Wexford County Council

Killurin Landfill
W0016-02

Annual Environmental Report 2009

Quality Control Sheet

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Address:	Wexford County Council County Hall, Wexford. Daniel McCartan, Facility Manager Tel 053-9120922 Mob 087-1236027 Email daniel.mccartan@wexfordcoco.ie

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Kill16-02_EPA_2009 AER	1	Compliance with Waste Licence W0016-02	Fintan Ryan Facility Engineer Fran Hobbs Facility Technician	Daniel McCartan, Senior Executive Engineer, Facility Manager

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EXECUTIVE SUMMARY

This *Annual Environmental Report* has been prepared for Killurin Landfill, Waste Licence 16-2, for the reporting period from **1 January 2009 to 31 December 2009 inclusive**. The report includes the information specified in Schedule G of the Waste Licence, Content of the Annual Environmental Report, in accordance with Waste Licensing - *Draft Guidance on Environmental Management Systems (EMS) and Reporting to the Agency, 1999'.* The main topics discussed with this report are as follows:

- General Site Information
- Management and Staffing
- Reported Incidents and Complaints
- Development Works
- Waste Acceptance and Handling
- Emissions Management
- Environmental Nuisances
- Resource and Energy Consumption
- Environmental Monitoring and Emissions

Killurin Landfill was closed to accepting waste on the 07 June 2008. No waste was accepted to landfill in 2009.

Wexford County Council continued to carry out a comprehensive environmental monitoring programme during 2009, in compliance with the waste licence conditions (Schedule D), to assess the significance of emissions. The monitoring programme included Landfill Gas, Leachate Level & Quality, Surface Water Quality, Groundwater Level & Quality, Odour monitoring and Meteorological monitoring as well as Topographical.

1 INTRODUCTION

1.1 General Information

The Annual Environmental Report (AER) for Killurin Landfill includes the information specified in Schedule G of the Waste Licence 16-2, *Content of Annual Environmental Report* and has been prepared in accordance with the Environmental Protection Agency (EPA) publication *'Waste Licensing – Draft Guidance on Environmental Management Systems (EMS) and Reporting to the Agency, 1999'.*

The reporting period for this AER is **1 January 2009 to 31 December 2009 inclusive**.

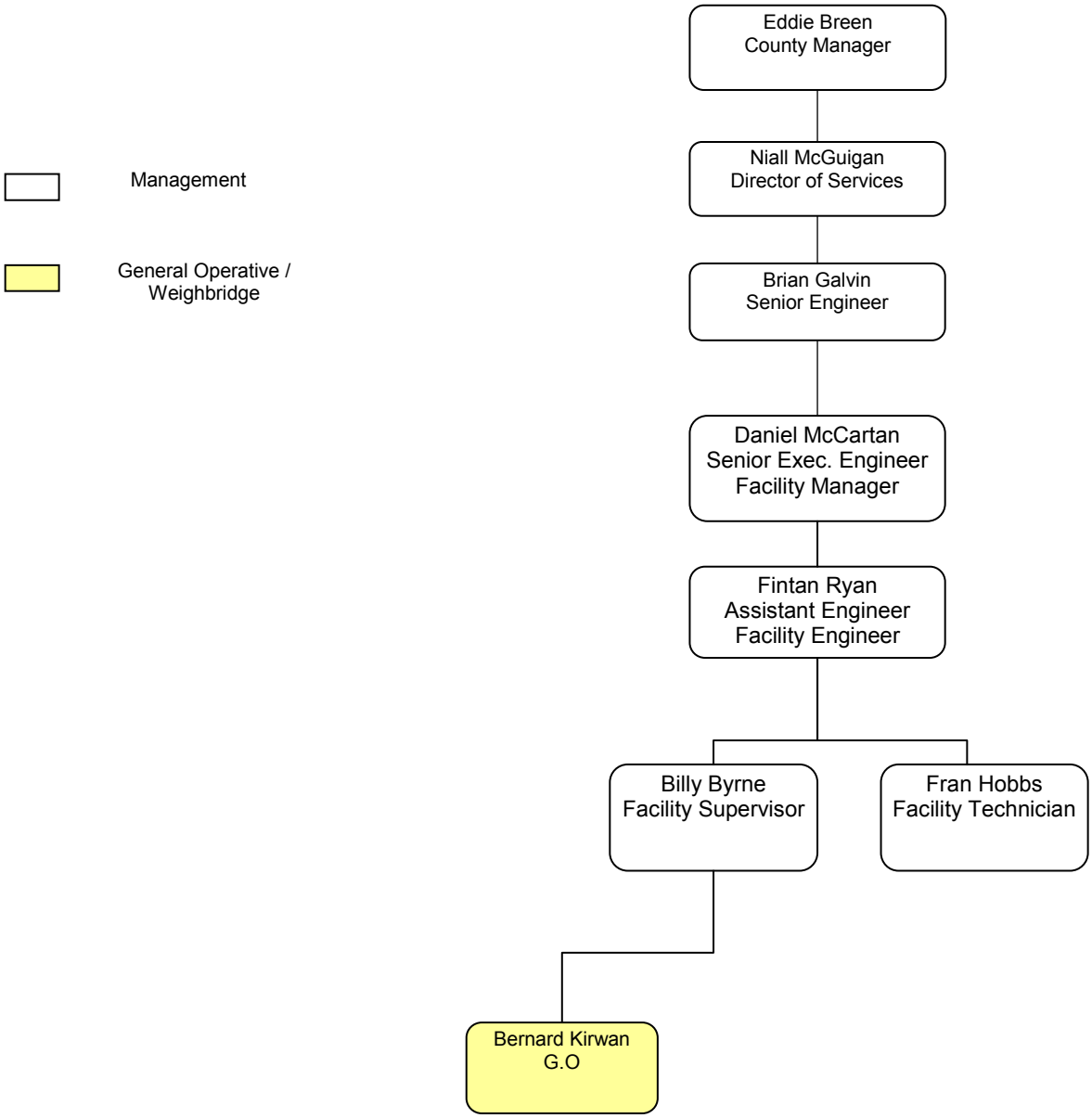
1.2 Site information

Table 1 Site information for Killurin Landfill

KILLURIN LANDFILL	
Waste licence register no:	16-2
Name and address of operator:	Wexford County Council County Hall Spawell Road County Wexford
Name and address of facility:	Killurin Landfill Killurin County Wexford
Site Description:	Killurin Landfill site is located in the town land of Newtown lower, Killurin, close to Deeps Bridge on a meander of the eastern bank of the River Slaney. The site is approximately 11km from Wexford town and covers an area of 10.7 hectares, of which 4.9 hectares are landfill and the remainder is CA site, buildings, car parking and buffer zones/screening. The facility is located in what once was a sand and gravel quarry. The area surrounding the site is rural with a mixed pattern of highly productive pasture and arable land use, with the River Slaney being the prominent landscape feature. Landfilling and CA site operations ceased in June 2008.

2 MANAGEMENT & STAFFING STRUCTURE

2.1 Management and staffing structure for Killurin Landfill 2009



The Killurin Landfill was operated by Wexford County Council during 2009 with consultancy support provided by sub consultants including Fehily Timoney & Company, Irish Biotech Services and Enviros Consulting.

2.2 Financial provisions

In accordance with Condition 12.1 Wexford County Council paid a sum of €25,154 to the Environmental Protection Agency for the management and monitoring of the waste licence.

2.2.1 *Provision for the Closure, Restoration and Aftercare*

Wexford County Council (WCC), as a Local Authority, has made the necessary provisions, for the development, management, restoration and aftercare of Killurin Landfill. WCC has assigned engineering and technical staff to manage the facility. Wexford County Council is committed to the ongoing provision of funding for all site development works, environmental monitoring costs and restoration and aftercare works at Killurin Landfill for the duration of the Waste Licence.

2.3 Environmental Management System

2.3.1 *Environmental Management Programme*

The site has an operational environmental management system (EMS) in accordance with the Waste Licence condition 2.3.2.2. Implementation of the EMS continued during this reporting period (January 2009 - December 2009). The Objectives and Targets of the EMS were reviewed and revised for the reporting period 2009.

2.3.2 *Environmental objectives and targets.*

Table 2 below provides the Objectives and Targets for 2009 and details progress made regarding each objective. Table 3 provides the Objectives and Targets for 2010 and the methods by which they will be achieved.

An environmental management plan (EMP) was prepared as part of the EMS for the facility. The EMP comprises information on the following topics:

- Site description
- Site infrastructure
- Types of waste accepted on site
- Civic amenity site
- Leachate Collection and treatment Leachate Management System
- Landfill Gas Abatement Methods
- Surface water Control Measures
- Environmental Monitoring
- Site Security and Site Offices
- Operational Matters
- Noise and dust abatement

- Vermin and litter control
- Fires
- Restoration and Aftercare

2.3.3 *Corrective action Procedure*

Procedures are in place in accordance with Condition 2.3.2.3 of the licence to monitor, measure, audit and record the environmental performance of the environmental management system. These procedures establish how non-conformance within the system is dealt with and how any corrective and preventive action is carried out. A corrective action procedure was prepared in October 2008 and included in the overall EMS report.

2.3.4 *Awareness and Training Programme*

In accordance with Condition 2.3.2.4 of the licence, an awareness and training programme has been developed to increase environmental awareness among staff and identify training needs of all personnel working at Killurin Landfill. The facility manager has overall responsibility for reviewing training needs on an annual basis to ensure that all staff have the necessary skills and level of awareness to carry out their duties to the highest environmental and safety standards. Training records are kept on file at Holmestown Waste Management Facility.

Table 2 **Achievements of Objectives and Targets for 2009**

Achievements of Objectives and Targets for 2009			
Objective	Comments	Target	Progress
Objective No 1: To maintain a documented EMS			
1.1 Review existing EMS annually	Ensure that annual modifications, omissions or deletions are incorporated into the EMS and agreed for inclusion into the AER No new procedures were developed in 2009	2009	Complete
Objective No 2: To maintain a system for the notification of incidents and improve record keeping methods used at the facility			
2.1 Improve current site record keeping and performance of site procedures including documentation of reviews.	Review existing filing system and record storage for the facility, in particular the retention of records for historical review of the facilities environmental performance. This will include for the archiving of files related to the sites' operations, communications and compliance of the waste licence at any time.	2009	Complete for 2009. Work is ongoing
Objective No 3: To maintain the current site infrastructure			
3.1 Ensure ongoing maintenance of the following site infrastructure: Site security; Roads; Weighbridge; Fuel storage; Surface water drains; Site offices and plant shed; Landfill gas extraction system; Leachate extraction system; Scrap metal area.	All of the items of existing infrastructure are being maintained as required and in accordance with suppliers/manufacturers instructions where applicable.	2009	Complete for 2009. Maintenance Ongoing
Objective No 4: To control emissions from the facility			
4.1 Assess and submit a proposal on the	Assess the control of surface water from	2009	Complete

Achievements of Objectives and Targets for 2009			
Objective	Comments	Target	Progress
management of surface water at the facility	areas along the western and north-western boundary and its discharge through agreed points from the site.		
4.2 Assess current leachate extraction system to determine a schedule of maintenance and improvement to optimise the amounts of leachate removed for treatment from the facility	Create a structured approach to the monitoring and performance of the leachate extraction system to include a schedule for servicing of pumps, compressors, air and leachate lines. The assessment of the system should provide increased leachate removal, additional control of leachate migration and preventative measures against failure of the system and additional protection against potential pollution sources.	2009	Incomplete 2009. Additional infrastructure required. Review is ongoing
4.3 Re-assess the potential for utilisation of landfill gas at the facility.	Irish Biotech Systems carried out a re-assessment of the facility in 2009. It was deemed that the utilisation of the landfill gas is not viable.	2009	Complete
Objective No 5: To provide for the restoration and aftercare of the facility			
5.1 Update the Restoration and Aftercare Plan for the facility in 2009	This will include a schedule of site inspections for routine maintenance of site infrastructure, monitoring of emissions, pollution control framework and slope stability.	2009	Incomplete 2009. Additional infrastructure required. Review is ongoing
Objective No 6: To develop a system for the monitoring and measurement of emissions			
6.1 Collate all environmental monitoring of the landfill site by private contractors	Wexford County Council will review all monitoring by site staff, EPAs regional	2009	Complete

Achievements of Objectives and Targets for 2009			
Objective	Comments	Target	Progress
	laboratory and private monitoring contractors to ensure that all monitoring information gathered is in accordance with the licence. All monitoring has been completed but all monitoring contractors still operate on individual contracts, it is proposed to review this and implement a cover contract for any monitoring at the facility for one or two contractors.		
Objective No 7: To develop a post operational plan for the site			
7.1 Review options under consideration at present and prepare proposals.	Landscaping plan for fully capped landfill.	2009	Incomplete. Final proposal to be completed following final capping.
7.2 Move flare. Move flare from present position to facilitate ease of maintenance	Move flare from present position to facilitate ease of maintenance	2009	Complete. Flare to remain in current location.
7.3 Review Waste Licence,	Review of waste licence W0016/02, prepare submission for EPA by mid 2009.	July 2009	Incomplete
7.4 Complete capping works	Complete capping of landfill during 2009	Late 2009	Incomplete. Postponed till summer 2010 due to poor weather.
7.5 Leachate extraction system	Full service and replacement (& where necessary installation) of wells for		Ongoing

Achievements of Objectives and Targets for 2009			
Objective	Comments	Target	Progress
7.6 Gas extraction system	leachate extraction system Re-connect 3 wells in stage 5 & connect 2 new additional gas extraction wells.	2009	Incomplete. Contract postponed till capping complete. Existing system improved in interim.

Table 3 **Objectives and Targets for 2010**

Objectives and Targets for 2010			
	Comments	Target	Responsibility
Objective No 1: To maintain a documented EMS			
1.1 Review existing EMS annually	Ensure that annual modifications, omissions or deletions are incorporated into the EMS and agreed for inclusion into the AER	2010	Facility Manager
Objective No 2: To maintain a system for the notification of incidents and improve record keeping methods used at the facility			
2.1 Improve current site record keeping and performance of site procedures including documentation of procedure reviews due to the closure of the landfill	Review existing filing system and record storage for the facility, in particular the retention of records for historical review of the facilities environmental performance. This will include for the archiving of files related to the sites' operations, communications and compliance of the waste licence at any time.	2010	Facility Technician
Objective No 3: To maintain the current site infrastructure			
3.1 Ensure ongoing maintenance of the following site infrastructure: Site security; Roads; Surface Water drainage; Weighbridge; Fuel storage; Surface water drains; Site offices and plant shed; Landfill gas	All of the items of existing infrastructure are to be maintained as required and in accordance with suppliers/manufacturers instructions where applicable.	2010	Facility Technician

Objectives and Targets for 2010			
	Comments	Target	Responsibility
extraction system; Leachate extraction system; Scrap metal area.			
Objective No 4: To control emissions from the facility			
4.1 Assess current leachate extraction system to determine a schedule of maintenance and improvement to optimise the amounts of leachate removed for treatment from the facility	Create a structured approach to the monitoring and performance of the leachate extraction system to include a schedule for servicing of pumps, compressors, air and leachate lines. The assessment of the system should provide increased leachate removal, additional control of leachate migration and preventative measures against failure of the system and additional protection against potential pollution sources.	2010	Facility Engineer
Objective No 5: To provide for the restoration and aftercare of the facility			
5.1 Update the Restoration and Aftercare Plan for the facility	This will include a schedule of site inspections for routine maintenance of site infrastructure, monitoring of emissions, pollution control framework and slope stability .	2010	Facility Manager
Objective No 6: To develop a post operational plan for the site			
6.1 Review options under consideration at present and prepare proposals.	Landscaping plan for fully capped landfill.	2010	Facility Manager
6.2 Review Waste Licence,	Review of waste licence W0016/02	2010	Facility Technician
6.3 Complete capping works	Complete capping of landfill during 2010	Summer 2010	Facility Manager

Objectives and Targets for 2010			
	Comments	Target	Responsibility
6.4 Leachate extraction system	Full service and replacement (& where necessary installation) of wells for leachate extraction system	2010	Facility Manager
6.5 Gas extraction system	Review gas extraction wells and install new wells if required.	2010	Facility Manager

2.3.5 *Full title of any procedures developed by the licensee in the year which relates to the facility operation*

No additional procedures were developed or submitted during the reporting period.

2.3.6 *Report on communication programme*

The site's EMS includes a procedure for communication. In addition Wexford County Council provides the following documentation for public viewing at the site and at the Wexford County Hall:

Table 4 List of records available for public viewing in relation to the landfill

List of records available for public viewing
Waste Licence W0016-2
Waste Licence application
Correspondence with the EPA
Incident / complaints records
Audit records
Waste acceptance records
Recycled material removal log
Material acceptance dockets
All monitoring records
Surface water inspection forms
Leachate removal records
Weekly site log
Vermin control reports

3 REPORTED INCIDENTS & COMPLAINTS SUMMARIES

3.1 Incidents

No incidents were recorded during this reporting period.

3.2 Complaints

No complaints were received during this reporting period.

4 DEVELOPMENT WORKS UNDERTAKEN DURING THE REPORTING PERIOD & THOSE PROPOSED FOR THE COMING YEAR

4.1 Landfill Engineering Works

4.1.1 *Completed Engineering Works 2009*

No engineering works were carried out on site in 2009.

4.1.2 *Proposed Engineering Works 2010*

Proposed engineering works for 2010 are summarized as follows:

- Stage C5/2, comprising the final stage of installation of the capping system is due to be completed in September of 2010. An updated CQA report will be made available for viewing for that stage.

- Installation of multipurpose in-waste boreholes for gas/leachate extraction and monitoring.

4.2 Restoration and Aftercare

Several proposals for the end use of the site are currently being reviewed. It is envisaged that the review will be completed in 2010. A report will be submitted to the EPA for approval when the review is complete.

5 WASTE ACCEPTANCE & HANDLING

5.1 Waste Activities carried out at the Facility

No waste disposal operations took place on site at Killurin Landfill during the reporting period 1st for January 2009 to 31st December 2009. Scrap metal was stored on site from Holmestown before it was transported off-site.

5.2 Total quantity of wastes accepted on site

A summary of the total quantity of waste accepted at the facility for the reporting period 1st January to 31st December 2009 is presented below in table 5.

5.3 Total Quantity of Waste Consigned Off Site

A summary of the total quantity of waste consigned off site at Killurin Landfill for the period 1st January to 31st December 2009 is presented below in table 6.

The total volume of leachate sent off site for treatment at Enniscorthy Wastewater Treatment Works was 4890 tonnes.

Table 5 **Waste accepted to Killurin Landfill from 1st January 2009 to 31st December 2009 (tonnes)**

Waste In	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yearly totals
SCRAP METAL	40.3	19.6	21.1	27.9	26.2	12.7	20.8	25.4	19.8	13	11.7	16.3	254.81
DEAD DOGS	1.36	1.54	1.02	1.3	1.08	0.5	1.34	0.76	0.96	0.6	1.08	1.06	12.6
Monthly Total:	41.64	21.18	22.14	29.23	27.28	13.15	22.18	26.16	20.72	13.6	12.78	17.35	267.41

Table 6 **Waste consigned off-site from Killurin Landfill from 1st January to 31st December 2009 (tonnes)**

Waste Out	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yearly totals
SCRAP METAL	88.19	0	0	109	0	0	0	85	0	0	0	60.81	343
DEAD DOGS	1.36	1.54	1.02	1.3	1.08	0.5	1.34	0.76	0.96	0.6	1.08	1.06	12.6
LEACHATE	221	85	95	106	498	568	655	482	301	233	418	1228	4890
Monthly Total:	310.6	86.54	96.02	216.3	499.1	568.5	656.3	567.8	302	233.6	419.1	1290	5245.6

5.4 Remaining capacity of the site

Killurin Landfill closed in the end of June 2008. There is no space remaining in the landfill for deposition of waste.

6 ENVIRONMENTAL NUISANCES

6.1 Review of environmental nuisance control at the facility for the reporting period

Nuisances at Killurin Landfill are logged in a weekly tick-box report and action is taken immediately to address any identified issues. Table 7 below summarises the measures implemented on site to combat environmental nuisances during 2009.

Table 7 Environmental Nuisance Control during 2009

Nuisance	Mitigation Measures in Place
Vermin	Permanent bait points set up on site (internal and external). Inspections carried out on a monthly basis. If infection found then weekly inspections until rodent free. Monthly reports produced and kept at site office.
Litter	Killurin landfill was fully enclosed by a permanent clay capping layer in 2008. A comprehensive litter pick was completed on site and in the surrounding area in 2009.
Flies	Fly control has not been required since waste operations ceased.
Odour	No incidents

7 RESOURCE & ENERGY CONSUMPTION

7.1 Electricity and Energy Usage

The cost of electricity on site for 2009 was €33,398.04.

7.2 Water

Domestic water usage data was not recorded.

7.3 Diesel

Total diesel fuel consumption is estimated to be 2000 litres from 01 January to 31 December 2009.

8 ENVIRONMENTAL MONITORING & EMISSIONS SUMMARY

8.1 Summary report on emissions

A summary of emissions monitoring at Killurin Landfill carried out during this reporting period (January 2009 – December 2009) is contained in Table 8 below. The E-PRTR Regulation (EC) No. 166/2006 concerning the establishment of a European Pollutant Release and Transfer Register came into force in February 2006 and was brought into Irish law through SI No 123 of 2007. As a result all industries have to annually report environmental emissions and waste transfer data through a web-based form as part of their AER. The PRTR 2009 document is included in Appendix A1.

Table 8 **A summary of Emissions monitoring as specified in Waste Licence W0016-2**

Note 1: When specific engineering works are being carried out

Emission Monitoring	Frequency
Landfill Gas	Continuously (Dwellings adjacent to Landfill) Weekly (Site Accommodation) Monthly (Boreholes) Annual (Flare)
Leachate	Monthly (Borehole Level) Quarterly (Analysis) Annually (Analysis)
Surface water	Weekly (Visual) Quarterly (Analysis) Annually (Analysis)
Groundwater Levels	Monthly (Borehole Level)
Groundwater	Quarterly (Analysis) Annually (Analysis)
Noise	As required [Note 1] (10 Stations)
Dust	As required [Note 1] (3 Stations)
River Water	Quarterly (Quarterly)

8.2 Environmental Monitoring

Wexford County Council carries out a comprehensive environmental monitoring programme, in compliance with the waste licence conditions, to assess the significance of emissions. The monitoring programme includes Landfill Gas, Leachate Level & Quality, Surface Water Quality, Groundwater Level & Quality, Noise and Dust monitoring (as required), Odour monitoring and Meteorological monitoring, as well as Flare emission and Topographical.

Monitoring during this reporting period was carried out according to Schedule D of Waste Licence W0016-2. Quarters 1, 2, 3 and 4 of 2009 are summarised in this chapter. A monitoring point location plan is provided see figure 2.

8.2.1 *Landfill gas*

In accordance with Schedule D.1 of the Waste Licence W0016-2, the following monitoring has been carried out and reported to the Agency.

- Monitoring boreholes LB2, LB3, LB4, LB5, LB6, LB7, LB8, LB12, LB13, LB15, LB16 as specified in the licence.
- Perimeter boreholes T1, T2, T3, T5, T6, T7, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19 and T20 were monitored on a monthly basis by Wexford County Council site staff.

The majority of boreholes have varying levels of gas quality over the reporting period and no particular trend could be identified. Gas monitoring details are provided in Table 9 below.

Table 9 **Gas Monitoring Points**

Off site and on site gas boreholes		
CO2 and CH4 levels (monthly)	40 points	In waste gas monitoring wells LB 2 - LB8, LB 12 - LB 16
		Boundary gas monitoring wells T1 –T3, T5- T7, T9- T20 GW1, GW9- GW11, GW17-GW19.
		Resident gas boreholes: GB1 and GB2
Site offices & Residential Dwelling gas alarms		
CO2 and CH4 levels (continuously)	2 points	Two closest residences
CO2 and CH4 levels (weekly)	10 points	All site buildings

Methane (CH_4)

Perimeter boreholes

CH4 readings at GW17, GW18 and GW 19 were noted to range from 0% to 69% v/v. CH4 levels were recorded below the limit value of 1.0% v/v at groundwater monitoring boreholes GW1, GW9, GW10 and GW11 in 2009. Perimeter boreholes T14, T15 and T16 were recorded as above the trigger level of 1.5% v/v and similar to results recorded in the previous reporting period, no exceedences were recorded at T17 – T20 which are located outside the landfill boundary.

Resident's boreholes

The following was recorded at resident's boreholes during this reporting period:

- **GB1 at Carley's:** Methane levels at this monitoring location were seen to be below the 1.0% volume per volume (v/v) trigger-level throughout the reporting period.

- **GB2 at Foxes:** Methane levels at this monitoring location were seen to be below the 1.0% volume per volume (v/v) trigger-level throughout the reporting period.

The CH_4 trigger level at the gas monitoring wells is 1.0% volume by volume (v/v)

Carbon Dioxide (CO_2)

Perimeter boreholes

CO2 concentrations at GW17 and GW19 were noted to be above the trigger level of 1.5% v/v and similar to results recorded in the previous reporting period. CO2 concentrations ranging from 0% to 37.3% v/v were recorded during the year. The elevated results at GW17, GW18 and GW19 are consistent with the migration of landfill gas away from the fill areas. These boreholes are located on the landfill side of the gas vent trench. Extraction of landfill gas is likely to gradually reduce the concentration of landfill gas detected at these particular monitoring locations. The CO2 concentration at GW18 has seen a slight reduction since the last reporting period with only one monitoring result (November) being above the emission limit value. The CO2 levels were recorded below the limit value of 1.5% v/v at groundwater monitoring boreholes GW1, GW9, GW10 and GW11 during 2009. Perimeter boreholes T1 to T16 were recorded as above the trigger level of 1.5% v/v and similar to results recorded in the previous reporting period, no exceedences were recorded at T17 – T20 which are located outside the landfill boundary.

Resident's boreholes

The following was recorded at resident's boreholes during this reporting period:

- **GB1 at Carley's:** All results were below the 1.5% volume per volume (v/v) trigger-level.

- **GB2 at Foxe's:** All results were below the 1.5% volume per volume (v/v) trigger-level.

The CH_4 trigger level at the gas monitoring wells is 1.0% volume by volume (v/v)

Monitoring boreholes GB1 and GB2 are located on the resident's side of the gas migration cut off trench. The cut off trench consists of a excavated trench along the landfill boundary adjacent to Carley's and Foxe's residents. Installed in this trench is an impermeable geotextile membrane with a series of gas extraction wells installed on the landfill side. The results indicate that the gas migration cut off trench combined with the gas abstraction system is operating as designed.

8.2.2 *Flare Emissions*

An air emission test of the landfill flare was carried out on the 11th December 2009. NO_x, SO_2, CO, O_2, HCL, HF and TOC were found to be in compliance with the emission limit values contained in Waste Licence W0016-2 – Schedule C4. The report is available to view at WCC, Holmestown Waste Management Facility, Administration Building.

8.2.3 *Leachate levels and monitoring*

Leachate monitoring points

Leachate Monitoring			
Levels	10 points	LB2-LB8, LB12-LB16	Weekly
Monitoring	3 points	Leachate storage tanks, LB2, LB12,	Annual

Leachate levels

Leachate levels were taken at 10 leachate boreholes during 2009 in compliance with Schedule D.5 of the waste licence. Composite samples for this reporting period were obtained from LB2, LB12 and the leachate storage tank. The levels were recorded using a dip meter on a weekly basis by Wexford County Council staff at the landfill. Wexford County Council has adopted a Leachate Management Plan designed to maintain leachate at acceptable levels by routine removal from the holding tank. The volumes of leachate removed from the tank in 2009 are detailed in Table 10. The quantity exported off-site in 2009 was 4,890 cubic metres compared to 3,817 cubic metres in 2008.

Leachate is collected from 34 extraction wells located around the site within the waste boundary. This leachate is directed to the three holding tanks located in the northwest of the landfill. It is then removed by road tanker on a routine basis and transported to Enniscorthy Wastewater Treatment Plant for treatment in accordance with the leachate management plan.

Leachate monitoring

Annual monitoring was undertaken on 30th June and 1st of July 2009. Leachate samples were collected from three locations, LB2, LB12 and the leachate storage tanks. The samples were analysed for a range of organic and inorganic parameters as defined in Table D.5.1 of the Waste Licence 16-2.

The levels recorded did not reveal any significant change to those recorded in the previous reporting period.

The typical characteristics of leachate generated on site are presented in Table 11. The results are similar to those obtained for the last reporting period and are in general indicative of a landfill in the methanogenic stage of decomposition of organic compounds i.e. conversion of organic compounds to landfill gas.

Table 10 **Leachate analysis results January 2009**

Leachate analysis 2009				
		Sampling points		
Parameter	**Units**	LB2	LB12	Storage Tanks
Depth of Borehole	m	6.6	4	nm
Leachate level	m	1.2	0.8	nm
Temperature	°C	13.5	18.5	17.8
pH	pH	6.5	7.2	7.8
Conductivity	µS/cm	1037	6590	11900
Ammonia	mg/l N	30	0.26	740
Chloride	mg/l Cl	55	426	1085
Nitrite	mg/l N	<0.001	<0.01	<0.02
Ortho-Phosphate	mg/l P	<0.006	0.88	5.5
Total Oxidised Nitrogen	mg/l N	0.8	0.3	7
Chemical Oxygen Demand	mg/l 02	29	404	1812
Biochemical Oxygen Demand	mg/l 02	1.1	40	800
Fluoride	mg/l F	0.21	0.35	4.4
Sulphate	mg/l SO4	60	5	92
Aluminium	µg/l	<250	2630	277
Antimony	µg/l		<5	12.7
Arsenic	µg/l	7.93	9.7	34.3
Barium	µg/l	187	96.7	239
Beryllium	µg/l	5.87	6.13	5.9
Boron	µg/l	369	<50	3050
Cadmium	µg/l	<5	<5	<5
Calcium	mg/l	52.6	120	92.1
Chromium	µg/l	<5	29.3	108
Cobalt	µg/l	14.8	19.6	27.1
Copper	µg/l	<5	8.7	30
Iron	µg/l	2430	7870	6610
Lead	µg/l	<5	<5	35.1
Magnesium	mg/l	48.1	75.8	86.5
Manganese	µg/l	5420	621	1950
Mercury	µg/l	<5	<5	<5
Molybdenum	µg/l	12.6	11.9	15

Nickel	µg/l	9.59	51.5	106
Potassium	mg/l	42.4	246	549
Selenium	µg/l	<5	<5	19.4
Sodium	mg/l	60.4	374	890
Thallium	µg/l	<5	<5	<5
Tin	µg/l	<10	<10	66.7
Uranium	µg/l	<5	11.1	<5
Vanadium	µg/l	<5	35.4	140
Zinc	µg/l	<30	<30	168
Total Cyanide	mg/l	<0.05	<0.05	<0.05

Inspection and testing of leachate storage tanks

In December 2008 Enviros Consulting carried out analysis of the leachate storage tanks at Killurin Landfill. The tanks passed the integrity test and are deemed fit for storing leachate. The tanks are due to be re- tested in December 2011.

8.2.4 *Surface Water*

Under Schedule D.5 of the Waste Licence 16-2, surface water monitoring was required in the locations listed below. SW1 is located upstream of the site, SW2 is situated downstream of the site and SW4 is located at the southern tip of the facility. The site streams sometimes run dry during the drier months of the year and consequently surface water samples cannot be obtained. These are discussed in subsequent sections.

Table 11 Surface water monitoring locations and frequency

Surface water monitoring locations and frequency			
Parameter	**Location**	**Name**	**Frequency**
Visual Inspection/ Odour	Off site (River Slaney)	S1, S2, S4	Quarterly
Chemical analysis	Off site (River Slaney)	S1, S2, S4	Quarterly and Annual
Visual inspection	On site	SW1, SW2, SW4	Weekly
Chemical analysis	On site	SW1, SW2 and SW4,	Quarterly and Annual

Visual inspection of surface water

Weekly visual inspections of surface water were conducted for monitoring points SW1, SW2 and SW4, and quarterly at off-site locations S1, S2 and S3. All surface water details are included in previously submitted monitoring reports for the landfill.

No visual abnormalities were recorded for any of the surface water inspection points during the reporting period.

Surface water quality analysis

Results for all surface water monitoring carried out in 2009 have been submitted to the Agency in quarterly monitoring reports. Due to dry periods it was not always possible to retrieve samples from all of the monitoring points. Only 4 samples were collected for SW1, SW2 and SW4.

All sampling and analysis was carried out in accordance with recognised quality assurance and control procedures. The detailed monitoring results are presented in the quarterly monitoring reports submitted to the Agency in the reporting period. The range of analysis is as specified in Schedule D.5 of the Waste Licence 16-2 and includes parameters such as ammoniacal nitrogen, BOD, COD, dissolved oxygen, pH, electrical conductivity and organic and inorganic parameters.

One exceedence was reported during the quarterly monitoring, that was Ammonia level of 1.5 mg/l N at SW1 during Quarter 4 2009, this exceedence was attributed to run off from the adjacent local road.

8.2.5 *Groundwater*

Table 12 Groundwater monitoring locations

Groundwater Monitoring Locations		
Upgradient	1 point	GW1
Downgradient (border of reed beds)	1 point	GW9
Downgradient (border of reed beds)	1 point	GW10
Upgradient	1 point	GW11
Upgradient	1 point	GW17
Upgradient	1 point	GW18
Upgradient	1 point	GW19
Upgradient	1 point	GBH1
Upgradient	1 point	GBH2

Groundwater levels

Groundwater levels were measured on a monthly basis using a dip meter. The groundwater dip levels have been submitted to the Agency in the quarterly monitoring reports. Details of groundwater levels are also available for inspection at the Holmestown site office. Groundwater levels remained relatively constant throughout the monitoring period, with only minor variations in groundwater levels in accordance with prevailing weather conditions. During the drier months the groundwater levels were seen to gradually decrease while during wetter periods where prolonged rain was evident, levels of groundwater were noted to rise slightly over a number of months.

Groundwater quality boreholes

Upgradient groundwater boreholes

Wexford County Council monitors groundwater quality in upgradient boreholes located around the landfill in accordance with Condition 8 and Schedules D1 and D.5.1 of the waste licence. Elevated levels of ammonia were consistently detected at GW1, throughout each of the quarterly monitoring rounds. Levels were found to be as high as 8.1 mg/l N during September 2009. This monitoring point is located upgradient of the landfill site and so pollution from agricultural sources or road run-off is most likely the reason for these elevated levels. The landfill may be having an effect on the boreholes but it is difficult to isolate a source. Elevated levels of iron and manganese are typical of the groundwater chemistry of the area although they are elevated above the levels of the other groundwater boreholes. In relation to List I/II substances no exceedences were recorded. All other parameters were noted to be within acceptable limits.

Downgradient groundwater boreholes

Elevated levels of ammonia were detected at GW9 during each round of quarterly sampling. Levels were consistently high during 2009 with 115mg/l N detected in Q1.
High electrical conductivity and low dissolved oxygen levels were also noted at GW9 throughout the year. All other parameters remained below limits throughout the year.
Elevated levels of ortho-phosphate were found at GW10 in the June. These levels indicate slight contamination which is most likely to have been from leachate as a result of landfill operations on site. List I/II organic substances were not found to be above detection limits which is consistent with the previous reporting period.

At GW10 and GW11 chloride and ammonia levels were found to be within acceptable limits.

Private Well water analysis

Table 13 Private well monitoring locations

Drinking water		
Pearson's residence	UV treated	Pearson's tap

Quarterly monitoring was carried out on drinking water samples from the Pearson's residence. All parameters were found to be within required limits.

8.2.6 *Noise*

No noise surveys were carried out during 2009, noise surveys will however be carried out when required. For example, during engineering works as and when they occur in the future.

8.2.7 *River water*

The river water monitoring results for the river Slaney are reported in the Table 14 below. Monitoring location S1 is located upstream of the landfill, monitoring location S2 is in the river adjacent to the landfill and monitoring location S3 is located downstream of the landfill and all

are located within the tidal zone of the river estuary (salt water). High levels of chloride and electrical conductivity were recorded at all three monitoring locations during 2009.

Table 14 **River water monitoring results for River Slaney 2009**

River water monitoring results for River Slaney 2009													
		Monitoring Locations											
		S1				S2				S3			
Parameter	Limit / Units												
Date		23 March	24 June	3 Sept.	17 Nov.	23 March	24 June	3 Sept.	17 Nov.	23 March	24 June	3 Sept.	17 Nov.
BOD	5	1.4	1.3	1.7	2.2	2.6	1.4	1.9	2.2	1.5	1.3	1.7	2.2
COD	40	18	4	16	26	40	10	18	17	20	3	20	14
Chloride as Cl	250	32	139	744	18	971	252	2050	21	384	1540	980	18
Dissolved oxygen		9.4	10	8	9.2	9.61	9.9	8.3	9.2	9.38	10.04	8.65	9.1
Conductivity	1500	286	690	2360	225	3070	1175	5855	210	1370	3280	3200	220
pH	6<pH >9	7.74	7.65	7.5	7.38	8.15	7.72	7.6	7.4	7.96	7.73	7.5	7.45
Suspended Solids	30	<2	9	10	15	2	9	25	15	10	8	14	20
Ammonia as NH3-N	0.3	0.02	0.08	0.02	<0.02	<0.02	0.06	0.06	0.08	<0.02	0.04	0.08	0.02
Temperature		8.4	15.5	17	13	8.4	15.5	17	13	8.4	15.5	17	13

8.2.8 *Dust*

No dust monitoring were carried out during 2009, dust monitoring will however be carried out when required. For example, during engineering works as and when they occur in the future.

8.2.9 *Meteorological monitoring*

All monitoring information was obtained from the weather station located at Johnstown House in Wexford; this station is within 10km of Killurin Landfill site. A full set of data has been previously sent to the Agency in the four quarterly monitoring reports.

8.2.10 *Topographical Survey*

A topographical survey of the site was carried out by Capital Surveys in September 2009. The site survey drawing is contained in Appendix A8.

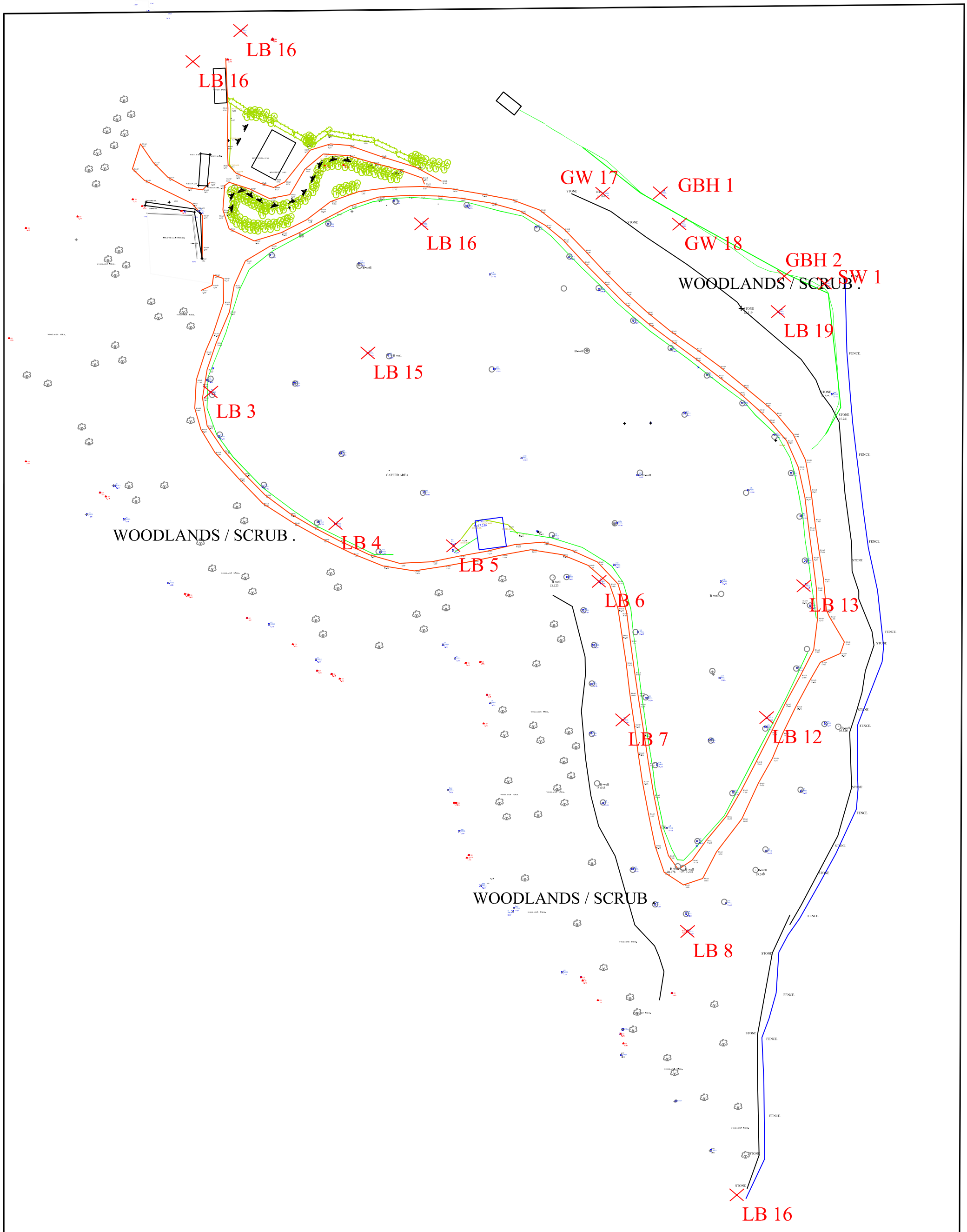
Figures

Figure 1 Monitoring Locations

APPENDICES

A1 PRTR 2009

A2 Topographical Survey



Wexford County Council

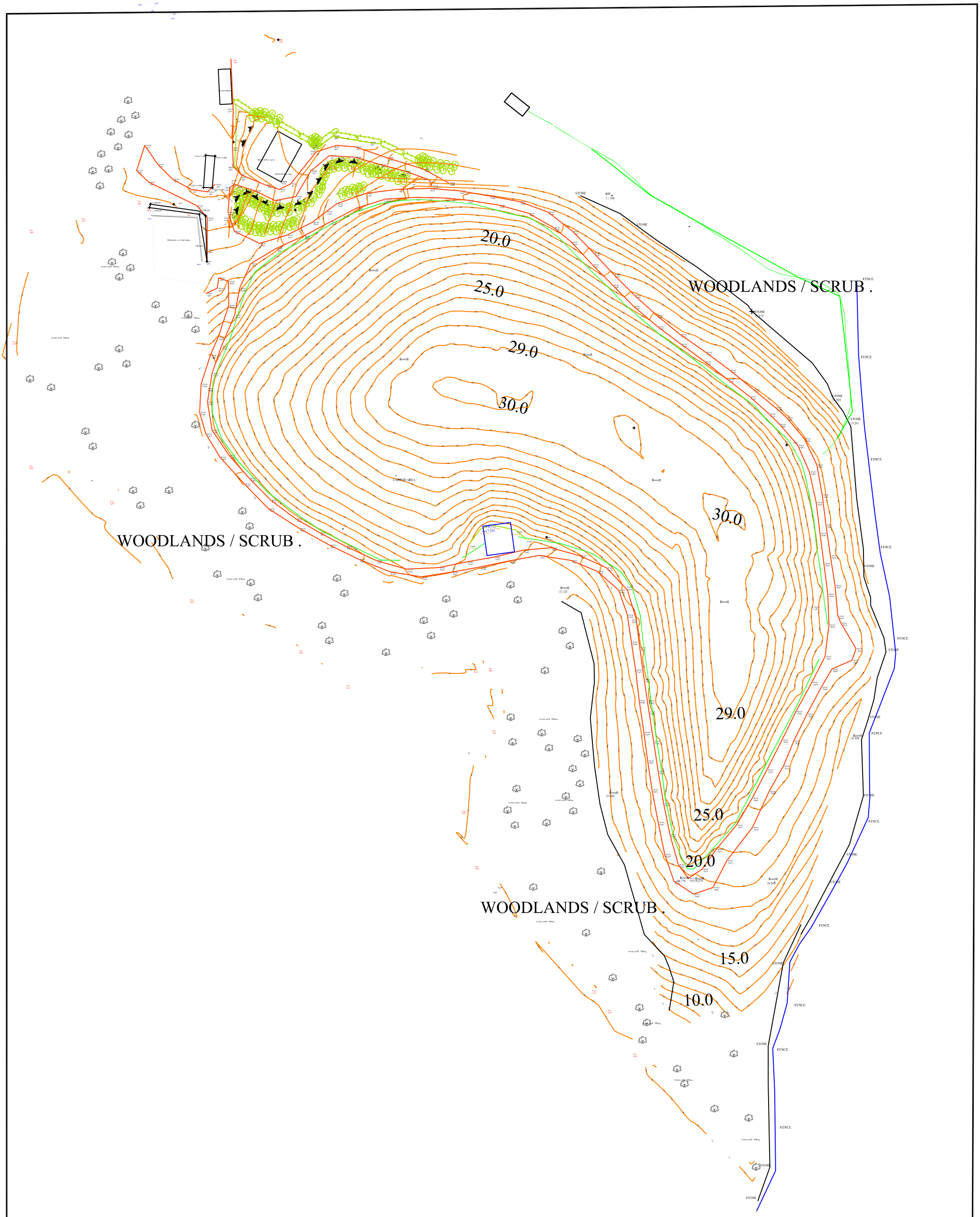
Holmestown Waste Management Facility

Wexford County Council,
Wexford
Tel: 053-9120922

Drawing Notes

Killurin Landfill Monitoring Locations

F. Ryan	
FH	
21-08-10	
1:6000	
FR	
Drawing No.	



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Drawing Notes

Killurin Landfill Topographical Survey
September 2009

F. Ryan	
FH	
21-08-10	
1:6000	
FR	
Drawing No.	

Environmental Protection Agency

AER Returns Worksheet

Version 1.1.10

REFERENCE YEAR	2009

1. FACILITY IDENTIFICATION

Parent Company Name	Wexford County Council
Facility Name	Killurin Landfill Site
PRTR Identification Number	W0016
Licence Number	W0016-02

Waste or IPPC Classes of Activity

No.	class_name
3.1	Deposit on, in or under land (including landfill).
3.10	Release of waste into a water body (including a seabed insertion).
3.12	Repackaging 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.
4.10	The treatment of any waste on land with a consequential benefit for an agricultural activity or ecological system.
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.

Address 1	Newtown Lower
Address 2	Killurin
Address 3	Co. Wexford
Address 4	
Country	Ireland
Coordinates of Location	-6.56116 52.3816
River Basin District	IESE
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	Fran Hobbs
AER Returns Contact Email Address	fran.hobbs@wexfordcoco.ie
AER Returns Contact Position	Technician
AER Returns Contact Telephone Number	053 9120922
AER Returns Contact Mobile Phone Number	087 9141105
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	0
User Feedback/Comments	There are no entries in the Releases to Water section. There are no emmissions from the site apart from surface waters. There are no discharge points to sewer, land or groundwater.
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 ?	No
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR								
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
					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 AIR								
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								
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) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Killurin Landfill Site

Please enter summary data on the quantities of methane flared and / or utilised			Method Used			
	T (Total) kg/Year	**M/C/E**	**Method Code**	**Designation or Description**	**Facility Total Capacity m3 per hour**	
Total estimated methane generation (as per site model)	0.0				N/A	
Methane flared	918966.0	C	Calculation	Flare operational data	1250.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0				N/A	

4.2 RELEASES TO WATERS

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								
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								
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								
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

4.3 RELEASES TO WASTEWATER OR SEWER

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER								
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								
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

4.4 RELEASES TO LAND

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND							
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							
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

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	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)
						M/C/E	Method Used					
Within the Country	02 01 02	No	12.6	deceased canines	R6	M	Weighed	Onsite in Ireland	Waterford Proteins,Dept. of Agriculture Permit - R919	Ferrybank,Waterford ,,,,,Ireland		
Within the Country	**20 01 40**	**No**	343.0	scrap metal from HWMF	R4	M	Weighed	Onsite in Ireland	Mulligan Recyclers,WP/05/20	Mulligan Dismantling & Salvage,Scaranagh Lower,Inch,Gorey Wexford,Ireland		
Within the Country	19 07 03	No	4890.0	leachate from landfill	D9	M	Weighed	Onsite in Ireland	Enniscorthy,Waste water treatment plant	Saint Johns,Enniscorthy,.,.,Ireland		

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