Wexford County Council

Holmestown Waste Management Facility
W0191-02

Annual Environmental Report 2015

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 2015 to 31 December 2015 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in Schedule H of the Waste Licence, Content of the Annual Environmental Report, in accordance with Waste Licensing - *Draft Guidance on Environmental Management Systems (EMS) and Reporting to the Agency, 1999'.* The main topics discussed within this report are as follows: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 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 2015 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 155 m^3/hr to 70 m^3/hr during the reporting period. Gas extraction rates were optimised in 2015 to minimise odours. The gas quality remained varied during the reporting period with concentrations from 20.8% CH_4 up to 25.8% CH_4.

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 2015 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 were a number of recurring category 3 incidents in 2015. 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.

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

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APPENDICES

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 2015 to 31 December 2015 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 2015

The Holmestown waste management facility was operated by Wexford County Council during 2015 with consultancy support provided by sub consultants including Bluerock Environmental and service contractors including Response Engineering Ltd and Irish Biotech Services. 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 €13,095.60 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).

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 September 2015, the EPA responded to seek submission of an updated ELRA and CRAMP to take account of their newly published guidelines *''Guidance on Assessing and Costing Environmental Liabilities 2014''*. WCC submitted the revised ELRA in December 2014 and the revised CRAMP in January 2015. WCC submitted a further revision of the ELRA in March 2015 to correct some earlier minor discrepancies.

The ELRA approach is a standard risk assessment that involves the assessment of the likelihood of occurrence of an event in combination with the consequences of that event. This is followed by the costing of the plausible worst case scenario for the purposes of informing the level of financial provision (cover) necessary. The projected worst-case scenario for Holmestown is landfill fire. Costs associated with such an event are estimated at **€671,440 (excluding VAT).**

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 2015 to December 2015 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: Progress implementation of polluter-pays principle at the civic amenity
- Objective No 4: Enhance protections to groundwater

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 2015 is included in Appendix B.

Table 2 Achievement of Objectives and Targets for 2015

Achievement of Objectives and Targets for 2015			
	Comments	**Target**	**Progress**
Objective No 1: Operate facility in accordance with the conditions of the waste licence and promote continual environmental improvement			
1.1 To prevent recurrence of leachate-related incidents that occurred during 2014	• Ensure strict controls are in place if pumps are operated in manual mode • New off-site pumping arrangement increases our capacity to manage leachate volumes. We can use auxiliary tankering if necessary. • We will install larger capacity pumps in cell risers	Continuous	Successful and 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	Conduct monitoring, as a minimum in accordance with the waste licence Maintain trend analysis graphs for 2015, interrogate and interpet this data. Make improvements where the need is identified	December 2015	Ongoing. No required improvements identified.
Objective No 3: Progress implementation of polluter-pays principle at the civic amenity			
3.1 Start planning for introduction of payu-by-weight for	Need to devise new entry control, weighing	December 2015	Ongoing

Achievement of Objectives and Targets for 2015			
	Comments	**Target**	**Progress**
residual waste in 2016	system, payment system and data management system		
Objective No 4: Enhance Protections to Groundwater			
4.1 Complete Groundwater Technical Assessment and Implement any Recommendations Therein	GW TA was submitted in April 2015	December 2015	Report complete. Implementation of recommendations is outstanding.

Table 3 Objectives and Targets for 2016

Objectives and Targets for 2016			
	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 prevent recurrence of leachate-related incidents that occurred during 2014	• Ensure strict controls are in place if pumps are operated in manual mode • Assess feasibility of temporary capping using proprietary artificial lining materials	Continuous	Facility Manager
Objective No 2: Improve environmental performance of the facility by maintaining a comprehensive monitoring regime			

Objectives and Targets for 2016			
	Comments	**Target**	**Responsibility**
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 2016, interrogate and interpet this data. Make improvements where the need is identified	December 2016	Facility Technician & Manager
Objective No 3: Progress implementation of polluter-pays principle at the civic amenity			
3.1 Introduction of pay-by-weight for residual waste in 2016	Need to install new entry control, weighing system, payment system and data management system	July 2016	Facility Supervisor & Manager
Objective No 4: Enhance Protections to Groundwater			
4.1 Implement any Recommendations in GW technical Assessment report	To be agreed with the Agency	December 2016	Facility Manager & technician
Objective No 5: Enhance Protections to Air			
5.1 Complete downsizing works to the landfill gas flare	This proposal has previously been approved via SEW to the EPA	June 2016	Facility Manager
Objective No 6: Accelerate waste decomposition and reduce long-term environmental liability			
6.1 Commence leachate recirculation	Subject to SEW approval	July 2016	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 2015 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. An environmental monitoring committee convenes 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 2015.

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 2015*

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 2015 is as follows:

Table 5 Summary of Engineering Works 2015

Start Date	Development Works
October	○ Maintenance works to site roads

4.1.2 *Proposed Engineering Works 2016*

A description of engineering works proposed at Holmestown Waste Management Facility for 2016 is as follows:

Table 6 Summary of Proposed Engineering Works 2016

Start Date	Development Works
June	○ Downsize landfill gas flare
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 2015.

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 2015.

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 cells 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 2015 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 2015

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 2015 was 1764Tonnes.

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 22,456 tonnes.

5.6 Remaining capacity of the site

The most recent void calculation indicates a remaining landfill capacity of approximately 1.1million tonnes remaining for waste, net of allowances for cover.

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 155M^3/hr to 70M^3/hr during the reporting period. Gas extraction rates have been maximised to minimise odours. The gas quality varied during the reporting period from 20.8% CH_4 up to 25.8% CH_4. The total volume of CH_4 flared on site during 2015 was 236,223 m^3 recorded by SCADA system. The cumulative volume from commencement of flaring to the end of 2015 was 3,192,596 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.

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.

In January 2015, off-site pumping of treated leachate to sewer commenced. Due to the severe rainfall during December 2015, auxiliary leachate management capacity was effected by tankering of untreated leachate off-site to Wexford WWTP.

Monthly volumes of leachate discharged off site are presented in Table 7 below. In August 2015, importation of raw leachate from Killurin Landfill (W0016-02) for treatment commenced. The table below takes account of these volumes also.

Table 7 Leachate volumes removed from site in 2015

	A	B	C	B+C	B+C-A
Month	**Tankered off site HWMF (m^3)**	**Imported from Killurin (m^3)**	**Pumped off site HWMF (m^3)**	**Total Off Site Volume (m^3)**	**Volume Generated at HWMF(m^3)**
January	1474	0	384	1858	1858
February	0	0	1185	1185	1185
March	0	0	1680	1680	1680
April	0	0	355	355	355
May	0	0	1834	1834	1834
June	0	0	1034	1034	1034
July	0	0	1608	1608	1608
August	0	314	1371	1371	1057
September	0	300	1219	1219	919
October	0	345	913	913	568
November	0	815	2676	2676	1861
December	1496	682	2785	4281	3599
Total	**2,970**	**2,456**	**17,044**	**20,014**	**17,558**

Integrity testing of leachate storage tanks in the leachate treatment plant is next due in 2017.

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 pumped off site to Wexford Town Wastewater Treatment Plant for final treatment and disposal. 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 2015 to 31st December 2015 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 2015 to the 31st December 2015 was approximately 1063 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 2015. The entire Phase 1 area is covered with a temporary cap. An 89% infiltration rate was used in the 2015 AER (as per 2014 infiltration rate) for temporary restored areas. Given that no fresh waste was emplaced during 2015, 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 2015 to the 31st December 2015 is 18,478m^3 (a calculation summary is included in Appendix F). During the same period 17,558 m^3 of HWMF-generated leachate (adjusted to 17,438m^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.

It should be noted that on the morning of 1st January 2016, there was an estimated 1,000m^3 of leachate in the system (between the landfill cells, raw water tanks, SBRs and final effluent tank). If this volume is added to the volume of leachate removed from site during 2015, it corresponds closely with that volume of leachate generated during 2015.

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 2015.

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 2015

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 241,188 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 500 litres from 1st January to 31st December 2015.

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 2015 – December 2015), 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 2015 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 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 2015 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 August 2015 by Fitz scientific Ltd. The report concluded that NOx, in the landfill flare exhaust stack was within the emission limit values specified in Schedule C6 of Waste Licence W0191-02, however a TOC level exceedence (14.35mg/m3) was recorded. 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 pre treated leachate (in accordance with section 5.12.4 of the Licence) was pumped 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 2015.

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 2015 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 pumped off-site for final treatment at Wexford Waste Water Treatment Plant.

Surface water pond emission results

Surface water results for the watercourses in and around the site were generally satisfactory. Elevated ammonia levels were recorded in Quarter 1&3 at the inlet to the surface water pond, field notes record that the samples were taken from stagnant water. Similar results have been recorded at this location in the past; the elevated readings do not appear to be linked to HWMF activities.

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 2015	
Points	**Description**
(GS6 to GS10 baseline pre land filling monitoring)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% (Oct.2015). 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.
Gas has not been detected in any of the site buildings.

A report to review the peripheral gas borehole results was 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. During 2015, it became apparent that due to decreasing yields of landfill gas from the waste mass, our current 500m3hr flare cannot continue to operate satisfactorily as it is oversized. An SEW was submitted to the EPA to seek approval to downsize our current flare, and approval was granted.

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. In cell leachate level is controlled and monitored by a combination of pumps, pressure probes and the SCADA system.

Leachate results

No significant visual, odour or temperature change was noted in 2015. 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 Nov 2015 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 2015 as per licence requirements. The visual inspection and surface water quality results for 2015 did not indicate pollution from facility activities.

Elevated ammonia levels were recorded in Quarter 1&3 at the inlet to the surface water pond, field notes record that the samples were taken from stagnant water. Similar results have been recorded at this location in the past. 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 in Nov 2015 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 in June 2015. 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 unpolluted and rated as Q4 at KS01, the overall quality of the un-named stream downstream of the facility was determined to be unpolluted and rated as Q4 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 unpolluted and rated as Q4-5 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).Elevated ammonia readings were recorded at SWP1 similar to past readings.The elevated levels are kept under review and the suspected source is from neighbouring agricultural lands and stagnant water at monitoring point location. Surface water results for the watercourses in and around the site were satisfactory.

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, PW2A, PW2B, 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

Elevated levels were recorded 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 2015, 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.

Monitoring results were not available for BH7, BH8 or BH9 during 2015 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 in Nov 2015 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 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]
$L(A)_{90}$ [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 2015. 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. Historical trend graphs of noise results are included in Appendix C.

9.4.9 *Dust*

Fitz Scientific carried out dust monitoring at ten representative locations using Bergerhoff dust gauges on three separate occasions during 2015. 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 not exceeded during 2015

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 July to August 2015. 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/m^3 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 2015 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).

No odour persistence or intensity was recorded above 0 at anytime during 2015. No odour complaints were received during 2015. 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. Bimonthly 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 2015. 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*

The latest topographical survey of the landfill cells was carried out in March 2014 and is included in Appendix G.

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 2014 survey will serve as a useful benchmark for future monitoring of landfill settlement.

APPENDICES

A.PRTR 2015

Guidance to completing the PRTR workbook

PRTR Returns Workbook

Version 1.1.19

REFERENCE YEAR	2015

1. FACILITY IDENTIFICATION

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

Classes of Activity

No.	**class_name**
-	Refer to PRTR class activities below

Address 1	Barntown
Address 2	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	087 6846089
AER Returns Contact Mobile Phone Number	087 6846089
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	3
User Feedback/Comments	Holmestown landfill was temporarily closed throughout 2015; a recycling centre attached to the facility was operational throughout 2015. The volume of landfill gas generated and extracted reduced from 2014 levels due to reducing landfill gas quality.
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		Flare 1			
No. Annex II	Name	M/C/E	Method Code	Designation or Description		T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
08	Nitrogen oxides (NOx/NO2)	M	EN 14792:2005		64.1	64.1	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	EN 14791:2005		12.7	12.7	0.0	0.0
01	Methane (CH4)	C	ALT		161330.0	161330.0	0.0	0.0
					0.0	0.0	0.0	0.0

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

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					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		Flare 1			
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	OTH		13.1	13.1	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**		**Facility Total Capacity m3 per hour**	
			Method Code	**Designation or Description**		
Total estimated methane generation (as per site model)	0.0				N/A	
Methane flared	0.0				0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0				N/A	

4.2 RELEASES TO WATERS

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

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

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

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

SECTION B : REMAINING PRTR POLLUTANTS

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

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

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

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

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

4.3 RELEASES TO WASTEWATER OR SEWER

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 KG			
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
01	Methane (CH4)	M	OTH		0.275465	0.275465	0.0	0.0
06	Ammonia (NH3)	M	OTH		39.7	39.7	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 KG			
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
303	BOD	M	OTH		336.6	336.6	0.0	0.0
306	COD	M	OTH		3789.5	3789.5	0.0	0.0
327	**Nitrate (as N)**	M	OTH		1677.9	1677.9	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					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
					0.0	0.0	0.0

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

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

RELEASES TO LAND					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
					0.0	0.0	0.0

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

Please enter all quantities on this sheet in Tonnes

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	0.508	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,Clonman,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)108	Ramstown Business Park,Gorey,Co.Wexford,.',Ireland	.',.',.',.',.',.',Ireland	.',.',.',.',Ireland
Within the Country	15 01 02	No	7.48	plastic packaging	R3	M	Weighed	Offsite in Ireland	Greenstar,WCP/KK/054(A)108	Ramstown Business Park,Gorey,Co.Wexford,.',Ireland		
Within the Country	15 01 04	No	2.36	metallic packaging	R4	M	Weighed	Offsite in Ireland	Rhab Glassco Ltd.,WP247/2006	Unit 4 Osberstown Industrial Park,Caragh Road,Nass,Co.Kildare,Ireland		
Within the Country	15 01 05	No	14.96	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)108	Ramstown Business Park,Gorey,Co.Wexford,.',Ireland		
Within the Country	15 01 07	No	61.84	glass packaging	R3	M	Weighed	Offsite in Ireland	Rhab Glassco Ltd.,WP247/2006	Unit 4 Osberstown Industrial Park,Caragh Road,Nass,Co.Kildare,Ireland		
Within the Country	16 01 07	Yes	0.24	oil filters	R9	M	Weighed	Offsite in Ireland	Enva Environmental,084/1	Clonman,Portlaoise,Co.Laois e,.',Ireland	Enva Environmental,084/1,Clonman,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,Clonman,Poartlaoise,Co. Laoise,.',Ireland	Clonman,Poartlaoise,Co. Laoise,.',Ireland
Within the Country	16 06 01	Yes	3.897	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	0.92	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,Drogheda,Co.Louth,Ireland		
Within the Country	19 07 03	No	18518.0	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	93.56	paper and cardboard	R3	M	Weighed	Offsite in Ireland	Greenstar,WCP/KK/054(A)108	Ramstown Business Park,Gorey,Co.Wexford,.',Ireland		
Within the Country	20 01 01	No	37.09	paper and cardboard	R3	M	Weighed	Offsite in Ireland	Recycling 2000,WP/06/06	Drinagh Business Park,Rosslare Road,Wexford,Co.Wexford,Ireland		
Within the Country	20 01 01	No	53.682	paper and cardboard	R3	M	Weighed	Offsite in Ireland	Greenstar,WCP/KK/054(A)108	Ramstown Business Park,Gorey,Co.Wexford,.',Ireland		
Within the Country	20 01 11	No	12.81	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	1.46	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	0.98	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	130.16	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	130.16	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	895.231	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 2015
HWMF W0191-2
Outdoor Staff

DESCRIPTION	Browne Barry	Browne Joseph	Byrne Billy	Byrne Noel	Byrne Peter	Courtney Billy	Dempsey Michael	Fenlon Myles	Hudson John	Kelly Eamonn	O Gorman Pat	Ryan Eric	Walsh Nigel	Comments
ADR Training						25/07/2014								Refresher recommended every 5 years
						25/07/2019								
Abrasive Wheels	25/07/2014		22/10/2014						25/07/2014					**Refresher required every 3 years.**
	25/07/2017		**22/10/2017**	**2016**			**2016**		**25/07/2017**					
Asbestos Awareness	13/10/2012		13/03/2012	14/03/2012	14/03/2012				14/03/2012					
							2016			**2016**				
ATEX: Safety Awareness	25/04/2014	25/04/2014	25/04/2014	25/04/2014	25/04/2014				25/04/2014	25/04/2014				**Refresher required every 2 years.**
	25/04/2016	**25/04/2016**	**25/04/2016**	**25/04/2016**	**25/04/2016**				**25/04/2016**	**25/04/2016**				
Basic Road Strengthening													22/03/2007	
Basic Surface Dressing													19/02/2007	
Bin Lift		06/05/2010		04/05/2010					29/04/2010					Refresher recommended every 2 years Refuse trucks no longer operated by WCC
		06/05/2012		04/05/2012					29/04/2012					
Business (Honours))	01/09/2012													
Business (Bachelor of))	01/09/2011													
Business (Higher Cert)	01/09/2009													
Certificate in Local Government Studies			01/06/2015	01/06/2015				01/11/2008						
Childcare Safeguarding Awareness	02/12/2014		02/12/2014											
Chemical Safety (spraying)		12/09/2007		12/09/2007		Mar. & May '12		Mar. & May '12						
Chlorine Hazard Awareness						25/05/2009								Check Refresher
Compactors & Balers (safe use)								01/10/2008					01/10/2008	Refresher recommended every 3 years
								01/10/2011					**01/10/2011**	
Computers (Introductory Level)	01/09/2007													
Counter-Balance Fork Lift Training	Sep-13			23/10/2014		13/11/2014	19/5//2014	30/09/2014					16/07/2014	**Refresher required every 3 years.**
	Sep-16			**23/10/2017**		**13/11/2017**	**19/05/2017**	**30/09/2017**				25/05/2015	**16/07/2017**	
CSCS Tickets -360 Excavator											11/02/2011			**Refresher required every 5 years.**
											12/02/2016			
CSCS Tickets -Dumper (provisional)	09/10/2012			09/10/2012					09/10/2012	26/07/2010				**Valid for 2 years**
	23/10/2014			**23/10/2014**					**23/10/2014**	**26/07/2012**				
CSCS Tickets -HEALTH AND SAFETY AT ROADWORKS)	06/11/2012		06/11/2012	06/11/2012	06/11/2012				06/11/2012	06/11/2012			23/10/2007	**Refresher required every 5 years.**
	06/11/2017		**06/11/2017**	**06/11/2017**	**06/11/2017**				**06/11/2017**	**06/11/2017**				
CSCS SLG at Roadworks Info update									21/05/2014					Check Refresher
Customer Care inc Managing difficult and Aggressive Behavour	17/10/2013	20/04/2012	16/10/2012	13/11/2012	30/05/2012	17/05/2012		24/05/2012	17/10/2012	29/11/2012			20/04/2012	
							2016				**2016**	**2016**		
Disability Awareness Training					31/05/2007	23/05/2007								
Driver CPC (module 1)						19/02/2015								**Module to be completed every 5 years.**
Driver CPC (module 2)						09/09/2010								**Module to be completed every 5 years.**
Driver CPC (module 3)						28/03/2012								**Module to be completed every 5 years.**
						2017								
Driver CPC (module 4)						11/02/2013								**Module to be completed every 5 years.**
						2018								
Driver CPC (module 5)						11/02/2014						11/02/2014		**Module to be completed every 5 years.**
						2019								
E.C.D.L. Computer Course			19/03/2003					20/09/2007						
Energy Mapping			13/10/2010											
Fas Waste Management Certificate			07/06/2007											
Fas Waste Operatives Training Course										10/07/2007				
Fas: Safe Pass	14/10/2014	14/10/2014	14/10/2014	16/10/2012	04/02/2015	08/12/2014	24/108/2015	24/08/2015	19/02/2013	24/05/2012	27/07/2012		08/05/2013	**Refresher required every 4 years.**
	14/10/2018	**14/10/2018**	**14/10/2018**	**16/10/2016**	**05/02/2019**	**08/12/2018**	**25/08/2019**	**25/08/2019**	**19/02/2017**	**24/05/2016**	**27/072016**		**08/05/2017**	
Safe Pass Alliance-Quarry & Mining					30/08/2011									**Check Refresher**
Fire Extinguisher (certificate)	12/05/2014	12/05/2014	12/05/2014	12/05/2014	12/05/2014	10/05/2012	12/05/2014	13/12/2011	12/05/2014	12/05/2014			13/12/2011	Refresher recommended every 3 years
	12/05/2017	**12/05/2017**	**12/05/2017**	**12/05/2017**	**12/05/2017**	15/05/2015	**12/05/2017**	**12/12/2014**	**12/05/2017**	**12/05/2017**			**12/12/2014**	
Fire Warden			06/12/2012	06/12/2012	04/12/2012	04/12/2012		04/12/2012					06/12/2012	**Check Refresher**
											2016	**2016**		
First Aid Basic			04/04/2007	04/04/2007	04/04/2007									
First Aid: Cardiac First Responder	11/03/2011												23/03/2011	**Refresher required every 2 years.**
First Aid: Heartsaver AED			22/01/2010	22/01/2010				17/09/2010						**Refresher required every 2 years.**
			22/01/2012	**23/01/2012**				**16/09/2012**						
First Aid: Occupational	12/03/2013		12/03/2013	25/05/2011	12/11/2013	12/11/2013	28/01/2015	12/11/2013	20/03/2013	20/03/2013			29/01/2014	**Refresher required every 2 years.**
	12/03/2015		**12/03/2015**	**25/05/2013**	**12/11/2015**	**12/11/2015**	**28/01/2017**	**12/11/2015**	**20/03/2015**	**20/03/2015**			**29/01/2016**	
I Map Training			04/04/2013		04/04/2013									
Ladder Awareness	06/03/2013	07/03/2013	07/03/2013	13/03/2013	13/03/2013	06/03/2013	13/03/2013	24/02/2011	13/03/2013	07/03/2013		24/09/2015	22/02/2011	Refresher recommended every 3 years
	06/03/2016	06/03/2016	06/03/2016	013/03/2016	013/03/2016	06/03/2016	013/03/2016	24/02/2014	013/03/2016	06/03/2016	**2016**	**2016**	24/02/2014	
Landfill Gas Management			15/05/2012											
Landfill Compactor (maintenance & safe use)	04/04/2008									04/04/2008				Refresher recommended every 3 years,Landfill Temp Closed Training not recquired
	04/04/2011									04/04/2011				
Life Jacket (Care & Use)	11/11/2010	11/11/2010	11/11/2010	11/11/2010	11/11/2010				11/11/2010	11/11/2010				
LITTER Warden Training														
			2016		**2016**									
LITTER MANAGEMENT & ENFORCEMENT		30/01/2014												
Loading Shovel (maintenance & safe use)	08/09/2014	08/09/2014	08/09/2014	08/09/2014	08/09/2014				08/09/2014	08/09/2014				Refresher recommended every 3 years
	08/09/2017	08/09/2017	08/09/2017	08/09/2017	08/09/2017		**2016**		08/09/2017	08/09/2017	**2016**	**2016**		
Managing H&S in the Workplace					21/05/2018									
Manual Handling	11/09/2014	16/07/2014	30/07/2014	23/07/2014	30/07/2014	1811/2013	28/07/2014	31/07/2014	11/09/2014	11/09/2014	25/11/2015	14/03/2014	31/07/2014	Refresher recommended every 3 years
	11/09/2017	16/07/2017	30/07/2017	23/07/2017	30/07/2017	16/11/2016	28/07/2017	31/07/2017	23/07/2017	11/09/2017	25/11/2018		31/07/2017	
Operating Horticulture Equipment	25/04/2013	25/04/2013	25/04/2013	25/04/2013	25/04/2013			25/04/2013	12/12/2012	25/04/2013			25/04/2013	
							2016				**2016**	**2016**		
OHSAS 18001 Internal Auditor Training					04/11/2013									
PSDS & PSDP Training			12/03/2009											
Quad Bike Training (safe use and operation)	20/08/2012		20/08/2012	20/08/2012	20/08/2012		09/07/2015							
Refuse Trucks (Safe Use) Banksman	20/04/2010	20/04/2010	20/04/2010	20/04/2010				20/04/2010	20/04/2010				27/04/2010	Refresher recommended every 2 years
	20/04/2012	20/04/2012	20/04/2012	20/04/2012				20/04/2012	20/04/2012				27/04/2012	

Training Record 2015
HWMF W0191-2
Outdoor Staff

DESCRIPTION	Browne Barry	Browne Joseph	Byrne Billy	Byrne Noel	Byrne Peter	Courtney Billy	Dempsey Michael	Fenlon Myles	Hudson John	Kelly Eamonn	O Gorman Pat	Ryan Eric	Walsh Nigel	Comments
Safety in Excavations			21/09/2010											
Safety in Excavations								12/03/2012						
Safety Representative Training					**2016**		**2016**	**2016**						
Signing, Lighting & Guarding at Roadworks									06/10/2009		06/03/2014		22/02/2007	Refresher recommended every 5 years
									06/10/2014		06/03/2019		22/02/2012	
Statutory Inspections (Lifting Equipment)			15/05/2013		15/05/2013									
Supervising Safety			27/06/2011		06/03/2012	04/11/2013		04/11/2013						
Telecopic Material Handling						**24/11/2005**								Refresher recommended every 5 years
						24/11/2010								
VDU Workstation Assessor					17/06/2014									
Waste Facility Operative Training										10/07/2007				

KEY

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

Training Record 2015
HWMF W0191-2
Indoor Staff

DESCRIPTION	Hobbs Fran	Meyler Sean	Comments
Cryptosporidium: Risk Assessment			
Abrasive Wheels			Refresher required every 3 years.
Asbestos Awareness			
ATEX: Safety Awareness	25/04/2014 **25/04/2016**	25/04/2014 **25/04/2016**	Refresher required every 2 years.
Certificate in Local Government Studies		01/06/2015	
CSCS Tickets -HEALTH AND SAFETY AT ROADWORKS)	**06/12/2012** **06/12/2017**		Refresher required every 5 years.
Customer Care inc Managing difficult and Aggressive Behavour	**30/05/2012**		
Data Protection Awarness Training		05/05/2015	
Disability Awareness			
EPA: Biodegradable Municipal Waste			
EPA: Odour Assessment			
FAS: Waste Management	18/01/2005	16/12/2014	
FAS: Safe Pass	18/06/2015 **18/06/2019**	17/09/2014 **17/09/2018**	Refresher required every 4 years.
Filters Eval., Op & Main.			
Fire Extinguisher	12/05/2014 12/05/2017	12/05/2014 12/05/2017	Refresher recommended every 3 years.
Fire Safety Manager	08/04/2009		
Fire Warden	06/12/2012		
First Aid Basic			
First Aid: Cardiac First Responder			
First Aid: Heartsaver AED	22/01/2010		
First Aid: Occupational	26/03/2015 **06/03/2017**	09/06/2015 **09/06/2017**	Refresher required every 2 years.
GPS Training	16/06/2006		
Health & Safety Management System Awareness			
IMAP Training		28/032013	
IEI Construction Contacts Bill		10/09/2013	
Landfill Gas Management			
	11/11/2010		

Training Record 2015
HWMF W0191-2
Indoor Staff

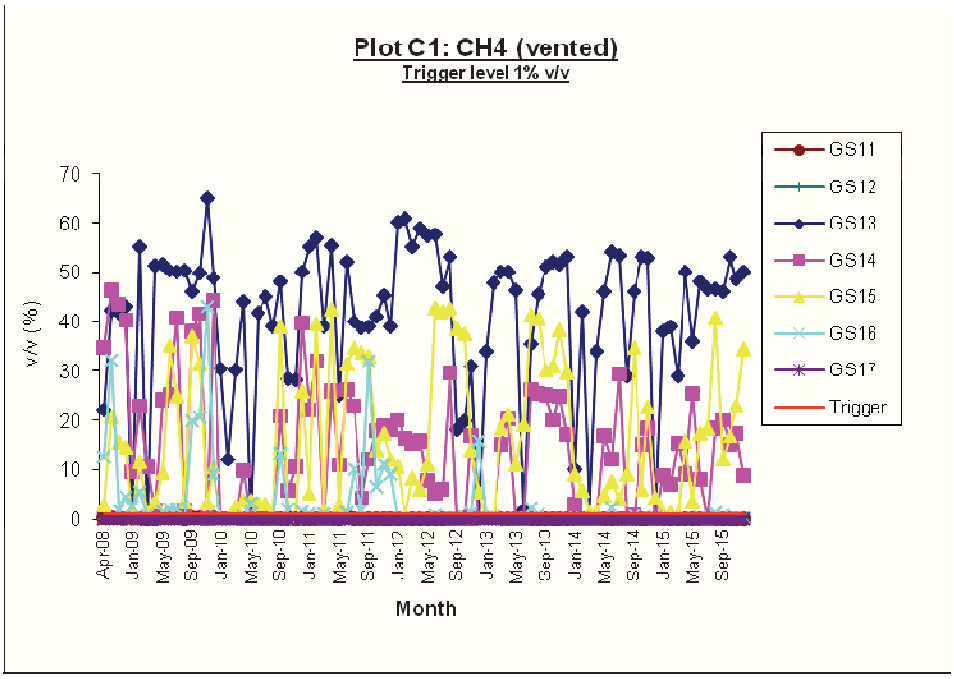
Life Jacket: Care and Use.			
Manual Handling	22/04/2015 **22/04/2018**	16/07/2014 **16/07/2017**	Refresher recommended every 3 years.
Procurement Training		 **2016**	
PSDS & PSCS	11/03/2009		
Safety in Excavations			
Statutory Inspections (Lifting Equipment)			
Supervising Safety		04/11/2013	
Water: Validation and Interpretation			

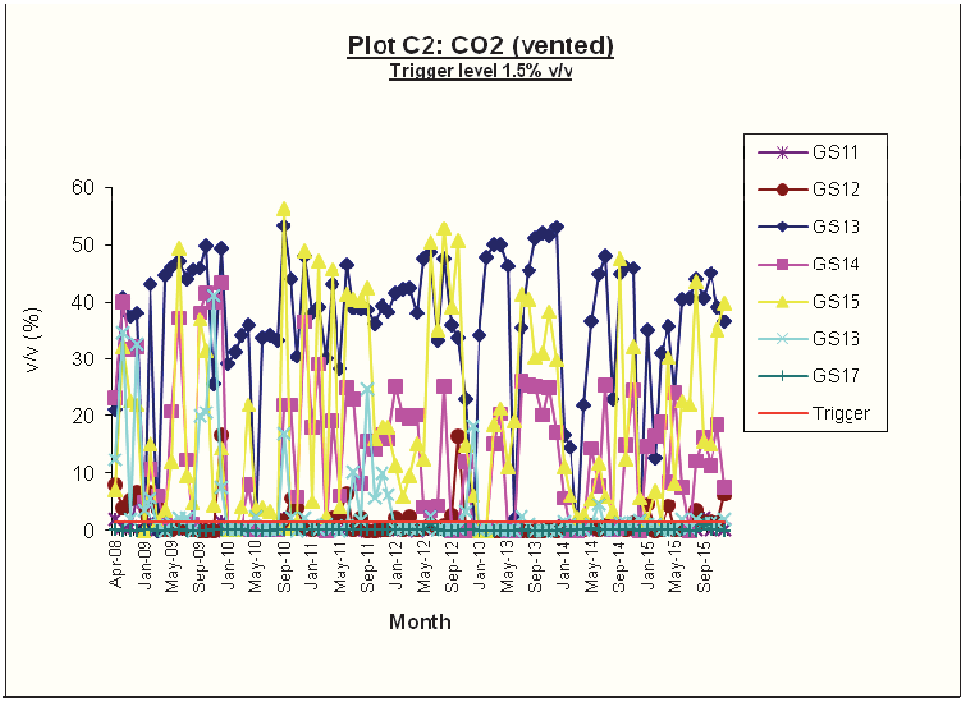
Key

31/12/2011
31/12/2011

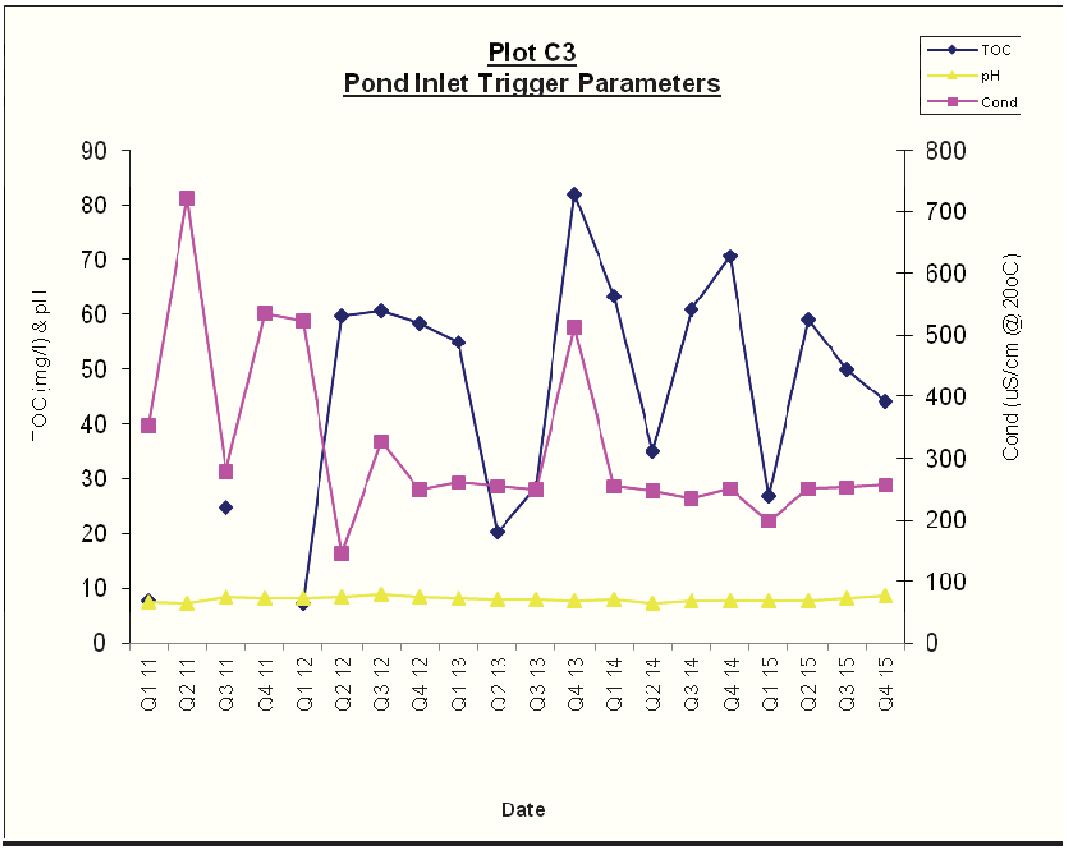
C. Monitoring Results and Graphs

Gas Monitoring Results 2015



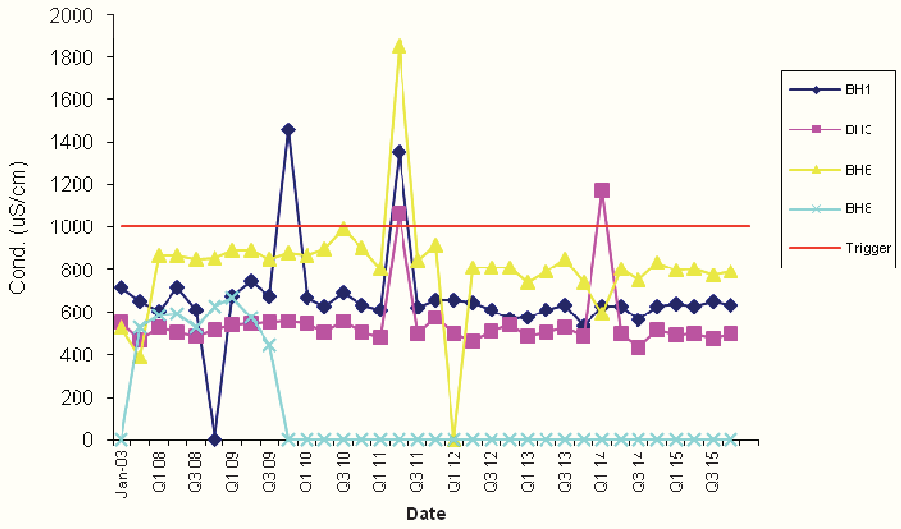


Surface Water Monitoring Results 2015

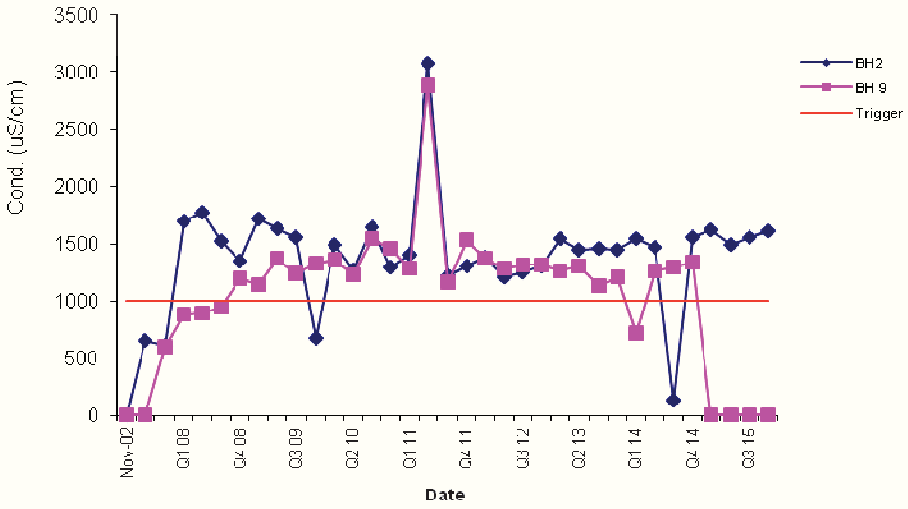


Ground Water Monitoring Results 2015

Plot C4
Conductivity (hist): Boreholes upstream of landfill
trigger level = 1000uS/cm (20o C)

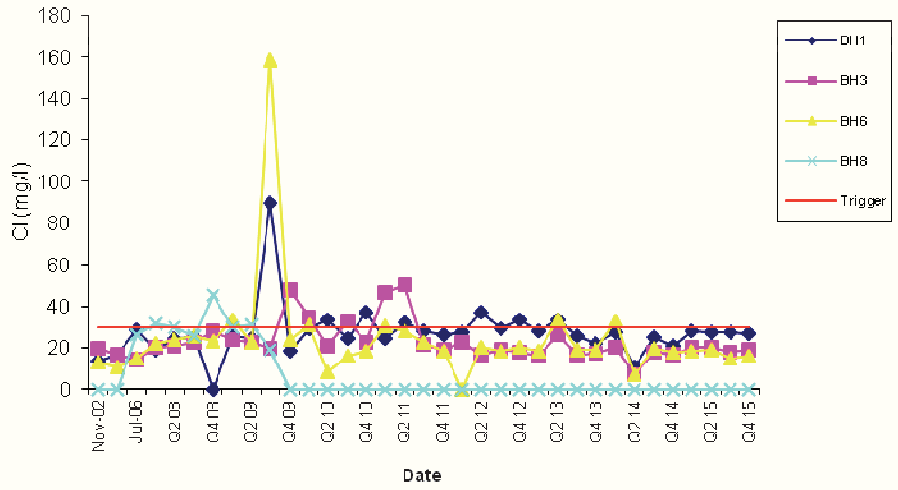


Plot C5
Conductivity (hist): Boreholes downstream of landfill
trigger level = 1000uS/cm (20o C)

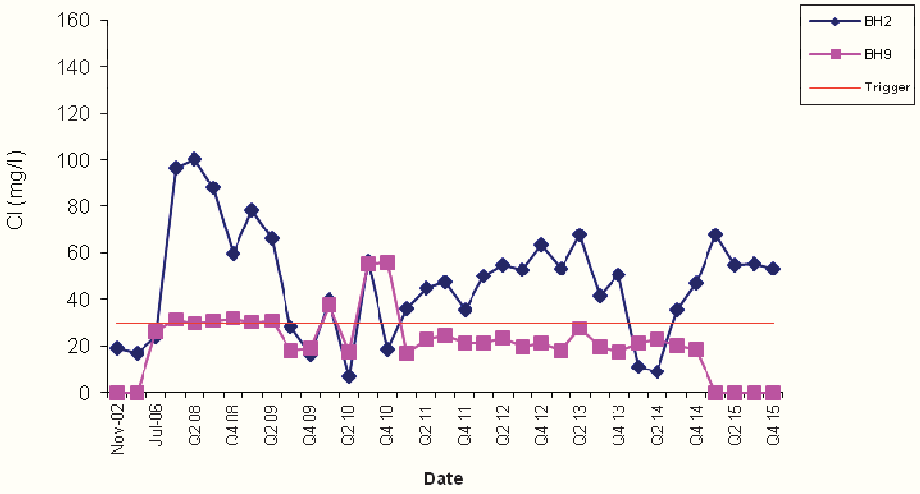


Ground Water Monitoring Results 2015

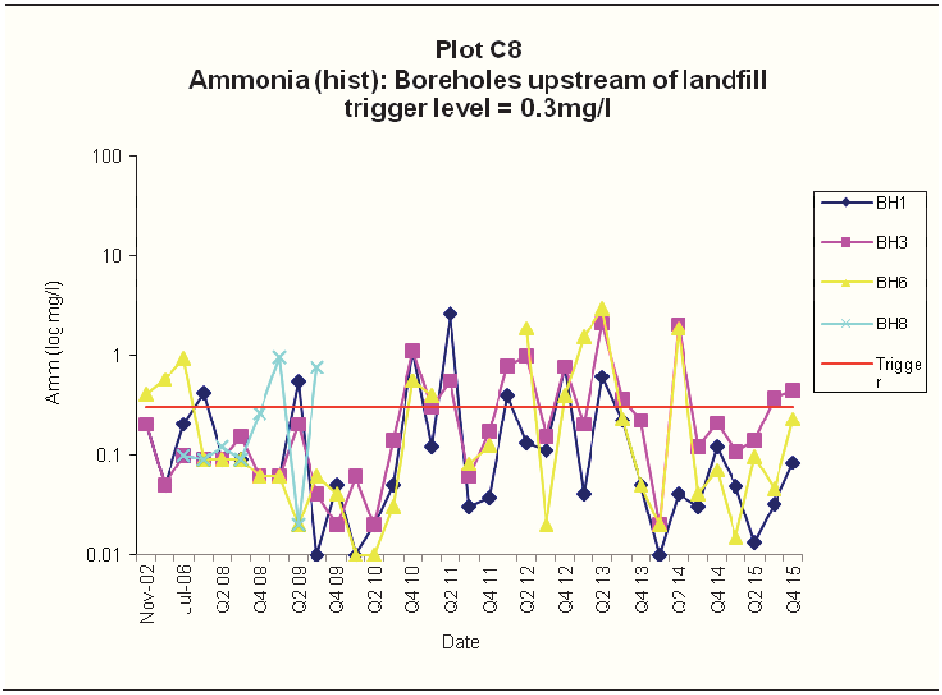
Plot C6
Chloride (hist): Boreholes upstream of landfill
trigger level = 30mg/l

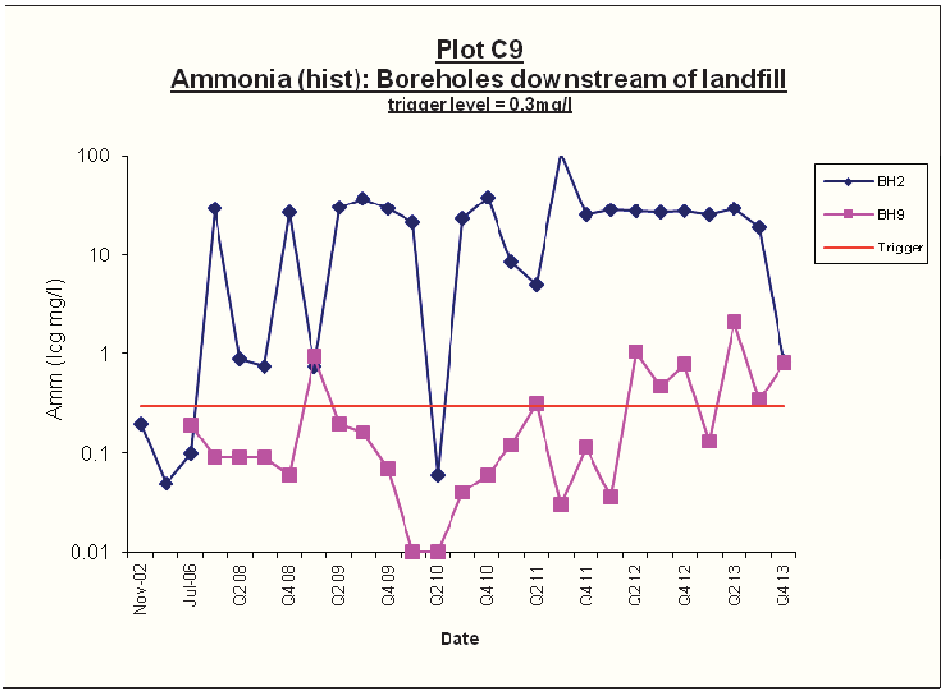


Plot C7
Chloride (hist): Boreholes downstream of landfill
trigger level = 30mg/l

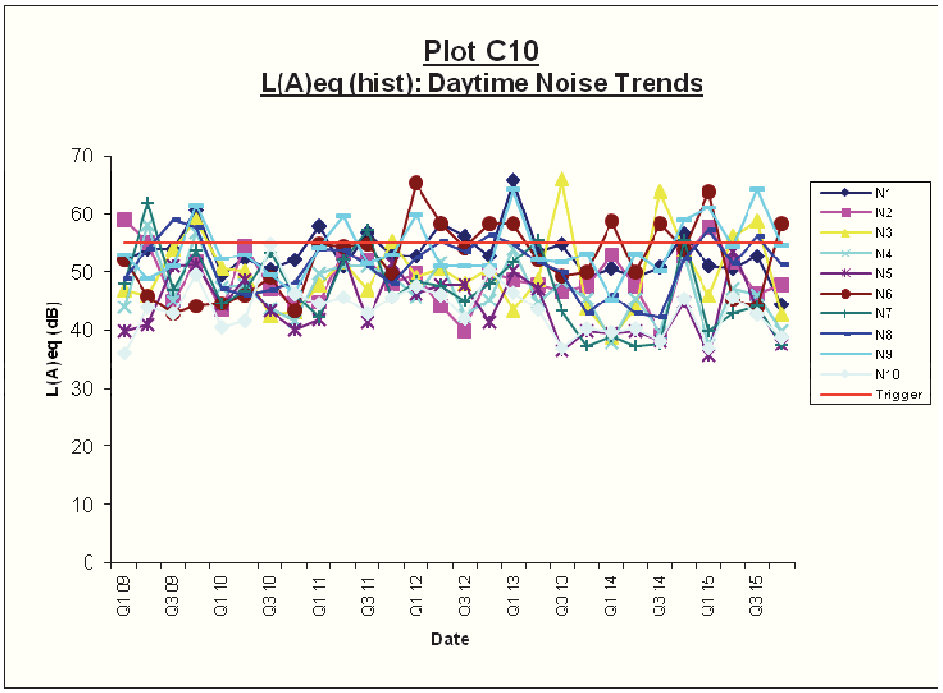


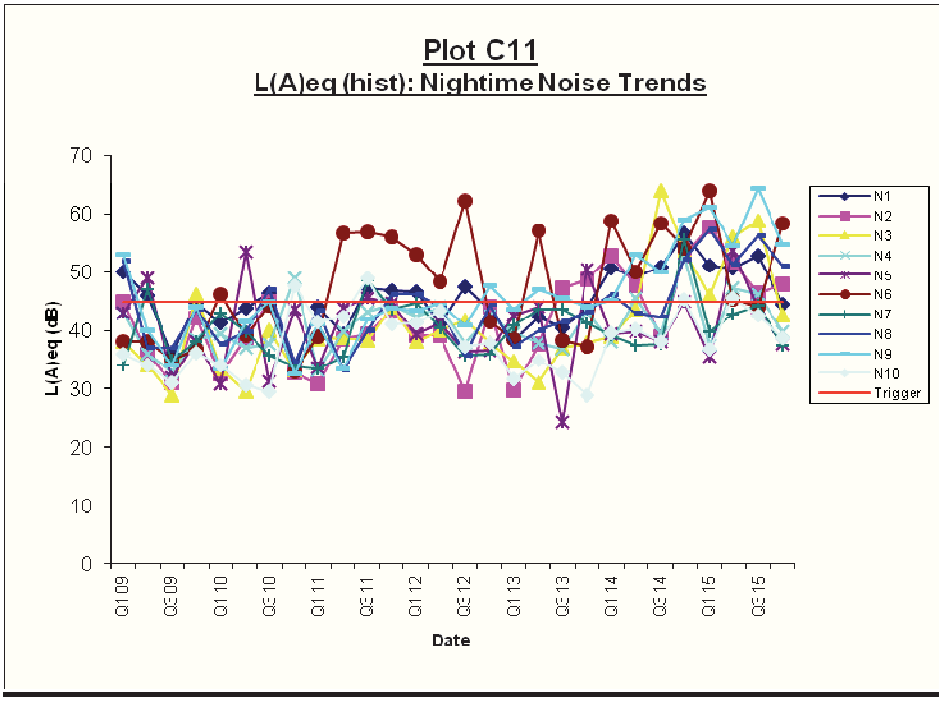
Ground Water Monitoring Results 2015



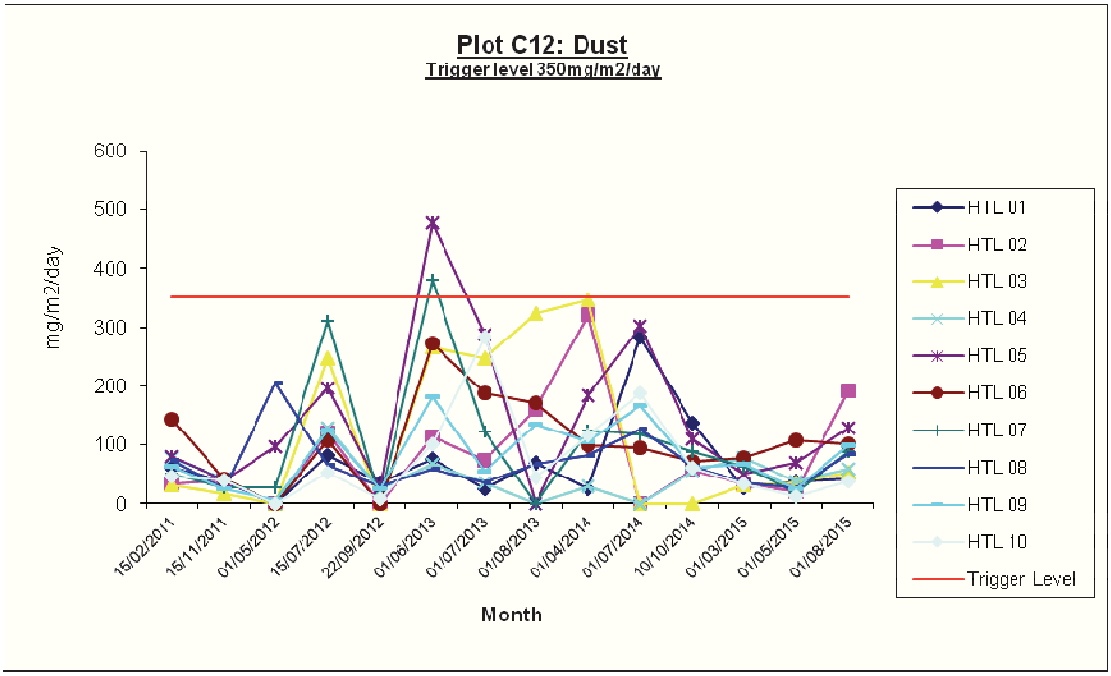


Noise Monitoring Results 2015





Dust Monitoring Results 2011 – 2015



Dust Monitoring Results 2015

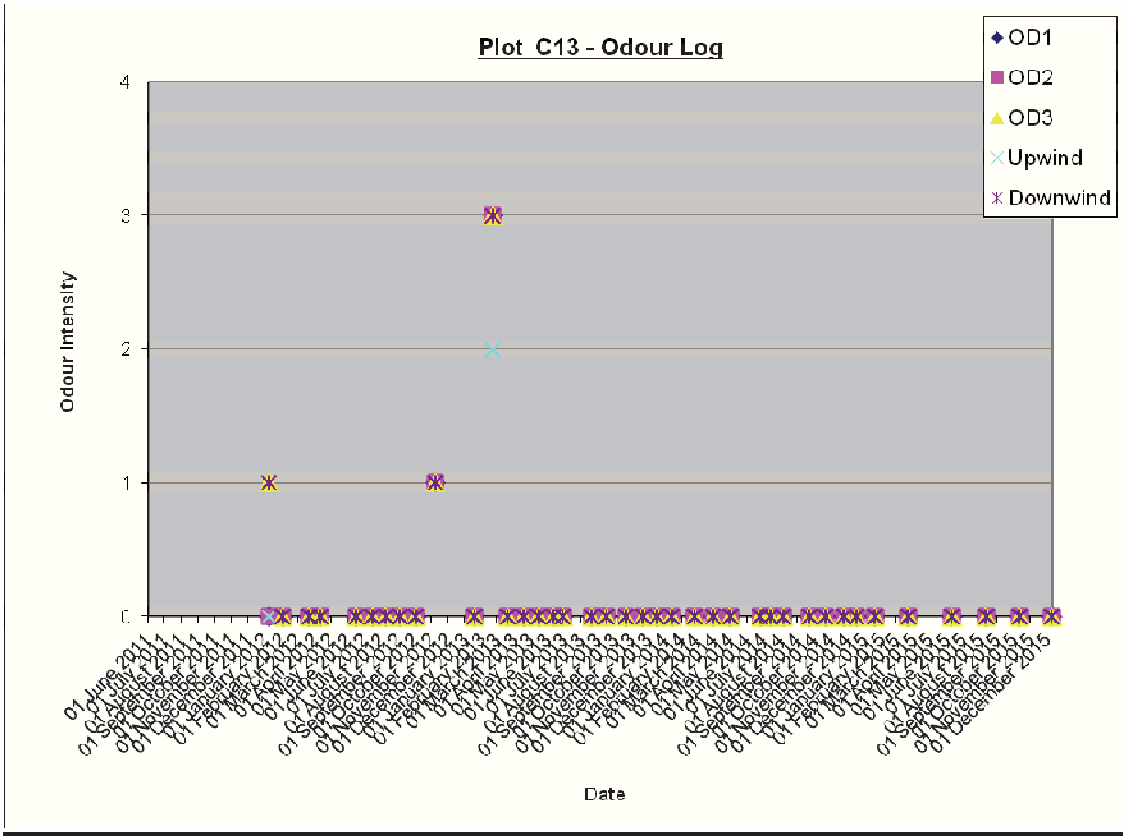
Dust Monitoring Locations and Frequency			
Dust analysis	D1 - D10	D1 - D10	D1 - D10
Dust Monitoring Results (mg/m^2/day)			
Date Range	**Feb-Mar 15**	**Apr-May 15**	**Aug-Sep 15**
D1	28	39	42
D2	34	21	193
D3	31	35	53
D4	79	39	60
D5	50	69	129
D6	79	109	102
D7	62	18	89
D8	35	26	84
D9	67	24	99
D10	34	13	38

PM_{10} Monitoring Results 2015

PM_{10} Monitoring	
Location	**Result (ug/m3)**
D1	<8.33
D2	<8.33
D3	<8.33
D4	<8.33
D5	<8.33
D6	<8.33
D7	<8.33
D8	<8.33
D9	<8.33
D10	<8.33

Monitoring performed in July/August 2015

Odour Monitoring Results 2012 - 2015

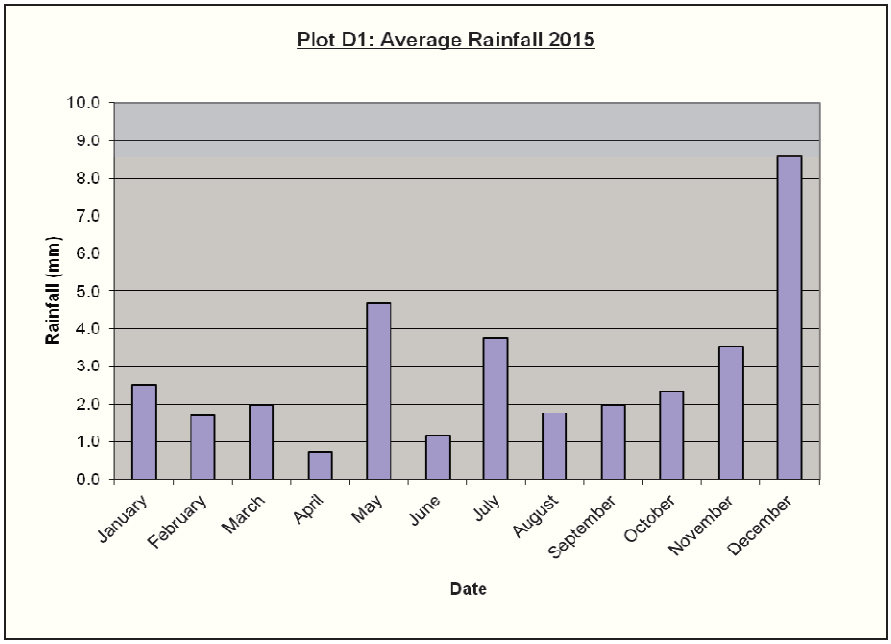


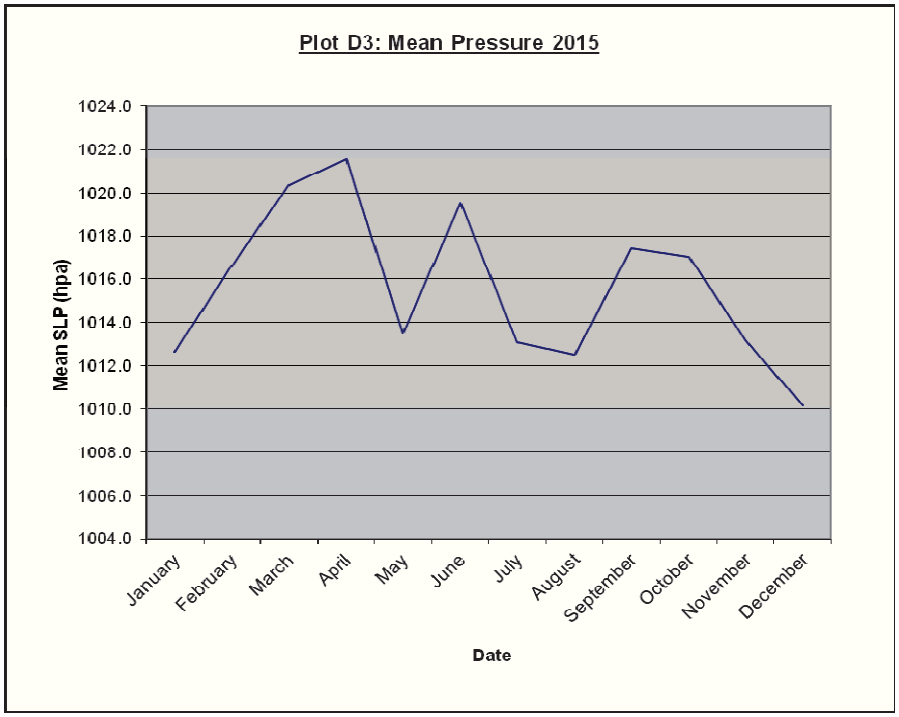
Legend

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

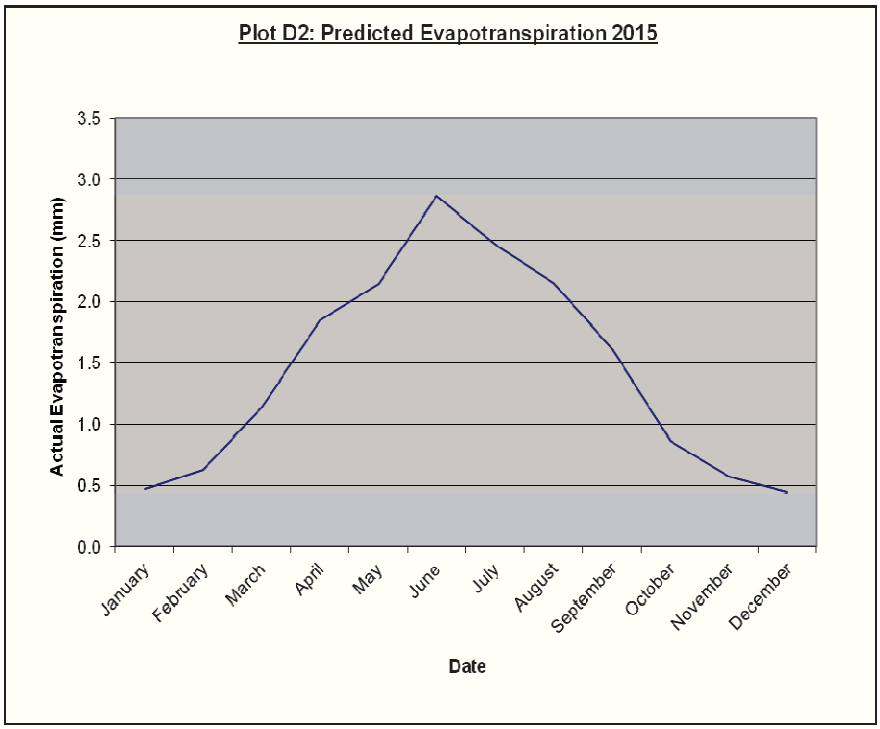
D. Meteorological Data Graphs

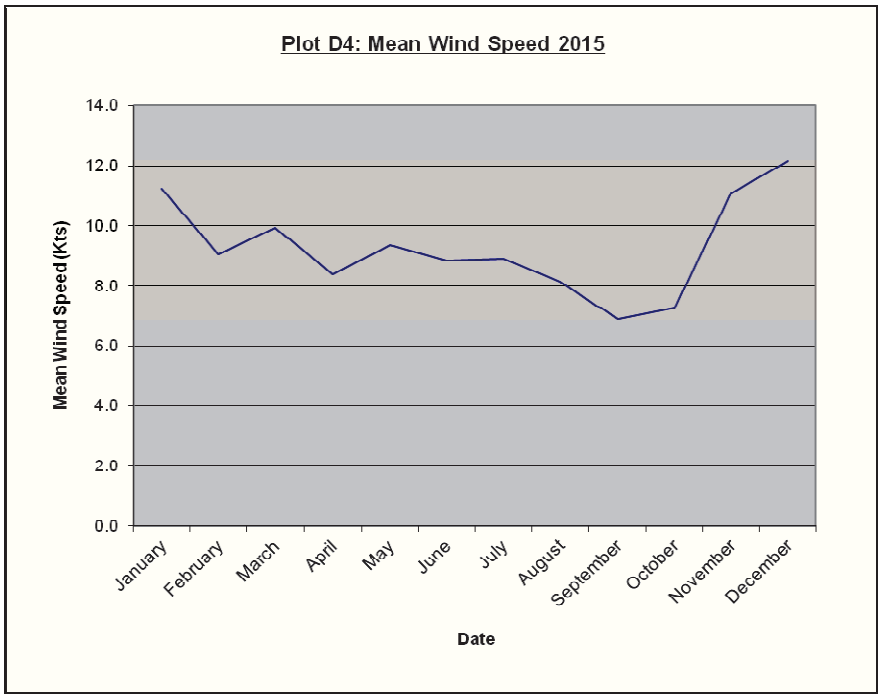
Appendix D – Meteorological Graphs



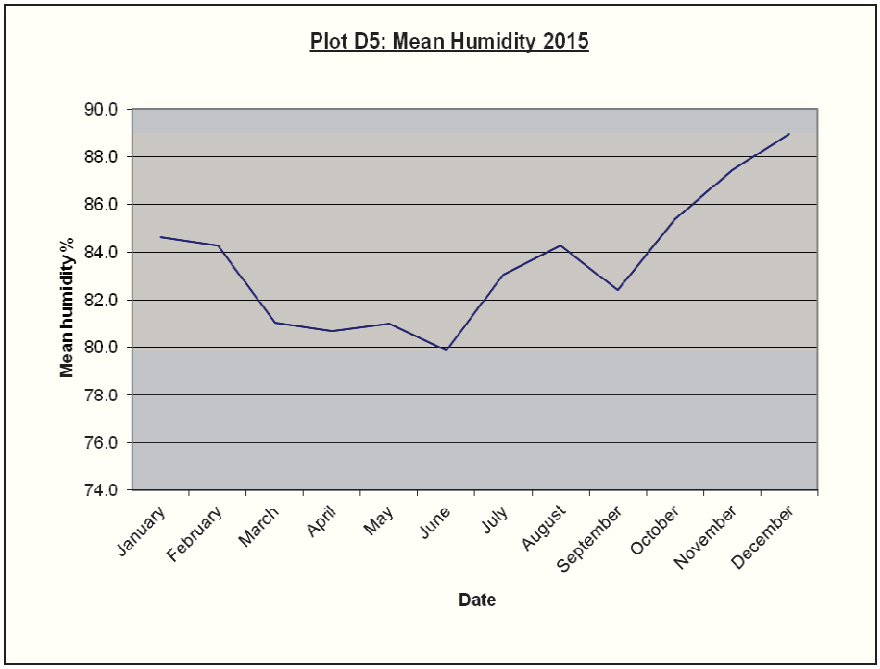


Appendix D – Meteorological Graphs





Appendix D – Meteorological Graphs



E. Summary of waste accepted and consigned off-site

Waste consigned off-site from Holmestown Civic Amenity from 1st January 2015 to 31st December 2015 (tonnes)

0	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	TOTALS
Cardboard	6.84	9.58	6.88	11.16	2.32	9.14	9.38	6.48	8.4	4.56	7.08	6.46	88.28
W.E.E.E. & Mobiles	16.19	11.779	11.641	17.223	13.241	14.147	28.157	20.04	14.373	18.673	15.08	14.44	194.984
Plastic	4.38	5.7	5.86	5.72	5.46	9.54	8.02	5.94	7.78	6.98	4.72	4.88	74.98
Newspaper	3.52	3.63	2.53	3.63	3.08	3.63	3.96	2.53	2.88	2.75	2.97	1.98	37.09
Scrap metal	9.82	10.7	12.64	13.94	12.9	14.58	6.48	8.2	15.86	8.8	9.06	7.18	130.16
Oil Filters	0	0	0	0	0	0	0	0	0	0	0.24	0	0.24
Textile	0.64	0.92	0.83	0.95	0.77	1.43	1.48	1.38	1.44	1	0.98	0.99	12.81
Glass	6.45	2.17	6.13	4.37	6.2	2.63	6.01	5.6	10.48	4.05	3.72	4.03	61.84
Tetra Pak	0	1.82	0	0	0	0	0	0	3.46	0	0	0	5.28
Engine Oil	0.92	0	0.1	0	0	1.12	0.98	0	0.96	0	1	0	5.08
Magazines	5.72	3.6	3.92	0.646	0.176	5.34	7.98	5.28	4.94	5.92	3.92	6.24	53.682
Aluminium drink cans	0.25	0.06	0.25	0.25	0.25	0.13	0.23	0.18	0.37	0.13	0.1	0.16	2.36
Books	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	3.6
Cooking Oil	0	0	0	0	0	0	0.98	0	0	0	0	0	0.98
Lead acid batteries	0	0.85	0.454	0	0.72	0.225	0	0.681	0.513	0.227	0.227	0	3.897
Household batteries	0	0.21	0	0	0	0	0.2	0	0	0.19	0	0	0.6
Farm fence batteries	0	0.12	0	0	0	0	0	0	0	0	0.2	0	0.32
Printer Cartridges	0	0	0	0	0	0.46	0	0	0	0.3	0	0	0.76
Food waste	1	0.16	0	6.1	0	0.7	0.72	0.76	1.56	1	1.16	1.1	14.26
Tubes & Bulbs	0	1	0	0	0	0.46	0	0	0	0	0	0	1.46
Recycling/recovery Total	56.03	52.599	51.535	64.289	45.417	63.832	74.877	57.371	73.316	54.88	50.757	47.76	692.663

	Holmestown Waste Management Facility												TOTALS
BLACK BAG	18.68	25.3	25.26	45.532	5.28	25.3	9.9	17.64	29.3	25.5	14.14	26.76	268.592
TIMBER	3.58	12.46	2.78	5.74	6.22	3.64	9.02	11.2	10.32	10.76	9.16	10.5	95.38
BULKY	25.08	53.405	30.54	64.988	10.606	29.54	35.36	30.36	58.14	58.82	64.88	69.54	531.259
Waste Total	47.34	91.165	58.58	116.26	22.106	58.48	54.28	59.2	97.76	95.08	88.18	106.8	895.231

F.Water Balance Calculation Spreadsheet

HWMF 2015 AER
Water Balance

TABLE 1
Leachate Generation

Actual rainfall						1063	mm/yr	actual data from met eireann (1st Jan to 31st dec)									
Infiltration						**946.07**	mm/yr (temporary restored areas)									89%	
						1063	mm (waste - active and unrestored areas) - assumes all rainfall infiltrates into the waste										
Density						0.90	t/m3										
Waste input 2014						0.00	t										
Liquid waste input						0	m3/yr										
Absorptive Capacity						**0.025**	m3 per m3										
Site life						20	years										

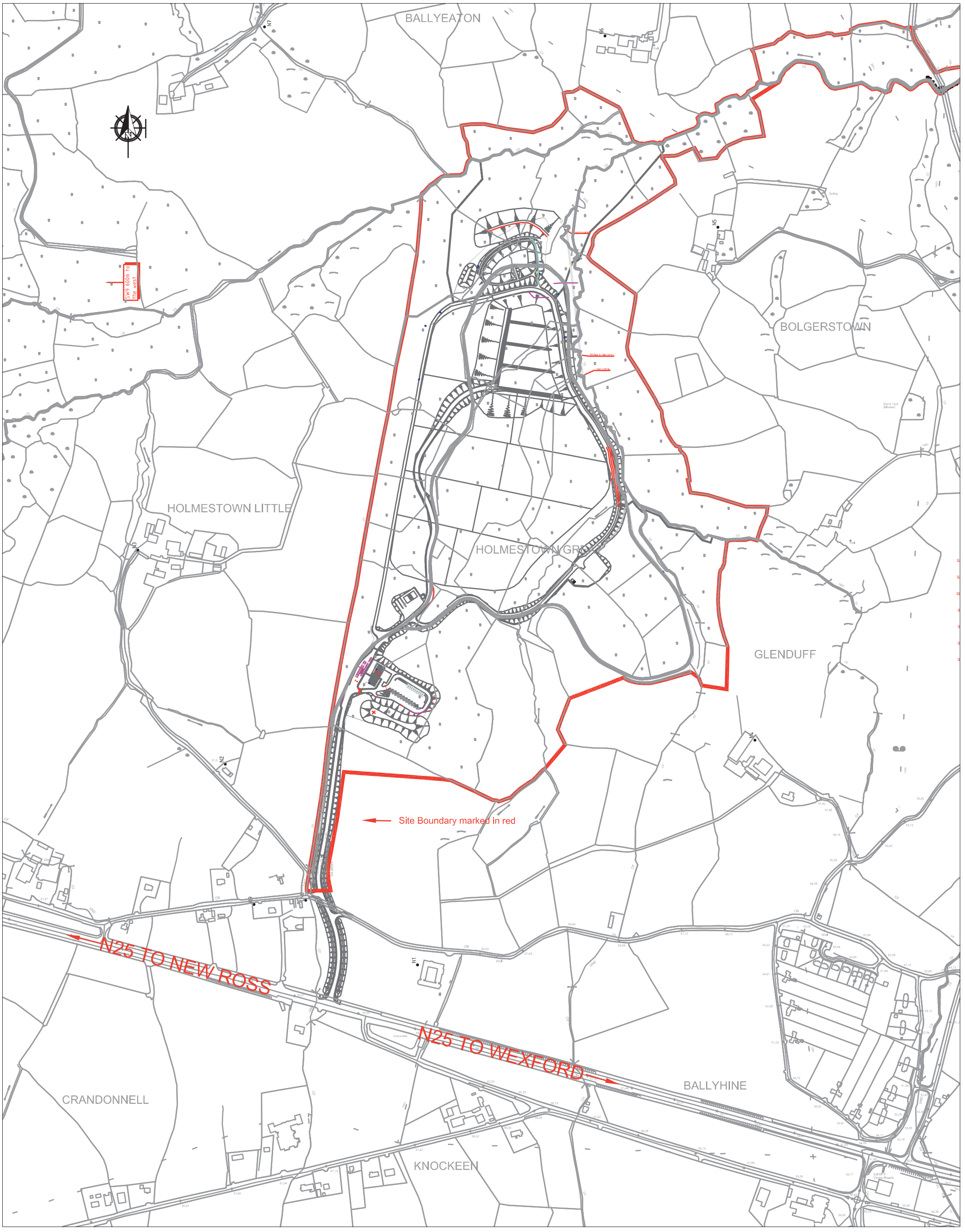
Year	Months	Phase	Active Area	Temp Cap	Full Cap	Waste Input 2015	Active Infiltration (m³)	Temp Infiltn. m3	Restored Area Infiltration (m³)	Total Water (m³)	Cumulative Water (m³)	Absorbtive Capacity (m³)	Cumulative abs. capacit (m³)	Cumulative leachate generation (m³)	leachate produced (Lo) (m³)
2015 (1st Jan to 31st Dec)	12	Dirty paved areas	740	0		0	787	0	0	787	787	0	0	787	787
2015 (1st Jan to 31st Dec)	12	1 (Cell 1,2,3,4, 1b)	0	18700		0	0	17,692	0	17,692	18,478	0	0	18,478	18,478

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 2015	18,478
Weighbridge Quantity	**17558**
Less Admin Bldg WW	120
Nett WB Quantity	**17438**
Variance	-5.964726459

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	297284.965	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	296896.386	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	Inl.	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