



Limerick County Council
Comhairle Chontae Luimnigh

LIMERICK COUNTY COUNCIL
ANNUAL ENVIRONMENTAL REPORT
FOR
GORTADROMA LANDFILL
W0017-04
2010

GORTADROMA LANDFILL SITE
ANNUAL ENVIRONMENTAL REPORT 2010

Waste License Register: No. W0017-04

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ANNUAL ENVIRONMENTAL REPORT

FOR THE REPORTING PERIOD
JANUARY 2010 TO DECEMBER 2010

FOR

LIMERICK COUNTY COUNCIL
COUNTY BUILDINGS
DOORADOYLE
LIMERICK

Approved By:

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EURO environmental services
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1.0 INTRODUCTION AND SITE DESCRIPTION

1.1 Introduction

Gortadroma Landfill, Ballyhahill, County Limerick is operated by Limerick County Council (LCC) in accordance with Waste License Register No. 0017- 04 issued by the Environmental Protection Agency on 21st December 2009.

The reporting period for the purposes of the Annual Environmental Report is January 2010 to December 2010. The report has been completed by EURO environmental services and includes information provided by Limerick County Council.

The Annual Environmental Report (AER) for Gortadroma landfill includes, where applicable, the information specified in Schedule G of the Waste License, Content of Annual Environmental Report, in accordance with the EPA publication Waste Licensing - Draft Guidance on Environmental Management Systems and Reporting to the Agency.

1.2 Site Description

The landfill site is located in the townland of Gortadroma, Ballyhahill, County Limerick, which is located approximately 12 km north of Newcastle West and 9 km south-west of Foynes. The location of the site is shown in Figure B2 of the Waste License Application (W0017-04). The facility is known and operates as the Gortadroma Landfill.

The site is located in a landscape of undulating lowlands separated by areas of gently sloping farmland. There are pockets of poorly-drained fields and bogland located at low points. The location of the landfill site itself is on a gentle south-facing slope.

The land use in the area is predominantly agricultural with a mixture of pasture and a significant amount of marginal agricultural land as damp pasture.

The bedrock underlying the general area has been mapped as the Cummer Flagstone Formation which is Namurian in age and up to 230m thick. These generally consist of bedded, argillaceous, coarse siltstones and mudstones overlain by an upper unit of more massive fine grained quartzitic, argillaceous sandstones or coarse siltstones with alternating mudstones.

There are two main soil types underlying this site; (a) sand and gravel and (b) silty clay and these are overlain in places by peat.

The site lies within the White River catchment. This river flows from east to west just to the south of the site. The regional formation has been classified as a poor aquifer by the Geological Survey of Ireland.

Long term meteorological reports from Shanagolden (1960 - 1997) indicate that the annual mean rainfall in the locality is estimated at 1100 millimetres (mm) with the months of October to January receiving the greatest monthly rates.

The site is bounded by agricultural land on the eastern, western and northern perimeters. Local Road L1226 bounds the site to the south.

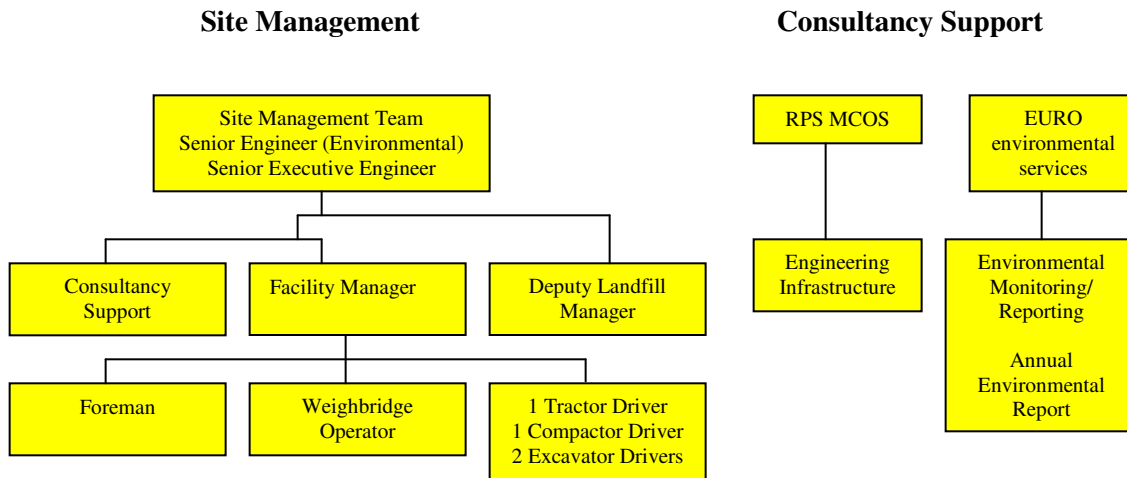
The current landfill facility at Gortadroma including the extension area occupies an area of 76 hectares.

2.0 MANAGEMENT OF THE ACTIVITY

2.1 Management of the Activity

The site is managed and operated by Limerick County Council. Details of the management structure for the facility were submitted to the Agency as part of the Environmental Management Programme in January 2011. The management structure is outlined in Figure 2.1 below.

Figure 2.1 Management Structure



LCC has overall responsibility for the management and operation of the Gortadroma Landfill site. The LCC senior engineer is responsible for the management of municipal waste and waste facilities in the County. With reference to Condition 2.1 of the Waste License, the facility manager for landfill, and a deputy site manager have responsibility for day to day site operation.

The facility manager and the deputy landfill manger are present on site from day to day during the operation of the facility. The facility manager has overall responsibility for the monitoring and day to day operations at the landfill. The senior executive engineer has responsibilities for areas such as development and waste license applications.

2.2 Environmental Management System

An Environmental Management System (EMS) is in operation for the site and is updated annually in accordance with site requirements and conditions, as required under Condition 2.2 of the Waste License.

2.3 Environmental Management Programme

The objective of the EMP is to act as the site manual, which will assist the site in achieving its objectives and targets during the current and future operation of the site. An updated EMP for 2011 has been prepared and was submitted separately to the Agency in January 2011.

2.4 Schedule of Environmental Objectives and Targets for 2011

The schedule of Environmental Objectives and Targets for the forthcoming year is described in the EMP for 2011, which was forwarded separately to the Agency and will become part of the public record for the site. The list of objectives and targets is reproduced from the EMP in Appendix I.

2.5 Report on the progress towards achievement of the Environmental Objectives and Targets contained in 2010

The 6 objectives and targets established for the EMP of Jan 2010 were reviewed to assess the progress towards achievement. In total, all 6 objectives were completed. Section 4.1 outlines the progress made towards achievement of the objectives and targets contained in the previous year's report.

2.6 Procedures developed by the licensee in 2010

There were no new procedures developed during 2010.

2.7 Report on programme for Public Information

LCC submitted details of a Waste License Communications Programme to the Agency in May 2000, in accordance with Condition 2.7 of the then Waste License. The Agency requested additional information in September 2000 in relation to the follow-up of complaints and incidents and the availability of information to the public. A detailed response was submitted and the Programme was approved by the Agency on November 1st, 2000.

LCC provide the following documentation for the public to view:

- Waste License 17-1 (superseded), WL17-2 (superseded), WL0017-03 (superseded), WL0017-04 (currently in operation)
- Environmental Impact Statement
- Conditioning Plan
- Waste License Application form
- Waste License Review Application
- Periodic reports
- All monitoring records
- Waste transfer and acceptance dockets
- Leachate removal log books
- Incident/Complaints reports
- Once-off reports submitted to the Agency
- MSDS sheets
- Calibration records
- Bait box inspection records
- Rejected loads log
- Bird control reports
- Agency correspondence, EPA approvals and request for additional information
- Monitoring personnel, experience and training
- Audit records
- Litter fines, rejected load, compliance, bund integrity
- Daily site log
- Weekly site inspection forms
- Surface water inspection forms
- Litter picking reports
- Monthly review of odour control measures report

3.0 NOTIFICATION AND RECORD KEEPING

All copies of environmental data and prescribed reports obtained and prepared on behalf of the licensee are forwarded to the Agency. Copies of reports and correspondence are retained and available for inspection at Gortadroma Landfill reception building.

Waste records and leachate removal logbooks are retained in the site office.

3.1 Non-Compliances

There were 2 notifications of non-compliance issued by the Agency to L.C.C on the 2nd March 2010 and 23rd December 2010. The notification on the 2nd March relates to non-compliance with Condition 5.2 of the Waste Licence with regard to odour emissions from the facility. The notification on the 23rd December relates to non-compliance with Condition 8.8.1 of the Waste Licence with regard to determination of BMW content of the municipal waste. The non-compliances are detailed in Table 3.1.

Table 3.1 Details of Non-Compliances at Gortadroma Landfill Facility during 2010 (with reference to certain conditions of the site waste license)

Non-compliance	Date	Details	Date of Response	Details
1	02/03/2010	Notification of Non-Compliance: Condition 5.2 – Odour Emissions from the facility: Persistent and significant landfill gas odours were detected at a number of locations beyond the site boundary. A number of complaints were received by the Agency from a resident adjacent to one of the odour monitoring points.	09/03/2010	<p>A landfill gas management plan was developed for the site and is reviewed and updated on a six monthly basis.</p> <p>The temporary 160mm diameter pipe line between cell 14 and the gas engine is susceptible to clogging with condensate due to the cold weather. On the 5th March, the gas engine was shut off for 1 hour and the flare switched on, which helped draw all the condensate from this line to the knock out pots on the main gas line. This improved suction at the manifold and this process was repeated on a weekly basis.</p> <p>A permanent 315mm under ground gas main will be installed between cells 14/15 and the gas engine. This will eliminate problems with condensate and improve gas collection efficiency from these cells. An S.E.W will be sent to the Agency in advance of these works.</p> <p>The temporary flare was</p>

				<p>replaced and upgraded on the 03/03/2010.</p> <p>Additional horizontal gas collection pipe work will be installed in active cell 15 as the waste height increased.</p> <p>Side slopes will be covered with GLG membrane when they become raised with additional waste.</p>
2	23/12/2010	Notification of Non-Compliance: Condition 8.8.1 – Determination of BMW content of Municipal Waste	19/01/2011	<p>1. BMW Limit in Licence: Limerick County Council will assess its position in relation to meeting the 47% target for BMW in MSW at the end of each quarter and put in place appropriate measures based on this assessment.</p> <p>2. Waste Records: Limerick County Council has introduced a new system for accurately recording the treatment that each waste load has been subjected to. A full list of the different waste treatment types is provided in the new recording sheet and this information will be used when compiling future BNW reports. The new recording system was introduced on the 1st January 2011 and will be retrospectively applied for waste data compiled during Q3.</p> <p>3. Training of Working Face Staff: Limerick County Council have contacted Mr Olivier Guillot of RPS to provide onsite training on biodegradable factors to the landfill staff. It is hoped to carry out the training during February 2011.</p>

3.2 Reported Incidents and Complaints Summaries

3.2.1 Incidents

During the reporting period a total of 3 incidents occurred and were reported to the Agency. They are summarised in Table 3.2.

Table 3.2 Summary of Incidents and their Corrective Actions, 2010

Date	Nature of Incident	Corrective Actions/Conclusions
08/01/2010	Exceedence of Nitrogen Oxide (NOx) emission limit at the emission point of gas utilisation plant during monitoring conducted by EURO environmental services on the 11/11/2009.	The most likely reason for the exceedence in the emission limit for NOx was that the monitoring was carried out immediately after the start up of the engine. The engine had been shut down for two hours prior to the monitoring event for an oil change. All future emissions monitoring events will not coincide with planned maintenance to the gas engine.
25/01/2010	A water leak was observed on the main feed valve on the wheel wash on Saturday 23 rd of January 2010 during the weekly cleaning operation. The housing around the valve had burst due to the frosty weather.	EPS Pumping systems are due on site on the 25 th January 2010 to remove the valve and repair the housing. Wheel wash expected to be back in operation by evening of 26 th January 2010. In the meantime all drivers were instructed to wash their wheels with the hand held lance provided on the wheel wash slab.
04/11/2010	Condition 6.12.3 of WL0017-04 requires that a minimum of 0.75 meter freeboard be maintained at all times in raw leachate holding lagoon. The freeboard level in the raw leachate lagoon at Gortadroma is marked at 1 meter and this level was near approached on the 3 rd November 2010. In order to maintain this freeboard landfill management decided to switch off the leachate extraction pumps at the collection point of Cells 7/9 and Cells 8/10. The level at both of these collections on the 4 th November was at 1.1 meters. The main reason for the increased leachate volumes was due to high rainfall(125 mm) recorded in the past two weeks and current open area in cells 14/15 of 23,380 m ² .	The following measures were put in place to ensure containment of leachate until weather conditions improved; <ul style="list-style-type: none"> • Tankering of treated leachate was increased from 180 m³ per day to Castletroy Waste Water Treatment. • The current freeboard in the raw leachate lagoon was 1 meter. In order to maintain this freeboard landfill management decided to stop extracting leachate on a temporary basis from leachate collections sumps at Cells 7/9 and Cells 8/10. The level of leachate in these two abstraction sumps was just in excess of 1 meter at present and the leachate abstraction pumps will be switched on manually from time to time while maintaining the freeboard in the leachate holding lagoon. • The possibility of tankering additional leachate to Limerick City Councils waste water treatment facility at Bunlicky was being investigated. <p>The combination of the above measures will ensure that all leachate generated will be contained.</p> <p>In addition to the above cells 14/15 will be filled to capacity during quarter 1 2011. These cells will be capped before the end of quarter 3 2011. Cell 16, the remaining lined cell, has been divided in two with a HDPE flap. The active area in cell 16 during 2011 will be approximately 4,900 m².</p>

3.2.2 *Complaints*

In summary there were 17 complaints or queries during the reporting period of January 1st to December 31st, 2010. The vast majority of complaints were attributed to odour. Other issues included windblown litter from the site. Complaints were responded to as soon as possible and were recorded in the complaints register. Corrective action, if considered necessary, is recorded. Details of all complaints, responses and corrective actions are maintained and available for inspection on-site. There was a decrease in the number of complaints from 20 in 2009 to 17 in 2010.

3.3 **Waste Records**

All waste materials accepted at the site are recorded on two separate documents, including a waste transfer document and a computer printout of the waste accepted. The following details are recorded:

Computer Printout:

- Ticket Number/Transaction Number
- Customer code
- Operator / driver signature
- Net weight
- Vehicle Registration Number
- Contractor Name
- Waste Code for site
- Waste Type
- Name of person who checked load
- Waste Source
- Accepted or rejected status
- Weight entering and weight of container leaving site
- Waste collection permit number

Waste Transfer Docket includes additional headings of:

- How waste is contained
- European waste catalogue number
- Physical description
- Odour/Description of odour
- Special problems/requirements of waste
- Knowledge with regard to waste
- Waste Producer
- Waste Collection Permit Number

All waste records are retained at the site office.

4.0 *SITE INFRASTRUCTURE*

Table 4.1 Report on Development Works Undertaken during 2010

	Objective	Reason for undertaking project	Project summary	Target in 2010 EMP	Status January 2011
1	Install Gas main between Flare/Gas engine compound and cells 14/15.	Increase gas flow from cells 14/15 to gas engine.	SEW to be sent to Agency for agreement. Materials to be ordered and pipe work installed	Quarter 2 2010	Completed.
2	Install permanent ground water extraction pump beneath cells 14-16	Replace temporary pump and improve energy efficiency.	Pump ordered and installation to be arranged.	Quarter 1 2010	Completed.
3	Temporary liner to be placed on southern side slope of cell 15.	Reduce landfill gas emissions.	Materials ordered and installation to be arranged.	Quarter 1 2010	Completed.
4	Replace existing temporary 500 m ³ /hr flare with alternative 500 m ³ /hr flare	Alternative flare can be run from existing permanent power supply.	Flare ordered.	Quarter 1 2010	Completed.
5	Install additional compactor skips for cardboard and plastic bottles in C.A Site.	Reduce double handling and increase manning efficiency.	Compactor skips ordered and installation to be arranged.	Quarter 1 2010	Completed.
6	Extend Scada control to pumps in extension area.	Increase control and monitoring.	Dynamic Automation to provide design and install system.	Quarter 2 2010	All pumps and hard wiring completed

4.2 Lagoon Structures Inspection Report

First Settling Lagoon

The integrity of the geomembrane liners installed on the First Settling Lagoon and the Final Settling Lagoon at the Gortadroma Landfill Development was carried out in accordance with Contract Specifications by Geomembrane Testing Services Limited on the 20th June 2010. Further to this a Mobile Electrical Leak Location Survey (MELLS) was carried out using geophysical techniques, to verify the integrity of the systems. On completion of the survey, no defects were present within the lined contained area of the First and Final Settling Lagoons and the HDPE membrane was free from all defects in both lagoons at the time of final inspection. Copies of the Certificates of Integrity are presented in Appendix II.

4.3 Calculated remaining capacity of the site and the year in which final capacity is expected to be reached

Cells 1 to 13 are now filled to capacity. The three available cells for waste disposal 14, 15 and 16 have a design capacity of approximately 750,000 m³. However, when filling these cells without adjacent cells to east and south, the capacity is reduced to 500,000 m³. Waste disposal commenced in cell 14 in early October 2007 and in cell 15 in December 2008. Approximately 289,159 tonnes of waste have been placed in cells 14/15 at the 31st December 2010 at a compaction rate of 1 tonne/m³. Therefore the remaining void capacity is approximately 210,841 m³.

Table 4.3 Estimated volumes in each cell

Cell	Final Capacity (t)
5	108,790
6	110,174
7	125,583
8	119,692
9	48,301
10	84,161
11-13	308,000
14-16	550,000

4.4 Area Occupied by Waste

The area occupied by waste at Gortadroma Landfill is 138,980m². Cells 1-4 are unlined and occupy an area of 20,800m², while cells 5-13 are lined cells and occupy an area of 94,800m². Cell 14 is lined and occupies an area 8,600 m². Cell 15 which was the active cell up until end 2010 occupied an area of 14,780 m².

4.5 Tank, pipeline and bund testing and inspection report

The integrity and water tightness of all bunds, tanks and pipelines must be demonstrated on a 3-yearly basis. The first settling lagoon and final settling lagoon were tested during June 2010. The reports along with the certificate of integrity of these tests are presented in Appendix II.

5.0 WASTE ACCEPTANCE AND HANDLING

5.1 Licensed waste disposal activities carried out at the facility

Part I of the Waste License details the activities that are licensed at the site under the Waste Management Act, 1996: Third Schedule and include:

- Class 1: Deposit on, in or under land (including landfill)
- Class 5: Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment;
- Class 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;
- Class 7: Physico-chemical treatment not referred to elsewhere in this Schedule (including evaporation, drying and calcination) 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;
- Class 11: Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule;
- Class 13: Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.

5.2 Licensed recovery activities under the Waste Management Act, 1996, Fourth Schedule

- Class 2: Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes);
- Class 3: Recycling or reclamation of metals and metal compounds;
- Class 4: Recycling or reclamation of other inorganic materials;
- Class 9: Use of any waste principally as a fuel or other means to generate energy;
- Class 10: The treatment of waste on land with a consequential benefit for an agricultural activity or ecological system;
- Class 11: Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule;
- Class 12: Exchange of waste for submission to any activity referred to in preceding paragraph of this schedule;
- Class 13: Storage of waste intended for submission to any activity referred to in preceding paragraphs of Schedule A, other than temporary storage, pending

collection, on the premises where such waste is produced (Limited to the temporary storage of recyclable and reusable waste pending their collection).

5.3 Quantity and composition of waste received, disposed of and recovered during the reporting period and each previous year

The total tonnage of materials received at the site from January 2010 to December 2010 inclusive, and during each previous years, is given in Table 5.1 below.

Table 5.1 Annual Waste Tonnages to 2010

Year	Tonnage Accepted at Site
1998	91,631
1999	120,358
2000	125,186
2001	132,678
2002	138,320
2003	82,184
2004	50,219
2005	43,252
2006	82,119
2007	39,578
2008	56,070
2009	103,834
2010	112,699.49

Waste source and Tonnes per month for this reporting period are summarised in Table 5.2 and in Figure 5.1 overleaf. A more detailed summary is presented in Appendix III.

5.4 Methods of Waste Deposition

Cell 11 was filled to final capacity during the end of October 2007 and capping completed during Quarter 1 2008. Landfilling commenced in cell 14 on the 30th October 2007. Phase 1 of landfilling was completed on the 8th December 2008. Cell 14 has gas a horizontal gas collection system is temporarily capped. Cell 15 was the active cell up to the end of 2010 and landfilling commenced here on 9th December 2008.

Table 5.2 Quantities of Waste Types Accepted at Gortadroma during 2010

Month	Commercial/Industrial	Private Domestic	Council Refuse	City Street Cleaning	Wastewater Treatment Screenings
January	1894.98	7,756.78	35.94	42.54	6.14
February	1605.46	7,415.36	22.02	31.62	2.48
March	1767.08	10,355.48	106.88	54.68	6.50
April	1512.16	11,176.46	34.02	50.22	8.80
May	1129.14	10,162.83	57.30	42.2	8.18
June	1121.50	10,679.86	68.14	54.06	8.52
July	1258.10	10,476.04	44.24	37.42	10.68
August	1116.10	7,256.52	18.50	33.04	6.96
September	1400.38	5,283.00	36.64	36.68	10.54
October	1480.46	5,171.12	45.02	59.58	7.22
November	1525.88	4,698.72	29.80	57.34	15.12
December	1208.20	4,141.72	17.14	0	0.00
SUBTOTAL	17019.44	94,573.89	515.64	499.38	91.14
ANNUAL TOTAL			112,699.49 Tonnes		

5.5 Recyclables

Table 5.3 below outlines the quantity of recyclables transferred from Gortadroma Civic Amenity Site for recovery during 2010. In addition to this the following materials were accepted on site for reuse, road making and as landfill cover:

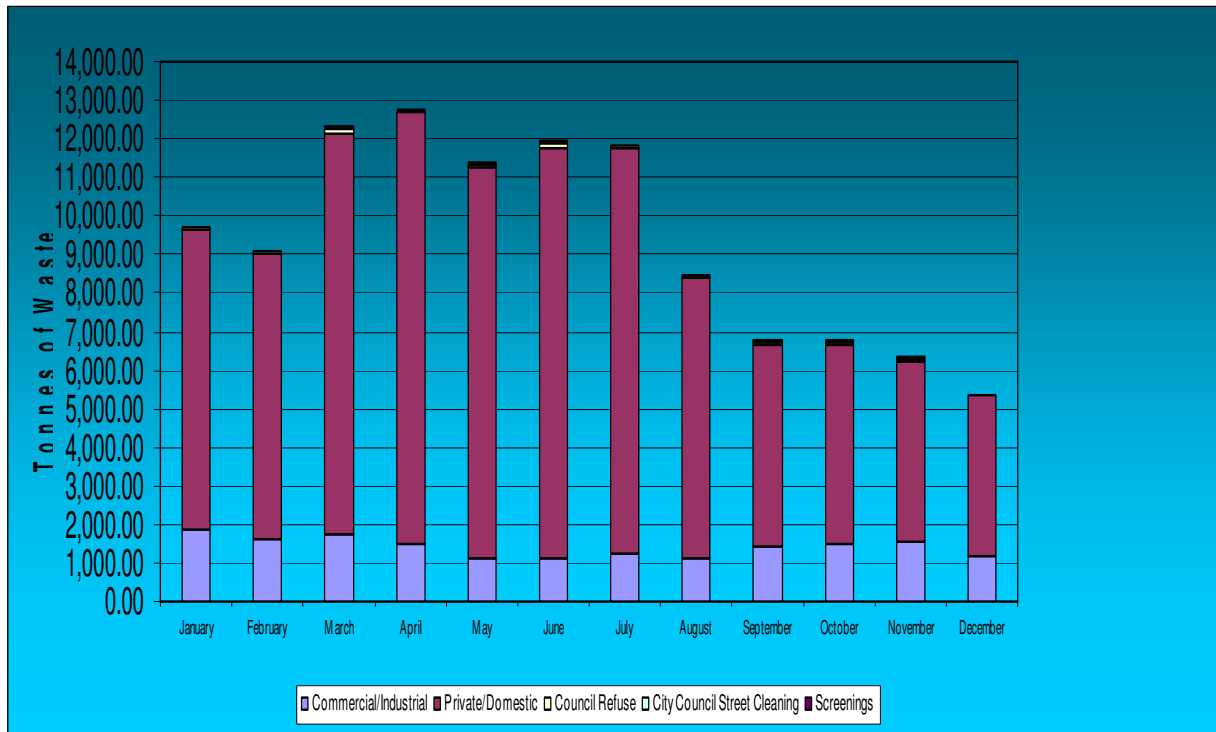
- EWC 17 05 04 Soil & Stones 4750.70 Tonnes
- EWC 17 01 03 C&D Waste (tiles & ceramics) 554.10 Tonnes
- EWC 19 12 12 Mechanically Treated C&D Waste 2954.54 Tonnes

Also 32.36 Tonnes of green waste was accepted on site and transferred of-site to Mungret composting facility.

Table 5.3 Recyclables transferred from Civic Amenity Site for recovery during 2010

Waste Type Name	EWC Code	Quantity Tonnes
Plastic Bottles	20 01 39	5.80
Tetrapacks	20 01 01	1.38
Newspapers/ Magazines	20 01 01	24.74
Glass	20 01 02	11.29
Food Cans	20 01 05	2.69
Drink Cans	20 01 05	1.67
Cardboard	20 01 01	23.75
LDA Non-Haz	20 01 36	15.40
Fridge Freezers	20 01 35	24.10
Mixed Metals	20 01 40	53.28
Textiles	20 01 11	4.12
Small WEEE	20 01 35	17.48

Figure 5.1 Waste Types and Quantities Received During 2010



6.0 ENVIRONMENTAL NUISANCES

6.1 Report on environmental nuisance control at the facility for 2010

The site is inspected daily and weekly by the landfill manager and recorded on separate inspection sheets. The daily inspection sheet records environmental nuisances such as flies, loose litter, vermin, birds, odour, dust, fires and complaints. The sheet also provides for the recording of descriptions of works on the day of inspection and provides for comments and required actions.

Litter picking is carried out daily and as required. Daily and weekly inspection sheets are maintained at the site office. The site manager carries out daily litter inspection in the area surrounding the landfill site. An overhead CCTV camera has been located at the weighbridge to enable inspection of loads brought to the facility. The weighbridge operator inspects each load brought to the facility and ensures that they are covered with appropriate netting.

An active litter management plan has been agreed with the Agency and has made provisions for an 8m high anti-litter fence placed at the north eastern corner of the site. The Agency has approved the use of Geo-hess as daily waste cover. In the event of wind speeds in excess of 8m/s an inspection is required to check the possibility of litter becoming airborne. In the event of litter becoming airborne, the site will be temporarily closed. Wind conditions are constantly monitored by staff.

Weekly inspection sheet provides for the recording of nuisances as well as site security, infrastructure and housekeeping.

A wheel wash is in use at the site and all vehicles exiting the tip head pass through the wash. A suction sweeper is employed two times per week to brush the access road outside the landfill and the entrance road into the landfill. LCC also carries out a daily odour check at 5 sensitive locations along the perimeter road of the landfill. Results of all inspections are recorded in the daily log sheet.

Cells 1-13 are fully capped and landfill gas extracted from this area is utilised in the landfill gas engine since June 2009. Landfill gas extracted from Cell 14 through a horizontal pipe network is also diverted to the gas utilisation engine. Landfill gas extracted from Cell 15 through a horizontal pipe network is diverted to a temporary 500m³/hr flare. All exposed side slopes on Cells 14 and 15 are covered with temporary liner to minimise odours.

Limerick County Council employs a full-time falconer and this prevents birds congregating at the landfill. A daily log of bird activity on site has been completed.

Rodent infestation is prevented by the following measures:

- Application of daily cover material
- Approx 30 bait boxes are at the perimeter of landfill and they are serviced on the first Thursday of every month by Rentokil.

7.0 EMISSIONS AND ENVIRONMENTAL IMPACTS

7.1 Summary Report on Emissions

A summary of emissions is contained in Table 7.1 below.

Table 7.1 Emissions Summary

Emission	Significance
Noise	Noise monitoring during the reporting period indicated daytime LAeq readings at monitoring location M3 exceeded the licence limit. This was due to the operation of petrol driven lawnmower at a nearby residential house and not to landfill activities. All other monitoring locations were within the daytime licence limit of 55dB (A). Night time readings at M1, M4, M5, M6 and M10 exceeded the limit of 45 dB (A) due to dogs barking and distant traffic movements.
Dust	During the course of the year there were no exceedences of the limit of 350 mg/m ² /day as specified in Schedule C.3 of the Waste Licence.
Odour	Odourous compounds measured at the landfill site were all recorded below the Licence limit of detection. Issues with nuisance odours continue to be reduced following restoration of phases and commissioning of the gas flare system.
Landfill Gas	Methane did exceed the trigger level at Monitoring Borehole C21 four times during the monitoring period. Carbon dioxide exceedences have been detected at a number of monitoring points as outlined in Chapter 9. Gas monitoring in gas vents is indicative of early stages of waste decomposition and are also discussed in Chapter 9.
Emission to surface water	There was 5076.90 m ³ of treated leachate discharged to the White River during 2010.
Leachate	A volume of 38,541.65 m ³ was tankered off site to waste water treatment plants.

7.2 Resource and Energy Consumption/Production

Resource and energy consumption/production for the site can be summarised for 2010 as follows:

Table 7.2 Energy Consumption Summary

Energy	2004	2005	2006	2007	2008	2009	2010
Diesel fuel (used for council machinery and pumps)	19,020 litres	10,529 litres	11,947 litres	9,812 litres	27,288 litres	33,793 litres	15,755 litres
Pesticides: BioKill Pro (fly spray) concentrate	900 litres	700 litres	900 litres	750 litres	690 litres	850 litres	500 litres
Electricity consumption	635,700 kWh	517,500 kWh	380,405 kWh	604,631 kWh	469,310 kWh	381,936 kWh	400,329 kWh

7.3 Estimated Annual and Cumulative Quantities of Gas Emitted from the Site

At Gortadroma Landfill there are 16 distinct landfill cells. 15 of these are now occupied by waste. The landfill is considered to be two separate landforms, cells 1-13 as the main area of landfill to date and cells 14-16 as the extension area which may be extended again in the future. Cells 1-14 are connected to a gas engine (600m³/hr) and cell 15 is connected to a temporary gas flare (500m³/hr, 8hr/ day). Two Gassim models have been created to model this scenario. One for those cells connected to the engine (cells 1-14) and one to the temporary flare (cell 15).

Filling operations ceased in Cells 1-13 at the end of September 2007 and recommenced in the extension area at the beginning of October 2007. Waste operations have continued in Cells 14 and 15 since then.

There are currently 130 gas wells at Gortadroma Landfill within Cells 1-13. The landfill gas collected by these vertical wells is transported via a manifold system with two mains connecting to a carrier main and in turn to a 1,500m³/hr gas flare, located within the gas compound within the southern portion of the site. The last wells were connected to this flare in 2008. There are no vertical wells to date within cells 14 -16 yet there is an extensive horizontal gas collection system. As cell 14 and 15 were filled a series of horizontal gas collection pipe-work was installed and connected to a temporary 500m³/hr flare.

Landfill Gas is produced principally in the year after the waste is deposited. Therefore when discussing volumes of gas generated in 2010 it is appropriate to discuss waste quantities and compositions principally from 2009. In 2009 a total of 103,833 tonnes of waste was landfilled at Gortadroma. This was an increase over the previous year, 2008, and as such it would generally be predicted that this would result in a slight increase in the volume of landfill gas generated on-site in 2010. 112,699 tonnes of waste was

deposited in cell 15 in 2010 which would also have some impact on gas generation for that year.

The landfill Gas package, GASSIM (1.52) was used to model the gas production at Gortadroma. Figure 7.1 & Figure 7.2, taken from GASSIM, illustrates the total bulk landfill gas which is generated from the landfill in the period 2000-2010.

For 2010 approximately 744m³/hr of landfill gas was generated from cells 1-14 and approximately 319m³/hr from cell 15, giving a combined volume of 1063m³/hr at the 50th percentile for the median for the year.

Of the total bulk gas generated at Gortadroma in 2010 approximately 550m³/hr was collected from cells 1-14 and used to generate electricity through an engine at the gas compound area. Approximately 200m³/hr was flared from cell 15 (for 8 hours per day on average).

Figure 7.1 Total Bulk Landfill Gas Generated 2000-2010, cells 1-14

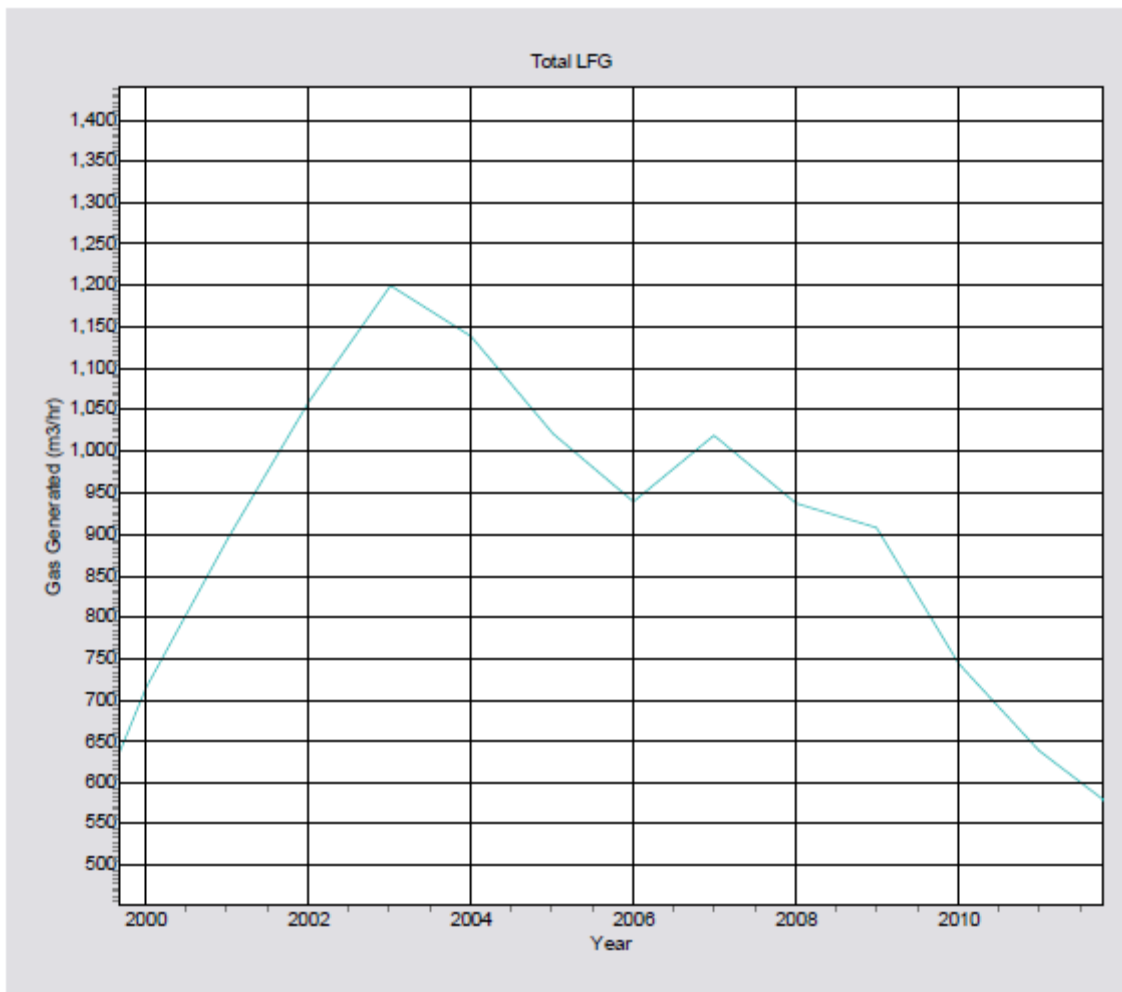
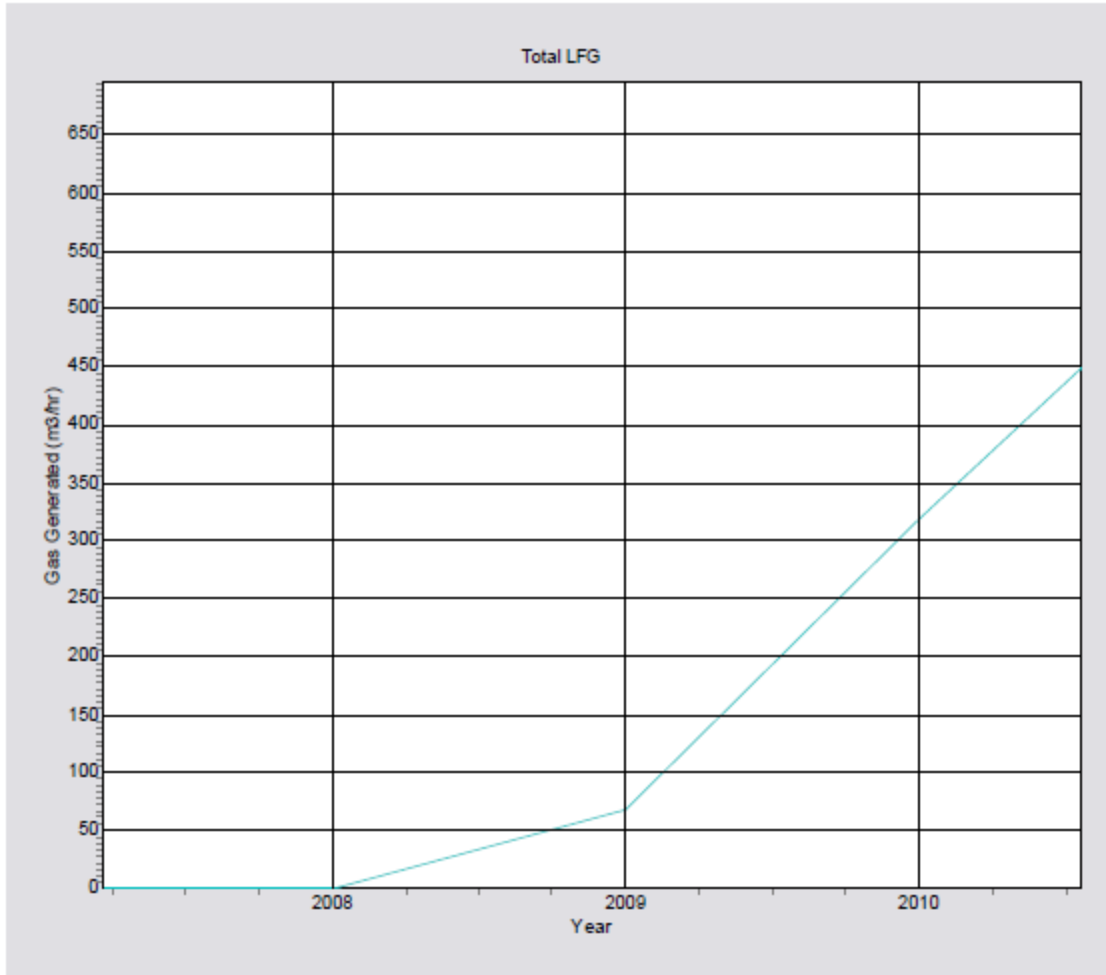


Figure 7.2 Total Bulk Landfill Gas Generated 2008-2010 cell 15



Of the total bulk gas generated at Gortadroma in 2010 approximately 649m3/hr (455 m3/hr from cells 1-14; 194 m3/hr from cell 15) of the total bulk landfill gas generated was modelled as methane. The majority of this was destroyed in the engine and flare. The total output of methane, post combustion from the temporary flare and engine, was modelled at 3.9m3/hr (99% destruction efficiency). The majority of this was from the engine and a low volume came from the 500m3/hr temporary flare.

Figure 7.3 Methane Produced from cells 1-14 and Engine Methane Output (from cells 1-14)

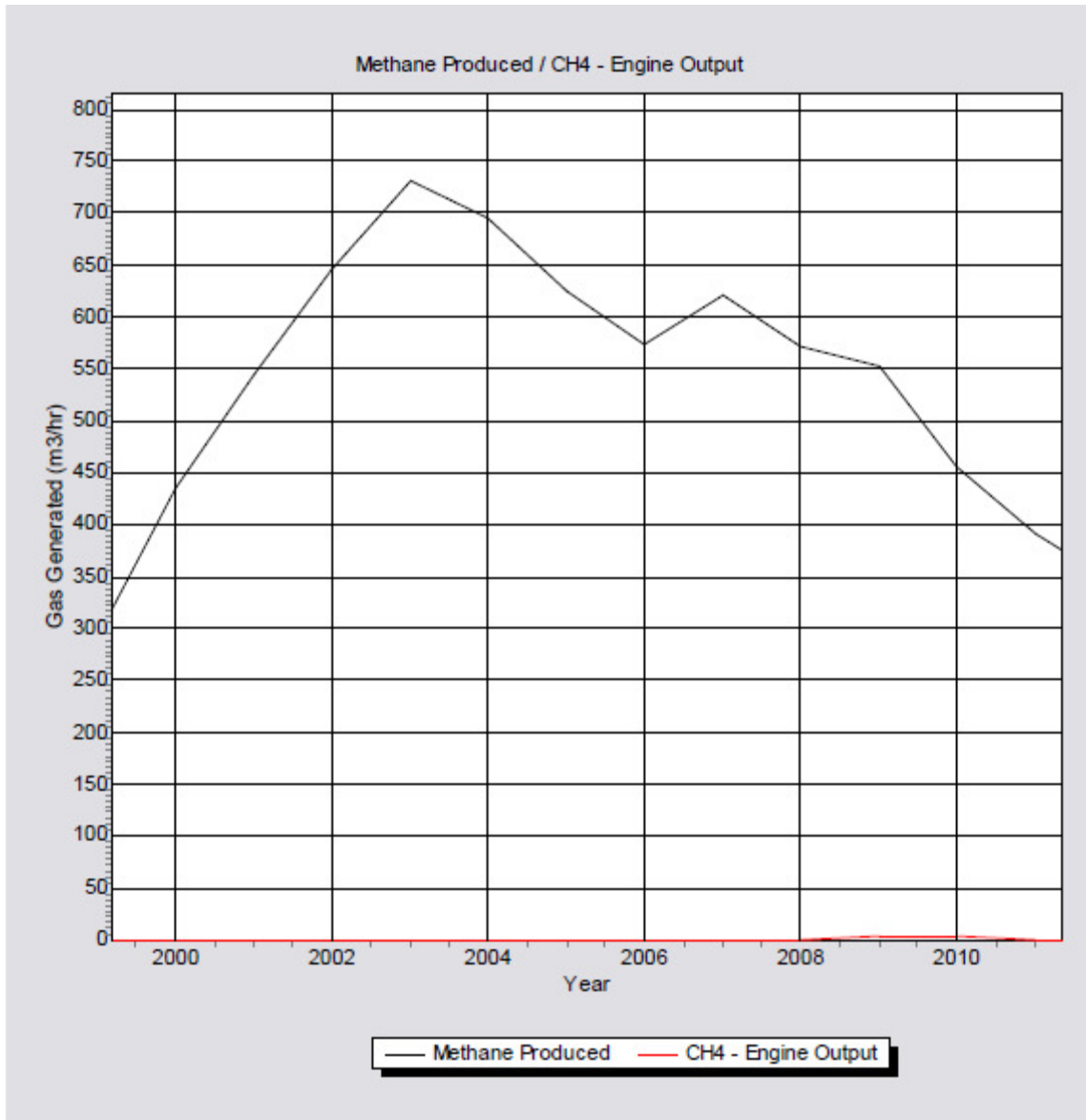
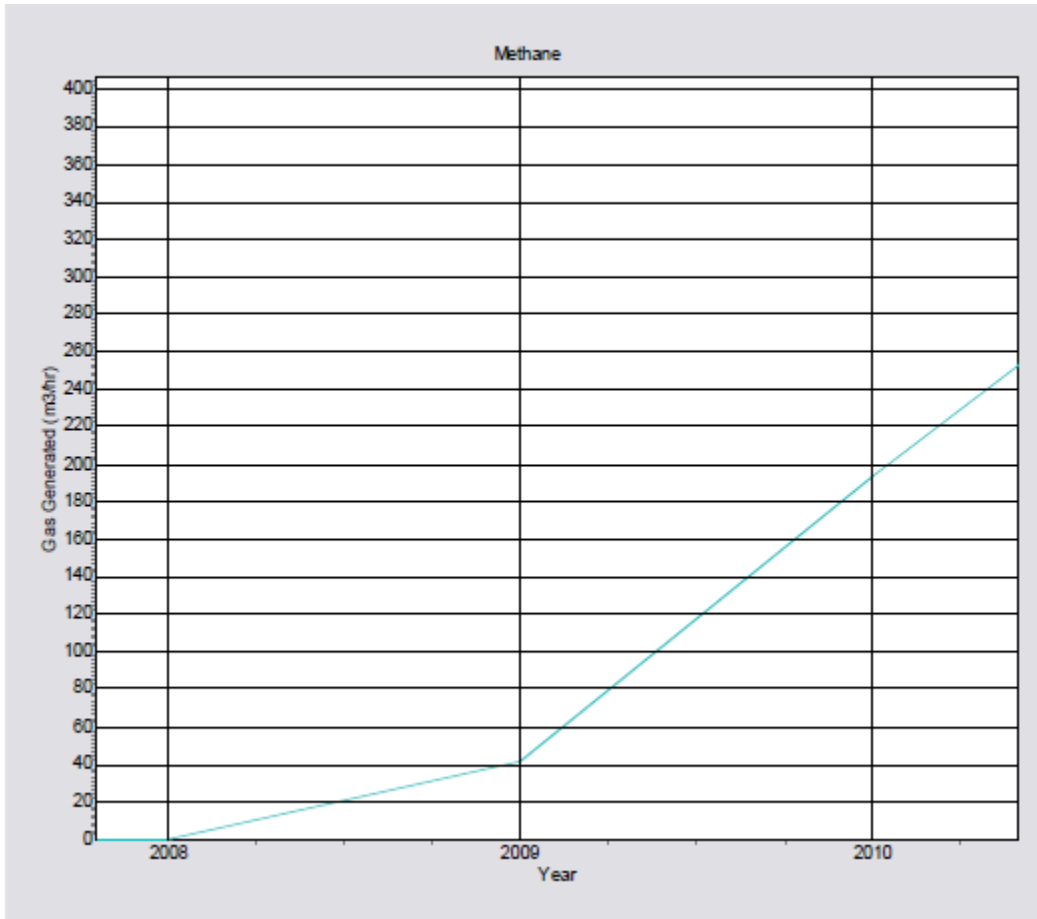


Figure 7.4 Methane Produced from cell 15



GASSIM also estimates the global warming potential of the emissions from Gortadroma Landfill in 2010. This is estimated in tonnes of Carbon Dioxide, as CO₂ is used as a baseline molecule by which the global warming impacts of all gases are measured. Emissions of other greenhouse gases are converted to a CO₂ equivalent on the basis of their global warming potential (GWP). For example, the GWP of methane is 21, which means that one tonne of methane is equivalent to 21 tonnes of CO₂.

According to the GASSIM model of Gortadroma landfill a total of 505 tonnes of methane was emitted from the cells 1-14 and 891 tonnes from cell 15 in 2010. This figure includes all landfill emissions to air. Using a GWP factor of 21 these volumes of methane are equivalent to 29,300 tonnes of Carbon Dioxide. GASSIM also estimates that 10,900 tonnes of Carbon Dioxide was generated, post engine from cells 1-14 and 2,820 tonnes post flare from cell 15 in 2010. Combining these two results yields a total equivalent Carbon Dioxide emission of 43,020 tonnes for 2010 for Gortadroma Landfill.

7.4 Estimated Annual and Cumulative Quantity of Indirect Emissions to Groundwater

Gortadroma Landfill consists of 16 individual landfill cells. Cells 5-16 contain a fully engineered liner while Cells 1-4 have an in-situ clay base. Cells 1-4 have been fully capped with 1m of subsoil/topsoil, drainage blanket, GCL and an LLDPE geosynthetic layer. This capping system essentially prevents any ingress of water into these cells. This removes the possibility of the leachate head increasing and thus assuming that the leachate head will reduce and eventually stabilise and that the emissions to groundwater will be significantly reduced. In addition leachate pumping wells have been installed within each of the four cells. The function of these pumps is to draw down the leachate head within the four cells. These pumps have been operational since mid December 2003 and are drawing the leachate head down constantly. The leachate abstraction wells were re-drilled in August 2004 in an attempt to retrieve leachate from a lower level, since the original wells had run dry. Five wells were drilled, four to abstract leachate and a fifth to monitor the leachate head. Leachate levels were maintained at 1m from the base of the wells throughout the year and additional pumping was carried out when capacity in the treatment plant allowed for it.

Table 7.3 Depths of the wells and the leachate heads

Well ID	Depth of Well b.g.l.	Leachate Levels b.g.l
1/4a	11.4m	10.4
1/4b	12m	11
1/4c	16.7m	15.7
1/4d	13.75m	12.75

The leachate head is reducing within cells 1-4 due to the lack of ingress of water into the cells and the pumping from the cells. The pumps will only activate when there is sufficient volume available in the leachate management system.

At the highest point of cells 1-4 the depth from ground level to the basal clay liner is approximately 14m, and varies between 11 and 16m below the top of the cap across the cells. At present (taking the annual average values) the head of leachate is at between 10-16m (average 12.5m) below ground level, giving an estimated leachate head of 1.5m above the base of the cells. On average, across cells 1-4, the leachate head is assumed to be 1.5m over an area of 22,000m². It is assumed that the waste has an overall moisture content of 25% below this level.

$1.5\text{m} \times 22,000\text{m}^2 \times 0.25 = 8,250 \text{ m}^3$ of leachate within cells 1-4 in 2010. This figure can be used to calculate the hydraulic gradient above the basal clay liner per unit area.

The hydraulic conductivity of the clay liner can be taken to be approximately 1×10^{-9} m/s.

Using Darcy's law, ($Q=kiA$) the flow volume through the clay liner can be calculated as follows:

Where k is the hydraulic conductivity of the clay liner (using 1×10^{-9} in this incidence)

$I = (h + L)/L$ (m/m) is the hydraulic gradient, where h is the head of leachate (taken to be 0.375 in this case because of the relationship between the hydraulic conductivity of the waste and its moisture content) and L is the thickness of the mineral layer (1m in this case), therefore I is 1.375.

A is the area, in this case 22,000m².

Therefore the flow (Q) can be calculated to be $3.0 \times 10^{-5} \text{ m}^3/\text{s}$ through the clay liner at the base of cells 1-4.

For the one-year period of 2010 the flow rate of leachate emissions to groundwater is calculated to be 930 m³/year (or 2.5m³/day).

A 1m head of leachate is not exceeded above the base of the wells, and the pumps within cells 1-4 are rarely operational due to a lack of leachate in the borehole, indicating that their max pumping depths have been achieved at this stage.

It is assumed that as the leachate head is reduced in cells 1-4 through the limited ingress of water and the leachate abstraction pumping, the leachate head within cells 1-4 will continue to reduce, at very low detection rates, thereby reducing the flow rate through the clay basal liner and limiting the emissions to groundwater. Ground water monitoring in the surrounding boreholes should indicate a marked improvement in groundwater quality in the future.

7.5 Theoretical leachate generated vs. tankered

The theoretical leachate generated was calculated for each month of 2010 using the following data.

- Monthly rainfall figures in meters;
- Effective cell area open m² for each month and hard standing area (1,320 m²) from the composting slab and waste inspection area;
- The effective area open for each of the months January to December 2010 was 24,700 m².

Table 7.4 Theoretical Leachate Volumes and Tankered

Month 2010	Rainfall m	Effective area open m²	Theoretical Leachate produced m³	Volume of leachate discharged m³	Volume of leachate tankered off-site m³
January	0.0648	24,700	1600.56	0	4211.88
February	0.0664	24,700	1640.08	1801.9	4,468.03
March	0.0982	24,700	2425.54	908.7	3,496.14
April	0.0898	24,700	2218.06	2366.3	2167.91
May	0.0476	24,700	1175.72	0	116.6
June	0.052	24,700	1284.4	0	2262.26
July	0.2022	24,700	4994.34	0	2044.72
August	0.047	24,700	1160.9	0	3149.97
September	0.1534	24,700	3788.98	0	4392.89
October	0.0977	24,700	2413.19	0	3781.93
November	0.205	24,700	6175	0	4558.66
December	0.0278	24,700	686.66	0	3890.66
Annual Total	1.1519		29,563.43	5076.9	38,541.65

7.6 Volume of Leachate Produced and Volume of Leachate Transported/Discharged off-site

There was 5076.90 m³ of treated leachate discharged to the White River during 2010.

A volume of 38,541.65 m³ was tankered off site to waste water treatment plants. All tankered leachate was collected and sent to wastewater treatment plants (WWTPs) in Castletroy and Newcastle West.

Figures 7.5 to 7.7 summarise daily and monthly volumes of leachate being tankered off-site. The total volume of leachate tankered off-site between January and December 2010 was 38,541.65 m³.

Figure 7.5 2010 Monthly Tankered Leachate

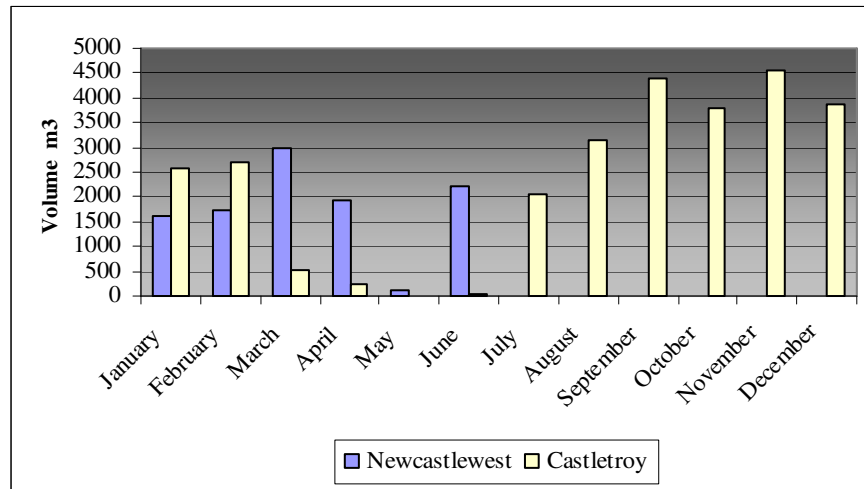
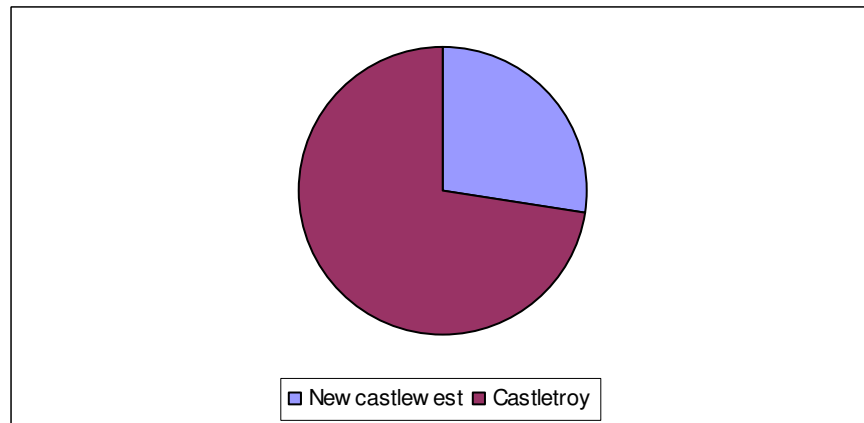


Figure 7.7 Location of Tankered 2010 Leachate



7.7 Monthly Surface Water Balance

The surface water management system at Gortadroma is designed so that all surface water entering the site boundary and all run-off from the site is collected and diverted through the surface water lagoons at the main entrance to the site. The storm water lagoons are the designated point of discharge of surface water from the landfill. The monthly totals of surface water discharged are provided in Table 7.7 below.

The design catchment area for the storm water lagoons is 90 hectares in total. Of the 90 hectares, 35 are the licenced site which contains 11 hectares of landfill area, 3.3 hectares of which are open cells. Approximately 5% of the remaining 24 hectares can be classified as hard standing areas.

The total catchment, which feeds to the surface water lagoons, can be broken down into common permeability areas as follows:

Table 7.5 Percentage run-offs for each area

Area	Type	Percentage Run-off
55 hectares	Agricultural land	35%
11.56 hectares	Landfill area - capped	75%
3.3 hectares	Landfill area - open cells	0%
1.2 hectares	Hardstanding areas	90%
22.8 hectares	Other land within licenced boundary	35%

The predicted estimated flow in l/sec can be assessed using a simple equation based on area, rainfall (for 2010) and percentage run offs from table 7.5. Since the volumes are required monthly a figure for each month has been generated in Table 7.7, and follows the procedure set out below for an annual figure.

$$Q = \text{Area (m}^2\text{)} \times \text{Rainfall (m for 2010)} \times \text{percentage runoff.}$$

The flows for the different areas listed in Table 7.5 above can be calculated and then added together for a total flow in m³/year. Since the rainfall data from 2010 is being used the Total Flow is specifically for 2010.

Table 7.6 Surface water flow from each area and total for the site 2010

Area (m ²)	Rainfall (m)	Percentage Run-Off	Q (m ³ /year)
550,000	1.1519	0.35	221,740.75
115,600	1.1519	0.75	99,869.73
33,000	1.1519	0.00	0
12,000	1.1519	0.90	12,440.52
228,000	1.1519	0.35	91,921.62
Total Flow (m³)			425,972.62

Table 7.7 Monthly Surface Water Balance

Month (2010)	Rainfall (m)	Discharge volumes from surface water lagoons (m ³)
January	0.0648	23,963.04
February	0.0664	24,554.72
March	0.0982	36,314.34
April	0.0898	33,208.12
May	0.0476	17,602.46
June	0.0520	19,229.60
July	0.2022	74,773.56
August	0.0470	17,380.60
September	0.1534	56,727.30
October	0.0977	36,129.46
November	0.2050	75,809.00
December	0.0278	10,280.42
Annual Total	1.1519	425,972.62

Volumes of surface water discharge during 2010 do not include large volumes extracted from the storm water tanks for road spraying. It does not include surface water over topping the retaining berm during very high flows. This method of calculation is a preliminary estimate and does not take account of storm conditions, light rainfalls, lag times between rain falling and entering the stream, evaporation and transpiration and as such is reflecting a larger, more conservative volume of surface water discharged from the site.

8.0 RESTORATION AND AFTERCARE

8.1 Report on restoration of completed cells/phases

The remaining life span of each cell and time frame for restoration of these cells is outlined in Table 8.1. This time frame is estimated at January 2011 filling rates. The restoration dates indicate the period in which the restoration / final capping contract will be carried out. Phase 1 of landfilling has been completed in cell 14 and the 2 exposed site slopes on this cell has been lined with a temporary liner. The top of cell 14 has been temporary capped. Cell 15 was filled to final capacity in January 2011.

A Closure Restoration & Aftercare Management plan (CRAMP) will be developed and submitted to the Agency during 2011.

Table 8.1 Life Spans and Proposed Restoration Dates

Cell No.	Life Span –Years (Based on Current Filling Rates)	Proposed Date for Commencement of Restoration
1-4		Restored
5		Restored
6		Restored
7		Restored
8		Restored
9		Restored
10		Restored
11		Restored
12		Restored
13		Restored
14	Filled to Final Capacity	Q3 2011
15	Filled to Final Capacity	Q3 2011
16	1.6	Q2 2013

9.0 ENVIRONMENTAL MONITORING

Monitoring is carried out according to Schedule C of Waste Licence W0017-04. There is permanent access to all permanent on-site monitoring points. All monitoring equipment was calibrated during the reporting period.

9.1 Landfill Gas

In accordance with Schedule C.2.1 of Waste Licence W0017-04, the following points are monitored on a monthly basis for methane (CH₄), carbon dioxide (CO₂), oxygen (O₂), atmospheric pressure and temperature:

- Perimeter gas monitoring locations - C1 to C22. (Results for perimeter locations have been grouped according to their location at the northern, southern, eastern or western boundary.);
- Gas vents - Cells 1-4, Vents A-D; 5A, 6A, 7A, 9A, 10B, 8B, 11A, 12A, 13B, 14A and 15A;
- Site Office - gas levels continuously monitored and gas alarm installed.

9.1.1 Perimeter Gas Monitoring

Methane

Methane did exceed the trigger level of 1% (v/v) at Monitoring Borehole C21 four times during the monitoring period.

Carbon dioxide

Exceedences of the CO₂ trigger level occurred at several locations during the reporting period and are outlined in Table 9.1.

Table 9.1 Exceedences of CO₂ trigger levels

Location	Date
C2	January, July, August, September, October, November, December
C3	January, February, March, May, June, October, November, December
C4	January, February, March, April, May, June, July, August, September, October, November, December
C5	No exceedences
C7	May, September
C8	May, June
C11	No exceedences
C12	January, February, June
C14	May, June, July, August
C15	May, June
C16	February, April
C17	January, February, March, April, May, June, September, October, November, December
C18	No exceedences
C19	May, June, July, August
C21	January, February, March, April, May, June, July, August, September, October, November, December
C22	January, February, March, April, May, June, July, August, September, October, November, December

These exceedences are not accompanied by elevated methane levels. Exceedences of CO₂ levels at these boreholes have all previously been reported as incidents and are highlighted in all Quarterly monitoring reports.

9.1.2 Site Office Gas Monitoring

Monitoring of methane and carbon dioxide levels in the site office has indicated that there have been no breaches of the trigger levels during the 2010 reporting period.

9.1.3 Gas Vent Monitoring

Gas quality is measured at a total of 15 points. Results for most cells indicate that levels of CH₄ and CO₂ were relatively low for in-waste wells until capping works were completed. Landfill gas levels from mature waste can be in the region of 60% methane, 40% carbon dioxide; these levels are now being seen on occasion in Cells 1 - 4, 5, 6, 7, 8, 9, 10, 11, 12 and 13.

9.1.4 Landfill Gas Utilisation Plant

EURO environmental services personnel conducted the monitoring surveys for the landfill gas utilisation plant on 4th August 2010 and 4th October 2010. No exceedences were recorded during the monitoring occasions for the year.

9.2 Dust

On-site dust monitoring was carried out by EURO environmental services as per Schedule C.3, once per quarter as outlined in Table 9.2 below. Dust monitoring was carried out using Standard Method VDI 2119 (Measurement of Dust-fall, Determination of Dust-fall using Bergerhoff Instrument (Standard Method) German Institute) at six locations labeled D1, D3, D4, D5, D6 and D7 on Figure 1.

Results for dust monitoring are presented in Table 9.2.

Table 9.2 Dust Monitoring Results

Sampling Point	Dust Deposition Rate mg/m ² /day			
	6 th January to 2 nd February 2010	20 th April to 19 th May 2010	15 th July to 24 th August 2010	16 th November to 15 th December 2010
D1	147.7	94.45	250.73	97.7
D3	24.7	87.31	331.11	96.1
D4	60.6	114.22	n/a	35.7
D5	201.2	112.58	130.59	40.6
D6	33.5	229.54	229.03	71.9
D7	57.1	n/a	n/a	260.3

n/a – Dust jar invalid

There were no exceedences of the limit of 350mg/m²/day as specified in Schedule B.1 of the waste license.

9.3 Odour

On-site odour monitoring was carried out quarterly by EURO environmental services as per Schedule C.3. Odour monitoring was carried out at four monitoring locations namely M1, M2, M7 and M10. Monitoring was carried out in order to identify if measurable concentrations of hydrogen sulphide, mercaptans, organic acids and volatile organic compounds were present. In all cases the measured parameters were below the limit of detection.

9.4 Noise

Noise monitoring was conducted by EURO environmental services personnel on the 29th June to 1st July 2010 to satisfy condition 6.9 of Waste Licence Register W0017-04. Results are included in Table 9.3 and in Figures 9.1 and 9.2. The two figures also include the relevant license limit.

Table 9.3 Noise monitoring results

Monitoring Point	LAeq, 30 mins	
	Daytime	Night time
	29 th and 30 th June 2010	29 th , 30 th June and 1 st July 2010
M1	54	53*
M2	47	31
M3	59*	25
M4	45	52*
M5	49	54*
M6	46	50*
M7	36	27
M9	41	37
M10	49	47*
M11	48	39

(* Exceeds license limit)

The report by EURO environmental services included the following conclusions:

Daytime noise measurements exceeded the license limit, of 55 dB(A) at monitoring location M3. This exceedence was not due to landfill activities but was noise from a petrol driven lawnmower operating at a nearby dwelling, horse activity, dogs barking in the distance and vehicles travelling along the Ballyhahill road.

Monitoring locations M1, M4, M5, M6 and M10 were over the night time license limit of 45 dB(A). These exceedences were not due to activities at the landfill site as the site does not operate during the night time. Elevated noise levels measured were mainly due to noise from traffic movements, dogs barking in the distance and the breeze blowing through the trees.

M1, M2 and M11 had tonal components during the daytime survey which were not attributable to the landfill site.

M1 had tonal components during the night time survey which were not attributable to the landfill site.

Figure 9.1 2010 Daytime Noise Results

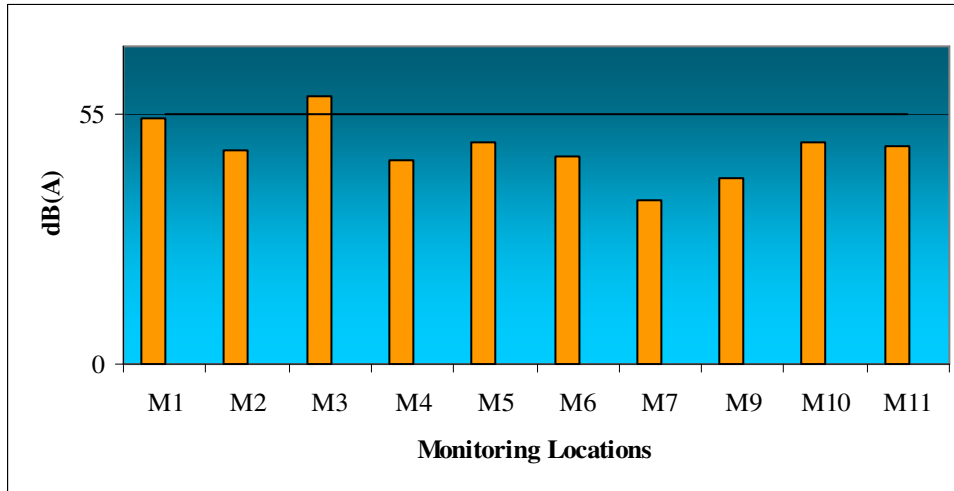
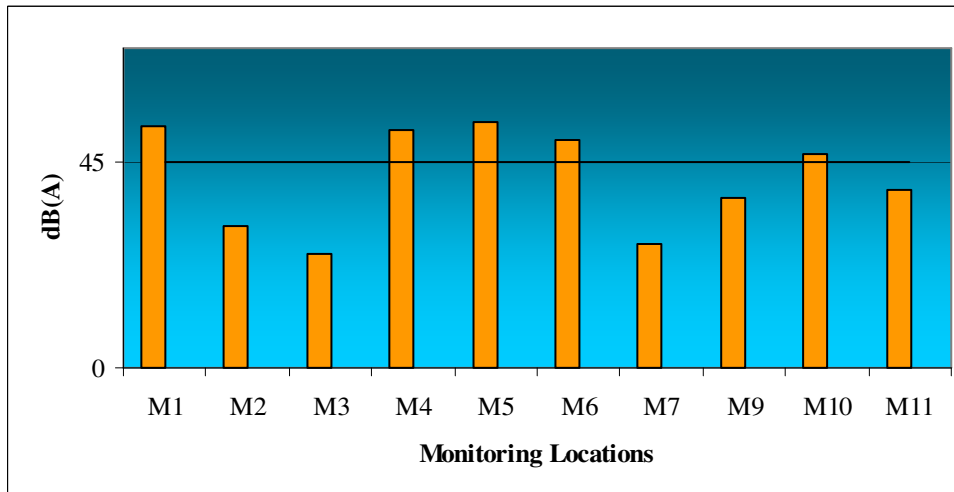


Figure 9.2 2010 Night time Noise Results



9.5 Surface Water

Under Schedules C.2.3 and C.3 of Waste Licence W0017-04 weekly visual inspections and quarterly and annual analysis of surface water monitoring points were conducted at S1, S2, S6, S7, S8, SW1, SW2, SW3, SW4, SW9, SW10 and SW11. In addition, there was weekly analysis of the storm water retention pond (SW4) carried out.

9.5.1 Visual Inspection

Visual inspections are carried out weekly on monitoring points S1, S2, S6, S7, S8, SW1, SW2, SW3, SW4, SW9, SW10 and SW11. Observations of water flow rate, water clarity, colour and vegetation growth are recorded. Inspections throughout the reporting period noted that surface water was generally of good quality. Occasionally there was no flow experienced at monitoring locations SW1, SW2 during 2010.

9.5.2 Chemical Analysis

Quarterly and annual samples from 12 surface water monitoring locations were taken as specified in Waste Licence 0017-04. The results are compared with the Quality Standards for Surface Water, EC (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1988 [S.I. No. 294 of 1989] and the EC (Quality of Salmonid Waters) Regulations, 1988 [S.I. No. 293 of 1988]. The parameters included in the scope of this analysis for which Water Quality Standards exist are listed in Table 9.4 together with the Maximum Admissible Concentration (MAC) for each parameter. It should also be noted that water is not abstracted for potable use from surface water in the immediate vicinity of the site.

The range of conductivity measurements recorded during 2010 was from 160 uS/cm at S6 to 696 uS/cm at SW1. All of the results for conductivity are within the 1000uS/cm limit value as specified in the surface water regulations.

The results for pH for all monitoring locations are of neutral compositions and within the expected range for surface waters.

Ammonia was detected in low concentrations at all monitoring locations. All levels recorded are below the limits specified in the EC (Quality of Salmonid Waters) Regulations, 1988 [S.I. No. 293 of 1988].

The measured results for BOD ranged from <2 mg/L to 3 mg/L. All monitoring location results are within the MAC A3 limit of the Surface Water Regulations. Results have shown that COD concentrations ranged from 13 mg O₂/L to 289 mg O₂/L. COD. Results were shown to exceed the MAC A3 limit at many locations, however this may be due to several factors including stream substrate type and inputs from surrounding peatland.

Chloride results ranged from 5.90 mg/l Cl to 59.46 mg/l Cl at the surface water monitoring locations.

The results for suspended solids for some of the monitoring locations are low at < 2 mg/l. The highest concentration of suspended solids of 4764 mg/l was detected at monitoring location SW2, where the flow of water was very low and disturbance of the bottom

sediments may have caused the high suspended solids result. In total, nine monitoring points exceeded the A1 quality standard MAC of 50mg/L, S2 during Quarter 1 at 650 mg/L; S7 during Quarters 1, 2 and 3 at 1708 mg/L, 162 mg/l and 343 mg/l, respectively; SW2 during Quarter 1 at 4764 mg/L; SW11 during Quarter 1; SW1 during Quarters 3 and 4 at 83 mg/L and 95 mg/l, respectively; SW3 during Quarter 4 at 51 mg/L. However, all surface water is diverted to the surface water settling tank before discharge to the White River.

Storm water samples were collected on a weekly basis and analysed for a number of parameters as described in Schedule C.2.3 of Waste Licence W0017- 04. The trigger levels for the discharge from the storm water tank were not exceeded for suspended solids, pH and Conductivity. The sample collected on the 31/08/10 exceeded the trigger limit for Ammonia. This sample was a grab sample and did not exceed the 1.2 times the emission limit as per licence condition 4.3.3.

The measured results for DO range considerably depending on the time of year. The lower measurement values were recorded at monitoring locations where there was an insufficient flow of water and where turbulence and mixing was minimal. There is no specified DO limit under the surface water regulations.

Results for sulphates ranged from <0.72 mg/l at S1 and S6 to 93.50 at surface water monitoring point SW10. All of the results are within the A1 Quality Standard (SI 298 of 1989) of 250 mg SO₄/l.

Phosphate (Ortho) was detected at concentrations greater than the A1 Surface Water MAC at each location, except for SW1, SW2, SW3, SW9, SW10, S1, S6 and S8. All monitoring locations were within the A1 MAC of 50 ug/L for lead. Iron (Total) was exceeded at monitoring location S7. With regard to the remaining metal parameters other than iron and lead, all locations comply with A1 Standard for Surface Water Quality as per EC (Quality of Surface Water intended for the abstraction of Drinking Water) Regulations 1988.

Table 9.4 Surface Water Quality Standards for Parameters Analysed

PARAMETER	QUALITY STANDARDS			
	SURFACE WATER REGULATIONS [1]			SALMONID WATERS REGULATIONS [2]
	A1 MAC	A2 MAC	A3 MAC	
Temperature, °C	25	25	25	NS
Dissolved oxygen, mg/L	NS	NS	NS	50% ≥9
Dissolved oxygen, % Saturation	> 60%	> 50%	> 30%	NS
Conductivity, µS/cm at 20° C	1000	1000	1000	NS
pH	5.5 – 8.5	5.5 - 9	5.5 – 9.0	6-9
BOD, mg/L O ₂	5	5	7	≤5
COD, mg/L O ₂	NS	NS	40	NS
Chloride, mg/L Cl	250	250	250	NS
Total Ammonium, mg N/L	0.16	≤ 0.80	3.1	≤0.016
Suspended solids, mg/L	50	NS	NS	≤25
Manganese, mg/l Mn	0.05	0.3	1	NS
Copper, mg/l Cu	0.05	0.1	1	NS
Zinc, mg/l Zn	3	5	5	NS
Cadmium, mg/l Cd	0.005	0.005	0.005	NS
Iron, mg/l Fe	0.2	2	2	NS
Sulphates, mg/l SO ₄	200	200	200	NS
Lead, mg/l Pb	0.05	0.05	0.05	NS
Mercury, mg/l Hg	0.001	0.001	0.001	NS
Total Chromium, mg/l Cr	0.05	0.05	0.05	NS

1. EC (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regs, 1988[S.I. No. 294 of 1989] Categories A1, A2 and A3 Surface Waters, as defined in the Regulations are classified on the basis of quality standards requiring simple to intensive methods of treatment. MAC = Maximum Admissible Concentration; NS = Not Specified
2. EC (Quality of Salmonid Waters) Regs, 1988 [S.I. No. 293 of 1988].

9.5.3 Discharge to surface water

There was 5076.90 m³ of treated leachate discharged to surface water in 2010.

9.5.4 White River

As required under Schedule C.3, a biological survey of the White River was conducted on 12th July 2010 at Sites A, B, C and D as shown in Appendix IV.

A summary of trends in biological water quality at these points since 1997 is provided in Table 9.5 below.

Table 9.5 Biological Water Quality along the White River

Site Reference	A	B	C	D
Results 1997	Q4	Q4	Q4	Q4
Results 2000	Q4	Q4	Q4	Q3-4
Results 2001	Q4	Q3-4	Q4	Q3-4
Results 2002	Q4	Q3-4	Q3-4	Q3-4
Results 2003	Q3-4	Q4	Q4	Q4
Results 2004	Q4	Q4-5	Q4	Q4
Results 2005	Q4	Q4	Q4	Q4
Results 2006	Q4	Q4	Q4	Q4
Results 2007	Q4	Q4	Q4	Q4
Results 2008	Q3-4	Q4	Q4	Q4
Results 2009	Q3	Q3	Q3	Q3
Results 2010	Q4	Q4	Q4	Q4

These figures show that water quality has improved at all four locations over the last year. All sites merited a rating of Q4 indicating unpolluted conditions and fair water quality.

The results of the present biological water quality assessment do not indicate any adverse impact on the Owvane River from the landfill at Gortadroma.

Overall, this is a good indicator of the water management at the landfill, as Location B is located upstream of the landfill, C and D are located downstream of the site and A, is located furthest away from the site and all points are achieving a Q4 rating.

9.6 Groundwater

As required under Schedule C.3 of Waste Licence W0017-04, monthly levels were recorded and quarterly/annual analysis conducted on groundwater monitoring points GW2-B, GW2-O, GW8-B, GW8-O, GW SA2, GW3-O, GW5, GW6-O, GW6-B, GW SA1, GW7-B, GW4-O, Collins Well, GW7-O, GW11-B, GW11-O, GW9-B, GW9-O, GW10-O, GW10-B and GW1-O.

9.6.1 Monthly/Quarterly Groundwater Monitoring

When assessing groundwater quality, the limits prescribed in the Drinking Water Regulations (Statutory Instrument No 278 of 2007) are generally used as a guide, based on the principal that uncontaminated groundwater should be potable. Analysis of groundwater during this reporting period indicates that the overall water quality has generally been satisfactory.

Ammoniacal nitrogen has been found in all wells across the site and a number of wells have consistently elevated levels. GW10 had the highest level of ammonia measured across the site with a high of 4.30 mg/L N being recorded here in Quarter 1. Trigger levels set for ammonia at monitoring locations SA1 (1.2 mg/l), GW5 (2.2 mg/l) and Collins Well (1.7 mg/l) were not exceeded at any time during 2010.

The measured results for Electrical Conductivity ranged from 271 μ S/cm to 849 μ S/cm in 2010. Trigger levels set for Conductivity at SA1 (800 μ S/cm), GW5 (800 μ S/cm), and Collins Well (1,500 μ S/cm) were not exceeded at any time during 2010.

Chloride levels were below the trigger levels set for all of the 2010 monitoring period. Sulphate concentrations, where detected, did not exceed the 250 mg/l limit specified in the Drinking Water Regulations for all samples. Concentrations of Sulphate ranged from <0.75 mg/l to 133.93 mg/l (recorded at GW9-O). Groundwater samples analysed were all below the limit of detection for analysis of organic compounds.

The samples for metal analysis were collected in separate bottles and the water acidified. Consistent with previous monitoring events, Manganese and Iron were the only metals that showed elevated levels above the parametric values. However as iron is naturally present and reflects the basic solid geology of the area, these concentrations are of little significance.

Heavy metals Cadmium and Mercury concentrations were below their respective limits of detection. The wells sampled are monitoring wells only and not used for drinking water purposes.

Total Coliforms were detected at 18 sample locations – GW5, GW SA1, GW3-O, GW4-O, GW2-O, GW2-B, GW1-O, GW8-O, GW8-B, GW6-O, GW6-B, GW7-O, GW7-B, GW9-O, GW9-B, GW10-B, GW11-O and GW11-B. Faecal Coliforms were tested through analysis for E. coli. Faecal Coliform concentrations were detected at six sample locations – GW 3-O, GW6- O, GW7-O, GW7-B, GW9-B and GW11-B.

9.6.2 Private Wells

Boreholes sampled were all within the 500m boundary of Gortadroma Landfill. There were 14 boreholes in total both up-gradient and down-gradient of the landfill.

Five wells were determined to be contaminated with Total Coliforms, one well was contaminated with Faecal Coliforms, five wells exceeded the MAC for Total Iron and ten wells exceeded the MAC for Manganese. List I/II substances were not detected at any of the monitoring locations.

South East

Of the seven wells analysed to the south east of the landfill (wells 1-7), four wells had elevated Total Coliform concentrations and one well exceeded the Faecal Coliform concentration above the Maximum Admissible Concentration (MAC), two had elevated levels of Total Iron and five had elevated levels of Manganese.

North West

Parameters that were elevated above the MAC were Total Coliforms on PW17, Total Iron on PW17 and PW18 and Manganese on PW15, PW17 and PW18. As the wells were within 500 metres of each other and are upstream of the landfill site, it is unlikely that the landfill was contributing to the elevated Total Coliform concentrations. Conclusions would indicate that agricultural practices or poor percolation areas might be responsible.

South West

Well number PW20 did show elevated Total Iron concentrations, while PW20 and PW24 showed Manganese concentrations above the recommended MAC.

Limerick County Council has issued the results to all Well Owners and has also issued Boil-Notices where appropriate.

9.7 Leachate

9.7.1 Leachate Levels

Under Schedule C2.5 in Waste License W0017-03, leachate levels in cells are monitored on a weekly basis at two locations in cells 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15. Levels are also monitored in Cells 1 to 4 A, 1 to 4 B and 1 to 4 C. Exceedences in leachate levels of 1m over the top of the liner at the base of Cells 7/9 and 8/10 were reported as an incident to the Agency on the 4th November 2010.

9.7.2 Leachate Composition Analysis

A leachate sample is collected from the raw leachate storage lagoon and analysed on a quarterly and annual basis in accordance with Table C.2.5 in Waste Licence W0017-04. Quarterly monitoring requirements for leachate include measurement of BOD and COD levels. The results for these parameters are within the expected range for leachate from a landfill site.

Conductivity and pH were measured on-site on the day of the sampling. The conductivity result was 11090 $\mu\text{S/cm}$, which is higher than that recorded in 2009 (3380 $\mu\text{S/cm}$). The pH result was 8.1.

Ammonia (701.91 mg/L N) concentrations were higher to those found in the previous annual monitoring. Sulphate (4.86 mg/L SO_4) concentrations were higher to those found in the previous annual monitoring. Chloride concentration was higher than previously with a value of 1127.85 mg/L.

Concentrations of metals were in general higher to the results observed in 2009. Concentrations of Boron (3267 $\mu\text{g/L}$), Cadmium (0.80 $\mu\text{g/L}$), Chromium (159.7 $\mu\text{g/L}$), Copper (234.3 $\mu\text{g/L}$), Cyanide (50 $\mu\text{g/L}$), Iron (3887 $\mu\text{g/L}$), Lead (116 $\mu\text{g/L}$), Mercury (0.61 $\mu\text{g/L}$), Nickel (120 $\mu\text{g/L}$), Zinc (206.3 $\mu\text{g/L}$) were found. Magnesium (47.22 mg/L), Sodium (806.9 mg/L) and Potassium (295.7 mg/L) were also detected.

There was an increase in the concentration of total phosphorous from 0.607 mg/L P to 4.537 mg/L P. There was also an increase in the Orthophosphate concentration from 0.012 mg/L P to 3.232 mg/L P. A fluoride concentration level of 0.28 mg/L was recorded, lower than the previous year.

Pesticides and semi-volatile organic carbons were below the limit of detection. VOCs were detected at a concentration of 14.632 $\mu\text{g/L}$. These relate to the presence of Toluene (4.196 $\mu\text{g/L}$), m-p-Xylene (4.574 $\mu\text{g/L}$), o-Xylene (2.110 $\mu\text{g/L}$), Benzene (0.997 $\mu\text{g/L}$) and 1, 2, 4-Trimethylbenzene.

9.7.3 Leachate Treatment Plant

The following volumes of treated leachate were discharged to the White River during 2010.

Month	Volume of Treated Leachate Discharged m ³
January	0
February	1801.9
March	908.7
April	2366.3
May	0
June	0
July	0
August	0
September	0
October	0
November	0
December	0

All treated leachate discharged during 2010 complied with the licence limits.

9.8 Meteorological Monitoring

Meteorology is monitored in accordance with Schedule C.3 of Waste Licence W0017-04. A Vaisala Meteorological station was installed at the landfill in June 2000. The following parameters are recorded:

- Temperature
- Evaporation
- Evapotranspiration
- Relative Humidity
- Pressure
- Wind Direction
- Wind Speed
- Precipitation

A summary of meteorological data recorded during the reporting period is provided in Appendix V.

9.9 Ecological Monitoring

During the December 2000 ecological survey 98 plant species were identified, 4 more than a survey carried out in 1997. It was considered that there has been no loss of floral biodiversity due to operations of the site since the last survey in 1997.

The ecological survey of August 2001 reported 114 plant species were identified, and no loss of floral, faunal or habitat diversity was noted.

During the ecological survey of July 2002 a total of 129 floral species were noted. This represents a slight increase in diversity, and although seasonal and observational factors must be taken into account, the increase reflects the appearance of many opportunistic grasses and forbs which are common to disturbed ground and which are found around recently disturbed or capped areas of the site.

The Ecological Survey carried out during October 2003 referred new habitats having been created within the landfill site, pointed out that the landfill did not appear to be having any significant impacts on the ecology of the land in the surrounding areas. In relation to the White River the survey indicated that it had an excellent diversity of riparian fauna, with important species such as otter and dipper (and undoubtedly kingfisher), all of which are dependent on good water quality.

The survey carried out in 2004 referred to new habitats been created within the landfill site. Of these, unfertilised grassland (on the consolidated landfill) and immature woodland strips were the most obvious. The landfill does not appear to be having any impacts on the habitats which surround the site, none of which are considered of conservation importance. The White River is the most significant ecological feature in the area. The survey indicated that it had an excellent diversity of riparian fauna, with important species such as otter, kingfisher and dipper, all of which are dependent on good water quality. On available information, the landfill site did not seem to be affecting the populations of these animals.

The 2005 survey was carried out in December and found that the habitats within the landfill site itself were continuing to develop in terms of their establishment and biodiversity. It appeared that the landfill operations were not impacting on the surrounding area, and based on the results of both the aquatic and terrestrial surveys conducted, it would appear that the landfill activities are not having a significant impact on the habitats and species in the riparian zone of the White River.

The 2006 survey found that new habitats have been, and are being, created within the landfill site. Of these, unfertilised grassland, immature woodland and a pond are the most obvious.

The landfill does not appear to be having any impacts on the habitats which surround the site, none of which are considered of conservation importance.

The Owvane/White River is the most significant ecological feature in the area. Survey indicates that it has an excellent diversity of riparian fauna, with important species such as otter, kingfisher and dipper, all of which are dependent on moderate to good water quality. On available information, the landfill site does not seem to be affecting the populations of these animals.

The 2007 survey found that overall the site is currently of minor local ecological value for mammals, especially where construction works are ongoing. It is likely that mammal use of the overall site will increase once construction works have finished, especially in sections set aside from operational activities including screening, planted woodlands, grasslands and ponds. The areas landscaped including the capped landfill and boundary areas are already of some local value for mammals such as Fox (*Vulpes vulpes*), Rabbit (*Oryctolagus cuniculus*), hedgehog (*Erinuseuropaeus*), Wood mouse (*Apodemus sylvaticus*) and Pygmy shrew (*Sorex minutus*). Minor negative impacts on mammals as a result of loss of habitat will be temporary, with long-term positive impacts possible if the site is managed for nature conservation purposes following restoration.

The 2008 survey concluded that the site is currently of minor local ecological value for mammals, particularly in the active landfill area where a high level of related works are ongoing. It is likely that mammal use of the overall site will increase once landfill operations are complete, especially in sections set aside from operational activities including screening, planted woodlands, grasslands and ponds.

The 2009 survey concluded that the Site remains of moderate local ecological interest for birds, particularly in areas which have not been disturbed by ongoing Site activities. Bird usage of the Site appears to have decreased slightly since 2008 in terms of species diversity, with 8 no. species recorded in 2008 not observed in 2009. However, 6 no. species were observed during the 2009 survey which were not observed during the 2008 survey; three of these (skylark, jackdaw, hooded crow) were also recorded in the 2007 survey. Habitats on the Site range from low to moderate local ecological value. Overall the Site is currently of minor local ecological value for mammals, particularly in the active landfill area where a high level of related works are ongoing. It is likely that mammal use of the overall Site will increase once landfill operations are complete, especially in sections set aside from operational activities including screening, planted woodlands, grasslands and ponds.

The 2010 survey, carried out on the 26th July 2010, concluded that in general, habitats on the Site range from low to moderate local ecological value. Areas of wet grassland to the south of the Site, the coniferous and broadleaved treeline and woodland plantations and the hedgerows in the eastern area of the Site provide good foraging and roosting habitat for a variety of bird species. Compared to the 2009 survey the only changes relate to continued recolonisation of bare areas, with a small area of soil excavated for capping purposes (involving the removal of a small area of wet grassland directly adjacent to the active landfill cells). Although areas of wet grassland and hedgerow have been lost in the eastern area of the Site as a result of the construction of the landfill cells, continued phased development and ongoing restoration will ensure that significant areas of semi-natural habitat remain. Two areas of the Site lie within the 'Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle' SPA. These are the restored grassland area to the east of the drainage ditch which divides the eastern and western sections of the Site, and the spruce plantation along the eastern boundary of the Site. As these areas lie within the SPA boundary, they are considered to be of international importance. Overall

the Site is currently of minor local ecological value for mammals, particularly in the active landfill area where a high level of related works are ongoing. The smaller mammals provide a food source for larger mammals such as fox and also for birds of prey such as hen harrier, for which part of the Site is designated as an SPA. Minor negative impacts on mammals at the Site are anticipated as a result of habitat loss; however restoration of former landfill cells to replace lost habitats is likely to reduce these impacts to neutral. It is likely that mammal use of the overall Site will increase once landfill operations are complete, especially in sections set aside from operational activities including screening, planted woodlands, grasslands and ponds.

The White River is known to provide excellent habitat for the EU Annex II species otter (BES, 2006). No evidence of this species' presence was observed on the Site. Ongoing Site activities do not currently appear to impact on the White River or this species.

9.10 Pollution Emission Register

The pollution emissions register is described in Appendix VI.

10.0 CONTINGENCY ARRANGEMENTS

LCC have developed and submitted an Emergency Response Procedure (ERP) to the Agency. The ERP is linked to the Major Emergency Plan for LCC and outlines the activation of the ERP, control of operations and responsibility and demobilisation of the ERP.

11.0 FINANCIAL ARRANGEMENTS

Reports on financial provision made under this licence, management and staffing structure of the facility.

11.1 Financial Provision

LCC had made the necessary provisions to ensure that there is adequate funding for the management, development and restoration of Gortadroma landfill site.

According to condition 12.3 of Waste Licence W0017-04 Limerick County Council must provide, as part of the Annual Environmental Report, a statement on the measures taken or adopted at the site in relation to the prevention of environmental damage, and the financial provisions in place in relation to the underwriting of costs for remedial actions following anticipated events or accidents/incidents, as may be associated with the carrying on of the activity.

This statement is presented in Appendix VIII.

12.0 STAFF TRAINING

Staff training was carried out on updated waste procedures.

APPENDIX I - Objectives and Targets for 2011

Targets & Objective 2011				Target in 2010 EMP.	Responsibility for Project.
Objective	Reason for Underfaking Project	Project Summary	Target in 2010 EMP.	Responsibility for Project.	
1 Install final cap on cells 14/15.	Increase gas collection efficiency and reduce leachate production	SEW to be sent to Agency for agreement. Capping contract to be advertised.	Quarter 3 2011	Limerick County Council.	
2 Temporary liner to be placed on remaining side slope of cell 14/15.	Reduce landfill gas emissions.	Installation to be arranged when final fill heights are achieved in cells 14/15.	Quarter 1 2011	Limerick County Council	
3 Horizontal gas collection pipe work to be installed in cell 16.	Reduce landfill gas emissions	Horizontal gas collection pipe work to be installed during landfill in cell 16.	Ongoing	Limerick County Council	
4 Extend Scada control to pumps in extension area.	Increase control and monitoring.	Pumps and hard wiring installed. Radio control & Scada configuration to be completed.	Quarter 2 2011	Limerick County Council and Dynamic Automation.	

Appendix II – Bund and Aeration Basin Certificates of Integrity



Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

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HIGH DENSITY POLYETHYLENE MEMBRANE (HDPE) INTEGRITY CERTIFICATE

Based on results of the monitoring of integrity of the geomembrane liner as described herein, Geomembrane Testing Services Limited certifies that the geomembrane installation of Gortadroma Landfill Development, Final Settling Lagoon, Ballyhahill, Co Limerick, was carried out in accordance with the Contract Specifications. Further to this, a Mobile Electrical Leak Location Survey (MELLS) was carried out using geophysical techniques, to verify the integrity of the lining system. On completion of this Survey no defects were present within the lined contained area of the Final Settling Lagoon. It is the opinion of Geomembrane Testing Services Limited that the High Density Polyethylene Membrane was free from all defects at the time of final inspection.

Frank Lennon

Geomembrane Testing Services Limited

June 2010



Geomembrane Testing Services Limited

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HIGH DENSITY POLYETHYLENE MEMBRANE (HDPE) INTEGRITY CERTIFICATE

Based on results of the monitoring of integrity of the geomembrane liner as described herein, Geomembrane Testing Services Limited certifies that the geomembrane installation of Gortadroma Landfill Development, First Settling Lagoon, Ballyhabill, Co Limerick, was carried out in accordance with the Contract Specifications. Further to this, a Mobile Electrical Leak Location Survey (MELLS) was carried out using geophysical techniques, to verify the integrity of the lining system. On completion of this Survey no defects were present within the lined contained area of the First Settling Lagoon. It is the opinion of Geomembrane Testing Services Limited that the High Density Polyethylene Membrane was free from all defects at the time of final inspection.

Frank Lennon
Geomembrane Testing Services Limited
June 2010

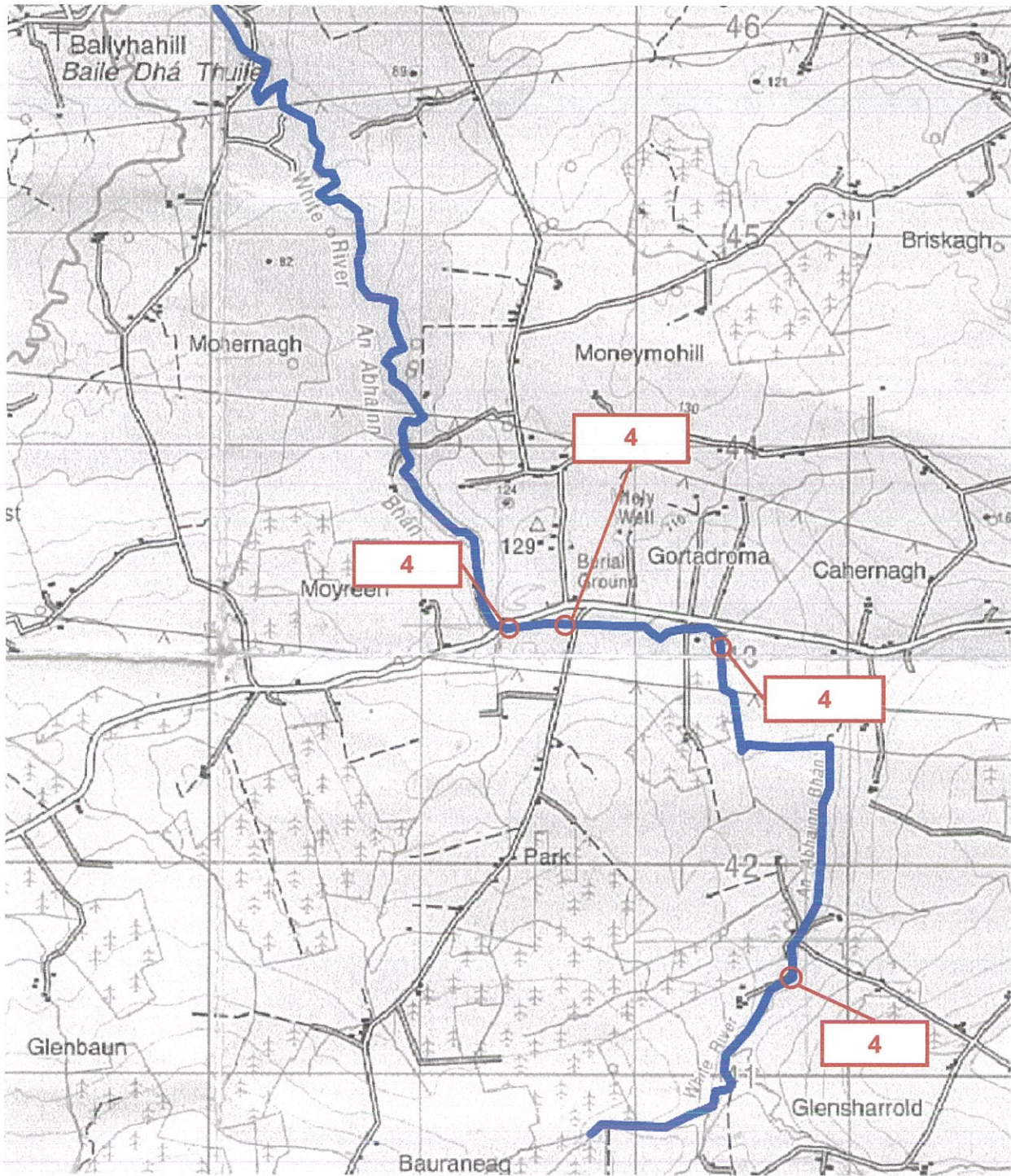
Appendix III - Waste Figures 2010

GORTADROMA WASTE QUANTITIES 2010

SOURCE	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES
COMMERCIAL													
GREENSTAR	37.32	11.60	24.26	9.52	9.98	0.16	12.70	4.58	11.02	34.48	29.40	16.22	201.24
MR. BIN MAN	334.60	210.26	118.28	20.92	65.98	5.74	37.40	9.14	25.48	20.96	15.54	17.64	881.94
BUCKLEY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wards Waste Disposal	15.38	35.18	52.38	45.74	45.30	98.96	27.46	1.06	0.00	33.92	2.08	0.00	357.46
WHITES SKIPS	77.60	190.62	264.60	201.98	75.54	200.88	251.84	110.56	229.54	182.18	173.36	143.82	2,102.52
Fitzgeralds Skip Hire	166.38	148.86	208.70	39.46	53.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	616.48
Ashgrove Recycling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Killarney Waste Disposal	1,263.70	1,008.94	1,098.86	1,194.54	879.26	815.76	914.94	976.14	1,120.72	1,195.90	1,256.80	1,030.52	12,756.08
SUB-TOTAL	1,894.98	1,605.46	1,767.08	1,512.16	1,129.14	1,121.50	1,244.34	1,101.48	1,386.76	1,467.44	1,477.18	1,208.20	16,915.72
PRIVATE DOMESTIC													
MR. BIN MAN (Domestic)	3,176.84	2,823.58	3,141.72	3,065.58	2,997.88	3,239.28	3,196.96	1,811.42	0.00	0.00	0.00	0.00	23,513.26
Mr. BIN MAN (Organic Fines)	1,043.62	905.62	3,154.92	3,690.44	3,067.68	3,154.78	2,870.68	1,113.66	0.00	0.00	0.00	44.10	19,035.50
VEOLIA	11.74	8.48	17.14	41.80	0.00	7.28	0.00	4.32	0.00	0.00	0.00	0.00	90.76
SOUTHWEST BINS	286.74	400.86	503.96	675.32	636.34	596.12	604.44	536.22	627.30	449.26	560.72	527.92	6,305.20
Dillon Waste	896.76	960.90	988.96	1,084.18	1,040.84	977.94	1,088.16	1,092.98	987.32	880.60	807.88	339.00	11,145.52
Clean Ireland	0.00	0.00	0.00	0.00	0.00	76.34	113.44	327.12	979.20	804.48	93.82	67.12	2,461.52
Country Clean	2,124.62	2,115.90	2,306.28	2,359.38	2,188.86	2,348.54	2,351.44	2,212.34	2,606.12	2,874.46	3,069.68	3,016.86	29,574.48
Local Residents	9.04	9.96	6.30	9.76	7.14	10.46	10.74	10.90	10.56	10.28	11.28	9.24	115.66
Cash	207.42	190.06	236.20	250.00	234.09	209.12	240.18	147.56	172.50	152.04	155.34	137.48	2,331.99
SUB-TOTAL	7,756.78	7,415.36	10,355.48	11,176.46	10,162.83	10,679.86	10,476.04	7,256.52	5,283.00	5,171.12	4,698.72	4,141.72	94,573.89
INDUSTRIAL WASTE													
GREENSTAR (Anderson IRL)	0.00	0.00	0.00	0.00	0.00	0.00	13.76	14.62	13.62	13.02	48.70	0.00	103.72
Limerick County Council													
Housing/Roads/Sanitary	28.52	15.26	100.46	18.08	32.20	15.00	22.10	17.42	31.06	36.16	29.80	17.14	363.20
ENVIRONMENT SECTION	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.26
BRING Banks	7.42	3.52	1.66	13.14	10.16	6.20	2.30	1.08	0.00	0.00	0.00	0.00	45.48
Civic Amenity Sites	0.00	2.84	1.98	0.00	14.94	44.20	12.84	0.00	1.38	0.00	0.00	0.00	78.18
Street Cleaning	0.00	0.00	2.78	2.80	0.00	2.74	7.00	0.00	4.20	0.00	0.00	0.00	19.52
SUB-TOTAL	35.94	22.02	106.88	34.02	57.30	68.14	44.24	18.50	36.64	45.02	29.80	17.14	515.64
City Council Street Cleaning	42.54	31.62	54.68	50.22	42.20	54.06	37.42	33.04	36.68	59.58	57.34	0.00	499.38
Screenings													
Cork County Council	3.62	2.48	4.42	8.80	5.40	8.52	8.48	6.96	8.26	7.22	12.34	0.00	76.50
EPS Mallow	2.52	0.00	2.08	0.00	2.78	0.00	2.20	0.00	2.28	0.00	2.78	0.00	14.64
SUB-TOTAL	6.14	2.48	6.50	8.80	8.18	8.52	10.68	6.96	10.54	7.22	15.12	0.00	91.14
GRAND TOTAL	9,736.38	9,076.94	12,290.62	12,781.66	11,399.65	11,932.08	11,826.48	8,431.12	6,767.24	6,763.40	6,326.86	5,367.06	112,699.49

Appendix IV - Map of Biological Monitoring Locations

MAP 2 Q-RATINGS AT BIOLOGICAL MONITORING SITES



Appendix V - Meteorological Data

Annual Meteorological Report

2010

Gortadroma Landfill Site

Waste Licence 0017-04

Limerick County Council

1.0 Introduction

The meteorological station was installed at the Gortadroma landfill in June 2000. The system records hourly and daily values for the various parameters. Data is normally downloaded on a daily basis. However the system is capable of holding eleven days logged files and this ensures that data is recorded when the site is closed at weekends. Precipitation values are recorded automatically and a vat at the rear of the reception building is measured every day to calculate evaporation. The system is serviced and calibrated on an annual basis.

2.0 Attached graphs and data

A number of graphs are attached which summarise the data over the course of the year. These graphs include temperature (24 hour average), Atmospheric pressure (24 hour average), wind speed (24 hour average) and monthly rainfall values. Figure 1 shows the average temperature variation over the course of the year, the range of average temperature was in the order of -9.0 to 17°C . Figure 2 shows the average atmospheric pressure variation over the course of the year, which was in the order of 954 to 1030 hP a. Figure 3 shows that the average wind speed was in the order of 0 m/s to 9.4 m/s. Figure 4 shows the monthly rainfall values. November was the wettest month and December was the driest month.

The annual rainfall recorded was 1151.9 mm and the annual evaporation was 670.23 mm.

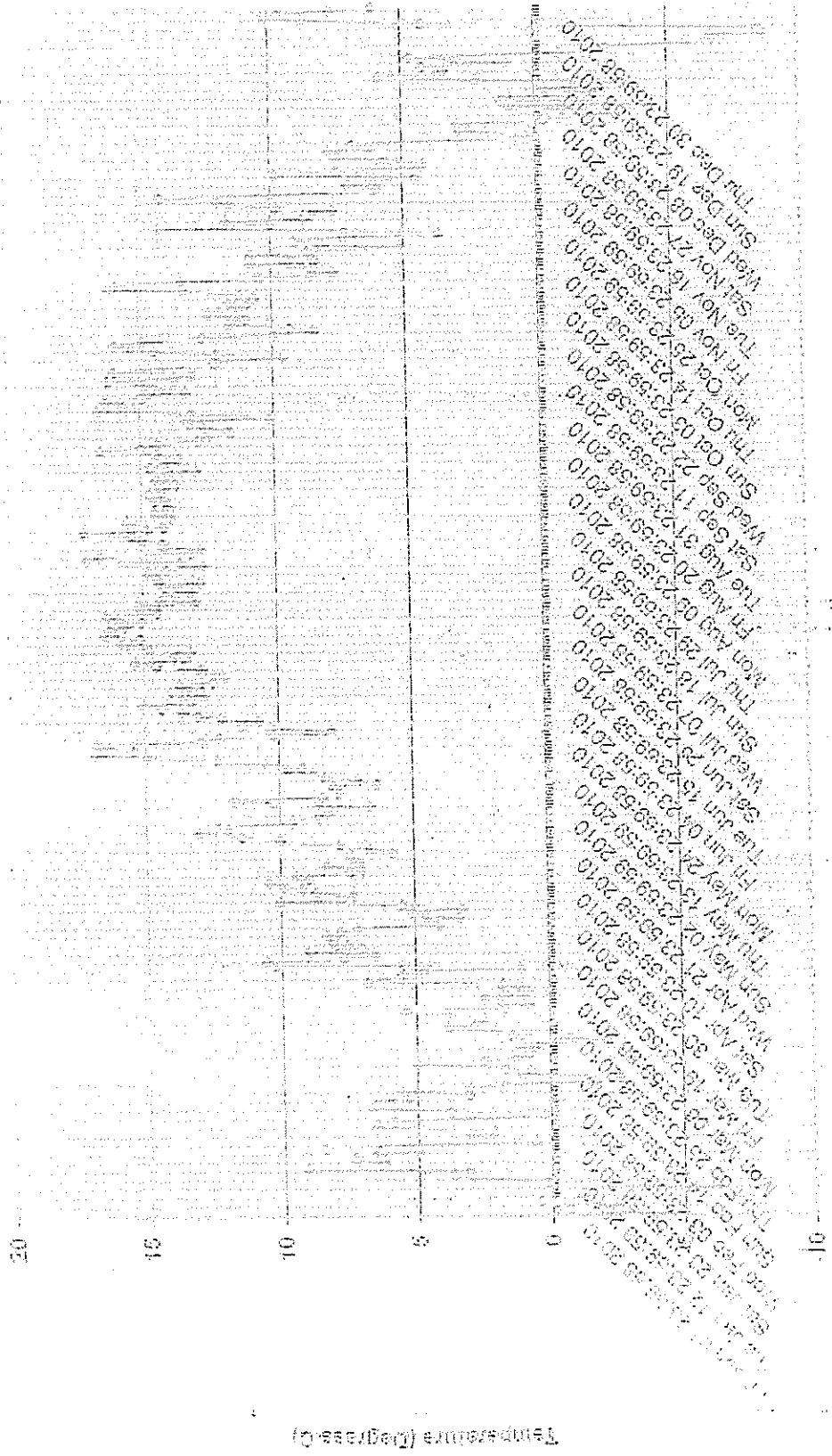
A complete copy of all data is attached for your information and includes the following:

- ◆ Precipitation
- ◆ Evaporation
- ◆ Evapotranspiration
- ◆ Pressure
- ◆ Temperature
- ◆ Wind speed
- ◆ Wind direction
- ◆ Humidity

3.0 Conclusion

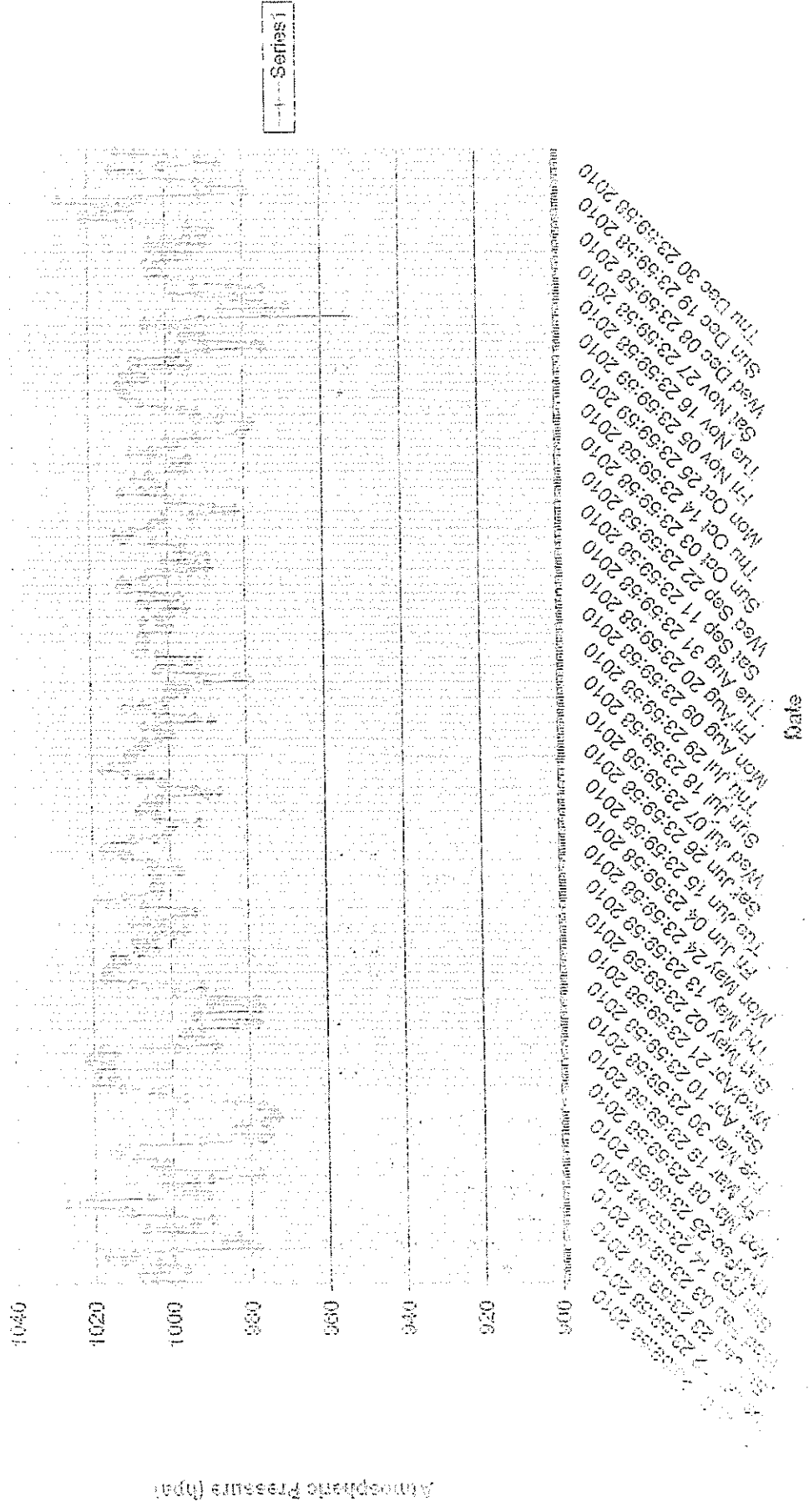
The meteorological station was a vital component in the operation of our high winds procedure at the site over the course of the year. The precipitation value of 1151.90 mm was 489.51 mm less than recorded the previous year. The evaporation value of 670.23 mm was 17.78 mm greater than the previous year.

Temp (24 Hr Avg)-Figure 1

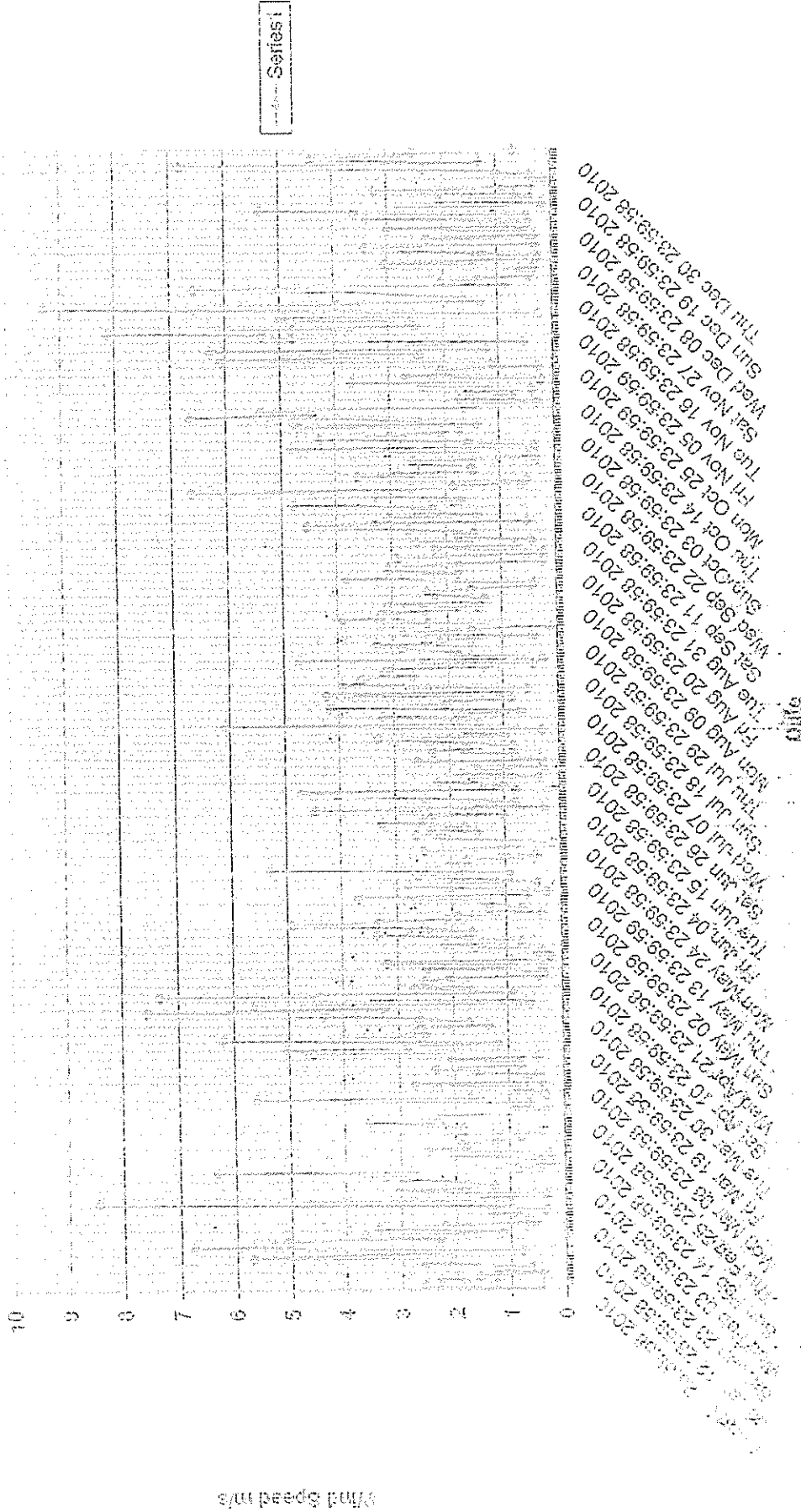


Series1

Pressure (24 hr Avg)- Figure 2

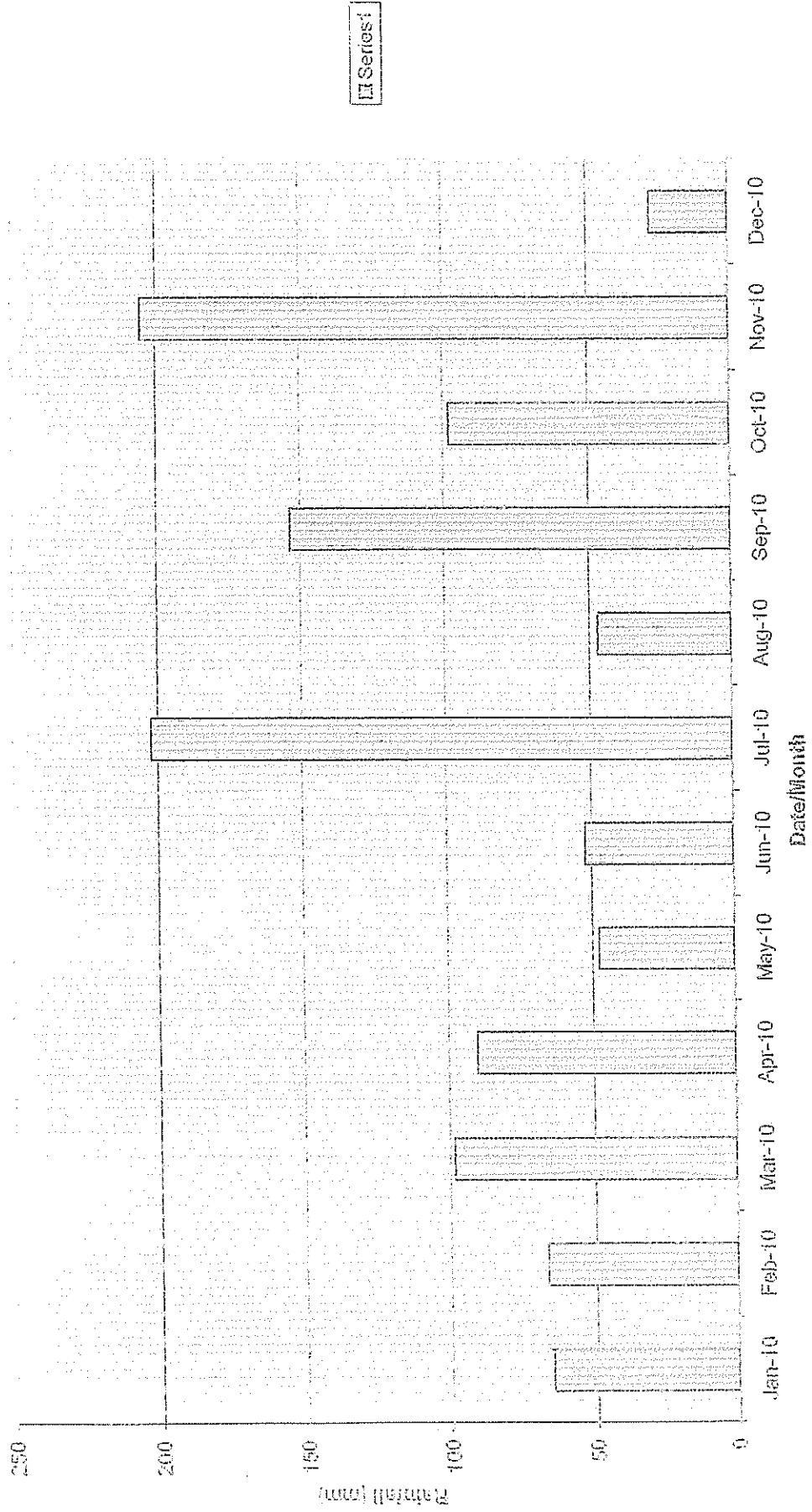


Wind Speed-24 hr Avg-Figure 3



Series1

Precipitation 2010- Figure 4



Appendix VI - Pollution Emissions Register



Environmental Protection Agency

| PRTR# : W0017 | Facility Name : Gortadroma Landfill Site | Filename : W0017_2010.xls | Return Year : 2010 |

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.11

REFERENCE YEAR	2010
----------------	------

1. FACILITY IDENTIFICATION

Parent Company Name	Limerick County Council
Facility Name	Gortadroma Landfill Site
PRTR Identification Number	W0017
Licence Number	W0017-04

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.
3.1	Deposit on, in or under land (including landfill).
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.
3.6	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	Gortadroma
Address 2	Ballyhahill
Address 3	Co. Limerick
Address 4	

Country	Ireland
Coordinates of Location	-9.14882 52.5393
River Basin District	IEGBNISH
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	John OCarroll
AER Returns Contact Email Address	jocarroll@limerickcoco.ie
AER Returns Contact Position	Facility Manager
AER Returns Contact Telephone Number	069 82355
AER Returns Contact Mobile Phone Number	087-7565449
AER Returns Contact Fax Number	069-82350
Production Volume	0.0
Production Volume Units	
Number of Installations	1
Number of Operating Hours in Year	2210
Number of Employees	9
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
5(d)	Landfills
50.1	General

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

Is it applicable?	
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 ?	

4.1 RELEASES TO AIR [Link to previous years emissions data](#)

PRTR# : W0017 | Facility Name : Gostadroma Landfill Site | File Name : W0017_2010.xls | Return Year : 2010

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

No. Annex II	POLLUTANT	Name	METHOD		Gas Engine Emission Point 1	QUANTITY		
			Method Code	Method Used		T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
01	Methane (CH4)		E	ESTIMATE	0.0	1398000.0	0.0	1398000.0
03	Carbon dioxide (CO2)		E	ESTIMATE	0.0	13720000.0	0.0	13720000.0
08	Nitrogen oxides (NOx/NO2)		M	ALT	1752.0	1752.0	0.0	0.0
11	Sulphur oxides (SOx/SO2)		M	ALT	762.12	762.12	0.0	0.0
02	Carbon monoxide (CO)		M	ALT	5936.16	5936.16	0.0	0.0
05	Particulate matter (PM10)		M	ALT	8.76	8.76	0.0	0.0

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

SECTION B : REMAINING PRTR POLLUTANTS

No. Annex II	POLLUTANT	Name	METHOD		Emission Point 1	QUANTITY		
			Method Code	Method Used		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 edit button

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

Pollutant No.	POLLUTANT	Name	METHOD		Emission Point 1	QUANTITY		
			Method Code	Method Used		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 edit 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 the CH4 gas (flared) quantities of methane flared and / or utilised

Landfill: Gostadroma Landfill Site

Total estimated methane generation (as per site model)	Methane flared	Methane utilised in engines	Net methane emission (as reported in Section A above)	Method Used		Facility Total Capacity m3 per hour
				Method Code	Designation or Description	
T (Total) kg/year				E	GasSim Model	N/A
4076317.0				C	On Site Records	2000.0 (Total Flaring Capacity)
468293.7				C	On Site Records	600.0 (Total Utilising Capacity)
1376172.5					GasSim Model	N/A
1398000.0					GasSim Model	N/A

DATE ON WHICH MATERIALS OF THIS NATURE WERE OR GRADUALLY INTRODUCED TO THE ENVIRONMENT. SHOULD NOT BE SUBMITTED UNDER AER/PRTR Reporting as this only concerns RE

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS	POLLUTANT	UNIT	RELEASES TO WATERS		QUANTITY	
			Emission Point 1	Emission Point 2	A (Accidental) KG/Year	F (Fugitive) KG/Year
3.1.2.3	Carbon and compounds (as CO)	M	0.043	0.0	0.043	0.0
3.1.2.3	Carbon and compounds (as CO ₂)	M	0.247	0.0	0.247	0.0
3.1.2.3	Carbon and compounds (as CH ₄)	M	2.812	0.0	2.812	0.0
3.1.2.3	Carbon and compounds (as C ₂ H ₆)	M	1.619	0.0	1.619	0.0
3.1.2.3	Carbon and compounds (as H ₂)	M	0.178	0.0	0.178	0.0
3.1.2.3	Carbon and compounds (as N ₂)	M	2.253	0.0	2.253	0.0
3.1.2.3	Carbon and compounds (as SO ₂)	M	0.043	0.0	0.043	0.0
3.1.2.3	Carbon and compounds (as SO ₃)	M	0.426	0.0	0.426	0.0
3.1.2.3	Carbon and compounds (as H ₂ O)	M	0.043	0.0	0.043	0.0
3.1.2.3	Carbon and compounds (as H ₂ O ₂)	M	0.426	0.0	0.426	0.0
3.1.2.3	Carbon and compounds (as CO ₂)	M	0.043	0.0	0.043	0.0
3.1.2.3	Carbon and compounds (as CH ₄)	M	0.043	0.0	0.043	0.0
3.1.2.3	Carbon and compounds (as C ₂ H ₆)	M	0.213	0.0	0.213	0.0
3.1.2.3	Carbon and compounds (as H ₂)	M	0.426	0.0	0.426	0.0
3.1.2.3	Carbon and compounds (as SO ₂)	M	0.213	0.0	0.213	0.0
3.1.2.3	Carbon and compounds (as SO ₃)	M	0.426	0.0	0.426	0.0
3.1.2.3	Carbon and compounds (as H ₂ O)	M	0.426	0.0	0.426	0.0
3.1.2.3	Carbon and compounds (as H ₂ O ₂)	M	0.426	0.0	0.426	0.0
3.1.2.3	Carbon and compounds (as CO ₂)	M	0.043	0.0	0.043	0.0
3.1.2.3	Carbon and compounds (as CH ₄)	M	0.213	0.0	0.213	0.0
3.1.2.3	Carbon and compounds (as C ₂ H ₆)	M	0.426	0.0	0.426	0.0
3.1.2.3	Carbon and compounds (as H ₂)	M	0.426	0.0	0.426	0.0
3.1.2.3	Carbon and compounds (as SO ₂)	M	0.213	0.0	0.213	0.0
3.1.2.3	Carbon and compounds (as SO ₃)	M	0.426	0.0	0.426	0.0
3.1.2.3	Carbon and compounds (as H ₂ O)	M	0.426	0.0	0.426	0.0
3.1.2.3	Carbon and compounds (as H ₂ O ₂)	M	0.426	0.0	0.426	0.0
3.1.2.3	Carbon and compounds (as CO ₂)	M	6885.55	0.0	6885.55	0.0
3.1.2.3	Carbon and compounds (as CH ₄)	M	11234.2	0.0	11234.2	0.0
3.1.2.3	Carbon and compounds (as C ₂ H ₆)	M	0.213	0.0	0.213	0.0
3.1.2.3	Carbon and compounds (as H ₂)	M	0.013	0.0	0.013	0.0

SECTION B : REMAINING PRTR POLLUTANTS

POLLUTANT	RELEASES TO WATERS		QUANTITY	
	Emission Point 1	Emission Point 2	A (Accidental) KG/Year	F (Fugitive) KG/Year
	0.0	0.0	0.0	0.0

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

POLLUTANT	RELEASES TO WATERS		QUANTITY	
	Emission Point 1	Emission Point 2	A (Accidental) KG/Year	F (Fugitive) KG/Year
	103.2	3.57	117.17	0.0
	851.94	23.2	875.14	0.0
	20850.7	0.0	20850.7	0.0
	2125.0	118.2	2247.2	0.0

4.3 RELEASES TO WASTEWATER OR SEWER

[Link to previous years emissions data](#)

IPRTTR - W0017 Facility Name - Godalming Levee Site | Permit - W0017_2010.xls | Return Year

SECTION A : PRTR POLLUTANTS

No. Annex II	Name	M	METHOD		QUANTITY		
			Method Code	Method Used (Destination or Description)	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
13	Total Phosphorus	M	OTH	Digestion/Composting	66.1	0.0	0.0
				Lacharia Treated to WWT	66.1	0.0	0.0
				Emission Point 1			

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

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

Pollutant No	Name	M	METHOD		QUANTITY		
			Method Code	Method Used (Destination or Description)	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
303	BOD	M	OTH	Electrometry	1029.1	0.0	0.0
240	Suspended Solids	M	OTH	Filtration/Drying @ 104C	1900.1	0.0	0.0
238	Ammonia (as N)	M	OTH	Chlorimetry	256.3	0.0	0.0
				Emission Point 1			

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

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE | PRTR# : W0017 | Facility Name : Gortadroma Landfill Site | Filename : W0017_2010.xls | Return Year : 2010 | Please enter all quantities on this sheet in Tonnes

18/02/2011 15:21

Transfer (Destination)	European Waste Code	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Licence/Permit No of Recover/Disposer	Licence/Permit No of Receiving Facility	Name and Address of Final Disposition (HAZARDOUS WASTE ONLY)	Name and Address of Final Disposition (HAZARDOUS WASTE ONLY)
					MCCE	Method Used					
Within the Country	20 01 39	5.8	plastics	R5	M	Weighted	Offsite in Ireland	Marwin Environmental Trading Ltd ,Reg No. IRE/G02708	The Rubicon Centre,CIT reland Campus Bishopstown,Cork,Ireland		
Within the Country	20 01 95	1.38	Tetra Packs	R5	M	Weighted	Offsite in Ireland	Marwin Environmental Trading Ltd ,Reg No. IRE/G02708	The Rubicon Centre,CIT reland Campus Bishopstown,Cork,Ireland		
Within the Country	20 01 01	24.74	Newspapers & Magazines	R5	M	Weighted	Offsite in Ireland	Marwin Environmental Trading Ltd ,Reg No. IRE/G02708	The Rubicon Centre,CIT reland Campus Bishopstown,Cork,Ireland		
Within the Country	20 01 02	11.29	glass	R5	M	Weighted	Offsite in Ireland	MR. BINIHAN,W0016-03 Marwin Environmental Trading Ltd ,Reg No. IRE/G02708	Luddenmore,Granaga,Kilmallock,Limerick,Ireland		
Within the Country	20 01 01	23.75	Cardboard	R5	M	Weighted	Offsite in Ireland	MR. BINIHAN,W0016-03 Marwin Environmental Trading Ltd ,Reg No. IRE/G02708	The Rubicon Centre,CIT reland Campus Bishopstown,Cork,Ireland		
Within the Country	20 01 99	2.69	Food Cans	R5	M	Weighted	Offsite in Ireland	MR. BINIHAN,W0016-03 Marwin Environmental Trading Ltd ,Reg No. IRE/G02708	Luddenmore,Granaga,Kilmallock,Limerick,Ireland		
Within the Country	20 01 40	1.67	Drink cans	R5	M	Weighted	Offsite in Ireland	MR. BINIHAN,W0016-03 Marwin Environmental Trading Ltd ,Reg No. IRE/G02708	Luddenmore,Granaga,Kilmallock,Limerick,Ireland		
Within the Country	20 01 11	4.12	textiles	R5	M	Weighted	Offsite in Ireland	Cookstown Textile Recyclers,VLNO,VAMEK 01/11	Cookstown ,Tyone,Ireland	EMR,EAWML40041/SL0957	Benilly Road South,Darlaston,West Midlands,WS108LW,United Kingdom
Within the Country	20 01 35	24.1	Fridge Freezers	R5	M	Weighted	Offsite in Ireland	KMK Metals,W0113/93	Cappincur Industrial Estate ,Dailigean Road,Tullamore,Offaly,Ireland		
Within the Country	20 01 30	15.4	LDA-Non-hazardous	R5	M	Weighted	Offsite in Ireland	KMK Metals,W0113/93	Cappincur Industrial Estate ,Dailigean Road,Tullamore,Offaly,Ireland		
Within the Country	20 01 36	17.48	Small WEEE self and stones other than those mentioned	R5	M	Weighted	Offsite in Ireland	KMK Metals,W0113/93	Cappincur Industrial Estate ,Dailigean Road,Tullamore,Offaly,Ireland		
Within the Country	17 05 04	4760.7	in 17 05 03	R5	M	Weighted	Onsite in Ireland	Gortadroma Landfill,W0017-04	Ballynahilly,.....Limerick,Ireland		
Within the Country	17 01 03	554.1	tiles and ceramics	R5	M	Weighted	Onsite in Ireland	Gortadroma Landfill,W0017-04	Ballynahilly,.....Limerick,Ireland		
Within the Country	19 12 12	2554.54	Mechanically treated C&D Waste	R5	M	Weighted	Onsite in Ireland	Gortadroma Landfill,W0017-04	Ballynahilly,.....Limerick,Ireland		
Within the Country	20 01 40	53.28	Mixed scrap metal	R5	M	Weighted	Offsite in Ireland	ERIN RECYCLERS,WFS008/93	Quay,Finiskin,Sligo		
Within the Country	19 07 03	27931.62	in 19 07 02	D8	M	Weighted	Offsite in Ireland	Casfilloy Waste Water Treatment Plant,D0019201	Harbour,Sligo ,Ireland		
Within the Country	19 07 03	10610.03	in 19 07 02	D9	M	Weighted	Offsite in Ireland	Newcastlewest West Waste Water Treatment Plant,D0109701	Casfilloy,.....Limerick,Ireland		

* Select a row by double-clicking the Description of Waste then click the site status

Appendix VII - Financial Provision

Box 3

Detail any loans associated with the acquisition, setting-up, development or operation of the facility.

In each case detail the:

- Reason for the loan
- Total value of the loan
- Amount repaid at start of this year
- Annual schedule of repayments
- Remaining duration of the loan

See Attachment B

Box 4

Estimated costs, during a period of not less than 30 years or such greater period as may be prescribed, of the closure, restoration, remediation or aftercare of the facility

€ 6.0 m

Source of estimated costs: *Own calculations*

Detail the status of and arrangements in place to cover the above costs.

For example, a fund covering these costs fully may be in place or there may be an arrangement to pay into an annually accruing fund in which case the current value of the fund and the schedule of payments should be detailed.

See Attachment C

Box 5		
	Income (€)	Expenditure (€)
Total income from waste intake for disposal this year (excluding landfill levy)	5,437,783	
Amount paid this year to service any loans associated with the acquisition, setting-up, development or operation of the facility	=	3,805,207*
Amount paid this year to contribute to closure, restoration, remediation or aftercare costs		338,097
Nett operational and infrastructure costs this year ¹		1,944,567
Do not include costs already covered under loans above.		
Income – Expenditure	- € 650,088 *	
Balance carried forward from previous years	€ 16,605,877	
Balance carried forward to next year	€ 15,955,789	

¹ For example, costs such as payroll, provision of daily and intermediate cover, provision of lined cells, leachate and gas management, capping cells, environmental monitoring, environmental insurance, etc. less income (e.g. from electricity generation)

Box 6
<p>Please indicate if you wish the information supplied to be deemed confidential and state reason(s) for the information to be held in confidence.</p> <p>Information to be held in confidence Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p>If yes, the reason(s) for information to be held in confidence must be stated:</p> <p><i>In competition with other landfills</i></p>
<p>Note: Public Bodies are subject to the provisions of FOI and AIE legislation.</p>

* See Attachment D for further information

Declaration

I hereby certify that the aggregate of the amount of charges imposed by Limonick Co. Co. [name of licensee] in respect of the disposal of waste at Gortachrome landfill Unit 01 [name of landfill and Waste Licence Registration Number] during 2010 [year covered by statement] were not less than the amount that would meet the total of the following costs (irrespective of whether those costs, or any of them, have been or will be met from other financial measures available to the operator), namely—

- (a) the costs incurred by the operator in the acquisition or development, or both (as the case may be), of the facility,
- (b) the costs of operating the facility during the relevant period (including the costs of making any financial provision under section 53), and
- (c) the estimated costs, during a period of not less than 30 years or such greater period as may be prescribed, of the closure, restoration, remediation or aftercare of the facility.

I further certify that the information given in this form is truthful, accurate and complete.

Signature T. Tarpey

Date 21/3/2011

Print name TOM TARPEY

Position Senior Engineer, Environment Section

Attachment A (Box 2 Contents)

Introduction

The landfill is currently consists of two separate waste bodies: Cells 1 to 13, which were filled between 1990 and late 2007, and Cells 14, 15 and 16, which are in use since November 2007. There is no physical connection between the two waste bodies; there are separated by service roads laid on natural ground.

Cells 1 to 13 (the old landfill) contain about one million tonnes of waste and all have been covered with permanent capping in accordance with the waste licence requirements applying at the time of the works.

Cells 14 was constructed in 2007 as part of a larger development of three new cells and 15 form part of a development of new three cells (Cells 14, 15 & 16). The new development was completed in 2008, creating a void space of 550,000m³. This development in turn represents phase one of a two phase development (the new landfill) that would have a total void space of 800,000m³. The new landfill contained 282,533 tonnes of waste at the end of 2010.

The old landfill also contains the full range of ancillary infrastructure needed to operate a modern licensed facility. This infrastructure also serves the new landfill.

Financial Framework

The old landfill was financed initially through a series of loans and laterally through direct transfers annually from the revenue account. All of the operating costs, development costs and capping costs for the old landfill have been paid for at this stage. Gate fees were reviewed annually to ensure that the all of the aforementioned costs were collected along with provision for profit and future aftercare costs.

Monitoring and maintenance costs on the old landfill are provided for from the annual revenue budget in conjunction with the annual operating costs for the new landfill.

The development costs for the new landfill are being funded primarily through loans and to a smaller extent through revenue transfers. Current loans fall into two categories. Four year loans were taken out to cover the development of Cells 14 to 16. These loans will be paid off before the three cells are filled. Eight year loans were also taken out to cover the cost of assets that have a longer term revenue generation potential, such as land acquired for cell development and new ancillary infrastructure like site roads, services and treatment facilities. Once again the loan durations have been chosen to ensure that the repayment periods do not exceed the useful life of the assets. The status of the loans is detailed in Attachment B (Box 3 Contents)

The aftercare provision was set at IR£2.50/tonne in the late 1990's. This was increased to €5/tonne in 2004 and to €5.50 in 2005 and has remained at that level to the end of 2009. The aftercare provision rate for 2010 has not yet been finalised. It will be at least €3/tonne.

The aftercare fund has so far been reserved for post closure monitoring and management along with the final cell capping. Permanent capping works have generally been constructed in conjunction with the development of new cells. So far all of the capping works have been funded directly from the annual revenue account transfers. Future capping works will generally be funded through loans where they are constructed in conjunction with new cell developments and from the aftercare fund where cell developments have already been completed.

The aftercare fund stands provisionally at €4,820,568 for the end of 2010 and the remaining capacity in the landfill with planning permission is 500,085 m³ approx of void space.

Attachment B (Box 3 Contents)

Gortadroma Landfill Loans (4 No. Term Loans)

1. Depfa Bank 8 year €2.875 million loan, drawdown on 12/12/2007
Amount repaid by end of 2010 ...€1,078,125
Annual scheduled repayments...6 monthly capital repayments are €179,687.50 + int.
Remaining duration of loan at 12/12/10 ...5 years

2 Depfa Bank 4 year €4 million loan, drawdown on 12/12/2007
Amount repaid by end of 2010....€3 million
Annual scheduled repayments...6 monthly capital repayments are €500,000 + int.
Remaining duration of loan at 12/12/10 ...1 year

3 Housing Finance Agency 8 year €2.875 million loan, drawdown on 19/12/2008
Amount repaid by end of 2010...€718,750
Annual scheduled repayment....Annual capital repayment is €359,375 + int.
Remaining duration of loan at 19/12/10 ...6 years

4 Housing Finance Agency 4 year €4 million loan, drawdown on 19/12/2008
Amount repaid by end of 2010.....€4 million*
Annual scheduled repaymentAnnual capital repayment €1m + int.
Remaining duration of loan at 19/12/10 ...0 years*

* Additional €1.0 million payments were made on this loan in 2009 and 2010 from surpluses generated by the landfill, thereby reducing the term of the loan to 2 years in total.

Attachment C (Box 4 Contents)

The annual monitoring and management costs post closure are estimated to be in the order of €200,000 based of current prices. This would require a fund of €6 million over 30 years. At current contribution rates the aftercare fund would amount to €8 million approx., however it may be necessary to invest this fund in order to provide a hedge against inflation.

Attachment D (Box 5 Contents)

The €3,805,207 entered as total loan repayments for 2010 is the gross figure for the year. The net loan repayment figure for the year is €2,805,207 as the additional €1.0 million, which was a portion of the €1.24 million profit recorded in 2009, was accrued as additional expenditure amount in the Council's Accounts for 2009. A corresponding amount of €1.0 million will appear as a credit item in the Council's Accounts for 2010, therefore showing a net expenditure of €2,805,207 in the Landfill Loan Account for 2010. In effect while the Council paid the larger amount in actual loan repayments in 2010, the €1.0 million additional payment appears on the Council's Accounts for 2009 in order that it can be offset against profits made in 2009.

This transaction will also mean the Landfill Account shows a net profit of €349,912 (€1,000,000 - €650,088) for 2010 rather than the €650,088 deficit shown in Box 5.

Appendix VIII – Positive Developments During 2010

Positive Developments at Gortadroma Landfill during 2010.

- The Gas utilisation engine generated a total of 7,508,569 kwh. A total of 400,329 kwh was utilised on site and the remainder was exported to the grid.
- There was no downtime recorded on the landfill gas extraction system on site. The 1500 m³/hr landfill gas flare was operational at all times when the gas utilisation engine was shutdown
- Complaints from the public reduced from 20 in 2009 to 17 in 2010.