112B | Internal ref.: ME-CA-[ENV]SPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0005-NOV20	ug/L	0.01	<0.01	0	20	82	80	120	86	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Arsenic (total)	EMS0029-NOV20	mg/L	0.0002	<0.0002	2	20	94	90	110	94	70	130
Barium (total)	EMS0029-NOV20	mg/L	0.00002	<0.00002	1	20	96	90	110	92	70	130
Boron (total)	EMS0029-NOV20	mg/L	0.002	<0.002	7	20	103	90	110	100	70	130
Calcium (total)	EMS0029-NOV20	mg/L	0.01	<0.01	5	20	93	90	110	90	70	130
Cadmium (total)	EMS0029-NOV20	mg/L	0.000003	<0.000003	0	20	95	90	110	95	70	130
Chromium (total)	EMS0029-NOV20	mg/L	0.00008	<0.00008	9	20	94	90	110	103	70	130
Copper (total)	EMS0029-NOV20	mg/L	0.0002	<0.0002	3	20	95	90	110	98	70	130
Iron (total)	EMS0029-NOV20	mg/L	0.007	<0.007	3	20	96	90	110	NV	70	130
Potassium (total)	EMS0029-NOV20	mg/L	0.009	<0.009	2	20	103	90	110	84	70	130
Magnesium (total)	EMS0029-NOV20	mg/L	0.001	<0.001	2	20	101	90	110	89	70	130
Manganese (total)	EMS0029-NOV20	mg/L	0.00001	<0.00001	4	20	94	90	110	92	70	130
Sodium (total)	EMS0029-NOV20	mg/L	0.01	<0.01	2	20	97	90	110	90	70	130
Lead (total)	EMS0029-NOV20	mg/L	0.00001	<0.00001	14	20	95	90	110	92	70	130
Phosphorus (total)	EMS0029-NOV20	mg/L	0.003	<0.003	0	20	94	90	110	NV	70	130
Zinc (total)	EMS0029-NOV20	mg/L	0.002	<0.002	8	20	93	90	110	103	70	130

QC SUMMARY

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0052-NOV20	No unit	0.05	NA	0		100			NA		
pH	EWL0066-NOV20	No unit	0.05	NA	0		100			NA		

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0066-NOV20	mg/L	0.001	<0.001	ND	10	98	90	110	92	75	125

Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0043-NOV20	mg/L	30	<30	2	20	99	90	110	NA		

QC SUMMARY

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0051-NOV20	mg/L	2	< 2	1	10	98	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0040-NOV20	as N mg/L	0.5	<0.5	0	10	98	90	110	86	75	125

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

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AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS Insufficient sample for analysis.
RL Reporting Limit.
↑ Reporting limit raised.
↓ Reporting limit lowered.
NA The sample was not analysed for this analyte
ND Non Detect

Samples analysed as received. Solid samples expressed on a dry weight basis. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated. This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

-- End of Analytical Report --

Appendix F
MOECC Monitoring and Screening Checklist

Appendix D-Monitoring and Screening Checklist
General Information and Instructions

General Information: The checklist is to be completed, and submitted with the Monitoring Report.
Instructions: A complete checklist consists of:
(a) a completed and signed checklist, including any additional pages of information which can be attached as needed to provide further details where indicated.
(b) completed contact information for the Competent Environmental Practitioner (CEP)
(c) self-declaration that CEP(s) meet(s) the qualifications as set out below and in Section 1.2 of the Technical Guidance Document.

Definition of Groundwater CEP:
For groundwater, the CEP must have expertise in hydrogeology and meet one of the following:
(a) the person holds a licence, limited licence or temporary licence under the *Professional Engineers Act*; or
(b) the person holds a certificate of registration under the *Professional Geoscientists Act, 2000* and is a practicing member, temporary, member or limited member of the Association of Professional Geoscientists of Ontario. O. Reg. 66/08, s. 2..
Definition of Surface water CEP:
A CEP for surface water assessments is a scientist, professional engineer or professional geoscientist as described in (a) and (b) above with demonstrated experience and post-secondary education, either a diploma or degree, in hydrology, aquatic ecology, limnology, aquatic biology, physical geography with specialization in surface water, and/or water resource management.

The type of scientific work that a CEP performs must be consistent with that person's education and experience. If an individual has appropriate training and credentials in both groundwater and surface water and is responsible for both areas of expertise, the CEP may then complete and validate both sections of the checklist.

Monitoring Report and Site Information	
Waste Disposal Site Name	Warsaw Road Landfill Site
Location (e.g. street address, lot, concession)	Part Lot 8, Concession 5, Township of Douro-Dummer (Douro), County of Peterborough
GPS Location (taken within the property boundary at front gate/ front entry)	17 781275E 445174N
Municipality	Township of Douro-Dummer
Client and/or Site Owner	Corporation of the Township of Douro-Dummer
Monitoring Period (Year)	2020
This Monitoring Report is being submitted under the following:	
Environmental Compliance Approval Number:	Provisional Certificate of Approval A341004
Director's Order No.:	N/A
Provincial Officer's Order No.:	N/A
Other:	N/A

Report Submission Frequency	◉ **Annual** ○ **Other**	Specify (Type Here):	
The site is: **(Operation Status)**	○ **Open** ○ **Inactive** ◉ **Closed**		
Does your Site have a Total Approved Capacity?	○ **Yes** ○ **No**		
If yes, please specify Total Approved Capacity		*Units*	
Does your Site have a Maximum Approved Fill Rate?	○ **Yes** ○ **No**		
If yes, please specify Maximum Approved Fill Rate		*Units*	
Total Waste Received within Monitoring Period (Year)		*Units*	
Total Waste Received within Monitoring Period (Year) *Methodology*			
Estimated Remaining Capacity		*Units*	
Estimated Remaining Capacity *Methodology*			
Estimated Remaining Capacity *Date Last Determined*	Select Date		
Non-Hazardous Approved Waste Types	☐ Domestic ☐ Industrial, Commercial & Institutional (IC&I) ☐ Source Separated Organics (Green Bin) ☐ Tires	☐ Contaminated Soil ☐ Wood Waste ☐ Blue Box Material ☐ Processed Organics ☐ Leaf and Yard Waste	☐ Food Processing/Preparation Operations Waste ☐ Hauled Sewage Other: Provide any other approved waste types not listed here
Subject Waste Approved Waste Classes: Hazardous & Liquid Industrial *(separate waste classes by comma)*			
Year Site Opened *(enter the Calendar Year only)*		**Current ECA Issue Date**	17/09/1980
Is your Site required to submit Financial Assurance?		○ **Yes** ◉ **No**	
Describe how your Landfill is designed.		◉ Natural Attenuation only ○ Fully engineered Facility ○ Partially engineered Facility	
Does your Site have an approved Contaminant Attenuation Zone?		○ **Yes** ◉ **No**	

If closed, specify C of A, control or authorizing document closure date:	22-May-96

Has the nature of the operations at the site changed during this monitoring period?	○ **Yes** ◉ **No**
If yes, provide details:	Type Here
Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i.e. exceeded the LEL for methane)	○ Yes ◉ No

Groundwater WDS Verification:

Based on all available information about the site and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:	◉ **Yes** ○ **No**	If no, list exceptions (Type Here):
2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document (s):	◉ **Yes** ○ **No** ○ **Not Applicable**	If no, list exceptions below or attach information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

3) a) Is landfill gas being monitored or controlled at the site?	◉ **Yes** ○ **No**	
If yes to 3(a), please answer the next two questions below.		
b) Have any measurements been taken since the last reporting period that indicate landfill gas is present in the subsurface at levels exceeding criteria established for the site?	○ **Yes** ◉ **No**	
c) Has the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:	◉ **Yes** ○ **No** ○ **Not Applicable**	If no, list exceptions below or attach additional information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	◉ **Yes** ○ **No**	If no, specify (Type Here):

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.	(●) **Yes** ( ) **No**	If no, the potential design and operational concerns/exceptions are as follows (Type Here):	
6) The site meets compliance and assessment criteria.	(●) **Yes** ( ) **No**	If no, list and explain exceptions (Type Here):	
7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.	(●) **Yes** ( ) **No**	If no, list exceptions and explain reason for increase/change (Type Here):	
1) Is one or more of the following risk reduction practices in place at the site: ***(a)*** **There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/ treatment; or** ***(b)*** **There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or** ***(c)*** **The site meets the following two conditions (typically achieved after 15 years or longer of site operation):** ***i.*** **The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and** ***ii.*** **Seasonal and annual water levels and water quality fluctuations are well understood.**	(●) **Yes** ( ) **No**	**Note which practice(s):**	☐ **(a)** ☐ **(b)** ☒ **(c)**
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	( ) **Yes** (●) **No** ( ) **Not Applicable**	If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here):	

Groundwater CEP Declaration:

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended), and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Select Date

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

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

Name:	Nyle McIlveen, P.Eng.		
Seal:	Add Image 		
Signature:		**Date:**	23-Mar-21
CEP Contact Information:	Nyle McIlveen, P./Eng.		
Company:	GHD		
Address:	347 Pido Road, Unit 29, Peterborough, Ontario K9J 6X7		
Telephone No.:	(705) 749-3317	Fax No. :	(705) 749-9248
E-mail Address:	nyle.mcilveen@ghd.com		
Co-signers for additional expertise provided:			
Signature:		**Date:**	10-Mar-21
Signature:		**Date:**	Select Date

Surface Water WDS Verification:

Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):

Name (s)	Dummer Lake
Distance(s)	2.5 Km

Based on all available information and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:	(●) Yes ( ) No	If no, identify issues (Type Here):
2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):	( ) Yes (●) No ( ) **Not applicable (No C of A, authorizing / control document applies)**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
DSW 7	Location Dry in November Sampling	2-Nov-20
DSW 6	Location Dry in November Sampling	2-Nov-20
DSW 17	Location Dry in November Sampling	2-Nov-20
Type Here	Type Here	Select Date

3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.	◯ **Yes** ◉ **No** ◯ **Not Applicable**	
b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:	◯ **Yes** ◯ **No** ◯ **Not Applicable**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	◉ **Yes** ◯ **No**	If no, specify (Type Here):

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The receiving water body meets surface water-related compliance criteria and assessment criteria: i.e., there are no exceedances of criteria, based on MOE legislation, regulations, Water Management Policies, Guidelines and Provincial Water Quality Objectives and other assessment criteria (e.g., CWQGs, APVs), as noted in Table A or Table B in the Technical Guidance Document (Section 4.6):	◉ **Yes** ○ **No**

If no, list parameters that exceed criteria outlined above and the amount/percentage of the exceedance as per the table below or provide details in an attachment:

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO
Type Here	Type Here	Type Here
Type Here	Type Here	Type Here
Type Here	Type Here	Type Here
Type Here	Type Here	Type Here
6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	○ **Yes** ○ **No**	If yes, specify (Type Here)

7) All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.	◉ **Yes** ◯ **No**	If no, list parameters and stations that is outside the expected range. Identify whether parameter concentrations show an increasing trend or are within a high historical range (Type Here)
8) For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g. , PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):	◯ Yes ◉ No ◯ Not Known ◯ Not Applicable	.
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	◯ **Yes** ◉ **No** ◯ **Not Applicable**	If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here)

Surface Water CEP Declaration:

I, the undersigned hereby declare that I am a Competent Environmental Practitioner as defined in Appendix D under Instructions, holding the necessary level of experience and education to design surface water monitoring and sampling programs, conduct appropriate surface water investigations and interpret the related data as it pertains to the site for this monitoring period.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended) and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Select Date

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

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

CEP Signature	
Relevant Discipline	civil engineering, hydrogeology
Date:	23-Mar-21
CEP Contact Information:	Nyle McIlveen, P.Eng.
Company:	GHD
Address:	347 Pido Road, Unit 29, Peterborough, Ontario K9J 6X7
Telephone No.:	(705) 749-3317
Fax No.:	(705) 749-9248
E-mail Address:	nyle.mcilveen@ghd.com

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