Wexford County Council

Holmestown Waste Management Facility
W0191-02

Annual Environmental Report 2013

Quality Control Sheet

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EXECUTIVE SUMMARY

This *Annual Environmental Report* has been prepared for Holmestown Waste Management Facility, Waste Licence W0191-02, for the reporting period from **1 January 2013 to 31 December 2013 inclusive**. The report includes the information specified in Schedule H of the Waste Licence, Content of the Annual Environmental Report, in accordance with Waste Licensing - *Draft Guidance on Environmental Management Systems (EMS) and Reporting to the Agency, 1999'.* The main topics discussed within this report are as follows:

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

The waste management facility commenced accepting waste on site on 29 April 2008 in the northern end of the landfill, namely Cells 3 + 4 in Phase 1, being used first. The waste management facility temporarily ceased accepting waste on 21st May 2012. No waste has been accepted for landfilling at the facility since then. Therefore, the total quantity of waste accepted for landfill at the facility for the reporting period 1st January to 31st December 2013 was 0 tonnes.

An environmental management system was prepared for Holmestown Waste Management Facility in October 2008 consisting of the following elements:

- Schedule of Environmental Objectives and Targets
- Environmental Management Plan
- Corrective Action Procedures
- Awareness and Training Programme

A number of objectives and targets were developed for the facility which are reviewed and updated where appropriate on an annual basis.

The majority of engineering works associated with the general development of the site including the preparation of Phase 1, Cells 1-4, were completed from 2006-2008. The installation of the twin gas lines from phase 1 to the enclosed gas flare and other minor operational works were completed in 2009.

The enclosed flare was commissioned in August 2009 and put into permanent operation in September 2009. Horizontal and vertical gas management infrastructure has been installed in cells 1, 2, 3, and 4. The volumes of landfill gas extracted varied from 176 m^3/hr to 273 m^3/hr during the reporting period. Gas extraction rates were optimised in 2013 to minimise odours. The gas quality remained relatively constant during the reporting period with CH_4 values of approx. 27%.

The construction of the Phase 2 landfill cells commenced in June 2010 and was completed in December 2010.

The Phase 2 landfill footprint encompasses approximately 17,500 m^2. Lining of the cells involved the placing of approximately 16,600 m^3 of engineered clay and the laying and welding of approximately 17,500 m^2 of HDPE liner. A 500 mm stone drainage blanket was laid on the cell floors with a protective geotextile placed on the cell side slopes.

Wexford County Council carried out a comprehensive environmental monitoring programme during 2013 in compliance with the waste licence conditions. The monitoring programme incorporated Landfill Gas, Leachate Level & Quality, Surface Water Quality, Groundwater Level & Quality, Noise, Dust, Odour, Meteorological and topographical surveys. Results to date suggest that there is no notable pollution from operational activities.

There was a number of recurring category 3 incidents in 2013. These were related to:

- peripheral gas wells;
- groundwater monitoring;
- noise.

The elevated gas and groundwater results were detected pre-landfilling and are not related to site operations. Reports to date have summarised that the elevated results recorded are due to naturally occurring elements in the site soils.

The elevated noise readings were also not attributed to site operations. Noise reports commented that all the elevated readings were caused by either the N25 or local noises in close proximity to the sampling device (e.g. tractor passing, dog barking etc.).

Reports have been submitted to the EPA that review peripheral gas, groundwater and surface water pond results and provide proposals for control and trigger levels where applicable.

There was one incident of elevated odour level on site, on 20th February 2013, but this was attributed to slurry spreading ongoing on adjacent agricultural lands.

No complaints were received by WCC or the EPA during this reporting period.

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1 INTRODUCTION

1.1 General Information

The Annual Environmental Report (AER) for Holmestown Waste Management Facility includes as a minimum the information specified in Schedule H of the Waste Licence W0191-2, *Content of Annual Environmental Report.*

The AER has been prepared in accordance with the Environmental Protection Agency (EPA) publication *'Waste Licensing – Draft Guidance on Environmental Management Systems (EMS) and Reporting to the Agency, 1999'* and further guidance provided on the EPA website. This document is the sixth AER prepared for the site.

The reporting period for this AER is **1 January 2013 to 31 December 2013 inclusive**.

1.2 Site information

Table 1 Site information on Holmestown Waste Management Facility

HOLMESTOWN WASTE MANAGEMENT FACILITY	
Waste licence register no:	W0191-02 (revised date 24/03/2010)
Name and address of operator: Name and address of facility:	Wexford County Council County Hall Carricklawn, Wexford. Holmestown Waste Management Facility Barntown Wexford
Site Description:	Holmestown Waste Management Facility is located within the town lands of Holmestown Great, Glenduff, Bolgerstown, Muchwood and Ballyeaton, approximately 8 kilometres west from Wexford Town (National Grid Reference 2973, 1230). The site which lies to the north of the N25, Wexford to New Ross road comprises an area of approximately 63 hectares of which 15 hectares will be used for landfilling and is situated within a mixed forested plantation of mainly coniferous trees known as Holmestown Wood. The property is bounded by agricultural lands to the North, South, East and West. The land use in the surrounding area is good quality grazing and is intensely farmed to the west, north and east by dairy and livestock farmers. There are a number of dwellings surrounding the site including farmhouses, residences and a nursing home. The site is within the catchment of the Slaney River, and a number of small streams drain the site to the Slaney, less than 2km away. A site location map is provided as **Appendix G.**

2 MANAGEMENT & STAFFING STRUCTURE

2.1 Management and staffing structure for Holmestown Waste Management Facility

Management Structure for Holmestown Waste Management Facility on 31st December 2013

The Holmestown waste management facility was operated by Wexford County Council during 2013 with consultancy support provided by sub consultants including Fehily Timoney & Company, Irish Biotech Services and Odour monitoring Ireland. Details of the management structure during the reporting period for the facility are provided above.

2.2 Financial provisions

In accordance with Condition 12.1 Wexford County Council paid a sum of €14,597 to the Environmental Protection Agency for the management and monitoring of the waste licence.

2.2.1 *Provision for the Closure, Restoration and Aftercare*

Wexford County Council (WCC), as a Local Authority, has made the necessary provisions, for the development, management, restoration and aftercare of Holmestown Waste Management Facility. WCC has assigned a full time permanent engineer for the management of the facility. Wexford County Council is committed to the ongoing provision of funding for all site development works, environmental monitoring costs and restoration and aftercare works at Holmestown Landfill for the duration of the Waste Licence, and has made financial provision as presented in the Environmental Liabilities Risk Assessment (see 2.3 below and Appendix H).

2.2.2 Community Support and Development

An environmental monitoring committee (EMC) was established in July 2005 and includes two members of the Barntown Environmental Alliance, two elected members of Wexford County Council and two Wexford County Council officials. The Committee meets periodically – less frequently than when the landfill was fully operational. A community support and development fund has been set up by Wexford County Council.

2.3 Review of Environmental Liabilities

Condition 12.2.2 states the licensee shall arrange for the completion of a Environmental Liabilities Risk Assessment (ELRA) to address the liabilities from past and present activities. WCC engaged the services of Fehily Timoney and Company, consulting engineers, to undertake this assessment. The ELRA was completed in July 2013 and issued to the EPA via the Eden system.

In summary, the ELRA addresses WCC's commitments with respect to known and unknown liabilities. It details the known liabilities (e.g. capital development, restoration, aftercare) and provides an estimate of annual aftercare costs in the post-closure period. It also considers what unknown liabilities might arise during the remaining lifetime of the landfill and assesses the likelihood of occurrence and the severity of occurrence. It concludes that there are no likely risks within the medium or high zones. The assessment report concludes with a statement of the financial provisions that WCC has in place to cover its environmental liabilities.

A copy of the ELRA is included at Appendix H to this report.

2.4 Environmental Management System

Condition 2.3 requires the licensee to establish and maintain an Environmental Management System (EMS) at the facility. The site environmental management system was prepared in October 2008 and revised in 2010. The EMS consists of the following elements:

- Schedule of Environmental Objectives and Targets
- Environmental Management Plan
- Corrective Action procedures
- Awareness and training Programme

2.4.1 *Environmental Objectives & Targets – Progress*

The Environmental Objectives and Targets for the period January 2012 to December 2012 and details of progress made regarding each objective are detailed in Table 2 and 3 hereafter. In summary the objectives and targets established include the following;

- Objective No 1: Operate facility in accordance with the conditions of the waste licence and promote continual environmental improvement
- Objective No 2: Improve Environmental Performance of the facility by maintaining a comprehensive monitoring regime
- Objective No 3: Maximise recycling levels within the civic amenity and site office
- Objective No 4: Promote energy efficiency on site and in the site offices
- Objective No 5: Minimisation of Complaints

2.4.2 *Environmental Management Plan*

An environmental management plan (EMP) was prepared and as part of the EMS in October 2008 and reviewed in January 2010. The EMP comprises information on the following topics:

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

2.4.3 *Corrective action Procedure*

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

2.4.4 *Awareness and Training Programme*

In accordance with Condition 2.3.2.4 of the licence, an awareness and training programme has been developed to increase environmental awareness among staff and identify training needs of all personnel working at Holmestown waste management facility. The facility manager has overall responsibility for reviewing training needs on an annual basis to ensure that all staff have the necessary skills and level of awareness to carry out their duties to the highest environmental and safety standards. A training schedule summarizing staff training proposals for 2013 is included in Appendix B.

Table 2 2013

Achievement of Objectives and Targets for 2013			
	Comments	**Target**	**Progress**
Objective No 1: Operate facility in accordance with the conditions of the waste licence and promote continual environmental improvement			
1.1 Programme of regular inspections of the foul and surface water drainage infrastructure & desludge as necessary,	Weekly inspections of all foul and surface water infrastructure to be carried out.	December 2013	Ongoing
Objective No 2: Improve environmental performance of the facility by maintaining a comprehensive monitoring regime			
2.1 Regularly review environmental monitoring data and monitor changes in trends	Maintain trend analysis graphs for 2013	December 2013	Ongoing
Objective No 3: Maximise recycling levels within the civic amenity and site office			
3.1 Increase public awareness of the recycling facility through advertising	School tours of the facility are scheduled in coming year, and radio and paper advertising will be continued. Organise an outside radio programme to highlight civic amenity site and the importance of waste segregation and waste recycling.	December 2013 Jan 2013	Completed Complete

Achievement of Objectives and Targets for 2013			
	Comments	**Target**	**Progress**
3.2 Maintain the civic amenity facility in a tidy and orderly manner	Daily inspections carried out.	December 2013	Ongoing
Objective No 4: Minimisation of Complaints			
4.1 Effectively deal with complaints	There were no complaints in 2013.	December 2013	Ongoing
4.2 Review complaints register and formulate action plans for next period to minimise/reduce complaints	There were no complaints in 2013.	December 2013	Ongoing
4.3 Improve housekeeping practices to minimise the number of complaints received	Litter picking of the site and surrounding areas periodically as required, onsite noise monitoring to reduce noise impact.	December 2013	Ongoing
4.4 Maintain the site in an orderly and accessible fashion	All staff responsible for upkeep of site	December 2013	Ongoing
4.5 Engage with the local community through meetings	The local community are kept informed through the EMC committee.	December 2013	Ongoing
Objective No 5: To maintain the current site infrastructure			
5.1 Ensure ongoing maintenance of the following site infrastructure: Roads; Surface Water drainage infrastructure; Weighbridge; Site offices and Plant shed; Landfill gas extraction system; Leachate extraction system.	All of the items of existing infrastructure were maintained as required and in accordance with suppliers/manufacturers instructions where applicable.	December 2013	Ongoing

Table 3 Objectives and Targets for 2014

Objectives and Targets for 2014			
	Comments	**Target**	**Responsibility**
Objective No 1: Operate facility in accordance with the conditions of the waste licence and promote continual environmental improvement			
1.1 To re-commence landfill activity without any undue increase in nuisance or environmental impact	This will require strict compliance with the conditions of the waste licence	December 2014	Facility Manager
Objective No 2: Improve environmental performance of the facility by maintaining a comprehensive monitoring regime			
2.1 Regularly review environmental monitoring data and monitor changes in trends	Conduct monitoring, as a minimum in accordance with the waste licence Maintain trend analysis graphs for 2014, interrogate and interpet this data. Make improvements where the need is identified	December 2014	Facility Technician & Manager
Objective No 3: Increase the scope of service at the civic amenity			
3.1 Commence acceptance of source segregated food waste in accordance with the Household Food Waste Regulations	140L wheelie bins to be provided for patron disposal of food waste to minimise odour nuisance. Food waste taken off site to compost facility for recovery. Advertise on website, local press, local radio	January 2014	Facility Supervisor & Manager

Objectives and Targets for 2014			
	Comments	**Target**	**Responsibility**
3.2 Commence acceptance of garden waste	Obtain prices from contractors. Agree schedule of charges. Advertise on website, local press, local radio	April 2014	Facility Manager & Supervisor
3.3 Commence acceptance of waste paint	Obtain prices from contractors. Agree schedule of charges. Advertise on website, local press, local radio	June 2014	Facility Manager & Supervisor
Objective No 4: Reduce leachate generation in phase 1			
4.1 Enhance run-off of clean surface water from Cells 1 and 2	To reduce leachate generation, run-off needs to be shed to outside the Cell 1 containment berm. This will be done using proprietary artificial lining materials.	June 2014	Facility Manager & Supervisor
Objective No 5: To commence discharge of pre-treated leachate to sewer			
5.1 This will displace current tankering of leachate to Wexford WWTP, which is environmentally costly from a CO2 perspective	The pipeline will be re-tested to ensure integrity prior to commissioning.	Q1 2014	Facility Manager

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

During the reporting period January – December 2013 no new site procedures were developed at the facility. All procedures are kept on file at the site office and all staff are made fully aware of new/revised procedures as they are developed. The procedures developed for the site are as follows:

- HWMF001 Waste Acceptance Procedure rev.2
- HWMF002 Waste Handling Procedure
- HWMF003 Communications Procedure
- HWMF004 Environmental Records Procedure
- HWMF005 Corrective Action Procedure
- HWMF006 Leachate Handling Procedure
- HWMF007 Emergency Response Procedures
- HWMF008 Firewater Risk Retention assessment
- HWMF009 Entering onto private property procedure
- HWMF010 Civic Amenity procedures
- HWMF011 Weighbridge procedures
- HWMF012 Fire Evacuation - Emergency Procedure
- HWMF013 Accident and reporting procedure

2.4.6 *Report on communication programme*

In accordance with Condition 2.4.1 of the waste licence a communications programme has been developed at the facility. We held an outside broadcast with Southeast Radio in January 2013 to promote public awareness that the civic amenity site is still in operation, and to advertise the range of services on offer. An environmental monitoring committee also convene periodically to discuss a range of matters relating to the management and operation of the waste management facility. In addition Wexford County Council provides the following documentation for public access at the site office and at Wexford County Hall:

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

List of records available for public access
Waste Licence W00191-2
Waste Licence application
Correspondence with the EPA
Incident / complaints records
Audit records
Waste acceptance records
Rejected waste records

All monitoring records
Surface water inspection forms
Leachate removal records
Bird / vermin control reports

3 REPORTED INCIDENTS & COMPLAINTS SUMMARIES

3.1 Incidents

A recurring category 3 incident which was initially reported to the EPA on 11 January 2008 relating to the detection of carbon dioxide and methane gas at a number of gas monitoring boreholes continued to be in exceedence of its trigger level during the period January to December 2013.

Monitoring of gas wells was carried out between September 2007 and March 2008. Naturally occurring methane and carbon dioxide were regularly detected in a number of boreholes located outside the perimeter of the constructed lined cells during routine monitoring on site prior to waste acceptance. As a means of investigating these recurring gas levels the EPA requested that an investigation be carried out on site, this was undertaken between March and April 2008.

The investigation found existing levels of naturally occurring methane and carbon dioxide in the area as a result of the breakdown of organic material in the soil. An assessment was carried out and the risk associated with naturally occurring methane and carbon dioxide on the site was deemed not to be significant due to the underlying geology of the area. The presence of clay which has a low permeability acts as a natural containment material preventing gas from travelling through the ground for any considerable distance. The cells are also fully lined with a double liner system consisting of a geocomposite liner on top of an engineered clay liner. A number of recommendations were made to monitor and manage the landfill in the absence of perimeter gas wells through maintaining a negative pressure within the waste body. Two reports were submitted to the EPA during April and December 2008 entitled:

- Investigation of Naturally Occurring Background Gas Levels at Holmestown Landfill – Risk Assessment and Recommendations. (Revision 1)

- Investigation of Naturally Occurring Background Gas Levels at Holmestown Landfill – Risk Assessment and Recommendations – Trace Gas Analysis. (Revision 2)

A review of the peripheral gas borehole results as recommended in previous reports has been completed. The review incorporates all results to the end of 2009. This report will form the basis for future works/monitoring

Another recurring category 3 incident was the exceedence of trigger levels for groundwater boreholes. Results were outside Interim Guideline Values in a number of the on-site groundwater boreholes tested. The elevated values date back to pre-landfilling and have been recorded both upstream and downstream of the landfill footprint. Similar to gas readings the elevated results are prevalent downstream in the north east corner where the bulk of the on site excavation works were carried out and appear to be due to a non-landfill source in the soil. The main soil mass is low permeability clay with sand and gravel lenses. Groundwater movement in the soil zone is relatively slow resulting in low flows. This enables emissions to build up locally around a source as appears to be indicated from the results.

Subsequent to ongoing interim trigger level exceedences, a report reviewing all groundwater data to the end of 2009 was completed and submitted to the EPA.

Exceedences of noise trigger levels were also noted during the reporting period. The excessive noise was attributed to traffic on the N25 roadway or local noise sources (dogs barking etc.) during monitoring for all the monitoring locations that tested above the licence limit.

3.2 Complaints

No complaints were received during this reporting period.

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

4.1 Landfill Engineering Works

Condition 3.1 of the licence states that the licensee shall establish all infrastructure referred to in the licence prior to the commencement of the licensed activities or as required by the waste licence. In accordance with Condition 3.2 proposals for all Specified Engineering Works reports (SEW's) have been submitted to the Agency for approval. A list of these reports to date is as follows. Due to a numbering error SEW No. 7 was omitted i.e. next report after SEW No. 6 is in fact SEW No. 8.

- SEW Report No. 1: Development of the facility including preparatory works and lining – October 2005
- SEW Report No. 2: Installation of the Civic Amenity Facility – October 2005
- SEW Report No. 3: Installation of the Landfill Gas System – October 2005
- SEW Report No. 3A: Installation of the Landfill Gas System (Revised) – September 2007
- SEW Report No. 4: Installation of the Leachate Management System – October 2005
- SEW Report No. 5: Installation of the Groundwater Control Infrastructure – October 2005
- SEW Report No. 6 Installation of the Surface Water Management Infrastructure – October 2005
- SEW Report No. 8: Installation of Clay Liner – February 2007
- SEW Report No. 9: Access to Additional Cells – July 2008
- SEW Report No. 10: Landfill Cell Development Phase 2 – April 2009

4.1.1 *Completed Engineering Works to end of 2013*

The majority of engineering works associated with the general development of the site including the preparation of Phase 1, Cells 1-4, were completed during 2006 and 2007. During the latter part of 2008 engineering works associated with the completion of contract 3 and snagging works were completed. During 2009 the installation of the twin gas lines from phase 1 to the enclosed gas flare and other minor operational works was completed. Landfill Cell Development Phase 2 commenced in June 2010 and was completed in December 2010.

A description of minor engineering works completed at Holmestown Waste Management facility during 2013 is as follows:

Table 5 Summary of Engineering Works 2013

Start Date	Development Works
March	○ Maintenance works to on site surface water streams and channels
May	○ Seal west slopes facing phase 2 development
September	○ Maintenance works to site roads

4.1.2 *Proposed Engineering Works 2014*

A description of engineering works proposed at Holmestown Waste Management Facility for 2014 is as follows:

Table 6 Summary of Proposed Engineering Works 2014

Start Date	Development Works
July	○ To reduce leachate generation, run-off needs to be shed to outside the Cell 1 containment berm. This will be done using proprietary artificial lining materials..
August	○ Maintenance works to site roads
September	○ Maintenance works to drains/channels

4.2 Restoration and Aftercare

No permanent capping works were carried out on site during 2013.

5 WASTE ACCEPTANCE & HANDLING

5.1 Waste Activities carried out at the Facility

In accordance with Schedule A of the Licence, Holmestown Waste Management facility is licensed to accept 80,000 Tonnes of waste per annum. This includes 55,000 Tonnes of non-hazardous household and commercial waste, 5,000 Tonnes of waste for composting, 8,000 Tonnes of construction and demolition waste for recovery and 12,000 Tonnes of household and commercial waste for recovery.

Both waste recovery and disposal operations took place on site at Holmestown Waste Management facility during 2013.

5.2 Waste Acceptance and Handling Procedures

Holmestown Waste Management facility opened in April of 2008, as a replacement landfill for Killurin which ceased accepting waste on site at the end of June 2008. The facility temporarily stopped accepting waste on 21st May 2012. Waste has been placed in cell's 1, 2, 3 & 4 of Phase 1 which is at the northern end of the landfill footprint.

5.3 Waste Deposition

As the facility temporarily stopped accepting waste on 21st May 2012 no Waste was brought to the active tipping face during the reporting period.

All waste consigned off-site during 2013 was disposed of to facilities licensed or permitted to accept or treat that waste. Transport of waste was carried out in accordance with the *Waste Management (Collection Permit) Regulations, SI 820 of 2007, and Amendment Regulations, SI 87 of 2008* as appropriate.

5.4 Total quantity of wastes accepted on site

As the facility temporarily stopped accepting waste on 21st May 2012 no waste was accepted for landfill at the facility for the reporting period 1st January to 31st December 2013

5.5 Total Quantity of Waste Consigned Off Site

The total quantity of waste consigned off site at Holmestown Waste Management facility for the reporting period 1st January to 31st December 2013 was 1864Tonnes.

A summary of the total quantity of waste consigned off site for the reporting period is presented below in Appendix E

The total volume of leachate sent off site for treatment at Wexford Wastewater Treatment Works was 13,320 tonnes.

5.6 Remaining capacity of the site

Waste was first accepted on site at Holmestown Waste Management facility during April 2008. The site is designed to provide for the disposal and recovery of a maximum of 80,000 tonnes of waste per annum comprising non-hazardous household and commercial waste, waste for composting, construction and demolition waste for recovery and household and commercial waste accepted for recovery at the civic waste facility and materials recovery facility.

Wexford County Council intention, in planning, constructing and operating the Holmestown Landfill Facility is to provide a void space for 900,000 tonnes of compacted municipal solid waste and to place same in accordance with the profile set by An Bord Pleanala grant of planning and the EPA licence.

Up to date of closure in May 2012, a total of 92,606 tonnes of waste had been disposed of in the landfill. This leaves remaining capacity of 807,394 tonnes.

5.7 Area occupied by waste

A topographical survey completed in March 2011 showed the area of waste present within Cells 1, 2, 3 and 4 to be 18,132m^2. The overall area where waste will be land filled is approximately 15.2 ha (152,000 m^2).

6 Emissions Management

6.1 Landfill Gas Management

The installation of the landfill gas control system is an ongoing process and will develop further as each of the cells is filled with waste. Horizontal and vertical infrastructure is placed concurrent with waste. The pipe work systems are then connected to a 500m^3 enclosed gas flare. The enclosed flare was commissioned in August 2009 and put into permanent operation in September 2009 replacing the temporary open flare with carbon filter which operated from January to August 2009.

More detailed information on the landfill gas extraction system installed to date on site can be found in the following report which can also be viewed on file in the site office:

- *SEW Report No. 3A: Installation of the Landfill Gas System (Revised) which was submitted to the EPA in September 2007*

6.1.1 *Estimated annual and cumulative quantities of landfill gas emitted from the site.*

The volumes of landfill gas extracted varied from 276M^3/hr to 176M^3/hr during the reporting period. Gas extraction rates have been maximised to minimise odours. The gas quality varied during the reporting period from 22.4% CH_4 up to 31.8% CH_4. The total volume of CH4 flared off on site during 2013 was 378,446 m^3 recorded by SCADA system The cumulative volume from commencement of flaring to the end of 2013 was 2,695,091 m^3

We have installed infrastructure in accordance with best practice to ensure that gas capture is maximised. We are confident from the absence of odour in and around the site and by maintaining a negative pressure in the landfill that gas capture at HWMF is satisfactory.

6.2 Leachate, Groundwater and Surface Water Management

6.2.1 *Leachate*

Leachate is generated by incident rainfall seeping into the landfill and becoming contaminated by contact with the waste product, and by the decomposition of the waste itself. Other potential sources of leachate generation, such as groundwater and surface water ingress are prevented from entering the waste fill areas through a number of site specific engineering works.

Leachate from Cells 1, 2, 3 & 4 is pumped directly to the leachate treatment plant using the in-cell submersible pumps. A road tanker then removes the treated leachate from the leachate treatment plant balancing tank to Wexford Town Wastewater Treatment Plant for final treatment and disposal. It should be noted that occasionally, during periods of persistent heavy rainfall, it becomes necessary to remove untreated leachate from site by tanker. It is expected that once the off-site rising main is commissioned, this will no longer be necessary.

The on-site leachate treatment plant was commissioned during 2009 and began to accept leachate directly from Phase 1 for treatment. The treatment plant provides a capacity of approximately 1200 m^3, equivalent to a process retention time of 15 days at the maximum flow (average estimate is 50m^3 per day, estimated peak flow is 80m^3 per day). The plant comprises of the following main elements, together with ancillary pipe work to convey the leachate between tanks:

- 2 x Sequencing batch reactor (SBR);
- Treated leachate balance tank (TLBT);
- Raw leachate feed pump;
- Venturi aerators;
- Decant pump;
- Final discharge pump;
- Alkali dosing facilities; and
- Nutrient dosing facilities.

Monthly volumes of leachate tankered off site are presented in Table 7 below.

Table 7 Leachate volumes removed from site in 2013

Month	Volume (m^3)
January	2,150
February	2,958
March	1,251
April	1,349
May	247
June	578
July	67
August	296
September	331
October	1,660
November	953
December	1,480
Total	**13,320**

Integrity testing of leachate storage tanks was carried out during August 2011. The tests were carried out in accordance with the procedure described in the *Civil Engineering specification for the Water Industry (CESWI).* All tanks assessed passed the integrity test. These tanks are due for retesting during 2014.

6.2.2 *Groundwater*

Condition 3.10 of the licence states that effective groundwater management infrastructure shall be provided and maintained at the facility during construction, operation, restoration and aftercare of the facility. As a minimum, the infrastructure is required to be capable of the following:

- Protection of groundwater resources from pollution by the waste activities
- Protection of other infrastructure, such as the liner; from any adverse effects caused by groundwater.

At Holmestown Waste Management facility the cell formation levels have been designed so that the formation levels will be a minimum of 2m above the expected winter water-table levels. The nature of the excavation elsewhere on site is shallow so groundwater is not expected to be encountered.

Groundwater resources are protected from waste related pollution by the construction of a quality-assured composite lining system, which comprise the following:

- 1,000 mm compacted engineered clay with hydraulic conductivity (k) ≤ 1 x 10^{-9} m/sec; overlain by
- 2 mm fully-welded HDPE liner.

Leachate arising from waste activities is contained within the landfill by the lined system and conveyed to the on-site leachate treatment plant via sealed pipe systems. Treated leachate is currently tankered off site to Wexford Town Wastewater Treatment Plant for final treatment and disposal Effluent will eventually be removed from site via a pumped rising main to Wexford Wastewater Treatment Plant as outlined in *Specified Engineering Works Report No. 4*. There is no discharge to groundwater from any aspect of the landfill development.

Foul water drains to a proprietary wastewater treatment plant on site. Effluent from the wastewater treatment plant discharges to the leachate treatment plant.

6.2.3 *Surface Water*

In accordance with the licence conditions (condition 3.10); surface water is collected on site via a network of drains, and is fed into the surface water collection pond to the north of the site at SWP1. The water settles in the pond and is then released to a petrol interceptor tank via SWP2. From there the surface water flows in an easterly direction to the stream on the east of the site, and enters the stream at SW4.

The following describes the various aspects of surface water collection systems:

- All clean surface water from paved roads and roofed areas on site drains into the constructed surface water drainage system and drains to the surface water pond via carrier pipes and open channels.

- Dirty surface run-off from the civic amenity area is collected in gullies, and drains and diverted to the leachate treatment plant via a splitter chamber and carrier pipe.

- Surface water run-off from the screening berm at the north end of the site is collected by a number of embankment swales and directed to the surface water pond.

- Surface water in constructed landfill cells in which the filling with waste has not yet commenced is pumped to the surface water pond.

The surface water pond located to the north east of the landfill is lined with a 1 m thick layer of clay, engineered to ensure a maximum permeability of 1 x 10^{-9} m/sec. The pond is designed to attenuate peak flows up to a 1 in 100 year return period, and to fully contain peak flows up to a 1 in 5 year return period. The pond is designed to cater for the worst case scenarios during the lifetime of the entire landfill. The allowable discharge from the pond has been reduced below baseline flow levels in order to enable water settlement and achieve suspended solids content less than 25 mg/l.

6.2.4 *Water Balance Calculations*

The objective of water balance calculations is to understand and predict and reconcile the liquid inputs and outputs of the facility. In order to predict the approximate leachate volumes which would be generated on-site, water balance calculations have been calculated for the period 1st January 2013 to 31st December 2013 to estimate the approximate volume of leachate that were generated during the reported period. This volume can then be compared to the volume of leachate leaving site, by tanker over the weighbridge.

The water balance addressed the volume of leachate generated at the site including the estimated annual infiltration of rainfall. The water balance methodology is described below and the calculation is shown in Appendix F.

The water balance calculations are based on the methodology specified in the EPA's Landfill Site Design Manual. The calculation used is as follows: -

Lo = [ER(A) + LW + IRCA +ER(l)] – [aw]

Lo = leachate produced (m3)

ER = effective rainfall (m) (Use actual rainfall (R) for active cells)

A = area of cell (m^2)

LW = liquid waste (m^3)

IRCA = infiltration through restored and capped areas (m)

l = surface area of lagoon (m^2)

a = absorptive capacity of new waste (m^3/t)

w = weight of waste deposited (t/a)

An absorptive capacity of 0.025 m^3 per tonne was assumed.

The meteorological data used was obtained from the nearby Met Eireann meteorological station at Johnstown Castle. The total rainfall from 1st January 2013 to the 31st December 2013 was approximately 880 mm. Meteorological data is presented in Appendix D.

Phase 1 (18,700m^2) was the only part of the landfill contributing to leachate generation in 2013. The entire Phase 1 area is covered with a temporary cap. An 80% infiltration rate was used in the 2012 AER for temporary restored areas. During 2013, temporary LLDPE lining works were carried out at the toe of Phase 1 western flank to shed surface water. This is predicted to reduce the overall Phase 1 infiltration rate by c. 8%. Hence, an overall infIltration rate of 72% was applied to the temporary capped area. Given that no fresh waste was emplaced during 2013, the absorptive capacity of waste was ignored.

In addition, the water balance takes account of other 'dirty' areas of the site that drain to the leachate treatment plant, namely the weighbridges, wheelwash, waste inspection/quarantine bays and the leachate treatment plant pavement. We have also made an adjustment to the leachate quantity tankered off-site to take account of wastewater generated on site by facility staff.

The estimated volume of leachate generated for the period 1st January 2013 to the 31st December 2013 is 13,146m^3 (a calculated summary is included in Appendix F). During the same period 13,320 m^3 of leachate (adjusted to 13,200m^3 when wastewater is deducted) was removed from the site for treatment in the waste water treatment plant at Wexford. A monthly breakdown of leachate volumes removed is presented in Table 7 above.

7 ENVIRONMENTAL NUISANCES

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

Condition 8.15 of the Waste Licence states that the licensee will inspect the facility and its immediate surrounds for nuisances caused by litter, vermin, birds, flies, mud, dust and odours. Nuisances at Holmestown Waste Management facility are logged in a weekly tick-box report and action is taken immediately to address any identified issues. Table 8 below summarises the measures implemented on site to combat environmental nuisances during 2013.

Condition 7.3 of the Waste Licence states that litter fencing shall be installed and maintained around the perimeter of the active tipping area prior to the disposal of waste in any cells and that all litter control infrastructure shall be inspected on a daily basis. A litter fence was maintained around Cells 1, 2, 3 & 4 during the filling period. The litter control infrastructure was inspected on a daily basis and any defects remedied immediately. Any loose litter or other litter identified on site is removed and disposed of in an appropriate manner and all vehicles delivering waste to or removing waste from Holmestown Waste Management facility are appropriately covered.

Table 8 Environmental Nuisance Control 2012

Nuisance	Mitigation Measures in Place
Vermin	*Pestguard.* Permanent bait points set up on site (internal and external). Inspections carried out on a monthly basis. If infection found then weekly inspections until rodent free. Monthly reports produced and kept at site office.
Litter	Daily litter picking and litter inspections are carried out as CA site. Inspection log kept at site office. Litter fencing has been erected around Cells 1, 2, 3 & 4. Permanent litter fencing was erected around Phase 2
Flies	*Pestguard* employed to control flies. If flies present then treated through spraying. Reports kept in site office.
Odour	Fixed monitoring points established on site and monitored as required. Odour inspections adhere to recommendations from the Office of Environmental Enforcement's method of assessment of odours.

Condition 11.5 of the licence states that prior to the commencement of waste disposal, the licensee shall submit to the Agency for its agreement a proposal for the control and eradication of vermin and fly infestations at the facility.
A number of proposals were produced by Wexford County Council during 2008 and submitted to the Agency for approval. These proposals have since been approved and implemented on site in order to address the issue of nuisance monitoring as follows:

- Control and eradication of vermin and fly infestation proposal.
- Odour monitoring proposal

Copies of both proposals and associated correspondence with the Agency are kept on file at the site office.

8 RESOURCE & ENERGY CONSUMPTION

8.1 Electricity and Energy Usage

Electricity usage for the reporting period was estimated at 198,608 kWh. The administration building at Holmestown has been designed with energy efficiency in mind. The following is a list of energy saving mechanisms that have been implemented:

- Control of internal lighting based on occupancy and the level of available natural light.
- Hot water heated by a combination of wood chip boiler and highly efficient vacuum tube solar panels
- Under floor heating system and wood chip boiler providing all heat for administration building
- Mechanical heat recovery unit which uses exhaust warm air to heat cold air coming into the building
- Rainwater harvester in operation to collect water from building roof for reuse in toilets
- Building management system monitors the temperature in each room and controls
- Integral mini wind turbine and solar panel power each light column in operation in the car park area.
- A wind turbine was constructed on site in October 2009. This is located south east of the Administration Building and provides power to the building.

8.2 Water

No water was used on the landfill site. As there was no water meter installed in the site office to date to monitor water intake, no domestic water usage data is available. A rainwater harvester is in operation to supply water for sanitary use.

8.3 Diesel

Total diesel fuel consumption is estimated to be 7,496 litres from 1st January to 31st December 2013.

9 EMISSIONS & ENVIRONMENTAL MONITORING SUMMARY

9.1 Emissions and environmental monitoring

A summary of licence requirements for environmental monitoring, as carried out at Holmestown Landfill during this reporting period (January 2013 – December 2013), is presented in Table 9 below. A plan showing the location of all monitoring points is included in Appendix G.

All industries have to annually report environmental emissions and waste transfer data through a web-based form as part of their AER. The E-PRTR Regulation (EC) No 166/2006 concerning the establishment of a European Pollutant Release and Transfer Register came into force in February 2006 and was brought into Irish law through SI No 123 of 2007. The PRTR 2013 document is included in Appendix A.

Table 9 A summary of emissions & environmental monitoring as specified in W0191-2

Emissions Monitoring	**Frequency**
Landfill Gas Flare	Continuously/Annually
Leachate Leachate Treatment Plant	Continuously/Quarterly/Annually
Surface Water Pond	Continuously/Quarterly/Annually
Environmental Monitoring	**Frequency**
Landfill Gas Site Office Gas migration monitoring Boreholes Gas field Balancing	Continuously Monthly Monthly/as required
Leachate Leachate levels Visual, odour and temperature Leachate analysis	Continuous Quarterly Annual
Surface water	Quarterly / Annual
Groundwater Levels	Monthly
Groundwater	Quarterly / Annual
Noise	Quarterly
Dust	Tri-Annually and Annually
Environmental Monitoring	**Frequency**
Odour	Daily/Weekly/As required

9.2 Monitoring

Wexford County Council carries out a comprehensive monitoring programme, in compliance with the waste licence conditions. The monitoring programme includes Landfill Gas, Leachate Level & Quality, Surface Water Quality, Groundwater Level & Quality, Noise, Dust, Odour, Meteorological and Topographical surveys.

Results are interpreted using either pre-defined emission limits or in the case of more variable systems such as water bodies by comparison with pre-operational (baseline) trends. Licence Monitoring at HWMF follows the principles set out in the following:

- 1999/31/EC. *Council Directive on the Landfill of Waste.* Official Journal of European Communities.
- Campbell, R. et al. (2003), *Landfill Manuals: Landfill Monitoring, 2nd Edition.* EPA.

There are emission limits in the license for gas, noise and dust parameters. Trigger Levels (based on monitoring data) have also been set for emissions from the storm water attenuation pond and selected groundwater parameters. Control Rule principles as referred to in the Landfill Directive have been established for groundwater monitoring (see Quarter 3 & 4 report for 2009 for further details) and will be revised as more data is collected. In accordance with the Licence/best practice we measure a number of additional parameters to supplement emission limit/trigger level data. All the data measured is reviewed and utilised for interpretation where applicable.

Monitoring during this reporting period was carried out according to Schedule D of Waste Licence W191-02. Monitoring for 2013 is summarised in this section.

9.3 Emissions Monitoring:

9.3.1 *Landfill Gas Flare*

One enclosed type flare (in accordance with Section 3.14.1.of the licence) is in operation at HWMF. The flare was commissioned in August 2009. The flare is located at the eastern side of the facility adjacent to the Leachate Treatment Plant. The flare is connected to the active cells via a 355mm OD PE pipe that runs both over and underground. The flares maximum operating capacity is 500m^3/hr and it is set to burn at >1000 degrees C. The retention time for the flare is 0.5 sec. The main components of the flare include:

- Control valves;
- Knock out Pot with filter;
- Flame arresters;
- Gas booster (variable speed motor)
- Sampling equipment for both influent bulk gases and emissions;
- Temperature control by thermocouple and louvers;
- Human Machine Interface;
- Call out System.
- Connection to SCADA

Emission limit values for landfill gas plant are set out in Schedule C.6 of our License and are summarized in the Table 10 below.

Table 10 Flare Emission Limits

Parameter	Flare Enclosed Emission Limit Value[Note 1]	Utilisation Plant Emission Limit Value[Note 1]
Nitrogen oxides (NO_x)	150mg/m^3	500mg/m^3
CO	50mg/m^3	50mg/m^3
Particulates	n/a	130mg/m^3
Total Organic carbon (TOC)	10mg/m^3	10mg/m^3

Note1: Dry gas referenced to 5% oxygen by volume for utilisation plants and 3% oxygen by volume for flares.

The operation of the flare unit is continuously monitored and recorded by the SCADA system. A call out system is linked to the SCADA which notifies WCC staff via text message if the preset control limits are breached. The SCADA is linked to the Administration Building and the internet. Flare performance is monitored by staff on an ongoing basis.

Flare emission results

A flare emission test was carried out in accordance with specified requirements on the flare unit in July 2013 AXIS environmental services Ltd. The report concluded that CO, NOx, as NO_2 and TOC in the landfill flare exhaust stack were within the emission limit values specified in Schedule C6 of Waste Licence W00191-02. The full report will be submitted to the EPA as part of the Annual Results Report under separate cover.

9.3.2 *Leachate Treatment Plant*

Emission limit values for leachate discharged to sewer are set out in Schedule C.7 of our License and are summarized in the Table 11 below.

Table 11 Emission Limits for Leachate Being Discharged to Sewer

Emission Point Reference: LTP3

Volume to be emitted: *Maximum in one day 80m^3*

Parameter	Emission Limit Value
	Daily Mean Concentration (mg/l)
BOD	200
COD	750
Ammoniacal Nitrogen ($NH_{4+}N$)	10
Nitrate Nitrogen	1500
Alkalinity	1000
Dissolved Methane	0.2

Monitoring frequency and analysis techniques for emissions to sewer are set out in Table D.8.1 of the licence.

Leachate treatment plant results

The on site Leachate Treatment Plant was commissioned in 2009. All leachate following pre treatment (in accordance with section 5.12.4 of the Licence) was tankered off-site for final treatment at Wexford Wastewater Treatment Plant. It is noted that the Leachate Treatment Plant was fully compliant with the emission limits throughout 2013.

It should be noted that, occasionally, during periods of persistent heavy rainfall, it is necessary to tanker untreated leachate off site to Wexford WWTP for treatment. As this leachate is not being discharged to sewer, this leachate has not been assessed for compliance with the licence limits, although by its nature, this tends to be relatively weak leachate due to dilution.

9.3.3 *Surface Water Pond*

Two sampling points SWP1 and SWP2 are located on the inlet and outlet of the attenuation pond respectfully. Schedule C4 of the Licence sets discharge limits for the level of suspended solids from the outlet (SWP2) of the attenuation pond. The discharge limit is detailed in Table 12 below.

Table 12 Surface Water Discharge Limit.

Measured at the outlet of the surface water pond (SWP2).

Level (Suspended Solids mg/l)
25

In accordance with sections 3.22.1(c) and 6.5.3 of the Licence monitoring of surface water entering and discharging from the attenuation pond is ongoing. Proposals have been submitted to the Agency detailing criteria/trigger levels that determine when the outlet from the pond shall be closed. The pond outlet will close automatically if the trigger levels at the inlet (SWP1) are breached. The parameters monitored include conductivity, pH and TOC. Trigger levels have been set and are summarised in Table 13 below.

Table 13 Trigger Levels for the Attenuation Pond.

Monitoring Point	pH		Electrical Conductivity	TOC
	Upper	Lower		
	pH		uS/cm	mg/l
SWP1	9.5	6.5	875	25

The trigger level review recommends that TOC trigger levels are set at 25mg/l. For full details of attenuation pond trigger levels see report as follows:

- Fehily Timoney and Company (September 2010). Trigger Levels for Surface Water Retention Pond.

In addition Section 3.22.1 of the Licence requires levels in the surface water retention pond, flows to perimeter streams and quality of the surface water at the inlet to the surface water lagoons and being discharged to the perimeter streams to be recorded on telemetry. Similar to the pond inlet (and in addition to quarterly environmental monitoring) pH, electrical conductivity and TOC are being recorded continuously at the outlet (SWP2). A SCADA monitoring / control system is operational and can be accessed in the Administration Building on site. Discharges from the pond to the surface water stream were manually controlled, grab samples, SCADA data and visual inspection are used to ascertain optimum release conditions.

In 2013 flows to the pond were limited to:

- main access road drainage from the entrance gate to the head of the western track;
- Water pumped from waste free cells in Phase 2
- Clean run-off from the civic amenity and maintenance areas

All dirty run-off (including dirty run off from the civic amenity site and waste acceptance/quarantine areas) is directed to the LTP for pre-treatment in accordance with the Licence and then removed by tanker off-site to Wexford Waste Water Treatment Plant.

Surface water pond emission results

Surface water results for the watercourses in and around the site were satisfactory. Atypical results were recorded in Quarter 3 but following a retest no exceedences of trigger levels were recorded at the outlet from the surface water pond.

9.4 Environmental Monitoring

9.4.1 *Landfill Gas*

Gas sampling was carried out on site prior to construction. Initially groundwater wells were sampled until gas wells were installed around the proposed landfill footprint. Pre-construction results showed elevated levels of carbon dioxide at a number of locations. One elevated methane reading was recorded. The majority of the pre-construction gas wells were in filled during the construction phase. Peripheral landfill monitoring boreholes GS11-GS17 (as detailed in Schedule D, Table D1.1, of our Licence) were installed in conjunction with Phase 1 of the landfill cells. Prior to landfilling high naturally occurring Methane and Carbon Dioxide levels were measured in these boreholes and an investigation was carried out at the request of the Agency. The high readings are all concentrated in the north east corner of the facility where the bulk of the excavation work was carried out. As part of the investigation nine additional boreholes (GW2-GW10) were installed. Subsequent reports noted the elevated levels of carbon dioxide and methane pre-construction and summarized that *'It is likely therefore that when fill material was placed on top of this virgin ground, it acted like a semi-impermeable blanket, inhibiting venting of gases and causing a build up of gas in the ground.'*

The reports recommended that for a two year period monitoring is carried out at all boreholes at intervals not exceeding one month. Additionally, vertical and horizontal gas extraction pipes are monitored (at weekly intervals approx.) to assess pressures

within the waste body to ensure that negative pressures are maintained. For full details of the investigation into the naturally occurring gases see reports as follows:

- Fehily Timoney and Company (April 2008). Investigation of Naturally Occurring Background Gas Levels at Holmestown Landfill. Risk Assessment and Recommendations, Rev 1;
- Fehily Timoney and Company (December 2008). Investigation of Naturally Occurring Background Gas Levels at Holmestown Landfill. Trace Gas Analysis, Rev 2;

In accordance with Section 3.24.1 (b) of the Licence, landfill gas is monitored continuously in all site buildings. WCC have also installed Gas monitoring equipment in two local dwellings at the owner's request.

To allow for settlement gas sampling points within the waste will be installed when the landfill cap is completed. As noted above monitoring of the in-cell gas infrastructure is ongoing.

Landfill gas concentration limits measured in any service duct or manhole on, at or immediately adjacent to the facility and/or at any other point located outside the body of the waste are set out in Schedule C.2 of our License and are summarized in the Table 14 below.

Table 14 Landfill Gas Concentration Limits

Methane	Carbon Dioxide
20% LEL (1% v/v)	1.5% v/v

A summary of gas monitoring points is included in Table 15 below.

Table 15 Gas Environmental Monitoring Points

List of landfill gas monitoring points for 2013	
Points	**Description**
GS11, GS12, GS13, GS14, GS15, GS16, GS17	Perimeter gas migration monitoring wells
GB1, GB2, GB3, GB4	Gas monitoring points in buildings
GW2 East west, GW3 East west, GW4 North south, GW5, GW6, GW7, GW8, GW9 East west, GW10	Gas investigation wells (Installed March/April 2008)
Waste cells	All vertical extraction wells in Phase 1.

Landfill gas results

Methane and Carbon Dioxide levels remain elevated in a number of the perimeter monitoring wells. Elevated readings were initially recorded before landfilling operations commenced with Borehole GS13 consistently recording the highest

readings with methane levels as high as 53% (Dec.2013). The elevated readings are concentrated along the north east periphery of the phase 1 landfill footprint where the bulk of the excavation work was carried out.

Methane and carbon dioxide results for the peripheral gas boreholes have tended to fluctuate dramatically. The results on average, however, indicate that the level and location of gas release has not varied significantly since the pre-landfilling stage (Q1, 2008) and contamination from the landfill cell is not suspected.

Three boreholes GS17, GW5 and GW10 have not exceeded trigger levels to date. GW5 and GW10 are located in virgin ground and GS17 is the most southerly borehole on the eastern perimeter of Phase 1.

Elevated results were also recorded pre and post landfilling operations for groundwater in the north east corner.

Plots detailing trends for Methane and Carbon Dioxide (licenced emission limit parameters) for the peripheral boreholes GS11-GS17 are included in Appendix C. Refer to Quarterly monitoring reports 2013 for full details.

Gas has not been detected in any of the site buildings.

A report to review of the peripheral gas borehole results were submitted to the EPA in 2010.The review incorporates all results to the end of 2009.

9.4.2 *Flare.*

See section 9.3.1 for general information on the flare. Landfill gas utilisation plant/enclosed flare parameters and monitoring frequency are set out in Table D.7.1 of our License. The enclosed flare parameters, monitoring frequency and analysis method are summarized in Table 16 below.

Table 16 Flare Parameters and Monitoring Frequency

Parameter	Flare (enclosed)	Analysis
	Monitoring Frequency	**Method / Technique**
Inlet		
Methane (CH_4)%v/v	Continuous	Infrared analyser
Carbon dioxide (CO_2)%v/v	Continuous	Infrared analyser
Oxygen (O_2)%v/v	Continuous	Electrochemical
Total Sulphur	Annually	Ion chromatography
Process Parameters		
Combustion Temperature	Continuous	Temperature Probe / Data logger

The results of parameters which are monitored continuously are transferred and stored on the SCADA system.

In addition, regular monitoring of inlet gas is carried out as part of the gas field balancing procedure. The equipment used for the detection and quantification of landfill gas is a GA2000 – ATEX Certified Gas Analyser.

The operation of the flare unit is continuously monitored and recorded by the SCADA system. A call out system is linked to the SCADA which notifies WCC staff via text message if preset control limits are breached.

Flare results

The reporting element of the SCADA system was commissioned in 2010. Daily on site inspections were also carried out the results have shown that the flare has operated satisfactorily since it was commissioned.

A backup data logging system was commissioned at the flare in February 2010. Data is downloaded from the backup data logger quarterly and maybe utilised for future reports if required.

9.4.3 *Leachate*

See section 6.2.1 for general information on the Leachate Treatment Plant. Seven leachate sampling locations have been established and maintained as detailed in Schedule D, Table D1.1, of the license. Three points LTP-1, LTP-2 and LTP-3 are located within the leachate treatment compound. The remainder of the monitoring points (L1, L2, L3 & L4) are located in the corresponding waste cells. In accordance with our licence, leachate levels are continuously monitored and are recorded on the SCADA system. Leachate levels for the landfill cells are maintained at 1.0m over the top of the liner at the base of the landfill in accordance with section 5.12.2 of our licence.

Leachate parameters and monitoring frequency are set out in Tables D.5.1 of the License. Continuous and quarterly monitored leachate parameters, monitoring frequency and analysis method are summarized in Table 17 below.

Table 17 Leachate Parameters and Monitoring Frequency

Parameter	Flare (enclosed)	Analysis
	Monitoring Frequency	**Method / Technique**
On-site Leachate		
Visual	Quarterly	Visual
Odour	Quarterly	Olfactory
Leachate Level	Continuous	Pressure transducer
Temperature.	Quarterly	Thermometer

Visual, odour and temperature inspections are carried out by site staff. Visual and odour assessment are based on visual and olfactory scales respectively (see quarterly monitoring reports 2013 for details). In cell leachate level is controlled and monitored by a combination of pumps, pressure probes and the SCADA system. Level is recorded in meters above ordnance datum (mAOD).

Leachate results

No significant visual, odour or temperature change was noted in 2013. Leachate levels in the landfill cells is maintained at <1.0m above the liner at the base of the landfill.

Annual leachate quality was sampled in July 2013 in accordance with Table D5.1 of the Licence. The annual leachate quality report is submitted under separate cover in accordance with schedule F of the licence.

9.4.4 *Surface Water*

Eleven surface water sampling locations have been established and maintained as detailed in Schedule 4, Table D1.1, of the license. Two points SW4 and SW5 are located downstream of Phase 1 of the landfill. Nine are located on watercourses upstream: SW1; SW2, SW2A; SW3; SW3A; SW6; SW7; SW8; SW9 of current operations. There are two principal surface water streams one flowing from SW9 to SW5 and another from SW2 to SW5. Each is made up from a number of smaller streams and drainage ditches. These combine to the north east of the site and flow east, north east towards the river Slaney. Monitoring point SW5 is located downstream of the main junction of these streams. The northern edge of the landfill is 1.8km approx. from the River Slaney. The first surface water samples were collected in 2002. Pre-construction and pre-landfilling results are utilised as baseline data for comparison as required.

The objective of environmental monitoring is to screen for environmental pollution due to facility operations. Surface water bodies within and downstream of the facility are at risk. The relevant monitoring points are SW4 & SW5 (both downstream of the main operational areas), SWP1 & SWP2 (the attenuation pond monitoring points) and to a lesser extent SW1, SW2, SW2A, SW3, SW3A, and SW6 which are also on the Holmestown site but are upstream of all major activities. The other monitoring locations (SW7, SW8 & SW9) are upstream and offsite and their results are only interpreted if an influence in onsite streams is suspected. Surface water monitoring locations are summarized in Table 18 below.

Table 18 Surface Water monitoring locations

Surface water monitoring locations	
Surface water monitoring point	SW1, SW2, SW2a, SW3, SW4, SW5, SW6, SW7, SW8, SW9

The parameters tested in this report (in accordance with Table D.5.1 of the license) are as follows: Ammoniacal Nitrogen; Electrical Conductivity; Chloride; Dissolved Oxygen; Temperature; Ph; BOD; COD; Total Suspended Solids (TSS); Visual Inspection/Odour (weekly)

Surface water results

A visual inspection of each of the surface water monitoring locations was carried out on a weekly basis during 2013 as per licence requirements. The visual inspection and surface water quality results for 2013 did not indicate pollution from facility activities.

Elevated ammonia results 0.75mg/l was recorded at SWP1 in Q3. The suspected source is run off from neighbouring agricultural lands. A number of elevated COD and BOD readings were recorded in 2013 and were consistent at both upstream and downstream sampling locations. The elevated readings do not appear to be linked to HWMF activities.

The annual suite of surface water monitoring which includes a more comprehensive list of chemical parameters compared to the quarterly groundwater monitoring suite was carried out on 22 & 24 July 2013 at all surface water monitoring locations as per Schedule D. The test results suggest that no pollution is entering the surface water from the landfill. The annual surface water analysis report is submitted under a separate cover in accordance with Schedule F of the licence.

9.4.5 *Surface water Biological Survey*

A biological survey of the surface water streams surrounding Holmestown Waste Management Facility was carried out on 27th July 2013. A total of 4 locations were selected for monitoring as follows:

- KS01 Upstream SE of facility within the site boundary – Un-named stream
- KS02 Downstream NE of the facility within the site boundary – Un-named stream
- KS03 Downstream of the facility within the site boundary – Polehore stream
- KS04 Upstream of the facility within the site boundary – Polehore stream

The overall quality of the un-named stream upstream of the facility was determined to be moderately polluted and rated as Q3 at KS01, the overall quality of the un-named stream downstream of the facility was determined to be slightly polluted and rated as Q3-4 at KS02 using the EPA Q-value rating system. The overall quality of the Polehore stream upstream and downstream of the facility was determined to be slightly polluted and rated as Q3-4 using the EPA Q-value rating system. There were no signs of animal access to the streams at any of the monitoring locations. There was no noticeable difference in water quality between upstream and downstream locations. All surface water biological monitoring locations are shown in Appendix G. A copy of the biological monitoring report is kept on file at the site office and can be viewed upon request.

9.4.6 *Surface water pond quality: SWP1 – SWP2*

For general details on the pond see section 9.3.3 above. SWP1 and SWP2 are also monitored as part of the quarterly monitoring suite (see section 9.3.3 above). Slightly elevated ammonia levels 0.75mg/l were recorded in Q3, 2013 at SWP1 and elevated conductivity levels 1585uS/cm were recorded in Q3 2013. Similar elevated ammonia readings were recorded in the past.The elevated levels were kept under review and the suspected source is from neighbouring agricultural lands, no further exceedences were recorded. More details are presented in the quarterly monitoring reports submitted to the agency during the reporting period.

9.4.7 *Groundwater*

Groundwater monitoring was carried out at a total of 7 on-site and 11 off-site private well locations on a quarterly basis as detailed in Schedule D of the waste licence. Appendix G shows the location of all groundwater monitoring locations on site. Groundwater monitoring locations are summarized in Table 19 below.

Table 19 Groundwater Monitoring Locations

Groundwater Monitoring Locations	
Existing Groundwater Monitoring Wells	BH1, BH2, BH3, BH6, BH7, BH8, BH9.
Private well monitoring points	PW1, PW2, PW2B, PW2C, PW5, PW7, PW8, PW9, PW10, PW11, PW11A.

In accordance with section 6.4.2 of the Licence a report was previously submitted to the Agency detailing proposals for trigger levels for Groundwater results. Three parameters were selected based on suitability: Ammoniacal Nitrogen; Conductivity and Chloride. The trigger levels are summarised in Table 20 below.

Table 20 Trigger Levels for Groundwater.

Trigger level			
Units	**Ammoniacal nitrogen mg/l**	**Electrical Conductivity µS/cm**	**Chloride Mg/l**
BH 1	0.2	1,890	126
BH 2 Note 1	66.0	2,633	163
BH 3	0.2	613	59
BH 6	0.1	917	211
BH 7 Note 2	Note 2	Note 2	Note 2
BH 8	1.6	835	59
BH 9 Note 1	1.3	1,629	46

Note 1 = Down gradient groundwater borehole
Note 2 = BH7 has been dry during post waste monitoring

The trigger level report (in accordance with the Landfill Directive) proposes Control Rule principles for groundwater management at HWMF. The Control Rule principal involves the establishment of Control Levels and Trigger Levels. A Control Level is set as an indicator of possible environmental pollution. A Trigger Level is defined as the level at which significant adverse environmental effects have occurred. Control Levels are used to instigate review/remediation works prior to significant environmental pollution taking place. For full details on the Control Levels and the Trigger Levels for groundwater see report as follows:

- Fehily Timoney and Company (September 2010). Groundwater Monitoring Trigger Levels.

Groundwater results

Results are outside trigger levels in a number of the on-site groundwater boreholes tested. The elevated levels date back to pre-landfilling and have been recorded both upstream and downstream of the landfill footprint. Similar to gas readings the elevated results are prevalent downstream in the north east corner where the bulk of the on site excavation works were carried out and appear to be due to a non-landfill source in the soil. Elevated ammonia and chloride levels were recorded in 2013,

based on borehole locations and trends the elevated ammonia and chloride do not appear to be related to HWMF activities. The main soil mass is low permeability clay with sand and gravel lenses. Groundwater movement in the soil zone is relatively slow resulting in low flows. This enables emissions to build up locally around a source as appears to be indicated from the results.

Monitoring of groundwater levels was carried out at each of the on-site locations on a quarterly basis with the use of a dip meter. Groundwater levels remained relatively consistent throughout the monitoring period, with only minor variations in groundwater levels recorded in accordance with prevailing weather conditions. See quarterly reports for full details.

Monitoring results were not available for BH7 or BH8 during 2013 as the wells were found to be dry at time of sampling.
Historical trend graphs of groundwater trigger levels (ammoniacal nitrogen, conductivity and chloride) are included in Appendix C

A total of eleven private wells are monitored around the facility. A review of private well results is considered outside the scope of standard reporting. The results will be utilised for more rigorous reviews if required. See quarterly reports for results.

The annual suite of groundwater monitoring which includes a more comprehensive list of chemical parameters compared to the quarterly groundwater monitoring suite was carried out on 23, 24 and 25 July 2013 at all borehole and private well monitoring locations as per Schedule D. The test results suggest that no pollution is entering the groundwater from the landfill. The annual groundwater analysis report is submitted under separate cover in accordance with Schedule F of the licence.

9.4.8 *Noise*

Ten potentially noise sensitive locations are sampled at HWMF on a quarterly basis in accordance with Table D.1.1 of the Licence and amendments thereof. Emission limit values for noise are set out in Schedule C.1 of our License and are summarized in the Table 21 below.

Table 21 Noise Emission Limits

Day Db(A)L_{Aeq}(*30*[1] minutes)	Night Db(A)L_{Aeq}(*30*[1] minutes)
55	45

1. *Duration amended to 30mins in accordance with Table D.4.1 of the licence and current standard practice.*

Noise monitoring frequency and technique are summarized Table 22 below.

Table 22 Noise Monitoring: Frequency and Technique

Parameter	Monitoring Frequency	Analysis Method/Technique
$L(A)E_Q$ [30 minutes]	Quarterly	Standard[Note1]
$L(A)_{10}$ [30 minutes]	Quarterly	Standard[Note1]

Parameter	Monitoring Frequency	Analysis Method/Technique
$L(A)_{90}$ [30 minutes]	Quarterly	Standard[Note1]
Frequency Analysis *(U3* Octave band analysis)	Quarterly	Standard[Note1]

Note 1: *"International Standards Organisation. ISO 1996. Acoustics- description and Measurement of Environmental noise. Parts 1, 2 and 3."*

Leq(t): is the continuous equivalent sound level over a specified time (t), where t represents a 30-minute period during this survey. This measure is used to give an indication of the average noise level over the specified time period.

L10 and L90: are both statistical noise levels. L10 Indicates that for 10% of the monitoring period, the sound levels were greater than the quoted value. L90 Indicates that for 90% of the monitoring period, the sound levels were greater than the quoted value. L10 is used to express event noise. L90 is used to express background noise, usually filtering out loud, intermittent interferences such as traffic noise.

Noise results

A number of elevated noise monitoring results were noted for both day and night monitoring in 2013. The elevated noise levels have been attributed to external factors (e.g. N25, vehicles passing, dogs barking etc.) for the majority of the results recorded. No significant tonal noises were recorded. See quarterly reports for full details. Historical trend graphs of noise results are included in Appendix C.

9.4.9 *Dust*

AXIS environmental services carried out dust monitoring at ten representative locations using Bergerhoff dust gauges on three separate occasions during 2013. Sampling results are provided in Appendix C. The location of all dust monitoring locations can be found in Appendix G.

- The dust deposition limit of 350 mg/m^2/day was exceeded during round one (July/August) 2013 at monitoring points D5 & D7 no other exceedences were recorded.
- For a number of samples (indicated NR in the tables in Appendix C), dust jars were contaminated with either bird droppings or excessive algal growth.

9.4.10 *PM_{10} Monitoring*

PM_{10} monitoring was carried out as per Licence condition D.3.1 over a 24 hour period from 25 to 27 July 2013. The PM_{10} monitoring locations were the same locations used for the ambient dust monitoring. All results were noted to be below the trigger value of 50ug/m3 as specified in the waste licence. PM_{10} monitoring results are included in Appendix C.

9.4.11 *Odour*

Odour monitoring was carried out at Holmestown waste facility during 2013 as per EPA Guidance. Five odour monitoring points previously agreed with the Agency were monitored and labelled OD1, OD2, OD3, OD4 and OD5. OD1 is located to the northeast of the landfill on a bordering farm property. OD2 is located on the landfill between the active tipping area and Holmestown Little Farm on the western boundary of the site. OD3 is located between the landfill and Bolgerstown Farm on the eastern boundary of the site OD4 is upwind of the landfill and OD5 is downwind of the landfill. Odour monitoring is based on a combination of odour persistence which is rated on a scale of 0 to 2 (0 = none, 1 = intermittent, 2 = persistent), and odour intensity which is rated on a scale of 0 to 4 (0 = none, 1 = faint, 2 = moderate, 3 = strong, 4 = very strong).

Odour persistence and intensity was recorded at 2 and 3 respectively on 20th Feb. 2013 at all monitoring points, apparently due to slurry spreading ongoing on adjacent agricultural lands. No odour persistence or intensity was recorded above 1 at any other time during 2013. No odour complaints were received during 2013. On a daily basis site personnel carry out a brief walkover of the site, to assess potential odour issues. If any odours are identified during the walkover measures are implemented to reduce or remove the source of the odour as soon as possible. Monthly odour monitoring is carried out at the five agreed points copies of all odour logs are kept on file at the site office and can be viewed upon request. Odour monitoring results for the reporting period are included in Appendix C.

9.4.12 *Bioaerosols*

Bioaerosols monitoring was not carried out on site at Holmestown during 2013. As per licence conditions bioaerosols monitoring is only required to be carried out upon commencement of composting operations on site. To date no composting of materials has taken place at Holmestown Waste Management facility.

9.4.13 *Meteorological monitoring*

All monitoring information was obtained from the weather station located at Johnstown Castle in Wexford; this station is within 10km of Holmestown Landfill site. A copy of the reports are available for review at the facility office. Meteorological graphs showing trends over time are available for review in Appendix D.

9.4.14 *Topographical Survey*

A topographical survey of the landfill cells was carried out in March 2014 and is included in Appendix G. Given that there was no landfilling carried out during the reporting period, a simple level survey was conducted for record purposes to monitor settlement and to check slope gradients.

It is difficult to make any predictions in relation to settlement by comparison to the 2012 AER survey; given that some landfilling (c. 3,000t) was carried out after that survey was conducted, prior to the landfill ceasing to accept waste. Some temporary capping works were also carried out post landfill cessation. However the 2013 AER survey will serve as a useful benchmark for future monitoring of landfill settlement.

APPENDICES

A. PRTR 2013

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.18

REFERENCE YEAR	2013

1. FACILITY IDENTIFICATION

Parent Company Name	Wexford County Council
Facility Name	Holmestown Waste Management Facility
PRTR Identification Number	W0191
Licence Number	W0191-02

Waste or IPPC Classes of Activity

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

Address 1	Barntown
Address 2	Co. Wexford
Address 3	
Address 4	
	Wexford
Country	Ireland
Coordinates of Location	-6.57278 52.35079
River Basin District	IESE
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	Sean Meyler
AER Returns Contact Email Address	sean.meyler@wexfordcoco.ie
AER Returns Contact Position	Facility Manager
AER Returns Contact Telephone Number	053 9120922
AER Returns Contact Mobile Phone Number	0877406265
AER Returns Contact Fax Number	
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	0
User Feedback/Comments	Holmestown Landfill was temporarily closed throughout 2013, a recycling center attached to the facility was operational throughout 2013. The volumn of landfill gas generated and extracted reduced from 2012 levels which resulted in the figures for Nitrogen oxides and Sulphur oxides being in excess of +/- 50% variance on the previous year's data.
Web Address	

2. PRTR CLASS ACTIVITIES

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

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

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

4. WASTE IMPORTED/ACCEPTED ONTO SITE

Guidance on waste imported/accepted onto site

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

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

4.1 RELEASES TO AIR

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
08	Nitrogen oxides (NOx/NO2)	M	EN 14792:2005		322.43	322.43	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	ALT	TGNM21	152.78	152.78	0.0	0.0
01	Methane (CH4)	C		Landgem	0.0	35210.0	0.0	35210.0

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

SECTION B : REMAINING PRTR POLLUTANTS

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

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

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

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
351	**Total Organic Carbon (as C)**	M	ALT	EN12619:2013	18.26	18.26	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: Holmestown Waste Management Facility

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 pe site model)	413656.0	C		Landgem	N/A	
Methane flared	378446.0	M		Flare records	500.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Sectio A above)	35210.0	C			N/A	

4.2 RELEASES TO WATERS

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO WATERS	
POLLUTANT	
No. Annex II	Name

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

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS	
POLLUTANT	
No. Annex II	Name

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

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

RELEASES TO WATERS	
POLLUTANT	
Pollutant No.	Name

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

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NO

			Please enter all quantities in this section in KGs	
	Method Used			
M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year
			0.0	0.0

then click the delete but

			Please enter all quantities in this section in KGs	
	Method Used			
M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year
			0.0	0.0

then click the delete but

			Please enter all quantities in this section in KGs	
	Method Used			
M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year
			0.0	0.0

then click the delete but

Γ be submitted under AER / PRTR Reporting as this only concerns Releases from your facili

QUANTITY	
A (Accidental) KG/Year	F (Fugitive) KG/Year
0.0	0.0

QUANTITY	
A (Accidental) KG/Year	F (Fugitive) KG/Year
0.0	0.0

QUANTITY	
A (Accidental) KG/Year	F (Fugitive) KG/Year
0.0	0.0

4.3 RELEASES TO WASTEWATER OR SEWER

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

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

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

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

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

4.4 RELEASES TO LAND

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND	
POLLUTANT	
No. Annex II	Name

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

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

RELEASES TO LAND	
POLLUTANT	
Pollutant No.	Name

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

			Please enter all quantities
METHOD			
M/C/E	Method Used		
	Method Code	Designation or Description	Emission Point 1
			0.0

) then click the delete button

			Please enter all quantities
METHOD			
M/C/E	Method Used		
	Method Code	Designation or Description	Emission Point 1
			0.0

) then click the delete button

in this section in KGs	
QUANTITY	
T (Total) KG/Year	A (Accidental) KG/Year
0.0	0.0

in this section in KGs	
QUANTITY	
T (Total) KG/Year	A (Accidental) KG/Year
0.0	0.0

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	13 02 08	Yes	3.5	other engine, gear and lubricating oils	R9	M	Weighed	Offsite in Ireland	Enva Environmental,084/1	Clonman,Portlaoise,Co.Laois e,.',Ireland	Enva Environmental,084/1,Clonma n,Poartlaoise,Co. Laoise,.',Ireland	Clonman,Poartlaoise,Co. Laoise,.',Ireland
Within the Country	13 02 08	Yes	0.0	other engine, gear and lubricating oils	R9	M	Weighed	Offsite in Ireland	Greenstar,WCP/KK/054(A)1 08	Ramstown Business Park,Gorey,Co.Wexford,.',Ire land	.',.',.',.',.',.',Ireland	.',.',.',.',Ireland
Within the Country	15 01 02	No	52.5	plastic packaging	R3	M	Weighed	Offsite in Ireland	Greenstar,WCP/KK/054(A)1 08	Ramstown Business Park,Gorey,Co.Wexford,.',Ire land		
Within the Country	15 01 04	No	1.94	metallic packaging	R4	M	Weighed	Offsite in Ireland	Rhab Glassco Ltd.,WP247/2006	Unit 4 Osberstown Industrial Park,Caragh Road,Nass,Co.Kildare,Irelan d		
Within the Country	15 01 05	No	0.0	composite packaging	R3	M	Weighed	Offsite in Ireland	AES/GOFF Ltd.,W00229-01	Kilrane,Rosslare,Co. Wexford,.',Ireland		
Within the Country	15 01 05	No	0.0	composite packaging	R3	M	Weighed	Offsite in Ireland	Greenstar,WCP/KK/054(A)1 08	Ramstown Business Park,Gorey,Co.Wexford,.',Ire land		
Within the Country	15 01 07	No	54.58	glass packaging	R3	M	Weighed	Offsite in Ireland	Rhab Glassco Ltd.,WP247/2006	Unit 4 Osberstown Industrial Park,Caragh Road,Nass,Co.Kildare,Irelan d		
Within the Country	16 01 07	Yes	0.54	oil filters	R9	M	Weighed	Offsite in Ireland	Enva Environmental,084/1	Clonman,Portlaoise,Co.Laois e,.',Ireland	Enva Environmental,084/1,Clonma n,Poartlaoise,Co. Laoise,.',Ireland	Clonman,Poartlaoise,Co. Laoise,.',Ireland
Within the Country	16 06 01	Yes	0.0	lead batteries	R4	M	Weighed	Offsite in Ireland	Enva Environmental,084/1	Clonman,Portlaoise,Co.Laois e,.',Ireland	Enva Environmental,084/1,Clonma n,Poartlaoise,Co. Laoise,.',Ireland	Clonman,Poartlaoise,Co. Laoise,.',Ireland
Within the Country	16 06 01	Yes	4.73	lead batteries	R4	M	Weighed	Offsite in Ireland	KMK,WCP-OW-08-0607-01	Bettystown Cross,Bettystown ,Co.Meath,.',Ireland	KMK,WCP-OW-08-0607-01,Bettystown Cross,Bettystown ,Co. Meath,.',Ireland	Bettystown Cross,Bettystown ,Co. Meath,.',Ireland
Within the Country	16 06 04	No	1.82	alkaline batteries (except 16 06 03)	R4	M	Weighed	Offsite in Ireland	The Recycling Village,WFP-LH-10-0010-01	Unit 4 Tenure Business Park,Monasterboice,Droghed a,Co.Louth,Ireland		
Within the Country	19 07 03	No	13320.0	landfill leachate other than those mentioned in 19 07 02	D9	M	Weighed	Offsite in Ireland	Wexford Waste Water Treatment Plant,.'	Trinity Street,Wexford ,.',.',Ireland		
Within the Country	20 01 01	No	0.0	paper and cardboard	R3	M	Weighed	Offsite in Ireland	AES/GOFF Ltd.,W00229-01	Kilrane,Rosslare,Co. Wexford,.',Ireland		
Within the Country	20 01 01	No	124.66	paper and cardboard	R3	M	Weighed	Offsite in Ireland	Greenstar,WCP/KK/054(A)1 08	Ramstown Business Park,Gorey,Co.Wexford,.',Ire land		
Within the Country	20 01 01	No	27.0	paper and cardboard	R3	M	Weighed	Offsite in Ireland	Recycling 2000,WP/06/06	Drinagh Business Park,Rosslare Road,Wexford,Co.Wexford,I reland		
Within the Country	20 01 01	No	0.0	paper and cardboard	R3	M	Weighed	Offsite in Ireland	Greenstar,WCP/KK/054(A)1 08	Ramstown Business Park,Gorey,Co.Wexford,.',Ire land		
Within the Country	20 01 11	No	12.42	textiles	R3	M	Weighed	Offsite in Ireland	Textiles Recycling Limited,WCP-DC-08-1225-01	Glen Abby Complex,Belgard Road,Tallagh,Dublin 24,Ireland		
Within the Country	20 01 21	Yes	0.61	fluorescent tubes and other mercury-containing waste	R5	M	Weighed	Offsite in Ireland	KMK,WCP-OW-08-0607-01	Bettystown Cross,Bettystown ,Co.Meath,.',Ireland	KMK,WCP-OW-08-0607-01,Bettystown Cross,Bettystown ,Co. Meath,.',Ireland	Bettystown Cross,Bettystown ,Co. Meath,.',Ireland
Within the Country	20 01 25	No	1.24	edible oil and fat	R9	M	Weighed	Offsite in Ireland	Pure Oil,WCP-KK-10-557-01	Ballyweather,Barntown,Co. Wexford,.',Ireland		

Within the Country	20 01 35	Yes	187.52	discarded electrical and electronic equipment other than those mentioned in 20 01 21 and and 20 01 23 containing hazardous components	R5	M	Weighed	Offsite in Ireland	The Recycling Village,WFP-LH-10-0010-01	Unit 4 Tenure Business Park,Monasterboice,Drogheda,Co.Louth,Ireland	The Recycling Village,WFP-LH-10-0010-01,Unit 4 Ternure Business Park,Monasterboice,Drogheda,Co.Louth,Ireland	Unit 4 Ternure Business Park,Monasterboice,Drogheda,Co.Louth,Ireland
Within the Country	20 01 40	No	0.0	metals	R4	M	Weighed	Offsite in Ireland	Wexford County Council,.'	Killurin Landfill,The Deeps,Killurin Landfill,Co.Wexford,Ireland		
Within the Country	20 01 40	No	118.22	metals	R4	M	Weighed	Offsite in Ireland	Greenstar,WCP/KK/054(A)108	Ramstown Business Park,Gorey,Co.Wexford,.',Ireland		
Within the Country	20 03 01	No	0.0	mixed municipal waste	R3	M	Weighed	Offsite in Ireland	AES/GOFF Ltd.,W00229-01	Kilrane,Rosslare,Co. Wexford,.',Ireland		
Within the Country	20 03 01	No	0.0	mixed municipal waste	R3	M	Weighed	Offsite in Ireland	Wexford County Council (kerb side recycling section),.'	Machinery Yard,Enniscorthy,Co.Wexford,.',Ireland		
Within the Country	**20 03 01**	**No**	1188.99	mixed municipal waste	R3	M	Weighed	Offsite in Ireland	Greenstar,WCP/KK/054(A)108	Ramstown Business Park,Gorey,Co.Wexford,.',Ireland		

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

Link to previous years waste data
Link to previous years waste summary data & percentage change
Link to Waste Guidance

B. Staff Training

Training Record 2013
HWMF W0191-2
Outdoor Staff

DESCRIPTION	Browne Joseph	Byrne Billy	Dempsey Michael	Comments
Abrasive Wheels		23/11/2010		Refresher required every 3 years.
		23/11/2013		
Asbestos Awareness		13/03/2012		
	2014		2014	
ATEX: Safety Awareness		20/03/2011		Refresher required every 2 years.
	2014	20/03/2013	2014	
Basic Road Strengthening				
Basic Surface Dressing				
Bin Lift	06/05/2010			Refresher recommended every 2 years Refuse trucks no longer operated by WCC
	06/05/2012			
Business (Honours))				
Business (Bachelor of))				
Business (Higher Cert)				
Certificate in Local Government Studies				
		2014		
Chemical Safety (spraying)	12/09/2007			
Chlorine Hazard Awareness				Check Refresher
Compactors & Balers (safe use)				Refresher recommended every 3 years
Computers (Introductory Level)				
Counter-Balance Fork Lift Training				Refresher required every 3 years.
CSCS Tickets -360 Excavator				
CSCS Tickets -Dumper (provisional)				Valid for 2 years
CSCS Tickets -HEALTH AND SAFETY AT ROADWORKS)		06/11/2012		Refresher required every 5 years.
		06/11/2017		
Customer Care inc Managing difficult and Aggressive Behavour	20/04/2012	16/10/2012		
			2014	
Disability Awareness Training				
Driver CPC (module 1)				Module to be completed every 5 years.
Driver CPC (module 2)				Module to be completed every 5 years.
Driver CPC (module 3)				Module to be completed every 5 years.
Driver CPC (module 4)				Module to be completed every 5 years.
Driver CPC (module 5)				Module to be completed every 5 years.
E.C.D.L. Computer Course		19/03/2003		
Energy Mapping		13/10/2010		
Fas Waste Management Certificate		07/06/2007		
Fas Waste Operatives Training Course				
Fas: Safe Pass	24/09/2010	24/09/2010		Refresher required every 4 years.
	24/09/2014	24/09/2014		
Safe Pass Alliance-Quarry & Mining				
	05/07/2012	05/07/2012		Refresher recommended every 3 years

Training Record 2013
HWMF W0191-2
Outdoor Staff

Fire Extinguisher (certificate)				
	05/07/2015	**05/07/2015**	**2014**	
Fire Warden		06/12/2012		
			2014	
First Aid Basic		04/04/2007		
First Aid: Cardiac First Responder				**Refresher required every 2 years.**
First Aid: Heartsaver AED		22/01/2010		**Refresher required every 2 years.**
		22/01/2012		
First Aid: Occupational		12/03/2013		**Refresher required every 2 years.**
		12/03/2015		
Health & Safety for Road Workers				
Walk behind Lawnmower training				
I Map Training		04/04/2013		
Ladder Awareness	07/03/2013	07/03/2013	13/03/2013	
Landfill Gas Management		15/05/2012		
Landfill Compactor (maintenance & safe use)				Refresher recommended every 3 years,Landfill Temp Closed Training not recquired
Life Jacket (Care & Use)	11/11/2010	11/11/2010		
Loading Shovel (maintenance & safe use)	08/08/2011	08/08/2011		Refresher recommended every 3 years
	08/08/2014	08/08/2014		
Manual Handling	19/05/2010	19/05/2010		Refresher recommended every 3 years
	19/05/2013	19/05/2013		
Operating Horticulture Equipment	25/04/2013	25/04/2013		
OHSAS 18001 Internal Auditor Training				
PE Pipe Welding				
PSDS & PSDP Training		12/03/2009		
Quad Bike Training (safe use and operation)		20/08/2012		
Refuse Trucks (Safe Use) Banksman	20/04/2010	20/04/2010		Refresher recommended every 2 years
	20/04/2012	20/04/2012		
Safety Awareness				
Safety in Excavations		21/09/2010		
Signing, Lighting & Guarding at Roadworks				Refresher recommended every 5 years
Statutory Inspections (Lifting Equipment)		15/05/2013		
Supervising Safety		27/06/2011		
Telecopic Material Handling				Refresher recommended every 5 years
Safety Representative Training				
		2014		

Training completed (date)

No record of training

Training proposed this year

Training required

Recommended refresher

Required refresher

Training Record 2013
HWMF W0191-2
Indoor Staff

DESCRIPTION	Hobbs Fran	Meyler Sean	Ryan Fintan	Comments
Cryptosporidium: Risk Assessment				
Abrasive Wheels			23/10/2010	Refresher required every 3 years.
			23/10/2013	
Asbestos Awareness			14/03/2012	
ATEX: Safety Awareness	20/03/2011		20/03/2011	
CSCS Tickets -HEALTH AND SAFETY AT ROADWORKS)	06/12/2012		27/05/2013	Refresher required every 5 years.
	06/12/2017		27/05/2018	
Customer Care inc Managing difficult and Aggressive Behavour	30/05/2012			
Disability Awareness				
EPA: Biodegradable Municipal Waste			2406/2010	
EPA: Odour Assessment				
FAS: Waste Management	18/01/2005	Oct-Dec 2013	05/05/2010	
FAS: Safe Pass	18/08/2011		08/07/2011	Refresher required every 4 years.
	18/08/2015		08/07/2015	
Filters Eval., Op & Main.				
Fire Extinguisher			05/07/2012	Refresher recommended every 3 years.
			05/07/2015	
Fire Safety Manager	08/04/2009		09/04/2009	
Fire Warden	06/12/2012		06/12/2012	
First Aid Basic				
First Aid: Cardiac First Responder			11/03/2011	
First Aid: Heartsaver AED	22/01/2010			
First Aid: Occupational	02/05/2011		05/03/2013	Refresher required every 2 years.
	02/05/2013		05/03/2015	
GPS Training	16/06/2006			
Health & Safety Management System Awareness			29/11/2012	
IEI Construction Contacts Bill		10/09/2013	29/11/2012	
Landfill Gas Management			15/05/2012	
Life Jacket: Care and Use.	11/11/2010		11/11/2010	
Manual Handling	22/09/2011			Refresher recommended every 3 years.
	22/09/2014			
PSDS & PSCS	11/03/2009		09/03/2009	
			21/09/2010	

Training Record 2013
HWMF W0191-2
Indoor Staff

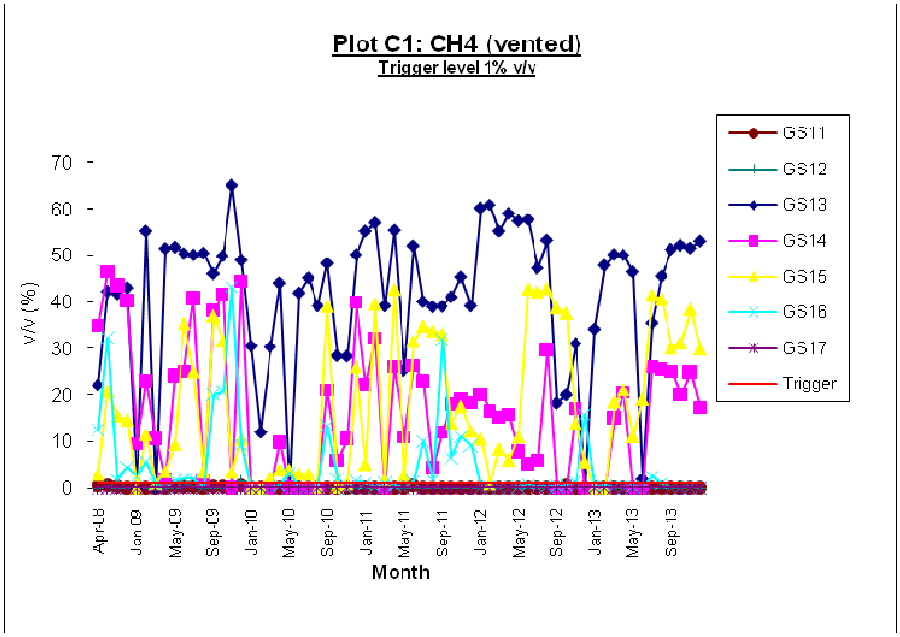
Safety in Excavations				
Statutory Inspections (Lifting Equipment)			15/05/2013	
Supervising Safety		04/11/2013	06/11/2012	
Water: Validation and Interpretation				

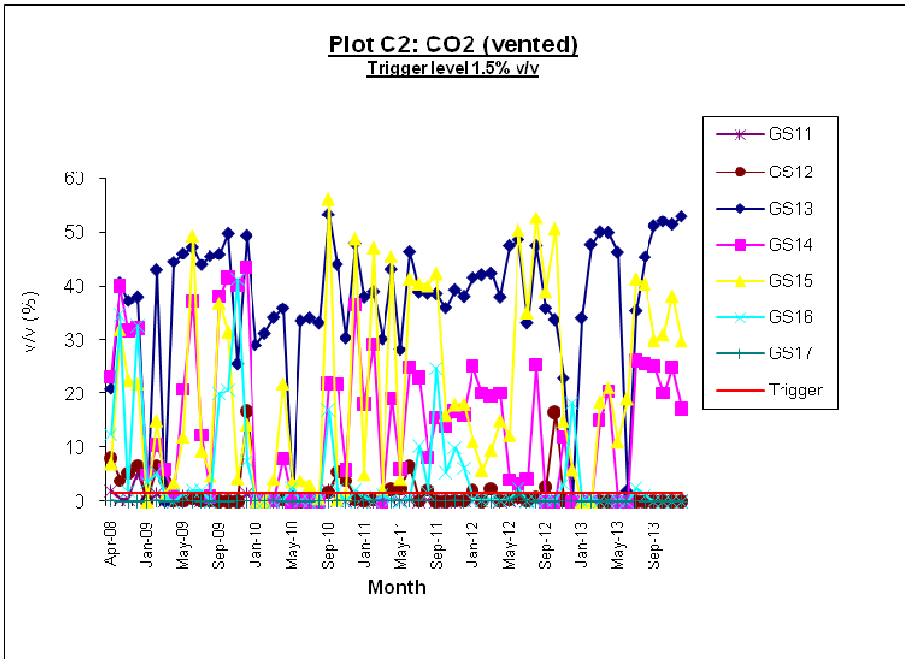
Key

	Training completed
	No record of training
	Training proposed this year
	Training required
31/12/2011	Recommended refresher
31/12/2011	Required refresher

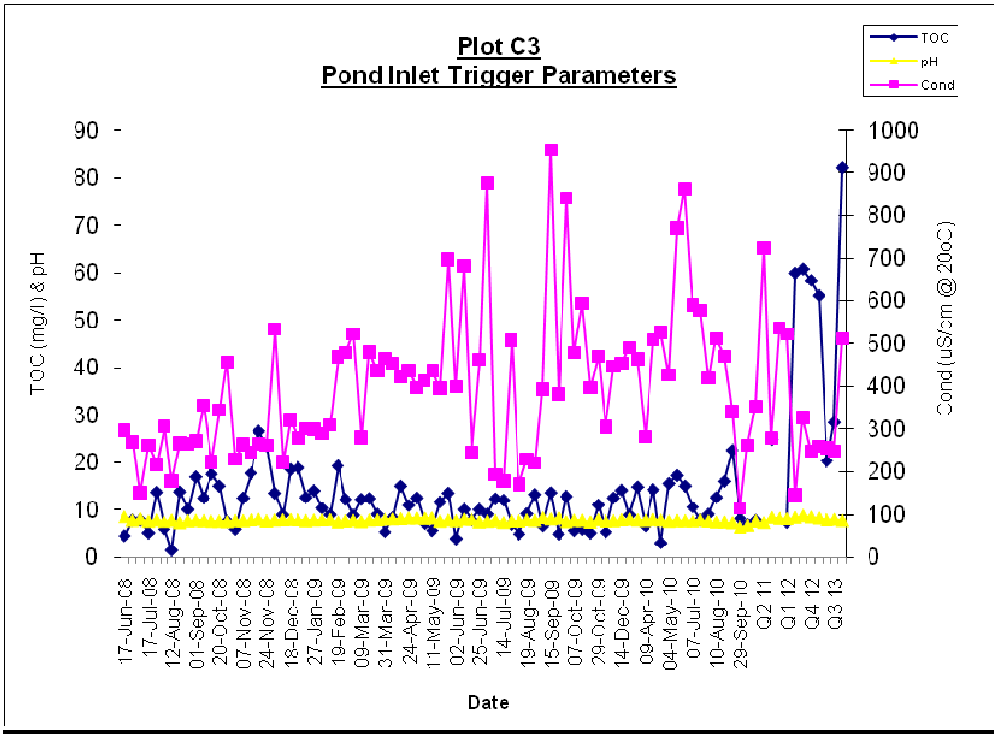
C. Monitoring Results and Graphs

Gas Monitoring Results 2013

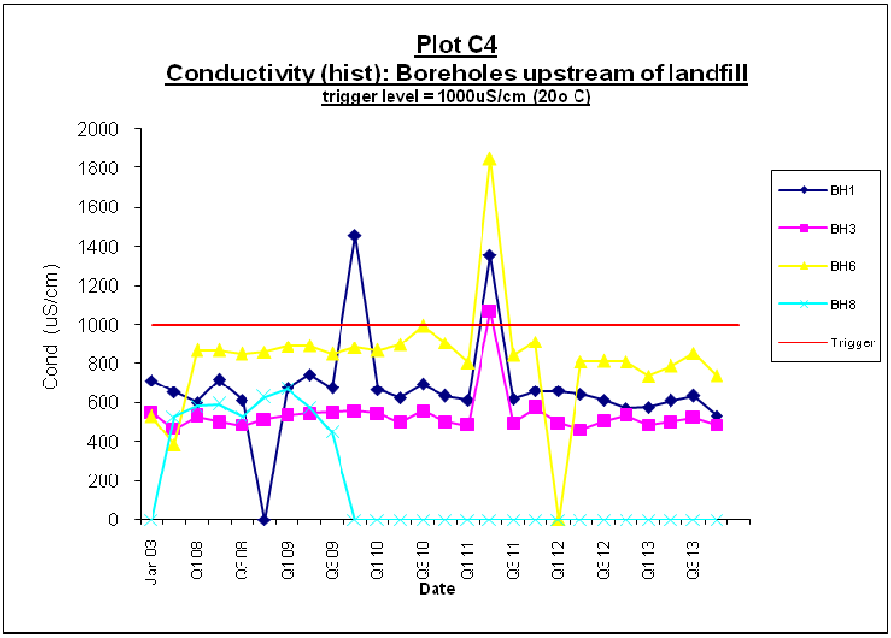


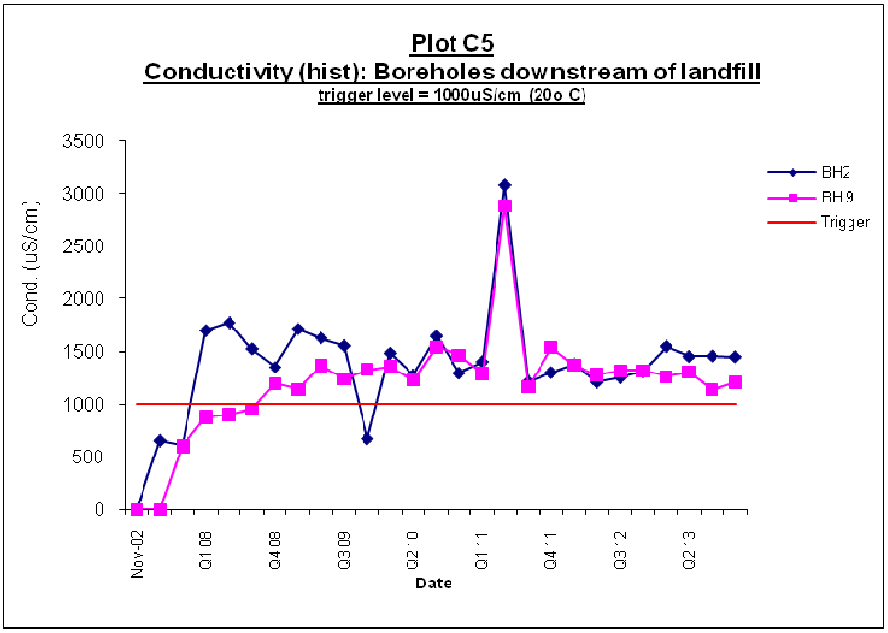


Surface Water Monitoring Results 2013

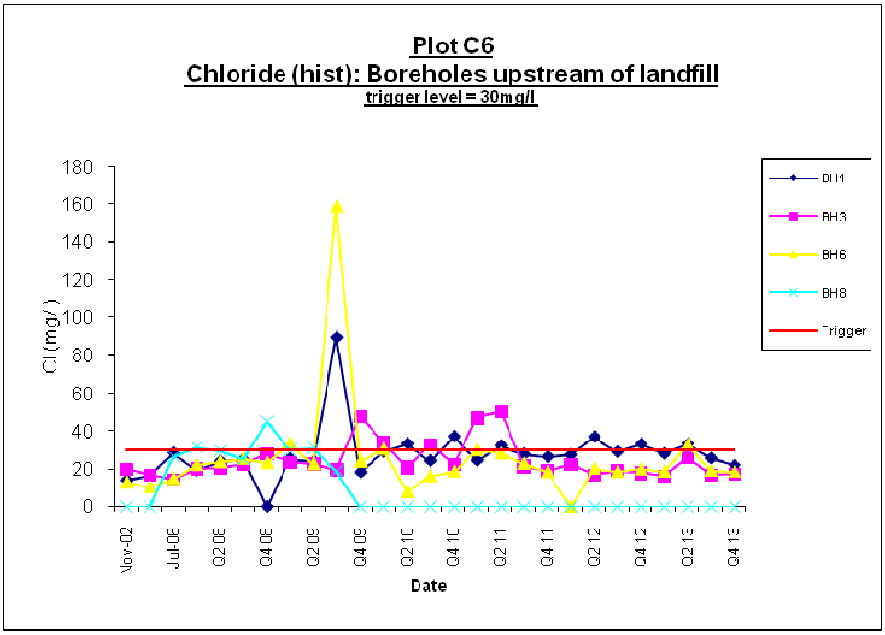


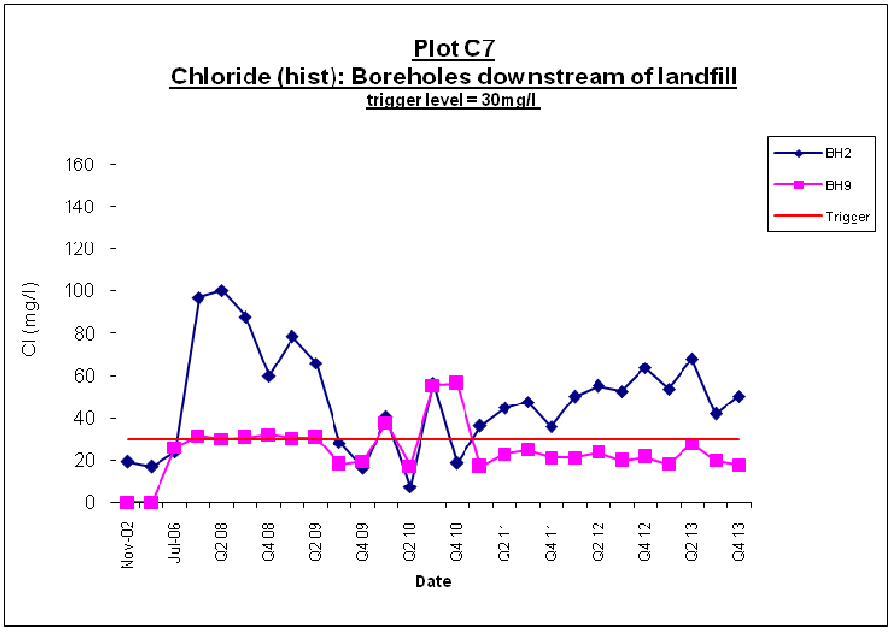
Ground Water Monitoring Results 2013



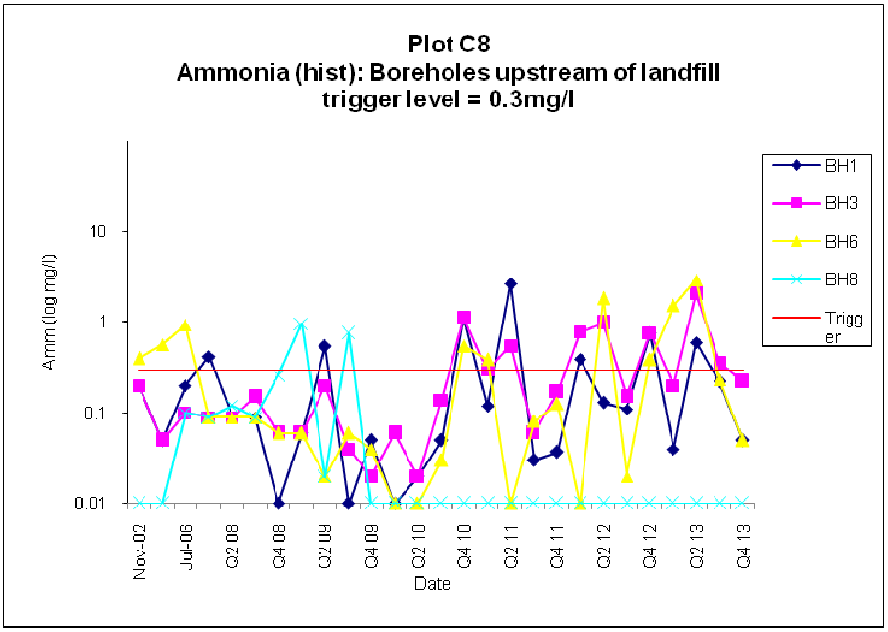


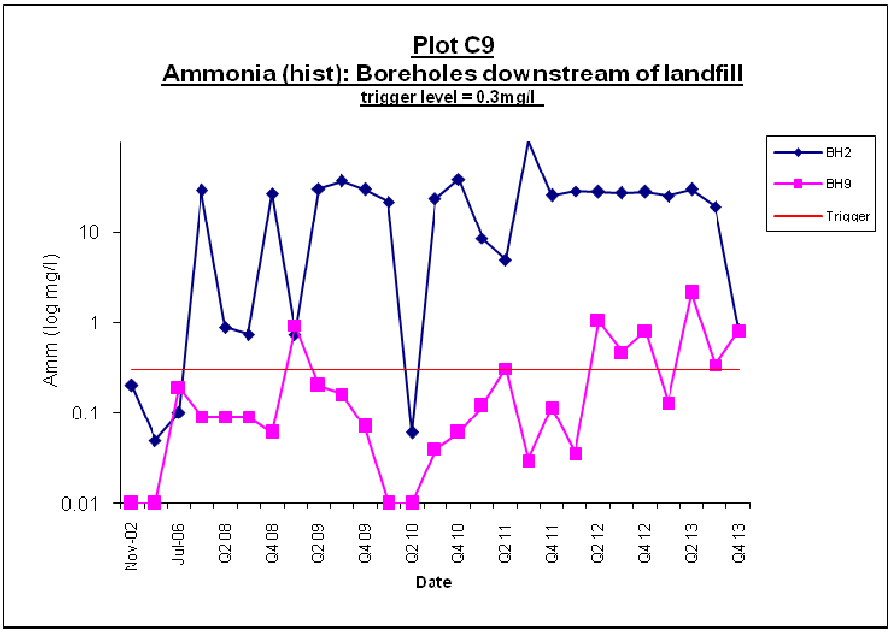
Ground Water Monitoring Results 2013



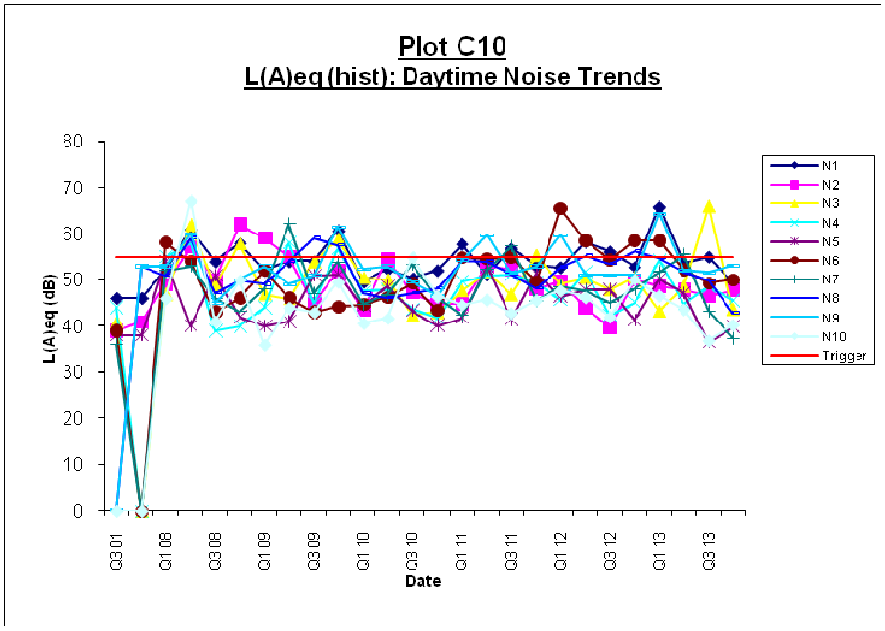


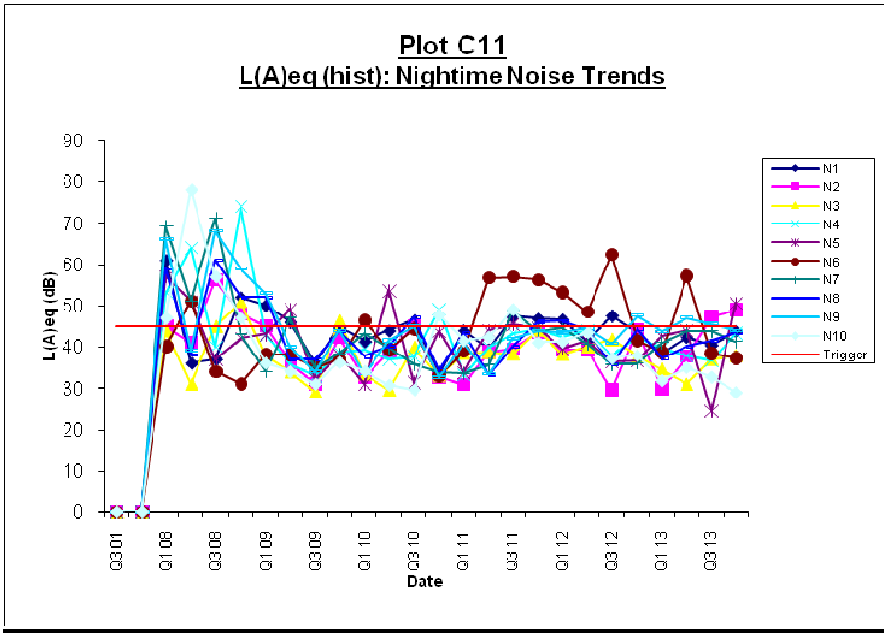
Ground Water Monitoring Results 2013



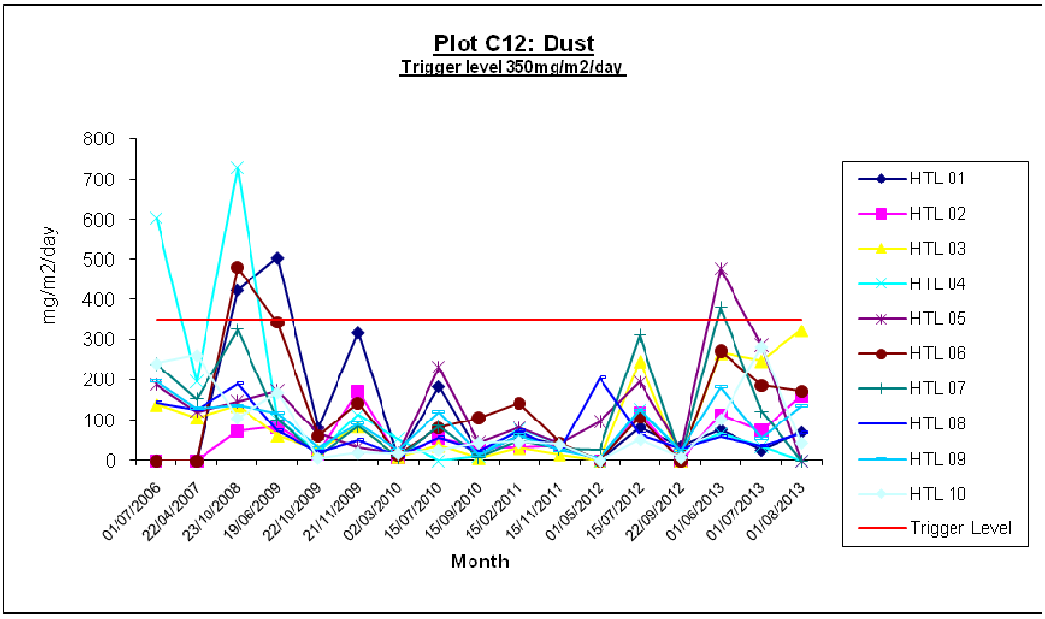


Noise Monitoring Results 2013





Dust Monitoring Results 2006 – 2013



Dust Monitoring Results 2013

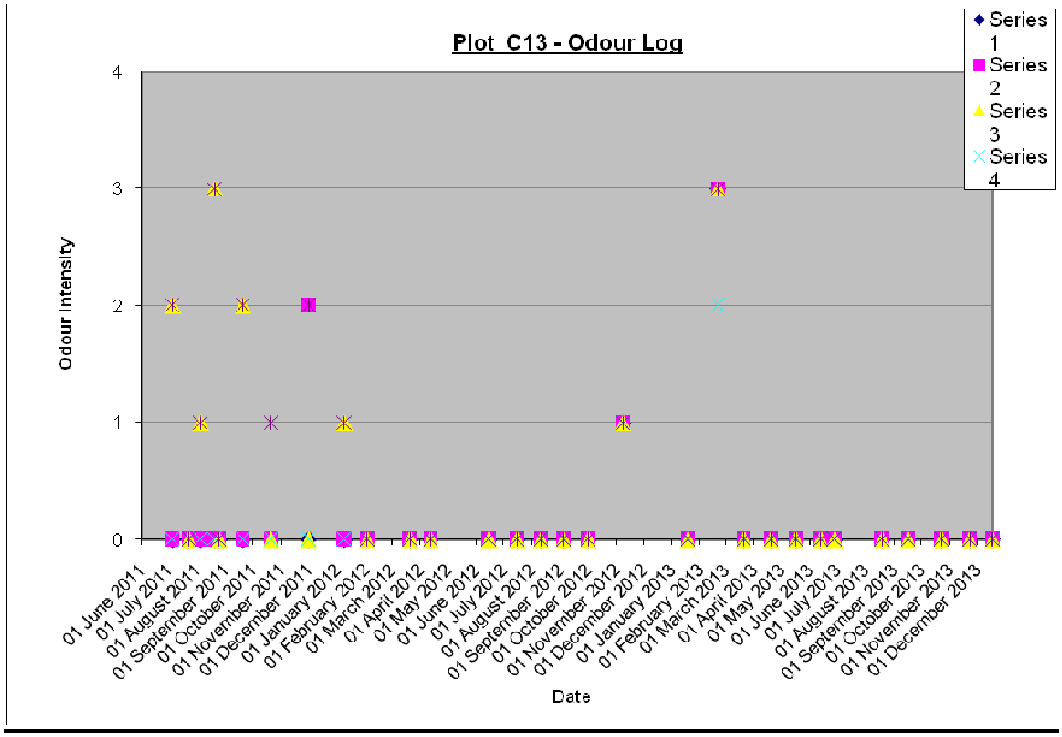
Dust Monitoring Locations and Frequency			
Dust analysis	D1 - D10	D1 - D10	D1 - D10
Dust Monitoring Results ($mg/m^2/day$)			
Date Range	**Jun-13**	**Jul-13**	**Aug-13**
D1	76.4	25.8	70.1
D2	112.8	73.8	160.8
D3	266.9	247.4	322.9
D4	66.7	36.2	NR
D5	476.8	286.5	NR
D6	271.8	186.8	171.4
D7	379.7	121.8	NR
D8	59.4	34.7	67.5
D9	182.0	54.6	135.0
D10	101.9	282.1	43.7

PM_{10} Monitoring Results 2013

PM_{10} Monitoring	
Location	**Result (ug/m3)**
D1	22
D2	27
D3	26
D4	20
D5	29
D6	28
D7	27
D8	17
D9	24
D10	20

Monitoring performed between 25th to the 27th July 2013

Odour Monitoring Results 2013

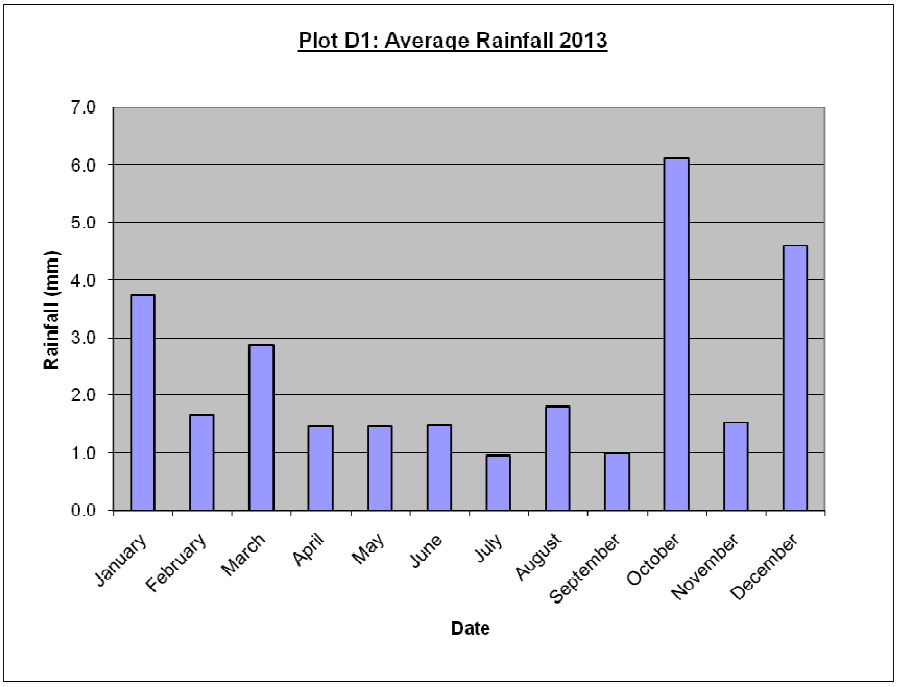


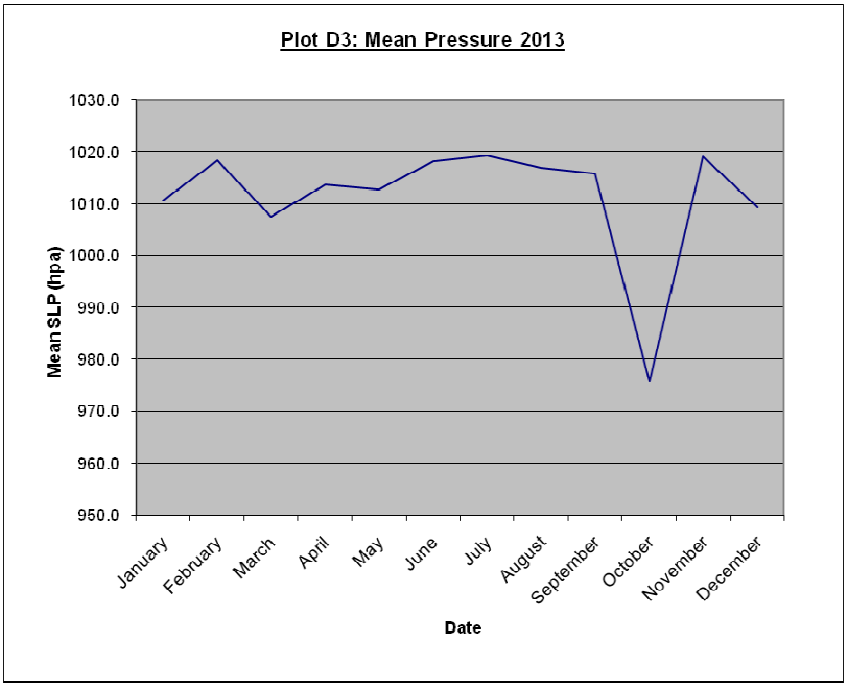
Legend

0	No detectable odour
1	Faint odour
2	Moderate odour
3	Strong odour
4	Very strong odour

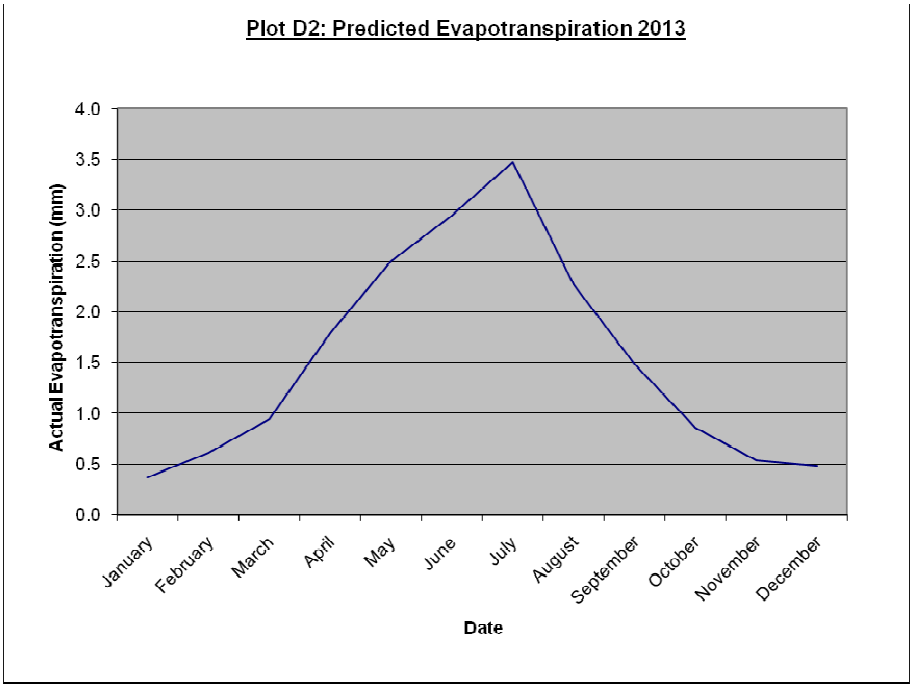
D. Meteorological Data Graphs

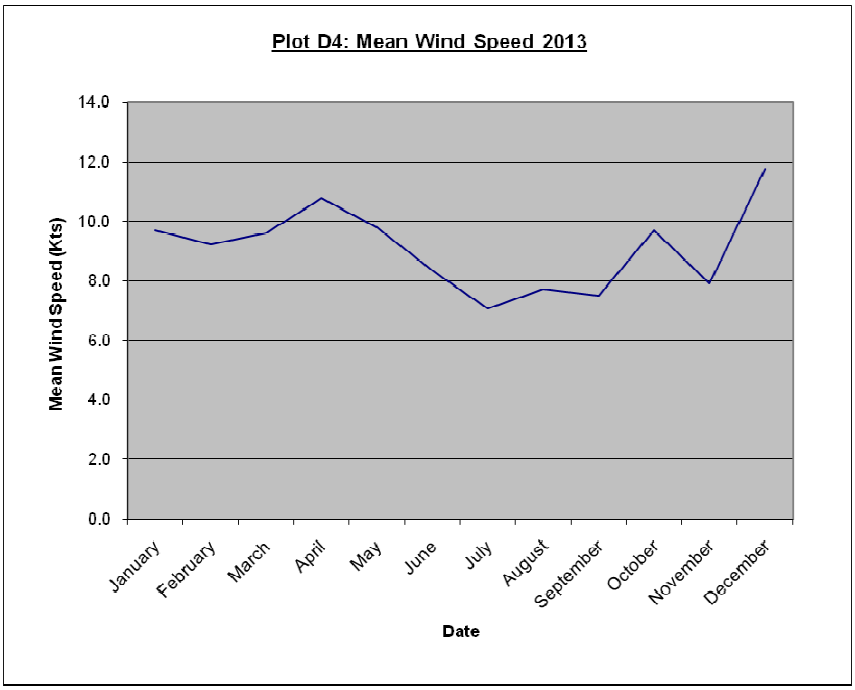
Appendix D – Meteorological Graphs



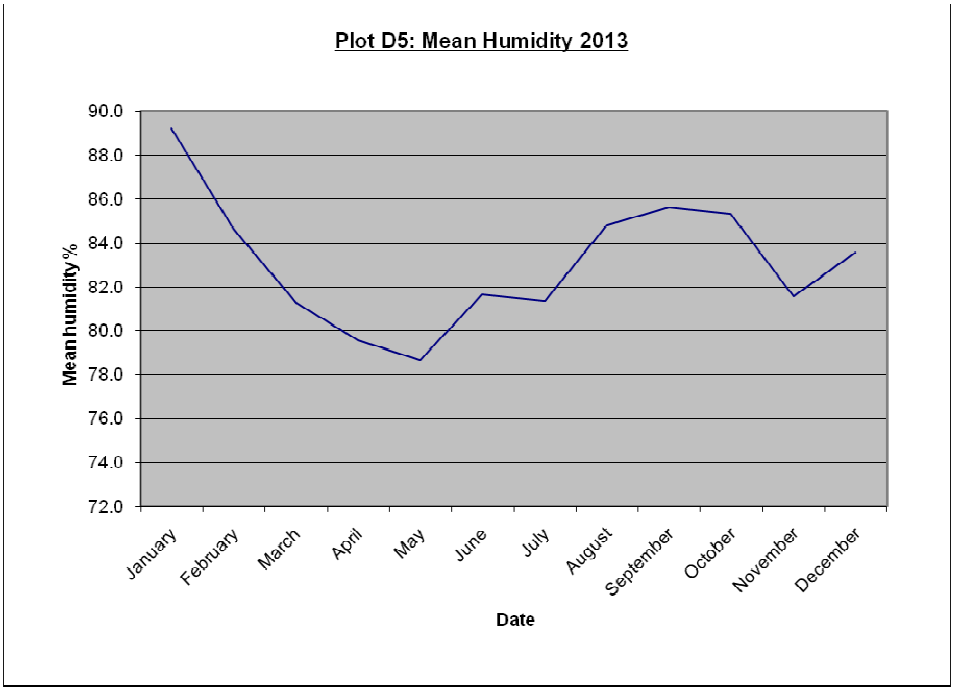


Appendix D – Meteorological Graphs





Appendix D – Meteorological Graphs



E. Summary of waste accepted and consigned off-site

Waste consigned off-site from Holmestown Landfill from 1st January 2013 to 31st December 2013 (tonnes)

Waste Out	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yearly totals
BULKY WASTE:	43.76	40.44	48.38	44.58	49.28	52.6	45.62	56.27	36.78	38.32	35.08	33.86	**524.97**
BLACK BAGS:	33.58	25.74	21.18	34	31.48	30.68	29.04	36.7	24	27.64	26.12	24.42	**344.58**
FLY TIPPING:	15.6	7.96	8.44	36.94	37.3	13.22	11.8	24.44	16.92	10.96	7.32	8.5	**199.4**
TIMBER:	13.72	9.9	4.6	10.34	10	11.18	11.34	13.58	8.94	5.84	11.5	9.1	**120.04**
BATTERIES :	0.86	1.12	0.00	0.00	1.04	1.68	0.00	0.00	1.01	0.84	0.00	0.00	**6.55**
FLUORESCENT LIGHTS :	0.1	0.1	0	0.1	0.08	0.1	0.05	0	0.03	0.03	0.02	0	**0.61**
GLASS BOTTLES :	9.32	2.86	3.78	2.86	8.52	2.12	2.56	6.68	4.98	3.96	4.96	1.98	**54.58**
LEACHATE	2,150.00	2,958.00	1,251.00	1,349.00	247.00	578.00	67.00	296.00	331.00	1,660.00	953.00	1,480.00	**13,320.00**
PLASTIC BOTTLES :	4.36	2.64	3.08	4.9	5.5	4.88	5.12	5.42	4.52	4.22	5.2	2.66	**52.50**
TEXTILES :	1.36	0.98	1.12	1.38	0.9	1.18	1.2	1.12	0.84	1.08	0.58	0.68	**12.42**
SCRAP METAL	8.94	7.72	7.92	9.7	14.56	11.5	12.46	15.38	9.64	7.02	8.08	5.3	**118.22**
ALLUMINIUM CANS	0.34	0.12	0.14	0.1	0.28	0.14	0.08	0.24	0.12	0.16	0.14	0.08	**1.94**
CARDBOARD	5.62	6.76	3.16	7.16	4.16	4.92	6.96	9.18	3.02	3.52	7.58	2.94	**64.98**
NEWSPAPER	2.12	1.68	2.46	1.92	2.44	2.5	2.68	3.26	1.88	2	2.84	1.22	**27.00**
TETRAPACK	0.48	0	0.72	0	0.42	1.34	0	0.38	0.42	0	0.44	0	**4.20**
WASTE ELECTRONICS	18.02	18.5	14.48	12	17.6	15.96	14.2	24.2	14.14	18.68	10.86	8.82	**187.52**
WASTE ENGINE OIL	0	0.94	0	0	0.8	0	0	1	0	0	0.76	0	**3.50**
MIXED DRY RECYCABLES	0.00	0.00	2.60	0.00	0.00	2.57	0.00	0.00	0.00	0.00	0.00	0.00	**5.17**
OIL FILTERS	0	0	0	0	0	0	0.34	0	0	0.2	0	0	**0.54**
PRINT CARTRIDGES	0	0	0	0.08	0	0	0	0	0.06	0	0	0	**0.14**
COOKING OIL	0	0	0	0.58	0	0	0	0	0.66	0	0	0	**1.24**
MAGAZINES	3.1	2.4	4.78	2.38	4.76	5.21	5.92	4.12	5.82	2.4	5.08	4.34	**50.31**
Monthly Totals:	**2,311.28**	**3,087.86**	**1,377.84**	**1,518.08**	**436.12**	**739.78**	**216.37**	**497.97**	**464.78**	**1,786.87**	**1,079.56**	**1,583.90**	**15,100.41**

F. Water Balance Calculation Spreadsheet

HWMF 2013 AER
Water Balance

TABLE 1
Leachate Generation

Actual rainfall		879.7	mm/yr	actual data from met eireann (1st Jan to 31st dec)	
Infiltration		**633.384**	mm (temporary restored areas) Assumes 80% of actual rainfall		72%
		627	mm (restored areas) Assumes runoff of		90%
		879.7	mm (waste - active and unrestored areas) - assumes all rainfall infiltrates into the waste		
Density		0.90	t/m3		
Waste input 2011		4,800.00	t		
Liquid waste input		0	m3/yr		
Absorptive Capacity		**0.025**	m3 per m3		
Site life		20	years		

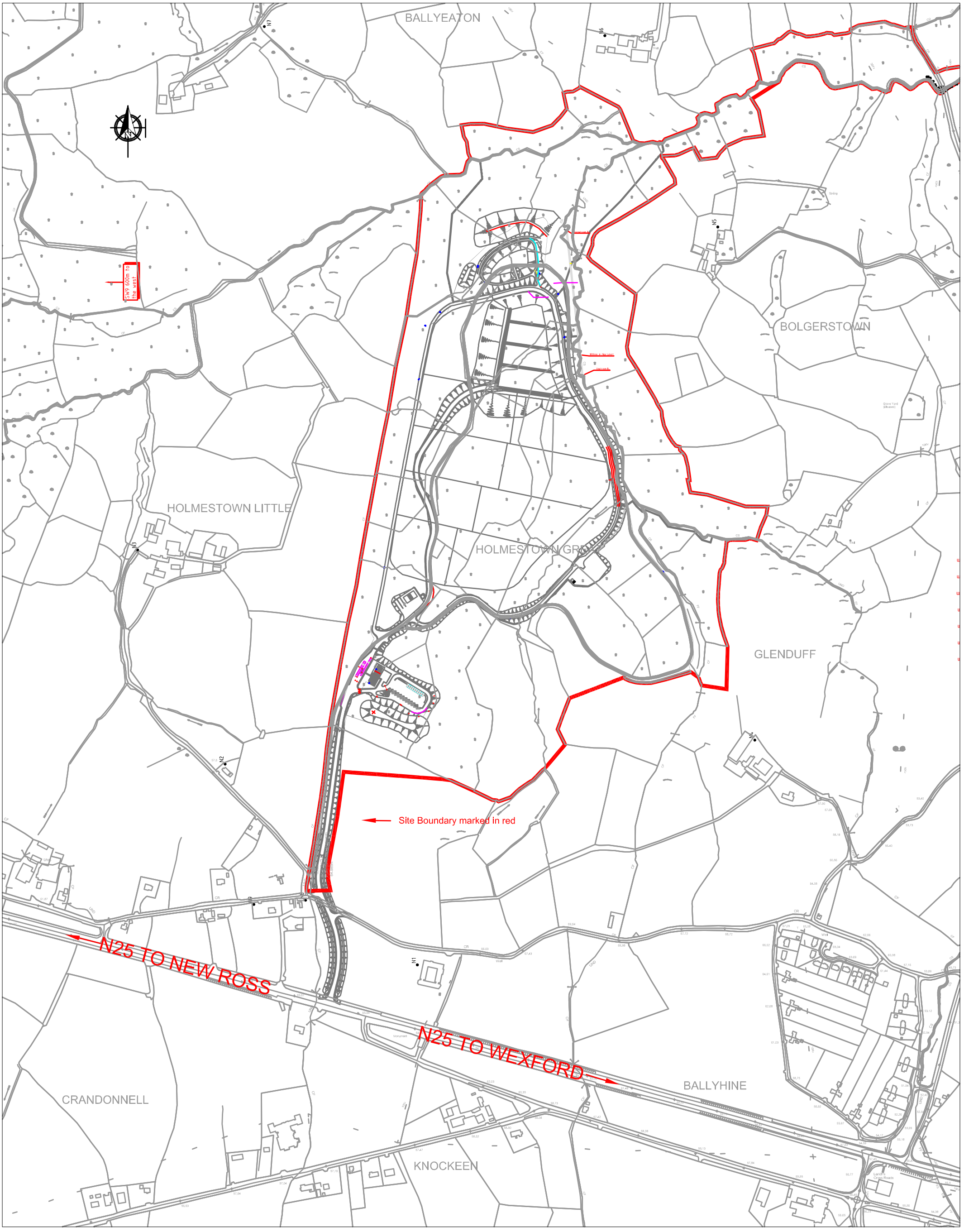
Year	Months	Phase	Active Area	Temp Cap	Full Cap	Waste Input 2013	Active Infiltration (m³)	Temp Infiltn. m3	Restored Area Infiltration (m³)	Total Water (m³)	Cumulative Water (m³)	Absorbtive Capacity (m³)	Cumulative bs. capacit (m³)	Cumulative leachate generation (m³)	leachate produced (Lo) (m³)	Monthly leachate generation (m³/mnt)	Leachate per day (m/day)	50% allowance
2013 (1st Jan to 31st Dec)	12	Dirty paved areas	740	0		0	651	0	0	651	651	0	0	651	651	54	2	3
2013 (1st Jan to 31st Dec)	12	1 (Cell 1,2,3,4, 1b)	0	18700		0	0	11,844	0	11,844	12,495	0	0	12,495	12,495	1,041	35	52

Dirty' paved areas draining to LTP	Area (m2)
Weighbridges	100
Waste Inspection/Quarantine	250
Wheelwash	90
LTP Yard	300
Total	740

Wastewater from Admin Building	
Ave Nr of Staff	8
Per capita daily flowrate (from EPA manu	60 l
Total Daily flowrate	480 l
Nr working days	250 d
total Annual Flow	120000 l
	120 m3

Total 2013	13,146
Weighbridge Quantity	**13320**
Less Admin Bldg WW	120
Nett WB Quantity	**13200**
Variance	0.40729697 %

G. Drawings



Wexford County Council

Holmestown Waste Management Facility

Wexford County Council,
Wexford
Tel: 053-9120922

PROJECT TITLE: Holmestown Waste Management Facility

DRAWING TITLE: Appendix G1
Site Location Plan

DRAWN:
CHECKED:
DATE:
SCALE:
DRAWING No:

DRAWING IS INDICATIVE ONLY. DO NOT SCALE.

BH1	297039.975	122814.478	42.730
BH2	297295.299	123456.557	14.707
BH3	297507.600	122878.303	24.256
BH5	297119.292	123332.688	0.000
BH6	297393.948	123153.195	17.184
BH7	297272.112	122854.454	33.137
BH8	297040.294	123270.883	33.260
BH9	297350.708	123299.768	20.960
BH10	297199.000	123330.000	0
D1	297511.746	123593.241	0.000
D10	297264.704	122797.575	0.000
D2	297505.338	123219.998	0.000
D3	297584.534	122986.308	0.000
D4	297495.467	122532.866	0.000
D5	296897.046	122718.769	0.000
D6	297061.385	123580.954	0.000
D7	297179.909	123550.036	0.000
D8	297401.061	123273.780	0.000
D9	296924.792	122617.597	0.000
GB1	297035.277	122856.226	0.000
GB2	296946.653	122723.357	0.000
GB3	296975.975	122717.819	0.000
GB4	296986.415	122681.418	0.000
GS11	297189.710	123405.649	20.399
GS12	297237.100	123416.951	0.000
GS13	297284.985	123403.337	17.644
GS14	297301.651	123362.923	17.230
GS15	297311.668	123313.405	17.336
GS16	297318.999	123269.027	0.000
GS17	297332.800	123226.323	18.058
GW1	297323.000	123287.000	0.000
GW2	297313.000	123345.000	0.000
GW3	297309.000	123419.000	0.000
GW4	297261.000	123426.000	0.000
GW5	297326.000	123603.000	0.000
GW6	297389.000	123350.000	0.000
GW7	297360.000	123420.000	0.000
GW8	297337.000	123472.000	0.000
GW9	297422.000	123281.000	0.000
GW10	297402.000	123643.000	0.000
KS01	297437.000	123033.000	0.000
KS02	297411.663	123658.969	0.000
KS03	297420.128	123686.356	0.000
KS04	297134.000	123628.000	0.000
L1	297288.236	123256.667	0.000
L2	297285.790	123274.312	0.000
L3	297277.324	123340.796	0.000
L4	297274.776	123356.846	0.000
LTP1/LTP2/LTP3	297366.093	122893.971	0.000
N1	297033.882	122189.788	0.000
N2	296696.386	122554.241	0.000
N3	296595.962	122973.601	0.000
N4	297676.851	122569.145	0.000
N5	297617.057	123523.549	0.000
N6	297368.822	123878.943	0.000
N7	296786.508	123887.905	0.000
N8	296854.739	122292.602	0.000
N9	296765.477	122285.437	0.000
PW1	297478.990	123859.662	18.339
PW10	297742.159	122485.520	0.000
PW11	296556.602	122317.026	0.000
PW2	297546.337	123408.659	0.000
PW2A	297584.688	123553.368	0.000
PW2B	297827.481	123031.480	0.000
PW4	296837.889	122276.677	0.000
PW5	296669.494	122261.079	0.000
PW6	296748.425	122427.439	0.000
PW7	296715.488	122537.448	0.000
PW8	296597.554	122991.603	0.000
PW9	296637.600	123790.527	0.000
SW1	297235.091	122814.649	0.000
SW2	297532.459	122859.447	0.000
SW2A	297583.292	122772.100	0.000
SW3	297439.978	123037.355	0.000
SW3A	297585.017	122966.756	0.000
SW4	297322.540	123466.648	0.000
SW5	297493.552	123680.361	0.000
SW6	297162.636	123648.886	0.000
SW7	296848.257	123496.913	0.000
SW8	296643.949	123359.856	0.000
* SW9	296027.225	123314.992	0.000 *
SWP1	297165.348	123429.626	0.000
SWP2	297264.019	123497.170	0.000
OD1	297355.000	123880.000	
OD2	297095.000	123252.000	
OD3	297333.000	123442.000	
Met Station	297006.600	122631.300	0.000

* = Approximate, to be checked on site

SW9 600m to the west

Legend:

- GS1 Perimeter Gas Migration Monitoring Well
- GB1 Gas Monitoring Point in Building
- SW1 Surface Water Monitoring Point
- SWP1 Surface Water Pond Monitoring Point
- PW1 Private Well (subject to owners consent)
- BH1 Existing Groundwater Monitoring Well
- L1 Leachate Monitoring Point
- LTP1 Leachate Treatment Plant Monitoring Point
- N1 Noise Monitoring Point
- D1 Dust Monitoring Point
- OD1 Odour Monitoring Point
- Met Station Met Station
- GW1 Methane Gas Investigation Well (Mar/Apr 2008)
- KS01 Biological Monitoring Points

Wexford County Council

Holmestown Waste Management Facility

Wexford County Council, Wexford
Tel: 053-9120922

Drawing Notes

No.	Revision Description	Date	Ini.	Ckd.

Project Title: Holmestown Waste Management Facility

Drawing Title: Appendix G2 Monitoring Locations

Drawn	F. Ryan
Checked	FH
Date	21-06-12
Scale	1:6000
Surveyed	FR
Drawing No.	001

Holmestown Landfill Mar 2014 Elevation surevy

Title: DESCRIPTION OF CONTENT	
Drawn by: EL	Checked by:SM
Date: 26 Mar 2014	Map No: 1

H. Environmental Liabilities Risk Assessment

ENVIRONMENTAL LIABILITIES RISK ASSESSMENT (ELRA) & CLOSURE, RESTORATION & AFTERCARE MANAGEMENT PLAN (CRAMP) FOR HOLMESTOWN WASTE MANAGEMENT FACILITY (W0191-02)

WEXFORD COUNTY COUNCIL

July 2013

FEHILY TIMONEY & COMPANY

ENVIRONMENTAL LIABILITIES RISK ASSESSMENT (ELRA) & CLOSURE, RESTORATION & AFTERCARE MANAGEMENT PLAN (CRAMP) FOR HOLMESTOWN WASTE MANAGEMENT FACILITY (W0191-02)

User is Responsible for Checking the Revision Status Of This Document

Rev. Nr.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
0	Issue to Client	DFM	PK/AR	DFM	11-07-13

Client: Wexford County Council

Keywords: Landfill, Waste Licence, Environmental Liability Risk Assessment, Closure Restoration Aftercare Management Plan (CRAMP), Environmental Liabilities Risk Assessment (ELRA).

Abstract: Condition 12.2.2 of Holmestown Waste Management Facility's Waste Licence (W0191-02) requires the submission of a comprehensive and fully costed Environmental Liabilities Risk Assessment (ELRA). This report has been prepared in accordance with the document 'Guidance on Environmental Liabilities Risk Assessment, Residuals Management Plans and Financial Provision, EPA 2006' and also refers to the document 'Environmental Liabilities Regulations – Guidance Document, EPA 2011'.

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1 INTRODUCTION

Condition 12.2 of W0191-02 requires the licensee to:

12.2 Environmental Liabilities

12.2.1 …. provide an annual statement as to 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 (including closure) or accidents /incidents, as may be associated with the carrying on of the activity.

12.2.2 …shall arrange for the completion, by an independent and appropriate qualified consultant, of a comprehensive and fully costed Environmental Liabilities Risk assessment (ELRA) to address the liabilities from past and present activities. A report on this assessment shall be submitted to the Agency for agreement within 12 months of the date of grant of this licence. The ELRA shall be reviewed as necessary to reflect any significant change onsite, and in any case every three years following initial agreement. The results shall be notified as part of the AER.

12.2.3 …make financial provisions to cover any liabilities associated with operation, including closure and aftercare, of the facility not covered by Condition 12.3. The amount of indemnity held shall be reviewed and revised as necessary, but at least annually. Proof of renewal or revision of such financial indemnity shall be included in the annual 'Statement of Measures' report identified in Condition 12.2.1'

Condition 12.3 addresses the 'Financial Provision for Closure, Restoration and Aftercare'.

12.3 Financial Provision for Closure, Restoration and Aftercare

12.3.1 The licensee shall prior to the commencement of waste disposal activities establish and maintain a fund, or provide a written guarantee, that is adequate to assure the Agency that the licensee is at all times financially capable of implementing the Restoration and Aftercare Plan required by Condition 4. The type of fund established and means of its release/recovery shall be agreed by the Agency prior to its establishment.

12.3.2 Any fund established shall be maintained in an amount always sufficient to underwrite the current Restoration and Aftercare Plan.

12.3.3 The licensee shall revise the cost of restoration and aftercare annually and any details of the necessary adjustments to the fund or guarantee must, within two weeks of the revision, be forwarded to the Agency for its agreement. Any adjustment agreed by the Agency shall be effected within four weeks of said written agreement.

12.3.4 Unless otherwise agreed any revision to the fund shall be computed using the following formula: -

*Cost = (ECOST **x** WPI) + CiCC*

Where:-

Cost = Revised restoration and aftercare cost

ECOST = Existing restoration and aftercare cost

WPI = Appropriate Wholesale Price Index [Capital Goods, Building & Construction (i.e. Materials & Wages) Index], as published by the Central Statistics Office, for the year since last closure calculation/revision

CiCC = Change in compliance costs as a result of change in site conditions, changes in law, regulations, regulatory authority charges or other significant changes.

This document addresses the requirements of Conditions 12.2 and 12.3 of W0191-02.

The Environmental Liability Directive (2004/35/EC) has been transposed into law through the European Communities (Environmental Liability) Regulations (2008) and the Environmental Liability Act. The Directive identifies activities for which 'strict liabilities' apply, for which waste management operations are identified.

The Regulations places a number of responsibilities on operators i.e. the entity that controls an activity, namely:

- Prevention of environmental damage including taking measures to prevent (environmental) damage occurring when there is an imminent threat of damage
- Informing the EPA of the imminent threat of environmental damage where the preventative measures have not been successful in dispelling the threat
- Informing the EPA when environmental damage has occurred
- Complying with the EPA's direction in relation to imminent threat of damage has occurred
- Where damage has occurred, the operators shall take steps to control, contain, remove or manage the contaminants

Section 4.1 of the document '*Environmental Liabilities Regulations – Guidance Document, EPA 2011'* identifies **proactive risk management** as a core principle by which these Regulations will be implemented by the EPA. Section 4.3 of the Regulations identifies Environmental Liability Risk Assessment (ELRA) as being a good example of a methodology for environmental risk management. Therefore, the preparation of an ELRA can be considered as a means of implementation of these Regulations.

1.1 Environmental Liability Risk Assessment

Environmental Liabilities can be subdivided into **known** and **unknown liabilities**. Different financial instruments are appropriate depending on whether it is an anticipated liability, such as the ongoing environmental management of the closed and restored landfill, or whether it is an unknown liability arising from accidental discharge, tank rupture of uncontrolled gas migration.

- The financial instruments most suited for the provision of **known liabilities** are cash based, such as Trusts, Cash funds or Escrow.
- The financial instruments most suited for the provision of **unknown liabilities** are Insurances, Bonds, Standby Letters of Credit and Guarantees.

The EPA guidance document *'Guidance on Environmental Liabilities Risk Assessment, Residuals Management Plans and Financial Provision'* (hereafter referred to as the 'Guidance Document') states that "Closure Restoration Management Planning (CRAMP), Environmental Liabilities Risk Assessment (ELRA) and Financial Provision (FP) are mutually dependent".

This document identifies a systematic step-wise approach to assess and quantify the risks and liabilities of a licensed facility as follows:

- Step 1: Initial Screening & Operational Risk Assessment
- Step 2: Preparation of a Closure, Restoration and Aftercare Management Plan (CRAMP) for known Liabilities
- Step 3: Environmental Liability Risk Assessment (ELRA) for unknown Liabilities
- Step 4: Identification of Financial Provision (FP) and Instruments

Step 1: Initial Screening & Operational Risk Assessment

Step 1 of the process involves a risk assessment decision matrix which is used to classify the Holmestown Waste Management Facility into a Risk Category (1-3) and thereby select the specific CRAMP, ELRA and FP requirements that are required.

Step 2: Preparation of a Closure, Restoration and Aftercare Management Plan (CRAMP) for Known Liabilities

A CRAMP must include the following:

- Site evaluation - including description and history of activities on the site, compliance status with previous licence, facility processes and activities
- Closure considerations – plant decontamination, plant disposal/recovery, waste disposal, leachate recirculation, groundwater pumping, soil removal etc.
- Criteria for successful closure
- Closure Plan costing (Financial Provision)
- Closure plan update and review procedures
- Closure plan implementation
- Closure plan validation – auditing report and validation certificate

The CRAMP was initially scoped using the Operational Risk Assessment process as outlined in the EPA guidance document.

The CRAMP contains:

- a scope statement
- the criteria for successful decommissioning
- a programme to achieve stated criteria
- details of how costs will be underwritten

Aftercare management is an integral part of the site restoration process and follows logically from the site restoration plan. The length of the aftercare period is one of the most critical components in the aftercare management plan and is related to the type of restoration required at the site. The aftercare management plan deals with restoration maintenance and environmental monitoring.

Step 3: Environmental Liability Risk Assessment (ELRA) for Unknown Liabilities

In order to comply with condition 12.2.2 an ELRA must be prepared for Holmestown Waste Management Facility in accordance with the EPA guidance document. The ELRA has particular regard to accidents, emergencies, past activities or other incidents, which might occur at the facility and their effect on the environment, on the neighbours of the facility and on adjoining land-uses. Information gathered during a desk based review of existing site documentation and site inspection was used to determine potential environmental risks.

The risk assessment identifies:

- any historical environmental liabilities related to the site
- potential environmental liabilities arising from the operating activities at the site
- potential environmental liabilities arising from ceasing to carry out these activities
- financial provisions required for the site

This report contains a matrix identifying potential areas of risk, probability of an incident occurring and the consequences of such an incident. Worst-case scenarios for each incident or potential incident have been evaluated.

The risk assessment includes a comprehensive and fully costed environmental liabilities risk assessment for the facility. Based on this, the financial provisions that must be put in place are calculated. The financial provisions include the costs entered into or incurred in the carrying on of the activities to which this licence relates including decommissioning and closure of the facility.

Step 4: Identification of Financial Provision (FP) and Instruments

The main objective of Financial Provision is to ensure that sufficient financial resources are available to cover:

- known environmental liabilities that will arise at the time of facility closure
- known environmental liabilities that are associated with the aftercare and maintenance of the facility until such time as the facility is considered to no longer pose a risk to the environment
- unknown environmental liabilities that may occur during the operating life of the facility

The amount of financial provision required for Holmestown Waste Management Facility has been determined using the CRAMP (Step 2) and ELRA (Step 3) as outlined in the guidance document.

2 STEP 1 – INITIAL SCREENING AND OPERATIONAL RISK ASSESSMENT

The initial screening and operational risk assessment of the Holmestown Waste Management Facility was carried out to establish if the facility is of Low, Medium or High risk. The risk assessment criteria are as follows:

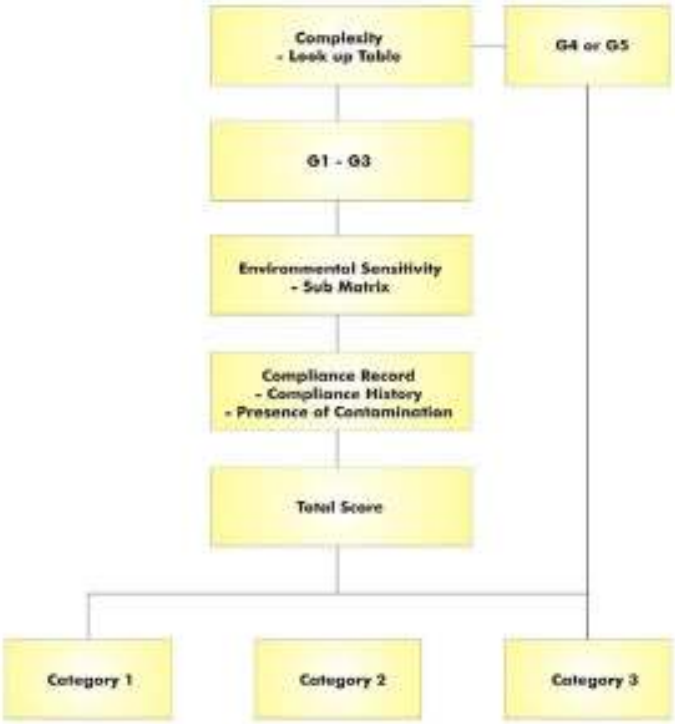
- ***Complexity*** *– the extent and magnitude of potential hazards present due to the operation of the facility (e.g. a function of the nature of the activity, the volumes of hazardous materials stored on site etc.). A Complexity Band (G1 least complex to G5 most complex) for each class of activity has been assigned and included in a Look-Up Table (Appendix B of the EPA Guidance Document). For activities with complexity G4 or G5, these facilities are automatically classified as Risk Category 3. For activities with complexity of G1, G2 or G3, these facilities must consider and evaluate their score using the Environmental Sensitivity and Compliance record*

- ***Environmental Sensitivity*** *– the sensitivity of the receiving environment in the vicinity of the facility, with more sensitive locations given a higher score (e.g. the presence of aquifers below the site, groundwater vulnerability, the proximity to surface water bodies and their status, the proximity to sensitive human receptors, etc). The Environmental Sensitivity is calculated on a site-specific basis using a sub-matrix*

- ***Compliance Record*** *– the compliance history of the facility and whether soil and/or activities carried on are in compliance with licence requirements and emission limits.*

Each aspect is multiplied to give the Total Score for the facility, and this can be used to place the facility into an appropriate Risk Category (1-3). Once this has been completed, the licensee proceeds through the relevant steps of CRAMP, ELRA and FP that are considered appropriate for the Risk Category. Figure 2.1 shows the overall Step 1 process.

Figure 2.1: Flow chart of Initial Screening and Operational Risk (EPA, 2006)



2.1 Complexity

The *'Guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision'* (EPA 2006) was used to determine the initial screening and operational risk assessment of Holmestown Waste Management Facility. There are five possible complexity bands for a facility, G1 to G5, G5 being the most complex. The bands are used to determine the value used in the Operational Risk Assessments. Table 2.1 is based on Appendix 2 of the guidance document.

Table 2.1: Complexity Rating

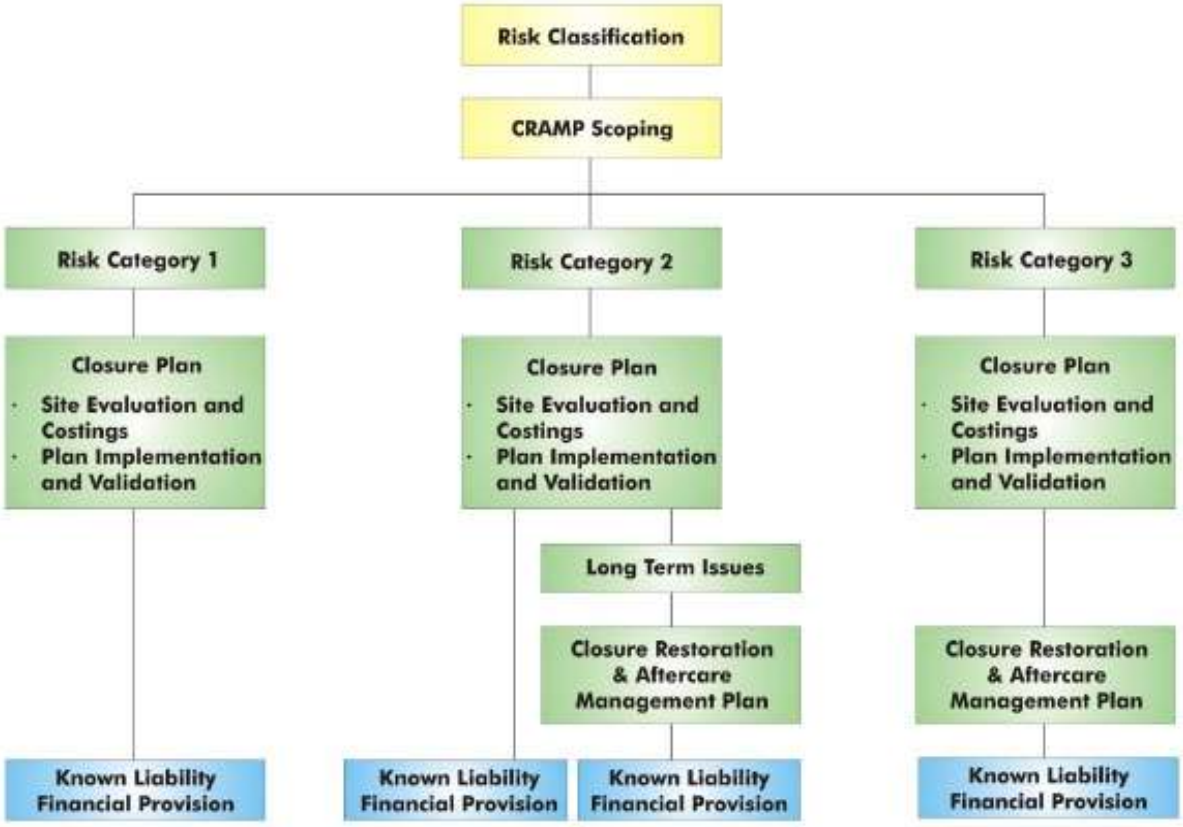
Complexity	Score	
Licensed Activity Class	**Complexity Band**	**Risk Category**
Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment; where		
• engineered landfill accepting > 100,000 tonnes per annum non-hazardous waste or hazardous waste landfill	G5	
• **engineered landfill accepting < 100,000 tonnes per annum non hazardous waste**	**G4**	**3**
• closed lined landfills	G3	
• inert landfills	G2	

Holmestown Waste Management Facility is an engineered landfill accepting less than 100,000 tonnes per annum non-hazardous waste (80,000 tonnes as per W0191-02). The Complexity Band for Holmestown is **G4.** As a result of the G4 Complexity Band the site is automatically assigned a Category 3 Risk.

3 STEP 2: CLOSURE, RESTORATION AND AFTERCARE MANAGEMENT PLAN (CRAMP) - KNOWN LIABILITIES

As a result of the Initial Screening (previous Step 1), the Holmestown Waste Management Facility is a Category 3 facility. Therefore a Closure Plan and Restoration and Aftercare Plan (CRAMP) are required.

Figure 3.1: Closure, Restoration and Aftercare Management Plan Process (CRAMP) (EPA, 2006)



3.1 Closure Plan for Holmestown Waste Management Facility

The closure plan for the Holmestown Waste Management Facility includes the following sections (as set out in Table 3.2 of the EPA guidance document):

- Introduction
- Site Evaluation
- Closure Considerations
- Closure Plan Costing
- Closure Plan Update and Review
- Closure Plan Implementation
- Closure Plan Validation

3.1.1 Introduction

Holmestown Waste Management Facility is located within the town lands of Holmestown Great, Glenduff, Bolgerstown, Muchwood and Ballyeaton, approximately 8 kilometres west of Wexford Town (National Grid Reference 2973, 1230). The site, which lies to the north of the N25 Wexford to New Ross road, comprises an area of approximately 63 hectares of which 15 hectares is allocated for landfilling. It is situated within a mixed forested plantation of mainly coniferous trees known as Holmestown Wood. A site location maps is shown in Figure 3.2.

3.1.2 Site Evaluation

The Holmestown Waste Management Facility site evaluation includes the following information:

- a description of the site
- planning & waste licence details
- a description of waste activities
- the containment principles of the landfill design
- an inventory of site buildings, plant and equipment
- details of bund testing
- drawings of the facility

Description of the Site

The Holmestown Waste Management Facility is bounded by agricultural lands to the north, south, east and west. The land use in the surrounding area is good quality grazing and it is intensely farmed to the west, north and east by dairy and livestock farmers. There are a number of dwellings surrounding the site including farmhouses, residences and a nursing home. The site is within the catchment of the Slaney River, and a number of small streams drain the site to the Slaney, located less than 2km away.

The total quantity of waste accepted at the facility from 1st January 2008 to the 31st December 2012 was 105,102 tonnes.

As well as operating as a landfill facility, Wexford County Council also operates a civic amenity site at the Waste Management Facility to provide an outlet to domestic customers to recycle and dispose of a range of materials.

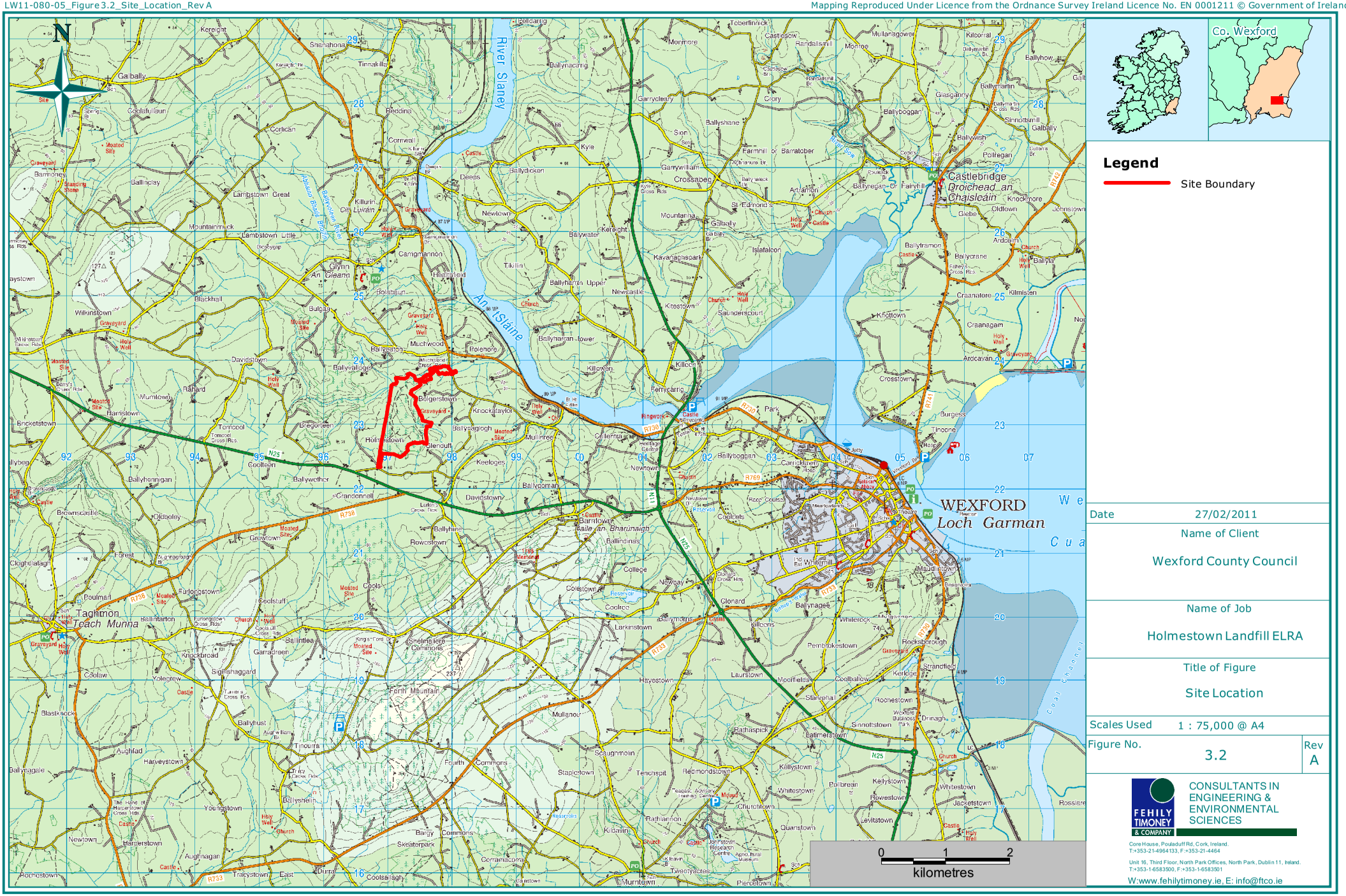
Planning & Waste Licence History

Wexford County Council (WCC) applied to An Bord Pleanala on the 14th April 2004 for the development of an integrated waste management facility at Holmestown. An oral hearing was undertaken in October 2004 in relation to the proposed development. Subject to 9 conditions, An Bord Pleanala granted permission for the development of the facility on the 10th March 2005.

Waste Licence W0191-01 was granted to WCC by the EPA on the 10th of December 2004 which allowed for the acceptance of 55,000 tonnes of non hazardous household and commercial waste, 5,000 tonnes of waste for composting, 8,000 of construction and demolition waste for recovery and 12,000 tonnes of household and commercial waste to be accepted at the civic amenity and materials recovery facilities. In August 2005, Technical Amendment A was made to the licence which allowed for the acceptance of WEEE at the civic amenity facility. Furthermore, in January 2006, a second Technical Amendment was made, Technical Amendment B, in relation to emissions from the leachate treatment plant to the sewer.

In the 24th of March 2010, the EPA issued a new licence (W0191-02), as part of a review of all landfill waste licences in the country, principally to give effect the requirements of Directive 99/31/EC regarding the diversion of biodegradable waste from landfill. A number of conditions were added/amended in relation to waste acceptance procedures (5.2.9), BMW acceptance (5.1.8), reporting (11.8) and environmental liabilities (12.2.1 & 12.2.3). Conditions relating to restoration and aftercare remained unchanged (4.1 & 4.2). A Technical Amendment A was made to this licence in January 2013 in relation to groundwater discharges.

R:\Map Production\2012\LW11\080\05\Workspace
LW11-080-05_Figure 3.2_Site_Location_Rev A



Legend

Site Boundary

Date	27/02/2011
Name of Client	Wexford County Council
Name of Job	Holmestown Landfill ELRA
Title of Figure	Site Location
Scales Used	1 : 75,000 @ A4
Figure No.	3.2
Rev	A

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Waste Activities

Waste activities carried out at Holmestown Waste Management Facility are in accordance with licence W0191-02 as follows:

Waste Disposal Activities (Third Schedule)

Class 1 **Deposit on, in or under land (including landfill):**

This activity is limited to the landfilling of non-hazardous household and commercial wastes

Class 4 **Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons:**

This activity is limited to the temporary storage of leachate in a lagoon, prior to its removal offsite for treatment

Class 5 **Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment:**

This activity is limited to the landfilling of non-hazardous household and commercial wastes

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:**

This activity is limited to the disposal of material which is composted on-site, which fails to comply with the standards set out in Schedule G: Compost Quality of the licence

Class 7 **Physico-chemical treatment not referred to elsewhere in this Schedule (including evaporation, drying and calcinations) 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:**

This activity is limited to the mixing of non hazardous waste at the Civic Amenity Facility, Materials Recovery Facility and composting facility prior to disposal at the landfill.

Class 12 **Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule**

This activity is limited to the mixing or compaction of waste and the reloading of waste tipped for inspection into a container prior to landfilling or disposal offsite

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**

This activity is limited to the temporary storage of waste in the Civic Waste facility prior to disposal at the landfill

Waste Recovery Activities (Fourth Schedule)

Class 2 **Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes)**

This activity is limited to the collection of organic wastes at the Civic Waste Facility and the composting or recovery of organic waste

Class 3 **Recycling or reclamation of metals and metal compounds**

This activity is limited to the collection of metal at the Civic Waste Facility e.g. scrap metal, white goods, cans, batteries and the removal of metals from other waste in the Civic Waste Facility and Material Recovery Facility

Class 4 Recycling or reclamation of other inorganic materials

This activity is limited to the collection of inorganic recyclables such as glass, textiles and clothing, batteries, fluorescent tubes and construction and demolition wastes in the Civic Waste Facility. It also refers to the use of construction and demolition waste in restoration and engineering projects.

Class 10 The treatment of any waste on land with a consequential benefit for an agricultural activity or ecological system

This activity is limited to the possible future spreading of composts or treated sludges on the landfill as part of its restoration

Class 11 Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule

This activity is limited to the use of composted waste and construction and demolition waste in recovery or restoration projects at eth landfill

Class 12 Exchange of waste for submission to any activity referred to in a preceding paragraph of this Schedule

This activity is limited to the exchange of waste at the Civic Waste Facility

Class 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

This activity is limited to the storage of waste onsite prior to recycling and reclamation activities

The principal activity is Class 5 of the Third Schedule.

Waste Acceptance and Handling

Waste is brought to the facility by both private waste management companies and local authority waste collections. A written record of each load of waste entering and leaving the facility including weights is kept in the weighbridge office. Each waste stream is characterised in accordance with European Waste Catalogue (EWC) codes, and on site verification is carried out to confirm waste types. Waste acceptance and waste handling procedures are developed for the site.

Waste is brought to the active tipping face by refuse transport vehicles. Each vehicle is reversed to the tipping face and the load ejected / tipped out. The waste is spread out and compacted into the active tipping area through the use of a steel wheeled compactor and covered daily with suitable material. The compaction process is a continuous one and the compactor is in operation almost continuously during site operating hours. Several passes are made over the consignment of waste prior to pushing the remnants over the tipping face. These passes are necessary to achieve the required optimum compaction of 0.8 tonnes/cubic meter. The deposition of the remnants of the consignment, i.e. a small fraction of the consignment, over the tipping face gradually extends the tipping face into the active cell thereby filling it.

Hessian matting and woodchip/sand mix are used to cover the working area at the end of each day as per the Procedure for Waste Handling (HWMF 002). Wood chip/sand mixture is used for the purposes of cover material at the facility.

Advantages of the woodchip/sand include: excellent trafficking qualities, low road maintenance, odour abatement and it is suited to the use of the landfill as a bioreactor. At the end of each day a layer of cover material is placed over any exposed hessian matting to provide adequate protection.

In accordance with Condition 5.4 of the licence only one working face is operational at any one time with a maximum working face height of 2.5m after compaction. The working face is kept to less than 25m wide with a slope no greater than 1 in 3.

Design Principles of the Landfill – Containment Principle

The landfill site and landfilling area is designed in accordance with the containment principle. This design principle facilitates the control and management of potentially adverse environmental impacts from activities at the site.

The landfill, when filled, will comprise 10 Phases occupying a total area of approximately 152,000 m^2. The cells are (or will be) fully lined in accordance with specifications set out in the EU Landfill Directive comprising of a 2 mm thick fully welded high density polyethylene (HDPE) flexible membrane liner underlain by a minimum of 1 m of engineered clay with a permeability of 1 x 10^{-9} m/sec overlying naturally occurring clay with similar permeability. This lining system minimises leakage of leachate and migration of landfill gas through the base and side walls of the filling cells. All liner placement was (or will be) carried out under strict documented quality assurance procedures.

The landfill is being constructed on a phased basis:

- Phase 1 - Cells 1 to 4 are filled and temporarily capped
- Phase 2 - Construction complete but filling has not commenced
- Phases 3 to 10 – not yet commenced

Site Layout

Drawing LW11-080-05-001 in Appendix I shows the entire site layout. All buildings on site are permanent structures that were built for staff use. No major plant or equipment is stored in these buildings with the exception of hand held monitoring instrumentation and laboratory equipment. There is one machinery maintenance building. A civic amenity facility is located at the site comprising a series of containers for the collection of recyclable materials deposited by members of the public. An attendant's office is located at the civic amenity site. A monitored surface water attenuation and settlement pond lies to the north. The outlet of the pond is monitored and controlled. The leachate treatment plant (LTP) incorporates stormwater and leachate balance tanks, sequence batch reactors (SBR) tanks, effluent tanks, filters and sludge dewatering. There is a control building with an adjacent ESB substation. An enclosed flare is adjacent the LTP. There is a domestic wind turbine and photovoltaic solar panel.

Inventory of site buildings, plant, raw material and waste

The site buildings are the:

- administration building
- plant room building
- leachate treatment plant buildings
- contractors compound
- maintenance building
- weighbridge office
- civic amenity attendants office

The site office and staff facilities are located in permanent purpose built structure and are located in the main office building. These buildings are approximately 4 years old. Electricity is used in this building for both power and lighting. A solar panel heating system has also been installed to supplement a wood burning pellet boiler.

A list of the plant is provided below. A supervisory control and data acquisition (SCADA) system monitors and controls facility-based processes.

The mechanical plant present on-site is listed as follows:

- landfill compactor (sub-contractor)
- excavators (WCC own)
- site dumper (sub-contractor)
- loading shovel (WCC own)

The electrical plant on-site is listed as follows:

- leachate treatment plant pumps and aerators
- leachate pumps
- landfill gas flare
- site lighting
- CCTV
- monitoring equipment

Landfill gas is thermally treated in an enclosed flare with a capability for active carbon treatment for low methane concentrations.

Other site assets include:

- site fencing
- monitoring infrastructure and signage (groundwater wells, landfill gas wells and leachate wells)
- landfill gas collection infrastructure (pipework, well heads, valves and manifolds)
- leachate collection & treatment infrastructure
- surface water pond
- paved roadways, carpark and marshalling yard slab
- stormwater drainage system (drains and pipework)
- civic amenity facility

The raw and ancillary materials used at the landfill include:

- electricity - approximately 179,662 kWhrs per annum (2008 to 2010 average)
- diesel fuel - approximately 40,572 litres per annum (2008 to 2010 average)
- water for dust suppression approximately 31,666 litres per annum (2008 to 2010 average)

Leachate is generated on site. Table 3-1 identifies how much treated leachate has been tankered offsite since the facility opened in April 2008.

Table 3-1 Quantities of treated leachate

Year	Volume
2008	3,329 tonnes
2009	7,543 tonnes
2010	15,364 tonnes
2011	10,846 tonnes
2012	18,108 tonnes

Tank, Pipeline and Bund Testing

Integrity testing of the leachate storage tanks was carried out in 2007 and 2011. The test was carried out in accordance with the procedure described in the Civil Engineering specification for the Water Industry (CESWI). On both occasions, all tanks assessed passed the integrity test. Testing and certification will continue in accordance with the conditions of the waste licence, as long as the facility is licensed by the EPA.

3.1.3 Closure considerations

WCC will restore the site in accordance with the licence following completion of landfill activities. It is expected that a **non-clean closure**[1] will occur upon cessation of landfilling operations on-site.

The closure considerations discussed in this section include:

- the quantity and nature of waste acceptance
- the remaining void
- phased capping plan and landscape plan
- environmental monitoring
- decommissioning

Quantity and nature of wastes & remaining capacity of the site

Table 3.2 presents the tonnage of waste material received at the facility annually since operations commenced on the 29 April 2008 to the end of the 2012 reporting period. In May, 2012, Holmestown Waste Management facility temporarily stopped accepting waste.

Table 3-2 Waste Intake (tonnes)

Year	Cumulative Waste Input	Annual Waste Input
2012	104,471 tonnes	4,130 tonnes
2011	100,341 tonnes	23,291 tonnes
2010	77,050 tonnes	32,601 tonnes
2009	44,449 tonnes	28,610 tonnes
2008	15,839 tonnes	15,839 tonnes

Remaining Capacity

Waste was first accepted on site at Holmestown Waste Management facility during April 2008. Wexford County Council's intention in planning, constructing and operating the Holmestown Landfill Facility is to provide a void space for 900,000 tonnes of compacted municipal solid waste and to place same in accordance with the profile identified in the EPA licence.

Based on an allowance for 25% for daily and intermediate cover material and achieving 0.8 tonnes/m^3 compaction ratio an overall volume capacity requirement of 1,406,250 cubic meters is estimated over the operational life of the facility.

A topographical survey carried out in January 2011 showed that the volume of waste present within Cells 1, 2, 3 and 4 of Phase 1 was approximately 72,799m^3. A topographical survey completed in March 2011 showed the area of waste present within Cells 1, 2, 3 and 4 to be 18,132 m^2. The overall area where waste will be landfilled is approximately 15.2 ha (152,000m^3).

Phased restoration

To date, Cells 1, 2, 3 & 4 have been used to accept waste. Cells 3 & 4 were filled initially when waste began being accepted at Holmestown Waste Management Facility in 2008. Cells 1 & 2 were used as the active tipping area in 2010 and 2011. An intermediate clay cap has been installed on Cells 2, 3 & 4 while a temporary cap is in place on Cell 1.

[1] Non Clean Closure – upon cessation of operations and subsequent decommissioning, there are remaining liabilities which require a restoration and aftercare management plan; as per Section 3.3.3 of the *Guidance Document*

Following completion of landfill activities the landfill will be appropriately capped and the closure and restoration programme will be implemented in full.

Table 3.1: Landfill Cap Phases

Capping Phase	Area m^2	Completion Date
1	Approx. 7,000	2015
2	Approx. 11,000	2 years after filling
3 - 10	Approx. 10,000 each	2 years after filling of each phase

The final landfill cap will be a fully engineered cap in accordance with Condition 4.3 of the waste licence.

4.3. Final Capping

4.3.1. Unless otherwise agreed in writing the final capping shall consist of the following:-.

a) Top soil (150 - 3OO mm):

b) Subsoils such that total thickness of top soil and subsoils is at least lm;

c) Drainage layer of 0.5m thickness having a minimum hydraulic conductivity of 1 x 10^{-4} m/s;

d) Compacted mineral layer of minimum 0.6m thickness with a permeability of less than 1x10^{-9} m/s or a geosynthetic material (e.g. GCL) or similar that provides equivalent protection: and

e) Gas collection layer of natural material (minimum 0.3 m) or a geosynthetic layer.

Proposed Final Landform and Landscaping Plan

When landfilling ceases on the site, the site will be restored to the profile required under Condition 4.2 of the W0191-02. The maximum height will be 45 mOD and the minimum will be 11 mOD.

As deposited waste continues to decompose, the surface topography of the site will continue to change. The facility manager will monitor the settlement at the site as part of the annual inspection. Topographic surveys will also continue to be carried out annually, though this may be reviewed with the EPA following the closure of the site.

The landscaping plan will be implemented as outlined in Sections of 5.66 to 5.75 of the EIS submitted during planning and licence application. This information is included in Appendix 2 of this document.

Environmental Monitoring & Aftercare

Monitoring and reporting to the EPA, of landfill gas, leachate, groundwater, surface water, dust, odour, flare emissions and noise will continue in accordance with licence requirements for the aftercare period until the EPA accepts the surrender of the waste licence (the point at which the landfill has stabilised and no longer poses a risk to the environment or human health).

The monitoring programme will be reviewed annually and, with the agreement of the EPA, modified to take account of the changing circumstances.

It is envisaged that, during the restoration and aftercare period, the site will be restored to bring it into mixed woodland and pasture and will be developed as a nature conservation/public amenity resource.

Decommissioning

Holmestown Waste Management Facility will not require significant decommissioning or decontamination of plant, buildings or other infrastructure in the short-term (at the non-clean closure point) due to the nature of site operations and aftercare requirements.

All functioning mobile plant, not required during the aftercare management, will be removed from the site. Onsite decontamination of plant is not envisaged. Site buildings will be maintained as required during restoration and aftercare as maintenance and environmental monitoring of the site will be ongoing until the EPA accepts the surrender of the waste licence.

The buildings shall be retained on site for the duration of the aftercare period.

Following cessation of waste acceptance, waste handling equipment will be removed from the site.

The wheel wash and dry shakeout unit shall be retained for a period on site to facilitate capping and restoration works and removed off site once no longer necessary.

In the short to medium term (from the non-clean closure point), there shall be decommissioning of the:

- weighbridges

It is expected that leachate treatment will be required in the medium to long term, a timeline cannot be determined as the requirement for the treatment plant is dependant on a wide variety of factors. The timeline will be reviewed annually in line with leachate generation volumes and constituents of the leachate and based on approval from the EPA.

In the long term, there shall be decommissioning of the:

- landfill gas flare, activated carbon filter and/or utilisation plant
- landfill gas collection infrastructure

Flaring and/or carbon filtration will be used to treat the lower quality gas which is unsuitable for combustion in utilisation plant. The generation capacity and flaring requirements will be forecasted on an annual basis. Subsequently, Wexford County Council will operate the flare/activated carbon filter for as long as there is sufficient landfill gas quality and volume. Once they become redundant, they shall be removed off-site either for the second hand market or recovery.

It is possible that WCC, in tandem with activated carbon filtration, will be required to install some new landfill gas infrastructure at this time to facilitate passive venting. This may consist of venting cowls, conditioning filters etc. These will remain in place on site for the long term. When no longer required, they shall be decommissioned and the remaining landfill gas pipework will be made safe and non-accessible. This will include the removal of all above ground landfill gas infrastructure including manifolds, pipework and valves. The manifolds and pipework is HDPE and shall be sent for recovery if suitable. The valves shall be sent for metal recovery. All the landfill gas extraction well heads are located within the cap in concrete chambers. These shall either be sealed shut or the covers removed and infilled with inert material. It is not considered that any of the wellhead infrastructure will be fit for re-use or recovery at that time.

It is anticipated that the surface water pond will remain on site to continue to attenuate surface water as it drains off the landfill cap before being discharged at a steady rate to the adjacent stream.

3.1.4 Closure Plan Costing

Table 3.3 in Appendix 3 shows a matrix of decommissioning and closure tasks and associated costs.

3.1.5 Closure Plan Update and Review

The closure plan will be reviewed and updated as necessary. The updated plan will take into account any site process changes, technology changes and costing changes. Updates will be included as part of the relevant AER and submitted to the EPA for approval.

3.1.6 Closure Plan Implementation

Prior to and upon cessation of waste acceptance at the Holmestown Waste Management Facility, the EPA will be notified.

Landfilling will cease, but restoration, environmental monitoring and maintenance of the facility will continue. The initial restoration works will be the final phase of capping.

SEWs will be forwarded to the Agency in advance of any works for approval. The facility management will continue to operate and maintain the leachate collection and treatment plant and the landfill gas collection system.

When landfill gas is no longer of sufficient volume or quality for generation (if undertaken at the site), the licensee will commence flaring to be following by passive venting and/or carbon filtration.

WCC will also continue to carry out all environmental monitoring and reporting, including the review of all plans in accordance with the conditions of the waste licence.

3.1.7 Closure Plan Validation

During the closure period there will be ongoing restoration works and long term monitoring which is estimated to continue for a period of approximately 30 years. The final closure will be dictated by leachate and landfill gas generation quality and volume.

It is anticipated that the certification of the closure process will take place in the following steps:

- completion of the final phase of capping
- decommissioning of the leachate collection system
- decommissioning of the landfill gas treatment capacity
- decommissioning of the landfill gas collection system
- decommissioning of the leachate treatment plant

For each relevant closure step, WCC will retain a suitably qualified independent auditor to certify the process.

3.2 Site Closure, Restoration and Aftercare Plan

Holmestown Waste Management Facility will be restored in accordance with the site planning permission and the requirements of W0191-02. Landfill capping and landscaping will be carried out on a phased basis to restore the landform.

3.2.1 Restoration and remediation proposal

When landfilling ceases on the site, the site will be restored to the profile submitted with the original planning application with a maximum height of 45 m OD and a minimum height of 11 m OD. The final landform will be to the specifications and details identified in Condition 4.2 of W0191-02 i.e. as per Drawing No. 2.8 Rev A of the EIS Addendum.

A closure plan is proposed for the non-clean closure of the facility in the previous sections. In addition to the closure actions described in the closure plan, WCC will continue to operate and maintain some key infrastructure for the aftercare period.

3.2.2 Aftercare Management Plan

The following plant and infrastructure will be maintained on site during the restoration and aftercare period:

- environmental monitoring infrastructure
- environmental monitoring equipment
- landfill gas collection infrastructure
- landfill gas treatment infrastructure
- leachate collection infrastructure
- leachate treatment infrastructure
- landfill cap including landscaping
- roadways and drainage system
- surface water collection system
- surface water retention pond
- groundwater management infrastructure
- security system
- access to monitoring locations and access to the cap

The environmental monitoring programme will continue in accordance with the licence conditions for the duration of the aftercare period, or as agreed with the Agency.

The timeframes for the maintenance and servicing of the above infrastructure is dependant on the operational timeframe for each. For example:

- leachate collection and treatment is estimated to be required for approximately 5 – 10 years post capping
- landfill gas collection is estimated to be required for a period of 30 years
- surface water collection will continue indefinitely
- environmental monitoring shall continue until surrender of the waste licence.

The Aftercare Strategy for the Holmestown Waste Management Facility foresees the development of a recreational and nature conservation resource at the site. The nature conservation value and ecological development will be monitored during the phased restoration so that any modifications necessary to improve the success of habitat creation can be incorporated in to later phases. It is the intention of Wexford County Council to develop a detailed management and aftercare scheme for the entire site in consultation with Coillte, local nature conservation groups, the local community and other relevant stakeholders prior to the commencement of restoration works on the first completed phase of the site.

3.2.3 Site Restoration and Aftercare Management Costs

In accordance with Condition 12.3, Financial Provision for Closure, Restoration and Aftercare of the waste licence (W0191-02), Wexford County Council commits to making the necessary financial provisions for the restoration and aftercare of the Holmestown Waste Management Facility.

The facility will remain 'operational' post waste cessation due to the requirement to operate the leachate and landfill gas management systems. There are several other management and monitoring systems that will remain operational but landfill gas and leachate are key in terms of cost and duration.

The assumed annual costs associated with the restoration and aftercare periods for the Holmestown Waste Management Facility, post closure, are shown in Table 3.4.

3.2.4 Implementation of the Closure, Restoration and Aftercare Plan

The Closure, Restoration and Aftercare Plan will be implemented by Wexford County Council and the management team in place at the facility.

The current management structure at the Holmestown Waste Management Facility is as follows:

- Eddie Breen – County Manager
- Eddie Taaffe– Director of Services
- Gerry Forde – Senior Engineer
- Fintan Ryan – Assistant Engineer & Facility Manager
- Billy Byrne – Facility Supervisor
- Fran Hobbs – Facility Technician

Table 3.4: Assumed Annual Costs of Restoration & Aftercare (post closure)

Overheads	Year 1- 5	Year 6-10	Year 11-15	Year 16-20	Year 21-25	Year 26-30
Salaries and Wages	€126,127	€142,631	€80,648	€91,201	€103,135	€116,631
Environmental Monitoring	€42,042	€47,544	€26,883	€30,400	€34,378	€38,877
Regulatory Compliance	€21,021	€23,772	€13,441	€15,200	€17,189	€19,439
Vector Control	€7,357	€8,320	€4,704	€5,320	€6,016	€6,803
Electricity & Fuel	€21,021	€23,772	€13,441	€15,200	€17,189	€19,439
Hire	€5,255	€0	€0	€0	€0	€0
Day-works and Maintenance	€26,276	€29,715	€16,802	€0	€0	€0
Insurance	€7,883	€8,914	€5,040	€5,700	€6,446	€7,289
Communications	€2,102	€2,377	€2,688	€3,040	€3,438	€3,888
Rates & Statutory Contributions	€23,649	€26,743	€15,120	€17,100	€19,338	€21,868
Health & Safety	€2,102	€1,350	€1,350	€1,542	€1,762	€2,013
Miscellaneous	€24,108	€28,344	€16,124	€18,234	€20,620	€23,318
Leachate disposal & treatment	€199,701	€225,833	€67,206	€76,061	€85,946	€97,193
Flare maintenance/replacement	€13,664	€15,452	€19,760	€19,760	€22,346	€25,270
Gas well maintenance/replacement	€5,255	€5,943	€7,600	€7,600	€8,595	€9,719
Remaining capping costs post closure	€106,307	€0	€0	€0	€0	€0
Average Yearly total	**€633,871**	**€591,737**	**€287,643**	**€325,299**	**€346,398**	**€391,747**

3.2.5 Conclusion – Known Liabilities

With regard to the known liabilities of Holmestown Waste Management Facility, Wexford County Council recognises its responsibility to prevent or mitigate environmental emissions from the site. The operational costs will continue to be funded in full from the Wexford County Council annual budget post closure.

Wexford County Council will make the necessary provisions to ensure that there is adequate funding for the management, restoration and aftercare of the Holmestown Waste Management Facility.

4 STEP 3: ENVIRONMENTAL LIABILITIES RISK ASSESSMENT (ELRA) - UNKNOWN LIABILITIES

As required under Condition 12.2 of W0191-02 and in accordance with the initial Risk Categorisation (Section 2.1) which identified Holmestown Waste Management Facility as a Category 3 site, the objectives of a detailed ELRA, as identified in the EPA guidance document, are:

- to identify and quantify environmental liabilities at the facility focusing on unplanned but possible and plausible events occurring during the operational (and aftercare) phase
- to calculate the value of financial provisions required to cover unknown liabilities,
- to identify suitable financial instruments to cover each of the financial provisions; and
- to provide a mechanism to encourage continuous environmental improvement through the management of potential environmental risks

This section addresses:

- risk classification
- risk identification
- risk assessment
- risk prevention/mitigation
- costs

4.1 Risk Classification and Identification

In order to identify and quantify the risk the following are required:

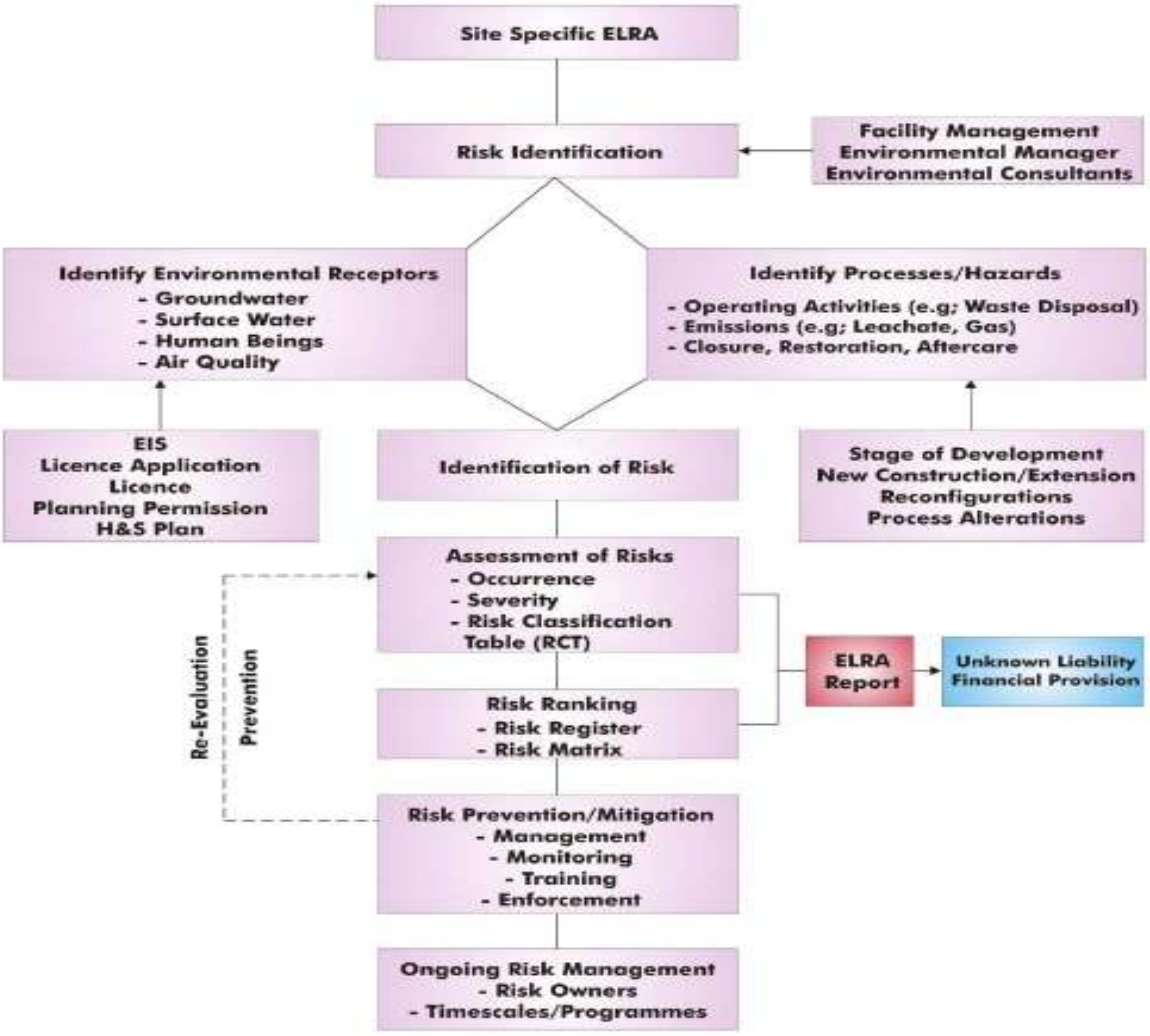
- the establishment of Risk Classification Table (Table 4.1); and the
- identification of risks (Table 4.2).

A flow chart summarising the process for Category 3 sites is shown in Figure 4.1 (extracted from the guidance document). The risk classification is based on an assessment of the probable occurrence of an event and following on from that, the likely severity if an event does occur. The combination of probable occurrence and likely severity determines the Risk Score and consequently the amount of financial provision required.

Probable Event Occurrence x likely Event Severity = Risk Score

A 'Risk Classification Table – Occurrence' and 'Risk Classification Table – Severity', as per the guidance document, are included in Tables 4.1 and 4.2. Estimated costs have been inserted into Table 4.2.

Figure 4.1: Environmental Liability Risk Assessment – Risk Category 3 Facilities (EPA, 2006)



A list of potential risks has been identified and is shown in Table 4.3 in Appendix 4.

Table 4-1: Risk Classification Table – Occurrence (EPA, 2006)

Rating	Occurrence		
	Category	Description	Likelihood of Occurrence (%)
1	Very Low	Very low chance (0-5%) of hazard occurring in 30yr period	0-5
2	Low	Low chance (5 - 10%) of hazard occurring in 30yr period	5-10
3	Medium	Medium chance (10 -20%) of hazard occurring in 30yr period	10-20
4	High	High chance (20 -50 %) of hazard occurring in 30yr period	20-50
5	Very High	Very high chance (>50%) of hazard occurring in 30yr period	>50

Table 4-2: Risk Classification Table – Severity (EPA, 2006)

Rating	Severity		
	Category	Description	Cost of Remediation €
1	Trivial	No damage or negligible change to the environment	500-1,000
2	Minor	Minor impact/ localised or nuisance	1,000-5,000
3	Moderate	Moderate damage to environment	5,000-50,000
4	Major	Severe damage to local environment	50,000-300,000
5	Massive	Massive damage to a large area, irreversible in medium term	300,000-1,500,000

**The facility specific cost estimates are based on expert opinion*

The identified risks were classified in accordance with Tables 4.1 and 4.2 and this is shown in Table A.1 in Appendix 4.

4.2 Assessment of Risks

The risks were scored in accordance with the severity rating and the occurrence rating as presented in Table 4.3 in Appendix 4.

4.3 Risk Matrix

Based on the risks identified in Table 4.3 of Appendix 4, a risk matrix has been developed to allow the risks to be easily displayed and prioritised. The risks are colour coded to provide a broad indication of the critical nature of each task, using the following colour code:

- Red – risks highlighted in red are considered to be high level risks requiring priority attention
- Amber – these risks are considered medium level risks and mitigation and/or management is required
- Green – (light and dark) these are identified as low level risks, however, they still require continuing awareness and monitoring on a regular basis.

Table 4-4 Risk Matrix

Occurrence						
V. High	5					
High	4		14			
Medium	3		1, 15			
Low	2		5	8, 9	2, 12	3, 7, 10
V. Low	1	6		11,16	4	13
		1	2	3	4	5
		Trivial	Minor	Moderate	Major	Massive
		Severity				

There are no risks identified in the red or amber zones that currently require attention and/or mitigation. All risks currently identified require ongoing monitoring and awareness on an ongoing basis. Regular risk reviews will examine the status of the identified risks on an ongoing basis.

4.4 Risk Prevention

Wexford County Council actively manages the landfill with mitigation measures in place. A summary of the relevant control and mitigation measures in terms of potential risks are included in Table 4.3 in Appendix 4.

4.5 Quantification of Unknown Environmental Liabilities

A financial model was prepared to quantify the unknown environmental liabilities and assess the median probability and the median severity of the identified risks to identify a 'most likely scenario cost'. The financial modelling is included in Table 4.3 in Appendix 4.

4.6 Reviews of Risk Assessment

In accordance with the EPA guidance document, it is proposed that the risk assessment is reviewed every two years to reflect any changes in environmental risks. In particular, the reviews will include:

- an update of the risk register through the addition of new risks or the omission of redundant ones
- verification of continued management systems in place, i.e. mitigation measures
- ensure that the financial provision continues to cover the environmental liabilities at the site
- verification that the financial instruments continue to effectively provide the financial provision

5 STEP 4: FINANCIAL PROVISION

Wexford County Council must provide financial provision for:

- known environmental liabilities that will arise at the time of facility closure
- known environmental liabilities that are associated with the aftercare and maintenance of the facility until such a time as the facility is considered to no longer pose a risk to the environment (when the EPA accepts the surrender of the waste licence)
- unknown environmental liabilities that may occur during the operating life of the facility

The EPA guidance document indicates that unknown environmental liabilities are costed only for the operational phase of a facility and that the likelihood of unknown environmental liabilities occurring during the aftercare phase and post surrender of the licence should be extremely low if all significant environmental liabilities are identified and addressed during closure, restoration and aftercare phases.

Wexford County Council will continue to operate critical environmental management systems during the closure period. The likelihood of liability is considered to be low due to the fact that the facility will continue to be actively managed in accordance with the conditions of the waste licence and in accordance with the various management plans and procedures in place on site e.g. EMS and Holmestown Waste Management Facility (HWMF) Procedures 001 – 013.

The amount of financial provision required for known liabilities have been costed in Section 3 of this report. It is intended to fund these liabilities from the annual WCC operational budget. This budget is prepared annually in accordance with the needs of the facility.

The financial provision for unknown liabilities that may occur during the operating life of the facility have been costed in Table 4-3 in Appendix 4.

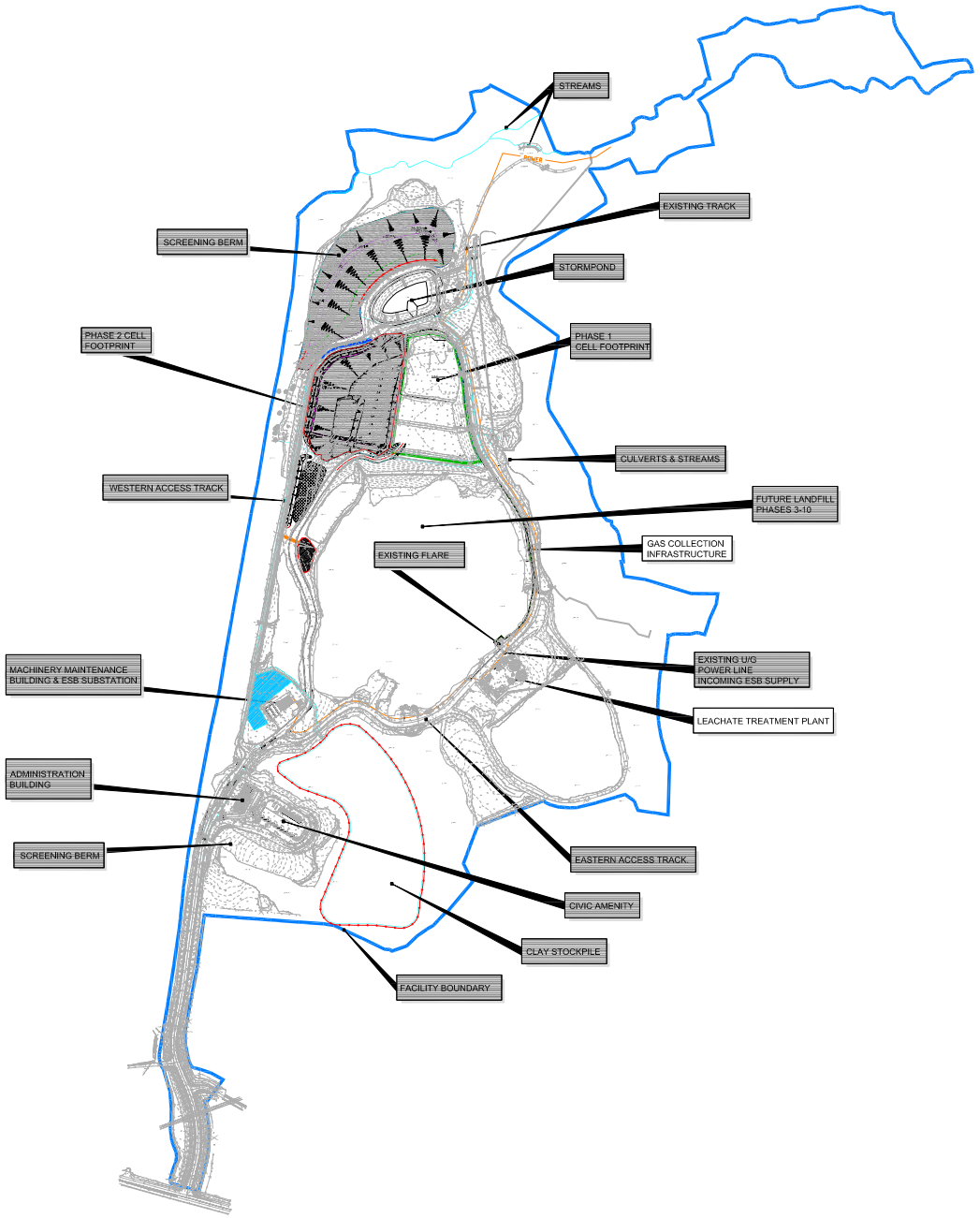
Table 5-1 summarises the financial provisions put in place by Wexford County Council to address the known and unknown liabilities associated with Holmestown Waste Management Facility.

Table 5-1 Financial Provision for Holmestown Waste Management Facility

Liability Type	Description	Method of Quantification	Amount of Provision	Financial Instrument
Known Liability – Closure	Non Clean Closure of the facility	Cost estimates included in Table 3.3 (Appendix 3) of this document	€24,500	Wexford County Council Financial Resources
Known Liability – Restoration and Aftercare Management	Restoration and aftercare management of the facility post closure	Cost estimates included in Table 3.4 of this document	Refer to Table 3.4	Wexford County Council Financial Resources
Unknown Liability (Operational Phase)	Risk of unplanned/unknown events occurring at the facility (during operations)	Environmental Liability Risk Assessment and likely cost scenario (Table 4.3 Appendix 4)	€267,006	Wexford County Council Financial Resources

Appendix 1

Drawings



SITE LAYOUT

Scale 1:7500

0m 37.50m 75.00m 112.50m 150.00m 187.50m 225.00m 262.50m 300.00m 337.50m 375.00m

Scale 1:7500

Rev.	Drawn	Ckkd	Apprd	Rev Origin	Description
A	TM	DM	BG	Cork 11-7-13	ISSUE FOR INFORMATION
Revision History	A	0		Date	

Name of Client

WEXFORD COUNTY COUNCIL

Name of Job

HOLMESTOWN WASTE MANAGEMENT FACILITY

ELRA

Title of Drawing

SITE LAYOUT

Scales Used	This Drawing was printed to
1:7500	A3

Dwg. No.	Rev.
LW11-080-05-001	A

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Appendix 2

Landscape Plan

5.60 Wexford CC will operate the site in accordance with the Waste Licence and the Environmental Management Programme (EMP). As part of the Policy the Council will undertake regular environmental audits of their waste management facility. The Holmestown site will be included in the audit programme. The audits check compliance with all Waste Licence conditions and adherence to the Council's Environmental Policy.

Restoration and aftercare

Restoration Proposals

5.61 Wexford County Council will restore the site following the progressive completion of the operational landfill facility. The following paragraphs outline the restoration proposals for the project. It is anticipated these proposals will develop over time through the involvement of interested bodies such as Wexford County Council, the Environmental Protection Agency and local nature conservation groups. These sections detail how the landfill site will be restored and outline the proposed after-use for the site.

Approach

5.62 The proposals for the restoration of the site aim to benefit the local community and increase the biodiversity of the site. The proposed scheme is illustrated by Figure 5.8. The main aim of the restoration proposals is to provide a new landscape which reflects the local landscape and will ultimately blend with the surrounding topography and landscape pattern. More specific objectives are:

- to integrate the proposed scheme with the adjacent agricultural land uses, whilst also linking the site with the retained woodland of Holmestown Forest;
- to develop the site as a recreational resource for the local community;
- to protect and enhance the existing nature conservation resource on the site; and
- to include mitigation measures which reduce the visual impact of the proposed waste management facility.

Proposed Final Landform

5.63 The restoration contours replicate the undulating landform of the surrounding area. The landform provides a single summit, with elevation of the high point relating to the topography of the surrounding area.

5.64 The final landform after landfill settlement, gradually slopes upwards from heights of 20m at the northern end of the site and ultimately reaches a height of 45m towards the south of the site. This topography of the restored landform will be comparable with surrounding land.

5.65 The landform will be restored with soils and soil making materials to the appropriate depths and quality required for the proposed after use.

Project Description *continued*

Landscape design

5.66 The restoration proposals for the site provide a mixed after-use of agricultural grassland within an agricultural landscape of small fields bounded by hedgerows. In addition to this woodland will be created on the lower slopes to integrate the restored site with the coniferous woodland of Holmestown Forest that will be retained around the perimeter of the site.

5.67 The proposals are described in detail in the following paragraphs, which should be read in conjunction with Figure 5.8.

- **Woodland areas**

5.68 The proposed woodland planting around the perimeter of the landfill site is designed to integrate the site with the retained area of Holmestown Forest. The shape of the areas for woodland planting reflect the proposed restoration contours. Woodland has not been proposed for these upper slopes in order to minimise the visual intrusion of the restored site. Introducing woodland planting on the more elevated slopes of the restored site could lead to the proposals breaking the horizon, therefore making the site look more conspicuous within the surrounding landscape.

5.69 Within the woodland and shrub areas the species to be planted will include:

Common Alder	Silver Birch
Beech	Ash
Goat Willow	Hazel
Common Hawthorn	Blackthorn

- **Pasture/meadow areas**

5.70 The dominant land use within the surrounding area is pasture, with irregular field shapes and sizes enclosed by hedgerows. Restoring the upper slopes of the landfill to pasture and meadows, in fields bounded by hedgerows will reflect the character of the surrounding landscape. These fields will be used for low intensity grazing by cattle and sheep to maintain the grassland.

5.71 These areas will be cultivated and seeded with a species rich wild flower seed mixture with amenity grasses. Wild flower seed from a local source will be used in the restoration wherever possible. To encourage species diversity, herbicides and fertilisers will not be applied to these areas. The lack of fertiliser, combined with regular cutting will gradually reduce the fertility of these areas and promote species diversity.

5.72 The fields will be enclosed by a network of hedgerows. The field pattern illustrated by Figure 5.8 reflects that seen in the surrounding landscape. Species to be included in the hedgerows are:

Common Hawthorn

Blackthorn

Spindle

5.73 These amenity/agricultural areas will be cut for hay once at the end of the flowering period and again in the autumn. This second cut will give a short grass cover prior to winter to encourage more rapid growth of wild flowers in the following spring. Some controlled stock grazing may be permitted on these areas after the early summer cut if the wild flower establishment is successful, but this will be strictly monitored to ensure no adverse effects on species diversity. The management regime will encourage species diversity and also provide feeding grounds for bird life lost through the removal of the woodland that will be removed on this part of the site. The grassland around the scrub areas will be allowed to grow taller, thus encouraging wild flower species that prefer taller grass cover.

- ***Facilities for passive recreation***

5.74 A series of footpaths and bridleways are proposed for the site to provide the local community with opportunities for passive recreation. These are routed through the areas of Holmestown Forest that will be retained and across the restored landfill site. The proposed footpaths take a variety of circuitous routes through different types of vegetation. A vista point at the highest point on the proposed landform will provide a opportunities for viewing the surrounding landscape. A lower level footpath circles the entire site taking in much of the retained forest.

Retained area of Holmestown Forest

5.75 A substantial area of Holmestown Forest that surrounds the waste management facilities will be retained through the life of the development and after its completion. During operational years this woodland will serve as a mitigation feature, restricting views of operations on the site. During the restoration phase the woodland will assist in integrating the proposed final landform with the surrounding landscape. In addition to this the retained woodland will assist in increasing the biodiversity of the site.

Integration of landscape and restoration environmental protection systems

Leachate control

5.76 The leachate holding tanks will remain on site after restoration. However they will be screened by earth mounds and vegetation until such time as they are no longer required. At that point the redundant plant will be removed from site and the area incorporated into the overall landscape design. Should on site treatment of the leachate be required at a later stage, the landscape proposals for the site will be altered to accommodate this.

Landfill gas control

5.77 The landfill gas control compound will be surrounded by fencing and screened by vegetation

5.78 The difficulties caused by landfill gas wellheads and other features are not significant in grassland agricultural areas where regular cultivation and harvesting equipment is not used. Farmers and land managers can easily work around well heads with grass maintenance equipment without serious damage or inconvenience.

5.79 Amenity and woodland after-uses are not inconvenienced by the presence of gas control systems, and location of wellheads is not a material disadvantage to aftercare or long term management. In woodland areas access to the wellheads will be easier if gaps can be left in the planting to allow vehicular access to and between wells. This is usually possible without compromising the design of tree and shrub planted areas.

5.80 It is important that the gas pipes are covered with an adequate depth of soil to ensure that essential restoration and aftercare operations can be undertaken without risk to either the gas pipes or agricultural equipment. The proposed soil depths allow for this and detail on restoration soil profiles is given in the soils section later in this chapter.

Phased Restoration Proposals

5.81 The site will be progressively restored in phases to return the site to beneficial uses at the earliest opportunity. The restoration phases will follow the phases of landfilling. The timing of final restoration works within each phase will be dependent upon the rate of settlement and the effect of settlement on the landfill gas control system. The restoration phasing is demonstrated on Figures 5.3 and 5.4.

Settlement

5.82 Due to landfill biodegradation processes the fill will settle over a period of years. The degree of settlement has been provided for using data and experience from other landfill sites taking similar types of waste, and the settlement contours have been designed using this information so that the final landform will be achieved in time. The initial rapid settlement of the waste can cause disruption to surface environmental protection infrastructure, principally landfill gas control systems, and repairs and modifications may be necessary during this period to develop a reliable and effective system.

5.83 Restoration of the site will therefore be completed after the gas control system has been installed in each phase and any further disturbance for repair works are expected to be infrequent and can be planned and controlled to cause minimal disturbance to the restored area. The restoration will involve spreading the full depth of subsoil, and topsoil on those areas that require it, and establishing the final vegetation and landscape features, such as amenity grassland, hedgerows and tree planted areas.

Soil handling and placement

5.84 The restoration soil profiles have been determined with regard to the needs of vegetation establishment and aftercare, and the presence of landfill gas pipes within the soil profile. Full use will be made of the on-site topsoils and subsoils, the

composted green waste and screened inert wastes that are brought to site throughout the operational period. The proposed soil profiles are as follows:

- *Agricultural grassland fields*: topsoil up to a depth of 250mm, subsoil depth 750mm giving a total soil depth of up to 1m. The topsoil depth will vary between 0mm and 250mm to promote biodiversity in certain areas whilst creating more productive grassland in others.
- *Woodland areas*: subsoil depth 1.5m, no topsoil used.

5.85 The proposed soil depth in the agricultural grassland fields is 1m and therefore landfill gas pipes will be below the depth of normal subsoil ripping and any field drainage works. Similarly the soil depth in tree planted areas will be 1.5m and landfill gas pipes will therefore be buried to a depth of at least 1m.

5.86 Soil spreading will be carried out during dry weather and ground conditions. A loose tipping technique will be used as far as is practically possible, using dump trucks to bring the soil to the restoration area and spreading the soil with a long reach back acter. Running over the spread soil with heavy wheeled vehicles and plant will be avoided at all times. Where it is not possible to use the loose tipping technique, the soil will be subsoil ripped to relieve compaction before vegetation establishment. The depth of subsoil ripping will be carefully controlled to avoid damage to gas pipes. In areas that are to be topsoiled, the subsoil will be graded before topsoil is spread, to ensure an even depth of topsoil.

5.87 The soil will be stonepicked to ensure that no stones or other materials are present within the top 250mm of the soil profile that could impede cultivation or damage agricultural equipment.

Aftercare strategy

5.88 The site will be managed during the restoration aftercare period to develop a recreational and nature conservation resource. The nature conservation value and ecological development will be monitored throughout the phased restoration so that any modifications necessary to improve the success of habitat creation can be incorporated into later phases. The informal footpaths/bridleways will be maintained on a regular basis to keep them clear of excessive grass growth yet retain a soft, informal, rural character.

5.89 A management and aftercare scheme for the entire site (incorporating the retained area of Holmestown Forest) will be developed in consultation with Wexford County Council (Planning Department), Coillte, local nature conservation groups and the local community to ensure a successful early establishment of the different vegetation types and habitat areas.

5.90 The detailed aftercare scheme will be submitted to the planning authority when requested, but no later than 6 months before the commencement of restoration works on the first completed phase of the site.

5.91 The environmental systems required to control landfill gas and leachate will be required for a considerable period of time following the ending of waste disposal. The Waste Licence will require that these systems are maintained and operated for as long as is necessary. WCC are committed to providing this long term "technical aftercare" in addition to the aftercare required for landscape and planning purposes.

Discussion, Landscape

5.92 A new landform will be created which blends with the surrounding topography, and provides a suitable setting for a range of after-uses. The site will provide the local community with opportunities for passive recreational use and enjoyment of the countryside. The planting that is proposed for the site will integrate the restored landform with the retained coniferous woodland. In addition to this the pasture on upper slopes will reflect to landscape pattern of the wider area, whilst seeking to minimise the visual intrusion of the new landform. The development of the landfill facility in this location will provide opportunities for increasing biodiversity and nature conservation value of the site as a whole.

Environmental and Operational Controls

Dust

5.93 The construction of screen bunds, delivery of drainage materials and site restoration materials will each involve the handling and movement of soils and overburden. The duration of each of these activities will be relatively short-term (typically a few months) compared with the proposed life of the landfill site. Dust is most likely where it has gathered on internal haul routes and is disturbed by the movement of heavy vehicles. During periods of extended dry weather, a water bowser will be available for the routine damping of haul routes to suppress the release of dust. It is expected that on

G. RESTORATION AND AFTERCARE

G.1 Restoration Scheme

A) proposed end-use of the site;

The proposed end use of the site will be for agricultural or recreational use.

b) final contours of the site showing how the landform will blend into existing landscape features and the highest level that waste will be filled to;

Figure 5.8 (Rev A) Landfill Restoration proposal in Chapter 5 of the Supplementary Information Addendum EIS, shows the entire site once it is restored, including post settlement contours.

c) maximum height of deposited waste (surcharge) to accommodate settlement to final levels;

d) final levels after settlement;

Figure 5.8 (Rev A) Landfill Restoration proposal shows the entire site once it is restored, including post settlement contours. The highest final level will be 45m AOD, the minimum level will be 11m.

e) phasing of the restoration, including initial landscaping, temporary capping, interim restoration and final restoration;

The restoration of the site will take place gradually, once each phase is filled it will be capped and restored. Details of the operational phasing is provide in **Chapter 5** –Project Description of the EIS Addendum, **paragraphs 5.20-5.22**. Restoration and aftercare details are also provided in **paragraphs 5.61-5.75.**

f) total quantities of soil required for restoration, indicating soil types and the use, if any, of soil substitutes;

g) soil survey details, including soil profile, types, distribution, and quantities with respect to soil available on site;

h) details of all soil handling operations including soil stripping, storage and respreading;

Details of soil handling and placement are provided in **Chapter 5**, EIS 2001 in **paragraphs 5.84-5.87**.

i) drainage and under drainage of restored surfaces, including the location and specification of drains;

j) details of fencing, hedging and security;

These are detailed in **Attachment D.1- Site Infrastructure** and also in **Chapter 5- Project Description** of the EIS Addendum, under the heading, Site Security and Fencing.

k) details of all vegetation establishment operations, (e.g. cultivations, timing of planting, choice of species, weed control, plant protection etc.). Include landscaping details;

Details of the proposed restoration planting scheme are provide in **Chapter 5- Project Description**, EIS 2001, **paragraphs 5.66 -5.75**.

l) location and specification of any access roads (including for installation and maintenance of the restored areas, gas and leachate management infrastructure, land after-use), tracks, rights of way to be retained or constructed;

The access road to each phase during operation and restoration are shown on **Figure 5.5 (Rev A) landfill Phase Development**. **Figure 5.7a (Rev A) Site Facilities** shows the access road and road to the landfill which will retained when the site is closed to waste disposal to landfill.

Details of the gas and leachate infrastructure are provided in **Chapter 5 Project Description**, EIS 2001, **paragraphs 5.76 and 5.77**.

m) details of pollution control systems, (e.g. gas control, monitoring points etc.); and

n) details of locations of all infrastructure.

Refer to **Figure 5.8 (Rev A) Landfill Restoration proposal** and **Figure 5.12 Proposed Environmental Monitoring Locations.** The proposed monitoring locations are provided for the operational period of the landfill and waste recovery and recycling operations. It is likely that many of these points will still be used for monitoring when the landfill is closed. However, this is something that would be defined in a waste licence review application.

G.2 Aftercare Management Plan

Maintenance and management of site engineering works

WCC will undertake the maintenance and management of the site engineering works, primarily the restored road, landfill gas and leachate management systems throughout the aftercare period.

Leachate and groundwater will be monitored and the leachate treatment plant system will be retained, maintained and inspected. Landfill gas wells will continue to be monitored. Landfill gas extraction and any utilisation equipment will be continually monitored and maintained.

Maintenance of restored areas of site

The site will be managed during the restoration aftercare period to bring it into active agricultural use and develop a nature conservation resource. The management of the site will include the following areas:

- Agriculture pasture
- Hedgerows; and
- Woodland areas.

The management of these is outlined in paragraphs 5.68 – 5.74.

Appendix 3

Table 3-3 Closure Tasks & Costs

TABLE 3-3; DECOMMISSIONING AND CLOSURE TASKS & COSTS

Element of Facility	Plant Removal	Decontamination	Waste Disposal/Recovery	Decommissioning Supervision	Demolition	Environmental Monitoring	Verification audit/certification	Report to EPA
Vehicles								
Landfill Compactor (3rd Party)	Yes (3rd party)	No	n/a	n/a	n/a	n/a	n/a	n/a
Excavators (WCC own)	Yes (at no cost)	No	n/a	n/a	n/a	n/a	n/a	n/a
Site Dumper (3rd Party)	Yes (3rd party)	No	n/a	n/a	n/a	n/a	n/a	n/a
Loading Shovel (WCC own)	Yes (at no cost)	No	n/a	n/a	n/a	n/a	n/a	n/a
Other site infrastructure								
Wheel wash & shakeout unit	€2,000	€1,000	n/a	Facility personnel	incl. in plant removal	n/a	n/a	n/a
Weighbridge	€5,000	No	n/a	Facility personnel	incl. in plant removal	n/a	n/a	n/a
Site fencing and gates	No	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Monitoring infrastructure (groundwater wells, landfill gas wells and leachate wells)	No	n/a	n/a	Facility personnel	no	Yes (annual monitoring budget)	Facility personnel	Yes (annual reporting budget)
Roadways, carpark and administration building	No	n/a	n/a	n/a	No	n/a	n/a	n/a
Civic amenity facility (assumes civic amenity continues indefinitely)	No	No	No	No	No	Yes (annual monitoring budget)	n/a	n/a
Landfill Gas Infrastructure								
Enclosed flare	€5,000	No	n/a	Facility personnel	incl. in plant removal	Yes (annual monitoring budget)	Facility personnel	Yes (annual reporting budget)
Landfill gas extraction pipework (above cap)	€6,000	No	n/a	Facility personnel	incl. in plant removal	No	Facility personnel	Yes (annual reporting budget)
Gas engines & associated utilisation infrastructure (future)	3rd Party (assumed)	No	n/a	Facility personnel	No	Yes (annual monitoring budget)	Facility personnel & 3rd party	Yes (annual reporting budget)
Gas utilisation grid connection (future)	3rd Party (assumed)	No	n/a	Facility personnel	No	Yes (annual monitoring budget)	Facility personnel & 3rd party	Yes (annual reporting budget)
Leachate treatment & plant								
2 no. Sequencing Batch Reactors (SBRs)	3rd Party	€5,000	incl. in decontamination cost	3rd Party	No	No	Facility personnel & 3rd party	Yes (annual reporting budget)
Treated leachate balance tank								
Leachate feed pumps		No	No					
Raw leachate feed pump								

Venturi aerators								
Decant pump								
Final discharge pump								
Alkali dosing facilities								
Nutrient dosing facilities								
Surface Water Management and Groundwater Management								
Surface water collection pond	No	n/a	n/a	n/a	No	Yes (annual monitoring budget)	n/a	n/a
Petrol Interceptor	No	500	incl. in decontamination cost	Facility personnel	No	n/a	Facility personnel	Yes (annual reporting budget)
Surface water collection pumps	No	n/a	n/a	Facility personnel	n/a	n/a	Facility personnel	Yes (annual reporting budget)
Facility Buildings								
Administration building	n/a	n/a	n/a	n/a	No	No	n/a	n/a
Leachate plant building	Already addressed	n/a	n/a	3rd Party	No	No	3rd Party	Yes (annual reporting budget)
Maintenance building	Yes (at no cost)	n/a	n/a	Facility personnel	No	No	Facility personnel	Yes (annual reporting budget)
Weighbridge building	Already addressed	n/a	n/a	Facility personnel	No	No	Facility personnel	Yes (annual reporting budget)
Civic Amenity	No (assumed indefinite operation)	n/a	n/a	n/a	No	No	n/a	n/a
Total	**€18,000**	**€6,500**						

Appendix 4

Table 4-3 Risk Register (Unknown Liabilities)

TABLE 4.3 - RISK REGISTER - OPERATIONAL PHASE ONLY

Risk ID	Potential Hazard	Potential Impact on Environment (inc Human health)	Ref Table 4-1	Ref Table 4-2	Ref Table 4-4	Ref Table 4-1	Ref Table 4-2	Median Probability	Median Severity	Most Likely Cost Scenario	Control & Mitigation Measures
			Occurrence	Severity Rating	Risk Score	Likelihood of Occurrence (%)	Cost Range (€)				
1	Uncontrolled escape of gas from landfill body	Odour generation; Exceedence in emission limits; Nuisance to sensitive receptors;	3	2	6	10-20	1,000-5,000	15	3,000	450	• Active gas extraction through horizontal and vertical systems to gas flaring • Back up system utilising activated carbon • Minimise air ingress through daily, cover, temporary capping • Active gas management through field balancing • Use of woodchip and sand as daily cover • Regular odour assessment
2	Uncontrolled discharge of leachate from landfill body or leachate collection system	Contamination of soil and/or ground and surface water	2	4	8	5-10	50,000-300,000	7.5	175,000	13,125	• SCADA system monitors leachate level in lined cells • CQA validation of liner construction • HWMF006 Leachate Handling Procedure • HWMF004 Environmental Records Procedure • HWMF013 Accident & Reporting Procedure
3	Damage to liner due to poor installation or through operations	Contamination of soil and/or ground and surface water	2	5	10	5 - 10	300,000 - 1,500,000	7.5	900,000	67,500	• CQA validation of liner construction • HWMF001 Rev 2 Waste Acceptance Procedure • HWMF002 Waste Handling Procedure • HWMF004 Environmental Records Procedure • HWMF013 Accident & Reporting Procedure
4	Breach/overflow of leachate from leachate treatment plant	Contamination of soil, groundwater and/or surfacewater	1	4	4	0-5	50,000-300,000	2.5	175,000	4,375	• SCADA system monitors leachate level in leachate tanks • HWMF006 Leachate Handling Procedure • Integrity testing of tanks as per Condition 3.10.5

5	Leak from fuel storage areas	Contamination of soil, groundwater and/or surfacewater system	2	2	4	5 -10	1,000-5,000	7.5	3,000	225	• Fully bunded building • Integrity testing • HWMF007 Emergency Response Procedure • HWMF013 Accident & Reporting Procedure
6	Oil (or similar) spillage in Maintenance Building area	Contamination of surfacewater collection system.	1	1	1	0-5	500-1,000	2.5	750	19	• Spill kits kept in maintenance building
7	Fire in the landfill cell	Air pollution; Contaminated surface water runoff; Potential damage to liner, cap and leachate and gas collection infrastructure ; Unstable areas of landfill surface ; Potential long term landfill fire (difficulties in quenching).	2	5	10	5-10	300,000 - 1,500,000	7.5	900,000	67,500	• No smoking policy enforced onsite • Welding of pipes etc carried out using intrinsically safe equipment • Fire fighting equipment kept in cell • HWMF012 Fire Evacuation - Emergency Procedure • HWMF008 Firewater Risk Retention Procedure • HWMF007 Emergency Response Procedure
8	Fire at the administration building	Air Pollution; contaminated surface water runoff during fire fighting	2	3	6	5-10	5,000 50,000	7.5	27,500	2,063	• Automatic fire alarms • No smoking policy strictly enforced • Facility Security • HWMF012 - Fire Evacuation - Emergency Procedure • HWMF008 Firewater Risk Retention Assessment
9	Fire at the fuel storage area	Air Pollution; contaminated surface water runoff during fire fighting	2	3	6	5-10	5,000 - 50,000	7.5	27,500	2,063	• Automatic fire alarms • No smoking policy strictly enforced • Facility Security • HWMF012 - Fire Evacuation - Emergency Procedure • HWMF008 Firewater Risk Retention Assessment
10	Fire associated with gas collection and/or treatment infrastructure causing explosion	Air Pollution and potentially contaminated surface water runoff during fire fighting;	2	5	10	5-10	300,000 - 1,500,000	7.5	900,000	67,500	• Fire fighting equipment in cells • No smoking policy strictly enforced

		Human H&S risk: Landfill gas migration risk (ref Risk ID 1)									• Facility Security • HWMF012 - Fire Evacuation - Emergency Procedure • HWMF008 Firewater Risk Retention Assessment • HWMF007 Emergency Response Procedures
11	Gas leakage from gas collection/flaring/ utilisation plant	Air pollution; Risk of fire; explosive risk, human health risk	1	3	3	0-5	50,000 - 300,000	2.5	175,000	4,375	• SCADA control • Regular Odour Assessments
12	Slope collapse leading to potential damage to landfill infrastructure	Air pollution; Contamination of soil, groundwater and surface water, Risk of fire, explosive risk, human health risk	2	4	8	5-10	50,000-300,000	7.5	175,000	13,125	• Slope stability testing to be carried out when permanent slopes are in place • HWMF002 Waste Handling Procedure
13	Site works: welding, excavations, machinery, lagoons	Electrocution; asphyxiation; burial; struck by vehicles; drowning	1	5	5	0-5	300,000 - 1,500,000	2.5	900,000	22,500	• HWMF001 Waste Acceptance Procedure rev 2 • HWMF002 Waste Handling Procedure • HWMF007 Emergency Response Procedure • HWMF012 Fire Evacuation - Emergency Procedure • Health & Safety Statement
14	Uncontrolled release of dust during operations and restoration	Nuisance in the localised area	4	2	8	20 - 50	1,000 - 5,000	35	3,000	1,050	• Dust mitigation measures carried out during dry weather periods • Monitoring as per licence requirements
15	Improper collection and storage of materials at the civic amenity site	Potential litter generation and run off, impacting on the surface water collection system.	3	2	6	10 -20	1,000 - 5,000	15	3,000	450	• HWMF010 Civic Amenity procedures
16	Potential environmental risk from naturally elevated ammonia levels in groundwater	Contamination of ground and/or surface waters	1	3	3	0 - 5	5,000 - 50,000	2.5	27,500	688	• Regular environmental monitoring as per licence requirements
									Total	**267,006**	