

ANNUAL ENVIRONMENTAL REPORT
FOR
GREENSTAR LTD. - BALLYNAGRAN LANDFILL
LICENCE NO. W0165-02
JANUARY – DECEMBER 2013

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4th July 2014

Project	Annual Environmental Report 2013			
Client	Ballynagran Landfill Limited W0165-02			
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1. INTRODUCTION

This is the 2013 Annual Environmental Report (AER) for Ballynagran Landfill Limited's non-hazardous residual landfill at Coolbeg & Kilcandra, Ballynagran, County Wicklow. It covers the period from the 1st January 2013 to the 31st December 2013.

In March 2014 the Waste Licence was transferred from Greenstar Holdings Limited to Ballynagran Landfill Limited.

The content of this report is based on Schedule B of the Waste Licence (Reg. No. W0165-02) and the report format follows guidelines set in the "Guidance Note for Annual Environmental Report" issued by the Environmental Protection Agency (Agency)¹. Account is also taken of the AER Draft Guidance Document and AER Information Templates issued by the Agency in January 2013².

¹ EPA (Environmental Protection Agency) 1999 Waste Licensing – Draft Guidance on Environmental Management Systems and Reporting to the Agency

² EPA (Environmental Protection Agency) 2012 Draft AER Guidance Document

2. SITE DESCRIPTION

2.1 Site Location & Layout

The site, which encompasses approximately 128 ha, is located on the eastern side of the Wicklow Mountains in the townlands of Ballynagran, Coolbeg and Kilcandra. It is approximately 5 km to the south west of Wicklow Town and 3.5 km to the south east of Glenealy. It is on the southern side of an east-west ridge at an elevation between 52 and 147m Ordnance Datum (OD).

The site layout is shown on the topographical survey drawing included in Appendix 1 and includes: -

- Waste Reception Area;
- Weighbridges (2 No.);
- Wheel Wash;
- Waste Quarantine & Inspection Areas;
- Landfill Cells;
- Leachate Storage lagoon;
- Surface Water Pond;
- Administration Block (offices, stores, canteen, toilets and showers);
- Oil Storage Tank & Bund;
- Security Fencing.
- Landscaped Areas
- Landfill gas utilisation compound

2.2 Site History

The facility was granted a Waste Licence (W0165-01) by the Agency on 5th September 2003 which was reviewed with a revised licence (W0165-02) issued on the 23rd March 2010.

The facility will be developed in five phases. The initial phase involved the provision of five (5) landfill cells (1, 2, 3, 4 and 5A/B), and the entire supporting infrastructure. In 2007 the Agency approved the development of two additional cells (Cells 6 and 7), which were constructed in 2008 and became active in 2009. An active gas abstraction and flaring system

was commissioned in April 2007. Cells 9 and 10 were constructed in 2009 and 2010 respectively and despite being EPA approved for waste placement; they did not receive any waste until 2012 when waste placement commenced in cell 9. Cell 10 did not receive any waste in 2012 and 2013. A landfill gas utilisation plant was commissioned and began operating in January 2011. The placement of final capping commenced when cells were filled to final profile heights. The first phase of capping took place in 2011 with the placement of 16,000m² of complete capping to topsoil and grass seeding. This was followed by 6,000m² in late 2012 and 27,000m² placement of liner in 2013. The capping completion works to final design and topsoil and grass seeding is being undertaken in 2014. The following cells are completely covered cells 1, 2, 3, 4, 5a/b. Parts of cell 6 and cell 7 are also under the permanent cap.

2.3 Waste Activities Carried Out at the Facility

The facility is a full containment landfill, which is designed to accept treated waste for final disposal. The licensed waste activities are summarised in Tables 2.1 and 2.2.

Table 2.1 Licensed Waste Disposal Activities, in accordance with the Third Schedule of the Waste Management Act 1996 as amended

Class 1	Deposit on, in or under land (including landfill).
Class 4	Surface impoundment, including placement of liquids or sludge discards into pits, ponds or lagoons: This activity is limited to the storage and management of leachate and surface water at the facility.
Class 5	Specially engineered landfill, including placement into lines discrete cells which are capped and isolated from one another and the environment: This is the principal activity. This activity is limited to the construction of the landfill in distinct phases consisting of specially engineered lined cells, the deposit of non-hazardous waste into these lined cells and the collection of leachate and landfill gas.
Class 6	Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 10 of this Schedule: This activity is limited to the treatment of leachate at the facility.
Class 13	Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.

	This activity is limited to the storage of unacceptable waste prior to its transport off-site to another facility.
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Table 2.2 Licensed Waste Recovery Activities, in accordance with the Fourth Schedule of the Waste Management Act 1996 as amended

Class 4	Recycling or reclamation of other inorganic materials. This activity is limited to the use of recycled construction and demolition waste as cover and/or construction material at the facility.
Class 9	Use of any waste principally as a fuel or other means to generate energy: This activity is limited to the utilisation of landfill gas at the facility.
Class 11	Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule: This activity is limited to the use of recycled construction and demolition waste at the facility.
Class 13	Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced: This activity is limited to the storage of recycled construction and demolition waste prior to reuse.

2.4 Waste Types & Volumes

Only non-hazardous, solid, residual waste is accepted for disposal. Hazardous and liquid wastes are not accepted. All wastes delivered to the facility are subject to Waste Acceptance Procedures that have been approved by the Agency, as specified in Condition 5.3 of the Waste Licence.

The facility is licensed to accept 175,000 tonnes of waste per annum for disposal. The following waste types and volumes, as specified in Schedule A of the Waste Licence, can be accepted: -

- Household (62,500 tonnes),
- Commercial (67,500 tonnes),
- Industrial (45,000 tonnes),

2.5 Waste Received & Consigned

A breakdown of the different types and quantities of wastes received, consigned & recovered at the facility in 2013 are shown in Tables 2.3, 2.4 and 2.5.

Table 2.3 Waste Received 2013

Description	European Waste Code Categories	Tonnes
LDF Filter Cake	07 05 14	28.14
Ink Sludge	08 03 15	38.92
Ash	10 01 01	8.04
Casting cores	10 10 08	28.62
Minerals	01 01 01	31.92
LDF Filter Cake	11 01 10	76.06
Minerals	17 01 07	7305.34
Soil and Stones	17 05 04	
Soil & Stones	17 05 04	21055.59
Bottom Ash	19 01 12	4.28
Biostabilised waste	19 05 99	4936.42
Screening from Waste water treatment	19 08 01	988.24
LDF Filter Cake (Rec)	19 09 02	3094.84
Wood	19 12 07	2167.86
Minerals	19 12 09	
Mixed Municipal Wastes	19 12 09	50084.4
Mixed Municipal Wastes	19 12 12	68146.5
Mixed Municipal Wastes	20 03 01	18715.84
Mixed Municipal Wastes	20 03 03	2709.34
Mixed Municipal Wastes	20 03 07	485.64
Total		179,905.99

Table 2.4 Waste Consigned 2013

EWC	Description	Tonnes	Destination
19 07 03	Leachate	15,149.74	EPS Drogheda wwtp
19 07 03	Leachate	1,313.50	Rilta Greenogue Facility
19 07 03	Leachate	14,654.91	CAW Ringsend wwtp
19 07 03	Leachate	3,468.08	Veolia Wicklow wwtp
Total waste consigned		34,586.23	

Table 2.5 Waste Recovered 2013

European Waste Code Categories	Description	Tonnes
17 01 07	Minerals	7305.34
17 05 04	Soil & Stones	19,494.15
19 05 99	Biostabilised waste	4936.42
19 09 02	LDF Filter Cake (Rec)	2315.44
19 12 07	Wood	2167.86
19 12 09	Minerals	49857.62
Total Recovered		86,076.83

2.6 Landfill Capacity

The most recent topographic survey for the landfill cell footprint is included in Appendix 1. The facility has a design capacity of approximately 2,770,000 m³. It is estimated that the void space consumed since the site opened up until 31st December 2013 is approximately 1,219,820m³.

2.7 Method of Deposition of Wastes

2.7.1 Waste Acceptance

The waste accepted for disposal is residual waste from County Wicklow and adjoining counties from household, commercial and industrial sources. At present the majority of waste is delivered to the facility by waste contractors based in County Wicklow. Waste contractors have systems in place whereby the recyclable fraction is either collected separately, or else separation is carried out mechanically at their facilities.

All waste is delivered to the site in Heavy Goods Vehicles (HGV) and small refuse trucks provided with the appropriate covers to prevent loss of load. Each vehicle first proceeds to the incoming weighbridge where it is weighed and documentation checked and logged. The weighbridge operator and/or the facility manager may at their own discretion request the load to be tipped in the Waste Inspection Area.

The vehicles then proceed to the active waste disposal area where waste is deposited under the direction of a banks man. The vehicles weigh out at the outgoing weighbridge and receive an individual weighbridge docket before exiting the site. Each landfill cell is divided into a number of grids, which are used to identify the areas where waste is deposited. Each load is assigned the relevant grid number.

2.7.2 Working Face

Waste is deposited close to and above the advancing tipping face. In accordance with Condition 5.6.1 the active face is confined to a height of 2.5 metres after compaction, a width of 25 metres and a slope no greater than 1 in 3. Deposited waste is spread in shallow layers on the inclined surface and compacted. Steel-wheeled compactors operate on the gradient of the more shallow face, pushing thin layers of waste and applying compaction pressure to them. The site operatives inspect the deposited waste for items that are not acceptable under the Waste Licence, such as tyres, gas bottles, batteries etc. These are removed and stored in appropriate areas for later removal from the facility to appropriately licence facilities. Each day waste is deposited to form a block, which is compacted and covered as described above. The following day a new block of waste is deposited adjacent to the existing block. The waste is covered at the end of each day with a covering of fines and woodchip.

This ordered method of waste deposition enables areas, which have been filled and are to be left for a period to be progressively restored over the site life, minimising the areas of active waste deposition.

2.8 Report on Development and Restoration at the Site

In May and June of 2013 a construction project involving the raising of an existing cell embankment at cell 2, 5 A/B by 2 meters and associated works were completed. In accordance with Section 3.2.1 of the waste licence a Specified Engineering Works proposal was submitted to the Agency detailing the proposed works in advance of commencement of the works. This was approved by the Agency once carried out in accordance with licence conditions.

2.9 Progress and Implementation of Landscaping Programme

There was no additional tree planting at the facility during the reporting period. There was maintenance carried out on all existing trees planted, in terms of weeding and pruning.

2.10 Report on Meeting the Requirements of the Landfill Directive

The site is fully compliant with the requirements of the Landfill Directive.

2.11 Programme for Public Information

During 2013 the site accommodated all requests for site visits and tours. There was one tour of the site by an international group as part of the Ballynagran Energy Plus / ZECOS project – www.zecos.eu on Friday the 26th of April. The ZECOS project is an European Research project part financed by INTERREG to look at a Carbon Reduction Certification System for Communities. Ballynagran liaison committee sat several times during the year and monies from the fund were distributed to various organisations and persons under the community and local schemes.

3. ENVIRONMENTAL MONITORING

There is a comprehensive environmental monitoring programme to assess the significance of emissions from site activities. The programme includes groundwater, surface water, leachate, landfill gas, noise, dust and particulate monitoring and a biological assessment of the of the three streams (Ballynagran, Ford and Killandra) as well as the Three Mile Water River, Ballynagran Co. Wicklow. The monitoring locations are shown in Appendix 1.

The monitoring results, including the full laboratory reports, were submitted to the Agency at quarterly intervals in the reporting period. This section presents a summary of the monitoring with summary graphs showing trends. A summary of all monitoring data for 2013 is included in Appendix 2.

3.1 Groundwater Monitoring

3.1.1 Groundwater Levels

Up until June 2011 groundwater levels were measured monthly in the sixteen (16 No.) groundwater wells on site. Following approval by the Agency on the 1st June 2011, the monitoring frequency was reduced from monthly to quarterly (Ref Agency Letter W0165-02/AP26DM). There are eight groundwater monitoring locations with one deep and one shallow well at each location. The monitoring confirms that the direction of groundwater flow in the bedrock aquifer is from the north west to the south east.

3.1.2 Groundwater Quality

During 2013, sixteen (16 No.) private groundwater well samples were collected and analysed. These sampling events took place in Q-2 and Q-3 of 2013. The results of the analysis were reported in the Q-2 and Q-3 quarterly reports. All residents received copies of the results from their respective wells. Groundwater quality in the private wells was good consistent with previous rounds.

Groundwater quality was monitored in the on-site monitoring wells and reported to the Agency at quarterly intervals. The sampling was carried out in accordance with internationally accepted techniques and control procedures and the analyses were completed by a laboratory using standard and internationally accepted procedures.

The groundwater analysis is compared to the licence specific trigger levels as well as the Interim Guideline Values (IGVs) for groundwater published by the Agency and the Groundwater Regulations Threshold Value (GTV) which were introduced in 2010 (S.I. 9 of 2010).

The IGV represent typical background or unpolluted conditions; however levels higher than the IGV may occur naturally depending on the local geological and hydrogeological conditions. While the GTV's are more appropriate for large scale abstraction wells used for potable supply, they can be used to assess the significance of contamination where present in non potable groundwater supplies. Because GTVs have not been established for all of the parameters monitored, the relevant IGV was used for comparative purposes.

The 2013 results were generally consistent with those obtained during the monitoring completed before the start of site development works. The monitoring programme confirms that the site activities are not impacting on groundwater quality. The monitoring detected elevated pH levels in groundwater wells, MW1s, MW1d and MW7d. There were slightly elevated levels of ammonia in MW-3s, MW-3d and MW-7d. The levels of conductivity detected in MW-3d was slightly higher than the other site wells. The trend of key indicator parameters analysed for between 2011 and 2013 including pH, EC, chloride and ammonia are presented in Figures 3.1 to 3.4 below. These graphical representation of these key parameters are included in the AER following a request to by the Agency.

Figure 3.1 Groundwater pH trend data

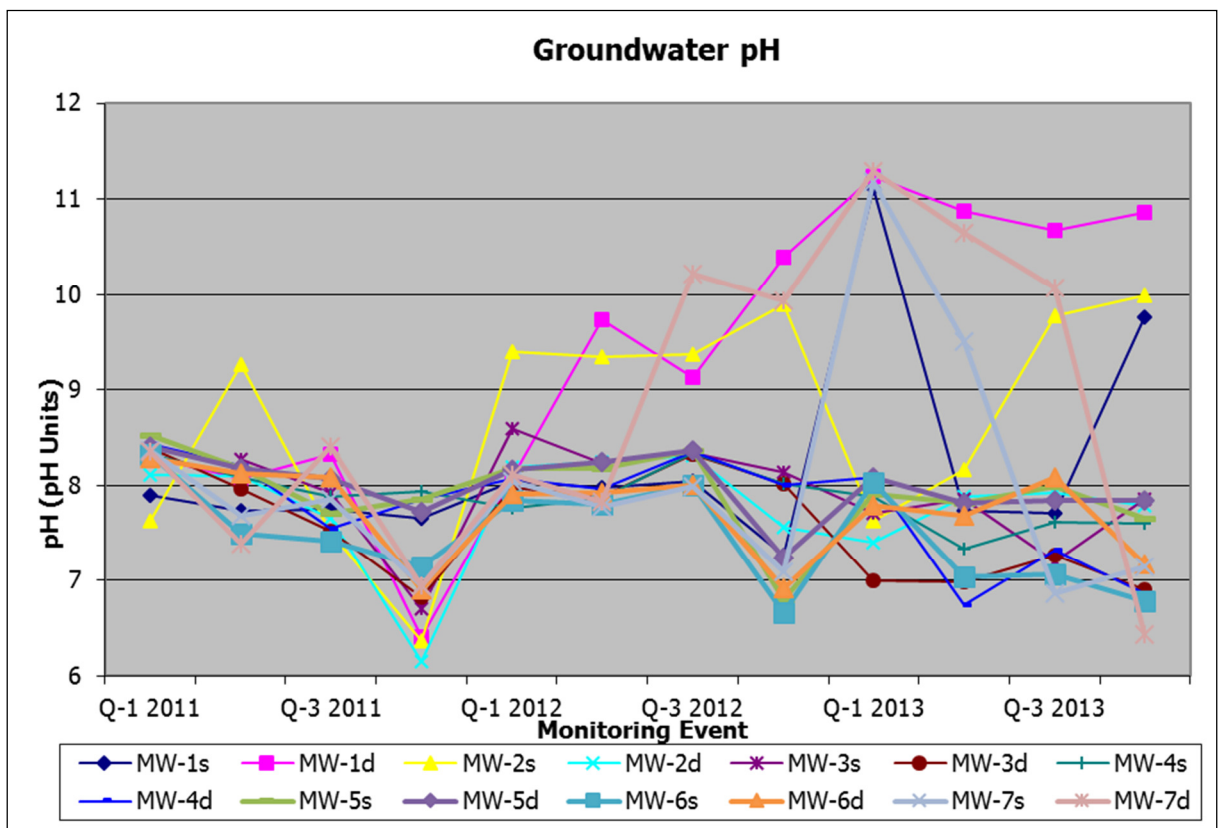


Figure 3.2 Groundwater Electrical Conductivity trend data

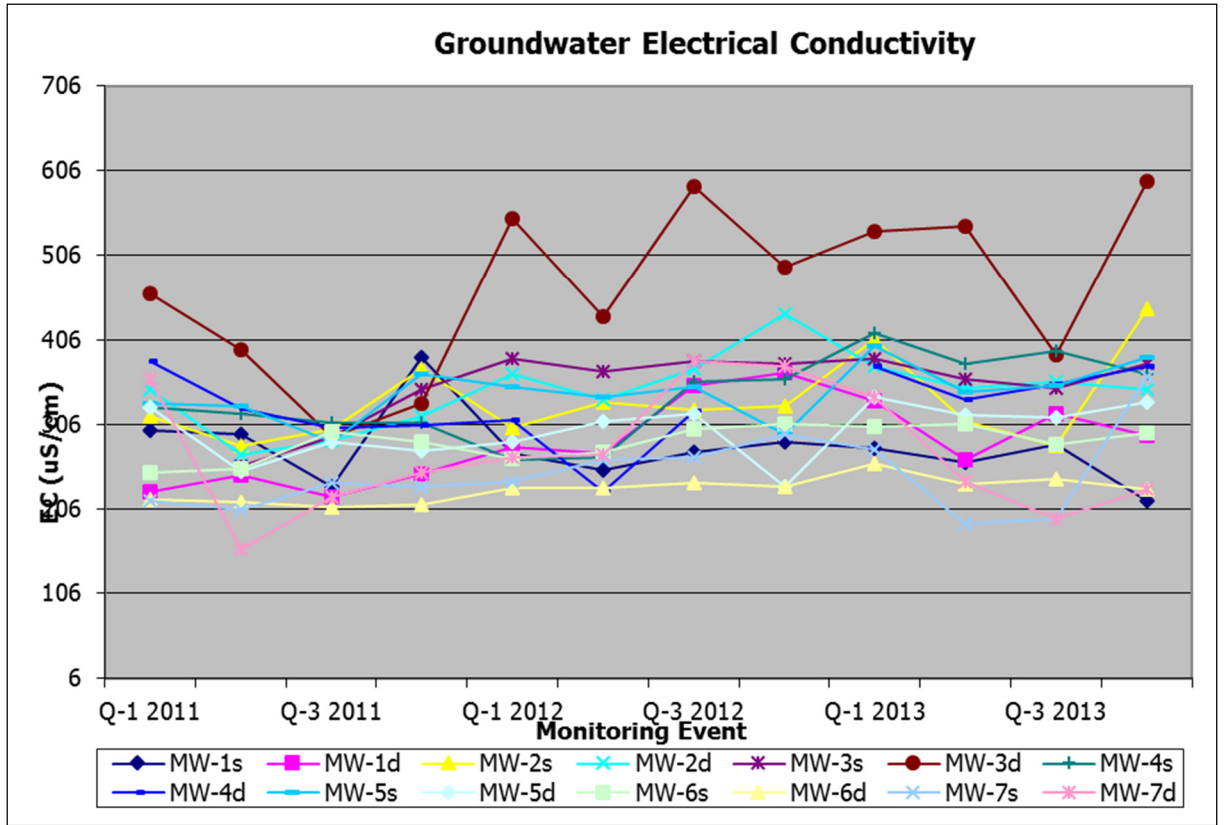


Figure 3.3 Groundwater Chloride trend data

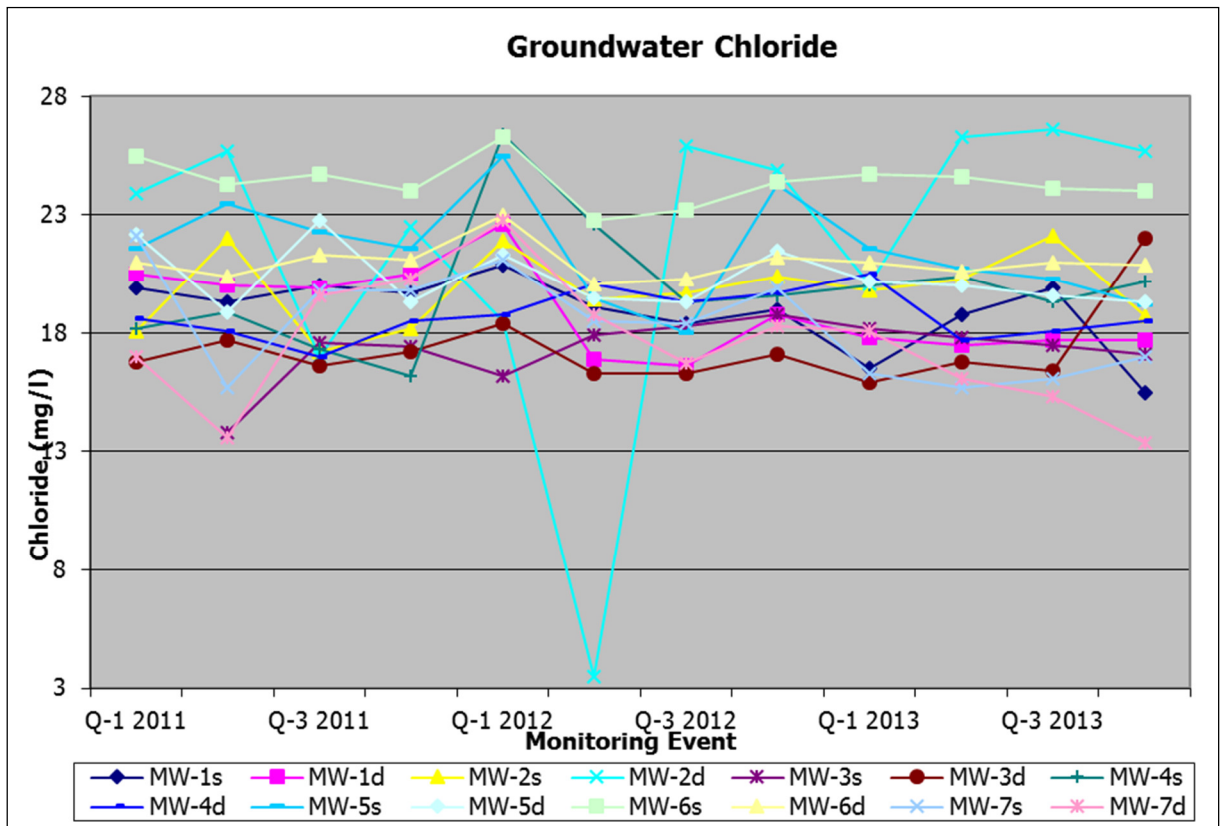
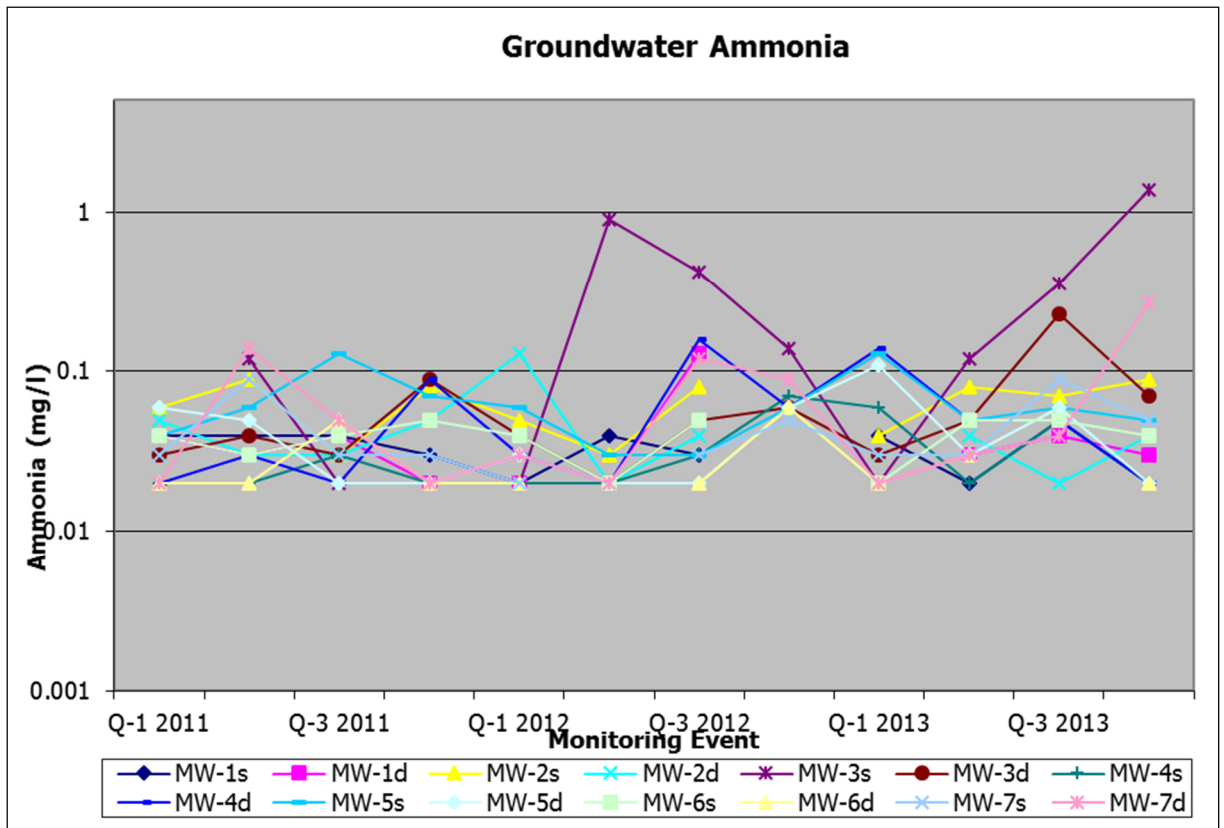


Figure 3.4 Groundwater Ammonia trend data



3.2 Surface Water Monitoring

The site is within the catchment of three streams (Ballynagran, Ford and Killandra) as well as the Three Mile Water River. The catchments are characterised by sudden high flows coinciding with high rainfall periods and particularly low flows in the drier summer months.

3.2.1 Visual Assessment

Greenstar carried out weekly inspections of the surface water drainage system. The inspections did not identify the presence of any impact on the drainage system associated with site activities.

3.2.2 Chemical Assessment

The surface water monitoring was conducted quarterly at the ten monitoring locations specified in the Licence and reported to the Agency on a quarterly basis. The sampling was carried out in accordance with internationally accepted techniques and control procedures, the analyses were completed by a laboratory using standard and internationally accepted procedures. The 2013 results confirm that site activities are not impacting on surface water quality.

3.3 Leachate

The monitoring programme involves the collection and testing of leachate samples from the collection sumps and the storage lagoon. The 2013 results indicate an increase in leachate strength throughout the monitoring period, which is expected given the age of the facility. Leachate is removed off site to Waste Water Treatment plants (WWPT) as agreed with the Agency.

3.4 Landfill Gas (LFG)

Landfill gas is monitored on a monthly basis in wells located outside the waste body. Ballynagran staff members conducted landfill gas monitoring throughout the reporting period. In total 23 no. landfill gas monitoring wells were monitored monthly at Ballynagran during 2013.

Monthly gas results are sent to OCM for inclusion in each quarterly environmental monitoring report. These were included as an appendix in each report sent to the Agency during 2013.

During 2013, methane levels were detected in levels above the licence emission limit value (ELV) of 1% at locations MG16 and MG17. The methane levels have fluctuated over the course of the year with a high of 13.8% v/v recorded in MG17 in June 2013. A high of 10.6% was detected in MG16 during the December 2013 monitoring round. There has been a reduction in the levels of methane detected between 2012 and 2013.

Elevated levels of Carbon Dioxide were detected in levels above the licence emission limit value of 1.5% v/v in monitoring wells in MG-16 and 17 during 2013. The highest level detected was recorded in monitoring well MG17 in July 2013 at a level of 17.8% v/v. There has been a significant reduction in the number of wells in which carbon dioxide was detected above the licence emission limit between 2012 and 2013.

The high CH₄ and CO₂ levels can be explained by the high baseline concentrations in these wells before the facility began accepting waste.

Historically, high concentrations of methane and carbon dioxide were recorded in MG15, MG16, MG17 and MG18 in October 2006, which was prior to the placement of any waste in the landfill. Background CH₄ and CO₂ concentrations continue to be elevated outside the perimeter of the landfill active waste area. These concentrations are consistent with baseline levels recorded prior to the period of active landfilling on the site. The concentrations may be as a result of the natural degradation of organic material and historical waste having been placed in the vicinity prior to the current operators being active at the site.

Analysis carried out in the vicinity of Ballynagran on two occasions in 2007 and 2010 reported by Odour Monitoring Ireland (OMI), showed a VOC profile that is significantly different when

comparing perimeter gas wells with active gas wells. In their report, they state that it is highly unlikely that methane and carbon dioxide concentrations in the perimeter gas wells are the results of lateral or horizontal landfill gas migration.

The OMI reports indicate that the most likely source of the high measurements is from disturbed ground from the construction phase and results represent natural degradation of organic material.

3.5 Noise Surveys

Noise surveys were conducted on four occasions at the locations specified in Table D.1.1 of the Waste Licence. The surveys were carried out in accordance with International Standards Organisation 1996: Acoustics-description and Measurement of Environmental Noise (Parts 1, 2 and 3).

The results at the noise sensitive locations indicate that noise from the site complied with the licence limits.

3.6 Dust Monitoring

Dust deposition is monitored monthly at seven monitoring locations (AD-6, 7, 8, 9, 10, 11 and 12) as specified in Table D.1.1 of the Waste Licence. The dust deposition limit of 350 mg/m²/day was exceeded in February 2013 at AD-11, in May 2013 at AD-6 and at AD10 in September 2013. The levels detected were 411.26, 558 and 543.41mg/m²/day respectively. Incident reports were submitted to the Agency following the exceedances. All of the remaining 2013 monitoring results were less than the deposition limit set in the Licence (350 mg/m²/day) and dust is not an issue at the facility.

3.7 PM₁₀

PM₁₀ levels were monitored on four occasions at the locations specified in Table D.1.1 in March, June, September and November 2013. All measurements were below the trigger level of 50 µ/m³.

3.8 Meteorological Monitoring

Climate data for 2013 was collected from the synoptic stations at Casement Aerodrome and Ashford Climatological Station which is located 16 km to the north of the facility. The rainfall data was taken from the Ashford station as it is closer to the landfill site than Casement.

3.9 Biological Monitoring

The annual biological assessment of the three streams (Ballynagran, Ford and Killandra) as well as the Three Mile Water River, Ballynagran Co. Wicklow was carried out on the 11th November 2013.

The Q values assigned in 2013 were the same as those awarded in 2012 and only slight differences in Q value have been recorded since 2008. A Q value of 3-4 was recorded at sites SW1 and SW7 in 2009 and at SW3 and SW6 in 2008, however in practical terms the difference between a Q3 and Q3-4 is very small and may come down to the presence of a small number of Group A individuals. Therefore despite the slight drop in some Q values since 2008, there is no evidence to indicate that there has been a significant deterioration in water quality. As there were no significant differences in results from the sites which can be considered up gradient of the landfill (SW1-SW3) and those considered down-gradient of the landfill (SW4-SW10) there are no indications that the landfill development is having a significant impact on water quality in the surrounding watercourses.

4. SITE DEVELOPMENT WORKS

4.1 Summary of Resource & Energy Consumption

The principal energy resources consumed at the site are electricity, water for potable supply oil, vehicle wheel cleaning and dust suppression, diesel fuel and hydraulic oils. All site vehicles are fuelled by diesel. Table 4.1 presents an estimate of the resources used on-site in 2013 and 2012 for comparison. All water used for dust suppression comes from the surface water lagoon on site and the potable water from an onsite well.

Table 4.1 Resources Used On-Site

Resource	Units	Total Consumption in 2012	Total Consumption in 2013
Electricity	kWh	373,916	207,850
Diesel Oil	Litres	179,388	
Water, potable supply	Litres	52,000	52,000*
Water, dust suppression	Litres	500,000	500,000*
Water, wheel wash	Litres	100,000	100,000*
Hydraulic Oils	Litres	1,000	1,000

*estimate

4.2 Proposed Site Development Works 2014

The main works proposed for 2014 is the completion of the capping works commenced in 2013 to final design, including soil placement, gas pipe infrastructure placement, topsoil and grass seeding, covering approximately 27,000 m² of liner placed last year.

5. EMISSIONS

5.1 Leachate

There are no direct emissions from leachate generated on-site as it is collected in the main leachate storage lagoon prior to removal off-site for treatment. The total volume of leachate tankered off-site during the reporting period January 2013 – December 2013 was 34,586.23m³. Detailed figures are presented in Table 5.1 below.

Table 5.1 Leachate taken off site in 2013.

Month 2013	Volume (m3)
January	4,197.19
February	4,155.91
March	4,234.02
April	3,833.58
May	2,489.40
June	1,880.56
July	1,450.41
August	2,328.68
September	1,906.86
October	2,069.31
November	4,166.53
December	1,873.78
Total	34,586.23

Water balance calculations were prepared using guidance in the Agency's Landfill Manual-Landfill Site Design and are based on total rainfall data from the Casement and Ashford Met stations and the volumes of waste deposited at the site during the reporting period. The calculations are presented in Table 5.2.

It was assumed that all of the incident rainfall on the active cells had the potential to generate leachate. An absorptive capacity of 0.025 m³/tonne was used based on a waste density of 0.8 tonnes/m³.

The calculations indicate that approximately 28,741m³ of leachate was generated in 2013. The calculations take into account the placement of capping on 47,000m² of the landfill. The calculation assumes that the capping has been in place for the whole of 2013 and therefore underestimates the total amount of leachate generated. Therefore the estimated leachate volumes are lower than the 34,586 m³ of leachate that was removed during the reporting period.

5.2 Landfill Gas

A Landfill Utilisation Compound was constructed in late 2010 and one Landfill Gas Engine commissioned. The facility is currently exporting 0.75 MWhr to the national grid. The Main Enclosed flare which is connected to the landfill gas engine is extracting on average 1,800m³/hour of landfill gas presently. The facility installed a further Enclosed Flare in Cell 7 in May 2010 to replace two open flares situated there since December 2008. This flare was subsequently moved to the Landfill Gas compound and is extracting approximately 1,000m³/hour similar quality landfill gas from Cells 5a/b, 7 and cell 10 in 2014.

There is one 2500m³ open flare used as a back –up site flare only located in the compound and there is also a 500m³ open flare on the landfill which was not used in 2013.

Landfill gas is extracted from the cells through a series of constructed wells, vertically drilled wells, installed horizontal wells and extraction on leachate upslope risers.

Landfill gas infrastructure is installed progressively as the waste is placed and the different gas extraction types are chosen to meet the specific needs of that particular landfill area.

5.3 Estimated Annual and Cumulative Quantity of Indirect Emissions to Groundwater

The potential sources of indirect emissions to groundwater from the facility are as follows:

- **Landfill Base** – The landfill has a composite base lining system comprising a HDPE geomembrane and a half metre thick layer of Bentonite Enhanced Soil. A leak detection survey of the HDPE geomembrane after placement of the drainage stone layer was completed and defects to the HDPE liner were repaired in accordance with industry standards.
- **Surface Water Collection and Treatment System** – Surface water from the paved access roads and landfill cell swale drain is collected and discharged into the surface water lagoon along with groundwater collected at the interceptor sump located below the landfill cells. Water from the lagoon discharges to the reed bed which further filters the water before it is finally discharged to the Ford Stream.
- **Treated Sewage Effluent** – There is a biocycle wastewater treatment plant located adjacent to the weighbridge which treats the canteen and office waste water prior to being pumped to the leachate holding tank via the foul-water sump. Leachate (containing foul water) is tankered off-site to a waste water treatment plant via a vacuum tanker.

In summary, as the landfill is fully contained, there are no indirect emissions to groundwater.

5.4 Surface Water

Rainfall run-off on the undeveloped parts of the site discharges directly to the surface water drainage system. Rainfall on active fill areas is collected in the leachate collection system. The surface drainage from all roads is directed to the surface water retention pond via an oil interceptor. Drainage from the waste inspection and quarantine bays is directed to the leachate lagoon. The retention pond design and capacity meets the requirements of the Waste Licence. The inlet to the pond is fitted with a Class 1 Full Oil interceptor.

Table 5.2 Annual Leachate Volume

Year	Active	Waste	Active	Intermediate	Intermediate	Intermediate	Restored	Restored	Liquid	Total	Absorptive	Annual
	Area	Input	Infiltration	Restoration	Restored	Infiltration	Area	Infiltration	Waste	Leachate	Capacity	Leachate
	Uncapped				Area							
	(m ²)	(t)	(m ³)	Cell No.	(m ²)	(m ³)	(m ²)	(m ³)	(m ³)	(m ³)	(m ³)	Generation
2013	40,000	179,802	30,000				47,000	3235.95	0	33,236	4,495	28,741
Cell area (m ²)				-		Estimated maximum waste input (t/year)				200,000		
Total rainfall (m/year)				0.6885		Liquid waste input (t/year)				0		
Effective Rainfall post vegetation (m/year)				0.189		Final Infiltration				0.06885		10% of Effective Rainfall per annum
Density of <i>in-situ</i> waste (t/m ³)				0.8		Intermediate Infiltration				0.4131		60% of Effective Rainfall per annum
Absorptive capacity (m ³ /t)				0.025								
Effective Rainfall before vegetation assumed to be (m)				0.45								

6. NUISANCE CONTROL

In accordance with Condition 7 of the waste licence, the licensee is committed to ensuring that the facility does not give rise to nuisance at the facility or in the immediate area of the facility. The potential sources of nuisance at a landfill facility are odour, vermin, birds, flies, mud, dust and litter. A procedure, (F09j - Completion of Daily Site Condition Reports) has been drawn up to comply with Condition 7 and is being carried out at the facility.

6.1 Odour

In accordance with Condition 8.12.2 of the waste licence, the licensee had submitted a programme to the Agency for the monitoring and assessment of odours emissions arising from the facility. An odour control and monitoring procedure (F 09 r) has been drawn up and carried out in 2013.

Good operational practices on site are the main controls to avoid odour nuisances. These include procedures relating to the Operation Start-Up and Shut-Down (F 09 001) and Waste Acceptance (F 09 a (IV)) (dealing with the handling, depositing and covering of waste at the facility). These procedures have been written in accordance with the Landfill Manual. Landfill Operational Practices., published by the Agency and are incorporated into the odour control and monitoring procedure onsite.

A landfill gas extraction system with two enclosed landfill gas flares and one landfill gas engine which is connected to the national grid is currently in operation. Landfill gas well drilling was carried out in March 2013 with twelve (12 No.) wells drilled and in August and October 2013 with six (6 No.) wells drilled. This active gas extraction system allows for the long term control of any potential odours. An external consultant (Odour Monitoring Ireland) conducted VOC survey emissions surveys in 2013. The PID/FID survey highlighted areas where there could be potential for VOC escape, by measuring VOC levels around the landfill area. Recommendations from their study of the site have been implemented.

In accordance with daily condition reports, odour inspections are carried out on a daily basis by site staff at the facility and also in response to any odour complaints. In the monitoring period there have been complaints in relation to odours and these are dealt more specifically in Reported Incidents and Complaints (Section 7).

6.2 Vermin and Birds

Inspections for vermin are carried out on a weekly basis for rodents and on a daily basis for birds, in particular crows. BNG employs specialist contractors to control vermin at the facility. Vermin control measures; used as part of this programme, include internal and external bait boxes, rodenticides and insect control measures. The specialist contractor visits the site at regular intervals throughout the year to inspect the control measures and assess their effectiveness. BNG manages bird control internally with a series of control measures used including kits, visual and audible deterrents. These control measures have been found to be successful.

6.3 Flies

Particularly during the warmer months, attention is paid to observations of flies. Any observations are recorded on the Daily Site Condition Report (F09(j)(i)). The Facility Manager or the Site Supervisor is notified immediately in order to take measures to eliminate any significant fly populations from establishing.

6.4 Dust and Mud

The site roads are inspected on a daily basis for mud or dust and any observations recorded on the Daily Site Condition Report ((F09(j)(i)). Special attention is paid to dust during the dry months and mud during the wet months and the Site Supervisor or the Facility Manager is notified immediately in order to take measures to minimise or eliminate any potential nuisances arising from mud or dust accumulating on site roads. Some measures include the use of a wheelwash, road sweeper and the use of a water bowser to dampen access roads and stockpiles during periods of dry weather.

6.5 Litter

Litter is controlled by fencing which was installed around the landfill footprint as specified in the waste licence. Portable litter fencing is also used at the working face, which can be moved to various points around the working face depending on the wind direction. Litter inspections are carried out and recorded as part of the daily inspection, which is outlined in the Completion of Daily Site Condition Reports (F09j (i)) and the Procedure for Litter Prevention & Assembly/Disassembly of Nets (F 09 g). The presence of litter is noted on the Inspection Form and removed immediately if practicable. Any litter noted at or outside the boundary fence, which appears to be illegally dumped, is inspected for any indications of identity if possible and reported to the Facility Manager.

7. ENVIRONMENTAL INCIDENTS AND COMPLAINTS

7.1 Incidents

There were twenty one minor incidents of Non Urgent Category 3 level with regard to trigger levels specified in Condition 6.4.2 of the licence and four minor incidents of Non Urgent Category 3 level excess emissions specified in Schedule C of the licence. These were reported to the agency as soon as the licensee was notified and did not cause any environmental impacts.

7.2 Register of Complaints

The licensee maintained a register of complaints in compliance with Condition 10.4. Details of all complaints received during the reporting period and the action taken by the licence are available at the facility.

The site received 203 complaints during 2013. All complaints received were related to odour. A table illustrating the date, the issue, the corrective action taken and date the complaint was closed is provided in Appendix 3.

Complaints were responded to via the complaints procedure.

8. ENVIRONMENTAL MANAGEMENT SYSTEM

8.1 Management Structure

The Management Structure as required by Condition 2.2.1 of the waste licence for the year 2013 is presented below. Greenstar Holdings Limited the licence holder went into receivership in August 2012 and Greenstar South East Ltd were the interim operator of the facility, until a change of licence holder was agreed and approved by the Agency in March 2014. At this time the licence transferred to Ballynagran Landfill Ltd.

8.1.1 Site Management Structure

The day to day management of the facility and supervision of waste activities are the responsibility of the Facility Manager, Assistant Manager, Site Foreman and the site operatives. The positions and names of the persons who provide management and supervision are set out below: -

- Greenstar Holdings Limited in Receivership - License holder (former 2013)
- Greenstar South East – Operator (former 2013)
- General Manager – Landfill Development and Management, Donal Monaghan (former 2013)
- Facility Manager, Tomas Fingleton
- Assistant Landfill Manager, Robert Kirwan (former 2013)
- Site Foreman, Michael Macleod
- Weight bridge operative Barry Mernagh
- General Operatives, Joseph Donohue, Joseph Moore, Mathew Powell and John Kinsella

8.1.2 Responsibilities

Greenstar Holdings Ltd, as the licensee during 2013, was responsible for ensuring that the requisite resources are provided to operate the facility in accordance with the objective of the EMP and the Waste Licence conditions, this requirement was provided by Greenstar South East Limited during 2013 as Greenstar Holdings went into receivership

The Facility Manager or nominated Deputy is responsible for ensuring that the day to day operation of the facility is carried out in accordance with the EMP, the Waste Licence conditions and the Operating Procedures.

The Facility Manager or nominated Deputy is responsible for ensuring that the environmental monitoring programme is carried out and reports submitted to the Agency in accordance with the schedule in the EMP and the Waste Licence conditions.

The Facility Manager or nominated Deputy is responsible for arranging that the specified engineering works, the leachate and landfill gas management programmes and the restoration programmes are properly implemented.

The Facility Manager or nominated Deputy is responsible for ensuring that the Corrective Action Procedures, Emergency Response Procedures and Contingency Arrangements specified in the EMP and the Waste Licence are implemented.

The Facility Manager or nominated Deputy is responsible for arranging appropriate training programmes for all facility personnel and for maintaining training records.

The Facility Manager, nominated Deputy and designated staff are responsible for implementing the waste acceptance procedures, including the assessment of suitability of the waste for disposal and recording the data specified in the Waste Licence. They are responsible for receiving and recording complaints from members of the public at the facility and informing the General Manager or nominated Deputy of the complaints.

The Facility Manager, nominated Deputy, Site Foreman and designated staff are responsible for ensuring compliance with conditions relating to waste inspection, placement and nuisance control (e.g. daily cover, litter, dust, vermin, birds).

8.1.3 Staff Training

All training was carried out as scheduled in the training plan for 2013. A summary of all training to date can be seen in Appendix 4.

Any facility staff who performs duties which involve interpretation of monitoring results or site inspections, will receive the appropriate training by the General Manager or nominated deputy, prior to carrying out such duties.

All facility staff will receive further training in their individual areas of activity. This training will comprise theoretical sessions as well as practical training. All such training will be recorded and documented in individual training files.

8.2 EMP

Ballynagran Landfill Limited have implemented an Integrated Management System (IMS) in accordance with the requirements of Occupational Health and Safety Assessment Series (OHSAS) 18001:2007 and International Standard Organisation (ISO) 14001:2004 in order to manage the Health, Safety and Environmental performance of their business and to control health and safety risk and to minimise their environmental aspects and impacts. The facility maintained ISO14001 and OHSAS 18001 in 2013 with Certification Europe auditing. The audit found the facility to be compliant with its conditions for standard certification for both management systems.

The IMS has been developed for the achievement of continual improvement taking into the requirements of the Waste Licence Conditions. The IMS has been prepared and effectively implemented in accordance with the requirements of both the OHSAS 18001:2007 and ISO 14001:2004.

As part of this IMS the licence had developed a list of environmental, management, operating and maintenance procedures, details of which are outlined in Appendix 5. The schedule of Objectives and Targets, including their status for 2013 (Table 8.1), as well as the proposed Objectives and Targets for 2014 (Table 8.2) are presented below.

8.2.1 Schedule of Objectives 2013

Table 8.1 describes the implementation of the objectives and targets in the reporting period.

8.2.2 Schedule of Objectives 2014

Ballynagran Landfill Ltd has set a schedule of targets and objectives for 2014. These are presented in Table 8.2.

8.3 Communications Programme

The Communications Programme required by Condition 2.4 of the waste licence, was established three months before the start of waste activities and has been submitted to the Agency.

Ballynagran Landfill pursues an active programme of disseminating information on its operations to all interested parties. This is undertaken through a variety of means including site tours, the company website, presentations and open days. During 2008, a short film was produced detailing how the facility was constructed and is operated. The film is shown to those visiting the facility.

The overall communications programme contains the following objectives:

- To promote public awareness of Greenstar's activities and environmental policies;
- To maintain an ongoing dialogue with authorities that have direct involvement with waste;
- To make available Environmental Performance Data to all interested parties;
- To disseminate information relating to the operation and management of the site;
- To encourage liaison between the site and local residents and those who may be affected by the site operations,
- To provide general information on waste management issues;
- To ensure all users and customers of the site are conversant with the requirements of the site waste licence;
- To ensure that all objectives are, where possible, measurable and quantifiable;

The objectives of the programme are met through the following elements as appropriate:

- Personal contact;
- Residents meetings/Liaison groups;
- Information displays;
- Information packs;
- Site visits;
- Web page;
- Educational links; and
- Published information

Table 8.1 Progress Report on Schedule of Objectives and Targets for 2013

Originated from	Objective	Progress
F01 - impact no. 1 / AER 2008, 2009, 2010, 2011, 2012	Develop landfill gas collection infrastructure and gas utilisation plant.	Installation of 25 gas wells during 2013. Completed the installation for 6000m2 of Geohess and 27,000m2 of permanent liner.
F01 – impact no. 3 / AER 2009,2010, 2011 & 2012	Minimise risk of potential water pollution from generation of leachate	Construction of Cell 2 5 a/b cell embankment raise and completion of 27,000m2 of capping. Installation of 6000m2 of Geohess
F01 – impact no. 5 / AER 2009,2010, 2011 & 2012	Reduce dust nuisance on environment and surrounding neighbours	Maintain and operate the dust management procedures for the facility, Minimise the movement of capping soils during very windy dry weather.
F01 – impact no. 4 / AER 2009,2010, 2011& 2012	Avoid contamination of groundwater after a spillage or emergency situation	Carry out spillage emergency response training (for timescale see project sheet)
F01 – impact no. 6 and AER 2008, 2009, 2010, 2011& 2012	Reduce risk of wind blown litter when the site is operating in adverse weather conditions	Ensure site remains compliant with Licence conditions which refer to wind blown litter (for timescale see project sheet)
F03a No.1 AER 2012	To reduce the risk of site personnel being hit by a vehicle	To significantly reduce this type of incident on site.

Originated from	Objective	Target including timescale
F03a No.2 AER 2012	Reduce or eliminate the risk from tipper vehicles overturning	Actively discourage tipper type vehicles from the site in favour of more stable and safer type vehicles suitable to the landfill terrain.
F03a No.3 AER 2012	Ensure edge protection is adequate on all landfill haul roads	Construction of safety berms on all internal landfill site roads
F01 - impact no. 7 / AER 2007, 2008, 2009, 2010, 2011 & 2012	Review and assess the effectiveness of nuisance control procedures including bird, rats and mice	Continually review and assess all nuisance control procedures to ensure minimal impact on surrounding area. Update reports on bird control and odour abatement measures. Prepare and implement odour nuisance management plan (for timescale see project sheet)
AER 2007, 2008, 2009, 2010, 2011 & 2012	Minimise nuisance from vehicle movements and uploading / tipping	Ensure noise, dust, odour from vehicle movements are minimised by correct implementation of relevant operational protocols (for timescale see project sheet)
AER 2007, 2008, 2009, 2010, 2011 & 2012	Continue to improve relationships with neighbouring communities / reduce environmental complaints	Develop communications with site neighbours and respond to queries as quickly as reasonably practicable, ensuring that any complaints are followed up in writing as soon as possible after receipt of complaint (for timescale see project sheet).
AER 2007, 2008, 2009, 2010, 2011 & 2012	Environmental monitoring	Ensure monitoring results comply with Licence limits and investigate any exceedances of emission limit value (for timescale see project sheet).
AER 2007, 2008, 2009, 2010, 2011 & 2012	Monitor progress of planting programme on a regular basis	Regularly review planted woodland area and ensure the replacement of any failed trees to ensure visual impact of site is minimised (for timescale see project sheet).

Originated from	Objective	Progress
AER 2008, 2009, 2010, 2011 & 2012	Awareness and training programme	Carry out continued ISO and Health and Safety Training
H&S Policy / AER 2009/AER 2010/AER 2011/AER 2012	<ul style="list-style-type: none"> • Promotion of H&S amongst all employees and the generation of an ethos of continual improvement • Diligent management of operations by employing control mechanisms, procedures and processes that are technologically proven and economically feasible • Promotion of continual improvement, good health and safety work practices through continual review of O&Ts • Fostering of openness, dialogue, enhanced communication and discussion with employees, clients, neighbours, suppliers, contractors and all interested parties regarding our H&S and our O&Ts • Publication and communication of our policy internally and ensuring its availability to the public and interested parties on request so that it is understood implemented and maintained • Measurement of performance by conducting regular audits and assessment of compliance with the OHSAS 18001:2007 standards, EHS policy, relevant legislation and regulatory requirements 	<ul style="list-style-type: none"> • Improvement driven Safety Observation Audit Reports are to be undertaken bi-monthly focussing on swiftly resolving problems as they occur • Develop H&S training giving more focus on empowering employees to become safety representatives, as applicable • Look to develop staff interaction enabling keen spotting of potential problem or hazards through training and communication • Encourage feedback on equipment and resources including adequacy of PPE in protective properties, wear ability and durability and look at alternatives, where appropriate • Develop neighbour relations by encouraging site visits to complainants or mediation through local groups such as the liaison committee or anti-dump group also handling complaints with higher degree of positive feedback

Table 8.2 Schedule of Objectives and Targets for 2014

Originated from	Objective	Target including timescale	Project no.
F01 - impact no. 1 / AER 2008, 2009, 2010 & 2011& 2013	Develop landfill gas collection infrastructure and gas utilisation plant.	Extend gas collection infrastructure into new cells, respond to increased gas generation by installing additional infrastructure. Ensure delivery of high gas quality above 37% methane suitable for burn in engine to ensure approximately 100% of all landfill generated by the facility can be converted to power. Facilitate the installation of new engines to ensure sufficient power generation capacity for all gas produced, by end of year 2014. Install intermediate capping materials progressively over filled areas to reduce gas loss and improve gas quality. Maintain FID surveys on quarterly. (for timescale see project sheet)	1
F01 – impact no. 3 / AER 2009,2010 & 2011& 2013	Minimise risk of potential water pollution from generation of leachate	Minimise leachate generation. In 2014 complete capping works and surface water off capped areas to surface water system, ensure intermediate capping allows for surface water run off away from cells. (for timescale see project sheet)	2
F01 – impact no. 5 / AER 2009,2010 & 2011& 2013	Reduce dust nuisance on environment and surrounding neighbours	All dust emissions in accordance with Licence (for timescale see project sheet)Complete grass seeding of cap by end of September 2014, Complete grass seeding of soil deposit area above borrow source levelled by sept 2014	3
F01 – impact no. 4 / AER 2009,2010 & 2011	Avoid contamination of groundwater after a spillage or emergency situation	Carry out spillage emergency response training (for timescale see project sheet)	4

Originated from	Objective	Target including timescale	Project no.
F01 – impact no. 6 and AER 2008, 2009, 2010 & 2011& 2013	Reduce risk of wind blown litter when the site is operating in adverse weather conditions	Ensure site remains compliant with Licence conditions which refer to wind blown litter (for timescale see project sheet). Install new litter fence across capped area to reduce open area for wind blow Oct 2014	5
Risk assessment (hazard no. 4) / AER 2009	To reduce the risk of site personnel being hit by a vehicle	To significantly reduce this type of incident on site.	6
F01 - impact no. 7 / AER 2007, 2008, 2009, 2010 & 2011& 2013	Review and assess the effectiveness of nuisance control procedures including bird, rats and mice	Continually review and assess all nuisance control procedures to ensure minimal impact on surrounding area. Update reports on bird control and odour abatement measures. Update and implement odour nuisance management plan (for timescale see project sheet). Update internal bird control plan and implement measures.	7
AER 2007, 2008, 2009, 2010 & 2011	Minimise nuisance from vehicle movements and uploading / tipping	Ensure noise, dust, odour from vehicle movements are minimised by correct implementation of relevant operational protocols (for timescale see project sheet)	8
AER 2007, 2008, 2009, 2010 & 2011	Continue to improve relationships with neighbouring communities / reduce environmental complaints	Develop communications with site neighbours and respond to queries as quickly as reasonably practicable, ensuring that any complaints are followed up in writing as soon as possible after receipt of complaint (for timescale see project sheet).	9
AER 2007, 2008, 2009, 2010 & 2011	Environmental monitoring	Ensure monitoring results comply with Licence limits and investigate any exceedances of emission limit value (for timescale see project sheet).	10

Originated from	Objective	Target including timescale	Project no.
AER 2007, 2008, 2009, 2010 & 2011	Monitor progress of planting programme on a regular basis	Regularly review planted woodland area and ensure the replacement of any failed trees to ensure visual impact of site is minimised (for timescale see project sheet).	11
AER 2008, 2009, 2010 & 2011	Awareness and training programme	Carry out continued ISO and Health and Safety Training	n/a
H&S Policy / AER 2009/AER 2010/AER 2011 & 2013	<ul style="list-style-type: none"> • Promotion of H&S amongst all employees and the generation of an ethos of continual improvement • Diligent management of operations by employing control mechanisms, procedures and processes that are technologically proven and economically feasible • Promotion of continual improvement, good health and safety work practices through continual review of O&Ts • Fostering of openness, dialogue, enhanced communication and discussion with employees, clients, neighbours, suppliers, contractors and all interested parties regarding our H&S and our O&Ts • Publication and communication of our policy internally and ensuring its availability to the public and interested parties on request so that it is understood implemented and maintained • Measurement of performance by conducting regular audits and assessment of compliance with the OHSAS 18001:2007 standards, EHS policy, relevant legislation and regulatory requirements 	<ul style="list-style-type: none"> • Improvement driven Safety Observation Audit Reports are to be undertaken bi-monthly focussing on swiftly resolving problems as they occur • Develop H&S training giving more focus on empowering employees to become safety representatives, as applicable • Look to develop staff interaction enabling keen spotting of potential problem or hazards through training and communication • Encourage feedback on equipment and resources including adequacy of PPE in protective properties, wear ability and durability and look at alternatives, where appropriate • Develop neighbour relations by encouraging site visits to complainants or mediation through local groups such as the liaison committee or anti-dump group also handling complaints with higher degree of positive feedback • Ensure toolbox talks are conducted on a monthly bases minimum. 	n/a

Originated from	Objective	Target including timescale	Project no.
<p>AER 2008 & 2009 / 2010 Energy Audit March 10/Jan 11</p>	<p>Assess and review resource and energy consumption at the site (AER 2008) 14 points from Energy Audit March 2011. 1. Review energy policy statement annually. 2. Provide appropriate training annually. 3.. Prepare targets and objectives 4. Annual summary on performance in AER 5. Assessment of energy efficiency of future plant and equipment 6. Communicate policy objectives to staff 7. Provide sub meters for gas utilisation plants 8. Bi-monthly data analyses and identification of efficiency opportunities 9. Annual summary report in AER 10. Provide awareness training to staff 11. Provide feedback to staff 12. Provide time sensors for office lighting 13. Consider introducing bio-diesel for mobile plant 14. Benchmark gas utilisation plant against KTK and IPS systems</p>	<p>For 14 points of energy audit carried out in February 2011 see project sheet.</p> <p>Carry out energy efficiency and resource use audit next audit report to be carried out by October 2014</p>	<p>17</p>

9. OTHER REPORTS

9.1 Financial Provision

Under condition 12.3.3 of the site licence Ballynagran Landfill is required to maintain a financial provision that is sufficient to cover the anticipated cost of closure, final restoration and aftercare, which are all the costs that will be incurred after such time as the landfill has ceased accepting waste. This liability is known as the CRAMP liability. As part of the licence transfer from Greenstar Holdings Ltd to Ballynagran Landfill Ltd, the CRAMP liability was recalculated and agreed with the Office for Environmental Enforcement as being €10.1M. Financial provision, to the satisfaction of the Board of the EPA, has been put in place sufficient to cover the CRAMP liability.

As part of Condition 12.3.2, the Licensee has completed an Environmental Liabilities Risk Assessment. This document outlines the potential unforeseen environmental liabilities associated with the landfill and estimates the possible cost of these liabilities. An environmental liability insurance policy has been taken out for €10M which is more than sufficient to cover any of the unforeseen events contemplated within the ELRA.

9.2 Landscape Programme

There was no additional tree planting at the facility during 2013. There was maintenance carried out on all existing trees planted, in terms of weeding and pruning.

9.3 Surface Water and Leachate Management System Inspection and Slope Stability Assessment Report

A surface water and leachate management system inspection and slope stability assessment report was prepared by Fehiley Timoney in early 2014 and filed on site for review as and when required by the Agency. The survey concluded that apart from a small section of the final capping soils placed in 2012 which required remediation, the slopes are not showing any signs of movement or distress and the surface water lagoon is in good condition.

9.4 European Pollutant Release and Transfer Register

Under the European Pollutant Release and Transfer Register Regulation (EC) No. 166/2006 Greenstar are required to submit information annually to the Agency. A copy of the information submitted to the Agency via the web-based data reporting system is included in Appendix 6.

9.5 Tank, drum, pipeline and bund testing and inspection report

Integrity testing was not due in 2013. Testing will be conducted in 2014.

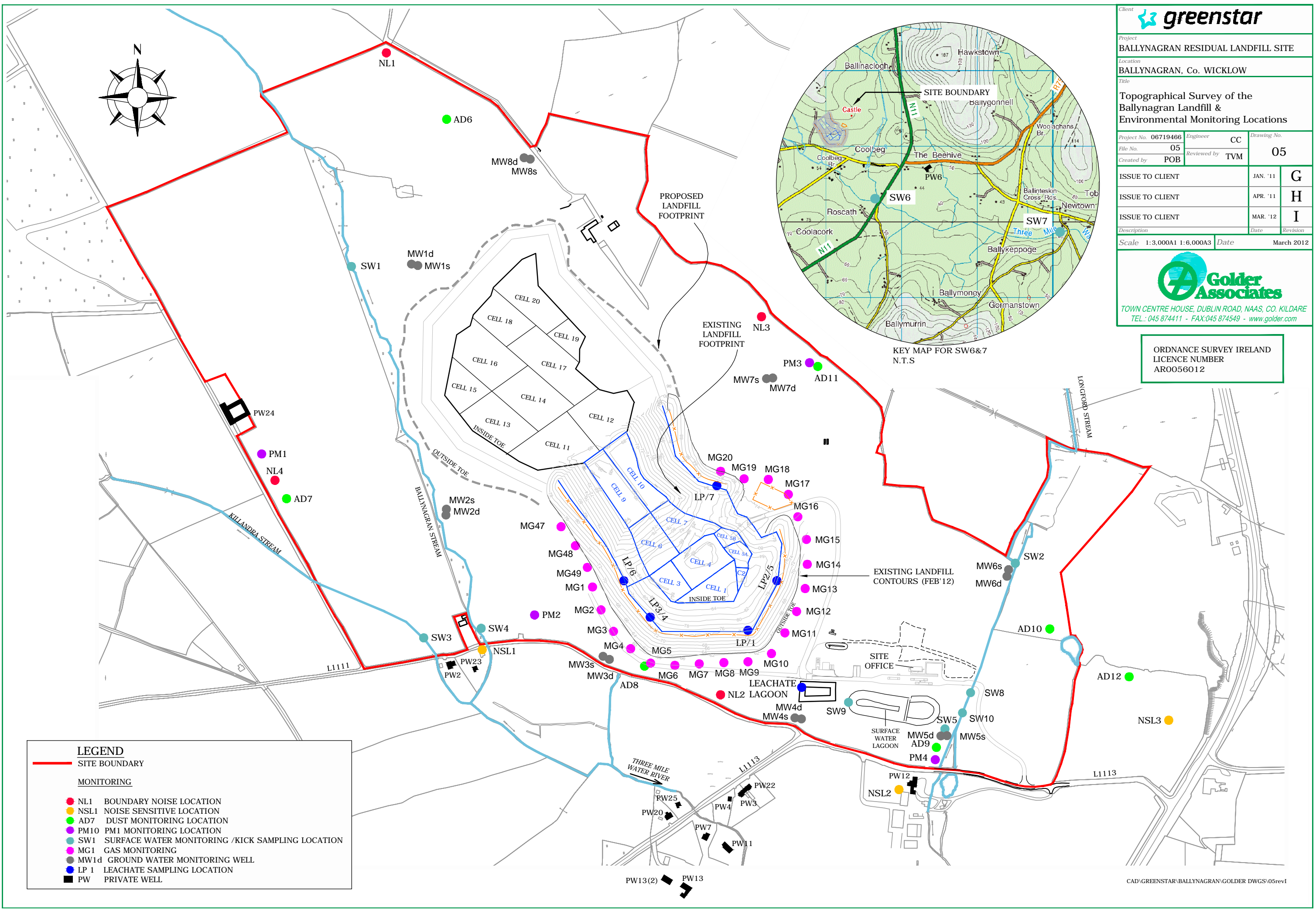
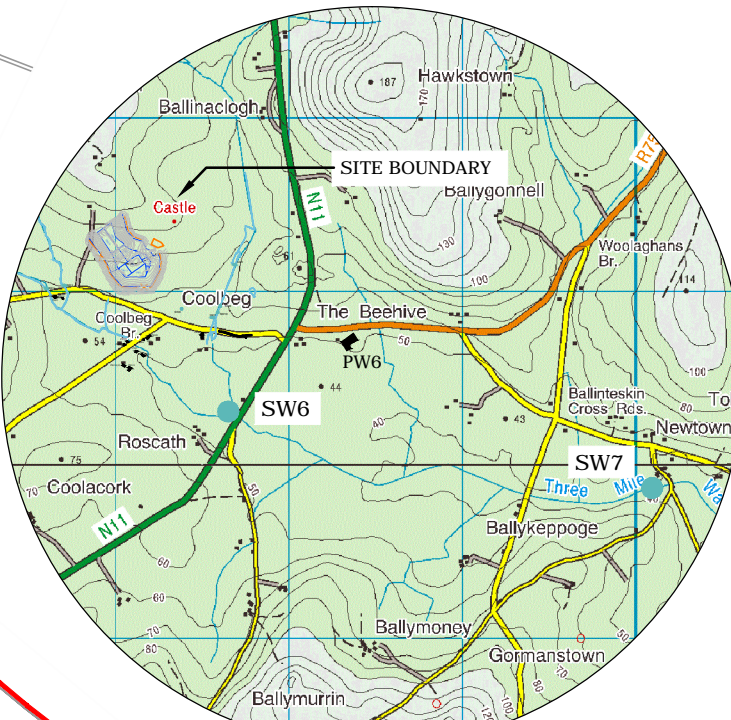
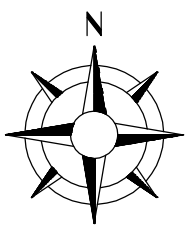
APPENDIX 1

Topographic Survey with Monitoring Locations



TOWN CENTRE HOUSE, DUBLIN ROAD, NAAS, CO. KILDARE
TEL.: 045 874411 - FAX: 045 874549 - www.golder.com

ORDNANCE SURVEY IRELAND
LICENCE NUMBER
AR0056012



LEGEND	
	SITE BOUNDARY
MONITORING	
	NL1 BOUNDARY NOISE LOCATION
	NSL1 NOISE SENSITIVE LOCATION
	AD7 DUST MONITORING LOCATION
	PM10 PM1 MONITORING LOCATION
	SW1 SURFACE WATER MONITORING /KICK SAMPLING LOCATION
	MG1 GAS MONITORING
	MW1d GROUND WATER MONITORING WELL
	LP 1 LEACHATE SAMPLING LOCATION
	PW PRIVATE WELL

APPENDIX 2

Monitoring Results 2013

Groundwater Data 2013

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-1S	MW-1S	MW-1S	MW-1S
pH	11.12	7.74	7.71	9.76
Electrical Conductivity	278	261	283	216
Chloride	16.5	18.8	19.9	15.5
Ammonia	0.04	0.02	0.05	0.02
Potassium	1.6	0.8	0.5	1.4
Dissolved Oxygen	9	9	9	11
Total Chromium				<1.5
TOC	<2	<2	<2	<2
Boron				<12
Cadmium				<0.5
Calcium				17.4
Copper				<7
Iron				<20
Lead				<5
Magnesium				1.6
Manganese				<2
Mercury				<1
Nickel				<2
Sodium				17.7
Zinc				<3
Fluoride				<0.3
Sulphate				19.27
Ortho Phosphate				<0.06
TON				4.7
Total Cyanide				<0.01
Alkalinity				60
Total Solids				385
VOCs				nd
sVOCs				nd
Pesticides				nd
Total Coliforms				10
Faecal Coliforms				<1

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-1D	MW-1D	MW-1D	MW-1D
pH	11.24	10.88	10.67	10.86
Electrical Conductivity	334	265	318	293
Chloride	17.8	17.5	17.7	17.7
Ammonia	0.02	0.03	0.04	0.03
Potassium	1.3	1.2	0.8	1.1
Dissolved Oxygen	5	8	7	10
Total Chromium				<1.5
TOC	<2	<2	<2	<2
Boron				<12
Cadmium				<0.5
Calcium				34.2
Copper				<7
Iron				<20
Lead				<5
Magnesium				0.2
Manganese				<2
Mercury				<1
Nickel				<2
Sodium				19.4
Zinc				<3
Fluoride				<0.3
Sulphate				41.12
Ortho Phosphate				<0.06
TON				1.4
Total Cyanide				<0.01
Alkalinity				132
Total Solids				360
VOCs				nd
sVOCs				nd
Pesticides				nd
Total Coliforms				<1
Faecal Coliforms				<1

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-2S	MW-2S	MW-2S	MW-2S
pH	7.63	8.16	9.77	9.99
Electrical Conductivity	407	310	281	443
Chloride	19.8	20.3	22.1	18.7
Ammonia	0.04	0.08	0.07	0.09
Potassium	1.2	1.2	1.2	1.4
Dissolved Oxygen	6	8	8	10
Total Chromium				7.7
TOC	<2	<2	<2	3
Boron				26
Cadmium				<0.5
Calcium				32.0
Copper				<7
Iron				<20
Lead				<5
Magnesium				3.1
Manganese				<2
Mercury				<1
Nickel				<2
Sodium				50.9
Zinc				<3
Fluoride				<0.3
Sulphate				121.12
Ortho Phosphate				<0.06
TON				0.3
Total Cyanide				<0.01
Alkalinity				100
Total Solids				713
VOCs				nd
sVOCs				nd
Pesticides				nd
Total Coliforms				10
Faecal Coliforms				3

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-2D	MW-2D	MW-2D	MW-2D
pH	7.4	7.88	7.93	7.79
Electrical Conductivity	374	349	357	348
Chloride	20.1	26.3	26.6	25.7
Ammonia	<0.01	0.04	0.02	0.04
Potassium	1.2	0.8	0.5	0.6
Dissolved Oxygen	5	7	8	10
Total Chromium				<1.5
TOC	<2	<2	<2	<2
Boron				<12
Cadmium				<0.5
Calcium				37.9
Copper				<7
Iron				<20
Lead				<5
Magnesium				7.4
Manganese				<2
Mercury				<1
Nickel				<2
Sodium				15.4
Zinc				<3
Fluoride				<0.3
Sulphate				5.42
Ortho Phosphate				<0.06
TON				9.2
Total Cyanide				<0.01
Alkalinity				86
Total Solids				420
VOCs				nd
sVOCs				nd
Pesticides				nd
Total Coliforms				41
Faecal Coliforms				7

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-3S	MW-3S	MW-3S	MW-3S
pH	7.71	7.86	7.2	7.86
Electrical Conductivity	383	360	349	377
Chloride	18.2	17.8	17.5	17.1
Ammonia	0.02	0.12	0.36	1.37
Potassium	2.4	2.2	1.6	1.7
Dissolved Oxygen	4	9	8	7
Total Chromium				<1.5
TOC	<2	<2	<2	<2
Boron				234
Cadmium				<0.5
Calcium				24.5
Copper				<7
Iron				<20
Lead				<5
Magnesium				8.9
Manganese				185
Mercury				<1
Nickel				<2
Sodium				40.5
Zinc				<3
Fluoride				0.4
Sulphate				0.15
Ortho Phosphate				0.24
TON				<0.2
Total Cyanide				<0.01
Alkalinity				166
Total Solids				212
VOCs				nd
sVOCs				nd
Pesticides				nd
Total Coliforms				488.4
Faecal Coliforms				2

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-3D	MW-3D	MW-3D	MW-3D
pH	7	6.99	7.27	6.90
Electrical Conductivity	535	541	388	594
Chloride	15.9	16.8	16.4	22.0
Ammonia	0.03	0.05	0.23	0.07
Potassium	2.1	1.7	0.8	2.4
Dissolved Oxygen	4	6	6	6
Total Chromium				<1.5
TOC	4	3	<2	5
Boron				13
Cadmium				<0.5
Calcium				89.5
Copper				<7
Iron				<20
Lead				<5
Magnesium				12.8
Manganese				<2
Mercury				<1
Nickel				<2
Sodium				12.2
Zinc				<3
Fluoride				<0.3
Sulphate				35.29
Ortho Phosphate				<0.06
TON				4.8
Total Cyanide				<0.01
Alkalinity				224
Total Solids				365
VOCs				nd
sVOCs				nd
Pesticides				nd
Total Coliforms				73.8
Faecal Coliforms				2

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-4S	MW-4S	MW-4S	MW-4S
pH	7.88	7.33	7.61	7.60
Electrical Conductivity	414	378	392	365
Chloride	20	20.4	19.3	20.2
Ammonia	0.06	0.02	0.05	0.02
Potassium	1.1	1.1	0.9	1.0
Dissolved Oxygen	5	6	6	6
Total Chromium				<1.5
TOC	<2	<2	<2	<2
Boron				<12
Cadmium				<0.5
Calcium				42.3
Copper				<7
Iron				<20
Lead				<5
Magnesium				8.3
Manganese				48
Mercury				<1
Nickel				<2
Sodium				16.1
Zinc				<3
Fluoride				<0.3
Sulphate				18.49
Ortho Phosphate				<0.06
TON				0.6
Total Cyanide				<0.01
Alkalinity				126
Total Solids				309
VOCs				nd
sVOCs				nd
Pesticides				nd
Total Coliforms				8010
Faecal Coliforms				<1

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-4D	MW-4D	MW-4D	MW-4D
pH	8.08	6.74	7.32	6.87
Electrical Conductivity	375	335	353	375
Chloride	20.5	17.7	18.1	18.5
Ammonia	0.14	0.05	0.05	0.02
Potassium	1.2	1.1	1	1.1
Dissolved Oxygen	3	8	8	8
Total Chromium				<1.5
TOC	<2	<2	<2	<2
Boron				<12
Cadmium				0.9
Calcium				42.8
Copper				<7
Iron				<20
Lead				<5
Magnesium				8.5
Manganese				19
Mercury				<1
Nickel				<2
Sodium				14.0
Zinc				4
Fluoride				<0.3
Sulphate				29.70
Ortho Phosphate				<0.06
TON				2.0
Total Cyanide				<0.01
Alkalinity				114
Total Solids				191
VOCs				nd
sVOCs				nd
Pesticides				nd
Total Coliforms				126.7
Faecal Coliforms				<1

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-5S	MW-5S	MW-5S	MW-5S
pH	7.91	7.82	7.99	7.65
Electrical Conductivity	399	345	352	385
Chloride	21.6	20.7	20.3	19.2
Ammonia	0.13	0.05	0.06	0.05
Potassium	1.4	1.2	1.1	1.5
Dissolved Oxygen	3	7	6	7
Total Chromium				<1.5
TOC	<2	<2	<2	<2
Boron				20
Cadmium				<0.5
Calcium				48.1
Copper				<7
Iron				<20
Lead				<5
Magnesium				8.9
Manganese				23
Mercury				<1
Nickel				<2
Sodium				15.5
Zinc				<3
Fluoride				<0.3
Sulphate				13.08
Ortho Phosphate				<0.06
TON				2.5
Total Cyanide				<0.01
Alkalinity				142
Total Solids				264
VOCs				nd
sVOCs				nd
Pesticides				nd
Total Coliforms				11199
Faecal Coliforms				20

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-5D	MW-5D	MW-5D	MW-5D
pH	8.08	7.82	7.84	7.85
Electrical Conductivity	339	317	314	333
Chloride	20.2	20	19.6	19.3
Ammonia	0.11	0.03	0.06	0.02
Potassium	1.2	1.2	1.3	1.3
Dissolved Oxygen	2	4	5	5
Total Chromium				<1.5
TOC	<2	<2	<2	<2
Boron				55
Cadmium				<0.5
Calcium				33.5
Copper				<7
Iron				<20
Lead				<5
Magnesium				9.2
Manganese				6
Mercury				<1
Nickel				<2
Sodium				15.9
Zinc				<3
Fluoride				<0.3
Sulphate				7.70
Ortho Phosphate				0.46
TON				0.7
Total Cyanide				<0.01
Alkalinity				120
Total Solids				196
VOCs				nd
sVOCs				nd
Pesticides				nd
Total Coliforms				134
Faecal Coliforms				3

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-6S	MW-6S	MW-6S	MW-6S
pH	8.03	7.04	7.07	6.79
Electrical Conductivity	304	307	283	296
Chloride	24.7	24.6	24.1	24.0
Ammonia	0.02	0.05	0.05	0.04
Potassium	0.8	0.8	0.5	0.8
Dissolved Oxygen	7	8	8	9
Total Chromium				<1.5
TOC	<2	<2	<2	<2
Boron				<12
Cadmium				<0.5
Calcium				26.7
Copper				<7
Iron				<20
Lead				<5
Magnesium				7.6
Manganese				<2
Mercury				<1
Nickel				<2
Sodium				14.8
Zinc				<3
Fluoride				<0.3
Sulphate				9.17
Ortho Phosphate				<0.06
TON				5.7
Total Cyanide				<0.01
Alkalinity				72
Total Solids				549
VOCs				nd
sVOCs				nd
Pesticides				nd
Total Coliforms				248.1
Faecal Coliforms				<1

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-6D	MW-6D	MW-6D	MW-6D
pH	7.79	7.68	8.09	7.17
Electrical Conductivity	260	235	241	230
Chloride	21	20.6	21	20.9
Ammonia	0.02	0.03	<0.01	0.02
Potassium	0.7	0.7	0.4	0.6
Dissolved Oxygen	7	9	8	10
Total Chromium				<1.5
TOC	<2	<2	<2	<2
Boron				<12
Cadmium				<0.5
Calcium				16.0
Copper				<7
Iron				<20
Lead				<5
Magnesium				6.1
Manganese				<2
Mercury				<1
Nickel				<2
Sodium				17.9
Zinc				<3
Fluoride				<0.3
Sulphate				4.30
Ortho Phosphate				<0.06
TON				3.9
Total Cyanide				<0.01
Alkalinity				56
Total Solids				104
VOCs				nd
sVOCs				nd
Pesticides				nd
Total Coliforms				6.3
Faecal Coliforms				<1

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-7S	MW-7S	MW-7S	MW-7S
pH	11.18	9.5	6.87	7.14
Electrical Conductivity	277	188	195	362
Chloride	16.3	15.7	16.1	17.0
Ammonia	0.03	0.03	0.09	0.05
Potassium	1.5	1	0.4	0.6
Dissolved Oxygen	9	9	10	9
Total Chromium				<1.5
TOC	<2	<2	<2	4
Boron				<12
Cadmium				<0.5
Calcium				35.4
Copper				<7
Iron				<20
Lead				<5
Magnesium				9.4
Manganese				<2
Mercury				<1
Nickel				<2
Sodium				20.4
Zinc				6
Fluoride				<0.3
Sulphate				23.42
Ortho Phosphate				<0.06
TON				11.0
Total Cyanide				<0.01
Alkalinity				80
Total Solids				457
VOCs				nd
sVOCs				nd
Pesticides				nd
Total Coliforms				24196
Faecal Coliforms				200

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-7D	MW-7D	MW-7D	MW-7D
pH	11.29	10.65	10.07	6.43
Electrical Conductivity	338	239	195	229
Chloride	18.1	16.1	15.3	13.4
Ammonia	0.02	0.03	0.04	0.27
Potassium	1.3	1.1	0.5	0.4
Dissolved Oxygen	4	7	10	10
Total Chromium				<1.5
TOC	<2	<2	<2	<2
Boron				<12
Cadmium				1.1
Calcium				12.4
Copper				<7
Iron				<20
Lead				<5
Magnesium				9.0
Manganese				27
Mercury				<1
Nickel				<2
Sodium				17.3
Zinc				9
Fluoride				<0.3
Sulphate				13.76
Ortho Phosphate				<0.06
TON				0.7
Total Cyanide				<0.01
Alkalinity				82
Total Solids				192
VOCs				nd
sVOCs				nd
Pesticides				nd
Total Coliforms				61310
Faecal Coliforms				280

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-8S	MW-8S	MW-8S	MW-8S
pH	Dry	Dry	Dry	Dry
Electrical Conductivity	Dry	Dry	Dry	Dry
Chloride	Dry	Dry	Dry	Dry
Ammonia	Dry	Dry	Dry	Dry
Potassium	Dry	Dry	Dry	Dry
Dissolved Oxygen	Dry	Dry	Dry	Dry
Total Chromium	Dry	Dry	Dry	Dry
TOC	Dry	Dry	Dry	Dry
Boron				Dry
Cadmium				Dry
Calcium				Dry
Copper				Dry
Iron				Dry
Lead				Dry
Magnesium				Dry
Manganese				Dry
Mercury				Dry
Nickel				Dry
Sodium				Dry
Zinc				Dry
Fluoride				Dry
Sulphate				Dry
Ortho Phosphate				Dry
TON				Dry
Total Cyanide				Dry
Alkalinity				Dry
Total Solids				Dry
VOCs				Dry
sVOCs				Dry
Pesticides				Dry
Total Coliforms				Dry
Faecal Coliforms				Dry

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	MW-8D	MW-8D	MW-8D	MW-8D
pH	Dry	Dry	Dry	Dry
Electrical Conductivity	Dry	Dry	Dry	Dry
Chloride	Dry	Dry	Dry	Dry
Ammonia	Dry	Dry	Dry	Dry
Potassium	Dry	Dry	Dry	Dry
Dissolved Oxygen	Dry	Dry	Dry	Dry
Total Chromium	Dry	Dry	Dry	Dry
TOC	Dry	Dry	Dry	Dry
Boron				Dry
Cadmium				Dry
Calcium				Dry
Copper				Dry
Iron				Dry
Lead				Dry
Magnesium				Dry
Manganese				Dry
Mercury				Dry
Nickel				Dry
Sodium				Dry
Zinc				Dry
Fluoride				Dry
Sulphate				Dry
Ortho Phosphate				Dry
TON				Dry
Total Cyanide				Dry
Alkalinity				Dry
Total Solids				Dry
VOCs				Dry
sVOCs				Dry
Pesticides				Dry
Total Coliforms				Dry
Faecal Coliforms				Dry

Surface Water Data 2013

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	SW-1	SW-1	SW-1	SW-1
pH	7.75	7.68	7.7	7.21
Electrical Conductivity	189	183	229	263
Chloride	16.4	18.9	14	23.9
Ammoniacal Nitrogen	<0.03	0.03	<0.03	0.02
Total Suspended Solids	<10	<10	<10	<10
Dissolved Oxygen	12	10	10	12
BOD	<1	<1	<1	<1
COD	<7	8	<7	12
Boron				<12
Cadmium				<0.5
Calcium				21.9
Copper				<7
Iron				26
Lead				<5
Magnesium				7.4
Manganese				<2
Mercury				<1
Nickel				<2
Potassium				1.8
Sodium				14.0
Zinc				3
Total Chromium				<1.5
Sulphate				14.99
Ortho Phosphate				<0.06
Total Oxidised Nitrogen				4.5
Total Alkalinity				58

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	SW-2	SW-2	SW-2	SW-2
pH	5.72	7.65	7.75	7.10
Electrical Conductivity	286	263	315	270
Chloride	28.2	28.6	31	28.3
Ammonia	<0.03	0.08	<0.03	0.02
Potassium	<10	<10	<10	<10
Dissolved Oxygen	12	11	9	11
Total Chromium	<1	<1	<1	<1
TOC	<7	8	<7	11
Boron				<12
Cadmium				<0.5
Calcium				22.9
Copper				<7
Iron				<20
Lead				<5
Magnesium				7.0
Manganese				5
Mercury				<1
Nickel				<2
Potassium				1.6
Sodium				15.8
Zinc				<3
Total Chromium				<1.5
Sulphate				12.25
Ortho Phosphate				<0.06
Total Oxidised Nitrogen				4.3
Total Alkalinity				60

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	SW-3	SW-3	SW-3	SW-3
pH	7.79	7.78	6.94	6.99
Electrical Conductivity	226	208	235	225
Chloride	18.4	19.1	20.4	19.5
Ammonia	0.05	0.06	0.04	0.02
Potassium	<10	<10	<10	<10
Dissolved Oxygen	12	10	9	11
Total Chromium	<1	<1	<1	<1
TOC	<7	<7	<7	<7
Boron				<12
Cadmium				<0.5
Calcium				14.9
Copper				<7
Iron				<20
Lead				<5
Magnesium				7.2
Manganese				<2
Mercury				<1
Nickel				<2
Potassium				2.2
Sodium				11.9
Zinc				<3
Total Chromium				<1.5
Sulphate				13.71
Ortho Phosphate				<0.06
Total Oxidised Nitrogen				4.7
Total Alkalinity				38

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	SW-4	SW-4	SW-4	SW-4
pH	8.13	6.46	Dry	6.89
Electrical Conductivity	276	184	Dry	178
Chloride	16.5	18.5	Dry	17.2
Ammonia	<0.03	0.21	Dry	0.02
Potassium	<10	<10	Dry	<10
Dissolved Oxygen	12	10	Dry	11
Total Chromium	<1	<1	Dry	<1
TOC	<7	<7	Dry	11
Boron				<12
Cadmium				<0.5
Calcium				12.6
Copper				<7
Iron				26
Lead				<5
Magnesium				5.1
Manganese				<2
Mercury				<1
Nickel				<2
Potassium				0.9
Sodium				10.5
Zinc				<3
Total Chromium				<1.5
Sulphate				12.26
Ortho Phosphate				<0.06
Total Oxidised Nitrogen				2.7
Total Alkalinity				36

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	SW-5	SW-5	SW-5	SW-5
pH	7.75	7.48	7.56	7.14
Electrical Conductivity	328	262	314	275
Chloride	29.2	28.5	31	28.1
Ammonia	1.37	0.14	<0.03	0.05
Potassium	<10	<10	<10	<10
Dissolved Oxygen	12	11	9	11
Total Chromium	2	<1	<1	<1
TOC	<7	11	10	<7
Boron				<12
Cadmium				<0.5
Calcium				23.7
Copper				<7
Iron				<20
Lead				<5
Magnesium				7.0
Manganese				<2
Mercury				<1
Nickel				<2
Potassium				1.6
Sodium				15.5
Zinc				<3
Total Chromium				<1.5
Sulphate				12.25
Ortho Phosphate				<0.06
Total Oxidised Nitrogen				4.5
Total Alkalinity				62

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	SW-6	SW-6	SW-6	SW-6
pH	7.63	7.78	8.33	7.27
Electrical Conductivity	276	246	294	263
Chloride	24.7	23.9	26.6	24.0
Ammonia	0.14	0.03	0.03	0.03
Potassium	<10	<10	<10	<10
Dissolved Oxygen	12	11	10	12
Total Chromium	<1	<1	<1	<1
TOC	<7	8	<7	<7
Boron				<12
Cadmium				<0.5
Calcium				21.1
Copper				<7
Iron				<20
Lead				<5
Magnesium				7.1
Manganese				<2
Mercury				<1
Nickel				<2
Potassium				1.7
Sodium				13.7
Zinc				<3
Total Chromium				<1.5
Sulphate				13.56
Ortho Phosphate				<0.06
Total Oxidised Nitrogen				4.6
Total Alkalinity				58

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	SW-7	SW-7	SW-7	SW-7
pH	7.79	7.74	8.03	7.72
Electrical Conductivity	384	335	457	378
Chloride	29.1	25.4	27.1	24.9
Ammonia	0.09	0.03	<0.03	0.02
Potassium	<10	<10	<10	<10
Dissolved Oxygen	12	11	10	11
Total Chromium	<1	<1	<1	<1
TOC	<7	<7	<7	9
Boron				<12
Cadmium				<0.5
Calcium				45.9
Copper				<7
Iron				31
Lead				<5
Magnesium				8.5
Manganese				30
Mercury				<1
Nickel				<2
Potassium				1.9
Sodium				14.7
Zinc				<3
Total Chromium				<1.5
Sulphate				17.16
Ortho Phosphate				<0.06
Total Oxidised Nitrogen				4.2
Total Alkalinity				118

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	SW-8	SW-8	SW-8	SW-8
pH	7.62	7.91	7.08	7.13
Electrical Conductivity	290	265	339	280
Chloride	28.3	28.4	32	28.3
Ammonia	0.05	0.15	<0.03	0.02
Potassium	<10	<10	<10	<10
Dissolved Oxygen	12	11	9	11
Total Chromium	<1	<1	<1	<1
TOC	<7	<7	<7	<7
Boron				<12
Cadmium				<0.5
Calcium				23.3
Copper				<7
Iron				<20
Lead				<5
Magnesium				6.9
Manganese				<2
Mercury				<1
Nickel				<2
Potassium				1.6
Sodium				15.6
Zinc				<3
Total Chromium				<1.5
Sulphate				12.71
Ortho Phosphate				<0.06
Total Oxidised Nitrogen				4.6
Total Alkalinity				60

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	SW-9	SW-9	SW-9	SW-9
pH	7.88	8.49	7.2	7.75
Electrical Conductivity	274	463	320	482
Chloride	9	22.6	31.5	16.6
Ammonia	<0.03	2.68	<0.03	0.17
Potassium	<10	<10	<10	<10
Dissolved Oxygen	12	13	10	9
Total Chromium	<1	2	<1	<1
TOC	<7	17	<7	10
Boron				13
Cadmium				<0.5
Calcium				67.0
Copper				<7
Iron				<20
Lead				<5
Magnesium				10.8
Manganese				78
Mercury				<1
Nickel				<2
Potassium				3.2
Sodium				11.7
Zinc				<3
Total Chromium				<1.5
Sulphate				44.71
Ortho Phosphate				<0.06
Total Oxidised Nitrogen				2.1
Total Alkalinity				182

Parameter	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
	SW-10	SW-10	SW-10	SW-10
pH	8.03	7.54	Dry	7.12
Electrical Conductivity	308	270	Dry	286
Chloride	28.8	28.7	Dry	28.3
Ammonia	0.69	0.18	Dry	0.02
Potassium	<10	<10	Dry	<10
Dissolved Oxygen	12	11	Dry	11
Total Chromium	2	<1	Dry	<1
TOC	<7	<7	Dry	<7
Boron				<12
Cadmium				<0.5
Calcium				24.0
Copper				<7
Iron				<20
Lead				<5
Magnesium				7.0
Manganese				6
Mercury				<1
Nickel				<2
Potassium				1.6
Sodium				15.7
Zinc				<3
Total Chromium				<1.5
Sulphate				12.14
Ortho Phosphate				<0.06
Total Oxidised Nitrogen				4.2
Total Alkalinity				58

Leachate Data 2013

Parameter	Units	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
		LP-1	LP-1	LP-1	LP-1
pH	pH Units	Dry	7.81	8.1	Dry
Electrical Conductivity	µS/cm	Dry	20337	28381	Dry
Chloride	mg/l	Dry	1476.8	2539.2	Dry
Ammoniacal Nitrogen	mg/l	Dry	2265.34	3130.77	Dry
BOD	mg/l	Dry	2304	522	Dry
COD	mg/l	Dry	6700	6510	Dry
Boron	ug/l				
Cadmium	ug/l				
Calcium	mg/l				
Copper	ug/l				
Iron	ug/l				
Lead	ug/l				
Magnesium	mg/l				
Manganese	ug/l				
Mercury	ug/l				
Nickel	ug/l				
Potassium	mg/l				
Sodium	mg/l				
Zinc	ug/l				
Total Chromium	ug/l				
Fluoride	mg/l				
Sulphate	mg/l				
Orthophosphate	mg/l				
Total Oxidised Nitrogen	mg/l				
Total Cyanide	mg/l				

Parameter	Units	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
		LP-2/5	LP-2/5	LP-2/5	LP-2/5
pH	pH Units	8.32	8.01	7.97	8.08
Electrical Conductivity	µS/cm	25761	28800	28749	31434
Chloride	mg/l	2384.1	2513	2764.8	2876.3
Ammoniacal Nitrogen	mg/l	2336.98	2897.77	2804.61	3083.75
BOD	mg/l	324	1098	420	1035
COD	mg/l	4110	6440	9810	6625
Boron	ug/l				7370
Cadmium	ug/l				<2.5
Calcium	mg/l				75.6
Copper	ug/l				289.4
Iron	ug/l				748
Lead	ug/l				729
Magnesium	mg/l				<25
Manganese	ug/l				102.3
Mercury	ug/l				247
Nickel	ug/l				<5
Potassium	mg/l				151
Sodium	mg/l				1369
Zinc	ug/l				2760
Total Chromium	ug/l				223
Fluoride	mg/l				5
Sulphate	mg/l				48.22
Orthophosphate	mg/l				72.97
Total Oxidised Nitrogen	mg/l				<0.2
Total Cyanide	mg/l				0.04

Parameter	Units	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
		LP-3	LP-3	LP-3	LP-3
pH	pH Units	8.03	8.02	8.09	8.08
Electrical Conductivity	µS/cm	24078	27355	28362	29971
Chloride	mg/l	2303.1	2339.4	2461.8	2423.7
Ammoniacal Nitrogen	mg/l	1887.14	2749.7	3014.61	3134.55
BOD	mg/l	917	588	450	304
COD	mg/l	4870	6320	6480	6750
Boron	ug/l				4477
Cadmium	ug/l				<2.5
Calcium	mg/l				42.8
Copper	ug/l				264.6
Iron	ug/l				295
Lead	ug/l				3641
Magnesium	mg/l				<25
Manganese	ug/l				77.5
Mercury	ug/l				342
Nickel	ug/l				<5
Potassium	mg/l				81
Sodium	mg/l				1241
Zinc	ug/l				2512
Total Chromium	ug/l				134
Fluoride	mg/l				6.8
Sulphate	mg/l				16.77
Orthophosphate	mg/l				56.6
Total Oxidised Nitrogen	mg/l				<0.2
Total Cyanide	mg/l				0.05

Parameter	Units	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
		LP-6	LP-6	LP-6	LP-6
pH	pH Units	7.94	8.06	8.03	8.16
Electrical Conductivity	µS/cm	22953	30700	28002	33794
Chloride	mg/l	2151.2	2801.3	2733.1	2970.5
Ammoniacal Nitrogen	mg/l	1811.56	2962.49	2656.21	3452
BOD	mg/l	707	2630	366	7110
COD	mg/l	4310	9720	9250	14725
Boron	ug/l				11380
Cadmium	ug/l				<2.5
Calcium	mg/l				91.4
Copper	ug/l				541.5
Iron	ug/l				309
Lead	ug/l				1612
Magnesium	mg/l				<25
Manganese	ug/l				104.2
Mercury	ug/l				501
Nickel	ug/l				<5
Potassium	mg/l				188
Sodium	mg/l				1623
Zinc	ug/l				3170
Total Chromium	ug/l				255
Fluoride	mg/l				95.5
Sulphate	mg/l				<0.05
Orthophosphate	mg/l				73.58
Total Oxidised Nitrogen	mg/l				<0.2
Total Cyanide	mg/l				0.05

Parameter	Units	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
		LP-7	LP-7	LP-7	LP-7
pH	pH Units	Dry	7.81	7.81	7.82
Electrical Conductivity	µS/cm	Dry	26441	28008	28072
Chloride	mg/l	Dry	2489.1	2771.9	2543.8
Ammoniacal Nitrogen	mg/l	Dry	2402.58	2584.49	2557.64
BOD	mg/l	Dry	534	354	723
COD	mg/l	Dry	5130	9680	5650
Boron	ug/l				6027
Cadmium	ug/l				<2.5
Calcium	mg/l				115.5
Copper	ug/l				445.2
Iron	ug/l				145
Lead	ug/l				1569
Magnesium	mg/l				<25
Manganese	ug/l				115.4
Mercury	ug/l				621
Nickel	ug/l				<5
Potassium	mg/l				178
Sodium	mg/l				1160
Zinc	ug/l				2377
Total Chromium	ug/l				119
Fluoride	mg/l				12.8
Sulphate	mg/l				24.44
Orthophosphate	mg/l				62.77
Total Oxidised Nitrogen	mg/l				<0.2
Total Cyanide	mg/l				0.04

Parameter	Units	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
		LP-9	LP-9	LP-9	LP-9
pH	pH Units	8.24	7.98	8.02	7.85
Electrical Conductivity	µS/cm	22533	25302	27820	20584
Chloride	mg/l	2188.6	2451.6	2718.8	1816.1
Ammoniacal Nitrogen	mg/l	1868.57	2395.99	2627.35	1784.51
BOD	mg/l	607	1416	354	279
COD	mg/l	4180	5960	9290	3680
Boron	ug/l				6469
Cadmium	ug/l				<2.5
Calcium	mg/l				121.7
Copper	ug/l				377.3
Iron	ug/l				<35
Lead	ug/l				1212
Magnesium	mg/l				<25
Manganese	ug/l				94
Mercury	ug/l				422
Nickel	ug/l				<5
Potassium	mg/l				181
Sodium	mg/l				980.7
Zinc	ug/l				1804
Total Chromium	ug/l				81
Fluoride	mg/l				4.2
Sulphate	mg/l				42.3
Orthophosphate	mg/l				32.6
Total Oxidised Nitrogen	mg/l				<0.2
Total Cyanide	mg/l				0.06

Parameter	Units	Q-1 2013	Q-2 2013	Q-3 2013	Q-4 2013
		Lagoon	Lagoon	Lagoon	Lagoon
pH	pH Units	8.32	8	7.97	7.94
Electrical Conductivity	µS/cm	19855	23021	26604	21181
Chloride	mg/l	1772.1	2188	2514.9	1755
Ammoniacal Nitrogen	mg/l	1701.96	2221.07	2481.84	1882.68
BOD	mg/l	620	1110	1088	885
COD	mg/l	3570	8790	6240	4570
Boron	ug/l				4777
Cadmium	ug/l				<2.5
Calcium	mg/l				82
Copper	ug/l				278.9
Iron	ug/l				<35
Lead	ug/l				948
Magnesium	mg/l				<25
Manganese	ug/l				63.2
Mercury	ug/l				419
Nickel	ug/l				<5
Potassium	mg/l				115
Sodium	mg/l				878.3
Zinc	ug/l				1719
Total Chromium	ug/l				63
Fluoride	mg/l				15.1
Sulphate	mg/l				22.24
Orthophosphate	mg/l				39.32
Total Oxidised Nitrogen	mg/l				<0.2
Total Cyanide	mg/l				0.04

Landfill Gas Data 2013

Landfill Gas Results 2013 Ballynagran W0165-02

Sample Station Number	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	CH ₄	CH ₄	CH ₄	CH ₄	CH ₄	CH ₄	CH ₄	CH ₄	CH ₄	CH ₄	CH ₄	CH ₄	
	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	
MG000001	0.7	0.6	0.4	0.2	0.6	0	0.2	0.4	0.6	0.6	0.5	0.3	
MG000002	0.3	0.3	0.5	0.4	0.4	0.1	0.3	0.2	0.3	0.4	0.4	0.4	
MG000003	0.2	0.4	0.3	0.3	0.4	0.1	0.3	0.3	0.3	0.3	0.3	0.4	
MG000004	0.7	0.4	0.3	0.4	0.6	0.2	0.4	0.3	0.5	0.5	0.3	0.4	
MG000005	0.8	0.2	0.3	0.2	0.8	0.1	0.3	0.3	0.3	0.2	0.3	0.3	
MG000006	0.6	0.6	0.5	0.4	0.6	0.1	0.4	0.4	0.4	0.4	0.4	0.4	
MG000007	Flooded	0.9	0.7	0.6	0.5	0.7	0.5	0.7	0.5	0.5	0.5	0.5	
MG000008	Flooded	0.7	0.8	0.6	0.7	0.1	0.6	0.6	0.6	0.8	0.5	0.7	
MG000009	0.5	0.6	0.4	0.5	0.4	0.1	0.5	0.5	0.7	0.7	0.5	0.5	
MG000010	0.4	0.4	0.3	0.2	0.3	0.2	0.2	0.5	0.5	0.5	0.5	0.6	
MG000011	0.2	0.2	0.4	0.2	0.3	0	0.2	0.2	0.3	0.4	0.4	0.4	
MG000012	0.1	0.6	0.5	0.4	0.6	0	0.4	0.4	0.4	0.6	0.6	0.6	
MG000013	0.5	0.6	0.6	0.5	0.6	0.4	0.5	0.6	0.5	0.5	0.5	0.5	
MG000014	0.9	0.7	0.7	0.6	0.7	0.3	0.6	0.6	0.6	0.8	0.8	0.8	
MG000015	1.1	0.4	0.7	0.6	0.6	0.1	0.6	0.7	0.8	0.8	0.8	0.7	
MG000016	3.4	4.4	6.7	8.3	9.6	6.9	9.3	8.2	7.6	8.8	9.4	10.6	
MG000017	6.7	6.7	7.8	9.8	10.5	13.8	10.2	9.7	8.7	9.1	10.4	11.8	
MG000018	0.8	0.8	0.8	0.6	0.6	0.2	0.7	0.8	0.6	0.8	0.8	0.7	
MG000019	0.7	0.4	0.6	0.4	0.5	0.1	0.5	0.6	0.7	0.4	0.7	0.6	
MG000020	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	0.6	0.3	0.5	0.5	0.6	0.4
MG000046	0.5	0.5	0.4	0.3	0.4	0.4	0.2	0.3	0.4	0.4	0.4	0.4	
MG000047	0.5	0.4	0.2	0.2	0.5	0.3	0.2	0.2	0.4	0.6	0.6	0.6	
MG000048	0.3	0.4	0.4	0.5	0.4	0.1	0.6	0.5	0.3	0.3	0.3	0.3	
MG000049	0.8	0.4	0.3	0.2	0.4	0.1	0.2	0.2	0.2	0.4	0.4	0.3	

- Problem with gas meter therefore it was not possible to take

Landfill Gas Results 2013 Ballynagran W0165-02

Sample Station Number	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	CO ₂	CO ₂	CO ₂	CO ₂	CO ₂	CO ₂	CO ₂	CO ₂	CO ₂	CO ₂	CO ₂	CO ₂
	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)
MG000001	0.8	0.8	0.8	0.8	1.1	0	0.7	0.9	0.7	0.2	0.2	0.2
MG000002	0.9	1.1	1.1	1	0.8	0	0.9	0.8	0.8	0.8	0.8	0.8
MG000003	0.7	0.5	0.9	0.6	0.6	0	0.8	0.8	0.9	0.3	0.3	0.8
MG000004	0.6	1.2	0.6	0.4	0.5	0.1	0.6	0.6	0.6	0.6	0.6	0.8
MG000005	0.4	0.7	0.4	0.4	0.6	1.3	0.7	0.5	0.7	0.5	0.5	0.5
MG000006	0.4	0.8	0.7	0.8	0.9	0.3	0.9	0.9	0.9	0.9	0.9	0.9
MG000007	Flooded	1.1	0.6	0.6	0.5	0.6	0.5	0.6	0.7	0.8	0.8	0.7
MG000008	Flooded	1.2	0.7	0.6	0.3	1.1	0.6	0.6	0.6	0.6	0.6	0.6
MG000009	1	0.9	1	0.9	0.6	0.3	1	0.8	0.9	0.9	0.9	0.5
MG000010	1.1	1.1	1.2	1	1.2	0.6	0.9	0.9	0.9	0.7	0.8	0.8
MG000011	0.9	1	1.1	0.9	0.7	0.7	0.9	0.7	0.8	0.7	0.8	0.8
MG000012	0.8	0.9	0.6	0.8	0.8	0.4	0.6	0.6	0.6	0.6	0.8	0.3
MG000013	0.6	0.7	0.8	0.6	0.7	0.6	0.6	0.8	0.9	0.6	0.6	0.6
MG000014	1.1	1.2	1.1	1	1.1	0.1	0.8	0.8	0.8	0.8	0.8	0.4
MG000015	0.8	0.9	0.9	0.8	0.9	0	0.8	0.9	0.7	0.7	0.7	0.7
MG000016	10.8	8.9	11.2	13.2	11.2	0.9	14.2	15.6	14.7	12.6	13.8	12.9
MG000017	12.3	10.3	13.5	14.8	13.2	0.9	17.8	16.8	16.2	14.5	15.7	16.2
MG000018	0.7	0.6	0.6	0.7	0.6	0.5	0.6	0.8	0.6	0.6	0.6	0.5
MG000019	0.6	0.8	0.4	0.6	0.4	0.4	0.6	0.7	0.5	0.4	0.3	0.4
MG000020	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	0.8	0.6	0.3	0.3	0.4
MG000046	0.8	0.8	0.6	0.4	0.7	0.7	0.2	0.1	0.2	0.2	0.8	0.8
MG000047	1.1	0.7	0.6	0.4	0.6	0.4	0.3	0.3	0.3	0.3	0.8	0.8
MG000048	0.6	0.6	0.7	0.6	0.4	0.1	0.3	0.4	0.6	0.2	0.8	0.8
MG000049	0.6	0.6	0.6	0.6	0.6	0	0.4	0.4	0.4	0.4	0.4	0.4

- Problem with gas meter therefore it was not possible to take

Landfill Gas Results 2013 Ballynagran W0165-02

Sample Station Number	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	O ₂	O ₂	O ₂	O ₂	O ₂	O ₂	O ₂	O ₂	O ₂	O ₂	O ₂	O ₂
	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)
MG000001	20.3	20.6	20.6	20.5	20.4	20.6	20.5	20.5	20.5	20.5	20.4	20.5
MG000002	20	20.6	20.8	20.9	20.9	20.3	20.9	20.4	20.3	20.3	20.4	20.5
MG000003	20.3	20.5	20.4	20.5	20.5	20.4	20.5	20.5	20.5	20.5	20.4	20.4
MG000004	20.1	20.4	20.4	20.6	20.6	20.3	20.6	20.8	20.3	20.5	20.5	20.5
MG000005	20.6	20.6	20.6	20.6	20.6	20.4	20.6	20.6	20.6	20.5	20.5	20.5
MG000006	20.3	20.6	20.2	20.3	20.3	20.1	20.3	20.3	20.5	20.5	20.5	20.5
MG000007	Flooded	20.4	20.7	20.6	20.6	20.6	20.6	20.9	20.9	20.5	20.5	20.5
MG000008	Flooded	20.5	20.6	20.4	20.4	20.3	20.4	20.4	20.6	20.6	20.6	20.6
MG000009	20.1	20.6	20.5	20.6	20.6	20	20.6	20.4	20.4	20.4	20.4	20.4
MG000010	20.2	20.4	20.1	20.3	20.3	20.4	20.3	20.3	20.5	20.5	20.5	20.5
MG000011	20.1	20.4	20.2	20.4	20.4	19.6	20.4	20.6	20.6	20.6	20.6	20.6
MG000012	20.3	20.6	20.8	20.4	20.4	20.4	20.4	20.4	20.6	20.6	20.6	20.6
MG000013	20.1	20.8	20.4	20.6	20.6	20.4	20.6	20.5	20.5	20.6	20.4	20.7
MG000014	20.2	20.3	20.6	20.8	20.8	20.3	20.8	20.8	20.5	20.6	20.4	20.4
MG000015	20.3	20.4	20.7	20.6	20.6	20.3	20.6	20.5	20.3	20.6	20.4	20.7
MG000016	18.5	19.8	19.5	19.1	19.4	17.6	19.1	19.4	19.1	19.1	19.3	19.1
MG000017	17.6	19.9	19.3	19.5	19.7	13.6	19.5	19.6	19.2	19.2	18.7	18.5
MG000018	20.1	20.3	20.2	20.4	20.2	19.6	20.4	20.6	20.4	20.6	20.6	20.4
MG000019	20.4	20.1	20.8	20.8	20.6	20.1	20.8	20.7	20.4	20.4	20.6	20.4
MG000020	Flooded	Flooded	Flooded	Flooded	Flooded	Flooded	20.1	20.5	20.2	20.2	20.4	20.4
MG000046	20.1	20.1	20.6	20.5	20.5	20.5	20.5	20.8	20.6	20.6	20.6	20.9
MG000047	20.3	20.3	20.4	20.4	20.4	20	20.4	20.5	20.4	20.4	20.4	20.4
MG000048	20.4	20.5	20.8	20.6	20.5	21	20.6	20.6	20.6	20.6	20.4	20.4
MG000049	20.3	20.4	20.4	20.6	20.6	20.8	20.6	20.7	20.4	20.4	20.4	20.5

- Problem with gas meter therefore it was not possible to take

Landfill Gas Results 2013 Ballynagran W0165-02

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sample Station Number	Baromet	Baromet	Baromet	Baromet	Baromet	Baromet	Baromet	Baromet	Baromet	Baromet	Baromet	Baromet
	ric	ric	ric	ric	ric	ric	ric	ric	ric	ric	ric	ric
	Pressure	Pressure	Pressure	Pressure	Pressure	Pressure	Pressure	Pressure	Pressure	Pressure	Pressure	Pressure
MG000001	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000002	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000003	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000004	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000005	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000006	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000007	Flooded	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000008	Flooded	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000009	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000010	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000011	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000012	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000013	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000014	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000015	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000016	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000017	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000018	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000019	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000020	Flooded	Flooded	Flooded	Flooded	1004	Flooded	1012	1007	1008	1004	1010	1023
MG000046	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000047	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000048	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023
MG000049	1006	1025	1013	1016	1004	1011	1012	1007	1008	1004	1010	1023

measurement

Noise Data 2013

Noise Results 2013 Ballynagran W0165-02 Q1

Location	Time	Measured Noise Levels (dB re. 2x10 ⁻⁵ Pa)				Comments
		L _{Aeq}	L _{A10}	L _{A90}	Specific level*	
NL1	1340-1355	44	46	39	<39	No site emissions audible. Rustling vegetation significant, masking distant traffic. Bird song/calls and aircraft. Quad bike audible at low level occasionally several hundred metres N.
NL2	1430-1445	49	48	44	<44	No site emissions audible apart from occasional truck and dumptruck movements audible near maintenance garage area, and truck passing locally x1. Distant N11 traffic continuously clearly audible. Sporadic road traffic outside entrance also audible. Bird song/calls, aircraft and rustling vegetation.
NL3	1401-1416	46	48	44	<44	No site emissions audible. N11 traffic continuously audible at low level to E. Bird song/calls, aircraft and rustling vegetation.
NL4	1248-1303	47	46	39	<39	No site emissions audible other than reversing alarms. Distant road traffic audible in background. Bird song/calls and aircraft. Rustling vegetation.
NSL1	1226-1241	48	47	40	37	Onsite dumptruck movements and excavator operations audible at low level occasionally, with reversing alarms. No other site emissions audible. Local road vehicle pass x1. Distant road traffic audible at low level in background. Rustling vegetation, bird song/calls and aircraft.
NSL2	1207-1222	64	60	46	<46	No facility emissions audible other than sporadic truck movements through weighbridge area. Intermittent local road traffic dominant when present. N11 traffic continuously audible in distance. Chainsaw audible at low level at several hundred metres. Bird song/calls and aircraft. Rustling vegetation.

*Specific level: Sound pressure level contribution considered attributable to facility, determined using real time assessment, field notes, time history profiles, statistical analysis, frequency spectra, near field correction if applicable, and other parameters.

Noise Results 2012 Ballynagran W0165-02 Q2

Location	Time	Measured Noise Levels (dB re. 2x10 ⁻⁵ Pa)				Comments
		L _{Aeq}	L _{A10}	L _{A90}	Specific level*	
NL1	1336-1351	44	46	39	<39	No site emissions audible. N11 traffic to E continuously clearly audible and significant. Bird song/calls also significant. Aircraft.
NL2	1246-1301	48	50	37	<37	No site emissions audible, apart from sporadic truck and 4x4 movements on nearest haul road. N11 traffic to E continuously audible at low level. Bird song/calls and aircraft. Sporadic road traffic audible outside boundary.
NL3	1315-1330	44	46	42	<42	No site emissions audible other than slightly audible compactor and trucks at active cell on occasion, with one ejector trailer. N11 traffic to NE continuously clearly audible and significant. Bird calls also significant. Aircraft.
NL4	1158-1213	44	46	36	<36	Earth moving works at site slightly audible continuously. Distant traffic faintly audible continuously. Birdsong, aircraft and lightly rustling trees.
NSL1	1137-1152	52	52	36	41	Tracked excavator and dump truck movements at facility audible almost continuously at low level, not significant. Reversing alarms more clearly audible. Site emissions masked by sporadic local road traffic, and occasional emissions from power tools at nearby dwelling. Bird song/calls and aircraft. Distant road traffic to S and E slightly audible.
NSL2	1117-1132	60	54	40	<40	No emissions audible from facility apart from sporadic truck movements on access road through weighbridge area. Intermittent local road traffic dominant when present. Distant road traffic continuously audible at low level to E. Bird song/calls and aircraft.
NSL3	1059-1114	60	63	49	<49	No facility emissions audible. N11 traffic continuously audible and dominant. No other noise audible other than intermittent local road traffic to S, and local birdsong.

*Specific level: Sound pressure level contribution considered attributable to facility, determined using real time assessment, field notes, time history profiles, statistical analysis, frequency spectra, near field correction if applicable, and other parameters.

Noise Results 2013 Ballynagran W0165-02 Q3

Location	Time	Measured Noise Levels (dB re. 2x10 ⁻⁵ Pa)				Comments
		L _{Aeq}	L _{A10}	L _{A90}	Specific level*	
NL1	1053-1108	43	46	37	<37	Wheeled compactor on mound audible at low level on breeze. No other site emissions audible. Distant N11 traffic continuously audible in background. Bird song/calls, aircraft and lightly rustling vegetation.
NL2	1000-1015	50	52	40	<40	Wheeled compactor in cell faintly audible occasionally. Ejector trailer x1 slightly audible 1004-1006. Sporadic truck movements on adjacent haul road dominant when present. Sporadic car movements audible outside boundary. Distant N11 traffic continuously significant. Bird song/calls, aircraft and lightly rustling vegetation.
NL3	1027-1042	52	55	43	49	Wheeled compactor on mound clearly audible on breeze when in use, and dominant. N11 traffic continuously audible in background. Bird song/calls, rustling vegetation and aircraft.
NL4	0924-0939	45	48	37	<37	Emissions from mound plant faintly audible on occasion, fluctuating on breeze. Distant N11 traffic slightly audible continuously in background. Aircraft, bird calls (crows significant) and lightly rustling trees).
NSL1	0902-0917	41	43	35	<35	Reversing alarms on mound plant faintly audible on occasion. No other site emissions audible. Distant N11 traffic continuously audible in background. Bird song/calls, aircraft and lightly rustling trees. No local car movements. Occasional dog barking at adjacent premises significant.
NSL2	0842-0857	66	68	43	42	Mobile plant on mound almost continuously audible at low level during lulls in intermittent passing road traffic. Latter dominant when present. Occasional plant and truck movements on site haul roads also audible at low level. N11 road traffic continuously audible, and dominant. Bird song/calls, aircraft and rustling trees.
NSL3	1127-1142	60	63	54	<<54	No Greenstar emissions audible. N11 traffic continuously audible and dominant. Excavator operating at 100 m on road works project also continuously significant. Local birdsong.

*Specific level: Sound pressure level contribution considered attributable to facility, determined using real time assessment, field notes, time history profiles, statistical analysis, frequency spectra, near field correction if applicable, and other parameters

Noise Results 2013 Ballynagran W0165-02 Q4

Location	Time	Measured Noise Levels (dB re.				Comments
		L _{Aeq}	L _{A10}	L _{A90}	Specific level*	
NL1	1619-1634	41	43	37	<37	Excavator on mound faintly audible on breeze. Offsite tractor operating in field E of landfill audible at low level to 1625. Distant road traffic audible at low level continuously. Aircraft. Rustling vegetation.
NL2	1538-1553	46	47	41	42	No site emissions audible from cell. Truck movement x1 on adjacent haul road dominant when present. Intermittent road traffic audible outside boundary. N11 traffic continuously audible at low level. Bird song/calls and aircraft. Lightly rustling vegetation, although breeze almost reduced to 0 m/s.
NL3	1600-1615	53	54	42	<42	Bowser pump on mound occasionally audible at low level, carried by breeze. Excavator on mound occasionally audible. Distant road traffic slightly audible continuously. Bird song/calls, aircraft, and lightly rustling vegetation. Tractor operating in field outside boundary dominant from 1609.
NL4	1508-1523	40	43	37	<37	No site emissions audible. Distant traffic continuously audible to S. Bird song/calls, aircraft and lightly rustling vegetation.
NSL1	1448-1503	47	41	36	<36	Greenstar plant faintly audible for first 5 min. Distant road traffic continuously slightly audible. Bird song/calls, aircraft and lightly rustling vegetation. Nearby watercourse slightly audible. Local car x1.
NSL2	1429-1444	69	74	47	<47	No site emissions audible due to local traffic noise intrusion - repeated waves of diverted traffic. Between waves, N11 traffic, birdsong and rustling vegetation audible.
NSL3	1410-1425	62	64	54	<54	No facility emissions audible. Noise environment dominated by N11 and local primary road traffic. No other noise audible apart from local birdsong and local vegetation rustling.

*Specific level: Sound pressure level contribution considered attributable to facility, determined using real time assessment, field notes, time history profiles, statistical analysis, frequency spectra, near field correction if applicable, and other parameters.

Dust Data 2013

Dust Results 2013 Ballynagran W0165-02

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AD6	143.01	133.3	8.04	27.87	558	80.39	58.41	55.2	9.11	17.63	3.22	140.17
AD7	14.97	18.15	32.15	4.29	8.03	81.99	99.68	62.17	11.79	29.56	5.36	156.25
AD8	12.75	114.61	63.24	13.4	16.08	79.31	20.36	115.76	43.94	28.01	4.29	243.67
AD9	15.52	251.01	20.36	55.2	9.65	25.72	33.76	4.82	26.8	22.3	5.89	295.42
AD10	12.75	15.59	10.72	20.36	13.93	81.46	18.76	5.89	543.41	28.01	3.75	151.73
AD11	35.48	411.26	11.79	35.37	61.09	25.72	23.58	60.02	47.7	18.67	2.68	334.1
AD12	52.66	65.86	12.3	24.12	31.64	64.31	24.12	4.82	60.56	9.85	2.68	116.06

*Sample Contaminated - Analysis Not Completed

NS - denoted not sampled

PM10 Data 2013

PM10 Results 2013 Ballynagran W0165-02

Location	March PM₁₀ Concentration (µg/m³)	July PM₁₀ Concentration (µg/m³)	September PM₁₀ Concentration (µg/m³)	November PM₁₀ Concentration (µg/m³)
Location PM1	8	4	6	3
Location PM2	9	3.5	5	2
Location PM3	9	6	3	2
Location PM4	10	7	2	4
Limit Value	50	50	50	50


APPENDIX 3

Complaints and Incidents 2013


Month (2013)	No of Complaints Received
January	20
February	33
March	19
April	12
May	29
June	11
July	13
August	17
September	15
October	9
November	21
December	4
Total	203

APPENDIX 4

Staff Training Records

Document type	FORM	
Title	Training Schedule	
Document No.	F05	

Trainee (C denotes a course where a certificate has been received and is on display in the offices)	JONES, John	MACLEOD, Michael	KIRWAN, Robbie	MENZIES, Neil	POWELL, Matthew	DONOHUE, Joseph	MOORE, Joseph	HEALY, Kevin	KINSELLA, John	BATES, Angela	DUNN, Domonic	MURPHY, Noel	FITZGERALD, David	DONOHUE, Michael
	Renton Plant													
Course / Trainer														
Adverse Weather / John Jones	Oct-06	Oct-06	Oct-06			Oct-06	Oct-06	Jun-07	Oct-06	Dec-05				
Ascon Safety Induction	Oct-06	Oct-06	Oct-06			Oct-06	Oct-06	Jun-07	Oct-06	Oct-06				
Banksman Procedures	Jun-11				Jun-11		Jun-11	Jun-11	Jun-11					
Chainsaw Course / NIGEL KEANE consafe@mail.ie] - EXPIRY DATE		Mar-14				Apr-14								
Chemical Handling / Olivier Gardelle		May-15	May-15			May-15	May-15		May-15					
CIWM Member	Yes		Yes C											
Communication Skills / LGR Training	Aug-08	Aug-08												
Compactor Operation / Safety Solutions EXPIRY DATES		Oct-12 C				Oct-12 C	Oct-12 C							
Complaints Procedure / John Jones	Oct-06	Oct-06	Oct-06							Oct-06				
Daily Inspections / John Jones	Oct-06	Oct-06	Oct-06			Oct-06	Oct-06		Oct-06	Dec-05				
Driver qualification card EXPIRY DATE					Jan-15									
Dumptruck / Jo Donohue		Jun-07				Jun-07	Jun-07		Jun-07					
Dumptruck Operation / T Duignan - EXPIRY DATES (CSCS)		Sept-12 C				Sept-12 C	Jan-13 C	Jan-13 C	Jan-13 C					
Energy Policy and awareness training / Robert Kirwan	Mar-10	Mar-10	Mar-10		Jul-10	Mar-10	Mar-10	Mar-10	Mar-10	Mar-10				
Environmental Awareness training / Robert Kirwan	Jun-08	Jun-08	Jun-08		Jun-10	Jun-08	Jun-08	Jun-08	Jun-08		Sep-09	Sep-09	Sep-08	Sep-08
Excavator Operation / T Duignan - EXPIRY DATES (CSCS)		Mar-15				Dec-12 C								
FAS Waste Management Course	Complete C	Complete C	Complete C	Autumn 07						Winter 09				
Fire Safety and Procedures / John Lennon		Jan-07				Jan-07	Jan-07		Jan-07	Dec-05				
Fire Warden		Apr-12	Apr-12											
First Aid / NB Training Services or James Maye EXPIRY DATES		May-14							May-14					
First Line Supervisory Skills / Legal Island		Sept-07 C												
Fleet insurance procedures training	Feb-11	Feb-11	Feb-11		Feb-11	Feb-11								
Gas Management / CIWM	Jul-07	Jul-08	Mar-08 C	Sep-07										
Gas System Checks and Balancing / John Jones/Ciaran Geoghegan		Apr-07	Jan-08			Apr-07	Apr-07							
Hazard Identification & Risk Assessment Workshop / Oliver Callan		Mar-09 C												
Refresher Gas system check and balancing / Robert Kirwan			Jan-09				Jan-09	Jan-09	Jan-09					
H&S Induction / John Lennon	Oct-06	Oct-06	Oct-06			Oct-06	Oct-06		Oct-06	Dec-05				
H&S Statement and Risk Assessments / Jim Duff		May-07		May-07	Jun-10	May-07	May-07		May-07	May-07				
Refresher H&S Statement and Risk Assessments / Jim Duff	Apr-08	Apr-08	Apr-08			Apr-08	Apr-08	Apr-08	Apr-08					
Housekeeping Procedures / J Jones	Nov-06	Nov-06				Nov-06	Nov-06		Nov-06					
HR Induction / Fiona Gilboy	Nov-06	Nov-06		Feb-07		Nov-06	Nov-06		Nov-06	Dec-05				
HR Disciplinary / Grievance Policy	Apr-09	Mar-09	Apr-09											
IOSH Managing Safety Course	Jan-08		Jan-08							Feb-10				
ISO 14001 EMS internal auditors course / SGS UK Ltd				Sep-07						Sept-07 C				
ISO 18001 OH&S internal auditors course / SGS UK Ltd										Oct-09				
ISO Training / Robbie Kirwan	Apr-08	Apr-08	Apr-08			Apr-08	Apr-08	Apr-08	Apr-08	Apr-08			Sep-08	Sep-08
KTK Gas System / Dominic				May-07			May-07							
KNK EMS system / R Wilkes										Apr-08				
Landfill Construction / John Jones	Oct-06	Oct-06	Oct-06			Oct-06	Oct-06		Oct-06	Dec-05				
Licence Conditions / John Jones	Oct-06	Oct-06	Oct-06			Oct-06	Oct-06	Jun-07	Oct-06	Dec-05				

Document type	FORM	
Title	Training Schedule	
Document No.	F05	

Trainee (C denotes a course where a certificate has been received and is on display in the offices)	JONES, John	MACLEOD, Michael	KIRWAN, Robbie	MENZIES, Neil	POWELL, Matthew	DONOHUE, Joseph	MOORE, Joseph	HEALY, Kevin	KINSELLA, John	BATES, Angela	DUNNE, Domic	MURPHY, Noel	FITZGERALD, David	DONOHUE, Michael
Course / Trainer	Renton Plant													
Licence Refresher Training (Cond. 5 and 7) / Neil Menzies		Apr-07				Apr-07	Apr-07		Apr-07					
Manual Handling Training - EXPIRY DATES	Jun-14	Jun-14	Jun-14		Jun-14	Jun-14		Jun-14	Jun-14					
Mobile elevating work platform operation - EXPIRY DATES		Aug-17				Aug-17								
Off site training / KTK	Oct-06	Oct-06	Oct-06			Oct-06	Oct-06		Oct-06					
Report Writing / Professional Development training				Nov-07										
Safe Pass - EXPIRY DATES	Jul-15	Oct-13	Oct-13		Jun-13	Jul-13	Jul-15	Nov-13	Jun-14					
Safety, Health & Welfare Programme FETEC level 5 / NISO										Feb-10				
Senior Management Legal Briefing / Ray Byrne NIFAST	Nov 08 C													
Site Induction / John Jones	Oct-06	Oct-06	Oct-06	Feb-07		Oct-06	Oct-06		Oct-06	Oct-06				
Skid Steer / Michael Macleod				Jun-07		Jun-07	Jun-07		Jun-07					
Skid Steer Certification / T Duignan - EXPIRY DATES (CSCS)		Sept-12 C				Sept-12 C	Sept-12 C	Sept-12 C	Sept-12 C					
Supervising Safety Course / NIFAST	Nov-07	Nov-07				Nov-07								
TBT Slips and Trips / J Jones	Jan-07	Jan-07				Jan-07	Jan-07		Jan-07					
TBT Banks Mans Procedure / John Jones		Feb-07				Feb-07	Feb-07		Feb-07	Feb-07				
TBT Weil's Disease Refresher / John Jones		Mar-07				Mar-07	Mar-07		Mar-07	Mar-07				
TBT Fire Safety DVD / J Jones		May-07		May-07		May-07	May-07		May-07	May-07				
TBT Working in Confined Spaces / Neil Menzies	Jun-07	Jun-07		Jun-07		Jun-07	Jun-07							
TBT Correct use of Safety Belts / John Jones		Jul-07		Jul-07		Jul-07	Jul-07	Jul-07	Jul-07	Jul-07				
TBT Manual handling / M Macloed	Aug-07	Aug-07		Aug-07		Aug-07	Aug-07		Aug-07	Aug-07				
TBT Banksmans Procedures / John Jones		Oct-07		Oct-07		Oct-07	Oct-07	Oct-07	Oct-07	Oct-07				
TBT Material Safety Data Sheets / John Jones	Dec-07	Dec-07	Dec-07			Dec-07	Dec-07	Dec-07	Dec-07	Dec-07				
TBT Safe use of Pressure Washer / Micheal Macleod	Feb-08	Feb-08	Feb-08			Feb-08	Feb-08	Feb-08	Feb-08	Feb-08				
TBT Compaction of covering waste / John Jones	Mar-08	Mar-08					Mar-08	Mar-08	Mar-08	Mar-08				
TBT Horrific Accidents DVD / J Jones	Apr-08	Apr-08	Apr-08				Apr-08	Apr-08	Apr-08	Apr-08				
TBT Slips, Trips and Falls / DVD Safety Media	Jun-08	Jun-08				Jun-08	Jun-08	Jun-08	Jun-08	Jun-08			Jun-08	
TBT Fire Safety DVD / J Jones	Aug-08		Aug-08			Aug-08	Aug-08	Aug-08	Aug-08	Aug-08			Aug-08	Aug-08
TBT Manual handling DVD / J Jones	Sep-08	Sep-08	Sep-08			Sep-08	Sep-08	Sep-08	Sep-08	Sep-08				
TBT Banksmans Procedures / John Jones	Oct-08	Oct-08	Oct-08			Oct-08	Oct-08	Oct-08	Oct-08	Oct-08			Oct-08	
TBT Litter prevention and litter cages assembly / disassembly / MM	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08
TBT Suppression of dust / MM	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08
TBT Vermin control / MM	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08
TBT Handling tipping vehicles / MM	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08
TBT Random inspection of incoming loads / MM	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08
TBT Lone working process / MM	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08
TBT Handling and storage of batteries / MM	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08
TBT Record of tipping location / MM	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08
TBT Procedure for construction of landfill gas vents / MM	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08	Nov-08	Nov-08	Nov-08			Nov-08	Nov-08
TBT Ken Woodward Complete Safety	Jan-09	Jan-09				Jan-09	Jan-09	Jan-09	Jan-09	Jan-09			Jan-09	Jan-09
TBT Tractor Safety / DVD Safety Media	Jan-09	Jan-09	Jan-09			Jan-09	Jan-09	Jan-09	Jan-09	Jan-09			Jan-09	
TBT Covering down procedure	Feb-09	Feb-09	Feb-09			Feb-09	Feb-09	Feb-09	Feb-09	Feb-09			Feb-09	Feb-09
TBT DVD on landfill operation and facility management / in house	Feb-09	Feb-09	Feb-09			Feb-09	Feb-09	Feb-09	Feb-09	Feb-09			Feb-09	Feb-09
TBT Risk assessment DVD / Safety Media	Apr-09	Apr-09	Apr-09			Apr-09	Apr-09	Apr-09	Apr-09	Apr-09			Apr-09	
TBT Computer and workstation safety DVD	May-09	May-09	May-09			May-09	May-09	May-09	May-09	May-09			May-09	May-09
TBT Manual handling and electrical safety - farming DVD	Jun-09	Jun-09	Jun-09				Jun-09	Jun-09	Jun-09	Jun-09			Jun-09	
TBT Procedure for handling needle stick (F09 005) / refresher	Jul-09	Jul-09	Jul-09			Mar-10	Jul 09 / Feb 10	Jul 09 / Feb 10	Jul 09 / Feb 10	Jul-09				

Issue Date	Constantly updated	Revision 1	Authorised by	JJ
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Document type	FORM	
Title	Training Schedule	
Document No.	F05	

Trainee (C denotes a course where a certificate has been received and is on display in the offices)	TOMAS FINGLETON	MACLEOD, Michael	KIRWAN, Robbie	DONOHUE, Joseph	MOORE, Joseph	HEALY, Kevin	KINSELLA, John	BARRY MERNAGH	POWELL, Matthew	DUNNE, Dornic	MURPHY, Noel	DONOHUE, Michael
Course / Trainer	Renton Plant											
TBT swine flu information	Aug-09	Aug-09	Aug-09		Aug-09	Aug-09	Aug-09	Aug-09				
TBT waste acceptance	Sep-09	Sep-09	Sep-09	Sep-09	Sep-09	Sep-09	Sep-09	Sep-09		Sep-09		
TBT accident investigation	Oct-09	Oct-09		Oct-09	Oct-09	Oct-09	Oct-09			Oct-09	Oct-09	Oct-09
TBT Occupational H&S system awareness	Nov-09	Nov-09	Nov-09	Nov-09	Nov-09	Nov-09	Nov-09	Nov-09	Jul-10	Nov-09	Nov-09	Nov-09
TBT Safe use of lifting equipment and working in adverse weather conditions	Jan-10	Jan-10	Jan-10		Jan-10	Jan-10	Jan-10	Jan-10				
TBT Reversing vehicles	Feb-10	Feb-10	Feb-10	Feb-10	Feb-10	Feb-10	Feb-10	Feb-10				
TBT Vehicle and pedestrian collisions	Mar-10	Mar-10	Mar-10		Mar-10	Mar-10	Mar-10	Mar-10				
TBT Wheelwash procedure	Apr-10	Apr-10	Apr-10	Apr-10	Apr-10	Apr-10	Apr-10	Apr-10				
TBT Hearing protection	May-10	May-10	May-10	Jul-10	May-10	May-10	May-10	May-10				
TBT Vehicle tipovers	Aug-10	Aug-10	Aug-10	Aug-10	Aug-10		Aug-10	Aug-10				
TBT H&S whats is all about and working at heights	Sep-10	Sep-10	Sep-10	Sep-10	Sep-10	Sep-10	Sep-10	Sep-10				
TBT Covering down procedure		Oct-10	Oct-10	Oct-10	Oct-10	Oct-10		Oct-10				
TBT slips and falls	Jan-11	Jan-11	Jan-11	Jan-11	Jan-11	Jan-11	Jan-11	Jan-11				Jan-11
TBT welding gas pipes	Mar-11	Mar-11	Mar-11	Mar-11	Mar-11	Mar-11	Mar-11					Mar-11
TBT lawnmower and strimmer safety	Apr-11	Apr-11		Apr-11	Apr-11	Apr-11	Apr-11	Apr-11	Apr-11			
TBT H&S issues concerned with capping project	Jul-11	Jul-11	Jul-11	Jul-11	Jul-11	Jul-11	Jul-11	Jul-11				
Tractor and Bowser / Jo Donohue		May-07			Jun-07		Jun-07					
VDU assessments	Jan-10	Jan-10	Jan-10		Jan-10	Jan-10		Jan-10				
Waste Acceptance Seminar / Greenstar					Apr-07			Apr-07				
Weighbridge Training / on site		Jul-07	Jan-08	Feb-07		Jul-07	Jun-07					
British Geomembrance Association - welding course		Jul-14			01-Jul-14	N/A	Jul-14					
Skid Steer Certification / T Duignan - EXPIRY DATES (CSCS)		C			C		C					
Safe Pass - EXPIRY DATES		Oct-13	Oct-13		Jul-15		Jun-14					
Dumptruck Operation / T Duignan - EXPIRY DATES (CSCS)		Sept-17 C		Dec-17 C	Sept-12 C		Jan-13 C					
Excavator Operation / T Duignan - EXPIRY DATES (CSCS)		Mar-15		Dec-15								
Manual Handling Training - EXPIRY DATES	Jun-14	Jun-14	Jun-14	Jun-14	Jun-14		Jun-14	Jun-14				
Importance of PPE/ Robbie Kirwan	Apr-13	Apr-13		Apr-13	Apr-13		Apr-13	Apr-13				
Environmental / Robert Kirwan	May-13	May-13		May-13	May-13		May-13					
Working with Heavy Mobile Plant / Robbie Kirwan	Apr-13	Apr-13		Apr-13	Apr-13		Apr-13	Apr-13				
Working with Site Radios/Tomas Fingleton	Jul-13	Jul-13	Jul-13	Jul-13	Jul-13		Jul-13	Jul-13				
Working with Heavy Mobile Plant / Robbie Kirwan	Jul-13	Jul-13	Jul-13	Jul-13	Jul-13		Jul-13	Jul-13				
Manual handling Robert Kirwin	Sep-13	Sep-13	Sep-13		Sep-13		Sep-13	Sep-13				
the site's confined space training robert Kirwain	Nov-13	Nov-13	Nov-13		Nov-13		Nov-13	Nov-13				

Issue Date	Constantly updated	Revision 1	Authorised by	JJ
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APPENDIX 5

Procedures Index

Doc. No.: Control	Revision No.: As Shown	Issue Date: As Shown
Approved By:	Malcolm Dowling – <i>Group Environmental Manager</i> Oliver Callan – <i>Group H&S Manager</i>	Page 1 of 4

Integrated Procedures - IP

IP-01	Document & Record Control Procedure	Rev 01, 05/07/10
IP-02	Health & Safety Risk Assessment Procedure	Rev 01, 05/07/10
IP-03	Environmental Aspects & Impacts Procedure	Rev 01, 05/07/10
IP-04	Legal & Regulatory Requirements Procedure	Rev 02, 05/11/10
IP-05	Objectives, Targets & Management Programmes Procedure	Rev 01, 05/07/10
IP-06	Competence, Training & Awareness Procedure	Rev 01, 05/07/10
IP-07	Communication & Consultation Procedure	Rev 01, 05/07/10
IP-08	Monitoring, Measurement & Improvement Procedure	Rev 01, 05/07/10
IP-09	Evaluation of Compliance Procedure	Rev 02, 15/09/11
IP-10	Non Conformances, Corrective/Preventive Actions Procedure	Rev 03, 01/02/11
IP-11	Internal Audit Procedure	Rev 03, 28/05/12
IP-12	Management Review Procedure	Rev 01, 05/07/10
IP-13	Control of Contractors/Visitors Procedure	Rev 03, 08/06/12
IP-14	Health & Safety & Environmental Monitoring	Rev 02, 29/10/10
IP-15	Emergency Preparedness & Response Procedure	Rev 02, 01/02/11

Safety Procedures - SP

SP-01	Permit to Work Procedure	Rev 02, 03/05/12
SP-02	Maintenance & Calibration Procedure	Rev 03, 04/04/11
SP-03	Mobile Plant Procedure	Rev 01, 05/07/10
SP-04	Fork Truck Procedure	Rev 01, 05/07/10
SP-05	Operation of Fixed Plant Procedure	Rev 01, 05/07/10
SP-06	Lock Out / Tag Out Procedure	Rev 01, 05/07/10
SP-07	Health & Safety Notification Procedure	Rev 01, 05/07/10
SP-08	Motor Claim Notification Procedure	Rev 01, 01/02/11
SP-09	MSW Shredder routine Maintenance & Clearing of Blockages Procedure (SCGT)	Rev 01, 01/12/11
SP-10	Weighbridge & Tipping Procedure (SCGT)	Rev 01, 01/12/11
SP-11	Cleaning of Washing Bay (Greenogue)	Rev 01, 05/05/12



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Approved By:	Malcolm Dowling – <i>Group Environmental Manager</i> Oliver Callan – <i>Group H&S Manager</i>	Page 2 of 4

Environmental Procedures - EP		
EP-01	Office Waste & Energy Management Procedure	Rev 01, 05/07/10
EP-02	Decommissioning and Aftercare Procedure	Rev 02, 14/09/11
EP-03	Environment Communications Procedure	Rev 02, 13/09/10
EP-04	Waste Permits & Licences Procedure	Rev 01, 05/07/10
EP-05	Waste Acceptance Procedure	Rev 01, 05/07/10
EP-06	Unacceptable Waste Procedure	Rev 01, 05/07/10
EP-07	Waste & Material Storage Procedure	Rev 01, 05/07/10
EP-08	Waste Processing Procedure	Rev 01, 05/07/10
EP-09	Site Infrastructure Procedure	Rev 01, 05/07/10
EP-10	Nuisance Management Procedure (Site Specific)	(Site Specific)
EP-11	Civic Amenity Site Procedure	Rev 01, 05/07/10

Doc. No.: Control	Revision No.: As Shown	Issue Date: As Shown
Approved By:	Malcolm Dowling – <i>Group Environmental Manager</i>	Page 3 of 4
	Oliver Callan – <i>Group H&S Manager</i>	

Amendment History

Date	Amendment No.	Procedure No:	Revision No:	Comment	Authorised By
05.07.10	01	All	01	Initial Issue	M.D & O.C
13.09.10	02	EP-03	02	Issue of Incident Reports	M.D
20.09.10	03	IP-10	02	Env issues not logged on WIMS Database	M.D
29.10.10	04	IP-13	02	Use of M&M equipment by contractors	M.D & O.C
29.10.10	05	IP-14	02	Use of M&M equipment by contractors	M.D & O.C
29.10.10	06	SP-02	02	Inclusion of Maintenance Schedule	M.D & O.C
05.11.10	07	IP-04	02	Inclusion of other requirements	S.B & O.C
01.02.11	08	SP-08	01	Inclusion of new procedure	O.C
01.02.11	09	IP-10	03	Inclusion of SP-08	O.C
01.02.11	10	IP-15	02	Removal of SF-022	O.C
01.02.11	11	Contents	As shown	EP-10 Site Specific	M.D & O.C
01.02.11	12	Circ List	02	Amendment to document control	M.D & O.C
04.04.11	13	SP-02	03	Inclusion of Site Specific Maintenance schedules	O.C
07.06.11	14	IP-11	02	Inclusion of H&S & Env Internal Audit Schedules	M.D & O.C
14/09/11	15	EP-02	02	Inclusion of decommissioning of plant/equipment	S.B
15/09/11	16	IP-09	02	Inclusion of Statutory Inspections	O.C
01/12/11	17	SP-09	01	Inclusion of new procedure for SCGT	O.C
01/12/11	18	SP-10	01	Inclusion of new procedure for SCGT	O.C
03/05/12	19	SP-01	02	Amendment to remove SF 028	O.C
05/05/12	20	SP-11	01	Inclusion of a new procedure for Greenogue	O.C
28/05/12	21	IP-11	03	General Amendments to internal audit procedure	M.D & O.C
08/06/12	22	IP-13	03	Grammatical amendment	M.D & O.C



Doc. No.: Control	Revision No.: 02	Issue Date: 1 st February 2011
Approved By:	Malcolm Dowling – Group Environmental Manager Oliver Callan – Group H&S Manager	Page 4 of 4

Circulation List

The Integrated Procedures Manual is a controlled document. Copies of the Integrated Procedures Manual are available as follows;

Copy Number	Holder
1 (Master Copy)	Environmental, Health & Safety (EHS) Executive
2	Greenstar Limited Intranet – Electronic Copy

APPENDIX 6

E-PRTR Returns



[Guidance to completing the PRTR workbook](#)

AER Returns Workbook

Version 1.1.18

REFERENCE YEAR	2013
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1. FACILITY IDENTIFICATION

Parent Company Name	Ballynagran Landfill Limited
Facility Name	Ballynagran Residual Landfill
PRTR Identification Number	W0165
Licence Number	W0165-02

Waste or IPPC Classes of Activity

No.	class name
3.5	Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment.
3.1	Deposit on, in or under land (including landfill).
3.13	Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.
3.4	Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons.
3.6	Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1. to 10. of this Schedule.
4.11	Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.
4.13	Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.
4.4	Recycling or reclamation of other inorganic materials.
4.9	Use of any waste principally as a fuel or other means to generate energy.
Address 1	Ballynagran
Address 2	Coolbeg and Kilcandra
Address 3	
Address 4	
	Wicklow
Country	Ireland
Coordinates of Location	-8.41098 51.914
River Basin District	IEEA
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	Tomas Fingleton
AER Returns Contact Email Address	tomas.fingleton@landfills.ie
AER Returns Contact Position	Landfill Manager
AER Returns Contact Telephone Number	0867741813
AER Returns Contact Mobile Phone Number	0867741813
AER Returns Contact Fax Number	045 482629
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	6
User Feedback/Comments	Air emissions lower than previous year due to flare not operational throughout the year.
Web Address	

2. PRTR CLASS ACTIVITIES

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

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

Is it applicable?	
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	

Is the reduction scheme compliance route being used ?	
---	--

4. 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](#)

[PRTR# : W0165 | Facility Name : Ballynagran Residual Landfill | Filename : W0165_2013.xls | Return Year : 2013]

04/07/2014 14:40

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

POLLUTANT		METHOD			Please enter all quantities in this section in KGs		QUANTITY		
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Flares	Engine	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
03	Carbon dioxide (CO2)	C	OTH	GasSim2 Calculation	39100000.0	0.0	39100000.0	0.0	0.0
01	Methane (CH4)	C	OTH	GasSim2 Calculation	0.0	0.0	653790.0	0.0	653790.0
08	Nitrogen oxides (NOx/NO2)	M	EN 14792:2005	OMI Report	1696.69	2249.94	3946.63	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	EN 14791:2005	OMI Report	21430.02	6378.37	27808.39	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

POLLUTANT		METHOD			Please enter all quantities in this section in KGs		QUANTITY		
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)

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

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

Additional Data Requested from Landfill operators

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

Landfill: Please enter summary data on the quantities of methane flared and / or utilised	Ballynagran Residual Landfill				
	T (Total) kg/Year	M/C/E	Method Code	Designation or Description	Facility Total Capacity m3 per hour
Total estimated methane generation (as per site model)	8103000.0	C	OTH	GasSim2 calculation	N/A
Methane flared	5418813.0	M	OTH	Facility on-site monitoring	0.0 (Total Flaring Capacity)
Methane utilised in engine/s	1263953.0	M	OTH	Facility on-site monitoring	0.0 (Total Utilising Capacity)
Net methane emission (as reported in Section A above)	653790.0	C	OTH	Modelling - Monitoring	N/A

4.2 RELEASES TO WATERS

[Link to previous years emissions data](#)

| PRTR# : W0165 | Facility Name : Ballynagran Residual Landfill | Filename : W0165_2013.xls | Return Year : 2013 |

04/07/2014 14:40

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 con

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT		M/C/E	Method Used		QUANTITY			
No. Annex II	Name		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		M/C/E	Method Used		QUANTITY			
No. Annex II	Name		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		M/C/E	Method Used		QUANTITY			
Pollutant No.	Name		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](#)

| PRTR# : W0165 | Facility Name : Ballynagran Residual Landfill | Filename : W0165_2013.xls | Ret

04/07/2014 14:40

SECTION A : PRTR POLLUTANTS

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

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

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

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

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

4.4 RELEASES TO LAND

[Link to previous years emissions data](#)

| PRTR# : W0165 | Facility Name : Ballynagran Residual Landfill | Filename : W0165_2013.xls | Return Year : 2013 |

04/07/2014 14:40

SECTION A : PRTR POLLUTANTS

POLLUTANT		RELEASES TO LAND			Please enter all quantities in this section in KGs		
No. Annex II	Name	M/C/E	METHOD		Emission Point 1	QUANTITY	
			Method Code	Designation or Description		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)

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

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

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR#: W0165 | Facility Name : Ballynagran Residual Landfill | Filename : W0165_2013.xls | Return Year : 2013 |

04/07/2014 14:40

Please enter all quantities on this sheet in Tonnes

0

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility	Haz Waste : Address of Next Destination Facility	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		Haz Waste : Name and Licence/Permit No of Recover/Disposer	Non Haz Waste: Address of Recover/Disposer		
Within the Country	13 07 01	Yes	4.6	fuel oil and diesel	R1	M	Weighed	Offsite in Ireland	Rilta Environmental Ltd,W0192-01	Block 402 ,Grant?s Drive ,Greenogue Business Park, Rathcoole ,Dublin,Ireland	Rilta,W0192-01,Block 402 Grants Drive,Greenogue Business Park,Dublin,,Ireland	Block 402 Grants Drive,Greenogue Business Park,Dublin,,Ireland
Within the Country	19 07 03	No	15149.74	landfill leachate other than those mentioned in 19 07 02	D9	M	Weighed	Offsite in Ireland	Drogheda WWTP,D0041-01	Drogheda ,County Louth,-,ireland	Enva,184-01	Clonminam Industrial Estate,Portlaoise ,County Laois,Laois,Ireland
Within the Country	19 07 03	No	1313.5	landfill leachate other than those mentioned in 19 07 02	D9	M	Weighed	Offsite in Ireland	Rilta Environmental Ltd,W0192-01	Block 402 ,Grant?s Drive ,Greenogue Business Park, Rathcoole ,Dublin,Ireland		
Within the Country	19 07 03	No	14654.91	landfill leachate other than those mentioned in 19 07 02	D9	M	Weighed	Offsite in Ireland	Ringsend WWTP,D00-34-01	Ringsend ,Dublin,-,ireland		
Within the Country	19 07 03	No	3468.08	landfill leachate other than those mentioned in 19 07 02	D9	M	Weighed	Offsite in Ireland	Veolia,D0012-01	Wicklow,,,,,Ireland		