



ANNUAL ENVIRONMENTAL REPORT

By

Drogheda Borough Council

To

Environmental Protection Agency

For

Waste licence Reference (W0033-01)

Reporting Period January – December 2013

DROGHEDA LANDFILL SITE COUNTY LOUTH



DROGHEDA LANDFILL SITE
ANNUAL ENVIRONMENTAL REPORT
JANUARY – DECEMBER 2013

DOCUMENT CONTROL SHEET

Client	Drogheda Borough Council					
Project Title	Drogheda Landfill Site					
Document Title	Annual Environmental Report (January – December 2013)					
Document No.	IBR0610/Reports					
This Document Comprises	DCS	TOC	Text	List of Tables	List of Figures	No. of Appendices
	1	1	35	1	1	6

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
	Draft	AMG	AMG	DD	Letterkenny	15/04/2013
	Final	AMG	AMG	DD	Letterkenny	16/04/2013

TABLE OF CONTENTS

1.0	INTRODUCTION.....	4
1.1	SITE GEOLOGY.....	4
1.1.1	Solid Geology	4
1.1.2	Drift Geology.....	4
1.1.3	Groundwater Resources.....	4
1.1.4	Hydrogeology	5
1.1.5	Local Meteorology.....	5
1.2	RESTORATION WORKS UNDERTAKEN.....	6
1.3	REPORT PERIOD.....	6
2.0	WASTE ACTIVITIES CARRIED OUT AT THE FACILITY	7
3.0	QUANTITY AND COMPOSITION OF WASTE RECEIVED AND DISPOSED OF DURING THE REPORTING PERIOD AND EACH PREVIOUS YEAR	8
4.0	METHODS OF DEPOSITION OF WASTE	10
4.1	LANDFILL	10
4.2	CIVIC WASTE FACILITY	10
5.0	SUMMARY REPORT ON EMISSIONS	11
5.1	EMISSIONS TO AIR.....	11
5.1.1	Emissions to Groundwater.....	11
5.1.2	Emissions to Waste Water Treatment Works.....	11
6.0	SUMMARY OF RESULTS AND INTERPRETATIONS OF ENVIRONMENTAL MONITORING, INCLUDING PLANS OF ALL MONITORING LOCATIONS INCLUDING 12 DIGIT GRID REFERENCES.....	12
6.1	MONITORING LOCATIONS	12
6.2	GROUNDWATER.....	14
6.3	UP-GRADIENT	16
6.4	DOWN GRADIENT.....	18
6.5	BOREHOLE BH5A	20
6.6	SURFACE WATER	20
6.7	QUARRY LAKE	22
6.8	CAPPED AREA.....	23
6.9	DISCHARGE TO SEWER	24
6.10	PERIMETER GAS MONITORING	26
6.11	DUST MONITORING	26
6.12	NOISE	26
6.13	ECOLOGY.....	27
7.0	RESOURCE AND ENERGY CONSUMPTION SUMMARY	28

8.0	DEVELOPMENT WORKS	29
8.1	PROPOSED DEVELOPMENT OF THE SITE AND TIMESCALE OF SUCH DEVELOPMENT	29
8.2	REPORT ON DEVELOPMENT WORKS UNDERTAKEN DURING THE REPORTING PERIOD, AND .. THOSE PROPOSED DURING THE COMING YEAR.....	29
8.3	REPORT ON RESTORATION.....	29
9.0	VOLUME OF LEACHATE PRODUCED AND VOLUME OF LEACHATE TRANSPORTED / DISCHARGED OFF-SITE.....	30
9.1	MONTHLY WATER BALANCE CALCULATION AND INTERPRETATION	30
10.0	SITE SURVEY SHOWING EXISTING LEVELS OF THE FACILITY AT THE END OF THE REPORTING PERIOD	31
11.0	ESTIMATED ANNUAL AND CUMULATIVE QUANTITIES OF LANDFILL GAS EMITTED FROM THE SITE.....	32
12.0	ESTIMATED ANNUAL AND CUMULATIVE QUANTITY OF INDIRECT EMISSIONS TO GROUNDWATER	33
13.0	ENVIRONMENTAL OBJECTIVES AND TARGETS	34
13.1	SCHEDULE OF ENVIRONMENTAL OBJECTIVES AND TARGETS FOR THE FORTHCOMING YEAR	34
14.0	FULL TITLE AND A WRITTEN SUMMARY OF ANY PROCEDURES DEVELOPED BY THE LICENSEE IN THE YEAR WHICH RELATES TO THE FACILITY OPERATION	35
15.0	TANK, PIPELINE AND BUND TESTING AND INSPECTION REPORT	36
16.0	REPORTED INCIDENTS AND COMPLAINTS SUMMARIES	37
17.0	REPORTS ON FINANCIAL PROVISION MADE UNDER THIS LICENCE, MANAGEMENT AND STAFFING STRUCTURE OF THE FACILITY, AND A PROGRAMME FOR PUBLIC..	38
17.1	MANAGEMENT AND STAFFING STRUCTURE	38
17.2	ANNUAL BUDGET AND SITE RUNNING COSTS	38

LIST OF FIGURES

Figure 17.1	Management Structure at Drogheda Landfill Site	38
-------------	--	----

LIST OF TABLES

Table 3.1	Waste Quantities Accepted (Tonnes) at Landfill Site	8
Table 3.2	Waste Quantities (Tonnes) at Civic Waste Facility	8
Table 3.3	Waste Quantities Accepted for Recycling at Drogheda Civic Waste Facility in 2013	8
Table 5.1	Net Methane Emission	11
Table 6.1	Grid References of Monitoring Points	12
Table 6.2	Groundwater Parameters Monitoring Frequencies	14
Table 6.3	Summary of 2012 Results from Groundwater Monitoring Boreholes.....	15
Table 6.4	Surface Water Monitoring Frequency.....	21
Table 6.5	Summary of 2013 Results from surface water Monitoring locations.....	21
Table 6.6	Summary of 2013 Results from Capped Area.....	23
Table 6.7	Emission Limit Values for Emissions to Sewer Civic Waste Facility (S2)	25
Table 6.8	Results from Dust Monitoring Analysis, Drogheda Landfill Site (mg/m ² /day).....	26
Table 7.1	Consumption of Resources	28
Table 16.1	Site Inspection Observations.....	37

APPENDICES

APPENDIX A	PRTR REPORTING
APPENDIX B	WATER BALANCE CALCULATION
APPENDIX C	DRAWINGS
APPENDIX D	GROUNDWATER RESULTS
APPENDIX E	SURFACE WATER RESULTS
APPENDIX F	LANDFILL GAS RESULTS

1.0 INTRODUCTION

This Annual Environmental Report (AER) has been prepared to meet the requirements of Condition 2.8 of Waste Licence W0033-01 for Drogheda Landfill and includes the information listed in Schedule C of the Waste Licence. Drogheda Landfill Site has been in operation since 1983 and has ceased accepting waste for disposal since the waste licence was granted on 30th December 1999 as required by the Waste Management (Licensing) Regulations, 1997.

The site is located 600 metres north of the River Boyne on the north-west edge of Drogheda town. The site is adjacent to Leonards Cross at the junction of the R168 road to Collon (and there on to the newly constructed M1) and Cement Road, a minor road linking the Slane Road and the N1 primary road northwards from Drogheda to Dundalk. The site is approximately 32 hectares in extent and was formally a limestone quarry. The site was developed on the benches of the redundant limestone quarry. The site has historically operated on a dilute and disperses principle.

1.1 SITE GEOLOGY

1.1.1 Solid Geology

The limestone rocks exposed at the quarry faces form part of a limb of a broad synclinal basin, which covers an area of approximately 140 km². The rocks are shallow water sedimentary rocks of Lower Carboniferous limestone. The exposed limestone is dominated by thickly bedded pale, bioclastic calcarenites with minor shales and occasional micrites. Depositional bedding planes within the limestone are inclined in a south easterly direction at lower angle towards the River Boyne. The bedding is cross cut by numerous, well developed, widely spaced joints, which are largely uniformly oriented. The rocks which are pure calcium carbonate deposits are prone to long term dissolution by weakly acidic percolating groundwater. Dissolution of the rock over many years often forms underground conduits known as Karsts.

1.1.2 Drift Geology

Much of the overburden within the site was stripped and stockpiled in perimeter bunds at the eastern and western site margins to facilitate quarrying activities. The overburden stockpiles comprise of moderate to slow permeability gravely sandy silt material of glacial origin. These deposits are extensive over the area. Glacial till was encountered in exploratory boreholes put down around the periphery of the site. Till thickness encountered above the rockhead ranged from 2.5m to 36m below ground surface with the greatest thickness encountered outside the North West boundary of the site.

1.1.3 Groundwater Resources

The aquifer has an estimated resource potential of 1.6 x10⁶ m³/annum and is classified as a regionally important groundwater resource by the Geological Survey of Ireland. Due to the crystalline nature of the intact rock groundwater movement is principally confined to fissure flow. Conduit flow via karstic features also predominates. The water table beneath the facility is situated at depth and groundwater movement through the fractured rock is inclined towards the main quarry lake. The lake appears to be the principle receptor, which receives stores and dilutes contaminated groundwater from landfill areas on the Northern and eastern upper quarry benches. The groundwater outflow from the lake is via the south western boundary.

1.1.4 Hydrogeology

A site investigation undertaken in 1998 determined the following;

- The unsaturated zone beneath the facility is very thick and extends to depths of up to 49m below present ground levels
- Karstic features were encountered at depth within the boreholes located in the south eastern part of the site. These features represent significant potential conduits for groundwater flow
- Mass permeability values for the limestone were determined by borehole rising head tests to range from 2.2×10^{-5} m/s to 2.1×10^{-7} m/s
- The hydraulic gradient within the northern and eastern sites is inclined toward the quarry lake and there is a net groundwater movement towards the quarry lake at this facility
- The hydraulic gradient in the southern site is inclined towards the River Boyne and there is a net groundwater movement from the quarry lake at this location.

A hydrogeological review was undertaken in 2012. Regional groundwater is interpreted to flow in a north to south direction towards the River Boyne. The nature of groundwater flow in the area is dependent on the degree of karstification of the limestone. Where limestone is heavily karstified, groundwater generally flows within a small number of enlarged conduits. However, in areas where karstification is not prevalent, groundwater generally flows through a series of connected fractures, fissures and joints. The only evidence of karstification at the site is in the southern region i.e. within borehole BH10A.

The report found that water quality results suggest that monitoring boreholes BH4A and BH5A have been impacted from leachate generated from the waste body. The elevated concentrations of ammonia and manganese within BH5A and manganese, iron, nickel and barium within BH4A have regularly been recorded above typical background concentrations for the general region in addition to the 2010 Groundwater Regulation Standards and the EPA

IGV. The remaining monitoring boreholes and flooded former quarry void do not indicate significant impact from the waste body

The report also found that water quality recorded within the flooded former quarry void does not suggest that groundwater in the southern region of the site has been significantly impacted from the waste body and the risks posed to groundwater wells to the south or down gradient of the site is considered to be low.

1.1.5 Local Meteorology

The meteorology of Drogheda is typical of areas on the eastern seaboard of Ireland. The climate is predominately temperate, characterised by mild conditions with no extremes of wind, rain or temperature.

1.2 RESTORATION WORKS UNDERTAKEN

The following restoration works were undertaken at the site during 2005-2007;

- Installation of 55 No. gas extraction wells
- Installation and commissioning of an active gas extraction flare and methane stripper
- Installation of capping layers consisting of Gas Drainage Layer, LLDPE capping and Surface Water Drainage Layer (A total area of approximately 101,650m²).
- Reinforcement of the capping system using geogric on slopes greater than 1 in 2.5
- Surface Water Drainage System
- Construction of a 1.0m high safety bund along cliff edges on the site to improve safety.
- Subsoil and topsoil have been placed above the capping layer to a depth of 850mm and 150mm respectively across the site.

1.3 REPORT PERIOD

The report period for this Annual Environmental Report (AER) is from January to December 2013.

2.0 WASTE ACTIVITIES CARRIED OUT AT THE FACILITY

The licensed disposal activities, in accordance with the Third Schedule of the Waste Management Act, 1996, are restricted to those listed as follows;

- Class 13 Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced

Licensed waste recovery activities, in accordance with the Fourth Schedule of the Waste Management Act, 1996, are restricted to those listed as follows;

- Class 2 Recycling or reclamation of organic substances, which are not used as solvents (including composting and other biological transformation processes).
- Class 3 Recycling or reclamation of metals and metal compounds.
- Class 4 Recycling or reclamation of other inorganic materials.
- Class 10 The treatment of waste on land with a consequential benefit for an agricultural activity or ecological system.
- Class 11 Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.
- Class 13 Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collecting, on the premises where such waste is produced.

3.0 QUANTITY AND COMPOSITION OF WASTE RECEIVED AND DISPOSED OF DURING THE REPORTING PERIOD AND EACH PREVIOUS YEAR

Table 3.1 shows waste quantities accepted at Drogheda landfill site from 1997-2006. The landfill site is now closed. The site ceased accepting waste for disposal since the waste licence was granted on 30th December 1999, however waste were brought on site for restoration and capping following this date.

Table 3.2 provide the quantities of waste accepted for recycling at Drogheda Civic Waste Facility in 2012. 387 tonnes was sent for disposal as results of contamination of the recyclables, waste accepted for disposal and bulky waste.

Table 3.1 Waste Quantities Accepted (Tonnes) at Landfill Site

Waste Types	1997	1998	1999	2000	2001
Total	75,350 ¹	86,000 ¹	40,000 ¹	58,506 ¹	27,085 ¹
Waste Types	2002	2003	2004	2005	2006
Total	21,288 ¹	-	8,744	-	58,584 ²

Table 3.2 Waste Quantities (Tonnes) at Civic Waste Facility

Waste Types	2006	2007	2008	2009	2010	2011	2012	2013
Accepted for Recycling	1404.99		3169.9	3,520.71	4020.28	3446.59	3,085.63	2578
To landfill					52		390	387

Table 3.3 Waste Quantities Accepted for Recycling at Drogheda Civic Waste Facility in 2013³

Material Type	EWC Codes	Tonnage	Name of Destination Facility(ies), or Collector(s) if Directly Exported
Mixed residual waste	20 03 01	293 + 94	Whiteriver Landfill W0060-03 and Indaver Incinerator W0167-02
Garden	20 02 01	1,114	Dundalk Town Council W0034
Cardboard packaging	15 01 01	324	Dundalk Town Council W0034
Newspaper and magazines	20 01 01	130	Dundalk Town Council W0034-02

¹ 1997 to 2002 figures based on estimates.

² Capping material under the Capping and Restoration Contract.

³ National Waste Report 2013 Survey, Part 3.

Material Type	EWC Codes	Tonnage	Name of Destination Facility(ies), or Collector(s) if Directly Exported
Glass packaging	15 01 07	156	Glasson NI LN06/08
Metals (aluminium cans)	15 01 04	8	Tinnelly NI LN/09/10
Metals (steel cans)	15 01 04	16	Tinnelly NI LN/09/10
Metals (other metals non-packaging)	20 01 40	199	Tinnelly NI LN/09/10
plastic packaging	15 01 02	111	Shabra Plastics MN 080022-01
Textiles	20 01 11	29	Cookstown NI wmex01/11
wood packaging	15 01 03	226	Dundalk Town Council W0034-02
wood non-packaging	20 01 38	250	Dundalk Town Council W0034-02
lead acid batteries and accumulators	16 06 01*	13	Rilta W0192-02
Total		2,965	

4.0 METHODS OF DEPOSITION OF WASTE

4.1 LANDFILL

The site ceased to accept waste for disposal when the waste licence was granted in December 1999. The only materials accepted at the site were inert wastes, which was utilised for capping at the site. Phase 1 capping works were completed in September 2007.

4.2 CIVIC WASTE FACILITY

The Civic Waste Facility (CWF) is open;

- Monday - Friday 9.30am - 6.00pm
- Saturday 9.00am - 3.00pm

The following are accepted at the CWF;

- cardboard,
- newspaper,
- glass (green, brown, clear),
- aluminium drink cans,
- steel food tins,
- domestic plastics,
- textiles (e.g. clothes) and footwear.
- car and household batteries,
- scrap metal,
- wood,
- electrical and domestic appliances,
- green garden waste

All waste deposited at the CWF are placed;

- Into a receptacle for recovery , or
- into a designated inspection area

The storage containers and storage areas are clearly labelled with yellow backgrounds and black/green writing to indicate their content.

There are samples or signage describing the type of waste which can deposited into each container.

5.0 SUMMARY REPORT ON EMISSIONS

5.1 EMISSIONS TO AIR

In accordance with The PRTR Regulations releases of pollutants and off site transfers of waste by facilities operating in relevant industrial sectors are to be reported by the EPA to the European E-PRTR website where the facility exceeds specified thresholds. The PRTR reporting and landfill gas survey have been completed for Drogheda landfill site and submitted to the EPA. The PRTR is including in Appendix A.

There is a 750m³/hr landfill gas flare in operation at Drogheda landfill site. Based on model predications and information from the landfill gas flares the estimated net emission of methane from the flare combustion process and both surface and lateral emissions from the landfill body is 53,410.5 kg/year.

Table 5.1 Net Methane Emission

Quantities of Methane Flared and / or Utilised	T (Total) kg/Year
Total estimated methane generation (as per site model)	313,343.0
Methane flared	259,932.0
Methane utilised in engine/s	0.0
Net Methane Emission	53,410.5

Flue gas monitoring was also undertaken on the permanent landfill gas flare. All monitoring was carried out in accordance with Environmental Protection Agency Office of Environmental Enforcement (OEE) Air Emission Monitoring Guidance Note 2 (AG2). This report has been submitted to the EPA. .

CO and NO_x as NO₂ results were within the typical emission limit values used for such installations in Ireland

5.1.1 Emissions to Groundwater

There are no direct emissions to groundwater or surface water. A water balance calculation has been completed for Drogheda landfill site and is presented in Appendix B. The site is unlined and an area of approximately 101,650m² has been capped. There is no active leachate extraction system on the site. Infiltration in restored areas has been calculated using range of 2-10% of total rainfall. This equate to 2,116 m³ to 8,288 m³ of leachate produced.

Water discharges from the capped areas of the site via two concrete silt interceptors which discharge the surface water into the quarry lake.

5.1.2 Emissions to Waste Water Treatment Works

Condensate from the landfill gas extraction system is currently transported off site to Drogheda wastewater treatment plant via tanker. An estimated 15 m³ was sent for disposal.

The estimated volume discharged from Civic Waste Facility (area 13,500 m²) is approximately 10,313 m³ for 2013. This is within the limit of the licence.

6.0 SUMMARY OF RESULTS AND INTERPRETATIONS OF ENVIRONMENTAL MONITORING, INCLUDING PLANS OF ALL MONITORING LOCATIONS INCLUDING 12 DIGIT GRID REFERENCES

6.1 MONITORING LOCATIONS

Monitoring is carried out at locations and at frequencies as specified in Schedule F of the waste licence. Permanent access to all monitoring points is maintained.

The results contained in this report were assessed as follows;

- EPA Interim guideline values⁴ (IGV),
- SI No 278 of 2007 EC (Drinking water) Regulations (DWR),
- SI No 9 of 2010 European Communities Environmental Objectives (Groundwater) Regulations 2010 as amended (GWR 2010).
- SI No 294 of 1989 European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations (SWQS),and
- SI No 272 of 2009 European Communities Environmental Objectives (Surface Water) Regulations 2009 (EQS).

Boreholes BH4A and BH10A were installed in March 2000. Boreholes BH1A, BH2A, BH3A, BH5A, BH6A, BH7, BH8A, BH9A and BH11A were installed in August 2001.

These points were surveyed in October 2001 and grid reference points are given in Table 6.1 below. LG1 to LG7 were installed in October 1998. LG8 to LG10 were installed in February 2012.

Leachate monitoring points L1A to L5A were installed in February 2000. No samples of leachate were collected as these monitoring locations are dry. All monitoring points are shown in Drawing No. IBR0378/100 Monitoring Locations in Appendix C.

Table 6.1 Grid References of Monitoring Points

Monitoring Points	Easting	Northing
Groundwater Boreholes		
BH1A	306777	276414
BH2A	306869	276471
BH3A	307055	276063
BH4A	306959	276523
BH5A	307047	276563
BH6A	307182	275918

⁴EPA (2003) Towards setting guideline values for the protection of groundwater in Ireland. Interim Report

Monitoring Points	Easting	Northing
BH7	307239	276620
BH8A	307246	275890
BH9A	307394	275853
BH10A	307500	275928
BH11A	307699	276158
Surface Water		
SW1	307164	276270
SW2	307414	276470
SW3	307388	275910
Gas Piezometers		
LG1	306773	276393
LG2	306820	276330
LG3	306867	276283
LG4	306913	276218
LG5	306949	276171
LG6	307564	276281
LG7	307580	276241
LG8	TBS	TBS
LG9	TBS	TBS
LG10	TBS	TBS
Leachate		
L1A	307021	276228
L2A	307028	276337
L3A	307216	276378
L4A	307291	276334
L5A	307359	276279
Noise		
N1	306786	276384
N2	306850	276238
N3	307311	275840
Dust		
DG1	306854	276352
DG2	307024	276073
DG3	307539	275993
DG4	307131	275903

TBS To be surveyed

6.2 GROUNDWATER

As required under the Waste Licence, groundwater monitoring has been undertaken at the borehole locations as set out in Table 3 of the waste licence. Schedule F of the waste licence requires the monitoring of certain parameters on either a monthly, quarterly or annual basis as shown in Table 6.2.

Table 6.2 Groundwater Parameters Monitoring Frequencies

Monitoring Frequency	BH1A, BH4A, BH6A, BH9A, BH10A, BH11A	BH2A, BH3A, BH5A, BH7A, BH8A
Monthly	Visual Inspection and Odour, Groundwater Level, Ammoniacal Nitrogen, Chloride, Cadmium, Chromium, Electrical Conductivity, pH, Temperature, Iron, Lead, Manganese, Potassium, Sodium, Barium, Nickel, Nitrate, Nitrite, Phenol, Zinc	Groundwater Level, Ammoniacal Nitrogen, Electrical Conductivity, pH, Temperature
Quarterly	Dissolved Oxygen, Total Suspended Solids, TON, TOC, Zinc	Visual Inspection and Odour, Chloride, Dissolved Oxygen, Cadmium, Chromium, Iron, Lead, Manganese, Potassium, Sodium, TON, TOC, Barium, Nickel, Nitrate, Nitrite, Phenol
Annually	Boron, Calcium, Copper, Cyanide, Fluoride, Magnesium, Mercury, Sulphate, Total Alkalinity, Total Phosphorous, Residues on Evaporation, Faecal Coliforms, Total Coliforms List I & II substances monitored biannually from BH10, annually from other boreholes	Boron, Calcium, Copper, Cyanide, Fluoride, Magnesium, Mercury, Sulphate, Total Alkalinity, Total Phosphorous, Residues on Evaporation, Zinc, Faecal Coliforms, Total Coliforms

These results are presented graphically and in table format in Appendix D.

Parameters that are indicative of possible leachate contamination include Ammoniacal-N, Conductivity, Iron, Chloride and heavy metals.

The boreholes BH1A – BH4A and BH7 provide an indication of the up-gradient baseline groundwater characteristics whilst BH6A, BH8A and BH9A typify the down-gradient location for flow from the site. In addition BH11A provides information on the nature of the groundwater deep beneath the landfill site and BH10A provides down-gradient information in a borehole, which was penetrated through a karstic void and hence is potentially an area of relatively high groundwater flows emanating from the site. BH5A is no longer considered an upgradient borehole as it appears to be influenced by leachate emission from the adjacent waste.

Table 6.3 provides a summary of results in 2013 from groundwater monitoring boreholes throughout the monitoring period.

Table 6.3 Summary of 2012 Results from Groundwater Monitoring Boreholes

	Units	No. of Samples	Minimum	Maximum	Mean	Standard Deviation
Alkalinity	mg/l CaCO ₃	11	135	376	251.55	82.15
Aluminium	ug/l	79	<5	843.6		
Ammonia	mg/l N	125	<0.03	6.78		
Antimony	ug/l	79	<0.5	1.16		
Arsenic	ug/l	79	<0.5	47.05		
Barium	ug/l	79	8.4	101.2	38.35	19.24
Beryllium	ug/l	79	<0.5	<0.5		
Boron	µg/l	79	11.7	212.6	83.90	66.63
Cadmium	µg/l	79	<0.1	0.5		
Calcium	mg/l Ca	79	12.16	157.46	89.16	34.96
Chloride	mg/l Cl	86	12	76	39.27	18.67
Chromium	µg/l	79	<0.5	24.7		
Cobalt	µg/l	79	<0.5	1.3		
Coliform Bacteria	(No/100 ml)	11	2	78	22.09	22.80
Conductivity	µS/cm @ 25	125	385	942	655.40	162.37
Copper	µg/l	79	0.5	7.2	1.82	1.49
Cyanide	mg/l	11	<0.05	<0.05		
D.O.	% Saturation	44	13	98	50.07	22.09
E_Coli	No/100 ml	11	0	61	5.64	18.36
Fluoride	mg/l	11	<0.150	0.2		
Iron	µg/l	79	<10	1451.2		
Lead	µg/l	79	<0.5	5.2		
Magnesium	mg/l Mg	79	1.59	32.65	10.36	8.24
Manganese	µg/l	79	<0.05	926.7		
Mercury	µg/l	79	<0.05	0.1		
Molybdenum	µg/l	79	<0.5	70		
Nickel	µg/l	79	<0.5	30.3		
Nitrite	mg/l N	85	<0.002	0.053		
o-Phosphate	mg/l P	12	0.02	0.07	0.03	0.02
pH	0	125	6.1	9.7	7.41	0.46
Phenol	mg/l	85	<0.002	<0.002		
Potassium	mg/l	74	0.5	124.56	10.87	20.41
Selenium	µg/l	79	<0.5	109		
Silver	µg/l					
Sodium	mg/l	79	7.16	44.14	22.51	10.24
Strontium	µg/l	79	47.14	270.93	148.89	55.95
Sulphate	mg/l SO ₄	12	6	190.2	45.18	52.12
Temp	°C	125	6	21.4	11.36	3.06
Thallium	µg/l	79	0.1	2.66	0.34	0.48
T.O.C.	mg/l	43	<1.5	94.5	22.11	30.99
T.O.N	mg/l N	86	0.08	7.85	1.76	1.75
Total S Solids	mg/l					
Uranium	µg/l	79	0.23	26.88	3.07	5.86
Vanadium	µg/l	79	0.5	44.47	3.95	10.08
Zinc	µg/l	79	1.3	61.3	11.57	9.89

6.3 UP-GRADIENT

The pH levels for all up-gradient boreholes remain between the IGV and DWR of 6.5 and 9.5 except for BH7A (9.7) in September.

All up-gradient boreholes Electrical Conductivity levels were below the IGV of 1,000 μ S/cm and DWR of 2,500 μ S/cm.

Ammonia concentrations were below the GWR 2010 (0.175 mg/l N), IGV (0.15 mg/l) and DWR (0.30 mg/l) throughout the year, except BH3A in November (0.9 mg/l N) and in December (0.34 mg/l N).

Chloride levels exceeded the IGV of 30 mg/l in BH1A, BH3A, BH4A, and BH7A. All boreholes up-gradient were below the GWR 2010 (187.5 mg/l Cl) and DWR (250 mg/l). The highest chloride level was 67 mg/l in BH7A.

One elevated concentration for manganese was recorded in BH1A (208.4 μ g/l) in June. One elevated concentration for iron was recorded in BH4A (1451.2 μ g/l) in February.

Elevated concentrations of potassium were consistently recorded at BH3A and BH7A. Occasional elevated concentrations were recorded at BH1A. Potassium levels were highest in BH7A in July (124.56 mg/l).

Barium, Cadmium, Chromium, Lead, Sodium, Nickel, Nitrite, Zinc concentrations were below the GWR 2010, DWR and IGV.

Elevated concentrations of manganese and iron were recorded at BH1A. Arsenic and Molybdenum exceeded the GWR 2010 at BH7A in July and October. One elevated concentration for Aluminium which exceeded the GWR 2010 was recorded at BH4A in February. Selenium exceeded the DWR at BH7A throughout the monitoring period.

All up gradient boreholes showed an increase in Total Organic Carbons (TOC) concentrations in January and April.

TON showed no abnormal change. TON concentrations were general higher in up gradient boreholes.

Coliform bacteria exceeded the IGV in all boreholes in April ranging from 10 to 41 No/100ml.

Total Phenol levels were analysed and were less than the lower detection limit for the methodology used. (This varies throughout the monitoring period) and as a result could be below the IGV of 0.5 μ g/l. ortho-Phosphate exceeded the IGV at BH1A and BH2A in April

Concentrations above the limit of detection were measured for the following parameters:

- Cobalt 0.6 μ g/l to 1.3 μ g/,
- Strontium 47.14 μ g/l to 270.93 μ g/l,
- Thallium <0.1 μ g/l to 0.45 μ g/l

-
- Uranium 0.3 µg/l to 26.88 µg/l⁵,
 - Vanadium 0.55 µg/l to 44.47 µg/l.

Cyanide concentration of <0.05 mg/l were detected in all upgradient boreholes. This concentration is the lowest limit of detection for the methodology used for cyanide; therefore this could be lower than the WTL and IGV of 0.01 mg/l. The results were below the DWR of 0.05 mg/l.

All other parameters were below the IGV, GWR 2010 and DWR for those comparable or below the limit of detection.

Analysis for Polycyclic Aromatic Hydrocarbons (total 16 EPA PAHs) was <0.247 µg/l. All parameters measured were less than the limits of detection. For the purposes of determining compliance with the DWR of 0.1µg/l for PAH only four are considered – benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene and indeno(1,2,3-cd)pyrene. Concentrations were as follows:

- Benzo (b) fluoranthene <0.023 µg/l,
- Benzo (k) fluoranthene <0.027 µg/l,
- Benzo (ghi) perylene <0.016 µg/l, and
- Indeno (1, 2, 3-cod) pyrene <0.014 µg/l,

Pesticide, herbicide and semi volatile organic compound parameters analysis was carried out in BH1A in April. The results were either below the IGV for those comparable or were below the lower detection limit for the analytical methodology used analysis.

Volatiles organic compound parameters were either below the IGV for those comparable or were below the lower detection limit for the analytical methodology used. The following parameters were detected above the detection limit. There are no drinking water drinking water standards in Ireland for these substances. Those comparable with WHO guideline values are referenced:

BH1A

- 1, 2, 4-Trimethylbenzene 0.2 µg/l⁶.

BH4A

- Styrene 0.1 µg/l⁶

⁵ World Health Organisation (2011) Guidelines for Drinking-water Quality, Fourth Edition. Table A3.3 Guideline values for chemicals that are of health significance in drinking-water. Uranium 30 µg/l.

⁶ World Health Organisation (2011) Guidelines for Drinking-water Quality, Fourth Edition. No health-based guideline values are given for trimethylbenzene. No guideline value proposed for 1,1-Dichloroethane. Table A3.3 Guideline values for chemicals that are of health significance in drinking-water. 1,2 Dichlorobenzene - 1000µg/l, 1,4 Dichlorobenzene 300 µg/l, Styrene - 20 µg/l, Chloroform - 300µg/l, Bromoform - 100 µg/l, Dibromochloromethane – 100 µg/l, Bromodichloromethane – 60µg/l.

6.4 DOWN GRADIENT

The pH levels for all boreholes remain between the IGV and DWR of 6.5 to 9.5 pH units throughout the monitoring period.

All down-gradient boreholes recorded Electrical Conductivity levels were below the IGV of 1,000 $\mu\text{S}/\text{cm}$ and DWR of 2,500 $\mu\text{S}/\text{cm}$.

Ammonia concentrations were below the GWR 2010 (0.175 mg/l N), IGV of 0.15 mg/l and the DWR of 0.3 mg/l

Chloride levels do not exceed the GWR 2010 (187.5 mg/l Cl) and DWR of 250 mg/l, however all boreholes exceed the IGV of 30 mg/l except BH6A throughout the monitoring period. The maximum concentration was 76 mg/l at BH10A.

Elevated concentrations of manganese were consistently recorded at BH10A from June to December. The highest concentration in BH10A was in August (926.7 mg/l).

One elevated concentration for iron was recorded in BH10A (287.2 $\mu\text{g}/\text{l}$) in June

Elevated concentrations of potassium were consistently recorded at BH10A and BH11A. Potassium levels were highest in BH11A in May (25.32 mg/l).

As with the up gradient boreholes, all down gradient boreholes also showed an increase in TOC concentrations in January and April .

TON levels were highest downstream in BH11A (2.86 mg/l) in October and the concentrations in each borehole show no significant fluctuations over the past year of monitoring.

Coliform bacteria exceeded the IGV in all boreholes in April ranging from 2 to 16 No/100ml.

Total Phenol levels were analysed and were less than the lower detection limit for the methodology used. (This varies throughout the monitoring period) and as a result could be below the IGV of 0.5 $\mu\text{g}/\text{l}$.

Concentrations above the limit of detection were measured for the following parameters:

- Strontium 83.88 $\mu\text{g}/\text{l}$ to 192.15 $\mu\text{g}/\text{l}$,
- Thallium <0.1 $\mu\text{g}/\text{l}$ to 0.36 $\mu\text{g}/\text{l}$
- Uranium 0.23 $\mu\text{g}/\text{l}$ to 1.03 $\mu\text{g}/\text{l}$
- Vanadium <0.5 $\mu\text{g}/\text{l}$ to 1.13 $\mu\text{g}/\text{l}$.

These concentrations were below the up gradient maximum concentration.

Cyanide concentration of <0.05 mg/l were detected in all down gradient boreholes. This concentration is the lowest limit of detection for the methodology used for cyanide; therefore this could be lower than the WTL and IGW of 0.01 mg/l. The results are below the DWR of 0.05 mg/l.

All other parameters were below the IGW, GWR 2010 and DWR for those comparable or below the limit of detection.

Analysis for Polycyclic Aromatic Hydrocarbons (total 16 EPA PAHs) was <0.247 µg/l. All parameters measured were less than the limits of detection. For the purposes of determining compliance with the DWR of 0.1µg/l for PAH only four are considered – benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene and indeno(1,2,3-cd)pyrene. Concentrations were as follows:

- Benzo (b) fluoranthene <0.023 µg/l,
- Benzo (k) fluoranthene <0.027 µg/l,
- Benzo (ghi) perylene <0.016 µg/l, and
- Indeno (1, 2, 3-cod) pyrene <0.014 µg/l,

Pesticide, herbicide and semi volatile organic compound parameters analysis was carried out in BH9A and BH14A in April. The results were either below the IGW for those comparable or were below the lower detection limit for the analytical methodology used analysis.

Volatiles organic compound parameters were either below the IGW for those comparable or were below the lower detection limit for the analytical methodology used except for the following parameters were detected above the detection limit.

BH9A

- 1,2,4-Trimethylbenzene 0.2 µg/l.⁷

BH11A

- 1,2,4-Trimethylbenzene 0.2 µg/l.
- 1,1-Dichloroethane 0.1 µg/l.

⁷ World Health Organisation (2011) Guidelines for Drinking-water Quality, Fourth Edition. No health-based guideline values are given for trimethylbenzene. No guideline value proposed for 1,1-Dichloroethane. Table A3.3 Guideline values for chemicals that are of health significance in drinking-water. 1,2 Dichlorobenzene - 1000µg/l, 1,4 Dichlorobenzene 300 µg/l, Styrene - 20 µg/l, Chloroform - 300µg/l, Bromoform - 100 µg/l, Dibromochloromethane – 100 µg/l, Bromodichloromethane – 60µg/l.

6.5 BOREHOLE BH5A

BH5A is no longer considered an upgradient borehole as it appears to be influenced by leachate emission from the adjacent waste.

Ammonia concentration ranged from <0.03 to 6.78 mg/l N during the monitoring period. BH5A exceeded the GWR 2010 (0.175 mg/l N), IGV (0.15 mg/l) and DWR (0.30 mg/l) for ammonia for the majority of the year.

Chloride concentrations were above the IGV of 30 mg/l but were below the GWR 2010 of 187.5 mg/l C (ranging between 37 and 60 mg/l).

Elevated concentrations of potassium were consistently recorded above the IGV during the monitoring period. One elevated concentration for manganese was recorded in BH5A (490.3 µg/l) in January.

Cadmium, Chromium, Iron, Sodium, Zinc concentrations were below the GWR 2010, DWR and IGV.

A slightly elevated concentration of Barium was recorded in borehole BH5A in January (101.5 µg/l). Nitrite (0.254 µg/l) and Nickel (32.5 µg/l) concentrations above the IGV were also recorded

Total Phenol levels were analysed and were less than the lower detection limit for the methodology used. (This varies throughout the monitoring period) and as a result could be below the IGV of 0.5µg/l.

BH5A recorded the highest TOC concentration (79.7 mg/l) and TON (7.85 mg/l) during the monitoring period.

Coliform bacteria (78 No/100ml) exceeded the IGV in April

Concentrations above the limit of detection were measured for the following parameters:

- Strontium 94.35 µg/l to 143.67 µg/l.
- Thallium 0.13 µg/l to 2.66 µg/l
- Uranium 0.24 µg/l to 1.34 µg/l.
- Vanadium <0.5 µg/l to 0.77 µg/l.

All other parameters were below the IGV, GWR 2010 and DWR for those comparable or below the limit of detection.

6.6 SURFACE WATER

SW1 and SW3 are samples from the lake on site. Water within the former quarry void is considered to be groundwater and will be assessed against the DWR, IGV and GWR 2010. Monitoring point SW2 is located in the cement works pond, which is adjacent and up-gradient of the site.

Schedule F of the waste licence requires the monitoring of certain parameters on either a quarterly or annual basis; the frequency of the monitoring of surface water parameters are shown in Table 6.4.

Table 6.4 Surface Water Monitoring Frequency

Monitoring Frequency	Parameter
Quarterly	Ammoniacal Nitrogen, BOD, COD, Chloride, Dissolved Oxygen, Electrical Conductivity, pH, Total Suspended Solids, Temperature, Cadmium, Chromium, Iron, Lead, Potassium, Total Phosphorous, Barium, Nickel, Nitrate, Nitrite, and Phenol
Annually	Calcium, Copper, Magnesium, Manganese, Mercury, Sulphate, Sodium, Total Alkalinity, TON, and Zinc

Surface water results are presented in Appendix E.

Table 6.5 provides a summary of results in 2013 from quarry surface water locations throughout the monitoring period.

Table 6.5 Summary of 2013 Results from surface water Monitoring locations

	Units	No. of Samples	Minimum	Maximum	Mean	Standard Deviation
Alkalinity	mg/l CaCO ₃	3	135	140	137.67	2.52
Aluminium	ug/l	12	<5	15		
Ammonia	mg/l N	12	<0.03	0.22		
Antimony	ug/l	12	<0.5	1.25		
Arsenic	ug/l	12	0.74	3.24	1.46	0.79
Barium	ug/l	12	<0.5	68.5		
Beryllium	ug/l	12	<0.5	<0.5		
B.O.D.	mg/l O ₂	12	<1.5	2.1	1.80	0.94
Boron	µg/l	12	83	205	169.36	32.74
Cadmium	µg/l	12	<0.1	<0.1		
Calcium	mg/l Ca	12	30.37	43.26	38.19	3.33
C.O.D.	mg/l O ₂	12	<10	39	21.33	12.88
Chloride	mg/l Cl	12	27	75	62.67	13.32
Chromium	µg/l	12	<0.5	<0.5		
Cobalt	µg/l	12	<0.5	<0.5		
Conductivity	µS/cm @ 25	12	359	550	509.25	52.32
Copper	µg/l	12	0.7	9.6	2.04	2.56
D.O.	% Saturation	12	68	104	93.91	29.02
Iron	µg/l	12	<10	26.1		
Lead	µg/l	12	<0.5	<0.5		
Magnesium	mg/l Mg	12	8.39	20.27	12.35	4.62
Manganese	µg/l	12	1	65.8	18.28	23.96
Mercury	µg/l	12	0.4	0.4	0.40	0.12
Molybdenum	µg/l	12	0.5	2.2	1.12	0.81
Nickel	µg/l	12	0.9	7.9	3.98	1.99
Nitrite	mg/l N	12	<0.002	0.028		
o-Phosphate	mg/l P	3	<0.02	<0.02		

	Units	No. of Samples	Minimum	Maximum	Mean	Standard Deviation
pH	0	12	7.9	8.6	8.28	0.19
Phenol	mg/l	12	<0.002	<0.002		
Potassium	mg/l	12	6.89	28.07	13.18	8.47
Selenium	µg/l	12	1.1	33.6	9.40	9.61
Sodium	mg/l	12	10.5	44.37	33.34	10.84
Strontium	µg/l	12	85.82	191.76	128.42	37.46
Sulphate	mg/l SO4	3	20.2	46.8	29.13	15.30
Suspended Solids	mg/l	3	4	6	5.33	1.15
Temp	°C	12	6.2	24.1	13.63	6.64
Thallium	µg/l	12	<0.1	0.73		
T.O.N	mg/l N	12	<0.08	0.22	0.15	0.09
Total S Solids	mg/l	9	<5	11	10.50	4.64
Uranium	µg/l	12	0.23	0.53	0.34	0.11
Vanadium	µg/l	12	0.73	10.11	3.88	2.89
Zinc	µg/l	12	1.4	17.6	4.63	4.94

6.7 QUARRY LAKE

SW1, SW2, SW3 were below the DWR, IGV and GWR 2010 for the following parameters, Aluminium, Ammonia, Antimony, Arsenic, Barium, Boron, Cadmium, Calcium, Chromium, Conductivity, Copper Iron, Lead, Magnesium Manganese, Mercury, Molybdenum, Nickel, Nitrite, pH, Sodium, and Zinc.

Potassium exceeded the IGV of 5 mg/l in all locations. Chloride concentrations were above the IGV of 30 mg/l at SW1 and SW3 but were within the GWR 2010 overall threshold value range of 24-187.5 mg/l Cl. TON concentrations ranged from <0.08 mg/l to 0.22 mg/l. Dissolved oxygen were SW1 (100%), SW2 (101%) and SW3 (99%).

Concentrations above the limit of detection were measured for the following parameters:

- Selenium SW2 (33.6 µg/l)
- Strontium SW1 (101.03 µg/l), SW2 (85.82 µg/l) and SW3 (96.41 µg/l).
- Thallium SW2 (0.79 µg/l)
- Uranium SW1 (0.45 µg/l), SW2 (0.23 µg/l) and SW3 (0.44 µg/l).
- Vanadium SW2 (10.11 µg/l)

All locations recorded < (less than) the limit of detection for phenol. Phenol concentration were <0.002 mg/l. These are the lower limit of detection for the methodology used and as a result could be below the IGV of 0.5µg/l.

All other parameters were below the IGV, GWR 2010 and DWR for those comparable or below the limit of detection.

6.8 CAPPED AREA

Table 6.6 provides a summary of results in 2013 from surface water locations throughout the monitoring period.

Table 6.6 Summary of 2013 Results from Capped Area

	Units	No. of Samples	Minimum	Maximum	Mean	Standard Deviation
Alkalinity	mg/l CaCO ₃	2	298	324	311.00	18.38
Aluminium	ug/l	8	8.7	94	42.68	37.05
Ammonia	mg/l N	8	<0.03	0.07	0.05	0.03
Antimony	ug/l	8	<0.5	<0.5		
Arsenic	ug/l	8	<0.5	0.66	0.58	0.30
Barium	ug/l	8	27.6	56.2	43.13	8.12
Beryllium	ug/l	8	<0.5	<0.5		
B.O.D.	mg/l O ₂	8	<1.5	<1.5		
Boron	µg/l	8	18.9	25.7	21.90	2.68
Cadmium	µg/l	8	<0.1	0.2		
Calcium	mg/l Ca	8	36.99	123.79	86.19	33.11
C.O.D.	mg/l O ₂	8	<10	23		
Chloride	mg/l Cl	8	12	18	14.50	2.00
Chromium	µg/l	8	<0.5	1.1	0.85	0.43
Cobalt	µg/l	8	<0.5	<0.5		
Conductivity	µS/cm @ 25	8	299	665	517.50	144.72
Copper	µg/l	8	1.8	3.4	2.59	0.51
Cyanide	mg/l					
D.O.	% Saturation	8	62	120	83.63	18.42
Iron	µg/l	8	<10	21		
Lead	µg/l	8	<0.5	<0.5		
Magnesium	mg/l Mg	8	6.21	8.76	7.32	0.88
Manganese	µg/l	8	1.2	1.7	1.45	0.79
Mercury	µg/l	8	<0.05	<0.05		
Molybdenum	µg/l	8	0.6	1.3	0.89	0.22
Nickel	µg/l	8	<0.5	1.3		
Nitrite	mg/l N	8	<0.002	0.02	0.01	0.01
o-Phosphate	mg/l P	2	<0.02	<0.02		
pH	0	8	7.7	8.3	7.96	0.22
Phenol	mg/l	8	<0.002	<0.002		
Potassium	mg/l	8	0.79	7.9	3.85	2.92
Selenium	µg/l	8	<0.5	0.6	0.53	0.28
Sodium	mg/l	8	8.31	10.26	9.42	0.61
Strontium	µg/l	8	158.78	229.5	199.27	26.35
Sulphate	mg/l SO ₄	2	12.9	16.4	14.65	2.47
Suspended Solids	mg/l	2	<4	<4		
Temp	°C	8	6.1	18.7	11.44	5.49
Thallium	µg/l	8	<0.1	<0.1		
T.O.N	mg/l N	8	<0.08	1.64	0.67	0.63
Total S Solids	mg/l	6	<5	<5		
Uranium	µg/l	8	1.32	2.67	1.93	0.50
Vanadium	µg/l	8	0.51	1.17	0.85	0.24
Zinc	µg/l	8	1.7	3.3	2.51	0.62

SW4 and SW5 monitor the surface water arising from the capped area. The majority of the parameters were below the lower level of detection for the methodology used for analysis or the Surface Water Quality Standards (SWQS) laid out in the European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations 1989, European Communities Environmental Objectives (Surface Water) Regulations 2009 Environmental quality standard (EQS) and the European communities (Drinking Water) (No. 2) Regulations 2007 parametric value (DWR) were comparable.

Ammonia, Barium, BOD, COD, Cadmium, Chromium, Chloride, Dissolved Oxygen, Electrical Conductivity, Lead, Iron, Nickel, and Nitrite pH, Total Suspended Solids, were below the SWQS, EQS and DWR.

Potassium levels were above the IGW at times during the monitoring period. Phenol concentration were <0.002 mg/l. These are the lower limit of detection for the methodology used and as a result could be below the IGW of 0.5 µg/l. Dissolved Oxygen levels ranged from 62 -120 % are within the SWQS A1 >60% but not the EQS.

TON concentrations ranged from 0.22 mg/l to 0.26 mg/l.

Concentrations above the limit of detection were measured for the following parameters:

- Strontium
- Uranium
- Vanadium

All other parameters were below the IGW, GWR 2010 and DWR for those comparable or below the limit of detection.

6.9 DISCHARGE TO SEWER

There are two discharge points to sewer, treated condensate from the methane stripper (S1) and the discharge point to sewer from Civic Waste Facility (S2).

Monitoring at S2 during the year showed no exceedances in the emission limits to sewer as shown in Table 6.7. The estimated volume discharged from Civic Waste Facility (area 13,500 m²) was approximately 10,313 m³ for 2013. This is within the limit of the licence.

S1 was not sampled during the monitoring period as the tank was empty on sampling dates.

Condensate from the methane stripper is tankered from site following agreement with EPA and Waste Water Treatment Plant Operator. There were no emissions to sewer from S1.

Table 6.7 Emission Limit Values for Emissions to Sewer Civic Waste Facility (S2)

Parameter Emission Limit Value	Grab Sample mg/l ELV	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
BOD ₅	335	<1.5	<1.5	<1.5	4.6	2.3	10.1	3.2	8	4.1	1.9	1.4	<1.0
COD	450	<10	25	15	14	<10	29	20	21	27	37	<20	25
Ammoniacal Nitrogen NH ₄ -No	35	0.12	0.05	0.29	0.66	0.7	1.34	2.82	0.95	1.27	<0.03	<0.020	<0.020
Suspended Solids	294	9	<5	<5	6	<5	6	<5	8	9	36	8	9
Sulphates (as SO ₄)	240	6.6	3.7	7.6	13.5	6.7	7.1	4	2.7	5.9	15	18.9	26.3
pH	6 – 9	<1.5	<1.5	<1.5	7.5	7.4	7.2	7.5	7.3	7.3	7.8	7.5	7.9
Temperature	32°C	6.2	7	nm	6.7	10.5	13.7	18.9	15.1	14.8	14.6	7.1	10

6.10 PERIMETER GAS MONITORING

The licence trigger levels for the following landfill gases are greater than or equal to 1.0% v/v Methane and greater than or equal to 1.5% v/v Carbon Dioxide. Landfill gas monitoring results have been provided for the period and are shown in Appendix F.

Monitoring of landfill gas was not undertaken during March, September and October.

Methane was recorded along the perimeter of the site at location (LG1 – LG7) throughout the monitoring period. Methane levels ranged from 0.1%v/v to 0.3%v/v which is below the trigger level. Carbon Dioxide levels from LG1, LG2, LG3, LG4, LG5, LG8 and LG9 were above 1.5% v/v at various stages during the monitoring period.

Methane was recorded in groundwater boreholes around the perimeter of the site (BH1A – BH11A) at times. Methane levels ranged from 0.1%v/v to 0.3%v/v which is below the trigger level. Carbon Dioxide levels in BH3A, BH4A and BH5A were above 1.5% v/v at various stages of the monitoring period.

6.11 DUST MONITORING

Dust monitoring was carried out on three occasions during this monitoring period. Table 6.8 details the results of the dust monitors installed on site. The waste licence requires dust deposition limits to be no more than **350** mg/m²/day. From Table 6.8 can be seen that all dust deposition levels in all periods are below the limit except in DG3, which exceeds the licence requirements in August and DG4 in September which is slightly over the 350 mg/m²/day limit. It not thought that these exceedances are a result of operations at the recycling facility. No complaints were received nor was problem with dust noted during this period.

Table 6.8 Results from Dust Monitoring Analysis, Drogheda Landfill Site (mg/m²/day)

Sampling Location	Dust Monitor 1	Dust Monitor 2	Dust Monitor 3	Dust Monitor 4
07/01/2013	198.5	37.5	105.4	25.2
07/08/2013	30	160	390.1	264
03/09/2013	235	101.2	140.8	361.2

6.12 NOISE

The measurements were completed on Wednesday and Thursday and Friday 27th and 28th February 2014 in accordance with the following environmental noise standards:

- ISO 1996: 2007 Acoustics – Description and Measurement of Environmental Noise, Parts 1-4
- EPA Guidance Note for Noise (NG4) 2012

The range of noise levels at each noise sensitive location during respective measuring periods were as follows:

- NSL 1: Daytime: LAeq (T 30 min) 76-74dBA;
Evening time: LAeq (T 15 min) constant at 75dBA;
Night time: LAeq (T 15 min) 67-64dBA
- NSL 2: Daytime: LAeq (T 30 min) 77-73dBA;
Evening time: LAeq (T 15 min) constant at 76dBA;
Night time: LAeq (T 15 min) constant at 70dBA.
- NSL 3: Daytime: LAeq (T 30 min) 67-65dBA;
Evening time: LAeq (T 15 min) constant at 64dBA;
Night time: LAeq (T 15 mins) 59-55dBA

The report found that traffic was found to be the predominant source of noise at all locations. Reduced traffic noise levels during the night-time measuring period provides a more accurate representation of background noise against which any potential noise levels arising from the site activities could be compared. The findings show that during the night-time measurements and during lulls in traffic noise there was no noise audible from the landfill site. Hence it is considered to be in compliance with NG4 and the requirements of Waste Licence W0033.

6.13 ECOLOGY

An assessment of the ecology of the Quarry Lake and adjoining habitats was undertaken on 11th September 2013. This has been submitted to the EPA. 304

7.0 RESOURCE AND ENERGY CONSUMPTION SUMMARY

Consumption of resources for the reporting period are shown in Table 7.1 below;

Table 7.1 Consumption of Resources

Parameters	CWF and Landfill	Unit
Water	340	m ³
Electricity	3560	kWh

8.0 DEVELOPMENT WORKS

8.1 PROPOSED DEVELOPMENT OF THE SITE AND TIMESCALE OF SUCH DEVELOPMENT

Completion of Phase 2 of capping works when consultation with landowners re - historical waste deposited outside the facility boundary is complete.

8.2 REPORT ON DEVELOPMENT WORKS UNDERTAKEN DURING THE REPORTING PERIOD, AND THOSE PROPOSED DURING THE COMING YEAR

No development works were undertaken in 2013. There are no proposed development works to be undertaken in 2014.

8.3 REPORT ON RESTORATION

Phase 1 of the Restoration Capping Works for Drogheda Landfill Site has been completed satisfactorily in accordance with the contract specification, the licence conditions and EPA correspondence Ref. W0033-01/AK17EM. The CQA report has been completed and is available on site for inspection.

9.0 VOLUME OF LEACHATE PRODUCED AND VOLUME OF LEACHATE TRANSPORTED / DISCHARGED OFF-SITE

The site was permanently capped during 2007 except for an area along the boundary of the site (approximately 3,000m²). No leachate is collected from the facility.

Condensate from the landfill gas extraction system is currently transported off site to Drogheda wastewater treatment plant. An estimated 15 m³ was sent for disposal.

9.1 MONTHLY WATER BALANCE CALCULATION AND INTERPRETATION

The calculation for monthly water balance is as follows

$$L_o = [ER (A) + LW + IRCA + ER (I)] - [aW]$$

Where;

L_o = leachate produced (m³)

ER = effective rainfall

A = area of cell (m²)

LW = liquid waste

IRCA = infiltration through restored areas and capped areas (m)

a = absorptive capacity of waste (m³/t)

W = weight of waste deposited

I = surface area of lagoons (m²)

A water balance calculation for 2013 is presented in Appendix B using rainfall data from metrological station at Dublin Airport. Infiltration in restored areas would be in the range of 2-10% in the worst case scenario for a geosynthetic clay liner cap. This estimates the leachate production for 2013 will be in the range of 2,116 m³ to 8,288 m³.

10.0 SITE SURVEY SHOWING EXISTING LEVELS OF THE FACILITY AT THE END OF THE REPORTING PERIOD

A topographical survey was undertaken at the site in 2007 following the completion of Phase 1 restoration. This survey was submitted to the EPA in December 2007.

11.0 ESTIMATED ANNUAL AND CUMULATIVE QUANTITIES OF LANDFILL GAS EMITTED FROM THE SITE

A 750m³/hr flare has been installed at the facility. Field balancing is undertaken at the facility as required. The average flow rate from the flare in 2013 was approximately 276 m³/hr with an average methane concentration of 31%. The total hours run was 4,487.

The landfill gas extraction system shut down periodically during 2013 due to a low flow or low methane levels. Once landfill gas flow and concentration are sufficient the flare was restarted.

12.0 ESTIMATED ANNUAL AND CUMULATIVE QUANTITY OF INDIRECT EMISSIONS TO GROUNDWATER

A site investigation undertaken in 1998 determined the following;

- The unsaturated zone beneath the facility is very thick and extends to depths of up to 49m below present ground levels
- Karstic features were encountered at depth within the boreholes located in the south eastern part of the site. These features represent significant potential conduits for groundwater flow
- Mass permeability values for the limestone were determined by borehole rising head tests to range from 2.2×10^{-5} m/s to 2.1×10^{-7} m/s
- The hydraulic gradient in the southern site is inclined towards the River Boyne and there is a net groundwater movement from the quarry lake at this location.

The site was formally a limestone quarry and the landfill was developed on the benches of the redundant limestone quarry. The site has historically operated on a dilute and disperse principle.

The GSI has classified the underlying bedrock aquifer as a regionally important karstified aquifer (Rkd) dominated by diffuse flow. The site is located within the Drogheda Urban Groundwater Body (GWB) which has been classified as being of "Good" status.

The site was permanently capped during 2007 except for an area along the boundary of the site (approximately $3,000\text{m}^2$). No leachate is collected from the facility. Condensate from the landfill gas extraction system is currently transported off site to Drogheda wastewater treatment plant. An estimated 15 m^3 was sent for disposal

There are no direct discharges to groundwater. A water balance calculation has been undertaken and is included in Appendix B using rainfall data from meteorological station at Dublin Airport. This estimates the leachate production for 2013 will be in the range of $2,116\text{ m}^3$ to $8,288\text{ m}^3$.

13.0 ENVIRONMENTAL OBJECTIVES AND TARGETS

13.1 SCHEDULE OF ENVIRONMENTAL OBJECTIVES AND TARGETS FOR THE FORTHCOMING YEAR

Objectives and targets to be undertaken in 2013 for Drogheda Landfill Site are as follows:

- Continue to liaise with landowners re - historical waste deposited outside the facility boundary. This is an ongoing process.

- Investigate downsizing flare to improve run times

14.0 FULL TITLE AND A WRITTEN SUMMARY OF ANY PROCEDURES DEVELOPED BY THE LICENSEE IN THE YEAR WHICH RELATES TO THE FACILITY OPERATION

The Environmental Management System (EMS) for the facility was updated in 2007 to take into consideration works undertaken at the site. This has been forwarded to the OEE under a separate cover.

15.0 TANK, PIPELINE AND BUND TESTING AND INSPECTION REPORT

There are no tanks or bunds on site. The landfill gas extraction system including condensate tank is serviced annually.

16.0 REPORTED INCIDENTS AND COMPLAINTS SUMMARIES

No complaints or incidents were reported to the EPA during the monitoring period. A site inspection was carried out in 2013. A number of observations were noted in the site inspection as shown on Table 16.1

Table 16.1 Site Inspection Observations

Summary of Site Inspection	
18-04-2013 (W0033-01)sm19lm	<p>Restoration Corrective Action Required: The licensee shall without further delay commence the capping works on the land now in its ownership in accordance with the approved capping Specified Engineering Works (SEW) submission</p> <p>The licensee shall engage with the landowners involved to enable commencement of capping works on these remaining lands without further delay.</p> <p>Landfill Gas Management Corrective Action Required: The licensee shall document a flare management procedure. Corrective Action Required: During Gas balancing events the licensee shall ensure that: - the actual gas pressure readings obtained during monitoring are recorded and documented. - undertake periodic monitoring at individual gas wells in addition to monitoring undertaken at manifold boxes. - a reading of gas flow shall be taken at the flare during gas balancing events. - any corrective actions identified shall be documented and close out of these actions shall be recorded</p>

17.0 REPORTS ON FINANCIAL PROVISION MADE UNDER THIS LICENCE, MANAGEMENT AND STAFFING STRUCTURE OF THE FACILITY, AND A PROGRAMME FOR PUBLIC

17.1 MANAGEMENT AND STAFFING STRUCTURE

The management and staffing structure for the facility is as follows;

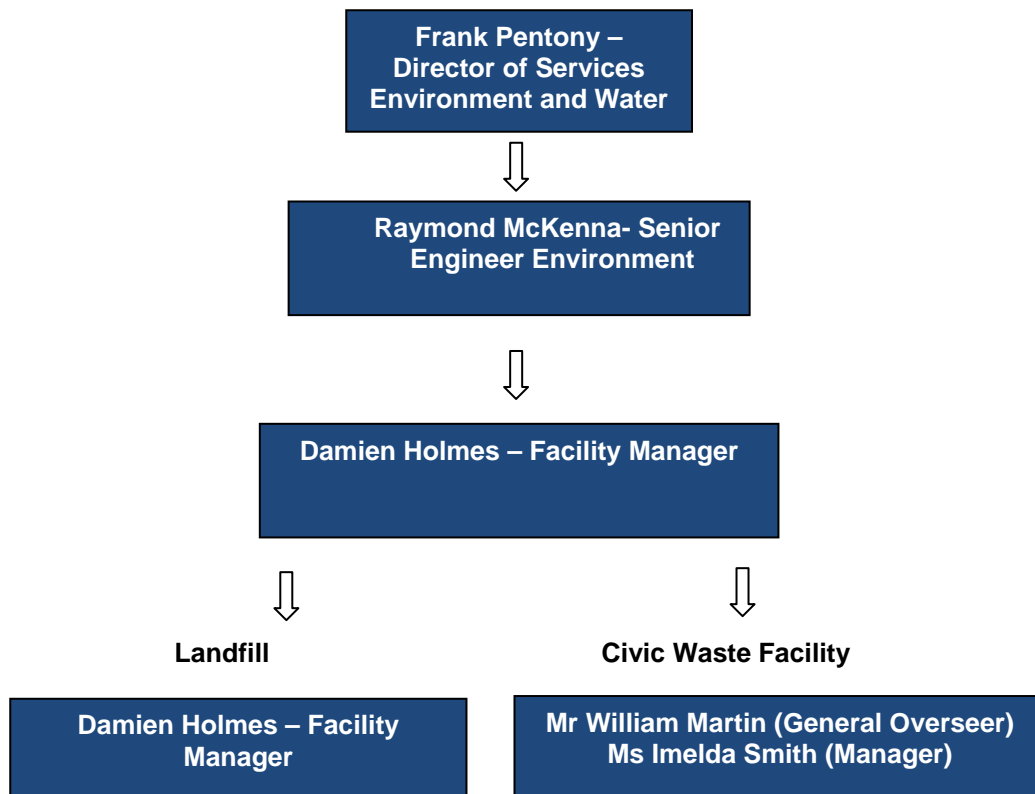


Figure 17.1 Management Structure at Drogheda Landfill Site

The public information programme is provided in the Environmental Management System for the site.

17.2 ANNUAL BUDGET AND SITE RUNNING COSTS

The civic amenity facility is operated by third party (V & W Recycling) on behalf of Drogheda Borough Council. A €2.00 entrance charge is applicable to all users of the site except for the disposal of electrical goods.

Funding is provided by Drogheda Borough Council for all monitoring requirements.

APPENDIX A

PRTR REPORTING

[Link to previous years emissions data](#)

4.1 RELEASES TO AIR

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

POLLUTANT	RELEASES TO AIR				Please enter all quantities in this section in KGs				
	No. Annex II	Name	METHOD Method Used	M/C/E	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	0.0	0.0
					0.0	0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

POLLUTANT	RELEASES TO AIR				Please enter all quantities in this section in KGs				
	No. Annex II	Name	METHOD Method Used	M/C/E	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	0.0	48105.8
01		Methane (CH4)	flow rate from GasSIM , methane from LFG survey.	C OTH	5304.7	53410.5	0.0	0.0	48105.8

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

POLLUTANT	RELEASES TO AIR				Please enter all quantities in this section in KGs				
	Pollutant No.	Name	METHOD Method Used	M/C/E	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	0.0	0.0
					0.0	0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T (total) KG/yr for Section A; Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Please enter summary data on the quantities of methane flared and / or utilised	Drogheda Landfill			Facility Total Capacity m3 per hour
	T (Total) kg/Year	Method Code	Designation or Description	
Total estimated methane generation (as per site model)	313343.0	OTH	flow rate from GasSIM , methane from LFG survey.	N/A
Methane flared	259932.0	OTH	methane from LFG survey 2	750.0 (Total Flaring Capacity)
Methane utilised in engine/s	0.0			0.0 (Total Utilising Capacity)
Net methane emission (as reported in Section A above)	53410.5	OTH	as per EPA guidance	N/A

4.3 RELEASES TO WASTEWATER OR SEWER

[Link to previous years emissions data](#)

IPRTR# W0033 | Facility Name Drogheda Landfill | Filename W0033_2013 IPRTR.xls | Return Yr 16/04/2014 12:35

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER									
No. Annex II	Name	M/C/E	METHOD		QUANTITY				
			Method Code	Method Used Designation or Description WBC using rainfall and area x annual average concentration	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	Civic Waste Facility Emission Point 1	
06	Ammonia (NH3)	C	OTH		150.81	150.81	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER									
Pollutant No.	Name	M/C/E	METHOD		QUANTITY				
			Method Code	Method Used Designation or Description WBC using rainfall and area x annual average concentration	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	Civic Waste Facility Emission Point 1	
303	BOD	C	OTH		45.89	45.89	0.0	0.0	0.0
306	COD	C	OTH		150.81	150.81	0.0	0.0	0.0
240	Suspended Solids	C	OTH		51.52	51.52	0.0	0.0	0.0
243	Sulphate	C	OTH		98.4	98.4	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE | PRTR# : W0033 | Facility Name : Drogheda Landfill | Filename : W0033_2013 PRTR.xls | Return Year : 2013 | **Please enter all quantities on this sheet in Tonnes**

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Hazardous Waste Licence/Permit No of Next Destination Facility Hazardous Waste Licence/Permit No of Recover/Disposer	Hazardous Waste Licence/Permit No of Next Destination Facility Non-Hazardous Waste Licence/Permit No of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination I.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						IMC/E	Method Used					
Within the Country	15 01 01	No	324.0	paper and cardboard packaging	R3	M	Weighed	Offsite in Ireland	V&W Recycling,W0034-02	Newry Road ,Dundalk,Co Louth,,Ireland .Killycard ind est		
Within the Country	15 01 02	No	1111.0	plastic packaging	R3	M	Weighed	Offsite in Ireland	Shrabra,Licence No 15/5	Bree,Castleblayey,Co Monaghan ,Ireland Newry Road ,Dundalk,Co Louth,,Ireland		
Within the Country	15 01 03	No	226.0	wooden packaging	R3	M	Weighed	Offsite in Ireland	V&W Recycling,W0034-02	52 Creagh Road,Toomebridge,Co Antrim,BT11 3SE,United Kingdom		
To Other Countries	15 01 07	No	156.0	glass packaging	R5	M	Weighed	Abroad	Glassdon ,NI licencel,N06/08		Rilla Environmental Ltd,Licence No W0192-02,Block 402,Grants Drive,Greenogue Business Park,Rathcoole Co Dublin,Ireland	Block 402,Grants Drive,Greenogue Business Park,Rathcoole Co Dublin,Ireland
Within the Country	16 06 01	Yes	13.0	lead batteries	R4	M	Weighed	Offsite in Ireland	Rilla Environmental Ltd,Licence No W0192-02	Block 402,Grants Drive,Greenogue Business Park,Rathcoole Co Dublin,Ireland		
Within the Country	16 06 04	No	0.0	alkaline batteries (except 16 06 03)	R4	M	Weighed	Offsite in Ireland	Rilla Environmental Ltd,Licence No W0192-02	Block 402,Grants Drive,Greenogue Business Park,Rathcoole Co Dublin,Ireland		
Within the Country	19 07 03	No	15.0	in 19 07 02 landfill leachate other than those mentioned	D9	C	Volume Calculation	Offsite in Ireland	Drogheda Waste Water Treatment Plant ,D0041-01	Marsh Road ,Drogheda ,Co Louth,,Ireland		
Within the Country	20 01 01	No	130.0	newspaper and magazines	R3	M	Weighed	Offsite in Ireland	V&W Recycling,W0034-02	Newry Road ,Dundalk,Co Louth,,Ireland 36 Magheraline Road,Randalsstown,County Antrim,BT141 2NT,United Kingdom		
To Other Countries	20 01 11	No	29.0	textiles	R3	M	Weighed	Abroad	Cookstown NI,W0034-02			
Within the Country	20 01 38	No	250.0	wood other than that mentioned in 20 01 37	R3	M	Weighed	Offsite in Ireland	V&W Recycling,W0034-02	Newry Road ,Dundalk,Co Louth,,Ireland		
To Other Countries	20 01 40	No	199.0	metals	R4	M	Weighed	Abroad	John Tinnelly & Sons,W0034-02	Newtowncloghogue,Newry, Co Down,BT38 8LZ,United Kingdom		
Within the Country	20 02 01	No	1114.0	biodegradable waste	R3	M	Weighed	Offsite in Ireland	V&W Recycling,W0034-02	Newry Road ,Dundalk,Co Louth,,Ireland Gunstown		
Within the Country	20 03 01	No	387.0	mixed municipal waste	D5	M	Weighed	Offsite in Ireland	Whiteriver Landfill Site ,W0060-03	Louth,,Ireland Newtowncloghogue,Newry, Co Down,BT38 8LZ,United Kingdom		
To Other Countries	15 01 04	No	26.0	metallic packaging	R4	M	Weighed	Abroad	John Tinnelly & Sons,W0034-02			

* Select a row by double-clicking the Description of Waste then click the delete button

APPENDIX B

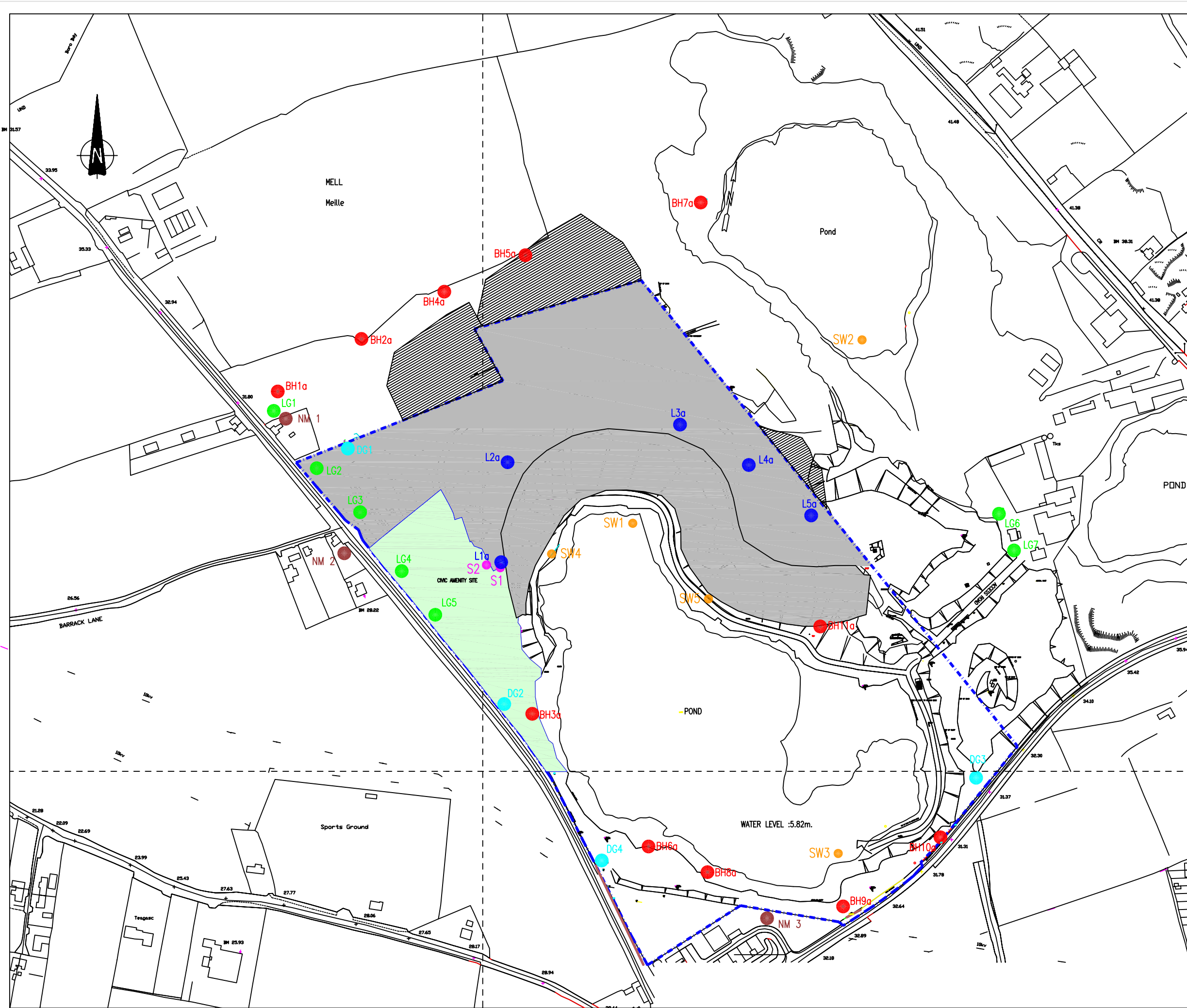
WATER BALANCE CALCULATION

WATER BALANCE CALCULATION - Drogheda															
Year 2013	Active Phase	Active Area A(m ²)	Waste Input t/year	Active Area Infiltration R(A)(m ³)	Liquid Waste LW(m ³)	Temporary Restored Area	Temporary Restored area infiltration IRCA(m ³)	Permanently Restored Area	Restored area infiltration IRCA(m ³)	Total Water	Cumulative Water	Absorptive Capacity aW(m ³)	Cumulative Absorptive Capacity	Cumulative leachate	Leachate produced Lo(m ³)
2013	Closed	0	0	763.90	0	3,000	573	101000	7715	8288	8288	0	0	8288	8288
Total				764											8288

<u>Assumptions</u>			
1. IRCA =	Temporary	25%	% of annual rainfall
	Permanently (2-10%)	10%	% of annual rainfall
2. Absorptive Capacity =	Waste density of 0.8 tonnes/m ³ . Estimated absorptive capacity	0.06	t/m ³
3. Rainfall data (R) taken from Dublin Airport (=		763.9	mm
4. Capping Area		101,000	m ²
Future permanent cap area		3,000	m ²

APPENDIX C

DRAWING



NOTES

1. Verifying Dimensions.
The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.
Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipient's own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipient's drawing production, or setting out on site.

4. Datum:

5. Key

- Site Boundary
- Capped Area within Licensed Boundary
- Approx Extent of Waste Outside Licensed Boundary
- L1 Leachate Borehole
- LG Landfill Gas Monitoring Point
- DG Dust Monitoring Gauge
- BH Groundwater Borehole
- NM Noise Monitor
- SW Surface Water Monitoring Point
- S1 Sewer

rev	amendments	drawn	date

RPS	Elmwood House	T	+44 (0) 28 90 667914
	74 Boucher Road	F	+44 (0) 28 90 668286
	Belfast	W	www.rpsgroup.com/ireland
	BT12 6RZ	E	ireland@rpsgroup.com

Client
Drogheda Borough Council

Project
Drogheda Landfill Site

Title
Monitoring Locations


Drawing Status	Sheet Size	Drawing Scale
Preliminary	A3	1:4,000

Drawing Number	Rev
IBR0378 /100	-

Project Leader	Drawn By	Date	Initial Review
DD	JD	June 2012	AMcG

APPENDIX D

GROUNDWATER RESULTS

		S.I. No. 9/2010 — European Communities Environmental Objectives (Groundwater)	EPA Interim guideline values (IGV)	EC (Drinking water) Regulations 2007 (SI .no 278 of 2007)	EC (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations 1989 S.I. No.294/1989	WFD	European Communities Environmental Objectives (Surface Water) Regulations 2009 Environmental quality standard (EQS)	
PARAMETERS	UNITS						Annual Mean	95%ile
Alkalinity	mg/l CaCO3		NAC					
Aluminium	µg/l	150	0.2 mg/l	200				
Ammonia	mg/l N	65-175 µg/l N-	0.15 mg/l (0.11 mg/l N)	0.3 mg/l (0.23 mg/l N)	A1- 0.2 or 0.155 mg/l N) (A2- 1.5) (A3- 4)		0.065 good 0.040 high	0.140 good 0.090 high
Antimony	µg/l			5		0.4		
Arsenic	µg/l	7.5		10			25	25
Barium	mg/l		0.1		(A1- 0.1) (A2- 1)	75		
Beryllium	µg/l							
B.O.D.	mg/l				(A1- 5) (A2- 5), (A3- 7)		1.50 good 1.30 high	2.60 good 2.20 high
Boron	µg/l	750	1000	1000	2000	6.5		
Cadmium	µg/l	3.75	5	5	5			
Calcium	mg/l Ca		200					
C.O.D.	mg/l				40			
Chloride	mg/l Cl	24-187.5	30	250	250			
Chromium	µg/l	37.5	30	50	50	0.3		
Calcium	µg/l					0.2		
Coliform Bacteria	No/100 ml			0				
Conductivity	µS/cm @20	800-1875	1000	2500	1000			
Copper	µg/l	1500	0.03 mg/l	2000	(A1- 0.05) (A2- 0.1) (A3- 1) mg/l	0.5	5 or 30	5 or 30
Cyanide	µg/l	37.5	0.01 mg/l	50	50		10	10
D.O	% Sat		NAC		>60% (A1), >50% (A2), >30% (A3)		lower limit 95%ile >80% saturation, upper limit 95%ile <120%	
E Coli	No/100 ml		0	0	(A1- 1000) (A2- 5000) (A3- 40000)			
Fluoride	mg/l		1	0.8	(A1- 1) (A2- 1.7)	1000	500	500
Iron	µg/l		200	200	(A1- 200) (A2- 2000)			
Lead	µg/l	18.75	10	25	50		7.2 AA EQS	
Magnesium	mg/l Mg		50					
Manganese	µg/l		50	50	(A1- 50) (A2- 300) (A3- 1000)			
Mercury	µg/l	0.75	1	1	1		0.05	0.05
Molybdenum	µg/l	35				4.3		
Nickel	µg/l	15	20	20			20 AA EQS	
o-Phosphate	mg/l P		0.03				0.035 good 0.025 high	0.075 good 0.045 high
pH			6.5 - 9.5	6.5 - 9.5	(A1- 5.5-8.5) (A2- 5.5-9.0)		Soft Water 4.5< pH < 9.0 Water hardness 100 mg/l CaCO3 Hard Water 6.0< pH < 9.0 Water hardness > 100 mg/l CaCO3	
Phenol	mg/l		0.0005		(A1- 0.5) (A2- 5) (A3- 100)		8 AA EQS 46 MAC EQS	
Potassium	mg/l		5					
Selenium	µg/l			10		5.3		
Silver								
Sodium	mg/l	150	150	200	200			
Strontium								
Sulphate	mg/l SO4	187.5		250				
Total Dissolved Solids	mg/l		1000					
Temperature	degrees C		25		25			
Thallium								
Tin						0.2		
T.O.C.	mg/l		NAC	No abnormal change				
T.O.N	mg/l N		NAC					
Nitrate	mg/l	37.5	25	50	Nitrates 50			
Nitrite	mg/l	375	0.1	0.5				
Nitrites	mg/l							
Total S Solids	mg/l				50			
Uranium	µg/l					0.9		
Vanadium	µg/l							
Zinc	µg/l		100		(A1- 3000) (A2- 5000)	2.3	8 or 50 or 100 AA EQS	

AA-EQS means that for each representative monitoring point within the waterbody, the arithmetic mean of the concentrations measured over a twelve month monitoring period does not exceed the standard.
EQS-MAC means that the measured concentration at any representative monitoring point within the water body must not exceed the standard.

Drogheda Landfill Site Groundwater Quality

Monitoring Point:		BH1A																				
Date Collected	DWR	IGV	2010 GW Regs	24-Jul-12	14-Aug-12	11-Sep-12	09-Oct-12	06-Nov-12	11-Dec-12	31-Jan-13	12-Feb-13	26-Mar-13	16-Apr-13	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	
Alkalinity	mg/l CaCO3												344									
Aluminium	ug/l	200	200	150	<5	<5	<5	<5	<5	<5	55		<5	<5	113.7	<5	<5	<5	<5	<10	<10	
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03	0.03	0.035	0.02	
Antimony	ug/l	5			<0.5	<0.5	<0.5	<0.5	0.55	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	
Arsenic	ug/l		10	7.5	1.85	1.61	1.52	2.16	2.76	0.89	0.6	1.24		2.29	1.27	1.12	1.58	2.42	1.95	1.5	2.14	3.24
Barium	ug/l		100		32.6	68.6	61.4	49	36.2	63.4	84.2	75		26.5	17.8	66.1	33.3	18.4	19.9	19.1	46.8	29.7
Beryllium	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1
B.O.D.	mg/l O2																					
Boron	ug/l	1000	1000	750	22.1	17.8	16.2	21.8	21.5	15.5	11.7	14.3		20	21.3	17	26.8	22.8	21.6	22.4	21.6	27.6
Cadmium	ug/l	5	5	3.75	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.1	0.1
Calcium	mg/l Ca		200		132.43	92.43	96.8	112.86	117.5	78.15	81.1	85.97		131.99	136.73	114.28	135.45	139.73	138.33	147.88	102.77	104.95
C.O.D.	mg/l O2																					
Chloride	mg/l Cl	250	30	187.5	26	17	20	21	22	15	13	16		27	29	19	25	30	39	39	26	28
Chromium	ug/l	50	30	37.5	<0.5	<0.5	0.5	1.2	1.5	<0.5	<0.5	0.9		1.6	1.4	0.7	1.5	0.9	1	1.7	1.3	3.9
Cobalt	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<1	<1	<1
Coliform Bacteria	(No/100 ml)	0												21								
Conductivity	uS/cm @ 25	2500	1000	1875	787	619	617	676	738	561	508	546	422	761	819	636	752	820	849	860	650	704
Copper	ug/l	2000	30	1500	2.8	2.5	1.2	1	0.9	0.9	1.1	1.8		2.2	4.9	6.5	3.9	4.5	3.5	5.1	2	2
Cyanide	mg/l	0.05	10											<0.05								
D.O.	% Saturation				39			56			51			32			28			30		
E Coli	No/100 ml	0												0								
Fluoride	mg/l	0.8	1000											<0.150								
Iron	ug/l	200	200		<10	<10	<10	<10	<10	<10	<10	101.3		11.4	<10	256.8	21.9	<10	20	<10	<10	<10
Lead	ug/l	25	10	18.75	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.4		<0.5	<0.5	5.2	<0.5	<0.5	<0.5	<0.5	<1	<1
Magnesium	mg/l Mg		50		10.28	8.74	9.29	10.47	9.7	9.28	8.92	9.17		10.32	9.08	10.47	10.27	9.82	9.14	9.27	9.99	9.41
Manganese	ug/l	50	50		3.8	8.8	3.4	5.6	1.7	1.5	4.6	32.2		3.2	1.2	208.4	3	1.5	1.9	1.5	<5	<5
Mercury	ug/l	1	1	0.75	nm	nm	nm	nm	nm	nm	nm	nm		<0.05	nm	nm	nm	nm	nm	nm	nm	nm
Molybdenum	ug/l		35		<0.5	0.8	0.5	0.8	0.9	<0.5	<0.5	<0.5		0.5	<0.5	<0.5	1.4	<0.5	<0.5	<0.5	<1	<1
Nickel	ug/l	20	20	15	3.4	1	1	<0.5	<0.5	<0.5	<0.5	1.8		5.1	7.4	5.8	2.8	4.6	4.3	6.3	1.4	1.9
Nitrite	mg/l N	0.5	0.1	0.375	0.002	0.004	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004
o-Phosphate	mg/l P		30											0.07								
pH		6.5 - 9.5			7	7.3	7.1	7.4	6.8	7	6.1	7.4	7.4	7.1	7.2	7.3	7.2	7.4	7.1	7.1	7.3	7.1
Phenol	mg/l		0.0005		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Potassium	mg/l		5		5.29	2.27	2.21	3.59	3.91	1.62	1.14	1.81		5.68	6.41	3.4	5.31		7	7.72	3.84	4.47
Sampling Depth	m				19.9	20.3	20.3	20.6	20.1	19.9	17.6	15.1	15.7	19.9	21.4	20.9	22.8	23.2	24.1	22.6	22.9	22
Selenium	ug/l	10			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5		<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<1	<1
Silver	ug/l				nm	nm	nm	nm	nm	nm	nm	nm		nm								
Sodium	mg/l	200	150	150	15.31	11.25	12.24	15.27	14.69	10.2	8.98	10.52		16.14	16.21	12.88	15.21	16.53	17.7	18.69	15.72	15.19
Strontium	ug/l				211.39	193.82	195.48	188.73	202.12	166.96	189.6	196.78		209.45	200.11	220.4	210.61	218.41	199.58	212.03	189.86	189.2
Sulphate	mg/l SO4	250	200	187.5										22.4								
Suspended Solids	mg/l																					
Temp	°C				16.1	16.4	11.7	16.3	9.8	10.1	9.1	8.3	7.2	10.7	11.5	11.3	21.3	14.2	10.7	13.4	8.2	8.1
Thallium	ug/l				0.32	0.16	0.14	0.17	0.22	<0.1	<0.1	<0.1		0.3	0.34	0.2	0.27	0.33	0.4	0.45	<1	<1
Time sampled					12:40	13:30	12:00	10:50	13:15	13:10	11:00	13:25	13:50	10:20	13:20	12:55	10:50	13:10	13:30	10:50	10:35	13:35
Tin (ug/l)	ug/l				<1	<1	<1	<1	<1	<1	nm	nm		nm								
T.O.C.	mg/l	NAC			nm		2.3			62.8				<1.5			<1.5			2.1		
T.O.N	mg/l N		NAC		2.55	0.98	1.21	1.84	2.35	0.73	0.33	0.99	0.45	2.82	2.9	1.47	2.27	3.11	2.73	2.83	1.5	2.2
Total S Solids	mg/l																					
Uranium	ug/l				16.01	10.99	11.64	17.38	22.53	6.74	3.79	9.14		20.52	14.34	9.42	15.06	21.38	14.94	12.51	17.88	26.88
Vanadium	ug/l				2.92	2.13	2.3	3.26	3.91	0.97	1.06	1.91		2.8	1.67	1.75	2.5	3.48	2.78	1.83	3.5	5.55
Zinc	ug/l		100		19	25	19.2	14.9	15.6	21.4	20.5	25		20.4	20.5	23.9	23.6	13.3	11.4	13.6	15.2	15.1
Water Level m OD		31.953			12.053	11.653	11.653	11.353	11.853	12.053	14.353	16.853	16.253	12.053	10.553	11.053	9.153	8.753	7.853	9.353	9.053	9.953

Drogheda Landfill Site Groundwater Quality

Monitoring Point:		BH2A																					
Date Collected		DWR	IGV	2010 GW Regs	24-Jul-12	14-Aug-12	11-Sep-12	09-Oct-12	06-Nov-12	11-Dec-12	31-Jan-13	12-Feb-13	26-Mar-13	16-Apr-13	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	
Alkalinity	mg/l CaCO3													348									
Aluminium	ug/l	200	200	150	5.9			<5			<5			5.5			5.1			<5			
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	0.04	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.020	<0.020	
Antimony	ug/l	5			<0.5			<0.5			<0.5			<0.5			<0.5			<0.5			
Arsenic	ug/l		10	7.5	0.51			0.64			0.51			0.6			<0.5			<0.5			
Barium	ug/l		100		56.5			59.6			69.8			63			64.2			62.9			
Beryllium	ug/l				<0.5			<0.5			<0.5			<0.5			<0.5			<0.5			
B.O.D.	mg/l O2																						
Boron	ug/l	1000	1000	750	21.6			25.8			19.3			28.5			30.3			33.1			
Cadmium	ug/l	5	5	3.75	<0.1			<0.1			<0.1			<0.1			<0.1			<0.1			
Calcium	mg/l Ca		200		116.31			127.44			118.55			124.92			128.86			128.36			
C.O.D.	mg/l O2																						
Chloride	mg/l Cl	250	30	187.5	11			12			12			14			16			16			
Chromium	ug/l	50	30	37.5	<0.5			1.5			<0.5			1.5			1.4			1.4			
Cobalt	ug/l				<0.5			<0.5			<0.5			<0.5			<0.5			<0.5			
Coliform Bacteria	(No/100 ml)	0												10									
Conductivity	uS/cm @ 25	2500	1000	1875	675	668	689	723	720	671	675	694	691	707	724	722	719	726	730	728	738	735	
Copper	ug/l	2000	30	1500	3			2.9			2.8			5.3			1.6			1.8			
Cyanide	mg/l	0.05	10											<0.05									
D.O.	% Saturation				65			50			39			47			36			98			
E. Coli	No/100 ml	0												0									
Fluoride	mg/l	0.8	1000											<0.150									
Iron	ug/l	200	200		14.7			<10			<10			20			<10			<10			
Lead	ug/l	25	10	18.75	<0.5			<0.5			<0.5			<0.5			<0.5			<0.5			
Magnesium	mg/l Mg		50		10.96			12.09			10.03			11.3			11.42			11.27			
Manganese	ug/l	50	50		5.5			5.6			2.3			2.6			3.2			<1			
Mercury	ug/l	1	1	0.75	nm			nm			nm			<0.05			nm			nm			
Molybdenum	ug/l		35		<0.5			<0.5			<0.5			<0.5			<0.5			<0.5			
Nickel	ug/l	20	20	15	1			<0.5			<0.5			2.9			<0.5			1			
Nitrite	mg/l N	0.5	0.1	0.375	<0.002			<0.002			<0.002			<0.002			<0.002			<0.002			
o-Phosphate	mg/l P		30											0.04									
pH		6.5 - 9.5			7.2	7.1	7	7.1	6.9	7.1	7	7.2	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.1	7.2	7.2	
Phenol	mg/l		0.0005		<0.002			<0.002			<0.002			<0.002			<0.002			<0.002			
Potassium	mg/l		5		2.4			3.19			2.51			3.06			3.23			3.44			
Sampling Depth	m				19.8	20.2	20.2	20.1	20	20	17.8	15.9	15.6	19.4	21	21.7	22.7	24.5	25	14.2	14.9	22.4	
Selenium	ug/l	10			<0.5			<0.5			<0.5			0.7			0.7			<0.5			
Silver	ug/l				nm			nm			nm			nm									
Sodium	mg/l	200	150	150	9.27			11.6			8.92			10.64			11.19			11.83			
Strontium	ug/l				199.86			199.22			199.05			213.84			219.43			228.56			
Sulphate	mg/l SO4	250	200	187.5										15.8									
Suspended Solids	mg/l																						
Temp	°C				16	17	11.8	16	10.7	10	9.4	7.4	6	11	11.5	11.3	21.4	14.5	10.5	15.2	9.2	nm	
Thallium	ug/l				<0.1			<0.1			<0.1			0.11			<0.1			0.11			
Time sampled					12:15	13:50	12:15	11:10	13:00	12:55	11:25	13:10	13:25	10:55	13:00	12:40	11:15	12:50	13:05	11:20	10:50	13:15	
Tin (ug/l)	ug/l				<1			<1			nm			nm									
T.O.C.	mg/l	NAC			5.9			5.3			85.9			3.4			3.9			4.1			
T.O.N	mg/l N		NAC		0.48			1.01			0.73			1.74			2			2.13			
Total S Solids	mg/l																						
Uranium	ug/l				0.94			0.98			0.94			1.06			0.99			1.07			
Vanadium	ug/l				0.61			0.78			0.75			<0.5			0.55			0.75			
Zinc	ug/l		100		10.6			5.8			9.6			7.4			6.4			7.6			
Water Level m OD		32.362			12.562	12.162	12.162	12.262	12.362	12.362	14.562	16.462	16.762	12.962	11.362	10.662	9.662	7.862	7.362	18.162	17.462	9.962	

Drogheda Landfill Site Groundwater Quality

Monitoring Point:		BH3A																					
Date Collected		DWR	IGV	2010 GW Regs	24-Jul-12	14-Aug-12	11-Sep-12	09-Oct-12	06-Nov-12	11-Dec-12	31-Jan-13	12-Feb-13	26-Mar-13	16-Apr-13	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	
Alkalinity	mg/l CaCO3													272									
Aluminium	ug/l	200	200	150	<5					<5	<5			<5			<5			5.2			
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	1.17	<0.03	0.13	<0.03	0.04	<0.03	<0.03	0.03	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	0.23	0.04	0.9	0.34	
Antimony	ug/l	5			<0.5					<0.5	<0.5			<0.5			<0.5			<0.5			
Arsenic	ug/l		10	7.5	<0.5					<0.5	<0.5			<0.5			<0.5			<0.5			
Barium	ug/l		100		44.7					45.1	56.6			54.5			54.3			56.5			
Beryllium	ug/l				<0.5					<0.5	<0.5			<0.5			<0.5			<0.5			
B.O.D.	mg/l O2																						
Boron	ug/l	1000	1000	750	58					69.7	52.7			56.4			61.6			59.4			
Cadmium	ug/l	5	5	3.75	<0.1					<0.1	<0.1			<0.1			<0.1			<0.1			
Calcium	mg/l Ca		200		122.63					130.33	128.73			135.93			139.73			134.28			
C.O.D.	mg/l O2																						
Chloride	mg/l Cl	250	30	187.5	42					42	54			62			56			51			
Chromium	ug/l	50	30	37.5	0.5					1.6	0.6			1.7			2			2			
Cobalt	ug/l				<0.5					<0.5	<0.5			<0.5			<0.5			<0.5			
Coliform Bacteria	(No/100 ml)	0												14									
Conductivity	uS/cm @ 25	2500	1000	1875	694	822	851	862	829	847	849	822	840	883	895	889	879	862	864	874	903	901	
Copper	ug/l	2000	30	1500	0.8					1.4	1.1			0.8			<0.5			1.2			
Cyanide	mg/l	0.05	10											<0.05									
D.O.	% Saturation				53					55	56			61			50			62			
E. Coli	No/100 ml	0												0									
Fluoride	mg/l	0.8	1000											<0.150									
Iron	ug/l	200	200		<10					<10	17.4			<10			<10			11.9			
Lead	ug/l	25	10	18.75	<0.5					<0.5	<0.5			<0.5			<0.5			<0.5			
Magnesium	mg/l Mg		50		8.27					9.45	8.18			8.89			9.09			9.03			
Manganese	ug/l	50	50		2.2					2.2	7.5			6.5			3.1			4.6			
Mercury	ug/l	1	1	0.75	nm					nm	nm			<0.05			nm			nm			
Molybdenum	ug/l		35		<0.5					<0.5	<0.5			<0.5			<0.5			<0.5			
Nickel	ug/l	20	20	15	<0.5					<0.5	<0.5			0.8			<0.5			1			
Nitrite	mg/l N	0.5	0.1	0.375	0.056					0.01	0.004			0.004			0.002			0.012			
o-Phosphate	mg/l P		30											0.02									
pH		6.5 - 9.5			7.2	7.2	7.1	7	7.1	7.2	7.2	7.2	7.1	7.2	7.2	7.2	7.1	7.2	7.1	7.1	7.1	7.1	7.1
Phenol	mg/l		0.0005		<0.002					<0.002	<0.002			<0.002			<0.002			<0.002			
Potassium	mg/l		5		24.31					24.83	21.35			22.02			24.58			25.5			
Sampling Depth	m				27.3	26	27	26.1	25	26	23	23.8	26.1	24.9	25	26.4	26.8	26.3	27	13	13.2	27.8	
Selenium	ug/l	10			1					<0.5	0.9			0.6			0.7			0.7			
Silver	ug/l				nm					nm	nm			nm			nm			nm			
Sodium	mg/l	200	150	150	18.48					23.3	17.77			20.7			20.88			20.53			
Strontium	ug/l				168.17					161.63	177.3			189.75			195			204.77			
Sulphate	mg/l SO4	250	200	187.5										75.4									
Suspended Solids	mg/l																						
Temp	°C				16.1	14.6	12.2	10.6	10.2	14.2	9.4	9.5	9.2	11.1	11.1	11	13.8	13	10.7	11.8	10.4	8.6	
Thallium	ug/l				<0.1					<0.1	<0.1			<0.1			<0.1			<0.1			
Time sampled					14:40	09:45	09:50	14:00	14:00	13:15	13:05	10:15	10:25	13:45	10:35	10:10	10:30	10:00	14:30	10:40	11:35	nt	
Tin (ug/l)	ug/l				<1					<1	nm			nm			nm			nm			
T.O.C.	mg/l	NAC			2.2					3	69.6			2.1			2.6			3.3			
T.O.N	mg/l N		NAC		4.89					4.5	3.76			4.03			4.52			4.16			
Total S Solids	mg/l																						
Uranium	ug/l				0.62					0.65	0.66			0.69			0.71			0.73			
Vanadium	ug/l				<0.5					0.58	0.56			<0.5			<0.5			0.59			
Zinc	ug/l		100		15					4.8	17.1			19.5			5.9			25			
Water Level m OD		33.664			6.364	7.664	6.664	7.564	8.664	7.664	10.664	9.864	7.564	8.764	8.664	7.264	6.864		6.664	20.664	20.464	5.864	

Drogheda Landfill Site Groundwater Quality

Monitoring Point:		BH4A																					
Date Collected		DWR	IGV	2010 GW Regs	24-Jul-12	14-Aug-12	11-Sep-12	09-Oct-12	06-Nov-12	11-Dec-12	31-Jan-13	12-Feb-13	26-Mar-13	16-Apr-13	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	
Alkalinity	mg/l CaCO3														376								
Aluminium	ug/l	200	200	150				<5	<5	<5	11.3	843.6		<5	<5								
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175				<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03								
Antimony	ug/l	5						<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5								
Arsenic	ug/l		10	7.5				0.53	<0.5	0.54	<0.5	1.5		<0.5	<0.5								
Barium	ug/l		100					11.4	11.5	12.3	12.8	26.6		10	9.5								
Beryllium	ug/l							<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5								
B.O.D.	mg/l O2																						
Boron	ug/l	1000	1000	750				41.3	35	35	31.7	31.7		27.3	29.5								
Cadmium	ug/l	5	5	3.75				<0.1	<0.1	<0.1	<0.1	0.2		<0.1	<0.1								
Calcium	mg/l Ca		200					151.13	146.23	143.55	156.38	157.46		149.85	150.84								
C.O.D.	mg/l O2																						
Chloride	mg/l Cl	250	30	187.5				41	40	40	43	42	42	42	42								
Chromium	ug/l	50	30	37.5				1	0.8	<0.5	<0.5	2.3		1.2	1.1								
Cobalt	ug/l							<0.5	<0.5	<0.5	<0.5	1.3		<0.5	<0.5								
Coliform Bacteria	(No/100 ml)	0												40									
Conductivity	uS/cm @ 25	2500	1000	1875				955	949	933	919	904	901	911	921								
Copper	ug/l	2000	30	1500				<0.5	0.5	0.8	1	3.1		2.3	0.8								
Cyanide	mg/l	0.05	10											<0.05									
D.O.	% Saturation							67			22			83									
E Coli	No/100 ml	0												0									
Fluoride	mg/l	0.8	1000											<0.150									
Iron	ug/l	200	200					<10	<10	<10	74.1	1451.2		24.6	<10								
Lead	ug/l	25	10	18.75				<0.5	<0.5	<0.5	<0.5	1		<0.5	<0.5								
Magnesium	mg/l Mg		50					15.05	14.23	13.79	13.05	13.24		13.24	12.89								
Manganese	ug/l	50	50					1.9	1.1	1.1	<1	202.4		<1	2.4								
Mercury	ug/l	1	1	0.75				nm	nm	nm	nm	nm		<0.05	nm								
Molybdenum	ug/l		35					<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5								
Nickel	ug/l	20	20	15				<0.5	<0.5	1.9	<0.5	3.7		13.3	1.1								
Nitrite	mg/l N	0.5	0.1	0.375				<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002								
o-Phosphate	mg/l P		30											0.02									
pH		6.5 - 9.5						7.1	6.9	6.9	6.4	7	7.1	7.2	7.3								
Phenol	mg/l		0.0005					<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002								
Potassium	mg/l		5					1.61	1.28	1.28	1.31	1.31		1.39	1.39								
Sampling Depth	m							23.9	23	23.7	16.9	17	18	20.2	22								
Selenium	ug/l	10						0.6	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5								
Silver	ug/l							nm	nm	nm	nm	nm		nm									
Sodium	mg/l	200	150	150				23.86	20.28	19.33	18.46	19.02		18.58	17.94								
Strontium	ug/l							256.23	259.39	232.57	258.6	270.93		255.14	248.87								
Sulphate	mg/l SO4	250	200	187.5										52.1									
Suspended Solids	mg/l																						
Temp	°C							15.1	10.4	10	9.3	8.2	7.1	10.8	11.7								
Thallium	ug/l							<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1								
Time sampled								11:35	12:40	12:40	11:55	12:50	13:10	11:30	12:45								
Tin (ug/l)	ug/l							<1	<1	<1	nm	nm		nm									
T.O.C.	mg/l	NAC						1.9			94.5			<1.5									
T.O.N	mg/l N		NAC					3.72	2.78	3.48	3.15	3.27	3.14	3.27	3.11								
Total S Solids	mg/l																						
Uranium	ug/l							4.35	4.09	3.94	4.2	4.63		4.98	4.58								
Vanadium	ug/l							0.55	<0.5	<0.5	0.61	2.19		<0.5	<0.5								
Zinc	ug/l		100					58.5	7.5	5.9	4.1	10.4		3.7	4.7								
Water Level m OD		33.57						9.67	10.57	9.87	16.67	16.57	15.57	13.37	11.57						33.57		

Drogheda Landfill Site Groundwater Quality

Monitoring Point:		BH5A																					
Date Collected		DWR	IGV	2010 GW Regs	24-Jul-12	14-Aug-12	11-Sep-12	09-Oct-12	06-Nov-12	11-Dec-12	31-Jan-13	12-Feb-13	26-Mar-13	16-Apr-13	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	
Alkalinity	mg/l CaCO3													266									
Aluminium	ug/l	200	200	150	<5			<5			<5			<5			<5		<5	<5			
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	0.05	1.04	3.34	3.63	4.12	4.35	6.78	6.13	3.44	2.37	1.27	0.49	0.15	0.08	<0.03	0.04	2.5	0.96	
Antimony	ug/l	5			<0.5			<0.5			<0.5			<0.5			<0.5		<0.5	<0.5			
Arsenic	ug/l		10	7.5	<0.5			0.54			<0.5			<0.5			<0.5		<0.5	<0.5			
Barium	ug/l		100		17.3			32.1			101.2			20.9			10.9		27.9	9.7			
Beryllium	ug/l				<0.5			<0.5			<0.5			<0.5			<0.5		<0.5	<0.5			
B.O.D.	mg/l O2																						
Boron	ug/l	1000	1000	750	100.4			162.1			169.7			105.4			68.7		117.3	61.5			
Cadmium	ug/l	5	5	3.75	0.1			0.2			0.5			0.1			<0.1		<0.1	<0.1			
Calcium	mg/l Ca		200		92.61			110.39			117.23			99.8			89.33		73.45	86.2			
C.O.D.	mg/l O2																						
Chloride	mg/l Cl	250	30	187.5	42			49			52		49	42			37		60	39			
Chromium	ug/l	50	30	37.5	3.1			4.1			<0.5			5.2			7.7		<0.5	8.3			
Cobalt	ug/l				<0.5			<0.5			0.6			<0.5			<0.5		<0.5	<0.5			
Coliform Bacteria	(No/100 ml)	0												78									
Conductivity	uS/cm @ 25	2500	1000	1875	825	696	840	842	881	851	919	908	856	740	688	645	613	611	590	601	742	702	
Copper	ug/l	2000	30	1500	1.3			1.7			5.1			2.1			0.6		0.9	<0.5			
Cyanide	mg/l	0.05	10											<0.05									
D.O.	% Saturation				23			25			22		25	19			19			31			
E Coli	No/100 ml	0												61									
Fluoride	mg/l	0.8	1000											<0.150									
Iron	ug/l	200	200		<10			10.6			<10			10.9			<10		16.8	<10			
Lead	ug/l	25	10	18.75	<0.5			<0.5			<0.5			<0.5			<0.5		<0.5	<0.5			
Magnesium	mg/l Mg		50		12.84			15.82			15.37			13.44			11.33		4.74	10.48			
Manganese	ug/l	50	50		58.1			83.1			490.3			81.1			15.3		<1	1.7			
Mercury	ug/l	1	1	0.75	nm			nm			nm			<0.05			nm		nm	nm			
Molybdenum	ug/l		35		<0.5			<0.5			<0.5			<0.5			<0.5		<0.5	<0.5			
Nickel	ug/l	20	20	15	4.5			10.4			30.3			13.5			3.3		2	2.4			
Nitrite	mg/l N	0.5	0.1	0.375	0.019			0.013			0.053			0.006			0.016		<0.002	<0.002			
o-Phosphate	mg/l P		30										0.03	0.04									
pH		6.5 - 9.5			7.2	7.2	7	7.2	7	7.1	7.2	7.1	7.1	7.1	7.2	7.2	7.1	7.3	7.4	7.1	7.1	7.1	7.2
Phenol	mg/l		0.0005		<0.002			<0.002			<0.002			<0.002			<0.002		<0.002	<0.002			
Potassium	mg/l		5		5.16			8.89			10.4			6.11			3.87		2.5	3.45			
Sampling Depth	m				25.1	25.2	25.2	25.1	25	24.2	22.7	23		24	23.9	25.9	25.3	27.6	28.1	27.1	18	26	
Selenium	ug/l	10			0.7			<0.5			0.6			0.5			<0.5		<0.5	<0.5			
Silver	ug/l				nm			nm			nm			nm									
Sodium	mg/l	200	150	150	22.1			34.57			31.31			25.51			19.42		31.43	17.64			
Strontium	ug/l				129.35			163.24			227.34			143.67			108.87		94.35	109.61			
Sulphate	mg/l SO4	250	200	187.5									31.9	24.5									
Suspended Solids	mg/l																						
Temp	°C				15.8	17	12.7	16	10.4	10.4	9.2	10.2	9.8	10.8	12.6	12.2	20.2	14.8	10.5	14	9.9	nm	
Thallium	ug/l				0.46			0.82			2.66			0.57			0.22		<0.1	0.13			
Time sampled					11:45	12:20	12:50	12:00	12:20	12:25	12:25	12:35	12:05	11:55	12:30	12:15	11:45	12:30	11:45	11:50	11:20	13	
Tin (ug/l)	ug/l				<1			<1			nm			nm									
T.O.C.	mg/l	NAC			2.5			1.6			79.7			<1.5			1.9			3.8			
T.O.N	mg/l N		NAC		2.89			9.06			7.12		7.85	7.36			5.96		0.23	4.89			
Total S Solids	mg/l																						
Uranium	ug/l				1.02			1.18			0.93			1.34			1.03		0.24	1.04			
Vanadium	ug/l				0.64			0.86			0.75			<0.5			0.58		<0.5	0.77			
Zinc	ug/l		100		12.3			14.9			30.9			9.2			6.2		5.1	5.3			
Water Level m OD		36.13			11.03	10.93	10.93	11.03	11.13	11.93	13.43	13.13		12.13	12.23	10.23	10.83		8.03	9.03	18.13	10.13	

Drogheda Landfill Site Groundwater Quality

Monitoring Point:		BH6A																					
Date Collected		DWR	IGV	2010 GW Regs	24-Jul-12	14-Aug-12	11-Sep-12	09-Oct-12	06-Nov-12	11-Dec-12	31-Jan-13	12-Feb-13	26-Mar-13	16-Apr-13	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	
Alkalinity	mg/l CaCO3													182									
Aluminium	ug/l	200	200	150	<5	<5	<5	<5	7.8	<5	<5	19		8.8	<5	25.1	<5	<5		5.5	<10	<10	
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.08	0.03	<0.020	0.022	
Antimony	ug/l	5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<1	<1	
Arsenic	ug/l		10	7.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<1	<1	
Barium	ug/l		100		37.1	40.4	37	36.3	34.8	32.2	40.3	41.5		40.9	35.2	33.7	36	36		36	38.5	39.5	
Beryllium	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<1	<1	
B.O.D.	mg/l O2																						
Boron	ug/l	1000	1000	750	46.9	54	53.8	63.4	53.7	52.1	45.5	45.6		24.9	27.1	34.9	42.3	42.3		44	49.4	55.9	
Cadmium	ug/l	5	5	3.75	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	
Calcium	mg/l Ca		200		71.45	63.68	65.72	72.07	65.77	61.46	63.29	63.76		70.98	67.47	70.84	69.16	69.16		66.69	66.58	64.84	
C.O.D.	mg/l O2																						
Chloride	mg/l Cl	250	30	187.5	22	23	25	25	22	21	16	16		15	14	16	17	23		27	38	44	
Chromium	ug/l	50	30	37.5	<0.5	<0.5	<0.5	0.9	0.8	0.5	<0.5	1		0.9	0.8	0.7	1	1		1.2	<1	1.8	
Cobalt	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<1	<1	
Coliform Bacteria	(No/100 ml)	0												13									
Conductivity	µS/cm @ 25	2500	1000	1875	459	525	465	471	453	445	413	424	431	420	423	415	419	419	611	438	463	485	
Copper	ug/l	2000	30	1500	0.5	2	<0.5	0.7	1.3	<0.5	1.1	1.6		0.9	0.6	1.3	0.5	0.5		0.7	<1	1.2	
Cyanide	mg/l	0.05	10											<0.05									
D.O.	% Saturation				79			74			76			78			54	54		65			
E Coli	No/100 ml	0												0									
Fluoride	mg/l	0.8	1000											0.15									
Iron	ug/l	200	200		17.1	<10	<10	<10	<10	11.4	17.2	50.7		29	<10	92.9	<10	<10		<10	15.5	10.1	
Lead	ug/l	25	10	18.75	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.3		<0.5	<0.5	2.1	<0.5	<0.5		<0.5	<1	<1	
Magnesium	mg/l Mg		50		2.56	2.33	2.47	2.7	2.58	2.43	2.34	2.56		2.96	2.68	2.79	2.65	2.65		2.58	2.76	2.68	
Manganese	ug/l	50	50		1.6	<1	<1	<1	1	<1	2.6	8.8		4.5	1.1	17	1.5	1.5		1.6	<5	<5	
Mercury	ug/l	1	1	0.75	nm	nm	nm	nm	nm	nm	nm	nm		<0.05	nm	nm	nm	nm		nm	nm	nm	
Molybdenum	ug/l		35		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<1	<1	
Nickel	ug/l	20	20	15	<0.5	<0.5	<0.5	<0.5	0.6	0.5	2.7	1		0.7	1.3	2.1	0.6	0.6		1.3	1.1	1.5	
Nitrite	mg/l N	0.5	0.1	0.375	<0.002	0.007	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		0.002	<0.004	<0.004	
o-Phosphate	mg/l P		30											0.02									
pH		6.5 - 9.5			7.5	8.1	7.3	7.6	7.1	7.2	6.9	7.4	7.4	7.6	7.6	7.6	7.6	7.6	7.3	7.6	7.6	7.4	
Phenol	mg/l		0.0005		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	nm	
Potassium	mg/l		5		0.81	0.85	0.88	1.25	0.84	0.75	0.86	0.79		1.19	1.23	0.81	1.3			1.11	1.54	1.41	
Sampling Depth	m				29.3	29	28.8	29.2	27.8	29	27.5	27.3	26.8	27.8	28.4	28.8	29.6	29.6	27.6	28.6	29.2	28.7	
Selenium	ug/l	10			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<1	<1	
Silver	ug/l				nm	nm	nm	nm	nm	nm	nm	nm		nm									
Sodium	mg/l	200	150	150	17.59	18.54	19.5	22.7	19.74	18	15.25	16.09		11.91	11.86	14.56	15.87	15.87		16.44	18.56	19.86	
Strontium	ug/l				93.2	90.67	92.9	88.25	86.1	75.96	83.88	90		92.43	88.59	92.25	88.38	88.38		93.63	89.41	91.79	
Sulphate	mg/l SO4	250	200	187.5										11.6									
Suspended Solids	mg/l																						
Temp	°C				15.6	14	12	14.8	10.6	10.4	9.4	10.2	9.6	10.5	10.4	10.6	13.8	13.8	14.8	11	10	8.3	
Thallium	ug/l				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<1	<1	
Time sampled					09:50	10:15	10:20	10:35	10:15	10:30	10:40	10:30	10:45	10:00	10:50	10:25	11:20	11:20	12:30	11:20	12:10	10:45	
Tin (ug/l)	ug/l				<1	<1	<1	<1	<1	<1	nm	nm		nm									
T.O.C.	mg/l	NAC			5			<1.5			43.7			<1.5			<1.5	<1.5		2.5			
T.O.N	mg/l N		NAC		1.11	1.19	0.96	1.15	0.86	1.1	0.86	1.1	1.12	1.11	1.25	1.04	0.78	0.78		1.51	0.59	0.3	
Total S Solids	mg/l																						
Uranium	ug/l				0.47	0.42	0.38	0.41	0.36	0.34	0.41	0.42		0.4	0.39	0.47	0.39	0.39		0.44	<1	<1	
Vanadium	ug/l				<0.5	<0.5	0.5	0.54	<0.5	<0.5	0.51	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5		0.52	<1	<1	
Zinc	ug/l		100		10.2	10.3	4.4	3.2	19.4	4.4	22.4	29.7		30.6	8.6	13.6	4.4	4.4		18.7	29.7	17.2	
Water Level m OD		35.951			6.651	6.951	7.151	6.751	8.151	6.951	8.451	8.651	9.151	8.151	7.551	7.151	6.351		8.351	7.351	6.751	7.251	

Drogheda Landfill Site Groundwater Quality

Monitoring Point:		BHTA																						
Date Collected		DWR	IGV	2010 GW Regs	24-Jul-12	14-Aug-12	11-Sep-12	09-Oct-12	06-Nov-12	11-Dec-12	31-Jan-13	12-Feb-13	26-Mar-13	16-Apr-13	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13		
Alkalinity	mg/l CaCO3													140										
Aluminium	ug/l	200	200	150	5.3			8			nm			14.6			29.4				59.5			
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	nm	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.06	<0.020	<0.020		
Antimony	ug/l	5			<0.5			0.59			nm			0.58			0.95				1.16			
Arsenic	ug/l		10	7.5	6.86			8.74			nm			8.74			44.61				47.05			
Barium	ug/l		100		37.2			31			nm			32.6			10.3				8.4			
Beryllium	ug/l				<0.5			<0.5			nm			<0.5			<0.5				<0.5			
B.O.D.	mg/l O2																							
Boron	ug/l	1000	1000	750	66.1			66.7			nm			38.8			26.2				33.6			
Cadmium	ug/l	5	5	3.75				<0.1			nm			<0.1			0.2				0.1			
Calcium	mg/l Ca		200		79.24			56.18			nm			58.95			13.39				12.16			
C.O.D.	mg/l O2																							
Chloride	mg/l Cl	250	30	187.5	16			34			nm			34			67				60			
Chromium	ug/l	50	30	37.5	4.7			11			nm			11.7			24.7				24.6			
Cobalt	ug/l				<0.5			<0.5			nm			<0.5			<0.5				<0.5			
Coliform Bacteria	(No/100 ml)	0												41										
Conductivity	uS/cm @ 25	2500	1000	1875	553	491	465	592	537	551	nm	578	577	571	561	565	627	621	606	595	451	454		
Copper	ug/l	2000	30	1500	1.6			2			nm			1.9			1				1.4			
Cyanide	mg/l	0.05	10											<0.05										
D.O.	% Saturation				102			79			nm			90			50				57			
E Coli	No/100 ml	0												0										
Fluoride	mg/l	0.8	1000											0.2										
Iron	ug/l	200	200		<10			<10			nm			20.7			<10				<10			
Lead	ug/l	25	10	18.75	<0.5			<0.5			nm			<0.5			<0.5				<0.5			
Magnesium	mg/l Mg		50		11.29			9.47			nm			7.53			1.59				2.1			
Manganese	ug/l	50	50		1.8			<1			nm			1.4			<1				<1			
Mercury	ug/l	1	1	0.75	nm			nm			nm			0.1			nm				nm			
Molybdenum	ug/l		35		2.7			14.5			nm			18.8			63.9				70			
Nickel	ug/l	20	20	15	<0.5			<0.5			nm			2.6			1.3				1			
Nitrite	mg/l N	0.5	0.1	0.375	<0.002			<0.002			nm			<0.002			<0.002				<0.002			
o-Phosphate	mg/l P		30											<0.02										
pH		6.5 - 9.5			7.6	7.7	7.6	7.7	7.4	7.4	nm	7.5	7.6	7.9	8	7.9	9.1	9.5	9.7	9.5	7.8	7.6		
Phenol	mg/l		0.0005		<0.002			<0.002			nm			<0.002			<0.002				<0.002			
Potassium	mg/l		5		12.14			48.65			nm			45.55			124.56				113.3			
Sampling Depth	m				7.9	9.2	9.2	9.2	9	9.7	nm	6	5.4	6.8	8.7	9.2	9.3	10.2	13.1	9.8	10.3	9.1		
Selenium	ug/l	10			73.5			72.7			nm			71.8			109				100			
Silver	ug/l				nm			nm			nm			nm										
Sodium	mg/l	200	150	150	9.89			15.39			nm			13.55			18.09				16.66			
Strontium	ug/l				294.76			163.61			nm			218.29			267.75				47.14			
Sulphate	mg/l SO4	250	200	187.5										82.2										
Suspended Solids	mg/l																							
Temp	°C				15.2	18.2	11.5	15.1	10.6	9.8	nm	7.2	6	11	nm	11.4	19.5	14.6	10.6	14	9.6	nm		
Thallium	ug/l				0.1			<0.1			nm			<0.1			<0.1				<0.1			
Time sampled					13:10	11:55	13:15	12:30	12:00	12:05	13:05	12:10	12:20	12:35	12:10	11:50	12:35	12:00	12:30	12:35	14:25	12:30		
Tin (ug/l)	ug/l				<1			<1			nm			nm										
T.O.C.	mg/l	NAC			3.2			3.1			nm			2			1.8				2.3			
T.O.N	mg/l N		NAC		0.1			0.33			nm			0.32			0.9				0.79			
Total S Solids	mg/l																							
Uranium	ug/l				1.69			1.19			nm			1.23			0.36				0.3			
Vanadium	ug/l				1.15			2.71			nm			2.23			41				44.47			
Zinc	ug/l		100		6.8			22			nm			10.8			1.3				5.8			
Water Level m OD		25.172			17.272	15.972	15.972	15.972	16.172	15.472				19.172	19.772	18.372	16.472	15.972	15.872		12.072	15.372	14.872	16.072

Drogheda Landfill Site Groundwater Quality

Monitoring Point:	BH6A																						
	Date Collected	DWR	IGV	2010 GW Regs	24-Jul-12	14-Aug-12	11-Sep-12	09-Oct-12	06-Nov-12	11-Dec-12	31-Jan-13	12-Feb-13	26-Mar-13	16-Apr-13	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	
Alkalinity	mg/l CaCO3													210									
Aluminium	ug/l	200	200	150	<5			<5			<5			<5			<5			<5			
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.020	<0.020	
Antimony	ug/l	5			<0.5			<0.5			<0.5			<0.5			<0.5			<0.5			
Arsenic	ug/l		10	7.5	<0.5			<0.5			<0.5			0.61			<0.5			<0.5			
Barium	ug/l		100		17.3			17.5			21.1			19.3			18.4			20.9			
Beryllium	ug/l				<0.5			<0.5			<0.5			<0.5			<0.5			<0.5			
B.O.D.	mg/l O2																						
Boron	ug/l	1000	1000	750	23.7			28.8			20.7			20.6			55.1			78.7			
Cadmium	ug/l	5	5	3.75	<0.1			<0.1			<0.1			<0.1			<0.1			<0.1			
Calcium	mg/l Ca		200		79.96			85.91			85.4			81.62			77.41			76.42			
C.O.D.	mg/l O2																						
Chloride	mg/l Cl	250	30	187.5	16			16			14			17			53			55			
Chromium	ug/l	50	30	37.5	<0.5			1.2			0.8			1.3			1.1			1.2			
Cobalt	ug/l				<0.5			<0.5			<0.5			<0.5			<0.5			<0.5			
Coliform Bacteria	(No/100 ml)	0												16									
Conductivity	uS/cm @ 25	2500	1000	1875	483	476	486	505	504	485	496	505	500	484	491	510	524	528	539	549	492	497	
Copper	ug/l	2000	30	1500	<0.5			<0.5			0.7			<0.5			<0.5			0.5			
Cyanide	mg/l	0.05	10											<0.05									
D.O.	% Saturation				102			89			86			90			56			49			
E Coli	No/100 ml	0												0									
Fluoride	mg/l	0.8	1000											<0.150									
Iron	ug/l	200	200		<10			<10			<10			<10			<10			17.1			
Lead	ug/l	25	10	18.75	<0.5			<0.5			<0.5			<0.5			<0.5			<0.5			
Magnesium	mg/l Mg		50		3.84			4.04			3.95			3.77			3.2			3.72			
Manganese	ug/l	50	50		<1			<1			1.7			2			1.4			1.9			
Mercury	ug/l	1	1	0.75	nm			nm			nm			<0.05			nm			nm			
Molybdenum	ug/l		35		<0.5			<0.5			<0.5			<0.5			2			0.9			
Nickel	ug/l	20	20	15	<0.5			<0.5			<0.5			<0.5			<0.5			2.2			
Nitrite	mg/l N	0.5	0.1	0.375	<0.002			<0.002			<0.002			<0.002			<0.002			<0.002			
o-Phosphate	mg/l P		30											<0.02									
pH		6.5 - 9.5			7.5	7.5	7.4	7.4	7.2	7.3	7.5	7.4	7.4	7.5	7.4	7.5	7.5	7.6	7.5	7.5	7.4	7.5	
Phenol	mg/l		0.0005		<0.002			<0.002			<0.002			<0.002			<0.002			<0.002			
Potassium	mg/l		5		0.43			0.54			0.5			0.71			0.87			1.73			
Sampling Depth	m				28.5	29.3	28.9	29.4	27	28.9	26.2	27.5	26.7	28.2	28.7	29.1	29.7	29.3	29.6	28.2	28.9	29.2	
Selenium	ug/l	10			0.7			1.4			1.5			2.1			<0.5			<0.5			
Silver	ug/l				nm			nm			nm			nm									
Sodium	mg/l	200	150	150	12.08			14.31			10.93			11.09			23.65						
Strontium	ug/l				93.95			86.57			94.44			89.39			85.5			91.66			
Sulphate	mg/l SO4	250	200	187.5										10.3									
Suspended Solids	mg/l																						
Temp	°C				16	14.1	11.7	14.7	10.8	10.1	9.4	10.1	9.7	10.5	10.5	10.4	12.4	11.9	10.4	11	9.9	8.4	
Thallium	ug/l				<0.1			<0.1			<0.1			<0.1			<0.1			0.1			
Time sampled					10:15	10:40	10:45	10:55	10:35	10:55	11:05	10:55	11:05	10:25	11:10	10:40	11:50	10:55	11:20	11:40	12:40	11:10	
Tin (ug/l)	ug/l				<1			nm			nm			nm									
T.O.C.	mg/l	NAC			1.7			<1.5			61.5			<1.5			1.8			2.4			
T.O.N	mg/l N		NAC		0.49			0.72			0.33			0.35			0.12			0.27			
Total S Solids	mg/l																						
Uranium	ug/l				0.31			0.3			0.36			0.33			0.25			0.27			
Vanadium	ug/l				<0.5			0.52			<0.5			<0.5						<0.5			
Zinc	ug/l		100		3.9			1.5			12.3			12.3			14.6			12.3			
Water Level m OD		36.151			7.651	6.851	7.251	6.751	9.151	7.251	9.951	8.651	9.451	7.951	7.451	7.051	6.451		6.551	7.951	7.251	6.951	

Drogheda Landfill Site Groundwater Quality

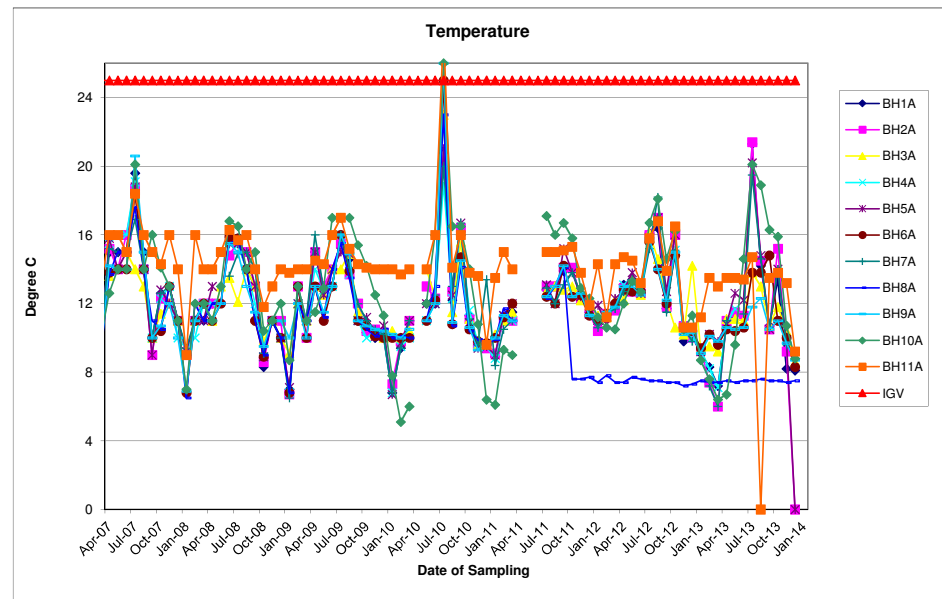
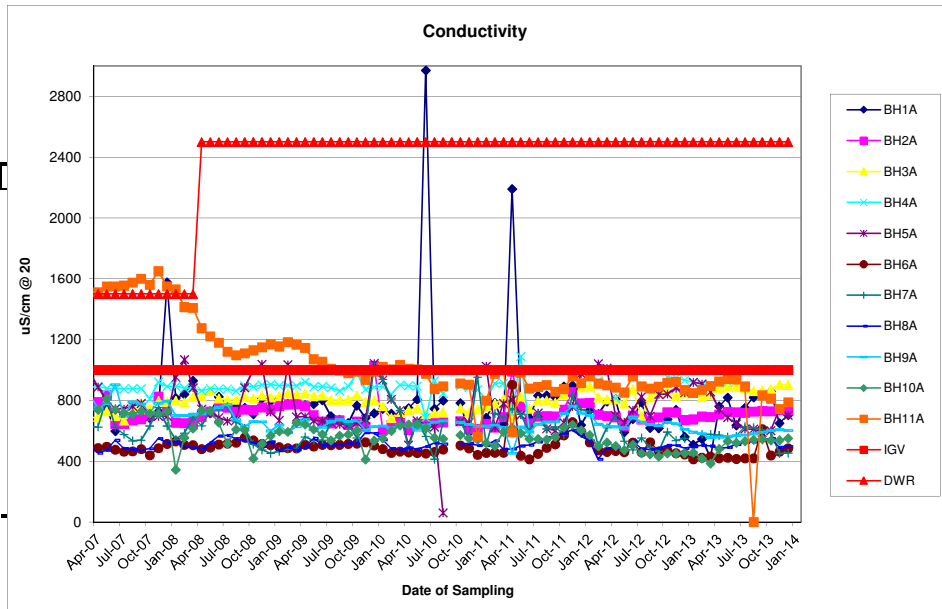
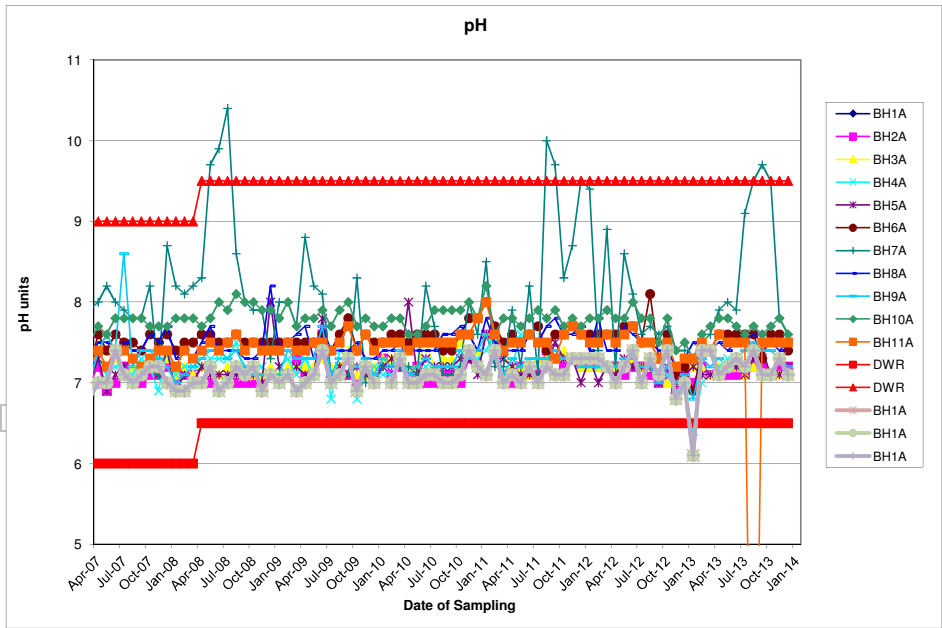
Monitoring Point:		BH9A																					
Date Collected		DWR	IGV	2010 GW Regs	24-Jul-12	14-Aug-12	11-Sep-12	09-Oct-12	06-Nov-12	11-Dec-12	31-Jan-13	12-Feb-13	26-Mar-13	16-Apr-13	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	
Alkalinity	mg/l CaCO3													268									
Aluminium	ug/l	200	200	150	<5	<5	<5	<5	<5	<5	<5	20.4		<5	<5	18.7	<5	<5	<5	<5	<10	<10	
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.020	0.026	
Antimony	ug/l	5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	
Arsenic	ug/l		10	7.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	
Barium	ug/l		100		28.7	33.2	30.7	31	28.9	26.3	29.2	29.6		26.2	24.2	27.9	28.2	26.8	27.9	28.6	29.2	28.6	
Beryllium	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	
B.O.D.	mg/l O2																						
Boron	ug/l	1000	1000	750	32.3	34.8	40	73	38.3	31.7	24.7	23.7		25.3	30.6	69.5	112.2	108.5	117.3	109	86.8	78.8	
Cadmium	ug/l	5	5	3.75	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.02	<0.02	
Calcium	mg/l Ca		200		114.1	107.42	107.57	111.22	110.22	103.72	109.07	108.06		106.02	97.02	94.68	80.88	75.04	73.45	82.83	86.84	89.65	
C.O.D.	mg/l O2																						
Chloride	mg/l Cl	250	30	187.5	25	26	29	37	24	23	19	18	16	16	23	38	54	56	60	57	48	42	
Chromium	ug/l	50	30	37.5	<0.5	<0.5	0.5	1.2	1.1	0.7	<0.5	1.7		1.3	1	0.7	1	<0.5	<0.5	1.9	<1	2	
Cobalt	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	
Coliform Bacteria	(No/100 ml)	0												3									
Conductivity	uS/cm @ 25	2500	1000	1875	656	641	634	656	647	611	591	581	556	559	561	569	573	580	590	602	608	603	
Copper	ug/l	2000	30	1500	<0.5	4	<0.5	1.2	1	0.5	0.8	1.1		<0.5	0.5	1	0.7	0.8	0.9	0.6	<1	<1	
Cyanide	mg/l	0.05	10											<0.05									
D.O.	% Saturation				64			48			66			63			26			24			
E Coli	No/100 ml	0												0									
Fluoride	mg/l	0.8	1000											<0.150									
Iron	ug/l	200	200		<10	<10	<10	<10	<10	<10	24.4	11.7		<10	<10	34.5	<10	<10	16.8	<10	<10	<10	
Lead	ug/l	25	10	18.75	<0.5	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	
Magnesium	mg/l Mg		50		5.04	4.73	4.92	5.78	5.21	4.87	4.26	4.41		4.55	4.28	4.88	5.16	4.78	4.74	4.9	4.89	5.03	
Manganese	ug/l	50	50		<1	<1	<1	<1	2.8	<1	2.2	7.4		1.1	<1	13	<1	<1	<1	<1	<5	<5	
Mercury	ug/l	1	1	0.75	nm	nm	nm	nm	nm	nm	nm	nm		<0.05	nm	nm	nm	nm	nm	nm	nm	nm	
Molybdenum	ug/l		35		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	
Nickel	ug/l	20	20	15	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	1.1	2.4	1.7	2.5	2	1.9	1.6	1.1	
Nitrite	mg/l N	0.5	0.1	0.375	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.004	<0.004	
o-Phosphate	mg/l P		30											0.02									
pH		6.5 - 9.5			7.2	7.2	7	7.2	7	7.1	6.8	7.3	7.2	7.3	7.2	7.3	7.4	7.5	7.4	7.4	7.3	7.2	
Phenol	mg/l		0.0005		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Potassium	mg/l		5		0.72	0.84	0.83	1.97	0.84	0.71	0.63	0.66		0.97	1.08	1.31	2.45		2.5	2.55	2	1.81	
Sampling Depth	m				28	28.1	26.4	27.9	26.8	27.8	26.5	25.3	26.2	27.3	27	27.4	28.7	27.5	28.1	27.1	27.5	28	
Selenium	ug/l	10			<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5		<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<1	<1	
Silver	ug/l				nm	nm	nm	nm	nm	nm	nm	nm		nm									
Sodium	mg/l	200	150	150	9.76	10.78	11.94	20.62	10.98	9.7	7.16	7.33		8.81	10.29	21.46	31.21	30.46	31.43	30.16	24.85	21.42	
Strontium	ug/l				135.72	123.61	129.38	123.06	124.93	109.51	119.54	123.42		116.71	110.48	110.3	99.91	103.42	94.35	107.75	109.47	107.5	
Sulphate	mg/l SO4	250	200	187.5										6									
Suspended Solids	mg/l																						
Temp	°C				15.8	14	12.2	15	10.2	10.3	9.1	10.1	9.8	10.6	10.5	10.6	11.8	12.3	10.5	11	9.7	8.7	
Thallium	ug/l				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1	
Time sampled					10:40	11:00	11:05	11:20	11:00	11:15	11:30	11:15	11:25	10:55	11:30	11:05	12:10	11:15	11:45	12:05	13:00	11:35	
Tin (ug/l)	ug/l				<1	<1	<1	<1	<1	<1	nm	nm		nm									
T.O.C.	mg/l	NAC			2.1			<1.5			70.7			<1.5			1.6			2.3			
T.O.N	mg/l N		NAC		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.16	<0.08	0.08	<0.08	<0.08	0.16	0.23	<0.08	<0.20	<0.20	
Total S Solids	mg/l																						
Uranium	ug/l				0.29	0.29	0.31	0.28	0.27	0.25	0.27	0.28		0.27	0.25	0.27	0.23	0.24	0.24	0.24	<1	<1	
Vanadium	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.51	<1	
Zinc	ug/l		100		3.7	11.9	2	4.1	6	2.8	6.4	3.1		4.8	4.4	3.5	2.7	4.2	5.1	7.6	21.2	5.6	
Water Level m OD		34.345			6.345	6.245	7.945	6.445	7.545	6.545	7.845	9.045	8.145	7.045	7.345	6.945	5.645		6.245	7.245	6.845	6.345	

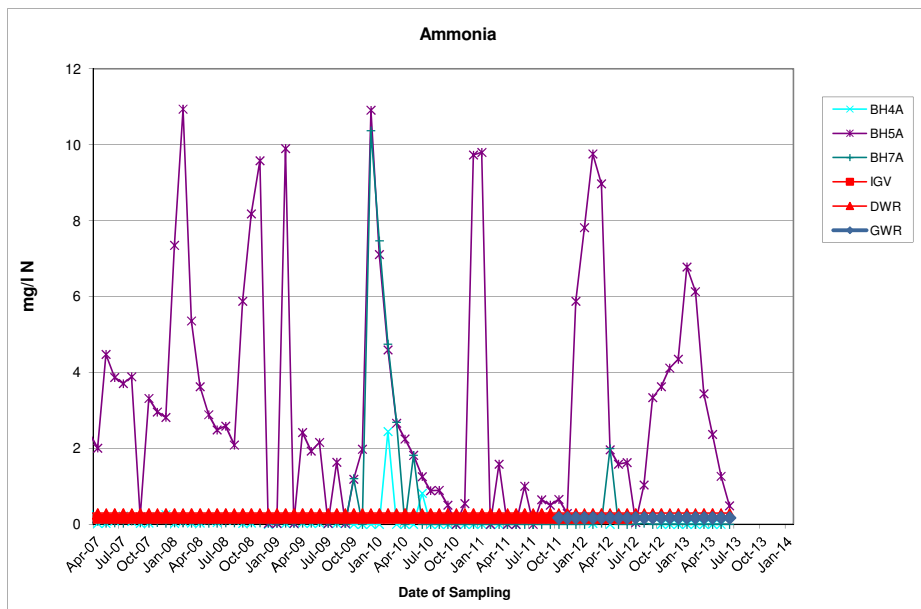
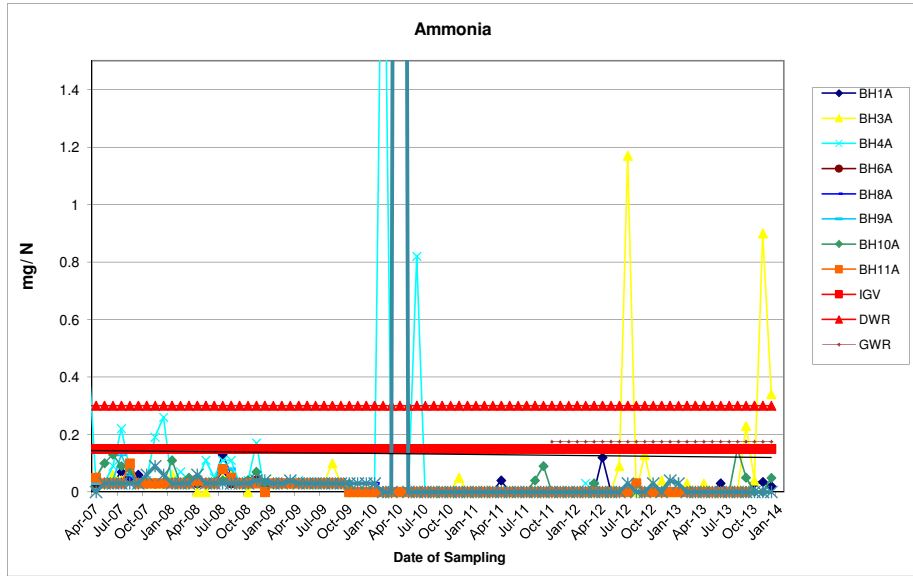
Drogheda Landfill Site Groundwater Quality

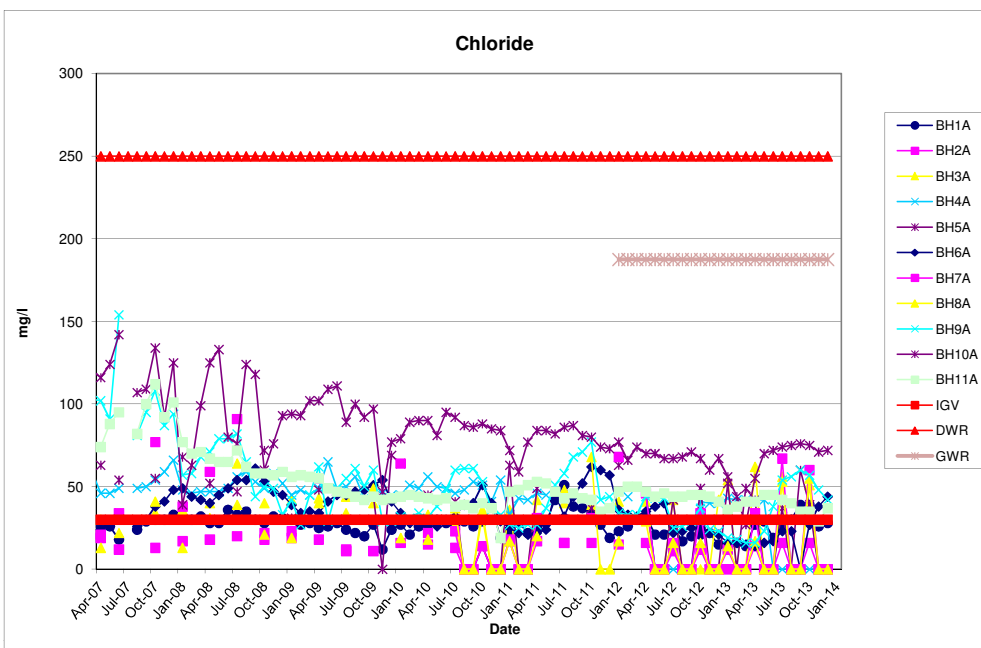
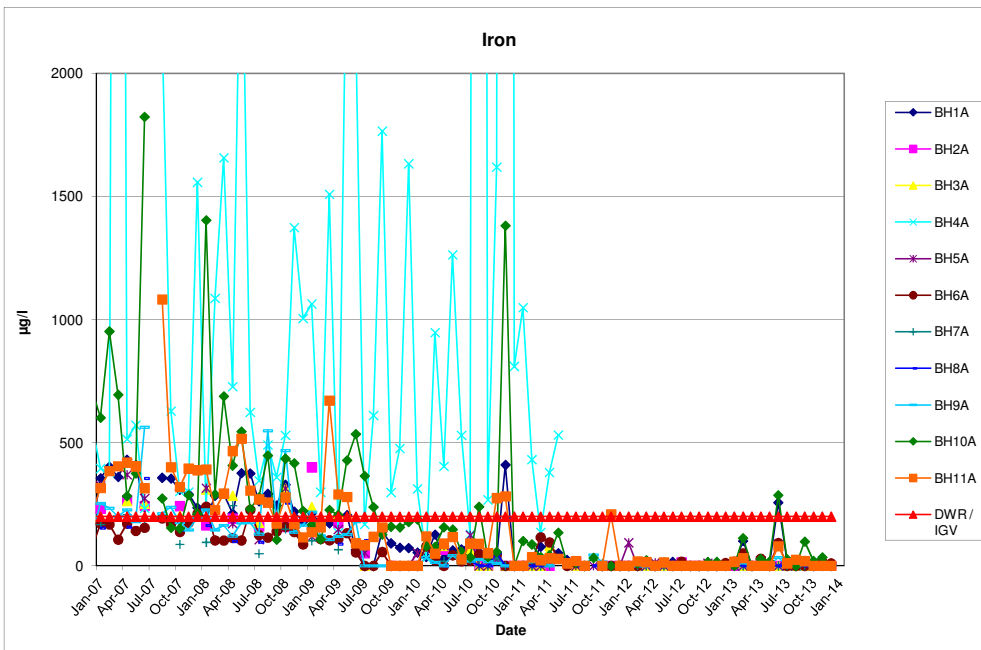
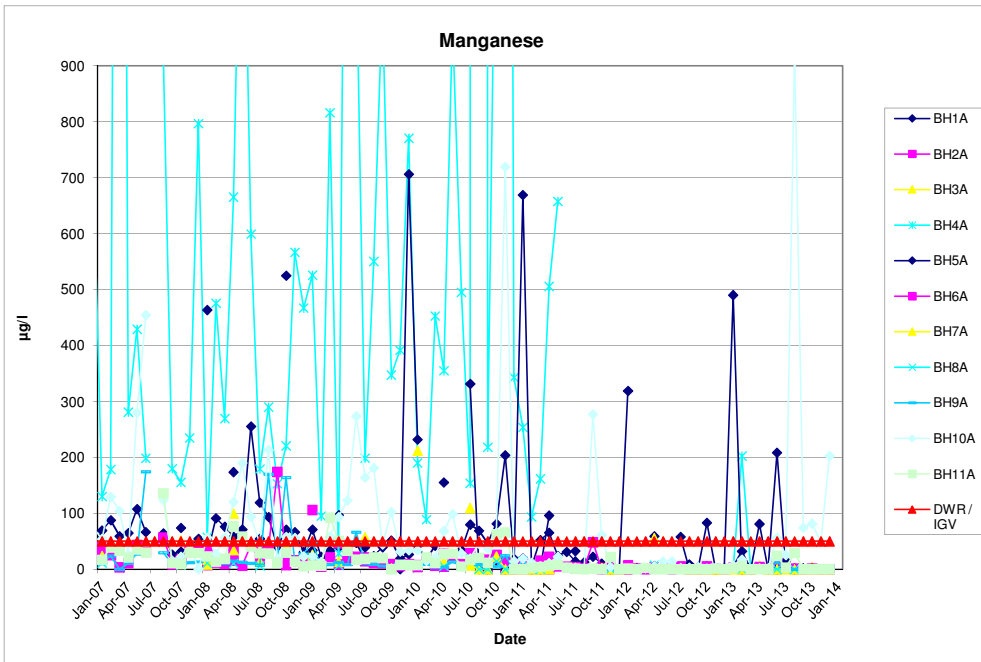
Monitoring Point:		BH10A																					
Date Collected		DWR	IGV	2010 GW Regs	24-Jul-12	14-Aug-12	11-Sep-12	09-Oct-12	06-Nov-12	11-Dec-12	31-Jan-13	12-Feb-13	26-Mar-13	16-Apr-13	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	
Alkalinity	mg/l CaCO3													135									
Aluminium	ug/l	200	200	150	6.3	6.5	6.6	9	11.9	5.1	5.8	99.5		16.2	6.6	200.3	10.3	6.3	13.3	11.9	14	<10	
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.15	0.05	<0.03	<0.020	0.049	
Antimony	ug/l	5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	
Arsenic	ug/l		10	7.5	0.76	1.1	1.37	1.23	1.07	0.91	0.76	0.52		0.57	0.63	1.23	1.78	2.45	1.56	1.25	<1	<1	
Barium	ug/l		100		30.5	31	28.4	26.1	29.1	30.4	40.3	36.2		39.6	47.3	53.9	58.7	65.7	58.6	63.3	68.6	72.3	
Beryllium	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	
B.O.D.	mg/l O2																						
Boron	ug/l	1000	1000	750	175.6	187	183.4	212.4	159.3	179.9	127.7	98.4		139.6	172.1	191.8	206.4	193.6	194.7	204.2	191.6	186.9	
Cadmium	ug/l	5	5	3.75	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Calcium	mg/l Ca		200		27.56	23.9	23.18	26.98	30.5	28.99	41.9	41.64		46.86	41.82	43.75	42.68	40.85	38.97	41.5	42.65	42.38	
C.O.D.	mg/l O2																						
Chloride	mg/l Cl	250	30	187.5	67	68	71	67	60	67	56	44	27	55	70	72	74	75	76	75	71	72	
Chromium	ug/l	50	30	37.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.6		1.2	<0.5	0.6	0.5	<0.5	<0.5	0.7	<1	<1	
Cobalt	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	
Coliform Bacteria	(No/100 ml)	0												2									
Conductivity	µS/cm @ 25	2500	1000	1875	452	446	430	451	450	453	457	418	385	481	531	521	532	541	545	537	538	551	
Copper	ug/l	2000	30	1500	2.4	1.6	1.5	2.2	1.7	1.2	1.4	1.8		1.5	2.5	2.5	7.2	1.3	1.9	1	1.3	1.2	
Cyanide	mg/l	0.05	10											<0.05									
D.O.	% Saturation				32			58			67			71			13			30			
E. Coli	No/100 ml	0												1									
Fluoride	mg/l	0.8	1000											<0.150									
Iron	ug/l	200	200		<10	<10	<10	15.8	16.9	<10	<10	112.9		28.4	18	287.2	26.4	24.7	98.6	20.2	35	<10	
Lead	ug/l	25	10	18.75	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1		<0.5	<0.5	0.9	<0.5	<0.5	1.1	<0.5	<1	<1	
Magnesium	mg/l Mg		50		8.38	8.08	8.41	9.48	8.58	9.22	7.41	6.29		8.24	9.04	10.17	10.44	9.9	10.02	10.17	10.46	10.58	
Manganese	ug/l	50	50		2.2	3.2	3.8	1.3	2.5	<1	6.7	17.4		1.5	2	56.2	25.5	926.7	74.1	81.7	48.4	202.8	
Mercury	ug/l	1	1	0.75	nm	nm	nm	nm	nm	nm	nm	nm	nm	<0.05	nm	nm	nm	nm	nm	nm	nm	nm	
Molybdenum	ug/l		35		1	1.1	<0.5	0.6	0.8	0.7	0.6	0.7		0.6	<0.5	0.6	1	1.1	1	0.7	<1	<1	
Nickel	ug/l	20	20	15	3.2	3.3	3.3	3.2	2.7	3.1	2.5	2.5		4.6	4.6	6.2	4	6.6	5.6	5.7	5.8	5	
Nitrite	mg/l N	0.5	0.1	0.375	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	0.012	0.009	<0.002	<0.004	<0.004	
o-Phosphate	mg/l P		30											<0.02									
pH		6.5 - 9.5			7.8	7.8	7.5	7.8	7.4	7.5	7.3	7.6	7.7	7.8	7.8	7.7	7.6	7.7	7.6	7.7	7.8	7.6	
Phenol	mg/l		0.0005		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Potassium	mg/l		5		7.92	8.02	7.48	9.15	7.21	6.93	5.92	4.67		6.33	7.88	8.64	9.18		8.89	9.4	8.91	8.6	
Sampling Depth	m				26	26.9	26.2	26.2	26.1	25.9	25.2	25.1	23.8	25.3	25	25.3	26.9	26	25.9	17.9	18.2	25.5	
Selenium	ug/l	10			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	
Silver	ug/l				nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	
Sodium	mg/l	200	150	150	39.8	40.34	39.6	46.47	37.78	39.15	31.47	25.45		34.02	39.01	43.05	44.14	42.45	42.79	43.54	41.79	41.1	
Strontium	ug/l				88.08	81.74	79.53	76.76	81.63	77.77	96.05	95.59		103.21	108.46	114.26	114.08	116.26	113.36	122.44	118.3	120.41	
Sulphate	mg/l SO4	250	200	187.5										19.7									
Suspended Solids	mg/l																						
Temp	°C				16.7	18.1	14.6	16.2	10.5	11.3	8.7	7.6	6.4	6.7	9.6	14.6	20.1	18.9	16.3	15.9	10.7	8.8	
Thallium	ug/l				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	0.13	0.18	0.13	0.12	<1	<1	
Time sampled					11:05	11:20	11:25	11:40	11:20	11:40	11:45	11:35	11:50	11:20	11:45	11:25	12:30	11:35	12:00	12:20	13:15	11:55	
Tin (µg/l)	ug/l				<1	<1	<1	<1	<1	<1	nm	nm		nm									
T.O.C.	mg/l	NAC			5.3			6.3			35.5			3.5		6.9				7.1			
T.O.N	mg/l N		NAC		<0.08	0.27	<0.08	<0.08	0.14	0.33	0.27	0.51	0.97	0.51	0.3	0.31	0.09	0.09	0.22	0.28	0.29	<0.20	
Total S Solids	mg/l																						
Uranium	ug/l				0.38	0.35	0.3	0.38	0.39	0.4	0.46	0.5		0.57	0.43	0.44	0.31	0.26	0.3	0.28	<1	<1	
Vanadium	ug/l				<0.5	<0.5	0.58	0.62	<0.5	<0.5	0.51	<0.5		<0.5	<0.5	0.78	<0.5	<0.5	<0.5	0.61	<1	<1	
Zinc	ug/l		100		5.5	4.6	1	1.1	6.5	2.3	2.6	26.6		5.1	4	5	2.3	4.7	61.3	2.3	16.7	2	
Water Level m OD		32.776			6.776	5.876	6.576	6.576	6.676	6.876	7.576	7.676	8.976	7.476	7.776	7.476	5.876		6.876	14.876	14.576	7.276	

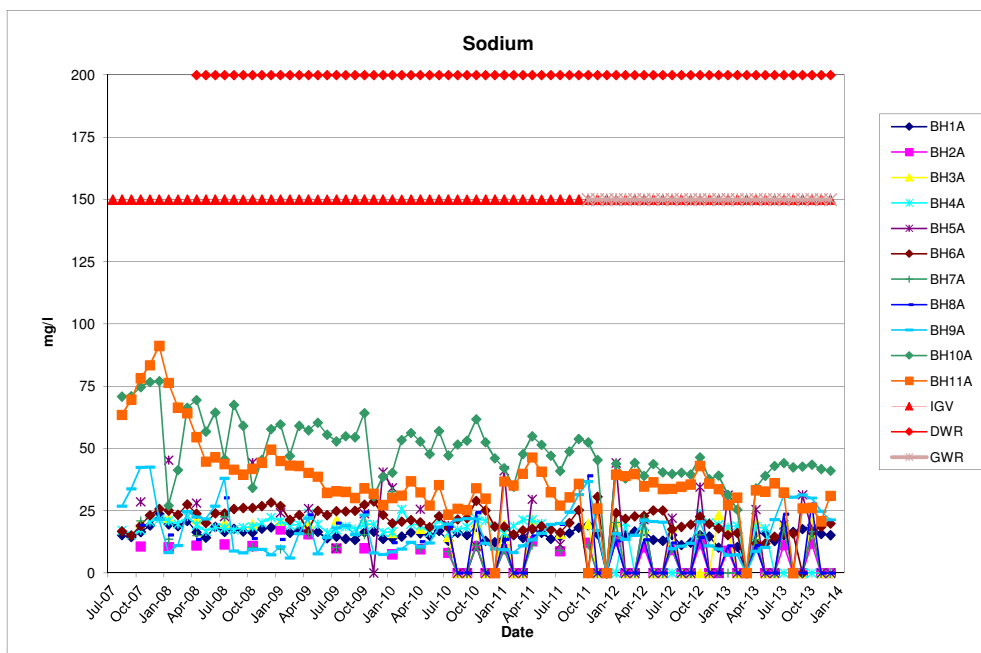
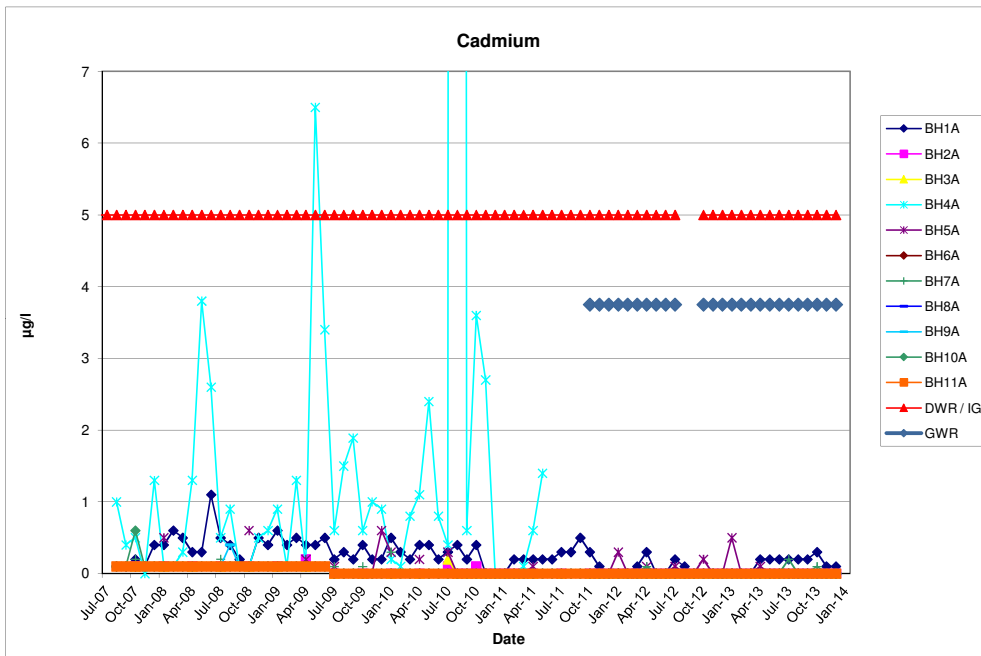
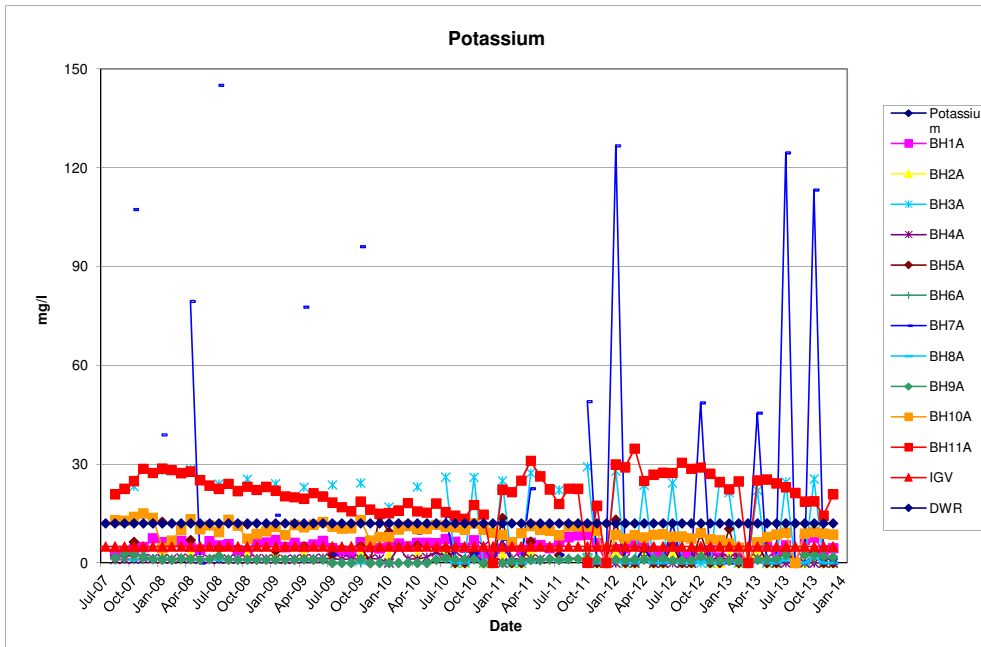
Drogheda Landfill Site Groundwater Quality

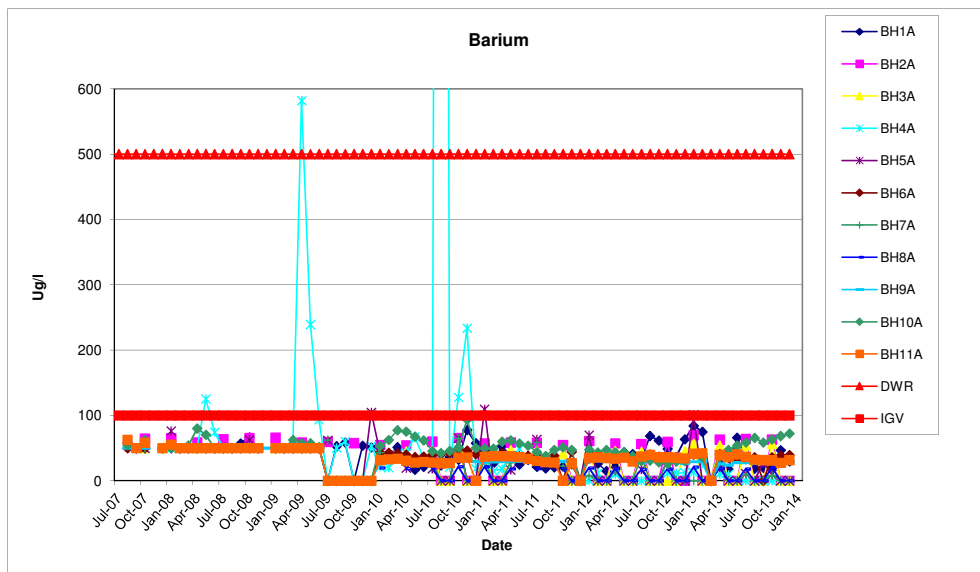
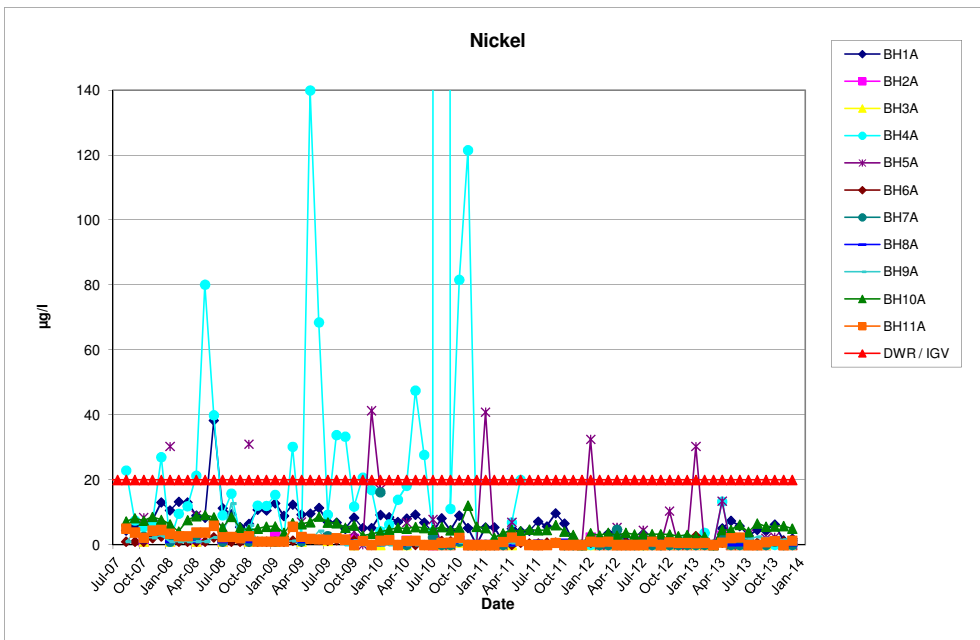
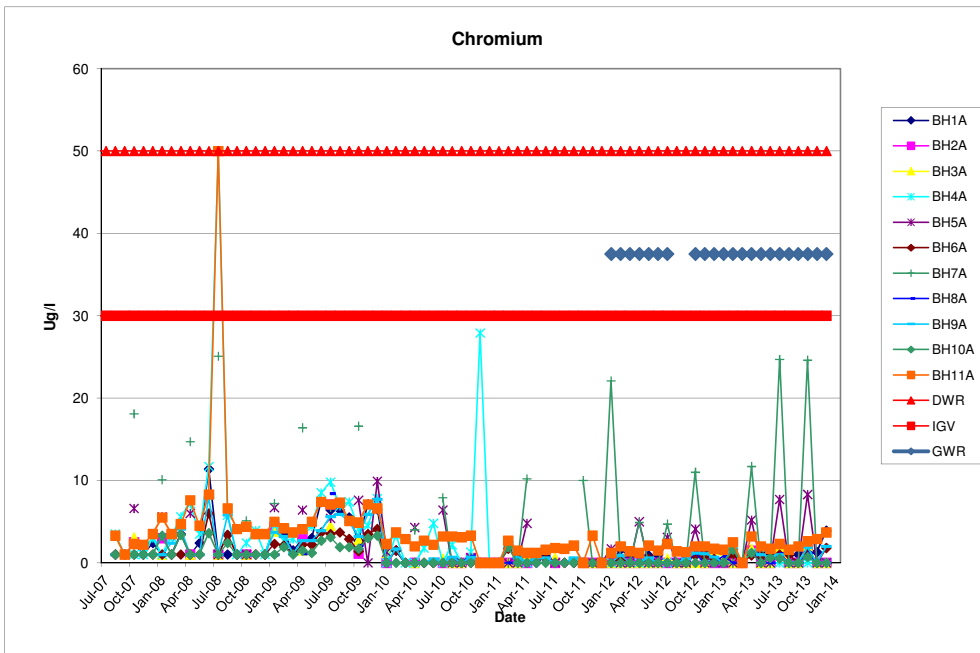
Monitoring Point:		BH11A																				
Date Collected	DWR	IGV	2010 GW Regs	24-Jul-12	14-Aug-12	11-Sep-12	09-Oct-12	06-Nov-12	11-Dec-12	31-Jan-13	12-Feb-13	26-Mar-13	16-Apr-13	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	
Alkalinity	mg/l CaCO3												226									
Aluminium	ug/l	200	200	150	<5	<5	<5	<5	5.6	<5	<5	17.7		<5	28	<5	<5	<5	<5	<10	<10	
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.020	<0.020
Antimony	ug/l	5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	
Arsenic	ug/0		10	7.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	
Barium	ug/l		100		37.3	39.7	36.2	36.1	35.5	34.3	41.4	42.2		39.6	36.3	40.6	36.5	32.5	31.6	31.1	27.4	31.6
Beryllium	ug/2				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	
B.O.D.	mg/l O2																					
Boron	ug/l	1000	1000	750	231	232.9	236	292	236.5	226.3	174.2	193.5		212.6	207.2	208.2	189.2	176.3	149.3	150.3	102.7	173.1
Cadmium	ug/l	5	5	3.75	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Calcium	mg/l Ca		200		92.62	85.17	90.19	94.47	88.24	84.02	90.18	93.9		98.86	96.47	107.97	101.55	92.89	85.98	89.87	81.77	81.41
C.O.D.	mg/l O2																					
Chloride	mg/l Cl	250	30	187.5	44	44	45	45	44	41	36	38	41	41	45	45	42	40	35	35	29	37
Chromium	ug/l	50	30	37.5	2.3	1.4	1.3	2	2	1.7	1.6	2.5		3.2	2	1.7	2.3	1.6	2	2.6	2.9	3.7
Cobalt	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1
Coliform Bacteria	(No/100 ml)	0												5								
Conductivity	uS/cm @ 25	2500	1000	1875	892	878	891	916	923	869	849	869	896	925	942	938	892	877	833	812	744	788
Copper	ug/l	2000	30	1500	1.1	3.3	1	2	1.3	1.2	1.4	2.2		0.8	1	1.5	<0.5	0.9	0.8	<0.5	<1	1
Cyanide	mg/l	0.05	10											<0.05								
D.O.	% Saturation				37			33			45			40		37			55			
E. Coli	No/100 ml	0												0								
Fluoride	mg/l	0.8	1000											<0.150								
Iron	ug/l	200	200		<10	<10	<10	<10	<10	<10	16.3	31.3		<10	<10	79.4	10.2	<10	19.2	<10	<10	<10
Lead	ug/l	25	10	18.75	36.4	2	<0.5	<0.5	<0.5	<0.5	<0.5	0.9		<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<1	<1	
Magnesium	mg/l Mg		50		28.73	27.97	27.96	28.44	26.79	26.82	27.61	28.81		31.37	32.65	30.7	32.08	29.03	29.72	27.85	28.43	28.66
Manganese	ug/l	50	50		<1	<1	<1	<1	1.7	<1	2	5.9		<1	<1	24.2	2.9	<1	<1	<1	<5	<5
Mercury	ug/l	1	1	0.75	nm	nm	nm	nm	nm	nm	nm	nm		<0.05	nm	nm	nm	nm	nm	nm	nm	
Molybdenum	ug/l	35	35		1.2	<0.5	<0.5	0.5	0.6	<0.5	0.6	<0.5		0.6	<0.5	<0.5	1.1	<0.5	0.6	<0.5	<1	<1
Nickel	ug/l	20	20	15	<0.5	1	<0.5	0.8	0.6	0.6	0.5	0.6		0.7	2.1	2.3	<0.5	1.9	0.8	1.2	<1	1.3
Nitrite	mg/l N	0.5	0.1	0.375	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004
o-Phosphate	mg/l P		30											<0.02								
pH		6.5 - 9.5			7.5	7.5	7.3	7.5	7.2	7.3	7.3	7.5	7.4	7.6	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Phenol	mg/l		0.0005		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Potassium	mg/l		5		27.33	30.45	28.58	28.97	27.08	24.55	22.37	24.78		25.07	25.32	24.15	23.03	21.28	18.62	18.71	14.33	20.84
Sampling Depth	m				14.3	10	14.8	14.8	14.5	14.5	12.4	14.2	11.1	13.9	14.7	14	16	14.3	15	15.8	16.3	15.1
Selenium	ug/l	10			0.8	0.6	<0.5	1.1	<0.5	0.7	0.9	1.1		1.4	0.9	0.9	1.1	0.8	1.1	1.3	<1	<1
Silver	ug/l				nm	nm	nm	nm	nm	nm	nm	nm		nm								
Sodium	mg/l	200	150	150	33.83	34.63	35.59	43.03	35.87	33.71	27.35	30.31		33.26	32.72	36.08	32.35	29.48	26.01	26.16	20.78	30.98
Strontium	ug/l				158.1	149.07	151.56	150.68	155.75	147.13	189.63	176.52		192.15	173.86	187.86	175.08	169.09	151.87	161.31	141.87	148.07
Sulphate	mg/l SO4	250	200	187.5										190.2								
Suspended Solids	mg/l																					
Temp	°C				15.8	16.8	13.9	16.5	10.6	10.6	11.2	13.5	13	13.5	13.5	13.4	14.7	16	13.5	13.8	13.2	9.2
Thallium	ug/l				0.36	0.33	0.35	0.38	0.31	0.26	0.27	0.36		0.3	0.33	0.33	0.23	0.23	0.19	0.17	<1	<1
Time sampled					13:55	14:15	13:40	12:35	13:40	13:35	12:20	13:50	14:15	12:15	13:55	13:25	13:10	13:40	14:00	13:15	13:35	13:50
Tin (ug/l)	ug/l				<1	<1	<1	<1	<1	<1	nm	nm		nm								
T.O.C.	mg/l	NAC			3.6			3.5			56.6			2.2						2.9		
T.O.N	mg/l N		NAC		1.41	1.85	2.07	2.84	1.7	2.2	1.81	1.92	2.09	1.68	2.41	1.59	1.91	2.14	1.31	1.32	1.6	2.1
Total S Solids	mg/l																					
Uranium	ug/l				0.72	0.79	0.8	0.79	0.72	0.79	1.03	0.92		0.96	0.82	0.87	0.82	0.75	0.78	0.75	<1	<1
Vanadium	ug/l				<0.5	<0.5	<0.5	0.54	<0.5	<0.5	0.61	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<1	1.13
Zinc	ug/l		100		7.9	8.1	1.8	2.5	11.5	5.4	7.4	6.8		3.6	2.6	7.2	3.8	2.4	7	5	17.3	6.2
Water Level m OD		21.715			7.415	11.715	6.915	6.915	7.215	7.215	9.315	7.515	10.615	7.815	7.015	7.715	5.715	7.415	6.715	5.915	5.415	6.615

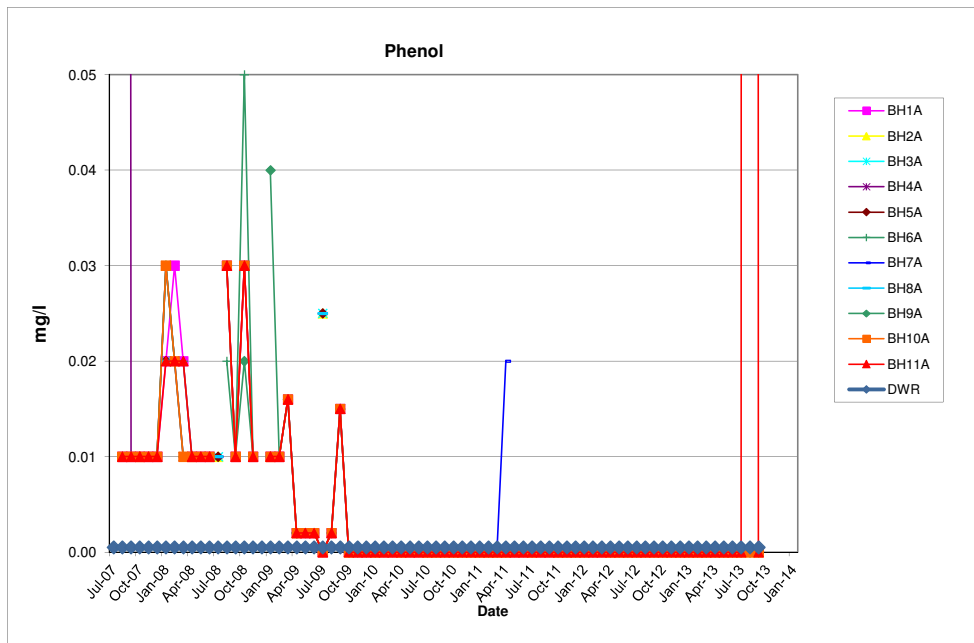
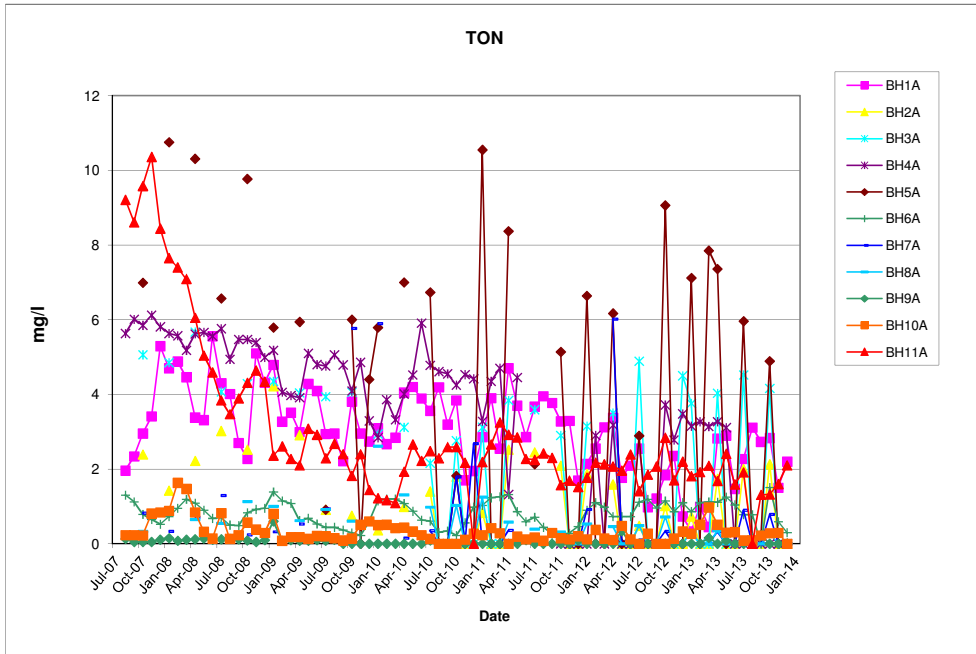
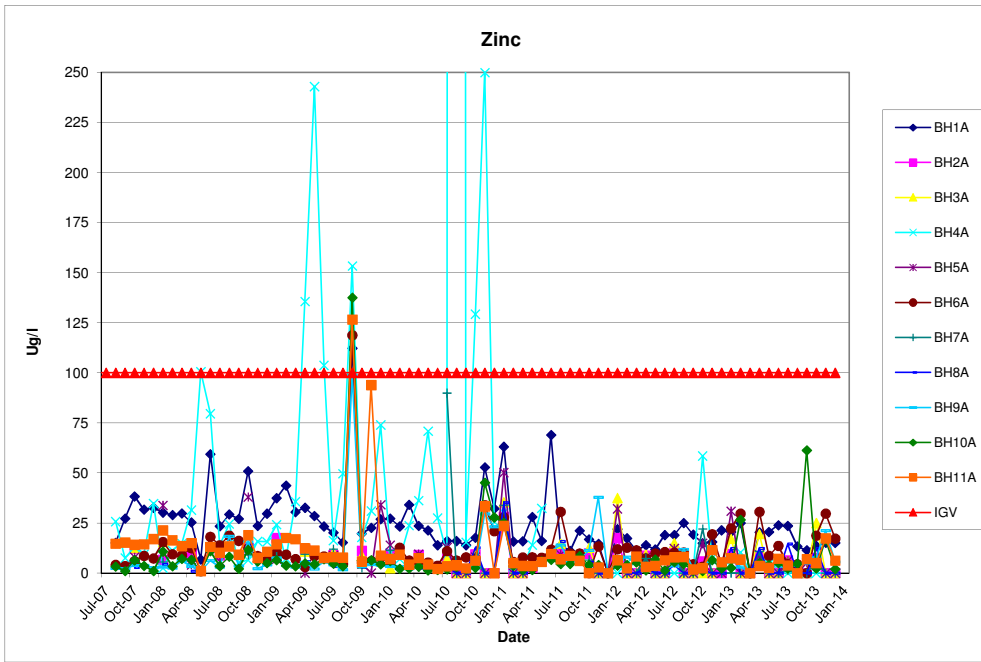


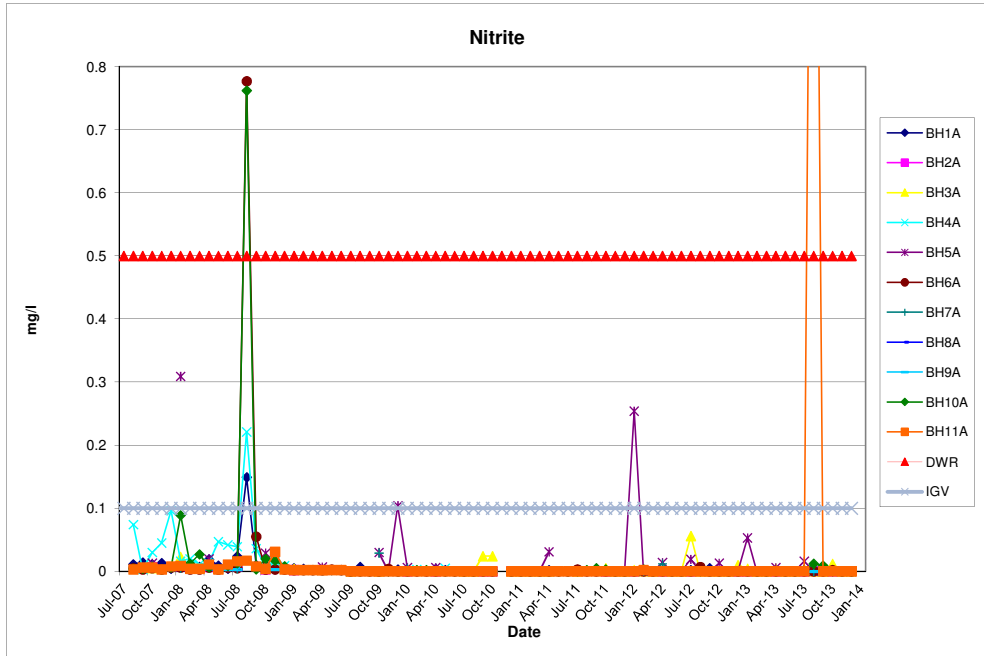
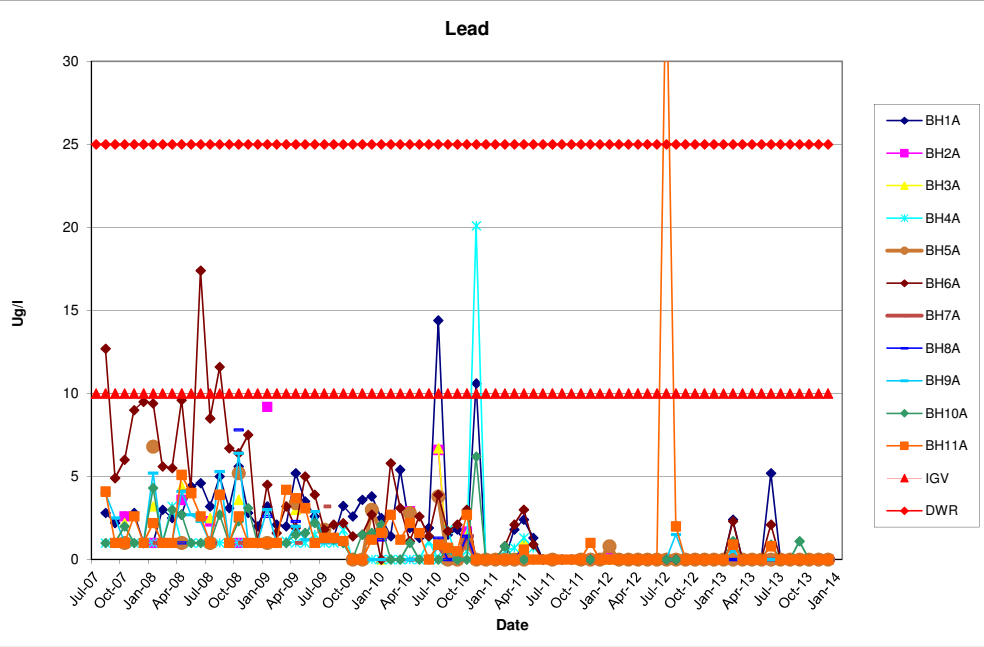


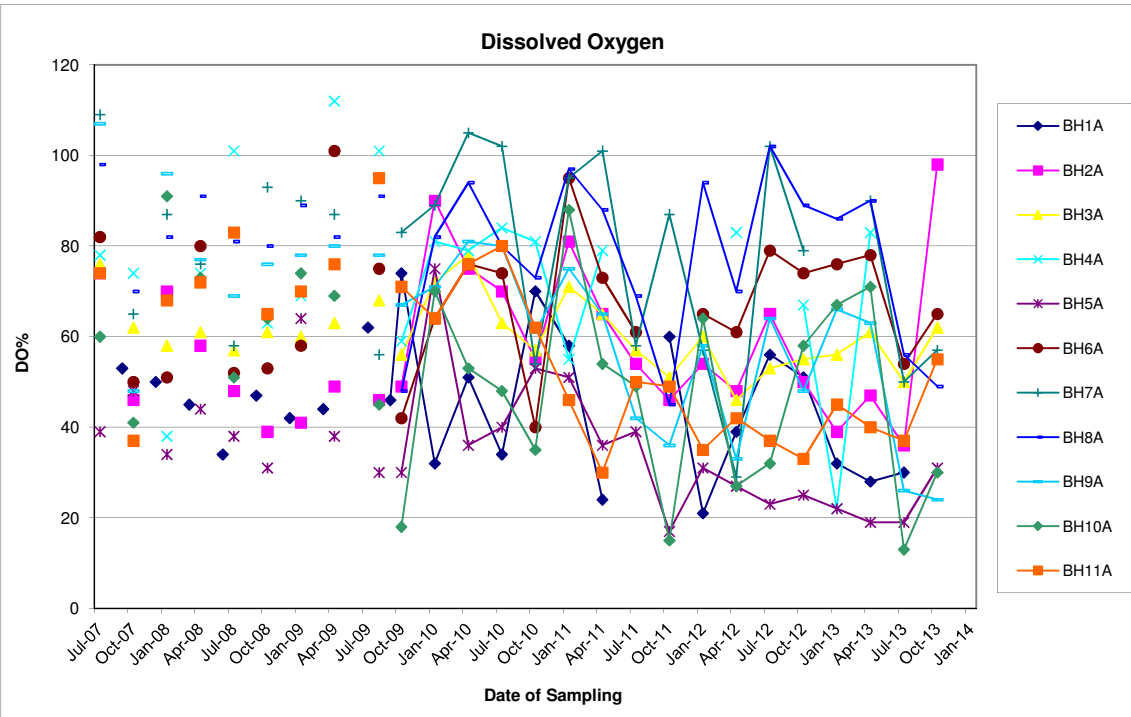
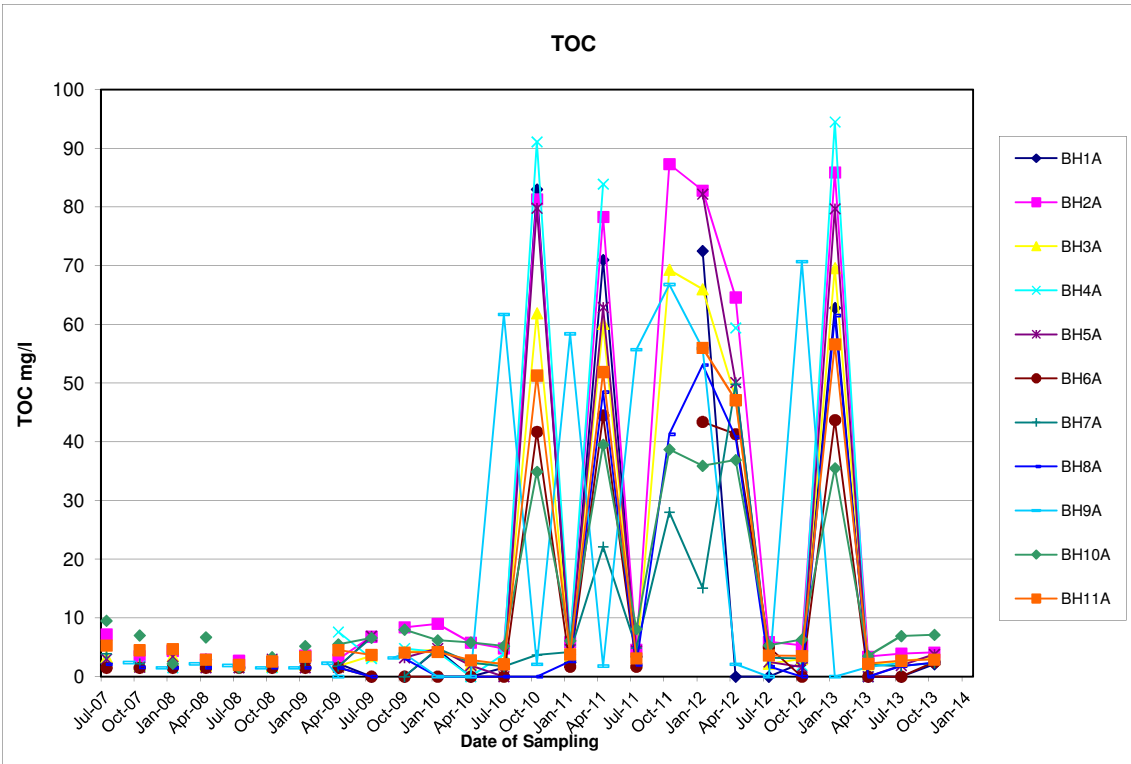












APPENDIX E

SURFACE WATER RESULTS



Drogheda Landfill Site Surfacewater Quality

Monitoring Point:	SW1																
Date Collected	DWR	IGV	2010 GW Regs	19-Oct-11	20-Jan-11	12-Apr-11	12-Jul-11	04-Oct-11	17-Jan-12	24-Apr-12	25-Jul-12	09-Oct-12	31-Jan-13	16-Apr-13	23-Jul-13	08-Oct-13	
Alkalinity	mg/l CaCO3			116		135				85				140			
Aluminium	ug/l	200	200	150						12.9	10	9.3	<5	<5	7.2	<5	
Ammonia	mg/l N	0.23 mg/l N	0.15	0.175	0.03	0.07	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	0.08	0.08	0.04	0.21	
Antimony	ug/l	5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Arsenic	ug/l		10	7.5						0.66	1.8	1.97	0.82	0.74	2.09	1.99	
Barium	ug/l		100		53.4	52.0	57.9	40.7		44.6	30.5	23.9	24.1	51.6	53.8	64.8	
Beryllium	ug/l									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
B.O.D.	mg/l O2				2.3	<1.5	<1.5	1.6	<1.5	<1.5	2.2	2.2	<1.5	<1.5	1.7	1.5	
Boron	ug/l	1000	1000	750					177.1	186.3	186.6	212.9	158	169.1	198.9	198.8	
Cadmium	ug/l	5	5	3.75	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Calcium	mg/l Ca		200		37.89		42.97			33.82	25.15	20.76	21.47	39.04	42.92	39.31	
C.O.D.	mg/l O2				<10	<10	15	23	20	17	13	17	<10	12	24	36	
Chloride	mg/l Cl	250	30	187.5	86	80	82	86	84	74	74	66	68	64	66	74	
Chromium	ug/l	50	30	37.5	<0.5	<5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.6	
Cobalt	ug/l									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Coliform Bacteria	(No/100 ml)	0															
Conductivity	uS/cm @ 25	2500	1000	1875	559	537	597	526	483	521	448	409	422	481	525	521	
Copper	ug/l	2000	30	1500	2.7		1.6			1.7	1.5	1.8	1.9	0.9	1.6	9.6	
Cyanide	mg/l	0.05	10														
D.O.	% Saturation				101	132	102	114	89	97	97	110	99	92	100		
E. Coli	No/100 ml	0															
Fluoride	mg/l	0.8	1000					<0.150									
Iron	ug/l	200	200		37.3	<100	12.5	16.4		<10	<10	<10	25.7	<10	10.3	26.1	
Lead	ug/l	25	10	18.75	<0.5	<5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Magnesium	mg/l Mg		50		11.86		11.29			9.34	9.6	8.87	9.44	8.59	9.42	10.56	
Manganese	ug/l	50	50		34.9		19.4			1.6	2.9	4.8	5.5	1.2	7.4	37.5	
Mercury	ug/l	1	1	0.75	<0.05		<0.05			nm	<0.05	nm	nm	nm	<0.05	nm	
Molybdenum	ug/l		35							0.8	0.7	0.6	<0.5	0.5	0.8	<0.5	
Nickel	ug/l	20	20	15	6.0	5.9	4	4.8		4.3	3.4	3.4	3.5	3.6	7.9	5.3	
Nitrite	mg/l N	0.5	0.1	0.375	0.003	0.003	0.004	<0.002		0.003	<0.002	<0.002	<0.002	0.004	0.005	<0.002	
o-Phosphate	mg/l P		30		<0.02		<0.02		<0.02		<0.02			<0.02			
pH		6.5 - 9.5			8.6	8.1	8.3	8.8	8.9	8.2	8.8	8.7	8.5	7.9	8.2	8.4	
Phenol	mg/l		0.0005		<0.025	<0.025	<0.013	<0.008	<0.016	<0.002	<0.025	<0.002	<0.002	<0.002	<0.002	<0.002	
Potassium	mg/l		5		12.36	9.11	9.51	8.08		8.71	8.56	7.74	9.08	7.09	7.75	9.25	
Sampling Depth	mg/l																
Selenium	ug/l	10								<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	
Silver	ug/l									<0.5	nm	nm	nm	nm			
Sodium	mg/l	200	150	150	62.09		48.26			42.98	43.94	39.36	46.47	35.32	38.71	44.37	
Strontium	ug/l										88.23	84.15	75.29	101.03	111.85	113.83	
Sulphate	mg/l SO4	250	200	187.5	23.2		27.6		21.3		23.4				20.2		
Suspended Solids									<5							6	
Temp	°C				11.0	1.3	13.9	19.2	16.4	6.8	14	20.4	14.5	6.2	9.3	15.6	
Thallium	ug/l										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Time sampled					13:00	12.45	13:10	12:15	13:00	14:35	12:10	13:40	12:00	12:05	11:40	0.53125	
Tin (ug/l)	ug/l										<1	<1	<1	nm	nm		
T.O.C.	mg/l	NAC															
T.O.N	mg/l N		NAC		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.09	0.22	<0.08	0.11	
Total Suspended Solids	mg/l				<5	<5	<5	<5		<5	6	<5	<5	<5	<5		
Uranium	ug/l										0.52	0.42	0.38	0.45	0.52	0.34	
Vanadium	ug/l										<0.5	<0.5	0.63	<0.5	<0.5	<0.5	
Zinc	ug/l		100		7.0					7.6	2.2	4.4	1.5	10.9	5.2	1.8	



Drogheda Landfill Site Surfacewater Quality

Monitoring Point:		SW2																
Date Collected		DWR	IGV	2010 GW Regs	19-Oct-11	20-Jan-11	12-Apr-11	12-Jul-11	04-Oct-11	17-Jan-12	24-Apr-12	25-Jul-12	09-Oct-12	31-Jan-13	16-Apr-13	23-Jul-13	08-Oct-13	
Alkalinity	mg/l CaCO3				320		145				148				138			
Aluminium	ug/l	200	200	150							<5	5.5	<5	15	<5	<5	5.7	
Ammonia	mg/l N	0.23 mg/l N	0.15	0.175	0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	0.1	<0.03	<0.03	
Antimony	ug/l	5									1.1	1.09	1	1.02	1.25	1.22	1.24	
Arsenic	µg/l		10	7.5							0.79	0.78	1.07	3.24	1.16	0.8	1.01	
Barium	µg/l		100		65.3	46.5	41.4	59		41.2	40.5	39.1	41.5	19.3	38.8	40.5	41.8	
Beryllium	µg/l										<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
B.O.D.	mg/l O2				<1.5	1.6	<1.5	<1.5	<1.5	<1.5	<1.5	2.6	2.4	<1.5	1.7	<1.5	<1.0	
Boron	ug/l	1000	1000	750						167.8	179.5	181	212.4	83	158.9	169.2	173.4	
Cadmium	µg/l	5	5	3.75	<0.1	<1	<0.1	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Calcium	mg/l Ca		200		132.46		42.35			36.43	37.94	36.46	37.34	30.37	36.37	36.42	36.25	
C.O.D.	mg/l O2				<10	10	13	18	14	<10	13	27	20	<10	14	16	18	
Chloride	mg/l Cl	250	30	187.5	14	48	63	16	62	62	61	59	58	27	54	59	56	
Chromium	µg/l	50	30	37.5	0.7	<5	<0.5	<0.5		<0.5	<0.5	<0.5	0.6	2.1	0.5	0.9	1.1	
Cobalt	µg/l										<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Coliform Bacteria	(No/100 ml)	0																
Conductivity	µS/cm @ 25	2500	1000	1875	665	633	586	692	584	603	568	554	578	359	550	546	547	
Copper	µg/l	2000	30	1500	3.5		1.1			1	0.7	12.1	1.2	2.2	0.9	1.2	1.2	
Cyanide	mg/l	0.05	10															
D.O.	% Saturation				91	106	108	95	93	94	87	101	90	97	101	81	98	
E_Coli	No/100 ml	0																
Fluoride	mg/l	0.8	1000						0.23									
Iron	µg/l	200	200		34.2	<100	29.2	47.1		<10	<10	<10	<10	15.3	<10	<10	<10	
Lead	µg/l	25	10	18.75	1.4	<5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Magnesium	mg/l Mg		50		10.92		22.23			19.73	20.97	21.55	22.25	11.93	19.11	20.16	20.27	
Manganese	µg/l	50	50		29.0		20.1			1.7	2.7	1.3	2	1	2.1	1.6	2.6	
Mercury	µg/l	1	1	0.75	<0.05		<0.05			nm	<0.05	nm	nm	nm	0.4	nm	nm	
Molybdenum	µg/l		35								1.7	1.8	<0.5	2.2	0.6	2.1	2	
Nickel	µg/l	20	20	15	1.4	<5	1.2	<0.5		1.8	1.1	1.5	1.7	0.9	1.8	2.5	2	
Nitrite	mg/l N	0.5	0.1	0.375	<0.002	0.002	<0.002	<0.002		0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
o-Phosphate	mg/l P		30		0.03		<0.02		<0.02		<0.02				<0.02			
pH		6.5 - 9.5			7.5	8.4	8.5	7.5	8.6	8.2	8.5	8.7	8.3	8.1	8.4	8.6	8.5	
Phenol	mg/l		0.0005		<0.025	<0.025	<0.013	<0.008	<0.016	<0.002	<0.025	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Potassium	mg/l		5		3.06	22.88	30.16	2.41		29.1	30.8	28.48	30.43	11.01	25.62	28.07	27.5	
Sampling Depth	mg/l																	
Selenium	µg/l	10									<0.5	0.6	0.9	33.6	1.8	1.1	1.1	
Silver	µg/l										<0.5	nm	nm	nm	nm			
Sodium	mg/l	200	150	150	10.79		26.64			24.72	25.67	24.58	29.33	10.5	22.49	23.68	23.4	
Strontium	µg/l										204.16	84.15	188.67	85.82	187.69	184.61	191.76	
Sulphate	mg/l SO4	250	200	187.5	12.2		52.8		50.9		49.3				46.8			
Suspended Solids									<5								4	
Temp	°C				11.0	4.0	15	16	16.4	8.1	13.1	19.7	16.2	6.9	10.4	24.1	15.2	
Thallium	µg/l										<0.1	<0.1	<0.1	0.73	<0.1	<0.1	<0.1	
Time sampled					nt	13:15	13:20	13:10	13:30	13:40	13:00	13:20	12:45	13:15	13:10	12:20	10:55	
Tin (µg/l)	µg/l										<1	<1	<1	nm	nm			
T.O.C.	mg/l	NAC																
T.O.N	mg/l N		NAC		1.82	<0.08	<0.08	2.55	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	
Total Suspended Solids	mg/l				<5	<5	10	27		<5	7	<5	<5	11	10	<5		
Uranium	µg/l										0.25	0.26	0.23	0.23	0.25	0.27	0.28	
Vanadium	µg/l										<0.5	0.71	0.84	10.11	<0.5	0.79	0.73	
Zinc	µg/l		100		9.6					4.7	5.2	2.5	2.8	17.6	3.6	1.4	2.5	



Drogheda Landfill Site Surfacewater Quality

Monitoring Point:																	
SW3																	
Date Collected		DWR	IGV	2010 GW Regs	19-Oct-11	20-Jan-11	12-Apr-11	12-Jul-11	04-Oct-11	17-Jan-12	24-Apr-12	25-Jul-12	09-Oct-12	31-Jan-13	16-Apr-13	23-Jul-13	08-Oct-13
Alkalinity	mg/l CaCO3						130				87				135		
Aluminium	ug/l	200	200	150							55.7	14.6	7.4	<5	<5	6.9	<5
Ammonia	mg/l N	0.23 mg/l N	0.15	0.175	0.03	0.09	0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03	0.06	0.07	0.04	0.22
Antimony	ug/l	5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	ug/l		10	7.5							0.61	1.52	1.79	0.81	0.91	2.13	1.86
Barium	ug/l		100		52.6	45.0	64.2	41.1	22.7	41.2	29.2	22.7	23.3	50.6	53.3	64.7	67.1
Beryllium	ug/l										<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
B.O.D.	mg/l O2				<1.5	1.8	<1.5	<1.5	<1.5	<1.5	<1.5	1.9	<1.5	<1.5	<1.5	2	2.1
Boron	ug/l	1000	1000	750						167.8	181.6	185.4	229.2	152.7	167.8	197.5	205
Cadmium	ug/l	5	5	3.75	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Calcium	mg/l Ca		200				43.85			36.43	25.08	20.82	21.14	38.41	43.26	38.41	38.62
C.O.D.	mg/l O2				22	22	22	60	21	<10	23	24	35	<10	12	21	39
Chloride	mg/l Cl	250	30	187.5	87	67	84	86	85	62	75	66	67	63	67	73	75
Chromium	ug/l	50	30	37.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
Cobalt	ug/l										<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Coliform Bacteria	(No/100 ml)	0															
Conductivity	uS/cm @ 25	2500	1000	1875	555	447	579	528	476	603	448	407	429	480	525	525	526
Copper	ug/l	2000	30	1500			1.5			1	1.5	1.5	0.9	1.1	1	0.7	<0.5
Cyanide	mg/l	0.05	10														
D.O.	% Saturation				98	127	103	112	90	94	102	110	99	90	99	68	104
E_Coli	No/100 ml	0															
Fluoride	mg/l	0.8	1000														
Iron	ug/l	200	200		25.5	<100	12.1	12.9	<10	<10	<10	15.3	15.5	12.9	<10	16.4	25.7
Lead	ug/l	25	10	18.75	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/l Mg		50				11.53			19.73	9.42	8.76	9.36	8.39	9.29	10.44	9.98
Manganese	ug/l	50	50				19.9			1.7	3.3	3.2	4.5	1.2	6.7	35.6	65.8
Mercury	ug/l	1	1	0.75			<0.05			nm	<0.05	nm	nm	nm	<0.05	nm	nm
Molybdenum	ug/l		35								0.7	0.9	0.6	0.7	<0.5	0.6	0.6
Nickel	ug/l	20	20	15	6.0	5.6	4	4.7	4.5	1.8	3.4	3.2	3.4	3.5	4.1	5.4	5.5
Nitrite	mg/l N	0.5	0.1	0.375	0.002	0.004	0.004	<0.002	<0.002	0.005	<0.002	<0.002	<0.002	0.004	0.012	<0.002	0.026
o-Phosphate	mg/l P		30				<0.02				<0.02				<0.02		
pH		6.5 - 9.5			8.5	8.3	8.3	8.8	8.9	8.2	8.9	9	8.7	8.1	8.3	8.3	8.4
Phenol	mg/l		0.0005		<0.025	<0.025	<0.013	<0.008	<0.016	<0.002	<0.025	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Potassium	mg/l		5		12.28	7.85	9.84	8.36	10.44	29.1	8.34	7.85	9.17	6.89	7.56	9.07	9.05
Sampling Depth	mg/l																
Selenium	ug/l	10									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Silver	ug/l										<0.5	nm	nm	nm	nm		
Sodium	mg/l	200	150	150			49.53			24.72	42.65	39.05	47.65	34.35	38.11	43.43	42.68
Strontium	ug/l										86.27	84.15	75.17	96.41	107.85	114.73	122.05
Sulphate	mg/l SO4	250	200	187.5			27.8				23.3				20.4		
Suspended Solids																	6
Temp	°C				11.2	0.8	14.4	19.1	16.4	8.1	13.7	20.1	14.2	6.2	8.9	23	15.7
Thallium	ug/l										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Time sampled					13:10	13:15	13:35	12:50	13:20	13:40	13:10	14:15	12:10	13:50	12:45	12:55	13:00
Tin (ug/l)	ug/l										<1	<1	<1	nm	nm		
T.O.C.	mg/l	NAC															
T.O.N	mg/l N		NAC		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.12	0.21	<0.08	<0.08
Total Suspended Solids	mg/l				<5	6	<5	<5	8	<5	<5	<5	<5	<5	<5	<5	<5
Uranium	ug/l										0.47	0.43	0.38	0.44	0.53	0.32	0.25
Vanadium	ug/l										<0.5	<0.5	0.61	<0.5	<0.5	<0.5	<0.5
Zinc	ug/l		100				1.8			4.7	2	2.1	<0.5	5.8	1.6	1.5	1.6



Drogheda Landfill Site Surfacewater Quality

Monitoring Point:		SW4															
Date Collected		20-Oct-09	08-Dec-09	13-Jan-10	27-Apr-10	27-Jul-10	19-Oct-11	12-Jul-11	04-Oct-11	17-Jan-12	24-Apr-12	25-Jul-12	09-Oct-12	31-Jan-13	16-Apr-13	23-Jul-13	08-Oct-13
Alkalinity	mg/l CaCO3				129						216				324		
Aluminium	ug/l										32.5	28.2	19.2	11.4	8.7	78.9	53.2
Ammonia	mg/l N	<0.03		<0.03	0.07		<0.03	0.03	<0.03	<0.03	0.07	0.04	<0.03	<0.03	<0.03	<0.03	0.05
Antimony	ug/l										<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	ug/l										0.72	0.74	0.75	0.66	<0.5	<0.5	<0.5
Barium	ug/l	51.6		35.8	36.4		53.6	27.3	38	42.4	34.8	47.5	44.6	46.4	43	27.6	40.1
Beryllium	ug/l										<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
B.O.D.	mg/l O2	<1.5		<1.5	<1.5		1.8	<1.5	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.0
Boron	ug/l									34.8	28.3	44.3	50.3	23.5	25.3	25.7	21.9
Cadmium	ug/l	<0.1		<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2
Calcium	mg/l Ca				104.17					105.23	87.75	112.96	125.71	113.03	112.32	36.99	56.21
C.O.D.	mg/l O2	26		13	20		12	24	13	23	16	36	16	<10	<10	<10	18
Chloride	mg/l Cl	14		20	17		14	13	15	22	16	9	11	14	15	14	12
Chromium	ug/l	2.6		<1	<1		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.4	<0.5	0.8	0.8	1.1
Cobalt	ug/l										<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Coliform Bacteria	(No/100 ml)																
Conductivity	uS/cm @ 25	735		569	587		702	309	425	656	541	641	717	629	651	299	391
Copper	ug/l				3.9					4.2	2.6	3.2	3.8	3.1	2.7	3.4	2.2
Cyanide	mg/l																
D.O.	% Saturation	59		104	117		44	99	52	64	89	106	57	87	93	85	62
E. Coli	No/100 ml																
Fluoride	mg/l																
Iron	ug/l	<50		<50	25.6		24.4	<10	<10	<10	12.6	<10	<10	21	<10	<10	<10
Lead	ug/l	<1		<1	<1		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/l Mg				8.51					8.59	8.86	11.21	10.98	8.19	8.76	7.26	6.72
Manganese	ug/l				6					<1	1.5	1.2	1.9	<1	1.5	<1	1.2
Mercury	ug/l				<0.1					nm	<0.05	nm	nm	nm	<0.05	nm	nm
Molybdenum	ug/l										1.8	1.4	1.7	1.3	1	1	0.8
Nickel	ug/l	2.3		1.5	1.6		1.9	0.6	0.6	1.4	<0.5	<0.5	1.0	<0.5	1.1	1.3	1.1
Nitrite	mg/l N	<0.002		<0.002	0.002		0.004	<0.002	0.029	<0.002	0.007	0.009	0.003	<0.002	<0.002	<0.002	0.02
o-Phosphate	mg/l P				<0.02						0.02				<0.02		
pH		7.8		8.1	8		8.1	8.4	8	8.1	8.1	8.1	7.9	7.8	7.8	8.3	8
Phenol	mg/l	nm		<0.015	<0.015		nm	<0.016	<0.016	<0.002	<0.025	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Potassium	mg/l	7.15		4.59	2.99		7.19	9.62	14.27	6.92	5.03	2.99	2.25	1.05	1.86	5.3	7.41
Sampling Depth	mg/l																
Selenium	ug/l										<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5
Silver	ug/l										<0.5	nm	nm	nm	nm		
Sodium	mg/l				10.91					13.95	11.62	11.79	14.04	9.14	9.49	10.26	9.96
Strontium	ug/l										221.81	277.57	256.450	221.09	229.5	158.78	190.76
Sulphate	mg/l SO4				33.3						46.3				16.4		
Suspended Solids																	<4
Temp	°C	11.9		3.4	12.3		11.6	16	15.5	7.7	10.3	18	14.6	6.2	6.4	18.7	14.4
Thallium	ug/l										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Time sampled		12.40		13.05	13.4		13:45	12:30	13:10	14:45	12:55	14:05	12:40	12:35	12:30	13:25	13:25
Tin (ug/l)	ug/l										<1	<1	<1	nm	nm		
T.O.C.	mg/l																
T.O.N	mg/l N	0.58		0.68	0.72		0.65	<0.08	0.59	1.26	1.67	0.17	0.46	0.42	0.26	<0.08	0.11
Total Suspended Solids	mg/l			<5	<5		<5	<5	<5	10	<5	<5	<5	<5	<5	<5	
Uranium	ug/l										2.43	3.05	3.18	2.67	2.55	1.69	1.73
Vanadium	ug/l										0.76	1.06	1.18	0.74	0.61	1	1.16
Zinc	ug/l				8.5					7.3	3.1	7.2	2.4	2	2.7	2.5	3.1



Drogheda Landfill Site Surfacewater Quality

Monitoring Point:		SW5															
Date Collected		20-Oct-09	08-Dec-09	13-Jan-10	27-Apr-10	27-Jul-10	19-Oct-11	12-Jul-11	04-Oct-11	17-Jan-12	24-Apr-12	25-Jul-12	09-Oct-12	31-Jan-13	16-Apr-13	23-Jul-13	08-Oct-13
Alkalinity	mg/l CaCO3				254						316				298		
Aluminium	ug/l										25.3	16.2	14.9	9.1	9.2	94	76.9
Ammonia	mg/l N	0.05		<0.03	0.1		0.09	0.12	0.35	<0.03	0.05	0.08	0.05	<0.03	0.03	0.07	0.05
Antimony	ug/l										<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	ug/l										0.82	0.55	0.87	0.52	0.55	0.6	0.57
Barium	ug/l	53.9		42.6	37.5		54.8	41.9	54.9	41.5	42.5	57.8	50.1	48.2	41.9	41.6	56.2
Beryllium	ug/l										<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
B.O.D.	mg/l O2	<3.0		<1.5	<1.5		2.5	<1.5	2.7	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.0
Boron	ug/l									31.5	24.8	45.3	43.7	20.8	20.1	18.9	19
Cadmium	ug/l	<0.1		<0.1	<0.1		<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Calcium	mg/l Ca				101.48					112.13	118.78	144.59	139.69	123.79	112.03	58.11	77.06
C.O.D.	mg/l O2	45		20	19		12	24	21	13	11	26	15	<10	<10	23	19
Chloride	mg/l Cl	10		18	15		13	14	20	15	15	9	10	12	18	16	15
Chromium	ug/l	<1		<1	<1		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	0.7	0.6	1.1
Cobalt	ug/l										<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Coliform Bacteria	(No/100 ml)																
Conductivity	µS/cm @ 25	752		717	573		749	414	725	651	656	752	751	665	633	390	482
Copper	ug/l				4.5					213.7	2.2	3.1	2.8	2.7	2.3	2.5	1.8
Cyanide	mg/l																
D.O.	% Saturation	56		103	115		33	89	41	36	40	104	38	83	120	63	76
E_Coli	No/100 ml																
Fluoride	mg/l																
Iron	ug/l	<50		<50	33.1		36.7	<10	20.1	<10	37.8	10.3	12.6	17.2	<10	<10	<10
Lead	ug/l	<1		<1	<1		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/l Mg				7.16					6.93	8.25	11.49	9.81	7.54	7.55	6.36	6.21
Manganese	ug/l				1.7					2.1	2.6	1.2	3.6	1.4	1.7	<1	<1
Mercury	ug/l				<0.1					nm	<0.05	nm	nm	nm	<0.05	nm	nm
Molybdenum	ug/l										1	0.9	1.0	0.9	0.8	0.7	0.6
Nickel	ug/l	2.1		1.1	<1		1.4	<0.5	<0.5	1.1	<0.5	<0.5	0.5	<0.5	1.2	1.3	1
Nitrite	mg/l N	0.032		<0.002	0.002		0.051	0.009		0.051	0.037	0.002	0.008	<0.002	<0.002	0.008	0.016
o-Phosphate	mg/l P				<0.02				nm		0.08				<0.02		
pH		7.8		7.8	8.1		8.1	8.2	7.8	7.9	7.9	7.8	7.8	7.7	7.8	8.1	8.2
Phenol	mg/l	nm		<0.015	<0.015		nm	<0.016	<0.016	<0.002	<0.025	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Potassium	mg/l	5.69		1.56	2.4		4.27	8.24	4.85	4.87	3.88	1.46	1.67	0.79	1.45	5.05	7.9
Sampling Depth	mg/l																
Selenium	ug/l										<0.5	<0.5	<0.5	<0.5	0.5	0.6	<0.5
Silver	ug/l										<0.5	nm	nm	nm	nm		
Sodium	mg/l				10.15					12.33	11.21	11.6	13.10	8.31	9.05	9.34	9.78
Strontium	ug/l										230.63	291.91	251.600	221.21	209.22	164.94	198.68
Sulphate	mg/l SO4				26.4						30.3				12.9		
Suspended Solids																	<4
Temp	°C	12.1		4.4	11.9		11.8	15.6	15.4	8.1	10.3	18	14.7	6.1	7.4	18.1	14.2
Thallium	ug/l										<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Time sampled		13.00		13.25	14.05		13:50	13:10	13:45	15:00	13:20	14:25	12:50	12:45	13:05	13:40	13:40
Tin (ug/l)	ug/l										<1	<1	<1	nm	nm		
T.O.C.	mg/l																
T.O.N	mg/l N	0.53		0.72	0.76		0.85	1.64	0.64	1.34	1.75	0.17	0.65	0.52	0.22	1.49	1.64
Total Suspended Solids	mg/l			<5	<5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Uranium	ug/l										2.18	2.81	2.48	2.13	1.95	1.36	1.32
Vanadium	ug/l										0.78	1.08	1.22	0.75	0.51	0.84	1.17
Zinc	ug/l				2					2.4	3	2.5	1.0	1.7	1.8	3.3	3

APPENDIX F

LANDFILL GAS RESULTS

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.:			
Licensee: Drogheda Borough Council			
Date of licensing:		Date of sampling: 30/01/13	Time of sampling: 08:50
Instrument used: Geotechnical Instruments GA2000		Date Next Full Calibration: 06/06/13 Last Field Calibration: (include date and gases)	
Monitoring Personnel: Shane Boylan		Weather: Cold/Wet & windy	Barometric pressure: (e.g. 1001-1003 mbar rising) Mean temperature:

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 1	23.0	18.7	8.3	0	0	Manifold 1
GW 2	26.7	20.5	8.2	0	0	Manifold 1
GW 3	24.2	18.2	15.3	0	0	Manifold 1
GW 4	29.1	22.6	6.5	0	0	Manifold 1
GW 5	25.1	19.1	6.3	0	0	Manifold 1
GW 6	44.5	29.7	1.8	0	0	Manifold 1
GW 7	15.6	16.4	7.5	0	0	Manifold 1
GW 8	26.8	19.1	9.1	0	0	Manifold 1
GW 9	25.2	21.1	7.1	0	0	Manifold 1
GW 10	32.3	25.7	3.2	0	0	Manifold 1
GW 11	33.6	28.4	1.1	0	1	Manifold 1
GW 12	37.4	28.2	0.0	0	1	Manifold 1
GW 13	17.5	16.3	10.6	0	0	Manifold 2
GW 14						Manifold 2 Broken connector
GW 15	40.7	30.7	0.0	0	0	Manifold 2
GW 16	28.0	20.6	6.8	2	6	Manifold 2
GW 17	38.2	26.7	4.9	2	40	Manifold 2
GW 18	52.6	31.8	0.3	0	19	Manifold 2
GW 19	26.2	19.6	8.4	0	0	Manifold 2
GW 20	22.7	17.7	8.5	0	0	Manifold 2
GW 21	9.5	18.2	1.2	0	0	Manifold 2
GW 22	4.4	19.8	1.7	0	0	Manifold 2
GW 23	20.9	16.1	11.2	0	1	Manifold 2
GW 24	36.9	26.2	6.2	0	4	Manifold 2

General Comments

Note:

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 25	9.6	6.6	17.2	0	0	Manifold 3
GW 26	8.0	5.6	17.8	0	0	Manifold 3
GW 27	8.6	5.8	17.8	0	0	Manifold 3
GW 28	1.9	4.6	17.1	11	0	Manifold 3
GW 29	6.4	4.2	20.7	0	0	Manifold 3
GW 30	6.2	4.3	18.4	2	0	Manifold 3
GW 31	7.9	5.3	15.8	30	0	Manifold 3
GW 32	1.4	2.5	20.2	0	0	Manifold 3
GW 33	0.5	0.3	21.0	0	0	Manifold 3
GW 34	0.2	0.3	21.1	0	0	Manifold 3
GW 35	0.2	1.2	21.0	0	0	Manifold 4
GW 36	21.2	16.9	6.9	0	2	Manifold 4
GW 37	0.2	0.2	20.5	0	0	Manifold 4
GW 38	30.6	16.4	4.9	0	0	Manifold 4
GW 39	0.3	0.4	20.4	0	0	Manifold 4
GW 40	36.6	31.1	0.5	0	3	Manifold 4
GW 41	28.4	29.4	0.3	0	4	Manifold 4
GW 42	20.5	25.3	0.4	1	0	Manifold 4
GW 43	0.1	1.6	18.6	0	0	Manifold 4
GW 44	0.6	1.1	20.0	0	0	Manifold 4
GW 45	21.9	22.0	3.5	0	0	Manifold 5
GW 46	19.2	19.1	6.6	1	0	Manifold 5
GW 47	23.0	22.9	1.5	2	0	Manifold 5
GW 48	13.5	12.8	11.4	0	0	Manifold 5
GW 49	15.1	14.8	8.9	0	0	Manifold 5
GW 50	23.1	23.0	1.9	0	0	Manifold 5
GW 51	12.2	11.5	11.8	0	0	Manifold 5
GW 52	0.3	2.5	17.9	0	0	Manifold 5

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 53	11.9	11.5	11.3	0	0	Manifold 5
GW 54	16.1	16.2	7.5	0	0	Manifold 5
BH1A	0.2	0.3	20.2	0	0	31.953m A.O.D Top of Cover
BH2A	0.1	0.4	20.6	0	0	32.362m A.O.D Top of Cover
BH3A	0.2	0.4	20.1	0	0	33.664m A.O.D Top of Cover
BH4A	0.1	0.4	20.2	0	0	33.570m A.O.D Top of Cover
BH5A	0.2	1.4	17.1	0	0	36.130m A.O.D Top of Cover
BH6A	0.2	0.1	20.9	0	0	35.951m A.O.D Top of Cover
BH7A	0.2	0.1	20.8	0	0	25.172m A.O.D Top of Cover
BH8A	0.2	0.0	20.9	0	0	36.151m A.O.D Top of Cover
BH9A	0.2	0.4	20.5	0	0	34.345m A.O.D Top of Cover
BH10A	0.2	0.1	21.1	0	0	32.776m A.O.D Top of Cover
BH11A	0.2	0.1	21.1	0	0	21.715m A.O.D Top of Cover
LG1	0.1	0.1	21.1	0	0	
LG2	0.1	0.1	21.0	0	0	
LG3	0.1	0.2	20.4	0	0	
LG4	0.2	2.9	18.9	0	0	
LG5	0.2	1.1	18.5	0	0	
LG6	0.2	0.1	20.8	0	0	
LG7						Broken
PZ8	0.2	0.5	20.5	0	0	Constructed 26/02/12
PZ9	0.0	0.0	19.6	0	0	Constructed 26/02/12
PZ10	0.2	0.1	19.2	0	0	Constructed 26/02/12

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.:			
Licensee: Drogheda Borough Council			
Date of licensing:		Date of sampling: 20/02/13	Time of sampling: 09:00
Instrument used: Geotechnical Instruments GA2000		Date Next Full Calibration: 06/06/13	
		Last Field Calibration: (include date and gases)	
Monitoring Personnel: Shane Boylan		Weather: Dry/sunny	Barometric pressure: (e.g. 1001-1003 mbar rising) 1027mb Mean temperature:

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (%v/v)	O ₂ (%v/v)	CO ppm	H ₂ S ppm	Comments
GW 1	33.3	25.3	5.2	0	0	Manifold 1
GW 2	35.8	26.1	5.4	0	0	Manifold 1
GW 3	39.9	27.2	5.5	0	0	Manifold 1
GW 4	47.1	28.9	4.7	0	1	Manifold 1
GW 5	45.9	27.4	5.8	0	0	Manifold 1
GW 6	52.6	29.0	4.7	0	0	Manifold 1
GW 7	48.8	27.2	2.3	0	0	Manifold 1
GW 8	51.9	25.0	2.4	0	0	Manifold 1
GW 9	55.2	24.7	6.6	0	0	Manifold 1
GW 10	63.0	27.0	6.0	0	0	Manifold 1
GW 11	65.1	27.1	5.9	0	0	Manifold 1
GW 12	65.4	25.7	6.5	0	0	Manifold 1
GW 13	26.3	17.9	5.0	0	1	Manifold 2
GW 14						Manifold 2 Broken connector
GW 15	72.1	32.3	5.6	0	4	Manifold 2
GW 16	81.0	33.0	0.1	0	6	Manifold 2
GW 17	71.9	26.8	3.3	0	9	Manifold 2
GW 18	91.4	33.4	2.6	0	24	Manifold 2
GW 19	71.2	32.3	4.1	0	0	Manifold 2
GW 20	68.3	26.5	3.9	0	0	Manifold 2
GW 21	30.8	19.1	2.7	0	0	Manifold 2
GW 22	17.8	20.3	1.9	0	2	Manifold 2
GW 23	50.1	18.8	9.0	0	5	Manifold 2
GW 24	49.5	18.3	9.8	0	3	Manifold 2

General Comments

Note:

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 25	82.8	34.3	1.5	0	12	Manifold 3
GW 26	78.1	33.6	2.7	0	9	Manifold 3
GW 27	80.7	34.4	3.0	0	13	Manifold 3
GW 28	12.2	4.9	13.3	9	2	Manifold 3
GW 29	80.1	35.7	0.2	0	18	Manifold 3
GW 30	72.9	34.4	2.6	0	5	Manifold 3
GW 31	18.5	5.6	12.6	24	0	Manifold 3
GW 32	70.8	35.2	1.2	0	13	Manifold 3
GW 33	74.4	39.4	0.4	0	10	Manifold 3
GW 34	69.3	37.4	2.9	0	10	Manifold 3
GW 35						Manifold 4 full of water
GW 36	61.2	34.6	1.0	0	24	Manifold 4
GW 37	2.0	0.2	16.9	0	1	Manifold 4
GW 38	54.6	34.6	0.3	0	27	Manifold 4
GW 39	1.1	0.5	17.9	0	0	Manifold 4
GW 40	48.8	34.4	0.0	0	4	Manifold 4
GW 41	45.9	33.9	0.0	0	17	Manifold 4
GW 42	47.2	34.1	1.8	0	6	Manifold 4
GW 43	1.4	2.6	15.5	0	0	Manifold 4
GW 44						Manifold 4 full of water
GW 45	41.5	30.1	0.1	0	12	Manifold 5
GW 46	45.7	32.2	0.0	0	7	Manifold 5
GW 47	41.2	30.6	0.0	0	22	Manifold 5
GW 48	41.3	30.9	1.3	0	0	Manifold 5
GW 49	42.2	31.3	3.2	0	8	Manifold 5
GW 50	44.6	32.5	0.0	0	8	Manifold 5
GW 51	45.2	32.2	0.6	0	2	Manifold 5
GW 52	0.4	2.9	15.4	0	0	Manifold 5

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 53	45.2	32.7	1.1	0	0	Manifold 5
GW 54	45.3	32.6	0.0	0	0	Manifold 5
BH1A	0.2	0.2	20.2	0	0	31.953m A.O.D Top of Cover
BH2A	0.2	0.1	20.4	0	0	32.362m A.O.D Top of Cover
BH3A	0.1	1.4	18.8	0	0	33.664m A.O.D Top of Cover
BH4A	0.2	2.4	10.1	0	0	33.570m A.O.D Top of Cover
BH5A	0.2	2.2	15.9	0	0	36.130m A.O.D Top of Cover
BH6A	0.2	0.1	20.3	0	0	35.951m A.O.D Top of Cover
BH7A	0.2	0.1	20.0	0	0	25.172m A.O.D Top of Cover
BH8A	0.2	1.1	19.3	0	0	36.151m A.O.D Top of Cover
BH9A	0.2	0.4	20.0	0	0	34.345m A.O.D Top of Cover
BH10A	0.2	0.1	20.4	0	0	32.776m A.O.D Top of Cover
BH11A	0.2	0.1	20.4	0	0	21.715m A.O.D Top of Cover
LG1						Full of water
LG2	0.3	0.2	20.3	0	0	
LG3	0.1	0.2	20.0	0	0	
LG4	0.1	1.2	18.8	0	0	
LG5	0.1	0.1	20.3	0	0	
LG6	0.2	0.0	20.7	0	0	
LG7						Broken
PZ8	0.1	0.5	19.5	0	0	Constructed 26/02/12
PZ9	0.2	2.0	4.8	0	0	Constructed 26/02/12
PZ10	0.2	0.1	19.1	0	0	Constructed 26/02/12

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.:			
Licensee: Drogheda Borough Council			
Date of licensing:		Date of sampling: 29/05/13	Time of sampling: 09:10
Instrument used: Geotechnical Instruments GA2000		Date Next Full Calibration: 06/06/13	
		Last Field Calibration: (include date and gases)	
Monitoring Personnel: Shane Boylan		Weather: Sunny	Barometric pressure: (e.g. 1001-1003 mbar rising) 1011mb Mean temperature:

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 1	6.7	6.2	15.9	0	0	Manifold 1
GW 2	6.8	6.6	15.8	0	0	Manifold 1
GW 3	7.4	7.0	15.2	0	0	Manifold 1
GW 4	0.7	0.7	19.1	0	0	Manifold 1
GW 5	7.0	6.7	15.7	0	1	Manifold 1
GW 6	1.0	2.3	18.4	0	0	Manifold 1
GW 7	19.5	20.7	2.4	0	0	Manifold 1
GW 8	16.9	16.4	2.6	0	0	Manifold 1
GW 9	11.6	17.8	9.4	0	0	Manifold 1
GW 10	0.2	10.7	15.4	0	0	Manifold 1
GW 11	18.7	21.3	2.6	1	0	Manifold 1
GW 12	29.0	25.6	0.7	0	5	Manifold 1
GW 13	0.1	13.2	14.3	0	0	Manifold 2
GW 14						Manifold 2 BROKEN CONNECTOION
GW 15	3.9	2.4	18.7	0	0	Manifold 2
GW 16	0.1	0.2	20.3	0	0	Manifold 2
GW 17	0.1	0.1	20.2	0	0	Manifold 2
GW 18	0.1	0.3	20.2	0	0	Manifold 2
GW 19	2.3	2.9	17.9	0	0	Manifold 2
GW 20	1.8	1.8	19.1	0	0	Manifold 2
GW 21	4.9	17.8	0.0	0	0	Manifold 2
GW 22	2.6	19.0	0.5	0	0	Manifold 2
GW 23	0.0	0.0	20.4	0	0	Manifold 2
GW 24	0.0	10.2	14.4	0	0	Manifold 2

General Comments

Note:

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 25	5.0	3.5	18.2	0	0	Manifold 3
GW 26	3.4	2.7	18.8	0	0	Manifold 3
GW 27	3.6	2.7	18.6	0	0	Manifold 3
GW 28	1.7	3.9	16.6	12	0	Manifold 3
GW 29	2.0	2.0	19.0	0	0	Manifold 3
GW 30	3.5	2.9	18.5	0	0	Manifold 3
GW 31	7.5	5.0	15.1	29	0	Manifold 3
GW 32	1.2	4.3	18.1	0	0	Manifold 3
GW 33	2.1	2.1	19.0	0	0	Manifold 3
GW 34	2.0	1.9	19.1	0	0	Manifold 3
GW 35	0.0	2.7	18.0	0	0	Manifold 4
GW 36	1.7	1.9	19.3	0	0	Manifold 4
GW 37	0.0	0.0	20.4	0	0	Manifold 4
GW 38	1.6	1.8	19.4	0	0	Manifold 4
GW 39	0.1	0.2	20.1	0	0	Manifold 4
GW 40	1.6	1.9	19.3	0	0	Manifold 4
GW 41	1.6	1.9	19.3	0	0	Manifold 4
GW 42	1.8	1.9	19.1	0	0	Manifold 4
GW 43	0.2	1.5	17.8	0	0	Manifold 4
GW 44						Manifold 4 FULL OF WATER
GW 45	2.3	1.9	19.2	0	0	Manifold 5
GW 46	2.2	1.9	19.3	0	0	Manifold 5
GW 47	2.1	1.9	19.2	0	0	Manifold 5
GW 48	4.2	3.0	18.4	0	0	Manifold 5
GW 49	2.1	1.9	19.3	0	0	Manifold 5
GW 50	2.1	1.8	19.3	0	0	Manifold 5
GW 51	3.9	2.9	18.6	0	0	Manifold 5
GW 52	0.3	0.7	19.6	0	0	Manifold 5

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 53	5.7	4.3	18.0	0	0	Manifold 5
GW 54	4.9	3.9	18.0	0	0	Manifold 5
BH1A	0.0	0.1	20.4	0	0	31.953m A.O.D Top of Cover
BH2A	0.0	0.0	20.6	0	0	32.362m A.O.D Top of Cover
BH3A	0.0	1.9	18.9	0	0	33.664m A.O.D Top of Cover
BH4A	0.0	0.0	20.5	0	0	33.570m A.O.D Top of Cover
BH5A	0.0	2.7	15.9	0	0	36.130m A.O.D Top of Cover
BH6A	0.0	0.0	20.9	0	0	35.951m A.O.D Top of Cover
BH7A	0.0	0.0	20.5	0	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.3	20.7	0	0	36.151m A.O.D Top of Cover
BH9A	0.0	0.0	21.1	0	0	34.345m A.O.D Top of Cover
BH10A	0.0	0.0	21.1	0	0	32.776m A.O.D Top of Cover
BH11A	0.0	0.0	21.2	1	1	21.715m A.O.D Top of Cover
LG1	0.0	0.1	20.3	0	0	
LG2	0.2	7.5	13.5	0	0	
LG3	0.2	4.9	14.2	0	0	
LG4	0.0	0.0	20.8	0	0	
LG5	0.0	0.0	20.9	0	1	
LG6	0.0	0.0	20.8	0	0	
LG7						BROKEN CONNECTOR
PZ8	0.0	0.9	18.7	0	0	Constructed 26/02/12
PZ9	0.0	2.1	14.1	0	0	Constructed 26/02/12
PZ10						Constructed 26/02/12 FULL OF WATER

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.:			
Licensee: Drogheda Borough Council			
Date of licensing:		Date of sampling: 21/06/13	Time of sampling: 08:50
Instrument used: Geotechnical Instruments GA2000		Date Next Full Calibration: 06/06/13	
		Last Field Calibration: (include date and gases)	
Monitoring Personnel: Shane Boylan		Weather: Dry/Sunny	Barometric pressure: (e.g. 1001-1003 mbar rising) 1009mb Mean temperature:

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 1	5.4	5.0	16.2	0	1	Manifold 1
GW 2	6.2	5.8	15.7	0	1	Manifold 1
GW 3	6.3	5.6	15.7	0	0	Manifold 1
GW 4	0.4	1.7	18.5	0	1	Manifold 1
GW 5	32.0	24.7	1.2	0	4	Manifold 1
GW 6	32.3	26.2	0.8	3	5	Manifold 1
GW 7	0.1	2.5	19.3	0	0	Manifold 1
GW 8	0.1	2.0	19.3	0	1	Manifold 1
GW 9	0.1	0.4	20.4	0	0	Manifold 1
GW 10	0.2	0.9	20.0	0	1	Manifold 1
GW 11	23.3	25.4	0.7	1	14	Manifold 1
GW 12	29.7	25.3	1.3	0	10	Manifold 1
GW 13	0.2	5.3	16.1	0	1	Manifold 2
GW 14						Manifold 2 BROKEN CONNECTOR
GW 15	19.3	21.4	0.7	0	4	Manifold 2
GW 16	33.7	28.2	0.0	1	5	Manifold 2
GW 17	15.7	19.5	5.4	3	14	Manifold 2
GW 18	40.8	28.8	0.0	4	12	Manifold 2
GW 19	13.9	14.5	9.6	0	1	Manifold 2
GW 20	29.9	26.8	0.2	0	1	Manifold 2
GW 21	3.1	19.0	0.3	0	0	Manifold 2
GW 22	4.2	20.6	0.7	2	0	Manifold 2
GW 23	12.1	6.6	16.2	0	3	Manifold 2
GW 24	29.0	19.4	9.6	0	15	Manifold 2

General Comments

Note:

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 25	52.5	36.1	0.0	1	21	Manifold 3
GW 26	44.1	31.5	3.1	0	8	Manifold 3
GW 27	47.3	32.9	1.6	5	13	Manifold 3
GW 28	1.9	4.1	16.4	12	1	Manifold 3
GW 29	47.8	29.7	0.7	0	6	Manifold 3
GW 30	46.9	29.5	1.2	3	3	Manifold 3
GW 31	7.5	5.0	15.2	31	1	Manifold 3
GW 32	0.1	1.8	19.4	0	0	Manifold 3
GW 33	47.4	33.2	1.4	0	2	Manifold 3
GW 34	0.1	0.0	20.6	0	0	Manifold 3
GW 35	0.0	2.7	18.8	0	0	Manifold 4
GW 36	22.2	17.4	6.8	0	4	Manifold 4
GW 37	0.2	0.1	19.9	0	0	Manifold 4
GW 38	33.1	20.1	3.4	0	0	Manifold 4
GW 39	0.2	0.3	19.9	2	0	Manifold 4
GW 40	38.6	30.4	0.6	0	5	Manifold 4
GW 41	30.1	25.4	0.7	4	6	Manifold 4
GW 42	25.6	25.5	0.2	0	10	Manifold 4
GW 43	0.1	2.5	19.0	1	0	Manifold 4
GW 44						Manifold 4 FULL OF WATER
GW 45	16.1	20.5	1.2	0	5	Manifold 5
GW 46	38.3	29.0	2.7	0	4	Manifold 5
GW 47	33.7	28.8	0.7	0	26	Manifold 5
GW 48	34.4	28.5	0.4	0	4	Manifold 5
GW 49	37.0	27.7	0.0	2	16	Manifold 5
GW 50	26.4	25.9	0.0	1	10	Manifold 5
GW 51	29.5	26.4	0.5	2	8	Manifold 5
GW 52	0.2	0.8	19.6	0	0	Manifold 5

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 53	26.5	23.8	1.9	0	7	Manifold 5
GW 54	25.8	23.8	2.1	0	8	Manifold 5
BH1A	0.1	0.5	20.0	0	0	31.953m A.O.D Top of Cover
BH2A	0.1	0.0	20.7	0	1	32.362m A.O.D Top of Cover
BH3A	0.1	0.5	19.8	0	0	33.664m A.O.D Top of Cover
BH4A	0.1	0.3	20.5	0	1	33.570m A.O.D Top of Cover
BH5A	0.0	2.6	16.8	0	1	36.130m A.O.D Top of Cover
BH6A	0.0	0.0	20.6	0	0	35.951m A.O.D Top of Cover
BH7A	0.1	0.1	20.8	0	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.1	20.4	0	0	36.151m A.O.D Top of Cover
BH9A	0.1	1.3	19.0	0	0	34.345m A.O.D Top of Cover
BH10A	0.0	0.0	20.8	0	0	32.776m A.O.D Top of Cover
BH11A	0.1	0.1	20.8	0	0	21.715m A.O.D Top of Cover
LG1	0.0	0.2	20.5	0	0	
LG2	0.2	12.1	9.8	0	0	
LG3	0.2	4.8	14.7	0	1	
LG4	0.1	1.3	19.2	0	0	
LG5	0.1	6.6	14.1	1	0	
LG6	0.0	0.0	20.9	0	1	
LG7						BROKEN
PZ8	0.1	1.7	16.9	0	0	Constructed 26/02/12
PZ9						Constructed 26/02/12 Machine wouldn't work at this point, unable to read PZ9 or PZ10. sent to be fixed/serviced
PZ10						Constructed 26/02/12

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.:			
Licensee: Drogheda Borough Council			
Date of licensing:		Date of sampling: 18/07/13	Time of sampling: 09:00
Instrument used: Geotechnical Instruments GA2000		Date Next Full Calibration: December 2013	
		Last Field Calibration: (include date and gases)	
Monitoring Personnel: Shane Boylan		Weather: Sunny	Barometric pressure: (e.g. 1001-1003 mbar rising) 1020 Mean temperature:

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 1	3.3	3.1	17.3	0	1	Manifold 1
GW 2	5.3	4.9	15.7	2	1	Manifold 1
GW 3	1.2	1.0	19.1	3	1	Manifold 1
GW 4	0.7	2.1	17.8	2	1	Manifold 1
GW 5	33.3	24.7	0.9	5	3	Manifold 1
GW 6	37.0	25.5	0.7	3	5	Manifold 1
GW 7	0.1	5.2	17.8	0	1	Manifold 1
GW 8	0.1	1.7	19.2	0	1	Manifold 1
GW 9	0.1	1.1	19.5	1	1	Manifold 1
GW 10	0.1	0.4	19.8	3	1	Manifold 1
GW 11	29.0	25.4	1.0	3	10	Manifold 1
GW 12	33.1	24.8	1.3	0	8	Manifold 1
GW 13	0.1	3.7	17.9	0	1	Manifold 2
GW 14	0.1	3.0	18.1	1	1	Manifold 2
GW 15	24.6	23.9	0.7	4	3	Manifold 2
GW 16	36.7	27.7	0.1	2	6	Manifold 2
GW 17	18.5	18.6	6.5	4	11	Manifold 2
GW 18	44.1	27.7	0.1	3	9	Manifold 2
GW 19	0.2	3.2	17.9	2	0	Manifold 2
GW 20	18.7	17.1	7.4	2	2	Manifold 2
GW 21	0.0	9.1	13.4	0	1	Manifold 2
GW 22	0.0	15.2	7.9	0	1	Manifold 2
GW 23	7.5	3.9	17.3	1	2	Manifold 2
GW 24	32.7	21.3	9.1	0	10	Manifold 2

General Comments

Note:

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 25	53.5	35.0	0.0	1	7	Manifold 3
GW 26	44.9	30.4	2.4	4	3	Manifold 3
GW 27	45.6	30.9	2.3	6	4	Manifold 3
GW 28	1.8	3.6	16.2	8	1	Manifold 3
GW 29	50.1	29.1	0.5	1	6	Manifold 3
GW 30	43.5	28.5	2.6	3	1	Manifold 3
GW 31	6.9	4.7	15.0	33	1	Manifold 3
GW 32	0.0	1.4	19.2	0	1	Manifold 3
GW 33	50.3	33.9	0.5	2	2	Manifold 3
GW 34	0.0	0.0	20.2	0	0	Manifold 3
GW 35	0.0	1.8	19.0	0	1	Manifold 4
GW 36	21.9	15.9	8.2	1	4	Manifold 4
GW 37	0.0	0.1	20.1	4	0	Manifold 4
GW 38	30.6	19.5	1.6	4	1	Manifold 4
GW 39	0.3	0.4	19.7	0	1	Manifold 4
GW 40	10.9	30.4	0.1	0	7	Manifold 4
GW 41	36.5	24.9	1.3	2	8	Manifold 4
GW 42	31.6	26.3	0.4	0	14	Manifold 4
GW 43	0.1	2.1	19.0	0	1	Manifold 4
GW 44						Manifold 4 FULL OF WATER
GW 45	21.2	21.9	0.7	2	6	Manifold 5
GW 46	39.4	29.9	2.4	1	4	Manifold 5
GW 47	37.6	28.7	0.3	5	18	Manifold 5
GW 48	27.1	24.3	1.7	0	3	Manifold 5
GW 49	41.8	28.1	0.0	2	14	Manifold 5
GW 50	32.1	26.3	0.1	13	1	Manifold 5
GW 51	32.8	25.6	0.7	1	9	Manifold 5
GW 52	0.2	0.5	19.6	2	0	Manifold 5

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 53	27.6	22.3	3.6	0	6	Manifold 5
GW 54	28.8	23.2	2.9	5	7	Manifold 5
BH1A	0.1	0.9	19.1	0	1	31.953m A.O.D Top of Cover
BH2A	0.0	0.0	20.1	1	1	32.362m A.O.D Top of Cover
BH3A	0.0	0.7	18.8	1	1	33.664m A.O.D Top of Cover
BH4A	0.0	0.0	20.2	2	1	33.570m A.O.D Top of Cover
BH5A	0.0	1.9	17.3	0	1	36.130m A.O.D Top of Cover
BH6A	0.0	0.0	19.9	3	1	35.951m A.O.D Top of Cover
BH7A	0.0	0.0	20.1	0	1	25.172m A.O.D Top of Cover
BH8A	0.0	0.2	19.7	1	1	36.151m A.O.D Top of Cover
BH9A	0.0	0.5	19.1	1	2	34.345m A.O.D Top of Cover
BH10A	0.0	0.0	20.2	1	1	32.776m A.O.D Top of Cover
BH11A	0.0	0.0	19.9	2	1	21.715m A.O.D Top of Cover
LG1	0.0	0.4	19.8	2	1	
LG2	0.1	11.8	11.1	3	1	
LG3	0.1	8.3	2.4	2	1	
LG4	0.0	0.1	19.9	3	1	
LG5	0.0	0.8	19.2	4	1	
LG6	0.0	0.0	20.0	3	1	
LG7	0.0	0.0	20.0	2	1	
PZ8	0.0	0.8	19.1	0	0	Constructed 26/02/12
PZ9	0.0	2.0	17.6	0	0	Constructed 26/02/12
PZ10						Constructed 26/02/12 Unable to read

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.:			
Licensee: Drogheda Borough Council			
Date of licensing:		Date of sampling: 29-08-13	Time of sampling: 08:45
Instrument used: Geotechnical Instruments GA2000		Date Next Full Calibration: Dec 2013	
		Last Field Calibration: (include date and gases)	
Monitoring Personnel: Shane Boylan		Weather: Overcast	Barometric pressure: (e.g. 1001-1003 mbar rising) 1018mb Mean temperature:

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 1	5.7	7.4	14.5	0	0	Manifold 1
GW 2	6.0	7.8	14.1	0	1	Manifold 1
GW 3	1.3	1.3	19.5	0	0	Manifold 1
GW 4	0.2	2.3	18.1	0	1	Manifold 1
GW 5	21.4	24.1	1.6	1	4	Manifold 1
GW 6	25.8	25.7	0.5	0	4	Manifold 1
GW 7	0.1	0.9	20.1	0	0	Manifold 1
GW 8	0.1	1.0	20.1	0	0	Manifold 1
GW 9	0.1	0.7	20.3	0	0	Manifold 1
GW 10	0.1	0.9	19.7	0	1	Manifold 1
GW 11	17.9	25.7	0.6	0	12	Manifold 1
GW 12	24.7	26.1	1.6	0	9	Manifold 1
GW 13	0.0	0.6	20.3	0	0	Manifold 2
GW 14	0.0	0.4	20.4	0	0	Manifold 2
GW 15	14.0	23.3	0.5	1	3	Manifold 2
GW 16	30.2	27.5	0.0	0	6	Manifold 2
GW 17	15.1	19.8	4.6	0	1	Manifold 2
GW 18	37.0	27.9	0.0	1	16	Manifold 2
GW 19	0.0	1.7	19.5	0	0	Manifold 2
GW 20	10.3	11.4	11.8	0	1	Manifold 2
GW 21	0.0	1.4	19.8	0	0	Manifold 2
GW 22	0.0	2.3	19.3	0	1	Manifold 2
GW 23	0.0	0.1	10.4	1	1	Manifold 2
GW 24	31.5	22.6	7.5	0	15	Manifold 2

General Comments

Note:

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 25	46.2	34.2	0.0	0	8	Manifold 3
GW 26	37.7	28.6	3.1	0	4	Manifold 3
GW 27	39.0	29.4	2.8	1	5	Manifold 3
GW 28	2.1	3.3	17.3	10	0	Manifold 3
GW 29	46.6	29.8	1.0	0	7	Manifold 3
GW 30	4.9	28.9	2.0	0	3	Manifold 3
GW 31	6.9	4.8	15.4	30	1	Manifold 3
GW 32	0.0	2.4	19.3	0	0	Manifold 3
GW 33	44.7	33.8	0.8	0	4	Manifold 3
GW 34	0.0	0.0	20.5	0	0	Manifold 3
GW 35	0.0	0.4	19.9	0	0	Manifold 4
GW 36	18.4	15.6	9.2	0	4	Manifold 4
GW 37	0.1	0.4	19.6	0	1	Manifold 4
GW 38	33.1	21.1	1.0	0	0	Manifold 4
GW 39	0.2	0.5	19.4	0	0	Manifold 4
GW 40	37.7	31.8	0.1	0	7	Manifold 4
GW 41	30.4	26.7	0.4	3	8	Manifold 4
GW 42	23.9	25.4	0.0	1	12	Manifold 4
GW 43	0.0	0.3	20.3	0	0	Manifold 4
GW 44						Manifold 4 CANNOT READ FULL OF WATER
GW 45	15.2	20.9	1.1	0	7	Manifold 5
GW 46	34.5	28.7	3.2	2	5	Manifold 5
GW 47	31.6	27.9	1.0	0	24	Manifold 5
GW 48	37.6	32.2	0.3	1	3	Manifold 5
GW 49	37.8	28.9	0.0	0	18	Manifold 5
GW 50	24.5	25.4	0.8	1	12	Manifold 5
GW 51	29.1	26.7	0.4	1	14	Manifold 5
GW 52	0.1	0.9	19.4	0	0	Manifold 5

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 53	26.8	25.4	1.3	1	7	Manifold 5
GW 54	25.9	23.4	2.5	0	8	Manifold 5
BH1A	0.1	0.9	19.8	0	0	31.953m A.O.D Top of Cover
BH2A	0.1	0.0	20.7	0	0	32.362m A.O.D Top of Cover
BH3A	0.0	2.1	17.8	0	0	33.664m A.O.D Top of Cover
BH4A	0.1	2.9	17.2	0	0	33.570m A.O.D Top of Cover
BH5A	0.1	2.0	18.5	0	0	36.130m A.O.D Top of Cover
BH6A	0.0	0.0	20.9	0	0	35.951m A.O.D Top of Cover
BH7A	0.1	0.0	20.7	0	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.0	20.8	0	0	36.151m A.O.D Top of Cover
BH9A	0.0	0.6	20.4	1	1	34.345m A.O.D Top of Cover
BH10A	0.0	0.0	20.8	0	0	32.776m A.O.D Top of Cover
BH11A	0.0	0.0	20.8	0	0	21.715m A.O.D Top of Cover
LG1	0.1	3.2	18.6	0	0	
LG2	0.1	0.1	20.2	0	1	
LG3	0.1	10.4	1.1	0	0	
LG4	0.0	2.3	19.3	0	0	
LG5	0.0	6.9	14.3	1	0	
LG6	0.0	0.0	20.8	0	1	
LG7	0.0	0.0	20.7	0	0	
PZ8	0.0	1.0	20.1	0	0	Constructed 26/02/12
PZ9	0.0	2.6	17.4	0	0	Constructed 26/02/12
PZ10						Constructed 26/02/12
Full Of Water						

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.:			
Licensee: Drogheda Borough Council			
Date of licensing:		Date of sampling: 05/11/13	Time of sampling: 08:45
Instrument used: Geotechnical Instruments GA2000		Date Next Full Calibration: Dec 20013	
		Last Field Calibration: (include date and gases)	
Monitoring Personnel: Shane Boylan		Weather: Wet & cold	Barometric pressure: (e.g. 1001-1003 mbar rising) 0995mb Mean temperature:

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 1	3.0	4.4	16.9	6	0	Manifold 1
GW 2	4.2	6.3	15.4	7	0	Manifold 1
GW 3	2.3	2.6	18.1	6	0	Manifold 1
GW 4	1.9	2.5	18.7	6	0	Manifold 1
GW 5	4.1	3.7	17.3	10	0	Manifold 1
GW 6	0.5	0.8	19.9	6	0	Manifold 1
GW 7	1.6	1.9	19.1	6	0	Manifold 1
GW 8	0.6	0.8	19.7	4	0	Manifold 1
GW 9	0.6	0.7	19.3	6	0	Manifold 1
GW 10	5.0	5.1	16.5	9	0	Manifold 1
GW 11	1.4	2.2	18.5	10	0	Manifold 1
GW 12	23.8	25.9	1.4	9	1	Manifold 1
GW 13	0.3	0.5	20.0	6	0	Manifold 2
GW 14	0.3	0.5	19.9	4	0	Manifold 2
GW 15	4.6	3.9	17.5	7	0	Manifold 2
GW 16	2.3	1.6	19.2	4	0	Manifold 2
GW 17	4.5	2.8	18.4	8	0	Manifold 2
GW 18	2.4	1.6	19.2	4	0	Manifold 2
GW 19	0.6	1.8	18.5	7	0	Manifold 2
GW 20	16.1	14.8	9.6	6	0	Manifold 2
GW 21	2.9	2.6	19.4	5	0	Manifold 2
GW 22	0.3	1.9	18.4	4	0	Manifold 2
GW 23	1.2	0.9	18.9	4	0	Manifold 2
GW 24	29.1	20.5	7.7	3	0	Manifold 2

General Comments

Note:

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 25	14.0	10.0	14.4	6	1	Manifold 3
GW 26	11.3	8.0	15.9	5	0	Manifold 3
GW 27	13.0	9.3	15.1	8	0	Manifold 3
GW 28	2.4	3.7	17.0	19	0	Manifold 3
GW 29	6.5	5.1	17.0	6	0	Manifold 3
GW 30	9.1	6.6	16.1	9	0	Manifold 3
GW 31	8.6	4.9	15.4	43	0	Manifold 3
GW 32	0.3	1.8	18.3	8	0	Manifold 3
GW 33	6.4	4.9	17.3	10	0	Manifold 3
GW 34	0.3	0.1	20.3	7	0	Manifold 3
GW 35	0.1	0.3	20.1	0	0	Manifold 4
GW 36	0.1	0.3	20.0	0	0	Manifold 4
GW 37	0.2	0.1	20.2	0	0	Manifold 4
GW 38	0.4	0.4	19.9	0	0	Manifold 4
GW 39	0.2	0.2	20.1	0	0	Manifold 4
GW 40	0.8	0.9	19.6	0	0	Manifold 4
GW 41	1.5	1.4	19.2	0	0	Manifold 4
GW 42	20.	1.7	18.9	0	0	Manifold 4
GW 43	0.4	0.6	19.9	0	0	Manifold 4
GW 44						Manifold 4 FULL OF WATER
GW 45	25.0	24.2	2.7	0	0	Manifold 5
GW 46	24.9	24.4	2.4	0	0	Manifold 5
GW 47	24.5	24.0	3.2	0	0	Manifold 5
GW 48	28.2	27.8	1.4	0	0	Manifold 5
GW 49	24.4	24.6	2.3	0	0	Manifold 5
GW 50	25.5	25.4	2.0	0	5	Manifold 5
GW 51	26.7	26.6	1.1	0	2	Manifold 5
GW 52	0.1	0.8	17.3	0	0	Manifold 5

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 53	25.9	26.1	3.5	0	0	Manifold 5
GW 54	25.5	25.4	2.7	0	0	Manifold 5
BH1A	0.2	0.1	20.5	3	0	31.953m A.O.D Top of Cover
BH2A	0.2	0.1	20.7	5	0	32.362m A.O.D Top of Cover
BH3A	0.2	0.3	20.3	2	0	33.664m A.O.D Top of Cover
BH4A	0.2	0.5	20.1	2	0	33.570m A.O.D Top of Cover
BH5A	0.1	2.5	15.7	0	0	36.130m A.O.D Top of Cover
BH6A	0.2	0.1	20.7	0	0	35.951m A.O.D Top of Cover
BH7A	0.2	0.1	20.5	2	0	25.172m A.O.D Top of Cover
BH8A	0.2	0.5	20.1	0	0	36.151m A.O.D Top of Cover
BH9A	0.2	0.9	20.1	2	0	34.345m A.O.D Top of Cover
BH10A	0.2	0.1	20.7	0	0	32.776m A.O.D Top of Cover
BH11A	0.2	0.1	20.6	0	0	21.715m A.O.D Top of Cover
LG1	0.2	1.3	19.9	0	0	
LG2	0.2	6.7	10.2	0	0	
LG3	0.2	8.4	7.5	0	0	
LG4	0.3	1.7	18.2	0	0	
LG5	0.2	9.3	11.7	0	0	
LG6	0.1	0.1	20.1	0	0	
LG7	0.1	0.2	20.8	0	0	
PZ8	0.2	0.1	20.4	0	0	Constructed 26/02/12
PZ9	0.3	0.9	18.9	2	0	Constructed 26/02/12
PZ10						Constructed 26/02/12 FULL (Can't take reading)

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.:			
Licensee: Drogheda Borough Council			
Date of licensing:		Date of sampling: 17/12/13	Time of sampling: 08:45
Instrument used: Geotechnical Instruments GA2000		Date Next Full Calibration: DEC 2013	
		Last Field Calibration: (include date and gases)	
Monitoring Personnel: Shane Boylan		Weather: Frosty	Barometric pressure: (e.g. 1001-1003 mbar rising) 1027mb Mean temperature:

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 1						Manifold 1 FULL OF WATER
GW 2	10.4	20.1	6.4	2	0	Manifold 1
GW 3	0.5	5.6	14.4	3	0	Manifold 1
GW 4	0.4	1.5	17.7	0	0	Manifold 1
GW 5	26.9	24.8	1.3	1	5	Manifold 1
GW 6	29.2	27.7	0.0	1	2	Manifold 1
GW 7	0.3	0.5	19.9	2	0	Manifold 1
GW 8	0.3	0.4	19.9	0	0	Manifold 1
GW 9	0.3	0.4	19.5	0	0	Manifold 1
GW 10						Manifold 1 FULL OF WATER
GW 11	15.5	24.3	3.6	4	1	Manifold 1
GW 12	24.5	26.2	1.7	0	6	Manifold 1
GW 13	0.3	0.6	19.7	0	0	Manifold 2
GW 14	0.3	0.6	17.8	2	0	Manifold 2
GW 15	15.6	25.1	0.0	4	2	Manifold 2
GW 16	29.7	28.2	0.0	0	0	Manifold 2
GW 17	16.4	25.0	1.7	0	0	Manifold 2
GW 18	39.3	29.3	0.5	3	6	Manifold 2
GW 19	5.1	6.2	17.5	0	0	Manifold 2
GW 20	26.5	25.7	3.6	0	0	Manifold 2
GW 21	6.4	6.0	16.8	0	0	Manifold 2
GW 22	0.6	12.2	10.2	0	0	Manifold 2
GW 23	0.3	0.1	19.1	0	0	Manifold 2
GW 24	28.0	19.5	9.1	0	10	Manifold 2

General Comments

Note:

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 25	60.6	39.1	0.0	4	15	Manifold 3
GW 26	45.5	29.7	3.0	0	2	Manifold 3
GW 27	46.9	30.6	3.2	1	3	Manifold 3
GW 28	2.5	4.3	13.6	9	0	Manifold 3
GW 29	49.2	31.3	0.4	4	2	Manifold 3
GW 30	46.3	29.7	1.7	3	0	Manifold 3
GW 31	8.3	5.1	15.1	37	0	Manifold 3
GW 32	0.2	1.1	15.4	0	0	Manifold 3
GW 33	45.5	32.8	4.8	0	0	Manifold 3
GW 34	0.2	0.1	19.6	0	0	Manifold 3
GW 35	0.1	0.4	18.7	0	0	Manifold 4
GW 36	17.1	15.5	9.8	0	1	Manifold 4
GW 37	0.1	0.1	17.9	0	0	Manifold 4
GW 38	24.6	15.8	9.8	0	0	Manifold 4
GW 39	0.4	0.6	15.8	2	0	Manifold 4
GW 40	37.1	33.2	0.0	2	2	Manifold 4
GW 41	19.2	25.3	0.0	0	0	Manifold 4
GW 42	19.6	25.3	0.0	0	0	Manifold 4
GW 43	0.1	0.3	18.6	1	0	Manifold 4
GW 44						Manifold 4 FULL OF WATER
GW 45	11.7	20.1	4.3	0	1	Manifold 5
GW 46	33.1	28.6	4.2	0	3	Manifold 5
GW 47	27.8	28.7	1.6	0	21	Manifold 5
GW 48	37.1	32.4	0.2	1	18	Manifold 5
GW 49	35.5	29.5	0.8	1	17	Manifold 5
GW 50	22.1	26.2	0.0	2	14	Manifold 5
GW 51	26.8	27.3	0.9	0	12	Manifold 5
GW 52	0.3	0.7	16.9	0	0	Manifold 5

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
GW 53	24.8	24.8	3.0	0	7	Manifold 5
GW 54	20.2	24.4	0.7	2	32	Manifold 5
BH1A	0.1	0.2	20.4	2	0	31.953m A.O.D Top of Cover
BH2A	0.2	0.1	20.5	0	0	32.362m A.O.D Top of Cover
BH3A	0.3	0.4	19.9	0	0	33.664m A.O.D Top of Cover
BH4A	0.3	1.6	19.0	0	0	33.570m A.O.D Top of Cover
BH5A	0.3	1.3	20.2	0	0	36.130m A.O.D Top of Cover
BH6A	0.2	0.1	20.5	1	0	35.951m A.O.D Top of Cover
BH7A	0.2	0.1	20.4	4	0	25.172m A.O.D Top of Cover
BH8A	0.2	0.1	20.5	0	0	36.151m A.O.D Top of Cover
BH9A	0.3	0.8	19.7	2	0	34.345m A.O.D Top of Cover
BH10A	0.3	0.1	20.5	1	0	32.776m A.O.D Top of Cover
BH11A	0.3	0.1	20.6	0	0	21.715m A.O.D Top of Cover
LG1	0.1	0.4	20.3	0	0	
LG2	0.2	0.1	19.4	4	0	
LG3	0.3	9.4	1.4	1	0	
LG4	0.2	0.1	20.5	0	0	
LG5	0.2	1.1	19.1	2	0	
LG6	0.1	0.3	20.4	1	0	
LG7	0.2	0.3	20.4	0	0	
PZ8	0.3	0.8	19.3	1	0	Constructed 26/02/12
PZ9	0.3	0.1	20.3	3	0	Constructed 26/02/12
PZ10						Constructed 26/02/12 FULL OF WATER