



Ballinasloe Town Council
Comhairle Bhaile Béal Atha na Slua

POLLBOY LANDFILL FACILITY

ANNUAL ENVIRONMENTAL REPORT FOR 2009

January 2010

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Environment Section
Galway County Council

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1 REPORTING PERIOD

The reporting period is from the 1st January 2009 to the 31st December 2009

The Waste Licence for this site for the period 1st January 2009 to 31st December 2009 was Waste Licence Reg. No. W0027-02. This landfill facility closed for acceptance of waste on 31st December 2005.

2 SITE DEVELOPMENT WORKS

2.1 PROPOSED DEVELOPMENT WORKS

The following works are proposed for 2010:

- Landfill and civic amenity facility landscaping works in accordance with Landscaping Specification
- Leachate Storage: Address the recommendations of the “Review and upgrading of Leachate Management Report (October 2008)” with regard to upgrading the leachate telemetry system and the provision of additional leachate storage capacity at the landfill.

3 WASTE ACTIVITIES CARRIED OUT AT THE FACILITY

Licensed Waste Disposal and Recovery Activities were carried out in accordance with the Third and Fourth Schedules of the Waste Management Act 1996 as per Part 1 Licensed Activities of Waste Licence W0027-02. The facility accepts waste on Tuesdays, Thursdays and Saturdays between 8.30am and 4.30pm.

4 QUANTITY AND COMPOSITION OF WASTE

Tables 4.1 below outlines the categories and quantities which may be accepted for disposal and for recovery under Waste Licence W0027-02.

Table 4.1: 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 4.2 provides details on the quantity and composition of waste that was accepted for recovery in 2009 at Pollboy Landfill Civic Amenity Facility.

Table 4.2: Waste Accepted at Civic Waste Facility for Recovery in 2009

EWC Code	Quantity (tonnes)	Description of waste	Hazardous waste. Y/N	Waste Treatment Operation
15 01 07	11.76	Glass Bottles and Jars	N	R13
20 01 02	6.82	Flat Glass	N	R13
15 01 04	1.12	Steel Cans	N	R13
20 01 40	69.94	Household Scrap Metal	N	R13
20 01 10	2.20	Clothes	N	R13
20 01 33	1.117	Small Batteries	Y	R6
16 06 01	8.674	Lead Acid Batteries	Y	R6
16 01 07	0.28	Oil Filters	Y	R12
20 01 27	8.747	Waste Paint	Y	D10
20 01 23	26.158	Fridges and Freezers	Y	R4
20 01 36	77.292	White Goods (Electrical and Electronic)	N	R4

EWC Code	Quantity (tonnes)	Description of waste	Hazardous waste. Y/N	Waste Treatment Operation
20 01 35	22.152	Televisions and PC Monitors	Y	R4
20 01 21	0.309	Fluorescent Tubes and Lighting	Y	D10
20 01 99	63.777	White Goods incl. washing machines, dryers, toasters, radios etc.	N	R4
13 07 03	0.414	Waste Oil	Y	R9
16 05 04	0.255	Waste aerosols/aerosol product	Y	D10

5 SUMMARY OF EMISSIONS AND MONITORING

Quarterly monitoring results for leachate, groundwater and surfacewater are contained in Appendix 5. A summary of emissions and monitoring during 2009 in accordance with the Waste licence is provided in the following sections.

5.1 NOISE

There were no noise surveys carried out during 2009, due to the closure of the landfill on the 31st December 2005. Noise was generated in the most part by compaction and placement machinery which are no longer operational.

5.2 DUST

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

5.3 LANDFILL GAS

5.3.1 Off Site Gas Migration

Migratory Boreholes

Appendix 1 (Drawing No. DG0001–04 F07) shows the locations of boreholes used to monitor off-site gas migration as well as the results obtained for gas emissions from these boreholes during 2009.

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

5.3.2 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.

5.2.3 Flare Emissions

No flare emissions monitoring was carried out during 2009.

5.4 LEACHATE

In 2009 three leachate sampling points were used for monitoring purposes; L14, CH1 and the leachate lagoon. In the second quarter a full suite of parameters was tested for at all three sampling points.

The samples taken at all leachate sample points were within the requirements as set out in Schedule C.5. of the Waste Licence W0027-02, with the exception of COD levels recorded at CH1 in Q3 of 2009. The level recorded here was 5,040 mg/l O₂ which exceeded the limit as set out under schedule C.5 of 3,000 mg/l O₂. However, the level recorded in the lagoon was only 462 mg/l O₂. The level recorded in CH1 in Q4 of 2009 was 2125 mg/l O₂ which were within the requirements as set out in Schedule C.5. of the Waste Licence W0027-02.

Appendix 2 shows the location of these sampling locations on drawing DG0001-07 F08.

5.5 SURFACE WATER

Appendix 3 (Drawing No. DG0001-05 F02) shows the positions of the seven surface water sampling locations (SW1, SW3 – SW7, SW8). These sampling points were chemically analysed by the EPA in each quarter of 2009. It should be noted that SW8 was not sampled in Q4 and SW7 was not sampled in Q1, Q2, Q3 and Q4.

During 2009 surface water samples could not be taken at location SW7 as this location had very little flow / was flooded due to a blocked drain as a result of the N6 roadworks. This monitoring location is behind the civic amenity site. This drain is now unblocked and flowing freely.

The highest results achieved for ammonia, during 2009, were at SW1 and SW6 which are both located downstream of the landfill. The water quality at these locations is comparable with A2 quality waters under the surface water regulations, 1989. The remaining monitoring locations all showed very low concentrations of ammonia for all sampling periods.

These samples were analysed for metals and volatile organic carbons (voc's) on one sampling occasion. SW1, SW4, SW5 and SW8 exceeded the limit set out for iron in S.I. 278 of 2007. SW1 and SW8 exceeded the limit set out for manganese in S.I. 278 of 2007. SW5 and SW8 exceeded the limit set out for copper in S.I. 278 of 2007. These results can be explained because of the sample points close proximity to the waste mass.

Ammonia (mg/l N) recorded for surface water samples taken at Pollboy landfill during 2009				
Monitoring Location	Date			
	1 st Quarter	2 nd Quarter	3 rd Quarter	4 th Quarter
SW1	0.32	2.1	0.03	1.6
SW3	0.06	0.04	0.03	0.04
SW4	0.05	0.03	0.03	0.04
SW5	0.06	0.03	0.03	0.05
SW6	0.86	0.29	0.03	0.62
SW7				
SW8	0.11	0.13	0.27	

Figure 5.1 shows the ammonia levels in the surface water sampling points for 2009

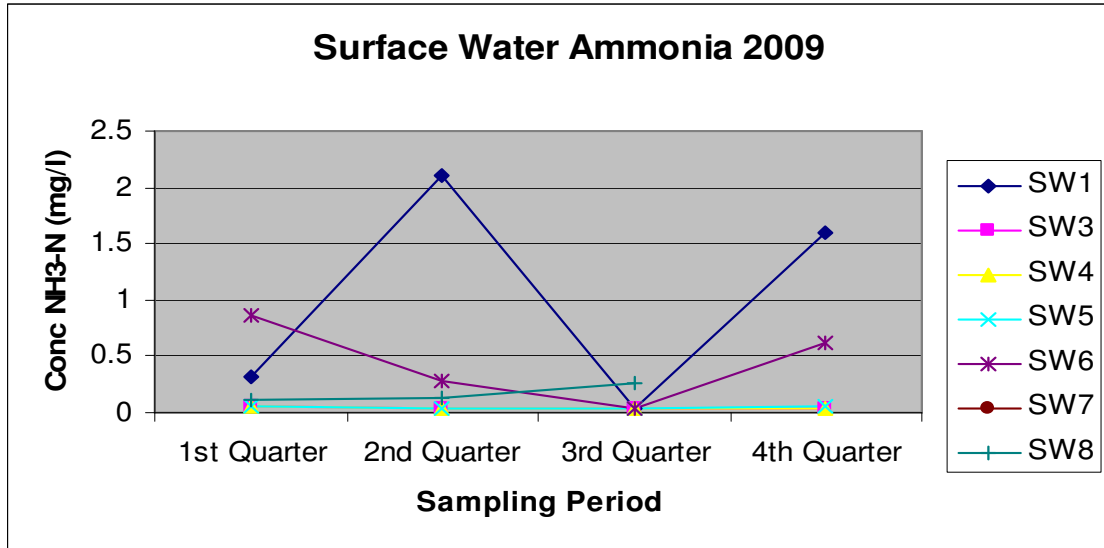


Figure 5.1

5.6 GROUNDWATER

Appendix 4 (Drawing No. DG0001-01 F08) shows the positions of groundwater sampling locations. Sampling and analysis was carried out during the year by the EPA.

During 2009 groundwater samples could not be taken at location 8AP due to this borehole being blocked and MW3 could not be found for Q3 and Q4.

The highest concentration of ammonia in all 4 quarters was achieved at borehole 2AP which is located in the vicinity of the landfill. Elevated results for ammonia were also reached at MW1, MW6 and RC3. MW6 and RC3 are also located in the vicinity of the landfill. MW1 is located upstream of the landfill and the high result for ammonia may be due to other sources than the closed landfill. The concentrations of ammonia at all remaining boreholes are significantly reduced but are still above that expected of clean drinking water.

These samples were analysed for metals and volatile organic carbons (voc's) on one sampling occasion. The results showed elevated concentrations of iron, zinc and copper at all locations especially at MW6. The results showed elevated concentrations of manganese at all locations except at RC2. The results showed elevated concentrations of iron at all locations especially at MW6.

Overall the results show that there is still some level of localised pollution at this landfill.

Ammonia (mg/l N) recorded for groundwater samples taken at Pollboy landfill during 2009				
Monitoring Location	Date			
	1 st Quarter	2 nd Quarter	3 rd Quarter	4 th Quarter
MW1	7.3	7.3	6.9	7.8
MW2	0.14	2	0.91	0.76
MW3	3.3	3.5		
MW6	8.1	8	7.8	7.9
8A	1.4	1.3	4.1	14
8AP				
RC2	1.3	1.4	0.97	1.8
RC3	7.9	9.2	8.2	8.4
2AP	24	19	18	13

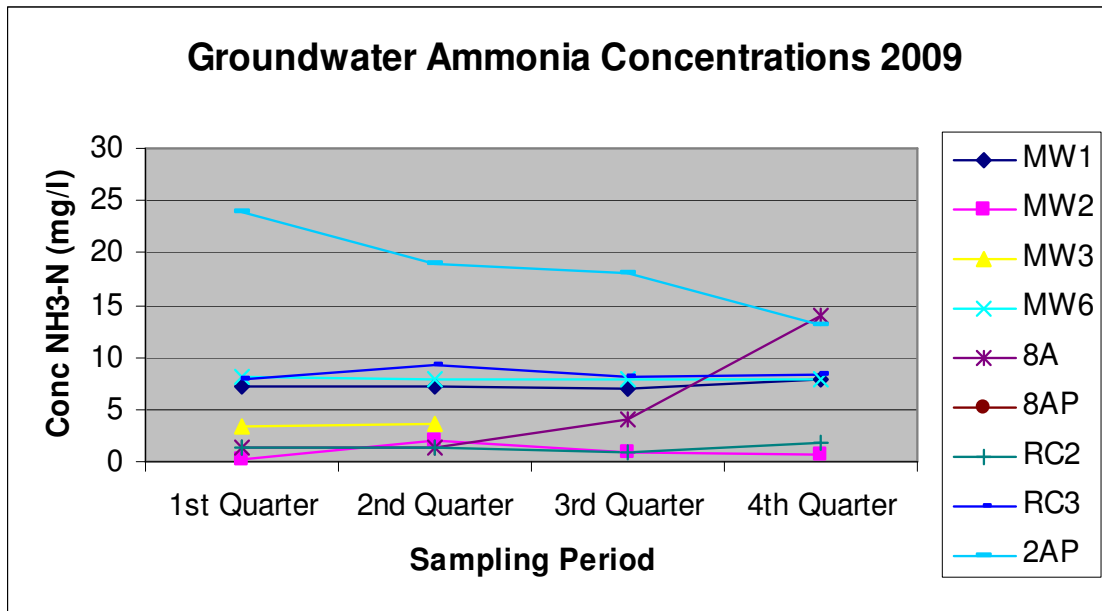


Figure 5.2

5.7 METEOROLOGICAL DATA

No meteorological data was recorded at the site during 2009. Meteorological data for 2009 from the nearest weather station, Birr, Co. Offaly (January to August), and Gurteen (August to December) is attached in Appendix 6. Gurteen has replaced Birr as the nearest synoptic station.

6 RESOURCE AND ENERGY CONSUMPTION SUMMARY

30,948 kWh of electricity were used at the landfill during 2009.

7 LEACHATE VOLUMES PRODUCED AND TRANSPORTED OFF SITE

The following table shows the quantities of leachate pumped off-site to Ballinasloe Waste Water Treatment Plant during 2009.

Table 4.3: Quantity of Leachate Discharged via Rising Main to WWTP

Month	Quantity of leachate discharged (m ³)
January	923
February	1,257
March	1,511
April	734
May	414
June	498
July	1,407
August	904
September	901
October	923
November	1,059
December	1,706
Total Volume	12,237

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 8, was carried out in October 2009.

10 QUANTITY OF LANDFILL 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 6m³ 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 5.3: Total Bulk Landfill Gas 1998 to 2035 at the 50th Percentile

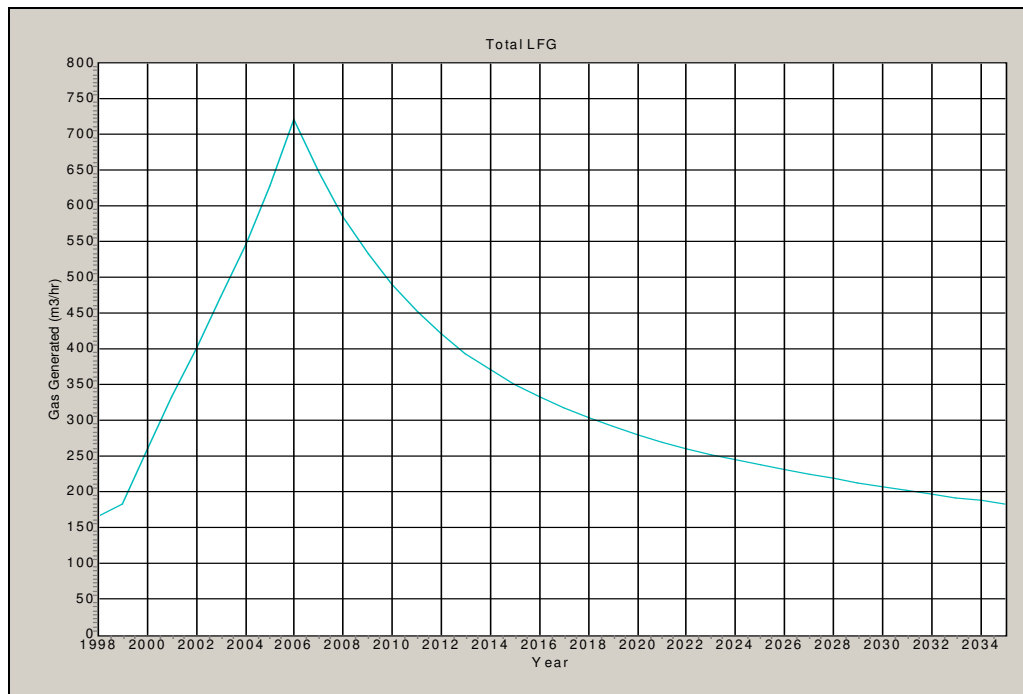
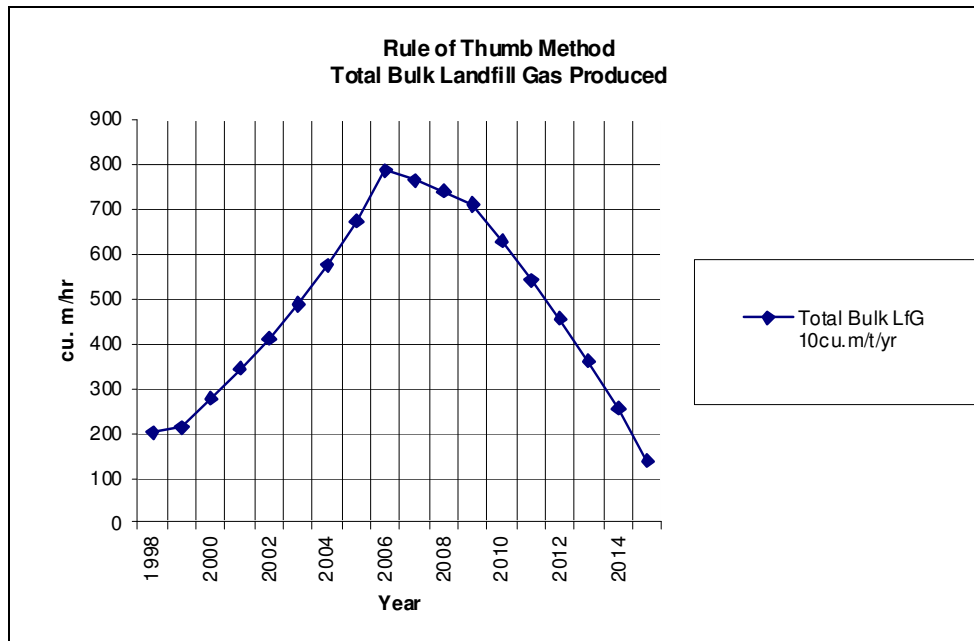


Figure 5.4: Estimation of Landfill Gas Potential using Rule of Thumb Method, 1998-2015



For 2009, a generation rate of 530 m³/hr of landfill gas was estimated using the GasSim Model and 720 m³/hr was estimated using the Rule of Thumb method.

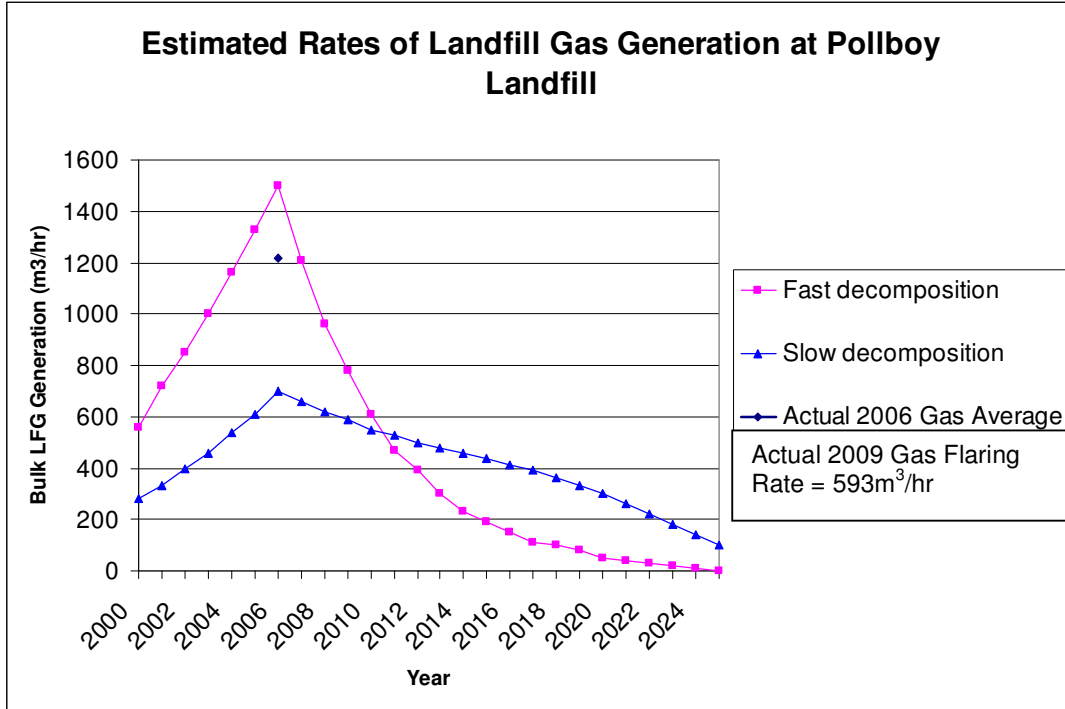
The above results are theoretical rates of landfill gas production and should be viewed with caution. Some models can over predict the quantities of gas to be generated while others can underestimate.

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 2009 could vary between 585 and 785 m³/hr.

Based on monitoring results, the mean volume of gas flared at the facility for 2009 was as follows:

- 292m³/hr in the old landfill cell
- 301m³/hr in Cell 1

Figure 5.5: Estimated Rates of Landfill Gas Generation at Pollboy Landfill



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 7.

12 ENVIRONMENTAL MANAGEMENT

12.1 REVIEW OF OBJECTIVES AND TARGETS SET OUT FOR 2009

Objective 1: Restoration and Aftercare of the Landfill (Landscaping)

Reason for Undertaking Project: To protect the surrounding environment and integrate the site with the surrounding landscape.

Target: To complete landscaping works in accordance with Restoration Plan

Responsibility: Ballinasloe Town Council was responsible for the implementation of this project.

Progress: A landscaping specification was prepared in October 2008. Landscaping/planting is proposed to be carried out in Spring 2010.

Objective 2: Landfill Gas Management

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

Target: To install / replace redundant landfill gas boreholes where required

Summary: Wells providing low/no gas to the system will be disconnected and new wells will be installed.

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

Progress: No new gas wells were installed during the year.

12.2 SCHEDULE OF OBJECTIVES AND TARGETS FOR 2010

Objective 1: Restoration and Aftercare of the Landfill

Reason for Undertaking Project: To protect the surrounding environment and integrate the site with the surrounding landscape.

Target: To ensure completion of topsoiling and landscaping works

Responsibility: Ballinasloe Town Council is responsible for the implementation of this project.

Timescale: The topsoiling and landscaping works will be carried out in Spring/early Summer to coincide with the best season for planting

Objective 2: Landfill Gas Management

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

Target: To install / replace redundant landfill gas boreholes where required

Summary: Wells providing low/no gas to the system will be disconnected and new wells will be installed.

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

Timescale: The installation of new gas wells will be carried out during the year as the need for additional wells is identified.

Objective 3: Leachate Management Upgrade

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

Target: Carry out extensive leachate sampling, explore additional storage capacity options and upgrade telemetry system to reduce pumping, operational and staff overtime costs

Summary:**1) Leachate Sampling**

Extensive sampling of leachate from CH1, CH2, CH6 and the leachate lagoon was undertaken throughout the Summer of 2009. WWTP influent and effluent was to be carried out in November 2009 in order to provide an accurate picture of leachate loadings to the plant and their impact on the WWTP's treatment process. This sampling was delayed before Christmas due to severe flooding but was begun in January 2010. This sampling is required for the treatment process modelling at the WWTP. This process is necessary to determine the optimum treatment regime and to allow recommendations to be made with regard to additional storage and pre-treatment options.

2) Additional Leachate Storage

Additional leachate storage is required for the contaminated groundwater currently being collected and pumped from the leachate interceptor drain around the perimeter of the old landfill cell.

Options for providing additional leachate storage capacity at the landfill to be explored.

3) Telemetry

Existing telemetry system to be upgraded to reduce pumping, operational and staff overtime costs.

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

Timescale: Leachate sampling at the lagoon was carried out during April – September 2009. Additional sampling at the WWTP was delayed before Christmas due to flooding but was begun in January 2010. Treatment Process modelling at the WWTP will begin in February 2010 and will take approximately three weeks to complete. Proposals for telemetry upgrade and additional storage to be based on these sampling results and treatment process modelling.

13 SUMMARIES OF REPORTED INCIDENTS & COMPLAINTS

There were no complaints registered with the landfill in 2009. All incidents at the landfill concerned emission limit exceedences which are summarised in Section 5.

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 two flares for gas management and control.
- Reinstatement of gas management system on old landfill.

14.2 VERMIN

ISS (Pest Control), Letterkenny are contracted to control the vermin on the site. ISS carry out a program of monitoring and control at the facility. 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.

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

A total of €18 million (ex. VAT) has been set aside for the 30 year restoration and aftercare of Pollboy Landfill from 2005 onwards.

Landfill Expenditure in 2009 was €448,159. Operating Costs for the Civic Amenity Facility in 2009 were €88,864.

16 MANAGEMENT STRUCTURE

The management structure at Pollboy Landfill is as follows:

Ms. Máire Ní Chionna: Senior Engineer, Environment Section, Galway County Council, with overall responsibility for management of the Pollboy Landfill Facility.

Mr. Kevin Mulrennan: Kevin Mulrennan, Environment Section, Galway County Council commenced managing operations at Pollboy landfill in July 2009. Mr. Barry Cormican was Acting landfill Manager during the first half of the reporting period (Jan-June 2009).

17 PROGRAMME FOR PUBLIC INFORMATION

The Communication Procedure outlines the programme for public 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.

The Council will also ensure that 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.

Appendix 1

Drawing of Location of Gas Migration Boreholes and Landfill Gas Emissions from Boreholes

Appendix 2

Drawing of Leachate Monitoring Points

Appendix 3

Drawing of Surface Water Monitoring Points

Appendix 4

Drawing of Groundwater Monitoring Points

Appendix 5

Quarterly Monitoring Results for Leachate, Surface water and Groundwater

First Quarter Results (Q1)

Second Quarter Results (Q2)

Third Quarter Results (Q3)

Fourth Quarter Results (Q4)

Appendix 6
2009 Meteorological Data from Birr and Gurteen
Weather Station

Appendix 7

Water Balance Calculation

Appendix 8

Topographical Survey