

Cover Page

Signed Declaration

**Waste License
Registration Number:** W0201-03

Licensee: Bord Na Móna Resource Recovery
Drehid Waste Management Facility

Reporting year: 2012

I Declare that;

"All the data and information presented in this report has been checked and certified as being accurate. The quality of the information is assured to meet licence requirements"

Signature



Landfill Manager

ANNUAL ENVIRONMENTAL REPORT

Bord na Móna Resource Recovery Drehid

Waste Management Facility

January 2012

Through

December 2012

Waste License Registration Number:	W0201-03
Licensee:	Bord Na Móna Resource Recovery Drehid Waste Management Facility
Location of Activity:	Killinagh Upper, Carbury, Co. Kildare
Attention:	Office of Environmental Enforcement, EPA Headquarters, PO Box 3000, Johnstown Castle Estate, Co. Wexford
Prepared by:	Anua Environmental



REVISION CONTROL TABLE

User is Responsible for Checking the Revision Status of This Document.

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Client: Bord na Mona Drehid Waste Management Facility

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1. INTRODUCTION

The following document is the 2012 Annual Environmental Report (AER) for Bord na Mona Waste Management Facility at Drehid, County Kildare. It covers the period from 1st January 2012 to 31st December 2012. The facility is a non-hazardous residual landfill and is also authorised to carry out composting of biodegradable wastes.

The Environmental Protection Agency (Agency) granted the Waste Licence (W0201-01) in August 2005 and construction works began in August 2006. Phase 1 was completed in 2007 and the facility began accepting waste in February 2008. In April 2009, the Agency issued a revised Waste Licence (W0201-02), which increased the annual waste acceptance limit to 350,000 tonnes for a seven year period or until the end of 2015, whichever is sooner. In March 2010, the Agency issued a revised Waste Licence (W0201-03), which was primarily aimed at ensuring the landfill is operating in compliance with all relevant requirements of the Landfill Directive (1999/13/EC) including the need to divert biodegradable municipal waste from landfill.

The content of this AER is based on Schedule F of the Waste Licence and the report format follows guidelines set in the "Guidance Note for Annual Environmental Report" issued by the Agency.

2. SITE DESCRIPTION

2.1 Site Location and Layout

The facility is located approximately 9km south of Enfield in County Kildare and is within the confines of the Bord na Mona owned Timahoe bog. The site encompasses a total area of approximately 179 hectares (ha), which includes the site access road, clay borrow area, landfill footprint, sand and gravel borrow area and associated infrastructure.

The landfill, when complete, will encompass approximately 39 ha. It will be developed in eight distinct phases, each having duration of between 2 to 3 years. Waste deposition will only take place in the active phase and each phase will occupy between 2.2ha and 2.6 ha in area. The initial construction phase was completed in January 2008 and waste acceptance began in February of that year.

Subsequent phases will involve the construction of additional engineered cells, the provision of additional leachate storage capacity required, landfill gas management infrastructure including an utilisation plant that will generate electricity, and the development of a composting facility.

2.2 Waste Types & Volumes

Only non-hazardous, solid, residual waste is accepted for disposal. Hazardous and liquid wastes are not accepted. All wastes deliveries are subject to Waste Acceptance Procedures that have been approved by the Agency, as specified in Condition 8.1.10 of the Waste Licence.

A maximum of 360,000 tonnes of non hazardous municipal, commercial and industrial waste can be accepted annually for disposal until the end of 2015, after which the annual intake reduces to 120,000 tonnes per annum. A maximum of 25,000 tonnes of compostable wastes can be accepted in the composting facility. An unlimited amount of suitable inert waste can be accepted for use in on-site engineering works.

2.3 Waste Activities

The facility is a full containment landfill, which is designed to accept treated waste for final disposal. The waste activities carried out during the reporting period were: -

- Disposal (landfilling) of wastes,
- Recovery of wastes for removal off-site for recycling,
- Recovery of certain inert wastes on-site for use in engineering works and as daily cover and
-

2.4 Waste Received, Recovered & Consigned

The different types and quantities of wastes received, disposed, recovered and consigned from the facility in 2012 are shown in Tables 2.1 and 2.2. The consigned wastes are those generated by daily operations and which were not suitable for recovery or disposal on-site.

Table 2.1 Waste Received 2012

Waste Type to <u>Landfill Facility</u>	Description	Tonnes
Municipal	Mixed Commercial and Domestic	270,255
	Street Cleaning	16,936.14
Industrial	Non Hazardous Industrial Solid Waste	2,893.64
	Biostabilised Waste	4,275.27
Sludges & Filter cake	Non Hazardous Municipal & Industrial	161.78
Construction & Demolition	Mixed Non Hazardous Waste	589
Total Disposed to Landfill Facility		295,110.83
Construction and Demolition	Inert Soil and Fines Material	71,346
Construction and Demolition	Shredded Timber	9,137.96
Construction and Demolition	Mix of C&D concrete, brick, tiles and ceramic	24,076.8
	Agricultural Manure	43.08
Municipal & Agricultural	Biostabilised Waste	11,625.54
Total recovered on-site from Landfill Facility		116,229.38
Commercial	End of Life tyres for reuse in intermediate lining	96.94
Re Used		96.94
Total Accepted to Landfill Facility including Inert Waste		411,437.15
Waste Type to <u>Composting Facility</u>	Description	Tonnes
Biodegradable kitchen and canteen waste	Brown Bin Biowaste	10,408.87
Household & Commercial	Off-specification Compost	1,232.90
Waste from mechanical treatment of waste. Woodchip Amendment	Oversize Amendment Material	201.78
Total Accepted to Composting Facility		11,843.55

Table 2.2 Waste Consigned 2012

Description	Tonnes
Waste Oil	5.34
Oil Filters	0.48
Leachate	54,823.88
Aqueous Liquid waste	14,175.74
Off Spec Compost	189.74
Paper & cardboard	0.29
Total Consigned	69195.47
Waste derived from Composting Process	
Contaminated Plastics from Brown Bin removed during screening	65.08
Contaminated Metals from Brown Bin removed during screening	78.82
Contaminated Glass & Stones from Brown Bin removed during screening	67.98
Oversize Material, Non composted Fraction from Brown Bin removed post compost screening	245
Total Disposed of on site of generation	456.88

2.5 Landfill Capacity

The most recent topographic survey of landfill cell footprint is included in Appendix 1, which also includes calculations of the void space that has been used. The total capacity of the phases 1-8 of the landfill is estimated to be 3,047,453m³ in the most recent survey. The construction phase void space in Phase 1-5 was calculated to be 364,574 m³ at the time of the survey. It is estimated that approximately 1,631,147 m³ of void space has been used. That leaves an actual remaining void space of 1,416,306m³ in the phases 1-8 of the landfill. The projected closure date of the facility is 2028. The mass balance calculation is included in Appendix 1.

2.6 Method of Deposition of Wastes

2.6.1 Waste Acceptance

The waste accepted for disposal is residual waste from household, commercial and industrial sources. All of the waste collectors that deliver the waste have systems in place whereby the recyclable fraction is either collected separately, or else separation is carried out at their recovery/transfer facilities.

Wastes are delivered in Heavy Goods Vehicles (HGV) provided with the appropriate covers to prevent loss of load. Each vehicle first proceeds to the incoming weighbridge where it is weighed. The weighbridge operator and/or the Facility Manager may, at their own discretion, request the load to be tipped in the Waste Inspection Area to ensure it is suitable for acceptance.

The vehicles then proceed to the active fill area, where it is deposited under the direction of a banksman. 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. The vehicles weigh out at the outgoing weighbridge and receive an individual weighbridge docket before exiting the site.

2.6.2 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. 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 site.

The deposited waste is then spread in shallow layers on the inclined surface and compacted. Steel-wheeled compactors operate on the gradient of the more shallow face, pushing and compacting thin layers of waste. Each day's waste input forms a 'block', which is compacted and covered. The following day a new 'block' of waste is deposited adjacent to this block. This allows areas that 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.

3. ENVIRONMENTAL MONITORING

Bord na Móna implements a comprehensive environmental monitoring programme to assess the significance of emissions from site activities. The programme, which is specified in Schedule C of the Waste Licence, includes groundwater, surface water, leachate, landfill gas, noise, dust and particulate monitoring and a biological assessment of the Cushaling River. The monitoring locations are shown on Figure 3.1.

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 included in Appendix 2.

3.1 Groundwater Monitoring

3.1.1 Baseline Groundwater Conditions

The site is underlain by the Carboniferous Kildare Shelf, which comprises the Waulsortian, Boston Hill and Allenwood limestone Formations. The majority of the site is underlain by Waulsortian limestone, which comprises pale grey, fine grained limestone. The subsoil comprises basin peat deposits, which are underlain by thick (10 to 35m) undifferentiated till.

The groundwater monitoring carried out before the start of the construction works established naturally occurring elevated ammonia, iron, manganese and electrical conductivity levels. The hydrochemistry in the upgradient and downgradient wells is similar and characteristic of the limestone rocks in confined conditions.

3.1.2 Groundwater Quality

Groundwater quality was monitored at monthly 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. Samples obtained were analysed for the monthly and annual parameters specified in Schedule C.3 of the Licence.

The results were generally consistent with those obtained previously, with naturally high levels of ammonia detected at all monitoring wells. The monitoring programme confirmed that the site activities are not impacting on groundwater quality.

3.2 Surface Water Monitoring

The site is located in the catchment of the River Barrow and a divide between the Barrow and the River Boyne catchments is more than 500m to the north. There is an extensive man made drainage network across the Bord na Móna landholding and the site is divided into a number of discrete areas, referred to as 'peat fields' formed by the surface water drains.

The drains connect to a central culvert, which flows towards the south, where it passes through settlement ponds, before discharging to the Cushaling River. Rainfall on roof and paved areas of the landfill discharge to the underground culvert and are directed to the settlement ponds prior to discharge to the Cushaling. The Cushaling supports salmonid and cyprinid fish, the latter being dominant in the slower flowing upper reaches.

The Cushaling is a tributary of River Figile, which is a sub-catchment of the River Barrow. Biological monitoring in the Figile downstream of the site before site development works began established that the surface water quality had been impacted by the peat extraction activities. The Barrow is a candidate Special Area of Conservation (cSAC), and a nationally important river for fisheries.

3.2.1 Visual Assessment

Bord-na-Mona carries out weekly inspections of the surface water drainage system. Any defects observed are acted upon and repaired as they may arise.

3.2.2 Chemical Assessment

The surface water monitoring was conducted weekly at the three locations specified in the Waste Licence. 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.

Q1:

The ELV for ammonia was consistently exceeded at SW 6 (Settlement Lagoon). Ammonia levels have been historically elevated at SW6 due to the pumping of groundwater, which contains naturally occurring high ammonia, into the settlement lagoons to regulate their levels. The ELV for Suspended Solids was exceeded on four occasions at SW-6, three of which occurred consecutively in weeks 4, 5 and 6. The BOD limit of 25mg/l was also exceeded during weeks 4, 5 and 6.

SW5 is downstream of SW6. Two exceedences of the Ammonia (NH₄) ELV (0.5mg/l) occurred in weeks 4 and 5. No exceedences of any other parameters were recorded during quarter one.

SW4 is located on the Cushaling Stream downstream of SW5. From Table 4.3 (C) we observe that the ELV of 0.5mg/l for Ammonia (NH₄) was exceeded on one occasion during sampling undertaken in week 5. No other exceedences were noted during quarter one of 2012.

Q2:

There was no discharge from the facility during weeks 21 and 22 during quarter two.

The ELV for Ammonia was consistently exceeded at SW 6 (Settlement Lagoon). Ammonia levels have been historically elevated at SW6 due to the pumping of groundwater, which contains naturally occurring high ammonia, into the settlement lagoons to regulate their levels. The ELV for Suspended Solids was exceeded on two occasions at SW-6, both of which occurred consecutively in weeks 16 (40mg/l) and 17 (57mg/l). The BOD limit of 25mg/l was not exceeded on any sampling occasion.

SW5 is downstream of SW6. Two exceedences of the Ammonia ELV (0.5mg/l) occurred in weeks 23 and 24. No exceedences of any other parameters were recorded during quarter two.

SW4 is located on the Cushaling Stream downstream of SW5. From Table 4.3 (C) we observe that the ELV of 0.5 mg/l for Ammonia (NH₄) was not exceeded during quarter two of 2012. No other exceedences were noted during quarter two of 2012.

The EPA was notified of the each environmental incident and the period of the cessation of discharge from the facility.

Q3:

The ELV for Ammonia was consistently exceeded at SW 6 (Settlement Lagoon). Ammonia levels have been historically elevated at SW6 due to the pumping of groundwater, which contains naturally occurring high ammonia, into the settlement lagoons to regulate their levels. The ELV for Suspended Solids (35mg/l) and BOD (25mg/l) were not exceeded at any sampling occasion at SW-6 during quarter three.

SW5 is downstream of SW6. No exceedences of any parameters were recorded during quarter three.

SW4 is located on the Cushaling Stream downstream of SW5. From Table 4.3 (C) we observe that no exceedences were noted during quarter three of 2012.

Q4:

The ELV for Ammonia was consistently exceeded at SW 6 (Settlement Lagoon). Ammonia levels have been historically elevated at SW6 due to the pumping of groundwater, which contains naturally occurring high ammonia, into the settlement lagoons to regulate their levels. The ELV for Suspended Solids (35mg/l) was exceeded once during quarter four. This occurred during week 41 (43mg/l). The ELV for BOD (25mg/l) was not exceeded at any sampling occasion at SW-6 during quarter four.

SW5 is downstream of SW6. Ammonia levels were exceeded during week 46 (0.5mg/l). No exceedences of any remaining parameters were recorded during quarter four.

SW4 is located on the Cushaling Stream downstream of SW5. From Table 4.3 (C) we observe that no exceedences were noted during quarter four of 2012.

3.3 Leachate

Leachate samples are analysed quarterly for BOD and COD at one monitoring location LT1. The samples are also analysed annually for the range of parameters specified in the Licence. The results are typical of those of a leachate from a relatively young municipal solid waste landfill.

3.4 Landfill Gas (LFG)

The gas monitoring programme includes monthly measurements of methane, carbon dioxide, oxygen and atmospheric pressure in wells located both outside and inside the waste body. The wells are at 50m intervals around the landfill footprint and two per hectare within the cells. The locations of the 19 external wells (LG-01 – LG-19), which were agreed in advance with the Agency, are shown on the monitoring location map included in Appendix 2.

3.4.1 Outside the Waste Body

The concentration limit for methane (1% v/v) was exceeded in monitoring well LG-16 (1.2% v/v) in Q2, LG-19 (1.3% v/v) in Q3 and LG19 (1.4% v/v) & LG13 (1.1% v/v) in Q4 of 2012.

The concentration limit for carbon dioxide (1.5% v/v) was exceeded at three monitoring wells (LG-9 (1.9%v/v), LG-15 (1.6%v/v) & LG-16 (2.0%v/v)) in Q2 of 2012.

3.4.2 Inside the Waste Body

Levels of methane, carbon dioxide and oxygen were typical of those in an operational non-hazardous waste landfill.

3.5 Fugitive Emissions Survey

Two Landfill Gas surface emissions surveys were conducted at the Drehid Facility to evaluate potential areas of landfill gas release/flux from the surface of the landfill cap in 2012. The surveys involved landfill cap source monitoring using a portable Photo Ionisation Detector (PID) and a portable Flame Ionisation Detector (FID) to detect VOC's and Methane. A Global Positioning System was used to mark areas sampled using a grid system. The emission surveys were carried out on 5th of March and the 21st of July 2012 by Odour Monitoring Ireland and both reports are available onsite.

3.6 Noise Survey

Noise monitoring is carried out annually at five monitoring locations (N2 – N5 and NSL-1) in accordance with *“International Standard Organisation (ISO) 1996 Acoustics – Description and Measurement of Environmental Noise Part 1, 2, and 3”*, in addition to the Environmental Protection Agency 2012, *“Guidance note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)”*.

See monitoring location map and monitoring results in Appendix 2

3.7 Dust Monitoring

Dust deposition is monitored monthly at five monitoring locations (D1, D2, D5, D6 and D8) as shown on the monitoring location map in Appendix 2. With the exception of monitoring location D6 in August all of the monitoring results were less than the deposition limit set in the licence (350 mg/m²/day). The exceedance at D6 was due to its location beside an internal haul road which was busy with loader traffic carrying earth removed from the newly engineered landfill cell to the clay borrow area.

3.8 Meteorological Monitoring

Average rainfall, temperature, humidity and wind speed and direction for the monitoring period were obtained from the Meteorological Station at Casement Aerodrome, which is located approximately 40 km from the facility, is presented in Table 3.1.

Table 3.1 Meteorological Data: Casement Aerodrome – 2012

Rainfall	
Total Annual	926 mm
Maximum monthly (June)	178.5 mm
Minimum monthly (March)	19.8 mm
Temperature	
Mean	15.9°C
Monthly Mean Maximum (August)	19.3°C
Monthly Mean Minimum (December)	2.2°C
Wind (Knots)	
Mean	9.9Kts
Maximum Month (January)	13.9Kts
Minimum Month (May)	7.4Kts
Prevailing direction	South West
Prevailing sector	South West

The total annual rainfall is 716 mm. The winds were predominantly from the south west sector.

3.9 Biological Monitoring

The annual biological assessment of the Cushaling River was carried out in accordance with Condition 8.11 of the Licence 19th of September 2012. Sampling was undertaken at one monitoring location downstream of the facility. As the river rises on-site there is no upstream sampling location. The assessment used the EPA Q-rating system for the evaluation of rivers and streams. Benthic macro-invertebrates were sampled qualitatively using kick-sampling and the results indicated that the Q value to be Q3-4, which is slightly polluted. The results are the same as that for the 2008 assessment, which was carried out prior to waste acceptance. The assessment indicates that the facility is not impacting the Cushaling River.

4. SITE DEVELOPMENT WORKS

4.1 Tank, Pipeline and Bund Testing

An inspection and integrity testing of the bunds at the facility was carried out by Fehily Timoney and Co in the 2010 reporting year. Tank, pipeline and bund testing are scheduled for testing for 2013.

4.2 Summary of Resource & Energy Consumption

Table 4.1 presents an estimate of the resources used on-site in 2012. Bord na Mona completed an Energy Efficiency Audit of the facility in compliance with Conditions 7.1 and 7.2 of the Licence in January 2009. The audit was carried out in accordance with the Agency's "Guidance Note on Energy Efficiency Auditing" (2003). The Audit report recommended the development of a documented energy policy statement, as this is considered fundamental to the successful implementation of any management system as it provides the framework for the introduction and maintenance of energy efficiency and conservation measures in the day to day operation of the facility.

The facility is a significant source of greenhouse gas emissions, not through the use of fossil fuels, but as a result of the production and flaring of landfill gas. To address this Bord-na-Mona intends to install a landfill gas utilisation plant at the facility, when gas volumes are sufficient to support it. When operational, this will significantly reduce the facility's carbon footprint.

Table 4.1 Resources Used On-Site

Resources	Quantities
Diesel (green)	399,130 litres
Kerosene	7,001 litres
Electricity	1,411,044 kWh

4.3 Site Developments

Phase 4 of the landfill was completed in 2010 and work began in 2011 on the construction of phase 5 of the landfill.

Infrastructural works for the Bord na Mona Drehid Compost Facility were completed in November 2011 with a period of dry commissioning taking place in December 2011.

Wet commissioning commenced in January 2012 and a validation period required by the Department of Agriculture, Food and Marine was completed in April 2012. Upon receipt of approval from DAFM, processing re-commenced and has continued since July 2012.

There were no substantial infrastructural works carried out on the compost facility in 2012.

There are no substantial infrastructural works envisaged/planned for the compost facility during 2013.

4.4 Stability Assessment

The Drehid Facility is currently within Phase 6 of construction works, which together with Phases 1, 2, 3, 4 and 5 are subject to a stringent Construction Quality Assurance (CQA) programme. This programme ensures the side slopes of the retaining bunds are stable. The CQA plan has been submitted to the Agency. The method of waste placement, where the active waste 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 means the risk of slope failure is negligible.

A Stability Assessment of the Engineered Landfill at the Drehid Waste Management Facility was carried out by Tobin Consulting Engineers on the 11th March 2013. The report is available onsite.

5. EMISSIONS

5.1 Landfill Gas

The volumes of landfill gas generated at the facility during the reporting period were estimated using predictive gas generation model GasSim Version 2.5. The model input data were site specific values, i.e. size of the site, operational period, quantity and type of waste.

The model estimates that approximately 3510.6m³ / hour of landfill gas (50/50 methane and carbon dioxide,) is produced. This equates to 9,804,419 kg/yr of Methane generated at the facility over the reporting period. The total Methane flared from the site was calculated to be 9,636,140 kg/yr. Therefore the fugitive Methane was calculated to be 168,279 kg/yr. This equates to 1.7% of Methane generated onsite.

5.2 Surface Water

Rainfall from the landfill cap and hard stand areas of the landfill discharges firstly into a regulated settlement lagoon, the outlet of which (SW-6) is continuously monitored. The discharge then flows to the extensive manmade drainage network across the Bord na Móna landholding formed by the surface water drains between areas referred to as "Peat fields". The drain connect to a central culvert, which flows towards the south, where it passes through settlement ponds, before discharging to the Cushaling River.

5.3 Leachate

The amount of leachate taken offsite in 2012 was 54,823.88 tonnes. Other aqueous liquid waste transported from the site amounted to 14,175.74 tonnes. Both the leachate and aqueous liquid waste removed off site were transported onward for treatment at appropriate licensed facilities.

6. NUISANCE CONTROL

Bord na Móna is committed to operating in the best possible manner, using the best available techniques to minimise impacts to the environment and local residential neighbours. The potential sources of nuisance at the facility are odour, vermin, birds, flies, mud, dust and litter.

6.1 Odour

In addition to the gas extraction and flaring system, good operational practices on-site are the main controls to avoid odour nuisances. The handling, depositing and covering of waste at the facility is carried out in accordance with the Agency's Landfill Manual "Landfill Operational Practices". In addition, Bord na Móna have developed a site specific "Odour Management Plan".

The waste delivery trucks are unloaded at the working face and the waste is compacted within 3 to 4 minutes. The level areas of the working face are covered on a continuous basis during the day. The slope of the working face is covered completely with artificial cover sheets at the end of each working day, which can easily be removed again the following day prior to commencement of operations.

6.2 Vermin / Flies / Insects

The methods used for vermin control are as detailed in the EMS, which is ISO 14001 accredited. These control measures have found to be successful.

6.3 Birds

Bord na Móna employs one of the leading bird control specialists, Falcon Bird Control Services, who operate a seven day dawn to dusk programme. An aviary is provided at the site, which houses the birds of prey. The aim is to create an association of danger, so that birds choose not to fly around the area where bird control is active. To date these measures have proven to be successful.

6.4 Dust & Litter

Bord na Móna has prepared a Dust and Litter Control Plan, a copy of which is available onsite.

Dust and mud control measures were implemented at the start of the construction phase of the site and continued into the operational phase. These measures include the use of a wheelwash, road sweeper and a water bowser to dampen access roads and stockpiles during periods of dry weather. To date these measures have proven to be successful.

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. As part of operational controls all litter is collected at the end of the working day and litter has not been an issue at the facility.

7. ENVIRONMENTAL INCIDENTS AND COMPLAINTS

7.1 Incidents

There were forty-five (45) incidents on-site during the reporting period. The majority (39) related to exceedances of the limits set in the Licence at SW-6. A single incident related to an exceedance of the dust emission limit value. Another single incident related to an oil spill on the access road. Three incidents related to Landfill Gas exceedances recorded in quarterly monitoring. A single incident related to an exceedance of licenced leachate levels. All of these incidents were reported to the Agency.

7.2 Register of Complaints

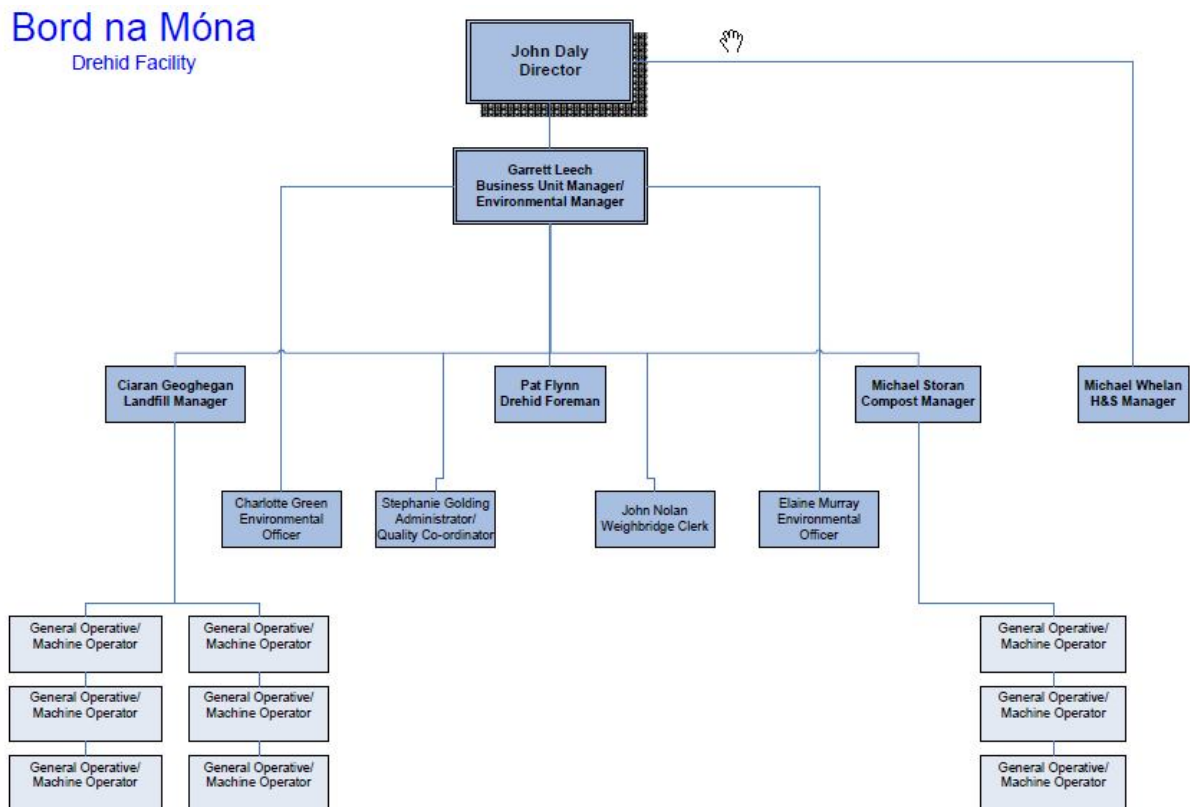
Bord na Móna maintains a register of complaints in compliance with Condition 11.4. Details of all complaints received during the reporting period and the action taken by Bord na Móna are available at the facility. During 2012 there was a total of 76 complaints received at Drehid. 69 relating to odour, 5 relating to litter and 2 relating to visual. All of the complaints were addressed by facility staff.

8. ENVIRONMENTAL MANAGEMENT SYSTEM

8.1 Management Structure

The Management Structure as required by Condition 2.2.2.1 of the waste licence was submitted to the Agency on 26th May 2006, as part of the EMS. An amended version is included below.

8.1.1 Site Management Structure



The day to day management of the facility and supervision of waste activities are the responsibility of the Environmental Manager, Landfill Manager, Facility Supervisor/Foreman and the General Operatives. The site organisational chart is shown below.

8.1.2 Staff Training

Staff training is carried out in accordance with the Environmental Management System (EMS) training procedures for the facility which is included in Appendix 5.

8.2 EMP

In compliance with Condition 2.2.1 an Environmental Management System (EMS) has been documented and implemented at the Facility. As part of the EMS an Environmental Management Programme (EMP) was developed.

8.2.1 Schedule of Objectives 2012

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

8.2.2 Schedule of Objectives 2013

Bord na Mona has set a schedule of targets and objectives for 2013. These are presented in Table 8.2.

8.3 Communications Programme

The Communications Programme required by Condition 2.4.1 Licence, was established three months before the start of waste activities and has been submitted to the Agency.

Table 8.1 Progress Report on Schedule of Objectives and Targets for 2012

Ref No	Objective	Target	Response	Status
1	Completion of Construction Strategy	Construction of further engineered landfill cells along with associated infrastructure in line with the phased construction management plan. (Phases 4-8)	CG	Complete
2	Waste Minimisation ongoing target (2020)	Re-use where possible materials used on site.	CG	Complete
		Minimise import of materials from off site	Team	Complete
3	Upkeep of Environmental Management System	Maintain EMS to ISO 14001 standard/certification	Team	Complete
		Implement ISO 16001 at the Facility	Team	Complete
		Roll out of the Environmental Management System at the Composting Plant	SG/EM/MS	Complete
		Roll out of ISO 9001	Team	Complete
		Maintain Policy for control of the office waste	SG/EM/CG	Complete
4	Raise awareness with contractors of Environmental Policy of the site	Contractors Induction	JN	Complete
5	Environmental Monitoring	Noise, Weekly surface water, Annual & Monthly Groundwater, Monthly Landfill Gas and Dust Monitoring	Technical Services/EM	Complete
6	Environmental Training and Awareness	Continue internal training programme and assessment of training needs for all operational staff during 2012	CG	Complete
7	Review effectiveness of Nuisance Control measures	For: Litter dust, birds and vermin	Team	Complete
8	Meteorological monitoring	Maintain log of Meteorological data- <i>Continuous</i>	CG	Complete
9	Landfill Gas Utilisation	Installation of landfill gas engines on-site for power generation.	CG/GL	Complete

Table 8.1 Schedule of Objectives and Targets for 2012 (continued)

Ref No	Objective	Target	Response	Status
10	BMW conversion rate (in line with EU Landfill Directive)	<i>Condition 8.1.2 of Waste Licence W0201-03</i> 'From 1st July 2010 to 30th June 2013 inclusive, a maximum of 47% by weight of municipal solid waste (MSW) accepted for disposal to the body of the landfill shall comprise biodegradable municipal waste (BMW), measured on a calendar year basis or, in 2010 and 2012, part thereof'	EM	Complete
11	Review outstanding Energy Efficiency Audit recommendations	Assess recommendations and introduce where possible. Investigate and implement possible measures for the reduction of diesel consumption.	CG	Complete
12	Review Aspects Register to reflect Composting Plant and Construction Phases 4-8.	Assess risks associated with new construction phases	Team	Complete
13	Intermediate Liner Installation	Installation of an intermediate liner to minimise leachate generation and fugitive emissions from the landfill	CG	Complete
14	Environmental Compliance	Review licence conditions outlined within W0201-03	EM/CG	Complete
15	Environmental Auditing	Carrying out audits of customers to establish environmental compliance	EM/CG/SG	Complete

Table 8.2 Schedule of Objectives and Targets for 2013

Ref No	Objective	Target	Response	Timescale
1	EPA Enforcement Priorities for 2013	To comply with the EPA's enforcement priorities for the open landfill sector for 2013	Team	Dec-13
2	Completion of Construction Strategy	Construction of further engineered landfill cells along with associated infrastructure in line with the phased construction management plan. (Phases 7)	Technical Services	Ongoing
3	Waste Minimisation ongoing target (2020)	Re-use where possible materials used on site.	CG	Ongoing
		Minimise import of materials from off site	Team	Ongoing
4	Upkeep of Environmental Management System	Maintain EMS to ISO 14001 standard/certification	Team	Ongoing
		Implement ISO 16001 at the Facility	Team	Ongoing
		Roll out of ISO 9001	Team	Jul-13
		Maintain Policy for control of the office waste	SG/EM/CG	Ongoing
5	Raise awareness with contractors of Environmental Policy of the site	Contractors Induction	JN	Ongoing
6	Energy Efficiency	Complete an Energy Efficiency Audit at the facility, including the activities of the Compost Plant with a view to setting energy reduction targets for diesel, electricity and water consumption 2014.	CG/MS/EM	Aug-13
		Obtain a BER rating for the administration building.	SG/EM	Sep-13
		Investigated the possibility of using more fuel efficient plant and machinery with a view to reducing diesel consumption.	PF	Nov-13
7	Environmental Training and Awareness	Continue internal training programme and assessment of training needs for all operational staff during 2012	CG/PF	Ongoing

Table 8.2 Schedule of Objectives and Targets for 2013 (continued)

Ref No	Objective	Target	Response	Timescale
8	Odour Management	Continued roll-out of the intermediate liner. Submit SEW (Specified Engineering Works) for approval for the Final Cap.	CG/PF	Ongoing
9	Surface Water Management	Evaluation of treatment technologies for treatment of background Ammonia at the facility	EM/GL	Ongoing
10	Leachate Management	Continued roll-out of intermediate liner to reduce the amount of rain water infiltration therefore reducing leachate generation. Upgrade the existing leachate management infrastructure to allow for expansion and to improve environmental controls.	CG/PF/Technical Services	Dec-13
11	Landfill Gas Utilisation	Installation of landfill gas engines on-site for power generation.	CG/GL	Dec-13
12	BMW conversion rate (in line with EU Landfill Directive)	<i>Condition 8.1.2 of Waste Licence W0201-03</i> 'From 1st July 2010 to 30th June 2013 inclusive, a maximum of 47% by weight of municipal solid waste (MSW) accepted for disposal to the body of the landfill shall comprise biodegradable municipal waste (BMW), measured on a calendar year basis or, in 2010 and 2012, part thereof'	EM	Dec-13
13	Review Aspects Register for the Facility	Assess risks associated on a bi-annual basis.	Team	Jun-13
15	Environmental Compliance	Review licence conditions outlined within W0201-03	Team	Dec-13
16	Environmental Auditing	Carrying out audits of customers to establish environmental compliance	EM/CG/SG	Ongoing

9. OTHER REPORTS

9.1 Financial Provision

An Environmental Liability Risk Assessment (ELRA) was submitted as part of 2007 AER. There has been no change in operations at the facility and hence there remains no change in the environmental risks and liabilities. The ELRA outlines

- Estimated costs that may arise from accidents and unplanned events
- Estimated costs associated with the closure, restoration and aftercare measures, including unexpected closure

The following conclusions were made in the ELRA –

Cost of unexpected closure at the end of year 1 and reoccurring costs - €1,400,000.

Restoration and aftercare costs at the end of scheduled operational life - €3,200,000.

Maximum cost of unplanned incident - €200,000.

9.2 Contributions to Community fund

A contribution of €347,589.54 was made to the community fund in 2012 in compliance with planning condition 17 of PL09.212059.

9.3 Statement on Costs of Landfill

The costs in the setting up, operation of, and provision of financial security and closure and after-care for a period of at least 30 years, are covered by the price charged for the disposal of waste at the facility.

9.4 European Pollutant Release and Transfer Register

Under the European Pollutant Release and Transfer Register Regulation (EC) No. 166/2006 Bord na Móna 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 3

9.5 Waste Recovery Report

National and regional policy on waste management is based on the Department of the Environment and Local Government's policy statement of September 1998, "Changing Our Ways", in which the Government affirmed its commitment to the EU hierarchy of waste management. In order of preference this is: -

- Prevention,
- Minimisation,
- Reuse,
- Recycling,
- Energy Recovery,
- Disposal.

The policy statement was based on, and is supported by, EU legislation (Landfill Directive 99/339/EC) that requires the diversion of organic wastes, including green waste, from landfill to alternative waste treatment facilities.

In 2012, Bord na Móna accepted 116,229.38 tonnes of inert waste for recovery which was used in on-site engineering works at the facility.

APPENDIX 1

Topographic Survey

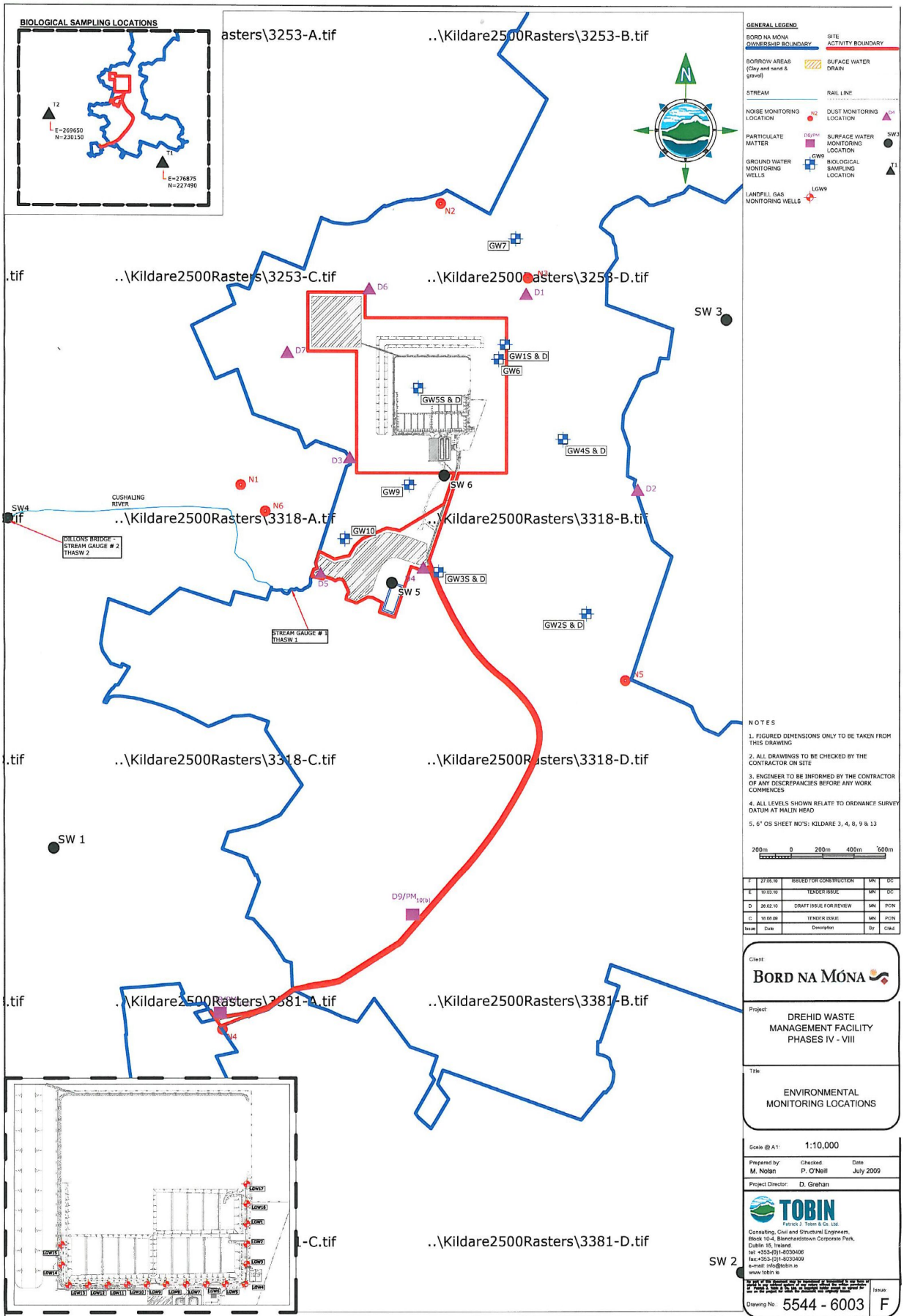


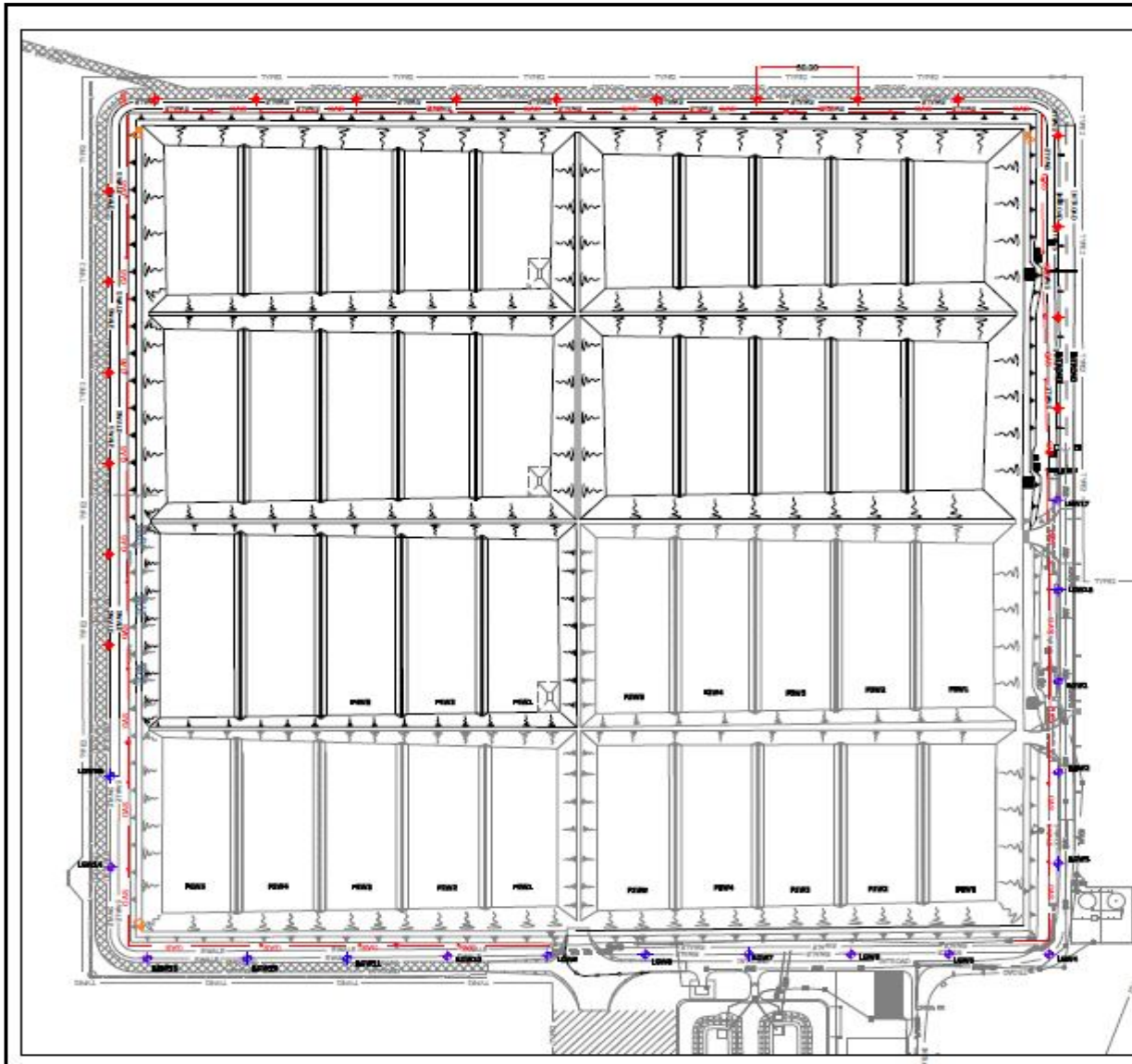
Mass Balance Calculation

	Survey date	03-Jan-13				
	Design m ³	As Built m ³	Surveyed Volume	Calculated Volume Remaining	Over Fill Volume	Actual Volume Remaining
Phase 1	356,102		350,034	6,068	7,444	13,512
Phase 2		322,855	309,703	13,152	2,259	15,411
Phase 3		444,408	367,225	77,183	268	77,451
Phase 4		405,080	328,318	76,762	570	77,332
Phase 5		456,527	275,867	180,660	208	180,868
Phase 6	418,055			418,055		418,055
Phase 7	335,185			335,185		335,185
Phase 8	309,241			309,241		309,241
Sum	3,047,453		1,631,147	1,416,306	10,749	1,427,055

APPENDIX 2

Monitoring Location Maps / Monitoring Results





- HORIZONTAL GAS WELL +
- VERTICAL GAS WELL +
- SURFACE EXTRACTION WELL +
- + OVER
- EXISTING GAS RING MAIN
- PROPOSED GAS RING MAIN | AIR LINE
- PROPOSED GAS FIELD CONNECTION
- PROPOSED CONDENSATE KO POT
- PROPOSED GAS MONITORING WELLS (@ 50m centres) +
- EXISTING GAS MONITORING WELLS (@ 50m centres) +

Project		Drehid Waste Management Facility		
Title		Landfill Gas Monitoring Locations		
Dimensions in	mm	 BORD NA MÓNA ENERGY LIMITED <small>LEASG, TULLAMORE CO. OFFALY Tel: 057 246900. Fax: 057 246100</small>		
Scale	1:2000			
Drawn By	M.G. 12/10/2011	Drawing No.	Revision	Sheet
Checked By		RE-DR-001	0	1 of 1
Approved By				

Groundwater Results

Field Readings												
GW-1S Grid Coordinates (ITM) 0674707 0732319	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Total Depth	9.43	9.43	9.43	9.43	9.43	9.43	9.43	9.43	9.43	9.43	9.43	9.43
Surface Water Level	1.73	1.76	1.85	2.04	1.97	1.49	1.85	2.04	1.97	1.49	1.98	1.67
Colour	Cloudy/ grey	Cloudy/ grey	Cloudy	Cloudy,	Cloudy,	Light brown,	Cloudy,	Cloudy,	Light brown,	Cloudy,	Cloudy,	Cloudy/ grey,
Silt content	some S.S	some S.S	some S.S	Few S.S,	some S.S,	few S.S,	Few S.S,	some S.S	few S.S,	Few S.S,	some S.S,	some S.S,
Odour	foul odour	Slight odour	Slight odour	No odour	Foul odour	no odour	No odour	Foul odour	no odour	Foul odour	Foul odour	slight odour
Recharge Rate	Instant	Instant	Instant	Instant	Instant	Instant	Instant	Instant	Instant	Instant	Instant	5cm/3sec
Chemical Scan												
pH	7	7.3	7.5	7.3	7.2	7.2	7.3	7.3	7.3	7.3	7.3	7.3
Conductivity	1029	939	972	908	917	1007	1031	999	1008	956	974	974
Chloride	13	13	14	13	13	15	13	14	14	12	13	14
Ammonia as NH3	6.1	5.6	6.8	6.9	5.1	6.9	6.1	7.2	6.6	6.2	7.2	7.2
Sulphate								0.53				
Nitrate as NO3								<0.2				
Nitrite as NO2								<0.02				
Orthophosphate								<0.01				
Total Phosphorus								0.7				
Metal Scan												
Calcium - dissolved								237				
Magnesium - dissolved								25				
Potassium - dissolved								1.3				
Sodium - dissolved								15				
Iron - dissolved								15				
Boron - dissolved								17				
Arsenic - dissolved								59				
Barium - dissolved								393				
Cadmium - dissolved								<2				
Mercury - dissolved								<1				

GW-1S continued												
Grid Coordinates (ITM) 0674707 0732319	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Cobalt - dissolved								2				
Chromium - dissolved								2				
Copper - dissolved								2				
Manganese - dissolved								661				
Beryllium - dissolved								<2				
Nickel - dissolved								15				
Lead - dissolved								5				
Antimony - dissolved								<2				
Selenium - dissolved								<2				
Silver - dissolved								<2				
Aluminium - dissolved								110				
Tin - dissolved								<2				
Zinc - dissolved								50				
Chromium - total												
Organics Scan												
USEPA								<10				
Bacterial Scan												
Faecal Coli								1				
Total Coliforms								770.1				

Field Readings												
GW-1D Grid Coordinates (ITM) 0674701 0732320	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Total Depth	24.17	24.17	24.17	24.17	24.17	24.17	24.17	24.17	24.17	24.17	24.17	24.17
Surface Water Level	1.32	2.3	2.36	2.21	2.2	1.96	2.11	1.43	2.37	1.86	2.38	2.02
Colour	Cloudy	Cloudy	Cloudy	Cloudy,	Cloudy,	Light brown,	Clear,	Light Brown,	Light brown,	Clear,	Cloudy,	Clear,
Silt content	few S.S	few S.S	V.few S.S	Few S.S,	Few S.S,	Few S.S,	No S.S,	Some S.S,	Few S.S,	Few S.S,	Few S.S,	No S.S,
Odour	no odour	no odour	no odour	No odour	No odour	No odour	No odour	No odour	No odour	No odour	No odour	No odour
Recharge Rate	Instant	Instant	Instant	Instant	Instant	Instant	2cm/5sec	Instant	Instant	Instant	1cm/2sec	2cm/4sec
Chemical Scan												
pH	7.3	7.2	7.3	7.1	7	7.1	7	7.4	7.2	7.1	7.1	7.1
Conductivity	706	710	724	712	726	708	728	720	727	713	718	718
Chloride	11	11	12	11	11	12	11	11	11	10	11	11
Ammonia as NH3	5.7	6	6.6	6.4	6	6.1	6.3	6.6	6.2	5.8	6.5	6.5
Sulphate								<0.5				
Nitrate as NO3								<0.2				
Nitrite as NO2								<0.02				
Orthophosphate								<0.01				
Total Phosphorus								0.62				
Metal Scan												
Calcium - dissolved								293				
Magnesium - dissolved								7.2				
Potassium - dissolved								1.1				
Sodium - dissolved								8.7				
Iron - dissolved								9.3				
Boron - dissolved								10				
Arsenic - dissolved								191				
Barium - dissolved								400				

Field Readings												
GW-1D continued												
Grid Coordinates (ITM) 0674701 0732320	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Cadmium - dissolved								10				
Cobalt - dissolved								11				
Chromium - dissolved								2				
Copper - dissolved								184				
Mercury - dissolved								<1				
Manganese - dissolved								538				
Beryllium - dissolved								<2				
Nickel - dissolved								41				
Lead - dissolved								9				
Antimony - dissolved								<2				
Selenium - dissolved								<2				
Silver - dissolved								<2				
Aluminium - dissolved								243				
Tin - dissolved								<2				
Zinc - dissolved								76				
Chromium - total												
Organics Scan												
USEPA								<10				
Bacterial Scan												
Faecal Coli								0				
Total Coliforms								7.5				

Field Readings												
GW-2S Grid Coordinates (ITM) 0675246 0730677	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Total Depth	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53
Surface Water Level	2.91	1.58	1.51	1.6	1.75	1.6	1.88	1.9	1.53	1.3	1.54	1.22
Colour	Light brown	Light brown	Light brown	Light brown,	Light brown,	Light brown,	Light brown,	Light brown,	Light brown,	Light brown,	Light brown,	Light brown,
Silt content	some S.S	some S.S	some S.S	Few S.S,	Few S.S,	Few S.S,	Few S.S,	Few S.S,	Few S.S,	Some S.S,	Some S.S,	High S.S,
Odour	no odour	no odour	no odour	no odour	no odour	no odour	no odour	slight odour	slight odour	No odour	No odour	No odour
Recharge Rate	Instant	2cm/3sec	2cm/5sec	2cm/5sec	2cm/4sec	2cm/5sec	1cm/2sec	2cm/5sec	2cm/5sec	1cm/2sec	3cm/5sec	5cm/5sec
Chemical Scan												
pH	7.3	7.2	7.3	7.1	7	7.1	7	7.4	7.2	7.1	7.1	7.5
Conductivity	825	850	839	838	849	858	880	844	872	879	848	848
Chloride	11	10	11	11	11	13	10	11	11	9.6	10	10
Ammonia as NH3	1.84	1.35	0.6	1.64	1.13	0.67	1.1	1.8	2.1	1.6	1.9	2
Sulphate								6.6				
Nitrate as NO3								<0.2				
Nitrite as NO2								0.02				
Orthophosphate								<0.01				
Total Phosphorus								0.34				
Metal Scan												
Calcium - dissolved								336				
Magnesium - dissolved								35				
Potassium - dissolved								0.7				
Sodium - dissolved								6.6				
Iron - dissolved								2				
Boron - dissolved								68				
Arsenic - dissolved								6				

GW-2S continued												
Grid Coordinates (ITM) 0675246 0730677	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Copper - dissolved								6				
Mercury - dissolved								<1				
Barium - dissolved								574				
Cadmium - dissolved								2				
Cobalt - dissolved								4				
Chromium - dissolved								<2				
Manganese - dissolved								965				
Beryllium - dissolved								<2				
Nickel - dissolved								19				
Lead - dissolved								<2				
Antimony - dissolved								<2				
Selenium - dissolved								<2				
Silver - dissolved								<2				
Aluminium - dissolved								205				
Tin - dissolved								<2				
Zinc - dissolved								25				
Chromium - total												
Organics Scan												
USEPA								<10				
Bacterial Scan												
Faecal Coli								0				
Total Coliforms								8.3				

Field Readings												
GW-3S Grid Coordinates (ITM) 0674288 0730934	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Total Depth	12.25	12.25	12.25	12.25	12.25	12.25	12.25	12.25	12.25	12.25	12.25	12.25
Surface Water Level	2.51	2.31	2.4	2.51	2.2	2.54	2.78	1.65	2.3	2.39	1.65	2.4
Colour	Grey,	Light Brown,	Light Brown,	Cloudy/ Light Brown,	Cloudy,	Cloudy/ Grey,	Cloudy/ Light Brown,	Grey/ Cloudy,	Cloudy/ Grey,	Light Brown,	Light brown,	Brown
Silt content	High S.S,	some S.S,	some S.S,	Few S.S,	some S.S,	No S.S,	Few S.S,	Few S.S,	Some S.S,	Few S.S,	Some S.S,	High S.S,
Odour	No odour	no odour	foul odour	Foul odour	foul odour	Foul odour	Foul odour	foul odour	Foul odour	Foul odour	Foul odour	Slight odour
Recharge Rate	Instant	Instant	2cm/10sec	Instant	Instant	Instant	Instant	2cm/4sec	2cm/4sec	Instant	Instant	Instant
Chemical Scan												
pH	7.4	7.1	7	7	6.9	6.8	7.2	7.1	7	7.1	7	7
Conductivity	760	815	793	804	841	808	829	844	866	872	845	845
Chloride	13	15	15	14	14	14	9.4	13	13	9.3	12	12
Ammonia as NH3	3.02	1.18	3.51	4.32	4.8	4.38	2	4.1	4.3	1.7	3.9	3
Sulphate								6.9				
Nitrate as NO3								<0.2				
Nitrite as NO2								<0.02				
Orthophosphate								0.12				
Total Phosphorus								0.85				
Metal Scan												
Calcium - dissolved								192				
Magnesium - dissolved								26				
Potassium - dissolved								1.4				
Sodium - dissolved								11				
Iron - dissolved								8.4				
Boron - dissolved								33				
Arsenic - dissolved								19				
Barium - dissolved								419				
Cadmium - dissolved								<2				

GW-3S continued Grid Coordinates (ITM) 0674288 0730934	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Cobalt - dissolved								<2				
Chromium - dissolved								<2				
Copper - dissolved								2				
Mercury - dissolved								<1				
Manganese - dissolved								264				
Beryllium - dissolved								<2				
Nickel - dissolved								5				
Lead - dissolved								4				
Antimony - dissolved								<2				
Selenium - dissolved								<2				
Silver - dissolved								<2				
Aluminium - dissolved								152				
Tin - dissolved								<2				
Zinc - dissolved								38				
Chromium - total												
Organics Scan												
USEPA								<10				
Bacterial Scan												
Faecal Coli								0				
Total Coliforms								10.8				

Field Readings												
GW-6 Grid Coordinates (ITM) 0674699 0732305	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Total Depth	-	-	-	-	-	-	-	-	-	-	-	-
Surface Water Level	Tap	Tap	Tap	Tap	Tap	Tap	Tap	Tap	Tap	Tap	Tap	Tap
Colour	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Silt content	no S.S	no S.S	no S.S	no S.S	no S.S	no S.S	no S.S	no S.S	no S.S	no S.S	no S.S	no S.S
Odour	no odour	no odour	no odour	no odour	no odour	no odour	no odour	slight odour	no odour	no odour	Slight odour	no odour
Recharge Rate	-	-	-	-	-	-	-	-	-	-	-	-
Chemical Scan												
pH	7.5	7.6	7.7	7.6	7.2	7.7	7.2	7.7	7.6	7.6	7.6	7.6
Conductivity	508	510	516	509	506	515	747	519	524	510	520	520
Chloride	11	12	12	12	12	12	12	12	12	11	11	11
Ammonia as NH3	6.2	6.2	6.8	6.1	6	6.3	6.3	6.3	6.1	6.2	6.2	5.8
Sulphate								<0.5				
Nitrate as NO3								<0.2				
Nitrite as NO2								<0.02				
Orthophosphate								<0.01				
Total Phosphorus								0.2				
Metal Scan												
Calcium - dissolved								84				
Magnesium - dissolved								8.6				
Potassium - dissolved								1.7				
Sodium - dissolved								11				
Iron - dissolved								5.4				
Boron - dissolved								15				
Arsenic - dissolved								255				
Barium - dissolved								139				
Cadmium - dissolved								<2				
Cobalt - dissolved								9				

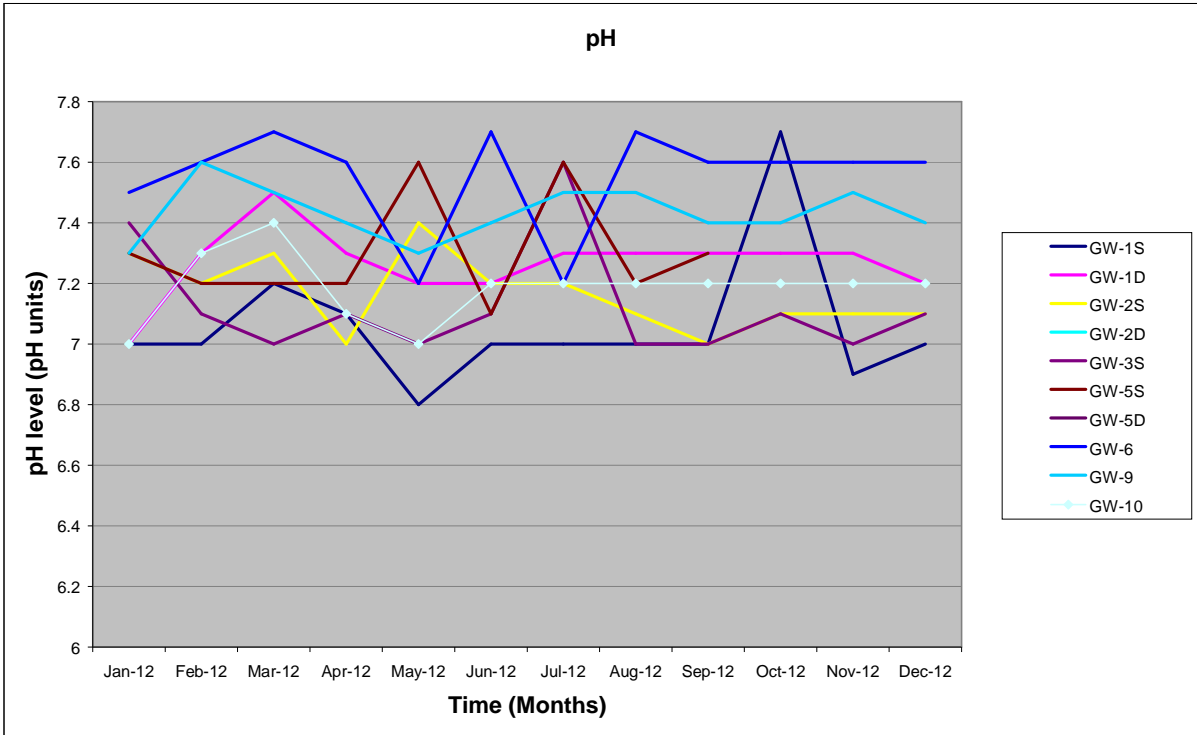
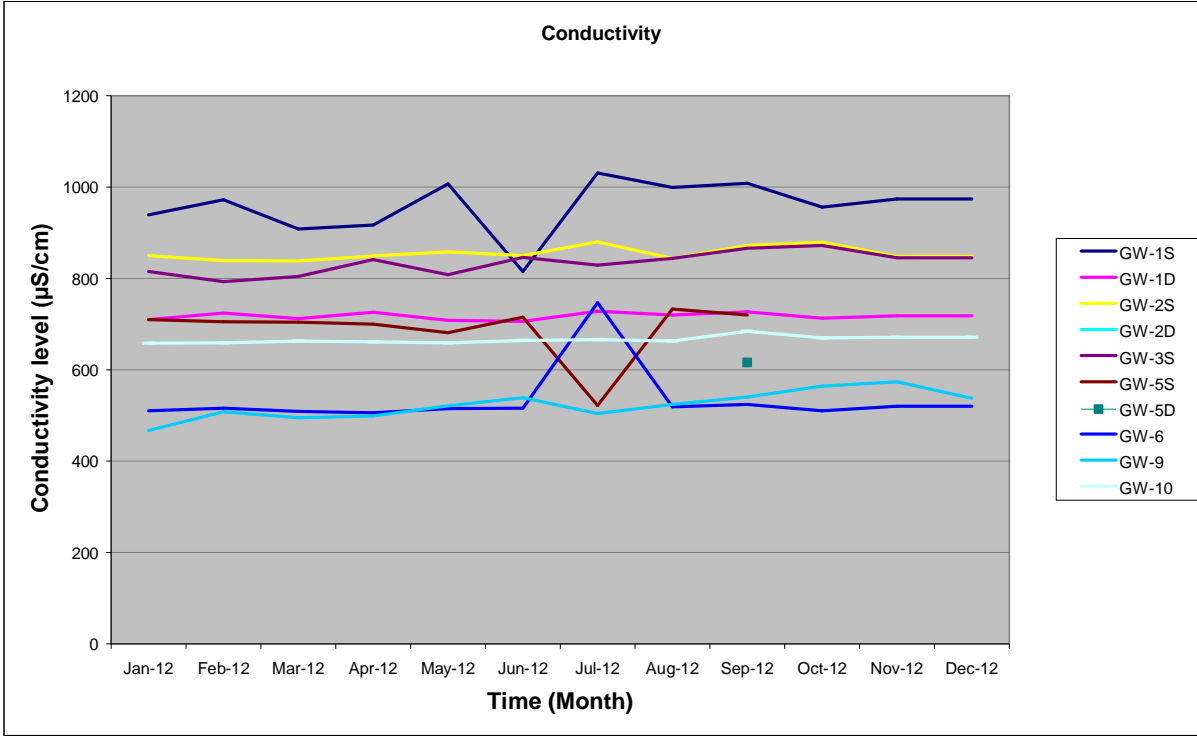
	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
GW-6 continued												
Grid Coordinates (ITM) 0674699 0732305												
Nickel - dissolved								21				
Chromium - dissolved								<2				
Copper - dissolved								<2				
Mercury - dissolved								<1				
Manganese - dissolved								32				
Beryllium - dissolved								<2				
Lead - dissolved								<2				
Antimony - dissolved								<2				
Selenium - dissolved								<2				
Silver - dissolved								<2				
Aluminium - dissolved								2				
Tin - dissolved								<2				
Zinc - dissolved								54				
Chromium - total												
Organics Scan												
USEPA								<10				
Bacterial Scan												
Faecal Coliforms								0				
Total Coliforms								1				

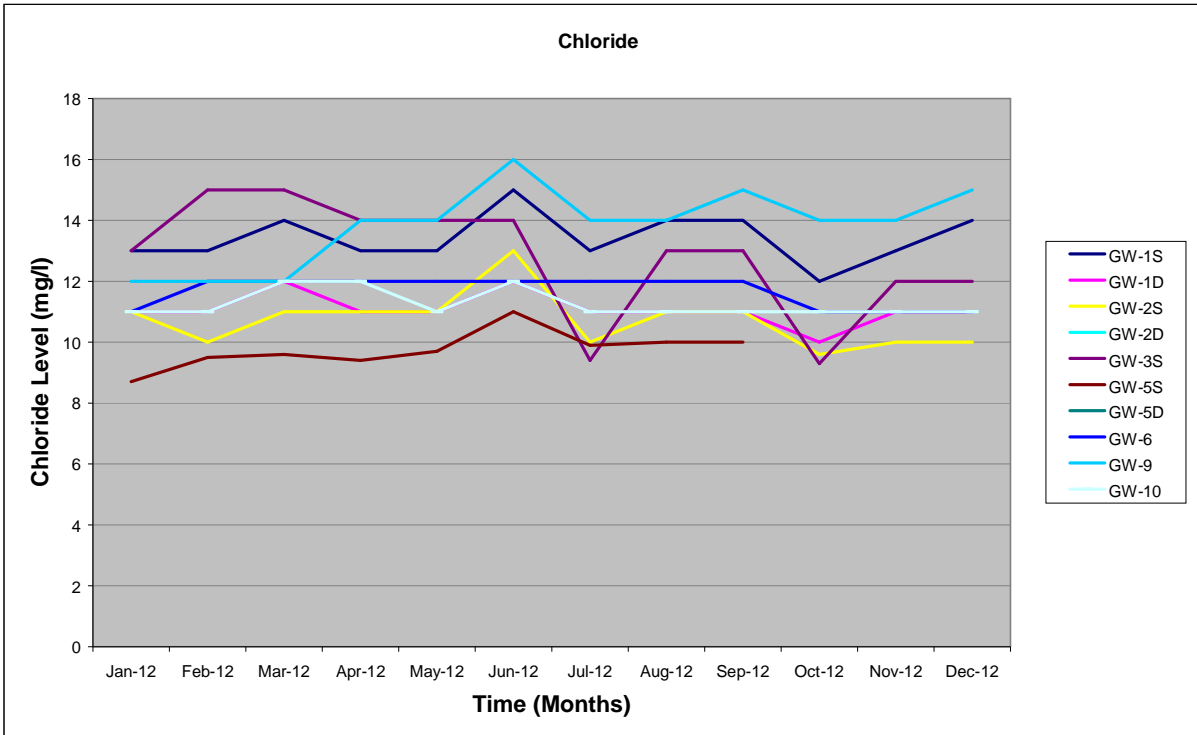
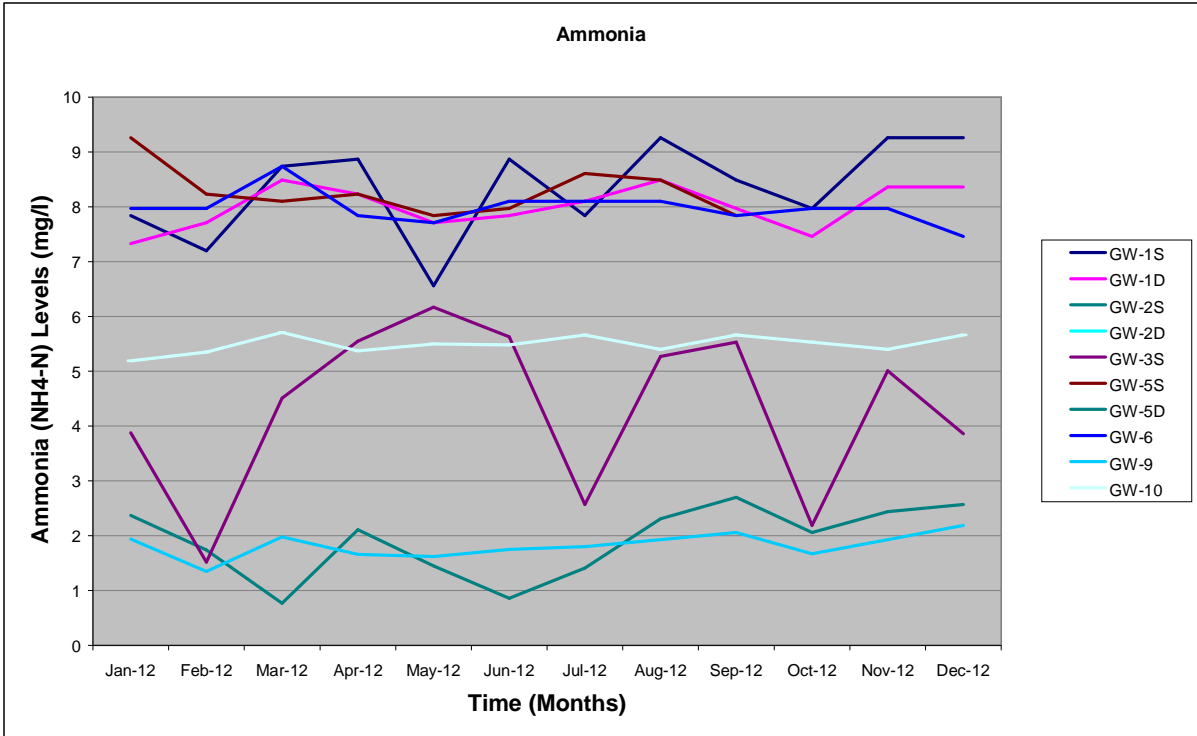
Field Readings												
GW-9 Grid Coordinates (ITM) 0674305 0731531	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Total Depth	13.02	13.02	13.02	13.02	13.02	13.02	13.02	13.02	13.02	13.02	13.02	13.02
Surface Water Level	1.02	1.21	1.46	1.4	1.53	1.6	1.6	2.3	1.47	1.24	1.26	1.28
Colour	Light brown,	Brown,	Light brown / cloudy,	Brown,	Light brown,	Cloudy/ light brown,	Brown,	Brown,	Brown,	Brown,	Brown,	Dark brown,
Silt content	high S.S,	high S.S,	some S.S,	high S.S,	few S.S,	some S.S,	high S.S,	high S.S,	high S.S,	High S.S,	High S.S,	V. high S.S,
Odour	no odour	no odour	slight odour	slight odour	foul odour	foul odour	no odour	slight odour	slight odour	Foul odour	Foul odour	No odour
Recharge Rate	Instant	Instant	Instant	Instant	Instant	Instant	Instant	Instant	Instant	Instant	Instant	Instant
Chemical Scan												
pH	7.3	7.6	7.5	7.4	7.3	7.4	7.5	7.5	7.4	7.4	7.5	7.5
Conductivity	501	467	508	495	499	521	504	524	540	564	574	537.5
Chloride	11	11	12	12	11	12	11	11	11	11	11	11
Ammonia as NH3	1.51	1.05	1.54	1.29	1.26	1.36	1.4	1.5	1.6	1.3	1.5	1.7
Sulphate								4.2				
Nitrate as NO3								<0.2				
Nitrite as NO2								<0.02				
Orthophosphate								0.09				
Total Phosphorus								0.22				
Metal Scan												
Calcium - dissolved								146				
Magnesium - dissolved								6.8				
Potassium - dissolved								0.9				
Sodium - dissolved								12				
Iron - dissolved								3.1				
Boron - dissolved								11				
Arsenic - dissolved								16				
Barium - dissolved								139				
Cadmium - dissolved								<2				

GW-9 continued												
Grid Coordinates (ITM) 0674305 0731531	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Cobalt - dissolved								<2				
Chromium - dissolved								2				
Copper - dissolved								3				
Mercury - dissolved								<1				
Manganese - dissolved								391				
Beryllium - dissolved								<2				
Nickel - dissolved								8				
Lead - dissolved								4				
Antimony - dissolved								<2				
Selenium - dissolved								<2				
Silver - dissolved								<2				
Aluminium - dissolved								143				
Tin - dissolved								<2				
Zinc - dissolved								36				
Chromium - total												
Organics Scan												
USEPA								<10				
Bacterial Scan												
Faecal Coli								0				
Total Coliforms								2				

Field Readings												
GW-10 Grid Coordinates (ITM) 0673770 0731019	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Total Depth	7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61
Surface Water Level	1.75	1.81	1.83	1.81	2.18	2.11	2.2	1.97	1.98	1.99	2.04	2.04
Colour	Pale yellow,	Light yellow,	Pale yellow,	Light brown,	V. Light brown,	Cloudy,	Cloudy,	Pale yellow,	Cloudy,	Cloudy	Cloudy	Yellow tint,
Silt content	few S.S,	few S.S,	few S.S,	few S.S,	few S.S,	few S.S,	few S.S,	No S.S	few S.S,	Few S.S,	some S.S,	Few S.S,
Odour	foul odour	no odour	foul odour	odourous	slight odour	no odour	no odour	slight odour	slight odour	slight odour	slight odour	No odour
Recharge Rate	Instant	Instant	Instant	Instant	Instant	Instant	Instant	Instant	Instant	Instant	Instant	Instant
Chemical Scan												
pH	7	7.3	7.4	7.1	7	7.2	7.2	7.2	7.2	7.2	7.2	7.2
Conductivity	650	658	659	663	661	659	666	663	684	670	671	671
Chloride	11	11	12	12	11	12	11	11	11	11	11	11
Ammonia as NH3	4.04	4.16	4.44	4.18	4.28	4.26	4.4	4.2	4.4	4.3	4.2	4.4
Sulphate								0.7				
Nitrate as NO3								<0.2				
Nitrite as NO2								<0.02				
Orthophosphate								0.09				
Total Phosphorus								0.12				
Metal Scan												
Calcium - dissolved								143				
Magnesium - dissolved								8.3				
Potassium - dissolved								0.64				
Sodium - dissolved								6.9				
Iron - dissolved								4.1				
Boron - dissolved								5				
Arsenic - dissolved								8				
Barium - dissolved								114				
Cadmium - dissolved								<2				
Cobalt - dissolved								<2				
Chromium - dissolved								2				

GW-10 continued Grid Coordinates (ITM) 0673770 0731019	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Copper - dissolved								<2				
Mercury - dissolved								<1				
Manganese - dissolved								227				
Beryllium - dissolved								<2				
Nickel - dissolved								3				
Lead - dissolved								3				
Antimony - dissolved								<2				
Selenium - dissolved								<2				
Silver - dissolved								<2				
Aluminium - dissolved								78				
Tin - dissolved								<2				
Zinc - dissolved								23				
Chromium - total												
Organics Scan												
USEPA								<10				
Bacterial Scan												
Faecal Coli								0				
Total Coliforms								13.5				



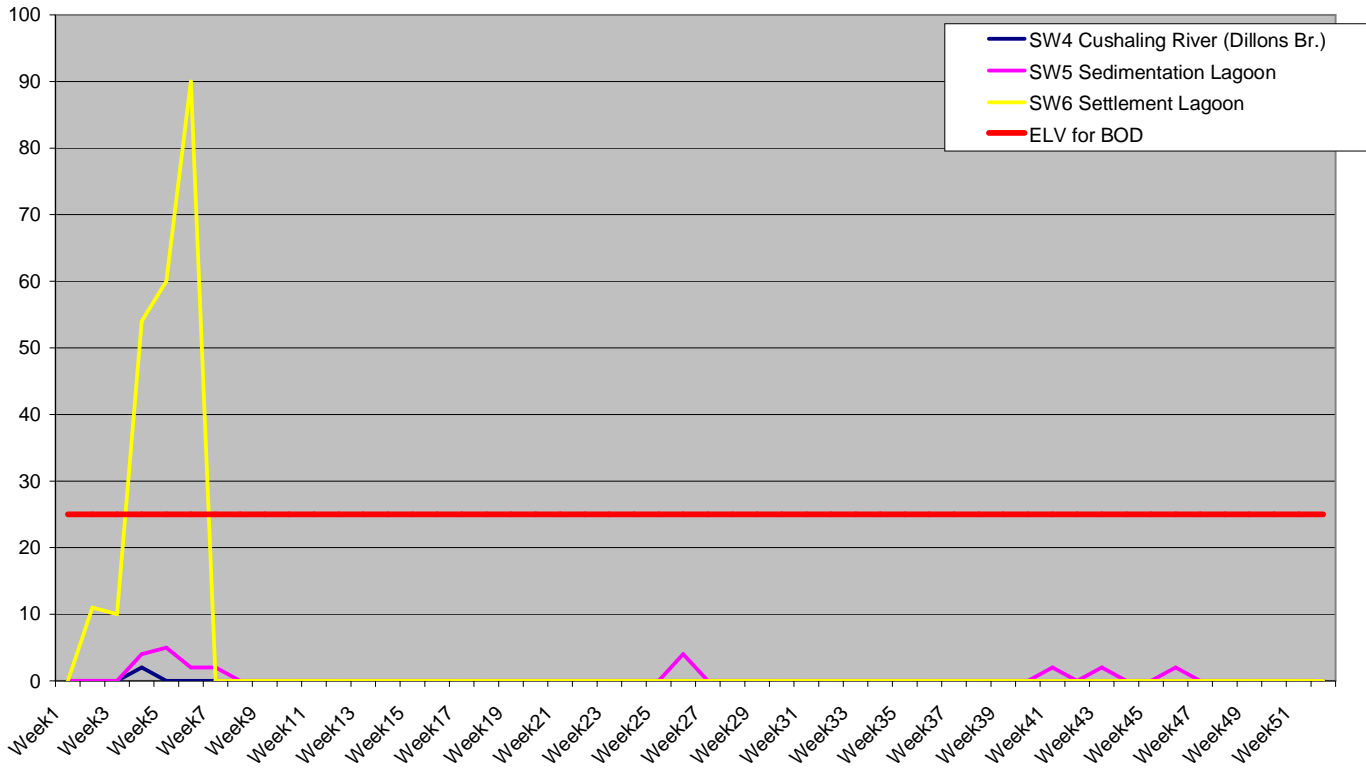


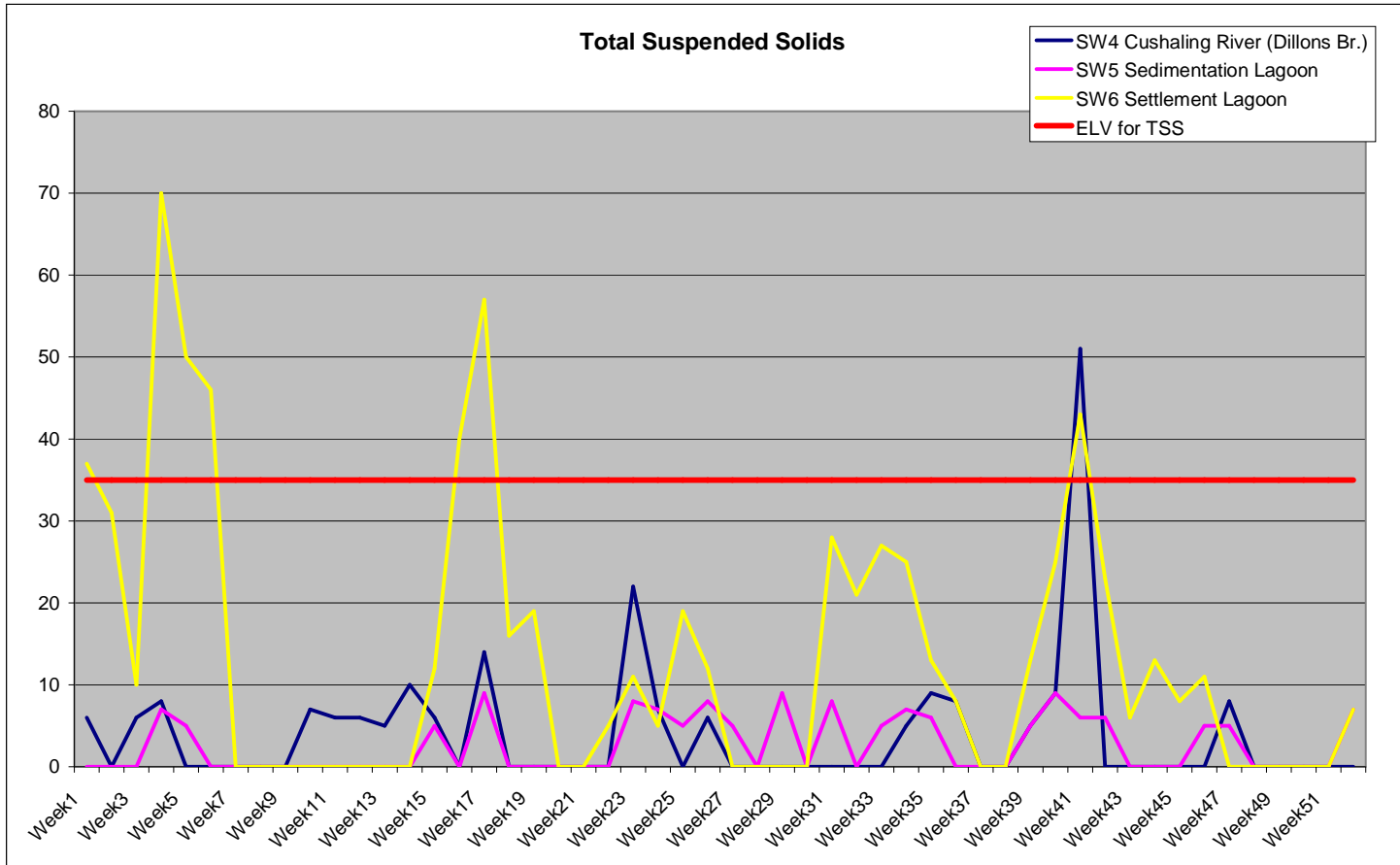
Surface Water Results

2012	Quarter-1													Quarter-2												
SW4	Wk1	Wk2	Wk3	Wk4	Wk5	Wk6	Wk7	Wk8	Wk9	Wk10	Wk11	Wk12	Wk13	Wk14	Wk15	Wk16	Wk17	Wk18	Wk19	Wk20	Wk21	Wk22	Wk23	Wk24	Wk25	Wk26
pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	7.9	7.9	7.8	7.6	7.6	7.5	7.6	7.9	7.5	7.3	7.5	7.1	7.3
BOD (mg/l)	<2	<2	<2	2	<2	<2	<2	-	-	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2-
Chloride(mg/l)	16	15	17	16	16	14	14	-	-	-	13	13	13	14	14	13	16	13	-	13	-	12	13	14	48	14-
COD(mg/l)	79	80	76	17	70	66	72	-	-	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	74
TSS(mg/l)	6	<5	6	8	<5	<5	<5	-	-	7	6	6	5	10	6	<5	14	<5	<5	<5	-	<5	22	7	<5	6
NH3(mg/l)	0.05	0.06	0.06	0.23	0.41	0.2	0.22	-	-	0.1	0.09	0.05	0.05	0.05	0.08	0.06	0.16	0.05	0.06	0.04	0.03	0.04	0.13	0.06	0.06	0.07
NH4(mg/l)	0.06	0.08	0.08	0.30	0.53	0.26	0.28	-	-	0.13	0.12	0.06	0.06	0.06	0.10	0.08	0.21	0.06	0.08	0.05	0.04	0.05	0.17	0.08	0.08	0.09
SW5	Wk1	Wk2	Wk3	Wk4	Wk5	Wk6	Wk7	Wk8	Wk9	Wk10	Wk11	Wk12	Wk13	Wk14	Wk15	Wk16	Wk17	Wk18	Wk19	Wk20	Wk21	Wk22	Wk23	Wk24	Wk25	Wk26
pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	7.9	7.8	7.7	7.4	7.3	7.3	7.4	7.7	7.5	7.4	7.3	7.7	7.2
BOD (mg/l)	<2	<2	<2	4	5	2	2	-	-	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Chloride(mg/l)	14	14	14	15	15	13	13	-	-	-	12	13	14	14	13	14	12	13	-	13	-	12	11	13	9.6	11
COD(mg/l)	106	104	98	106	96	88	97	-	-	93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	107
TSS(mg/l)	<5	<5	<5	7	5	<5	<5	-	-	<5	<5	<5	<5	<5	5	<5	9	<5	<5	<5	-	<5	8	7	5	8
NH3(mg/l)	0.09	0.13	0.13	0.58	0.84	0.34	0.5	-	-	0.16	0.13	0.1	0.07	0.08	0.2	0.28	0.09	0.14	0.19	0.16	0.07	0.13	0.55	0.45	0.15	0.34
NH4(mg/l)	0.12	0.17	0.17	0.75	1.08	0.44	0.64	-	-	0.21	0.17	0.13	0.09	0.10	0.26	0.36	0.12	0.18	0.24	0.21	0.09	0.17	0.71	0.58	0.19	0.44
SW6	Wk1	Wk2	Wk3	Wk4	Wk5	Wk6	Wk7	Wk8	Wk9	Wk10	Wk11	Wk12	Wk13	Wk14	Wk15	Wk16	Wk17	Wk18	Wk19	Wk20	Wk21	Wk22	Wk23	Wk24	Wk25	Wk26
pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	8.2	8.2	8.1	8	7.9	7.3	8	8.4	7.6	7.9	7.7	7.7	7.9
BOD (mg/l)	<2	11	10	54	60	90	-	-	-	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2
Chloride(mg/l)	23	29	34	39	35	35	-	-	-	-	15	16	17	17	18	17	15	17	-	17	-	17	15	20	18	18
COD(mg/l)	12	35	32	150	142	228	-	-	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15
TSS(mg/l)	37	31	10	70	50	46	-	-	-	<5	<5	<5	<5	<5	12	40	57	16	19	<5	-	5	11	5	19	12
NH3(mg/l)	1.08	1.23	2.76	6.8	10	13	-	-	-	0.81	0.95	0.19	<0.02	<0.06	0.49	1.38	1.35	1.68	1.88	1.89	0.12	0.38	2.28	3	3.7	3.3
NH4(mg/l)	1.39	1.58	3.55	8.74	12.86	16.71	-	-	-	1.04	1.22	0.24	<0.03	<0.08	0.63	1.77	1.74	2.16	2.42	2.43	0.15	0.49	2.93	3.86	4.76	4.24

	Quarter-3													Quarter-4												
SW4	Wk27	Wk28	Wk29	Wk30	Wk31	Wk32	Wk33	Wk34	Wk35	Wk36	Wk37	Wk38	Wk39	Wk40	Wk41	Wk42	Wk43	Wk44	Wk45	Wk46	Wk47	Wk48	Wk49	Wk50	Wk51	Wk52
pH Units	7.5	7.5	7.4	7.4	7.5	7.5	7.5	7.5	7.6	8	7.8	7.7	7.5	7.6	7.4	7.3	7.5	7.5	7.5	7.5	8.1	7.4	-	-	-	7.5
BOD (mg/l)	-	-	-	-	-	-	-	-	-	-	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2
Chloride(mg/l)	12	12	11	10	11	11	10	10	10	14	12	12	10	11	10	13	11	12	11	11	16	12	-	-	-	11
COD(mg/l)	-	-	-	-	-	-	-	-	-	-	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	71
TSS(mg/l)	<5	<5	<5	<5	<5	<5	<5	5	9	8	<5	<5	5	9	51	<5	<5	<5	<5	<5	8	<5	-	-	-	<5
NH3(mg/l)	0.03	0.03	0.07	0.02	0.04	0.05	0.04	<0.02	0.06	<0.02	0.03	0.02	0.04	0.04	0.13	0.05	0.04	0.05	0.03	0.08	2.9	0.1	-	-	-	0.07
NH4(mg/l)	0.04	0.04	0.09	0.03	0.05	0.06	0.05	<0.03	0.08	<0.03	0.04	0.03	0.05	0.05	0.17	0.06	0.05	0.06	0.04	0.10	3.73	0.13	-	-	-	0.09
SW5	Wk27	Wk28	Wk29	Wk30	Wk31	Wk32	Wk33	Wk34	Wk35	Wk36	Wk37	Wk38	Wk39	Wk40	Wk41	Wk42	Wk43	Wk44	Wk45	Wk46	Wk47	Wk48	Wk49	Wk50	Wk51	Wk52
pH Units	7.2	7.3	7.2	7.2	7.4	7.3	7.4	7.3	7.4	7.3	7.6	7.6	7.4	7.5	7.4	7.2	7.3	7.4	7.4	7.3	7.3	7.2	-	-	-	7.3
BOD (mg/l)	-	-	-	-	-	-	-	-	-	-	<2	-	-	<2	2	-	2	-	-	2	-	-	-	-	-	<2
Chloride(mg/l)	1	11	9.6	9.6	10	10	9.9	9.2	9.3	9.3	10	11	10	10	10	9.8	9.8	10	9.5	11	10	10	-	-	-	9.2
COD(mg/l)	-	-	-	-	-	-	-	-	-	-	93	-	-	94	103	-	120	-	-	99	-	-	-	-	-	109
TSS(mg/l)	5	<5	9	<5	8	<5	5	7	6	<5	<5	<5	5	9	6	6	<5	<5	<5	5	5	<5	-	-	-	7
NH3(mg/l)	0.14	0.22	0.18	0.17	0.3	0.24	0.26	0.2	0.2	0.08	0.15	0.18	0.21	0.24	0.17	0.18	0.14	0.29	0.19	0.4	0.22	0.27	-	-	-	0.14
NH4(mg/l)	0.18	0.28	0.23	0.22	0.39	0.31	0.33	0.26	0.26	0.10	0.19	0.23	0.27	0.31	0.22	0.23	0.18	0.37	0.24	0.51	0.28	0.35	-	-	-	0.18
SW6	Wk27	Wk28	Wk29	Wk30	Wk31	Wk32	Wk33	Wk34	Wk35	Wk36	Wk37	Wk38	Wk39	Wk40	Wk41	Wk42	Wk43	Wk44	Wk45	Wk46	Wk47	Wk48	Wk49	Wk50	Wk51	Wk52
pH Units	7.8	7.9	7.4	8.1	7.7	7.8	8	7.9	8	7.5	8.1	8	8	8.1	8	7.5	7.9	7.7	7.6	8	7.5	7.9	-	-	-	8
BOD (mg/l)	-	-	-	-	-	-	-	-	-	-	<2	-	-	<2	<2	-	<2	-	-	<2	-	-	-	-	-	<2
Chloride(mg/l)	18	20	11	16	16	16	15	14	14	11	15	15	15	15	15	13	15	13	14	17	11	15	-	-	-	17
COD(mg/l)	-	-	-	-	-	-	-	-	-	-	16	-	-	25	25	-	34	-	-	27	-	-	-	-	-	29
TSS(mg/l)	<5	<5	<5	<5	28	21	27	25	13	8	<5	<5	13	25	43	23	6	13	8	11	<5	<17	-	-	-	7
NH3(mg/l)	2.7	3.6	2.1	2.2	2.2	1.7	1.6	2	2.2	1.6	1.9	1.9	1.7	1.6	1.5	1.5	1.3	1.1	1.8	2.9	0.04	2.7	-	-	-	3.6
NH4(mg/l)	3.47	4.63	2.70	2.83	2.83	2.19	2.06	2.57	2.83	2.06	2.44	2.44	2.19	2.06	1.93	1.93	1.67	1.41	2.31	3.73	0.05	3.47	-	-	-	4.63

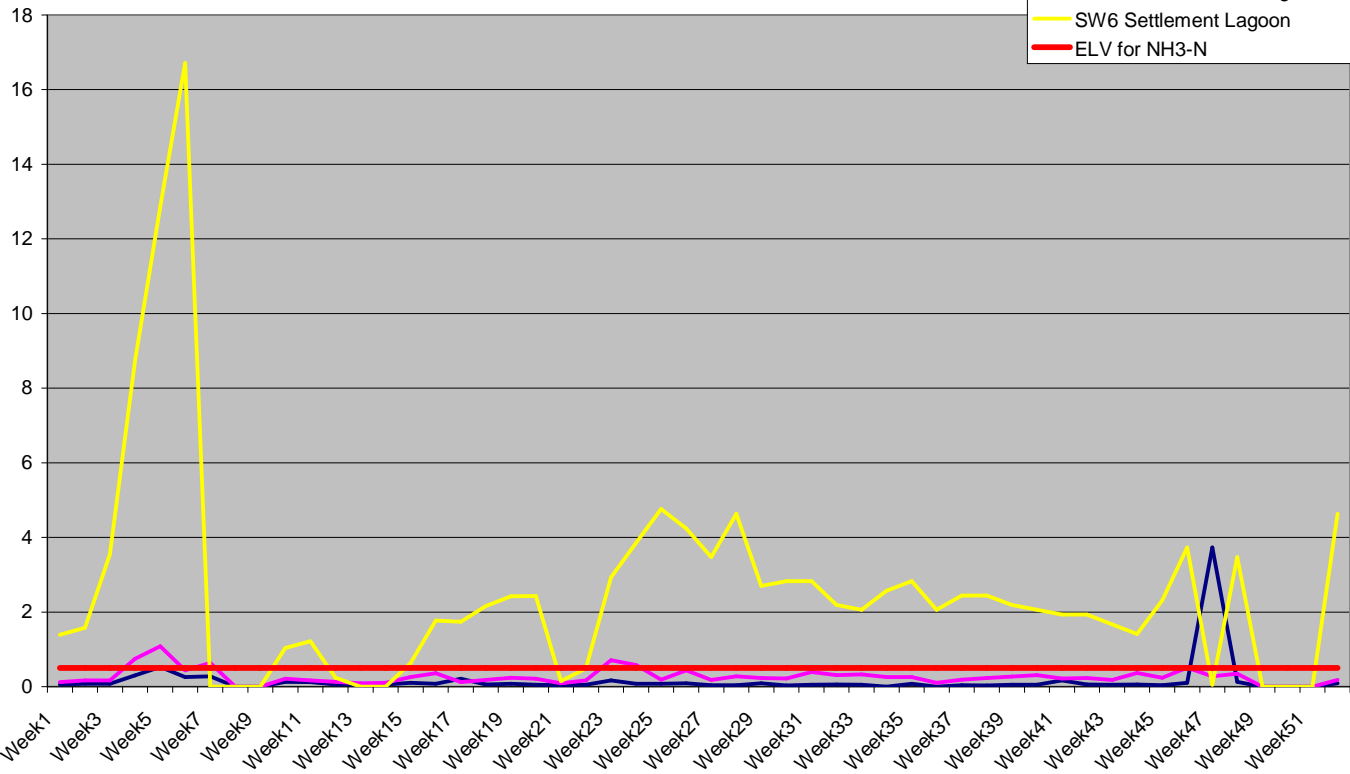
BOD





Ammonia (NH4-N)

- SW4 Cushaling River (Dillons Br.)
- SW5 Sedimentation Lagoon
- SW6 Settlement Lagoon
- ELV for NH3-N



Annual Parameters	Component	LOD	Emission limit	SW6	SW5	SW4
pH (pH units)	-	-	-	8.0	7.3	7.5
Conductivity @ 20°C (µS/cm)	-	-	-	528	285.2	492
BOD (mg/l)	-	<2	25 mg/l	<2	<2	<2
COD (mg/l)	-	<10	-	124	109	71
Ammonia as NH4 (mg/l)	-	<0.02	0.5	4.63	0.18	0.09
Total Phosphorous (mg/l)	-	<0.05	-	0.05	0.08	0.06
Suspended Solids (mg/l)	-	<5	35 mg/l	<5	7	<5
Anions (mg/l)	Chloride	<0.5	-	17	9.2	11
	N03-N	<0.05	-	0.23	0.54	1.2
	P04-P	<0.01	-	<0.01	<0.01	<0.01
	Sulphate	<0.5	-	22	6.8	9.7
Boron (µg/l)	-	<2	-	7	8	11
*Comb Pesticide Suite	All components	<0.01	-	<0.01	<0.01	<0.01
Hg (total) µ Wave	Mercury (µg/l)	<1	-	<1	<1	<1
Metals Scan (µg/l)	Arsenic	<2	-	2	2	2
	Silver	<2	-	<2	<2	<2
	Aluminum	<2	-	401	211	122
	Beryllium	<2	-	<2	<2	<2
	Barium	<2	-	36	38	76
	Chromium	<2	-	<2	<2	<2
	Cadmium	<2	-	<2	<2	<2
	Cobalt	<2	-	<2	<2	<2
	Copper	<2	-	2	2	2
	Manganese	<2	-	90	109	169
	Tin	<2	-	<2	<2	<2
	Nickel	<2	-	3	3	4
	Lead	<2	-	<2	<2	<2
	Antimony	<2	-	<2	<2	<2
	Selenium	<2	-	<2	<2	<2
	Zinc	<2	-	4	6	5
Metals Scan (mg/l)	Calcium	<0.1	-	47	57	91
	Iron	<0.1	-	1.5	1.2	1
	Potassium	<0.1	-	0.58	0.65	2.2
	Magnesium	<0.1	-	2.9	4.4	7.1
	Sodium	<0.1	-	6.2	6.5	7
*SVOC's (µg/l)	All components	<1	-	<1	<1	<1
VOC's GC-FID (mg/l)	All components	<0.5	-	<0.5	<0.5	<0.5

Leachate Results

Parameter	Units	LOD	LT1		
			22/6/2012	03/10/2012	27/12/2012
pH	pH units	<1 - <14	7.9		
Conductivity	µS/cm	0.1 - 1999	27470		
BOD ₅ - TCMP (mg/l)	mg/l	2-5000	825	175	170
COD (mg/l)	mg/l	10-1500	5540	3555	3190
Ammonia-N (mg/l)	mg/l	<0.02	2358		
Orthophosphate (mg/l)	mg/l	<0.01	8.67		
Total Phosphorous (mg/l)	mg/l	<0.05	15.52		
Chloride (mg/l)	mg/l	<2	2508		
Fluoride (mg/l)	mg/l	<0.1	<0.20		
Sulphate (mg/l)	mg/l	<0.5	8.86		
TON (mg/l)	mg/l	<0.2	<0.2		
Boron (µg/l)	µg/l	<3	10630		
Mercury (µg/l)	µg/l	<1	<1		
Arsenic (µg/l)	µg/l	<1	345		
Silver (µg/l)	µg/l	<2	<2		
Aluminium (µg/l)	µg/l	<2	1613		
Beryllium (µg/l)	µg/l	<2	<2		
Barium (µg/l)	µg/l	<2	127		
Chromium (µg/l)	µg/l	<2	669		
Cadmium (µg/l)	µg/l	<20	<2		
Cobalt (µg/l)	µg/l	<20	28		
Copper (µg/l)	µg/l	<20	12		
Manganese (µg/l)	µg/l	<2	289		
Tin (µg/l)	µg/l	<20	23		
Nickel (µg/l)	µg/l	<2	438		
Lead (µg/l)	µg/l	<20	15		
Antimony (µg/l)	µg/l	<20	96		
Selenium (µg/l)	µg/l	<20	36		
Zinc (µg/l)	µg/l	<2	430		
Calcium (mg/l)	µg/l	<0.1	57		
Sodium (mg/l)	mg/l	<0.1	2461		
Magnesium (mg/l)	mg/l	<0.1	188		
Potassium (mg/l)	mg/l	<0.1	1964		
Iron (mg/l)	mg/l	<0.1	3		

Parameter		Units	LOD	LT1		
				22/6/2012	03/10/2012	27/12/2012
VOC's USEPA 524.2	All Components	µg/l	<10	<10		
VOC's by GC-FID	Acetone	mg/l	<0.5	2.9		
	Methanol	mg/l	<0.5	<0.5		
	Ethanol	mg/l	<0.5	<0.5		
	Isopropanol	mg/l	<0.5	<0.5		
	Acetonitrile	mg/l	<0.5	<0.5		
SVOC'S	2,4-Dimethylphenol	µg/l	<1	9.23		
	2-Methylphenol	µg/l	<1	25.9		
	4-Methylphenol	µg/l	<1	100		
	Bis(2-	µg/l	<1	50.6		
	Diethyl phthalate	µg/l	<1	1.6		
	Phenanthrene	µg/l	<1	1.09		
	All Remaining	µg/l	<1	<1		
Comb Pesticide Suite	Methyl Parathion	µg/l	<0.1	<0.1		
	All Remaining	µg/l	<0.05	<0.05		
VOC's USEPA 524.2	All Components	µg/l	<10	<10		
VOC's by GC-FID	Acetone	mg/l	<0.5	2.9		
	Methanol	mg/l	<0.5	<0.5		
	Ethanol	mg/l	<0.5	<0.5		
	Isopropanol	mg/l	<0.5	<0.5		
	Acetonitrile	mg/l	<0.5	<0.5		

Dust Results

	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	<i>Emission Limit (mg/m²/day)</i>
D1	<17	22	57	23	50	61	89	111	34	46	21	80	350
D2	22	22	29	<17	72	50	71	139	75	46	52	29	350
D5	83	<17	29	29	67	89	119	33	63	57	37	34	350
D6	1416 note 1	67	69	132	161	72	59	361	92	75	73	57	350
D8	61	56	172	103	117	72	119	339	287	63	47	46	350

Note 1

Invalid result as the dust exceedance was caused by mud splash from dump trucks driving through puddles beside the dust gauge rather than airborne dust.

Noise Results

NOISE MEASUREMENT RESULTS ON THE 5TH, 8TH AND 9TH NOVEMBER 2012 (DAY TIME)

Map Ref	Date	Start Time	Duration	LA _{eq} dB(A)	LA ₁₀ dB(A)	LA ₉₀ dB(A)	LAF _{Max} dB(A)	Comments/Observations Summary
N1 (NSL)	5-11-12	15:25	30 min	40	43	34	63	<p>Site: Very faint reverse alarms.</p> <p>Background: Distant traffic on road. Birdsong.</p>
	8-11-12	12:04	30 min	35	37	32	65	
	8-11-12	16:31	30 min	37	40	29	57	
N2	8-11-12	13:38	30 min	48	47	32	71	<p>Site: Heavy plant machinery working on landfill – roller. Reverse alarms.</p> <p>Background: Birdsong. Cattle in shed. Traffic on external road. Gunshot. Tractor & trailer nearby.</p>
	8-11-12	14:52	30 min	51	55	38	68	
	9-11-12	12:49	30 min	46	46	35	67	
N3	5-11-12	12:19	30 min	41	44	34	57	<p>Site: Reverse alarms in distance. Heavy plant machinery operating on landfill.</p> <p>Background: Traffic on regional road.</p>
	8-11-12	14:14	30 min	39	41	35	64	
	8-11-12	15:40	30 min	37	39	34	59	
N4	5-11-12	13:53	30 min	60	64	46	77	<p>Site: Cars and trucks entering/exiting site. Lorry pulled up at 11:38.</p> <p>Background: Cars and trucks on road. Fence banging. Chainsaw in the distance. Birdsong.</p>
	8-11-12	11:24	30 min	59	61	42	81	
	15-11-12	14:23	30 min	59	62	45	82	
N5	5-11-12	14:35	30 min	38	40	32	66	<p>Site: Heavy plant machinery faintly audible – including reverse alarms. Trucks entering on site road.</p> <p>Background: Faint road traffic occasional audible. Birdsong.</p>
	8-11-12	10:37	30 min	39	42	31	61	
	9-11-12	13:34	30 min	42	45	37	55	

NOISE MEASUREMENT RESULTS ON THE 8TH AND 9TH NOVEMBER 2012 (NIGHT TIME)

Map Ref	Date	Start Time	Duration	LA _{eq} dB(A)	L ₁₀ dB(A)	L ₉₀ dB(A)	L _{AFMax} dB(A)	Comments / Site Observations Summary
N1 (NSL)	9-11-12	01:48	30 min	32	35	28	49	Site: No site noise audible. Background: Distant traffic on road.
N2	9-11-12	01:03	30 min	33	34	28	64	Site: Very faint hum of operations from facility. Background: Gusts in wind.
N3	9-11-12	00:27	30 min	36	39	29	51	Site: slight hum of operations from facility. Background: No cars passed on external road.
N4	8-11-12	22:42	30 min	50	54	32	66	Site: Cars and trucks entering/exiting site. Security gates opening & closing. Bollards rising – buzzing noise. Background: Fence banging.
N5	8-11-12	23:23	30 min	32	33	27	61	Site: No site noise audible. Background: Traffic could be heard in the distance.

WEATHER DATA FROM MET ÉIREANN - MULLINGAR

Date	Rainfall (mm)	Max. Temp (°C)	Min. Temp (°C)	Mean Wind Speed (m/sec)
5 th Nov	0.1	10.0	0.9	2.3
8 th Nov	0.1	10.4	6.5	3.0
9 th Nov	5.3	8.9	3.2	3.9

Landfill Gas Results

RESULTS OF LANDFILL GAS ANALYSIS

RESULTS OF LANDFILL GAS ANALYSIS															
	January-2012					February-2012					March-2012				
	Operator	Elaine Murray		Date	10/1/12	Operator	Elaine Murray		Date	10/2/12	Operator	Elaine Murray		Date	15/3/12
	Instrument ID	Geotech GA 2000		Time	09:30	Instrument ID	Geotech GA 2000		Time	12:30	Instrument ID	Geotech GA 2000		Time	11:00
	Weather	Dry		Ambient Temperature	4 °C	Weather	Dry		Ambient Temperature	6 °C	Weather	Dry and Windy		Ambient Temperature	14 °C
Sample Station	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments
	(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)	
LG-1	0.1	0.4	20.4	995		0.0	0.2	20.2	1005		0.1	0.4	19.4	1011	
LG-2	0.3	0.9	17.9	995		0.1	0.2	20.4	1005		0.0	0.3	18.9	1011	
LG-3	0.1	0.6	18.7	995		0.3	0.5	17.7	1005		0.2	0.7	19.1	1011	
LG-4	0.2	0.5	19.6	995		0.2	0.7	18.4	1005		0.4	0.7	19.6	1011	
LG-5	0.0	0.3	19.2	995		0.4	0.9	16.8	1005		0.1	0.3	20.3	1011	
LG-6	0.1	0.3	20.3	995		0.1	0.4	19.3	1005		0.0	0.2	20.1	1011	
LG-7	0.3	0.7	19.2	995		0.3	0.6	18.6	1005		0.3	0.7	18.7	1011	
LG-8	-	-	-	995	Note 1.	-	-	-	-	Note 1.	-	-	-	1011	Note 1.
LG-9	0.2	0.9	16.7	995		0.2	0.8	19.7	1005		0.2	0.6	18.3	1011	
LG-10	0.9	1.0	17.5	995		0.4	1.1	18.4	1005		0.5	0.9	17.5	1011	
LG-11	0.4	1.2	17.9	995		0.3	0.9	19.2	1005		0.2	0.7	18.9	1011	
LG-12	0.6	0.7	18.2	995		0.8	1.1	17.9	1005		0.7	1.3	16.8	1011	
LG-13	0.9	1.3	16.0	995		1.0	1.1	15.8	1005		0.9	1.0	17.4	1011	
LG-14	0.5	0.7	18.5	995		0.6	0.7	19.4	1005		0.4	0.5	18.7	1011	
LG-15	0.1	0.4	19.1	995		0.1	0.3	20.1	1005		0.1	0.5	19.2	1011	
LG-16	0.5	0.6	20.1	995		0.3	1.0	19.3	1005		0.4	1.0	18.3	1011	
Note 1: Well damaged.					Note 1: Well damaged.					Note 1: Well damaged.					

RESULTS OF LANDFILL GAS ANALYSIS

Sample Station	January-2012					February-2012					March-2012				
	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments
	(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)	
LFG-1	49.8	33.6	0.4	995		67.8	30.8	2.6	1005		48.2	34.0	0.9	1011	
PH1-V1	59.4	41.3	0.8	995		48.4	33.1	1.7	1005		42.3	29.4	4.7	1011	
PH1-V2	50.4	31.8	5.4	995		49.8	20.6	3.1	1005		43.7	25.1	5.8	1011	
PH1-V3	46.5	32.4	1.3	995		46.3	30.9	6.4	1005		38.6	21.4	1.7	1011	
PH1-V4	56.7	40.8	0	995		50.6	33.8	3.1	1005		56.4	42.6	0.8	1011	
PH1-V5	37.4	19.4	4.8	995		50.3	39.7	4.1	1005		59.1	39.8	2.7	1011	
PH2-V1	49.5	32.4	4.7	995		5.7	4.2	19.3	1005		13.3	9.7	13.8	1011	
PH2-V2	44.8	27.6	5.4	995		37.4	27.9	6.2	1005		54.2	37.1	1.1	1011	
PH2-V3	23.6	39.2	10.4	995		23.1	15.4	13.2	1005		14.1	9.9	14.8	1011	
PH2-V4	48.7	28.4	3.8	995		44.1	30.4	5.1	1005		34.5	24.4	7.0	1011	
PH2-V5	20.2	40.3	9.6	995		46.9	32.9	2.8	1005		55.9	37.0	0.6	1011	
PH3-V1	-	-	-	-	Note 2.	-	-	-	-	Note 2.	-	-	-	-	Note 2.
PH3-V2	51.0	40.9	0.8	995		61.6	37.3	0.3	1005		59.6	38.3	0.7	1011	
PH3-V3	61.1	49.3	0	995		61.2	40.2	0.7	1005		48.8	32.5	2.9	1011	
PH3-V4	55	46	3.3	995		62.1	40.2	0.5	1005		52.5	35.6	1.5	1011	
PH3-V5	55.3	39.2	5.1	995		39.7	45.4	0.4	1005		44.6	33.5	3.1	1011	
PH4-V1	60.1	47.6	0	995		55.4	51.4	0	1005		52.5	38.5	0	1011	
PH4-V2	30.7	19.8	7.3	995		57.3	48.1	0	1005		59.1	40.6	0	1011	
PH4-V3	49.5	38.3	5.1	995		-	-	-	-	Note 2.	63.3	44.6	0	1011	
PH4-V4	-	-	-	-	Note 2.	64.1	48.7	0.1	1005		63.1	40.4	0.2	1011	
PH4-V5						-	-	-	-	Note 2.	-	-	-	-	Note 2.
Note 1: Well damaged. Note 2: Sample port not accessible.					Note 1: Well damaged. Note 2: Sample port not accessible.					Note 1: Well damaged. Note 2: Sample port not accessible.					

RESULTS OF LANDFILL GAS ANALYSIS

	April-2012					May-2012					June-2012				
	Operator	Elaine Murray		Date	12/4/12	Operator	Elaine Murray		Date	2/5/12	Operator	Elaine Murray		Date	15/6/12
	Instrument ID	Geotech GA 2000		Time	10:00	Instrument ID	Geotech GA 2000		Time	10:30	Instrument ID	Geotech GA 2000		Time	11:00
	Weather	Dry and Windy		Ambient Temperature	15 ° C	Weather	Dry		Ambient Temperature	12 ° C	Weather	Dry		Ambient Temperature	14 ° C
Sample Station	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments
	(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)	
LG-1	0.8	1.1	18.1	1005		0.6	1.3	15.9	1008		0.3	1.2	17.7	998	
LG-2	0.0	0.4	19.2	1005		0.1	0.5	20.1	1008		0.0	0.6	18.5	998	
LG-3	0.2	0.3	20.8	1005		0.1	0.7	18.7	1008		0.2	0.3	18.9	998	
LG-4	0.3	0.8	17.9	1005		0.3	0.4	17.4	1008		0.1	0.7	17.4	998	
LG-5	0.1	0.5	19.7	1005		0.2	0.6	18.6	1008		0.3	0.8	16.8	998	
LG-6	0.4	0.3	18.1	1005		0.1	0.4	16.3	1008		0.4	1.1	18.1	998	
LG-7	0.2	0.7	19.4	1005		0.2	0.8	18.5	1008		0.2	0.6	19.3	998	
LG-8	-	-	-	-	Note 1.	-	-	-	-	Note 1.	-	-	-	-	Note 1.
LG-9	0.6	1.0	17.2	1005		0.5	1.9	17.2	1008		0.4	1.3	17.4	998	
LG-10	0.3	0.8	18.3	1005		0.3	0.7	16.9	1008		0.3	0.9	16.2	998	
LG-11	0.5	1.1	16.2	1005		0.2	0.6	17.3	1008		0.6	1.1	16.8	998	
LG-12	0.7	0.9	17.9	1005		0.3	0.7	18.6	1008		0.4	1.3	17.2	998	
LG-13	0.9	1.3	16.4	1005		0.1	1.4	17.8	1008		0.8	1.4	16.4	998	
LG-14	0.4	1.4	18.7	1005		0.3	0.8	19.8	1008		0.3	0.7	18.1	998	
LG-15	0.3	0.7	19.8	1005		0.2	1.6	20.1	1008		0.2	1.3	17.6	998	
LG-16	0.1	0.4	20.4	1005		1.2	2.0	16.7	1008		0.9	1.3	15.9	998	
Note 1: Well damaged.					Note 1: Well damaged.					Note 1: Well damaged.					

RESULTS OF LANDFILL GAS ANALYSIS

Sample Station	April-2012					May-2012					June-2012				
	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments
	(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)	
LFG-1	67.2	40.8	0.4	1005		59.4	38.2	0.8	1008		40.1	30.6	2.6	998	
PH1-V1	39.5	29.5	2.9	1005		62.4	39.9	0.6	1008		58.5	38.7	0.3	998	
PH1-V2	60.6	39.6	0.1	1005		56.6	37.3	1.4	1008		43.4	31.1	3.1	998	
PH1-V3	50.2	27.5	1.4	1005		51.1	35.1	2.1	1008		63.1	37.8	0.4	998	
PH1-V4	54.3	35.7	2.5	1005		51.9	35.6	0.2	1008		58.3	36.8	1.4	998	
PH1-V5	42.9	29.7	4.0	1005		-	-	-	-	Note 2.	55.8	36.3	2.1	998	
PH2-V1	7.9	4.8	17.3	1005		17.5	9.8	1.4	1008		63.1	29.6	0.5	998	
PH2-V2	59.9	36.9	1.0	1005		63.2	40.3	0	1008		55.3	37.8	0.6	998	
PH2-V3	15.	8.6	14.7	1005		52.5	34.1	2.7	1008		41.4	29.2	5.0	998	
PH2-V4	16.5	9.4	14.8	1005		66.7	39.8	0.2	1008		63.8	39.7	0.9	998	
PH2-V5	-	-	-	-	Note 2.	50.6	33.9	2.4	1008		36.4	29.3	3.1	998	
PH3-V1	44.9	35.5	1.4	1005		56.7	38.3	0.9	1008		-	-	-	-	Note 2.
PH3-V2	61.2	37.9	0.8	1005		63.7	38.1	0.9	1008		45.7	33.9	1.6	998	
PH3-V3	16.6	34.7	0.6	1005		64.1	41.8	0.4	1008		58.5	39.4	1.5	998	
PH3-V4	64.5	40.4	1.2	1005		48.8	38.8	3.6	1008		36.7	25.8	5.1	998	
PH3-V5	42.8	30.0	4.9	1005		-	-	-	-	Note 2.	41.6	29.3	4.3	998	
PH4-V1	60.4	39.8	0.0	1005		68.5	42.7	0	1008		34.7	30.5	3.9	998	
PH4-V2	30.5	13.9	0.3	1005		68.9	41.7	0	1008		42.7	35.2	3.1	998	
PH4-V3	57.4	33.7	1.9	1005		63.9	42.7	0.5	1008		64.6	40.4	0.2	998	
PH4-V4	48.6	24.3	0.7	1005		67.5	40	0.7	1008		58.5	45.1	0.3	998	
PH4-V5	-	-	-	-	Note 2.	53.7	41.2	2.0	1008		64.8	39.8	0	998	
Note 1: Well damaged. Note 2: Sample port not accessible.					Note 1: Well damaged. Note 2: Sample port not accessible.					Note 1: Well damaged. Note 2: Sample port not accessible.					

RESULTS OF LANDFILL GAS ANALYSIS

	July-2012					August-2012					September-2012				
	Operator	Elaine Murray		Date	18/7/12	Operator	Elaine Murray		Date	29/8/12	Operator	Elaine Murray		Date	14/9/12
	Instrument ID	Geotech GA 2000		Time	11:00	Instrument ID	Geotech GA 2000		Time	14:00	Instrument ID	Geotech GA 2000		Time	12:00
	Weather	Dry		Ambient Temperature	16 °C	Weather	Dry		Ambient Temperature	15 °C	Weather	Dry		Ambient Temperature	14 °C
Sample Station	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments
	(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)	
LG-1	0.2	0.5	20.1	1007		0.2	0.4	19.2	1006		0.1	0.5	19.1	990	
LG-2	0.1	0.2	19.7	1007		0.1	0.6	18.7	1006		0.0	0.2	20.1	990	
LG-3	0.0	0.6	17.8	1007		0.0	0.2	20.3	1006		0.1	0.8	18.7	990	
LG-4	0.3	0.4	18.5	1007		0.1	0.5	20.1	1006		0.3	0.3	19.5	990	
LG-5	0.2	0.3	19.2	1007		0.3	0.6	19.0	1006		0.2	1.0	19.2	990	
LG-6	0.5	0.8	17.7	1007		0.1	0.4	17.9	1006		0.1	0.6	17.9	990	
LG-7	0.2	0.6	18.0	1007		0.4	0.9	18.2	1006		0.4	0.2	18.6	990	
LG-8	-	-	-	-	Note 1.	-	-	-	-	Note 1.	-	-	-	-	Note 1.
LG-9	0.1	0.4	19.3	1007		0.5	0.4	17.3	1006		0.2	0.7	19.0	990	
LG-10	0.5	1.0	17.2	1007		0.2	1.1	16.7	1006		0.4	1.1	18.1	990	
LG-11	0.3	0.6	18.5	1007		0.3	0.9	17.8	1006		0.3	0.6	18.8	990	
LG-12	0.6	1.2	17.3	1007		0.5	0.7	16.2	1006		0.5	0.3	17.3	990	
LG-13	0.8	1.3	16.4	1007		0.8	1.3	17.0	1006		0.9	1.3	16.9	990	
LG-14	0.3	1.1	17.6	1007		0.3	1.0	18.2	1006		0.2	0.9	18.2	990	
LG-15	0.3	0.9	18.2	1007		0.1	0.4	19.8	1006		0.1	0.4	20.3	990	
LG-16	0.1	0.2	20.1	1007		0.7	1.2	17.4	1006		0.0	0.2	20.6	990	
LG-17	-	-	-	-	Note 2.	-	-	-	-	Note 2.	-	-	-	-	Note 2.
LG-18	0.3	0.6	19.8	1007		0.6	1.0	19.4	1006		0.3	0.7	18.9	990	
LG-19	1.3	1.0	16.3	1007		0.3	0.5	19.1	1006		0.8	1.4	19.3	990	
Note 1: Well damaged. Note 2: Sample port not accessible.					Note 1: Well damaged. Note 2: Sample port not accessible.					Note 1: Well damaged. Note 2: Sample port not accessible.					

RESULTS OF LANDFILL GAS ANALYSIS

Sample Station	July-2012					August-2012					September-2012				
	CH4 (% v/v)	CO2 (% v/v)	O2 (% v/v)	Pressure (mbar)	Comments	CH4 (% v/v)	CO2 (% v/v)	O2 (% v/v)	Pressure (mbar)	Comments	CH4 (% v/v)	CO2 (% v/v)	O2 (% v/v)	Pressure (mbar)	Comments
LFG-1	35.9	28.1	0.3	1007		56.5	38.3	0	1006		51.2	31.3	0.4	990	
PH1-V1	58.5	38.7	0.3	1007		57.3	38.9	0.2	1006		62.7	4.0	0.3	990	
PH1-V2	59.9	35.5	1.1	1007		61.8	38.0	0.2	1006		57.2	37.8	0.4	990	
PH1-V3	64.4	38.7	0.1	1007		52.3	34.7	1.7	1006		52.7	30.6	0.5	990	
PH1-V4	61.8	41.4	0.2	1007		59.8	41.5	0	1006		62.9	39.2	0.2	990	
PH1-V5	57.2	37.2	1.0	1007		40.9	33.9	0.9	1006		55.1	37.1	1.1	990	
PH2-V1	63.1	29.6	0.5	1007		59.9	39.4	0.3	1006		43.4	31.5	2.6	990	
PH2-V2	55.3	37.8	0.6	1007		59.4	39.2	0.1	1006		51.6	34.8	1.7	990	
PH2-V3	63.8	39.7	0.9	1007		57.7	40.2	0.6	1006		37.3	26.3	7.7	990	
PH2-V4	63.3	39.4	0.6	1007		46.1	32.2	3.8	1006		43.7	36.1	4.2	990	
PH2-V5	-	-	-	-	Note 2.	40.1	32.2	1.8	1006		63.7	39.7	0.2	990	
PH3-V1	55.4	38.8	0.3	1007		56.9	40.5	0	1006		61.2	48.2	0.6	990	
PH3-V2	60.4	38.4	1.0	1007		50.3	38.1	1.0	1006		58.7	37.3	0.3	990	
PH3-V3	61.1	41.2	0.6	1007		48.5	37.0	2.4	1006		40.3	32.6	1.7	990	
PH3-V4	39.6	29.3	5.4	1007		45.5	35.3	2.5	1006		53.9	41.7	2.6	990	
PH3-V5	57.6	37.7	1.4	1007		58.5	40.0	0.2	1006		60.6	48.3	0.9	990	
PH4-V1	36.0	33.0	1.8	1007		59.9	41.6	0	1006		49.1	34.2	3.1	990	
PH4-V2	68.6	40.9	0.7	1007		59.9	44.1	0	1006		58.7	43.2	0.8	990	
PH4-V3	58.5	45.1	0.3	1007		62.4	41.2	0	1006		49.7	31.8	1.5	990	
PH4-V4	60.9	39.6	1.0	1007		47.4	37.6	1.0	1006		52.4	39.8	0.4	990	
PH4-V5	61.8	41.2	0.6	1007		59.1	43.4	0	1006		48.3	35.4	1.1	990	
PH5-V1	35.9	28.1	0.3	1007		-	-	-	-	Note 2.	39.7	22.3	2.3	990	
PH5-V2	58.5	38.7	0.3	1007							-	-	-	-	Note 2.
Note 1: Well damaged. Note 2: Sample port not accessible.					Note 1: Well damaged. Note 2: Sample port not accessible.					Note 1: Well damaged. Note 2: Sample port not accessible.					

RESULTS OF LANDFILL GAS ANALYSIS

RESULTS OF LANDFILL GAS ANALYSIS															
	October-2012					November-2012					December-2012				
	Operator	Elaine Murray		Date	15/10/12	Operator	Elaine Murray		Date	26/11/12	Operator	Elaine Murray		Date	18/12/12
	Instrument ID	Geotech GA 2000		Time	10:00	Instrument ID	Geotech GA 2000		Time		Instrument ID	Geotech GA 2000		Time	11:00
	Weather	Dry		Ambient Temperature	10 °C	Weather	Dry, Cold		Ambient Temperature	5 °C	Weather	Dry		Ambient Temperature	7 °C
Sample Station	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments
	(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)	
LG-1	0.0	0.3	18.7	998		0.2	0.4	19.7	995		0.2	0.2	18.6	980	
LG-2	0.1	0.4	19.4	998		0.0	0.1	20.3	995		0.1	0.3	19.4	980	
LG-3	0.0	0.1	20.1	998		0.1	0.4	18.6	995		0.1	0.5	20.0	980	
LG-4	0.3	0.7	18.8	998		0.2	0.7	18.9	995		0.2	0.5	19.1	980	
LG-5	0.2	0.3	20.3	998		0.1	0.2	19.1	995		0.0	0.8	18.0	980	
LG-6	0.0	0.2	19.4	998		0.4	0.9	16.2	995		0.1	0.4	16.7	980	
LG-7	0.2	0.6	17.1	998		0.2	0.5	18.8	995		0.2	0.6	17.4	980	
LG-8	-	-	-		Note 1.	-	-	-	-	Note 1.	-	-	-	-	Note 1.
LG-9	0.3	0.6	16.9	998		0.2	0.6	18.5	995		0.2	0.5	18.2	980	
LG-10	0.3	0.8	16.1	998		0.1	0.8	16.7	995		0.3	1.3	16.9	980	
LG-11	0.1	1.2	17.2	998		0.3	0.8	17.3	995		0.2	0.9	18.6	980	
LG-12	0.6	0.4	18.6	998		0.4	1.0	16.8	995		0.3	0.6	17.1	980	
LG-13	0.7	1.1	16.5	998		0.9	1.1	17.9	995		1.1	1.3	15.7	980	
LG-14	0.4	0.8	19.2	998		0.5	0.9	18.4	995		0.6	0.7	17.2	980	
LG-15	0.1	0.6	18.8	998		0.2	0.7	18.5	995		0.4	0.7	19.4	980	
LG-16	0.4	1.1	16.9	998		0.1	0.3	19.9	995		0.2	0.3	19.1	980	
LG-17	-	-	-		Note 2.	-	-	-	-	Note 2.	-	-	-	-	Note 2.
LG-18	0.6	1.2	18.3	998		0.2	0.9	18.3	995		0.2	0.9	17.8	980	
LG-19	0.1	0.7	18.7	998		1.4	0.9	16.1	995		0.5	1.1	18.2	980	
Note 1: Well damaged. Note 2: Sample port not accessible.					Note 1: Well damaged. Note 2: Sample port not accessible.					Note 1: Well damaged. Note 2: Sample port not accessible.					

RESULTS OF LANDFILL GAS ANALYSIS

	October-2012					November-2012					December-2012				
	Operator	Elaine Murray		Date	15/10/12	Operator	Elaine Murray		Date	26/11/12	Operator	Elaine Murray		Date	18/12/12
	Instrument ID	Geotech GA 2000		Time	10:00	Instrument ID	Geotech GA 2000		Time		Instrument ID	Geotech GA 2000		Time	11:00
	Weather	Dry		Ambient Temperature	10 °C	Weather	Dry, Cold		Ambient Temperature	5 °C	Weather	Dry		Ambient Temperature	7 °C
Sample Station	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments
	(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)	
LFG - 1	59.5	40.1	0.6	998		62.3	37.7	1.0	995	62.3	61.1	35.0	0.0	980	
PH1-V1	58.7	40.4	0.2	998		62.5	38.2	0.5	995	62.5	53.4	34.5	0.3	980	
PH1-V2	60.9	41.6	0.0	998		63.0	36.7	0.3	995	63.0	63.4	36.5	0.0	980	
PH1-V3	61.4	38.4	0.2	998		60.1	38.3	0.0	995	60.1	61.9	35.8	0.0	980	
PH1-V4	60.2	40.6	0.0	998		55.9	35.4	0.2	995	55.9	62.1	37.0	0.0	980	
PH1-V5	47.7	35.8	0.9	998		46.5	33.5	1.3	995	46.5	60.9	37.6	0.0	980	
PH2-V1	12.8	8.7	9.4	998		59.1	37.5	1.6	995	59.1	53.9	36.3	0.3	980	
PH2-V2	37.3	31.8	1.0	998		62.4	38.7	0.5	995	62.4	56.7	35.1	0.8	980	
PH2-V3	58.8	38.7	1.2	998		44.4	31.3	2.6	995	44.4	43.3	29.1	2.6	980	
PH2-V4	44.3	32.6	3.4	998		56.7	34.9	3.1	995	56.7	63.8	37.4	0.0	980	
PH2-V5	-	-	-		Note 2.	41.0	32.4	2.1	995	41.0	61.5	37.8	0.0	980	
PH3-V1	41.1	34.0	0.9	998		61.3	38.4	0.2	995	61.3	54.9	37.0	0.3	980	
PH3-V2	24.1	25.8	3.6	998		61.2	38.3	0.0	995	61.2	62.9	38.6	0.0	980	
PH3-V3	52.4	39.2	1.2	998		60.3	38.9	0.1	995	60.3	63.5	39.4	0.0	980	
PH3-V4	47.8	30.9	1.9	998		46.8	33.4	2.1	995	46.8	45.8	32.8	2.2	980	
PH3-V5	-	-	-		Note 2.	61.3	38.2	0.1	995	61.3	46.8	35.2	0.1	980	
PH4-V1	60.8	41.4	0.1	998		33.1	28.0	3.1	995	33.1	26.6	25.7	3.8	980	
PH4-V2	57.6	36.9	1.8	998		52.5	38.3	0.1	995	52.5	-	-	-	-	Note 2.
PH4-V3	58.5	36.4	1.1	998		52.9	43.1	0.1	995	52.9	61.0	39.8	0.0	980	
PH4-V4	60.7	40.8	0.0	998		62.8	39.7	0.0	995	62.8	44.8	30.6	2.3	980	
PH4-V5	56.8	39.6	1.2	998		31.7	26.8	3.9	995	31.7	53.6	40.0	1.0	980	

RESULTS OF LANDFILL GAS ANALYSIS

RESULTS OF LANDFILL GAS ANALYSIS															
	October-2012					November-2012					December-2012				
	Operator	Elaine Murray		Date	15/10/12	Operator	Elaine Murray		Date	26/11/12	Operator	Elaine Murray		Date	18/12/12
	Instrument ID	Geotech GA 2000		Time	10:00	Instrument ID	Geotech GA 2000		Time		Instrument ID	Geotech GA 2000		Time	11:00
	Weather	Dry		Ambient Temperature	10 °C	Weather	Dry, Cold		Ambient Temperature	5 °C	Weather	Dry		Ambient Temperature	7 °C
Sample Station	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments	CH4	CO2	O2	Pressure	Comments
	(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)		(% v/v)	(% v/v)	(% v/v)	(mbar)	
PH5-V1	57.7	45.7	0.0	998		46.5	37.5	0.2	995	46.5	49.7	35.7	0.9	980	
PH5-V2	60.0	42.1	0.0	998		65.7	37.1	0.1	995	65.7	66.4	35.5	0.0	980	
PH5-V3	46.0	46.2	2.0	998		40.2	42.8	0.9	995	40.2	38.1	34.0	0.0	980	
PH5-V4	14.4	35.3	2.5	998		24.4	39.1	1.9	995	24.4	42.6	52.8	0.6	980	
PH5-V5											44.2	45.5	0.5	980	
Note 1: Well damaged. Note 2. Sample port not accessible.					Note 1: Well damaged. Note 2. Sample port not accessible.					Note 1: Well damaged. Note 2. Sample port not accessible.					

APPENDIX 3

EPRTTR

(European Pollutant Release and Transfer Register)



| PRTR# : W0201 | Facility Name : Drehid Waste Management Facility | Filename : W0201_2012.xls | Return Year : 2012 |

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[Guidance to completing the PRTR workbook](#)

AER Returns Workbook

Version 1.1.16

REFERENCE YEAR	2012
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1. FACILITY IDENTIFICATION

Parent Company Name	Bord na Mona Public Limited Company
Facility Name	Drehid Waste Management Facility
PRTR Identification Number	W0201
Licence Number	W0201-03

Waste or IPPC Classes of Activity

No.	class_name
3.1	Deposit on, in or under land (including landfill).
11.1	#####

Address 1	In the townlands of Parsonstown, Loughnacush, Kilkeaskin, Drumond
Address 2	Timahoe West, Coolcarrigan
Address 3	Killinagh Lower and Killinagh Upper, Carbury
Address 4	County Kildare
	Kildare
Country	Ireland
Coordinates of Location	-9.77721 54.1523
River Basin District	IEEA
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	Mr. Ciaran Geoghegan
AER Returns Contact Email Address	Ciaran.Geoghegan@bnm.ie
AER Returns Contact Position	Landfill Manager
AER Returns Contact Telephone Number	045439470
AER Returns Contact Mobile Phone Number	0863880679

AER Returns Contact Fax Number	045439489
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	19
User Feedback/Comments	
Web Address	

2. PRTR CLASS ACTIVITIES

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

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) ?	
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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# : W0201 | Facility Name : Drehid Waste Management Facility | Filename : W0201_2012.xls | Return Year : 2012 |

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SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR						Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			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	
01	Methane (CH4)	E	OTH	Gas Sim V2.5	0.0	168279.0	0.0	168279.0	

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

SECTION B : REMAINING PRTR POLLUTANTS

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

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

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

RELEASES TO AIR						Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY				
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

Drehid Waste Management Facility

	T (Total) kg/Year	M/C/E	Method Used		Facility Total Capacity m3 per hour
			Method Code	Designation or Description	
Total estimated methane generation (as per site model)	9804419.0	E	OTH	Gas Sim V2.5	N/A
Methane flared	9636104.0	E	OTH	EPA OCLR Template	7500.0 (Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0 (Total Utilising Capacity)
Net methane emission (as reported in Section A above)	168279.0	E	OTH	Gas Sim V2.5 / EPA OCLR Template	N/A

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR# : W0201 | Facility Name : Drehid Waste Management Facility | Filename : W0201_2012.xls | Return Year : 2012 |

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Please enter all quantities on this sheet in Tonnes

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Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste - Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste - Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	13 07 01	Yes	3.3	fuel oil and diesel	R9	M	Weighed	Offsite in Ireland	Enva,W0184-01	Clonminam Industrial Estate, ,Portlaoise,Co. Laois,Ireland	Enva,W0184-01	Clonminam Industrial Estate, ,Portlaoise,Co. Laois,Ireland
Within the Country	16 01 07	Yes	0.48	oil filters	R9	M	Weighed	Offsite in Ireland	Enva,W0184-01	Clonminam Industrial Estate, ,Portlaoise,Co. Laois,Ireland	RD Recycling,51727-1-KD, , ,Houthalen, ,Belgium	, ,Houthalen, ,Belgium
Within the Country	19 07 03	No	28973.09	landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	Leixlip WWTP Kildare County Council,D0004-01	Aras Chil Dara,Devoy Park,Naas,Kildare ,Ireland		
Within the Country	16 10 02	No	963.74	aqueous liquid wastes other than those mentioned in 16 10 01	D8	M	Weighed	Offsite in Ireland	Enva,W0196-1	JFK Road,Naas Road,Dublin 12, ,Ireland		
Within the Country	13 07 01	Yes	2.04	fuel oil and diesel	R9	M	Weighed	Offsite in Ireland	Enva,W0196-1	JFK Road,Naas Road,Dublin 12, ,Ireland	Enva,W0184-01	Clonminam Industrial Estate, ,Portlaoise,Co. Laois,Ireland
Within the Country	20 01 01	No	0.29	paper and cardboard	R3	M	Weighed	Offsite in Ireland	AES Portlaoise,W0194-01	Kyletalesha & Kyleclonhobert , ,Portlaoise,County Laois,Ireland		
Within the Country 19 07 03	No	No	5999.12	landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	Enva,W0196-1	JFK Road,Naas Road,Dublin 12, ,Ireland		
Within the Country	19 05 03	No	189.74	off-specification compost	R13	M	Weighed	Offsite in Ireland	Thorntons Kilmainhamwood Compost,W0195-01	Kilmainhamwood,Co. Meath,Ireland		
Within the Country	16 10 02	No	12276.64	aqueous liquid wastes other than those mentioned in 16 10 01	D8	M	Weighed	Offsite in Ireland	Osberstown WWTP Kildare County Council,D0002-01	Osberstown WWTP , Naas ,Co. Kildare , ,Ireland		
Within the Country	19 07 03	No	52.42	landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	Navan WWTP Meath CC D0059-01,D0059-01	Farganstown , ,Navan ,Meath ,Ireland		
Within the Country	19 07 03	No	1028.68	landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	Drogheda WWTP Louth CCC,D0041-01	Marsh road , ,Drogheda ,Louth ,Ireland		
Within the Country	19 07 03	No	29.68	landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	Riita Environmental,W0185-01	Park,Rathcoole,Dublin,Ireland		
Within the Country	16 10 02	No	310.58	aqueous liquid wastes other than those mentioned in 16 10 01	D8	M	Weighed	Offsite in Ireland	Leixlip WWTP Kildare County Council,D0004-01	Aras Chil Dara,Devoy Park,Naas,Kildare ,Ireland		
Within the Country	16 10 02	No	624.78	aqueous liquid wastes other than those mentioned in 16 10 01	D8	M	Weighed	Offsite in Ireland	Riita Environmental,W0185-01	Park,Rathcoole,Dublin,Ireland		
Within the Country	19 07 03	No	18770.56	landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	Riita Environmental,W0185-01	Park,Rathcoole,Dublin,Ireland		
Within the Country	20 01 39	No	65.08	plastics	D1	M	Weighed	Onsite of generati	Drehid Waste Management Facility,W0201-03	Kilnagh Upper,Carbury,Co. Kildare, ,Ireland		
Within the Country	20 01 40	No	78.82	metals	D1	M	Weighed	Onsite of generati	Drehid Waste Management Facility,W0201-03	Kilnagh Upper,Carbury,Co. Kildare, ,Ireland		
Within the Country	19 05 01	No	67.98	non-composted fraction of municipal and similar wastes	D1	M	Weighed	Onsite of generati	Drehid Waste Management Facility,W0201-03	Kilnagh Upper,Carbury,Co. Kildare, ,Ireland		
Within the Country	19 05 01	No	245.0	non-composted fraction of municipal and similar wastes	D1	M	Weighed	Onsite of generati	Drehid Waste Management Facility,W0201-03	Kilnagh Upper,Carbury,Co. Kildare, ,Ireland		

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