ANNUAL ENVIRONMENTAL REPORT 2016

For Kilbarry Landfill and Civic Amenity Site

Compiled by : Facility Manager, John McKeown.
Date : March 2017

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Annual Environmental Report

1.0 Introduction

Kilbarry Landfill site is located (National Grid Reference 2598E 1103N) on the outskirts of Waterford City on the Dunhill Road, approximately 300m of the N25.

The site occupies an area of 20.1 hectares. Land use in the vicinity of the site is a mixture of open flat farmland with wetland to the south-east. The area to the north and west of the site is a mixture of residential and commercial properties.

The landfilling of waste at the site has resulted in the formation of a mound of waste above ground level. The waste body has a maximum height of 20mOD in the centre of the site. The remainder of the site has a maximum height of 17.5mOD on top of the waste body and a base level of 2m to 3mOD on the edge of the site.

The site was in operation for approximately 40 years. The landfilling of waste has occurred on a former area of wetland known as Kilbarry Bog. A series of drains or channels are found on the entire western, southern and eastern perimeter of the landfill.

The waste license for the site was issued on the 19th of October 2001. Condition 2.4 of the Waste License (18-1) requires the preparation of an Annual Environmental Report within thirteen months from the date of grant of the license, and within one month of the end of each year thereafter.

This report has been prepared in accordance with Schedule C of Waste License 18-1 and the EPA "Draft Guidance on Environmental Management Systems and reporting to the Agency". This report covers the reporting period 1st January 2016 to 31st December 2016.

1.1 Management and Staffing Structure of the Facility

The site is operated by Waterford City and County Council (Environmental Services, Waterford City and County Council, Menapia Building, The Mall, Waterford).

The site is under the overall control of Mr. Fergus Galvin, Director of Services, Environmental Services and Water. John Nolan, Senior Executive Engineer, is responsible for the overall operation of the site. Mr. John McKeown, Executive Engineer, is responsible for reporting to the E.P.A. and compliancy with the licence. And he is responsible for the day to day supervision and management of the Civic Amenity
Site and is assisted by the Facility Supervisor, Mr. James Flavin. Details of the additional site staff are provided in Table 1.

Table 1: Operational Staff (Currently on Site)

Employee	Duties and Responsibilities
Mr. James Flavin	Collection of charges. Maintenance of onsite records. Implementation of waste acceptance procedures. Site inspections. Monthly monitoring of gas boreholes. Any other duties as required by site manager
Mr. Ferdy Ozturk	Daily litter patrols. Maintenance of metals recovery compound. Any other duties as required by the site manager/supervisor.

A staff member Patrick Fitzgerald has been assigned since Autumn 2014 to carry out maintenance duties to Kilbarry Landfill and to the Civic Amenity Centre. His duties include grass cutting, litter picking, anti-dog fouling measures.
The Facility Supervisor maintains regular contact with the Executive Engineer. Table 2 shows the current management structure of Kilbarry Landfill.

Table 2: Management Structure for Kilbarry Landfill

Position	**Employee Contact Details**
Director of Services Mr. Fergus Galvin	Waterford City Council, Environmental Services and Water Menapia Building, The Mall, Waterford. Tel: 051 309900 Fax: 051 849763
Senior Executive Engineer Mr. John Nolan	Waterford City Council, Environmental Services, Menapia Building, The Mall, Waterford. Tel: 051 309900 Fax: 051 849763
Executive Engineer (Landfill/EPA/CAS) Mr. John McKeown	Waterford City Council, Environmental Services, Menapia Building, The Mall, Waterford. Tel: 051 309900 Fax: 051 849763

Any changes to this structure will be submitted to the EPA by the Executive Engineer. It shall be the responsibility of the Civic Amenity Site Manager to organise staff in the absence of the named persons from the facility.

2.0 SITE DESCRIPTION

2.1 Waste Management Activities at the Facility

The waste categories and quantities that may be accepted for disposal and recovery, as outlined in Table A.1 of the Waste License, are shown below in Table 3.

Table 3: Waste Categories & Quantities for Disposal and Recovery

Waste Type	**Maximum Tonnes Per Annum**
Household	17,000
Commercial	12,500
Industrial Non Hazardous	28,500
Treated Sewage Sludges	2,500
Treated Industrial Non Hazardous Sludges	7,500
Construction & Demolition Waste	2,000
Wastes for Recycling & Recovery at the Civic Waste Facility	3,000
Waste for Recycling & Recovery at the Metal Recovery Area	2,000
Total	**75,000**

As of the 19th January 2003 commercial waste hauliers were stopped from disposing of waste at Kilbarry Landfill. As of 26th August 2005 Kilbarry Landfill ceased accepting domestic waste for landfill disposal and all landfilling activities ceased. From August 2005 to July 2009 all domestic waste collected by Waterford City Council was being deposited at Veolia's waste facility in Six Cross Roads Business Park before being brought to Powerstown Landfill in Carlow. Since July 2009 all domestic waste collected by Waterford City Council is deposited at Veolia's waste facility in Six Cross Roads Business Park before being hauled to Homestown Landfill in Wexford.

The landfill is closed to the public and remediation has taken place between 2005 and 2009 which included the installation of the final cap over the area of the waste body and installation of a gas abstraction system consisting of 82no. wells and a 500m3 permanent, enclosed gas flarestack. A surface water management system was installed in 2010. It was proposed that the site become a public amenity in the form of a park and an entrance and carpark were constructed in the North East area of the site during 2010. Landscaping for the park began in 2011 and completed in May 2012. The Kilbarry Nature Park opened to the public in June 2012 and its opening was officiated by Ireland's President Michael D. Higgins.

A Civic Amenity Site (C.A.S) is located adjacent to the old landfill entrance. The following range of goods are accepted for recycling or disposal:

- W.E.E.E.
- Scrap Metal
- Timber

Metals

- Cardboard
- Car and Household Batteries
- Engine Oil, Gear and Lubricating Oils

Oil Filters

- Cooking Oil
- Glass Bottles
- Aluminium Cans

Recycling Paper

- Clothes and Textiles
- Fluorescent Tubes
- Energy Saving Light Bulbs
- Aerosols
- Paint Tins

Biodegradable Waste

Mixed Municipal Waste

The opening hours at the C.A.S. are 11am to 4pm Monday to Friday.

2.2 Waste Quantities and Composition

The categories and quantities for the C.A.S. in 2016 are presented in Table 4 below:

Table 4: Breakdown of Waste Categories & Quantities for Civic Amenity Site

EWC Code	Description	Total Quantity 1/1/16 to 31/12/16 (tonnes)
13 02 --	Waste Engine, Gear & Lubricating Oils	2.2
16 01 07*	Oil Filters	0.12
16 05 04*	Aerosols	0.23
16 06 01*	Lead Batteries	1.77
16 06 04	Alkaline Batteries	1.512
15 01 01	Cardboard	24.88
20 01 01	Recycling Paper	2.07
15 01 07	Glass	9.15
15 01 04	Aluminium Cans	0.24
20 01 11	Textiles	2.3
20 01 21*	Fluorescent Tubes	0.449
20 01 25	Edible Oil & Fat	1.0
20 01 27*	Paint Tins	16.90
20 01 36	W.E.E.E.	185.88
20 01 38	Wood	2.0 (estimated)
20 01 40	Metals	3.0
20 02 01	Biodegradable Waste	832.92
20 03 01	Mixed Municipal Waste	217.22
15 02 02*	Filter Materials	0.32
16 05 06*	Laboratory Chemicals	0.12
15 01 10*	Packaging/Residues of Dangerous Substances	0.03
16 01 15	Antifreeze	0.03

The specific categories of W.E.E.E. materials collected at the Civic Amenity Site are now reported by WEEE Ireland and ERP.

On 23rd January 2016 the CAS in Kilbarry hosted an open day for free drop off for household hazardous waste. The range of items accepted were lead acid batteries, cooking oil, engine oil, oil filters, paints, lacquers, paint strippers, cleaners, fluorescent tubes and household aerosols. Additional items that were brought were pesticides and antifreeze. The open day was organised in most southern counties and was initiated by the Southern Waste Region. The open day was heavily publicised by WCCC for two months beforehand. Publicity consisted of flyers to the public especially to those who had come to the CAS in the preceding two months. Also, local radio and newspapers were used. The open day was a major success. The weights of paints for the full 2016 (including the open day) above significantly out-stripped the paint for 2015.

2.3 Methods of Waste Deposition

The following are locations to which waste from Kilbarry is transported.
Waste Engine, Gear and Lubricating oils, Oil Filters, Paint tins – Enva, Portlaoise, Co Loais.

Lead Batteries, WEEE , Fluorescent Tubes– KMK, Tullamore, Co Offaly. Cardboard, Mixed Municipal Waste – Greenstar, 6 Cross Roads, Waterford. Glass, Aluminium Cans – RehabGlassco, Naas, Co Kildare. Metals – Luke Mulrooney, Tramore Road, Waterford. Biodegradable Waste – AES, Bord na Mona, Newbridge, Co Kildare. Recycling Paper – Recycle2000, Wexford

2.4 Site Capacity
The site was in operation in the region of 40 years. The total volume of waste deposited to date is estimated to be 1,094,513m3.

The last area of landfilling was located in a lined cell constructed in 2002/2003 located at the northern end of the landfill. The site closed on 26th August 2005.

3.0 SITE DEVELOPMENT WORKS

3.1 Development Schedule

The following section describes works undertaken during 2012. A description of the existing situation for each component is provided below together with the details of the proposed works and a timescale for completion of the future work.

3.2 Report on Development Works Undertaken During Year 2012

The following works have been completed at Kilbarry Landfill during the period January 2012 to December 2012:

3.2.1 Landscaping

A landscape architect, Mitchell and Associates, was awarded the design contract in early 2010 and the design and contract documents were drawn up and agreed with WCC. The design of the landscaping at Kilbarry incorporates signage, information boards and pathways as well as specification of planting etc. The tendering process began in September 2010 with a prequalification stage. In November 2010 a letter of intent to award the contract to Grangemore Landscapes was sent out and this contract was signed in early 2011 and works began in March 2011. The schedule of works throughout 2012:

January 2012
• Landscaping of grass verges around newly laid tar paths
• Planting of tree areas in the north of park.

February 2012
• Works at entrance to park and car park. Landscaping, planting, gabions, planting of slopes either side of concrete path to plateau.

March 2012
• Erection of park signage
• Construction of park seating and marker posts
• Construction stepped access in north and south of park
• Construction of viewing areas

April 2012
• Finished off peripheral planting
• Finished off drainage in various locations
• Landscaping around arrivals plaza

May 2012

• Installation of fitness stations
• Finishing of landscaping to Plateau
• Erection of fencing to car park
• Completion of snag list

Drawing 4 shows a plan of the landscaped park at Kilbarry

3.3 Restoration & Aftercare Schedule

The following is the phasing of the remediation works to date:

Table 5: Phasing of the remediation works

Component	Commencement	Completion
Completion of liner and final capping	October 2005	June 2008
Completion of gas abstraction system	November 2006	April 2008
Installation 3 new leachate wells	January 2008	April 2008
Installation of Permanent Flare	October 2009	October 2009
Entrance,carpark and bridge Works	June 2010	November 2010
Surface Water Management	September 2010	January 2011
Landscaping	March 2011	May 2012

3.4 Environmental Liability and Risk Assessment

An Environmental Liability Risk Assessment (ELRA) was performed by Golders Associates early in 2009 on behalf of Waterford City Council for the Kilbarry site. This is included in the Appendix III.

4.0 EMISSIONS

4.1 Management of Emissions

Waterford City Council is committed to ensuring that any emissions at Kilbarry Landfill will not result in the contravention of any relevant standard, including any standard for an environmental medium or any relevant emission limit value, prescribed under any other enactment.

The council is committed that activities at Kilbarry Landfill and C.A.S. are carried on in accordance with such conditions as may be attached to the license and will not cause environmental pollution.

The council will also use the best available technology not entailing excessive costs to prevent or eliminate or, where that is not practicable, to limit, abate or reduce an emission from the activity concerned.

The potential emissions from the site include leachate, groundwater, surface water, air and noise.

Drawing 5 shows the positions of all monitoring points at the facility.

4.2 Leachate

A total of six boreholes were originally installed at the landfill, LM1 – LM6. However over time landfilling operations damaged a number of the boreholes. The damaged boreholes were replaced and an extra two were also installed. However a further two, LM2 and LM3 were damaged at some point prior to the commencement of final capping. During the capping works LM7 and LM8 were buried due to their low levels. For all of the year there was only one operational leachate monitoring borehole, LM1. LM4, LM5 and LM6 are now accessible again by jeep but remain under the final capping ground level, surrounded by manhole rings for protection. LM5 and LM6's manhole rings are full of water. A proposal is to be submitted to the EPA to abandon monitoring from these points as they are located in areas that will be wildflower meadows when the park is constructed. Future leachate monitoring will be proposed to be directly from the leachate storage lagoon in the form of grab samples.

Monitoring of the composition of leachate is undertaken on a quarterly basis, with analysis of a wider range of parameters on an annual basis. In addition leachate levels are also taken on a weekly basis. Leachate monitoring is carried out by The Country Garden, Kilkenny.

4.2.1 Interpretation of Results

Monitoring point LM1 is located on the north-western edge of the landfill. The results indicate that the composition of leachate at LM1 is of a low strength. Conductivity levels in 2016 range from 448 to 509. Conductivity levels in 2015 ranged from 435 to 455. This is a slight deterioration to 2015. Ammonia levels in 2016 range all <0.02 . Ammonia levels in 2015 ranged from <0.02 to 0.11. This is a slight improvement on 2015. Chloride levels in 2016 range from 24.1 to 25.7. Chloride levels in 2015 ranged from 25 to 26. This is a very slight improvement on 2015. BOD ranges in 2016 from <1.0 to <20. BOD ranged in 2015 from <1.0 to <6. This is a deterioration on 2015.

4.3 Groundwater

There are currently seven boreholes operational around the perimeter of the site, GW2, GW4, GW5, GW6, GW15, GW16 and GW17. There were a further two boreholes, GW1 and GW18 located off-site. These boreholes are now gone due to works in the areas. GW7 and GW9 are currently inaccessible for groundwater sampling due to final capping levels but are situated inside the waste body and would yield leachate samples rather than true groundwater. GW5 and GW17 are also situated within the waste body. GW3, GW10, GW11, GW12, GW14 and GW15 were irreparably damaged or lost during remediation. A set of new boreholes, GW22 to GW29 were installed for gas migration monitoring along the Western perimeter between the landfill and the nearest residential properties. Two of these boreholes, GW25 and GW29 were used from the second quarter of 2012 to provide monitoring coverage on the western side as replacements for GW14 and GW15. Monitoring occurs on a quarterly basis. For 2015 GW2, GW4, GW5, GW6, GW16, GW25, GW29 were monitored by The Country Garden, Kilkenny.

Monitoring location GW2 is located on the north of the landfill site. Results show that the borehole is not polluted. In 2016 ammonia ranged from all <0.2mg/l N. Chloride was from 28mg/l Cl to 30mg/l Cl. Conductivity ranged from 669uS/cm to 680uS/cm.
In 2015 Ammonia ranged from 0.044mg/l N to 0.3mg/l N. Chloride ranged from 30mg/l CL to 32mg/l Cl. Conductivity ranged from 636uS/cm to 661uS/cm. This borehole is not polluted.

GW4 is located on the eastern boundary along the Tramore Road. Historically results have shown gross pollution with ammonia levels reaching a high of 61mg/l N in 2011.
.In 2016 Ammonia ranged from11.4mg/l N to 119mg/l N. Chloride ranged from 28.4mg/l Cl to 213mg/l Cl. Conductivity ranged from 1039uS/cm to 3330uS/cm.
In 2015 Ammonia ranged from 4.6mg/l N to 20mg/l N. Chloride ranged from 24mg/l Cl to 135mg/l Cl. Conductivity ranged from 970uS/cm to 1506uS/cm. This borehole is polluted.

Monitoring point GW5 is located towards the south-eastern corner of the site and is within the boundary of the waste body. In 2013 results show a grossly polluted borehole with Ammonia levels ranged from 130mg/l N to 570mg/l N. The maximum chloride was 960mg/l and the maximum conductivity was 9440uS/cm.
In 2016 ammonia ranged from 411mg/l N to 595mg/l N. Chloride ranged from 849mg/l N to9731uS/cm. Conductivity ranged from 7680uS/cm to 9450uS/cm
In 2015 ammonia ranged from 340mg/l N to 610mg/l N. Chloride ranged from 564mg/l N to 991uS/cm. Conductivity ranged from 7040uS/cm to 9450uS/cm. This borehole is grossly polluted.

Monitoring point GW6 is located on the southern tip of the landfill and is upgradient of the landfill. Ammonia levels reached a level of 22mg/l N in 2012.
In 2016 ammonia ranged from < 0.2mg/l N to 1.88mg/l N. Chloride ranged from 27.8mg/l to 32mg/l. Conductivity ranged from 506uS/cm to 562uS/cm.
In 2015 ammonia ranged from 0.032mg/l N to 3.2mg/l N. Chloride ranged from 26mg/l to 31mg/l. Conductivity ranged from 494uS/cm to 560uS/cm. This borehole is very slightly polluted.

Monitoring station GW16 is located along the eastern boundary of the site. Ammonia levels stabilised at this point in 2012 with a maximum level of 26mg/l N.
In 2016 ammonia ranged from 19.1mg/l N to 20.8mg/l N. Chloride ranged from 1140mg/l Cl to 1260mg/l Cl. Conductivity ranged from 1260uS/cm to 5100uS/cm
In 2015 ammonia ranged from 20mg/l N to 27mg/l N. Chloride ranged from 1160mg/l Cl to 1210mg/l Cl. Conductivity ranged from 5020uS/cm to 5060uS/cm. This borehole is polluted.

Monitoring point GW25 was sampled from quarter 2 in 2012, is located on the western perimeter and showed results of gross contamination with Ammonia levels as high as 210mg/l N.
In 2016 ammonia ranged from 114 mg/l N to 174mg/lN. Chloride ranged from 177mg/l Cl to 224mg/l Cl. Conductivity ranged from 2950uS/cm to 3980uS/cm.
In 2015 ammonia ranged from 140 mg/l N to 160mg/lN. Chloride ranged from 168mg/l Cl to 202mg/l Cl. Conductivity ranged from 3260uS/cm to 3550uS/cm. This borehole is very polluted.

Monitoring Point GW29 was also introduced to the groundwater sampling schedule from quarter 2 of 2012 and also showed poor quality with maximum Ammonia levels at 77 mg/l N.
In 2016 ammonia ranged from 19.2 mg/l N to 201mg/l N. Chloride ranged from 36.9mg/l Cl to 349mg/l Cl. Conductivity ranged from1088uS/cm to 4760uS/cm.
In 2015 ammonia ranged from 74 mg/l N to 250mg/l N. Chloride ranged from 133mg/l Cl to 387mg/l Cl. Conductivity ranged from 2110uS/cm to 4870uS/cm. This borehole is polluted.

4.3.1 Interpretation of Results

Results show that GW2 remains unpolluted. GW4 is polluted. GW5 is grossly polluted.
GW6 remains very slightly polluted. GW16 is polluted.
GW25 is very polluted. GW29 is polluted.
Where necessary, in September 2014, new paths were laid to allow better access to the sampling points.

4.4 Surface Water

The landfill is surrounded on its western, southern and eastern sides by a perimeter drain, which receives several flows from the west and south as well as water from the landfill itself. This drain flows from the western side of the landfill around its southern end before flowing northward along the eastern side of the landfill and entering the Lisduggan Stream. The Lisduggan stream flows along the northern edges of the site before exiting along the eastern perimeter and joining up with St. Johns River. The waste license requires the monitoring of

surface water quality at nine locations around the landfill, S1-S9. Surface water monitoring is carried out by The Country Garden, Kilkenny.

There is also a tidal influence at the site, which results in water flowing from the Lisduggan stream into the perimeter drain.

For 2016 the maximum recorded levels for ammonia, chloride, conductivity BOD are as follows.

At S1 ammonia was 0.233mg/l N, chloride was 25.3mg/l Cl and conductivity was 414uS/cm, BOD was 9mg/l O2.
This shows an improvement from 2015 to 2016.

Monitoring point S2 is located on the western boundary of the site. This sampling station is no longer available as the boundary drain has been diverted through a conduit pipe.

At S3the maximum recorded levels were, ammonia was 0.837mg/l N, chloride was 30.6mg/l Cl, conductivity was 518uS/cm, BOD was 6mgl/ O2
This shows an improvement from 2015 to 2016.

At S4 the maximum recorded levels were, ammonia was 0.628mg/l N, chloride was 29.2 mg/l Cl, conductivity was 526 uS/cm, BOD was 3 mg/l O2.
This shows an improvement from 2015 to 2016.

S5 is located along the south-eastern boundary of the landfill. This was inaccessible for many years due to overgrowth in the pNHA bog which surrounds that edge of the landfill. A path was made in September 2014 to allow access to S5.
At S5 the maximum recorded levels were, ammonia 1.2mg/l N, chloride was 31.8mg/l Cl, conductivity was 545uS/cm, BOD was 7mg/l O2.
This shows an improvement from 2015 to 2016.

At S6 the maximum recorded levels were, ammonia was 1.02mg/l N, chloride was 38.4 mg/l Cl, conductivity was 561uS/cm, and BOD was 5mg/l O2.
This shows a similar status from 2015 to 2016.

At S7 the maximum recorded levels were, ammonia was 3.32mg/l N, chloride was 72.2mg/l Cl, conductivity was 578uS/cm and BOD was 8mg/l O2.
This shows a similar status from 2015 to 2016.

At S8 the maximum recorded levels were, ammonia was 1.59mg/l N, chloride was 99.2mg/l Cl, conductivity was 641uS/cm and BOD was 4.65mg/l O2.
This shows a dis-improvement from 2015 to 2016.

At S9 the maximum recorded levels were, ammonia was 0.208mg/l N, chloride was 54.6mg/l Cl, conductivity was 549uS/cm and BOD was 4mg/l O2.
This shows an improvement from 2015 to 2016.

4.4.1 Interpretation of Results

Most of the locations indicate an improvement in the quality of the surface water around the landfill in 2016.

4.5 Air Emissions

These include the following:

• Dust
• Odours
• Aerosols and airborne particulates (PM10)
• Landfill Gas

4.5.1 Dust Emissions

The main sources of dust on the landfill site are due to vehicle movement and control is effected by a mobile sprayer. Dust monitoring is required at seven locations in the vicinity of the site (D1, D2, B1, B2, S2, B6, and GW5). Dust monitoring is required three times per annum.

There were no dust limit breaches in 2016. Monitoring was carried out at the seven locations from 23rd May 2016 to 27th June 2016. One sample D1 was contaminated by insects and was not included. The second survey was from 29th July 2016 to 2nd September 2016. Two samples were contaminated D2 and B6 were contaminated by leaves, insects and paper and so were not included. The third survey was from 2nd September 2016 to 5th October 2016. One sample GW5 was contaminated and so was not included.
The results ranged from 19mg/m2/day at station B1 in the first survey to 349 mg/m2/day at station B6 in the second survey. Levels did not exceed the 350 mg/m2/day limit specified in the waste licence W0018-01. All monitoring was carried out by Dixon.Brosnan.

4.5.1.1 Interpretation of Results

The majority of results were well below the 350mg/m2/day limit for dust deposition with the one sample at 349mg/m2/day which was close to the limit.

4.5.2 Odours

Odour monitoring is required at a total of seven locations around the outskirts of the facility. Odour Ireland carried out all odour monitoring.

According to schedule F.3 of the waste licence, Waterford City Council is required to monitor odour emissions from seven monitoring locations. Four of the locations are stipulated in the licence as NSL2 to NSL5. The other three locations are NSL6, NSL7 and NSL8.

Odour monitoring was carried out on 4th May 2016 and 22nd November 2016.

4.5.2.1 Interpretation of Results

For 4th May 2016 odour monitoring carried out at Kilbarry show results with a maximum value of 39 ou/m3(odour units per cubic metre) at NSL8. There was no distinct odour from any of the samples. For 22nd November 2016 odour monitoring at Kilbarry show results with a maximum value of 33ou/m3 at NSL8. There was no distinct odour from any of the samples.

For 4th May 2016 and 22nd November 2016 the chemical analysis shows that the Hydrogen Sulphide samples give results of 3ppb at all locations. For 4th May 2016 and 22nd November 2016 the Total Volatile Organic Compounds (TVOC) show results of 3ppb at all locations.

The Hydrogen Sulphide and TVOC recorded levels were indicative of ambient background.

Hydrogen sulphide concentrations are all below limits that would be needed to cause a nuisance. The organic acids were also only present in low concentrations.
Levels are indicative of traffic based emissions.

As can be seen from these results odour is not a major problem at the site and this would be attributed to the fact that the site is closed and no longer operational. The closed landfill is a nature park and if odours were an issue the people who enjoy the amenity would bring it to the attention of the Council.

4.5.3 Aerosols

Aerosols are defined as fine particulate material water droplets and microbial emissions from activities carried out at the landfill. On site sources include re-suspension of fine material by wheel action of vehicles and fugitive emissions from tipping and distribution of waste. Since the closure of the site aerosols are no longer an issue.

4.6 Landfill Gas

It is estimated that 1,094,513m3 tonnes of waste has been landfilled over the lifetime of the site. Assuming that each tonne of waste will have a typical yield of 200m3 of gas, it is estimated that the facility will produce in the order of 220Mm3 of gas in its lifetime. In October 2009 a 500m3 permanent, enclosed flarestack was connected to the completed gas abstraction system and ignited. The flare is connected to 82no. gas wells bored into the main waste body contolled by 5 manifolds housing valves for the separate pipe branches to the wells. There are 20 wells at the southern tip of the site all connected to Manifold 1, which are controlled at that manifold rather than individually due to low levels of methane. The manifold valve connected to the main header pipe is closed down 95% or more to allow what little gas building up in these southern wells to be drawn off without too much oxygen getting in also.

The waste license requires the monitoring of the composition of the gas within the landfill site. However with the gas abstraction system now fully operational this monitoring is redundant and flare monitoring or field balancing data can be used instead.

Perimeter gas monitoring locations include LM1, GW2, GW4, GW5, GW6, GW16, GW22, GW23, GW24, GW26, GW27, GW28, GW29 and GW30.
Boreholes GW22 to GW28 were installed the provide extra monitoring of any possible migratory gas between the landfill and the nearest residential houses in Lacken Wood Estate and are outside the main waste body as are LM1, GW2, GW6, GW12, GW15 and GW19. Boreholes GW12 and GW15 are obsolete. Boreholes GW, GW5, GW7, GW9 and GW17 are all within the waste body.

GW4 is within the waste body and showed a CH4 reading of 2.9% on 8th August 2016 at 09.18hours, and 2.7% on 30th September 2016 at 08.46 hours..
GW29 showed CO2 readings of 2.6% on 31st May 2016 at 09.10 hours, of 6.8% on 1st July 2016 at 09.10 hours, of 4% on 8th August 2016 at 09.33 hours and 1.7% on 30th September 2016 at 09.01 hours. GW4 showed a CO2 reading of 2.1% on 30th September 2016 at 08.46 hours. GW27 showed a CO2 reading of 1.7% on 30th November 2016 at 10.25 hours.
Works adjacent to the landfill on a new industrial site made temporary monitoring points GW19, GW20 and GW21 obsolete. These points had been located outside the landfill boundary but the installation of GW22 – GW28 replaced them. Some boreholes have been lost due to landscaping and so it was decided to utilise GW16.

4.6.1 Interpretation of Results

The results from the field balancing indicate that there is limited production occurring in the southern part of the site. The different ages of the waste at the site means that there is likely to be some variability in the production of landfill gas in different parts of the site.

Results from the monitoring at perimeter boreholes, included in Appendix 1, show that there is no gas migration and the continued operation of the gas abstraction system should maintain this.

However, on 8th August 2016 at 09.18 hours and on 30th September 2016 at at Borehole GW4 the CH4 levels recorded indicate a breach of licence emission limits Schedule G, section G.2.
GW4 is outside the perimeter of the cap on the eastern side. It is known to be down into existing waste, so there is no gas migration at this location. The CH4 readings at GW4 represent a reduction in 2016 when compared to 2015.
At GW29 for 2016 there is an increase of CO2 compared to 2015. At GW27 there is a small increase in 2016 compared to 2015.

4.6.2 Landfill Gas Flare Monitoring

As per Table F.2.2 of Schedule F of waste licence 18-1 landfill gas flare monitoring is required on an annual basis for particulates, organics, hydrogen chloride and hydrogen fluoride and every six months for volumetric flow, SO2 and NOx. Results from both these monitoring events show emission values for all parameters to be within the limits prescribed by the licence.

In the PRTR returns sheet in Appendix IV the total kg of estimated methane generation as per site model is 314,381kg. Methane flared was 176,580 kg. The Net Methane emission was 137,801 kg. From the landfill gas survey the volume of methane flared was 262,681M3.

4.7 Noise

Noise monitoring is required on an annual basis. There are 14 noise monitoring locations in the vicinity of the site. B1, B2, B3, B4, B5, B6, B7 are the onsite locations. NSL2, NSL3, NSL4, NSL5, NSL6, NSL7 and NSL8 are the offsite locations. Dixon Brosnan performed the annual noise monitoring survey for the site on Tuesday 7th June 2016 and Wednesday 8th June 2016.

4.7.1 Interpretation of Results

Schedule G.1 of the site waste license specifies that daytime noise levels should not exceed 55 dB at any of the monitoring stations as a result of site activities. Six of the seven onsite stations (B2-B7) are located at some distance from the civic amenity facility near the site entrance, and consequently no site emissions were audible at these stations other than pedestrian voices on the park walkway. LAeq 30 min levels at these stations measured 42-65 dB, arising chiefly from Tramore Road traffic noise outside the site boundaries. At the seventh onsite station (B1), waste disposal activities and waste management operations at the civic amenity area were audible, resulting in an LAeq 30 min level of 46 dB. This station is not a noise sensitive location.

Stations NSL4 and NSL5 constitute the only offsite stations within earshot of the civic amenity facility. Road traffic noise was dominant at these stations, resulting in elevated LAeq 30 min levels of 60 dB and 65 dB respectively. Sporadic vehicle movements through the facility entrance, were audible at both stations. Contributions arising from facility specific these were estimated at less than 44dB and 45 dB at both stations, and thus lower than the 55 dB daytime limit specified in waste licence W0018-01. For the remaining offsite stations (NSL2-NSL3 and NSL6-NSL8) LAeq 30 min levels measured at these stations were 51 dB to 65 dB, with local noise environments affected chiefly by road traffic.

Noise levels measured at all onsite and offsite monitoring stations were satisfactory. In particular, site contributions at the only noise sensitive locations in proximity to the civic amenity facility (NSL4 and NSL5) were higher than the 55 dB daytime limit specified in the site licence only because of substantial road traffic.

Noise levels on the site are not considered to represent a nuisance to nearby residents. The operating hours of the Civic Amenity Site are strictly adhered to and no operations take place outside these hours. In the event of complaints about noise levels, noise impact statements will be made to investigate further techniques for keeping noise levels to a minimum.

4.8 Ecology Survey

According to condition 9.20 of the waste license an annual ecological survey must be undertaken at Kilbarry Bog. David Horgan, Environmental Scientist, URS Ireland Ltd., Cork carried out the survey in 2015. During 2015, URS changed their company name to AECOM.
In 2016 Mr Horgan left AECOM and the company was unable to carry out the annual ecological report. Mr Horgan recommended that a former colleague carry out the survey. This former colleague was duly authorised to carry out the survey. In Spring 2016 this person reported that he had completed the work and was formulating the results. He reported that he was seriously ill and was recovering and would have the report completed and sent to Waterford Council. Despite many efforts to contatct this person, the report has not been submitted and no contact has been made directly. As a result the report is not included in the AER. In the event of the report subsequently being submitted it will be submitted separately to EPA.

4.9 Leachate Volumes

The leachate management system at the site is composed of 13 no. leachate abstraction boreholes, a perimeter leachate collection trench 1.2m depth and 1m wide and 5 no. leachate collection sumps. These boreholes and sumps pump to the leachate lagoon at the north of the site.

The leachate lagoon has a capacity of 3,670m^3 (2,670m^3 with a freeboard of 0.5m). The leachate is discharged to the sewer by gravity feed and a valve allows a percentage of outflow into the sump. A monitoring system has been installed on the outfall of the leachate lagoon in accordance with the waste licence. The system monitors flow, pH and dissolved methane concentration. Approximately 900m3 of leachate was discharged to the sewer for treatment at the Belview Wastewater Treatment Plant in 2016.

4.10 Emissions to Groundwater

The bedrock beneath the landfill site is situated in the Campile Formation. These rocks are considered to generally form Regionally Important Aquifers with fissure flow (Rf).

To the north and north west of the site the bedrock is predominantly mudstone and shale. To the south and east the rocks are of a predominately acid volcanic unit. In addition a dolerite body has been mapped separating these units and lying immediately south and south east of the landfill site.

Depth to bedrock to the north and east of the site is between 12-14m. To the south and west the general indications are of shallow rock with one anomalous data point indicated 15m depth to bedrock. An outcrop is observed to the southern end of the site, which comprises of grey/green felsite. An outcrop to the north west of the site is described as clayey shaly ash or

tuff.

Due to the nature of the bedrock fissure flow will be the dominant type of groundwater flow. The groundwater levels in the area are generally close to the surface. Groundwater flow directions are from the ground to the south and east toward the stream to the west.

The results of in-situ permeability testing carried out in 1998 indicate generally low permeabilities in the bedrock with values between 10 e-6 and 10 e-8.

Due to the low permeability of the bedrock beneath the landfill site it is considered that the preferential migration of leachate from the landfill site is likely to be occurring along the southern and western sides where depth to bedrock is shallower.

The results of groundwater monitoring to date indicate a degree of contamination due to landfill activities. Monitoring of the groundwater surrounding the site showed elevated levels of ammonia and electrical conductivity indicating that leachate is entering the groundwater system. The volumes of leachate entering the groundwater system can be seen to be reduced given the effect of final capping on the leachate volume calculations. There should be little to no new leachate generation and the continued operation of the leachate extraction system from the perimeter and waste body should further minimise leachate contamination to groundwater.

Under Amendment B of Kilbarry EPA Licence W0018-01 Waterford City and Council is obliged to carry out a risk screening and where necessary a technical assessment in accordance with the *Guidance on the Authorisation of Discharges to Groundwater* published by EPA. In 2015 RPS were appointed consultants to carry out this study. The full RPS report was submitted to EDEN website in November 2015.

5.0 ENERGY CONSUMPTION/GENERATION

5.1 Resource and Energy Consumption Summary

Contractors are employed to supply and operate the site machinery, therefore there is no available information regarding the quantities of fuel on site at any given time. There is no fuel stored onsite.

There was approximately 5m3 of water used from the mains supply to the site throughout 2014.

In 2016 €6,551.98 was paid for electrical supply to the site.

6.0 ENVIRONMENTAL INCIDENTS AND COMPLAINTS

6.1 Non-Conformances/Incidents and Complaints

There were no incidents reported in 2016.
There were no complaints made in 2016.

6.2 Review of Nuisance Controls

It is the responsibility of the facility manager to ensure that the control measures are implemented to prevent the spread of litter. Since the closure of the landfill a number of management practices implemented on site in order to control the spread of litter have become redundant. These include litter fencing, the application of daily cover and the

spreading and compaction of waste in thin layers. Regular monitoring and site inspections are carried out to ensure site tidiness is maintained since the closure of the landfill.

The main area of concern in relation to litter at present is the Civic Amenity Site to the North of the landfill. Contractors transporting materials for recycling offsite shall be required to ensure that when transporting and discharging these loads that litter is kept to an absolute minimum. All vehicles are required to be totally sealed or covered with a net or tarpaulin to ensure that materials are not blown from the vehicles.

Routine litter patrols are carried out on a daily basis to ensure that any loose litter is collected, this shall include the area surrounding the landfill, all fences and the approach road to the site. The effectiveness of the litter control techniques are monitored on a weekly basis.

6.2.1 Birds

Since the closure of the landfill birds are no longer a nuisance on the site

6.2.2 Vermin

A contract is in place with Rentokil Ireland. A programme of baiting can be employed as required to control rat infestations with preventative baiting at regular intervals to ensure that large populations do not become established. Since closure of the landfill vermin has not been a significant issue on site

6.2.3 Flying Insects

The facility manager monitors the situation. Since closure of the landfill however there has been no issue and the materials collected at the Civic Amenity Site do not pose an issue.

6.2.4 Fires

The burning of waste or other material is not permitted at the facility. Hot or burning loads of waste arriving at the facility are rejected. In the event that a fire breaks out on the site it is treated as an emergency and dealt with immediately. The Emergency Response Procedures, containing steps for dealing with fires, is included in the appendices. No fire was reported in 2016.

6.2.5 Odour Control

Odour problems were kept to a minimum by implementing adequate compaction, speedy disposal and burial of malodorous wastes, effective and frequent use of cover material. These provisions are no longer needed due to closure of the landfill. A gas abstraction system began flaring in January 2008. A leachate management system is installed and had 3 additional wells installed in April 2008. Odour monitoring is carried out twice per year generally in Spring and Winter. There were no odour complaints in 2016 and based on the monitoring results odour presents no significant issue at the site.

6.2.6 Dust Control

Dust control measures, in the form of a mobile water sprayer, are not deemed necessary along the roads network of the park since the opening of the park itself.
At the Civic Amenity Site a street sweeper unit is employed every 10 days or so to do an overall sweep of the CAS. This is on a regular basis especially with loading off site of WEEE.

6.3 Programme for Public Information

Communications Programme

The purpose of the Communications Programme is to ensure that members of the public can obtain information concerning the environmental performance of the facility at all reasonable times.

Council Directive 90/313/EEC on the Freedom of Access to Information on the Environment recognises the significance of the public's access to information relating to the environment. To ensure that members of the public can obtain information concerning the environmental performance of Kilbarry Landfill the communications programme described below shall be implemented at the facility.

The purpose of this programme is to allow any local community groups, key interest groups, local residents and members of the local community access to information on matters relating to the environmental performance of Kilbarry Landfill. This in turn will address any local community concerns and allow the public the opportunity to provide feedback on the facility. The Facility Manager will be responsible for the implementation of this programme, which shall form a normal part of the routine operation and management of the facility.

Programme:

1. All requests concerning the environmental performance of the facility should be made in writing to:

Mr.John McKeown,
Facility Manager,
Environmental Services,
Floor 4 Menapia Building,
The Mall,
Waterford City.

2. The Facility Manager shall copy all requests to:

Mr. Fergus Galvin,
Director of Services,
Environmental Services,
Menapia Building,
The Mall,
Waterford.

3. Each request should indicate the name, address and contact telephone number of the concerned party, an outline of the information required and the manner in which they require the information i.e. copy of record, computed disk, etc.

4. If requested, a suitable member of staff will provide a clear, unbiased explanation of the information provided.

5. The Director of Services or other authorised, nominated representative in Waterford City and County Council or any other nominated person will deal with replies to requests made by the media for information relating to the environmental performance of the landfill.

Record keeping

All records of requests for information regarding the environmental performance of the landfill and all minutes of meetings with concerned parties and details of site visits/ open-days

shall be maintained and kept secure from loss, damage or deterioration. All of the aforementioned files shall be stored at the site office at Kilbarry Landfill and the Offices of Waterford City and County Council, Environment Department, Menapia Building, The Mall, Waterford.

The Facility Manager shall keep a register of all requests for information from the public on site.

7.0 OBJECTIVES AND TARGETS

7.1 Schedule of Environmental Objectives and Targets for the Forthcoming Year

The objectives and targets have been based on the conditions set by Waste License 18-1. The purpose of this section is to establish a summary of objectives and targets for the prevention of pollution and for the continual improvement of the site.

2017 Schedule of Objectives and Targets

Prepared by: John McKeown, Facility Manager **Date : March 2017**

Approved by : Mr Fergus Galvin, Director of Services, Waterford County Council

	Target	**Plan**	**Responsible Party**	**Timescale (for) completion)**
Objective 1 To establish site infrastructure as required by Licence Conditions	Repair all defects in the existing site gates and fences	Regular inspections are carried out of gates and fencing	Facility Manager	Within three working days of defect
	Install active collection and flaring system for landfill gas	Active gas collection system and permanent flare installed	Facility Manager/ Consultant Contractor	Completed
	Investigate utilisation of landfill gas	Utilisation not feasible	Facility Manager/ Consultant	Completed
	Surface Water Management	Install system as proposed	Facility Manager Consultant, Contractor	Completed
	Landscaping	Suitable tree and shrub planting required on the perimeter of the facility and for final capping/restoration.	Horticulurist	Completed
	Permanent Enclosed Flarestack	Install flare and connect to gas abstraction system	Facility Manager, Contractor	Completed

2017 Schedule of Objectives and Targets

Prepared by: John McKeown, Facility Manager **Date : May 2017**

Approved by : Mr Fergus Galvin, Director of Services, Waterford County Council

	Target	**Plan**	**Responsible Party**	**Timescale (for) completion)**
Objective 2 Management & Operation of the Facility **Objective 3 To Prevent Environmental Nuisance & Emissions**	Develop written waste acceptance procedures and ensure all staff are familiar with same	To minimise nuisance and ensure only permitted material accepted for recycling	Facility Manager & Compactor Operator	Reviewed annually
	Implement Litter Control Measures	To maintain litter control measures	Facility Manager Site Staff	Ongoing
	Dust Control	To maintain dust control measures	Facility Manager Site Staff	Ongoing
	Vermin Control	Contract with Rentokil Ireland	Facility Manager	In Place
	Continue existing gas monitoring programme	Continue with existing monitoring programme	Facility Manager	On Going
	Continue existing leachate monitoring programme	Monitor changes in the composition of the leachate with time	Facility Manager	On Going

	Monitor dust control measures during construction works at the facility	Dust control measures to be implemented on site during all construction works at the facility	Facility Manager	On Going

2017 Schedule of Objectives and Targets

Prepared by: John McKeown, Facility Manager **Date: March 2017**
Approved by: Mr. Fergus Galvin, Director of Services, Waterford County Council

	Target	**Plan**	**Responsible Party**	**Timescale (for completion)**
Objective 4 **Promotion of Waste Recycling**	Make public aware of recycling initiatives, techniques and current methods as well as materials accepted at Kilbarry	Promotion through local newspapers, radio, school talks and information leaflets	Environmental Officer Facility Manager	Ongoing

2017 Schedule of Objectives and Targets

Prepared by : John McKeown, Facility Manager **Date :** May 2017
Approved by : Mr Fergus Galvin, Director of Services, Waterford County Council

	Target	**Plan**	**Responsible Party**	**Timescale (for completion)**
Objective 5 **To improve the Environmental Performance**	Establish an Environmental Management System	To monitor the facility's environmental performance	Facility Manager	Reviewed Annually
	Prepare the Annual Environmental Report	Summarise the results of environmental monitoring programme and assess facility's progress towards achieving its objectives and targets	Facility Manager Consultant	March 2017
	Reduce non-compliance	Carry out site inspections	Facility Manager Site Supervisor	Ongoing
	Improve Environmental Monitoring Programme	Continue and expand groundwater, surface-water, leachate and landfill gas monitoring to ensure complete compliance with licence.	Facility Supervisor Facility Manager	Ongoing
	Reduce risk of gas migration	Install active gas abstraction system and flare. Also, gas utilisation system, to be assessed.	Facility Manager Consultant Contractor	Gas abstraction system completed. Utilisation unfeasible.

2017 Schedule of Objectives and Targets

Prepared by : John McKeown, Facility Manager Date : **March 2017**

Approved by : Mr Fergus Galvin, Director of Services, Waterford County Council

	Target	**Plan**	**Responsible Party**	**Timescale (for completion)**
Objective 5 To improve the Environmental Performance (Continued)	Reduce visual impact	Landscaping of site into a public amenity park	Horticulturist	Completed
	Control dust emissions	Monitoring	Contractor	Quarterly
		Spray roads during dry weather	Facility Manager	Ongoing
		Operate and maintain wheel wash	Facility Manager	Ongoing
		Enforce speed limits	Facility Manager	Ongoing
	Litter control	Daily Litter inspections	Facility Supervisor	Ongoing
	Reduce emissions to surface water	Install management system	Facility Manager	Ongoing
	Reduce emissions of leachate from unlined waste body	Maintain leachate collection system	Facility Manager, Contractor	Ongoing

Objective 5 (continued)	**Target**	Plan	**Responsible Party**	**Timescale (for completion)**
	Reduce long-term impact	Restoration and Aftercare Plan	Senior Engineer	After landscaping

2017 Schedule of Objectives and Targets

Prepared by : John McKeown, Facility Manager **Date** : **March 2017**
Approved by : Mr Fergus Galvin, Director of Services, Waterford County Council

	Target	**Plan**	**Responsible Party**	**Timescale (for completion)**
Objective 6 To Monitor Management of Facility	Environmental Management System	Environmental Management System developed and included in this submission	Facility Manager	Reviewed annually
	Environmental Management Programme	Environmental Management Plan established and included in this submission	Facility Manager	Reviewed annually
	Establish and maintain Corrective Action Procedures	Procedures have been developed and are included in this submission	Facility Manager	Reviewed annually
	Establish Awareness and Training Procedures to identify training needs	Procedures have been developed by Waterford City Council	Facility Manager	Reviewed annually
	Establish Communications Programme to ensure public access to information	Details included in this submission	Facility Manager	Reviewed annually
	Record keeping to ensure proper site management	Written records to be kept	Facility Manager	Reviewed annually

OBJECTIVE 1 – ESTABLISH INFRASTRUCTURE AT THE FACILITY IN ACCORDANCE WITH THE REQUIREMENTS OF WASTE LICENSE 18-1.

All remediation works were finished out in 2012 and the new Kilbarry Nature Park was opened in June 2012 by the president Mr. Michael D. Higgins. Infrastructure for control of leachate, landfill gas and surface water had already been installed. Monitoring and maintenance of the infrastructures for any upgrades or repair will be ongoing.

OBJECTIVE 2 – OPERATION & MANAGEMENT OF THE FACILITY IN ACCORDANCE WITH THE CONDITIONS OF THE WASTE LICENSE 18-1.

It is the objective of Waterford City Council to comply with the conditions of the Waste License (18-1) for Kilbarry Landfill Site.

As required by the waste license conditions, written waste acceptance procedures have been developed and ongoing training is being provided for all staff to ensure that they are familiar with them. Regular meetings are undertaken to review the performance of the facility. The meetings are attended by senior management staff and external consultants. The frequency of the meetings is reviewed as necessary. Procedures have been developed for the following:

- Waste acceptance procedures
- Emergency response procedures
- Corrective action procedure
- Communications programme
- Awareness and training

It is proposed that regular site meetings be undertaken to assess the performance of the facility and bring any potential problems to the attention of the Agency and Waterford City Council senior management staff.

OBJECTIVE 3 – TO PREVENT ENVIRONMENTAL NUISANCE & EMISSIONS.

In line with the objective of Waterford City Council to minimise environmental nuisance caused by the operation of the landfill at Kilbarry, actions have been implemented for the following:

- Litter control measures
- Dust control
- Vermin control
- Gas monitoring
- Leachate monitoring
- Groundwater monitoring
- Surface water monitoring

Litter control measures are in place as per condition 6.4 of the waste license.

The dust control measures employed have been outlined in section 6.2.5. The facility manager is responsible for the implementation of the dust control measures.

As part of the ongoing environmental monitoring at the facility the composition of surface water, groundwater and leachate is reported on a quarterly basis, with the analysis of a wider range of parameters on an annual basis. Monitoring of landfill gas is undertaken on a monthly basis with a continual monitoring system installed in the site office and weighbridge office.

In order to prevent landfill gas emissions to the environment the installation of an active gas abstraction system with permanent enclosed flare was begun in 2006 and completed in 2009. It can generally be seen from the monthly monitoring data that there are no migratory gas emissions occurring at the site.

As part of an overall surface water management system 3 existing retention ponds have been redeveloped and expanded in the form of constructed wetlands along with a fourth to be constructed at the southern end of the landfill. A collection drain for surface waters was installed at the top of the perimeter slopes also.

13 leachate abstraction boreholes are in place in the main waste body and a further 5 sumps collect leachate from the slotted pipe which surrounds the waste body at the bottom of the slopes. These all pump leachate to the lagoon at the north of the site.

OBJECTIVE 4 – PROMOTION OF WASTE RECYCLING AT SOURCE AND MINIMISE RELIANCE ON LANDFILL

It is the objective of Waterford City Council to promote recycling and thereby reduce the reliance on landfill for both commercial, household and construction and demolition waste. A three-bin collection system for household waste is operated in the city. This consists of a green bin for dry recyclables, a brown bin for organic waste and a black bin for residual waste.

In addition to this three-bin system the range of goods accepted for recycling at Kilbarry Civic Amenity site are:

- Timber
- Cardboard
- Batteries
- Engine oil
- Cooking oil
- Textiles
- Aluminium cans
- Glass bottles
- Fluorescent tubes
- Energy saving lightbulbs
- Metal
- W.E.E.E.

Aerosols
Paint tins
Biodegradable waste
Mixed Municipal Waste

The services at the civic amenity site are regularly promoted in local newspapers and Waterford City Councils Environmental Officer, Ella Ryan, frequently discusses the benefits and recycling and developments within the area in a column in the local papers also.

OBJECTIVE 5 – TO DEVELOP AND IMPLEMENT PROCEDURES TO MONITOR THE MANAGEMENT OF THE FACILITY

In order to monitor the management of the facility the following procedures have been developed:

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

It is the objective of Waterford City Council to improve the environmental performance of the site. In order to achieve this the implementation of the following is proposed:

- Prepare an Annual Environmental Report
- Improve record keeping
- Prevent non-compliance
- Continue and improve the environmental monitoring programme
- Reduce general nuisances
- Reduce risk of gas migration through the installation of a gas abstraction system

7.2 Financial Provisions

Waterford City Council have the ability to meet any financial commitments or liabilities incurred by the carrying out of the disposal activities relating to Kilbarry Landfill. These commitments include compliance with the waste management license and restoration and aftercare of the site as specified in Condition 8 of the license.

Under section 38 of the Waste Management Act, 1996, Waterford City Council “shall provide and operate, or arrange of, such facilities as may be necessary for the recovery and disposal of household waste arising within the functional area”. Compliance with section 38 and all other relevant sections of the waste management act, 1996 is a statutory obligation of Waterford City Council. Waterford City Council annually in the preparation of the “Book of Estimates” and the passing of these estimates shall make provision for any capital works and maintenance works required to fulfil conditions of the waste license for the Kilbarry Landfill.

Appendix I

Landfill Gas Perimeter Borehole Data and Landfill Gas Survey 2016

Environmental Protection Agency

A survey of landfill sites to determine the quantity of methane flared and or recovered in utilisation plants for 2016

Please choose from the drop down menu the license number for your site	W0018
Please choose from the drop down menu the name of the landfill site	Kilbarry Landfill Site
Please enter the number of flares operational at your site in 2016	1
Please enter the number of engines operational at your site in 2016	0
Total methane flared	176,580 kg/year
Total methane utilised in engines	0 kg/year

Please note that the closing date for reciept of completed surveys is 31/03/2017

Introduction

The Office of Environmental Sustainability (OES) of the Environmental Protection Agency acts as the inventory agency in Ireland with responsibility for compiling and reporting national greenhouse gas inventories to the European Commission and the United Nations Framework Convention on Climate Change. In addition to meeting international commitments Ireland's national greenhouse gas inventory informs national agencies and Government departments as they face the challenge to curb emissions and meet Ireland's emission reduction targets under the Effort Sharing Decision (No. 406/2009/EC). The national inventory also informs data suppliers, making them aware of the importance of their contributions to the inventory process and a means of identifying areas where input data may be improved.

It is on this basis that the Environmental Protection Agency is asking landfill operators to partake in this survey so that the most uptodate information on methane flaring and recovery in utilisation plants at landfills sites is used in calculating the contribution of the landfill sector to national greenhouse gas emissions

The Environmental Protection Agency wishes to thank you for partaking in this survey. If you have any questions about the survey and how to complete it please view the "Help sheet" worksheet. If however, your query is not answered by viewing the "Help sheet" worksheet please contact:
LFGProject@epa.ie

Once completed please send the completed file as an attachment clearly stating the name and or license number of the landfill site (e.g. W000 Xanadu landfill_2015) to:
LFGProject@epa.ie

Environmental Protection Agency

A survey of landfill sites to determine the quantity of methane flared and or recovered in utilisation plants for 2016

How to use the survey?

1) Please enter your license details in the title sheet

2) Please enter the landfill name in the title sheet

3) Please enter the number of flares present and in use at your site in 2016 in the title sheet

4) Please enter the number of engines present and in use at your site in 2016 in the title sheet

5) The survey consists of 6 worksheets for flares. Only complete the number of worksheets for the number of flares present and in use in 2016 at your site

6) The survey consists of 6 worksheets for utilisation engines. Only complete the number of worksheets for the number of engines present and in use in 2016 at your site

7) Data can either be directly enetered in each cell of the tables or chosen from the drop down menus. Where data is outside of the range of values presented in the drop down menus an error message will appear. Please check the value and try again. Where data or description is not provided in the drop down menus please type the answer in the box provided

8) Please view a copy of the worksheet for flare No. 1 below and click on the cells under each of the headings to help you fill out the survey questionnaire.

9) Please note under the method heading
M = Measured e.g. direct from scada
C = Calculated e.g from weekly/fortnightly/monthly checks/monitoring
E = Estimated e.g. based on operational design of flare/engine

10) Please note that data is only to be enetered in either the monthly or the yearly tables but not both

Flare No. 1

Flare type ?	AFS HT500	**If "other" enter flare description here**	
Is the flare an open or enclosed flare ?	Enclosed	**Rated flare capacity ?**	**m3/hr**
Month /year comissioned ?	October		
Month decomissioned if decomissioned in 2016 ?	Select		
What is the function of the flare ?	Extraction from capped area	**If "other" enter flare function here**	

Monthly	Method M/C/E	Runtime days/month	Runtime hrs/day	Downtime hrs	Total runtime hrs/month	Average Inlet Pressure (mbg)	Average Inlet Temp ◦ C	Average Flow Rate (m^3/hr)	Average CH_4 %v/v	Average CO_2 %v/v	Average O_2 %v/v	Combustion efficiency (%	Total CH_4 m^3	Total CH_4 kgs
January		15	24.0	2.0	358	-110	10	300	45.00	40.00	1.00	98.0	47,363	29,152
February		20	24.0	2.0	478	-110	10	300	44.00	41.00	2.00	98.0	61,834	38,058
March		25	24.0	2.0	598	-110	10	300	43.00	42.00	3.00	98.0	75,599	46,531

	to be filled in by licensee		calculated by spreadsheet	

Flare No. 1

Flare type ?	AFS HT500	**If "other" enter flare description here**	
Is the flare an open or enclosed flare ?	Enclosed	**Rated flare capacity ?**	500 **m3/hr**
Month /year comissioned ?	October 2009		
Month decomissioned if decomissioned in 2016 ?	Select		
What is the function of the flare ?	Extraction from capped area	**If "other" enter flare function here**	

Monthly	Method M/C/E	Runtime days/month	Runtime hrs/day	Downtime hrs	Total runtime hrs/month	Average Inlet Pressure (mbg)	Average Inlet Temp ◦ C	Average Flow Rate (m^3/hr)	Average CH_4 %v/v	Average CO_2 %v/v	Average O_2 %v/v	Combustion efficiency (%)	Total CH_4 m^3	Total CH_4 kgs
January	C	31	24.0	156.0	588	-22	10	76	36.50	18.90	1.00	98.0	15,985	10,797
February	C	29	24.0	79.0	617	-21	10	76	36.50	18.90	1.00	98.0	16,773	11,341
March	C	31	24.0	30.0	714	-22	10	76	36.50	18.90	1.00	98.0	19,410	13,111
April	C	30	24.0	158.0	562	-20	10	64	33.70	21.00	2.20	98.0	11,879	8,040
May	C	31	24.0	305.0	439	-20	10	64	33.70	21.00	2.20	98.0	9,279	6,280
June	C	30	24.0	100.0	620	-20	15	64	33.70	21.00	2.20	98.0	13,105	8,716
July	C	31	24.0	1.0	743	-20	15	85	55.00	30.00	1.30	98.0	34,041	22,640
August	C	31	24.0	48.0	696	-19	15	85	55.00	30.00	1.30	98.0	31,887	21,229
September	C	30	24.0	24.0	696	-19	15	85	55.00	30.00	1.30	98.0	31,887	21,229
October	C	31	24.0	20.0	724	-19	10	80	42.00	19.20	2.50	98.0	23,840	16,152
November	C	30	24.0	0.0	720	-18	10	80	42.00	19.20	2.50	98.0	23,708	16,078
December	C	31	24.0	82.0	662	-17	10	90	52.90	20.50	1.10	98.0	30,887	20,968
Total					7,781								262,681	176,580

Please note: Only fill the "Yearly" table if data is not availabe or cannot be calculated nor estimated on a monthly basis

Yearly	Method M/C/E	Runtime days/year	Runtime hrs/day	Downtime hrs	Total runtime hrs/year	Average Inlet Pressure (mbg)	Average Inlet Temp ◦ C	Average Flow Rate m^3/hr	Average CH_4 %v/v	Average CO_2 %v/v	Average O_2 %v/v	Combustion efficiency (%)	Total CH_4 m^3	Total CH_4 kgs
2016					0		10					98.0	0	0

ID	DATE	O2 %	CO2 %	CH4 %	BALANCE %
...L.M.1	29/01/2016 09:33	20	0	0	80
...G.W.2	29/01/2016 09:38	20.2	0	0	79.8
...G.W.4	29/01/2016 09:47	20.4	0	0	79.6
..G.W.16	29/01/2016 09:50	20.4	0.1	0	79.5
...G.W.5	29/01/2016 09:53	20.5	0	0	79.5
..G.W.30	29/01/2016 09:58	20.5	0.1	0	79.4
...G.W.6	29/01/2016 10:00	20.5	0.1	0	79.4
..G.W.29	29/01/2016 10:03	20.6	0	0	79.4
..G.W.22	29/01/2016 10:05	20.6	0.1	0	79.3
..G.W.23	29/01/2016 10:07	18.6	1.4	0.8	79.2
..G.W.24	29/01/2016 10:10	20.6	0	0	79.4
..G.W.25	29/01/2016 10:11	20.6	0	0	79.4
..G.W.26	29/01/2016 10:14	20.5	0.2	0	79.3
..G.W.27	29/01/2016 10:16	20	1	0	79
..G.W.28	29/01/2016 10:18	20.5	0.1	0	79.4
...L.M.1	29/02/2016 10:11	19.9	0	0	80.1
...G.W.2	29/02/2016 10:16	20	0	0	80
...G.W.4	29/02/2016 10:25	20.1	0	0	79.9
..G.W.16	29/02/2016 10:29	20.1	0	0	79.9
...G.W.5	29/02/2016 10:33	20	0	0	80
..G.W.30	29/02/2016 10:39	20	0.1	0	79.9
...G.W.6	29/02/2016 10:41	19.9	0	0	80.1
..G.W.29	29/02/2016 10:45	19.9	0	0	80.1
..G.W.22	29/02/2016 10:47	19.8	0.1	0	80.1
..G.W.23	29/02/2016 10:49	18.8	0.9	0.4	79.9
..G.W.24	29/02/2016 10:51	19.7	0	0	80.3
..G.W.25	29/02/2016 10:52	19.6	0	0	80.4
..G.W.26	29/02/2016 10:55	19.4	0.3	0	80.3
..G.W.27	29/02/2016 10:57	18.9	1.1	0	80
..G.W.28	29/02/2016 10:59	19.5	0.2	0	80.3
...L.M.1	31/03/2016 08:47	20	0	0	80
...G.W.2	31/03/2016 08:52	20.3	0	0	79.7
...G.W.4	31/03/2016 09:01	20.7	0	0	79.3
..G.W.16	31/03/2016 09:03	20.8	0	0	79.2
...G.W.5	31/03/2016 09:06	20.9	0	0	79.1
..G.W.30	31/03/2016 09:11	20.9	0	0	79.1
...G.W.6	31/03/2016 09:13	20.9	0	0	79.1
..G.W.29	31/03/2016 09:17	20.9	0.1	0	79
..G.W.22	31/03/2016 09:19	20.9	0	0	79.1
..G.W.23	31/03/2016 09:21	20.9	0	0	79.1
..G.W.24	31/03/2016 09:23	20.9	0	0	79.1
..G.W.25	31/03/2016 09:25	20.9	0	0	79.1
..G.W.26	31/03/2016 09:27	20.9	0.2	0	78.9
..G.W.27	31/03/2016 09:29	20.6	0.7	0	78.7
..G.W.28	31/03/2016 09:31	20.9	0	0	79.1

...L.M.1	28/04/2016 08:38	20.1	0	0	79.9
...G.W.2	28/04/2016 08:43	20.2	0.1	0	79.7
...G.W.4	28/04/2016 08:51	20.4	0.1	0.1	79.4
..G.W.16	28/04/2016 08:54	20.4	0.2	0	79.4
...G.W.5	28/04/2016 08:59	20.5	0	0	79.5
..G.W.30	28/04/2016 09:05	20.6	0	0	79.4
...G.W.6	28/04/2016 09:06	20.6	0	0	79.4
..G.W.29	28/04/2016 09:10	20	0.4	0	79.6
..G.W.22	28/04/2016 09:12	20.6	0	0	79.4
..G.W.23	28/04/2016 09:14	20.5	0	0	79.5
..G.W.24	28/04/2016 09:15	20.5	0	0	79.5
..G.W.25	28/04/2016 09:17	20.4	0	0	79.6
..G.W.26	28/04/2016 09:20	20.3	0.1	0	79.6
..G.W.27	28/04/2016 09:22	20	0.7	0	79.3
..G.W.28	28/04/2016 09:24	20.2	0.1	0	79.7
...L.M.1	31/05/2016 08:42	19.8	0	0	80.2
...G.W.2	31/05/2016 08:48	19.9	0	0	80.1
...G.W.4	31/05/2016 08:58	19.8	0.1	0.2	79.9
..G.W.16	31/05/2016 09:01	19.3	0.5	0	80.2
...G.W.5	31/05/2016 09:05	19.8	0	0	80.2
..G.W.30	31/05/2016 09:10	19.7	0	0	80.3
...G.W.6	31/05/2016 09:12	19.7	0	0	80.3
..G.W.29	31/05/2016 09:16	16.3	2.6	0	81.1
..G.W.22	31/05/2016 09:18	19.6	0	0	80.4
..G.W.23	31/05/2016 09:20	19.6	0	0	80.4
..G.W.24	31/05/2016 09:22	19.5	0	0	80.5
..G.W.25	31/05/2016 09:24	19.5	0	0	80.5
..G.W.26	31/05/2016 09:26	19.5	0	0	80.5
..G.W.27	31/05/2016 09:28	19.4	0.1	0	80.5
..G.W.28	31/05/2016 09:30	19.4	0	0	80.6
...L.M.1	01/07/2016 08:38	19.7	0	0	80.3
...G.W.2	01/07/2016 08:43	19.8	0	0	80.2
...G.W.4	01/07/2016 08:53	19.6	0.3	0.7	79.4
..G.W.16	01/07/2016 08:56	19.4	0.4	0	80.2
...G.W.5	01/07/2016 08:59	19.9	0	0	80.1
..G.W.30	01/07/2016 09:04	19.8	0.1	0	80.1
...G.W.6	01/07/2016 09:06	19.7	0	0	80.3
..G.W.29	01/07/2016 09:10	10.6	6.8	0	82.6
..G.W.22	01/07/2016 09:12	19.7	0	0	80.3
..G.W.23	01/07/2016 09:14	19.7	0	0	80.3
..G.W.22	04/07/2016 09:33	19.6	0	0	80.4
..G.W.23	04/07/2016 09:35	19.2	0.4	0	80.4
..G.W.24	04/07/2016 09:36	19.6	0	0	80.4
..G.W.25	04/07/2016 09:38	19.6	0	0	80.4
..G.W.26	04/07/2016 09:41	19.7	0	0	80.3
..G.W.27	04/07/2016 09:43	19.6	0.2	0	80.2
..G.W.28	04/07/2016 09:45	19.7	0	0	80.3

...L.M.1	08/08/2016 09:05	19.7	0	0	80.3
...G.W.2	08/08/2016 09:10	19.7	0	0	80.3
...G.W.4	08/08/2016 09:18	18.5	1.5	2.9	77.1
..G.W.16	08/08/2016 09:20	19.6	0.4	0	80
...G.W.5	08/08/2016 09:23	19.9	0	0	80.1
..G.W.30	08/08/2016 09:28	19.9	0	0	80.1
...G.W.6	08/08/2016 09:29	19.9	0	0	80.1
..G.W.29	08/08/2016 09:33	16	4	0	80
..G.W.22	08/08/2016 09:35	19.9	0.1	0	80
..G.W.23	08/08/2016 09:37	19.5	0.5	0	80
..G.W.24	08/08/2016 09:39	20	0	0	80
..G.W.25	08/08/2016 09:40	20	0	0	80
..G.W.26	08/08/2016 09:43	19.9	0	0	80.1
..G.W.27	08/08/2016 09:45	19.9	0.1	0	80
..G.W.28	08/08/2016 09:47	19.8	0	0	80.2
...L.M.1	31/08/2016 08:34	20	0	0	80
...G.W.2	31/08/2016 08:38	20.1	0	0	79.9
...G.W.4	31/08/2016 08:46	19.8	0.5	0.9	78.8
..G.W.16	31/08/2016 08:49	20.1	0.2	0	79.7
...G.W.5	31/08/2016 08:51	20.2	0	0	79.8
..G.W.30	31/08/2016 08:56	20.2	0.1	0	79.7
...G.W.6	31/08/2016 08:58	20.1	0	0	79.9
..G.W.29	31/08/2016 09:01	19.3	0.7	0	80
..G.W.22	31/08/2016 09:03	20	0.1	0	79.9
..G.W.23	31/08/2016 09:05	19	0.7	0	80.3
..G.W.24	31/08/2016 09:07	19.8	0	0	80.2
..G.W.25	31/08/2016 09:09	19.8	0	0	80.2
..G.W.26	31/08/2016 09:11	19.7	0	0	80.3
..G.W.27	31/08/2016 09:13	19.6	0.1	0	80.3
..G.W.27	31/08/2016 09:14	19.6	0.1	0	80.3
..G.W.28	31/08/2016 09:16	19.7	0	0	80.3
...L.M.1	30/09/2016 08:34	20	0	0	80
...L.M.1	30/09/2016 08:34	20	0	0	80
...G.W.2	30/09/2016 08:38	20.2	0	0	79.8
...G.W.2	30/09/2016 08:38	20.2	0	0	79.8
...G.W.4	30/09/2016 08:46	18.6	2.1	2.7	76.6
...G.W.4	30/09/2016 08:46	18.6	2.1	2.7	76.6
..G.W.16	30/09/2016 08:48	20.5	0.1	0	79.4
..G.W.16	30/09/2016 08:49	20.4	0.1	0	79.5
...G.W.5	30/09/2016 08:51	20.5	0	0	79.5
...G.W.5	30/09/2016 08:51	20.5	0	0	79.5
..G.W.30	30/09/2016 08:56	20.5	0.1	0	79.4
...G.W.6	30/09/2016 08:58	20.5	0.1	0	79.4
..G.W.29	30/09/2016 09:01	18.8	1.7	0	79.5
..G.W.22	30/09/2016 09:03	20.4	0.1	0	79.5
..G.W.23	30/09/2016 09:05	20.3	0	0	79.7
..G.W.24	30/09/2016 09:08	20.3	0.1	0	79.6

..G.W.25	30/09/2016 09:10	20.3	0	0	79.7
..G.W.26	30/09/2016 09:12	20.3	0.1	0	79.6
..G.W.27	30/09/2016 09:14	20.1	0.4	0	79.5
..G.W.28	30/09/2016 09:16	20.3	0.1	0	79.6
...L.M.1	30/11/2016 09:44	19.7	0	0	80.3
...G.W.2	30/11/2016 09:49	19.9	0.1	0	80
...G.W.2	30/11/2016 09:49	19.9	0.1	0	80
...G.W.4	30/11/2016 09:57	20.2	0.1	0	79.7
...G.W.4	30/11/2016 09:57	20.3	0.1	0	79.6
..G.W.16	30/11/2016 09:59	20.4	0.1	0	79.5
..G.W.16	30/11/2016 10:00	20.4	0.1	0	79.5
...G.W.5	30/11/2016 10:02	20.5	0	0	79.5
...G.W.5	30/11/2016 10:02	20.5	0	0	79.5
..G.W.30	30/11/2016 10:07	20.4	0.4	0	79.2
...G.W.6	30/11/2016 10:09	20.3	0.1	0.2	79.4
...G.W.6	30/11/2016 10:09	20.4	0.1	0.2	79.3
..G.W.29	30/11/2016 10:12	20.5	0.1	0	79.4
..G.W.22	30/11/2016 10:14	20.6	0.1	0	79.3
..G.W.22	30/11/2016 10:15	20.6	0.1	0	79.3
..G.W.23	30/11/2016 10:16	20.6	0	0	79.4
..G.W.24	30/11/2016 10:18	20.6	0.1	0	79.3
..G.W.25	30/11/2016 10:20	20.6	0	0	79.4
..G.W.26	30/11/2016 10:23	19.9	2	0.2	77.9
..G.W.27	30/11/2016 10:25	19.7	1.7	0.1	78.5
..G.W.28	30/11/2016 10:27	20.3	0.5	0	79.2
...L.M.1	30/12/2016 09:38	19.9	0	0	80.1
...G.W.2	30/12/2016 09:42	20	0	0	80
...G.W.4	30/12/2016 09:51	20.3	0.1	0	79.6
..G.W.16	30/12/2016 09:53	20.4	0.1	0	79.5
...G.W.5	30/12/2016 09:57	20.5	0	0	79.5
..G.W.30	30/12/2016 10:02	20.3	0.9	0	78.8
...G.W.6	30/12/2016 10:04	20.6	0	0	79.4
..G.W.29	30/12/2016 10:08	19.4	0.6	0	80
..G.W.22	30/12/2016 10:10	20.6	0.1	0	79.3
..G.W.23	30/12/2016 10:13	20.6	0	0	79.4
..G.W.24	30/12/2016 10:14	20.6	0.1	0	79.3
..G.W.25	30/12/2016 10:16	20.6	0	0	79.4
..G.W.26	30/12/2016 10:19	20.3	0.7	0	79
..G.W.27	30/12/2016 10:21	19.7	1.6	0	78.7
..G.W.28	30/12/2016 10:23	20.5	0.2	0	79.3

Appendix III

Environmental Management System and E.L.R.A.

May 2016

Environmental Management System

Version 10, April 2016

Table of Contents

Kilbarry Landfill Site

1.0 Environmental Management Plan

1.0 Introduction

Kilbarry Landfill site is located (National Grid Reference 2598E 1103N) on the outskirts of Waterford City on the link road from Cork Road to Kilbarry Road,, approximately 300m of the N25.

The site occupies an area of 20.1 hectares. Land use in the vicinity of the site is a mixture of open flat farmland with wetland to the southeast. The area to the north and west of the site is a mixture of residential and commercial properties.

The landfilling of waste at the site has resulted in the formation of a mound of waste above ground level. The waste body has a maximum height of 20mOD in the centre of the site. The remainder of the site has a maximum height of 17.5mOD on top of the waste body and a base level of 2m to 3mOD on the edge of the site.

The site has been in operation for approximately 40 years. The landfilling of waste has occurred on a former area of wetland known as Kilbarry Bog. A series of drains or channels are found on the entire western, southern and eastern perimeter of the landfill.

The waste license for the site was issued on the 19th of October 2001. The purpose of this Environmental Management Plan is to act as a site manual for Kilbarry Landfill and Civic Amenity Site. It outlines the requirements of the waste license (18-1) and sets out a programme for achieving the schedule of objectives and targets. A complete copy of the plan shall be kept at the site office and an additional copy at the offices of Waterford City Council.

1.1 Management and Staffing Structure of the Facility

The site is operated by Waterford City Council. The site is under the overall control of Fergus Galvin, Director of Services, Waterford City Council. Mr.John Nolan, Senior Executive Engineer, is responsible for the overall operation of the site. Mr John McKeown, Executive Enginer, is responsible for reporting to the E.P.A. and fulfilling responsibilities of the waste licence. Mr John McKeown, Executive Engineer, is responsible for the day to day supervision and management of the Civic Amenity Site and is assisted by the Facility Supervisor Mr. James Flavin. Details of the additional site staff are provided in Table 1.

Table 1: Operational Staff (Currently on Site)

Employee	**Duties and responsibilities**
Mr James Flavin	Collection of charges. Maintenance of on-site records. Implementation of waste acceptance procedures. Site inspections. Monitoring of gas boreholes. Any other duties as required by site manager.
Mr Ferdy Ozturk	Daily litter patrols. Maintenance of metals recovery compound. Any other duties as required by site manager

A staff member Patrick Fitzgerald has been assigned since Autumn 2014 to carry out maintenance duties to Kilbarry Landfill and to the Civic Amenity Centre. His duties include grass cutting, litter picking, anti-dog fouling measures.

The facility manager maintains regular contact with the Senior Executive Engineer. Table 2 shows the current management structure of Kilbarry Landfill.

Table 2: Management Structure for Kilbarry Landfil

Position	**Employee Contact Details**
Director of Services Fergus Galvin	Waterford City And County Council, Environmental Services, Menapia Building, The Mall, Waterford. Tel: 051 309900 Fax: 051 849701
Senior Executive Engineer John Nolan	Waterford City Council, Environmental Services, Menapia Building, The Mall, Waterford. Tel: 051 309900 Fax: 051 849701
Landfill Manager JohnMcKeown C.A.S. Manager John McKeown Facility Supervisor James Flavin	Waterford City and County Council, Environmental Services, Menapia Building, The Mall, Waterford Tel: 051 309900 Fax: 051 849701 Kilbarry Landfill Tel: 051 379615 Fax: 051 379615

Any changes to this structure will be submitted to the EPA by the Landfill Manager. It shall be the responsibility of the C.A.S. Manager to organise staff in the absence of the named persons from the facility.

1.2 SITE DESCRIPTION

1.2.1 Waste Management Activities at the Facility

The waste categories and quantities that may be accepted for disposal and recovery, as outlined in Table A.1 of the Waste License, are shown below in Table 3.

Table 3: Waste Categories & Quantities for Disposal and Recovery

Waste Type	**Maximum Tonnes Per Annum**
Household	17,000
Commercial	12,500
Industrial Non Hazardous	28,500
Treated Sewage Sludges	2,500
Treated Industrial Non Hazardous Sludges	7,500
Construction and Demolition Waste	2,000
Wastes for Recycling and Recovery at the Civic Waste Facility	3,000
Waste for Recycling & Recovery at the Metal Recovery Area	2,000
Total	**75,000**

As of the 19th January 2003 commercial waste hauliers were stopped from disposing of waste at Kilbarry Landfill. As of 26th August 2005 Kilbarry Landfill ceased accepting domestic waste for landfill disposal. The landfill is currently closed to the public and restoration including permanent capping, gas and leachate abstraction works has been completed. Surface water drainage and landscaping works are to be completed. Currently all domestic waste collected by Waterford City Council is deposited at Veolias waste facility in Six Cross Roads Business Park before being hauled to Homestownstown Landfill in Wexford.

All waste loads arriving at the site were dealt with as per the waste acceptance procedures.

A civic amenity centre is located adjacent to the site entrance. The following range of goods are accepted for recycling: W.E.E.E., scrap metal, timber, cardboard, batteries, engine oil, cooking oil, glass bottles, aluminium cans, clothes, fluorescent tubes, energy saving light bulbs, aerosols and paint tins, biodegradable garden waste.

1.2.2 Methods of Waste Deposition

Previously any vehicle entering the site was weighed and all relevant information recorded. The vehicle was directed to the tipping area where the driver discharged the waste. The machine operator compacted the waste and covered it with daily cover material at the end of the day. Inert waste (such as clay, stone and C&D materials) was used as cover.

Currently all waste for landfilling weighed at Kilbarry is sent to Greenstar for bailing and export.

1.2.3 Site Capacity

The site has been in operation in the region of 41 years. The total volume of waste deposited to date is estimated to be 1,094,513m3.

The last area of landfilling was located in the new cell constructed in 2002/2003 located at the northern end of the landfill.

1.3 Engineering Details

1.3.1 Site Description

Kilbarry landfill is located on the outskirts of Waterford City. The landfilling of waste has primarily taken place in unlined cells. Only one lined cell was constructed on site and landfilling has been ongoing in this cell since June 2003. Once this cell was full landfilling operations ceased at the site in August 2005. The landfilling has resulted in the creation of a waste mound up to 20m in height.

A description of the existing situation for each component of the specified engineering works is provided below with details of the proposed works and timescale for completion of the future work.

1.3.2 Fencing, Gates and Other Security

Fencing is installed around the full perimeter of the site. The fencing is a palisade fence, 2.4m high. With the closure of the site the fencing is no longer of intrinsic security value except while works are ongoing onsite for the final capping and gas abstraction systems. The future use of the site is envisaged to be a park landscaped with respect to the NHA bog to the south and the fencing may not required due to its visual impact.

As per Condition 4.3.2 of the waste license, the facility manager will ensure that any temporary repairs to gates/fencing will be carried out where necessary, before the end of each working day and final repairs will be carried out within three working days. It is the responsibility of the facility manager (or other nominated person) to ensure that all gates shall be locked shut when the facility is unsupervised.

Site lighting is provided at the civic amenity area, which also lights the area around the weighbridge and the site office.

1.3.3 Leachate Management System

A leachate collection trench was installed around the perimeter of the site in 2002/2003. This trench was designed so as to prevent any leachate migrating off site and pump it to the leachate lagoon. The trench is a minimum of 1.2m in depth and 1m wide. The outer wall and floor of the trench are lined with 2mm thick HDPE liner. Perforated pipes run along the floor of the trench to carry any leachate which is collected and the trench is backfilled with a noncalcareous, granular, rounded stone, 16-32mm in size. The collection trench drains to five sumps located at various intervals around the perimeter of the site. The leachate is then pumped from these sumps to the leachate lagoon.

10 leachate abstraction boreholes were installed in the main body of the waste. Leachate is pumped from these boreholes to the leachate lagoon. A further three abstraction boreholes were installed in 2008.

A leachate lagoon was constructed north of the new cell. The lagoon has an overall capacity of 3,670 m3 and allowing for a freeboard of 0.5m a capacity of 2,670m3. The lagoon is pumped directly to the sewer.

A monitoring system was installed on the outfall of the leachate lagoon in accordance with the waste license in 2005. This system monitors for flow, pH and methane. It also provides for a composite sampler that can be event controlled.

1.3.4 Construction of Lined Cell

Work began on the construction of a fully engineered lined cell in September 2002 and was completed in March 2003. The location of the cell is to the north of the site. The cell is made up of a number of different elements to ensure its integrity.

A subcell drainage layer 300mm thick was laid on the floor. Pipes were then laid in this layer to collect and carry and water that may arise. These pipes were then run underneath the western bank of the cell and into the adjoining stream. A 500mm layer of bentonite enhanced soil was then laid on the drainage layer and on the side slopes. The BES was batched on site and regularly tested in the site laboratory to ensure it could achieve the correct permeability. The BES was laid in two layers of 250mm each and compacted with a roller as it was laid. It was then tested using a nuclear densometer to ensure that it had achieved the correct moisture content and density.

A 2mm thick HDPE plastic liner and an 8mm thick geotextile were then laid over the bentonite layer. Over these a 500mm thick leachate collection blanket was laid. This consisted of a non-calcareous granular, rounded stone, 16-32mm grain size. A network of perforated pipes was placed through this collection blanket to collect and carry leachate arisings to the leachate sump. The leachate is then pumped from the sump to the leachate lagoon and on the sewer.

The cell was completed in March 2003 and waste was first placed in the cell on the 6th June. The cell was filled and the landfill closed in August 2005.

1.3.5 Surface Water Ponds

Three surface water ponds have been installed on the site. These ponds were operational while the site was. Since closure and the completion of final capping the surface water management system has become redundant and needs to be reinstated for the new levels onsite. A surface Water Management Plan was submitted to the Agency in April 2008. This was accepted by the Agency in a letter dated 26/11/08. Based on this contract documents were drafted in consultation with National Parks and Wildlife Services for the installation of a new surface water management system which compliments the use of the site as a public park. A further surface water pond was installed to the south of the landfill as part of this contract. These works were completed in early 2011.

1.3.6 Dry Wheel Shakeout Grid

The dry wheel shake out was located north of the metals recovery compound and was completed in late November 2002. All vehicles leaving the facility first passed over the grid.

The shakeout grid occupied an area of 10m by 4m. As a vehicle travels over the grid, dirt and grit were loosened from the wheels and fell into a chamber below. The spoil was later removed from the chamber below. A power wash could also be used in tandem with the shakeout grid in particularly bad weather. This shakeout grid has been filled in since completion of all restoration works on site as it is no longer necessary for the operation of the

CAS.

1.3.7 Groundwater Monitoring Boreholes

The following is the list of groundwater monitoring boreholes that are now in operation at the site: GW2, GW4, GW5, GW6, GW16 (artesian), GW25 and GW29.

Monitoring of groundwater levels is undertaken weekly and sampling occurs quarterly with a more comprehensive analysis on an annual basis. The quarterly and comprehensive annual sampling is carried out by the EPA Kilkenny.

1.3.8 Leachate

A total of six boreholes were originally installed at the landfill, LM1 – LM6. However over time landfilling operations damaged a number of the boreholes. The damaged boreholes were replaced and an extra two were also installed. However a further two, LM2 and LM3 were damaged at some point prior to the commencement of final capping. During the capping works LM7 and LM8 were buried due to their low levels. For all of the year there was only one operational leachate monitoring borehole, LM1, due to capping works preventing access to the others. There are now currently four operational boreholes on site, LM1, LM4, LM5 and LM6. But, LM4, LM5 and LM6 remain under the final capping ground level surrounded by manhole rings for protection.

Leachate levels are monitored on a weekly basis.

Analysis of the composition of the leachate is undertaken at quarterly intervals for a limited range of parameters with a more comprehensive analysis on an annual basis. The quarterly and comprehensive annual sampling is carried out by the EPA Kilkennyt.

1.3.9 Gas Monitoring Boreholes

82 no. gas abstraction wells have been installed for the active extraction and flaring of gas from the site. These wells can also be used to monitor the gas production in the waste body during field balancing.

Perimeter monitoring: LM1, GW2, GW4, GW5, GW6, GW7, GW9, GW12, GW15, GW17. Three temporary monitoring points GW19, GW20 and GW21 are now inoperable due to works adjacent to the landfill site. 8 new monitoring points have been established on the western perimeter between the landfill and the closest residential houses in Lacken Wood estate. These number GW22 to GW29.

1.3.10 Surface Water

The waste license requires the monitoring of surface water quality at the following locations,

- At monitoring points S1, S3 to S9 inclusive. Sampling point S2 is no longer available as the boundary drain has been diverted through a conduit pipe. S5 was inaccessible due to dense undergrowth for years, but in September a new path was laid to allow full access.
- EPA monitoring locations 0300, 0330, 0350 and 0400.
- Water quality monitoring including biological monitoring of the John’s River and the Lisduggan Stream and other unnamed watercourses and tributaries upstream and downstream of the facility.

The quarterly sampling is undertaken by the EPA Kilkenny.

1.3.11 Ecological Monitoring

Annual ecological monitoring is required to include an ecological survey of habitats and associated plant and animal communities within and adjoining Kilbarry Bog proposed NHA.

1.3.12 Noise

Noise monitoring is required at 14 locations in the vicinity of the landfill. B1, B2, B3, B4, B5, B6, B7 are the onsite locations. NSL2, NSL3, NSL4, NSL5, NSL5, NSL6, NSL7 and NSL8 are the offsite locations.

1.3.13 Dust

Dust monitoring is required at seven locations around the perimeter of the site. It is required three times annually, twice between the months of May and September.

1.3.14 Odours

Odour monitoring is required on a quarterly basis at seven locations in the vicinity of the site. Odour Ireland carry out all odour monitoring required.

1.3.15 Final Capping

Final capping commenced in the October of 2005. There is currently 100% of the landfill area capped to its final levels..

The phasing of the restoration works carried out was as follows:

Table 6: Phasing of the restoration works

Component	Commencement	Completion
Completion of liner and final capping	October 2005	June 2008
Completion of gas abstraction system	November 2006	April 2008
Installation of Permanent Flare	October 2009	October 2009
Installation 3 new leachate wells	January 2008	April 2008
Surface Water Management	September 2010	January 2011
Landscaping	March 2011	April 2012

1.4 Site Operation

1.4.1Descrition of the operations

The landfilling of waste has ceased at Kilbarry but a Civic Amenity Site operates at the old landfill entrance to the North of the overall site. Materials accepted here are :

- W.E.E.E.
- Scrap Metal
- Timber

- Cardboard
- Car and Household Batteries
- Engine Oil
- Cooking Oil
- Glass Bottles
- Aluminium Cans
- Clothes and Textiles
- Fluorescent Tubes
- Energy Saving Light Bulbs
- Aerosols
- Paint Tins

Oil filters
Recycling paper
Biodegradable Waste (Garden)
Mixed Municipal Waste

1.4.2 Site Opening and Operation Hours

The hours of operation of the Civic Amenity Site are between 11am and 4pm, Monday to Friday.

1.4.3 Access

All personnel and vehicles entering the site are required to stop at the weighbridge which is located adjacent to the site entrance gate and report the purpose of their visit to the weighbridge operator. The weighbridge operator then directs vehicles to the relevant area. Public access to the site is limited to the civic amenity area and the metals recovery compound only.

Only personnel who are involved in monitoring, or otherwise authorised by the facility manager shall be permitted access to the landfill area outside the civic amenity/metal compound areas. Access to the site outside of normal working hours in not permitted unless authorised by the facility manager.

1.4.4 Waste Acceptance

All waste entering the facility is subject to the acceptance procedures. All staff involved in waste acceptance at the site are trained in the waste acceptance procedures.
Cars and trailers including light vans carrying materials for recycling or disposal are directed to the civic amenity area. The site caretaker shall be responsible for ensuring that the area is kept tidy and that the goods for recycling are place in the correct collection area

1.4.5 Control of Nuisances

1.4.5.1 Litter Abatement Measures

It is the responsibility of the facility manager to ensure the prevention of the spread of litter. Regular monitoring and site inspections are carried out to this end.

Contractors transporting materials for recycling offsite are required to ensure that when

transporting and discharging these loads that litter is kept to an absolute minimum. All vehicles are required to be totally sealed or covered with a net or tarpaulin to ensure that materials are not blown from the vehicles.

Routine litter patrols are carried out on a daily basis to ensure that any loose litter is collected, this includes the area surrounding the landfill, all fences and the approach road to the site.

1.4.5.2 Birds

Birds are no longer a nuisance at the site since the landfill closed.

1.4.5.3 Vermin

A contract is in place with Rentokil Ireland. A programme of baiting can be employed as required to control rat infestations with preventative baiting at regular intervals to ensure that large populations do not become established.

1.4.5.4 Flying Insects

This does not pose a nuisance since the closure of the landfill.

1.4.5.5 Fires

The burning of waste or other material is not permitted at the facility. Hot or burning loads of waste arriving at the facility are rejected. In the event that a fire breaks out on the site it is treated as an emergency and dealt with immediately. No fire was reported in 2014.

1.4.5.6 Odour Control

Odour monitoring is carried out at quarterly intervals and the results for 2015 are contained in Appendix V. There were no odour complaints in 2015 and to date there have been no complaints or results of significance from monitoring.

1.4.5.7 Dust Control

The main sources of dust on the landfill site and the Civic Amenity Site are due to vehicle movement and control is effected by a mobile sprayer. Speed restrictions also apply to vehicles within the landfill. Dust monitoring is required at seven locations in the vicinity of the site (D1, D2, B1, B2, S2, B6, and GW5). Dust monitoring is required three times per annum. There were no dust limit breaches in 2015.

1.4.6 Wheel – Cleaning Procedures

A dry wheel shake out unit has been installed to the north of the metals recovery compound. All vehicles shall be required to pass through the unit on the instruction of the site caretaker prior to exiting the site. The site caretaker shall make an assessment as to the need for the vehicle to pass through the unit based on the site conditions at the time.

1.4.7 Emergency Response Procedures

The emergency response procedures for the facility are contained in Appendix X as part of the overall Environmental Management System

1.4.8 Awareness and Training

An ongoing training programme has been set up to ensure that staff involved with the facility are sufficiently trained in achieving compliance with the conditions of the waste license. The programme is maintained and updated as required.

1.4.9 Communications Programme

A communications programme has been set up in order to allow any local community groups or local resident's access to information concerning the environmental performance of the facility at all reasonable times.

1.4.10 Environmental Monitoring & Maintenance Procedures

Monitoring shall be undertaken at such locations and parameters as outlined in Schedule F: Monitoring of the waste license and as specified in Condition 9. All monitoring is to be carried out in accordance with the EPA Manual on Landfill Monitoring.

The facility manager shall be responsible for implementing the following:

• The monitoring and recording of landfill gas using an infrared gas analyser at the gas monitoring locations specified in the waste license. All monitoring equipment shall be calibrated, maintained and operated in accordance with the manufacturers' instructions. Written records of the calibrations and maintenance shall be kept. All equipment used for monitoring landfill gas shall be certified as being intrinsically safe.

• If a gas concentration reading at the site office exceeds the emission limit specified in Schedule G, the Emergency Response Procedures will apply.

• The visual inspection on a weekly basis of surface water monitoring locations as outlined in Schedule F: Monitoring

• The monitoring and recording of leachate levels within the filled waste on a weekly basis.

• Recording of data from the agreed climatological station on a monthly basis.

• The provision of safe and permanent access to all on-site sampling and monitoring points and off-site points.

• The maintenance and clear labelling of all sampling points.

• The replacement of all monitoring infrastructure which proves to be unsuitable for its purpose.

Upon the written instruction of the Agency only the facility manager shall amend that frequency, locations, methods and scope of monitoring, sampling, analyses and investigations and shall provide information concerning such amendments as may be requested in writing by the Agency.

The facility manager shall be responsible for forwarding copies of all environmental monitoring data to the Agency at the frequencies set out in schedule D of the waste license. In accordance with Condition 9.18 monthly inspections of the landfill for evidence of slippage shall be undertaken.

1.4.10.1 Emission Limits

Any exceedance of the trigger levels for emission limits as listed in Schedule G of the waste license shall be deemed an incident and documented in accordance with Condition 3.2 and 10.7 (a to e) of the waste license and reported to the Agency (and the Southern Regional Fisheries Board if necessary) by the facility manager in accordance with condition 3.3.

1.4.10.2 Annual Environmental Report

The facility manager shall prepare and submit to the Agency for its agreement the annual environmental report. In accordance with Condition 2.4 the facility manager shall submit the annual environmental report within one month of the end of each calendar year.

The facility manager shall ensure that the annual environmental report is prepared in accordance with any relevant written guidance issued by the Agency and includes at a minimum the information specified in Schedule C: Content of Annual Environmental Report.

1.4.11 Operational & Safety Rules Including Safety Statement

The general safety statement of Waterford City Council applies to operation in the Kilbarry Landfill. Regarding work to be constructed by outside contractors each contractor shall provide a specific safety statement and be appointed Project Supervisor Health & Safety as required by the Health, Safety & Welfare at Work Regulations 1995.

1.5 Closure & Aftercare

1.5.1 Final End Use of Site

The site has been turned into a public park.

A layout of the park is contained in Drawing 4 in the Appendices.

1.5.2 Aftercare Monitoring

The EU Directive on the Landfill of Waste (1999/31/EC) and the guidance published in the Agency's Landfill manual "Landfill Restoration & Aftercare" requires that the operators of landfill site continue to monitor the groundwater, surface water, leachate and landfill gas after the closure of the site.

The site management shall ensure that the aftercare programme for Kilbarry Landfill will

include stability assessment of the side slopes including slope stabilisation measures if required, monitoring of groundwater quality, leachate composition, surface water quality and landfill gas composition. The monitoring is to be carried out in accordance with the requirements of the EPA Manual on Landfill Monitoring. The following programme is proposed for the initial monitoring subsequent to the closure of the site. The proposed monitoring frequencies are outlined in Table 8 (based on EPA Landfill Monitoring Manual recommendations). The programme shall be reviewed on an annual basis.

Medium	**Parameter**	**Frequency**
Surface Water	Composition	Six monthly
Groundwater Levels	Composition	Six monthly
Landfill Gas	Gas Emissions	Six monthly
Stability & Settlement		Annually
Leachate	Levels Composition	Six monthly Six monthly

Sampling to be carried out at representative locations.

1.5.3 Maintenance Programme for Aftercare Phase

It is proposed that maintenance shall be carried out as required at the site. Maintenance of the following equipment is envisaged during the aftercare period.

- Leachate pumps in collection sumps and abstraction wells
- Gas flarestacks and abstraction system
- Fencing and gates

It is recommended that the above items are inspected on a regular basis (minimum six monthly) and that maintenance shall be carried out as required.

2017 Schedule of Objectives and Targets

Prepared by: John McKeown, Facility Manager **Date : March 2017**

Approved by : Mr Fergus Galvin, Director of Services, Waterford County Council

	Target	**Plan**	**Responsible Party**	**Timescale (for) completion)**
Objective 1 To establish site infrastructure as required by Licence Conditions	Repair all defects in the existing site gates and fences	Regular inspections are carried out of gates and fencing	Facility Manager	Within three working days of defect
	Install active collection and flaring system for landfill gas	Active gas collection system and permanent flare installed	Facility Manager/ Consultant Contractor	Completed
	Investigate utilisation of landfill gas	Utilisation not feasible	Facility Manager/ Consultant	Completed
	Surface Water Management	Install system as proposed	Facility Manager Consultant, Contractor	Completed
	Landscaping	Suitable tree and shrub planting required on the perimeter of the facility and for final capping/restoration.	Horticulurist	Completed
	Permanent Enclosed Flarestack	Install flare and connect to gas abstraction system	Facility Manager, Contractor	Completed

2017 Schedule of Objectives and Targets

Prepared by: John McKeown, Facility Manager **Date : March 2017**

Approved by : Mr Fergus Galvin, Director of Services, Waterford County Council

	Target	**Plan**	**Responsible Party**	**Timescale (for) completion)**
Objective 2 Management & Operation of the Facility **Objective 3 To Prevent Environmental Nuisance & Emissions**	Develop written waste acceptance procedures and ensure all staff are familiar with same	To minimise nuisance and ensure only permitted material accepted for recycling	Facility Manager & Compactor Operator	Reviewed annually
	Implement Litter Control Measures	To maintain litter control measures	Facility Manager Site Staff	Ongoing
	Dust Control	To maintain dust control measures	Facility Manager Site Staff	Ongoing
	Vermin Control	Contract with Rentokil Ireland	Facility Manager	In Place
	Continue existing gas monitoring programme	Continue with existing monitoring programme	Facility Manager	On Going
	Continue existing leachate monitoring programme	Monitor changes in the composition of the leachate with time	Facility Manager	On Going

	Monitor dust control measures during construction works at the facility	Dust control measures to be implemented on site during all construction works at the facility	Facility Manager	On Going

2017 Schedule of Objectives and Targets

Prepared by: John McKeown, Facility Manager **Date: March 2017**
Approved by: Mr. Fergus Galvin, Director of Services, Waterford County Council

	Target	**Plan**	**Responsible Party**	**Timescale (for completion)**
Objective 4 **Promotion of Waste Recycling**	Make public aware of recycling initiatives, techniques and current methods as well as materials accepted at Kilbarry	Promotion through local newspapers, radio, school talks and information leaflets	Environmental Officer Facility Manager	Ongoing

2017 Schedule of Objectives and Targets

Prepared by : John McKeown, Facility Manager **Date** : **March 2017**
Approved by : Mr Fergus Galvin, Director of Services, Waterford County Council

	Target	**Plan**	**Responsible Party**	**Timescale (for completion)**
Objective 5 **To improve the Environmental Performance**	Establish an Environmental Management System	To monitor the facility's environmental performance	Facility Manager	Reviewed Annually
	Prepare the Annual Environmental Report	Summarise the results of environmental monitoring programme and assess facility's progress towards achieving its objectives and targets	Facility Manager Consultant	March 2014 (Due to City and County amalgamation the AER delayed)
	Reduce non-compliance	Carry out site inspections	Facility Manager Site Supervisor	Ongoing
	Improve Environmental Monitoring Programme	Continue and expand groundwater, surface-water, leachate and landfill gas monitoring to ensure complete compliance with licence.	Facility Supervisor Facility Manager	Ongoing
	Reduce risk of gas migration	Install active gas abstraction system and flare. Also, gas utilisation system, to be assessed.	Facility Manager Consultant Contractor	Gas abstraction system completed. Utilisation unfeasible.

2017 Schedule of Objectives and Targets

Prepared by : John McKeown, Facility Manager Date **: March 2017**
Approved by : Mr Fergus Galvin, Director of Services, Waterford County Council

	Target	**Plan**	**Responsible Party**	**Timescale (for completion)**
Objective 5 To improve the Environmental Performance (Continued)	Reduce visual impact	Landscaping of site into a public amenity park	Horticulturist	Completed
	Control dust emissions	Monitoring	Contractor	Quarterly
		Spray roads during dry weather	Facility Manager	Ongoing
		Operate and maintain wheel wash	Facility Manager	Ongoing
		Enforce speed limits	Facility Manager	Ongoing
	Litter control	Daily Litter inspections	Facility Supervisor	Ongoing
	Reduce emissions to surface water	Install management system	Facility Manager	Ongoing
	Reduce emissions of leachate from unlined waste body	Maintain leachate collection system	Facility Manager, Contractor	Ongoing

Objective 5 (continued)	**Target**	Plan	**Responsible Party**	**Timescale (for completion)**
	Reduce long-term impact	Restoration and Aftercare Plan	Senior Engineer	After landscaping

2017 Schedule of Objectives and Targets

Prepared by : John McKeown, Facility Manager **Date** : **March 2017**
Approved by : Mr Fergus Director of Services, Waterford Ccounty Council

	Target	**Plan**	**Responsible Party**	**Timescale (for completion)**
Objective 6 To Monitor Management of Facility	Environmental Management System	Environmental Management System developed and included in this submission	Facility Manager	Reviewed annually
	Environmental Management Programme	Environmental Management Plan established and included in this submission	Facility Manager	Reviewed annually
	Establish and maintain Corrective Action Procedures	Procedures have been developed and are included in this submission	Facility Manager	Reviewed annually
	Establish Awareness and Training Procedures to identify training needs	Procedures have been developed by Waterford City Council	Facility Manager	Reviewed annually
	Establish Communications Programme to ensure public access to information	Details included in this submission	Facility Manager	Reviewed annually
	Record keeping to ensure proper site management	Written records to be kept	Facility Manager	Reviewed annually

3.0 Corrective Action Procedures

Throughout the operation of the landfill facility, there will be a need to resolve any noncompliances of the waste license that may arise as a result of problems with operation, complaints from the local community, non-conforming subcontractors etc. This procedure defines the approach that will be taken in implementing and evaluating corrective action to prevent the recurrence of non-compliances. The purpose of this procedure is to ensure that all corrective actions are documented and that the EPA are notified of any incident.

Responsibilities

The facility manager will be responsible for co-ordinating the corrective action procedures for Kilbarry Landfill and is responsible for retaining the corrective action file and forms. The Senior Engineer will be responsible for the review of corrective action forms and ensuring that controls are applied to ensure that corrective actions are implemented and effective. The landfill operational staff shall be responsible for following the procedure.

Corrective action is required in the event of the following:

- Any emission which results in the contravention of any relevant standard, including any standard for an environmental medium, or any relevant emission limit value, prescribed under the relevant enactment.
- Any emission which does not comply with the requirement of the license.
- Any trigger level specified in the license or in the EMS which is exceeded.
- Any indication that environmental pollution has, or may have taken place.
- Any occurrence with the potential for environmental pollution.
- Any emergency.
- Any incident which requires preventative action.
- Any failure to comply with procedures or systems.

Procedures

In the event of a non-compliance or incident occurring, the facility manager shall:

1. Take necessary short-term action to prevent the immediate reoccurrence of the problem or minimise any further impact.
2. Conduct a thorough investigation of the root cause of the problem to identify the nature, source and cause of the incident and any emission.
3. The person reporting the incident will identify the date, time and place of the incident. In the event that any monitoring, sampling or observations indicating that an incident has, or may have occurred the facility manager will be immediately notified.
4. Document the results of the investigation and propose a long-term corrective action to prevent recurrence of the problem on the corrective action form.
5. Enter the corrective action into the corrective action register.
6. Submit the completed corrective action form to the Senior Executive Engineer who shall review the recommendation and accept or require additional investigation. If additional investigation is required the form and attachments will be returned to the facility manager, who will continue with the investigation as detailed by the Senior Executive Engineer. If the recommendation is acceptable the facility manager will implement the corrective action.
7. Monitor the success of the corrective action.
8. Document the evidence that was reviewed to determine the effectiveness of the corrective action on the corrective action form.
9. File the original corrective action and any accompanying paperwork in the corrective action form and copy the completed form to the Senior Executive Engineer.
10. Notify the EPA.
11. Implement changes in procedure resulting from the corrective action.
12. Arrange staff training if required.

Corrective Action form

Non-compliance

Briefly describe what the root cause of the problem was after your investigation

Name of investigator :

Signature: **Date :**

Short-term Corrective Action :

Briefly describe the immediate action that was taken to prevent further impact

Action taken by :

Signature : **Date :**

Long –term corrective action:

Briefly describe recommended action to prevent recurrence

Details of further investigation if necessary

Approved By :

Responsibility assigned to : **Date :**

Review of Monitoring :*Briefly describe the evidence that was reviewed to determine the effectiveness of the corrective action*

Signature : **Date :**

4.0 Awareness and Training Procedures

Purpose
The purpose of this procedure is to identify and provide appropriate training needs for all personnel whose work is related to the operation of Kilbarry Landfill. It shall ensure that personnel are aware of the potential hazards and environmental impacts associated with their work on the landfill.
The operation of a modern landfill requires staff to have the relevant knowledge, training and experience in order to minimise the potential impacts of the landfill on the surrounding environment and to meet the requirements of the waste license and all relevant legislation.

Responsibility
The facility manager will be responsible for the following:
1. To identify and assess the training needs of all staff involved in the operation of the landfill.
2. To ensure that each employee receives the necessary training relating to his or her work procedures.
3. To ensure that contractors have received the relevant training prior to work on the landfill.
4. To organise all training courses.
5. To increase employee awareness of potential hazards and necessary precautions.
6. To ensure that all staff are provided with the necessary instruction and training to carry out their work having due regard to their safety, the safety of others and the public at large and also to ensure that best practice is followed in every respect of the landfill operation.

Procedure
The facility manager shall:
1. Set up a register of all training programmes completed by personnel involved in the operation of Kilbarry landfill.
2. Identify the training needs of staff based on their work procedures.
3. Research suitable training programmes and forward details to Senior Engineer for approval.
4. Organise staff to attend training programmes.
5. Ensure additional training will be provided when new procedures are established, new equipment is obtained or at any time a change in the employees working environment may create a potential hazard.

Documentation
Completion of the training for each individual will be documented on a separate form and maintained by the facility manager to ensure that each member of staff is provided with the information they are required to have to perform their job safely.

5.0 Communications Programme

The communications programme shall ensure that members of the public can obtain information concerning the environmental performance of the facility at all reasonable times.

Introduction

Council Directive 90/313/EEC on the Freedom of Access to Information on the Environment recognised the significance of the public's access to information relating to the environment. To ensure that members of the public can obtain information concerning the environmental

performance of Kilbarry landfill the communications programme described below shall be implemented at the facility.

The purpose of this programme is to allow any local community groups, key interest groups, local residents and members of the local community access to information on matters relating to the environmental performance of Kilbarry Landfill. This in turn will address any local community concerns and allow the public the opportunity to provide feedback on the facility

Programme:

1. All requests concerning the environmental performance of the facility should be made in writing to:

John McKeown,
Facility Manager, Kilbarry Landfill,
Menapia Building,
The Mall,
Waterford City.

2. The facility manager shall copy all requests to:

Fergus Galvin, Director of Services,
Waterford County Council,
Environment Department,
Menapia Building,
The Mall,
Waterford.

3. Each request should indicate the name, address and contact telephone number of the concerned party, an outline of the information required and the manner in which they require the information.

4. If requested, a suitable member of staff will provide and clear, unbiased explanation of the information provided.

5. The Director of Services or other authorised, nominated representative in Waterford County Council or any other nominated person will deal with replies to requests made by the media for information relating to the environmental performance of the landfill.

Record Keeping

1. All records of request for information regarding the environmental performance of the landfill and all minutes of meetings with concerned parties and details of site visits/open days shall be maintained. All of the aforementioned files shall be stored at the site office at Kilbarry Landfill and at the offices of Waterford County Council, Environment Department.

6.0 Waste Acceptance Procedures

Kilbarry Landfill comprises of a closed landfill site and a civic amenity centre for recycling for a limited number of streams of waste.

The following procedures have been put in place for waste acceptance by Waterford County Council:

Household Waste:

Household waste brought by the public to the Civic Amenity Site at Kilbarry is transferred to Greenstar for baling and export. There is a crush loader bin lorry kept onsite for any such household waste that is brought direct to the civic amenity site by the public. When the waste arrives at the landfill the weighbridge operator instructs the member of the public that it must be bagged.

Following a cursory visual inspection the householder is to be directed to the refuse lorry located in the civic amenity centre where he/she can dispose of the waste. If the weighbridge operator suspects that the load may contain unacceptable material (e.g. recyclables) a more thorough examination is to be carried out. If recyclable material is found that can be disposed of in the C.A. site the householder is to be directed to the appropriate location. If material is found that can neither be disposed of or recycled on site the householder should be instructed to remove said material off-site.

Fridges:

Fridges are a hazardous waste. Fridges are only stored on site before being transported off-site by KMK Recycling for correct disposal. When a householder arrives on-site he/she should be instructed to leave the fridge in or next to one of the two containers for the fridges. Every evening any fridges that have been deposited that day are moved into the container if not already done. If the container is nearing full KMK are contacted and a collection organised.

Small W.E.E.E. :

Anyone bringing small electrical goods to Kilbarry are directed to the cages for same inside the container in the Civic Amenity Site. These cages are emptied roughly once a week by KMK.

Large W.E.E.E.:

Large white electrical goods are stored in the metals compound in a neat and tidy manner for collection. The compound should be checked every evening and morning for signs of vandalism or dumping. Regular collections by KMK are essential to maintaining thecompound in a clean and tidy state.

Commercial Waste:
There is no commercial waste of any type accepted at Kilbarry Civic Amenity Site.

Cardboard:

Householders bringing cardboard to the Civic Amenity Site are directed to thecompactor onsite and accompanied by a member of staff. The staff member inspects thecardboard for contamination and removes any waste not suitable for compaction. This can bebagged and charged as per normal domestic waste. The cardboard is placed into thecompactor while it is not operating. Once the hopper is full the staff member closes the hopper and opens the control mechanism locked in the compartment on the wall beside the compactor. The staff member can only operate the compactor whilst keeping the emergency stop button control in his hand at all times. The control must be locked away again once the hopper is empty and ready for more cardboard. The control mechanism must never be left unlocked and accessible to the public.

Biodegradable Waste (Garden)

From January 2015 to June 2015 the biodegradable waste that the public deposited in Kilbarry was shredded on site and then transported to the old compost site at the 6 Cross Roads for long term

storage. From July to December AES, Kildare have taken the biodegradable waste to their compost facility in Kildare. This biodegradable waste is recycled into commercial compost.

Other Recyclables:

The following materials are accepted for disposal at the recycling centre:
Aluminium cans and Glass bottles

Untreated timber

Paint Tins

Batteries

Waste engine oil

Waste edible oil

Metals

Aerosols

Textiles

Fluorescent tubes

When a person comes in wishing to recycle they are directed to the appropriate location. If a person wishes to dispose of waste oil a City Council staff member disposes of it for them.

7.0 Emergency Response Procedures

Condition No: 10.1 Emergency Response Procedures

Condition: The licensee shall, within six months of the date of grant of this licence, submit an updated written Emergency Response Procedure (ERP) to the Agency for its agreement. The ERPshall address any emergency situation which may originate on the facility and shall include provision for minimising the effects of any emergency on the environment.

7.1 Scope / Objective

Condition 10.1 of Waste Licence No. 18-1 granted to Waterford City Council for Kilbarry Landfill site by the Environmental Protection Agency (EPA) requires the City Council to prepare an Emergency Response Procedure (ERP). The ERP will apply to Kilbarry Landfill Site and describes the actions to be taken in the event of a site emergency.
The purpose of this procedure is to propose appropriate actions to ensure health and safety risks to employees and visitors, and damage to property and the environment is minimised.

7.2 Responsibility

This document describes the ERP for the Kilbarry Landfill Site. The ERP will be maintained at the landfill site by the Landfill Engineering Manager. He will be

responsible for the implementation of this procedure.

The Landfill Deputy Managers, Weighbridge Clerk and all Waterford City Council employees at the site will be responsible for following this procedure.
Changes to the ERP will not be made without written approval from the Agency.

In the event of an emergency the EPA must be notified. The contact details are shown below:

Ms. Emer O'Reilly,
Environmental Protection Agency,
PO Box 3000,
Johnstown Castle Estate,
Co. Wexford.
Tel: 053 60600
Fax: 053 60699

7.3 Definition

Emergency

An emergency is defined as an unforeseen or sudden occurrence demanding immediate action.

7.4 Circulation List

The ERP is distributed to those named below and is available for reference from the Landfill Engineering Manager whose copy will be maintained at the site office. In order to maintain control of the procedures within the revision process, the ERP should not be copied without permission from Mr Fergus Galvin, Director of Services. Persons using this document are responsible to ensure that they are using the most up to date version.

	Position
Fergus Galvin	Director of Services
John Nolan	Senior Executive Engineer
John McKeown	Landfill Manager

7.5 Procedures

7.5.1 Emergency Response Procedures

1. Emergencies can be:-
- activation of site office fire or gas alarm
- discovery of a fire within the site boundary
- landfill gas detected exceeding safe operating levels within the site boundary or outside the site
- explosions
- flooding
- uncontained spillage / leakage

- major injury or dangerous occurrence

2. In the event of an emergency all employees should react promptly and calmly, following the guidelines outlined in this document.

7.5.2 Activation of Office Fire or Gas Alarms

1. The site office is fitted with fire and gas detection systems. The landfill gas concentration limits are 1%v/v for methane and 1.5%v/v for carbon dioxide. The gas alarm will sound if gas is detected above these specified limits and the smoke alarm will sound if smoke is detected in the office.

2. On hearing an alarm all personnel must evacuate the offices, closing all windows and doors behind them, if practical.

3. All personnel should proceed to the assembly point outside the front gates where employees, site visitors and site contractors will be accounted for (the site visitors book and contractors sheets should be checked if accessible).

4. The emergency services should be notified immediately by dialling 999 if it is suspected a fire has broken out or if the fire alarm sounds. Personnel should only tackle a fire if safe to do so and if they have been trained in the use of a fire extinguisher.

5. If the alarm is legitimate, the Landfill Engineering Manager should be notified as soon as is practicable.

6. The EPA should be notified as per condition 3.3 of the waste license (contact details above) and the incident should be recorded in the site incident report form.

7.5.3 Procedure for Dealing with Hot or Burning Loads

1. If on inspection a load is found to be hot or burning it should be refused admission to the site.

2. Details of the load (name, registration number, type of load, site of origin) should be recorded in the appropriate register retained in the site office.

3. If the load has entered the site, prior to deposition, it should be directed to the Quarantine area, away from the Civic Amenity Site to a location where the material can be extinguished. These loads must never be located close to areas of the site which are lined in case of heat damage to the liner.

4. If the load has been deposited it should be spread in a controlled manner and covered with inert material. This should always be carried out by working from the edges of the load inwards toward the centre. Machines must never be driven through the burning material.

5. The EPA should be notified as per condition 3.3 of the waste license (contact details above) and the incident should be recorded in the site incident report form.
Refer to 7.5.4 for dealing with fires.

7.5.4 Procedure for Dealing with Fires and Explosions on Site

The EPA should be notified of all fires and explosions on site.

1. **Procedure for Dealing with Fires**

The Landfill Engineering Manager or deputy should be informed immediately. The previous procedure for fires assumed an operational landfill. Since the closure of the landfill and installation of the gas abstraction system the possibility of a fire in the waste is greatly reduced. The following is the procedure for any fires within the existing site.

a) All personnel must evacuate the offices. The emergency services should be notified immediately by dialling 999. Personnel should only tackle a fire if safe to do so and if they have been trained in the use of a fire extinguisher

b) All personnel should proceed to the assembly point outside the front gates where employees, site visitors and site contractors will be accounted for (the site visitors' book and contractors sheets should be checked if accessible).

c) The EPA should be informed as per Condition 3.3 of the Licence (contact details above) and the incident should be recorded in the Site Incident Report Form.

2. **Procedure for Dealing with Explosions**

a) Ensure all personnel and site visitors are accounted for.

b) Check site for signs of fires resulting from the explosion. If identified follow the procedure in Section 1 above.

c) If the explosion results in personal injury the emergency services should be called by the Landfill Engineering Manager or his appointed deputy in his absence. In the event of a fire refer to Section 1 above. In addition, the EPA should be notified as soon as is practicable.

d) Access to the immediate area should be restricted. Under no circumstances should further waste be deposited until authorised by the Landfill Engineering Manager.

e) Every effort should be made after (d) above to identify the cause and source of the explosion.

f) The EPA should be informed as per Condition 3.3 of the Licence (contact details above) and the incident should be recorded in the Site Incident Report Form

7.5.5 Procedure for Dealing with Uncontained Spillage/Leakage

1. Immediately report the occurrence to the Landfill Engineering Manager or in his absence, his appointed deputy.

2. The spill/leak should be contained using the spill kit and the material recovered (if possible) by the most appropriate means available (plant, inert material etc.).

3. Access to the immediate area should be restricted, if necessary.

4. The EPA should be notified as soon as is practicable (contact details in Section 2.0).

5. Having carried out all practicable actions the EPA should be consulted to agree any further action which may be required.

6. The incident will be reported to the Site's Incident Report Form.

7.5.6 Procedure for Dealing with a Serious Injury

1. Immediately report the incident to the Landfill Engineering Manager or in his absence, his appointed deputy. If required, the emergency services should also be notified as soon as is practicable.

2. The immediate area should be kept clear to provide access for the emergency services.

3. Record all injuries in the accident book and note as much information about the accident as possible.

4. Report the incident to the Health and Safety Manager as soon as is practicable. The Health & Safety Officer is Ms Amanda Bolger, telephone number 051 309900.

5. If practicable the area in which the incident took place should remain undisturbed until any investigations into the circumstances are complete.

6. The incident will be reported on the Site's Incident Report Form.

7.5.7 Procedure for Dealing with a Landfill Gas Emergency

The following plan has been drawn up in accordance with the guidelines outlined in WMP 27. Areas around Kilbarry Landfill which may be affected by migrating gas include the landfill site offices and surrounding houses.

1. The landfill site office is currently monitored for the presence of methane and carbon dioxide.

2. If concentrations of methane and carbon dioxide in the office exceed 2,500ppm (0.25% v/v) and 5,00ppm (0.5% v/v) respectively, the building shall be ventilated and monitored until it can be demonstrated that concentrations remain below these levels.

3. If concentrations of methane and carbon dioxide in the landfill office exceed 10,000ppm (1% v/v) and 15,000ppm (1.5% v/v) respectively, the alarm will sound and the building shall be ventilated and then evacuated immediately.

4. The alarm will deactivate when the gas levels fall below the above levels. The building should be left to ventilate for another 15-20 minutes and then re-entered wearing the appropriate Personal Protective Equipment (PPE) and monitored until it can be demonstrated that concentrations remain below 0.25% and 0.5% for methane and carbon dioxide respectively.

5. The residence at the front of the landfill should be contacted and gas samples taken from the house to ascertain gas levels. The contact for this residence is Ms. Ann Kennedy, Kilbarry, Tel: 087 6717516.

6. If the gas levels exceed those in Step 2 the building should be monitored until it can be demonstrated that concentrations remain below those levels.

7. If gas levels persist both the Gardai (Telephone no. 051 305300) and Bord Gais (Telephone no. 1850 205 050) should be contacted.

7.6 Unable to Accept Waste

The inability to accept waste may be caused by one of the following:-

- Mechanical failure;
- Power failure;
- Industrial disputes;
- Fire;

In the event of a mechanical breakdown of plant at the site the Landfill Engineering Manager will make arrangements for the prompt repair of the machine. If the repair work will be prolonged then the Manager will make arrangements for replacement equipment.

7.7 Review

The Landfill Engineering Manager will review the cause of the emergency and will put appropriate measures in place to prevent the reoccurrence of such an emergency.

Golder Associates Ireland
Town Centre House,
Dublin Road, Naas,
Co. Kildare,
Ireland

Tel: [353] (0)45 874411
Fax: [353] (0)45 874549
E-mail: info@golder.ie
http://www.golder.com

REPORT ON

ENVIRONMENTAL LIABILITY RISK ASSESSMENT AND FINANCIAL PROVISION FOR KILBARRY LANDFILL SITE, DUNHILL ROAD, KILBARRY, WATERFORD CITY, CO. WATERFORD

Submitted to:

Mr. Vincent O'Shea,
Civil Technician,
Environmental Department,
Waterford City Council,
Maritana Gate,
Canada Street,
Waterford City,
Co. Waterford.

DISTRIBUTION:

2 copies - Waterford County Council
2 copies - Golder Associates Ireland (minimum 2)

February 2009 08 5071 90340 R01/A.0

REPORT ISSUE FORM

Version Code	A.0	***Issue Date***	6th February 2009
Document Title	Environmental Liability Risk Assessment and Financial Provision for Kilbarry Landfill Site, Dunhill Road, Kilbarry, Waterford City, Co. Waterford		
Comments	Formatted by: LC		
List of Authors	Garrett Byrne, MSc. Environmental Geoscientist & Acoustic Consultant AMIOA		
Client	Mr. Vincent O'Shea, Waterford City Council		
Client Reference			
Project Manager Approval	Garrett Byrne, MSc. Environmental Geoscientist & Acoustic Consultant MIOA		
Reviewer	Thomas Vainio-Matilla MSc, PGeo, Eur Geol		
Approval Signatory			

Report Distribution	***Name***	***No. Copies***
	Waterford County Council	2
	Golder Associates Ireland	2

Definition of Version Code:

D. Applied during initial drafting of the report before it has been reviewed.

C. Applied after the report has been reviewed but before it has been approved by the Project Manager.

B. Applied after the Project Manager has approved the report ready for issue to the client.

A. Applied to reports after external/client review.

The version number starts at '0' and is raised by '1' at each re-type.

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1.0 INTRODUCTION

This document represents the methodology and findings of an Environmental Liability Risk Assessment (ELRA), undertaken for the Kilbarry Landfill, Dunhill Road, Kilbarry, Waterford City, Co. Waterford. The document has been prepared by Golder Associates Ireland Ltd (Golder) on behalf of Waterford City Council. The document has been produced in compliance with Condition 8 (Restoration and Aftercare) and condition 11 (Charges & Financial Provision) of Waste Licence Register No. W0018-01. It is noted that no mention to ELRA is made in the waste licence as it predates the concept. This ELRA has been produced is response to a letter sent by the Agency to all licensed sites on the 13th of August 2008 seeking to assess the take-up of the ELRA concept by EPA licensed sites.

In addition, the Environmental Liability Directive 2004/35/EC which seeks to provides for the prevention and remediation of environmental damage and gives form and substance to the polluter pays principle was consulted in the preparation of this ELRA . Its seeks to promote good environmental practice by inducing those concerned to adopt measures and develop practices that minimise the risks of environmental damage and reduce their exposure to financial liabilities.

A Closure Restoration Aftercare Management Plan (CRAMP) was sent to the Agency in September 2003. According to correspondence (Ref: cb/ol/letters08) sent to the Department of Environment, Heritage and Local Government from Director of Services and Environmental Services at Waterford City Council, it is envisaged that restoration of Kilbarry Landfill will be completed by summer of 2009.

The methodology outlined in the EPA *Guidance on Environmental Liability Risk Assessments, Residual Management Plans and Financial Provision* as well as the EU draft regulations transposing the Environmental Liability Directive have been followed in the preparation of this document.

2.0 SCOPE OF ENVIRONMENTAL LIABILITY RISK ASSESSMENT

The scope of this has been developed using the EPA Guidance and includes the following:

- A review of the activities that were and are carried out at the site is presented in section 3.3;
- The initial screening approach is set out in section 4.1;
- An examination of the potential hazards, pathways and associated receptors is set out in section 4.3, 4.4 & 4.5;

- The Known and Unknown liabilities associated with the closure and capping of the landfill are presented in section 4.2 and 4.3 with detailed figures presented in Appendix 2;

- Examination and assessment of mitigation measures at the site are presented in section 4.6;

- Conclusions are set out in section 4.7;

- The financial provision element of the ELRA is dealt with in section 4.; and

- Figure 1 Rev A and associated site photographs are presented in appendix 5.

3.0 SITE DETAILS

Kilbarry landfill is located (National Grid Reference 2598E 1103N) on the outskirts of Waterford City on the Dunhill Road.

The entire site occupies an area of 20.1 hectares. Land use surrounding the site is a mixture of open flat farmland with wetland to the south-east. The area to the north and west of the site is a mixture of residential and commercial properties. The landfill was in operation for 40 years until its closure in 2005 and has since been capped and a gas management system has been installed. The landfill opened in the mid 1960's but didn't become very active until the 1970's. A mixture of commercial, domestic and mixed municipal waste was accepted at the site until 2003 under Waste Licence W0018-01 when commercial waste deposition ceased. Waste license W0018-01 for the site was issued on the 19th of October 2001.

The landfilling of waste at the site has resulted in the formation of a mound of waste above ground level. The waste body has a maximum height of 20mOD in the centre of the site. The remainder of the site has a maximum height of 17.5mOD and a base level of 2 m to 3 mOD on the edge of the site. The final stage of the landfill consisted of a fully engineered cell in the north of the site. This cell comprised a total void size of 35,000 m^3 and was constructed between 2002 and 2004. According to figures supplied by Kilbarry Landfill management, the total estimated wastes deposited at closure amounted to 1,112,410 m^3. A topographical survey drawing indicating the current (June 2008) conditions is presented in Appendix 5.

3.1 Geology

The geology of the City is vital to the natural environment of Waterford City as the geology shapes the landscape and determines the overlying soil types and vegetation, all of which is integral to supporting a diverse flora and fauna. The city of Waterford stands on a bedrock of

rhyolitic volcanic rock; slatey mudstone formed about 450 million years ago (mya), during the Ordovician period, and reddish sandstone and conglomerate from the Devonian "Old Red Sandstone", (ORS), period about 350 million years ago.

The bedrock beneath the site is classified as a Regionally Important Aquifer using the classification system prepared by the Geological Survey of Ireland (GSI). The direction of groundwater flow is from the south to the north/north west. A well search identified that there are no beneficial users of groundwater within 500 m of the site and all of the residents within 1 km of the site are connected to the Public Kilbarry water supply.

3.2 Hydrogeology

The major local discharge zone for the recharge area is Kilbarry Bog in which the landfill sits. The remaining areas of the bog to the south and east are now form a National Heritage Area.

The primary receptors of the identified environmental hazards include groundwater, surface water and the atmosphere. The secondary receptors of the environmental hazards would include humans, flora, fauna and livestock.

3.3 Activities Undertaken at the Site

The following processes and activities have been undertaken at the site in accordance with Schedule A: Waste Acceptance of Waste Licence W0018-01.

i. The disposal of non-hazardous household, commercial and industrial waste;
ii. The disposal of de-watered non-hazardous industrial treated sewage sludge/filtercake;
iii. The disposal of treated industrial non-hazardous sludges;
iv. The disposal of construction and demolition waste;
v. Waste for recycling and recovery at the Civic waste site; and
vi. Waste for recycling and recovery at the metal recovery area.

Moreover, a civic amenity site is located within the main site entrance accepting the following range of wastes for recycling:

- Metal;
- Timber;
- Cardboard;
- Batteries;
- Engine oil;
- Glass bottles;
- Fluorescent tubes; and
- Energy saving light bulbs.

4.0 ENVIRONMENTAL LIABILITY RISK ASSESSMENT

In the following, an approach as described in the '*Guidance Environmental Liability Risk Assessment, Residuals Management Plans incorporating Financial Provision' (EPA, 2006)* has been adopted to describe and assess the ELRA for the facility. The Guidance proposes a system whereby higher risk facilities can reduce their risk profile through risk management in order to reduce the costs of implementing financial provision.

A systematic step-wise approach is outlined in the Guidance and has been adopted into this document:

- *Step 1 – Initial Screening & Operational Risk Assessment*
- *Step 2 – Preparation of a Closure, Restoration and Aftercare Management Plan (CRAMP) for KNOWN liabilities*
- *Step 3 – Environmental Liability Risk Assessment (ELRA) for UNKNOWN liabilities*
- *Step 4 – Identification of Financial Provision (FP) and Instruments*

4.1 Step 1 - Initial Screening and Operational Risk Assessment

Environmental risk may be assessed by considering the probability of occurrence of a defined hazard and the magnitude of the consequences of that occurrence.

To characterise and assess the risks identified in step 1 the risk assessment model set out in the EPA's Guidance Document has been employed.

The risk assessment scores presented in Table 2 are based on the risk assessment methodology contained in Appendix 3.

The rational for the likelihood and severity weightings is presented in Appendix 1.

These assessments have been undertaken with consideration to the findings outlined in Step 1 of this report and are based on the residual risk posed by the landfill after assessment of the engineering and operational controls deployed at the site.

A register of the risks, which is based on the site specific characteristics and the Classification Tables for Occurrence and Severity included in the Agency's guidance document is presented in Table 2 below. The risk score is calculated by multiplying the likelihood score by the severity score. The assignation of the severity rating scores is based on the site specific assessment described in section 4.

Using the risk categorisation calculation tables presented in the Guidance document, the site can be given an accurate score and hence a risk category. The procedure is arranged using a combination of complexity, environmental sensitivity and the site's compliance record. Using the tables set out Appendix B (IPPC & Waste Activities Complexity look-up Tables) of the Guidance document, sites can be given a risk banding ranging from G1 – least complex to G5 – most complex.

Closed landfill facilities are set a complexity rating of G4. This complexity band equates to an automatic category **3** status according to the guidance.

Table 2: Environmental Risk Register for the Site

Risk ID	Description of Risk	Likelihood Score	Severity Score	Risk Score
R1	Discharge of landfill gas to sub-soils.	2	3	**6**
R2	Discharge of leachate to groundwater.	2	3	**6**
R3	Cracking of Landfill's capping system resulting in uncontrolled release of landfill gas to the atmosphere.	2	3	**6**
R4	Failure of the Landfill's gas management infrastructure, resulting in uncontrolled release of gas to the atmosphere.	2	3	**6**
R5	Failure of leachate pipe work or lagoon resulting in release of leachate to surface water.	2	2	**4**
R6	Operational accident resulting in release of oils/chemicals to the Landfill surface water.	1	2	**2**
R7	Uncontrolled landfill fire resulting in a release of noxious gas to the environment	1	4	**4**
R8	Uncontrolled landfill fire resulting in contamination of surface water from the water/foam and litter discharged during fire fighting.	1	4	**4**

4.2 Step 2 - Closure, Restoration, Aftercare Management Plan (CRAMP) – Known Liabilities

A Closure, Restoration Aftercare Management Plan (CRAMP) was submitted to the Agency in September 2003. Costs associated with the closure and restoration plan are presented in Appendix 2.

4.3 Step 3 - Environmental Liability Risk Assessment (ELRA) – Unknown Liabilities

The methodology used for the risk identification component of the ELRA is as follows;

1. Identification of possible **hazard sources;**
2. Identification of potential hazard **pathways;** and,
3. Identification and assessment of environmental **receptors** for those identified pathways.

The aim of the process is to provide an analysis of the environmental conditions at the landfill so to provide a baseline by which environmental liabilities may be established and assessed.

Identification of the environmental pathways and receptors has been undertaken with reference to Waste Licence W0018-01 of 2001, and in light of the environmental monitoring undertaken over the past seven years.

4.3.1 Identification of Environmental Hazards

The major environmental hazards associated with landfilling activities involve an emission of either hydrocarbons/chemical, leachate or landfill gas that has the potential to result in pollution of the receiving environment. In addition noise monitoring and dust deposition monitoring is carried out as per the licence. A total monitoring cost of €15,342.80 was spent in 2008.

4.3.2 Hydrocarbons/ Chemicals Stored on Site

The landfill has been closed since 2003 and capping will be completed in summer 2009. The civic amenity site is located at the main entrance to the site and no chemicals or hydrocarbons are used or stored on-site. Site vehicles are all fuelled off-site.

4.3.3 Leachate

A leachate collection drain, consisting of a 150mm slotted HDPE pipe around the perimeter of the waste body which directs leachate to 5 sumps at various points on the perimeter.

Leachate is pumped from the sumps via an 80mm rising main to a lined lagoon at the Northern tip of the landfill. In addition to this there are 13 additional pumped boreholes located throughout the waste body accessed by manholes on the upper level of the site. These boreholes provide coverage of the landfill area for leachate abstraction. The borehole pumps and perimeter sump pumps are controlled from panels located to the north and east of the site. It has been found that since the final capping little leachate has been pumped to lagoon. This would be assumed to be due to the inability of rain waters to permeate the waste body.

At the point of outlet from the lagoon to sewer there is a sump which contains monitoring equipment for the determination of pH, dissolved methane and flow. The leachate is released from the lagoon via a gravity feed and a valve allows a percentage of the outflow into the sump where readings can be taken for the prescribed parameters set out in table F.5.5 of Schedule F: Monitoring of the waste licence.

While leachate is being released, the quality in monitored daily. Any breach of limits requires the flow to be stopped and an alternative disposal method used, e.g. tanker and haul the liquid for disposal.

4.3.4 Landfill Gas

Commercial and industrial wastes have been deposited historically at Kilbarry Landfill. These wastes contain some biodegradable materials such as paper, wood, textiles etc. Gases have formed in the landfill due to the development of anaerobic conditions.

In total, 81 gas abstraction wellheads are currently installed at Kilbarry Landfill and are connected by a network of 110mm and 160mm pipes, which connect via 5 manifolds to a 225mm ring main. This terminates at a compound west of the leachate lagoon where the gas is flared. Currently 1 No.1000 m3/hr open flare is operational onsite with plans to install a 500 m3 enclosed flare. All collection pipes fall back towards the wellheads to allow condensate to exit the system.

A total of 5 no. condensate traps were placed onsite, four near the manifolds and one approximately 25m before the flare. The trap at the flare is not in the waste body and therefore the condensate is pumped to the adjacent leachate lagoon for disposal. In addition to the gas abstraction system there are a series of boreholes around the perimeter of the waste body for the monitoring of landfill gas to ensure migration is not occurring.

Most recently, residential dwellings were built within 250m of the site and 7 new boreholes were installed between the landfill and these houses specifically to ensure gas was not migrating in this direction. These boreholes are currently monitored daily but due to the active abstraction system in place and the lack of evidence of gas migration this monitoring is going to be scaled back to a weekly basis in agreement with the Agency.

4.3.5 Dust Deposition

Dust deposition surveys were undertaken at 7 no. locations three times per year in 2008 as specified in Tables F.3 and F.3.2 of the waste licence. Dust samples were set out at the landfill for a period of between 28 and 30 days. The samples were then sent to Bodycote Consultus Laboratories in Cork for gravimetric analysis in accordance with standard methodology. Over the course of the three dust monitoring surveys, elevated levels of dust were recorded at 2 locations in total over the year. This elevation was attributed to on-going rehabilitation works at the site.

4.3.6 Noise

Noise monitoring was undertaken at 7 no. on-site locations and 4 no. noise sensitive locations once during 2008 as specified in schedule F.4.2 of the waste licence. Although there were some elevations above the 55 dB(A) limit as specified in the licence, the sources of this noise were attributed to off-site activities.

4.4 Identification of Environmental Pathways

The primary pathways for hazards from the waste body to the environment is through the atmosphere (emissions to air), overland (emissions to surface water or land) or through the ground (emissions to the soil or groundwater).

4.4.1 Air

Metrological data is obtained from Waterford Regional Airport and indicates that the prevailing wind directions is to the south and west, while the average wind speed is 10.6 km/hr.

4.4.2 Groundwater

Groundwater quality is measured by samples taken by the Agency on a quarterly basis at the 7 no. active groundwater monitoring locations situated around the site. All parameters required under Table F.5.5 of Schedule F of Waste Licence Register Number W0018-01 are analysed for.

Currently, groundwater samples retrieved from the monitoring boreholes indicate that some pollution of the groundwater has taken place with several parameters being above guideline values. Currently, 7 no. groundwater monitoring boreholes are active at the site. These are labelled GW2, GW4, GW5, GW6, GW15, GW16, GW17.

4.4.3 Surface Water

The EPA carry out surface water monitoring at the site at designated monitoring locations on a frequency in line with the requirements of Waste Licence W0018-01. The analysis indicates that the surface water has been impacted upon by the presence of historic wastes that were deposited at the site in the past. It is noted that the site has been a landfill since the 1960's and at that time, the lining of landfills and protection of the environment was not enforced. However, a surface water management programme was recently submitted to the Agency and was approved. Funding has been made available which will enable the existing surface water ponds to be repaired and allow the construction of further collection ponds bringing the total on site to 4.

4.5 Identification of Environmental Receptors

4.5.1 Local Air Quality

Quarterly monitoring of ambient air is carried out by Odour Monitoring Ireland. The conclusions from the reports indicate that the air quality is good with hydrogen sulphide levels at levels below 3 ppm and general odour quality less than 45 odour units m^3.

The results of the air quality assessment found that concentrations of VOC, mercaptans and sulphide compounds were below detection levels.

4.5.2 Flora and Fauna

Kilbarry landfill is located in Kilbarry bog. Kilbarry bog (Provisional National Heritage Area pNHA) comprises an area of reed swamp, freshwater marsh, wet grassland and scrub. It is a site of conservation importance for a variety of reasons:

- It is the only remaining wetland of its type of significance in the vicinity of Waterford City;

- It supports a variety of wetland vegetation types and plant species; it is the site of records for the scarce Summer Snowflake;

- It supports a good diversity of birds, including an important breeding population of Reed Warbler; and a range of scarce invertebrate species has been recorded from this site; and

- The site is also used by Otter, a protected species in Ireland and one that is listed on Annex II of the E.U. Habitats Directive. (NPWS, 2005).

Waterford City Development Plan 2007-2013 identifies Kilbarry Bog as being important for biodiversity. The bog is considered of national importance for Reed Warbler and of regional importance for aquatic biodiversity. In a recent report the National Parks & Wildlife Service (NPWS) recommended that consideration be given to designating the site as a Nature Reserve (Waterford City Council, 2008).

4.5.3 Local Population and Land Use

The surrounding area around the landfill is dominated by industrial, commercial and residential premises with Waterford Crystal located within 0.5 km of the site. Waterford Institute of Technology is located approximately 1 km from the site also. Kilbarry landfill is also situated close to the Six Cross Business Park. The land use is dominated by industrial premises. According to the 2006 census, the population of Waterford City grew to 45,800 over the course of that year.

4.6 Identification and Assessment of Mitigation Measures

4.6.1 Lining System

The site has been operational for over 40 years and is unlined.

4.6.2 Capping System

The capping system for the Landfill was developed considering the requirements of the EPA's Landfill Manuals – Site Design and the UK Environment Agency's Technical Guidance on Capping and Restoration of Landfills. The installation of the cap was supervised and project managed by MCOS RPS Plc. Consultant Engineers and a CQA program was completed for its construction.

The capping system comprises, starting at the waste surface and working upwards to the completed restored surface:

- 80mm layer of quarry fines with maximum aggregate size of 20mm free of sharp stones;

- Gas collection layer – Geosynthetic layer with Geotextile filter/separator on top and bottom and similar or equivalent to Finesse Pozidrain 6S240D/NW8;

- Barrier layer – Geotextile protection layer similar or equivalent to Bentomat Cap 75 geosynthetic clay liner, GCL, with a minimum hydraulic conductivity of $1x10^{-9}$ m/s;

- Surface water drainage layer – Geosynthetic layer with Geotextile filter/separator on top and bottom similar or equivalent to Pozidrain 6S240D/NW8;

- Subsoil – 850mm silty sandy gravel; and

- Topsoil – 150mm.

4.6.3 Landfill Gas Management System

The gas management system or components of it, will be employed and maintained as long it is required to ensure control and management of landfill gas in compliance with the waste licence.

4.6.4 Surface Water Management System

Three (3 no.) surface water monitoring ponds were provided in accordance with licence conditions 7.6, 9.3 and 9.6. Surface water was planned to be diverted to these ponds for monitoring and storage before being discharged into peripheral drains. This situation had to be re-evaluated following the completion of the final capping layer.

The landfill falls from a high central level outwards to the external edges of the cap. A continuous surface water drain and compacted clay bund have already been proposed as part of the final restoration. The surface water from this upper circumferential drain would then be collected at 4 points before being conveyed to the lower level area via heavy duty PVC pipes. The drain will be inclined to each collection point and each pond will serve an estimated 25% of the site area.

The following surface water management program proposal which was accepted by the Agency on the 26th of November 2008 (Ref: W0018-01/ap01cok.doc) is as follows:

All existing surface water ponds that have been idle since the closure of the landfill be re-instated and repaired.

1. A fourth surface water pond will be constructed in the south of the site. This will be lined with a HDPE layer and secured and ballasted to prevent flotation due to tidal conditions.

2. Discharge trigger levels for surface water will be proposed to the Agency within 8 weeks based on sampling results from surrounding water courses.

3. A schedule of grab sampling will be initiated rather than the continuous monitoring. The frequency will be altered to reflect a weekly monitoring program whereby the current required parameters of pH, Conductivity and Total Organic Carbon will be analysed for. Should the samples reveal that the collected waters are below trigger level values, they will be allowed to be discharged to the peripheral drains. However, if the samples exceed the trigger levels, the surface water will be collected in the ponds and tankered and discharged to the leachate lagoon for later disposal to the foul sewer.

4. The weekly grab sampling schedule will be maintained for a period of 6 months after which point if the analysed parameters prove to be consistently clean, the monitoring frequency period will be addressed once more.

Currently, grass growth on the east and south of the capped landfill is plentiful with further growth already visible on rest of the site. This will assist greatly in the capture and control of surface water on the landfill.

4.6.5 Identification and Assessment of Operational Control Measures

Environmental Management System

Kilbarry Landfill operates an Environmental Management System. The system ensures continual improvement through a process of internal audit, management review and the setting of target and objectives relating to environmental hazards.

Waste Acceptance Procedures

Waste acceptance at Kilbarry Landfill was carried out in compliance with the requirements of Council Decision 2003/33/EC on establishing criteria and procedures for the acceptance of waste at landfills, and pursuant to Article 16 and Annex II of Council Directive 1999/31/EC on landfill waste. Waste acceptance at the site comprised waste characterisation, compliance testing and on-site verification.

Emergency Response Procedures

Kilbarry Landfill has developed site specific emergency response procedures. These procedures outline the actions that are required to be undertaken in the event of an emergency and cover both general and specific emergency situations.

Emergency situations covered by these procedures include:

- Activation of alarm;
- Gas in building emergency;
- Accident;
- Fire;
- Overturned vehicle;
- Spillage; and
- Handling hazardous and chemical wastes.

4.7 Conclusion

Considering the hazard, pathway and receptor model for the site, and in light of an assessment of current mitigation measures employed at the Landfill, the following have been identified and outlined as environmental risks at the Site.

Table 1 is not meant to be a comprehensive list of all potential environmental liabilities associated with the Landfill. The table considers those environmental liabilities that have the potential to have significant financial implication on the Landfill, both in terms of the cost associated with the repair of infrastructure and the cost arising from the environmental remediation that may be required if the incident was to occur.

Table 1: Environmental Risks Identified at Kilbarry Landfill

Risk Register No.	Description of Risk
R1	Discharge of landfill gas to sub-soils.
R2	Discharge of leachate to groundwater.
R3	Cracking of Landfill's capping system resulting in uncontrolled release of landfill gas to the atmosphere.
R4	Failure of the Landfill's gas pipe work or flares resulting in uncontrolled release of gas to the atmosphere.
R5	Failure of leachate pipe work or sumps resulting in release of leachate to surface water.
R6	Operational accident resulting in release of oils/chemicals to the Landfill surface water management system
R7	Landfill fire resulting in a release of noxious gas to the environment
R8	Landfill fire resulting in contamination of surface water from the water/foam and litter discharged during fire fighting.

4.8 Step 4 - Financial Provision – Known and Unknown Liabilities

The financial provision requirements for the site have been assessed in relation to the known and unknown liabilities associated with the site. Details of the financial provision for these liabilities spent to date at the site and monies that are expected in 2009 are presented in Appendix 2.

4.9 Known Liabilities

A full break-down of costs associated with the KNOWN closure and remediation of the Kilbarry Landfill area from the Department of Enviornment, Heritage & Local Government (DEHLG) Landfill Remediation Grant Scheme is presented in Appendix 2. A full breakdown of associated closure costs from 2006 to present is also presented.

The table presented in Appendix 2 has been compiled by Waterford City Council and issued by the DEHLG and can be verified by contacting Waterford City Council directly.

4.10 Financial Provision for Unknown Environmental Liabilities

In terms of the UNKOWN environmental liabilities at the site, Waterford City Council as a public body is insured with the Irish Public Bodies Mutual Insurances Ltd. Public liability insurance of €12.7 million is already in place.

However, following detailed advice from the Agency, it is apparent that separate and specific environmental liability insurance cover be prepared in order to cover the costs associated with future unknown liabilities. This insurance procedure is currently on-going.

It has been made clear by the Agency that when the appropriate insurance is in place, provision must be made that allows the Agency access to the insurance funds in respect to the unknown liabilities at the site.

Details of the environmental liability cover at the site are presented in appendix 4.

5.0 REVIEW OF THE ELRA AND FINANCIAL PROVISION

The Restoration and Aftercare Plan will be reviewed as necessary to reflect any changes on site or at a minimum every three years following agreement with the Agency. Any Changes to the plan will be documented and submitted to the Agency for approval.

APPENDICES

APPENDIX 1

COMPLETED ENVIRONMENTAL LIABILITIES RISK ASSESSMENT TABLES

Table A1: Environmental Liabilities Risk Assessment Tables

Risk ID	Description of Risk	Environmental Effect	Likelihood Score [Note 1]	Basis of Likelihood	Severity Score [Note 2]	Basis Of Severity	Risk Score Note 3
R1	Discharge of landfill gas to sub-soils.	Build up of gases in confined spaces resulting in the potential for asphyxiation. Release of greenhouse gases Risk of explosion	2	While it is considered that landfill liner will deteriorate over time, the amount of deterioration in the first 30 years of its operation is expected to be minimal and the risk that deterioration of liner with cause environmental harm is considered **low.**	3	If liner deterioration were to become acute, the cost of detection of the deterioration and repair of the lining system would be **significant**. The discharge of gas into sub soil surrounding the site would be **significant** over the short term, but would have a **minor** long term effect on the environment.	**6**

Table A1: Environmental Liabilities Risk Assessment Tables, continued

Risk ID	Description of Risk	Environmental Effect	Likelihood Score [Note 1]	Basis of Likelihood	Severity Score [Note 2]	Basis Of Severity	Risk Score Note 3
R2	Discharge of leachate to groundwater.	Groundwater contamination	2	While it is considered that landfill liner will deteriorate over time, the amount of deterioration in the first 30 years of its operation is expected to be minimal and the risk that deterioration of liner with cause environmental harm is considered **low.**	3	The cost of repair of the lining system as outlined above would, be **significant.** The discharge of leachate to groundwater has the potential to cause **significant** long term harm to the underlying aquifer. It should be noted however, that quality of the receiving groundwater has been previously affected by pollution from the existing unlined landfill that has been in place for several decades.	**6**

Table A1: Environmental Liabilities Risk Assessment Tables, continued

Risk ID	Description of Risk	Environmental Effect	Likelihood Score Note 1	Basis of Likelihood	Severity Score Note 2	Basis Of Severity	Risk Score Note 3
R3	Cracking of Landfill's capping system resulting in uncontrolled release of landfill gas to the atmosphere.	Release of greenhouse gases Risk of explosion	2	The landfill cap was designed, constructed and installed in accordance with EPA Guidelines, therefore the risk of the cap cracking is considered **low**.	3	In the event of cracking of the Landfill cap the cost of locating and repairing the crack would be **significant**. The discharge of gas into atmosphere surrounding the site would be **significant** over the short term, but would have an **insignificant** long term effect on the environment.	**6**

Table A1: Environmental Liabilities Risk Assessment Tables, continued

Risk ID	Description of Risk	Environmental Effect	Likelihood Score Note 1	Basis of Likelihood	Severity Score Note 2	Basis Of Severity	Risk Score Note 3
R4	Failure of the Landfill's gas management infrastructure, resulting in uncontrolled release of gas to the atmosphere.	Release of greenhouse gases Risk of explosion	2	Due to the advanced monitoring system, the preventative maintenance program in place the risk of failure of the infrastructure is considered to be **low**.	3	In the event failure of the gas management system the cost of repair is expected to be **significant**. Due to its short term nature, the excepted environmental impact is considered to be **minor**.	**6**

Table A1: Environmental Liabilities Risk Assessment Tables, continued

Risk ID	Description of Risk	Environmental Effect	Likelihood Score [Note 1]	Basis of Likelihood	Severity Score [Note 2]	Basis Of Severity	Risk Score Note 3
R5	Failure of leachate pipe work or lagoon resulting in release of leachate to surface water.	Contamination of soil, ground water and surface water.	2	Due to the advanced monitoring system, and preventative maintenance program, the risk of failure of the infrastructure is considered to be **low**.	2	In the event of failure of leachate management infrastructure the cost of repair to the system is considered to be **minor**. In the event that leachate contaminated soil or groundwater, the environmental impact would be considered **minor** due to the minimal volume of discharge expected.	**4**

Table A1: Environmental Liabilities Risk Assessment Tables, continued

Risk ID	Description of Risk	Environmental Effect	Likelihood Score Note 1	Basis of Likelihood	Severity Score Note 2	Basis Of Severity	Risk Score Note 3
R6	Operational accident resulting in release of oils/chemicals to the Landfill surface water.	Contamination of soil, ground water and surface water.	1	The risk of an operational accident resulting in the spillage of either hydrocarbons or chemicals is considered **very low** due to the fact that that there are no continuing landfilling operations on site and operations ceased in 2005.	2	In the event on a hydrocarbon or chemical spill contaminating soil or groundwater, the environmental impact would be considered **minor** due to the minimal volume of discharge possible.	**2**

Table A1: Environmental Liabilities Risk Assessment Tables, continued

Risk ID	Description of Risk	Environmental Effect	Likelihood Score Note 1	Basis of Likelihood	Severity Score Note 2	Basis Of Severity	Risk Score Note 3
R7	Uncontrolled landfill fire resulting in a release of noxious gas to the environment	Release of greenhouse gases. Potential harm to the local population.	1	Due to the emergency response procedures in place, the capping design and the operational practices which were used to deposit waste, the risk of a landfill fire is considered to be **very low.**	4	The cost associated with a release of noxious gas/ smoke that would arise from a landfill fire has the potential to result in **severe** impact on the local population.	**4**

Table A1: Environmental Liabilities Risk Assessment Tables, continued

Risk ID	Description of Risk	Environmental Effect	Likelihood Score Note 1	Basis of Likelihood	Severity Score Note 2	Basis Of Severity	Risk Score Note 3
R8	Uncontrolled landfill fire resulting in contamination of surface water from the water/foam and litter discharged during fire fighting.	Pollution of surface water from contaminated fire fighting water and litter.	1	Due to the emergency response procedures in place, the capping design and the operational practices which were used to deposit waste, the risk of a landfill fire is considered to be **very low.**	4	The cost of remediation of local water course from the contamination coursed by a landfill has the potential to be **severe**.	**4**

Note 1 **Rating for likelihood score is based on Risk Assessment Table A3.1 in Appendix 3**

Note 2 **Rating for Severity is based on Risk Assessment Table A3.2 in Appendix 3**

Note 3 **Risk score is based on likelihood of the hazard occurring and the severity of that hazard. The relationship between likelihood, severity and overall risk is shown in Table A3.3 in Appendix 3**

APPENDIX 2

FINANCIAL COST MODEL

Table A2 Most Likely Cost Financial Model

Risk Register No.	Likelihood Score	Likelihood of Occurrence Range [Note 1]	Median Likelihood of Occurrence	Severity Score	Likely Cost Range [Note 2]	Median Likely Cost	Most Likely Cost Scenario [Note 3]
R1	2	5-10%	7.5%	3	€100,001-€200,000	€ 150,000	€ 11,250
R2	2	5-10%	7.5%	3	€100,001-€200,000	€ 150,000	€ 11,250
R3	2	5-10%	7.5%	3	€100,001-€200,000	€ 150,000	€ 11,250
R4	2	5-10%	7.5%	3	€100,001-€200,000	€ 150,000	€ 11,250
R5	2	5-10%	7.5%	2	€10,0001 - €100,000	€ 55,000	€ 4,125
R6	1	0-5%	2.5%	2	€10,0001 - €100,000	€ 55,000	€ 1,375
R7	1	0-5%	2.5%	4	€200,001 - €500,000	€ 350,000	€ 8,750
R8	1	0-5%	2.5%	4	€200,001 - €500,000	€ 350,000	€ 8,750
R9	1	0-5%	2.5%	4	€200,001 - €500,000	€ 350,000	€ 8,750
R10	1	0-5%	2.5%	2	€10,0001 - €100,000	€ 55,000	€ 1,375
R11	2	5-10%	7.5%	2	€10,0001 - €100,000	€ 55,000	€ 4,125
R12	2	5-10%	7.5%	2	€10,0001 - €100,000	€ 55,000	€ 4,125
Total							€ 86,375

[Note 1] See Table A3.1 for likelihood of occurrence ranges.

[Note 2] See Table A3.2 for cost ranges.

[Note 3] The most likely cost scenario is based on the median likelihood of occurrence, multiplied by the median likely cost.

Department of Environment, Heritage & Local Government
Landfill Remediation Grant Scheme

Local Authority	**Waterford City Council**		
Landfill Site	**Kilbarry**	**Claim No.**	**5**
Grant Ref No	**LR/09/08**	**Period of Claim**	**08/07/2008 – 02/12/2008**

Summary of Expenditure Details

Approved Category	Approved Expenditure	Expenditure previous claims	Expenditure this claim	Total Expenditure claimed to date	Approved Expenditure - to be claimed
Preparatory Works	**€ 130,298.14**	**€120,298.14**	**Nil**	**€120,298.14**	**€10,000.00**
Leachate Collection	**€ 182,541.29**	**€80,496.79**	**€72,488.89**	**€152,985.68**	**€29,555.61**
Gas Collection	**€2,341,605.90**	**€1,706,387.70**	**€223,730.44**	**€1,930,118.14**	**€411,487.76**
Capping	**€2,682,126.18**	**€2,442,802.36**	**€226,028.04**	**€2,668,830.40**	**€13,295.78**
Landscaping	**€1,209,910.00**	**Nil**	**Nil**	**Nil**	**€1,209,910.00**
Project Management	**€ 122,713.69**	**€52,713.69**	**€45,517.98**	**€98,231.67**	**€24,482.02**
Other (Surface Water Management)	**€ 350,000.00**	**Nil**	**Nil**	**Nil**	**€350,000.00**
Expenditure Total	**€7,019,195**	**€4,402,698.68**	**€567,765.35**	**€4,970,464.03**	**€2,048,731.17**

Summary of Grant Claim Details					
	Total Grant Approved	**Grant previous claims**	**Grant this claim (75% of expenditure this claim)**	**Total Grant claimed to date**	**Approved Grant – to be claimed**
Grant Total	**€5,264,396**	**€3,302,024.01**	**€425,824.01**	**€3,727,848.02**	**€1,536,547.98**

Return Form to: Waste Infrastructure & Regulation Section, Department of Environment, Heritage & Local Government, Custom House, Dublin 1.

Department of Environment, Heritage and Local Government Landfill Remediation Grant Application/Renewal of Grant Scheme

Local Authority	**Waterford City Council**
Name of Landfill	**Kilbarry Landfill LRG/05/06**
EPA Licence Reference No.	**18-1**
Confirm that Restoration & Aftercare Plan is agreed with the Agency	**Yes**
Estimated Net-Total Cost of Plan	**€7,019,194 (Est. Cost in '06 €6,943,416**
Indicate if grant assistance was approved in 2006 or 2007	**'06 -**

Categories	**Total costs incurred to 31/12/06**	**Total costs incurred to 31/12/07**	**Total costs estimated for 2008**	**Total estimated costs from 2009 onwards**
1. Preparatory works (incl. design & consultation fees.	**€73,650.58**	**€120,298.14**	**€10,000.00**	
2. Leahate Collection	**€71,493.76**	**€80,496.79**	**€102,044.00**	
3. Gas Collection	**€186,719.45**	**€1,523,878.80**	**€596,460.00** **€182,508.90 ***	
4. Capping	**€2,518,536.75**	**€2,320,394.80**	**€238,192.00** **€123,539.38 ***	
5. Landscaping			**€500,000.00**	**€709,910.00**
6. Project Management	**€50,078.09**	**€52,713.69**	**€50,000.00**	**€20,000.00**
7. Other (Specify) Surface water mgmt **Extracts**			**€350,000.00** **€38,758.89**	
Total Costs	**€2,900,478.63**	**€4,097,782.22**	**€2,191,503.17**	**€729,910.00**

***Included in claim 4**

Additional Comments:
All grant aid approved has been claimed. Approval for additional expenditure of €2,615,285.00 now sought. The current estimated cost of €7,019,195.00 is €75,779.00 above the '06 estimate.

Signed Director of Service	**Colette Byrne**
County/City Council	**Waterford City Council**
Date	**28/07/08**

APPENDIX 3

RISK ASSESSMENT TABLES

Table A3: 1 – Risk Assessment - Likelihood

Rating	Likelihood		
	Description	**Likelihood of Occurrence (%)**	**Category**
1	Less than 5% of hazard occurring in 30 year period	0-5	Very Low
2	Low chance (5-10%) of hazard occurring in 30 year period	5-10	Low
3	Medium chance (10-20%) of hazard occurring in 30 year period	10-20	Medium
4	High chance (20-50%) chance of hazard occurring in 30 year period	20-50	High
5	Greater than 50% chance of the hazard occurring in 30 year period	>51	Very High

Table A3: 2 – Risk Assessment - Severity

Rating	Severity		
	Description	**Cost of Remediation (€)**	**Category**
1	No damage or negligible change to the environment	0-10,000	Insignificant
2	Minor impact/localised nuisance	10,001-100,000	Minor
3	Moderate damage to environment	100,001- 200,000	Significant
4	Severe damage to the environment	200,001-500,000	Severe
5	Catastrophic damage to a large area, irreversible in medium term	>500,001	Catastrophic

Table A3.3 – Risk Assessment - Overall Risk

The following risk assessment matrix is based the methodology proposed in the EPA's Guidance Documents and Assessment Tools on Environmental Liabilities Risk Assessment and Residual Management Plan incorporation Environmental Liabilities Risk Assessment.

The matrix is designed to represent risk in terms of likelihood multiplied by severity and should be read in conjunction with Risk Assessment Tables A3.1 and A3.2.

			Risk Identification Number				
LIKELIHOOD	Very High	5					
	High	4					
	Medium	3					
	Low	2					
	Very Low	1					
Very Low Risk 1-5 Low Risk 6- 10 Medium Risk 11-15 High Risks 16- 20 Very High Risks 21-25			1	2	3	4	5
			Insignificant	Minor	Significant	Severe	Catastrophic
			SEVERITY				

The above risk assessment matrix is based the methodology proposed in the EPA's Guidance Documents and Assessment Tools on Environmental Liabilities Risk Assessment and Residual Management Plan incorporation Environmental Liabilities Risk Assessment.

APPENDIX 4

COPY OF ENVIRONMENTAL LIABILITY INSURANCE POLICY AND PROPERTY INSURANCE POLICY

APPENDIX 5

FIGURES & SITE PHOTOGRAPHS

Appendix IV

PRTR 2015

Environmental Protection Agency

Guidance to completing the PRTR workbook

PRTR Returns Workbook

Version 1.1.19

REFERENCE YEAR	2016

1. FACILITY IDENTIFICATION

Parent Company Name	Waterford City & County Council
Facility Name	Kilbarry Landfill Site
PRTR Identification Number	W0018
Licence Number	W0018-01

Classes of Activity

No.	class_name
-	Refer to PRTR class activities below

Address 1	Kilbarry
Address 2	Waterford City
Address 3	
Address 4	
	Waterford
Country	Ireland
Coordinates of Location	-7.12405 52.2422
River Basin District	IESE
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	John McKeown
AER Returns Contact Email Address	jmckeown@waterfordcouncil.ie
AER Returns Contact Position	Executive Engineer, Environment Department
AER Returns Contact Telephone Number	051849588
AER Returns Contact Mobile Phone Number	0872024635
AER Returns Contact Fax Number	
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	2
User Feedback/Comments	Air: Net methane emissions. The predicted mass of CH4 increased from 2015 to 2016 as the LFG survey recorded a higher % CH4 (43% v 29% in 2015). Similarly the mass falred increased. The net emissions increased slightly, but in context by only 2 m3/hr of landfill gas. Pls note: total capacity of flare is recorded as 500 m3/hr LFG.
Web Address	

2. PRTR CLASS ACTIVITIES

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

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

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

4. WASTE IMPORTED/ACCEPTED ONTO SITE

Guidance on waste imported/accepted onto site

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

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

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used		Flare 1			
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
02	Carbon monoxide (CO)	M	EN 15058:2004	NCIR by Horiba PG-250	0.81327012	0.81327012	0.0	0.0
08	Nitrogen oxides (NOx/NO2)	M	EN 14792:2005	Chemiluminescence	71.37962598	0.0	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	ALT	TGN 21 NDIR Absorption	17.01331212	0.0	0.0	0.0
01	Methane (CH4)	C	OTH	calculated as below	137801.181775614	0.0	0.0	0.0

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

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used		Flare 1			
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
80	Chlorine and inorganic compounds (as HCl)	M	EN 1911-1 to 3:2003	Ion chromatogrpahy	0.2124213	0.2124213	0.0	0.0
84	Fluorine and inorganic compounds (as HF)	M	ISO/DIS 15713:2004	Ion chromatography	0.20635212	0.0	0.0	0.0

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

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

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used		Flare 1			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
230	**TA Luft organic substances class 1**	M	ALT	EN13649:2002 Paramagnetic	0.65547144	0.65547144	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: Kilbarry Landfill Site

Please enter summary data on the quantities of methane flared and / or utilised	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m3 per hour	
Total estimated methane generation (as per site model)	314381.0	E	OTH	Gassim 2.5	N/A	
Methane flared	176580.0	M	OTH	Landfill gas survey data (me	500.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	137801.0	C	OTH	Predicted generation minus	N/A	

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

Please enter all quantities on this sheet in Tonnes 0

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility 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	15 01 03	No	2.0	wooden packaging	R12	M	Weighed	Offsite in Ireland	Public,Public	Public,Public,Public,Public,Ireland		
Within the Country	15 01 04	No	0.24	metallic packaging	R4	M	Weighed	Offsite in Ireland	Rehab Glassco,NCWP-08-01150-02	Carragh Road,Unit Obserstown Industrial Park,Naas,Kildare,Ireland		
Within the Country	15 01 07	No	9.15	glass packaging	R5	M	Weighed	Offsite in Ireland	Rehab Glassco,NCWP-08-01150-02	Carragh Road,Unit Obserstown Industrial Park,Naas,Kildare,Ireland		
Within the Country	16 01 07	Yes	0.12	oil filters	R12	M	Weighed	Offsite in Ireland	Enva Ireland Ltd,W0184-01	Enva Ireland Ltd (Portlaoise),Clonminam Industrial Estate,Portlaoise,,Ireland	Enva Ireland Ltd,W0184-01	Enva Ireland Ltd (Portlaoise),Clonminam Industrial Estate,Portlaoise,,Ireland
Within the Country	16 06 01	Yes	1.77	lead batteries	R4	M	Weighed	Offsite in Ireland	KMK ,WCP-OY-08-0607--01	Cappincur Industrial Estate Daingean Road Tullamore Co. Offaly,Tullamore,Co Offaly,,,Ireland	KMK,WCP-OY-08-0607--01,Cappincur Industrial Estate,Daingean Road,Tullamore,Co Offaly,Ireland	Cappincur Industrial Estate,Daingean Road,Tullamore,Co Offaly,Ireland
Within the Country	19 07 03	No	900.0	landfill leachate other than those mentioned in 19 07 02	D8	C	Volume Calculation	Offsite in Ireland	Waterford City Wastewater Treatment Plant,D0022-01	Gorteens,,,,Co. Kilkenny,Ireland		
Within the Country	20 01 01	No	2.07	paper and cardboard	R3	M	Weighed	Offsite in Ireland	Recycle 2000,NWCPO-14-11480-01	Rosslare Road,Unit 17A/17B Wexford Enterprise Centre,Stranfield Business Park Kerlogue Rosslare,Wexford,Ireland		
Within the Country	08 01 11	Yes	16.9	waste paint and varnish containing organic solvents or other dangerous substances	R3	M	Weighed	Offsite in Ireland	Enva Ireland Ltd,W0184-01	Enva Ireland Ltd (Portlaoise),Clonminam Industrial Estate,Portlaoise,,Ireland	Enva Ireland Ltd,W0184-01	Enva Ireland Ltd (Portlaoise),Clonminam Industrial Estate,Portlaoise,,Ireland
Within the Country	20 01 40	No	3.0	metals	R4	M	Weighed	Offsite in Ireland	Luke Mulrooney Scrap Metals,WP05-04	Tramore Road,Tramore Road,Waterford,Waterford,Ireland		
Within the Country	20 02 01	No	832.92	biodegradable waste	R3	M	Weighed	Offsite in Ireland	AES Bord Na Mona,W0198-01	Newbridge,Newbridge,Newbridge,Kildare,Ireland		
Within the Country	20 03 01	No	217.22	mixed municipal waste	R12	M	Weighed	Offsite in Ireland	Starrus Eco Holdings Ltd ,W0177-05	Carrignard,Six Cross Roads Business Park,Waterford City,,Ireland		
Within the Country	15 01 01	No	24.88	paper and cardboard packaging	R12	M	Weighed	Offsite in Ireland	Starrus Eco Holdings Ltd ,W0177-03	Carrignard,Six Cross Roads Business Park,Waterford City,,Ireland		
Within the Country	20 01 25	No	1.0	edible oil and fat	R3	M	Weighed	Offsite in Ireland	Pure Oil,WFP-WX-130074-01	Ballyweather,Barntown,Co. Wexford,0,ireland		
Within the Country	13 02 08	Yes	2.2	other engine, gear and lubricating oils	R3	M	Weighed	Offsite in Ireland	Enva Ireland Ltd,W0184-01	Enva Ireland Ltd (Portlaoise),Clonminam Industrial Estate,Portlaoise,,Ireland	Enva Ireland Ltd.,W0184-01,Enva Ireland Ltd (Portlaoise) ,Clonminam Industrial Estate,Portlaoise,0,Ireland	Enva Ireland Ltd (Portlaoise) ,Clonminam Industrial Estate,Portlaoise,0,Ireland
Within the Country	16 05 04	Yes	0.23	gases in pressure containers (including halons) containing dangerous substances	R3	M	Weighed	Offsite in Ireland	Enva Ireland Ltd,W0184-01	Enva Ireland Ltd (Portlaoise),Clonminam Industrial Estate,Portlaoise,,Ireland	Enva Ireland Ltd.,W0184-01,Enva Ireland Ltd (Portlaoise) ,Clonminam Industrial Estate,Portlaoise,0,Ireland	Enva Ireland Ltd (Portlaoise) ,Clonminam Industrial Estate,Portlaoise,0,Ireland
Within the Country	15 02 02	Yes	0.32	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	R3	M	Weighed	Offsite in Ireland	Enva Ireland Ltd,W0184-01	Enva Ireland Ltd (Portlaoise),Clonminam Industrial Estate,Portlaoise,,Ireland	Enva Ireland Ltd.,W0184-01,Enva Ireland Ltd (Portlaoise) ,Clonminam Industrial Estate,Portlaoise,0,Ireland	Enva Ireland Ltd (Portlaoise) ,Clonminam Industrial Estate,Portlaoise,0,Ireland
Within the Country	16 05 06	Yes	0.12	laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals	R3	M	Weighed	Offsite in Ireland	Enva Ireland Ltd,W0184-01	Enva Ireland Ltd (Portlaoise),Clonminam Industrial Estate,Portlaoise,,Ireland	Enva Ireland Ltd.,W0184-01,Enva Ireland Ltd (Portlaoise) ,Clonminam Industrial Estate,Portlaoise,0,Ireland	Enva Ireland Ltd (Portlaoise) ,Clonminam Industrial Estate,Portlaoise,0,Ireland
Within the Country	15 01 10	Yes	0.03	packaging containing residues of or contaminated by dangerous substances	R3	M	Weighed	Offsite in Ireland	Enva Ireland Ltd,W0184-01	Enva Ireland Ltd (Portlaoise),Clonminam Industrial Estate,Portlaoise,,Ireland	Enva Ireland Ltd.,W0184-01,Enva Ireland Ltd (Portlaoise) ,Clonminam Industrial Estate,Portlaoise,0,Ireland	Enva Ireland Ltd (Portlaoise) ,Clonminam Industrial Estate,Portlaoise,0,Ireland
Within the Country	16 01 15	No	0.03	antifreeze fluids other than those mentioned in 16 01 14	R3	M	Weighed	Offsite in Ireland	Enva Ireland Ltd,W0184-01	Enva Ireland Ltd (Portlaoise),Clonminam Industrial Estate,Portlaoise,,Ireland		
Within the Country	20 01 10	No	2.3	clothes	R3	M	Weighed	Offsite in Ireland	Cookstown Textile Recyclers,36 Magheralane Road	Cookstown,Cookstown,Cookstown ,Tyrone,United Kingdom		
Within the Country	16 06 04	No	1.512	alkaline batteries (except 16 06 03)	R4	M	Weighed	Offsite in Ireland	KMK ,WCP-OY-08-0607--01	Cappincur Industrial Estate Daingean Road Tullamore Co. Offaly,Tullamore,Co Offaly,,,Ireland		
Within the Country	20 01 36	No	185.88	discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	R4	M	Weighed	Offsite in Ireland	KMK ,WCP-OY-08-0607--01	Cappincur Industrial Estate Daingean Road Tullamore Co. Offaly,Tullamore,Co Offaly,,,Ireland		
Within the Country	20 01 21	Yes	0.449	fluorescent tubes and other mercury-containing waste	R4	M	Weighed	Offsite in Ireland	KMK ,WCP-OY-08-0607--01	Cappincur Industrial Estate Daingean Road Tullamore Co. Offaly,Tullamore,Co Offaly,,,Ireland	KMK,WCP-OY-08-0607--01,Cappincur Industrial Estate,Daingean Road,Tullamore,Co Offaly,Ireland	Cappincur Industrial Estate,Daingean Road,Tullamore,Co Offaly,Ireland

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

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

Facility Information Summary	
AER Reporting Year	2016
Licence Register Number	W0018-01
Name of site	Kilbarry Landfill
Site Location	Kilbarry Lane, Waterford City
NACE Code	3821
Class/Classes of Activity	Treatment and Disposal of Non Hazardous Waste
National Grid Reference (6E, 6 N)	2598E, 1103N

A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year **and an overview of compliance with your licence** listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.

rd Council Civic Amenity Site is located at the northern area of the landfill and accepts small amounts of municip

Declaration:

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 Group/Facility manager (or nominated, suitably qualified and experienced deputy)	Date

AIR-summary template	Lic No:	W0018-01	Year	2016

Answer all questions and complete all tables where relevant

			Additional information
1	Does your site have licensed air emissions? If yes please complete table A1 and A2 below for the current reporting year and answer further questions. If **you do not have** licenced emissions and **do not complete a solvent management plan** (table A4 and A5) you do not need to complete the tables	SELECT	

Periodic/Non-Continuous Monitoring

2	Are there any results in breach of licence requirements? If yes please provide brief details in the comment section of TableA1 below	SELECT	
3	Was all monitoring carried out in accordance with EPA guidance note AG2 and using the basic air monitoring checklist? Basic air monitoring checklist AGN2	SELECT	

Table A1: Licensed Mass Emissions/Ambient data-periodic monitoring (non-continuous)

Emission reference no:	Parameter/ Substance	Frequency of Monitoring	ELV in licence or any revision therof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence limit	Method of analysis	Annual mass load (kg)	Comments - reason for change in % mass load from previous year if applicable
	volumetric flow	Biannual	3000m3/hr	100 % of values < ELV	78	m3	yes	MAB	606918	
	volumetric flow	Biannual	3000m3/hr	100 % of values < ELV		m3	yes	MAB		
	Carbon monoxide (CO)	Biannual	50mg/Nm3	100 % of values < ELV	1.34	mg/Nm3	yes	MAB	0.92	
	Carbon monoxide (CO)	Biannual	50mg/Nm3	100 % of values < ELV	3.31	mg/Nm3	yes	MAB	2.2	
	Nitrogen oxides (NOx/NO2)	Biannual	150mg/Nm3	100 % of values < ELV	117.61	mg/Nm3	yes	MAB	80.35	
	Nitrogen oxides (NOx/NO2)	Biannual	150mg/Nm3	100 % of values < ELV	40.38	mg/Nm3	yes	MAB	26.88	

AIR-summary template					Lic No:	W0018-01		Year	2016	
	Sulphur oxides (SOx/SO2)	Biannual	na		272.56	mg/Nm3		EN 13649:2001	185.85	
	Sulphur oxides (SOx/SO2)	Biannual	na		28.77	mg/Nm3		EN 13649:2001	19.15	
	Chlorine and inorganic compounds (as HCl)	Annual	<50mg/Nm3	100 % of values < ELV	0.35	mg/Nm3	yes	EN 1911-1 to 3:2003		
	Fluorine and inorganic compounds (as HF)	Annual	<5mg/Nm3	100 % of values < ELV	0.34	mg/Nm3	yes	EN 1911-1 to 3:2003		
	TA Luft organic substances class 1	Annual	20mg/m3	100 % of values < ELV	1.26	mg/Nm3	yes	EN 13649:2001		

7 Did your site experience any abatement system bypasses? If yes please detail them in table A3 below — SELECT

Table A2: Summary of average emissions -continuous monitoring

Emission reference no:	Parameter/ Substance	ELV in licence or any revision therof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission	Annual maximum	Monitoring Equipment downtime (hours)	Number of ELV exceedences in current reporting year	Comments
	volumetric flow	3000m3/hr		100 % of values < ELV	m3			1003		
	SELECT				SELECT					
	SELECT				SELECT					
	SELECT				SELECT					
	SELECT				SELECT					

note 1: Volumetric flow shall be included as a reportable parameter.

Table A3: Abatement system bypass reporting table Bypass protocol

Date*	Duration** (hours)	Location	Reason for bypass	Impact magnitude	Corrective action

* this should include all dates that an abatement system bypass occurred

** an accurate record of time bypass beginning and end should be logged on site and maintained for future Agency inspections please refer to bypass protocol link

AIR-summary template	Lic No:	W0018-01	Year	2016

Solvent use and management on site

8 Do you have a total Emission Limit Value of direct and fugitive emissions on site? if yes please fill out tables A4 and A5

No

Table A4: Solvent Management Plan Summary
Total VOC Emission limit value

Solvent regulations — Please refer to linked solvent regulations to complete table 5 and 6

Reporting year	Total solvent input on site (kg)	Total VOC emissions to Air from entire site (direct and fugitive)	Total VOC emissions as %of solvent input	Total Emission Limit Value (ELV) in licence or any revision therof	Compliance
					SELECT
					SELECT

Table A5: Solvent Mass Balance summary

	(I) Inputs (kg)	(O) Outputs (kg)						
Solvent	(I) Inputs (kg)	Organic solvent emission in waste	Solvents lost in water (kg)	Collected waste solvent (kg)	Fugitive Organic Solvent (kg)	Solvent released in other ways e.g.	Solvents destroyed onsite through	Total emission of Solvent to air (kg)
							Total	

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER)	Lic No:	W0018-01	Year

			Additional information
1	Does your site have licensed emissions direct to surface water or direct to sewer? If yes please complete table W2 and W3 below for the current reporting year and answer further questions. If **you do not have** licenced emissions you only need to complete table W1 and or W2 for storm water analysis and visual inspections	SELECT	
2	Was it a requirement of your licence to carry out visual inspections on any surface water discharges or watercourses on or near your site? If yes please complete table W2 below summarising only any evidence of contamination noted during visual inspections	SELECT	

Table W1 Storm water monitoring

Location reference	Location relative to site activities	PRTR Parameter	Licenced Parameter	Monitoring date	ELV or trigger level in licence or any revision thereof*	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT
	SELECT	SELECT	SELECT			SELECT		SELECT	SELECT

*trigger values may be agreed by the Agency outside of licence conditions

Table W2 Visual inspections-Please only enter details where contamination was observed.

Location Reference	Date of inspection	Description of contamination	Source of contamination	Corrective action	Comm
			SELECT		
			SELECT		

Licensed Emissions to water and /or wastewater(sewer)-periodic monitoring (non-continuous)

					Additional information
3	Was there any result in breach of licence requirements? If yes please provide brief details in the comment section of Table W3 below			SELECT	
4	Was all monitoring carried out in accordance with EPA guidance and checklists for Quality of Aqueous Monitoring Data Reported to the EPA? If no please detail what areas require improvement in additional information box	External /Internal Lab Quality checklist	Assessment of results checklist	SELECT	

Table W3: Licensed Emissions to water and /or wastewater (sewer)-periodic monitoring (non-continuous)

Emission reference no:	Emission released to	Parameter/ SubstanceNote 1	Type of sample	Frequency of monitoring	Averaging period	ELV or trigger values in licence or any revision thereof[Note 2]	Licence Compliance criteria	Measured value	Unit of measurement

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER)	Lic No:	W0018-01	Year

	SELECT	SELECT	SELECT		SELECT		SELECT		SELECT

Note 1: Volumetric flow shall be included as a reportable parameter

Note 2: Where Emission Limit Values (ELV) do not apply to your licence please compare results against EQS for Surface water or relevant receptor quality standards

Continuous monitoring

			Additional Information
5	Does your site carry out continuous emissions to water/sewer monitoring?	SELECT	

If yes please summarise your continuous monitoring data below in Table W4 and compare it to its relevant Emission Limit Value (ELV)

6	Did continuous monitoring equipment experience downtime? **If yes please record downtime in table W4 below**	SELECT	
7	Do you have a proactive service contract for each piece of continuous monitoring equipment on site?	SELECT	
8	Did abatement system bypass occur during the reporting year? **If yes please complete table W5 below**	SELECT	

Table W4: Summary of average emissions -continuous monitoring

Emission reference no:	Emission released to	Parameter/ Substance	ELV or trigger values in licence or any revision thereof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission for current reporting year (kg)	% change +/- from previous reporting year	Monitoring Equipment downtime (hours)
	SELECT	SELECT		SELECT	SELECT	SELECT			
	SELECT	SELECT		SELECT	SELECT	SELECT			

note 1: Volumetric flow shall be included as a reportable parameter.

Table W5: Abatement system bypass reporting table

Date	Duration (hours)	Location	Resultant emissions	Reason for bypass	Corrective action*	Was a report submitted to the EPA?	When was this report submitted?
						SELECT	

*Measures taken or proposed to reduce or limit bypass frequency

2016

Comments

ents

Compliant with licence	Method of analysis	Procedural reference source	Procedural reference standard number	Annual mass load (kg)	Comments

2016					
SELECT	SELECT	SELECT			

Number of ELV exceedences in reporting year	Comments

Bund/Pipeline testing template

Lic No: W0018-01 Year 2016

Bund testing

dropdown menu click to see options

			Additional information
1	Are you required by your licence to undertake integrity testing on bunds and containment structures ? if yes please fill out table B1 below listing all **new bunds and containment structures** on site, in addition to **all bunds which failed** the integrity test-**all bunding structures which failed including mobile bunds must be listed in the table below, please include all bunds outside the licenced testing period** (mobile bunds and chemstore included)	Yes	
2	Please provide integrity testing frequency period	3 years	
3	Does the site maintain a register of bunds, underground pipelines (including stormwater and foul), Tanks, sumps and containers? (containers refers to "Chemstore" type units and mobile bunds)	No	
4	How many bunds are on site?	1	
5	How many of these bunds have been tested within the required test schedule?	1	
6	How many mobile bunds are on site?	0	
7	Are the mobile bunds included in the bund test schedule?	SELECT	
8	How many of these mobile bunds have been tested within the required test schedule?	0	
9	How many sumps on site are included in the integrity test schedule?	0	
10	How many of these sumps are integrity tested within the test schedule?	0	
	Please list any sump integrity failures in table B1		
11	Do all sumps and chambers have high level liquid alarms?	Yes	
12	If yes to Q11 are these failsafe systems included in a maintenance and testing programme?	No	
13	Is the Fire Water Retention Pond included in your integrity test programme?	N/A	

Table B1: Summary details of bund /containment structure integrity test

Bund/Containment structure ID	Type	Specify Other type	Product containment	Actual capacity	Capacity required*	Type of integrity test	Other test type	Test date	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
	other (please specify)	Double Skinned Tank	Waste engine oil	2500L	2500L	Structural assessment		23/06/2015	Yes	Pass		SELECT	2018	
	SELECT					SELECT			SELECT	SELECT		SELECT		

* Capacity required should comply with 25% or 110% containment rule as detailed in your licence

			Commentary
15	Has integrity testing been carried out in accordance with licence requirements and are all structures tested in line with BS8007/EPA Guidance?	No	Visual inspection
16	Are channels/transfer systems to remote containment systems tested?	SELECT	
17	Are channels/transfer systems compliant in both integrity and available volume?	SELECT	

bunding and storage guidelines

Pipeline/underground structure testing

1	Are you required by your licence to undertake integrity testing* on underground structures e.g. pipelines or sumps etc ? if yes please fill out table 2 below listing all underground structures and pipelines on site **which failed the integrity test and all which have not been tested withing the integrity test period as specified**	SELECT	
2	Please provide integrity testing frequency period	SELECT	

*please note integrity testing means water tightness testing for process and foul pipelines (as required under your licence)

Table B2: Summary details of pipeline/underground structures integrity test

Structure ID	Type system	Material of construction:	Does this structure have Secondary containment?	Type of secondary containment	Type integrity testing	Integrity reports maintained on site?	Results of test	Integrity test failure explanation <50 words	Corrective action taken	Scheduled date for retest	Results of retest(if in current reporting year)
	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT				SELECT

Please use commentary for additional details not answered by tables/ questions above

Groundwater/Soil monitoring template	Lic No:	W0018-01	Year	2016

			Comments	
1	Are you required to carry out groundwater monitoring as part of your licence requirements?	yes		Please provide an interpretation of groundwater monitoring data in the interpretation box below or if you require additional space please include a groundwater/contaminated land monitoring results interpretaion as an additional section in this AER
2	Are you required to carry out soil monitoring as part of your licence requirements?	no		
3	Do you extract groundwater for use on site? If yes please specify use in comment section	no		
4	Do monitoring results show that groundwater generic assessment criteria such as GTVs or IGVs are exceeded or is there an upward trend in results for a substance? If yes, please complete the Groundwater Monitoring Guideline Template Report (link in cell G8) and submit separately through ALDER as a licensee return AND answer questions 5-12 below. Groundwater monitoring template	yes		
5	Is the contamination related to operations at the facility (either current and/or historic)	yes		
6	Have actions been taken to address contamination issues?If yes please summarise remediation strategies proposed/undertaken for the site	yes	Leachate Management System Installed	
7	Please specify the proposed time frame for the remediation strategy	SELECT	Completed	
8	Is there a licence condition to carry out/update ELRA for the site?	yes		
9	Has any type of risk assesment been carried out for the site?	yes		
10	Has a Conceptual Site Model been developed for the site?	no		
11	Have potential receptors been identified on and off site?	yes		
12	Is there evidence that contamination is migrating offsite?	SELECT		Please enter interpretation of data here

Table 1: Upgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration++	Average Concentration+	unit	GTV's*	IGV	Upward trend in pollutant concentration over last 5 years of monitoring data
2016	GW6	Ammonia		Quarterly	1.88	0.93	mg/l	0.15		no
2016	GW6	Chloride		Quarterly	32	29.6	mg/l	30		yes
2016	GW6	Total Oxidised Nitrogen		Quarterly	5.6	5.26	mg/l			yes
2016	GW6	Potassium		Quarterly	3.76	2.74	mg/l	5		yes
2016	GW6	Sodium		Quarterly	20.4	17.05	mg/l	150		yes
2016	GW6	Flouride		Annually	<0.5		mg/l	1		yes
2016	GW6	Sulphate		Annually	19.2		mg/l	200		no
2016	GW6	Boron		Annually	1670		ug/l	1000		yes
2016	GW6	Cadmium		Annually	<0.08		ug/l	5		no
2016	GW6	Calcium		Annually	71.6		mg/l	200		no
2016	GW6	Chromium		Annually	<1.2		ug/l	30		no
2016	GW6	Iron		Annually	<0.019		ug/l	200		no
2016	GW6	Lead		Annually	0.27		ug/l	10		no
2016	GW6	Magnesium		Annually	17.8		mg/l	50		no
2016	GW6	Manganese		Annually	761		ug/l	50		yes
2016	GW6	Mercury		Annually	<0.01		ug/l	1		no
2016	GW6	Zinc		Annually	348		ug/l	100		yes

Groundwater/Soil monitoring template					Lic No:	W0018-01		Year	2016	
							SELECT			SELECT
							SELECT			SELECT
							SELECT			SELECT

Table 2: Downgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit	GTV's*	SELECT**	Upward trend in yearly average pollutant concentration over last 5 years of monitoring data
2016	GW2	Ammonia		Quarterly	<0.2	<0.2	mg/l	0.15		no
2016	GW2	Chloride		Quarterly	30	29.1	mg/l	30		no
2016	GW2	Total Oxidised Nitrogen		Quarterly	1.22	0.91	mg/l			no
2016	GW2	Potassium		Quarterly	1.71	1.52	mg/l	5		no
2016	GW2	Sodium		Quarterly	25.3	22.72	mg/l	150		no
2016	GW2	Flouride		Annually	<0.5		mg/l	1		no
2016	GW2	Sulphate		Annually	47.2		mg/l	200		no
2016	GW2	Boron		Annually	18.8		ug/l	1000		no
2016	GW2	Cadmium		Annually	<0.08		ug/l	5		no
2016	GW2	Calcium		Annually	101		mg/l	200		no
2016	GW2	Chromium		Annually	<1.2		ug/l	30		yes
2016	GW2	Iron		Annually	<0.019		ug/l	200		no
2016	GW2	Lead		Annually	0.102		ug/l	10		no
2016	GW2	Magnesium		Annually	17.5		mg/l	50		no
2016	GW2	Manganese		Annually	162		ug/l	50		no
2016	GW2	Mercury		Annually	<0.01		ug/l	1		no
2016	GW2	Zinc		Annually	1.91		ug/l	100		no
							SELECT			data not available

*please note exceedance of generic assessment criteria (GAC) such as a Groundwater Threshold Value (GTV) or an Interim Guideline Value (IGV) or an upward trend in results for a substance indicates that further interpretation of monitoring results is required. In addition to completing the above table, please complete the Groundwater Monitoring Guideline Template Report at the link provided and submit separately through ALDER as a licensee return or as otherwise instructed by the EPA.

Groundwater monitoring template

More information on the use of soil and groundwater standards/ generic assessment criteria (GAC) and risk assessment tools is available in the EPA published guidance (see the link in G31)

Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013).

**Depending on location of the site and proximity to other sensitive receptors alternative Receptor based Water Quality standards should be used in addition to the GTV e.g. if the site is close to surface water compare to Surface Water Environmental Quality Standards (SWEQS), If the site is close to a drinking water supply compare results to the Drinking Water Standards (DWS)

Surface water EQS | Groundwater regulations GTV's | Drinking water (private supply) standards | Drinking water (public supply) standards | Interim Guideline Values (IGV)

Groundwater/Soil monitoring template	Lic No:	W0018-01	Year	2016

Table 3: Soil results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit
							SELECT
							SELECT

Where additional detail is required please enter it here in 200 words or less

Environmental Liabilities template	Lic No:	W0018-01	Year	2016

[Click here to access EPA guidance on Environmental Liabilities and Financial provision]

			Commentary
1	ELRA initial agreement status	Submitted and agreed by EPA	
2	ELRA review status	Review required and not completed;	
3	Amount of Financial Provision cover required as determined by the latest ELRA	€86,375	
4	Financial Provision for ELRA status	Submitted and not agreed by EPA;	
5	Financial Provision for ELRA - amount of cover	€86,375	
6	Financial Provision for ELRA - type	nsurance with Environmental Impairment Liability cover,	
7	Financial provision for ELRA expiry date	N/A	
8	Closure plan initial agreement status	losure plan submitted and agreed by EPA	
9	Closure plan review status	Review required and completed	
10	Financial Provision for Closure status	Submitted and agreed by EPA	
11	Financial Provision for Closure - amount of cover	N/A	
12	Financial Provision for Closure - type	Site is closed since 2005	
13	Financial provision for Closure expiry date	Enter expiry date	

Environmental Management Programme/Continuous Improvement Programme template

Lic No: W0018-01 Year 2016

Highlighted cells contain dropdown menu click to view

			Additional Information
1	Do you maintain an Environmental Mangement System (EMS) for the site. If yes, please detail in additional information	Yes	
2	Does the EMS reference the most significant environmental aspects and associated impacts on-site	Yes	
3	Does the EMS maintain an Environmental Management Programme (EMP) as required in accordance with the licence requirements	Yes	
4	Do you maintain an environmental documentation/communication system to inform the public on environmental performance of the facility, as required by the licence	Yes	

Environmental Management Programme (EMP) report

Objective Category	Target	Status (% completed)	How target was progressed	Responsibility	Intermediate outcomes
Reduction of emissions to Air	Install Gas Abstraction Syste	100%	Contract	Individual	Individual
Groundwater protection	Leachate Management	100%	Contract	Section Head	Reduced emissions
Reduction of emissions to Air	Dust Control	100%	Monitoring and operational pr	Individual	Increased compliance with licence conditions
Reduction of emissions to Water	Surface water management	100%	Contract	Individual	Individual

Noise monitoring summary report	Lic No:	W0018-01	Year	2016

1	Was noise monitoring a licence requirement for the AER period? If yes please fill in table N1 noise summary below	Yes
2	Was noise monitoring carried out using the EPA Guidance note, including completion of the "Checklist for noise measurement report" included in the guidance note as table 6? (Noise Guidance note NG4)	Yes
3	Does your site have a noise reduction plan	No
4	When was the noise reduction plan last updated?	Enter date
5	Have there been changes relevant to site noise emissions (e.g. plant or operational changes) since the last noise survey?	No

Table N1: Noise monitoring summary

Date of monitoring	Time period	Noise location (on site)	Noise sensitive location -NSL (if applicable)	LA_{eq}	LA_{90}	LA_{10}	LA_{max}	Tonal or Impulsive noise* (Y/N)	If tonal /impulsive noise was identified was 5dB penalty applied?	Comments (ex. main noise sources on site, & extraneous noise ex. road traffic)	Is site compliant with noise limits (day/evening/night)?
08.06.16	1104-1134	B1		46	39	50	N/A	No	No	Road traffic, aircraft	Yes
07.06.16	1521-1551	B2		47	39	51	N/A	No	No	Lawn mower, road traff	Yes
07.06.16	1445-1515	B3		65	40	60	N/A	No	No	Road traffic, aircraft	Yes
07.06.16	1219-1249	B4		55	46	58	N/A	No	No	Road traffic, aircraft	Yes
07.06.16	1255-1325	B5		43	39	45	N/A	No	No	Road traffic, aircraft	Yes
07.06.16	1330-1400	B6		42	38	45	N/A	No	No	Road traffic, aircraft	Yes
07.06.16	1408-1438	B7		43	38	45	N/A	No	No	Road traffic, aircraft	Yes
08.06.16	0939-1009		NSL2	51	43	54	N/A	No	No	Road traffic	Yes
07.06.16	1130-1200		NSL3	42	37	47	N/A	No	No	Road traffic, aircraft	Yes
07.06.16	1600-1630		NSL4	60	44	64	N/A	No	No	Road traffic, dog	Yes
07.06.16	1605-1635		NSL5	65	45	67	N/A	No	No	Road traffic, aircraft	Yes
08.06.16	1021-1051		NSL6	44	40	44	N/A	No	No	Road traffic, aircraft	Yes
07.06.16	1054-1124		NSL7	54	42	58	N/A	No	No	Road traffic, excavator	Yes
08.06.16	0902-0932		NSL8	65	47	69	N/A	No	No	Road traffic, mower	Yes
											Yes

*Please ensure that a tonal analysis has been carried out as per guidance note NG4. These records must be maintained onsite for future inspection

If noise limits exceeded as a result of noise attributed to site activities, please choose the corrective action from the following options? N/A

** please explain the reason for not taking action/resolution of noise issues?

Any additional comments? (less than 200 words)

Resource Usage/Energy efficiency summary	Lic No:	W0018-01	Year	2016

			Additional information
1	When did the site carry out the most recent energy efficiency audit? Please list the recommendations in table 3 below	Enter date of audit	
2	Is the site a member of any accredited programmes for reducing energy usage/water conservation such as the SEAI programme linked to the right? If yes please list them in additional information	No	SEAI - Large Industry Energy Network (LIEN)
3	Where Fuel Oil is used in boilers on site is the sulphur content compliant with licence conditions? Please state percentage in additional information	SELECT	

Table R1 Energy usage on site

Energy Use	Previous year	Current year	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*
Total Energy Used (MWHrs)				
Total Energy Generated (MWHrs)				
Total Renewable Energy Generated (MWHrs)				
Electricity Consumption (MWHrs)				
Fossil Fuels Consumption:				
Heavy Fuel Oil (m3)				
Light Fuel Oil (m3)				
Natural gas (m3)				
Coal/Solid fuel (metric tonnes)				
Peat (metric tonnes)				
Renewable Biomass				
Renewable energy generated on site				

* where consumption of energy can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Table R2 Water usage on site

					Water Emissions	Water Consumption	
Water use	Water extracted Previous year m3/yr.	Water extracted Current year m3/yr.	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*	Volume Discharged back to environment(m^3yr):	Volume used i.e not discharged to environment e.g. released as steam m3/yr	Unaccounted for Water:
Groundwater							
Surface water							
Public supply	5	5					
Recycled water							
Total	5	5					

* where consumption of water can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Table R3 Waste Stream Summary

	Total	Landfill	Incineration	Recycled	Other
Hazardous (Tonnes)					
Non-Hazardous (Tonnes)					

Resource Usage/Energy efficiency summary Lic No: W0018-01 Year 2016

Table R4: Energy Audit finding recommendations

Date of audit	Recommendations	Description of Measures proposed	Origin of measures	Predicted energy savings %	Implementation date	Responsibility	Completion date	Status and comments
			SELECT					
			SELECT					
			SELECT					

Table R5: Power Generation: Where power is generated onsite (e.g. power generation facilities/food and drink industry)please complete the following information

	Unit ID	Unit ID	Unit ID	Unit ID	Station Total
Technology					
Primary Fuel					
Thermal Efficiency					
Unit Date of Commission					
Total Starts for year					
Total Running Time					
Total Electricity Generated (GWH)					
House Load (GWH)					
KWH per Litre of Process Water					
KWH per Litre of Total Water used on Site					

Complaints and Incidents summary template

Lic No: W0018-01 Year 2016

Complaints

Have you received any environmental complaints in the current reporting year? If yes please complete summary details of complaints received on site in table 1 below	No	Additional information

Table 1 Complaints summary

Date	Category	Other type (please specify)	Brief description of complaint (Free txt <20 words)	Corrective action< 20 words	Resolution status	Resolution date	Further information
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		

Total complaints open at start of reporting year	
Total new complaints received during reporting year	
Total complaints closed during reporting year	
Balance of complaints end of reporting year	

Incidents

Have any incidents occurred on site in the current reporting year? Please list all incidents for current reporting year in Table 2 below	No	Additional information

*For information on how to report and what constitutes an incident	What is an incident

Table 2 Incidents summary

Date of occurrence	Incident nature	Location of occurrence	Incident category*please refer to guidance	Receptor	Cause of incident	Other cause(please specify)	Activity in progress at time of incident	Communication	Occurrence	Corrective action<20 words	Preventative action <20 words	Resolution status	Resolution date	Likelihood of reoccurence
	SELECT	SELECT	SELECT	SELECT	SELECT		SELECT	SELECT	SELECT			SELECT		SELECT
	SELECT	SELECT	SELECT	SELECT	SELECT		SELECT	SELECT	SELECT			SELECT		SELECT
	SELECT	SELECT	SELECT	SELECT	SELECT		SELECT	SELECT	SELECT			SELECT		SELECT
	SELECT	SELECT	SELECT	SELECT	SELECT		SELECT	SELECT	SELECT			SELECT		SELECT
	SELECT	SELECT	SELECT	SELECT	SELECT		SELECT	SELECT	SELECT			SELECT		SELECT

Total number of incidents current year	
Total number of incidents previous year	
% reduction/ increase	

WASTE SUMMARY	Lic No:	W0018-01	Year	2016
SECTION A-PRTR ON SITE WASTE TREATMENT AND WASTE TRANSFERS TAB- TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES		PRTR facility logon		dropdown list click to see options

SECTION B- WASTE ACCEPTED ONTO SITE-TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES

			Additional Information
1	Were any wastes accepted onto your site for recovery or disposal or treatment prior to recovery or disposal within the boundaries of your facility ?; (waste generated within your boundaries is to be captured through PRTR reporting) If yes please enter details in table 1 below	No	
2	Did your site have any rejected consignments of waste in the current reporting year? If yes please give a brief explanation in the additional information	No	
3	Was waste accepted onto your site that was generated outside the Republic of Ireland? If yes please state the quantity in tonnes in additional information	No	

Table 1 Details of waste accepted onto your site for recovery, disposal or treatment (do not include wastes generated at your site, as these will have been reported in your PRTR workbook)

Licenced annual tonnage limit for your site (total tonnes/annum)	EWC code European Waste Catalogue EWC codes	Source of waste accepted	Description of waste accepted **Please enter an accurate and detailed description - which applies to relevant EWC code** European Waste Catalogue EWC codes	Quantity of waste accepted in current reporting year (tonnes)	Quantity of waste accepted in previous reporting year (tonnes)	Reduction/ Increase over previous year +/ - %	Reason for reduction/ increase from previous reporting year	Packaging Content (%)- only applies if the waste has a packaging component	Disposal/Recovery or treatment operation carried out at your site and the description of this operation	Quantity of waste remaining on site at the end of reporting year (tonnes)	Comments -
75,000	*13 02--*	*13- OIL WASTES AND WASTES OF LIQUID FUELS (except edible oils, and those in chapters 05, 12 and 19)*	*Waste Engine Oil*	*2.2*	*4.5*						
75,000	*16 05 04**	*16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST*	*Aerosols*	*0.23*	*0*						
75,000	*16 06 01**	*16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST*	*Lead Batteries*	*1.77*	*0.32*						
75,000	*16 06 04*	*16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST*	*Alkaline Batteries*	*1.512*	*0.487*						
75,000	*15 01 01*	*15- WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED*	*Cardboard*	*24.88*	*22.32*						
75,000	*15 01 07*	*20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS*	*Glass*	*9.15*	*10.91*						
75,000	*20 01 11*	*20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS*	*Textiles*	*2.3*	*2.06*						
75,000	*20 01 21**	*20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS*	*Flourescent Tubes*	*0.449*	*0.242*						

WASTE SUMMARY				Lic No:	W0018-01		Year	2016			
75,000	20 01 25	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	Edible oil and fats	1	0						
75,000	20 01 27*	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	Paint Tins	16.9	2.19						
75,000	20 01 36	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	W.E.E.E.	185.88	163.465						
75,000	20 01 38	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	Wood	2	2						
75,000	20 01 40	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	Metals	3	5.68						
75,000	20 02 01	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	Biodegradable Garden Waste	832.92	712.32						
75,000	20 03 01	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	Mixed Municipal waste	217.22	303.82						
75,000	16 01 07*	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	Oil Filters	0.12	0.26						
75,000	20 01 01	20- MUNICIPAL WASTES (HOUSEHOLD WASTE AND	Recycling Paper	2.07	2.42						
75,000	15 02 02*	15- WASTE PACKAGING; ABSORBENTS, WIPING	Filter materials	0.32							
75,000	16 05 06*	06- WASTES FROM INORGANIC CHEMICAL PROCESSES	Laboratory chemicals	0.12							
75,000	15 01 10*	15- WASTE PACKAGING; ABSORBENTS, WIPING	Packaging/Residues of Dangerous Substances	0.03							
75,000	16 01 15	16- WASTES NOT OTHERWISE SPECIFIED IN THE LIST	Antifreeze	0.03							
75,000	15 01 04	15- WASTE PACKAGING; ABSORBENTS, WIPING	Aluminium Cans	0.24	0.3						

SECTION C-TO BE COMPLETED BY ALL WASTE FACILITIES (waste transfer stations, Composters, Material recovery facilities etc) EXCEPT LANDFILL SITES

4 Is all waste processing infrastructure as required by your licence and approved by the Agency in place? If no please list waste processing infrastructure required onsite	N/A	
5 Is all waste storage infrastructure as required by your licence and approved by the Agency in place? If no please list waste storage infrastructure required on site	Yes	
6 Does your facility have relevant nuisance controls in place?	N/A	
7 Do you have an odour management system in place for your facility? If no why?	N/A	
8 Do you maintain a sludge register on site?	N/A	

WASTE SUMMARY	Lic No:	W0018-01	Year	2016

SECTION D-TO BE COMPLETED BY LANDFILL SITES ONLY

Table 2 Waste type and tonnage-landfill only

Waste types permitted for disposal	Authorised/licenced annual intake for disposal (tpa)	Actual intake for disposal in reporting year (tpa)	Remaining licensed capacity at end of reporting year (m3)	Comments

Table 3 General information-Landfill only

Area ID	Date landfilling commenced	Date landfilling ceased	Currently landfilling	Private or Public Operated	Inert or non-hazardous	Predicted date to cease landfilling	Licence permits asbestos	Is there a separate cell for asbestos?	Accepted asbestos in reporting year	Total disposal area occupied by waste	Lined disposal area occupied by waste	Unlined area
										SELECT UNIT	SELECT UNIT	SELECT UNIT
Cell 8												

WASTE SUMMARY

Lic No: W0018-01 Year 2016

Table 4 Environmental monitoring-landfill only

Landfill Manual-Monitoring Standards

Was meterological monitoring in compliance with Landfill Directive (LD) standard in reporting year +	Was leachate monitored in compliance with LD standard in reporting year	Was Landfill Gas monitored in compliance with LD standard in reporting year	Was SW monitored in compliance with LD standard in reporting year	Have GW trigger levels been established	Were emission limit values agreed with the Agency (ELVs)	Was topography of the site surveyed in reporting year	Has the statement under S53(A)(5) of WMA been submitted in reporting year	Comments

.+ please refer to Landfill Manual linked above for relevant Landfill Directive monitoring standards

Table 5 Capping-Landfill only

Area uncapped*	Area with temporary cap	Area with final cap to LD Standard m2 ha, a	Area capped other	Area with waste that should be permanently capped to date under licence	What materials are used in the cap	Comments
SELECT UNIT	SELECT UNIT					

*please note this includes daily cover area

Table 6 Leachate-Landfill only

9	Is leachate from your site treated in a Waste Water Treatment Plant?	SELECT
10	Is leachate released to surface water? If yes please complete leachate mass load information below	SELECT

Volume of leachate in reporting year(m3)	Leachate (BOD) mass load (kg/annum)	Leachate (COD) mass load (kg/annum)	Leachate (NH4) mass load (kg/annum)	Leachate (Chloride) mass load kg/annum	Leachate treatment on-site	Specify type of leachate treatment	Comments

Please ensure that all information reported in the landfill gas section is consistent with the Landfill Gas Survey submitted in conjunction with PRTR returns

Table 7 Landfill Gas-Landfill only

Gas Captured&Treated by LFG System m3	Power generated (MW / KWh)	Used on-site or to national grid	Was surface emissions monitoring performed during the reporting year?	Comments
			SELECT	

Comments on liner type

DRAWINGS

Drawing No. 1	Site Location Plan
Drawing No. 2	Gas Abstraction Network
Drawing No. 3	Surface Water Management
Drawing No. 4	Landscaping Concept Design
Drawing No. 5	Map of Monitoring Points
Drawing No. 6	Leachate Collection System

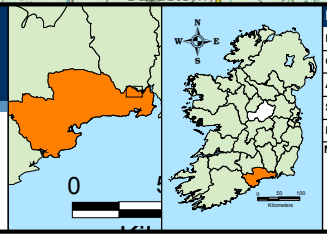
RPS
Innishmore, Ballincollig, Co Cork, Ireland
T +353 21 4665900
F +353 21 4873742
E ireland@rpsgroup.com
W rpsgroup.com/ireland

Project
Kilbarry Landfill Permanent Gas Flare Contract

Client
Waterford City Council

Title
1:50,000 Site Location Map

Figure DG0001



Issue Details

Drawn by:	C. Doyle	Project No.	MCW0568
Checked by:	B. O' Leary	File Ref.	MCW0568Mi0001B01
Approved by:	K. O'Sullivan		
Scale:	NTS	Drawing No.	Dg0001
Date:	03.02.09	Rev.	B01

Notes
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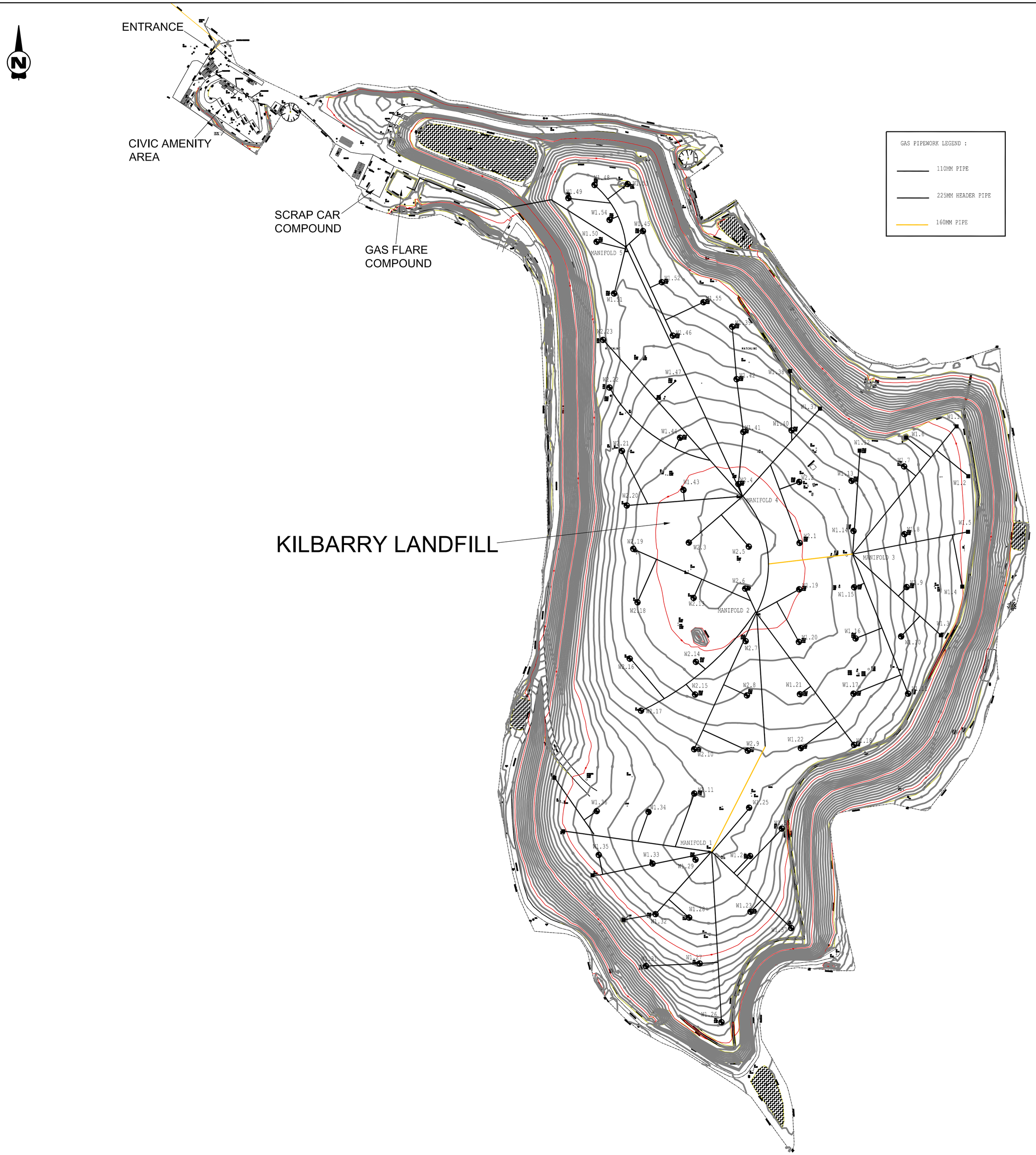

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No.	Date	Dsn. / Chk.	Amendment / Issue	App.
B01	Feb.'09	JM / CD	ISSUE FOR TENDER	KPOS
A01	Nov.'08	JM / CD	ISSUE FOR APPROVAL	KPOS

RPS
Innishmore, Ballincollig, Co Cork, Ireland
T +353 21 4865900
F +353 21 4873742
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
WATERFORD CITY COUNCIL

Project
KILBARRY LANDFILL : PERMANENT GAS FLARE CONTRACT

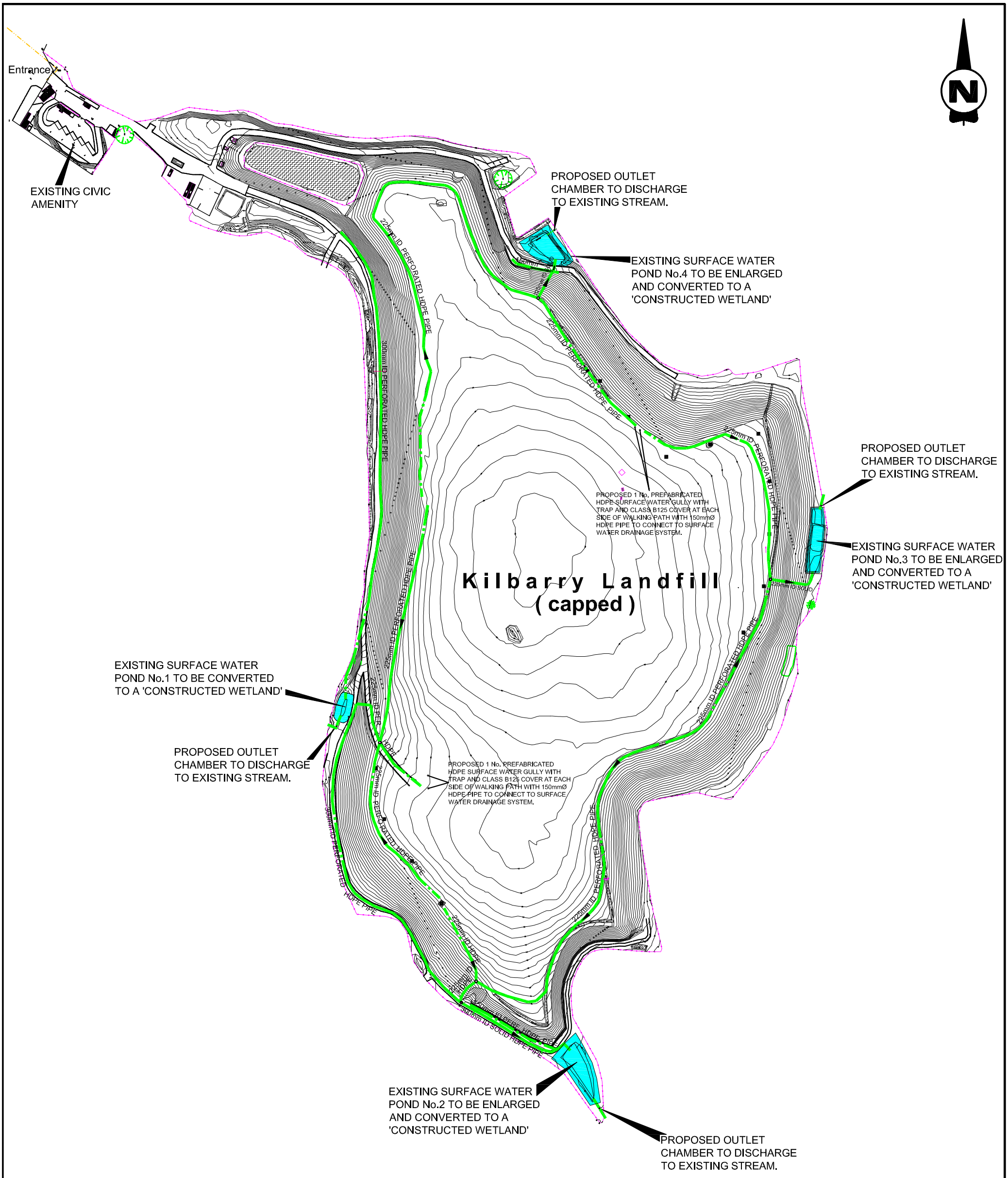
Title
LAYOUT PLAN OF LANDFILL SHOWING GAS NETWORK

Drawing Status	Sheet Size	Drawing Scale
For Tender	A1	1:1500

Drawing Number	Rev
MCW0568/02	B01

Drawn By	Checked By	Approved By	Date
JM	CD	KPOS	Nov.'08

MCW0568DG0001.dwg



No.	Date	Dm. / Chk.	Amendment / Issue	App
D01	Mar.'10	JM / CD	DRAFT ISSUE	KPOS

RPS
Innishmore
Ballincollig
Co. Cork
Ireland
T +353 21 4665900
F +353 21 4873742
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Drawing Number: 06

Rev: D01

Project: KILBARRY LANDFILL - WASTE LICENCE REVIEW

Client: WATERFORD CITY COUNCIL

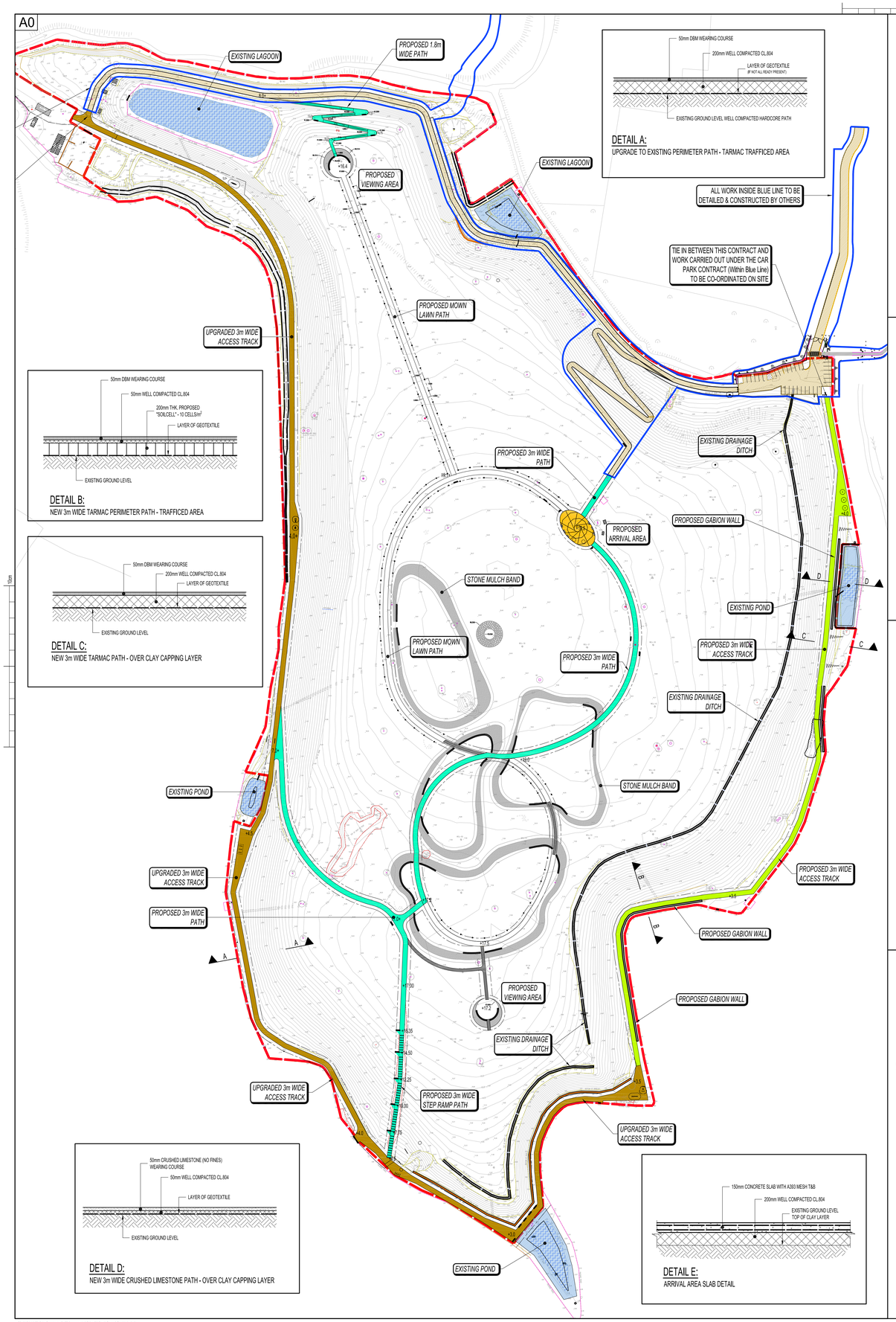
Title: SURFACE WATER MANAGEMENT SYSTEM.

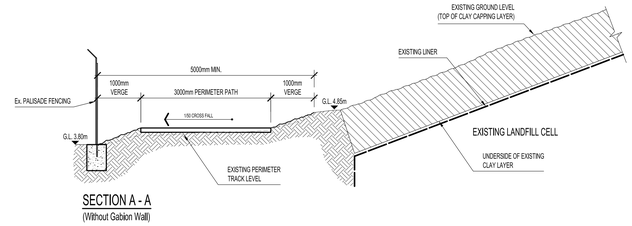
Drawing Status	Sheet Size	Drawing Scale	Drawn By	Checked By	Approved By	Date
Draft	A3	-	JM	CD	KPOS	Jan. 2010

(MCW0568DG0010.dwg)

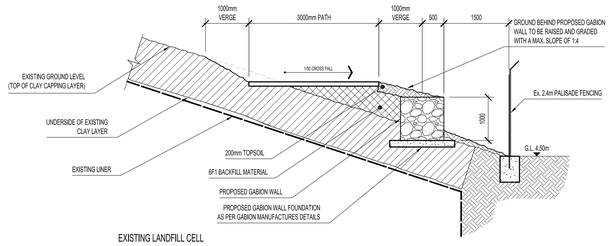
A0

10cm - SCALE WITH CAUTION AS DISTORTION CAN OCCUR

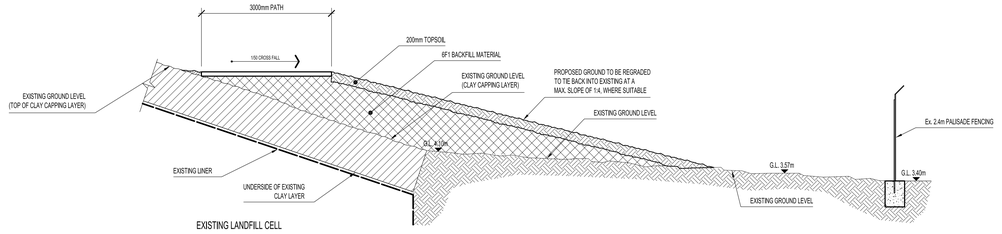




SECTION A - A
(Without Gabion Wall)



SECTION B - B
(With Gabion Wall)



SECTION C - C
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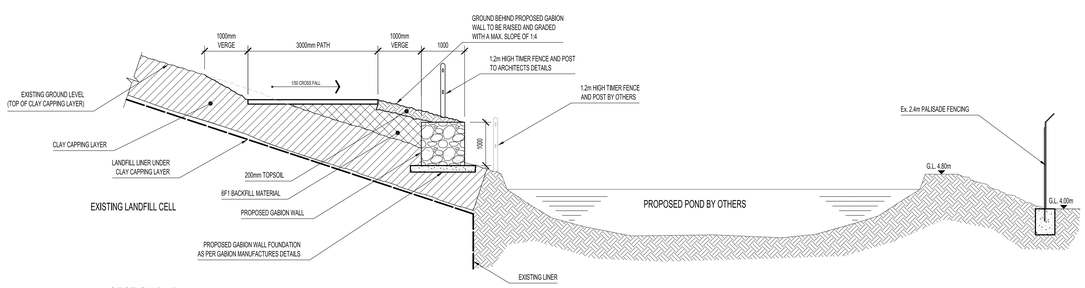

SECTION D - D
(With Gabion Wall)

NOTES:

1. EXISTING TOPOGRAPHICAL SURVEY CARRIED OUT BY FOCUS SURVEY LIMITED. ALL LEVELS RELATE TO MALIN HEAD O.D.
2. THIS DRAWING MUST BE READ IN CONJUCTION WITH ALL RELEVANT ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.
3. REFER TO ARCHITECTS DRAWINGS FOR SETTING OUT DETAILS OF ALL PATHWAYS.
4. DO NOT SCALE THIS DRAWING, IF IN DOUBT ASK.

LEGEND:

- PROPOSED SITE BOUNDARY
- ALL WORKS WITHIN BLUE LINE CARPARK CONTRACT TO BE DETAILED & CONSTRUCTED BY OTHERS
- TARMAC SURFACE - DETAIL A
- TARMAC SURFACE - DETAIL B
- TARMACE SURFACE - DETAIL C
- CRUSHED LIMESTONE SURFACE - DETAIL D
- STONE MULCH BAND BY ARCHITECTS
- MOWN LAWN PATH BY ARCHITECT

Rev.	Date	By	Description	Chd By
T1	03/09/10	J.B.	ISSUED FOR TENDER	JMacC

Drawing Status: TENDER

Job Title: LANDSCAPE REMEDIATION WORK AT KILBARRY LANDFILL

Drawing Title: PROPOSED SITE LAYOUT

ARUP
10 Oliver Plunkett Street Cork
Tel 021-4275570 Fax 021-4272245
EMail cork@arup.com
DUBLIN CORK LIMERICK

Scales	1:1000 (Plan), 1:50 (Sections), 1:25 (Details)	Originator	J.BOYLE
Checked	JMacC	Approved	JMacC	Date	03/09/10

Job No.	Drawing No.	Rev.
C2474.10	C001	T1

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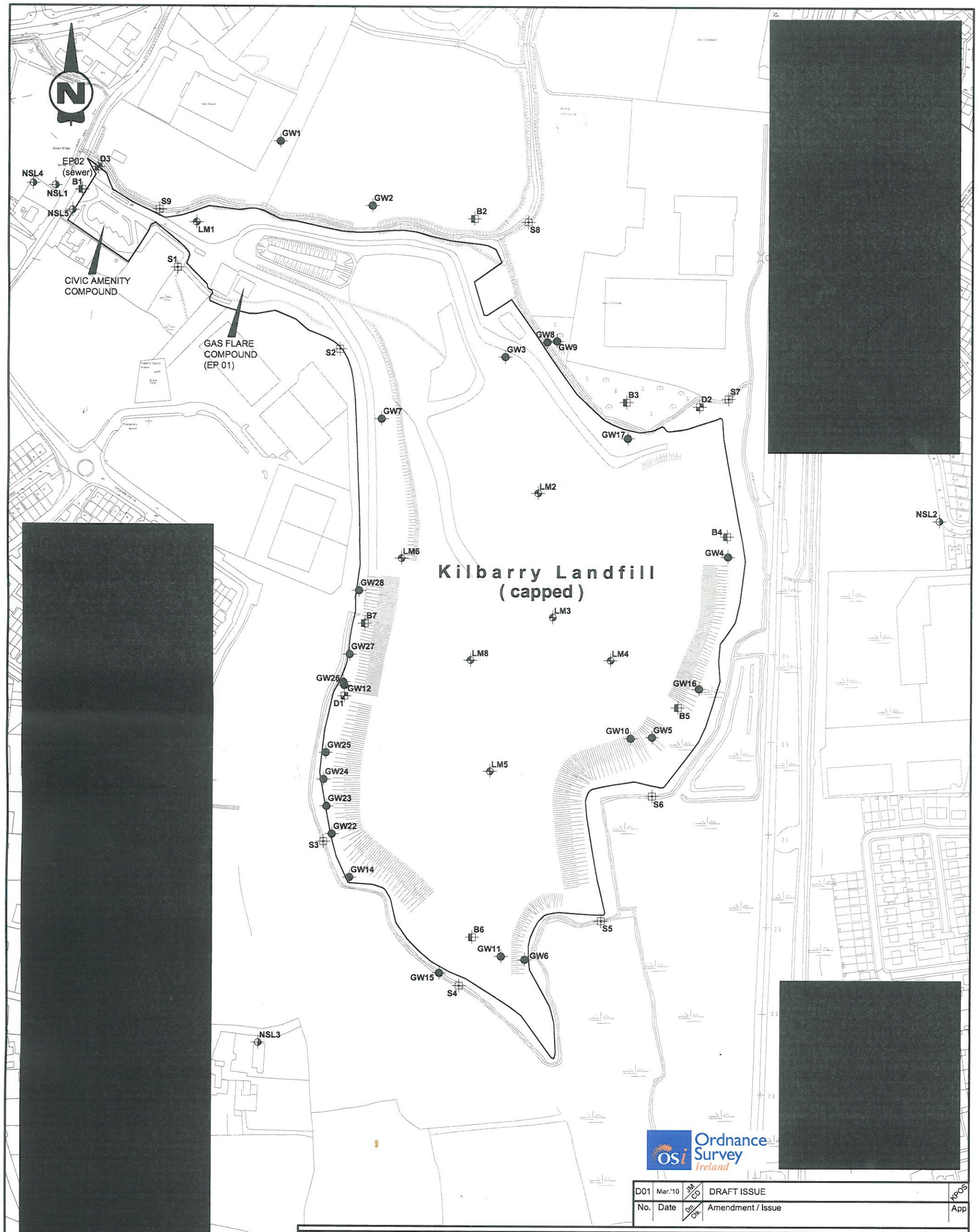


No.	Date	Dm. / Chk.	Amendment / Issue	App
D01	Mar.'10	JM / CD	DRAFT ISSUE	KPOS

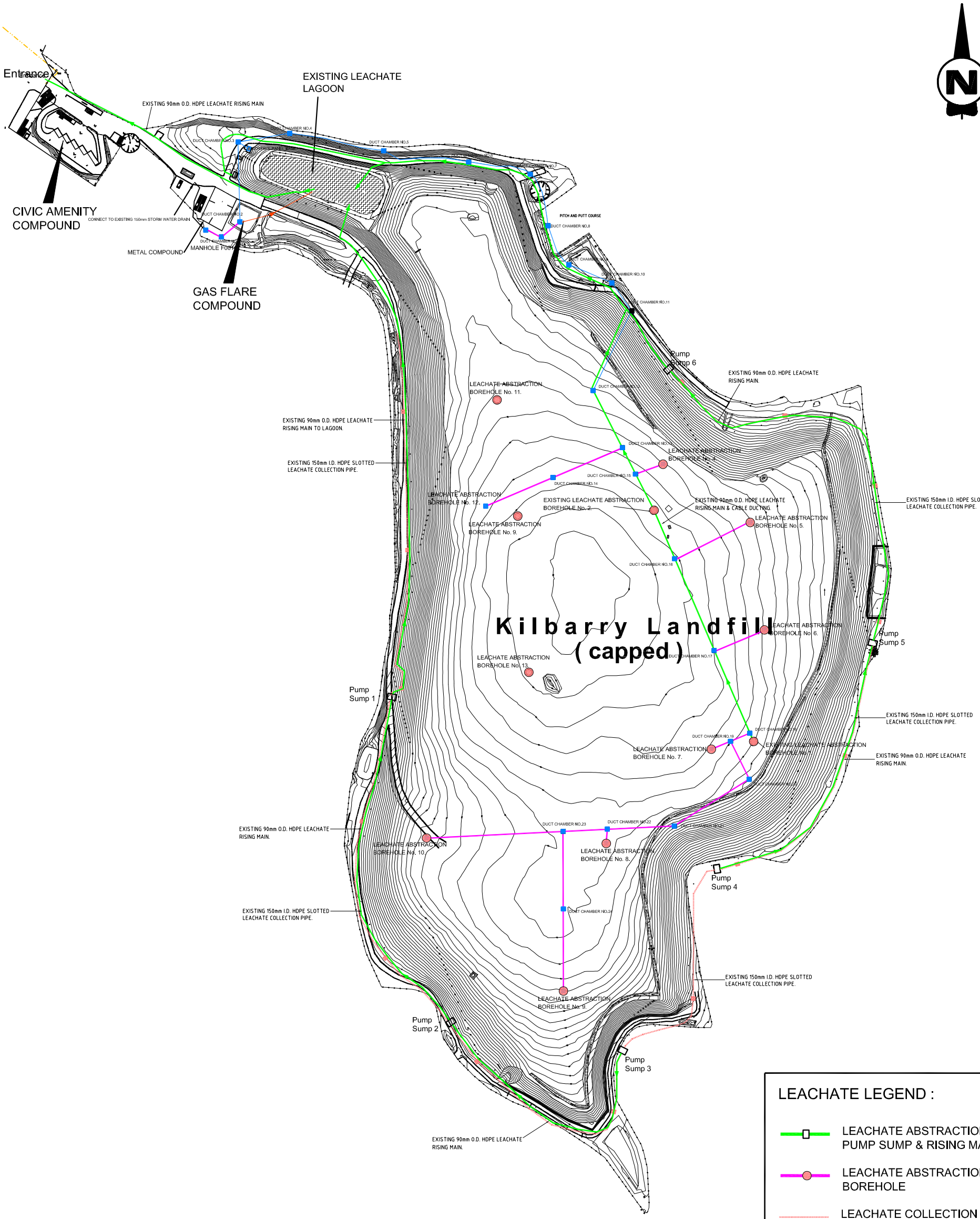
RPS

Innishmore
Ballincollig
Co. Cork
Ireland

T +353 21 4665900
F +353 21 4873742
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Drawing Number	10
Rev	D01
Project	KILBARRY LANDFILL - WASTE LICENCE REVIEW
Title	MONITORING LOCATIONS PLAN
Client	WATERFORD CITY COUNCIL

Drawing Status	Sheet Size	Drawing Scale	Drawn By	Checked By	Approved By	Date
Draft	A3	-	JM	CD	KPOS	Jan. 2010



LEACHATE LEGEND :

- LEACHATE ABSTRACTION PUMP SUMP & RISING MAIN
- LEACHATE ABSTRACTION BOREHOLE
- LEACHATE COLLECTION PIPEWORK.

No.	Date	Dm. / Chk.	Amendment / Issue	App
D01	Mar.'10	JM / CD	DRAFT ISSUE	KPOS

RPS
Innishmore, Ballincollig, Co. Cork, Ireland
T +353 21 4665900
F +353 21 4873742
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Drawing Number: 09

Rev: D01

Project: KILBARRY LANDFILL - WASTE LICENCE REVIEW

Client: WATERFORD CITY COUNCIL

Title: LEACHATE MANAGEMENT SYSTEM

Drawing Status	Sheet Size	Drawing Scale	Drawn By	Checked By	Approved By	Date
Draft	A3	-	JM	CD	KPOS	Jan. 2010