Pollboy Landfill

Annual Environmental Report (AER) 2012

March 2013

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1 REPORTING PERIOD

The reporting period is from the 1st January 2012 to the 31st December 2012.

The Waste Licence in operation for Pollboy Landfill for the period was Waste Licence Reg. No. W0027-02.

2 WASTE ACTIVITIES CARRIED OUT AT THE FACILITY

Poolboy landfill facility ceased acceptance of municipal waste on 31st December 2005. No municipal wastes types were accepted at Poolboy landfill during 2012.

The Civic Amenity Facility at Poolboy landfill remains operational. From the 1st January 2012 up until the 29th August 2012 the Civic Amenity Site was operated by Galway County Council.

The operation of the Civic Amenity Site at Poolboy Landfill was taken over by Barna Waste on the 29th August 2012. The quantities and composition of materials accepted at Pollboy Civic Amenity Facility are presented in Section 3 below.

3 QUANTITY AND COMPOSITION OF WASTE

Table 3.1 below outlines the categories and quantities which may be accepted for recovery under the current Waste Licence (W0027-02).

Table 3.1: Waste Categories and Quantities accepted for Recovery

Waste Type	Maximum Quantity
Waste to be accepted for composting. Waste to be accepted at Civic Waste Facility (Metal, electrical and electronic waste, glass, aluminium and tin cans, waste oils, fabrics, batteries, household hazardous, fluorescent tubes can all be accepted).	Maximum Quantity of biodegradable waste which can be processed = 1,000m^3. Tonnage to be agreed with the Agency.

Table 3.2 provides details on the quantity and composition of waste that was accepted for recovery at Pollboy Landfill Civic Amenity Site in 2012.

Table 3.2: Waste Accepted at Civic Waste Facility for Recovery in 2012

Waste description	EWC Code	Quantity (tonnes) 2012	Collector Name	Waste Treatment Operation
Mattresses	20 03 01	7.580	Barna Waste	D5
Polystyrene	15 01 02	0.270	Barna Waste	D5
Steel Scrap	17 04 05	15.940	Galway Metal Co. Ltd	R4
Waste Oil	13 02 08*	3.060	ENVA	R9
Filter Bin Collection	16 01 07*	0.660	ENVA	R4
Clothes	20 01 10 20 01 11	0.430	Textile Recycling Ltd.	N/A
Cathode Ray Tubes (Television and Computer Monitors)	20 01 35*	26.619	WEEE Ireland	R4
Portable Batteries and Farm Fence Batteries	16 06 04	0.937	WEEE Ireland	R4
Fridges and Freezers (FF)	20 01 23*	17.073	WEEE Ireland	R4
Small Domestic Appliances	20 01 35*	22.021	WEEE Ireland	R4
Large Household Appliances (LHA)	20 01 36*	21.045	WEEE Ireland	R4
Flourescent tubes (FL)	20 01 21*	0.461	WEEE Ireland	R4 (R5)
Paint - UN Pallet Box	20 01 27*	8.548	Indaver	D15 (D10)
Paint - UN Pallet Box	20 01 27*	2.390	Indaver	R13 (R1)
Aluminium Cans	15 01 04	0.413	Rehab Glass Co.	R4
Steel cans	15 01 04	0.302	Rehab Glass Co.	R4
Glass	15 01 07	6.400	Rehab Glass Co.	R4
Lead Acid	16 06 01*	0.367	Rialta Environmental Ltd.	R13 – Ireland R4 - UK
Alkaline Batteries	16 06 04	0.019	Rialta Environmental Ltd.	R13 – Ireland
Flat Glass	19 12 05	8.680	MSM Recycling Ltd.	R5

Note: Waste marked with an asterisk (*) is considered as a hazardous waste pursuant to Directive 91/689/EEC on hazardous waste, and subject to the provisions of that Directive unless Article 1 (5) of that Directive applies.

4 SUMMARY OF EMISSIONS AND MONITORING

The locations of the monitoring points for leachate, landfill gas, surface water and groundwater are shown on the monitoring drawings in **Appendix A**.

Quarterly monitoring results for landfill gas, flare, leachate, surface water and groundwater are contained in **Appendices B to F** inclusive. A summary of emissions and monitoring during 2012 in accordance with the Waste Licence is provided in the following sections.

4.1 NOISE

There was no noise survey carried out during 2012, due to the closure of the landfill on the 31st December 2005. Noise was generated in the most part by deliveries, compaction and placement machinery which are no longer operational.

4.2 DUST

There was no dust surveys carried out during 2012, due to the closure of the landfill on the 31st December 2005.

4.3 LANDFILL GAS

4.3.1 Off-Site Gas Migration Boreholes

Drawing No. DG0001–04 F07 shows the locations of boreholes used to monitor off-site gas migration. This drawing is contained in **Appendix A.**

The emission limit values for off-site gas migration in Schedule C of Waste Licence W0027-02 are 20% LEL (1% v/v) for methane and 1.5% v/v for carbon dioxide. The results obtained from the off-site gas migration boreholes were within these emission limit values for methane and carbon dioxide. The monitoring results from the off-site landfill gas monitoring boreholes are included in **Appendix B**.

4.3.2 Landfill Gas Wells Within Waste

An active gas extraction system consisting of 19 no. gas extraction wells and collector pipes collects gas from the older, unlined, landfill waste body. Gas collected by this system is flared by the 1,250m^3/hr AFS flare unit located in the flare compound close to the former composting facility. The gas main header pipe for this system, which was installed in 2004, was replaced in 2008. **Appendix B** contains daily records of gas flaring rates, temperature, methane, oxygen, carbon dioxide and carbon monoxide levels during 2012.

An active gas extraction system consisting of 23 no. gas extraction wells and collector pipes collects gas from Cell 1, which is fully engineered and lined. Gas collected by this system is also flared by the 1,250m^3/hr AFS flare unit.

A 850 m^3/hr Hasse flare is retained as a back-up flare.

4.3.3 Buildings

In November 2003, a gas monitor was placed in the main control office of the administration building at the landfill which measures the concentration of methane and carbon dioxide in the air. Neither of these parameters were detected during the reporting period.

4.3.4 Flare Emissions

Landfill gas flare emissions monitoring was carried out on the AFS Flare by Odour Monitoring Ireland on the 19th July 2012. The results of this monitoring showed NO_X (recorded as $NO_{2)}$, CO, TOC, HCL and HF emissions from the flare to be within the emission limit values specified in the Waste Licence.

A copy of the report for this monitoring is included in **Appendix C**.

4.4 LEACHATE

In 2012 one leachate sampling point was used for monitoring purposes. The leachate monitoring location is situated at the leachate lagoon. In the second quarter of 2012 the liquid at the sampling location was tested for a full suite of leachate parameters.

The results from the leachate samples taken at the sampling location were within the requirements as set out in Schedule C.5 of the Waste Licence.

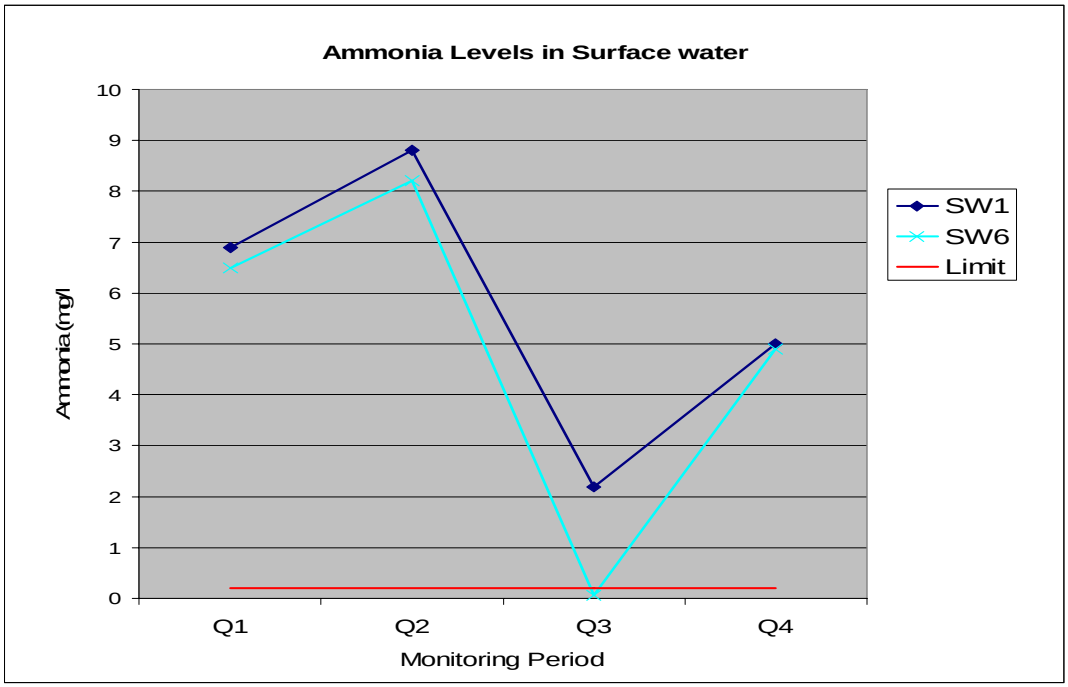
Drawing DG0001-07 F08, which is provided in **Appendix D** shows the leachate monitoring locations.

4.5 SURFACE WATER

4.5.1 Quartely Surface Water Monitoring

The surface water monitoring results for 2012 at Pollboy Landfill are contained in **Appendix E**. Drawing No. DG0001-05 F02, in **Appendix A**, shows the positions of the five surface water sampling locations (SW1, SW3, SW4, SW6, SW8). These sampling locations were chemically analysed by the EPA sampling division in each quarter of 2012. The results obtained were compared to standards as set out in S.I. 278 of 2007 – European Communities (Drinking Water) (No. 2) Regulations and where applicable to standards as set out in S.I. 294 of 1989 - European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1989. **Figure 4.1** shows the ammonia levels for sampling points SW1 and SW6 during 2012, both of which exceeded the standard limits for surface water.

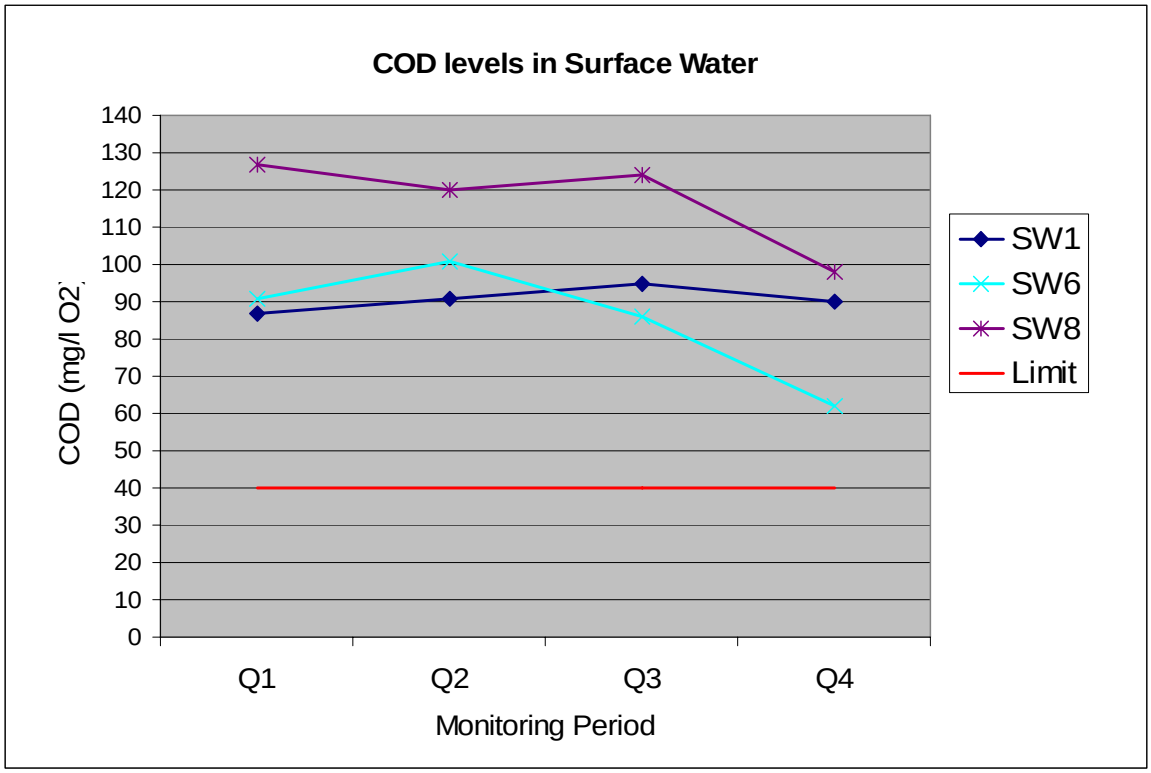
Figure 4.1: Elevated Ammonia Levels in Surface Water for the Reporting Period (SW1 and SW6)



Levels of ammonia were above the required limit of 0.2mg/l (as set out in S.I. 278, 2007) at surface water sampling point SW1 throughout the four sampling periods in 2012. The ammonia level at surface water sampling point SW6 decreased to below the limit of 0.2mg/l in Q3.

The levels of COD were also above the required limit of 40mg/l O_2 (as set out in S.I. 294, 1989) at surface water sampling points SW1, SW6 and SW8, throughout the four sampling periods in 2012. **Figure 4.2** shows the COD levels which exceeded the standard limits in surface water sampling points SW1, SW6 and SW8 during 2012.

Figure 4.2: Elevated COD Levels in Surface Water for the Reporting Period (SW1, SW6 and SW8)



Levels of pH, suspended solids, BOD, chloride, conductivity and dissolved oxygen were all within the required standard for each sampling quarter with the exception of SW6 which showed a slightly elevated level of BOD of 11 mg/l O_2 in Q2.

4.5.2 Annual Surface Monitoring

Surface water sampling and analysis for annual parameters in accordance with Table D.5.1 of Waste Licence W0027-02 was carried out at five surface water monitoring

locations (SW1, SW3, SW4, SW6, SW8) in the second quarter of 2012. The results are presented in **Appendix E**. The results obtained were compared to standards as set out in S.I. 294 of 1989 and S.I. 278, 2007 – European Communities (Drinking Water) (No. 2) Regulations. Levels for Iron and manganese were found to be elevated in SW1, SW6 and SW8. Levels of Total Oxidised Nitrogen (as N) were found to be slightly elevated in SW3 in Q2.

4.6 GROUNDWATER

Groundwater monitoring results for 2012 at Pollboy Landfill are contained in **Appendix F**. Drawing No. DG0001-01 F08, in **Appendix A**, shows the locations of the 9 no. groundwater sampling points. Sampling and analysis was carried out during the year by the EPA laboratories on behalf of Ballinasloe Town Council.

4.6.1 Quarterly Groundwater Monitoring

Quarterly groundwater monitoring was carried out on all monitoring locations in accordance with the requirements of schedule D.5 of the Waste Licence. The results obtained were compared to standards as set out in S.I. 9 of 2010, European Communities Environmental Objectives (Groundwater) Regulations. Where there were no specified limits for tested parameters in S.I. 9 of 2010, results were compared to Interim Guideline values set out in the EPA Document *"Towards Setting Guideline Values for the Protection of Groundwater in Ireland".* The quarterly results are presented in **Appendix F.**

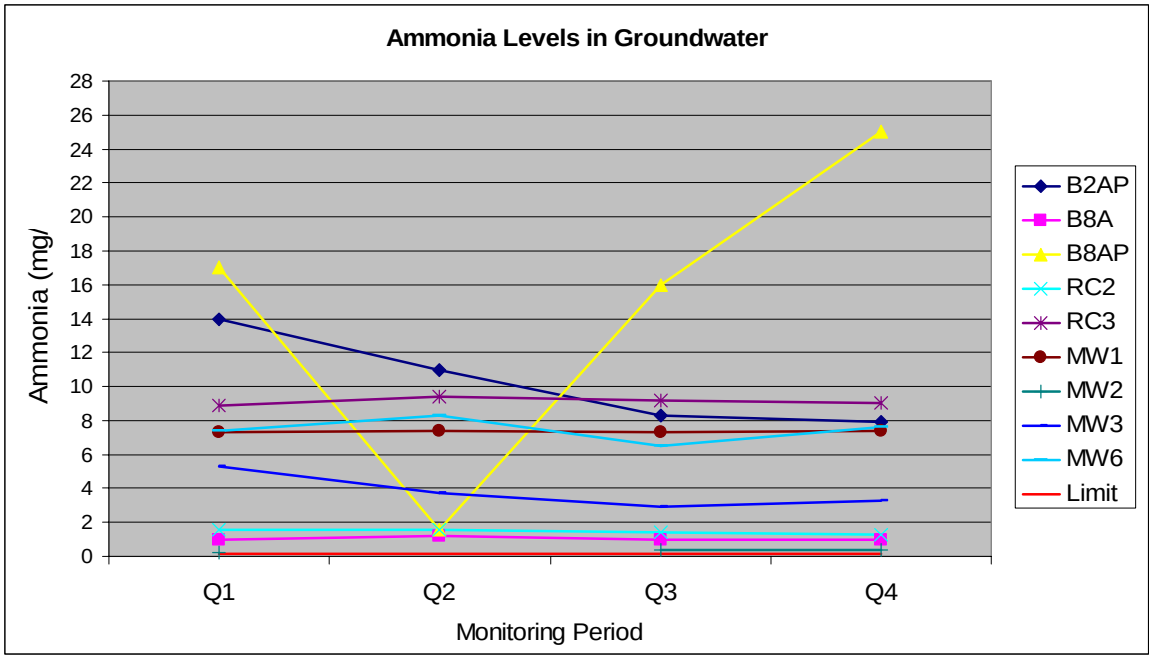
Levels of ammonia were found to be above the required limit of 0.3mg/l (as set out in S.I. 9 of 2010) at all groundwater sampling points, throughout the four sampling periods in 2012. The most elevated levels of ammonia (17-25mg/l) were found at B8AP in Q1, Q3 and Q4. B8AP sampling point is located down-gradient of the landfill and showed similar levels of ammonia in previous years. Sample points B2AP, RC3 and MW6 also displayed elevated levels of ammonia (7.4-9.4mg/l), Monitoring location B2AP is located approximately 10 metres from the waste mass.

Ammonia levels have historically been high in the vicinity of Pollboy Landfill. The piezometric contours of the area (established as part of the *EIS for Extension and Remediation of Pollboy Landfill,* RPS 2001) indicate that an overall groundwater flow in a northeast to southeast direction. It should therefore be noted that monitoring points MW1,

MW2, and MW3, which are upstream of the landfill showed levels of ammonia of up to 7.4 mg/l during 2012. It is therefore considered that there are other contributing sources (apart from the landfill) affecting the quality of the groundwater in this area. In general, ammonia levels in 2012 showed a slight increase on 2011 levels during three of the sampling period for B8AP, It did however also show a decrease in ammonia levels in 2012. The quarterly monitoring levels were generally consistent with the 2011 levels for the remaining sampling locations.

Figure 4.3 shows the ammonia levels in groundwater which exceeded the standard limits in 2012.

Figure 4.3: Elevated Ammonia Levels in Groundwater for the Reporting Period



Levels of pH, temperature, conductivity, chloride and total organic carbon were found to be below the specified limits throughout the year. This is an improvement on the 2011 levels which were found to display minor exceedences for these parameters.

4.6.2 Annual Groundwater Monitoring

Groundwater sampling and analysis for annual parameters was carried out in 2012 in accordance with Table D.5.1 of the Waste Licence. The monitoring was carried out at the 9 no. groundwater monitoring locations in the second quarter of 2012. The results

obtained were compared to standards as set out in S.I. 9 of 2010, European Communities Environmental Objectives (Groundwater) Regulations. Where there were no specified limits for tested parameters in S.I. 9 of 2010, results were compared to Interim Guideline values set out in the EPA Document *"Towards Setting Guideline Values for the Protection of Groundwater in Ireland".* The annual monitoring results are presented in **Appendix F**.

Highly elevated total solids were found at B8AP, MW3 and MW6. There is no limit for total solids in the EPA Interim Report, but the total dissolved solids is given as 1000mg/l. MW3 which contained the highest level of total solids is located upstream of the general groundwater flow in the vicinity of the landfill, which would suggest that some other factor(s) are effecting the total solids levels. Elevated levels of iron were found in B8A, RC2 and RC3. Manganese was found to be elevated at all monitoring locations with the exception of RC2. The remaining parameters were within the limits at all of the monitoring locations. The annual groundwater monitoring results were generally similar to those obtained in during 2011.

4.7 METEOROLOGICAL DATA

Approval was received from the EPA on the 15th July 2010 that the meteorological parameters required could be reduced to include the following parameters only:

- Precipitation Volume
- Temperature (min/max)
- Wind Force Direction
- Humidity

Approval was also received from the EPA on the 15th July 2010 that this weather data can be obtained from N6 Concession Ltd. who operate a weather station at Cappataggle, Ballinasloe. Meteorological data from Cappataggle is attached in **Appendix G**.

5 INPSPECTION OF LAGOON STRUCTURES

In accordance with Condition 15.13.2 of Waste Licence W0027-02, an inspection and certification of the lagoon structures at Pollboy Landfill is required every three years. A visual inspection of the leachate lagoon was undertaken on the 30th January 2012 by

RPS. The visual inspection also involved discussion with Mr. Kevin Mulrennan, Galway County Council.

The findings of this inspection were forwarded to the Agency in January 2012. A copy of these findings is included in **Appendix H**.

6 RESOURCE AND ENERGY CONSUMPTION SUMMARY

A total of 45,050 kWh of electricity were used at Poolboy landfill during 2012. A breakdown of this consumption is provided below as:

- Daytime Consumption 18,450 kWh
- Nightime Consumption 26,660 kWh

7 LEACHATE VOLUMES PRODUCED AND TRANSPORTED OFF SITE

Table 7.1 shows the quantities of leachate pumped off-site to Ballinasloe Waste Water Treatment Plant during 2012.

Table 7.1: Quantity of Leachate Discharged via Rising Main to WwTP

Month	Quantity of leachate (m3)
January	1,458.9
February	2,223.5
March	1,066.1
April	1,700.7
May	1,076.5
June	1,360.1
July	1,493.6
August	1,259.9
September	1,158.3
October	3,031.4
November	2,260.8
December	4,302.6
TOTAL	**22,392.4**

8 REPORT ON RESTORATION OF COMPLETED CELLS AND FINAL LEVELS

The Restoration and Aftercare Plan for Pollboy Landfill was submitted to the EPA in February 2003.

9 SITE SURVEY

The most recent topographical survey, which is contained in **Appendix I**, was carried out in September 2012.

10 QUANTITY OF LANFILL GAS

A Gas Utilisation Feasibility Study for Pollboy Landfill was prepared in August 2005. As part of this study the total quantity of landfill gas generated was estimated using the GasSim Model. For comparison purposes, an estimate was also made using the "Rule of Thumb" method contained in the EPA Landfill Site Design Manual. This assumes that a tonne of waste produces 6m^3 of landfill gas per year from the time of emplacement. Results are shown in **Figures 10.1** and **10.2**, for each modelling exercise.

Figure 10.1: Total Bulk Landfill Gas 1998 to 2035 at the 50th Percentile (GasSim)

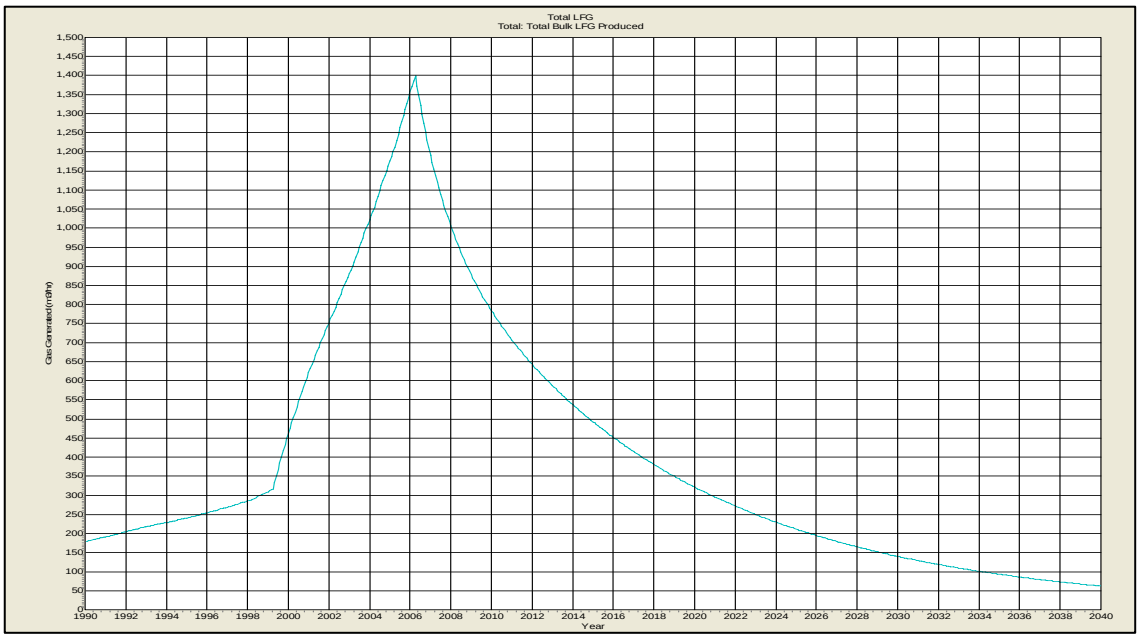
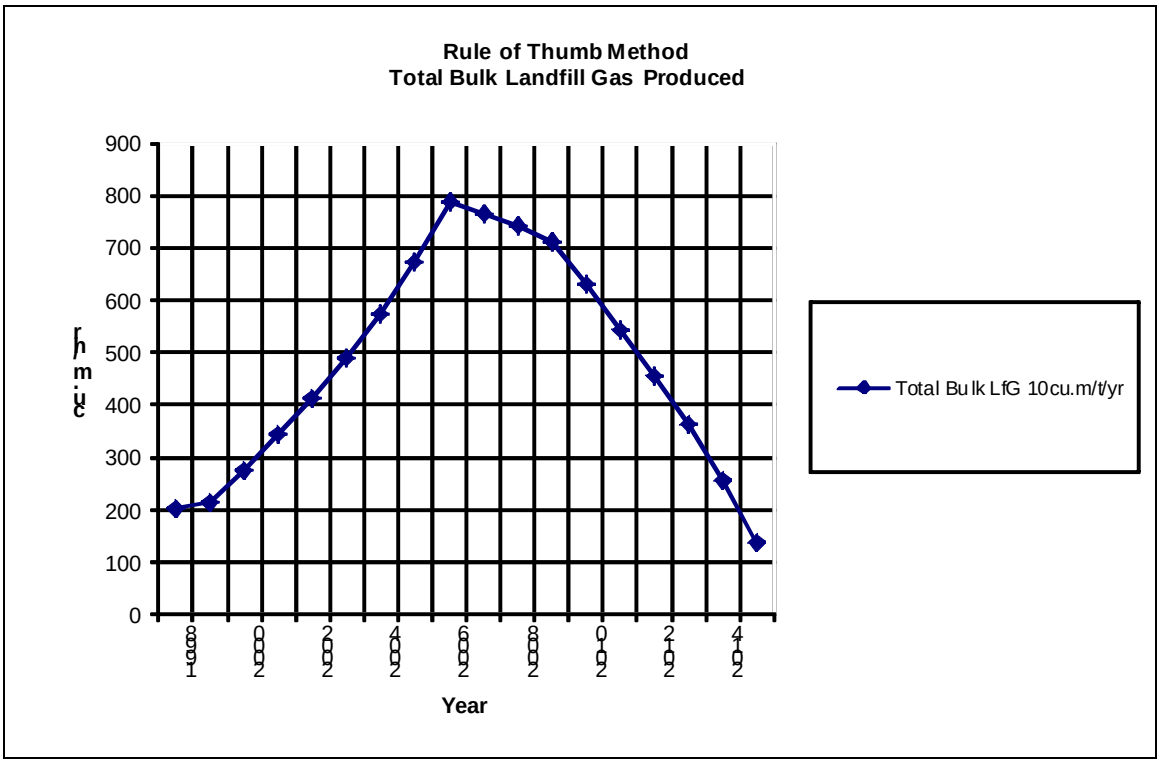


Figure 10.2: Estimation of Landfill Gas Potential using Rule of Thumb Method, 1998-2015

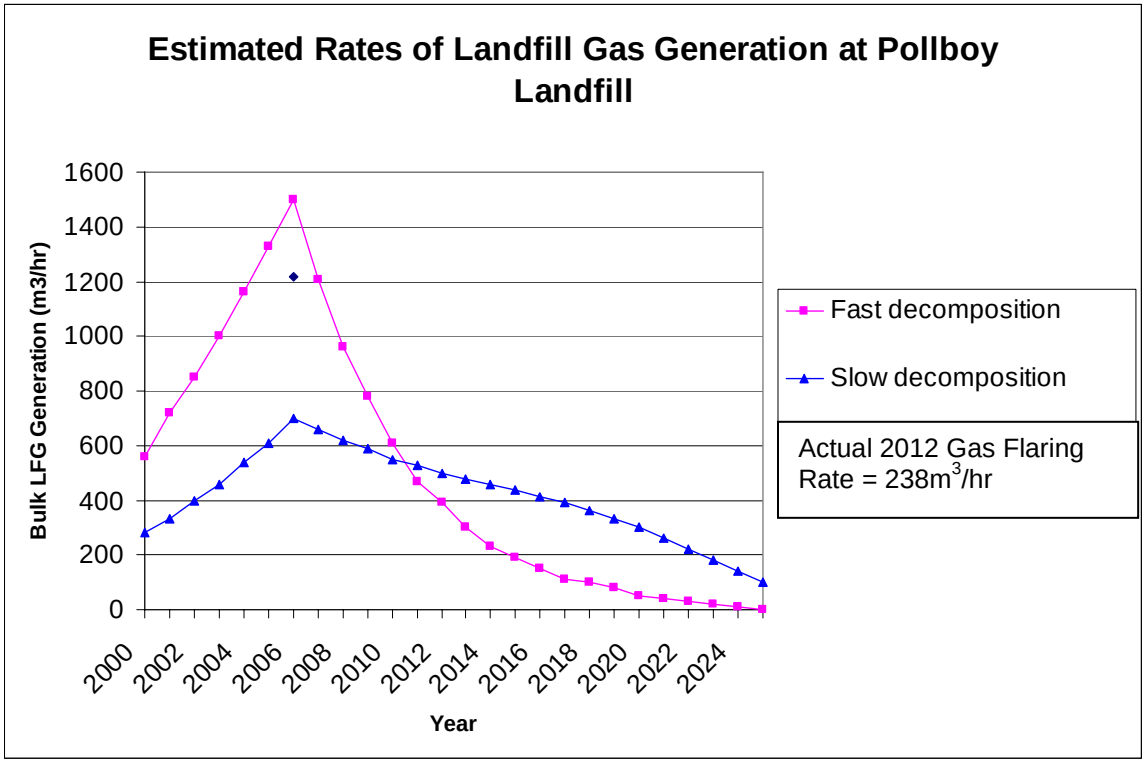


For 2012, a generation rate of 630 m^3/hr of landfill gas was estimated using the GasSim Model and alternatively, 600 m^3/hr was estimated using the Rule of Thumb method.

The above results are theoretical rates of landfill gas production. Some models can over predict the quantities of gas to be generated while others can underestimate.

A landfill gas pumping trial was carried out in 2005 to demonstrate the extracted landfill gas quantity and quality that could be obtained through active gas extraction from the existing wells using the available flare on site. This trial was carried out as part of the study into the feasibility of power generation at the landfill. Estimates of future landfill gas generation rates were made by the pumping trial contractor, based on waste input data, the results of monitoring carried out during the trial, and using his own in-house model. Estimates were made based on fast decomposition and slow decomposition of the waste as shown in **Figure 10.3**. This figure demonstrates the possible variation in generation rates. Based on this model, the landfill gas generation rate at the facility in 2012 could vary between 550m^3/hr and 610m^3/hr.

Figure 10.3: Estimated Rates of Landfill Gas Generation at Pollboy Landfill



The mean rate of gas flaring at the facility for 2012 was 238m^3/hr.

11 WATER BALANCE CALCULATION

Factors which affect the rate of generation of leachate include precipitation, surface run-off, evapotranspiration, moisture released and absorbed in waste, moisture used during decomposition and vapour contained in gas. Of these, precipitation, surface run-off and evapotranspiration are the major contributors.

The model of the water balance for leachate generation can be represented mathematically as follows:

$$L_o = [(ER.A)+LIW+IR]-[aW+MCW]$$

where:

L_o = Free leachate produced

ER = Effective rainfall i.e. actual rainfall minus [potential evapotranspiration plus soil moisture deficit]

A = Area of cell

LIW = Liquid Industrial Waste (e.g. sludge)

IR = Infiltration (from restored areas only)

aW = Absorption capacity of waste

MCW = Moisture Consumption of Waste

For the purposes of this estimation, the contributions due to Liquid Industrial Waste, Absorption Capacity of Waste and the Moisture Consumption of Waste have been ignored.

Capping of a landfill typically reduces rainwater infiltration into the waste by up to 90%. For the purposes of this estimation, a reduction of 85% has been assumed. Based on an annual precipitation of 923mm/year and an annual evapotranspiration of 454mm/year, leachate generation from the landfill was estimated for the current landfill scenario of old landfill (unlined) and Phase 1(lined) cells – both are capped.

The Water Balance Calculation is contained in **Appendix J**.

12 ENVIRONMENTAL MANAGEMENT

12.1 REVIEW OF OBJECTIVES AND TARGETS SET OUT FOR 2012

Objective 1: Landfill Gas Management

Reason for undertaking project: To further improve landfill gas and odour control at the facility.

Targets:

1 Fusion welded caps will be provided to all wellheads which are currently capped using duct tape.

2 Where possible, the level of the landfill gas main is to be re-graded to encourage drainage of condensate towards the existing knockout pots.

3 Reduce the level of a number of wellheads in Cell 1 so that the gas carrier pipes can be laid either at a gradient towards the gas main or towards the gas well, thereby removing sags in the pipework and preventing the build up of condensate

4 Install a new section of gas main close to Gas Well No. 2A to bypass the old defunct knockout pot which appears to be a source of positive pressure.

5 Re-grade the gas main between Gas Wells No. 37 and No. 24 on Cell 1 allowing condensation to flow to pump sump 1 at the bottom of the hill which will then be pumped into the lagoon. Should additional knockout pots be deemed necessary, their location and arrangement will be notified to the Agency prior to installation.

6 It is proposed that AFS Ltd. will carry out balancing of the gas field on a weekly basis. They will also be responsible for repairs to the system on an on-going basis

Summary of Works provided in 2012:

1. Fusion welded couplers provided to all recently installed well heads,
2. Relayed the 250mm gas main lines to the knock-out pots on the 28th and 29th March 2012.
3. Air emission testing of the landfill flare carried out by OMI on the 19th July 2012.
4. AFS are carrying out weekly monitoring and balancing of the gas field at Poolboy.

Objective 2: Leachate Management Upgrade

Reason for undertaking project: To improve the efficiency of leachate management

Summary of works provided in 2012:

1. Leachate management system review report provided by RPS in April 2012.
2. An upgrade was provided to the SCADA system which enabled the leachate pumping from the facility to be automatically linked to the Dissolved Oxigen (DO) meters at the WwTP.
3. 5 no. leachate extraction boreholes were replaced with new wells in the vicinity of existing wells in November 2012.
4. The leachate management report was issued to Ballinasloe Town Council.
5. Leachate flow-meters were installed upstream of the leachate lagoon allowing to measure the volume of leachate from Cell 1 and the old cell individually.

6. Installation of 2 no. new combined leachate extraction and gas wells, GW35 and GW39.
7. Installation of 2 no. new pneumatic pumps to GW35 and GW39 to remove perched leachate.

13 SUMMARIES OF REPORTED INCIDENTS & COMPLAINTS

13.1 COMPLAINTS

There were no complaints with regard to the facility in 2012.

13.2 NON-COMPLIANCES

A site inspection of the facility was carried out by the EPA on the 7th December 2012. The inspection report was issued on the 3rd February. The inspection report identified three specific non-compliances in relation to the facility infrastructure. A response to the non-compliance issues was issued on the 15th February 2012. A copy of this Audit Report is included in **Appendix K**.

A non compliance notification was issued by the EPA on the 11th July 2012 which contained three specific non compliances in relation to the leachate management plan for the facility. A response to the non-compliance was issued to the EPA on the 3rd August 2012. A copy of the non compliance and response are included in **Appendix K.**

13.3 INCIDENTS REPORTED

A copy of all incidents reported to the Agency in 2012 is included in **Appendix K**.

14 REVIEW OF NUISANCE CONTROLS

14.1 ODOUR

Odour management at the facility has significantly improved since 2005, as a result of the following works being carried out:

- Installation of temporary clay capping immediately following cessation of filling.
- Installation of permanent capping system incorporating, inter alia, an LLDPE membrane and landfill gas drainage geocomposite layer.
- Installation of additional landfill gas collection wells in Cell 1.
- Use of a landfill gas flare for gas management and control.
- Reinstatement of gas management system on old landfill.
- Replacement of redundant gas collection wells.

14.2 VERMIN

Pestguard Environmental Services, Rathcoole, Co. Dublin are contracted to control the vermin on the site. External bait boxes are located around the facility and internal bait boxes are located in the office buildings. The bait boxes are checked on a monthly basis and more frequently when required.

14.3 FIRES

An Emergency Response Procedure has been prepared in consultation with the Assistant Chief Fire Officer and approved by the EPA. A risk assessment of environmental pollution caused by contaminated firewater has been carried out. Fire safety and awareness, fire fighting and first aid training is provided for staff on site. Any fires will be treated as an incident and will be reported to the fire station immediately.

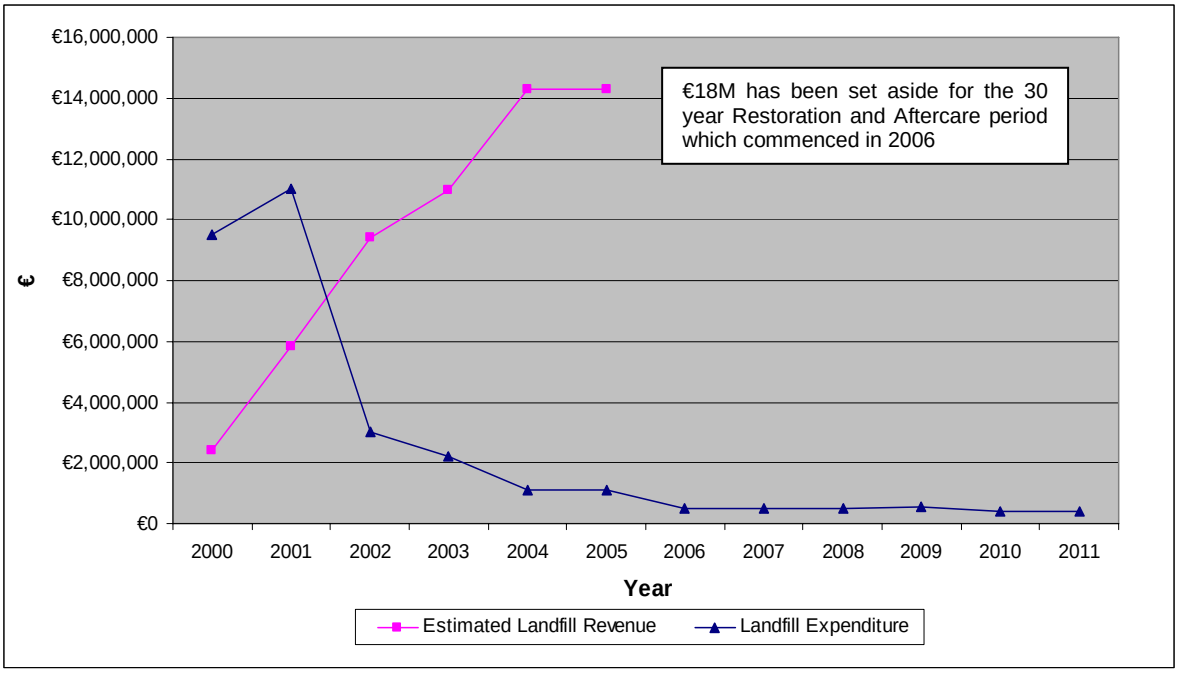
15 REPORT ON FINANCIAL PROVISIONS

Figure 15.1 provides a graphical representation of estimated landfill revenue compared to landfill operational cost over the period 2000-2008. This graph confirms that Ballinasloe Town Council can meet the costs associated with the operation and management of the landfill and that there are sufficient funds available for future restoration and aftercare works at the facility. A total of €18 million (ex. VAT) has been set aside for the 30 year restoration and aftercare of Pollboy Landfill from 2006 onwards.

Landfill Expenditure in 2012 was **€322,151.82 (ex. VAT)**.

Operating Costs for the Civic Amenity Facility in 2012 were **€70,670(ex. VAT)**.

Figure 15.1: Estimated Landfill Revenue V's Landfill Cost (ex. VAT)



16 MANAGEMENT STRUCTURE

The management structure at Pollboy Landfill is as follows:

Mr. Tony McInerney: Senior Executive Engineer, Environment Section, Galway County Council, with overall responsibility for management of Pollboy Landfill.

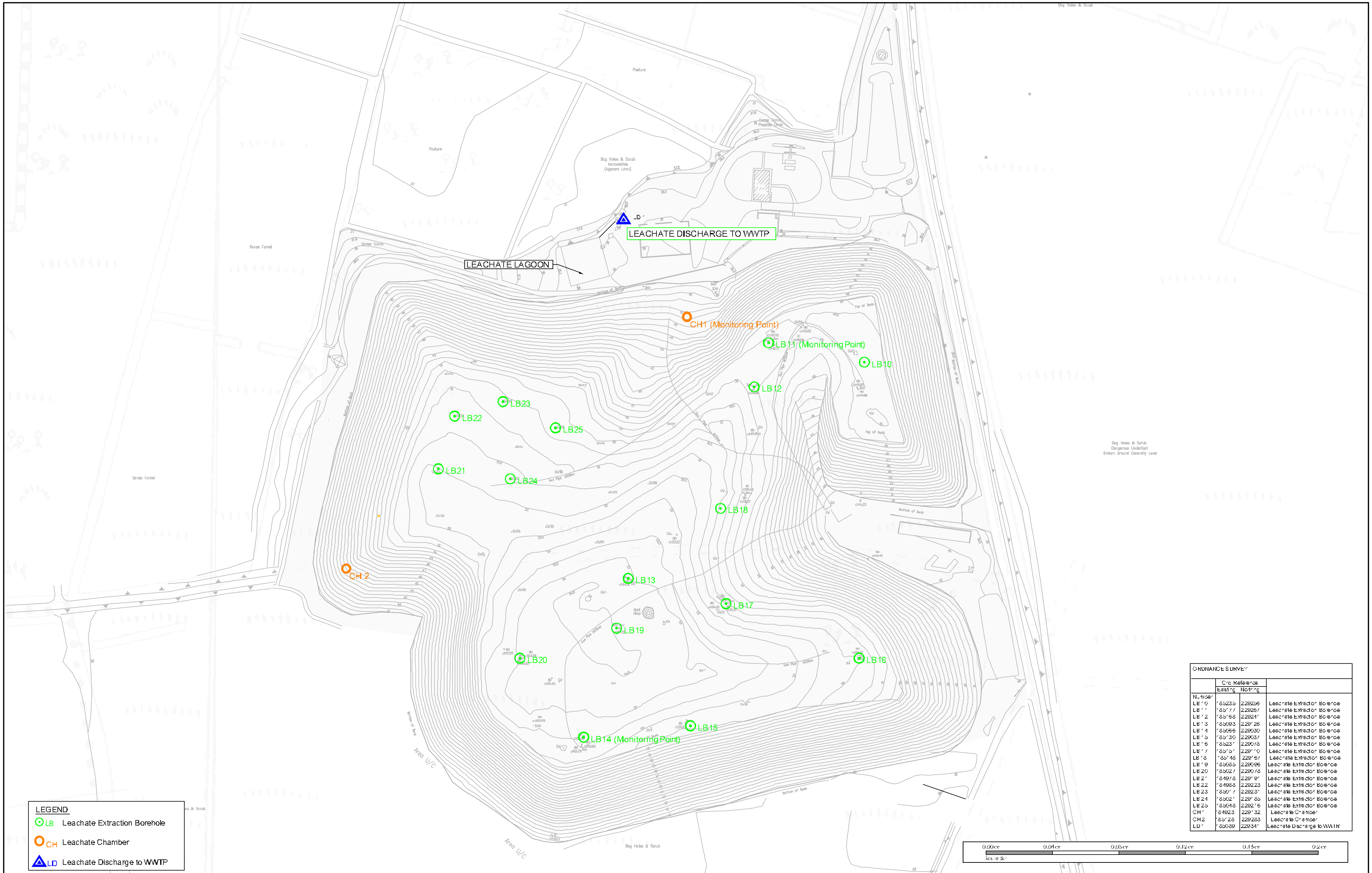
Mr. Kevin Mulrennan: Kevin Mulrennan, Environment Section, Galway County Council manages operations at Pollboy Landfill.

17 ENVIROMENTAL MANAGEMENT PLAN

In accordance with Condition 2.3.2.2 of Waste Licence W0027-02, an Environmental Management Plan (EMP) for the facility has been prepared and this is included in **Appendix L**.

Appendix A

Drawings of Monitoring Points



LEGEND

- LB Leachate Extraction Borehole
- CH Leachate Chamber
- LD Leachate Discharge to WWTP

ORDNANCE SURVEY

Number	Grid Reference Easting	Grid Reference Northing	
LB10	185235	229256	Leachate Extraction Borehole
LB11	185177	229267	Leachate Extraction Borehole
LB12	185168	229241	Leachate Extraction Borehole
LB13	185093	229126	Leachate Extraction Borehole
LB14	185066	229030	Leachate Extraction Borehole
LB15	185130	229037	Leachate Extraction Borehole
LB16	185231	229078	Leachate Extraction Borehole
LB17	185151	229110	Leachate Extraction Borehole
LB18	185148	229167	Leachate Extraction Borehole
LB19	185085	229096	Leachate Extraction Borehole
LB20	185027	229078	Leachate Extraction Borehole
LB21	184978	229191	Leachate Extraction Borehole
LB22	184988	229223	Leachate Extraction Borehole
LB23	185017	229231	Leachate Extraction Borehole
LB24	185021	229185	Leachate Extraction Borehole
LB25	185048	229216	Leachate Extraction Borehole
CH1	184923	229132	Leachate Chamber
CH2	185128	229283	Leachate Chamber
LD1	185089	229341	Leachate Discharge to WWTP

Scale Bar: 0.00km 0.04km 0.08km 0.12km 0.16km 0.2km

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No.	Date	Drn. Chk.	Amendment / Issue	App.
F08	06.11.09	W.L. K.G.	AER 2008	W.M.

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Project: POLLBOY LANDFILL LICENCE COMPLIANCE

Title: LOCATIONS OF LEACHATE MONITORING POINTS

Drawing Number: MGE0029 /DG0001-07 | Rev: F08

Drawn By	Checked By	Approved By	Date	Drawing Status	Scale / Sheet Size	
C.N.	S.A.	W.M.	MAR. '04	Final Issue	1:500 @ A1	1:1000 @ A3

MGE0029DG0001.dwg

S.W. Monitoring	Grid Reference E	Grid Reference N
S.W.1	185244	229543
S.W.3	184744	228369
S.W.4	185274	228379
S.W.5	185416	228683
S.W.6	185292	229594
S.W.7	185219	229438
S.W.8	185014	229321

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No.	Date	Drn / Chk	Amendment / Issue	App
F02	05.11.09	N.L. / K.G.	AER 2008	W.M.
F01	22.04.04	C.N. / S.A.	Final Issue	W.M.

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Drawn By	Checked By	Approved By	Date
C.N.	S.A.	W.M.	MAR. '04

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Project: POLLBOY LANDFILL LICENCE COMPLIANCE

Drawing Status: Final Issue
Scale / Sheet Size: 1:1000 @ A1 1:2000 @ A3

Drawing Number: MGE0029 /DG0001-05
Rev: F02

Title: SURFACE WATER MONITORING LOCATIONS

MGE0029DG0001.dwg

LEGEND

Gas Migration Boreholes

Gas Boreholes	Grid Reference E	Grid Reference N
B2AP	135309	229177
B3AP	135414	228906
B6AP	135081	228327
B8A	135118	229339
B8AP	135149	229372
BH6	134922	229275
BH7	134976	229312
MW3	134830	228371
MW5	135251	229495
RC1	134872	229125
RC2	135264	229338
RC3	135335	229041

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F07	06.11.09	N.L. / K.G.	AER 2008	W.M.

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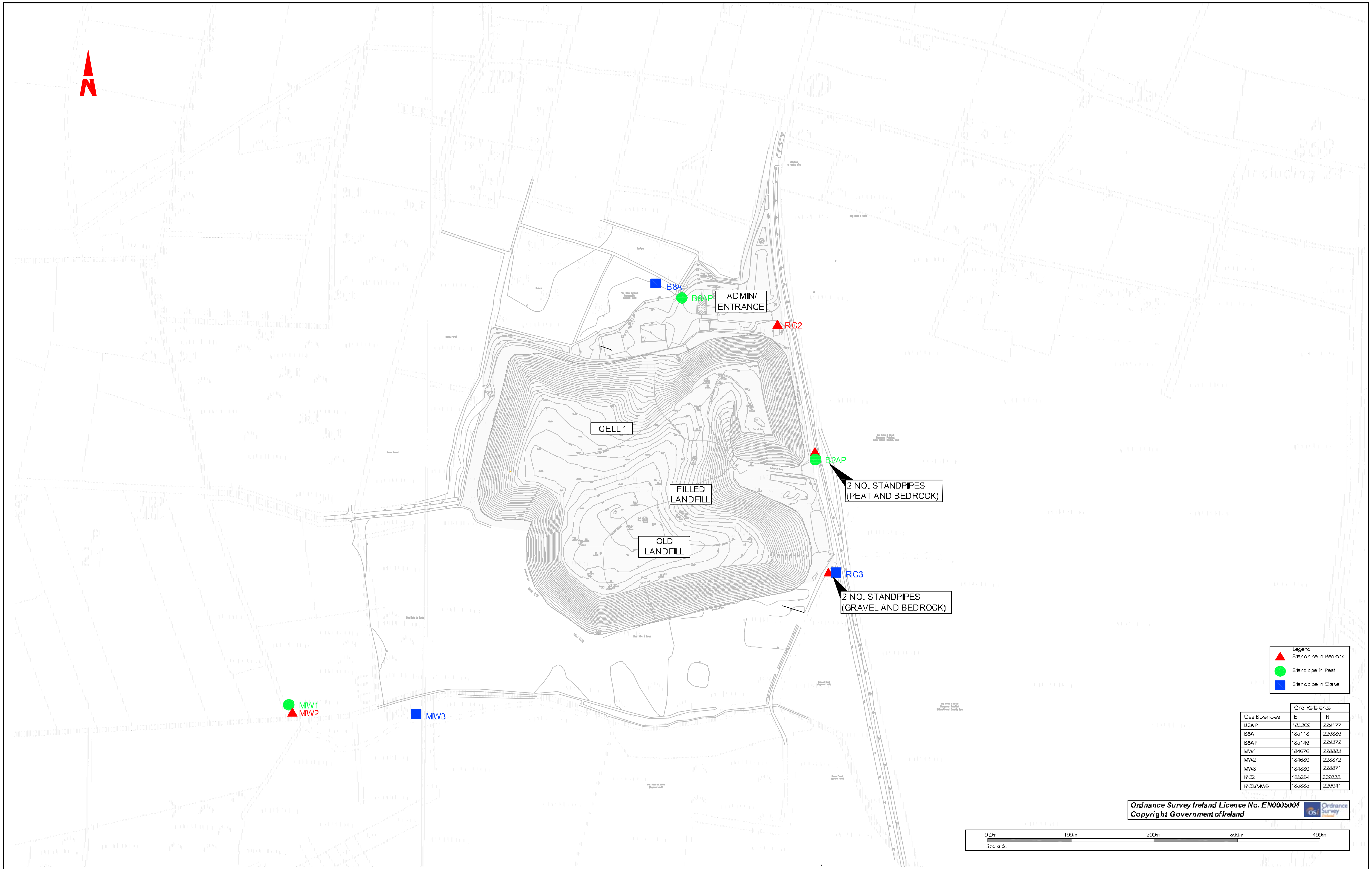
Drawing Number: MGE0029 /DG0001-04
Rev: F07

Project: POLLBOY LANDFILL LICENCE COMPLIANCE

Title: LOCATIONS OF GAS MIGRATION BOREHOLES

Drawn By	Checked By	Approved By	Date	Drawing Status	Scale / Sheet Size	
C.N.	S.A.	W.M.	MAR. '04	Final Issue	1:1000 @ A1	1:2000 @ A3

MGE0029DG0001.dwg



	Grid Reference	
Gas Boreholes	E	N
B2AP	185309	229177
B8A	185118	229389
B8AP	185149	229372
MW1	184676	228883
MW2	184680	228872
MW3	184830	228871
RC2	185264	229338
RC3/MW6	185335	229041

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F08	06.11.09	W.L. / K.G.	AER 2008	W.M.
F07	31.01.05	A.D. / S.A.	Final Issue	W.M.

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C.N.	S.A.	W.M.	MAR. '04

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Project
POLLBOY LANDFILL LICENCE COMPLIANCE

Drawing Status: Final Issue
Scale / Sheet Size: 1:1000 @ A1 | 1:2000 @ A3

Drawing Number: **MGE0029 /DG0001-01**
Rev: **F08**

Title
LOCATIONS OF GROUND WATER MONITORING BOREHOLES

MGE0029DG0001.dwg

Appendix B

Offsite Gas Migration Borehole Results and Flare Records

Offsite Gas Migration Borehole Monitoring Results - 2012

Sample Station	CH_4 Limit	CO_2 Limit	CH_4	CO_2	O_2	CH_4	CO_2	O_2	CH_4	CO_2	O_2	CH_4	CO_2	O_2	CH_4	CO_2	O_2
Sampling period			09.01.12			20.02.12			06.03.12			10.04.12			16.05.12		
Number	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)
B2AP	1.0	1.5	0	0	20.6	0	0	20.5	0	0	20.3	0	0	20.7	0	0	20.6
B6AP	1.0	1.5	0	0.2	20.5	0	0.3	20.6	0	0.3	20.5	0	0.2	20.8	0	0.1	20.5
B8A	1.0	1.5	0	0	20.9	0	0	21	0	0	21	0	0.2	20.6	0	0.2	20.8
BH6	1.0	1.5	0	0.3	20	0	0.1	20.1	0	0.1	20.6	0	0	20.3	0	0	20.1
BH7	1.0	1.5	0	0.1	20.2	0	0.2	19.9	0	0.1	20.2	0	0.1	20.8	0	0.2	19.7
MW5	1.0	1.5	0	0	21	0	0	20.8	0	0	21	0	0	21.1	0	0	20.6
RC2	1.0	1.5	0	0	20.9	0	0	20.9	0	0	21	0	0	21	0	0	20.9

Sample Station	CH_4 Limit	CO_2 Limit	CH_4	CO_2	O_2	CH_4	CO_2	O_2	CH_4	CO_2	O_2	CH_4	CO_2	O_2	CH_4	CO_2	O_2
Sampling period			17.07.02			21.08.12			11.09.12			16.10.12			13.11.12		
Number	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)
B2AP	1.0	1.5	0	0	20.6	0	0	20.4	0	0	20.4	0	0	20.3	0	0	20.4
B6AP	1.0	1.5	0	0.2	20.5	0	0.2	20.5	0	0.2	20.7	0	0.2	20.9	0	0.2	20.5
B8A	1.0	1.5	0	0	20.9	0	0	20.7	0	0.1	21.1	0	0	20.4	0	0.1	20.6
BH6	1.0	1.5	0	0.3	20	0	0.1	20.3	0	0.2	20.3	0	0	19.1	0	0	19.8
BH7	1.0	1.5	0	0.1	20.2	0	0.1	20.1	0	0.1	20.5	0	0.2	19.7	0	0.1	19.9
MW5	1.0	1.5	0	0	21	0	0	20.7	0	0	20.9	0	0	20.6	0	0	20.5
RC2	1.0	1.5	0	0	20.9	0	0	20.9	0	0	20.9	0	0	20.6	0	0	20.7

Date	Gas Flow Rate (m^3/hr)	Flare Temp (Oc)	Carbon Dioxide (%)	Carbon Monoxide	Methane (%)	Oxygen (%)
04/01/2012	277	1003	26	0	60	0.1
05/01/2012	208	1021	22	0	47	0.2
09/01/2012	270	1026	23	0	44	0.3
23/01/2012	269	1005	21	0	40	0
24/01/2012	218	1003	25	0	51	0
02/02/2012	184	1008	24	0	54	0
06/02/2012	240	1001	24	0	50	0
14/02/2012	247	1005	21	0	45	0
20/02/2012	202	1009	24	0	49	0
07/03/2012	203	1037	24	0	45	0
13/03/2012	235	1031	25	0	45	0
21/03/2012	250	1011	24	0	43	0
26/03/2012	300	1009	26	0	55	0
03/04/2012	226	1034	23	7	43	0
10/04/2012	210	1015	24	10	42	0
13/04/2012	223	1011	24	17	40	0
16/04/2012	283	1009	26	10	51	0
20/04/2012	220	1015	25	8	42	0.1
27/04/2012	204	1021	25	23	42	0.4
01/05/2012	239	1011	24	10	39	0.3
04/05/2012	212	1029	24	17	39	0.6
08/05/2012	248	1007	20	24	33	0.2
23/05/2012	244	1002	23	13	33	0
28/05/2012	291	1021	21	17	31	0
11/06/2012	232	1014	19	21	29	0
14/06/2012	207	1012	20	15	31	0
18/06/2012	211	1015	19	23	30	0
25/06/2012	167	1017	24	17	35	0
03/07/2012	231	1025	22	10	31	0
05/07/2012	238	1017	22	13	30	0
31/07/2012	210	1009	23	13	33	0
02/08/2012	187	1008	23	0	34	0
03/08/2012	188	1027	23	0	33	0
07/08/2012	156	1010	24	0	34	0
02/01/1900	157	1012	24	0	36	0
17/08/2012	189	1009	23	0	33	0
20/08/2012	229	1018	23	0	30	0
21/08/2012	216	1028	22	0	30	0
22/08/2012	196	1019	22	0	30	0
23/08/2012	202	1028	23	0	31	0
27/08/2012	202	1010	23	0	32	0
28/08/2012	215	1028	22	0	29	0
29/08/2012	188	1021	21	0	30	0
30/08/2012	192	1001	21	0	28	0
31/08/2012	210	1011	22	0	29	0
04/09/2012	227	1018	20	0	26	0
06/09/2012	191	1017	23	3.5	30	0
17/10/2012	321	1016	24	0	37	0
17/10/2012	309	1010	22	0	34	0
17/10/2012	307	1008	23	5	41	0
02/11/2011	313	1026	22	3.5	36	0
26/11/2012	306	1002	21	28	33	0
05/12/2012	305	1010	21	2	32	0
07/12/2012	284	1004	22	0	34	0
11/12/2012	217	1017	19	0	32	0
28/12/2012	327	1038	24	4.7	42	0

Appendix C

Flare Emissions Monitoring Report

ODOUR monitoring IRELAND

ODOUR & ENVIRONMENTAL ENGINEERING CONSULTANTS

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TITLE: AIR EMISSION TESTING OF ONE LANDFILL FLARE LOCATED IN POLLBOY LANDFILL FACILITY, POLLBOY, BALLINASLOE, CO. GALWAY

PREFORMED BY ODOUR MONITORING IRELAND ON BEHALF OF GALWAY COUNTY COUNCIL

PREPARED BY:	Dr. John Casey
ATTENTION:	Mr. Kevin Mulrennan
LICENCE NUMBER:	WL027-02
LICENCE HOLDER:	Galway County Council
FACILITY NAME:	Pollboy Landfill Facility
DATE OF MONITORING VISIT:	19th Jul. 2012
NAME AND ADDRESS OF CLIENT ORGANISATION:	Pollboy, Ballinsloe, Co. Galway
NAME AND ADDRESS OF MONITORING ORGANISATION:	Odour Monitoring Ireland, Unit 32 DeGranville Court, Dublin Road, Trim, Co. Meath
DATE OF REPORTING:	22nd Sept. 2012
NAME AND THE FUNCTION OF THE PERSON APPROVING THE REPORT:	Dr. Brian Sheridan, Managing Partner, Odour Monitoring Ireland
REPORT NUMBER:	2012379(1)
REVIEWERS:	Dr. Brian Sheridan

TABLE OF CONTENTS

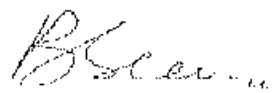
Document Amendment Record

Client: ***Galway County Council***

Project: Air emission testing of one enclosed Landfill flare located in Poliboy Lanofill, Poliboy, Ballinsloe, Co. Galway.

Project Number: 2012379(1)			Document Reference:		
2012379(1)	Document for review	B.A.S.	JWC	B.A.S	22/09/2012
Revision	**Purpose/Description**	**Originated**	**Checked**	**Authorised**	**Date**

Signing sheet



Brian Sherican Ph.D Eng

For and on behalf of Odour Monitoring Ireland

1. Executive Summary

The results of the monitoring exercise are contained in Section 2 of this report.

- NO_x as NO_2, CO, TOC and HCL/HF emissions from Flare 1 were within the emission limit values specified in Waste licence W027-02;

1.1 Monitoring Objectives

This report has been prepared by Odour Monitoring Ireland and contains the results of emission testing carried out on 1 No. Enclosed ground flare at Pollboy Landfill, Ballinsloe, Co. Galway. The monitoring was carried out at this facility as part of compliance monitoring with the requirements of Waste licence W0027-02. The emission testing was carried out by Odour Monitoring Ireland on behalf of Galway County Council.

1.2 Special Monitoring Requirements

There were no special monitoring requirements for this campaign.

1.3 The substances to be monitored at each emission point

The parameters listed in *Table 1.1* were monitored using the appropriate instrumentation as illustrated in *Table 1.1*. All monitoring was carried out in accordance with Environmental Protection Agency Office of Environmental Enforcement (OEE) Air Emission Monitoring Guidance Note 2 (AG2).

Table 1.1. Monitored parameters and techniques

Sample location	Parameter	Analytical method
Landfill Flare	Volumetric airflow rate & Temperature (^0C)	Pitot in accordance with EN13284-1 where possible. MGO coated K type thermocouple and PT100 Volumetric airflow rate theoretical calculated for Landfill flare.
Landfill Flare	Oxides of nitrogen (NO_x as NO_2), Carbon monoxide (CO), Carbon dioxide (CO_2), Sulphur dioxide (SO_2), and Oxygen (O_2)	Horiba PG250 All analytes, Oxygen EN14789, Oxides of Nitrogen Chemiluminescence, Carbon Monoxide EN15085.
Landfill Flare	Hydrogen chloride (HCL)	Impinger train containing high purity deionised water solution in accordance ISEN 1911:2010
Landfill Flare	Hydrogen fluoride (HF)	Impinger train containing 0.10 molar sodium hydroxide ISEN 15713:2006
Landfill Flare	Total Organic Carbon (TOC)	TOC analyser in accordance with EN12619:2002

This report presents details of this monitoring programme. This environmental monitoring was carried out Dr. John Casey, Managing Partner, Odour Monitoring Ireland on the 19th Jul. 2012. Methocology, Results, Discussion and Conclusions are presented herein.

2. Monitoring Results

This section will present the results of the monitoring exercise.

2.1 Operating Information

Emission Point Reference	Date	Process Type	Process Duration	Fuel	Feedstock	Abatement	Load
Flare 1	19/07/2012	Landfill flare	Continuous	Landfill Gas	N/A	None	Landfill Gas

2.2 Monitoring Result Reference Conditions

Emission Point Reference	Temperature (K)	Pressure	Moisture Correction	Oxygen Correction (%)
Flare 1	K	101.3	Yes	9

2.3. Sampling Location Summary

Comment	Yes/No
Recommended 5 hydraulic diameters straight length before sampling plane	Yes
Recommended 2 hydraulic diameters straight length after sampling plane	Yes
Ports number <1.5m - 2 ports >1.5m - 4 ports	1 port on the flare
Appropriate port size	Yes
Suitable working platform	Yes

Note: Temperature and airflow rate traverse measurements were performed across the stack in one plane only. Only one plane was possible due to access port issues.

2.4. Sampling run times for the monitoring

Parameter	Approx. Sampling period for landfill flare
Inlet CH_4	30 minutes
Inlet O_2	30 minutes
Volumetric air flow rate	Theoretically calculated
SO_2	40 minutes
NO_x	40 minutes
CO	40 minutes
O_2	40 minutes
CO_2	40 minutes
Stack gas temp	40 minutes
TOC	35 minutes
HCl	38 minutes
HF	38 minutes

2.5. Characteristics of raw inlet gas to enclosed Landfill flare

Parameter	Compound loading Flare1	Units
CH_4	31.8	%
CO_2	22.6	%
O_2	1	%
Volumetric flow rate	214	m^3/hr
Total chloride	32	mg/Nm^3
Total fluoride	<2.1	mg/Nm^3
Total sulphur	18	mg/Nm^3

2.6. Theoretically calculated landfill gas exhaust volume and physical characteristics from the Landfill flare.

Parameter	Flare 1
Total Volumetric methane loading (m^3/hr)	68
Total Volumetric Oxygen loading (m^3/hr)	2.14
Ratio to complete combustion of methane assuming no excess Oxygen	9.57
Oxygen concentration level in flue gas (%)	8.71
Flue gas temperature (Kelvin)[2]	1,298
Theoretical calculated Volumetric exhaust airflow rate (m^3/h)	1,479
Normalised average exhaust airflow rate ($Nm^3 h^{-1}$)[3]	311

Notes: [1] denotes data from 19/07/2012.
[2] denoted converted from degrees Celsius to Kelvin ($^0C + 273.15$);
[3] denotes normalised to 273.15 Kelvin and 101.3 kPa.

Table 2.7. Emission value results for landfill gas Flare 1.

Flare 1	Conc.	Normalised (mgN/m^3)	Oxygen corrected emission concentration to flare (mgN/m^3) 3% ref.	Kg/hr	Expanded uncertainty as percentage of limit value (%)[1]	Emission limit Values	Operating Status
Total NOx [as NO_2] (ppm)	21	43.05	63.22	21	5.32	<150 mg/Nm^3	As Normal
CO (ppm)	1.5	1.875	2.75	1.5	5.21	<50 mg/Nm^3	As Normal
Total Organic Carbon (mg/m^3)	1.32	2.11	3.32	1.32	3.54	<10 mg/Nm^3	As Normal
Average Hydrogen Chloride (mg/m^3)	3.25	4.44	6.97	3.25	-	<50 mg/Nm^3 (at mass flow > 0.30 kg/hr)	As Normal
Average Hydrogen Fluoride (mg/m^3)	0.38	0.52	0.82	0.38	-	<5 mg/Nm^3 (at mass flow > 0.050 kg/hr)	As Normal
SO_2 (ppm)	3	8.55	12.55	-	-	-	As Normal
O_2 (%)	5.71	-	-	-		-	As Normal
Temperature (degrees)	1,025	-	1,298	-	-	>1273K	As Normal
CO_2 (%)	8.5	-	-	-	-	-	As Normal
Volumetric Airflow (m^3/hr)	-	-		-	-	<3,000	As Normal
Efficiency (%)	>99.98	-	-	-	-	-	As Normal

Notes: [1] denotes that expanded uncertainty is elevated as the equation has not been validated for use with high temperature sources.
Leak check results for Horiba = <2%
Leak check results for Signal = <2%
Span (<2% range) and drift values within acceptable tolerance (<1%) for Horiba.
Span (<2% range) and drift values within acceptable tolerance (<1%) for Signal.

3. Discussion of results

Tables 2.1 to *2.7* present the results of the emission monitoring carried out on the landfill flare located in Pollboy Landfill.

There was very little variation at one traverse in oxygen and flue gas temperature profiles across the stack during the monitoring exercise (i.e. less than 15% as recommended by the Environment Agency, UK (Environment Agency, 2002)).

A high temperature Inconel 625 and ceramic probe (Testo, Germany) was used to prevent variations in CO emissions data. Normal stainless steel probes when subjected to temperatures above 600^{0}C can release CO from within the structure of the material and cause the recording of erroneous results (Environment Agency, 2002).

Correction of data to 3% oxygen was performed. Due to possible inaccuracies in airflow rate measurement, it was not possible to determine the oxygen intake of the flare through the louver system using measurement. Since the volume of intake air required for complete combustion was known and the oxygen concentration in the exhaust flue gas was known, the volume of intake excess fuel air could be theoretically calculated through numerous iterations using the Solver program (i.e. Microsoft Excel). This allows for the calculation of the volume of intake excess air through the louver landfill flare intake system (Environment Agency, 2002).

4. Conclusion

The following conclusions can be drawn from this study:

1. A theoretically exhaust flue gas volume was calculated for the landfill flare.
2. NO_x as NO_2, SO_2, CO, O_2, TOC, HCL and HF monitoring and analysis was carried out in accordance with specified requirements;
3. All data was standardised to 273.15 Kelvin, 101.3 kPa;
4. All data is presented as Oxygen corrected to 3% (v/v) using the appropriate equations;
5. NO_x as NO_2, CO, TOC, HCL and HF emissions from Flare 1 were within the emission limit values specified in Waste licence W027-02.

5. References

1. Environment Agency. (2002). Guidance for Monitoring Enclosed Landfill Gas Flares. www.environment-agency.co.uk
2. Environmental Protection Agency. (2009). Air Emissions Monitoring Guidance Note 2 (AG2).
3. I.S. EN 13284-1:2002. Stationary source emissions. Measurement of velocity and volume flow rate of gas streams in ducts.
4. IS EN13526:2002-Stationary source emissions-Determination of the mass concentration of total gaseous organic carbon in flue gases from solvent using processes-Continuous flame ionisation detector method.
5. IS EN12619:1999-Stationary source emissions-Determination of the mass concentration of total gaseous organic carbon at low concentrations in flue gases-Continuous flame ionisation detector method.
6. I.S. EN 13284-1:2002. Stationary source emissions. Determination of low range mass concentration of dust. Manual gravimetric method.

6. *Appendix I*-Sampling, analysis

6.1.1 Location of Sampling
Pollboy Landfill, Pollboy, Ballinsloe, Co. Galway.

6.1.2 Date & Time of Sampling
19th Jul. 2012

6.1.3 Personnel Present During Sampling
Dr. John Casey, Odour Monitoring Ireland, Trim, Co. Meath.
MCERTS: MM0674

6.1.4 Instrumentation check list
Federal Method 2 S type pitot and MGO coated thermocouple;
L type pitot tube
Testo 400 handheld and appropriate probes.
Ceramic and Inconel 625 sampling probes.
TCR Tecora Iso-kinetic Particulate and gas sampling train
Portable Signal 3030PM FID calibrated with Propane with non-methane hydrocarbon cutter.
SKC sample pumps and Bios Primary calibrator
Horiba PG250.

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TITLE: AIR EMISSION TESTING OF ONE LANDFILL FLARE LOCATED IN POLLBOY LANDFILL FACILITY, POLLBOY, BALLINASLOE, CO. GALWAY

PREFORMED BY ODOUR MONITORING IRELAND ON BEHALF OF GALWAY COUNTY COUNCIL

PREPARED BY:	Dr. John Casey
ATTENTION:	Mr. Kevin Mulrennan
LICENCE NUMBER:	WL027-02
LICENCE HOLDER:	Galway County Council
FACILITY NAME:	Pollboy Landfill Facility
DATE OF MONITORING VISIT:	18th Oct. 2011
NAME AND ADDRESS OF CLIENT ORGANISATION:	Pollboy, Ballinsloe, Co. Galway
NAME AND ADDRESS OF MONITORING ORGANISATION:	Odour Monitoring Ireland, Unit 32 DeGranville Court, Dublin Road, Trim, Co. Meath
DATE OF REPORTING:	05th Jan 2012
NAME AND THE FUNCTION OF THE PERSON APPROVING THE REPORT:	Dr. Brian Sheridan, Managing Partner, Odour Monitoring Ireland
REPORT NUMBER:	201207(1)
REVIEWERS:	Dr. Brian Sheridan

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Document Amendment Record

Client: ***Galway County Council***

Project: Air emission testing of one enclosed Landfill flare located in Pollboy Landfill, Pollboy, Ballinsloe, Co. Galway.

Project Number: 201207(1)			**Document Reference:**		
201207(1)	Document for review	B.A.S.	JWC	B.A.S	05/01/2012
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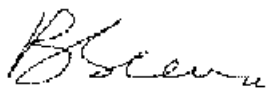


Brian Sheridan Ph.D Eng

For and on behalf of Odour Monitoring Ireland

1. Executive Summary

The results of the monitoring exercise are contained in Section 2 of this report.

- NO_x as NO_2, CO, TOC and HCL/HF emissions from Flare 1 were within the emission limit values specified in Waste licence W027-02;

1.1 Monitoring Objectives

This report has been prepared by Odour Monitoring Ireland and contains the results of emission testing carried out on 1 No. Enclosed ground flare at Pollboy Landfill, Ballinsloe, Co. Galway. The monitoring was carried out at this facility as part of compliance monitoring with the requirements of Waste licence W0027-02. The emission testing was carried out by Odour Monitoring Ireland on behalf of Galway County Council.

1.2 Special Monitoring Requirements

There were no special monitoring requirements for this campaign.

1.3 The substances to be monitored at each emission point

The parameters listed in *Table 1.1* were monitored using the appropriate instrumentation as illustrated in *Table 1.1*. All monitoring was carried out in accordance with Environmental Protection Agency Office of Environmental Enforcement (OEE) Air Emission Monitoring Guidance Note 2 (AG2).

Table 1.1. Monitored parameters and techniques

Sample location	Parameter	Analytical method
Landfill Flare	Volumetric airflow rate & Temperature (^{0}C)	Pitot in accordance with EN13284-1 where possible. MGO coated K type thermocouple and PT100 Volumetric airflow rate theoretical calculated for Landfill flare.
Landfill Flare	Oxides of nitrogen (NO_X as NO_2), Carbon monoxide (CO), Carbon dioxide (CO_2), Sulphur dioxide (SO_2), and Oxygen (O_2)	Horiba PG250 All analytes, Oxygen EN14789, Oxides of Nitrogen Chemiluminescence, Carbon Monoxide EN15058.
Landfill Flare	Hydrogen chloride (HCL)	Impinger train containing high purity deionised water solution in accordance ISEN 1911:2010
Landfill Flare	Hydrogen fluoride (HF)	Impinger train containing 0.10 molar sodium hydroxide ISEN 15713:2006
Landfill Flare	Total Organic Carbon (TOC)	TOC analyser in accordance with EN12619:2002

This report presents details of this monitoring programme. This environmental monitoring was carried out Dr. John Casey, Managing Partner, Odour Monitoring Ireland on the 18th Oct. 2011. Methodology, Results, Discussion and Conclusions are presented herein.

2. Monitoring Results

This section will present the results of the monitoring exercise.

2.1 Operating Information

Emission Point Reference	Date	Process Type	Process Duration	Fuel	Feedstock	Abatement	Load
Flare 1	18/10/2011	Landfill flare	Continuous	Landfill Gas	N/A	None	Landfill Gas

2.2 Monitoring Result Reference Conditions

Emission Point Reference	Temperature (K)	Pressure	Moisture Correction	Oxygen Correction (%)
Flare 1	K	101.3	Yes	3

2.3. Sampling Location Summary

Comment	Yes/No
Recommended 5 hydraulic diameters straight length before sampling plane	Yes
Recommended 2 hydraulic diameters straight length after sampling plane	Yes
Ports number <1.5m - 2 ports >1.5m - 4 ports	1 port on the flare
Appropriate port size	Yes
Suitable working platform	Yes

Note: Temperature and airflow rate traverse measurements were performed across the stack in one plane only. Only one plane was possible due to access port issues.

2.4. Sampling run times for the monitoring

Parameter	Approx. Sampling period for landfill flare
Inlet CH_4	30 minutes
Inlet O_2	30 minutes
Volumetric air flow rate	Theoretically calculated
SO_2	40 minutes
NO_x	40 minutes
CO	40 minutes
O_2	40 minutes
CO_2	40 minutes
Stack gas temp	40 minutes
TOC	40 minutes
HCL	35 minutes
HF	35 minutes

2.5. Characteristics of raw inlet gas to enclosed Landfill flare

Parameter	Compound loading Flare1	Units
CH_4	43.7	%
CO_2	25.5	%
O_2	0.5	%
Volumetric flow rate	289	m^3/hr
Total chloride	45	mg/Nm^3
Total fluoride	<1.2	mg/Nm^3
Total sulphur	19	mg/Nm^3

2.6. Theoretically calculated landfill gas exhaust volume and physical characteristics from the Landfill flare.

Parameter	Flare 1
Total Volumetric methane loading (m^3/hr)	126
Total Volumetric Oxygen loading (m^3/hr)	1.4
Ratio to complete combustion of methane assuming no excess Oxygen	9.57
Oxygen concentration level in flue gas (%)	11.6
Flue gas temperature (Kelvin)[2]	1,375
Theoretical calculated Volumetric exhaust airflow rate (m^3/h)	3,362
Normalised average exhaust airflow rate ($Nm^3\ h^{-1}$)[3]	667

Notes: [1] denotes data from 18/10/2011.
[2] denoted converted from degrees Celsius to Kelvin (^0C + 273.15);
[3] denotes normalised to 273.15 Kelvin and 101.3 kPa.

Table 2.7. Emission value results for landfill gas Flare 1.

Flare 1	Conc.	Normalised (mgN/m^3)	Oxygen corrected emission concentration to flare (mgN/m^3) 3% ref.	Kg/hr	Expanded uncertainty as percentage of limit value (%)[1]	Emission limit Values	Operating Status
Total NOx [as NO_2] (ppm)	24	49.2	94.70	0.03	10.5	<150 mg/Nm^3	As Normal
CO (ppm)	1	1.25	2.41	0.001	8.41	<50 mg/Nm^3	As Normal
Total Organic Carbon (mg/m^3)	1.8	2.88	5.55	0.002	15.62	<10 mg/Nm^3	As Normal
Average Hydrogen Chloride (mg/m^3)	0.91	1.25	2.53	0.0008	-	<50 mg/Nm^3 (at mass flow > 0.30 kg/hr)	As Normal
Average Hydrogen Fluoride (mg/m^3)	0.31	0.42	0.85	0.0003	-	<5 mg/Nm^3 (at mass flow > 0.050 kg/hr)	As Normal
SO_2 (ppm)	2	5.7	10.97	-	-	-	As Normal
O_2 (%)	11.6	-	-	-		-	As Normal
Temperature (degrees)	1,102	-	1,375K	-	-	>1273K	As Normal
CO_2 (%)	5.33	-	-	-	-	-	As Normal
Volumetric Airflow (m^3/hr)	-	-	328.50	-	-	<3,000	As Normal
Efficiency (%)	>99.98	-	-	-	-	-	As Normal

Notes: [1] denotes that expanded uncertainty is elevated as the equation has not been validated for use with high temperature sources.
Leak check results for Horiba = <2%
Leak check results for Signal = <2%
Span (<2% range) and drift values within acceptable tolerance (<1%) for Horiba.
Span (<2% range) and drift values within acceptable tolerance (<1%) for Signal.

3. Discussion of results

Tables 2.1 to *2.7* present the results of the emission monitoring carried out on the landfill flare located in Poliboy Landfill.

There was very little variation at one traverse in oxygen and flue gas temperature profiles across the stack during the monitoring exercise (i.e. less than 15% as recommended by the Environment Agency, UK (Environment Agency, 2002)).

A high temperature Inconel 625 and ceramic probe (Testo, Germany) was used to prevent variations in CO emissions data. Normal stainless steel probes when subjected to temperatures above 600^{0}C can release CO from within the structure of the material and cause the recording of erroneous results (Environment Agency, 2002).

Correction of data to 3% oxygen was performed. Due to possible inaccuracies in airflow rate measurement, it was not possible to determine the oxygen intake of the flare through the louver system using measurement. Since the volume of intake air required for complete combustion was known and the oxygen concentration in the exhaust flue gas was known, the volume of intake excess fuel air could be theoretically calculated through numerous iterations using the Solver program (i.e. Microsoft Excel). This allows for the calculation of the volume of intake excess air through the louver landfill flare intake system (Environment Agency, 2002).

4. Conclusion

The following conclusions can be drawn from this study:

1. A theoretically exhaust flue gas volume was calculated for the landfill flare.
2. NO_x as NO_2, SO_2, CO, O_2, TOC, HCL and HF monitoring and analysis was carried out in accordance with specified requirements;
3. All data was standardised to 273.15 Kelvin, 101.3 kPa;
4. All data is presented as Oxygen corrected to 3% (v/v) using the appropriate equations;
5. NO_x as NO_2, CO, TOC, HCL and HF emissions from Flare 1 were within the emission limit values specified in Waste licence W027-02.

5. References

1. Environment Agency. (2002). Guidance for Monitoring Enclosed Landfill Gas Flares. www.environment-agency.co.uk
2. Environmental Protection Agency. (2009). Air Emissions Monitoring Guidance Note 2 (AG2).
3. I.S. EN 13284-1:2002. Stationary source emissions. Measurement of velocity and volume flow rate of gas streams in ducts.
4. IS EN13526:2002-Stationary source emissions-Determination of the mass concentration of total gaseous organic carbon in flue gases from solvent using processes-Continuous flame ionisation detector method.
5. IS EN12619:1999-Stationary source emissions-Determination of the mass concentration of total gaseous organic carbon at low concentrations in flue gases-Continuous flame ionisation detector method.
6. I.S. EN 13284-1:2002. Stationary source emissions. Determination of low range mass concentration of dust. Manual gravimetric method.

6. *Appendix I*-Sampling, analysis

6.1.1 Location of Sampling
Polboy Landfill, Polboy, Ballinsloe, Co. Galway.

6.1.2 Date & Time of Sampling
18th Oct. 2011

6.1.3 Personnel Present During Sampling
Dr. John Casey, Odour Monitoring Ireland, Trim, Co. Meath.
MCERTS: MM06/4

6.1.4 Instrumentation check list
Federal Method 2 S type pitot and MGO coated thermocouple;
L type pitot tube
Testo 400 handheld and appropriate probes.
Ceramic and Inconel 625 sampling probes.
TCR Tecora Iso-kinetic Particulate and gas sampling train
Portable Signal 3030PM FID calibrated with Propane with non-methane hydrocarbon cutter.
SKC sample pumps and Bios Primary calibrator
Horiba PG250.

Appendix D

Leachate Monitoring Results

Annual Leachate Monitoring Results- Q2 of 2012

Monitoring point			Leachate Lagoon
Parameter	**Units**	**Licence Limits**	**Q2**
Temperature	ºC		18
pH	pH units	6-9	8.2
Conductivity	µS/cm		8060
Biochemical Oxygen Demand	mg/l O2	2,500	35
Chemical Oxygen Demand	mg/l O2	3,000	878
Ammonia	mg/l N	800	0.91
Ortho-Phosphate (as P)	mg/l P		0.836
Total Oxidised Nitrogen (as N)	mg/l N		1.3
Chloride	mg/l Cl		910
Cyanide	mg/l CN		nm
Fluoride	mg/l F		0.19
Sulphate	mg/l SO4		14
Boron	µg/l		1773
Sodium	mg/l		530
Magnesium	mg/l		42
Potassium	mg/l		230
Calcium	mg/l		100
Chromium	µg/l		34
Iron	µg/l		4599
Manganese	µg/l		550
Nickel	µg/l		48
Copper	µg/l		400
Zinc	µg/l		110
Cadmium	µg/l		<0.1
Mercury	µg/l		<0.05
Lead	µg/l		1.4

Quarterly Leachate Monitoring Results- 2012

Monitoring point		**Leachate Lagoon**			
Sampling Period	**Licence Limit**	**Q1**	**Q2**	**Q3**	**Q4**
Temperature (ºC)	**-**	6.6	13.1	13.8	9.8
pH (pH units)	**pH 6-9**	6.9	7.3	7.4	8.6
Conductivity (µS/cm)	**-**	3310	5490	4390	4270
Biochemical Oxygen Demand (mg/l O2)	**2,500**	11	30	16	13.5
Chemical Oxygen Demand (mg/l O2)	**3,000**	221	359	291	322
Ammonia (mg/l N)	**800**	140	290	220	280
Chloride (mg/l Cl)	**-**	290	760	480	540

Appendix E

Surface water Monitoring Results

Quarterly Surface Water Monitoring Results - 2012

Monitoring point		SW1				SW3				SW4			
Sampling Period	**Limits**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Temperature (ºC)	25	7.2	15.9	11.1	3.2	8.7	14.5	11	6.6	8.6	13.8	11	6.4
Dissolved Oxygen (% Saturation)	>60%	18	30	20	26	94	102	85	91	90	87	81	87
pH (pH units)	5.5-8.5	7.1	7.3	7.2	7.1	7.9	8.1	7.8	7.8	7.9	8.1	7.9	7.8
Conductivity (µS/cm)	1000	725	889	587	670	744	729	776	751	735	746	760	744
Biochemical Oxygen Demand (mg/l O2)	5	1.4	2.6	1.4	**14**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chemical Oxygen Demand (mg/l O2)	40	**87**	**91**	**95**	**90**	36	<25	<25	<25	46	<25	<25	<25
Suspended Solids (mg/l)	60	<8.0	13	9	68	8	19	<8	<8	<8	<8	<8	<8
Ammonia (mg/l N)	0.2	**6.9**	**8.8**	**2.2**	**5**	0.04	<0.03	0.06	0.04	0.04	<0.03	0.05	0.04
Chloride (mg/l Cl)	250	49	69	29	40	20	20	16	16	20	20	16	17

Monitoring point		SW6				SW8			
Sampling Period	**Limits**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Temperature (ºC)	25	7	16.5	11.1	3	6.9	13.3	10.5	2.3
Dissolved Oxygen (% Saturation)	>60%	24	47	19	25	40	26	21	34
pH (pH units)	5.5-8.5	7.2	7.4	7.2	7.1	7.1	7.3	7.3	7.1
Conductivity (µS/cm)	1000	734	871	583	670	416	461	444	421
Biochemical Oxygen Demand (mg/l O2)	5	1.4	**11**	2.6	1.5	1.5	2.7	1.1	1.1
Chemical Oxygen Demand (mg/l O2)	40	**91**	**101**	86	**62**	**127**	**120**	**124**	**98**
Suspended Solids (mg/l)	60	<8	27	<8	<8	<8	16	<8	<8
Ammonia (mg/l N)	0.2	**6.5**	**8.2**	0.05	**4.9**	**0.22**	**0.28**	0.18	0.14
Chloride (mg/l Cl)	250	48	<0.4	16	39	23	24	21	18

Quarterly Surface Water Monitoring Results - 2012

Monitoring point		SW1				SW3				SW4			
Sampling Period	**Limits**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Temperature (ºC)	25	7.2	15.9	11.1	3.2	8.7	14.5	11	6.6	8.6	13.8	11	6.4
Dissolved Oxygen (% Saturation)	>60%	**18**	**30**	**20**	**26**	94	102	85	91	90	87	81	87
pH (pH units)	5.5-8.5	7.1	7.3	7.2	7.1	7.9	8.1	7.8	7.8	7.9	8.1	7.9	7.8
Conductivity (µS/cm)	1000	725	889	587	670	744	729	776	751	735	746	760	744
Biochemical Oxygen Demand (mg/l O2)	5	1.4	2.6	1.4	**14**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chemical Oxygen Demand (mg/l O2)	40	**87**	**91**	**95**	**90**	36	<25	<25	<25	**46**	<25	<25	<25
Suspended Solids (mg/l)	60	<8.0	13	9	68	8	19	<8	<8	<8	<8	<8	<8
Ammonia (mg/l N)	0.2	**6.9**	**8.8**	**2.2**	**5**	0.04	<0.03	0.06	0.04	0.04	<0.03	0.05	0.04
Chloride (mg/l Cl)	250	49	69	29	40	20	20	16	16	20	20	16	17

Monitoring point		SW6				SW8			
Sampling Period	**Limits**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Temperature (ºC)	25	7	16.5	11.1	3	6.9	13.3	10.5	2.3
Dissolved Oxygen (% Saturation)	>60%	**24**	**47**	**19**	**25**	**40**	**26**	**21**	**34**
pH (pH units)	5.5-8.5	7.2	7.4	7.2	7.1	7.1	7.3	7.3	7.1
Conductivity (µS/cm)	1000	734	871	583	670	416	461	444	421
Biochemical Oxygen Demand (mg/l O2)	5	1.4	**11**	2.6	1.5	1.5	2.7	1.1	1.1
Chemical Oxygen Demand (mg/l O2)	40	**91**	**101**	**86**	**62**	**127**	**120**	**124**	**98**
Suspended Solids (mg/l)	60	<8	27	<8	<8	<8	16	<8	<8
Ammonia (mg/l N)	0.2	**6.5**	**8.2**	0.05	**4.9**	**0.22**	**0.28**	0.18	0.14
Chloride (mg/l Cl)	250	48	<0.4	16	39	23	24	21	18

Annual Surface Water Monitoring Results- Q2 of 2012

Monitoring point				SW1	SW3	SW4	SW6	SW8
Sampling Period		SI 294 of 1989	SI 278 of 2007	Q2	Q2	Q2	Q2	Q2
Parameter	Units	Limits	Limits					
Ortho-Phosphate (as P)	mg/l P	0.5		<0.012	<0.012	0.012	0.012	0.037
Total Oxidised Nitrogen (as N)	mg/l N	1		<0.4	1.1	0.7	<0.4	<0.4
Sulphate	mg/l SO4	200		7.7	16	16	7.8	5.2
Alkalinity-total (as CaCO3)	mg/l CaCO3	-		352	360	380	364	216
Boron	µg/l	2000	1000	84	41	16	83	28
Sodium	mg/l	-		46	14	12	45	14
Magnesium	mg/l	-		11	11	11	10	5.2
Potassium	mg/l	-		9.6	2.1	1.5	9	1.3
Calcium	mg/l	-		117	133	140	119	91
Chromium	µg/l	0.05	50	0.7	<0.5	<0.5	0.6	<0.5
Iron	µg/l	200	200	1243	88	177	1002	704
Manganese	µg/l	50	50	1300	78	19	850	170
Nickel	µg/l	-	20	3.1	2.9	2.7	3.1	1.2
Copper	mg/l	0.05 (o)	2	1	3.1	1.1	1.4	2.8
Zinc	µg/l	3		54	43	1.2	49	50
Cadmium	µg/l	0.005	5	<0.1	<0.1	<0.1	<0.1	<0.1
Mercury	µg/l	0.001	1	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	µg/l	0.05	25	<0.5	<0.5	<0.5	<0.5	<0.5

Appendix F

Groundwater Monitoring Results

Quarterly Groundwater Monitoring Results- 2012

Monitoring point	Trigger Levels (EPA IGV)	S.I. 9 2010 GW Regs	B2AP				B8A				B8AP			
Sampling Period	**Limits**	**Limits**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Temperature (ºC)	25	-	11.5	12.4	11.8	11.4	11.2	11.8	11.2	10.7	9.1	11.9	12.5	9.7
pH (pH units)	≥ 6.5 and ≤ 9.5	-	7.1	7.1	7.2	7.2	7.3	7.4	7.3	7.3	6.9	6.8	6.9	7.1
Conductivity (µS/cm)	1000	800-1875	1128	1072	1064	1299	634	624	627	617	1732	2260	1659	1716
Ammonia (mg/l N)	0.15	0.065 - 0.175	**14**	**11**	**8.3**	**7.9**	**0.95**	**1.2**	**0.99**	**0.97**	**17**	**1.6**	**16**	**25**
Chloride (mg/l Cl)	30	24 - 187.5	140	140	150	230	18	19	18	18	210	17	200	220
Total Organic Carbon (mg/l C)	No Abnormal Change	No Abnormal Change	7.5	9	<2	4	3.7	5	3	2	47	**494**	**nr**	369

Monitoring point	Trigger Levels (EPA IGV)	S.I. 9 2010 GW Regs	RC2				RC3				MW1			
Sampling Period	**Limits**	**Limits**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Temperature (ºC)	25	-	10.9	12	11.3	10.5	10.7	11.6	11	10.6	9.7	11.5	10.7	9.8
pH (pH units)	≥ 6.5 and ≤ 9.5	-	7.4	7.3	7.3	7.3	6.9	6.7	6.8	6.8	7.5	7.4	7.5	7.5
Conductivity (µS/cm)	1000	800-1875	604	593	597	594	1294	1353	1325	1247	575	569	570	563
Ammonia (mg/l N)	0.15	0.065 - 0.175	**1.6**	**1.6**	**1.4**	**1.3**	**8.9**	**9.4**	**9.2**	**9**	**7.3**	**7.4**	**7.3**	**7.4**
Chloride (mg/l Cl)	30	24 - 187.5	17	17	17	17	85	89	89	84	17	17	16	16
Total Organic Carbon (mg/l C)	No Abnormal Change	No Abnormal Change	<1	4	3	2	8.7	14	12	10	6.3	5	1	5

Monitoring point	Trigger Levels (EPA IGV)	S.I. 9 2010 GW Regs	MW2				MW3				MW6			
Sampling Period	**Limits**	**Limits**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Temperature (ºC)	25	-	7.5		11.4	6.4	9.9	10.5	11.5	10.5	10.6	11.4	10.9	8
pH (pH units)	≥ 6.5 and ≤ 9.5	-	7		6.9	6.9	7.1	7	7.1	7	6.6	6.8	6.9	6.9
Conductivity (µS/cm)	1000	800-1875	707		813	753	646	628	642	622	1366	1323	1233	1200
Ammonia (mg/l N)	0.15	0.065 - 0.175	**0.22**		**0.41**	**0.34**	**5.3**	**3.7**	**2.9**	**3.3**	**7.4**	**8.3**	**6.5**	**7.6**
Chloride (mg/l Cl)	30	24 - 187.5	21		10	11	19	18	18	18	**32**	**34**	20	25
Total Organic Carbon (mg/l C)	No Abnormal Change	No Abnormal Change	36		40	39	21	320	72	19	14	81	35	68

Annual Groundwater Monitoring Results- Q2 of 2012

Monitoring point				B2AP	B8A	B8AP	RC2	RC3	MW1	MW2	MW3	MW6
Sampling Period		Trigger Levels (EPA IGV)	S.I. 9 2010 GW Regs									
Parameter	Units	Limits	Limits	Q2	Q2	Q2	Q2	Q2	Q2	Q2	Q2	Q2
Dissolved Oxygen	% Saturation	No Abnormal Change		22	24	20	16	25	19	–	18	25
Ortho-Phosphate (as P)	mg/l P	0.03		<0.03	<0.03	<0.03	<0.03	<0.03	<0.012	–	<0.012	0.028
Total Oxidised Nitrogen (as N)	mg/l N	No Abnormal Change		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	–	<0.4	<0.4
Cyanide	mg/l CN	0.01	0.0375	nm	nm	nm	nm	nm	nm	–	<0.05	<0.05
Fluoride	mg/l F	1		0.63	0.45	0.24	0.62	0.55	0.66	–	0.55	0.16
Sulphate	mg/l SO4	200	187.5	2.5	14	28	6.7	94	**<0.5**	–	<0.5	120
Alkalinity-total (as CaCO3)	mg/l CaCO3	No Abnormal Change		352	316	675	296	548	284	–	320	564
Total Solids	mg/l	1000		805	543	**7740**	319	**1474**	283	–	**10140**	**7510**
Boron	µg/l	1000	750	93	17	238	21	49	41	–	33	97
Sodium	mg/l	150	150	84	10	**230**	11	62	16	–	13	34
Magnesium	mg/l	50		17	22	25	22	22	14	–	6.7	17
Potassium	mg/l	5		**6.1**	0.87	**60**	0.83	**5.4**	3.5	–	1.5	**14**
Calcium	mg/l	200		97	98	138	88	196	86	–	117	**227**
Chromium	µg/l	30	37.5	<0.5	<0.5	1.5	<0.5	<0.5	<0.5	–	1.5	<0.5
Iron	µg/l	200		50	**2091**	59	**2441**	**3258**	15	–	181	**873**
Manganese	µg/l	50	50	**160**	40	**1600**	31	**230**	**181**	–	**290**	**520**
Nickel	µg/l	20	15	2.1	0.8	25	0.6	19	290	–	13	8.6
Copper	µg/l	30	1500	2.4	0.7	2.6	0.8	2	13	–	2	2.7
Zinc	µg/l	100		52	2.7	74	1.5	64	2	–	63	69
Cadmium	mg/l	0.005	0.00375	<0.1	<0.1	<0.1	<0.1	<0.1	57	–	<0.1	<0.1
Mercury	mg/l	0.001	0.00075	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	–	<0.05	<0.05
Lead	mg/l	0.01	0.01875	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	–	<0.5	<0.5

Appendix G

2012 Meteorological Data

Date	Mean Wind Speed (m/s)	Mean Relative Humidity (%)	Max Air Temp (°C)	Min Air Temp (°C)	Mean Air Temp (°C)	Mean Wind Direction (°)	Rain Intensity Daily Total (mm)	Precipitation Amount (mm)
01/01/2012	3.946479	82.352113	9.4	1	5.783099	249.873239	11.3	5.4
02/01/2012	0.552778	85.180556	7.7	0.9	3.648611	240.361111	48.2	9.6
03/01/2012	0.4875	75.597222	12.8	3.5	6.719444	268.680556	9.4	12.9
04/01/2012	0	83.5	10.2	4.7	7.665714	268.971429	5	1.1
05/01/2012	0	73.819672	10.3	4.6	8.493443	278.360656	0	1.1
06/01/2012	0	87.830189	11.2	4.9	8.122642	256.415094	3.1	0.6
07/01/2012	0	78.290909	8.7	6.2	7.790909	271.490909	0	0.6
08/01/2012	0	88.490909	10.9	7.7	9.858182	263.254545	0.4	0
09/01/2012	0	82.135593	10	7.6	8.942373	258.830508	8	0.4
10/01/2012	0	90.101695	11.1	7.5	9.618644	245.881356	7	1.6
11/01/2012	0	90.985915	11.2	9.8	10.573239	259.197183	0.1	1.9
12/01/2012	0	85.857143	11.3	3.2	8.152857	269.828571	0	0.5
13/01/2012	0	92.875	7.9	3.4	5.529167	149.402778	0	0.2
14/01/2012	0	82.557143	7.8	3.2	5.737143	121.214286	0	0
15/01/2012	0	75.388889	7	1.8	4.927778	115.305556	0	0
16/01/2012	0	84.8	7.1	0.9	4.707143	135.771429	0	0
17/01/2012	0	86.069444	11.8	6.5	8.9375	198.916667	22.1	3.1
18/01/2012	0	86.112676	11.9	7.6	9.159155	260.577465	1	3.2
19/01/2012	0	81.916667	8.2	5	6.548611	272.361111	3.6	1.1
20/01/2012	0	86.25	10.6	6.7	9.233333	271.069444	2	0.9
21/01/2012	0	77.708333	10.5	6.3	8.361111	274.208333	0	0.8
22/01/2012	0	74.583333	9.7	6.3	8.105556	275.319444	0	0
23/01/2012	0	86.166667	8.5	5.3	6.493056	260.041667	4.9	1.5
24/01/2012	0	90.930556	11.4	7.8	10.423611	256.805556	18.2	7.6
25/01/2012	0	84.014085	10.5	2	7.547887	229.902778	26.7	8.5
26/01/2012	0	83.861111	6	0.9	3.409722	244.819444	7.2	8.5
27/01/2012	0	80.861111	8.1	1.5	4.388889	273.958333	2.5	1
28/01/2012	0	91.625	6.4	-1.6	3.230556	190.194444	35.9	10.7
29/01/2012	0	92.305556	10	6.4	8.080556	254.569444	35.7	17.1
30/01/2012	0	92.014085	6.8	4.3	5.484507	119.478873	10.8	6.9
31/01/2012	0	82.04918	4.8	2.8	3.911475	100.704918	5	1.3
01/02/2012	0	75.305556	4.1	-3	1.398611	122.166667	0	0.4

Date	Mean Wind Speed (m/s)	Mean Relative Humidity (%)	Max Air Temp (°C)	Min Air Temp (°C)	Mean Air Temp (°C)	Mean Wind Direction (°)	Rain Intensity Daily Total (mm)	Precipitation Amount (mm)
02/02/2012	0	80.180556	3.3	-4.6	-1.197222	168.388889	0	0
03/02/2012	0	79.957746	6.2	-2.8	2.035211	168.943662	0	0
04/02/2012	0	87.246377	9.2	4	6.526761	245.450704	2.5	1.7
05/02/2012	0	88.236111	8.5	3	5.788889	237.083333	6.7	2.9
06/02/2012	0	92.464789	11.3	7.9	9.450704	225.169014	4.3	2.9
07/02/2012	0	87.361111	8.6	5.2	6.943056	146.180556	0	1.9
08/02/2012	0	85.486111	7.5	5.5	6.872222	171.569444	18.2	6
09/02/2012	0	90.352113	11.2	7.3	9.15493	229.140845	0.7	6
10/02/2012	0	91.819444	11.4	8.5	9.798611	227.097222	18.9	6.7
11/02/2012	0	88.763889	9.2	4.2	7.501389	227.027778	15.7	13.4
12/02/2012	0	90.916667	8.1	2.7	5.725	221.305556	0.2	0.4
13/02/2012	0.002817	85.633803	9	5	6.838028	285.507042	1.7	0.9
14/02/2012	0	82.847222	8.3	6	7.318056	287.138889	0	0.9
15/02/2012	0	82.361111	9.9	7.1	8.101389	288.819444	0.8	0.9
16/02/2012	0.0375	84.708333	9.7	7.5	8.856944	268.333333	0	0.9
17/02/2012	0	90.550725	10.8	8	9.757971	263.521739	15.1	2.7
18/02/2012	0	80.56338	8.9	1.7	5.35493	277.225352	16.1	5.2
19/02/2012	0	77.666667	8.9	1.2	3.991667	263.319444	0	1.6
20/02/2012	0	83.028169	9.8	2.7	7.595775	240.619718	0	0.1
21/02/2012	0	84.777778	12.6	9.1	10.433333	239.125	1.9	0.8
22/02/2012	0	89.625	13.3	10.8	11.826389	253.819444	33.9	5.3
23/02/2012	0	90	12.5	10.9	11.546479	256.901408	1.9	5.3
24/02/2012	0	81.442857	11.6	5.8	9.08	281.671429	0.3	1.5
25/02/2012	0	81.458333	10.5	2.7	6.845833	262.444444	0	0.1
26/02/2012	0	89.152778	12.1	6.5	9.066667	222.152778	5.2	1.1
27/02/2012	0	89.458333	11.5	9.8	10.593056	256.180556	0.4	1.1
28/02/2012	0	83.971831	11.6	9.3	10.492958	244.788732	0	0.4
29/02/2012	0.001389	80.222222	11.6	8.2	9.872222	198.097222	0	0
01/03/2012	0	82.194444	11.1	4.7	8.879167	220.527778	1.2	0.1
02/03/2012	0	83.583333	10.9	4.9	8.361111	150.013889	0	0.1
03/03/2012	0	77.5	10.7	3.1	7.261111	233.444444	8.6	2.1
04/03/2012	0	77.833333	7.7	-0.5	3.558333	271.736111	0	1.2
05/03/2012	0	78	10.2	1.5	5.228169	261.585714	0.1	0
06/03/2012	0	87.704225	11.6	2.4	7.649296	208.1	24.4	6.9
07/03/2012	0	76.541667	11.7	4.5	6.870833	273.208333	2.9	7.3

Date	Mean Wind Speed (m/s)	Mean Relative Humidity (%)	Max Air Temp (°C)	Min Air Temp (°C)	Mean Air Temp (°C)	Mean Wind Direction (°)	Rain Intensity Daily Total (mm)	Precipitation Amount (mm)
08/03/2012	0	75.402778	12.2	4.3	8.705556	252.111111	0	1.1
09/03/2012	0	89.057143	11.8	9.3	10.867143	254.471429	4.5	0.9
10/03/2012	0	89.111111	12	8.1	10.205556	267.541667	0	0.4
11/03/2012	0	86.527778	11.4	7.3	9.338889	244.070423	0	0
12/03/2012	0	80.430556	10.8	8.3	9.338889	191.861111	0	0
13/03/2012	0	81.361111	11.1	7.1	8.683333	170.402778	0.6	0.5
14/03/2012	0	80.472222	10.6	6.4	8.5625	200.875	0	0.5
15/03/2012	0	81.236111	12.2	6.8	9.547222	221.513889	2.3	1
16/03/2012	0	85.704225	11.1	2.5	8.291549	244.323944	15.8	8.3
17/03/2012	0	90.361111	7.6	-0.2	4.040278	111.652778	41.9	15.5
18/03/2012	0	77.180556	11	1.2	5.651389	261.472222	0	15.5
19/03/2012	0	77.028169	11.8	2.1	8.13662	249.619718	0	0.2
20/03/2012	0	73.402778	12.4	6.3	10.205556	240.819444	0	0
21/03/2012	0	72.916667	10.8	7.1	9.468056	197.388889	0	0
22/03/2012	0	74.791667	14.9	3	9.016667	104.097222	4.7	1.8
23/03/2012	0	83.833333	11.8	5.8	9	133.680556	1.9	2.4
24/03/2012	0	71.458333	16.4	6.2	11.381944	131.859155	0	0.1
25/03/2012	0	68.15493	19.2	6.6	12.790141	161.704225	0	0
26/03/2012	0	67.666667	18.7	3.4	10.981944	166.472222	0	0
27/03/2012	0	65.830769	19.6	3.2	10.461538	188.353846	0	0
28/03/2012	0	61.819444	19	1.9	10.695833	160.125	0	0
29/03/2012	0	70.347222	18	4.4	10.577778	269.541667	0	0
30/03/2012	0	83.263889	11.5	8.4	9.531944	183.819444	0	0
31/03/2012	0	75.125	11	6.1	9.211111	131.791667	0	0.1
01/04/2012	0	75.529412	12.7	2.1	7.742647	133.588235	0	0
02/04/2012	0	86.707317	10.7	5.9	7.934146	222.097561	1.3	0.8
03/04/2012	0	71.666667	8.1	1.1	5.468254	98.428571	19.4	2.5
04/04/2012	0	58.375	8	0.6	4.268056	42.972222	0	2.5
05/04/2012	0	66.013889	10.8	-1.5	5.581944	106.444444	0	0
06/04/2012	0	86.333333	11.3	3.9	7.95	286.083333	0.1	0
07/04/2012	0	81.042254	15.3	8.6	10.967606	225.633803	0.3	0.2
08/04/2012	0	83.416667	11	7.2	9.048611	268.805556	6.2	1.6
09/04/2012	0	85.527778	9.9	3.6	7.186111	254.208333	28.7	4.9
10/04/2012	0	79.902778	9.7	2.2	5.593056	268.611111	10.6	6.4
11/04/2012	0	76.958333	11.8	1.5	7	280.638889	0	6.4

Date	Mean Wind Speed (m/s)	Mean Relative Humidity (%)	Max Air Temp (°C)	Min Air Temp (°C)	Mean Air Temp (°C)	Mean Wind Direction (°)	Rain Intensity Daily Total (mm)	Precipitation Amount (mm)
12/04/2012	0	83.263889	10.7	4.3	6.965278	251.583333	43.7	14.2
13/04/2012	0	72.507042	11.3	2.9	6.746479	119.619718	10.1	16.7
14/04/2012	0	66.333333	10.3	2.7	6.297222	110.458333	0	0
15/04/2012	0	62.309859	10.7	-0.1	5.808451	191.847222	0	0
16/04/2012	0	78.114286	10.6	4.7	7.735714	186.271429	16.9	5.1
17/04/2012	0	83.222222	9.1	5.3	6.490278	227.652778	39.3	16.5
18/04/2012	0	75.971429	12.5	5.1	7.960563	217.098592	4.4	18.2
19/04/2012	0	75.428571	12.6	2.8	7.56	289.757143	1.1	0.5
20/04/2012	0	76.486111	11.2	2.8	6.705556	275.541667	3.7	1.7
21/04/2012	0	73.915493	11.9	3.6	7.853521	274.971831	4.6	1.7
22/04/2012	0	81.180556	11.8	5.2	8.3375	259.277778	10.9	6.9
23/04/2012	0	78.342857	12.9	4.2	8.017143	143.371429	12.5	6.9
24/04/2012	0	77.125	12.5	5.1	7.822222	156.388889	16	5.1
25/04/2012	0	83.611111	8.6	4.8	6.663889	62.597222	59.9	20.3
26/04/2012	0	71.958333	11.7	6	8.495833	41.208333	10.3	23.3
27/04/2012	0	63.5	10.1	2.3	6.768056	50.125	2.5	1.5
28/04/2012	0	67.805556	11.2	0.3	6.1125	84.638889	0	0.1
29/04/2012	0	65.236111	12.9	1.1	6.798611	48.833333	19.8	6.9
30/04/2012	0	77.295775	13.4	5.1	9.264789	70.56338	24.2	11.8
01/05/2012	0	77.819444	14.4	8.7	10.720833	78.944444	19.3	6.1
02/05/2012	0	79.507042	13.9	8.3	10.456338	92.140845	0	6.1
03/05/2012	0	71.291667	17.7	8.6	12.744444	104.555556	0.2	0.4
04/05/2012	0	81.638889	12	5.8	8.976389	89.555556	10.3	4.8
05/05/2012	0	64.166667	9.8	3.8	6.754167	94.069444	0	4.8
06/05/2012	0	62.847222	11.1	0.8	7.011111	131	0	0
07/05/2012	0	80.930556	13.5	5.2	8.370833	173.041667	104	10.3
08/05/2012	0	73.402778	12.6	3.1	8.240278	211.055556	1.6	4.8
09/05/2012	0	77.666667	11.4	1.8	6.848611	142.819444	3.4	1.8
10/05/2012	0	90.736111	9.6	6.1	7.958333	136.069444	45.1	12
11/05/2012	0	71.028169	11.9	3.5	7.864789	244.549296	2.3	12
12/05/2012	0	72.028169	13.4	3	8.539437	269.422535	0.9	1.1
13/05/2012	0	77.666667	12.5	4.8	9.041667	254.041667	1.5	1.1
14/05/2012	0	72.805556	12.4	3.7	8.223611	277.180556	6.6	4.5
15/05/2012	0	68.138889	12	3.3	7.486111	255.5	1.6	4.5
16/05/2012	0	70.986111	10.8	2.7	7.781944	243.291667	3.7	2.4

Date	Mean Wind Speed (m/s)	Mean Relative Humidity (%)	Max Air Temp (°C)	Min Air Temp (°C)	Mean Air Temp (°C)	Mean Wind Direction (°)	Rain Intensity Daily Total (mm)	Precipitation Amount (mm)
17/05/2012	0	76.819444	11.8	6.4	9.018056	114.736111	19.5	5.6
18/05/2012	0	73.957746	12.1	6.6	9.543662	68.690141	4.4	1.6
19/05/2012	0	78.680556	11.5	7.1	9.294444	80.527778	1.1	2.1
20/05/2012	0	75.708333	15.6	4.9	10.291667	216	0	0
21/05/2012	0	73.84507	17.9	9.5	13.623944	189.15493	0	0
22/05/2012	0	80.305556	18.8	10.9	14.869444	181.236111	0.4	0.2
23/05/2012	0	75.885714	19.4	9.7	14.732857	176.042857	0	0
24/05/2012	0	68.125	24.1	8.7	16.7875	132.309859	0	0
25/05/2012	0	65.652778	25.4	11.2	18.890278	90.319444	0	0
26/05/2012	0	61.263889	23.8	12.4	18.720833	90.611111	0	0
27/05/2012	0	64.222222	24.5	11.8	18.247222	122.361111	0	0.3
28/05/2012	0	67.361111	19.9	12.4	16.1875	162.027778	0	0.3
29/05/2012	0	75.236111	20.7	9.2	15.273611	183.027778	0	0
30/05/2012	0	79.236111	18.9	12.4	14.911111	224.056338	15.2	3.2
31/05/2012	0	90.444444	16.5	12.1	13.965278	244.333333	52.4	13.4
01/06/2012	0	81.819444	20.4	13.7	16.619444	177.555556	0	7.5
02/06/2012	0	83.388889	16.4	12.5	14.229167	92.972222	66.9	20.1
03/06/2012	0	86.472222	12.4	9.1	10.809722	72.458333	77	38.9
04/06/2012	0	65.722222	15.6	8.2	12.118056	173.597222	0.7	7.1
05/06/2012	0	88.986111	14.9	8.4	11.141667	155.183099	62.1	18.2
06/06/2012	0	80.347222	17.6	10.9	13.761111	239.638889	20.2	18.2
07/06/2012	0	91.830986	14.4	11.4	12.376056	124.535211	161.1	50.4
08/06/2012	0	83.140845	11.5	9.7	10.756338	282.014085	77.1	66.6
09/06/2012	0	64.577465	16.9	8.8	12.371831	269.309859	0	10.6
10/06/2012	0	67.583333	18.3	5.8	12.681944	230.583333	0	0
11/06/2012	0	77.166667	19	9.2	12.611111	258.277778	5.8	2.2
12/06/2012	0	83.694444	14.3	10	11.945833	171.680556	49.6	11.6
13/06/2012	0	81.943662	16.4	8.6	11.690141	173.211268	11.3	11.6
14/06/2012	0	88.402778	13.1	8.7	11.009722	107.633803	88.7	28.2
15/06/2012	0	85.527778	15.9	11.2	13.177778	107.083333	35.6	7.7
16/06/2012	0	85.472222	13.4	9.8	11.9	259.527778	9.5	9.6
17/06/2012	0	68.763889	17.2	6.9	11.588889	264.098592	0.2	0.5
18/06/2012	0	82.652778	14.4	7.4	10.629167	218.652778	13.1	7.2
19/06/2012	0	70.5	17.5	5.6	12.315278	221.361111	0	7.2
20/06/2012	0	75.478873	18	8.5	13.629577	148.661972	15.8	5.5

Date	Mean Wind Speed (m/s)	Mean Relative Humidity (%)	Max Air Temp (°C)	Min Air Temp (°C)	Mean Air Temp (°C)	Mean Wind Direction (°)	Rain Intensity Daily Total (mm)	Precipitation Amount (mm)
21/06/2012	0	91.985714	13.6	10.1	11.944286	150.642857	146.3	30.9
22/06/2012	0	79.388889	16.2	11	12.897222	274.791667	2.7	25.1
23/06/2012	0	83.394366	14.9	11.2	12.9	238.943662	24.5	8.4
24/06/2012	0	77.873239	19	10.7	14.276056	282.285714	0.1	8.4
25/06/2012	0	72.597222	19.5	10	14.854167	170.166667	0	0
26/06/2012	0	86.027778	19.4	12.7	16.011111	215.597222	22.9	4.5
27/06/2012	0	82.097222	22	15.5	18.191667	215.152778	17.7	11.8
28/06/2012	0	86.777778	19.4	13.6	15.7125	185.430556	75.6	20.5
29/06/2012	0	85.791667	17.1	12.4	14.005556	247.513889	22.8	7.5
30/06/2012	0	81.319444	14.6	10.6	11.904167	271.611111	6.2	3.2
01/07/2012	0	81.680556	14.9	9.4	12.831944	240.180556	23.1	7.4
02/07/2012	0	83.347222	19.9	13.3	16.079167	222.847222	24.9	11.9
03/07/2012	0	89.208333	17	13.1	15.052778	169.138889	57.1	15.3
04/07/2012	0	84.388889	17.7	10.4	14.356944	146.347222	20.4	15.3
05/07/2012	0	75.28169	20.7	12.4	16.291549	119.887324	0	5.7
06/07/2012	0	87.083333	18.2	11.3	15.661111	140.583333	24.9	10.2
07/07/2012	0	80.847222	20.2	14.9	16.880556	53.125	7.7	11.4
08/07/2012	0	83.567164	14.5	10.9	13.237313	318.208955	0	2.7
09/07/2012	0	84.833333	16.7	10.2	12.718056	230.916667	14.6	4.2
10/07/2012	0	82.430556	16.5	9.9	12.770833	284.180556	38.1	6.6
11/07/2012	0	75.486111	15.8	8.9	12.2125	285.166667	5.5	6.6
12/07/2012	0	80.75	15.4	6.7	11.869444	128.125	22.2	5.9
13/07/2012	0	80.625	18.1	10.2	13.219444	109.819444	37.1	13.2
14/07/2012	0	75.690141	15.4	9.4	12.035211	286.535211	0.3	6
15/07/2012	0	76.013889	17.2	7.3	12.968056	258.277778	10.7	1.6
16/07/2012	0	88.013889	16.9	12.5	14.788889	248.875	34.1	7.7
17/07/2012	0	87.318182	19.7	13.8	16.345455	254.19697	12.2	11.5
18/07/2012	0	84.319444	17.3	12.5	14.6625	272.027778	24.8	11.5
19/07/2012	0	75.902778	15.8	9.9	12.886111	281.5	0	8.1
20/07/2012	0	68.944444	17.1	10	13.548611	268.541667	0	0
21/07/2012	0	72.736111	20.1	8	14.570833	235.208333	0	0
22/07/2012	0	81.125	21.2	13.1	17.651389	231.847222	3.1	0.4
23/07/2012	0	92.166667	19.7	14.8	16.997222	259.152778	22.6	8.6
24/07/2012	0	85.857143	19.5	13.4	15.428571	181.228571	44.6	13.4
25/07/2012	0	81.736111	19.1	12.4	15.447222	121.319444	0	13.4

Date	Mean Wind Speed (m/s)	Mean Relative Humidity (%)	Max Air Temp (°C)	Min Air Temp (°C)	Mean Air Temp (°C)	Mean Wind Direction (°)	Rain Intensity Daily Total (mm)	Precipitation Amount (mm)
26/07/2012	0	76.685714	21.4	11.3	15.482857	269.4	0	0
27/07/2012	0	73.805556	17.9	10.1	13.973611	281.708333	10.1	0.5
28/07/2012	0	77.236111	17	9.3	12.634722	279.930556	17.3	3.3
29/07/2012	0	77.5	16.2	7.9	11.819444	273.180556	9.7	9.5
30/07/2012	0	73.166667	18.4	8.1	12.878333	246.766667	0.2	9.5
31/07/2012	0	88.528571	17.5	11.2	14.331429	154.771429	69.4	23.9
01/08/2012	0	78.361111	17.7	11.9	15.743056	211.388889	27.2	28.8
02/08/2012	0	74.958333	18.3	10.5	14.629167	197.591549	3.1	4.8
03/08/2012	0	83	18.5	13.1	14.85493	136.239437	32.5	10.8
04/08/2012	0	81.541667	18.7	12.1	15.451389	79.013889	11	10.9
05/08/2012	0	84.239437	15.6	11.7	13.574648	267.985915	0.1	7.6
06/08/2012	0	79.597222	17.4	10.9	13.916667	271.069444	18.8	5.9
07/08/2012	0	80.069444	19.2	12.3	15.7375	170.763889	0	5.9
08/08/2012	0	80.597222	21.4	13.6	18.009722	206.944444	0	0
09/08/2012	0	80.328571	24.7	15.6	19.214286	214.914286	0	0
10/08/2012	0	73.902778	26.3	14.6	20.145833	150.929577	0	0
11/08/2012	0	72.757576	22	14.4	18.2	122.939394	0.2	0.1
12/08/2012	0	86.152778	20.9	15	16.993056	145.305556	70	20.9
13/08/2012	0	85.823529	20.5	14.7	16.7	192.161765	84.3	33.4
14/08/2012	0	77.529412	21.5	13.2	16.945588	157.5	0	14.9
15/08/2012	0	83.43662	18.1	14.3	16.35493	121.971831	58.3	19.3
16/08/2012	0	79.972222	20.4	12.7	16.115278	180.958333	30.9	20.4
17/08/2012	0	85.652778	21.2	15	16.998611	188.597222	49.2	13.5
18/08/2012	0	76.375	21.7	12.6	17.377778	212.619718	0	12.4
19/08/2012	0	80.666667	20.4	14	16.972222	170.722222	0	0.1
20/08/2012	0	76.365079	20	14.1	17.02381	236.460317	9.4	0.3
21/08/2012	0	80.069444	18.5	12.7	15.204167	228.069444	4	2.4
22/08/2012	0	82.056338	17.7	13.2	14.990141	259.971831	15.1	5.7
23/08/2012	0	82.888889	17.7	12.6	14.255556	215.583333	15.4	4.2
24/08/2012	0	90.388889	15.3	11.7	13.343056	87.819444	57.1	15.9
25/08/2012	0	77.166667	19	11.9	14.784722	258.819444	0.4	16.2
26/08/2012	0	81.041667	17.9	7.5	13.631944	199.791667	16	5.2
27/08/2012	0	84.448276	19.6	12.3	15.639655	220.603448	13	9.5
28/08/2012	0	76	18.6	10.8	14.273611	216.138889	8.8	2.7
29/08/2012	0	84.347222	16	11.4	13.669444	233.791667	32.4	7.7

Date	Mean Wind Speed (m/s)	Mean Relative Humidity (%)	Max Air Temp (°C)	Min Air Temp (°C)	Mean Air Temp (°C)	Mean Wind Direction (°)	Rain Intensity Daily Total (mm)	Precipitation Amount (mm)
30/08/2012	0	72.111111	17	8.7	12.868056	299.138889	0	7.8
31/08/2012	0	83.465753	16.9	8.4	13.39589	252.287671	3.7	0.6
01/09/2012	0	82.5	17.9	13.6	15.518056	247.513889	1.3	0.6
02/09/2012	0	81.549296	18.2	11.3	15.478873	275.690141	1.5	0.6
03/09/2012	0	85.15942	21.3	9.1	15.537681	238.855072	0	0.5
04/09/2012	0	74.888889	18.2	10	14.675	283.736111	0	0.3
05/09/2012	0	75.611111	18	8.4	13.016667	260.763889	0	0
06/09/2012	0	81.402778	17.7	7.4	13.459722	238.263889	0	0
07/09/2012	0	85.28169	19.8	14.1	16.328169	261.166667	0	0
08/09/2012	0	78.236111	19.3	10.6	15.952778	199.097222	0	0
09/09/2012	0	84.647887	19.3	10.6	15.03662	207.056338	0.9	2.8
10/09/2012	0	88.791667	14.6	9.6	11.958333	253.763889	42.7	9.3
11/09/2012	0	76.166667	14.3	7.1	10.643056	268.958333	6.5	10.5
12/09/2012	0	79.694444	16.6	7.6	12.570833	278.680556	1	2
13/09/2012	0	84.069444	16	7.4	13.206944	255.555556	1.1	1.1
14/09/2012	0	75	17.4	11.8	14.05	274.152778	0.1	1.2
15/09/2012	0	81.042254	15.2	12.5	13.395775	256.380282	0.9	0
16/09/2012	0	80.902778	16.3	9.5	13.004167	258.041667	17.5	3
17/09/2012	0	82.521127	14.9	8.5	11.204225	254.591549	16	3.7
18/09/2012	0	75.058824	14.3	7	9.932353	277.602941	12.6	3.7
19/09/2012	0	80.690141	14.1	6.6	10.512676	252.183099	6.1	3
20/09/2012	0	88	14.7	10.2	12.354167	247.361111	12.6	5.3
21/09/2012	0	77.625	14.2	4.6	10.141667	102.888889	27.9	12.3
22/09/2012	0	78.916667	14.5	2.3	8.030556	176.208333	0	0
23/09/2012	0	83.958333	15.2	2.9	8.740278	167.152778	0	0
24/09/2012	0	90.166667	10.3	6.2	8.427778	218.915493	27.1	9.1
25/09/2012	0	85.166667	11.4	8.2	9.993056	180.347222	46.7	18.8
26/09/2012	0	74.666667	15.9	8.5	12.005556	117.611111	2.5	4.9
27/09/2012	0	80.458333	14.2	8.6	11.040278	263.388889	3.3	0.9
28/09/2012	0	78.791667	14.9	7.7	11.2375	268.055556	1	1.1
29/09/2012	0	77.208333	14.7	7	11.229167	257.847222	1.9	0.5
30/09/2012	0	83.194444	15.4	10.4	13.276389	251.458333	30.3	5.9
01/10/2012	0	83.126761	13.3	9.2	10.664789	242.253521	13.7	6.7
02/10/2012	0	83.833333	13	7.3	9.823611	244.763889	46.3	10.2
03/10/2012	0	84.944444	12.3	5.6	8.629167	258.222222	25.5	8.4

Date	Mean Wind Speed (m/s)	Mean Relative Humidity (%)	Max Air Temp (°C)	Min Air Temp (°C)	Mean Air Temp (°C)	Mean Wind Direction (°)	Rain Intensity Daily Total (mm)	Precipitation Amount (mm)
04/10/2012	0	85.929577	12.9	4.5	8.409859	242.661972	6.7	4.5
05/10/2012	0	82.71831	12.4	4.7	8.470423	268.84507	1.6	4.3
06/10/2012	0	85.013889	14.2	3.8	8.697222	260.388889	0.6	0.8
07/10/2012	0	85.513889	12.4	2.8	7.759722	148.111111	0.8	0.1
08/10/2012	0	84.944444	13.3	5.4	9.609722	72.138889	10.1	2.1
09/10/2012	0	84.722222	13.2	2.8	8.0625	114.458333	0	1.3
10/10/2012	0	91.472222	14.3	3.5	9.8375	159.75	1.1	0.5
11/10/2012	1.074286	84.957143	14.3	4.3	10.201429	266.028571	88.6	16.3
12/10/2012	2.008451	84.661972	11	3.1	6.440845	259.070423	1.7	10.1
13/10/2012	1.920833	82.444444	12.4	3	6.834722	265.583333	0	2.4
14/10/2012	2.367606	88.901408	11.1	3.6	7.390141	274.253521	0	0
15/10/2012	1.65	94.333333	10	2.2	6.288889	210.986111	44.7	15.4
16/10/2012	2.963889	80.055556	12	5.1	8.436111	212.958333	5.3	16.3
17/10/2012	2.627143	89.257143	12.2	7	9.367143	112.357143	58.1	12.8
18/10/2012	1.783099	94.056338	10.7	8.8	9.794366	115.690141	86.4	21.7
19/10/2012	1.059722	87.791667	11.2	7.7	9.541667	128.416667	0	19.5
20/10/2012	1.027778	83.097222	14.4	8	10.426389	181.694444	0	0
21/10/2012	1.601408	86.422535	14.4	7.2	10.183099	129.394366	0	0
22/10/2012	1.044444	88.5	12.9	5.3	9.694444	127.458333	0	0
23/10/2012	1.788889	92.097222	12.7	10.4	11.413889	66.555556	3	0.6
24/10/2012	2.816418	88.791045	12.7	10.3	11.222388	62.865672	0	0.1
25/10/2012	3.709859	83.56338	11.1	8.6	9.909859	66.788732	0	0
26/10/2012	3.142857	71.342857	8.6	0.9	5.427143	55.1	0	0
27/10/2012	4.5	76	7.7	7.7	7.7	270	0	0
28/10/2012	4.261111	86.708333	9.2	5.8	8.247222	265.944444	20	5.6
29/10/2012	1.022222	88.541667	10.5	1.7	6.002778	208.986111	0.4	5.6
30/10/2012	3.756338	87.943662	9.1	2.5	6.726761	257.830986	1.4	0.6
31/10/2012	2.272222	89.597222	8.1	0.8	5.126389	246.75	51.6	15.2
01/11/2012	3.594444	87.583333	6.4	0.5	3.805556	268.527778	4	2.5
02/11/2012	2.991667	81.722222	8.5	2.6	5.15	260.555556	17.2	6.9
03/11/2012	3.15	85.722222	6.8	1.3	3.8375	240.569444	39.1	9.2
04/11/2012	1.402778	88.875	8.2	3	5.395833	92.180556	5.1	9.4
05/11/2012	1.498611	88.319444	10.5	0.7	4.629167	236.736111	13.3	2.8
06/11/2012	3.067797	83	11.7	4.6	8.452542	272.525424	0	1.9
07/11/2012	4.781429	85.5	11.1	8.7	9.368571	261.8	1.4	0.8

Date	Mean Wind Speed (m/s)	Mean Relative Humidity (%)	Max Air Temp (°C)	Min Air Temp (°C)	Mean Air Temp (°C)	Mean Wind Direction (°)	Rain Intensity Daily Total (mm)	Precipitation Amount (mm)
08/11/2012	2.96338	87.222222	10.8	5.8	8.511111	257.915493	0	0.8
09/11/2012	2.848611	87.083333	10.3	3.8	7.55	246.5	20.5	6.2
10/11/2012	2.530986	86.943662	8.6	2.9	5.257746	262.661972	3.9	2.3
11/11/2012	2.179167	86.847222	9	3.3	6.202778	248.041667	14.6	5.6
12/11/2012	2.893056	94.027778	12.5	6.2	11.118056	232.083333	8.8	7.7
13/11/2012	2.427778	91.138889	13.2	9.1	11.423611	223.930556	37.6	11.3
14/11/2012	1.0875	91.652778	12.2	8.5	10.265278	181.652778	31	17.1
15/11/2012	1.266667	89.638889	10.8	3.6	8.572222	232.208333	0	4.2
16/11/2012	1.180556	90.486111	7.9	3.3	6.198611	246.263889	4.3	1.8
17/11/2012	2	89.971831	7.5	1.2	3.847887	260.070423	4	2.1
18/11/2012	2.258333	92.138889	11.6	0.5	4.405556	200.986111	60.5	20.1
19/11/2012	3.759722	87.611111	12.3	8.7	10.930556	219.763889	17.5	26.1
20/11/2012	3.652113	83.915493	11.5	4.5	8.388732	211.577465	25.8	5.7
21/11/2012	1.865278	86.319444	10.2	1.5	6.391667	181.444444	0.4	2.9
22/11/2012	2.963889	85.472222	10.4	5.4	7.056944	233.791667	60.6	13.5
23/11/2012	1.811111	87.555556	6.9	1	4.040278	246.986111	19.7	5.2
24/11/2012	0.497222	96.277778	2.3	-1.6	0.434722	203.458333	0	4.9
25/11/2012	1.021739	94.785714	3.5	-2.6	0.958571	94.057143	3.5	0.2
26/11/2012	2.177778	83.486111	7.9	2	4.908333	209.208333	0	0
27/11/2012	1.566667	83	6.8	0.8	3.070833	216.472222	0	0
28/11/2012	0.973611	89.847222	7	0.1	2.179167	271.875	0	0
29/11/2012	0.514085	97.169014	2.4	-3.5	-0.166197	190.816901	0	0.1
30/11/2012	1.012676	96.985915	4.9	-0.1	2.984507	144.15493	0.5	2.7
01/12/2012	1.778571	91.028571	6.9	1.9	3.914286	273.914286	0	2.7
02/12/2012	2.079167	95.430556	10.4	1.6	5.75	195.902778	36.7	12.4
03/12/2012	3.215278	86.180556	8.9	2.8	4.975	267.444444	8.7	13.6
04/12/2012	3.1375	87.805556	6.3	2.2	3.75	274.013889	7	2.2
05/12/2012	1.429167	88.666667	4.6	-1.5	1.702778	252.638889	0	0.5
06/12/2012	3.936111	88.513889	7.3	-0.9	3.918056	257.652778	27	9.5
07/12/2012	2.352778	83.513889	7.8	1.6	4.188889	286.208333	4.1	10.2
08/12/2012	2.436111	90.541667	8	-0.6	5.113889	259.930556	0	0
09/12/2012	2.330556	91.430556	8.4	0.7	5.898611	276.694444	0	0.6
10/12/2012	0.491429	95.142857	1.9	-2.4	-0.135714	184.842857	0	0
11/12/2012	0.995775	92.028169	3.7	-2.7	0.071831	132.647887	0	0
12/12/2012	1.694118	89.867647	5.8	1.7	3.694118	126.617647	10.4	4

Date	Mean Wind Speed (m/s)	Mean Relative Humidity (%)	Max Air Temp (°C)	Min Air Temp (°C)	Mean Air Temp (°C)	Mean Wind Direction (°)	Rain Intensity Daily Total (mm)	Precipitation Amount (mm)
13/12/2012	2.451429	89.732394	5.1	-0.2	2.488732	121.140845	2.3	4
14/12/2012	3.266197	91.507042	9	3.7	6.478873	199.685714	39.2	6.9
15/12/2012	2.118056	90.861111	8.4	4	5.808333	242.291667	3.7	5.6
16/12/2012	2.036111	89.338028	8.7	3.1	5.730556	210.152778	9.7	4.3
17/12/2012	3.652174	88.492754	8.4	6	7.005797	268.362319	8.2	6.4
18/12/2012	1.780282	95.408451	7.1	0.5	3.933803	160.028169	0	2.4
19/12/2012	2.190278	92.513889	9.5	4.4	7.505556	152.041667	43.8	10.9
20/12/2012	0.843056	97.027778	6.8	3.7	5.588889	208.652778	6.4	3
21/12/2012	1.388889	96.236111	7.5	1.7	5.616667	179.763889	13.6	3.9
22/12/2012	2.756338	93.492958	13.2	7.6	11.292958	207.605634	45.8	12
23/12/2012	4.940845	84.323944	12	3.8	7.576056	237.577465	0	8.8
24/12/2012	1.313889	90.138889	8.7	3.9	6.263889	190.708333	2.7	1.7
25/12/2012	2.3	90.929577	8.2	2.3	5.057746	259.239437	9.3	2.6
26/12/2012	4.730556	85	8.7	3.8	6.213889	239.166667	50.5	10.9
27/12/2012	1.993056	88.958333	8	3.9	5.365278	235.097222	33	17.8
28/12/2012	4.198611	86.263889	12.6	5.8	10.595833	226.458333	17.5	8.8
29/12/2012	3.747887	82.43662	10.6	2.2	5.721127	249.338028	18.6	5.1
30/12/2012	6.804225	84.28169	10.9	2.3	7.269014	259.309859	15.9	6.7
31/12/2012	4.278873	84.887324	11	3.1	7.240845	265.211268	23	6.7
01/01/2013	3.6	85	4	4	4	275	0.5	0.7

Appendix H

Lagoon Inspection Report

RPS Consulting Engineers, Unit 2, IDA Business & Technology Park, Monivea, Galway, Ireland
T +353 (0)91 400 200 F +353 (0)91 400 299 E ireland@rpsgroup.com W rpsgroup.com/ireland

Mr. Tony McInerney,
Senior Executive Engineer,
Environment Section,
Galway County Council,
Centrepoint,
Liosbaun Business Park,
Liosbaun,
Tuam Road,
Galway.

14th February 2012

Our Ref: MGE0028LT0077GAL
File Ref: 310

Re: Pollboy Landfill – Certification of Lagoon Structure

Dear Mr. McInerney,

We refer to condition 15.13.2 of the waste licence in relation to the inspection and certification of the lagoon structures at Pollboy Landfill.

A visual inspection and the leachate lagoon was undertaken on the 30th January 2012 by RPS. The visual inspection also involved discussion with Mr. Kevin Mulrennan, Galway County Council.

The findings of the visual inspection are as follows:

- The leachate lagoon is generally in a good state of repair and there are no indications of obvious defects in the integrity of the lagoon.
- A quantity of silt is accumulating in the base of the lagoon but we understand that this is being removed from the lagoon and sump area by the operator every 6 months.
- The anchorage of the lagoon appears to be in a good condition and the lagoon liner is perfectly functional.
- The surface aerators operating in the lagoon appear to be in good working order.

I hereby certify the leachate lagoon structure at Pollboy Landfill as required under condition 5.13.2 of Waste Licence No. W0027-02.

RPS

We trust this is satisfactory. Please do not hesitate to contact the undersigned if you have any queries.

Yours sincerely,

Kieran Garvey

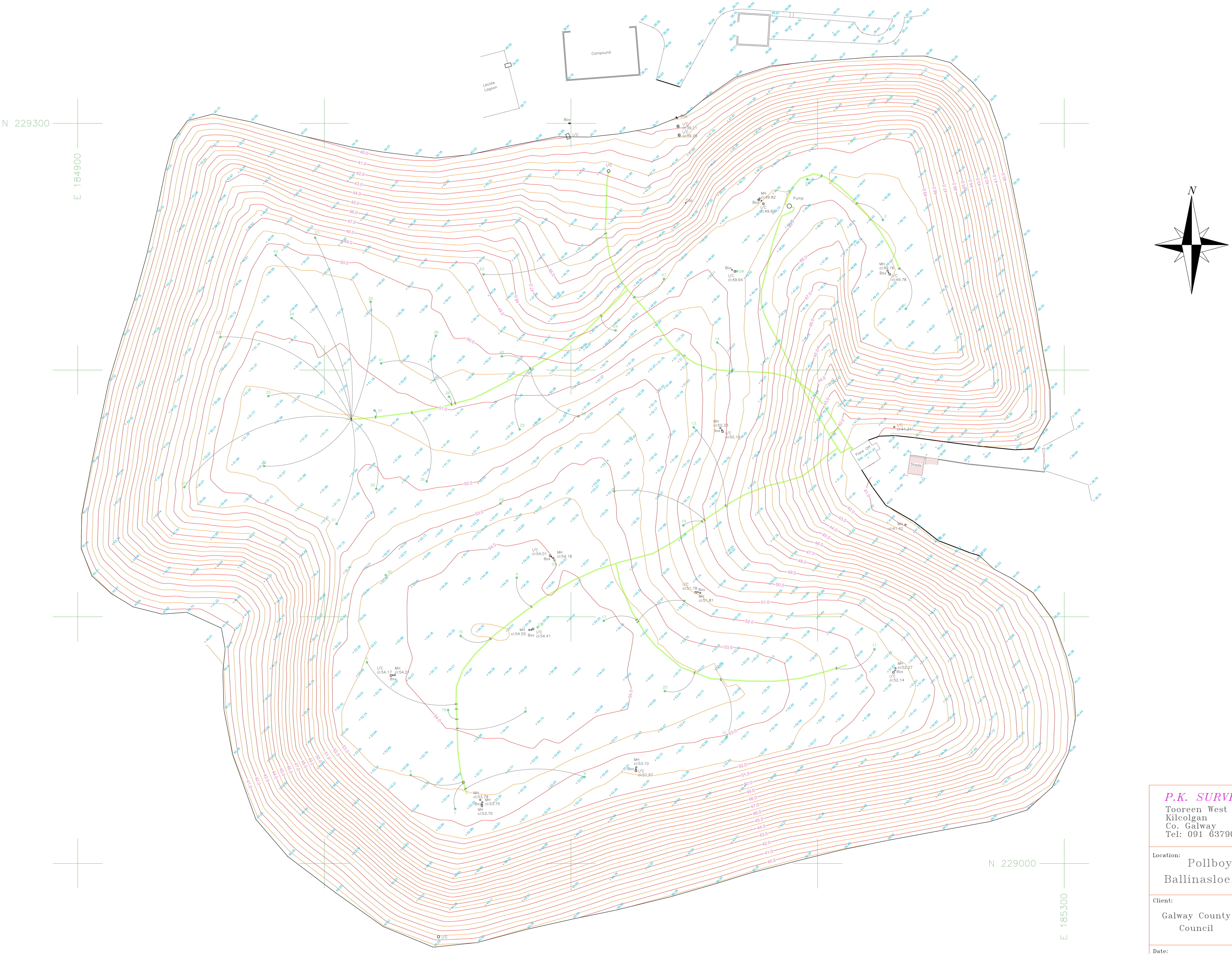
Kieran Garvey BE CEng MIEI PMP PMI
Senior Design Engineer
For RPS Consulting Engineers

dc/kg

cc: Mr. Kevin Mulrennan, Environment Section, Galway County Council

Appendix I

Topographical Survey



P.K. SURVEYS Ltd.

Tooreen West
Kilcolgan
Co. Galway
Tel: 091 637904

Location:
Pollboy Landfill
Ballinasloe, Co. Galway

Client:	Scale:
Galway County Council	(A0) 1:500
	Datum: O.S. Malin
Date: 20-06-2012	Ref No: 1324-2D.DWG

Appendix J

Water Balance Calculation

Year	Year	Active Cell	Active area	Annual Rainfall	PE	A.E.	Effective Rainfall	Active area Infiltration	Restored Phase No.	Liquid Waste	Restored Area	Infiltration to restored area	Restored area infiltration (m3)	Annual Leachate
			m2	mm	mm	mm	mm	m3		m3	m2	(%)	m3	m3
2003	1	OL+1	86400	928	563	450.4	478	41265	OL	0	0	20	0	41265
2004	2	1	36000	928	563	450.4	478	17194	OL	0	61400	20	5,865	23059
2005	3	1	36000	928	563	450.4	478	17194	OL	0	61400	20	5865	23059
2006	4	none		928	563	450.4	478	0	OL & 1	0	61400	20	8635	8635
2007	5	none		928	563	450.4	478	0	OL & 1	0	90400	20	8635	8635
2008	6	none		928	563	450.4	478	0	OL & 1	0	90400	20	8635	8635
2009	7	none		928	563	450.4	478	0	OL & 1	0	90400	20	8635	8635
2010	8	none		928	563	450.4	478	0	OL & 1	0	125400	20	8635	8635
2011	9	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2012	10	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2013	11	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2014	12	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2015	13	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2016	14	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2017	15	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2018	16	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2019	17	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2020	18	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2021	19	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2022	20	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2023	21	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2024	22	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2025	23	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2026	24	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2027	25	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2028	26	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2029	27	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2030	28	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2031	29	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2032	30	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635
2033	31	none		928	563	450.4	478	0	OL & 1	0	150400	20	8635	8635

Annual Rainfall (mm)	**923**
Potential Evapotranspiration (mm)	**563**
Actual Evapotranspiration (mm) (assumed to be 80% PE)	**454**
Effective Rainfall (mm)	**469**
Waste Density (tonne/m3)	**0.8**

Landfill Cell areas: [61,400 (old cell) + 36,000 (Cell 1)]m^2 = **97,400m^2**

Appendix K

Reported Incidents, Complaints and Non-Compliances

THE ENVIRONMENT SECTION
GALWAY COUNTY COUNCIL
COUNTY HALL
PROSPECT HILL
GALWAY

TEL: (091) 476402
FAX: (091) 769590

FAX

TO: DR. MICHAEL HENRY, GAA

ADDRESS: GAA, CASTLEBAR

DATE: 3/1/2011

FROM: Kevin McInerney, Pollboy Landfill, Ballinasloe

MESSAGE:

Michael,
I wish to inform you that the AFS flare is presently off since 2.30 this am on Blessed Trinity Haven. I have contacted the AFS Service Engineer and he will be on site either this evening or early tomorrow morning to rectify this problem. I will notify you as soon as this fault is rectified.

Regards,
Kevin McInerney

NO. OF PAGES INCLUDING THIS ONE: 1

Michael Henry,
Office of Environmental Enforcement,,
E.P.A.,
John Moore Rd.,
Castlebar,
Co. Mayo

24th January 2012

Re: Waste License 27-2 (Pollboy Landfill, Ballinasloe)

A Chara,

Following the installation of a new transducer at Pump sump 1, I wish to notify you that the leachate level in the lined cell at Pollboy landfill, Ballinasloe, Co. Galway is reading a level of 1.983m on the scada system. The license states that *" 5.11.1 Leachate levels in the waste shall not exceed a level of 1.0m over the top of the liner at the base of the landfill"*

Ballinasloe Town Council are presently investigating interim measures and long term measures of increasing the quantity of leachate been pumped from Pollboy landfill and it is envisaged that an increase in the quantities of leachate pumped from the landfill will reduce the level of leachate in the new lined cell.

Mise le meas,

Kevin Mulrennan,
Executive Technician Pollboy Landfill,
Environment Section,
Galway County Council,
Aras an Chontae,
Prospect Hill,
Galway.
087-6851937

THE ENVIRONMENT SECTION
GALWAY COUNTY COUNCIL
COUNTY HALL
PROSPECT HILL
GALWAY

TEL: (091) 476402
FAX: (091) 769590

FAX

TO: Dr. Mick Henry.

ADDRESS: EPA CASTLEBAR

DATE: 14-Feb-2012

FROM: Kevin McGeeown, Poolboy Landfill, Ballinrobe

MESSAGE:

I wish to inform you that the AFS gas flare at Poolboy landfill will be down for approx. one hour this afternoon (14/2/2012) due to AFS carrying out a service of the flare.

NO. OF PAGES INCLUDING THIS ONE: 1

THE ENVIRONMENT SECTION
GALWAY COUNTY COUNCIL
COUNTY HALL
PROSPECT HILL
GALWAY

TEL: (091) 476402
FAX: (091) 769590

FAX

TO: Dr. Michael Henry

ADDRESS: EPA, Castlebar

DATE: 20/1/2012

FROM: Kevin Mulkerrin, Pollboy Landfill

MESSAGE:

Michael,
I wish to inform you that the AFS @ Pollboy landfill went off @ approx. 11.30 am due to low methane. Barry McCormack (AFS) is on site and reported to me that there were a couple of loose pipes which he is reconnecting. He will check for any more loose connections but he expects the flare to be up and running within the hour.

Regards
Kevin Mulkerrin, Pollboy Landfill

NO. OF PAGES INCLUDING THIS ONE: 1

THE ENVIRONMENT SECTION
GALWAY COUNTY COUNCIL
COUNTY HALL
PROSPECT HILL
GALWAY

TEL: (091) 476402
FAX: (091) 769590

FAX

TO: DR MICK HENRY

ADDRESS: EPA CASTLEBAR.

DATE: 5/3/2012.

FROM: KEVIN MULPEHAN, ENVIRONMENT

MESSAGE:

I WISH TO INFORM YOU THAT I HAVE USE OF THE MACHINE AFTER LUNCH & WILL BE BREAKING A SMALL SECTION OF THE 250MM GAS MAIN. AS A PRECAUTION I WILL BE TURNING OFF THE GAS MAIN DURING THIS TIME.

NO. OF PAGES INCLUDING THIS ONE: 1

THE ENVIRONMENT SECTION
GALWAY COUNTY COUNCIL
COUNTY HALL
PROSPECT HILL
GALWAY

TEL: (091) 476402
FAX: (091) 769590

FAX

TO: Dr. Mick Henry, EPA, Castlebar

ADDRESS: EPA, Castlebar

DATE: 22/3/2002

FROM: Kevin Mulvennan, Pollboy Landfill

MESSAGE:

Mick,

I wish to inform you that the flowmeter that records the volume of leachate been pumped from Pollboy Landfill, Ballinasloe to the Wastewater Treatment Plant is giving an error message. As such no details of leachate pumped on Tuesday night or last night has been recorded (however, approx. 2000m³ would have been pumped each night)

I contacted EPS, Ballyhaunis this morning in order to organise a call out. Michael Kerrane, EPS is to get back to me today and I will then organise a call out as soon as possible in order to rectify problem.

Regards,

Kevin Mulvennan, Pollboy Landfill, Ballinasloe

NO. OF PAGES INCLUDING THIS ONE: 1

THE ENVIRONMENT SECTION
GALWAY COUNTY COUNCIL
COUNTY HALL
PROSPECT HILL
GALWAY

TEL: (091) 476402
FAX: (091) 769590

FAX

TO: DR. MICK HENRY

ADDRESS: EPA, CASTLEBAR

DATE: 29/3/2012

FROM: Kevin MULRENNAN, PALLBOY LANDFILL

MESSAGE:

Mick,
Please see attached sheets in relation to works which AFS Ltd, Coventry, England propose to carry out at Pallboy Landfill, Ballinasloe, Co. Galway on the 28th, 29th and 30th March.

NOTE: I also wish to inform you that the flowmeter which measures the quantity of leachate pumped from the landfill to the wastewater Treatment Plant is now replaced since last night. A proper Record will be kept of the leachate pumped last night and on Tuesday, Wednesday and Thursday nights of last week. Regards, Kevin Mulrennan, Pallboy Landfill

NO. OF PAGES INCLUDING THIS ONE: 2

Proposed Work.

AFS Ltd., Coventry, England are beginning the realignment of the 250mm main in both cells at Pollboy landfill, Ballinasloe, as referred to in our audit response of the 15th February, 2012. This will remove any possible condensation build up in this pipe and allow the flow of condensation to the knock-out pots. AFS expect to be carrying out these works on Wednesday and Thursday (28th and 29th March, 2012). This will require disconnecting the 63mm piping from the 250mm main and temporarily blanking these off to prevent any escape of gas until the realignment is complete. It is envisaged that the flare will be off whilst these pipes are disconnected and therefore AFS expect that the flare will be off from approx. 10am to 3pm on Wednesday and Thursday.

On Friday 30th March, AFS propose to fit 2no. pneumatic pumps into 2 of the recently drilled wells (i.e. GW 35 and GW 39) as it appears that there is perched leachate in these wells. This perched leachate will be pumped to the lagoon via the pipework previously installed for the removal of perched leachate from 5 other wells (these are no longer required and are not in use).

THE ENVIRONMENT SECTION
GALWAY COUNTY COUNCIL
COUNTY HALL
PROSPECT HILL
GALWAY

TEL: (091) 476402
FAX: (091) 769590

FAX

TO: Dr. Nick Henry

ADDRESS: EPA, Castlebar

DATE: 16th April - 2012

FROM: Kara Mulrednan, Galway Co. Co.

MESSAGE:

NO. OF PAGES INCLUDING THIS ONE: 2

Michelle Staunton

From: Kevin Mulrennan
Sent: 16 April 2012 12:12
To: Michelle Staunton
Subject: FW: FAX

From: Kevin Mulrennan
Sent: 16 April 2012 12:05
To: Michelle Collins
Subject: FAX

Michelle,

Would you mind faxing the following message to Dr. Mick Henry, EPA, Castlebar at 09490 48499. Thanks.

Mick,
Further to the phone message I left you earlier, I wish to inform you in writing that the AFS flare stopped on Saturday night (14/15th April) due to a low methane alarm. This was due to a loose connection on the gas field of a 63mm carrier pipe leaving one of the gas wells. This has now been repaired and the flare is again operating.

Regards,
Kevin Mulrennan
Pollboy landfill
Ballinasloe,
Co. Galway

For File 1.16

Dr. Michael Henry,
Office of Environmental Enforcement,,
E.P.A.,
John Moore Rd.,
Castlebar,
Co. Mayo

26th April 2012

Re: Pollboy Landfill

Michael,

For your information, I refer to surface water sampling that was carried out at Pollboy landfill on the 22nd February, 2012 for the Office of Environmental Enforcement.

Condition 6.6.3 of Waste License W27-2 states that: "*the trigger levels for emissions to surface water at (i) outfall to northern stream (ii) outfall to Southern stream and (iii) outfall to those areas referred to in Condition 3.14.5 are as follows:*

***(a)** BOD: 25mg/l*
***(b)** Suspended Solids: 60mg/l*

I therefore wish to inform you that the sampling results show a suspended solids figure of 171mg/l at SW3 and 87mg/l at SW4. I believe that these figures are elevated due to this drain been recently cleaned out by machine.

The ammonia figure at SW1 was 4.2mg/l. This is an improvement from the first quarter figure of 6.9mg/l which was sampled on the 19/1/2012.

The iron value at RC3 of 3037 ug/l is elevated due to the close proximity of this sample location to the landfill.

Mise le meas,

_____

Kevin Mulrennan,
Executive Technician,
Environment Section,
Galway County Council,
Aras an Chontae,
Prospect Hill,
Galway.
087-6851937

THE ENVIRONMENT SECTION
GALWAY COUNTY COUNCIL
COUNTY HALL
PROSPECT HILL
GALWAY

TEL: (091) 476402
FAX: (091) 769590

FAX

TO: DR MICHAEL HENRY, EPA, CASTLEBAR

ADDRESS: EPA, CASTLEBAR

DATE: 9/5/2012

FROM: KEVIN MURPHY, PUBLIC LANDFILL, BALLINAFAD

MESSAGE:

Michael,

I wish to inform you that the VPS flare went off this morning & I am close to a low methane alarm. Typically, this is because of a loose connection in the pipework out on the gas field. I will be on site this morning and rectify the problem.

Regards,

Kevin Murphy Landfill.

NO. OF PAGES INCLUDING THIS ONE: 1

To FILE

THE ENVIRONMENT SECTION
GALWAY COUNTY COUNCIL
COUNTY HALL
PROSPECT HILL
GALWAY

TEL: (091) 476402
FAX: (091) 769590

FAX

TO: Dr. Michael Henry, EPA

ADDRESS: EPA, Castlebar

DATE: 4/9/12

FROM: Kevin Mulcahy, Public Health

MESSAGE:

See attached sheets.

NO. OF PAGES INCLUDING THIS ONE: 3

Annex 1

Odours detected	
Extent[4]	Intermittent ☐ Persistent ☐
Sensitivity[5]	Remote ☐ Low ☐ Moderate ☐ High ☐ Extra ☐
Intensity[6]	Faint ☐ Moderate ☐ Strong ☐ Very strong ☐
Weather at time of incident:	[illegible]
Wind Direction:	
Details of who was notified:	EPA by telephone ☑ Local Authority ☐ Fisheries ☐ Other
Corrective actions taken:	[illegible]
Preventative actions taken or planned:	[illegible]
Likelihood of reoccurrence	[illegible]
Details of any other relevant detail or supporting information for submission to the Agency	[illegible]

This section should be completed by the licensee/COA holder for their records once the corrective and preventative actions are complete[7]

Follow up actions	
Close out date	
Signed	
Position	

THE ENVIRONMENT SECTION
GALWAY COUNTY COUNCIL
COUNTY HALL
PROSPECT HILL
GALWAY

TEL: (091) 476402
FAX: (091) 769590

FAX

TO:	DR MICHAEL HENRY, EPA
ADDRESS:	EPA, CASTLEBAR
DATE:	7/11/2002
FROM:	KEVIN [illegible], POOLBOY LANDFILL

MESSAGE:

AS ATTACHED.

NO. OF PAGES INCLUDING THIS ONE: 3

Annex 1 Incident Notification Form

Licence/COA Number Licence/COA Name	W0027-2 Pollboy Landfill Facility
Licensee/COA Address:	Facility Address: Pollboy, Ballinasloe, Co. Galway Facility is owned by: Ballinasloe Town Council, c/o Civic Offices, Ballinasloe, Co. Galway. Facility is operated by: Galway County Council, c/o Environment Section, Galway County Council, County Buildings, Prospect Hill, Galway.
Incident notification form submitted by:	Kevin Mulrennan
Licensees/COA holders Environmental Impact Ranking:	1 ☑ 2 ☐ 3. ☐ 4. ☐ 5. ☐
Details of incident:	Five new leachate extraction wells were drilled yesterday. The 250mm gas main was [illegible] 2 [illegible] and drilling rig to travel over. • Therefore to allow this rig tracking to be carried out the gas flare was turned off for 2 [illegible] on Monday 5th November 2012 (12:20pm to 13:40pm) • On Tuesday 6th November 2012 the gas flare was turned off from 14:20 to 16:30 whilst drilling rig and breaker [illegible] was travelling over the gas main.
Date of incident:	5th + 6th November 2012
Approximate start time of incident (Provide range if time is not known)	5th: 12:20 pm 6th: 14:20 pm
Details of when incident first noticed:	5th: 12:20 pm 6th: 14:20 pm
Still ongoing: Yes/No Finish time and date New or reoccurring incident[1]	No Finish Time 5th: 13:40pm, 6th: 16:30pm [illegible]
Uncontrolled release:	Air ☐ Water ☐ Sewer ☐ Ground ☐ No uncontrolled release ☑
Incident Nature (Explosion, Fire, Spillage, Odour, Breach of ELV, Monitoring Equipment offline, Trigger Level Reached, Uncontrolled Release, Other – specify)	Flare turned off
Details of any vulnerable receptors	None
Details of ELV Exceedance if available[2] (Provide measurement units for values provided)	Parameter: [blank] Value: [blank]
Grab or Composite sample Location of incident: Discharge point/Other	 Gas flare
Digital Photographs taken:	Yes/No
Odour[3]	Not applicable ☑ Odour detected ☐

Annex 1

Odours detected	None
Extent[4]	Intermittent ☐ Persistent ☐
Sensitivity[5]	Remote ☐ Low ☐ Moderate ☐ High ☐ Extra ☐
Intensity[6]	Faint ☐ Moderate ☐ Strong ☐ Very strong ☐
Weather at time of incident:	Dry
Wind Direction:	South-Easterly
Details of who was notified:	EPA by telephone ☑ Local Authority ☐ Fisheries ☐ Other
Corrective actions taken:	Gas flare is operating fine, it was just turned off whilst changes were carried over the weekend.
Preventative actions taken or planned:	Gas flare turned back on and changes monitored over weekend.
Likelihood of reoccurrence	Remote
Details of any other relevant detail or supporting information for submission to the Agency	None
This section should be completed by the licensee/COA holder for their records once the corrective and preventative actions are complete[7]	
Follow up actions	
Close out date	
Signed	
Position	

THE ENVIRONMENT SECTION
GALWAY COUNTY COUNCIL
COUNTY HALL
PROSPECT HILL
GALWAY

TEL: (091) 476402
FAX: (091) 769590

FAX

TO:	Dr. Michael Henry
ADDRESS:	EPA Castlebar
DATE:	10/12/12
FROM:	Kevin Mulkerrins, Pollboy Landfill, Ballinasloe, Co. Galway

MESSAGE:

See attached

NO. OF PAGES INCLUDING THIS ONE: 3

Annex 1 Incident Notification Form

Licence/COA Number Licence/COA Name	W0027-2 Pollboy Landfill Facility
Licensee/COA Address:	Facility Address: Pollboy, Ballinasloe, Co. Galway Facility is owned by: Ballinasloe Town Council, c/o Civic Offices, Ballinasloe, Co. Galway. Facility is operated by: Galway County Council, c/o Environment Section, Galway County Council, County Buildings, Prospect Hill, Galway.
Incident notification form submitted by:	Kevin Mulcennan
Licensees/COA holders Environmental Impact Ranking:	1 ☑ 2 ☐ 3. ☐ 4. ☐ 5. ☐
Details of incident:	Flare turned off @ 12.40 pm by APS who are presently securing the flare.
Date of incident:	14/11/17
Approximate start time of incident(Provide range if time is not known)	12.40 pm
Details of when incident first noticed:	12.40 pm.
Still ongoing: Yes/No Finish time and date	Yes. Anticipated that flare will be off for half an hour whilst flare is being secured.
New or reoccurring incident[1]	
Uncontrolled release:	Air ☐ Water ☐ Sewer ☐ Ground ☐ No uncontrolled release ☑
Incident Nature (Explosion, Fire, Spillage, Odour, Breach of ELV, Monitoring Equipment offline, Trigger Level Reached, Uncontrolled Release, Other – specify)	Flare turned off.
Details of any vulnerable receptors	
Details of ELV Exceedance if available[2] (Provide measurement units for values provided)	Parameter | Value
Grab or Composite sample	
Location of incident: Discharge point/Other	Flare Compound.
Digital Photographs taken:	Yes/No
Odour[3]	Not applicable ☑ Odour detected ☐

Office of
Environmental
Enforcement

Environmental Protection Agency
Regional Inspectorate, John Moore Road
Castlebar, County Mayo, Ireland

Telephone +353 94 904 8400
Fax +353 94 904 8409
Email info@epa.ie
Web www.epa.ie
Lo Call 1890 33 55 99

Ms. Caitriona Morgan
Town Clerk
Ballinasloe Town Council
Ballinasloe
Co. Galway

11/07/12 Our Ref. W0027-02/NC12MH (Leachate).docx

Notification of Non-Compliance

Dear Ms. Morgan

I refer to the report entitled 'Pollboy Landfill Leachate Management System Review, dated April 2012' which was received by the Agency on 06/07/12.

The Agency is concerned at many of the issues noted in the report and these include (but not limited to) the following:

- Leachate levels in the lined cell at the facility (Cell 1) were noted as being 2.1m above the base of the liner. The exceedance of the 1m level above the base of the liner **is in non-compliance with Condition 5.11.1.** It is evident from the report that leachate levels have been above the 1m level (above the basal liner) for a significant period of time and the failure of the licensee to take necessary corrective action is not acceptable to the Agency
- The licensee did not report the exceedance of the 1m level (above the basal liner) as an incident under the terms of the licence. **This is in non-compliance with Condition 11.2.**
- The report concludes that the leachate management system is only partly automated and that the telemetry system has a number of limitations (e.g. operation of leachate pumps). This has been noted previously by the Agency. **This is in non-compliance with Condition 5.11.2.**
- The report does not provide information on the following:
  - causes and timeframes for the build up of leachate in Cell 1
  - leachate levels within Cell 1 over time (e.g. last 3 years)
  - whether leachate mounding has taken/is taking place in the landfill
  - what implications the build up of leachate has had on the Cell 1 lining system
  - whether remedial actions in addition to leachate removal from the cell are needed.
- The report highlights that significant volumes of leachate are present in Cell 1 and that a total volume of 7,610m^3 is required to be pumped out of Cell 1 to bring the levels down to 1m within a year. **The timeframe for corrective action is not acceptable to the Agency.** In addition, the report does not adequately address what arrangements have been/will be put in place in the short term in relation to the transport and treatment of leachate at off-site locations other than Ballinasloe WWTP.
- The Agency is not satisfied that the licensee has put in place all available measures and corrective actions to ensure the optimisation of leachate abstraction and collection of leachate from both the unlined and lined areas in the facility and the minimisation of impact on the environment.

- It is also evident from the report that the current on-site leachate storage lagoon is not adequately sized to facilitate the maximum abstraction and removal of leachate at the facility.

ACTION REQUIRED

In view of the above and the findings of the report you are required to:

- Submit a report (including timeframes) which addresses each of the issues raised above together with the other recommendations in the report by 25/07/12.
- Comply with the conditions of the waste licence.

Failure to comply with the requirements specified in this notification of non-compliance will leave the Agency no option but to consider legal action in regard to this matter. Please quote the above reference in future correspondence in relation to this matter. If you have any queries please contact the undersigned.

Yours sincerely

Dr. Michael Feeney
Office of Environmental Enforcement

cc. Willie Madden, Operations Director, RPS Consulting Engineers, Lyrr Building, IDA Business and Technology Park, Mervue, Galway.
Kevin Mulrennan, Environment Section, County Buildings, Galway Co. Co., Prospect Hill, Galway

Environmental Protection Agency

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Mr. Kevin Mulrennan
Environment Section
Galway County Council
County Buildings
Prospect Hill
Galway

28th September, 2012

Reg No:W0028-02

Dear Mr.Muirennan,

The European Communities Environmental Objectives (Groundwater) Regulations 2010, S.I. No. 9 of 2010, require that the Agency examine all licences in order to bring them into compliance with the regulations.

The Agency has examined IPPC and Waste licences in accordance with S.I. No. 9 of 2010 and determined that upwards of 75 licences require to be technically amended to bring the licence into compliance with the Regulations, with respect to escape of leachate from landfills beyond engineered and/or geological barriers which is a potential pollutant input into groundwater. It is likely that your licence will require a Technical Amendment.

The amendment to your licence will require the insertion of a condition requiring a risk assessment of discharges (inputs) to groundwater from point sources of potential pollution as a means of satisfying the requirements of the European Communities Environmental Objectives (Groundwater) Regulations 2010, as amended. Any actions arising from the assessment will be required to be implemented before 22nd December 2015.

The scope of the Technical Amendment is strictly limited to the requirements of S.I. No. 9 of 2010 as amended. The Amendments must be completed by 22nd December 2012 according to Regulation 12 of the Regulations. You will receive official notification of the Amendment on or before December 22nd 2012.

The Agency is holding an **information session on Tuesday 16th October 2012 at 11am/2pm at The Horse and Jockey Hotel in Horse and Jockey, Co. Tipperary.** Directions are available here:
http://www.horseandjockeyhotel.com/web-content/Location.html

In order to book your place at the seminar of your choice either 11:00am or 2:00 pm please confirm your attendance by email to eoreview@epa.ie.

If you have any query in relation to this letter, you may contact us at eoreview@epa.ie

Yours sincerely,

Mary Turner
Office of Climate, Licensing & Resource Use

SGS

Comhairle Baile Bhéal Atha na Sluaighe
Ballinasloe Town Council

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Our Ref:
Your Ref:

Oifigí Cathartha
CIVIC OFFICES
Bhéal Atha na Sluaighe
BALLINASLOE
Co. na Gaillimhe
CO. GALWAY

Dr. Michael Henry,
Office of Environmental Enforcement,
E.P.A.,
John Moore Road,
Castlebar,
Co. Mayo.

3rd August 2012

Re: **W0027-02/NC12MH (Leachate).docx**
Notification of Non-Compliance

Dear Michael,

I refer below to your notification of Non-compliance with Waste Licence W0027-02 dated 11th of July 2012 and respond as follows:

1. Leachate levels in the lined cell at the facility (Cell 1) were noted as being 2.1m above the base of the liner. The exceedance of the 1m level above the base of the liner **is in non-compliance with Condition 5.11.1.** It is evident from the report that leachate levels have been above the 1m level (above the basal liner) for a significant period of time and the failure of the licensee to take necessary corrective action is not acceptable to the Agency.

Response: Ballinasloe Town Council only became aware of the high leachate levels in Cell 1 upon the replacement of the transducer in January 2012. Once aware of the high leachate levels a concerted effort was undertaken by Kevin Mulrennan (Landfill) and John Holihan (Waste Water Treatment Plant) to reduce the levels of leachate in Cell 1 as soon as possible. Since then RPS have been assisting Ballinasloe Town Council in the examination of this issue with a view to resolving same and ensuring full compliance with the licence.

As can be seen from the attached table "Restated depths of leachate in CH 2" by RPS the target of reducing the level to 1 metre in Cell 1 was achieved on the 3rd July 2012. This pumping effort has been maintained and the present level of leachate as shown presently (1st August 2012) on the scada system is 870mm.

Therefore, the correct restated level of leachate in this cell (after the adjustment as outlined in the attached RPS response on Item 5(a)) is 520mm above the basal liner. RPS recommends that the restated level of leachate in Cell 1 be corrected during the telemetry system upgrade as mentioned in Item 3 below. Ballinasloe Town Council accepts this recommendation and will include restating the level of leachate in Cell 1 during the telemetry system upgrade.

2. The licensee did not report the exceedance of the 1m level (above the basal liner) as an incident under the terms of the licence. **This is in non-compliance with Condition 11.2.**

Response: Ballinasloe Town Council notified the EPA of the exceedance of the 1 metre level on the 24th January 2012 (see attached letter) once we became aware of this exceedance following the replacement of the transducer in CH2.

3. The report concludes that the leachate management system is only partly automated and that the telemetry system has a number of limitations (e.g. operation of leachate pumps). This has been noted previously by the Agency. **This is in non-compliance with Condition 5.11.2.**

Response: Ballinasloe Town Council are in the process of upgrading the telemetry system to ensure compliance with Condition 5.11.2 of the waste licence. A meeting took place on the 30th July 2012 to discuss and agree the upgrading of the telemetry system at both the landfill and Ballinasloe WWTP. Ballinasloe Town Engineer attended this meeting and it is proposed & agreed to move the existing Scada system from the landfill to the WWTP and to put in place a radio link between the Landfill and the WWTP. This will allow for Authorised Operators of the WWTP to operate the system within the WWTP and it will also allow for remote access to view and operate the system by Authorised Staff via their PC. It is proposed as part of this system that the main pumps associated with both Cell 1 and Cell 2 will operate in the automatic setting and will be controlled via sensors in the wells and via a new sensor to be installed within the Lagoon. All these pumps will be linked to the new Scada.

4. The report does not provide information on the following:

- causes and timeframes for the build up of leachate in Cell 1

Response: As outlined in the attached RPS response the causes of the build up of leachate in Cell 1 appear to be as a result of inaccurate level readings which showed a level of 0m in the leachate collection chamber and as such insufficient pumping of leachate out of Cell 1 has occurred. This was realised when the transducer was replaced in January 2012. It is not known what timeframe the leachate build up occurred over.

- leachate levels within Cell 1 over time (e.g. last 3 years)

Response: As outlined in the attached RPS response due to the inaccuracy of the leachate level readings the leachate level within Cell 1 over the last 3 years is not known, but appropriate arrangements will be put in place by Ballinasloe Town Council to ensure accurate leachate level readings into the future.

- whether leachate mounding has taken/is taking place in the landfill

Response: As outlined in the attached RPS response there is no evidence to suggest that leachate mounding has taken or is taking place in Cell 1. There has been evidence of perched leachate in some gas wells which has been removed through the use of pneumatic borehole pumps but this is considered to be a normal occurrence in landfills and its incidence at Poolboy landfill is not considered to be higher than normal. Ballinasloe Town Council will arrange that all gas wells will be dipped in the coming weeks to investigate if there is perched leachate in any other wells.

- what implications the build up of leachate has had on the Cell 1 lining system

Response: RPS undertook a visual inspection of Cell 1 on 31st July 2012 and a copy of the inspection report is attached. The inspection report identified one area where discolouration of surface water was apparent. It is recommended that samples are taken of this surface water to determine whether there is evidence of leachate contamination or whether the discoloration is naturally occurring (e.g. iron). There were no other indications of any defects with the landfill capping system. Ballinasloe Town Council will sample the surface water in the area identified (shown on inspection report map) early next week and will carry out the necessary tests to determine the position. If there is evidence of leachate contamination then additional investment will be undertaken by Ballinasloe Town Council to determine the source of contamination.

- whether remedial actions in addition to leachate removal from the cell are needed.

Response: As outlined in the attached RPS response at this time no remedial actions (other than leachate removal) are deemed necessary, subject to the analysis being undertaken as recommended above. To ensure that the leachate level within Cell 1 remains below 1 metre consistently it is recommended that the upgrade of the telemetry system is undertaken and this is being undertaken by Ballinasloe Town Council. Ballinasloe Town Council will manually measure the depth of leachate in the collection chamber at least yearly to ensure that the telemetry system is reading the correct level.

5. The report highlights that significant volumes of leachate are present in Cell 1 and that a total volume of 7,610m³ is required to be pumped out of Cell 1 to bring the levels down to 1m within a year. **The timeframe for corrective action is not acceptable to the Agency.**

Response: As outlined by RPS the leachate calculation provided in the RPS April 2012 report were based on the February 2012 leachate level provided to RPS. Subsequent leachate level readings made available to RPS since that time indicate a significant reduction in leachate level. The leachate quantities estimated in the RPS April 2012 report now appear to be conservative and the reasons for this are included in the attached RPS response.

In addition, the report does not adequately address what arrangements have been/will be put in place in the short term in relation to the transport and treatment of leachate at off-site locations other than Ballinasloe WWTP.

Response: Based on the recorded leachate levels in Chamber CH2 of Cell 1 Ballinasloe Town Council are aware that the level of leachate has dropped from 1679mm on 23rd January 2012 to 520mm on 1st August 2012. In light of this reduction to date we feel that it is not necessary in the short term to transport leachate off-site to locations others than Ballinasloe WWTP.

It is considered from discussions between Ballinasloe Town Council, Galway County Council Water Services section and EPS that the WWTP is capable of treating the necessary quantities of leachate but this will be firmly established once the revised telemetry is in place and operation.

6. The Agency is not satisfied that the licensee has put in place all available measures and corrective actions to ensure the optimisation of leachate abstraction and collection of leachate from both the unlined and lined areas at the facility and the minimisation of impact on the environment.

Response: As outlined in the attached RPS response the upgrade of the telemetry system will allow better control and operation of the leachate collection system and Ballinasloe Town Council are in the process of upgrading the telemetry system.

Ballinasloe Town Council will ensure that leachate will be continuously pumped from Cell 2 to the lagoon from where it will be continuously pumped to the WWTP via the new Scada. It has been identified that continuous pumping from Cell 2 into the lagoon is important in order to dilute the leachate from Cell 1 which also enters the same lagoon.

It is proposed and agreed that the pump from Cell 1 will also be controlled via a link to the Dissolved Oxygen meter within the WWTP. It is envisaged that if the Dissolved Oxygen levels within the WWTP drop below acceptable levels that this will shut down pumping from Cell 1 into the lagoon. Is it envisaged that if this occurs that it will be over short durations and that we will continue to be able to reduce the levels in Cell 1 as we have done over the past months.

It is proposed that training will be provided by EPS (proposed installers of the new Scada) to all relevant staff.

7. It is also evident from the report that the current on-site leachate storage lagoon is not adequately sized to facilitate the maximum abstraction and removal of leachate at the facility.

Response: Following a meeting with EPS on 30th July 2012 re: telemetry upgrade it is envisaged that with the new Scada system and new sensor that greater quantities of leachate will be allowed to pass through the lagoon and in this regard it is proposed that the lagoon will remain in place and will act as a holding area with the same pre-treatment capabilities as before.

Conclusion

Ballinasloe Town Council is committed to remaining within the terms of its licence and will pursue all action necessary to ensure the required removal and treatment of leachate from the landfill. We are immediately proceeding with the upgrading of the telemetry as outlined and once this is in place and further detailed information is to hand Ballinasloe Town Council will carry out any further actions identified at that time including further storage and pre-treatment if considered necessary.

Mise le meas,

Caitriona Morgan
Town Clerk

Dr. Michael Henry,
Office of Environmental Enforcement,,
E.P.A.,
John Moore Rd.,
Castlebar,
Co. Mayo

22nd August 2012

Re: W0027-02/NC12MH (Leachate).docx
Notification of Non-Compliance

Dear Michael,

I refer below to my letter of the 3rd August, 2012 which responded to your notification of non-compliance with Waste License W0027-02 dated 11th of July 2012. In item 4 of my letter I responded with the following:

Response: As outlined in the attached RPS response there is no evidence to suggest that leachate mounding has taken or is taking place in Cell 1. There has been evidence of perched leachate in some gas wells which has been removed through the use of pneumatic borehole pumps but this is considered to be a normal occurrence in landfills and its incidence at Poolboy landfill is not considered to be higher than normal. Ballinasloe Town Council will arrange that all gas wells will be dipped in the coming weeks to investigate if there is perched leachate in any other wells.

I wish to inform you that all gas wells on site were dipped on the 7th August, 2012 by AFS Ltd. to investigate if there is perched leachate in any other wells. Please find the Leachate Level Report of the 7th August, 2012 attached.

As you are aware gas wells GW38,40,41,42 and 43 have previously had pneumatic pumps installed to remove perched leachate. These wells subsequently became free of perched leachate. Three of these pumps could not be removed from the wells. Two of the pumps were then moved to gas wells GW 35 and 39. These wells are now free of perched leachate as per comments by AFS Ltd. at the end of the Leachate Level Report.

I requested comments and advice from RPS Consulting Engineers in relation to the Leachate Level Report of the 7th August, 2012. After reviewing the results RPS Consulting Engineers recommended that GW 37 and GW 42 are pumped out to remove any perched leachate in these wells. RPS state that if GW42 cannot be pumped out because of the pump blocking the well then the pump should be installed in GW32 instead. I am presently requesting a price from AFS Ltd. for the installation of the two pneumatic pumps.

In item 4 of my letter I also responded with the following:

Response: RPS undertook a visual inspection of Cell 1 on 31st July 2012 and a copy of the inspection report is attached. The inspection report identified one area where discolouration of surface water was apparent. It is recommended that samples are taken of this surface water to determine whether there is evidence of leachate contamination or whether the discoloration is naturally occurring (e.g. iron). There were no other indications of any defects with the landfill capping system. Ballinasloe Town Council will sample the surface water in the area identified (shown on inspection report map) early next week and will carry out the necessary tests to determine the position. If there is evidence of leachate contamination then additional investment will be undertaken by Ballinasloe Town Council to determine the source of contamination.

I wish to inform you that a sample of the surface water referred to above was taken on the 3rd August, 2012. This was tested for iron and ammonia content. Please find the Certificate of Analysis attached for your information. I requested comments and advice from RPS Consulting Engineers in relation to the results.

RPS Consulting Engineers stated that they reviewed the analysis of the sample taken of the surface water ponding identified in their inspection of the 31st July, 2012. The results of the analysis show an Ammonia level of 0.01mg/l and an iron level of 2547ug/l. They state that this suggests that the discolouration of surface water evident in the site inspection was as a result of elevated iron levels in the surface water and not as a result of leachate contamination. RPS Consulting Engineers also state that no other signs of leachate on the surface or the side slope of Cell 1 were noted in the site inspection of the 31st July and there is no evidence to suggest the build up of leachate in Cell 1 has had any effect on the Cell 1 lining system.

Mise le meas,

_____

Caitriona Morgan,
Town Clerk

Dr. Michael Henry,
Office of Environmental Enforcement,,
E.P.A.,
John Moore Rd.,
Castlebar,
Co. Mayo

15th February 2012

Re: W0027-02/NC12jg{LFGDec11}.docx
Notification of Non-compliance with Waste License

Michael,

I refer to your notification of Non-compliance with Waste License W0027-02 of the 03/02/2012.

Response to Inspection Findings

Item 1 – Landfill Gas Management

"The landfill gas management system was not being maintained in a fully operational condition for the following reasons:

- ***The extraction pressure was not being distributed consistently all along the ring main or at the manifolds. Also there was elevated methane and oxygen levels and a variation in pressure noted at a number of well head lines at the manifolds due to pipe blockages and valve damage on the pipework."***

Response:
Regarding the issue of extraction pressure not being distributed evenly, it is recommended that the pressure on the system be re-balanced to allow even suction to all areas. This can be achieved by reducing suction to fully open wells and adjusting wells based on distance from the gas flare. This will allow an even extraction throughout the site and can facilitate over-extraction from problematic areas if required. It is proposed that this will be carried out during the next gas system balancing round which is scheduled to be carried out by AFS Ltd. before the 29th February 2012.

- ***"A number of manifolds and wells had been shut off due to breakages and disconnections and a number of extraction wells had been disconnected and or broken off from the ring main."***

Response:
We note that 2 no. gas wells were disconnected from the gas pipework at the time of the audit. These were re-connected by AFS Ltd. on the 10th December 2011. One gas carrier pipe (referred to in the Audit Report as Photo No. 2 – Gas Line Disconnected) was originally saddled onto the gas main to accommodate a future gas well in that area. However, no gas well was ever provided in this area. The end of the carrier pipe was sealed using duct tape. A cap will be fusion welded to this pipe by AFS Ltd. during

their next visit to site which will be before the 29th February 2012. In addition, fusion welded caps will be provided to all wellheads which are currently capped using duct tape.

- ***"Condensate was noted accumulating in the ring main (see Photo 1) and in lines leading to the wellheads at a number of locations."***

Response:
The depression in the gas main as shown in Photo 1 will be rectified by the 29th February. A machine will be brought on site to adjust the levels of the concrete supports that the gas main is resting on.

It is also proposed that the gas ring main between Gas Well No. 37 and No. 24 on Cell 1 will be regraded. All condensation will flow to pump sump 1 at the bottom of the hill which will then be pumped into the lagoon. Ballinasloe Town Council have also sought a quotation from AFS Ltd. to reduce the level of a number of wellheads in Cell 1 so that the gas carrier pipes can be laid either at a gradient towards the gas main or towards the gas well, thereby removing sags in the pipework and preventing the build up of condensate.

- ***"Positive gas pressure was noted in a manifold"***

Response:
This has been investigated by Ballinasloe Town Council and AFS Ltd. and it appears that air and positive pressure is entering the knockout pot close to Gas Well No. 2A via the old defunct underground gas pipe network. This pipework was previously connected to the knockout pot when the gas flare was located in this position a number of years ago. (Note: there are currently no gas wells connected to this defunct underground gas pipe network. This network has since been replaced with an overground pipe network system). It is proposed that a new gas main leg will be installed in this area which will bypass this knockout pot and restore negative pressure. This will be carried out by AFS before the 29th February, 2012. It is considered that there is sufficient gradient on the gas main to direct any condensate build up in the gas main to the knockout pot at the gas flare.

- ***"Regular field balancing was not being undertaken on the extraction system."***

Response:
Gas field balancing has been and is currently carried out on a monthly basis and all records are maintained on site. It is now proposed that AFS Ltd. will carry out balancing of the gas field on a weekly basis. This will begin from the first week in March. They will also be responsible for repairs to the system on an on-going basis.

- ***"The knock-out pots on the extraction system were not adequate and manifolds were not protected from damage. A number of gas pipes were noted to be disconnected and or broken. Levels for methane and carbon dioxide were recorded in the manifolds."***

Response:
As discussed above, it is proposed that the gas ring main will be regraded between Gas Well No. 37 and No. 24 on Cell 1 and all condensation will flow to pump sump 1 at the bottom of the hill which will then be pumped into the lagoon. AFS Ltd. will monitor the efficiency of these works in terms of removal of condensate build up. Should additional knockout pots be deemed necessary, their location and arrangement will be notified to the Agency prior to installation. Ballinasloe Town Council has also sought and is awaiting quotations for the installation of lockable boxes around the gas pipework manifolds.

- ***"The licensee shall ensure that the landfill gas management system is maintained in a fully operational manner at all times. Balancing should be carried out weekly and repairs as required, carried out on an ongoing basis."***

Response:
As discussed above, it is proposed that AFS Ltd. will carry out balancing of the gas field on a weekly basis. They will also be responsible for repairs to the system on an on-going basis.

Item 2 – Incident Notification

Response:
The licensee will ensure that all incidents are reported in accordance with the License conditions and corrective actions will be taken to ensure that the incident will not recur.

NOTE: Please note that items of work above which are pending quotation will be notified to the Agency as soon as quotations are received and approved by Ballinasloe Town Council and a timescale for the works is provided by the contractor.

Mise le meas,

_____

Mark O'Donnell
Town Clerk

Office of
Environmental
Enforcement

Environmental Protection Agency
Regional Inspectorate, John Moore Road
Castlebar, County Mayo, Ireland
An Ghníomhaireacht um Chaomhnú Comhshaoil
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Mr. Kevin Mulrennan
Environment Section
Ballinasloe Town Council
Galway County Council
County Buildings
Prospect Hill
Galway

03/02/2012

Our Ref: W0027-02/NC12jg{LFGDec11}.docx

Notification of Non-Compliance

Dear Mr. Mulrennan

The non-compliances with Waste Licence Register No.W0027-02 as detailed in the attached site inspection report have been noted by the Agency.

ACTION REQUIRED

- Submit a report to the Agency by 17/02/12 that details how and when the corrective actions specified will be completed and the non-compliances specified within the audit report will be rectified.

Failure to comply with the requirements specified in this notification of non-compliance will lead to further enforcement action by the Agency. Please quote the above reference in future correspondence in relation to this matter. If you have any queries please contact the Castlebar OEE Team at 0949048440.

Yours sincerely

John Gibbons
Inspector
Office of Environmental Enforcement

Site Inspection Report-Landfill Gas Assessment

Office of Environmental Enforcement

Environmental Protection Agency
Regional Inspectorate, John Moore Road
Castlebar, County Mayo, Ireland
An Ghníomhaireacht um Chaomhnú Comhshaoil
Cigireacht Réigiúnach, Bóthar Sheán de Mórdha
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Mr. Kevin Mulrennan
Environment Section
Ballinasloe Town Council
Galway County Council
County Buildings
Prospect Hill
Galway

Date of issue of Inspection Report: 3/02/2012

Licence Register No:	W0027-02	**Inspection Reference No:**	W0027-02 (11)SILFGJG(Dec11
Date of Inspection:	7/12/2011	**Inspectors:**	John Gibbons and Michelle Mc Kim
		Announced:	Yes

This Site Inspection Report details the Agency's findings following an inspection of Ballinasloe Town Council on 7/12/2012.

NOTIFICATION OF NON-COMPLIANCE

Ballinasloe Town Council has been found to be in non-compliance with the conditions of the Waste Licence as set out in this Site Inspection Report. You are required to undertake the corrective actions specified to close out the Non-Compliances and Observations raised in this Report or further enforcement action may be taken by the Agency.

In view of the above you are required to submit a schedule to the Agency by 17/2/2012 detailing how the non-compliances and observations specified therein are to be rectified. Please quote the above Inspection Reference Number in any future correspondence in relation to this Report. If you have any further queries please contact John Gibbons at 09490148400.

1. SITE INSPECTION AND ASSESSMENT

The Site Inspection commenced at 2.30 pm and the following were in attendance:

Representing Ballinasloe Town Council

Kevin Mulrennan (by phone)	Environmental

Representing the Environmental Protection Agency:

John Gibbons	Inspector
Michelle Mc Kim	Inspector

An Inspection of the site was conducted, special attention was paid to the landfill gas management infrastructure at the facility and an assessment of the operation of the infrastructure was conducted.

General Comment

Mr Kevin Mullrennan arranged for access to the facility, we were not accompanied during the site inspection. An up to-date layout map of the facility was available at the council office. Landfill gas pressure monitoring was conducted at a number of points along the gas extraction ring main, at well heads and at manifolds within the site.

The landfill gas extraction was not been managed or maintained in a fully operational manner at this time. A number of issues in relation to condensate build-up, and gas well head connections was noted.

Recent trends for gas and temperature showed that the flare was not working satisfactorily and shutdown was occurring on a regular basis. The gas quality at the flare was good with 40% CH_4 and CO_2 31% recorded.

The main findings of the landfill gas management/extraction infrastructure assessment are provided in Appendix I of this report.

2. INSPECTION FINDINGS

Inspection Non-Compliances

The site inspection process is a random sample on a particular day of a facility's compliance with some of its licence conditions. Where a non-compliance against a particular condition has not been reported, this should not be construed to mean that there is full compliance with that condition of the licence.

The licensee was found to be in non-compliance with the requirements of the Licence in respect of the following on the day of the Inspection (Schedule and Condition numbers refer to the Licence):

1. **Landfill Gas Management**

During an assessment of the landfill gas management system was undertaken and the following was noted:

The landfill gas management system was not been maintained in a fully operational condition for the following reasons:

- the extraction pressure was not being distributed consistently all along the ring main or at the manifolds. Also there was elevated methane and oxygen levels and a variation in pressure noted at a number of well head lines at the manifolds due to pipe blockages and valve damage on the pipe work.
- A number of manifolds and wells had been shut off due to breakages and disconnections and a number of extraction wells had been disconnected and or broken off from the ring main.
- Condensate was noted accumulating in the ring main (see photo1) and in lines leading to the well heads at a number of locations.
- Positive gas pressure was noted in a manifold.
- Regular field balancing was not been undertaken on the extraction system.
- The knock-out pots on the extraction system were not adequate and manifolds were not protected from damage. (See photograph). A number of gas pipes were noted to be disconnected and or broken. levels for methane and carbon dioxide were recorded in the manifolds.

This is in non-compliance with **CONDITION 3.13.**

Corrective Action Required

The licensee should ensure that the landfill gas management system is maintained in a fully operational manner at all times. Balancing should be carried out weekly and repairs as required carried out on an on-going basis.

2. **Incident Notification**

On the flare history data flare outages were noted on 29/9/2011, 2/11/2011 to 3/11/2011, 9/11/2011 and 17/11/2011. These outages were not reported as incidents within the timeframe in the Waste Licence conditions.

This is in non-compliance with **CONDITIONS 1.7 & 11.2.**

Corrective Action Required

The licensee should ensure that all incidents are reported in accordance with e Licence conditions and

corrective actions taken to ensure that the incident will not recur.

3. Follow-Up Actions

The licensee shall take the actions required to close out the non compliances and observations raised in this Site Inspection Report. These actions will be verified during subsequent Inspections.

Report prepared by Inspector: John Gibbons **Date:** 3/2/12

Landfill Site, Gas Extraction System, Assessment Form

Landfill Gas System Assessment Sheet

Site Name (Reg. No.): W0027-02	**Site Address:** Pollboy, Ballinasloe, County Galway		
Operator: Ballinasloe Town Council			
Site Status: Licenced		**Date:** 7/12/2011	**Time:** 2.30 pm
Odour Patrol No		**Photographs taken**	Yes
Instruments used: GEM 2000		**Facility Personnel:** None present	
EPA Personnel: John Gibbons and Michelle Mc Kim		**Weather:**	Cold and Dry
Site Map Provided: Yes		**Mean Temperature:**	4^0C

Landfill Gas Wells Extraction Pressure

Sample Location (Note 1)	Location type (Note 2)	Valve setting (Note 3)	Pressure (mBar) +/- Waste side	Pressure (mBar) +/- Flare Side	Flow Reading (include units)	Comments
Knockout pot at Flare	Knockout pot	100% open	+22	-48	240	CH_4 40% CO_2 31%, O^2% 3. Good quality LFG
Well No 2A	Vertical 2A	Spiral	+3	0		CH_4 66% CO_2 40%, O^2% 1. Good quality LFG
Well No 24	Vertical Well		0	-44		Condensate in the line
Well No 41	Vertical well	Butterfly open	-40	0		CH_4 31% CO_2 27%, O^2% 5.2. Good quality LFG. Oxygen level high.
Well 38	Vertical well					Disconnected
Well No 36	Vertical well	No valve, Open 100%	-44			CH_4 25% CO_2 30%, O^2% 1. Good quality LFG
Well No 16	Vertical well	Spiral valve	-44			CH_4 53% CO_2 33%, O^2% . Condensate in main line at this location.

Photographs from 7/12/2012.

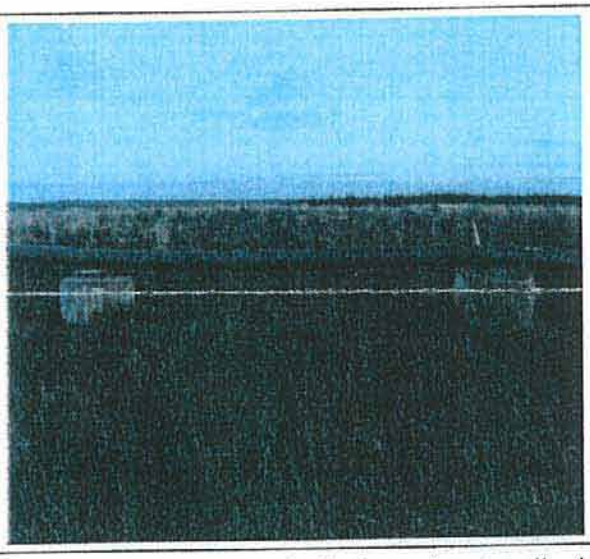

Photo1: Depression in gas main,likely condensate collection.

Photo2: Gas line disconnected

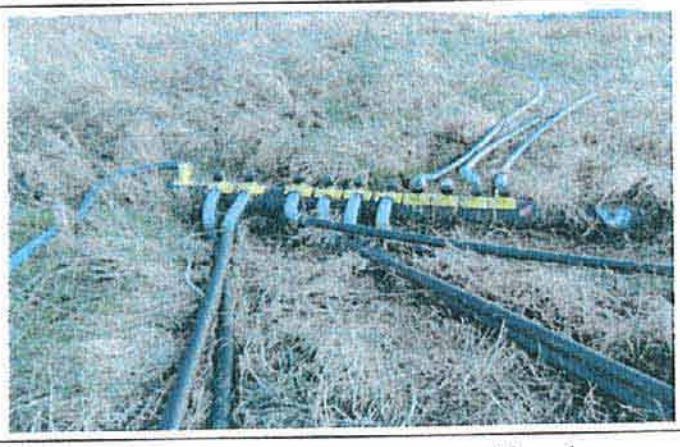

Photo3: Manifold not adequately protected from damage

Appendix L

Environmental Management Plan

Ballinasloe Town Council
Comhairle Bhaile Béal Atha na Slua

POLLBOY LANDFILL FACILITY

Environmental Management Plan 2011

March 2012

RPS

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

1 INTRODUCTION

This Environmental Management Plan (EMP) refers to Pollboy Landfill located in the townland of Pollboy, 2km south of Ballinasloe, Co. Galway and is prepared to comply with Condition 2.3 of Waste Licence W0027-02 granted to Ballinasloe Town Council for the operation of the landfill by the Environmental Protection Agency on 6th October 2003. The reporting period is from the 1st January 2011 to the 31st December 2011.

This landfill facility closed for acceptance of waste on 31st December 2005.

2 OPERATOR DETAILS

Site Operator: Ballinasloe Town Council,
Civic Offices,
Ballinasloe,
Co. Galway
Tel: 090-9642274

Site Supervisor: Mr. Kevin Mulrennan,
Environment Department,
Galway County Council,
County Buildings,
Prospect Hill,
Galway.
Tel: 091-476467
Mob: 087-6851937

3 TYPES OF WASTE ACCEPTED

Tables 3.1 below outlines the categories and quantities which may be accepted for disposal and for recovery under Third and Fourth Schedules of the Waste Management Act 1996 as per Part 1 Licensed Activities of Waste Licence W0027-02.

Table 3.1: Waste Categories and Quantities to be accepted for recovery

Waste Type	Maximum Quantity
Waste to be accepted for composting	Maximum Quantity of biodegradable waste which can be processed = 1,000m^3
Waste to be accepted at Civic Waste Facility (Metal, electrical and electronic waste, glass, aluminium and tin cans, waste oils, fabrics, batteries, household hazardous, fluorescent tubes can all be accepted)	Tonnage to be agreed with the Agency.

Table 3.2 provides details on the quantity and composition of waste that was accepted for recovery in 2011. The facility accepts waste on Tuesdays, Thursdays and Saturdays between 8.30am and 4.30pm.

Table 3.2: Waste Accepted at Civic Waste Facility in 2011

EWC Code	Quantity (tonnes)	Description of waste	Hazardous waste. (Yes/No)	Waste Treatment Operation
20 03 07	1.52	bulky waste	N	D1
15 01 02	0.05	plastic packaging	N	R3
13 02 08	2.2	other engine, gear and lubricating oils	Y	R6
16 01 07	0.09	oil filters	Y	R12
20 01 10	0.44	clothes	N	R13
20 01 40	27.0	metals	N	R13
20 01 99	30.65	other fractions not otherwise specified	N	R4
20 01 23	11.162	discarded equipment containing chlorofluorocarbons	Y	R4
20 01 36	27.853	discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	N	R4
20 01 36	12.956	discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	N	R4

EWC Code	Quantity (tonnes)	Description of waste	Hazardous waste. (Yes/No)	Waste Treatment Operation
20 01 21	0.232	fluorescent tubes and other mercury-containing waste	Y	R4
16 05 04	0.219	gases in pressure containers (including halons) containing dangerous substances	Y	R13
20 01 19	0.091	pesticides	Y	R13
20 01 27	22.446	paint, inks, adhesives and resins containing dangerous substances	Y	R10
15 01 04	0.793	metallic packaging	N	R13
15 01 04	0.298	metallic packaging	N	R13
15 01 07	3.651	glass packaging	N	R13
16 06 01	1.61	lead batteries	Y	R6
16 06 04	0.858	alkaline batteries (except 16 06 03)	N	R6
16 06 02	0.084	Ni-Cd batteries	Y	R6
19 07 03	19.825	landfill leachate other than those mentioned in 19 07 02	N	D8

4 ENGINEERING DETAILS

4.1 DEVELOPMENT WORKS DURING THE REPORTING PERIOD

There were no significant development works completed at the facility during the reporting period.

4.2 CONTAINMENT DETAILS AND LEACHATE COLLECTION AND TREATMENT

Pollboy Landfill comprises of an old unlined cell and a lined cell (Cell 1) with associated leachate collection facilities.

The old landfill was designed and operated on a dilute and disperse basis and hence there is no basal containment of leachate generated. Cell 1 was constructed using a composite liner system for the base and the sides of the cell which is comprised of the following elements:

- 0.5m leachate collection layer of non calcareous drainage stone with 200mm diameter slotted HDPE leachate collection pipes;
- Geotextile protection layer;

- 2mm HDPE liner;
- 1m thick compacted clay liner with a permeability of less than $1x10^{-9}$m/s.

The landfill ceased accepting waste in December 2005. The original unlined landfill area was capped in March 2006 while the lined cell (known as Cell 1) was capped in October 2006.

Leachate from the original unlined landfill cell is currently being pumped on a continuous basis by means of 8 no. submersible borehole type pumps installed in the leachate extraction wells. Leachate is pumped into the leachate storage lagoon via a ring main. The cut-in and cut-out of these pumps are controlled by the level sensors installed in the boreholes. A leachate interceptor drain was also installed around the perimeter of the original unlined landfill to prevent leachate from escaping laterally from the waste. This leachate is pumped via three separate pumping chambers to the leachate lagoon.

Leachate from the lined cell (Cell 1) is pumped via a rising main and pump chamber to the leachate storage lagoon. 5 no. pneumatic pump wells which were installed in Cell 1 in 2008 also pump leachate to the lagoon. Leachate is then pumped to Ballinasloe WWTP through a 90mm diameter HDPE rising main over a distance of approximately 2 km.

4.3 ABATEMENT

An active gas extraction system consisting of 19 no. gas extraction wells and collector pipes collects gas from the old landfill. Gas collected by this system is flared by the 1250m^3/hr AFS flare unit located in the flare compound close to the former composting facility. The gas main header pipe for this system which was installed in 2004 was replaced in 2008.

An active gas extraction system consisting of 23 no. gas extraction wells and collector pipes collects gas from Cell 1. Gas collected by this system is flared by the 1,250m^3/hr AFS flare unit also which is also located in the flare compound. The 850 m^3/hr. Hasse flare is retained as a back-up flare.

4.4 MONITORING POINTS

The location of monitoring points for surface water, groundwater, leachate and landfill gas have been shown in **Appendices 1-4** of the *Annual Environmental Report for 2011*.

4.5 SITE SECURITY

The front boundary of the site, which runs alongside the main access road, is formed by steel palisade security fencing. The entrance gates of the site are only accessible during the opening hours. A private security contractor is engaged outside normal working hours. All out of hours visits to the site are recorded and logged. Palisade security fencing was erected on the bog road along the east side of the landfill in 2004.

4.6 SITE ROADS

The service roads from the site entrance to the reception area and surrounds are compacted hardcore overlain with tarmacadam. The internal haul roads are compacted hardcore including the road and turnabout to the working face.

4.7 OFFICES, FUEL STORES ETC.

There is an administration/reception building on site which consists of a toilet block, canteen, offices and a control room. There is no fuel stored on site.

4.8 WHEELWASH, WEIGHBRIDGE

A wheelwash and a weighbridge are located at the landfill.

4.9 SURFACE WATER CONTROL MEASURES

A surface water drain around the old landfill collects surface water draining from the remediated surface and directs it to the surrounding watercourses. All sealed roads and concrete surfaces within the landfill are drained via a combined kerb and drainage system (beany block) to an oil/petrol interceptor, prior to discharge to an adjacent stream. Water in the wheelwash is recirculated and reused within the wheelwash.

5 OPERATIONAL MATTERS

5.1 CURRENT OPERATIONS

The landfill facility closed on 31st December 2005. A Civic Waste Facility is still in operation at the site where members of the public can deposit recyclable materials which are removed on a regular basis to licensed recovery facilities.

5.2 SITE OPENING TIMES

The landfill is now closed and the Civic Waste Facility under the control of Galway County Council is opened to the public on Tuesdays, Thursdays and Saturdays between 8.30am and 4.30pm.

5.3 ACCESS CONTROL AND WASTE ACCEPTANCE PROCEDURES

The site is secure and the entrance gates of the site are only accessible during the opening hours. There is also a procedure for visitors to the landfill.

5.4 MONITORING AND MAINTENANCE REQUIREMENTS

Monitoring of the site is carried out by the Licensee under the requirements of the Waste Licence. This requires the issuing of a quarterly report on the results of gas, surface water, leachate and groundwater monitoring.

5.5 MANAGEMENT STRUCTURE

The management structure at Pollboy Landfill for 2009 is as follows:

- **Mr. Tony McInerney**, Senior Executive Engineer, Environment Section, Galway County Council, has overall responsibility for management of the Pollboy Landfill Facility.

- **Mr. Kevin Mulrennan**, Site Supervisor, supervises operations on the landfill.

5.6 OPERATIONAL AND SAFETY RULES

Table 5.1 outlines the current list of procedures in operation at Pollboy Landfill. These procedures are contained in Appendix 1. Following closure of the landfill on 31st December 2005 the list of procedures has been updated and some which related to the operation of the landfill are now not applicable and have been deleted from the list, as follows:

- Procedure for Recording Incoming Waste,
- Procedure for Waste Inspections & Non-Conforming Material,
- Procedure for Waste Acceptance & Characterisation Procedures,
- Procedure for Waste Placement.

Table 5.1: Register of Procedures at Pollboy Landfill

NAME OF PROCEDURES	No.	Rev. No.	Date of Revision
Emergency Response Procedure (ERP)	01	003	26/11/04
Operational Procedures			
Training and Awareness Procedure	02	004	18/05/04
Corrective Action Procedure	03	004	18/05/04
Communication Programme	04	004	20/01/04
Procedure for Dealing with Incidents	05	005	25/04/05
Procedure for Submission of Documentation to the EPA.	06	004	18/05/04
Procedure for Recording all Complaints	09	004	18/05/04
Procedure for Recording each Load of Waste Departing from Civic Waste Facility.	010	004	18/05/04
Procedure for the Operation of the Civic Waste Facility.	013	004	19/05/04
Procedure for the Control of Environmental Nuisances.	014	005	13/02/06

NAME OF PROCEDURES	No.	Rev. No.	Date of Revision
Procedure for Environmental Monitoring.	015	004	19/05/04
Procedure for Visitors at Pollboy Landfill.	016	004	19/05/04
Procedure for Composting Organic Material on Site	017	004	19/05/04
Procedure for Recording Leachate Removed	018	001	20/05/04
Procedure for Maintenance Records	019	001	20/05/04

5.7 VERMIN AND PEST CONTROL

Currently there is no evidence of vermin present on the site. Pestguard Environmental Services, Rathcoole, Co. Dublin are contracted to control the vermin on the site. External bait boxes are located around the facility and internal bait boxes are located in the office buildings. The bait boxes are checked on a six weekly basis and more frequently when required.

Insect and pests nuisance is not an issue at the landfill since it has been full capped.

5.8 ODOUR

Odour management at the facility has significantly improved since 2005, as a result of the following works being carried out:

- Installation of temporary clay capping immediately following cessation of filling.
- Installation of permanent capping system incorporating, inter alia, an LLDPE membrane and landfill gas drainage geocomposite layer.
- Installation of additional landfill gas collection wells in Cell 1.
- Use of two flares for gas management and control.
- Reinstatement of the gas management system on the old landfill

6 CLOSURE AND AFTERCARE

The Restoration and Aftercare Plan for Pollboy Landfill was submitted to the EPA in February 2003.

7 SCHEDULE OF OBJECTIVES AND TARGETS FOR 2012

Objective 1: Landfill Gas Management

Reason for undertaking project: To further improve landfill gas and odour control at the facility.

Targets:

1 Fusion welded caps will be provided to all wellheads which are currently capped using duct tape.

2 Where possible, level of landfill gas main to be regraded to encourage drainage of condensate towards the existing knockout pots.

3 Reduce the level of a number of wellheads in Cell 1 so that the gas carrier pipes can be laid either at a gradient towards the gas main or towards the gas well, thereby removing sags in the pipework and preventing the build up of condensate

4 Install a new seciont of gas main close to Gas Well No. 2A to bypass the old defunct knockout pot which appears to be a source of positive pressure.

5 Regrade the gas main between Gas Wells No. 37 and No. 24 on Cell 1 allowing condensation to flow to pump sump 1 at the bottom of the hill which will then be pumped into the lagoon. Should additional knockout pots be deemed necessary, their location and arrangement will be notified to the Agency prior to installation.

6 It is proposed that AFS Ltd. will carry out balancing of the gas field on a weekly basis. They will also be responsible for repairs to the system on an on-going basis

Summary: Wells providing low/no gas to the system will be disconnected and new wells will be installed. The north eastern area of the old landfill cell has been identified as one such location.

Responsibility: The Landfill Facility Manager is responsible for the implementation of this project.

Timescale: Works to be completed in the first quarter of 2012.

Objective 2: Leachate Management Upgrade

Reason for undertaking project: To improve the efficiency of leachate management

Summary: A Leachate Management System Review report is currently (end of March 2012) being prepared by RPS on behalf of Galway County Council and Ballinasloe Town Council which is scheduled to be forwarded to the Agency in April 2012. This report will provide recommendations for upgrading the existing leachate telemetry system, increased pumping of leachate and the provision of additional leachate storage.

Responsibility: Ballinasloe Town Council/Galway County Council will be responsible for the implementation of the recommendations of this project.

Timescale: A timescale for execution of any works will be agreed with the Agency following approval of the Leachate Management System Review report.

Appendix 1
Procedures

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Emergency Response Procedure (ERP)	Procedure No: 01
Version Number: 003	**Date of Revision:** 26/11/04
Authorised Signature:	
Date:	

This **ERP** will be linked to the Major Emergency Plan for Galway County Council.

In circumstances when Pollboy Landfill is unable to accept waste due to the following:

Power failure, mechanical breakdown, industrial dispute, adverse weather conditions or other unforeseen circumstances **all waste contractors** shall be notified.

Activation

The **ERP** shall be activated and controlled by the Landfill Manager/Assistant in the event of any of the following incidents occurring: -

1. Fire within cells or outside cells but within the facility area.
2. Exceedance of landfill gas emission limits at site offices or elsewhere within the facility.
3. Any spillage of dangerous or toxic materials (leachate or other) occuring at the facility.
4. When it is evident that the landfill is having a significant effect on the quantity and/or quality of water in local wells.
5. Side slope failure.
6. Personal accident on site.

Outside assistance will be sought if occurrence is beyond the capabilities of site staff.

Control of Operations

The Landfill Manager or his representatives shall have full control of operations under the **ERP**:

- To co-ordinate the actives of site personnel during any emergency.
- To request the assistance of Fire Services, Gardai, Ambulance or other service that may be requested.
- To requisition any equipment needed at short notice.
- To alert the Health and Safety Section of the Galway County Council and EPA and Fisheries of any environmental incidents.
- To keep a record of the incident.
- To prepare a written report to the Galway County Manager and the EPA.

Ending the ERP

The controller may demobilise the Emergency Response Procedure if:

- ❖ The emergency does not occur
- ❖ The emergency being dealt with has passed.

The controller shall notify all bodies and agencies of the change being put into effect when the ERP has been demoblised.

ERP: Fire

1. All site staff shall receive adequate training on fire safety and protocol. A trained person shall remain on site at all times during operating hours.
2. The office buildings have fire alarms installed and fire fighting equipment is located at the facility. A fire hydrant is located on site near the reception area. A fire safety drill shall be developed and all staff will be given instruction in its operation. Fire drills shall be carried out on a regular basis and the Fire Authority shall be consulted.
3. On discovery of a fire the fire drill shall be initiated and all persons will assemble at the fire assembly point. The landfill shall be immediately closed and all vehicles will be allowed to exit the site.
4. The senior staff member on site shall decide if the Fire Brigade should be called. If not, trained operatives on site will deal with the fire. If it is decided that the Fire Brigade are needed 999 or 112 is dialled and the location and the description of the fire should be given. It will take approximately 10 minutes for the Fire Brigade to arrive on site.
5. Additional water supplies can be pumped from nearby streams where a dam can be erected.
6. Site staff or fire brigade personnel shall decide as to whether a fire has been extinguished.
7. The EPA shall be notified immediately of all fire incidents on site; and the incident will be recorded.
8. If fire occurs after normal opening hours the local Fire Station shall have access to the site and all necessary contact telephone numbers.

Scenario 1 Incoming Vehicle's Waste Load on Fire

All vehicles entering the site are examined as part of the waste acceptance procedures for indications of fire (smoke or burning smells). Any suspicious vehicle shall be directed to the inspection area where the fire can be extinguished. If necessary the load shall be emptied onto the concreted area and the fire extinguished with water. The quarantine area is contained and any firewater runoff will drain to the leachate lagoon.

Scenario 2 Fire in Waste Body

If material deposited at the working face is seen to be on fire, it shall be removed by excavator to a selected area where it will be mixed with sub soil. If a deep seated fire is discovered or suspected, the extent of the fire can be verified by measuring temperatures in the area by means of a temperature probe inserted into pipes driven into the tipped material. Readings shall start in the unaffected areas and progressively move towards the area of the suspected fire. The affected area should be marked off by indicator boards. A trench shall be dug ahead of the fire and filled with sub soil.

Scenario 3 Fire in the Civic Amenity Facility

If a minor fire occurs in the civic amenity facility the fire shall be extinguished with fire extinguishers or using water from the fire hydrant located there. If water is being used in fire fighting the shut off valve in the petrol interceptor shall be closed to contain any firewater runoff. If in house fire fighting is not successful or household hazardous waste is involved the fire brigade shall be called.

Scenario 4 Fire at Composting Facility

If a fire occurs in the composing process area the fire shall be extinguished with sub soil.

Scenario 5 Adminstration Building on Fire

On discovery of a fire the fire drill will be initiated and all persons shall evacuate the building and assemble at the fire assembly point. The fire brigade shall be called. A roll call will be taken to ensure that everyone is accounted for. Trained in house fire fighters shall be employed to fight the fire until the fire brigade arrives on site.

Scenario 6 Vehicle/Machinery on Fire

Fire extinguishers shall be contained on all machinery in case of engine fires.

Scenario 7 Waste in Quarantine Area on Fire

The fire shall be extinguished with water. The quarantine area is contained and any firewater runoff will drain to the leachate lagoon.

ERP: Migration of Landfill Gas.

1. A gas monitor is located in the main control office of the administration building at the landfill. Sensors will detect danger levels of methane and carbon dioxide and also oxygen depletion within the building.

2. If the levels rise above 1% v/v for methane or 1.5v/v for carbon dioxide an alarm shall be raised to evacuate the building. If such a situation arises the EPA and the Environment Section of Galway County Council shall be notified immediately.

3. If the levels of methane and carbon dioxide in the perimeter gas wells rise above the emission limits the EPA shall be contacted.

ERP: Accidental Spillage of Leachate or other Potential Contaminating Substances

1. Every precaution shall be taken to prevent any spillage of leachate or any other potentially contaminating substance.

2. In the event of any spillage at the civic amenity site or at the landfill containment booms and/or absorbent material shall be used to contain and absorb the spillage. The used absorbent shall be sent for treatment/disposal to a licensed facility.

3. If a leachate spillage occurs a temporary bund shall be constructed to contain the spillage and the liquid shall be pumped to the nearest leachate chamber or the lagoon from which it will be pumped or tankered off site.

4. If necessary the discharge outlet from the oil interceptor shall be shut off to prevent any contamination of surface water. Firewater and the contaminated water will be pumped to the leachate lagoon.

5. Both EPA and Shannon Regional Fisheries Board shall be notified immediately of any incident causing contamination of surface waters.

ERP: Contamination of Local Wells

1. When it is evident that the landfill is having a significant effect on the quantity and/or quality of water in local wells action will be taken.

2. The affected residents shall be informed of the contamination and an alternative supply of water shall be provided.

ERP: Side Slope Failure

1. In the event that there is a risk of side slope failure immediate measures shall be put in place to eliminate the risk, temporary or otherwise.

ERP: Personal Accident on Site

1. Staff members will be trained in first aid and first aid kits are located on site. In the case of minor injuries a first aider on site shall treat the person. In the case of major injuries the ambulance services shall be employed. The fire brigade should also be called in situations where a person is trapped etc.

Contact Details:

EPA,
North West Regional Office of Environmental Enforcement,
John Moore Road,
Castlebar,
Co. Mayo.

Tel: 094 9021588
Fax: 094 9021934

Galway County Council,
County Hall,
Prospect Hill,
Galway

Tel: 091 509000
Fax: 091 509010

Shannon Regional Fisheries Board,
Ashbourne Business Park,
Dock Road,
Limerick
Tel: 061 300238
Fax: 061 300308

The Central Fisheries Board,
Unit 4,
Swords Business Campus
Balheary Road,
Swords
County Dublin

Tel: 01 8842 600
Fax: 01 8360 060

Risk Assessment of Environmental Pollution Associated with Contaminated Firewater at Pollboy Landfill.

Existing Control and Protection Measures

Fire fighting equipment is located at the facility. A fire hydrant connected to the mains supply and extension hoses are located on site near the reception area. Fire extinguishers are located throughout the site.

The office buildings have smoke/heat detectors and fire alarms installed. Emergency numbers are on a notice board located on storage sheds near the administration building. The local fire station has a list of contact mobile phone numbers for Pollboy Landfill in case of a fire outside working hours. It is not necessary for the local fire station to have keys as they will be able to cut the lock and gain access to the site.

An Emergency Response Procedure (ERP) has been formulated in consultation with the Fire Authority (Assistant Chief Fire Officer visited the site on 9th June 2004). Fire safety and awareness, fire fighting and first aid training are provided at the facility. The local fire brigade will practice fire drills with the members of staff.

The local fire fighting unit has the following equipment available:

- 2 no. Class B Tenders with hoses, each can hold a 400 gallon water tank.
- Breathing apparatus and coveralls for gas and splash suits.

The approximate response time is 10 minutes and there are good access roads around the site.

Risk Assessment

No fuel is stored on site. Fire extinguishers should be kept on all machinery in case of engine fires.

Fire in civic waste facility is not significant as the quantities of household hazardous waste are small and contained in leak-proof storage containers on a concreted area. In the event of any spillage containment booms and/or absorbent material will be used to contain and absorb the spillage. The used absorbent will be sent for treatment/disposal to a licensed facility. Some fire water retention capacity exists in civic amenity site if the discharge outlet from the oil interceptor is blocked and firewater can backup onto concreted kerbed area. Fire water retention capacity of the kerbed areas at the facility was calculated at 1,426m^3. During cleanup firewater can then be pumped to the leachate lagoon.

For fighting fires at the working face, waste body and composting facility inert material i.e. sub-soil will be used and not water therefore there will be no risk of firewater contamination.

All vehicles entering the site are examined as part of the waste acceptance procedures for indications of fire (smoke or burning smells). Any suspicious vehicle will be directed to the quarantine/inspection area where the fire can be extinguished. If necessary the load can be emptied onto the bunded concreted area and the fire extinguished with water. The inspection/quarantine area is contained and any firewater runoff will drain to the leachate lagoon. The firewater retention capacity of the inspection/quarantine area was calculated at 224m^3. If a waste materials stored in quarantine goes on fire the same procedure as above will apply.

If the storage sheds, administration building and the civic amenity site office go on fire there is no risk of firewater contamination.

To conclude the potential impact on environment and on residents in the area are minimal. It is determined from this risk assessment that a significant risk of contaminated firewater pollution does not exist at Pollboy Landfill.

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Training and Awareness Procedure	**Procedure No.:** 02
Version Number: 004	**Date of Revision:** 18/05/04
Authorised Signature:	
Date:	

Purpose: To ensure proper development and implementation of a training and awareness programme.

Person Responsible: Landfill Manager.

Procedure:

1. All members of the staff upon appointment to Pollboy Landfill Site will undergo a suitable induction programme.

2. All members of staff shall be given a copy of the Waste Licence 27-2.

3. All relevant aspects of the licence will be explained to the staff.

4. Importance of compliance with the conditions of the licence will be emphasised.

5. The role of each member of staff will be explained and the potential environmental effects of departure from their responsibility will be emphasised.

6. All staff will be made aware of the benefit of improved performance in a working environment.

7. At any time a staff member may make a request for environmental training. These requests will be reviewed by the Landfill Manager. It will be the responsibility of the Landfill Manager to decide if training will be given. A training schedule will be drafted to incorporate services offered by external bodies, relevant legislation and other guidelines received from the regulatory authorities.

8. A training record will be set up for each member of staff and all details of training will be filed. A record template sheet for training and awareness is attached.

9. The following is a list of training courses which will be implemented on site as soon as it is practicable:

    - Familiarisation with licence conditions and corrective action procedure,
    - Waste acceptance procedure and waste inspection procedure,
    - Emergency response procedure,
    - Familiarisation with all other relevant procedures,
    - FAS waste management course,

- First Aid course,
- Manual Handling course,
- Safe Pass course.

TRAINING AND AWARENESS RECORD

Date:

Name of employee: **Position:**

Course attended:

Date of course:

Duration of course:

Record of attendance enclosed:

Course feedback:

Certificate obtained:

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Procedure for Corrective Action	**Procedure No.:** 03
Version Number: 004	**Date of Revision:** 18/05/04
Authorised Signature:	
Date:	

Purpose: To ensure corrective action following an occurence of non-compliances.

Person responsible: Landfill Manager.

Procedure:

Should any of the procedures fail as detailed in the EMS or non-compliances from the Agency occur regarding the waste licence the following procedure shall be applied:

1. When a non-compliance occurs it is given a CAR (Corrective Action Request) number and registered on the CAR register and the CAR sheet is filled out. (CAR register and CAR sheet templates attached).

2. The person who the CAR is directed to is noted, the person raising the CAR is noted, the date of issue is noted, the description of the non-compliance is given, the reason for occurrence is recorded, the action to corrective with effective date, the action to prevent recurrence with effective date is also described.

3. When the corrective action has been effective the person raising the CAR signs and dates the CAR Sheet closing the process. The date of closure is recorded on the register also for tracking purposes.

CORRECTIVE ACTION REQUEST (CAR) SHEET **CAR N0. 01 etc**

To:

From:

Date:

Description of Non-Compliance

Reason for Non-Compliance

Action to Correct **Effective Date**

Action to prevent recurrence **Effective Date**

Signatures **Date closed off**

CAR REGISTER

CAR Number	Date Issued	Date Closed

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Communications Programme	**Procedure No.:** 04
Version Number: 004	**Date of Revision:** 20/01/04
Authorised Signature:	
Date:	

2.4 Communications Programme

2.4.1 Within three months of the date of grant of this licence, the licensee shall submit to the Agency for agreement a revised Communications Programme to inform and involve the local community and ensure that members of the public can obtain information at the facility, at all reasonable times, concerning the environmental performance of the facility.

- **Legislative Requirements & Access to Information.**

  In formulating a revised Communications Programme for the Pollboy Landfill facility, Ballinasloe Town Council are fully aware of its statutory requirements under the following Acts:

  - **EPA Act, 1992**
  - **Waste Management Act 1996.**
  - **Litter Pollution Act 1997.**

  The Council will also ensure that greater access to environmental information on the landfill facility will be readily available in accordance with Council Directive 90/313/EEC on Freedom of Access to Information on the Environment, which came into effect in Ireland in May 1993.

- **Communications Programme.**

  In the formulation and implementation of an effective Communications Programme it is important to note that a wide variety of communication and education tools are available. The tools chosen for effective communication should ensure that all publicity material is consistent, have maximum impact and forms a part of building public understanding and trust.

  There are many tools available for effective communication and the main ones that will be used in the revised communications programme and implemented at the landfill are :

  - **Electronic Mail/Internet.**

A link has now been set up between the landfill site and Ballinasloe Town Council where all staff have e-mail and access to all information concerning the environmental performance of the facility.
Information in relation to the landfill and the Civic Waste Facility will now be more readily available to the public or any interested party to view at the facility or at the offices in Ballinasloe Town Council.
Environmental information will be available without prior notification during normal facility working hours.
Security and reception staff will be made aware of the arrangements for public access to environmental information.
All details of the community liaison committee will be provided and kept on file and will include details of meetings (dates of meetings, actions arising etc.) between the licensee and representatives of local residents.

Files will contain a list of the following:

- Correspondence and reports submitted to the Agency.
- Correspondence received from the Agency.
- Contents and reports pertaining to the licence.

Members of the public requesting information will not be asked to make their request in writing.

Members of the public will be allowed to review all information in private.

Personal details will not be requested unless required for site safety purposes.

➢ **Word of Mouth Communication.**

Word of mouth communication approaches by the landfill management will now be used to provide a balanced view of the need available to address local community concerns. In addressing local community concerns the management will admit to any problem arising from the facility and explain how it is being resolved.

Other tools to ensure effective communication will be implemented in the revised communications programme and they are as follows:

➢ **Local newspaper advertising.**
➢ **Local radio advertising.**
➢ **Brochures/leaflets.**
➢ **Displays.**
➢ **Newsletters.**

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Procedure for Dealing with Incidents	**Procedure No.: 05**
Version Number: 005	**Date of Revision:** 25/04/05
Authorised Signature:	
Date:	

Purpose: To ensure that all incidents are dealt with and recorded in the proper manner.

Person Responsible: Landfill Manager

Procedure:

The following shall constitute an incident for the purposes of this licence:

- An emergency,
- Any emission which does not comply with the requirements of the licence,
- Any trigger level specified in the licence which is attained or exceeded; and
- Any indication that environmental pollution has, or may have taken place.

In the event of any incident at Pollboy Landfill, the Ballinasloe Town Council will make a written record of the incident and carry out the following:

1. Identify the time, date and place of the incident.

2. Carry out an immediate investigation to identify the nature, source and cause of the incident and any emission arising from therefrom.

3. Isolate the source of the emission.

4. Evaluate the environmental pollution, if any, caused by the incident.

5. Identify and execute measures to minimise the emissions/malfunction and the effects thereof.

6. Notify the EPA as soon as practicable, and in any case not later than 10.00am the following working day after the occurrence of any incident.

7. Submit to the EPA a written record of the incident with 5 working days after the occurrence of any incident.

8. In the event of any incident which relates to discharges to surface water, notify the Shannon Regional Fisheries Board immediately, but not later than 10.00am on the following working day after such an incident.

9. The local residents liaison committee members will be notified of any incident which relates to the non-operation of the gas flare.

10. Should any further actions be taken as a result of an incident occurring a written report should be forwarded to the Agency as soon as practicable and not later than 10 days after the initiation of those actions.

INCIDENT RECORD

Name of Persons involved if applicable:

Address of Persons involved if applicable:

Time:

Date:

Place:

Cause of incident:

Description of incident:

Injury if any:

Action Taken:

Name and address of witness:

Name of supervisor on site **Signature of supervisor**

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Procedure for Submission of Documentation to EPA	**Procedure No.: 06**
Version Number: 004	**Date of Revision:** 18/05/04
Authorised Signature:	
Date:	

Purpose: To ensure that all documentation is submitted to the agency on time and in the format required.

Person Responsible: Landfill Manager

Procedure:

1. Any written communication with the EPA in relation to waste licence compliance shall be sent to the Regional Office of Environmental Enforcement (West/Northwest Region).

2. An original and 2 no. copies of each document should be sent to the Agency.

3. The documentation should be submitted according to the following format:

   All correspondence should have the licence no. and licence condition if relevant and should be typed, A4, double sided, corner stapled, punched (2 hole) and if too large to staple then should be inserted in a ring binder (2 hole). Maps should be submitted in A3 format if possible and no rolls of maps. Where the original is in colour so too should be copies. Material should not be submitted with spiral binding, heat binding, metal binding, plastic covers/folders/pockets and box files.

4. The information shall be identified by a unique code and it shall indicate any modifications or amendments and it shall be correctly dated to reflect any such modifications or amendments.

5. In the case of results of any environmental monitoring it shall be accompanied by a written interpretation setting out their significance. Documents shall be submitted in accordance with the relevant frequency specified in the licence.

6. The following documents shall be kept at the facility office:
   - The current waste licence relating to the facility,
   - The current EMS for the facility,
   - The previous year's AER for the facility; and
   - All written procedures.

7. The following written records shall be maintained:
   - The types and quantities of waste recovered and disposed of at the facility each year,

- All training undertaken by facility staff,
- Details of the maintenance records for the landfill gas flare,
- Results from all integrity tests of bunds and other structures and any maintenance or remedial work arising from them,
- Details of all nuisance inspections; and
- The names and qualifications of all persons who carry out all sampling and monitoring as required by this licence and who carry out the interpretation of the results of such sampling and monitoring.

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Procedure for Recording of Complaints	**Procedure No.:** 09
Version Number: 004	**Date of Revision:** 18/05/04
Authorised Signature:	
Date:	

Purpose: To ensure that accurate records of all complaints are recorded.

Person Responsible: Landfill Manager

Procedure:

All complaints shall be recorded in the complaints book and the following details shall be completed.

- Date and time of complaint,
- The name of complainant,
- Details of the nature of the complaint,
- Actions taken on foot of the complaints and the results of such actions and the response made to the complainant.

In the case of non-conformance with this procedure, corrective action will be taken as outlined in corrective action procedure.

Recording of complaints shall be completed at the time a complaint is made.

COMPLAINTS REGISTER

Date and time of complaint:

Name and address of complainant: _____

Nature of the complaint: _____

Actions taken on foot of complaint and the results of these actions :

Response made to each complainant: _____

Complaint logged by: _____

Procedure for Recording Outgoing Waste from the Civic Waste Facility

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Procedure for Recording Outgoing Waste from the Civic Waste Facility	**Procedure No.:** 010
Version Number: 004	**Date of Revision:** 19/05/04
Authorised Signature:	
Date:	

Purpose: To ensure that accurate information is available on the amount of waste being recycled and disposed of.

Person Responsible: Landfill Manager

Procedure:

1. A digital record is kept for each load of waste departing from the civic waste facility. The record contains the following:-

- The name of carrier and waste collection permit details.
- The vehicle registration number.
- The destination of the waste (facility name and waste licence/permit number as appropriate.)
- A description of the waste.
- The quality of waste recorded in tonnes.
- The name of the person checking the load.
- The time and date of departure.

2. Additional written records are kept at the civic waste facility office, which provide a register of materials received for recycling and a register of household waste which is removed to the landfill for disposal. Templates are attached which are used to record this information.

POLLBOY WASTE FACILITY RECYCLING REGISTER.

Day and Date: ..... **Waste Licence Register Number: 27 – 2.**

Cars.	Cars & Trailers.	Flat Glass.	Coloured Glass Blue. Green.Brown.	Clear Glass.	Plastics. PET. HDPE. PP. PS.	Papers/ Mag.	Cardboard.	D. C/I cans.	Paint cans.	Bulbs/ flors.	Batteries	White Goods.	Aersols/ Pests.	Meds	Waste oils./ Filters.
Total No of Cars.															
Total No of Cars and Trailers.															

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Procedure for the Operation of the Civic Waste Facility.	**Procedure No.:** 013
Version Number: 004	**Date of Revision:** 19/05/04
Authorised Signature:	
Date:	

Purpose: To ensure that the Civic Waste facility is operated in a safe manner.

Person Responsible: Landfill Manager

Procedure:

1. Only private vehicles are allowed to use the civic waste facility.

2. The facility shall not be used as transfer station for disposal of waste by commercial waste disposal contractors.

3. No hazardous waste (excluding household hazardous waste, waste oil and batteries collected for recovery) shall be deposited at the civic waste facility.

4. All tipping of waste shall be into a skip for disposal or in a receptacle for recovery or in the case where inspection is required into a designated inspection area.

5. Waste shall only be accepted at the civic waste facility between the hours of 08.30 and 17.00 hours Monday to Friday inclusive and 9.00 to 16.00 hours on Saturdays.

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Procedure for the Control of Environmental Nuisances	**Procedure No.:** 014
Version Number: 005	**Date of Revision:** 13/02/06
Authorised Signature:	
Date:	

Purpose: To ensure that environmental nuisances are not present at the site.

Person responsible: Assistant Landfill Manager.

Procedure:

1. The facility and its immediate surrounds shall be inspected on a weekly basis for nuisances caused by litter, vermin, birds, flies, mud, dust and odours.

2. A record shall be kept of these inspections.

Litter

3. All loose litter accumulated within the facility and its environs shall be removed subject to agreement of the landowners and appropriately disposed immediately and in any event by 10.00am of the next working day after such waste is discovered.

Dust

4. In dry weather, site roads and other areas used by vehicles shall be sprayed with water as and when required to minimise airborne dust nuisances.

5. Prior to exiting the facility, all waste vehicles shall use the wheelwash.

Vermin, Birds and Flies

6. Birds will be prevented from gathering on and feeding at the facility by the use of bird control techniques.

7. A programme for the control and eradication of vermin and fly infestations is implemented at the facility. A written record shall be kept at the facility and shall include the following:

    - The date and time during which spraying of insecticide is carried out;
    - Contractor details;
    - Contractor logs and site inspection reports;
    - Details of the rodenticide (s) and insecticide (s) used;
    - Operator training details;

- Details of any infestations;
- Mode, frequency, location and quantity of application; and
- Measures to contain sprays within the facility boundary.

Odour

8. An odour survey is carried out twice daily and during the evenings and at the weekend. Local residents are involved in these odour surveys. Any incidents of odour will be reported to the EPA in accordance with the Procedure in Dealing with Incidents and the Waste Licence conditions 1.7, 9.1 and 11.2.

9. An odour control programme is implemented at the facility. As part of this programme a monthly review of the odour measures in place takes place which included the following:

    - Consideration of odour complaints received,
    - Details of monitoring carried out,
    - Recommendations to deal with odour problems and implementation of these recommendations.

Pollboy Landfill Nuisance Inspection Report

** S= Satisfactory U= Unsatisfactory N=Not present P=Present*

Time & Date	***Nuisance***	**Status ***	**Action taken (if any)**	**Results.**
	Litter			
	Birds			
	Vermin			
	Mud			
	Dust			
	Flies			
	Odour (See Odour Monitoring Report Form)			

Comments .....

.....

Signed _____

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Procedure for Environmental Monitoring	**Procedure No.:** 015
Version Number: 004	**Date of Revision:** 19/05/04
Authorised Signature:	
Date:	

Purpose: To ensure that environmental monitoring is carried out in compliance with Waste Licence 27/2.

Person responsible: Assistant Landfill Manager

Procedure:

The Environmental Monitoring Programme will consist of the following:-

Surface Water

Surface water monitoring points are SW1, SW3, SW4, SW5, SW6, SW7 and SW8. The locations of which are shown in Drawing DG0001-05.

Surface water monitoring and frequency is set out in Schedule D.5 of the waste licence.

The flow of the stream u/s of SW6 is recorded weekly using a starflow flow recorder.

Groundwater

Ground water monitoring points are as follows:-

B8A, RC2, RC3, B2AP, B8AP, MW1, MW2, MW3 and MW6 shown in DG0001-01.

Groundwater monitoring is carried out at the frequency set out in Schedule D.5 of the waste licence.

Dust

Dust monitoring is to be carried out three times a year (twice during May to September) at four locations D1, D2, D3 and D4 shown in DG0001-02. The emission limit for dust is 350 $mg/m^2/day$.

Noise

Noise monitoring is to be carried out on an annual basis. Noise monitoring are as follows: B1, B2, B3, NSL, and NSL2 which are shown in DG0001-03. The parameters required are set out in Schedule D.4 of the waste licence. The daytime limit for noise is 55dB (A) L_{Aeq} and the night time limit for noise is 45 dB (A) L_{Aeq}.

Gas Monitoring

12 no. gas migration monitoring boreholes have been installed around the perimeter of the site. The locations of which are shown in DG0001-04. The parameters outlined in Schedule D.2 of the waste licence are measured on a monthly basis. The landfill gas concentration limit is 20% LEL (1% v/v) for Methane and 1.5% v/v for Carbon Dioxide.

Monitoring of the landfill gas flare is outlined in Schedule D.2 of the waste licence and emission limits in Schedule C.4.

Leachate

Leachate monitoring is carried out at five locations: two leachate extraction boreholes L11 and L19, two leachate chambers CH1 and CH2 and the outlet from the leachate lagoon LD1. The parameters required and the frequency of monitoring is set out in Schedule D.5 (boreholes and chambers) and D.7 (outlet from lagoon) of the waste licence. Emission limits are outlined for leachate being discharge off-site in Schedule C.5.

Meteorological Monitoring

Meteorological monitoring should be carried out in accordance with Schedule D.6 of the waste licence.

Nuisance Monitoring

The facility is inspected daily for odours and weekly for other nuisances.

Compost Monitoring

The quality of the compost should be analysed biannually and the composing process is monitored on a continuous and weekly basis as outlined in Schedule D.8 of the waste licence.

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Procedure for Pollboy Landfill Site Visitors.	**Procedure No.:** 016
Version Number: 004	**Date of Revision:** 19/05/04
Authorised Signature:	
Date:	

Purpose: To ensure control and safety of all visitors to the landfill site.

Person responsible: Receptionist/Weighbridge Operator/Gateman.

Procedure:

1. All visitors will be directed to report to the site office.

2. All visitors will be requested to complete a detailed visitor's log book stating name, date, reason for visit, time of entry and time of exit.

3. All visitors will be provided with safety items, and it is a pre-condition that they wear these safety items before they are allowed enter the site.

4. All visitors must be accompanied by a member of staff while on site.

5. All visitors will be made aware of any possible dangers on the site.

6. When leaving the site all visitors must report to the reception area and return any safety items provided and fill in their time of exit from the landfill in the visitor's log book. Any comments can be included in the log book.

Visitor Report Form, Pollboy landfill Site, Ballinasloe

Time and Date of visit:
Name of Visitor(s) :_____
Name of organisation/company which visitor represents:
Purpose of visit :
Name of person(s) who accompanied the visitor:
Comments :
Logged by:_____

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Procedure for the Composting of Organic Material	**Procedure No.:** 017
Version Number: 004	**Date of Revision:** 19/05/04
Authorised Signature:	
Date:	

Purpose: To ensure that a good quality compost is produced.

Person Responsible: Assistant Landfill Manager.

1. Material Receipt

All incoming material from off-site sources will be quantified as to its volume, weight and generator for record-keeping purposes. Any notable problem such as contaminants should be identified and removed. The operator has the responsibility to reject any load that does not meet specifications. The facility will not be open to the general-public.

2. Feedstock Preparation

2.1 Mixing

A mobile twin auger mixer is used for blending raw feedstocks. Using the front-end loader, the operator is responsible for loading dry carbonaceous, high moisture nitrogenous, water, compost inoculant, and other raw materials together in the mixing unit. Effective composting will only occur if a number of physio-chemical parameters can be achieved in the feedstock. Fundamentally, this includes.

2.2 Moisture

The moisture content of the incoming material must be between 55 to 65%. Wetter materials will tend to become anaerobic while dryer material will inhibit microbial activity.

2.3 Nutrient ratios

Composting is a biological process and the microbes involved must be provided with the correct proportions of essential nutrients. Typically, carbon and nitrogen are of fundamental importance with a ratio of 25 to 35 parts of carbon to one part of nitrogen providing optimum conditions for composting.

2.4 Porosity

This physical factor is essential in order to allow air and oxygen to circulate, as composting is an aerobic process.

Typically, most organic waste will not efficiently compost individually and must therefore be mixed with other materials to bring the above parameters into line. For example, food waste and sewage sludge on their own are often too wet, compact and have too much nitrogen. However, by mixing with other waste materials, a recipe can be derived to address these issues. For example, shredded cardboard and paper will soak excess moisture and add carbon, while wood chips will add porosity. The calculation of a composting recipe based on readily available materials is a crucial first step in the composting process. Likely input materials may include source separated municipal organic waste, shredded wood waste, paper, cardboard, sawdust and wood chip. A typical composting recipe is given be in Table 1.

Table 1: Sample compost recipe

Feedstock	Moisture %	C:N ratio	Porosity	Proportion
Food waste	70	15:1	Poor	2.5
Shredded cardboard	8	500:1	Good	0.7
Water	100	--	Bad	0.2
Woodchip / chipped brush	--	--	V. good	0.7
Mixture	60	30:1	Good	4.1

On a batch-by-batch basis, materials are mixed and discharged directly into the digester via conveyor. If a digester is not available to place under the conveyor, the mix is discharged onto the concrete surface of the mixing area. When thirty cubic meters have been mixed, the mix is loaded by front-end loader into the digester. Records will be kept regarding the weight, volume, and source of the processed material. Mixed material is to be immediately placed into a digester.

!!WARNING!!

Caution should be exercised around the mixer, as the augers are dangerous and capable of maiming or killing operators. Safety lockout procedures should be practiced when working on the mixer to ensure that the mixer does not accidentally start during maintenance. The mixer should be kept running during filling and discharge, as the mixer may be difficult to re-start with a full load. Consult the mixer operations manual for unloading procedures should a batch cause the mixer to stall.

The operator is responsible for visually inspecting the mix and adding inoculant and bulking material. The mixing formula ratios can be adjusted in the field, as necessary. Sawdust and or dry wood shavings should be available on site for conditioning moisture as may be necessary. Wood chips should also be available for adjusting porosity, especially during re-mixing. The mixing formula is for guidance purposes only and is

not a rigid rule of operation. The interaction of positive and negative air in the process control system, as well as the variable speed drive will impact the net air pressure through the system. This may reduce the amount of bulking material required in the mixture to provide free air space.

3. Digester Management

Each digester is to be managed in a safe and efficient manner that protects the environment. The proper operation of the container systems involve proper management of the mixture, air, temperature, and moisture. The goals of proper digester management are to achieve destruction of disease-forming organisms (pathogens), prevent the release of leachate, minimize off-odors, and to produce a compost product of beneficial use for growing plants.

3.1 Digester Loading

After the initial mixing phase, the blend is loaded into the digester until full. When loading the digester, it is important to load the digester evenly to ensure even and equal airflow throughout the mass. Load the digester as full as possible, leveling the mass as much as possible. When filling is completed, remove the safety pin carefully and lower the lid. Attach all lid latches before moving the digester.

!!WARNING!!

Make sure that all lid latches are undone before raising the lid. Be extremely careful raising the lid in windy conditions and insert the safety pin when the lid is in the upright position.

Once the digester is full and the lid is closed, the flexible airlines are then connected to the appropriate coupler. The discharge airline is connected to the upper coupler and the air feed line is connected to the lower coupler. The temperature probe is inserted completely into the center of the digester. The leachate line is then attached.

3.2 Digester Unloading

3.2.1 Container Management

Unloading the digester is performed when the material inside of the digester requires re-mixing (see digester remixing) or has met all of its regulatory and product requirements.

Before ever unloading the digester onto the roll-off truck, make sure that the air hoses, leachate lines, and the temperature probe are removed from the digester.

Once in place, proceed to open the rear door. When opening the rear door, make sure that the lid latch on the rear of the digester is undone. After the door is open, make sure

that the chain attached to the door is hooked to the wall of the digester before tipping the digester. Once the rear door is properly secured, the operator may proceed to tip the digester.

!!WARNING!!

Make sure that no one is standing behind the digester during the tipping process

Once the digester is unloaded, inspect the inside of the container for unloaded compost that may have stuck to the corners, sides, or edges. Re-tip the digester or otherwise remove this material using a shovel or other tools as may be necessary. Inspect the perforations in the floor for clogging and clear debris as may be necessary. Lastly, close the door and latch tightly before placing the digester in the loading area.

The rear door should never be opened when the digester is full, unless it is for dumping of material. Debris may fall into the gasket or seals, compromising the integrity of the seal. Material may also expand after the door is opened, making it difficult to re-close the door.

3.2.2 Process to Further Reduce Pathogens (PFRP)

The time/temperature composting protocols utilized in the Celtic Composting System is broadly based upon the USEPA 503 Regulations for the sanitation of sewage sludge. These regulations are broadly in line with the current drafts of the EU Biowaste and Biosolids Directives that require technologies to maintain feed stocks at set temperatures for defined lengths of time. These technologies are referred to as "Processes to Further Reduce Pathogens" (PFRP). The time/temperature standards are required to ensure that the material is relatively free of disease producing organisms and viable weed seeds as well as unattractive to vectors (i.e. insect, rodents, and birds) that can potentially transmit diseases from pathogens in the material being composted.

In order to meet the PFRP requirement, the material is maintained at 55°C or higher for 72 continuous hours. In addition, in order to reduce vector attraction, the material to be composted is maintained at temperatures greater than 40°C for 14 days or longer during which the average temperature must be higher that 45°C. Material should not to be moved to the compost curing and further processing area until it has met the PFRP and the vector attraction reduction standard in the digester. These protocols may need to be altered in the future, in the event that the requirements of the Biowaste and Biosolids Directive differ from current drafts. Such changes are easily configurable using the CCS operating software.

Careful attention to the composting environment is necessary during the "intensive care" period in the digester to meet PFRP and vector attraction reduction standards. Numerous variables will affect composting reactions, and many of these conditions, such as outdoor temperature and precipitation, shall be logged on the "Daily Log of Compost Operations" sheet. It is essential to collect and interpret data daily in order to identify any process or system problems early and to isolate the cause and take corrective action. The operator must perform routine tasks, and have the ability to adjust quickly to changing conditions rather than engage in operations under a predetermined set of actions and procedures.

Success is determined not by how many hours are spent in operation, but by achieving quantifiable product performance and quality standards.

3.3 Digester Codes and Documentation

For the purpose of regulatory requirements and facility management, the material being composted must be carefully tracked through the system.

As the feed stocks and bulking materials are loaded from the mixer into a digester, the material is subsequently transported to the appropriate empty space in the digester aeration area. To avoid confusion, it is recommended that a digester be placed in the same location every time it is filled.

The data logger and process controller recognize the blowers and temperature probe as they are located in the composting area. For consistency in operation, the same digester should be placed in the same location, such as Digester C-1 placed in temperature location "Digester-1" as identified by the process controller.

There are two "time and temperature" standards to be met to produce a Class I compost. The first is the Process to Further Reduce Pathogens (PFRP) which is 72 continuous hours over 55°C. The second is the Vector Attraction specification, which is achieved when the materials in any digester have been processed for a net of 14 days above 40°C (averaging 45°C).

When the materials in any digester have been processed for a net 14 days above 40°C (averaging 45°C) and have met the PFRP for any 72 consecutive hours (at 55°C) during this time period, the "Digester Code" is noted under "PFRP and Vector Attraction Met" of the "Daily Log of Compost Operations". The digester may then be unloaded and the materials are loaded into the curing piles. The volume and weight are noted on the "Daily Log of Compost Operations". The computer data logger will keep track of the temperature trend of the digester location, but this manual log and notation is an essential certification of the compost for regulatory compliance.

The curing piles may occasionally have overlapping aging dates due to the time lag of incoming dates. The longer the aging period, the more decomposed the compost will become and more product will be recovered in the finer and hence more valuable mesh sizes. Finally, the volume and weight of materials transferred off-site are noted.

3.4 Digester Aeration and Agitation

There are two techniques for digester aeration: digester re-mixing and the computerized CCS aeration system. Since the digesters are fully enclosed, minimal aeration occurs through natural convection within the mass. The digesters are agitated or re-mixed infrequently, so it is critical that the air system is fully operational. Should the computer

lock-up for any reason, there is a back-up control mechanism on the blowers, which is capable of maintaining proper oxygen levels even without the compute interface.

4. Curing

The in-vessel composting process converts raw feed stocks into a pasteurized compost product that has most of its the readily biodegradable material decomposed and stabilized. Consequently, it has a low attraction to vectors and other vermin. However, while this material can be described as being stable it is not yet mature enough for use as a soil amendment. An additional phase of maturation is therefore needed to allow the material to fully humify while reducing its fermentability further. This phase, called "curing," is a mesophyllic, aerobic process that eliminates organic plant phytotoxins, consumes fungal substrate and provides additional biological stabilization, especially the decomposition of cellulose, hemicellulose and lignin (woody materials, including paper). It also provides maturity and begins a prolonged period of humification and mineralization. Curing can be conducted in a number of ways: in static piles, turned windrows or in aerated static piles. CCS recommends using aerated static piles because it speeds the curing process and reduces the potential for generating odours.

4.1 The aerated curing system used by CCS :

In this configuration, perforated pipes are laid on top of a concrete slab where air is drawn downward through the curing pile and exhausted through a separate biofilter. This negative aeration process maintains the aerobic conditions needed for effective curing while further reducing the potential for odour. Due to the wet climate in Ireland, these piles should be covered with a breathable tarpaulin so that excess moisture will not penetrate the piles. Excessive wetting of the curing pile at this stage can potentially halt the maturation phase by causing anaerobic conditions and making the compost difficult to handle or screen. The materials will then need to cure for a minimum of 30 days. If time and space allows, 45-60 days would provide a more mature product.

The curing system (see Figure 3 below for a top view schematic and the appendices for full drawings and specifications for the CH2M Hill C:N Composting System) consists of a large concrete bunker into which the composting materials from the containers are discharged. The curing bunker is divided into four cells or zones, which are aerated by a series of HDPE air lances (4 lances per zone). A series of butterfly valves above the curing system blower controls airflow to each of these zones. The aeration system operates in negative aeration mode by drawing air through the curing pile and passing it through a biofilter to remove any off-odours produced. The curing piles are covered by a breathable tarpaulin to keep materials from getting too wet. Run-off from precipitation is directed towards a drain at the front of the curing area, which in turn drains to a sediment trap. The screening and compost storage area, next to the curing pad, are also served by this drainage system. Supernatant or liquid from this sediment trap is discharged to a percolation area. The manifold piping arrangement is configured to separate the exhaust airflow from any condensate produced. The condensate is directed to a concrete sump

and is automatically pumped to the sediment trap, while the dehumidified air stream is directed to the blower and discharged through the biofilter.

5. Screening, Blending and Packaging

The screening and storage area is located adjacent to the curing system. When materials are cured, they can be moved to storage area for screening. The County Council plans to share the Corporation's mobile trommel screen, supplied by Powerscreen. A trommel screen is basically a rotating cylinder on an incline. Composted materials are placed into the screen's hopper with the use of a bucket loader or tractor. The hopper then slowly feeds the rotating screen at the high end. As the materials are rotated within the screen and move to the lower end, small particles fall through the screen holes and fall below the screen onto the ground or onto a conveyor which piles the screened compost away from the screen. Oversized undecomposed materials or inert contaminants fall out of the lower end of the screen into a pile. Depending of the level of contamination, this larger fraction can be disposed of if it is highly contaminated. If contamination is low, the oversized materials, mostly undecomposted wood chip can be either reused in new batch of compost as an innoculant and structural material to add porosity or sold as a landscaping mulch. The level of the cylinder and the speed of rotation can be adjusted to facilitate movement of composted materials through the screen.

Once the compost is screened, it can be stored until it is used by the County or sold to customers. It can also be blended with other materials to make topsoil, potting mixes, custom growing mixes or organic fertilizer. These can be bagged or sold in bulk form.

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Procedure for Recording Leachate Removed	**Procedure No.:** 018
Version Number: 001	**Date of Revision:** 20/05/04
Authorised Signature:	
Date:	

Purpose: To ensure that accurate information is available on the amount of leachate being removed from the facility.

Person Responsible: Landfill Manager

Procedure:

A written record shall be kept for each consignment of leachate removed from the facility. The record shall contain the following:-

- The name of the carrier,
- The date and time of removal of leachate from the facility.
- The volume of leachate, in cubic metres, removed from the facility on each occasion.
- The name and address of the WWTP to which the leachate was transported; and
- Any incidents of spillages of leachate during its removal or transportation.

Leachate Consignments Register

Date and time of removal of leachate from Pollboy landfill:
Name of the carrier of the leachate:
Volume of leachate, in cubic metres, removed from Poolboy landfill:
Name and address of the Waste Water Treatment Plant to which the leachate was transported:
Any incidents or spillages of leachate during its removal or transportation:
Consignment logged by:

Pollboy Landfill Waste Licence 27-2	
Procedure Name: Procedure for Maintenance Records	**Procedure No.:** 019
Version Number: 001	**Date of Revision:** 20/05/04
Authorised Signature:	
Date:	

Purpose: To ensure for appropriate operation of the facility.

Person Responsible: Landfill Manager

Procedure:

1. All treatment/abatement and emission control equipment shall be calibrated and maintained, in accordance with the instructions issued by the manufacturer/supplier or installer. Written records of the calibrations and maintenance shall be made and kept by the licensee.

2. The wheel-wash shall be inspected on a daily basis and drained as required. Silt, stones and other accumulated material shall be removed as required from the wheel-wash and disposed of at the working face.

3. The oil separator should be inspected weekly and desludged as appropriate to a licensed facility for this type of waste.

4. Written records shall be kept for inspections and maintenance of the wheel-wash and oil separator.

RECORD OF WHEEL-WASH INSPECTION AND MAINTENANCE

Date & Time of Daily Inspection	Date & Time Desludging	Checked by	Comments

RECORD OF OIL SEPARATOR INSPECTION AND MAINTENANCE

Date & Time of weekly Inspection	Date & Time Desludging	Checked by	Name of Licensed Facility for Treatment

RECORD OF CALIBRATION

Item calibrated:

Date of calibration:

Calibrated by:

Certification of calibration enclosed:

Comments:

Frequency of calibration required:

Next calibration due on:

Person responsible for upkeep of register:

Appendix M

AER/PRTR Emissions DATA 2012

Environmental Protection Agency

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.15

REFERENCE YEAR	2012

1. FACILITY IDENTIFICATION

Parent Company Name	Ballinasloe Town Council
Facility Name	Pollboy Landfill Facility
PRTR Identification Number	W0027
Licence Number	W0027-02

Waste or IPPC Classes of Activity

No.	class_name
3.5	Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment.
3.11	Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule.
3.13	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.
3.4	Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons.
3.6	Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1. to 10. of this Schedule.
3.7	##
4.10	The treatment of any waste on land with a consequential benefit for an agricultural activity or ecological system.
4.11	Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.
4.12	Exchange of waste for submission to any activity referred to in a preceding paragraph of this Schedule.
4.13	Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.
4.2	Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).
4.3	Recycling or reclamation of metals and metal compounds.
4.4	Recycling or reclamation of other inorganic materials.
4.9	Use of any waste principally as a fuel or other means to generate energy.

Address 1	Pollboy
Address 2	Ballinasloe
Address 3	Co. Galway
Address 4	
	Galway
Country	Ireland
Coordinates of Location	-8.22343 53.3127
River Basin District	IEGBNISH
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	Kevin Mulrennan
AER Returns Contact Email Address	kmulrennan@galwaycoco.ie
AER Returns Contact Position	Facility Manager
AER Returns Contact Telephone Number	09096 42884/ 087 2909379
AER Returns Contact Mobile Phone Number	087 9178078
AER Returns Contact Fax Number	
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	1
User Feedback/Comments	
Web Address	

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
5(d)	Landfills
5(c)	Installations for the disposal of non-hazardous waste
50.1	General

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	No
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4. WASTE IMPORTED/ACCEPTED ONTO SITE Guidance on waste imported/accepted onto site

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	

This question is only applicable if you are an IPPC or Quarry site

4.1 RELEASES TO AIR

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
01	Methane (CH4)	C	OTH	GASSIM & on-Site Data	890565.0	890565.0	0.0	0.0
02	**Carbon monoxide (CO)**	C	OTH	GASSIM	1619.58575625	1619.58575625	0.0	0.0
03	Carbon dioxide (CO2)	C	OTH	GASSIM	1435920.393375	1435920.393375	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

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					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 C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					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) flare 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: Pollboy Landfill Facility

Please enter summary data on the quantities of methane flared and / or utilised	**T (Total) kg/Year**	**M/C/E**	**Method Used**		**Facility Total Capacity m3 per hour**	
			Method Code	**Designation or Description**		
Total estimated methane generation (as per site model)	1388625.6078	C	OTH	GASSIM	N/A	
Methane flared	498061.0	C	OTH	FROM LANDFILL GAS SUR	2050.0	(Total Flaring Capacity)
Methane utilised in engine/s					0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	890564.6078	C	OTH	GENERATED - FLARED = E	N/A	

4.4 RELEASES TO LAND

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					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)

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

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

4.3 RELEASES TO WASTEWATER OR SEWER

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					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 POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					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

4.2 RELEASES TO WATERS

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as th

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					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

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					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 C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					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

Please enter all quantities on this sheet in Tonnes

						Method Used						
Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	M/C/E	Method Used	Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address 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)
Within the Country	13 02 08	Yes	3.06	other engine, gear and lubricating oils	R9	M	Weighed	Offsite in Ireland	Enva Ireland,W0184-01	Portlaoise,.,Co. Laois,.,Ireland	Enva Ireland,W0184-01,Portlaoise,.,Co. Laois,.,Ireland	Portlaoise,.,Co. Laois,.,Ireland
Within the Country	15 01 02	No	0.27	polystyrene	D5	M	Weighed	Offsite in Ireland	Barna Waste,W0106-02	Carrowbrowne,Headford Road,Galway,".",Ireland		
Within the Country	20 03 01	No	7.58	matresses	D5	M	Weighed	Offsite in Ireland	Barna Waste,W0106-02	Carrowbrowne,Headford Road,Galway,".",Ireland		
Within the Country	16 01 07	Yes	0.66	oil filters	R4	M	Weighed	Offsite in Ireland	Enva Ireland,W0184-01	Portlaoise,.,Co. Laois,.,Ireland	Enva Ireland,W0184-01,Portlaoise,.,Co. Laois,.,Ireland	Portlaoise,.,Co. Laois,.,Ireland
Within the Country	20 01 35	Yes	26.619	Television and computer monitors	R4	M	Weighed	Offsite in Ireland	KMK Metals Recycling,W0113/03	Cappincur,Tullamore,Co. Offaly,".",Ireland	WEEE Ireland,.,Suite 18,The Mall Beacon Court,Dublin 18,.,Ireland	Suite 18,The Mall Beacon Court,Dublin 18,.,Ireland
Within the Country	20 01 23	Yes	17.073	discarded equipment containing chlorofluorocarbons	R4	M	Weighed	Offsite in Ireland	KMK Metals Recycling,W0113/03	Cappincur,Tullamore,Co. Offaly,".",Ireland	WEEE Ireland,.,Suite 18,The Mall Beacon Court,Dublin 18,.,Ireland	Suite 18,The Mall Beacon Court,Dublin 18,.,Ireland
Within the Country	20 01 36	No	21.045	Television and computer monitors	R4	M	Weighed	Offsite in Ireland	KMK Metals Recycling,W0113/03	Cappincur,Tullamore,Co. Offaly,".",Ireland	".",.,.,.,.,.,.	.,.,.,.,.
Within the Country	20 01 21	Yes	0.461	fluorescent tubes and other mercury-containing waste	R4	M	Weighed	Offsite in Ireland	KMK Metals Recycling,W0113/03	Cappincur,Tullamore,Co. Offaly,".",Ireland	WEEE Ireland,.,Suite 18,The Mall Beacon Court,Dublin 18,.,Ireland	Suite 18,The Mall Beacon Court,Dublin 18,.,Ireland
Within the Country	16 06 04	No	0.937	portable batteries and farm fence batteries (except 16 06 03)	R4	M	Weighed	Offsite in Ireland	KMK Metals Recycling,W0113/03	Cappincur,Tullamore,Co. Offaly,".",Ireland		
Within the Country	17 04 05	No	15.94	iron and steel	R4	M	Weighed	Offsite in Ireland	Galway Metal Co. Ltd.,WR-05	Oranmore,.,Co. Galway,.,Ireland		
Within the Country	20 01 27	Yes	8.547	paint, inks, adhesives and resins containing dangerous substances	D10	M	Weighed	Offsite in Ireland	Indaver,Collector	Rathcoole,.,Dublin,.,Ireland	".",.,.,.,.,.,.	.,.,.,.,.
To Other Countries	20 01 27	Yes	2.39	paint, inks, adhesives and resins containing dangerous substances	R1	M	Weighed	Abroad	Indaver,Collector	Rathcoole,.,Dublin,.,Ireland	".",.,.,.,.,.,.	.,.,.,.,.
Within the Country	**15 01 04**	**No**	0.715	metallic packaging	R4	M	Weighed	Offsite in Ireland	Rehab Glass Co,WFP-KE-080957-01	Site 4,Osberstown Business Park,Naas,Co. Kildare,Ireland	Abroad (Commercially Sensitive),".",".",".",".",".",".",".",".",".","."	".",".",".",".",".",".",".","."
Within the Country	16 06 01	Yes	0.367	lead batteries	R13	M	Weighed	Offsite in Ireland	Rialta Environmental Ltd.,W0192-03	Greenogue Business Park,Rathcoole,Co. Dublin,.,Ireland	".",.,.,.,.,.,.	.,.,.,.,.
Within the Country	16 06 04	No	0.019	alkaline batteries (except 16 06 03)	R13	M	Weighed	Offsite in Ireland	Rialta Environmental Ltd.,W0192-03	Greenogue Business Park,Rathcoole,Co. Dublin,.,Ireland		
Within the Country	19 12 05	No	8.68	glass	R5	M	Weighed	Offsite in Ireland	MSM Recycling,"."	Annagh,Birr,Co. Offaly,".",Ireland		
Within the Country	20 01 10	No	0.43	clothes	R4	M	Weighed	Offsite in Ireland	Textile Recycling Ltd.,WCP-DC-08-1225-01	Glen Abbey Complex,Belgard Road,Tallaght Dublin,.,Ireland		
Within the Country	15 01 07	No	6.4	glass packaging	R4	M	Weighed	Offsite in Ireland	Rehab Glass Co,WFP-KE-080957-01	Site 4,Osberstown Business Park,Naas,Co. Kildare,Ireland		
Within the Country	20 01 35	Yes	22.021	Small domestic appliances	R4	M	Weighed	Offsite in Ireland	KMK Metals Recycling,W0113/03	Cappincur,Tullamore,Co. Offaly,".",Ireland	WEEE Ireland,.,Suite 18,The Mall Beacon Court,Dublin 18,.,Ireland	Suite 18,The Mall Beacon Court,Dublin 18,.,Ireland