Limerick County Council
Comhairle Chontae Luimnigh

GORTADROMA LANDFILL SITE

ANNUAL ENVIRONMENTAL REPORT 2008

Waste License Register: No. W0017-03

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ANNUAL ENVIRONMENTAL REPORT

FOR THE REPORTING PERIOD
JANUARY 2008 TO DECEMBER 2008

FOR

LIMERICK COUNTY COUNCIL
COUNTY BUILDINGS
DOORADOYLE
LIMERICK

Approved By:

Report Ref: 4070/M41
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- 03 issued by the Environmental Protection Agency on 22nd September 2005.

The reporting period for the purposes of the Annual Environmental Report is January 2008 to December 2008. 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of the Waste License, Content of Annual Environmental Report, in accordance with the EPA publication Waste Licensing - Draft Guidance on Environmental Management Systems and Reporting to the Agency.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 (W0017-03). 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.

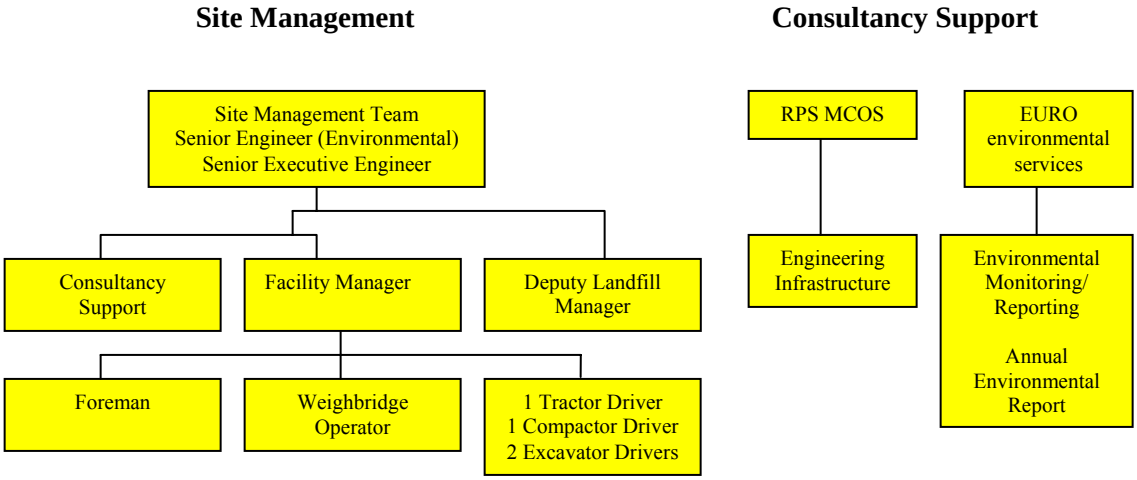
The current landfill facility at Gortadroma including the extension area occupies an area of 76 hectares.

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 November 2000, February 2002, March 2003, March 2004, March 2005, March 2006, February 2007, January 2008 and January 2009. 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 2009 has been prepared and was submitted separately to the Agency in January 2009.

2.4 Schedule of Environmental Objectives and Targets for 2009

The schedule of Environmental Objectives and Targets for the forthcoming year is described in the EMP for 2009, 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 2008

The 9 objectives and targets established for the EMP of Jan 2008 were reviewed to assess the progress towards achievement. In total 6 objectives were completed and 3 are ongoing,. 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 2008

There were no new procedures developed for use at the landfill facility in 2008.

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 (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

The Agency conducted a site audit on the 3rd July 2008, L.C.C received an audit report on the 9th July 2008 and 3 non-compliances were noted on the report are detailed in 3 Table 3.1.

Table 3.1 Details of Non-Compliances at Gortadroma Landfill Facility during 2008 (with reference to certain conditions of the site waste license)

Non-compliance	Date	Details	Date of Response	Details
1	03/07/08	Groundwater monitoring – certain metal parameters, pesticides and certain groundwater wells were not reported.	23/07/08	A meeting was arranged between L.C.C and Euro Environmental Services to discuss the non-compliances. L.C.C intends to start all future monitoring contracts in January in order to provide sufficient time to complete annual monitoring.
2	03/07/08	An ammonia value of 19 mg/l was recorded at groundwater monitoring borehole GW4-O in Quarter 1 of 2008.	23/07/08	Euro Environmental Services have informed L.C.C that the result was incorrectly transcribed and should have read <0.09 mg/l.
3	03/07/08	No oil receptor has been installed so that the discharge from the Storm Water Settling Ponds passes through it. This was raised as an issue at the audit in 2007.	23/07/08	L.C.C confirmed to the Agency that a petrol/oil interceptor had been installed.

Limerick County Council received an audit report from the Agency on the 9th of July 2009 and three non-compliances were noted in this report as detailed in table 3.1.

Limerick County Council sent a response to the audit report to the Agency on the 23rd of July 2009 and requested that Agency consider withdrawing the non-compliances for the following reasons.

Non- Compliances:

1. Groundwater Monitoring.

   Limerick County Council accept that there was omissions in annual groundwater monitoring as outlined in points a, b and d. These omissions were noted in our annual report submissions and the following actions were taken to prevent a reoccurrence.
   - A meeting was arranged between Limerick County Council and Euro Environmental (monitoring consultants) on the 5th March 2008. .
   - Arising from the meeting Euro Environmental were requested to complete all annual monitoring in time and to provide draft annual reports to Limerick County Council no later than the end of September and therefore a checklist of parameters tested could be carried out.
   - In addition to the above Limerick County Council intend to start all future monitoring contracts in January in order to provide sufficient time to complete annual monitoring.

   Point c states that only three sets of quarterly groundwater results were provide for 2007. This observation is incorrect. These reports were all on file the day of the audit.

2. Emission of environmental significance to Groundwater.

Groundwater monitoring well GW4 O was installed during quarter 4 2004 and monitoring of this well commenced during quarter 1 2005. The table below summarises result recorded at this well for ammonia as N, Conductivity and chloride.

Date/Period	Ammonia as N mg/L	Conductivity Us/cm	Chloride mg/L Cl
Quarter 1 05	0.03	619	22
Quarter 2 05	< 0.02	565	21
Quarter 3 05	0.04	506	21
Quarter 4 05	0.03	584	21
Quarter 1 06	0.49	583	20
Quarter 2 06	0.2	499	21
Quarter 3 06	0.103	495	30
Quarter 4 06	< 0.01	486	22
Quarter 1 07	0.336	558	21

Quarter 2 07	< 0.01	678	22
Quarter 3 07	< 0.09	551	1
Quarter 4 07	0.24	603	16.8
Quarter 1 08	19	636	19.75
Quarter 2 08	< 0.09	587	21.04

From the results recorded there does not seem to be evidence of gross contamination at GW4 O. The result recorded for quarter 1 2008 is not consistent with the other results and conductivity and chloride results recorded for quarter 1 do not indicate contamination of Groundwater. I subsequently requested Euro Environmental to check the validity of the quarter 1 result for ammonia as N at GW4 O. They have informed me that the result was incorrectly transcribed and should have read < 0.09 mg/L.

Limerick County Council have also put the following measures in place to prevent groundwater contamination from the unlined area of the site (Cells 1 to 4).

- A bentonite cut-off wall has been constructed around the entire footprint of cells 1 to 4 and keyed in to the clay layer at the bottom.
- Cells 1 to 4 have been fully capped with I meter of subsoil/topsoil, drainage layer, GCL and an LLDPE geosynthetic layer. This capping layer prevents ingress of water to these cells.
- Four deep leachate abstraction wells were drilled in cells 1 to 4 and leachate is pumped to the leachate holding lagoon. The leachate levels are maintained within 1 meter of the base at all times and this low head of leachate prevents migration of leachate through the clay liner.

3. Oil Interceptor for Storm Water Discharge:

Limerick County Council included the installation of Petrol/Oil interceptor in targets and objectives for 2008. A Specified Engineering Works report (Condition 3.17 of WL0017-03) was sent to the Agency on the 12th of May 2008. Approval for the S.E.W was received from the Agency on the 16th of June 2008. On receiving approval an order was immediately placed for the petrol/oil interceptor. The petrol/oil interceptor was installed on the 15th July. A CQAV report on the installation of the petrol/oil was sent to the Agency on the 8th August 2008.

3.2 Reported Incidents and Complaints Summaries

3.2.1 Incidents

During the reporting period a total of 8 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, 2008

Date	Nature of Incident	Corrective Actions/Conclusions
17/01/2008	Exceedence of emission limit for dust D3 between the period 7th of November to the 5th of December 2008. The exceedence in the dust emission limits at D3 can be attributed to road traffic outside the southern boundary.	Monitoring location D3 to be moved 20 metres from the southern site boundary and therefore only the contribution from site activities will be monitored.
30/01/2008	CO_2 trigger level exceeded at gas monitoring boreholes C16 (5.9% v/v) and C19 (2.3% v/v).	Gas monitoring borehole C2 to be observed closely for any increases or decreases in CO_2 or CH_4 occurrences.
07/02/2008	Exceedence of emission limit for suspended solids at SW4 (outlet storm water – sampled on 03/01/2008, 09/01/2008, 17/01/2008, 23/01/2008 and 30/01/2008). The source of the suspended solids can be attributed to dumper movements on the road to the capping works on Cell 11.	Limerick County Council Maintenance Staff instructed the Engineer supervising the project to divert run-off from the road through silt traps before entering the southern stream which enters the storm water tanks.
10/03/2008	Exceedence of emission limit for suspended solids from the treated leachate discharge composite sampler (sampled on 05/02/2008, 12/02/2008, 20/02/2008 and 26/02/2008).	The leachate treatment plant was not fully operational since December 2006 because difficulty was experienced getting the nitrification process activated. The problem was recently solved by means of pH balancing of the mixed liquor in the aeration basin.
12/03/2008	Exceedence of emission limit for suspended solids at SW4 (outlet storm water – sampled on 05/02/2008 and 12/02/2008). The source of the suspended solids can be attributed to dumper movements on the road to the capping works on Cell 11 run-off from Cell 11 cap and run-off from screening banks in the extension area.	Priority Construction have put a lot of effort in to constructing and maintaining silt traps. The key to resolving suspended solids issues was the grass seeding of the screening banks and the cap on Cell 11.
17/04/2008	Exceedence of emission limit for dust D7 between the period 12th of February to the 18th of March 2008. The exceedence in the dust emission limits at D3 can be attributed to construction traffic movements in this area.	The construction works were to be completed in the coming weeks.
17/04/2008	Exceedence of emission limit for suspended solids of 35mg/L on two occasions; 04/03/2008 and 11/03/2008. The source of the suspended solids can be attributed to run-off from screening banks in the extension area during heavy rainfall. All surface water from these areas are directed through the storm water banks.	Silt traps have been maintained on a regular basis. An improvement in suspended solid levels has been observed in the past three weeks.
07/07/2008	Exceedence of emission limit for dust D3 and D5 between the period 8th of April to the 13th of May 2008. The exceedence in the dust emission limits at D5 can be attributed to construction works related to contract 12. The exceedence in the dust emission limits at D3 can be attributed to road traffic outside the southern boundary.	The construction works completed that week at monitoring location D5 and monitoring location D3 has been relocated 30m in from the boundary and therefore road traffic should not affect future results.

3.2.2 Complaints

In summary there were 18 complaints or queries during the reporting period of January 1st to December 31st, 2008. The vast majority of complaints were attributed to odour. Other issues included litter, dust, flooding, and bird control at the site. Complaints were responded to as soon as possible and were recorded in the complaints register. Corrective action, if considered necessary, is recorded and reported to the Agency. Details of all complaints, responses and corrective actions are maintained and available for inspection on-site. There was a reduction in the number of complaints from 46 in 2007 to 18 in 2008.

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 2008

	Objective	Reason for undertaking project	Project summary	Target in 2008 EMP	Status January 2009
1	Install condensate tank on main gas line	Reduce condensate going to the Flare	Condensate tank to be fabricated and installed by W.S.G	Quarter 1 2008	Completed
2	Fit isolation valve on main gas line before Flare	Isolate gas field during servicing of Flare	Valve to be fabricated and installed by W.S.G	Quarter 1 2008	Completed
3	Construct leachate spillage slab near raw leachate lagoon	Collect any leachate spillage that may occur during tinkering	Concrete slab to be diverted to raw leachate lagoon	Quarter 3 2008	Target revised & included in 2009 targets
4	Install Oil Separator on surface water discharge drain from car park	License Condition 3.10	Oil separator to be installed as part of contract 12	Quarter 2 2008	Completed
5	Construct amenity walk near White River	Agreement with local liaison group	1500 metre walk and car park to be constructed	Quarter 2 2008	Completed
6	Upgrade Scada System	Increase control and including extension area	Existing Scada System to be upgraded or new Scada System to be installed	Quarter 3 2008	Design stage – included in 2009 targets
7	Gas Utilisation	License Condition	ESB substation and grid connection in place. Tender to be advertised for Operator	Quarter 4 2008	Contract signed for rental of 1 megawatt engine. Included in 2009 targets.
8	Install horizontal gas collection	Reduce odour nuisance	Horizintal gas collection pipe	Ongoing	Completed

	system in active cell 14		work to be put in place at different waste lifts and connected to flare		
9	Safety Signs	Improve safety	Extra safety and directional signs to be fabricated and installed	Quarter 1 2008	Completed

Additional works completed during 2008.

- Final capping cell 11 completed
- Construction of cells 15/16 completed. C.Q.A submitted and approved by Agency.

4.2 Lagoon Structures Inspection Report

Storm Water Retention Tank

The Storm Water Retention Tank at Gortadroma Landfill Development has been tested to the requirements of Section 9 of BS 8007:1987 British Standard Code of Practice of Concrete Structures for Retaining Aqueous Liquids.

The test under BS 8007 calls for a 7-day test. The recorded levels for the test carried out on the above structure are outlined in Table 1. The net water increase over the 7-day period was 4.25mm as recorded in the control. The increase in water level in the Storm Water Retention Tank during the same period was 2.3mm. The still well and hook gauge method was applied to record water levels. BS 8007 allows for a decrease in water level of up to 10mm in the concrete tank within the test period. The actual decrease in water level was 1.92mm which is within the standard, thus the Storm Water Retention Tank integrity is within the requirements of BS 8007.

Storm Water Settling Tank

Water Level in Bund (mm)	**Change +/- (mm)**	**Control Water Level (mm)**	**Change +/- (mm)**	**Date**	**Time**
90.87		75.40		14/02/08	10:45am
91.02	+0.15	75.76	+0.36	15/02/08	11:40am
91.89	+0.87	76.18	+0.42	18/02/08	10:25am
92.43	+0.54	77.80	+1.62	19/02/09	10:40am
93.20	+0.77	79.65	+1.85	20/02/08	11:45am
Net Change	+2.33	**Net Change**	+4.25		

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 m^3. However, when filling these cells without adjacent cells to east and south, the capacity is reduced to 550,000 m^3. Waste disposal commenced in cell 14 on the 30th of October 2007. Approximately 62,200 tonnes of waste have been placed in cell 14 up to the end of December 2008 at a compaction rate of 1 tonne/m^3. Waste disposal commenced in cell 15 on 9th December 2008 and approximately 4,000 tonnes of waste have placed in cell 15 up to the end of December 2008 at a compaction rate of 1 tonne/m^3. Therefore the remaining void capacity at the 1st January 2009 was approximately 483,800 m^3.

Table 4.2 Estimated volume 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 138,980m^2. Cells 1-4 are unlined and occupy an area of 20,800m2 , while cells 5-13 are lined cells and occupy an area of 94,800m^2. Cell 14 is lined and occupies an area 8,600 m^2. Cell 15 is the current active cell and occupies an area of 14,780 $m^{2.}$

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 storm lagoon was tested during May 2008. The reports along with the certificate of integrity of these tests are presented in Appendix II.

5 *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 2008 to December 2008 inclusive, and during each previous years, is given in Table 5.1 below.

Table 5.1 Annual Waste Tonnages to 2008

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

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 is current active cell which landfilling commenced on 9th December 2008.

Table 5.2 Quantities of Waste Types Accepted at Gortadroma during 2008

Month	Commercial/Industrial	Private Domestic	Council Refuse	City Street Cleaning	Sludge
January	1101.28	3917.98	89.72	70.94	0
February	2082.54	1180.3	422.7	89.34	0
March	1998.1	1243.38	135.34	48.1	0.38
April	3114.24	3495.1	72.78	73.7	0
May	2921.06	2111.26	94.22	57.82	0
June	2536.46	1741.4	76.98	55.76	0
July	2952.58	2525	191.88	59.46	0
August	2785.06	2081.72	832.46	51.50	10.78
September	2568.8	2189.56	162.68	70.28	0
October	485.48	1596.62	121.98	49.28	0
November	832.22	616.76	39.72	60.08	35
December	1363.3	5464.72	90.62	54.34	47.70
SUBTOTAL	**24,741.12**	**28,163.80**	**2331.08**	**740.60**	**93.86**
ANNUAL TOTAL			**56,070.46 tonnes**		

5.5 Recyclables

Table 5.3 below outlines the quantity of recyclables transferred from Gortadroma Civic Amenity Site for recovery during 2008. In addition to this the following materials were accepted on site for reuse, road making and as landfill cover:

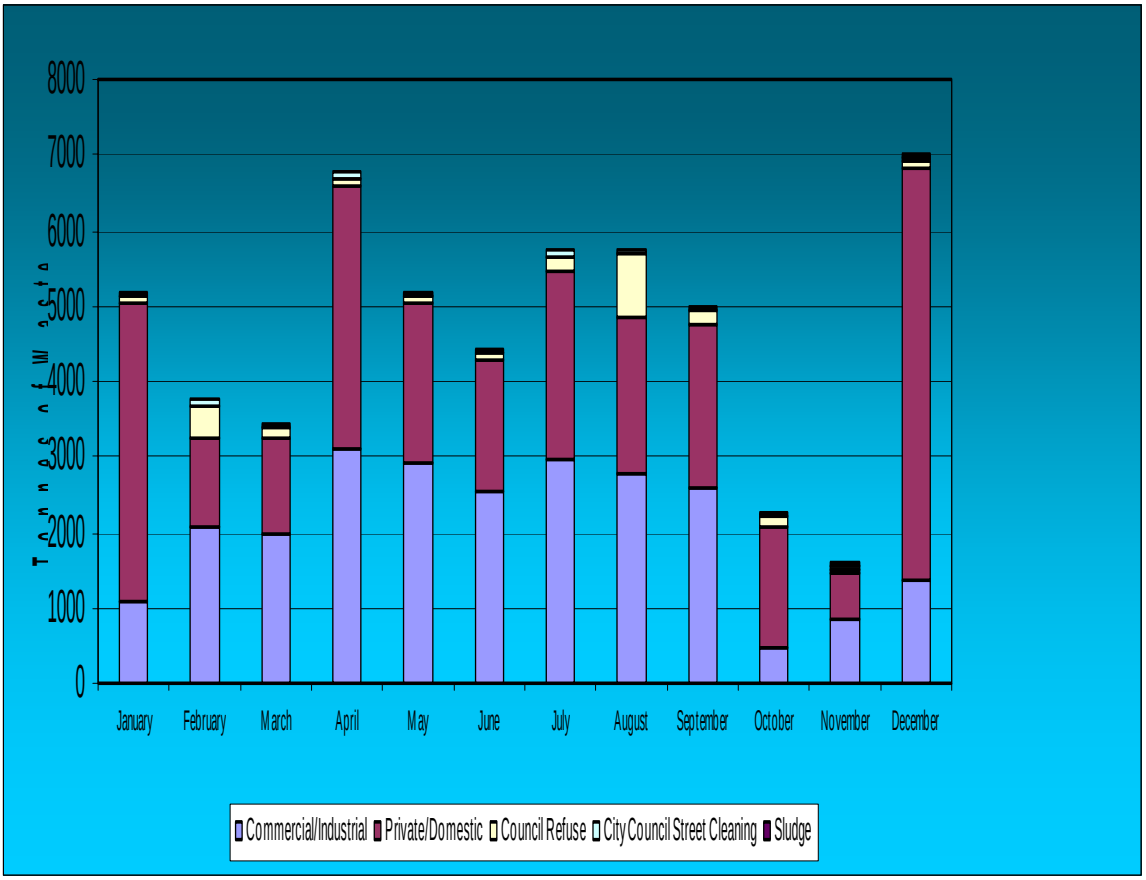
- EWC 17 05 04 Soil & Stones 5645.54 Tonnes
- EWC 03 01 99 Woodchip 390.16 Tonnes
- EWC 19 10 04 Automobile Shredder Residue 5099.34 Tonnes

Also 13.32 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 2008

Waste Type Name	EWC Code	Quantity Tonnes
Plastic Bottles	20 01 39	5.2
Tetrapacks	20 01 01	1.6
Newspapers/Magazines	20 01 01	37.84
Glass	20 01 02	6.49
Food Cans	20 01 05	4.30
Drink Cans	20 01 05	5.07
Cardboard	20 01 01	13.4
LDA Non-Haz	20 01 36	13.09
Fridge Freezers	20 01 35	23.05
Mixed Metals	20 01 40	98.28
Textiles	20 01 11	9.0
Small WEEE	20 01 35	29.40
Waste Tyres	16 01 03	4.96

Figure 5.1 Waste Types and Quantities Received During 2008



6 *ENVIRONMENTAL NUISANCES*

6.1 Report on environmental nuisance control at the facility for 2008

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 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. During 2002 the landfill gas flare was commissioned which further reduces potential for nuisance odour emissions. Cells 1 to 10 and cells 11, 12 and 13 are capped and have gas extraction in place in these cells. Phase 1 of landfilling in cell 14 has been completed, a horizontal gas collection system is in place and a temporary cap has been placed. A horizontal gas collection system is currently been installed in active cell 15.

Limerick County Council employ 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 *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 4 locations (M2, M5, M6 and M10) in excess of the licence limit of 55dB(A), for which construction activities on the landfill was the causative factor for all except location M6. Night time readings at M1, M3, M4, M5, M6 and M10 exceeded the limit of 45 dB(A). M1, M3, M4 and M6 exceeded due to a dog barking, M5 due to wind in the trees and M10 due to banging in the distance.
Dust	During the course of the year there were 3 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 Boreholes C18, C21 and C22 at least once 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 14,543.3 m3 of treated leachate discharged to the White River during 2008.
Leachate	A volume of 35,707.62m^3 was tankered off site to waste water treatment plants.

7.2 Resource and Energy Consumption

Resource and energy consumption for on site can be summarised for 2008 as follows:

Table 7.2 Energy Consumption Summary

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

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

There are currently 130 gas wells at Gortadroma Landfill (Cells 1-13). The landfill gas collected by these wells is transported via a manifold system with two mains connecting to a carrier main and in turn to a 1,500m^3/hr gas flare. The wells in Cells 12 and 13 were connected in May 2008 and for the remainder of 2008 the flow of gas to the flare was running at approximately 950 - 1,000m^3/hr. As cell 14 was filled in 2008 a series of horizontal gas collection pipe-work was installed and connected to a temporary 500m^3/hr flare, which ran at approximately 250m^3/hr for eight hours a day.

Landfill Gas is produced principally in the year after the waste is deposited. Therefore when discussing volumes of gas generated in 2008 it is appropriate to discuss waste quantities and compositions from 2007. In 2007 a total of 39,577 tonnes of waste was landfilled at Gortadroma. This was a decrease over the previous two years, 2005 & 2006, and as such it would generally be predicted that this would result in a slight decrease in the volume of landfill gas generated on-site in 2008, yet additional areas were capped in 2008 thereby increasing the collection efficiency on site and thereby maintaining gas flow rates.

The landfill Gas package, GASSIM is used to model the gas production at Gortadroma (cells 1-13 only). Figure 1.1, taken from GASSIM, illustrates the total bulk landfill gas which is generated from the landfill in the period 2000-2008. For 2008 a figure of approximately 940m^3/hr is outputted from the model at the 50th percentile. An additional 50m^3/hr is modelled for the cell 14, see Figure 2.2, which has a horizontal extraction system and temporary cover, yet site records indicate more in the region of 80m^3/hr. Therefore for 2008 the total bulk landfill gas generated from cells 1-14 is approximately 1020 m^3/hr.

Figure 1.1 Total Bulk Landfill Gas Generated 2000-2008, cells 1-13

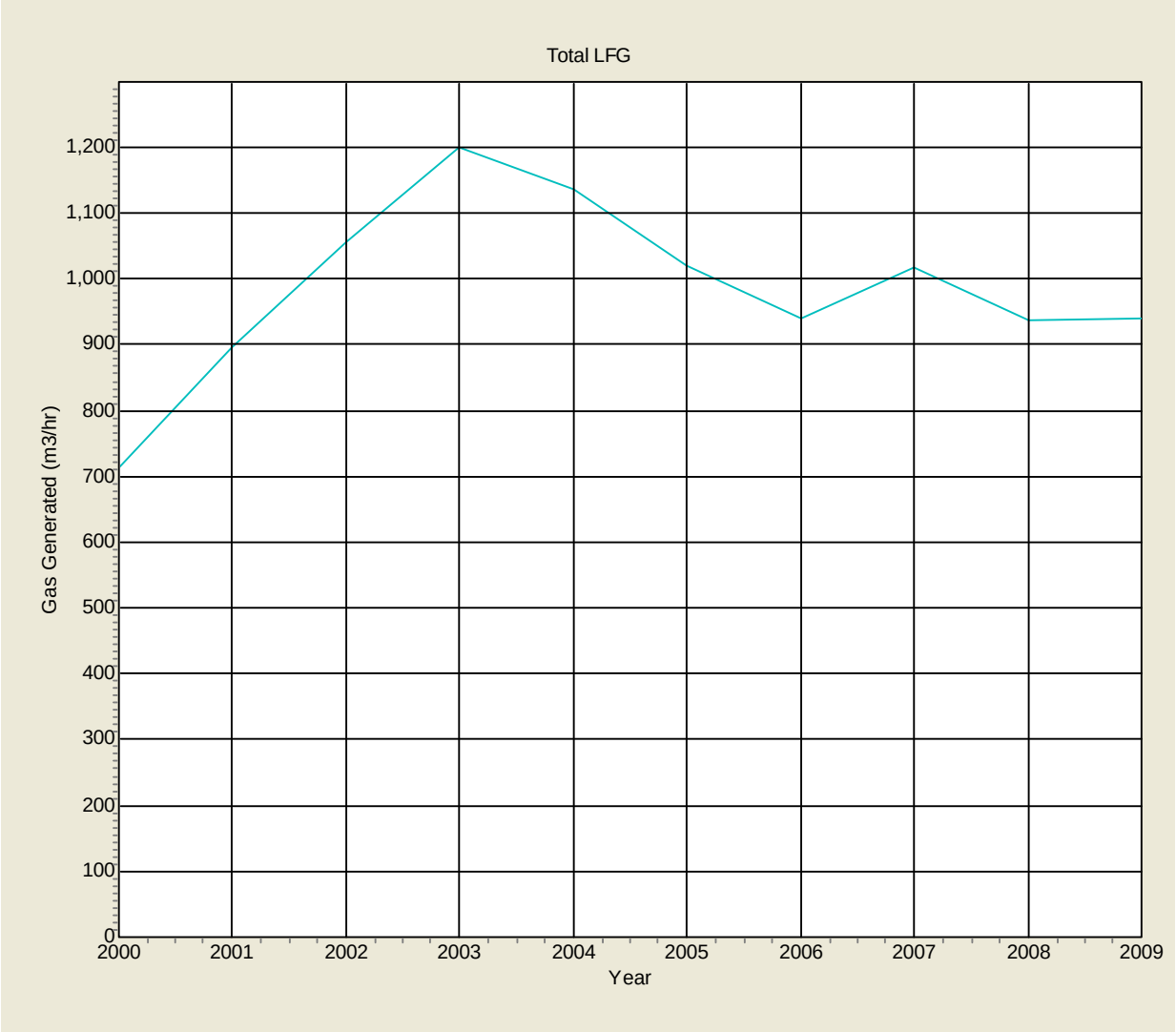
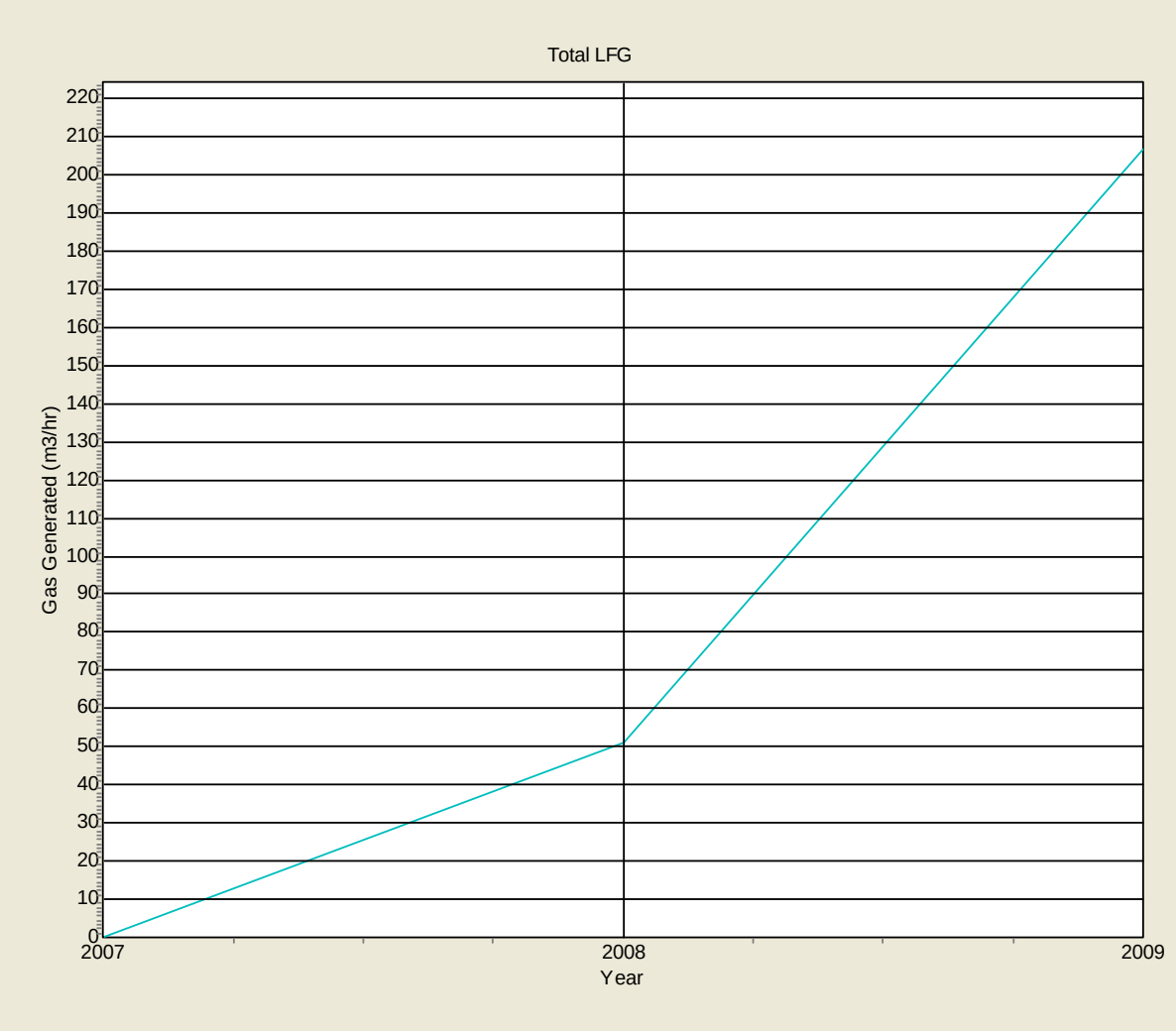


Figure 1.2 Total Bulk Landfill Gas Generated 2007-2008, cell 14



Of the total bulk gas generated at Gortadroma in 2008 approximately 600m^3/hr (570 m^3/hr from cells 1-13; 30 m^3/hr from cell 14) was modelled as methane. The total flare output of methane, post combustion, was estimated at 4.9m^3/hr (99% destruction efficiency - majority from 1,500m^3/hr flare for cells 1-13, insignificant volume from 500m^3/hr temporary flare for cell 14).

Figure 1.3 Methane Production and Flare Methane Output, cells 1-13

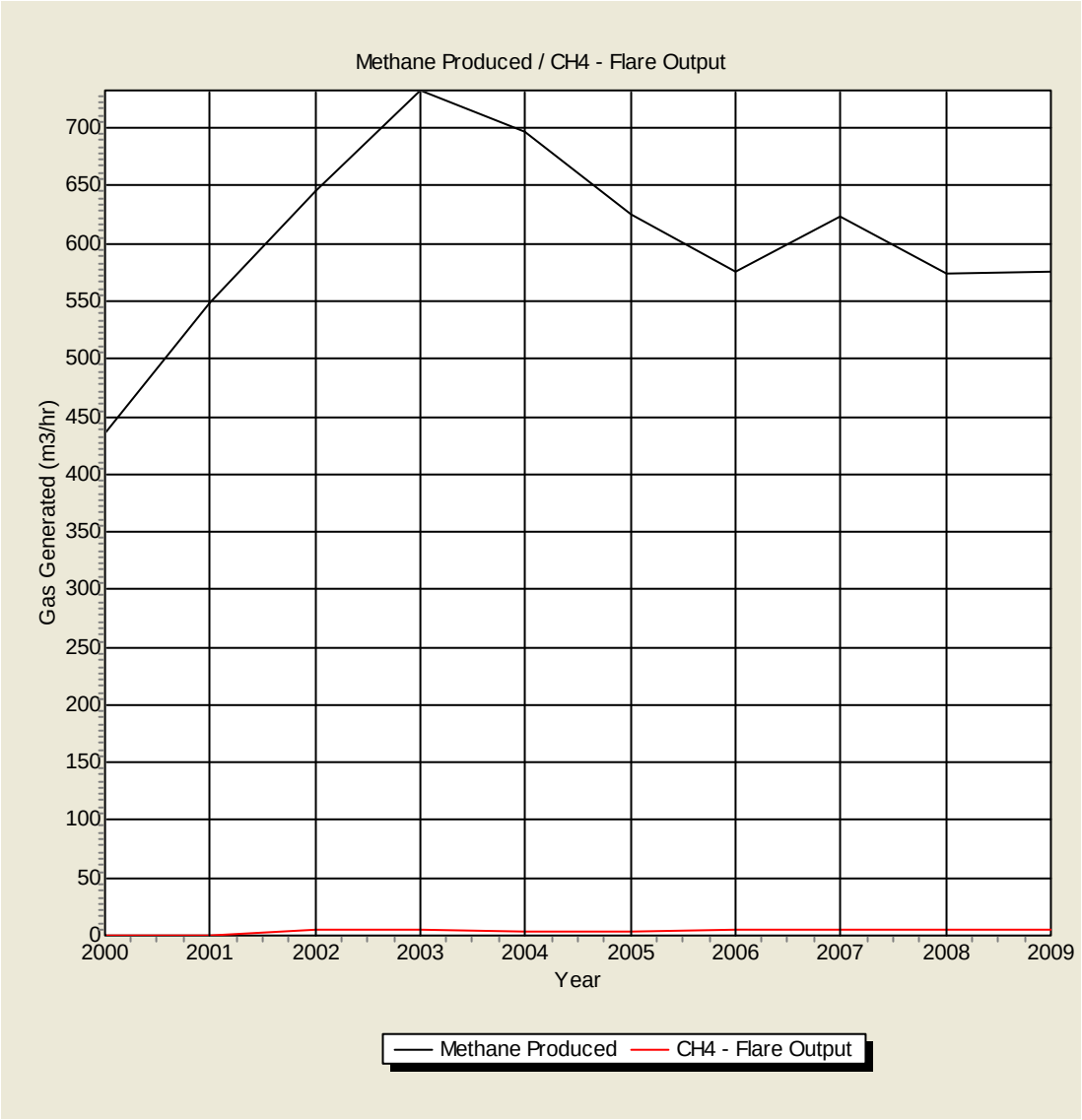
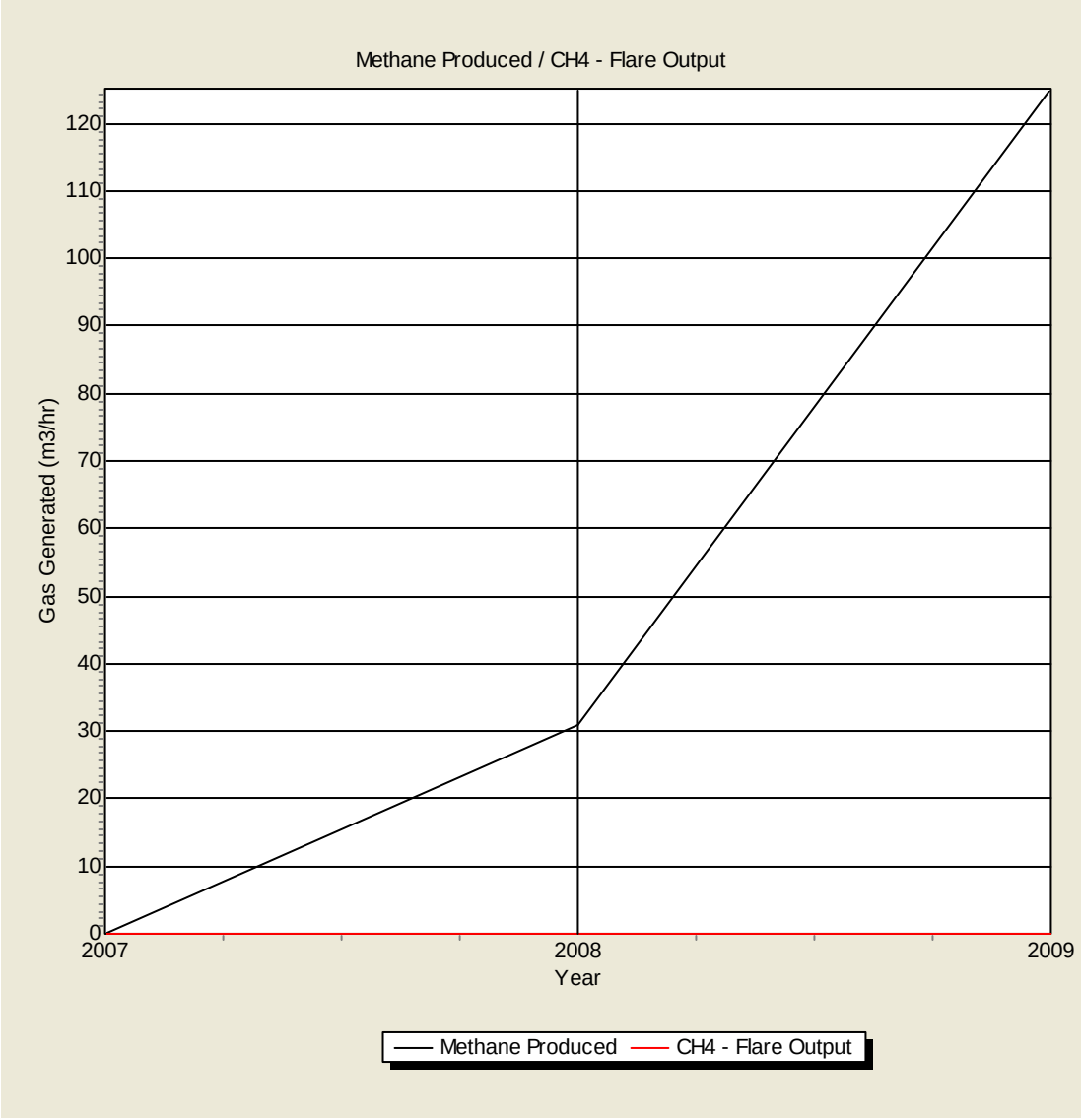


Figure 1.4 Methane Production and Flare Methane Output, cell 14



GASSIM also estimates the global warming potential of the emissions from Gortadroma Landfill in 2008. This is estimated in tonnes of Carbon Dioxide as CO_2 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 CO_2 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 CO_2.

According to the GASSIM model of Gortadroma landfill a total of 347 tonnes of methane was emitted from the cells 1-13 and 177 tonnes from cell 14 in 2008. This figure includes fugitive emissions and methane emissions post flaring. Using a GWP factor of 21 these volumes of methane are equivalent to 11,004 tonnes of Carbon Dioxide. GASSIM also

estimates that 14,500 tonnes of Carbon Dioxide was emitted from cells 1-13 and 387 tonnes from cell 14 in 2008. Combining these two results yields a total equivalent Carbon Dioxide emission of 25,891 tonnes for 2008 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 22,000m^2. It is assumed that the waste has an overall moisture content of 25% below this level.

1.5m x 22,000m^2 x 0.25 = 8,250 m^3 of leachate within cells 1-4 in 2008. 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 $1x10^{-9}$ 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 $1x10^{-9}$ 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 22,000m^2.

Therefore the flow (Q) can be calculated to be 3.0 $x10^{-5}$ m^3 /s through the clay liner at the base of cells 1-4.

For the one-year period of 2007 the flow rate of leachate emissions to groundwater is calculated to be 930 m^3 /year (or 2.5m^3 /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 2008 using the following data.

- Monthly rainfall figures in metres;
- Effective cell area open m^2 for each month and hard standing area (1320 m^2) from the composting slab and waste inspection area;
- The effective area open for each of the months January to February 2008 was 27,140 m^2. The effective area open from March to December 2008 was 9920 m^2.
- Landfilling commenced in Cell 15 on the 9th of December and effective open area for the remainder of the year was 24,700 m^2.

Table 7.4 Theoretical Leachate Volumes and Tankered

Month 2008	Rainfall m	Effective area open m^2	Theoretical Leachate produced m^3	Volume of leachate discharged m^3	Volume of leachate tankered off-site m^3
January	0.2957	27,140	8025.3	0	4568
February	0.1014	27,140	2752	1928.1	4832.92
March	0.143	9,920	1418.5	2342	3925.8
April	0.0562	9,920	557.5	1829.2	4198.2
May	0.066	9,920	654.7	0	919.3
June	0.116	9,920	1150.7	0	1022.7
July	0.2212	9,920	2194.3	0	4069.8
August	0.2456	9,920	2436.3	0	3510.4
September	0.1779	9,920	1764.8	0	3810.1
October	0.24397	9,920	2420.2	1178	2582.7
November	0.14378	9,920	1426.3	3580	1790.2
December	0.12224	24,700	3019.3	3686	477.5
Annual Total	**1.93299**		**27,819.9**	**14,543.3**	**35,707.62**

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

There was 14,543.3 m^3 of treated leachate discharged to the White River during 2008.

The difference between the actual figure generated and that, which should be generated in theory (Table 7.4), is in most likelihood caused by defects in the permanent capping system. The malfunction of the permanent capping system on cells 8/10 and on cells 7/9 has been investigated. Limerick County Council are currently awaiting a report with remediation proposals from RPS Consulting Engineers.

A volume of 35,707.6 m^3 was tankered off site to waste water treatment plants. All tankered leachate was collected and sent to wastewater treatment plants (WWTPs) in Castletroy and Newcastlewest.

Figures 7.3 to 7.5 summarise daily and monthly volumes of leachate being tankered off-site. The total volume of leachate tankered off-site between January and December 2008 was 35,707.6 m^3

Figure 7.3 2008 Average Daily Tankered Leachate

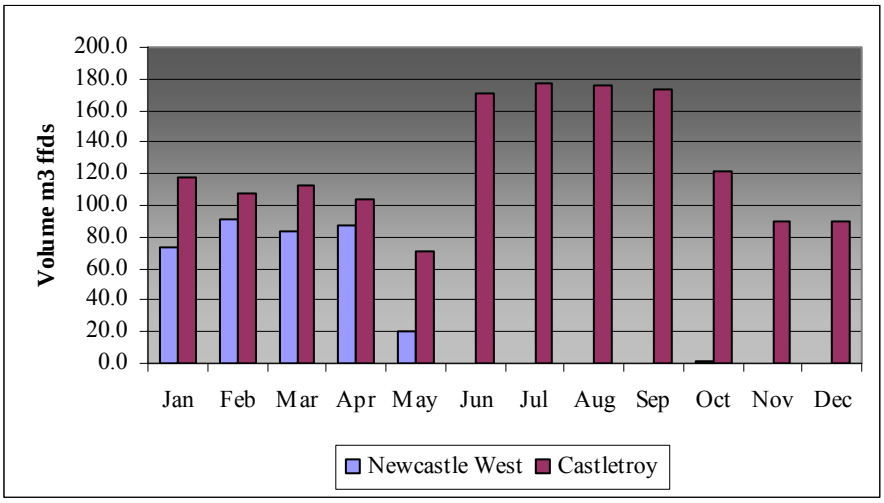


Figure 7.4 2008 Monthly Tankered Leachate

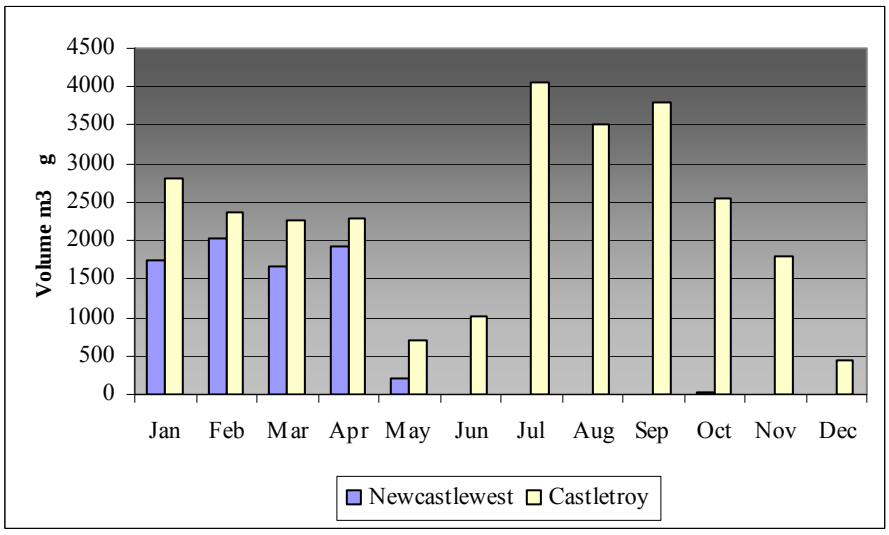
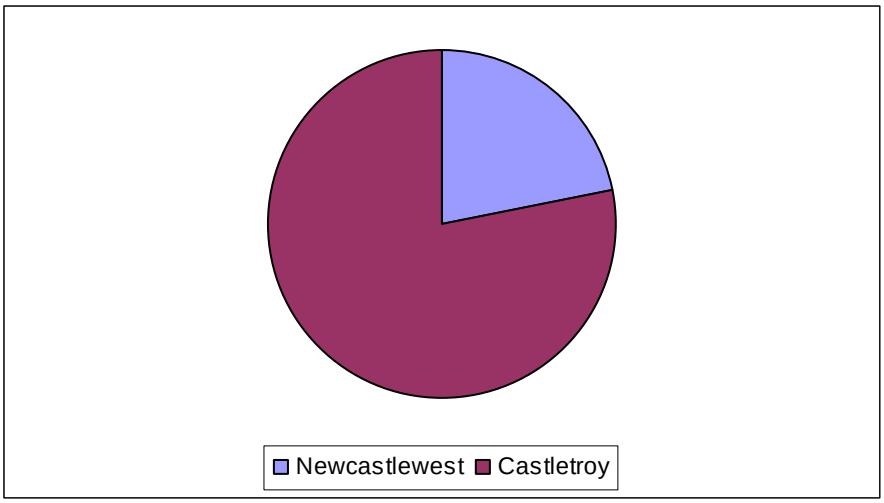


Figure 7.5 Location of Tankered 2008 Leachate



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 stormwater 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 2008) 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 = Area (m^2) x Rainfall (m for 2008) x 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 m^3/year. Since the rainfall data from 2008 is being used the Total Flow is specifically for 2008.

Table 7.6 Surface water flow from each area and total for the site 2008

Area (m^2)	Rainfall (m)	Percentage Run-Off	Q (m^3/year)
550,000	1.93299	0.35	372,100.6
115,600	1.93299	0.75	167,590.2
33,000	1.93299	0.00	0
12,000	1.93299	0.90	20,876.3
228,000	1.93299	0.35	154,252.6
Total Flow (m^3)	**714,819.7**		

Table 7.7 Monthly Surface Water Balance

Month (2008)	Rainfall (m)	Record of discharge from surface water lagoons (m^3)
January	0.2957	109,349.87
February	0.1014	37,497.72
March	0.1430	52,881.14
April	0.0562	20,782.76
May	0.0660	24,406.80
June	0.1160	42,896.80
July	0.2212	81,799.72
August	0.2456	90,822.88
September	0.1779	65,787.42
October	0.24397	90,220.12
November	0.14378	53,169.85
December	0.12224	45,204.36
Annual Total	**1.93299**	**714,819.70**

Volumes of surface water discharge during 2008 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 *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 December 2008 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 is current active cell.

A Closure Restoration & Aftercare Management plan (CRAMP) will be developed and submitted to the Agency as soon as capping issues on Cells 7 – 10 are being resolved.

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	0.5	Q1 2011
15	1.5	Q1 2011

9 *ENVIRONMENTAL MONITORING*

Monitoring is carried out according to Schedule C of Waste Licence W0017-03. 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 W0017-03, the following points are monitored on a monthly basis for methane (CH_4), carbon dioxide (CO_2), oxygen (O_2), 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 and 14B;
- 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 Boreholes C18, C21 and C22 once during the monitoring period.

Carbon dioxide

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

Location	Date
C2	January, February, March, April, May, June, July, October, November, December
C3	April, May, June, July, August, September, October, November, December
C4	February, March, April, May, June, July, August, September, October, November, December
C5	January, July
C7	April
C8	May, June
C11	December
C12	January, February, July, October
C14	April, May, June, July, August, September, October, November, December
C15	May, June
C16	January, February, March, October, November, December
C17	April, November, December
C18	January, February, March, April, May, July, August, September, October, November
C19	January, February, April, December
C21	January, February, March, April, May, July, September, October, November, December
C22	January, February, April, May, July, August

These exceedances are not accompanied by elevated methane levels. Exceedances of CO_2 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 2008 reporting period.

9.1.3 Gas Vent Monitoring

Gas quality is measured at a total of 14 points. Results for most cells indicate that levels of CH_4 and CO_2 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 Flare

EURO environmental services personnel conducted the monitoring surveys for the landfill gas flare on 18th January 2008 and 1st August 2008. All parameters monitored over the course of the first survey complied with the Waste License limits.

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			
	February 12th to March 18th 2008	April 8th to May 13th 2008	July 15th to August 12th 2008	November 9th to December 4th 2008
D1	338.18	232.95	322.42	n/a
D3	259.93	**363.84**	238.87	n/a
D4	220.57	95.72	166.51	84.64
D5	337.73	**354.03**	232.4	248.25
D6	325.37	185.66	n/a	106.8
D7	**414.15**	330.40	n/a	n/a

n/a – Dust jar invalid

There were 3 exceedences of the limit of 350mg/m^2/day as specified in Schedule B.1 of the waste license, one recorded at D3, D5 and D7.

9.3 Odour

On-site odour monitoring was carried out quarterly by TMS Environment Ltd and 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 10th to 12th June 2008 to satisfy condition 6.9 of Waste Licence Register W0017-3. Results are included in Table 9.4 and in Figures 9.1 and 9.2. The two figures also include the relevant license limit.

Table 9.4 Noise monitoring results

Monitoring Point	LAeq, 30 mins	
	Daytime	Night time
	10th and 11th June 2008	10th , 11th and 12th June 2008
M1	49	54*
M2	61*	41
M3	48	53*
M4	45	59*
M5	56*	47*
M6	57*	52*
M7	49	41
M9	49	45
M10	60*	54*
M11	53	41

(* Exceeds license limit)

The report by EURO environmental services included the following conclusions:

Daytime noise measurements exceeded the license limit, of 55dBA, on M2 (LA_{90} 35dB), M5 (LA_{90} 40dB), M6 (LA_{90} 21dB) and M10 (LA_{90} 34dB). Construction activities on site and waste transportation were the main contributors.

Night time readings were consistent with calm, dry weather. M1 (LA_{90} 32dB), M3 (LA_{90} 32dB), M4 (LA_{90} 25dB), M5 (LA_{90} 30dB), M6 (LA_{90} 24dB) and M10 (LA_{90} 28dB) were all over the night time license limit of 45dBA. These exceedences were mainly due to dogs barking, animal activity and the wind blowing.

M1 and M11 had tonal components during the daytime survey which were not attributable to the site. Both of these tonal components may have been attributable to traffic movement on the Ballyhahill Road. Neither tonal component was attributable to activities on the landfill due to the distance from the monitoring locations M1 and M11.

No tonal noise was recorded from the site during the night monitoring campaign.

Figure 9.1 2008 Daytime Noise Results

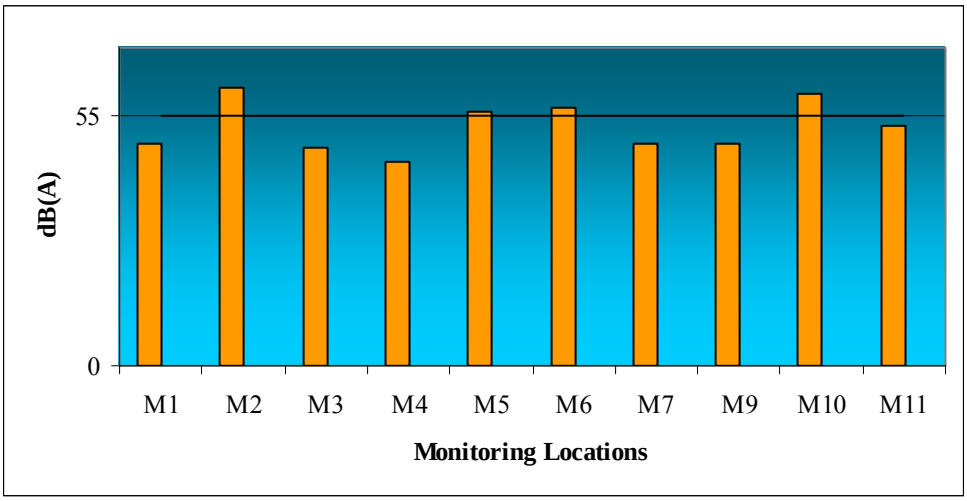
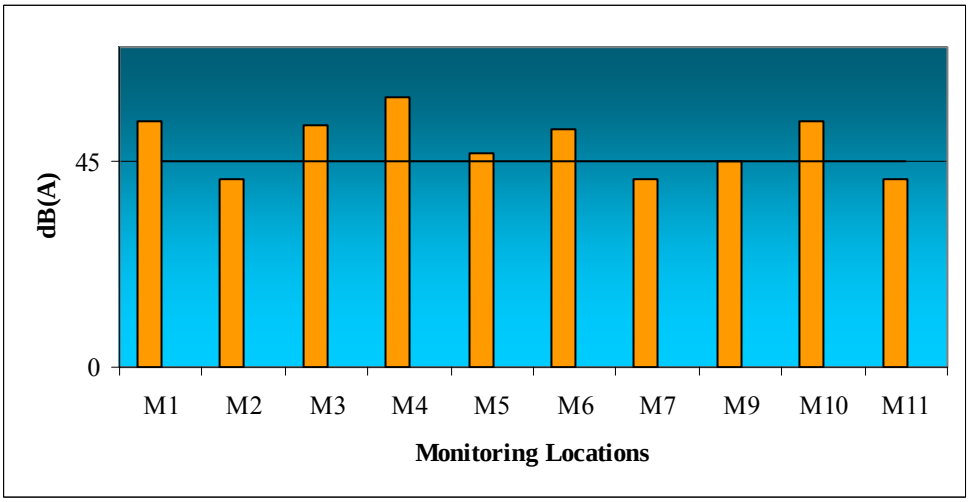


Figure 9.2 2008 Night time Noise Results



9.5 Surface Water

Under Schedules C.2.3 and C.3 of Waste Licence W0017-03 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, and colour and vegetation growth are recorded. Inspections throughout the reporting period noted that surface water was generally of good quality. Reports of vegetation growth were also experienced at SW1, SW2, SW3 and S2. Occasionally there was no flow experienced at monitoring locations SW1, SW2 and SW4 in 2008.

9.5.2 Chemical Analysis

Quarterly and annual samples from 12 surface water monitoring locations were taken as specified in Waste Licence 0017-03. 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 9.5 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 2008 was from 163 uS/cm at S6 to 790 uS/cm at SW2. 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] with the exception of one result recorded at S7 during Quarters 1, five results during Quarter 2 and two results during Quarter 3. There were no monitoring locations that exceeded the license limit during Quarter 4.

The measured results for BOD ranged from <2 mg/L to 43 mg/L. All monitoring location results are within the MAC A3 limit of the Surface Water Regulations, except SW1 during Quarter 2 and S2, S8 and SW2 during Quarter 3. Results have shown that COD concentrations ranged from 8 mg O_2/L to 215 mg O_2/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 14.28 mg/l Cl to 49.26 mg/l Cl at the surface water monitoring locations.

The results for suspended solids for some of the monitoring locations are low at < 3mg/l. The highest concentration of suspended solids of 11,396 mg/l was detected at monitoring location S7, 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, S1 during Quarter 1 at 65 mg/L; S2 during Quarters 1 and 3 at 217 mg/L and 84 mg/L respectively; S6 during Quarter 1 at 620 mg/L, S7 during Quarters 1, 2 and 3 at 11,396 mg/L, 529 mg/L and 167 mg/L respectively, S8 during Quarter 3 at 156 mg/L, SW2 during Quarters 1 and 3 at 723 mg/L and 314 mg/L respectively, SW9 during quarters 1 and 3 at 104 mg/L and 189 mg/L respectively and SW11 during Quarters 1 and 2 at 123 mg/L and 110 mg/L respectively.

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- 03. The trigger levels for the discharge from the storm water tank were exceeded for suspended solids on the 03/01/08, 09/01/08, 17/01/08, 23/01/08, 30/01/08, 05/02/08, 12/02/08, 04/03/08 and 11/03/08.

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 <2.11 mg/l at S6 and SW2 to 57.92 at surface water monitoring point SW11. All of the results are within the A1 Quality Standard (SI 298 of 1989) of 250 mg SO_4/l.

Iron was detected at concentrations greater than the A1 Surface Water MAC at each location. All monitoring locations were within the A1 MAC of 50 ug/L for lead. With regard to the remaining metal parameters other than iron and lead, all locations, apart from SW2 (4.226 mg/L) which exceeded the limit for manganese and SW11 (0.085 mg/L) which exceeded the limit for chromium, 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 9.5 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, ^{o}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^{o} 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 SO4	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 14,543.3 m^3 of treated leachate discharged to surface water in 2008.

9.5.4 White River

As required under Schedule C.3, a biological survey of the White River was conducted on 29th August 2008 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 9.6 below.

Table 9.6 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

These figures show that water quality remained the same at three locations over the last year. Site reference A had a Q-rating of 3-4. The water quality has remained constant over the three previous years with a Q4 measurement recorded at all locations, between 2005 and 2007.

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 W0017-03, monthly levels were recorded and quarterly/annual analysis conducted on groundwater monitoring points GW2-B, GW2-O, GW8-B, GW8-O, SW 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. GW8-B had the highest levels of ammonia measured across the site with a high of 3.64 mg/L N being recorded here in Quarter 4. 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 2008.

The measured results for Electrical Conductivity ranged from 310µS/cm to 1,033µS/cm in 2008. Trigger levels set for Conductivity at SA1 (800 µS/cm), GW5 (800 µS/cm), and Collins Well (1,500 µS/cm) were not exceeded at any time during 2008.

Chloride levels were below the trigger levels set for all of the 2008 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 <2.11 mg/l to 98.18 mg/l (recorded at GW9-B). 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, Chromium, Copper, Manganese, Iron, Nickel, Magnesium, Potassium and Zinc were the only metals that showed slightly elevated levels above the parametric values. However as iron is naturally present and reflect 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 concentration of Nickel marginally exceeded the limit of 0.02 mg/l in two of the monitoring points at GW5 and GW11-O. Zinc concentrations exceeded the limit of 0.1 mg/l at Collins Well. The wells sampled are monitoring wells only and not used for drinking water purposes.

Total Coliforms were detected at 15 sample locations - GW SA2, GW3-O, GW4-O, GW2-O, GW2-B, GW1-O, GW6-O, GW7-O, GW7-B, GW9-O, GW9-B, GW10-O, GW10-B, GW11-O and GW11-B. Faecal Coliforms were tested through analysis for E. Coli. Faecal Coliforms concentrations were detected at four sample locations – GW3-O, GW2-B, GW7-O and GW11-B.

9.6.2 Private Wells

Boreholes sampled were all within the 500m boundary of Gortadroma Landfill. There were 15 boreholes in total both up-gradient and down-gradient of the landfill.

Four of the wells tested were deemed to exceed the Maximum Admissible Concentration (MAC) for Ammonia. Nine wells were determined to be contaminated with Total Coliforms. Seven wells exceeded the MAC for Iron. Nine wells exceeded the MAC for manganese and one well exceeded the MAC for Sodium.

South East

Of the seven wells analysed to the south east of the landfill (wells 1-7), three were determined to have elevated Ammonia levels. Four of the adjacent wells were within the limit of 0.30 mg/L, it is unlikely that the landfill is contributing to the elevated levels. Five wells had elevated Total Coliform concentrations. Three wells showed elevated iron concentrations, above the Maximum Admissible Concentration (MAC). Four wells had elevated concentrations of Manganese and one well had elevated concentrations of Sodium.

North West

Well 17 had elevated Ammonia concentrations of 0.50 mg/L as N. Other parameters that were elevated above the MAC were Total Coliforms on PW14 and PW17 and Mercury, iron on PW17 and PW18 and Manganese on PW14, 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 Ammonia. Conclusions would indicate that agricultural practices or poor percolation areas might be responsible.

South West

Of the three wells analysed to the south west of the landfill, none of the wells indicated any elevated Ammonia concentrations. Well number PW19 and PW20 did show Total Coliform contamination, while PW20 and PW24 showed Iron and Manganese concentrations above the recommended MAC.

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

9.7 Leachate

9.7.1 Leachate Levels

Under Schedule C2.5 in Waste license 0017-03, leachate levels in cells are monitored on a weekly basis at two locations in cells 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14. Levels are also monitored in Cells 1 to 4 A, 1 to 4 B and 1 to 4 C. Levels during 2008 were below the acceptable 1 metre limit.

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 W0017-03. 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 7610 µS/cm, which is higher than that recorded in 2007 (5020µS/cm). The pH result was 7.8.

Ammonia (468.78 mg/L N) and sulphate (<2.11 mg/L SO 4) concentrations were disimilar to those found in the previous annual monitoring. Chloride concentration was higher than previously with a value of 806.29 mg/L.

Concentrations of metals were in general higher to the results observed in 2007. Trace concentrations of cadmium (<0.09 ug/L), chromium (0.15 mg/L), copper (30 mg/L), cyanide (35ug/L), nickel (0.108 mg/L), zinc (0.107 mg/L) and lead (0.056mg/L) were found. Sodium (889 mg/L) and potassium (260.1 mg/L) were also detected.

There was a increase in the concentration of total phosphorous from 0.337 mg/l P to 2.468 mg/l P. There was an increase in the concentration of iron (10130 mg/L) and and a decrease in manganese (2301 ug/L) on the previous annual monitoring event. A fluoride concentration level of 0.9 mg/L was recorded.

Pesticides, volatile and semi-volatile organic carbons were below the limit of detection.

9.7.3 Leachate Treatment Plant

The following volumes were treated leachate was discharged to the White River during 2008.

Month	Volume of Treated Leachate Discharged m^3
February	1928.1
March	2342
April	1829.2
October	1178
November	3580
December	3686

All treated leachate discharged during 2008 complied with the lience limits with the exception of suspended solids, which were exceeded on two separate dates, 05/02/08 and 26/02/08.

9.8 Meteorological Monitoring

Meteorology is monitored in accordance with Schedule C.3 of Waste Licence W0017-03. 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, carried out on 29th November 2007, 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, carried out on 10th September 2008, 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.

9.10 Site Survey During Reporting Period

The most recent topographical survey of the site was carried out in September 2008. A copy of this drawing and survey report was forwarded to the Agency on 25th November 2008.

9.11 Pollution Emission Register

The pollution emissions register is described in Appendix VI.

9.12 Industrial Sludge Test Results

A copy of sampling results taken from industrial sludge accepted at the facility is included Appendix VII.

10 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 *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 W0017-03 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 *STAFF TRAINING*

There were no new Standard Operation Procedures developed at the site during 2008.

FETAC/FAS certificate in Construction (Construction plant operation) in the operation of the rubber wheel JCB was undertaken by Brendan Brosnan, Ger Moroney and Thomas Kiely.

APPENDICES

APPENDIX I – Objectives and Targets for 2009

		Targets & Objectives 2009			
	Objective	**Reason for Undertaking Project**	**Project Summary**	**Target in 2009 EMP.**	**Responsibility for Project.**
1	Install condensate lances on 5 landfill gas manifolds on Cells 1/10.	Reduce condensate going to the Flare	Condensate lances to be fabricated and installed by LCC. SEW submitted to Agency.	Quarter 1 2009	L.C.C
2	Electrical distrubition system to be installed in extension area.	Power supply for pumps and temporary flare.	System to be designed and tendered during quarter 1 2009.	Quarter 3 2009	L.C.C/ RPSMCOS
3	Fabricate leachate spillage tray near raw leachate lagoon	Collect any leachate spillage that may occur during tankering.	Steel tray to be Fabricated and drainage to be diverted to raw leachate lagoon.	Quarter 2 2009	L.C.C
4	Install gas main between gas compound and extension area	Gas collection	Gas main to be designed and tendered for during quarter 1 2009.	Quarter 3 2009	L.C.C/ RPSMCOS
5	Upgrade Scada System	Increase control and including extension area	Existing Scada system to be upgraded or new Scada System to be installed.	Quarter 3 2009	L.C.C/ RPSMCOS
6	Gas Utilisation	Licence Condition	ESB substation and grid connection in place. Contract for supply of engine agreed.	Quarter 1 2009	L.C.C

	Objective	Reason for Undertaking Project	Project Summary	Target in 2009 EMP.	Responsibility for Project.
7	Install horizontal gas collection system in active cell 15.	Reduce odour nuisance	Horizontal gas collection pipe work to be put in place at different waste lifts and connected to flare	Ongoing	L.C.C
8	Label all gas extraction wells and gas manifolds	Achieve better control over gas field	Labels fabricated and to be placed on wells and manifolds.	Quarter 1 2009	L.C.C
9	Install temporary liner on exposed side slope of cell 14 and place temporary cap on top.	Reduce odour nuisance	Temporary liner ordered	Quarter 1 2009	L.C.C

APPENDIX II – Lagoon Certificate of Integrity

GTS
Geomembrane Testing Services Limited
Thornback Road, Troyswood, Co Kilkenny, Ireland
Tel/Fax: (056) 7770953 Mobile: (086 8323113)
Email: gts@o2.ie

Project:
Gortadroma Landfill Development
Storm Water Retention Tank

The Storm Water Retention Tank at Gortadroma Landfill Development has been tested to the requirements of Section 9 of BS 8007:1987 British Standard Code of Practice of Concrete Structures for Retaining Aqueous Liquids.

The test under BS 8007 calls for a 7-day test. The recorded levels for the test carried out on the above structure are outlined in Table 1. The net water increase over the 7-day period was **4.25mm** as recorded in the control. The increase in water level in the Storm Water Retention Tank during the same period was **2.33mm**. The still well and hook gauge method was applied to record water levels. BS 8007 allows for a decrease in water level of up to 10mm in the concrete tank within the test period. The actual decrease in water level was **1.92mm** which is within the standard, thus the Storm Water Retention Tank integrity is within the requirements of BS 8007.

Table 1: Storm Water Settling Tank

Water Level in Bund (mm)	Change +/- (mm)	Control Water Level (mm)	Change +/- (mm)	Date	Time
90.87		75.40		14/02/08	10.45am
91.02	+0.15	75.76	+0.36	15/02/08	11.40am
91.89	+0.87	76.18	+0.42	18/02/08	10.25am
92.43	+0.54	77.80	+1.62	19/02/08	10.40am
93.20	+0.77	79.65	+1.85	20/02/08	11.45am
Net Change	+2.33	Net Change	+4.25		

Signed:

Frank Lennon
Geomembrane Testing Services Limited

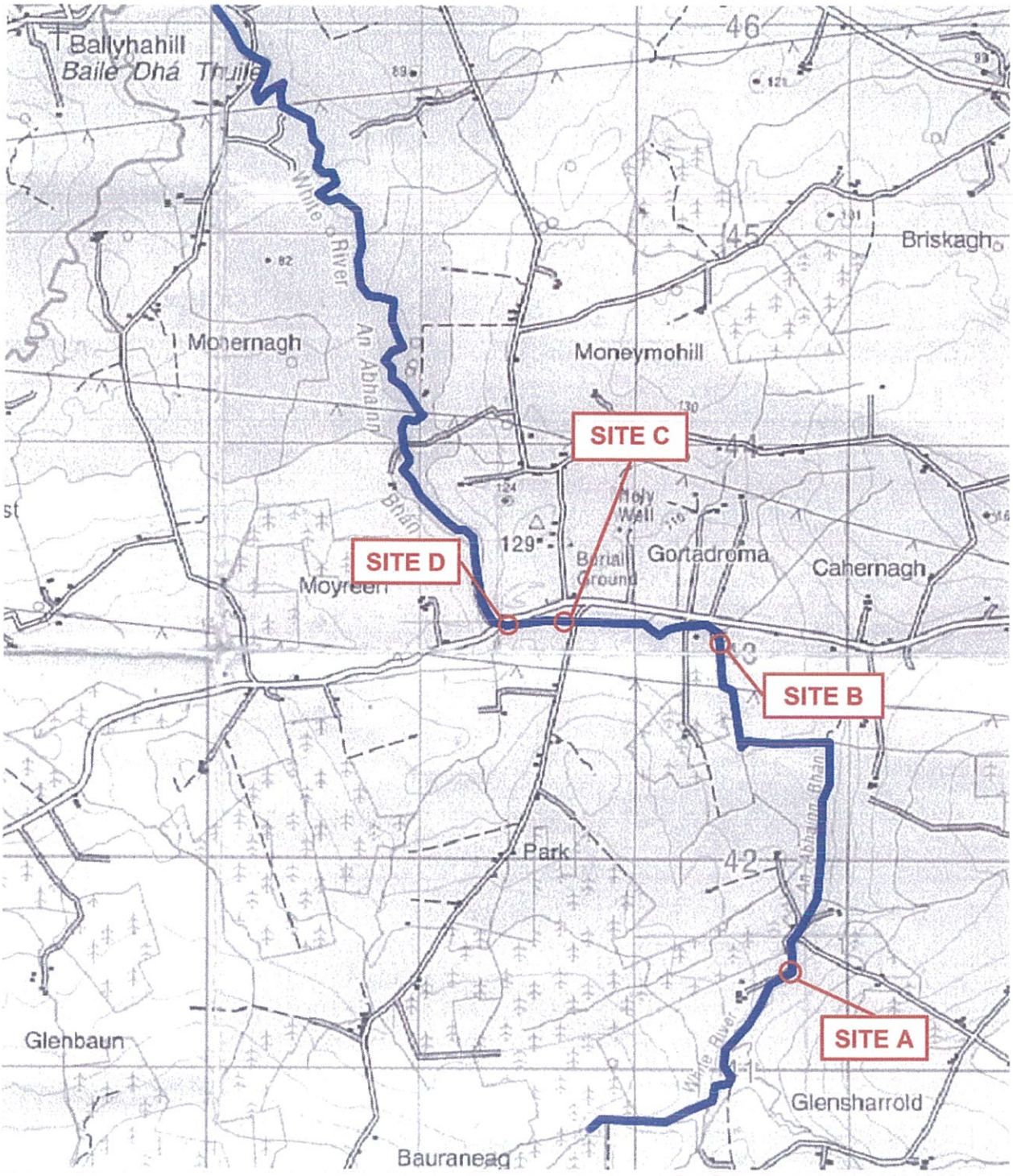
APPENDIX III – Waste Figures 2008

GORTADROMA WASTE QUANTITIES 2008

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													
VEOLIA	714.72	1,610.50	1,529.36	2,647.62	2,385.62	2,147.04	2,429.40	2,166.16	1,941.58	73.70	26.48	85.64	17,757.82
MR. BIN MAN	17.70	45.62	54.52	87.40	78.90	86.98	56.16	116.22	74.72	32.68	226.98	111.62	989.50
BUCKLEY	144.70	172.70	137.06	90.68	118.82	104.16	122.82	81.22	150.50	132.38	140.68	82.46	1,478.18
Wards Waste Disposal	86.48	65.48	78.86	90.84	66.18	88.82	64.70	37.52	97.46	89.78	56.66	79.32	902.10
WHITES SKIPS	66.86	111.78	93.02	102.44	106.16	90.18	138.28	168.92	131.04	104.40	127.98	119.86	1,360.92
Fitzgeralds Skip Hire	70.82	76.46	95.68	87.58	156.64	9.56	131.32	205.26	173.50	32.84	155.60	155.32	1,350.58
Ashgrove Recycling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	88.98	412.10	501.08
Killarney Waste Disposal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	316.98	316.98
SUB-TOTAL	**1,101.28**	**2,082.54**	**1,988.50**	**3,106.56**	**2,912.32**	**2,526.74**	**2,942.68**	**2,775.30**	**2,568.80**	**465.78**	**823.36**	**1,363.30**	**24,657.16**
PRIVATE DOMESTIC													
MR. BIN MAN (Domestic)	3,392.76	683.94	726.38	825.52	96.84	0.00	171.90	277.16	85.10	163.02	0.00	2,734.90	9,157.52
Mr. BIN MAN(Organic Fines)	0.00	0.00	38.96	2,205.40	1,491.68	1,303.16	1,886.18	1,052.20	1,141.90	835.20	50.88	1,134.16	11,139.72
VEOLIA	10.06	8.28	9.38	0.00	29.48	0.00	28.78	0.00	0.00	11.30	0.00	0.00	97.28
SOUTHWEST BINS	283.26	274.32	249.62	245.56	243.34	226.22	196.22	225.26	147.58	191.42	197.74	270.02	2,750.56
F.R ROHU L.T.D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	187.28	599.38	149.64	122.40	49.94	1,108.64
Clean Ireland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	267.98	267.98
Country Clean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	48.22	745.46	793.68
Local Residents	9.72	10.68	10.36	10.84	11.62	10.48	11.24	10.34	12.28	10.56	11.54	11.62	131.28
Cash	222.18	203.08	208.68	207.78	238.30	201.54	230.68	329.48	203.32	235.48	185.98	250.64	2,717.14
SUB-TOTAL	**3,917.98**	**1,180.30**	**1,243.38**	**3,495.10**	**2,111.26**	**1,741.40**	**2,525.00**	**2,081.72**	**2,189.56**	**1,596.62**	**616.76**	**5,464.72**	**28,163.80**
INDUSTRIAL WASTE													
BUCKLEY (Anderson IRL)	**0.00**	**0.00**	**9.60**	**7.68**	**8.74**	**9.72**	**9.90**	**9.76**	**0.00**	**19.70**	**8.86**	**0.00**	**83.96**
Limerick County Council													
Housing/Roads/Sanitary	55.46	376.60	99.58	33.04	58.10	32.98	41.88	29.04	35.80	30.66	11.70	22.14	826.98
ENVIROMENT SECTION	25.96	30.70	21.94	26.88	21.42	31.06	40.94	793.12	112.68	64.60	8.58	46.58	1,224.46
BRING Banks	0.00	2.48	6.64	5.56	8.02	4.76	9.24	6.82	7.70	11.22	5.18	10.62	78.24
Civic Ammenity Sites	0.00	0.00	0.00	0.00	0.00	0.00	92.86	0.00	0.00	0.00	0.00	0.00	92.86
Street Cleaning	8.30	12.92	7.18	7.30	6.68	8.18	6.96	3.48	6.50	15.50	14.26	11.28	108.54
SUB-TOTAL	**89.72**	**422.70**	**135.34**	**72.78**	**94.22**	**76.98**	**191.88**	**832.46**	**162.68**	**121.98**	**39.72**	**90.62**	**2,331.08**
City Council Street Cleaning	**70.94**	**89.34**	**48.10**	**73.70**	**57.82**	**55.76**	**59.46**	**51.50**	**70.28**	**49.28**	**60.08**	**54.34**	**740.60**
SLUDGE													
L.C.C. WASTEWATER	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	6.78	0.00	35.00	47.70	89.86
IPODEC (WYETHS)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.78	0.00	0.00	0.00	0.00	10.78
SUB-TOTAL	**0.00**	**0.00**	**0.38**	**0.00**	**0.00**	**0.00**	**0.00**	**10.78**	**0.00**	**0.00**	**35.00**	**47.70**	**93.86**
GRAND TOTAL	**5,179.92**	**3,774.88**	**3,425.30**	**6,755.82**	**5,184.36**	**4,410.60**	**5,728.92**	**5,761.52**	**4,991.32**	**2,253.36**	**1,583.78**	**7,020.68**	**56,070.46**

APPENDIX IV – Map of Biological Monitoring Locations

MAP 1 BIOLOGICAL MONITORING SITES



APPENDIX V – Meteorological Data

Annual Meteorological Report

2008

Gortadroma Landfill Site

Waste Licence 0017-03

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.

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 0.2 to 17.8 ^{0}C. Figure 2 shows the average atmospheric pressure variation over the course of the year, which was in the order of 953 to 1025 hP a. Figure 3 shows that the average wind speed was in the order of 0 m/s to 13.1 m/s. Figure 4 shows the monthly rainfall values. January was the wettest month and April was the driest month.

The annual rainfall recorded was 1932.99 mm and the annual evaporation was 594.62 mm.

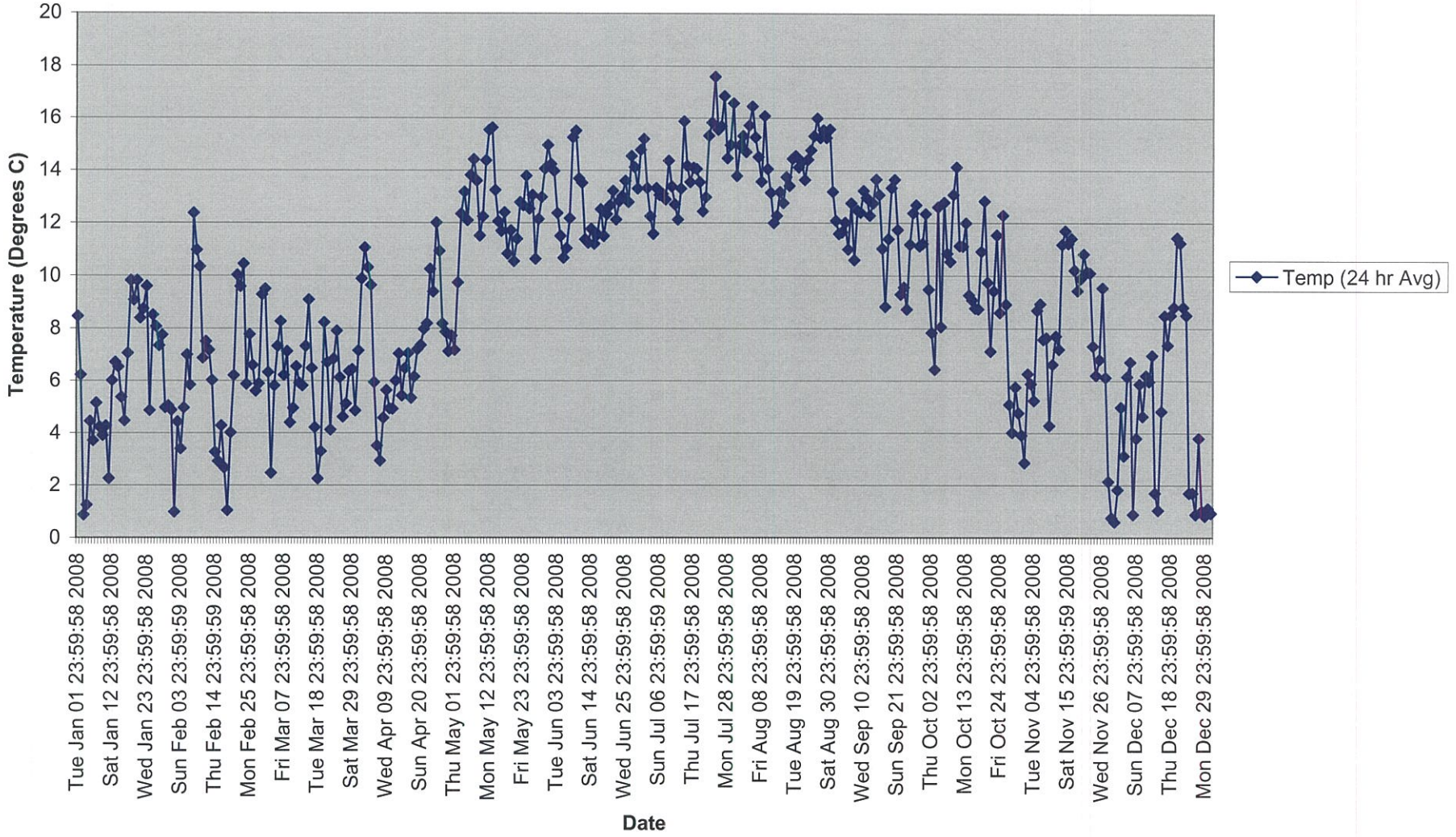
A complete copy of all data is attached for your information and includes the following:

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

3.0 Conclusion

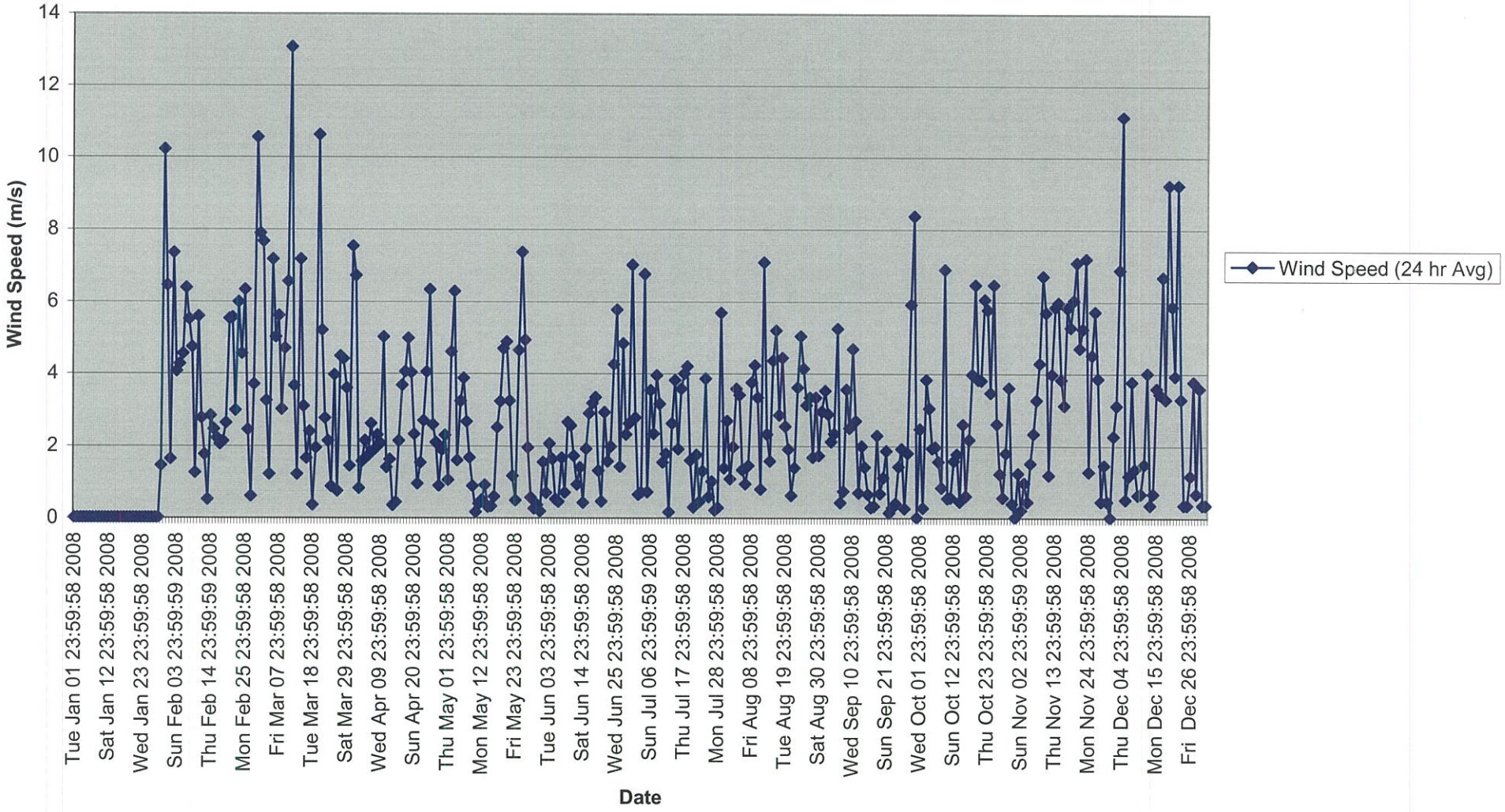
The meteorological station was a vital component in the operation of our high winds procedure at the site over the course of the year. The precipitation value of 1932.99 mm was the highest ever recorded at the site. The evaporation value of 594.62 mm was 66.06 mm less than the previous year.

Temp (24 hr Avg)- Figure 1

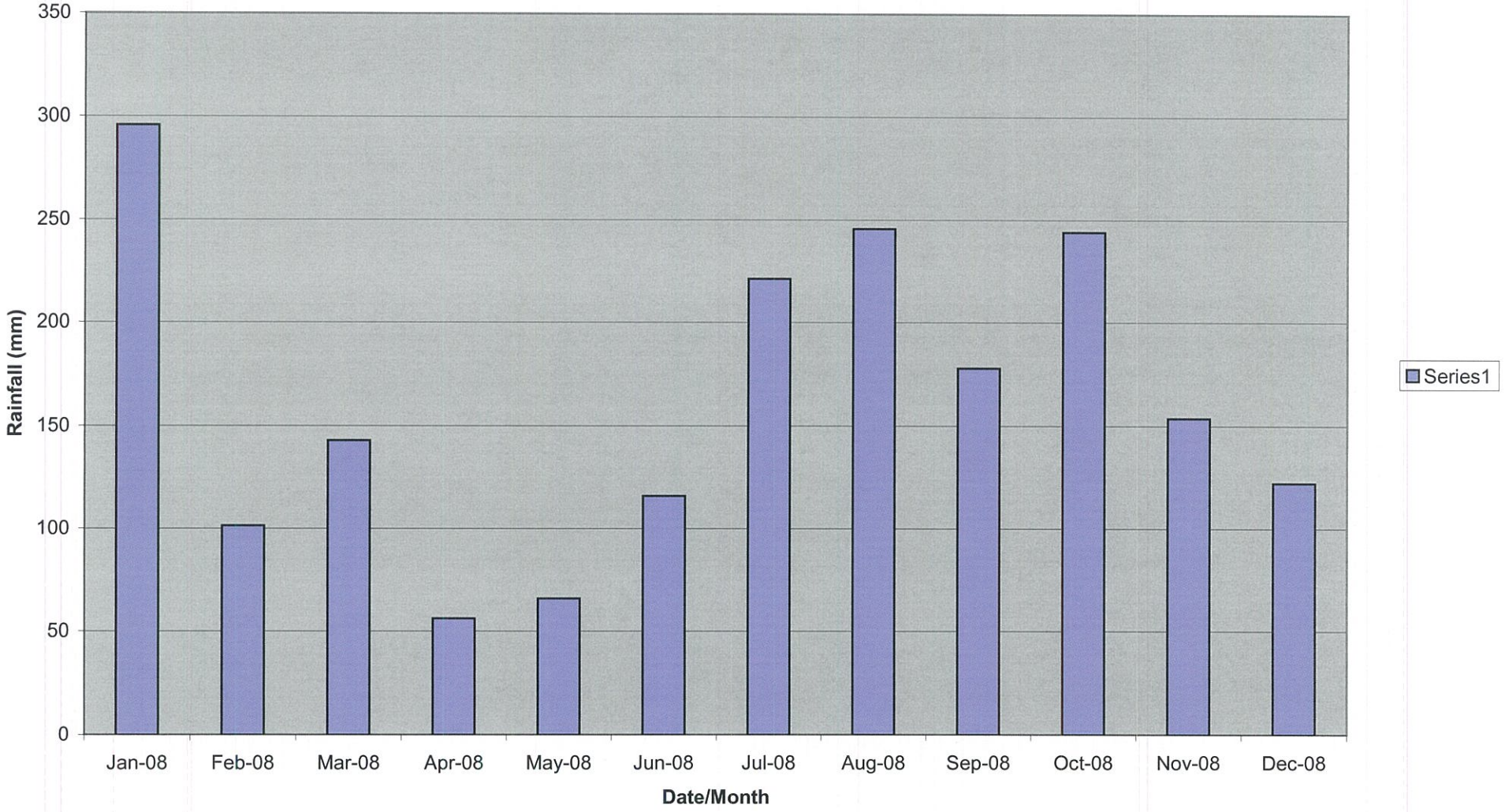


Pressure (24 hr Avg)-Figure 2
Pressure (24 hr Avg)
Atmospheric Pressure (hpa)
1040
1020
1000
980
960
940
920
900
Date
Tue Jan 01 23:59:58 2008
Sat Jan 12 23:59:58 2008
Wed Jan 23 23:59:58 2008
Sun Feb 03 23:59:59 2008
Thu Feb 14 23:59:59 2008
Mon Feb 25 23:59:58 2008
Fri Mar 07 23:59:58 2008
Tue Mar 18 23:59:58 2008
Sat Mar 29 23:59:58 2008
Wed Apr 09 23:59:58 2008
Sun Apr 20 23:59:58 2008
Thu May 01 23:59:58 2008
Mon May 12 23:59:58 2008
Fri May 23 23:59:58 2008
Tue Jun 03 23:59:58 2008
Sat Jun 14 23:59:58 2008
Wed Jun 25 23:59:58 2008
Sun Jul 06 23:59:59 2008
Thu Jul 17 23:59:58 2008
Mon Jul 28 23:59:58 2008
Fri Aug 08 23:59:58 2008
Tue Aug 19 23:59:58 2008
Sat Aug 30 23:59:58 2008
Wed Sep 10 23:59:58 2008
Sun Sep 21 23:59:58 2008
Thu Oct 02 23:59:58 2008
Mon Oct 13 23:59:58 2008
Fri Oct 24 23:59:58 2008
Tue Nov 04 23:59:58 2008
Sat Nov 15 23:59:59 2008
Wed Nov 26 23:59:58 2008
Sun Dec 07 23:59:58 2008
Thu Dec 18 23:59:58 2008
Mon Dec 29 23:59:58 2008

Wind Speed (24 hr Avg)-Figure 3



Precipitation 2008- Figure 4



APPENDIX VI – Pollution Emissions Register

Environmental Protection Agency

AER Returns Worksheet

Version 1.1.01

REFERENCE YEAR	2008

1. FACILITY IDENTIFICATION

Parent Company Name	Limerick County Council
Facility Name	Gortadroma Landfill Site
PRTR Identification Number	W0017
Licence Number	W0017-03

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.
3.6	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	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 t...
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.
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.
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.
3.1	Deposit on, in or under land (including landfill).
3.4	Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons.

Address 1	Gortadroma
Address 2	Ballyhahill
Address 3	Co. Limerick
Address 4	
Country	Ireland
Coordinates of Location	0.000
River Basin District	IE-Shannon
NACE Code	382
Main Economic Activity	Waste treatment and disposal
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	0
Number of Installations	1
Number of Operating Hours in Year	2210
Number of Employees	10
User Feedback/Comments	Release to Wastewater or Sewer, Section B: There was no option for BOD and Suspended Solids in drop down menu. The total BOD value was 7,479 Kgs/year and the total Suspended solids value was 3,703.23 Kgs/Year.
Web Address	

2. PRTR CLASS ACTIVITIES

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

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

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR								
POLLUTANT		METHOD			Flare	QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
01	Methane (CH4)	E	Estimate	Gassim	29188.32	524000.0	0.0	494811.68
03	Carbon dioxide (CO2)	E	Estimate	Gassim	0.0	14887000.0	0.0	14887000.0
08	Nitrogen oxides (NOx/NO2)	M	BS EN: 14792	International Standard	1051.2	1051.2	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	BS EN: 14791	International Standard	1489.2	1489.2	0.0	0.0

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

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR								
POLLUTANT		METHOD				QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

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

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

RELEASES TO AIR								
POLLUTANT		METHOD				QUANTITY		
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

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

Additional Data Requested from Landfill operators

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

Landfill: Gortadroma Landfill Site

Please enter summary data on the quantities of methane flared and / or utilised	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m3 per hour	
Total estimated methane generation (as per site model)	3574080.0	E	Actual Flow m3/hr	Gassim	N/A	
Methane flared	3050080.0	M	1020	FLOW METER	0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	524000.0	E	Estimate	Gassim	N/A	

4.2 RELEASES TO WATERS

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this only concerns Releases from your facility

RELEASES TO WATERS										
POLLUTANT					QUANTITY					
			Method Used		Storm Water (SW4)	Treated leachate discharge -				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	
18	Cadmium and compounds (as Cd)	M	CRM	Std. Methods 21st Edition.	0.0643	0.0	0.0643	0.0	0.0	
19	Chromium and compounds (as Cr)	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
20	Copper and compounds (as Cu)	M	CRM	Std. Methods 21st Edition.	1.4296	0.0	1.4296	0.0	0.0	
21	Mercury and compounds (as Hg)	M	CRM	Std. Methods 21st Edition.	0.1429	0.0	0.1429	0.0	0.0	
22	Nickel and compounds (as Ni)	M	CRM	Std. Methods 21st Edition.	2.8592	0.0	2.8592	0.0	0.0	
23	Lead and compounds (as Pb)	M	CRM	Std. Methods 21st Edition.	0.2716	0.0	0.2716	0.0	0.0	
24	Zinc and compounds (as Zn)	M	CRM	Std. Methods 21st Edition.	3.2881	0.0	3.2881	0.0	0.0	
26	Aldrin	M	CRM	Std. Methods 21st Edition.	0.0714	0.0	0.0714	0.0	0.0	
27	Atrazine	M	CRM	Std. Methods 21st Edition.	0.0714	0.0	0.0714	0.0	0.0	
28	Chlordane	M	CRM	Std. Methods 21st Edition.	0.0714	0.0	0.0714	0.0	0.0	
33	DDT	M	CRM	Std. Methods 21st Edition.	0.0714	0.0	0.0714	0.0	0.0	
34	1,2-dichloroethane (EDC)	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
35	Dichloromethane (DCM)	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
36	Dieldrin	M	CRM	Std. Methods 21st Edition.	0.0714	0.0	0.0714	0.0	0.0	
41	Heptachlor	M	CRM	Std. Methods 21st Edition.	0.0714	0.0	0.0714	0.0	0.0	
42	Hexachlorobenzene (HCB)	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
43	Hexachlorobutadiene (HCBD)	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
49	Pentachlorophenol (PCP)	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
51	Simazine	M	CRM	Std. Methods 21st Edition.	0.0714	0.0	0.0714	0.0	0.0	
54	Trichlorobenzenes (TCBs)(all isomers)	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
57	Trichloroethylene	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
58	Trichloromethane	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
60	Vinyl chloride	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
61	Anthracene	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
62	Benzene	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
65	Ethyl benzene	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
68	Naphthalene	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
71	Phenols (as total C)	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
73	Toluene	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0	
76	Total organic carbon (TOC) (as total C or COD/3)	M	CRM	Std. Methods 21st Edition.	7863.0	0.0	7863.0	0.0	0.0	
79	Chlorides (as Cl)	M	CRM	Std. Methods 21st Edition.	19251.0	0.0	19251.0	0.0	0.0	

88	Fluoranthene	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0

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

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS								
POLLUTANT					QUANTITY			
			Method Used					
No Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

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

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

RELEASES TO WATERS									
POLLUTANT					QUANTITY				
			Method Used		Storm Water SW4	Treated Leachate Discharge			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
238	Ammonia (as N)	M	CRM	Std. Methods 21st Edition.	86.494	2.371	88.865	0.0	0.0
303	BOD	M	CRM	Std. Methods 21st Edition.	1430.0	42.9	1472.9	0.0	0.0
306	COD	M	CRM	Std. Methods 21st Edition.	25589.0	0.0	25589.0	0.0	0.0
240	Suspended Solids	M	CRM	Std. Methods 21st Edition.	8207.28	385.4	8592.68	0.0	0.0

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

4.3 RELEASES TO WASTEWATER OR SEWER

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER								
POLLUTANT		METHOD			QUANTITY			
			Method Used		Waste Water Treatment			
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
06	Ammonia (NH3)	M	CRM	Std Methods 21st Edition.	9642.12	9642.12	0.0	0.0
12	Total nitrogen	M	CRM	Std Methods 21st Edition.	51.215	51.215	0.0	0.0
13	Total phosphorus	M	CRM	Std Methods 21st Edition.	12388.4	12388.4	0.0	0.0

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

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

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER								
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0
					0.0	0.0	0.0	0.0

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

4.4 RELEASES TO LAND

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND							
POLLUTANT		METHOD			QUANTITY		
			Method Used				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

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

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

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

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

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR# : W0017 | Facility Name : Gortadroma Landfill Site | Filename : W0017_2008(1).xls | Return Year : 2008 |

Transfer Destination	European Waste Code	Hazardous	Quantity T/Year	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Name and Licence / Permit No. of Recoverer / Disposer / Broker	Address of Recoverer / Disposer / Broker	Name and Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)	Licence / Permit No. of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	20 01 39	No	5.2	Plastic Bottles	R5	M	Weighed	Onsite in Ireland	South West Bins WCP/LK/080/07d	Kilmorna, Listowel		
Within the Country	20 01 99	No	1.6	Tetra Packs	R5	M	Weighed	Onsite in Ireland	South West Bins WCP/LK/080/07d	Kilmorna, Listowel		
Within the Country	20 01 01	No	37.84	Newspapers and Magazines	R5	M	Weighed	Onsite in Ireland	South West Bins WCP/LK/080/07D	Kilmorna, Listowel.		
Within the Country	20 01 01	No	13.4	Cardboard	R5	M	Weighed	Onsite in Ireland	South West Bin. WCP/LK/080/07d.	Kilmorna, Listowel.		
Within the Country	20 01 02	No	6.49	Glass Bottles and Jars	R5	M	Weighed	Onsite in Ireland	Mr. Binman WCP/LK/069/07d	Grange, Killmallock, CountyLimerick		
Within the Country	20 01 99	No	4.3	Food Cans	R4	M	Weighed	Onsite in Ireland	Mr. Binman WCP/LK/069/07d	Grange, Killmallock, CountyLimerick.		
Within the Country	20 01 40	No	5.07	Drink Cans	R4	M	Weighed	Onsite in Ireland	Mr. Binman WCP/LK/069/07d	Grange, Killmallock, CountyLimerick.		
Within the Country	20 01 40	No	98.28	Mixed Scrap Metal	R4	M	Weighed	Offsite in Ireland	Erin Recyclers WCP/LK/386/06B	Ballysimon Road, Limerick.		
Within the Country	20 01 11	No	9.0	Textiles	R5	M	Weighed	Offsite in Ireland	Cookstown Textile Recyclers WCP/LK/234/07C	36 Magherlane Rd., Randalstown, Co. Antrim.		
Within the Country	16 02 11	Yes	23.05	Fridge Freezers	R5	M	Weighed	Offsite in Ireland	KMK Metals, WCP/LK/078/05C	Cappincur Indst. Est., Tullamore, Co. Offaly.	M. Baker Recycling Ltd, Parr Indst. Est. St. Helens, Merseyside, Uk	Licence Ref No: EAWML 50133
Within the Country	16 02 14	No	13.09	LDA Non-Hazardous	R4	M	Weighed	Offsite in Ireland	KMK Metals, WCP/LK/078/05C	Cappincur Indst. Est., Tullamore, Co. Offaly.		
Within the Country	20 01 36	No	29.4	Small WEE	R5	M	Weighed	Offsite in Ireland	KMK Metals, WCP/LK/078/05C	Cappincur Indst. Est., Tullamore, Co. Offaly.		
Within the Country	**19 10 04**	**No**	5099.34	Automobile Shreeder Residue	R5	M	Weighed	Onsite in Ireland	WL0017-03	Gortadroma Landfill		
Within the Country	17 05 04	No	5645.54	Soil & Stones.	R5	M	Weighed	Onsite in Ireland	WL0017-03	Gortadroma Landfill		
Within the Country	03 01 99	No	390.16	Shreeded Wood Pallets	R3	M	Weighed	Onsite in Ireland	WL0017-03	Gortadroma Landfill		

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

APPENDIX VII – Industrial Sludge Test Results

EURO environmental services

Environmental Science & Management
Water,Soil & Air Testing

Unit 35,
Boyne Business Park,
Drogheda,
Co. Louth
Ireland
Tel: +353 41 9845440
Fax: +353 41 9846171
Web: www.euroenv.ie
email info@euroenv.ie

A copy of this certificate is available on www.euroenv.ie

Customer	Fiona Doyle Mc Gill Environmental Ballinvoher Castletownroche Co Cork Ireland	*Lab Report Ref. No.*	0360/066/04
		Date of Receipt	25/04/2008
		Date Testing Commenced	25/04/2008
		Received or Collected	Courier:Interlink
		Condition on Receipt	Acceptable
Customer PO	2096	*Date of Report*	01/05/2008
Customer Ref	Molaisin Wyeth Feb 08	*Sample Type*	Other

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
% Dry Matter	302	Drying @ 104 C	12.37	%	
Cadmium Solid (OES)	224	ICP-OES	14.00	ug/Kg	
Chromium Solid (OES)	224	ICP-OES	1164	ug/Kg	
Copper Solid (OES)	224	ICP-OES	3834	ug/Kg	
Lead Solid (OES)	224	ICP-OES	616	ug/Kg	
Mercury Solid (OES)	0	ICP-OES	<2.5	ug/Kg	
Nickel Solid (OES)	177	ICP-OES	412	ug/Kg	
pH (Solid)	110	Electrometry	5.8	pH Units	
Zinc Solid (OES)	224	ICP-OES	26653	ug/Kg	

Signed : Donna Heslin *Date :* 01/05/08

Donna Heslin - Laboratory Manager

Acc. : Accredited Parameters by ISO 17025:2005

All organic results are analysed as received and all results are corrected for dry weight at 104 C

Results contained in this report relate only to the samples tested

APPENDIX VIII – Financial Provision

Projected income and expenditure for Limerick County Council environment section for 2009, is shown below. The calculation for the determination of charges is also shown.

EXPENDITURE	
Gortadroma Landfill	**Euro's (€)**
Operational Costs	1,775,398
Gortadroma Aftercare	171,000
Landfill Levy	1,445,440
Local Development Fund/Salary/Internal Costs/Loan Charges	2,267,149
All other Environmental Costs	
Recovery & Recycling Costs	945,334
Provision of Waste Collection Service	244,840
Waste Reg. Monitoring & Enforcement	834,382
Waste Management Plan	725,780
Litter Management	699,490
Water Quality & Air, Noise Pollution	3,646,121
Total Expenditure	**12,754,934**

INCOME	
Landfill Gate Fee	7,950,000
Landfill Levy	1,445,440
Other Income(Fines, Waste Collection Permits)	558,094
Environment, Heritage & Local Government	2,801,400
Total Income	**12,754,934**

Gate Fee Calculation:

Projected tonnage (2009) = 78,295 x 120 = € 9,395,400
Charge per tonne = € 100 + € 20 per tonne landfill levy.