# ANNUAL ENVIRONMENTAL REPORT

## Year End December 2008

## Dunmore Landfill

Dunmore
County Kilkenny

**Waste Licence Register Number W0030-02**

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# 1. Introduction

Kilkenny County Council's Landfill Site at Dunmore received its first Waste Licence (30/1) from the Environmental Protection Agency on the 23rd November 1999. In March 2001 an application was made to review this Licence, to incorporate an enhanced entrance, better infrastructural features and a further four cells. The EPA granted the review of the licence in May 2002 register no. 30/2. The reporting period for this Annual Environmental Report is from 01/01/08 to the 31/12/08.

Records for gas production and waste quantities are based on the waste quantities entering the landfill over the weighbridge. Accurate records are available from July 1997 when the weighbridge was installed and used for cells 8 – 14; estimated figures are used for waste deposited since 1989. All water balance calculations, site area etc. refer to the entire licensed boundary of the site incorporating cells 1-14 (area for potential leachate generation).

# 2. Waste Acceptance

## *2.1 Waste Activities*

The categories of waste listed below may be accepted at the landfill site: -

- Household refuse collected by refuse contractors in the functional areas of Kilkenny County Council and Kilkenny Borough Council.
- Commercial refuse (similar in character to household refuse) collected by private refuse contractors in the functional areas of Kilkenny County Council and Kilkenny Borough Council. Restrictions on commercial recyclable waste have been in force since September 2001 and will continue under the terms of the Waste Management (Packaging) Regulations and the terms of the Waste Licence.

- Household refuse which is transported directly by householders to the landfill site or brought to the C.A. site which is in turn is deposited to landfill, including green waste.
- Commercial refuse (similar in character to household refuse) which is transported directly to the landfill site. Restrictions on Commercial recyclable waste have been in force since September 2001 and will continue under the terms of the Waste Management (Packaging) Regulations and the terms of the Waste Licence.
- Household waste for recycling which is temporarily stored on site (Mixed Electrical Goods, Steel/Aluminium Cans, Clear/Green/Brown Glass, Mixed Paper, Cardboard, Plastic Packaging, Tetra pack, Gas Cylinders, Timber, Metal, Waste Oils, Household Hazardous Waste, Textiles, Lead Acid/Primary Batteries)
- Non-hazardous construction and demolition waste which is specifically required for the site and is accepted by agreement with Kilkenny County Council.
- Non-hazardous industrial waste. Restrictions on Industrial recyclable waste have been in force since September 2001.
- Lime treated sewage sludge from Kilkenny Main Drainage treatment plant at Purcellsinch may be accepted as a soil conditioner in landfill cover.
- Litter, street sweepings and gully cleanings.
- Bonded asbestos, double bagged in small quantities, subject to 5 tonnes as specified in the licence (None accepted since August 2001).
- Imported cover and road material in quantities as required

The total maximum amount of each waste that may be accepted is listed in the table below.

| WASTE TYPE | MAX (PER ANNUM) | TOTAL 2008 |
|---|---|---|
| Household | 20,995 Note 1 | 12,263 |
| Commercial | 14,000 Note 1 | 5,816 |
| Industrial Non-Hazardous Solids | 5,000 Note 1 | 0.94 |
| Treated Sewage Sludge | 1,000 Note 2 | 0 |
| Construction and Demolition Waste | 1,000 Note 3&4 | 160 |
| Green Waste for Composting | 1,500 Note 5 | 0 |
| **TOTAL FOR DISPOSAL** | **40,000** | **18,239.94** |

Note 1: - The tonnage of household waste, commercial waste and industrial non-hazardous solid waste may be increased with the prior agreement of the Agency provided that the total amount of these wastes accepted at the landfill for disposal does not exceed the combined total of 40,000 tonnes per annum.
Note 2: - Treated sewage sludge may only be accepted at the facility for recovery and in accordance with Condition 5.7.1.
Note 3: - Construction & Demolition Waste shall not be disposed of at the facility but may be accepted for recovery for use as daily cover, in site construction works and landfill restoration. This quantity may be increased subject to agreement with the Agency.
Note 4: - A maximum of 5 tonnes per annum of construction waste containing asbestos may be disposed of in accordance with Condition 5.7.3.
Note 5: - Limited to 1,000 m3 at any time.

Dunmore Landfill Site accepts only non-hazardous waste however hazardous waste in small quantities may be present in domestic refuse and in commercial refuse, particularly in skips. Kilkenny County Council has provided a separate area for the collection of white goods, brown goods and a household hazardous waste container. Specialised companies (Indaver, KMK Metals Recycling Ltd, Irish Lamp Recycling Co. Ltd and Enva Ireland Ltd) remove all of this waste from site and dispose/recycle it in accordance the relevant legislation. Kilkenny County Council also provides a mobile Chemcar collection of household hazardous waste at various times through out the year at different locations around the county.

From September 2001 restrictions were put on the acceptance of all recyclable commercial and industrial waste, including white & brown goods, paper, cardboard, metal, timber, glass and cans.

The demand for recycling services and quantities of recyclable materials increased through out 2008. Kilkenny City and County have 43 Bring Site accepting glass, cans, newspapers and plastic bottles. It is hoped that the CAS and the Bring Sites will encourage recycling and reduce the amounts of domestic waste being landfilled. In addition to this over 8000 home compost units have been distributed throughout the county. It is hoped that this will result in a significant reduction in the amounts of kitchen green waste going for disposal.

Animal waste such as hide and skin trimmings and fish offal has been restricted from the site since the 30th November 2001, which is now policy at the site.

Kilkenny County Council may prohibit the importation of specific waste categories from time to time to conserve void space and/or to comply with any requirements, which the Council may decide from time to time.

### *2.2 Recycling*

In October 2003 Kilkenny County Council opened a dedicated recycling facility. The materials accepted at the site include: -

- Mixed Paper
- Cardboard
- Glass (Brown, Green, Clear)
- Batteries (Primary, Lead Acid, fence batteries)
- White Goods
- Brown Goods

- Household Hazardous waste
- Waste Oils/filters
- Steel/Aluminium Cans
- Mixed Metal
- Timber
- Textiles
- Tetra Pack
- Plastics
- Reading Books

Since opening in 2003 there has been a significant increase in the quantities accepted for recycling at the facility. The quantities of recyclable material accepted at the C.A. site and the category breakdown can be found in Appendix A. Since opening an extra member of staff has been employed specifically to supervise the centre, with security systems to monitor activity. There is a nominal charge levied for using the centre to assist with the running cost.

From the 13th August 2005 Dunmore Civic Amenity Site accepts WEEE (Waste Electronic & Electrical Equipment) free of charge from householders under the Waste Management (waste Electrical and Electronic Equipment) Regulations 2005. Registered retailers are permitted to deliver the WEEE (collected from a like for like take back scheme) to the CA site by prior agreement.

### *2.3 Quantity and Composition*

The quantities of waste accepted at the landfill since July 1997 and the categorised breakdown can be found in Appendix A. The recyclable waste removed from the site i.e. white/brown goods, bottles (green, brown and clear), metal, timber, paper/cardboard, tetra and mixed plastic are also listed.

### *2.4 Capacity*

The remaining capacity (January 2009) at Dunmore was approximately 11,500 tonnes, which is around 2/3 year at current filling rates. An agreement to revise the final contours together with a reduction in the tonnage accepted at Dunmore helped to prolong the life of the old site during 2002. An interim agreement was reached with Carlow County Council to accept some waste (up to 7000 tonnes, 2,500 tonnes actually diverted); from March 2002 to September 2002 which also assisted in prolonging the life until new void space was provided. This is a reciprocal arrangement.

## 2.5 Area Occupied by the Waste

The area occupied by the waste is shown in the table below:-

| Cell Number | Area (sqm) | Area (Hectares) | Area (Acres) | Comment |
|---|---|---|---|---|
| 1 | 5304 | 0.53 | 1.31 | Full |
| 2 | 3546 | 0.35 | 0.865 | Full |
| 3 | 3142 | 0.31 | 0.766 | Full |
| 4 | 6169 | 0.62 | 1.532 | Full |
| 5 | 3872 | 0.39 | 0.964 | Full |
| 6 | 4888 | 0.49 | 1.211 | Full |
| 7 | 2921 | 0.29 | 0.717 | Full |
| 8 | 7464 | 0.75 | 1.853 | Full |
| 9 | 4360 | 0.44 | 1.087 | Full |
| 10 | 6163 | 0.62 | 1.532 | Full |
| 11 | 6500 | 0.65 | 1.61 | Full |
| 12 | 3050 | 0.31 | 0.75 | Full |
| 13 | 6170 | 0.62 | 1.52 | Full |
| 14 | 5390 | 0.54 | 1.33 | ½ Full |
| **Total** | **68939** | **6.9** | **17.03** | |

Filling is currently taking place in cell 14. Cell 13 is full as at August 2008. The capping to cells 7, 8, 9, 10, 11 and 12 was largely completed during 2008 with the final capping of cell 7 to be completed in early 2009.

### *2.6 Deposition Methods*

Waste presented at Dunmore landfill for disposal is handled in the following ways: -

Household and commercial waste collected by private refuse contractors and Kilkenny Corporation is deposited at the active land filling face. The waste is then spread and compacted as soon as it becomes practical to do so, by the site staff.

Waste brought directly to the site by householders is placed by them in the container located in the recycling centre. When this container is full, it is weighed and transported to the active tipping face for disposal. All recyclables brought to the site are directed to the appropriate location and are placed in the appropriate receptacle for temporary storage on site. As soon as these receptacles are full, site staff arranges for the removal of the material to an authorised materials recycling centre. From the start of 2002 some white goods and brown goods have been reclassified in the European Waste Catalogue and these goods will be handled in accordance with this directive (EC) No. 2557/2001.

Bonded asbestos in small quantities is accepted at the site provided it is double bagged and secured in strong polythene bags. Prior arrangement with the site staff is required. A pit is excavated in the main body of deposited waste to a minimum depth of 3 metres. The bags are carefully placed in the pit and covered with excavated material up to original levels. Asbestos has not been accepted at the site since 2001 and it is intended to continue this practice.

Lime treated sewage sludge may be accepted at the site for use as a soil conditioner in capping works at the site. No sludge was accepted as part of such works in 2008.

Small amounts of construction/demolition waste are accepted at the site. This waste is

tipped away from the tip face. An assessment is carried out on the waste and is used for internal haul roads, inert cover material and strengthening the tipping face. Any recoverable metal is placed in the metal recycling skip. Any material unsuitable for these operations is landfilled, which would only be from a domestic source. A separate construction and demolition facility does not operate at present.

The site is licensed to set up a composting facility but this did not commence in 2008. Christmas trees brought to Dunmore during January 2008 were shredded and used as capping on the site.

# 3. Environmental Monitoring

## *3.1 Report on Emissions*

### *3.1.1 Landfill Gas*

Landfill gas monitoring locations at Dunmore are set out in the following locations.

*Perimeter Gas Migration Monitoring Locations*

| Station | Easting | Northing |
|---|---|---|
| GM1 | 249524 | 160493 |
| GM2 | 249587 | 160435 |
| GM3 | 249804 | 160270 |
| GM4 | 249867 | 160441 |
| GM5 | 249765 | 160510 |
| GM7 | 249732 | 160623 |
| GM8 | 249845 | 159922 |
| GM9 | 249529 | 160616 |
| GM10 | 249900 | 160467 |
| GM11 | 249930 | 160497 |
| GM12 | 249930 | 160535 |
| GM13 | 249900 | 160568 |
| GM14 | 249879 | 160632 |
| GM15 | 249848 | 160668 |
| GM16 | 249820 | 160707 |
| GM17 | 249709 | 160660 |
| GM18 | 249671 | 160714 |
| GM19 | 249818 | 160545 |
| GM20 | 249754 | 160497 |
| GM21 | 249751 | 160443 |
| GM22 | 249764 | 160401 |
| GM23 | 249811 | 160374 |

*Vent Pipe Locations (harnessed gas wells)*

| Station | Easting | Northing |
|---|---|---|
| VP1 | 249785 | 160305 |
| VP2 | 249752 | 160329 |
| VP3 | 249771 | 160357 |
| VP4 | 249735 | 160378 |
| VP5 | 249718 | 160350 |
| VP6 | 249688 | 160376 |
| VP7 | 249704 | 160398 |
| VP8 | 249650 | 160395 |

| | | |
|---|---|---|
| VP9 | 249674 | 160427 |
| VP10 | 249696 | 160466 |
| VP11 | 249718 | 160496 |
| VP12 | 249682 | 160499 |
| VP13 | 249655 | 160465 |
| VP14 | 249637 | 160423 |
| VP15 | 249611 | 160445 |
| VP16 | 249607 | 160483 |
| VP17 | 249644 | 160503 |
| VP18 | 249508 | 160564 |
| VP19 | 249537 | 160593 |
| VP20 | 249565 | 160621 |
| VP21 | 249593 | 160649 |
| VP22 | 249623 | 160676 |
| VP23 | 249606 | 160546 |
| VP24 | 249591 | 160571 |
| VP25 | 249559 | 160586 |
| VP26 | 249566 | 160554 |
| VP27 | 249532 | 160563 |
| VP28 | 249540 | 160537 |
| VP29 | 249565 | 160516 |
| VP30 | 249832 | 160014 |
| VP31 | 249630 | 160664 |
| VP32 | 249884 | 160007 |
| VP33 | 249608 | 160611 |
| VP34 | 249918 | 160038 |
| VP35 | 249577 | 160592 |
| VP36 | 249953 | 160070 |
| VP37 | 249589 | 160528 |
| VP38 | 249647 | 160566 |
| VP39 | 249674 | 160565 |
| VP40 | 249685 | 160589 |
| VP41 | 249618 | 160562 |
| VP42 | 249673 | 160623 |
| VP43 | 249654 | 160604 |
| VP44 | 249628 | 160588 |
| VP45 | 249633 | 160622 |
| VP46 | 249582 | 160623 |
| VP47 | 249728 | 160577 |
| VP48 | 249758 | 160574 |
| VP49 | 249760 | 160543 |
| VP50 | 249787 | 160570 |
| VP51 | 249759 | 160600 |
| VP52 | 249809 | 160585 |
| VP53 | 249780 | 160615 |
| VP54 | 249808 | 160638 |

Gas monitoring and migration results are submitted to the Agency biannually. Results for 2008 are available in Appendix B. The gas extraction and enclosed flare system which controls gas venting and migration was extended during 2008 with the addition of gas wells in cells 8, 9, 12, 13 & 14. All gas wells on the site are harnessed and the gas is burnt off thus reducing the landfills contribution to ozone depleting gases by 90%, and also reduces landfill gases odour.

*Gas Quantity Emissions from the Landfill*

The initial aerobic phase and the first transition stage only take a couple weeks. During these phases there is no gas produced as a result of degradation. In the second transition phase there is no longer oxygen intake to the site and the anaerobic phase begins. This results in methane production and will continue for up to two years. In this period of time the production of gas is not stable and the full annual production of gas is not reached. When gas production stabilizes in the methanogenic phase and total expected time until the end of methane production is approximately twenty years. The table below is an estimate based on the tonnages accepted since the weighbridge was installed (07/97) and since waste input (in tonnes) records were kept. The figures in the table below are based on an estimated gas production of 75 l/kg (which includes an assumption of 60% wet waste). A detailed discussion of landfill gas production since the site opened is contained in the EIS submitted as part of the licence review.

| Year | Annual Tonnage Waste | | Annual Gas Production Rate Methane (Mm3/yr) | Cumulative Methane Gas Production Rate (Mm3) | Annual Landfill Gas Production (Mm3/yr) |
|---|---|---|---|---|---|
| 1997 (6mths) | 12,793.65 | 0.02 | 0.02 | 0.02 | 0.04 |
| 1998 | 21,828.05 | 0.04 | 0.09 | 0.07 | 0.16 |
| 1999 | 27,853.72 | 0.05 | 0.18 | 0.24 | 0.33 |
| 2000 | 33,593.38 | 0.06 | 0.30 | 0.53 | 0.54 |
| 2001 | 29,805.96 | 0.06 | 0.42 | 0.95 | 0.76 |
| 2002 | 17,651.90 | 0.03 | 0.51 | 1.48 | 0.92 |
| 2003 | 17,259.53 | 0.03 | 0.57 | 2.05 | 1.04 |
| 2004 | 23,334.00 | 0.04 | 0.65 | 2.69 | 1.18 |
| 2005 | 19,266.00 | 0.04 | 0.73 | 3.42 | 1.32 |
| 2006 | 18,516.00 | 0.03 | 0.80 | 4.22 | 1.45 |
| 2007 | 22,267.00 | 0.04 | 0.87 | 5.09 | 1.59 |
| 2008 | 18,239.94 | 0.03 | 0.95 | 6.46 | 1.73 |

In November 2003 a temporary gas extraction and flare system was introduced at the site in cells 8-10. This resulted in a noticeable improvement in the air quality within the site, a reduction in odour problems and a reduction in measured exceedance levels adjacent to these cells. During 2004 a permanent gas extraction and enclosed flare system was installed. This system controls all gas venting and migrating from cells 1 to 14, the gas is drawn out of the cell and is burnt off. Since the installation of this system the landfill gases have been significantly reduced by 90%. This system was extended during 2008 to extract gas from Cell 13 & 14.

### *3.1.2 Surface Water, Groundwater and Leachate*

***Surface Water: -*** Surface water is analysed quarterly and the results are submitted to the Agency. The monitoring locations are listed below: -

| Station | Easting | Northing |
|---|---|---|
| Stream A -Upstream | 249978 | 160617 |
| - Downstream | 249544 | 160503 |

Results of the surface water monitoring are available in Appendix C

***Groundwater:*** - Groundwater well quality is tested quarterly, and results are submitted to the Agency as set out in condition 9.1 and schedule F of the licence. The monitoring locations are listed on below: -

| Station | Easting | Northing |
|---|---|---|
| No. 3 | 250011 | 160551 |
| GW1 | 249675 | 160924 |
| No. 14 | 249547 | 160507 |
| GW2 | 249867 | 160440 |
| GW3 | 249500 | 160511 |
| GW4 | 249562 | 160456 |
| MW1 | 249619 | 160383 |
| No.15 | 249454 | 159728 |
| No. 6 | 249488 | 160191 |

Results throughout the year have shown no adverse effects to the ground water as a result of landfilling in the area, and are listed in Appendix C.

***Leachate:*** - The composition of leachate is tested at leachate manholes and holding lagoon quarterly and results are submitted to the Agency as set out in condition 9.1 and schedule F of the licence. The results are listed in Appendix C. The monitoring locations are listed below: -

| **Monitoring Locations** | **Easting** | **Northing** |
|---|---|---|
| Holding Lagoon | 249566 | 160484 |
| Manhole 1 | 249649 | 160608 |
| Manhole 2 | 249600 | 160604 |
| Manhole 3 | 249521 | 160536 |
| Manhole 4 | 249526 | 160507 |
| Manhole 5 | 249566 | 160480 |

The volume of leachate produced and removed from the site is as follows: -

The water balance equation was calculated as follows: -

Amount of Leachate on Site = (effective rainfall * area cell 1-7 * % area not yet capped) + (effective rainfall * area cell 8-10 * % area not yet capped) + (effective rainfall * area cell 11-12* % area not yet capped) + (effective rainfall * area cell 13-14* % area not yet capped)–(leachate removed)–(primary absorption factor)–(degradation water usage2008)

Where: -

Effective Rainfall = Total Rainfall – Potential Evapotranspiration (Met Eireann Figures)

Primary absorption may be taken as 100 l/tonne for 10% of waste as the amount of dry materials is decreasing from domestic sources.

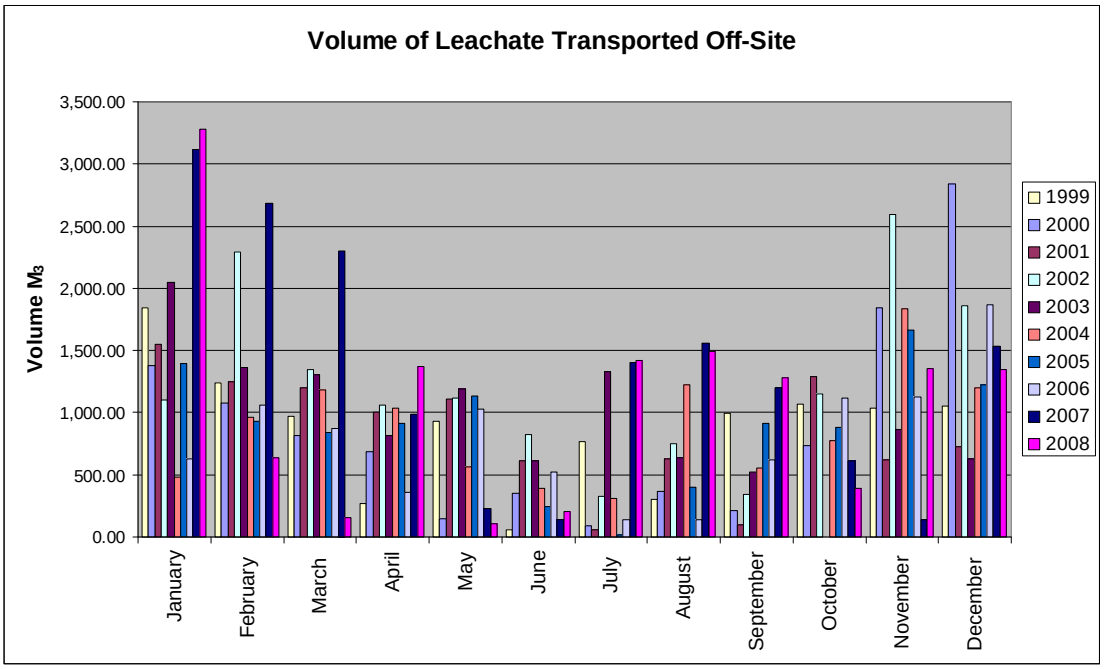
Volume required for degradation = 2mm per square meter

Amount of Leachate on Site = (3126.25) + (942.16) + (1000.46) + (6055.13) – (12546.6) - (182.4) – (137.87)

Amount of Leachate on Site = -1,742.89 $m^3$

The amount of leachate removed from site and frequency was in response to the amount of rainfall and potential evapo-transpiration at the site i.e. the rate of leachate

production. In 2008 the rainfall was in line with the average rate and similar to the amount in 2007 with a small increase of 8.1% in 2008. More leachate was removed off site than was produced on site during 2008 as it was necessary to store some leachate on site at the end of 2007. This leachate was then tankered off site in early 2008. A second leachate lagoon was installed during 2003 which provides for a much greater storage capacity at the site. The following graph shows the amounts of leachate taken from the site: -




During 2004 leachate recirculation tankers were installed in cells 8-10 to reduce the cost of leachate collection and disposal, enhance settlement with the aim of recovering air space, to encourage gas production and to promote early stabilisation. The leachate recirculation tanks are listed below.

**Leachate recirculation Tanks**

| Station | Easting | Northing |
|---|---|---|
| LR 1 | 249515 | 160572 |
| LR 2 | 249553 | 160605 |
| LR 3 | 249602 | 160643 |
| LR 4 | 249647 | 160670 |

### *3.1.3 Dust monitoring*

***Dust Monitoring: -*** Dust Monitoring takes place three times a year and the results are submitted to the Agency. The monitoring locations are listed below: -

| **Station** | **Easting** | **Northing** |
|---|---|---|
| DG 1 | 249565 | 160453 |
| DG 2 | 249756 | 160467 |
| DG3 | 249700 | 160638 |
| DG 4 | 249870 | 160671 |
| DG 5 | 249940 | 160588 |

### *3.1.4 Noise Monitoring*

***Noise Monitoring: -*** Noise Monitoring is analysed annually and the results are submitted to the Agency. The monitoring locations are listed below: -

| **Station** | **Easting** | **Northing** |
|---|---|---|
| NS 1 | 249725 | 160830 |
| NS 2 | 249852 | 160740 |
| NS 3 | 250006 | 160593 |
| NS 4 | 250003 | 160571 |
| N1 | 249803 | 160290 |
| N2 | 249489 | 160927 |
| NS 5 | 249981 | 160510 |
| Dunmore Cottage | 249442 | 160896 |

The locations of all sampling and monitoring points can be found in the attached drawing in Appendix D.

### *3.2 Interpretation of Environmental Monitoring*

***Gas:*** - Gas monitoring took place on the site at both gas well locations and migration points. The results from the wells indicted that approximately 2/3 of the gas in the vents was methane with the remaining 1/3 carbon dioxide. These are the normal levels that can be expected in a landfill of this age.

Results from the migration points around the site indicated a number of exceedances in the set trigger levels, which are given in Schedule C of the licence. An Assessment of Landfill Gas Measurements at Dunmore Landfill, Co. Kilkenny analysing the processes responsible for these exceedence levels was carried out in March 2006 and submitted to the agency in 2007. This report concluded that there is $CO_2$ naturally occurring in the Dunmore Area. To allow for this finding the Agency agreed to increase the tolerance of the $CO_2$ trigger level, from 1.5% v/v to 3% v/v, therefore any levels =>3% v/v would be treated as an incident and reportable to the Agency. During 2008, 30.43% of the monitoring migration analysis points had trigger levels = or > than 1.5%, 90.91% of these exceedences had values in the range of = or > 1.5% v/v & <3% v/v, and 9.09% of these exceedences were in the range of = or > 3% v/v. The number of exceedences in the gas migration monitoring points was slightly higher than that in 2007 however the overall number of exceedences = or > 3% v/v had decreased from 6.72% in 2007 to 2.77% in 2008. There were no exceedences of methane at any of the migration locations during 2008. If a trigger level was exceeded, the Agency was notified in writing and an investigation was carried out into the cause. In most cases once a cause was established, remedial measures were put in place. These resulted in the measures of carbon dioxide to fall within acceptable levels or be eliminated.

***Ground/Surface Water:*** - Primary indicator parameters used to detect the presence of any leachate infiltration to groundwater are conductivity and chloride levels. The levels of chloride and conductivity are within acceptable levels and there is no noticeable increases in these levels since records began.

***Dust Monitoring***: - Dust monitoring was carried out at five different locations during the months of August/September, April/May and February/March. There was one exceedence in dust deposition limits during 2008. The exceedence in the trigger level was due to construction works adjacent to the dust monitoring point.

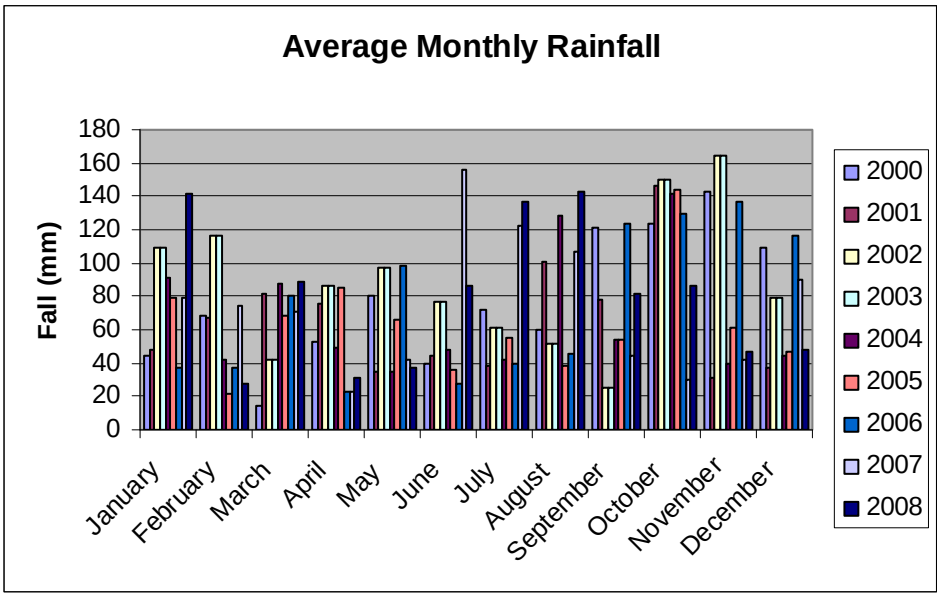
***Noise Monitoring***:-Noise monitoring was carried out during March 2009. Six sensitive locations and two boundary locations were monitored during daytime landfill operations. Results indicated that the local noise environment was primarily impacted by passing traffic on the N77 Kilkenny-Durrow Road, and that the noise from the landfill was negligible.

### *3.3 Meteorological Monitoring*

### *Meteorological Report*

The following is a summary of the rainfall amounts and potential evapo-transpiration rates at Dunmore. The results were obtained from Met-Eireann.

| Month | Rainfall (mm) | Potential Evapotrans. (mm) |
|---|---|---|
| January | 141.9 | 13.0 |
| February | 27.3 | 17.6 |
| March | 89.0 | 36.7 |
| April | 31.8 | 51.7 |
| May | 37.1 | 75.4 |
| June | 86.8 | 75.1 |
| July | 136.7 | 76.1 |
| August | 142.4 | 60.9 |
| September | 81.5 | 41.6 |
| October | 87.0 | 23.4 |
| November | 47.4 | 12.6 |
| December | 47.8 | 7.0 |
| **Total** | **956.7** | **491.1** |



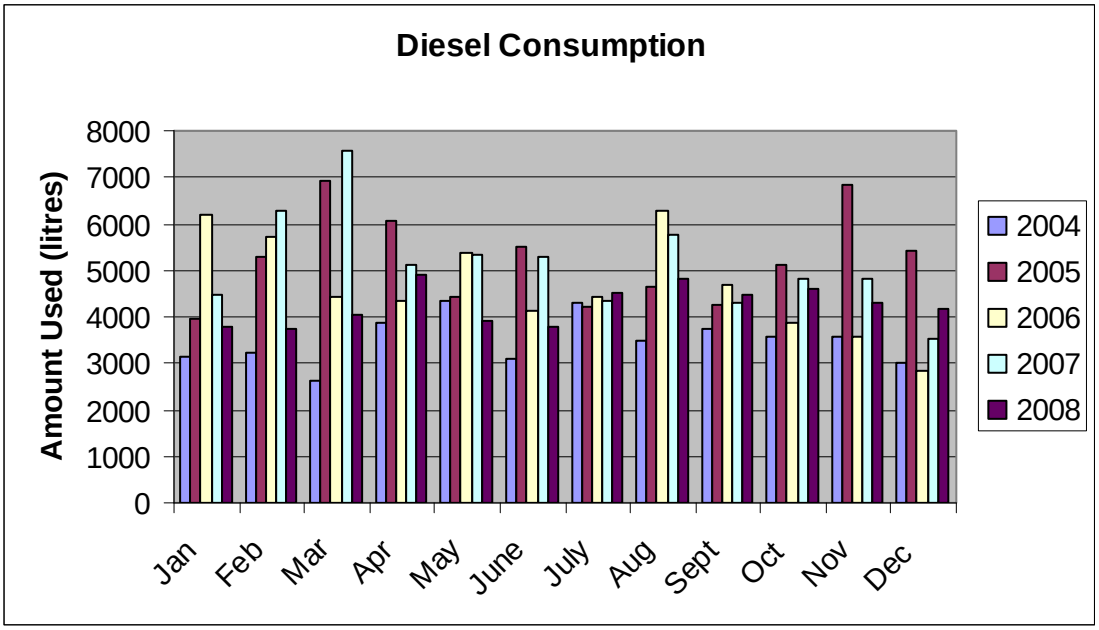

The rainfall rate in 2008 was higher to that of the previous year. See appendix E for Metrological data.

# 4. Site Infrastructure and Development

## *4.1 Resource and Energy Consumption*

The following raw materials are used as a result of the land filling process at Dunmore landfill facility:

**4.1.1 Diesel Fuel**: -The amount of fuel consumed per week at the landfill site averages at approximately 982 litres, by the loading shovel, tractor, excavator, and compactor. There was a decrease in diesel consumption by 17.13% in 2008 compared to previous year. The rate of fuel use is relatively constant throughout the year, with increases in use, when additional plant and machinery are on site to facilitate development works.



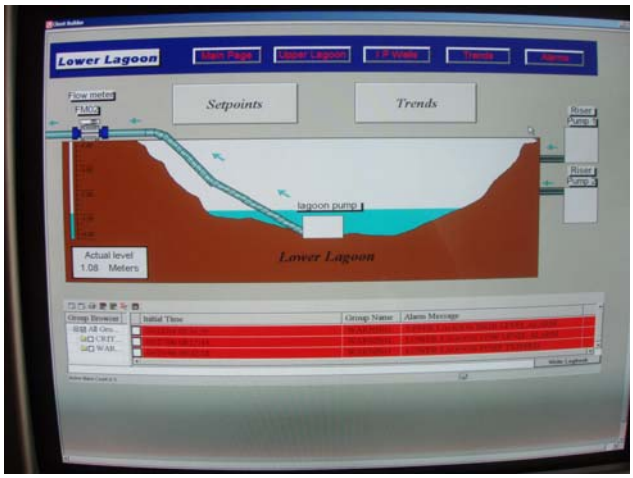

**4.1.2 Electricity**: -. Electricity is used in the following buildings; weighbridge office, main offices and recycling centre office. It is also used to operate the weighbridge computer, pump, lights, heating and cooling appliances, CCTV cameras etc. In 2003 a new three phase supply was installed to meet the demands of the revised licence and supply the recycling centre, gas flare, pumps, SCADA system and extended office.

**4.1.3 Sprinkling Water**: - During periods of dry weather water is used to suppress dust on the site haul roads. Occasionally water maybe taken from the river Nore located adjacent to the site. The quantities of water used would vary but would not exceed 8,000 gallons per day during dry weather. The entrance and weighbridge area are watered down and cleaned using the road sweeper or a power washer and a 300 gallon reused oil tank as a water reservoir filled from the site water supply. Some sprinkling around the weighbridge is carried out using local groundwater sources.

### *4.2 SCADA System:-*

#### 4.2.1 Leachate Monitoring

Supervisory Control and Data acquisition to facilitate monitoring and management of Leachate levels in the Leachate lagoons and new cells is in operation at the facility. This system allows for constant monitoring of all pumps, leachate levels in wells and lagoons, to ensure the levels in cells do not rise above 1m and that leachate level in lagoons shall always maintain a minimum freeboard of 0.75m. Alarms will be raised should any of the levels be reached. (see below typical screen showing level in lower lagoon). The SCADA system was upgraded during 2008 to facilitate the control of the additional leachate pumps in Cells 13 & 14.



### 4.2.2 Gas collection and flaring system

Collection and flaring of gas commenced August 2004. The flare operates 24hr a day 7 days a week at temperatures of approx $1020^0$C. SCADA system on site constantly monitors and records the flaring system. Data is down loaded on a monthly basis from the flare system to an excel spread (see Appendix K for sample of data) the following parameters are recorded:

| |
|---|
| **Ambient temperature** |
| **Atmospheric Pressure** |
| **Carbon Dioxide** |
| **Flow** |
| **Methane** |
| **Oxygen** |
| **Pressure** |
| **Flare Temperature** |
| **Carbon Monoxide** |

***Closed Flare System***

## *4.3 Development Works*

### 4.3.1. Development Works over during the Reporting Period

Over the past year the following development works have been carried out at the facility:

- Installation of gas monitoring wells in Cells 13 & 14, with the approval of the agency.
- Connection of additional gas wells in Cells 8, 9, 12 & 13 to the gas extraction and flaring system.
- Completion of capping works to Cells 8, 9, 10, 11 & 12.
- Continuation of capping works to Cell 7.
- Continuation of restoration of lined cells.
- SCADA system for leachate monitoring upgraded to facilitate the control of the additional leachate pumps in Cells 13 & 14.
- Removal of haulage roads to facilitate the completion of capping works.
- Further signage installed in Civic Amenity Site.
- Additional signage installed at site entrance.
- Installation of weighbridge software system upgrade.

### 4.3.2 Proposed Development Works

It is proposed to carry out the following developments at Dunmore in the year 2009 in accordance with the EIS and subsequent Waste Licence.

- Complete remaining capping of Cell 7.
- Installation of additional gas wells in Cell 14, with the approval of the agency.
- Connection of further gas wells in Cell 14 to the gas extraction and flaring system.
- Extension of leachate recirculation system.
- Install further signage at site entrance.
- Upgrade SMS texting system and data logging system on SCADA software for gas flare.
- Customer characterisation survey to be carried out to identify customer needs post closure of landfill.
- Review of traffic management measures on site.
- Review of Civic Amenity Site Services.

## 4.4 Tank and Pipeline Integrity Tests

In respect of Condition 5.12.2, an integrity test on the leachate-holding lagoon and pipeline outside the cells was carried out.

'Geomembrane Testing Services Limited', carried out an integrity test on the leachate holding lagoon which was submitted to the Agency on 2nd September 2003. Air pressure and high frequency spark tests were carried out over the lined area of the lagoon. It was found that 'the geomembrane liner was free of defects at the time of final inspection'. Lagoon structures were retested in 2007 with the final part of the test completed in early 2008. Upon completion of the integrity test on both leachate holding lagoons, results were forwarded to the Agency.

### *4.5 Restoration Plan and Aftercare Plan*

The final ground level contours of the landfill are shown on Drawing No. 30-2-DWG03, contours map, while the restoration plan for the area is shown on Drawing No. 30-2-DWG02, Landscaping Plan. These are available in appendix F.

Phase I of the Restoration in Cells 1 – 7 was completed with a temporary cap after it was filled between 1989 and 1998. Three acres of leased land has been seeded with grass and a small yard area is provided. The remaining six acres had been planted with native woodland species and fenced with a rabbit-proof fence. As part of the revised licence all seeded areas and trees were removed and a revised impermeable capping system commenced in 2003. 90% of this capping layer was completed in 2004 the remaining capping works to be completed in early 2009 as part of phase III capping. The area will be restored as outlined previously with a mix of grass and planting.

Phase II of the Restoration Scheme comprises Cells 8 – 10. As part of the licence conditions and landfill directive partial capping of cells 8 -10 commenced in 2003. At the end of 2004 50% of this capping layer was completed. Completion of the remaining capping works to cells 8, 9, 10, 11 & 12 took place during 2008. Final capping will consist of a gas drainage layer, a bentonite enhance liner, an impermeable plastic layer, surface water drainage layer, subsoil and topsoil. The restored area will be a combination of seeded and planted areas. The final capping detail was submitted to the Agency for approval and is in accordance with details shown in the EPA Landfill Manual on Restoration and Aftercare.

Phase III of the Restoration Scheme comprises Cells 8 – 14. The remainder of the site will be capped progressively within 12 months of the final filling of cells to level. Final capping will consist of a gas drainage layer, a bentonite enhance liner, an impermeable plastic layer, surface water drainage layer, subsoil and topsoil. The restored area will be a combination of seeded and planted areas. The final capping detail was submitted to the Agency for approval and is in accordance with details

shown in the EPA Landfill Manual on Restoration and Aftercare.

Prior to completion of the restoration, the gas pipework system shall be modified. Tree and shrub planting will be delayed until all remedial work on the gas system has been carried out and initial settlement has occurred. Areas subject to delays shall be restored on an interim basis and seeded with grass.

All leachate collection and control systems shall be maintained.

Upon completion of the landfill activities the following restoration/reinstatement works will be carried out: -

1. Removal of all litter screen fencing.
2. Removal of weighbridge, site offices and canteen.
3. Weighbridge and offices area no longer required shall be topsoiled and seeded with grass, those required for the operation of the civic amenity site will be maintained as required.
4. Any litter from perimeter hedging, ditches and surrounding land shall be removed.
5. All boundary fences on the site shall be secured. Hedge rows will be retained and renewed as necessary.
6. All unsurfaced roadways with the exception of the access to the leachate lagoon and civic amenity site shall be removed.
7. Decommission and removal of services, e.g. telephone, ESB, no longer required on site.
8. Erect signage indicating that the landfilling facility is closed and directing users of the civic amenity facility to the correct locations.
9. The boundary at the access road (from the Bleech Road) will be secured, all unsurfaced roadway shall be removed apart from access to the lagoon.

In the long term and subject to Waste Licence conditions and monitoring results, any appurtenances no longer required for the monitoring or maintenance programmes shall be removed off site. The localised areas affected by these works will be restored to the condition of the surrounding ground.

The leased area of land (O'Neill's pit) will be returned to the owner for agricultural grazing use, all fence boundaries restored and its maintenance, apart from monitoring points and gas wells, will no longer be the responsibility of Kilkenny County Council.

The remaining areas of land subject to agreement with the agency will be woodland/grassland after the restoration and landscaping plan is complete and specialist forestry management firms under contract with Kilkenny County Council will manage these areas.

### *4.6 Site Survey*

The site topographical survey is completed at least once a year. This survey was submitted to the Agency previously under condition 8.8.1 (ref. LC-41-MG) and will be submitted annually thereafter. Last topographical (Revision K) survey was carried out the March 2009 and sent to the Agency.

# 5. Environmental Targets and Objectives

## *5.1 Objectives and Targets*

**Objective 1**

Ensure that all waste acceptance requirements are met

**Target 1.1** All waste accepted at the facility is within the criteria set out in Part I of the Waste Licence

**Target 1.2** The amounts of each category of waste recovered and disposed if at the facility does not exceed that specified in Schedule A of the Waste Licence

**Target 1.3** Any restriction on waste entering the facility shall be strictly enforced

**Target 1.4** All waste accepted for recovery and disposal shall be done so within the opening hours specified in condition 1.6

**Objective 2**

Establish and Environmental Management System to fulfil the obligation of the Waste Licence.

**Target 2.1** The facility shall employ a suitably qualified facility manager as the person in charge and that this person or a nominated deputy shall be present at all times at the facility, this person will be in place from the grant date of the licence.

**Target 2.2** The facility manager and deputy shall complete the FAS Waste Management Training Program with 12 months of their appointment.

**Target 2.3** All personnel performing specially assigned tasks shall receive all appropriate instruction prior to carrying out that function

**Target 2.4** Submission of details of management structure for Dunmore Landfill Facility by the end of August 2002, which will be

reviewed annually or as required.

**Target 2.5** Preparation and submission of an Environmental Management Program (EMP) to the Environmental Protection Agency by the end of November 2002, which will be reviewed annually in November and submitted to the Agency or as required.

**Target 2.6** Preparation and submission of an Environmental Management System (EMS) to the Environmental Protection Agency by the end of November 2002, which will be reviewed annually in November and submitted to the Agency or as required.

**Target 2.7** Establish awareness and training procedures for personnel at Dunmore Landfill Facility which will form part of the EMS

**Target 2.8** Submission to the EPA of a communications program as part of the EMS

**Target 2.9** Preparation and submission of a corrective action procedure, which will be submitted to the Agency as part of the EMS

**Target 2.10** First Annual Environment Report (AER) of Waste Licence 30-2 submitted to Agency by the end of January 2003.

**Target 2.11** Review of AER by the end of January annually thereafter

**Objective 3**

Provision of required infrastructure at the facility with the agreement of the agency

**Target 3.1** An updated site notice board will be provided at the new facility entrance by end June 2002. The new Waste Licence reference number will be provided, contacted details including revised telephone numbers and location of all environmental monitoring information

**Target 3.2** Security fencing and security measures will be provided as part of the provision of the new access by May 2003

**Target 3.3** A new access will be provided from the N77 by April 2003.

Detailed SEW will be submitted on the project will be submitted to the Agency, when the safety audit on the alignment has been approved by the NRA.

**Target 3.4** Facility roads and hardstanding areas will be provided at the new access by April 2003, which will be designed to ensure safe access and movement within the site. All areas will be provided with appropriate surface water drainage systems.

**Target 3.5** New facility offices, will be provided, which will incorporate telephones and an electronic communication facility by April 2003. Offices shall be fitted with gas monitoring equipment, in accordance with 'Protection of New Buildings and Occupants from Landfill Gas.

**Target 3.6** A Waste Inspection and Quarantine Area will be provided by May 2003, subject to Agreement with the Agency. Drainage from these areas will go directly to the leachate lagoon.

**Target 3.7** The present weighbridge at the facility will be relocated or a new weighbridge will be provided at the new facility entrance, subject to agreement with the Agency, by May 2003. This weighbridge will not be made operational until approval is given by Legal Metrology Services.

**Target 3.8** A wheel cleaning as set out in the EIS area will be provided at the facility entrance by May 2003, subject to agreement with the Agency.

**Target 3.9** As part of the development of the new offices, a wastewater treatment plant will be provide at the new facility offices by May 2003, subject to agreement with the Agency. The discharge from this unit will go directly to the new leachate lagoon.

**Target 3.10** A revised tank and drum storage area will be provided by April 2003, to ensure any spillage that may occur is contained.

**Target 3.11** Four new cells will be provided (cell 11-14), between 2002

and 2005 and will be constructed to that specified in condition 3.13, subject to agreement with the Agency.

**Target 3.12** A new larger leachate lagoon shall be construction to the specified standard to provide sufficient capacity for storage by May 2003, subject to agreement with the Agency.

**Target 3.13** A new gas management system is in place, analysis and written procedure on the system will be prepared and submitted to the agency by 2006.

**Target 3.14** A SCADA system or equivalent will be installed at the facility by April 2003, where the hardware and software will be incorporated into the new facility offices, subject to the Agencies agreement.

**Target 3.15** A full surface water management system will be incorporated as infrastructure and capping is provided, subject to the Agencies agreement. Surface water from the extension will be diverted to the surface water stream once the capping system is provided.

**Target 3.16** All new infrastructure provided will have regard to the ground water in the area which is monitored on a monthly basis.

**Target 3.17** A construction and demolition storage area will be provided by April 2003 as part of the revised access, subject to the agreement of the Agency.

**Target 3.18** The civic amenity site will be provided by May 2003 and will be maintained to the highest environmental standards. It is anticipated that this area in conjunction with other County Council initiatives will increase recovery rates in the County.

**Target 3.19** A household hazardous waste facility will be provided at the new civic waste facility. This facility will be widely advertised and will raise awareness of the need to source segregate household hazardous waste.

**Target 3.20** A proposal on the provision of compost facilities will be

completed by May 2003 and submitted to the Agency. Composting/shredding facilities will increase recovery rates for green waste in the County.

**Target 3.21** A revised proposal for the provision of berms at the facility will be submitted to the Agency by January 2003. All revision made will be as a result of consultation with adjacent properties.

**Target 3.22** All monitoring points required to meet the conditions of the Waste Licence will be provided as infrastructure develops, subject to the Agencies agreement.

**Target 3.23** The landfill gas management system shall be extended to extract gas from the new cells as they develop, subject to agreement with the agency.

**Target 3.24** The leachate extraction system shall be extended as the cells develop, subject to agreement with the Agency.

**Target 3.23** A storage and shredding area for Christmas Trees shall be provided and shredded trees to be reused as landfill cover

**Objective 4**

Establishment of a detailed plan for the restoration and aftercare of the facility

**Target 4.1** A full revised restoration and aftercare plan will be submitted to the Agency by May 2003, which will incorporate a proposal for treatment of cells 1-7

**Target 4.2** Capping at the facility will commence in May 2003 in accordance with condition 4.3, subject to agreement with the Agency and will continue on a phased basis as the facility develops.

**Target 4.3** Assessment of the capping adequacy of cells 1-7 will commence in February 2003. A proposal for the capping and collection of gas from cells 1-7 will be submitted to the Agency by May 2003. All works on this area will be completed by May 2004.

**Target 4.4** All material excavated for the purpose of the development of infrastructure will be reused with the facility boundary and will be stored appropriately until required.

**Target 4.5** Proposals for the Phase II extension of capping of cells 10 & 11 will be submitted to the agency, it is proposed that works on this capping will be complete by October 2006.

**Target 4.6** Proposals for the Phase III capping of cells 7, 8, 9, 10, 11 & 12 will be submitted to the agency, it is proposed that works on this capping will be complete by end of 2009.

**Objective 5**

The facility shall be operated to ensure there are no adverse environmental effects as a result of the operation of the facility.

**Target 5.1** Waste shall not be disposed of in any part of the facility until approval is sought and granted by the Agency

**Target 5.2** A procedure for the acceptance of waste at the facility has been submitted and approved by the Agency and shall be updated annually thereafter.

**Target 5.3** All waste shall be covered appropriately at the end of each day

**Target 5.4** A full leachate management plan will be drawn up which shall include procedures for monitoring leachate levels, removal of leachate by tanker and control procedures to ensure that leachate levels remain within parameters set out in condition 5.11. This plan will form part of the AER and will be revised as necessary.

**Target 5.5** Written records of maintenance of all monitoring and emission equipment. Maintenance of these systems will take place as recommended by the manufacturer

**Target 5.6** All lagoons structures at the site will be independently tested every three years.

**Target 5.7** The wheel wash at the site entrance shall be maintained and cleaned as required.

**Objective 6**

Control of emissions at the facility

**Target 6.1** Any emission exceeding trigger levels or unauthorised emission will be notified to the Agency.

**Target 6.2** Monitoring of the landfill gas flare will commence once the installation of the flare is complete. All emission values shall comply with the terms of the Waste Licence.

**Target 6.3** Flare unit efficiency shall be tested once it is installed and once every three years.

**Objective 7**

Continuing minimisation of Environmental Nuisances associated with Dunmore Landfill Facility.

**Target 7.1** That any potential nuisance resulting from the operation of the facility will be minimised and any methods that may eliminate nuisance will be implemented. Ongoing community consultation and inspections at the facility will ensure nuisance is minimised. Full compliance with the requirements set out in Condition 7 of the Waste Licence will continue.

**Objective 8**

Continuation of Environmental Monitoring at the facility

**Target 8.1** All environmental monitoring at the facility as specified in Schedule D of the Waste Licence shall commence by 10th July, 2002.

**Target 8.2** An initial topographical survey of cells 1-10 and all areas to be developed as part of the revised licence to be completed by June 2002, and two more survey to be completed by January 2003 and May 2003, to map development of the site. A topographical survey shall be completed by January each year thereafter.

**Target 8.3** A drawing of all monitoring locations shall be submitted to the Agency by August 2002. Any changes to the location of monitoring locations will be immediately updated on this drawing and will be communicated to the Agency.

**Target 8.4** A stability assessment of the site will be completed by November 2002 and annually thereafter and submitted to the Agency.

**Target 8.5** A revised weekly nuisance monitoring system will be introduced at the site and implemented by January 2003; all records will be held at the site.

**Objective 9**

Contingency measures shall be put in place in the event of an incident or emergency at the site

**Target 9.1** An Emergency response procedure will be developed and submitted to the Agency by November 2002 and submitted to the Agency. The procedure will be revised as necessary.

**Target 9.2** An adequate supply of absorbent booms and material will be provided and maintained at the site.

**Target 9.3** All waste oil storage containers shall be bunded.

**Objective 10**

Records shall be maintained and available for inspection at all reasonable times

**Target 10.1** All records for the site shall be available at the facility office for inspection

**Target 10.2** Ongoing maintenance of waste records as per Condition 10.2 of the Waste Licence.

**Target 10.3** A procedure shall be developed to log all waste leaving the civic amenity site once the project has been completed.

**Target 10.4** A complaints book shall be kept at the facility office and any complaint shall be logged as per condition 10.4

**Target 10.5** A record of all leachate leaving the facility shall be kept in accordance with condition 10.5

**Target 10.6** A record shall be kept of the program for the control of vermin and flies as per condition 10.7

**Target 10.7** A record of bird control activities shall be kept and regular bird counts made.

**Target 10.8** A written record shall be kept of the type of daily cover that is used on the site as per condition 10.9

**Target 10.9** Long term environmental monitoring to continue a set out in the table below: -

| **Report Title** | **Report Submission** |
|---|---|
| Environmental Management System Updates | Annually in November |
| Annual Environmental Report (AER) | Annually at the start of February |
| Bund, tank and container integrity assessment | Every three years in September |
| Monitoring of landfill gas | Quarterly up to December 2004 biannually there after |
| Monitoring of Surface Water Quality | Quarterly |
| Monitoring Ground Water Quality | Quarterly |
| Monitoring of Leachate | Quarterly |
| Meteorological Monitoring | Annually |
| Dust Monitoring | Three times a year |
| Noise Monitoring | Annually |
| Site Topographic Survey | Annually |

**Objective 11**

To submit all relevant reports and notifications to the Agency in the timeframes specified

**Target 11.1** Any incident at the site shall be notified in accordance with the corrective action procedure

**Target 11.2** A new contract will be entered into for the recovery/disposal white goods/brown goods by end May 2003

**Target 11.3** Waste recovery reports shall be submitted to the Agency by November 2002 as outlined in condition 11.3

**Target 11.4** A report on the achievement of the final profile at the site shall be submitted by November 2002

**Target 11.5** An operations procedure shall be developed for operation in adverse wind conditions and submitted to the agency by November 2002.

**Target 11.6** A report on procedure to control vermin and flies shall be submitted to the Agency by November 2002

**Target 11.7** The first AER of the License will be submitted by May 2003

**Target 11.8** A conditioning plan in accordance with Council Directive 1991/31/EC shall be submitted to the Agency by 16th July 2002

**Objective 12**

To operate the landfill to compliment relevant legislation and the Landfill Directive

**Target 12.1** All packaging waste as defined in SI No. 61 of 2003 will be restricted from the landfill

**Target 12.2** All contractors using the site shall be in full compliance with SI No. 402 of 2001

**Target 12.3** Whole used tyres shall be restricted from the site from 1st of June 2003, in compliance with Council Directive 1991/31/EC.

Shredded tyres will be restricted from 1st June 2006.

**Target 12.4** The landfill site will be operated with regard to the South East Waste Management and any measures necessary to meet the terms and targets of the plan shall be implemented. This will include the acceptance of waste from outside the Kilkenny area from the partners in the South East Region

**Objective 13**

To provide infrastructure to reduce visual impact and minimise nuisance

**Target 13.1** Continuation of odour modelling and testing at the site and local properties. Odour survey monitoring shall be sent to the agency at the end of each month. Recommendations will be implemented.

**Target 13.2** Provision of extensive planting and renewal of hedgerows. Berms will be placed in locations in order to minimise visual impact.

**Target 13.3** The road access and roadway along the front of the site will be maintained and cleaned in order to minimise visual nuisance at the entrance to the facility.

Details of the status of the objectives and targets can be found in Appendix G.

# 6. Procedures

## *6.1 Waste Acceptance Procedure*

Municipal Waste defined as household waste as well as commercial and other waste which, because with nature or composition, is similar to household waste is accepted at Dunmore Landfill. Municipal Waste accepted at Dunmore Landfill Site will be subject to municipal waste characterisation surveys on a regular basis, at least once per annum.

Since the commencement of landfill operations at Dunmore a regular client base has been established of waste producers and waste contractors depositing waste at Dunmore Landfill. The waste producer and/or waste contractor have established with Kilkenny County Council if their waste is acceptable at the site. Any new waste producer or waste contractor wishing to dispose of waste at Dunmore Landfill Site is obliged to inform Kilkenny County Council of their operation. Similarly if the existing clientele have any reason to believe that the waste previously accepted has changed this information is brought to the attention of Kilkenny County Council. A correct and adequate description of the waste is sought and a determination whether the waste is acceptable or not is provided. If the waste is unacceptable at the Landfill Site then the waste producer/contractor is advised to find an alternative method of recovery or disposal and under the Waste Management Act, inform Kilkenny County Council of the alternative used.

When waste arrives at the Landfill the weighbridge operator notes the haulier/waste contractor and the vehicle registration number. The weighbridge operator determines the origin of the waste and the class of waste and inspects the covering of the waste. The weighbridge operator then confirms the type of waste by visual inspection. If the waste is acceptable the waste is directed to the tipping area where it is discharged from the vehicle. After discharge at the tipping area the compactor or loader operator inspects the waste. If the waste is acceptable the compactor operator proceeds to dispose and compact the waste in the active cell.

If the weighbridge operator determines that the waste is not acceptable, the site supervisor is informed. The site supervisor will then inspect the waste load. If the supervisor considers the waste acceptable the waste may be deposited in the active cell or if he/she requires to inspect the load it will be discharged on the active tipping area where it will be inspected and checked. The tipping area thus serves as an inspection area also. If the supervisor determines that the load is acceptable after inspection it is disposed of in the active cell. If the supervisor determines that the load is not acceptable the load will be directed to the waste quarantine area.

Once the site supervisor determines that a load prior to discharge from the vehicle is not acceptable or if a load is quarantined the site engineer is informed. The site engineer together with the site supervisor will discuss the waste load with the waste producer/contractor. Any further information as may be required or checks including analysis of the waste load will be undertaken. A decision on what action to be taken shall then be made and recorded. If it is determined at this stage that the load is acceptable it will be disposed of within the active. If the load is not acceptable the waste contractor/producer will be obliged to remove the load from the site and take it for an alternative recovery operation or to a disposal facility where the waste is accepted. Under section 18&34 of the Waste Management Act, Kilkenny County Council requires the Waste Contractor to record where all of the waste collected is disposed/recovered and such reports as required will be submitted to Kilkenny County Council.

A flow chart outlining the details of the procedure is outlined in Appendix H.

### *Emergency Response Procedure*

Following an assessment of risk at the site in Dunmore, as part of our ongoing safety audits, procedures were put in place to deal with any emergency that may arise at the site.

The main risks identified at the site are explosion, fire, oil/leachate spillage and injury to persons.

During the end of 2004 a gas extraction and enclosed flare system was installed on site. This system extracts gases present in the cells and treats the gas on site by flaring thus significantly reducing its accumulation on site, its migration into the atmosphere and minimises the risk to human health. Field balancing of the wells are regularly carried out to ensure each well in all areas of the site are not being over or under pumped which would effect the combustion of the gas at the flare stage, and to ensure concentrations of landfill methane gas being transmitted are not within the explosive range of 5-15%. It is not permissible to set a fire or smoke at Dunmore, but with the nature of the gases present there remains a risk of fire on the active site. Also there is a quantity of diesel stored at the site. This tank will be secured in a fire prove vault. Again there is a slight risk of fire at this area. If a fire is identified at the site and it is safe to do so, the fire would be covered with inert material. If it is considered that the fire is unsafe and out of control, the fire service would be contacted immediately. Any fire at the site is immediately reported to the Engineer in charge and the site will be fully inspected.

The possibility of fire on one of the site vehicles or site offices was also identified as a potential risk. All site vehicles and site offices have been fitted with a fire extinguisher. In the case of a fire being detected in either, the fire extinguishers shall be used initially to control the fire. If the fire is unsafe or out of control the fire the fire brigade will be called. In the event of fire on any of the vehicles the vehicle owner/Machinery Yard Engineer shall be contacted immediately.

Site staff have received instruction in the use of this equipment and there is regular servicing of any fire control equipment on the site.

The storage of fuel on site, the presence of methane gas and other containers that may be on site from time to time, may pose a potential risk of explosion at the site. If there is an explosion on the site, all personnel on the site should be evacuated immediately. The fire service and the Engineer in charge are to be called immediately. A full investigation of the site is to be carried out to establish the cause of the explosion. Any resultant fire shall be brought under control as described above. The site may not be re-opened until clearance has been received from the Chief Fire Officer and the Engineer in charge.

Any fire or explosion on the site would be considered an incident and a full report will be made to the EPA as per condition 11.2.

Any spillage of leachate at the site is regarded as an incident under the terms of the waste licence. The source of any spillage is to be identified immediately and the course of action to be taken will be decided on or booms stored on the site. Any spillage would be contained by a clay bund. If necessary any watercourses in the area should be dammed to prevent any reception of leachate to surface water supply. A vacuum or leachate tanker will take the excess spilled leachate away. The surface/ground water should be sampled to assess the impact of the spill. Monitoring controls would then be put in place to ensure that levels do not breach the bunds. Extra leachate tankers will be employed to remove the excess leachate produced (a number of companies are available to provide this service); until monitoring results show that they are unnecessary. If there is any spillage of leachate, the Engineer in charge, is to be notified. An incident report will be prepared by the Engineer and sent to the EPA. In the event of any incident which relates to the discharges to surface water, the Southern Regional Fishery Board will be notified as soon as practicable and in any case not later than 10:00am on the following working day after such an incident.

Oil spillage at the site will be contained with oil sorbant material. This sorbant when cleaned up will be stored in secure storage containers, supplied by the fire service, pending collection by an authorised waste facility. If any oil spillage occurs on site, the Engineer in charge should be notified.

All staff on site has been issued with personal protective equipment. All footwear is to SP3 standard (pierce proof, steel toed), hi-visibility clothing, gas masks and ear protection. Anti-bacterial wipes and bio guard wipes (which include protection from leptosporosis and other viruses) are provided on site. A number of first aid kits are available on site and they are regularly checked to ensure they are fully stocked. Some site staff have completed manual handling and first aid course and further courses are planned for the remainder. A full round of injections will be administered to the staff of Dunmore including Hepatitis A&B, Tetanus and Polio as required. All visitors to the site must report to the site offices and are restricted to certain areas within the site.

In the event of injury to any person, a member of the site staff will apply first aid. If it is necessary an ambulance will be called and the injured person will be taken to hospital. Any injury must be reported to Safety Co-ordinator and the Safety Officer to record the incident. The Safety Officer will then notify the HSA as required.

A summary chart of the procedures to be followed is shown on the following page. This chart along with all relevant phone numbers are posted in the site offices and all site staff has been made aware of this.

**Emergency Response Procedure**

| Emergency | Response | Notify |
|---|---|---|
| **Explosion** | 1. Call-out Fire Brigade<br>2. Evacuate Site | Engineer in Charge<br>Chief Fire Officer<br>EPA |
| **Fire-Vehicle** | 1. Control with Vehicle or site fire extinguishers.<br>2. If unsafe or out of control, call out Fire Brigade | Machinery Yard Engineer<br>Vehicle Owner<br>Engineer in Charge |
| **Fire-Site** | 1. Cover with Inert Material.<br>2. If unsafe, or out of control evacuate site and call-out Fire Brigade. | Engineer in charge.<br>EPA |
| **Oil Spillage** | Contain with oil sorbent material | Engineer in charge.<br>EPA<br>Southern Regional Fishery Board |
| **Leachate Spillage** | 1. Contain with clay bunds, Dam watercourses, if necessary.<br>2. Suction up spillage with Vacuum tanker or leachate tanker | Engineer in charge.<br>EPA<br>Southern Regional Fishery Board |
| **Injury to Persons** | 1. Call Ambulance<br>2. Apply First Aid | Engineer in charge. |

**Emergency Response Numbers: -**

| | |
|---|---|
| **Gardai Station**<br>**Dominic St**<br>**Kilkenny.** | **(056) 7722222** |
| **Fire Station**<br>**Gaol Rd**<br>**Kilkenny.** | **(056) 7794400** |
| **Ambulance** | **(056) 7751133** |
| **Environmental Protection Agency – OEE** | **(056) 7796700**<br>**LoCall 1890 335599** |
| **Southern Regional Fisheries Board** | **(052) 80055** |

# 7. Nuisance

### *7.1 Nuisance Control*

The following measures are employed at Dunmore to control nuisance: -

**7.1.1 Bird Control**: - 'Bird Control Ireland' (BCI) have been employed since 2000 to regulate and monitor the bird control on site. A number of different techniques for controlling birds are used and specific non-native species of bird that come into the area are targeted. The methods employed are acoustic scarers, visual scarecrows such as helekite, eagle kites and weekly falcon flights. Personnel visit the site weekly and provide a detailed monthly report of the bird populations observed on site. Instructions are left on a white board in the weighbridge for daily actions to be performed by site staff. A daily log sheet of on site activities is complete by site personnel and reviewed by both the facility manager and BCI to ensure the program remains successful.

During 2004 a marine signal pistol was purchased and is being used on the site to scare the birds. A number of staff on site have been trained in correct use of bird scaring pistol. A new acoustic scarer has recently been purchased for the site, which has a larger range of distress calls than on the previous machine. The distress calls added are designed to target the observed non native species that have tried to make raids on the site. A new contract was signed with Bird Control Ireland for the forthcoming year. Sample data logs and End of Year report are available in Appendix I.

**7.1.2 Vermin Control**: - 'Pestkill-Pest Control Services' visit the site on a regular basis, to place bait for vermin control at the site. There are 49 no. specific and labelled locations at and surrounding the site where bait is placed in custom made boxes. Pestkill inspects these monitoring points monthly to see if the bait was taken or rodent activity if any are noted and bait re-stock if necessary. The bait points are moved or the number shall be increased should it be deemed necessary by 'Pestkill'. Monthly record sheets of the findings at the site are logged and kept on site. There is

also a monthly meeting between the vermin control company and the facility manager to discuss findings and any improvements to be made.

In April 2002, 'Pestkill' installed bait boxes in three adjoining properties to ensure that any vermin attracted by the Landfill to these properties would be controlled. Monthly inspections of these points are also made; notes of any bait take are made and restocked if necessary.

It is considered that adequate covering of the waste is also a necessary measure that is carried out. This will ensure that the food supply for vermin is kept at a minimum and therefore is a control measure for vermin.

**7.1.3 Fly Control**: - 'Pestkill-Pest Control Services' is under contract to spray the face of the landfill and machinery during the late Spring, Summer and early Autumn, and at other times if necessary.

It is considered that good site practice should eliminate the need for spraying. These measures include good compaction and mixing of the waste with inert clay. This leads to flies on the waste and their larva being compacted and buried with the waste, which in turn leads to the life cycle being stopped. When this is complete the active face of the landfill is covered with inert clay material as soon as is practical.

The use of Hessian material has discontinued as this has lead producing an environment suitable for the propagation of flies. Once the site has reached its agreed height the site is covered with appropriate soil cover and a permanent cap will be in place within twelve months of this final agreed height being reached.

# 8. Incidents and Complaints

## *8.1 Incident Reports*

The following incidents took place at Dunmore during the reporting period. As a condition of the waste licence, the Agency was informed of these incidents. Details of the incidents are as follows: -

**Gas Migration***:* - Under condition 6.3.1 of the licence, results showing a Methane level greater than or equal to 1 v/v or a $CO_2$ value greater than or equal to 1.5 v/v, is regarded as an exceedance. An Assessment of Landfill Gas Measurements at Dunmore Landfill, Co. Kilkenny analysing the processes responsible for these exceedence levels was carried out and submitted to the agency at the end of 2004. This report concluded that there is $CO_2$ is naturally occurring in the Dunmore Area. To allow for this finding the Agency agreed to increase the tolerance of the $CO_2$ trigger level, from 1.5% v/v to 3% v/v, therefore any levels =>3% v/v would be treated as an incident and reportable to the Agency. For the purpose of this report I have included both ranges of $CO_2$ from between 1.5 % to <3% v/v (*Italic text*) and values=>3% v/v (**Normal bold test**). During the reporting period a number of points showed an exceedance and once this was noticed investigations were completed to ascertain the cause. The exceedances were at the following points (please refer to drawing indicating monitoring point): -

*Exceedance in **$CO_2$** value greater than or equal to 1.5 v/v*

| | 1 | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Jan* | | | | | | | *1.9* | *2.1* | | | | | | | | | | | | | | |
| *Feb* | | | | | | | | | *2.0* | | | | **3.8** | *2.0* | | *2.8* | *2.5* | | | | | |
| *Mar* | *1.5* | *1.9* | | | | | | | *2.0* | | | | | | | | | *1.6* | | | *1.8* | |
| *Apr* | | **3.1** | | | *2.0* | *2.0* | | | *2.5* | *2.6* | | | | | | | *1.5* | *1.5* | | | *1.7* | *1.7* |
| *May* | | | | | *1.8* | | | *2.3* | *2.5* | *2.0* | | | | | | *1.8* | *1.5* | | | | | *2.1* |
| *Jun* | *2.2* | **3.6** | | | *1.7* | | *1.5* | | **3.6** | *2.5* | | | *1.6* | | | *2.2* | **3.7** | *2.4* | | | | *1.9* |
| *Jul* | | | | | *1.7* | | | *1.8* | *2.0* | *1.8* | *1.6* | | *1.5* | | | *1.7* | *1.6* | *1.7* | | | *1.5* | *2.6* |
| *Aug* | | | | | *1.6* | *1.6* | | **7.5** | *1.6* | | | | **3.2** | | | *1.7* | *1.8* | *1.5* | | | | *1.7* |
| *Sep* | | *1.7* | | | *1.6* | | | | *1.6* | | *2.0* | | *1.6* | | | *1.9* | *1.8* | *1.7* | | | | *2.3* |
| *Oct* | | | | | | | | | *2.4* | | | | | | | *1.5* | | *1.5* | | | | |
| *Nov* | | | | | | | | | | | | | | | | | | | | | | |
| *Dec* | | | | | *1.7* | | | | | | | | | *1.5* | | *1.6* | | *1.6* | *1.5* | | *1.5* | |

Carbon Dioxide at low levels was found in some of the migration point in the site throughout the year. There were no recorded exceedances of =>3% v/v in GM1, GM3, GM4, GM5, GM7, GM8, GM11, GM12, GM13, GM15, GM16, GM17, GM19, GM20, GM21, GM22 and GM23. A report examining the landfill gas was compiled and submitted to the agency in 2004 to assess contributing factors in landfill gas migration.

A report titled ‘An assessment on Landfill Gas’ was carried out by consultant Fehily Timony & Co and submitted to the agency. It was found that there are naturally occurring levels of CO2 in Dunmore.

*Exceedance in **$CH_4$** level greater than or equal to 1 v/v*

| | *1* | *2* | *3* | *4* | *5* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* | *16* | *17* | *18* | *19* | *20* | *21* | *22* | *23* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Jan* | | | | | | | | | | | | | | | | | | | | | | |
| *Feb* | | | | | | | | | | | | | | | | | | | | | | |
| *Mar* | | | | | | | | | | | | | | | | | | | | | | |
| *Apr* | | | | | | | | | | | | | | | | | | | | | | |
| *May* | | | | | | | | | | | | | | | | | | | | | | |
| *Jun* | | | | | | | | | | | | | | | | | | | | | | |
| *Jul* | | | | | | | | | | | | | | | | | | | | | | |
| *Aug* | | | | | | | | | | | | | | | | | | | | | | |
| *Sep* | | | | | | | | | | | | | | | | | | | | | | |
| *Oct* | | | | | | | | | | | | | | | | | | | | | | |
| *Nov* | | | | | | | | | | | | | | | | | | | | | | |
| *Dec* | | | | | | | | | | | | | | | | | | | | | | |

In 2008 there was no exceedance in the methane trigger level of 1.0 v/v.

# 9. Staffing

## *9.1 Staffing Structure*

Kilkenny County Council own and manage the landfill site at Dunmore. The County Council with Philip O'Neill as Director of Service and Simon Walton as Senior Engineer are presently appointed as the project supervisors for design and construction phase.

The Environment Section manages the facility on behalf of Kilkenny County Council with Carol McCarty BA BAI, MIEI, as Senior Executive Engineer of the Section and also Eimear Doyle BSc as Facility Manager.

On site John Bolger is Caretaker at the site. The operatives at the site also include three drivers (Compactor, Traxcavator and Leachate Tanker), weighbridge operator, C.A. operator and a general operative.

The site is open Monday – Friday, 8.00 to 4.30 and on Saturday from 8.00 to 12.00. The phone numbers at the site are 056-7761999 and 056 7767848. Any queries or complaints may be made to the site or to the Environment Section in County Hall (056-7794470). A flow chart outlining the management structure is attached in Appendix J.

### *9.2 Monitoring and Sampling*

The monitoring and sampling at Dunmore is carried out by the staff of the Environment Section of Kilkenny County Council, personnel from the Environmental Protection Agency, Regional Inspectorate, Seville Lodge, Callan Rd., Kilkenny and personnel from environmental consultants Fehily, Timoney & Co. The list of all duties required and the relevant personnel are listed below: -

**Interpretation of Results: -**

***Simon Walton***, Senior Engineer
Environment Section Kilkenny Co. Co. January 2007 – Present
*Landfill Duties* Senior Engineer Environment

***Carol McCarthy*** BA BAI MIEI, Senior Executive Engineer,
Completed FAS Waste December 2001,
Environment Section Kilkenny Co. Co. August 1990 – August 1994 and October 2001 – Present,
Environment Section Laois County Council Sept. 1996 – June 1997
*Landfill Duties* Head of Environment Section

***Eimear Doyle*** BSc, Environmental Biologist,
Completed FAS Waste Management Certificate May 2007
Environment Section Kilkenny Co. Co. January 2006 – Present
*Landfill Duties* Facility Manager

***Maeve Good*** BA BAI MIEI, Assistant Engineer,
Completed FAS Waste Management Certificate Feb 2005
Environment Section Kilkenny Co. Co. October 2004 - Present
*Landfill Duties* Deputy Facility Manager

***Water Sampling (Condition 8.1 Schedule D.5)***: **-**

***Michael Daly*** NCEA Diploma in Environmental Protection, Technician,
Diploma in Environment Protection
Environment Section Kilkenny Co. Co. Nov. 1982 – Present
*Landfill Duties* Water/Leachate and Dust Monitoring/Noise Monitoring

Water sampling at the site is carried out by Jean Smith and Jim McGarry of the Environmental Protection Agency, Regional Inspectorate, Seville Lodge, Callan Rd., Kilkenny. Quarterly sampling is carried out on all parameters listed in accordance with Condition 9.1 and Schedule F.4 of the Licence

***Gas Monitoring (Condition 8.1 and Schedule D.2): -***

***Eimear Doyle*** BSc Facility Manager, Environment Section Kilkenny Co. Co.
Jan. 2006 – Present
*Landfill Duties* Gas Monitoring

***Noise Monitoring (Condition 8.1 Schedule D.4): -***

***Michael Daly*** NCEA Diploma in Environmental Protection, Technician,
Diploma in Environment Protection
Environment Section Kilkenny Co. Co. Nov. 1982 – Present
*Landfill Duties* Water/Leachate and Dust Monitoring/Noise Monitoring

***Fehily Timoney & Co., Core Hse., Pouladuff Rd., Cork.***

Director for Kilkenny Area Mr. Gerry O'Sullivan BE CEng
*Landfill Duties* Consulting Engineers/Noise Monitoring

***Dust Monitoring (Condition 8.1 Schedule D.3): -***

***Michael Daly*** NCEA Diploma in Environmental Protection, Technician,
Diploma in Environment Protection
Environment Section Kilkenny Co. Co. Nov. 1982 – Present
*Landfill Duties* Water/Leachate/Noise and Dust Monitoring

***Meteorological Monitoring (Condition 8.1 Schedule D.6): -***

Meteorological Monitoring was carried out by Met Eireann at the Kilkenny Meteorological Station, Granges Road, Kilkenny up to the end of March 2008. Meteorological Monitoring is now carried out by Met Eireann at the Carlow (Oakpark) station for the Kilkenny area. Results are submitted to Kilkenny County Council on a monthly basis.

# 10. Financial Provision

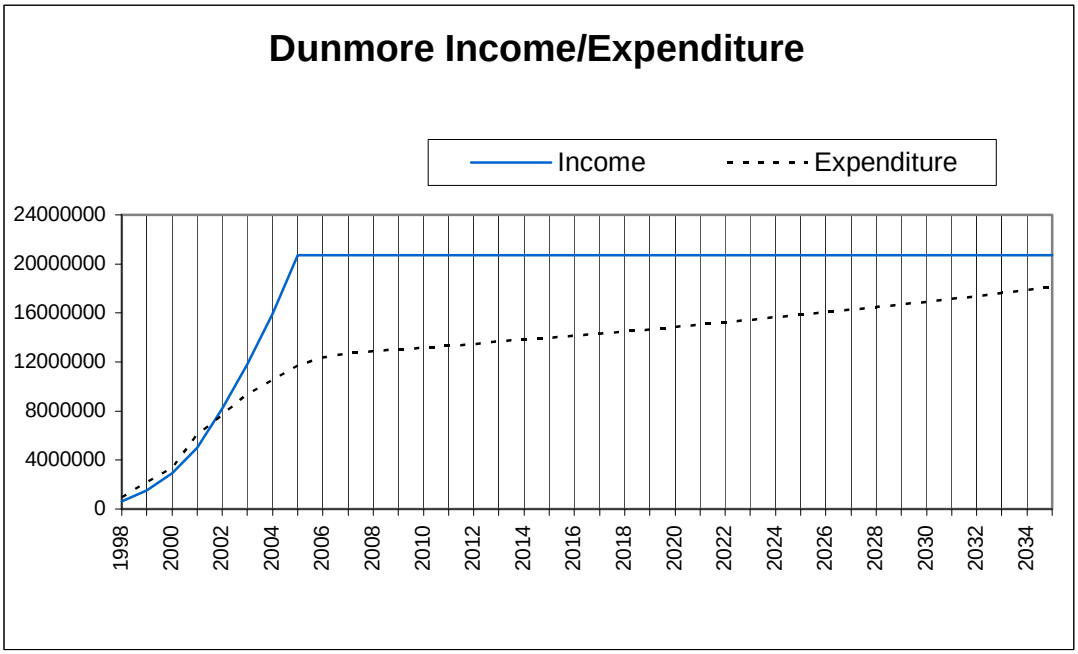
## *10.1 Financial Provision for the Site*

The estimated costs for the operation, development, restoration and aftercare of Dunmore Landfill Site are presented to Kilkenny County Council at its annual estimates meeting, whereby the proposed expenditure and income accruing from the Landfill Site for the coming year is decided.

When the landfill opened in 1997 landfill gate fees was £10 per tonne in 1997. The Council increased this fee numerous times over the years; the current fee of €150 inclusive of levy of €20 was introduced in January 2003. The gate fee has increased dramatically in this period in order to complete development works, ensure full compliance with the licence conditions, restoration and aftercare of the facility until 2035. The charge applied at the gate is in line with the polluter pays principle.

It is anticipated that the proposed extension to the landfill will extend the life of the site to 2009. The pricing structure is so devised that at closure of the site in 2009 a sufficient fund will be accumulated to provide for the aftercare of the site to the year 2035. This projection is indicated on the attached graph showing cumulative income/expenditure at Dunmore Landfill over the period 1998 – 2035.

The Agency will appreciate that the detailed figures upon which the attached chart is based include projections which will be subject to decision of elected members of the Council and which may be subject to change. However the philosophy for financial provision remains to accumulate a fund during the active phase of the landfill, which will be available for the aftercare subsequently.


Dunmore Income/Expenditure
Income
Expenditure
24000000
20000000
16000000
12000000
8000000
4000000
0
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034

# 11. Public Information

## *11.1 Procedure for Public Consultation*

Dunmore Landfill is established since 1989 and good communication has developed between the site staff and the local community. The site staff in a spirit of good neighbourliness promptly deals with any issues arising locally.

During the development of proposals for an extension to the landfill site at Dunmore, intensive consultation has taken place especially with the immediate neighbours of the site and with other local residents. This consultation process commenced in November 2000 and was ongoing during the development stage. Arising out of these consultations, Kilkenny County Council had set up a Community Liaison Group, which met on a monthly basis to discuss a typical agenda

- Previous minutes
- Environmental Monitoring Results
- Monitoring Queries
- Public Queries
- Development Works
- Any other business

The group comprises of seven members of the local community representing the different areas in the vicinity on the landfill, two local elected representatives, Senior Executive Engineer and the facility manager.

In addition to the above, the Kilkenny Area Committee of the County Council, comprising elected members of the Kilkenny Electoral Area are briefed on the developments at Dunmore.

The full Council are briefed on all waste management issues on a regular basis including developments at Dunmore, pricing structure, staff changes etc.

The Strategic Policy Committee on Environment (SPC 3), which comprises of council officials elected representatives and community representatives are briefed on developments at the landfill site and policy decisions are drafted as a result of the meetings.

All environmental monitoring results are held in the Dunmore Landfill, Dunmore, Co. Kilkenny and any member of the public is free to inspect them at any time during normal office hours (08:00 to 16:30 hours). Arrangements can be made to view the information at an alternative location by prior arrangement.

The Site Notice board contains information on where and when environmental information can be obtained.

There is a fax and phone located at the site where queries can be made during opening hours i.e. 08:00 to 16:30, or a message can be left on the answering machine and if required will be contacted as soon as the message is received.

### *11.2 Complaints*

A complaints register is located on site and any complaint regarding the operation of the facility is recorded and the action taken to address the complaint/observation.

***11.2 Summary of Complaints***

| **Date** | **Summary** | **Actions Taken** |
|---|---|---|
| 28/01/08 | Landfill odour detected late at night and early morning in the vicinity of Dunmore Landfill during beginning of 2008. | Gas wells located in Cell 13 were permanently connected to the gas extraction and flaring system in February 2008 reducing any associated landfill gas odours significantly. .<br>Daily odour monitoring surveys continue to be carried out at seven locations within the vicinity of Dunmore Landfill. |

| | | |
|---|---|---|
| 20/08/08 | Concerns regarding the acceptance of gypsum waste at Dunmore Landfill were raised. | Following correspondence issued by the EPA in June 2007 in relation to the disposal of non-hazardous gypsum based products; Dunmore Landfill no longer accepts gypsum waste. Customers were verbally informed of these restrictions and as part of the waste acceptance procedures at the facility, all incoming loads are visually inspected and any unauthorised material including gypsum waste are rejected. |

# 12. Compliance

### *12.1 Summary of Compliance*

A summary of compliance under licence as part of our objectives and targets in Appendix G.

### *12.2 Summary of Non-Compliance*

| Date | NC Number | Summary | Action Taken |
|---|---|---|---|
| 20/02/08 | W0030-02/nc08de | An intermittent moderate landfill odour was detected at McDermott's entrance on N77 (first stone wall entrance north of landfill entrance) on morning of 20/02/08. | The gas wells located in Cell 13 were permanently connected to the gas extraction and flaring system on 19/02/08 and resulted in a significant reduction in landfill gas odour. In addition, the use of intermediate cover material on waste in Cells 13 & 14 was increased. |
| 20/02/08 | W0030-02/nc08de | The facility Manager or the Deputy Facility Manager were not present at the facility on day of audit. | As per condition 2.1.1 the Facility Manager/Deputy Facility Manager is available at the facility at all times during its operation. |

| | | | |
|---|---|---|---|
| 20/02/08 | W0030-02/nc08de | Intermediate cover insufficient in Cell 13 & 14 area. | Intermediate cover as per condition 5.4.1 was placed in Cell 13 & 14 area. |
| 20/02/08 | W0030-02/nc08de | Working face of cell 13 – approximately 50m* 25m | Excess exposed waste on the working face was covered with clay to minimise the length. |
| 20/03/08 | W0030-02/nc09de | Working face of cell 13 – approximately 40m*25m | Works were continued on site to minimise the working face of Cell 13 as per condition 5.3.1(c) |
| 20/03/08 | W0030-02/nc09de | Intermediate cover insufficient in Cell 13 & 14 | Intermediate cover as per condition 5.4.1 was placed in Cell 13 & 14 area. |
| 19/05/08 | W0030-02/nc10de | Intermediate & daily cover was not adequate on waste outside of the working face of Cells 13 & 14. | Additional daily cover material was placed on waste at the end of each working day as per Condition 5.4.2 together with maintaining a record of these cover activities as per condition 10.9. Additional intermediate cover material was placed on waste areas identified within the Cell 13 & 14 area in accordance with condition 5.3.1(c) |
| 19/05/08 | W0030-02/nc10de | Small section of Cells 8 & 12 was not yet permanently capped. | This area was permanently capped by end of summer 2008. |
| 05/11/08 | W0030-02/NC11ID | Working face of Cell 14 – approximately 25m by 50m. | Works were carried out following site inspection to minimise the working face in Cell 14. In addition a record of the size of the working face is being maintained as part of daily cover activities record. |
| 05/11/08 | W0030-02/NC11ID | Intermediate cover material in Cell 14 - insufficient | Additional cover material was placed on dry commercial waste in cell 14 area. |
| 05/11/08 | W0030-02/NC11ID | Barrels containing waste cooking oil in the oil storage area of CAS were not bunded. There was an unbunded barrel containing waste oils in CAS. Fuel oil stored by contractor on site in an unbunded container. | Fuel oil stored by contractor on site is contained within bunded container. All tank and drum storage areas in the civic amenity site are bunded and all the receptacles used to store fuels and liquid wastes are appropriately sized and bunded in accordance with conditions 3.12.2, 5.6.7 and 5.9.4. |

| | | | |
|---|---|---|---|
| 05/11/08 | W0030-02/NC11ID | A small area in Cell 12 that forms the boundary with Cell 13 was not permanently capped. In addition a section of Cells 4 & 7 were yet to be capped | As outlined the small area remaining uncapped in Cell 12 will form part of the permanent capping of Cell 13 as it forms the boundary between the 2 cells. Capping works were completed in Cell 4 & 7 area in early 2009. |

# Appendix A

Waste Quantities

&

Recycling Rates

**DUNMORE LANDFILL** **2008**

007 Local authority, 008 Domestic brought by house holders, 009 Domestic (contractors)
010 Litter & street sweepings, 011 Commercial, 012 Industrial , 013 Construction & demolition.
014 Sewage sludge , 015 Agricultural , 017 Asbestos waste

| | WASTE CATEGORIES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **MONTHS** | **Local 007 (t)** | **House 008 (t)** | **Contractors 009 (t)** | **Street 010 (t)** | **Commercial 011 (t)** | **Industrial 012 (t)** | **Construction 013 (t)** | **Sewage 016(t)** | **Agricultural 015 (t)** |
| **January** | 40.24 | 340.36 | 915.43 | 153.48 | 688.14 | | 8.98 | | |
| February | 37.48 | 301.29 | 646.36 | 104.32 | 559.49 | | 89.37 | | |
| March | 21.36 | 254.24 | 541.82 | 88.2 | 471.1 | 0.12 | 6.34 | | |
| April | 32.86 | 315.14 | 523.16 | 114.84 | 589.10 | 0.16 | 11.02 | | |
| May | 27.96 | 272.82 | 579.84 | 202.54 | 388.10 | 0.24 | 12.34 | | |
| June | 28.12 | 328.58 | 416.20 | 135.86 | 340.08 | | 13.40 | | |
| July | 32.58 | 329.38 | 491.38 | 197.24 | 591.96 | | 3.88 | | |
| August | 28.12 | 276.10 | 718.28 | 84.96 | 454.88 | | 12.54 | | |
| September | 22.44 | 199.18 | 647.38 | 93.52 | 442.72 | | 0.4 | | |
| October | 26.26 | 247.3 | 525.36 | 157.22 | 454.72 | | 0.94 | | |
| November | 13.54 | 338.9 | 365.92 | 120.72 | 409.5 | | 0.8 | | |
| December | 37.42 | 323.94 | 479.04 | 84.28 | 425.8 | 0.42 | 0.32 | | |
| **TOTAL** | **348.38** | **3527.23** | **6850.17** | **1537.18** | **5815.59** | **0.94** | **160.33** | **0** | **0** |
| % | 2% | 19% | 38% | 8% | 32% | 0% | 1% | 0% | 0% |

| WASTE CATEGORIES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **MONTHS** | **Asbestos 017(t)** | **Clay** | **Roads** | **Stone** | **Gravel** | **Filt. Gravel** | **Sand** | **Topsoil** | **WEEE** | **Check** | **TOTAL** |
| **January** | | | 58.32 | 57.68 | | | 302.54 | | | | 2146.63 |
| February | | | 177.38 | 13.58 | 505.28 | | 676 | | | | 1738.31 |
| March | | 327.08 | 250.08 | | 157.78 | | 22.26 | | | | 1383.18 |
| April | | 12,539.80 | 207.60 | | 86.52 | 17.18 | | | | | 1586.28 |
| May | | 1,335.10 | 129.26 | 37.08 | 49.34 | 2.76 | | | | | 1483.84 |
| June | | 244.82 | 41.02 | 11.96 | | | | | | | 1262.24 |
| July | | 430.74 | 42.72 | 11.5 | | | | | | | 1646.42 |
| August | 0 | 1156.98 | 11.90 | 296.58 | 51.19 | 2.48 | | | | | 1574.88 |
| September | 0 | 2781.88 | 91.12 | 87.28 | 194.02 | | | | | | 1405.64 |
| October | 0 | 1,089.30 | 65.02 | | 441.14 | | 111.46 | | | | 1411.80 |
| November | 0 | 255.74 | 73.02 | | 382.82 | | 584.78 | | | | 1249.38 |
| December | 0 | 164.28 | 125.60 | | 581.10 | | 96.70 | | | | 1351.22 |
| **TOTAL** | **0** | **20325.72** | **1273.04** | **515.66** | **2449.19** | **22.42** | **1793.74** | **0.00** | **0.00** | | **18239.82** |
| % | 0% | | | | | | | | | | 100% |

# Recycling Rates 2008

| | Cardboard | Paper | Plastic | Timber | Metal | Fridges | Batteries | Textiles | Hazardous | Fluorescent tubes | Glass | White & brown goods | Tetra | Oil | Oil filters | Tyres | **Total per** | **Total WEEE** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Jan** | 11.2 | 26.16 | 8.28 | 4.14 | 15.58 | 0 | 0 | 8.62 | 1.32 | 0.06 | 12.3 | 22.26 | 1.22 | 1.56 | 0 | 0 | 112.7 | 22.26 |
| **Feb** | 9.38 | 27.68 | 5.82 | 1.4 | 10 | 0 | 0.3 | 4.54 | 1.62 | 0 | 9.6 | 17.22 | 0.92 | 0 | 0 | 0 | 88.48 | 17.22 |
| **Mar** | 8.98 | 24.3 | 6.1 | 1.56 | 6.52 | 0.4 | 2.98 | 4.56 | 0 | 0.6 | 10.46 | 16.6 | 1.72 | 0 | 0 | 0 | 84.78 | 17 |
| **Apr** | 8.52 | 23.92 | 5.74 | 2.04 | 19.24 | 0.5 | 0.6 | 4.9 | 0 | 0.04 | 6.82 | 24.92 | 0.5 | 0 | 0 | 0 | 97.74 | 25.42 |
| **May** | 7.64 | 27.88 | 7.58 | 2.54 | 15.54 | 0 | 0 | 4.96 | 1.56 | 0.06 | 13.28 | 23.14 | 1.08 | 1 | 0 | 0 | 106.26 | 23.14 |
| **Jun** | 5.78 | 28.8 | 4.64 | 1.44 | 14.16 | 1.34 | 1.38 | 4.66 | 2.46 | 0 | 7.86 | 20.38 | 0.82 | 0 | 0 | 0 | 93.72 | 21.72 |
| **Jul** | 7.32 | 42.06 | 9.34 | 4.34 | 12.72 | 0 | 0.52 | 8.68 | 1.44 | 0.06 | 4.46 | 29.54 | 1.56 | 0 | 0 | 13.84 | 135.88 | 29.54 |
| **Aug** | 7.08 | 22.44 | 5.06 | 2.78 | 18.6 | 0 | 1 | 5.54 | 1.32 | 0.04 | 9.38 | 28.62 | 1.16 | 0.8 | 0 | 0 | 103.82 | 28.62 |
| **Sep** | 4.1 | 23.48 | 5.32 | 3.14 | 10.9 | 0.78 | 0 | 4.18 | 1.5 | 0 | 10.76 | 18.08 | 1.12 | 1.6 | 0 | 0 | 84.96 | 18.86 |
| **Oct** | 4.36 | 23.92 | 7.84 | 0 | 10.08 | 0.2 | 1.26 | 3.74 | 1.38 | 0.06 | 7.44 | 18.16 | 1.59 | 0 | 0 | 0 | 80.03 | 18.36 |
| **Nov** | 5.14 | 24.84 | 5.38 | 3.24 | 17.2 | 2.88 | 1.58 | 3.58 | 0 | 0.06 | 9.6 | 20.48 | 0.74 | 0 | 0 | 0 | 94.72 | 23.36 |
| **Dec** | 5.68 | 29.8 | 6.84 | 1.84 | 20.41 | 2.38 | 0 | 4.98 | 2.18 | 0.04 | 3.3 | 13.9 | 0.96 | 0 | 0 | 0 | 92.31 | 16.28 |
| | **85.18** | **325.28** | **77.94** | **28.46** | **170.95** | **8.48** | **9.62** | **62.94** | **14.78** | **1.02** | **105.26** | **253.3** | **13.39** | **4.96** | **0** | **13.84** | **1175.4** | 261.78 |

# Appendix B

Gas Monitoring

&

Gas Migration

| | | | | | | |
|---|---|---|---|---|---|---|
| **Site Name:** Dunmore Landfill Site | | | **Site Address:** Dunmore, Co. Kilkenny | | | |
| **Operator:** Kilkenny County Council | | | **National Grid Reference: 160572N 249519E** | | | |
| **Site Status:** Active | | | **Date: 04/03/08** | | **Time: 10:17** | |
| **Instrument Used:** Infra Red Gas Analyser - GA 94 | | | | **Date of Calibration: March '07** **Next Calibration Due: April '08** | | |
| **Monitoring Personnel:** Alan Rhatigan | | | **Weather:** Dry | | **Barometric Pressure (mb) :** 1024 | |
| **RESULTS** | | | | | | |
| **Sample Station Number** | **Borehole/ Spike/ Other** | **Survey Depth** | **$CH_4$ % v/v** | **$CO_2$ % v/v** | **$O_2$ % v/v** | **Comments** |
| **VP1** | Cell No. 1 Vent | 600mm | 28.10 | 24.00 | 3.40 | New gas well |
| **VP2** | Cell No. 1 Vent | 600mm | 16.50 | 12.30 | 10.70 | New gas well |
| **VP3** | Cell No. 1 Vent | 600mm | 19.90 | 17.70 | 6.90 | New gas well |
| **VP4** | Cell No. 3 Vent | 600mm | 17.50 | 17.60 | 7.50 | New gas well |
| **VP5** | Cell No. 2 Vent | 600mm | 28.90 | 19.50 | 8.20 | New gas well |
| **VP6** | Cell No. 2 Vent | 600mm | 27.50 | 18.90 | 7.00 | New gas well |
| **VP7** | Cell No. 3 Vent | 600mm | 35.10 | 17.40 | 10.00 | New gas well |
| **VP8** | Cell No. 7 Vent | 600mm | 34.70 | 17.20 | 10.30 | New gas well |
| **VP9** | Cell No. 7 Vent | 600mm | 23.20 | 19.70 | 6.40 | New gas well |
| **VP10** | Cell No. 6 Vent | 600mm | 44.60 | 22.30 | 3.90 | New gas well |
| **VP11** | Cell No. 6 Vent | 600mm | 38.90 | 19.80 | 6.20 | New gas well |
| **VP12** | Cell No. 5 Vent | 600mm | 52.30 | 25.90 | 1.90 | New gas well |
| **VP13** | Cell No. 5 Vent | 600mm | 0.30 | 4.20 | 17.90 | New gas well |
| **VP14** | Cell No. 7 Vent | 600mm | 58.40 | 31.00 | 1.60 | New gas well |
| **VP15** | Cell No. 7 Vent | 600mm | 7.50 | 4.00 | 16.40 | New gas well |
| **VP16** | Cell No. 4 Vent | 600mm | 45.70 | 22.20 | 5.00 | New gas well |
| **VP17** | Cell No. 4 Vent | 600mm | 11.00 | 8.70 | 12.50 | New gas well |
| **VP18** | Cell No. 10 Vent | 600mm | 37.00 | 27.70 | 1.80 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP19** | Cell No. 10 Vent | 600mm | 6.90 | 6.10 | 16.10 | New gas well |
| **VP20** | Cell No. 10 Vent | 600mm | 23.20 | 16.70 | 9.50 | New gas well |
| **VP21** | Cell No. 9 Vent | 600mm | 16.10 | 8.70 | 15.10 | New gas well |
| **VP22** | Cell No. 8 Vent | 600mm | 16.10 | 8.80 | 15.30 | New gas well |
| **VP23** | Cell No. 11 Vent | 600mm | 40.30 | 21.70 | 7.70 | New gas well |
| **VP24** | Cell No. 11 Vent | 600mm | 65.90 | 30.90 | 0.80 | New gas well |
| **VP25** | Cell No. 11 Vent | 600mm | 63.30 | 36.20 | 0.90 | New gas well |
| **VP26** | Cell No. 11 Vent | 600mm | 41.10 | 25.50 | 3.00 | New gas well |
| **VP27** | Cell No. 11 Vent | 600mm | 63.50 | 31.30 | 2.00 | New gas well |
| **VP28** | Cell No. 11 Vent | 600mm | 38.40 | 26.60 | 0.20 | New gas well |
| **VP29** | Cell No. 11 Vent | 600mm | 39.20 | 27.60 | 1.20 | New gas well |
| **VP30** | Cell No. 8 Vent | 600mm | 57.60 | 28.80 | 1.80 | New gas well |
| **VP31** | Cell No. 8 Vent | 600mm | 54.10 | 30.90 | 0.20 | New gas well |
| **VP32** | Cell No. 9 Vent | 600mm | 50.00 | 29.90 | 1.10 | New gas well |
| **VP33** | Cell No9 Vent | 600mm | | | | out of commission |
| **VP34** | Cell No10 Vent | 600mm | 12.30 | 6.70 | 16.10 | New gas well |
| **VP35** | Cell No. 10 Vent | 600mm | 23.60 | 13.40 | 13.40 | New gas well |
| **VP36** | Cell No. 10 Vent | 600mm | 63.00 | 34.50 | 1.30 | New gas well |
| **VP37** | Cell No. 11 Vent | 600mm | 43.60 | 31.90 | 0.50 | New gas well |
| **VP38** | Cell No. 12 Vent | 600mm | 32.50 | 26.80 | 0.20 | New gas well |
| **VP39** | Cell No. 12 Vent | 600mm | 34.80 | 26.40 | 2.90 | New gas well |
| **VP40** | Cell No. 12 Vent | 600mm | | | | out of commission |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Site Name:** Dunmore Landfill Site | | | **Site Address:** Dunmore, Co. Kilkenny | | | |
| **Operator:** Kilkenny County Council | | | **National Grid Reference: 160572N 249519E** | | | |
| **Site Status:** Active | | | **Date: 02/05/08** | | **Time: 11:55** | |
| **Instrument Used:** Infra Red Gas Analyser - GA 94 | | | | **Date of Calibration: May'08** **Next Calibration Due: May'10** | | |
| **Monitoring Personnel:** Alan Ratigan | | | **Weather:** dry | | **Barometric Pressure (mb) :** 1005 | |
| **RESULTS** | | | | | | |
| **Sample Station Number** | **Borehole/ Spike/ Other** | **Survey Depth** | **$CH_4$ % v/v** | **$CO_2$ % v/v** | **$O_2$ % v/v** | **Comments** |
| **VP1** | Cell No. 1 Vent | 600mm | 37.00 | 27.10 | 2.10 | New gas well |
| **VP2** | Cell No. 1 Vent | 600mm | 27.80 | 18.80 | 5.90 | New gas well |
| **VP3** | Cell No. 1 Vent | 600mm | 4.60 | 21.70 | 5.50 | New gas well |
| **VP4** | Cell No. 3 Vent | 600mm | 21.40 | 15.00 | 8.50 | New gas well |
| **VP5** | Cell No. 2 Vent | 600mm | 27.90 | 19.60 | 5.70 | New gas well |
| **VP6** | Cell No. 2 Vent | 600mm | 25.20 | 17.80 | 7.90 | New gas well |
| **VP7** | Cell No. 3 Vent | 600mm | 41.10 | 21.10 | 7.10 | New gas well |
| **VP8** | Cell No. 7 Vent | 600mm | 0.60 | 2.60 | 18.90 | New gas well |
| **VP9** | Cell No. 7 Vent | 600mm | 9.50 | 15.80 | 9.90 | New gas well |
| **VP10** | Cell No. 6 Vent | 600mm | 29.80 | 18.60 | 5.90 | New gas well |
| **VP11** | Cell No. 6 Vent | 600mm | 28.40 | 17.50 | 6.80 | New gas well |
| **VP12** | Cell No. 5 Vent | 600mm | 35.90 | 22.60 | 3.30 | New gas well |
| **VP13** | Cell No. 5 Vent | 600mm | 16.30 | 11.00 | 12.70 | New gas well |
| **VP14** | Cell No. 7 Vent | 600mm | 28.40 | 16.90 | 9.40 | New gas well |
| **VP15** | Cell No. 7 Vent | 600mm | 28.80 | 17.20 | 9.40 | New gas well |
| **VP16** | Cell No. 4 Vent | 600mm | 18.60 | 9.80 | 13.80 | New gas well |
| **VP17** | Cell No. 4 Vent | 600mm | 3.60 | 1.10 | 19.30 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP18** | Cell No. 10 Vent | 600mm | 32.30 | 22.60 | 7.10 | New gas well |
| **VP19** | Cell No. 10 Vent | 600mm | 25.40 | 17.60 | 9.00 | New gas well |
| **VP20** | Cell No. 10 Vent | 600mm | 36.60 | 23.60 | 5.80 | New gas well |
| **VP21** | Cell No. 9 Vent | 600mm | 22.70 | 15.20 | 9.00 | New gas well |
| **VP22** | Cell No. 8 Vent | 600mm | 26.10 | 14.10 | 11.90 | New gas well |
| **VP23** | Cell No. 11 Vent | 600mm | 34.60 | 22.70 | 6.00 | New gas well |
| **VP24** | Cell No. 11 Vent | 600mm | 34.40 | 27.00 | 0.40 | New gas well |
| **VP25** | Cell No. 11 Vent | 600mm | 63.40 | 36.70 | 0.20 | New gas well |
| **VP26** | Cell No. 11 Vent | 600mm | 40.20 | 27.40 | 0.80 | New gas well |
| **VP27** | Cell No. 11 Vent | 600mm | 63.20 | 32.70 | 1.00 | New gas well |
| **VP28** | Cell No. 11 Vent | 600mm | 49.60 | 31.40 | 0.30 | New gas well |
| **VP29** | Cell No. 11 Vent | 600mm | 50.10 | 31.20 | 0.60 | New gas well |
| **VP30** | Cell No. 8 Vent | 600mm | 58.40 | 29.60 | 1.50 | New gas well |
| **VP31** | Cell No. 8 Vent | 600mm | 58.10 | 31.10 | 1.90 | New gas well |
| **VP32** | Cell No. 9 Vent | 600mm | 32.90 | 8.10 | 3.30 | New gas well |
| **VP33** | Cell No9 Vent | 600mm | 34.20 | 19.20 | 5.80 | New gas well |
| **VP34** | Cell No10 Vent | 600mm | 17.70 | 8.60 | 15.20 | New gas well |
| **VP35** | Cell No. 10 Vent | 600mm | 29.20 | 17.30 | 11.80 | New gas well |
| **VP36** | Cell No. 10 Vent | 600mm | 56.60 | 32.60 | 1.70 | New gas well |
| **VP37** | Cell No. 11 Vent | 600mm | 43.10 | 31.00 | 1.90 | New gas well |
| **VP38** | Cell No. 12 Vent | 600mm | 40.10 | 29.50 | 0.50 | New gas well |
| **VP39** | Cell No. 12 Vent | 600mm | 31.20 | 25.70 | 2.60 | New gas well |
| **VP40** | Cell No. 12 Vent | 600mm | 31.70 | 26.10 | 3.30 | New gas well |
| **VP41** | Cell No. 12 Vent | 600mm | 60.60 | 37.30 | 0.90 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP42** | Cell No. 8 Vent | 600mm | 32.90 | 26.70 | 0.30 | New gas well |
| **VP43** | Cell No. 8 Vent | 600mm | 49.90 | 31.30 | 0.60 | New gas well |
| **VP44** | Cell No. 9 Vent | 600mm | | | | Disconnected |
| **VP45** | Cell No. 9 Vent | 600mm | | | | Disconnected |
| **VP46** | Cell No. 9 Vent | 600mm | 22.30 | 17.80 | 6.30 | New gas well |
| **VP47** | Cell No. 13 Vent | 600mm | 27.40 | 26.80 | 1.50 | New gas well |
| **VP48** | Cell No. 13 Vent | 600mm | 43.90 | 33.70 | 1.60 | New gas well |
| **VP49** | Cell No. 13 Vent | 600mm | 40.00 | 32.00 | 0.20 | New gas well |
| **VP50** | Cell No. 13 Vent | 600mm | 23.40 | 23.40 | 1.70 | New gas well |
| **VP51** | Cell No. 13 Vent | 600mm | 26.60 | 19.70 | 9.70 | New gas well |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Site Name:** Dunmore Landfill Site | | | **Site Address:** Dunmore, Co. Kilkenny | | | |
| **Operator:** Kilkenny County Council | | | **National Grid Reference: 160572N 249519E** | | | |
| **Site Status:** Active | | | **Date: 16/05/08** | | **Time: 12:07** | |
| **Instrument Used:** Infra Red Gas Analyser - GA 94 | | | | **Date of Calibration: May'08** **Next Calibration Due: May'10** | | |
| **Monitoring Personnel:** Alan Ratigan | | | **Weather:** dry | | **Barometric Pressure (mb) :** 1002 | |
| **RESULTS** | | | | | | |
| **Sample Station Number** | **Borehole/ Spike/ Other** | **Survey Depth** | **$CH_4$ % v/v** | **$CO_2$ % v/v** | **$O_2$ % v/v** | **Comments** |
| **VP1** | Cell No. 1 Vent | 600mm | 53.30 | 30.60 | 0.80 | New gas well |
| **VP2** | Cell No. 1 Vent | 600mm | 37.10 | 20.60 | 4.70 | New gas well |
| **VP3** | Cell No. 1 Vent | 600mm | 43.90 | 26.40 | 0.80 | New gas well |
| **VP4** | Cell No. 3 Vent | 600mm | 33.10 | 21.30 | 4.90 | New gas well |
| **VP5** | Cell No. 2 Vent | 600mm | 42.00 | 24.40 | 1.80 | New gas well |
| **VP6** | Cell No. 2 Vent | 600mm | 52.80 | 27.30 | 2.20 | New gas well |
| **VP7** | Cell No. 3 Vent | 600mm | 46.60 | 23.80 | 5.40 | New gas well |
| **VP8** | Cell No. 7 Vent | 600mm | 15.50 | 8.20 | 14.80 | New gas well |
| **VP9** | Cell No. 7 Vent | 600mm | 59.40 | 28.80 | 1.80 | New gas well |
| **VP10** | Cell No. 6 Vent | 600mm | 53.50 | 25.20 | 0.70 | New gas well |
| **VP11** | Cell No. 6 Vent | 600mm | 47.10 | 26.80 | 0.50 | New gas well |
| **VP12** | Cell No. 5 Vent | 600mm | 42.80 | 24.80 | 1.90 | New gas well |
| **VP13** | Cell No. 5 Vent | 600mm | 51.70 | 28.40 | 2.60 | New gas well |
| **VP14** | Cell No. 7 Vent | 600mm | 17.30 | 9.20 | 13.60 | New gas well |
| **VP15** | Cell No. 7 Vent | 600mm | 46.00 | 26.40 | 5.40 | New gas well |
| **VP16** | Cell No. 4 Vent | 600mm | 50.90 | 28.50 | 4.20 | New gas well |
| **VP17** | Cell No. 4 Vent | 600mm | 19.50 | 12.20 | 10.70 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP18** | Cell No. 10 Vent | 600mm | 39.10 | 25.40 | 6.00 | New gas well |
| **VP19** | Cell No. 10 Vent | 600mm | 32.20 | 21.20 | 7.50 | New gas well |
| **VP20** | Cell No. 10 Vent | 600mm | 45.70 | 27.30 | 5.10 | New gas well |
| **VP21** | Cell No. 9 Vent | 600mm | 43.80 | 26.60 | 4.90 | New gas well |
| **VP22** | Cell No. 8 Vent | 600mm | 30.60 | 17.60 | 10.20 | New gas well |
| **VP23** | Cell No. 11 Vent | 600mm | 37.00 | 24.10 | 6.50 | New gas well |
| **VP24** | Cell No. 11 Vent | 600mm | 43.10 | 29.20 | 0.90 | New gas well |
| **VP25** | Cell No. 11 Vent | 600mm | 63.50 | 36.50 | 0.30 | New gas well |
| **VP26** | Cell No. 11 Vent | 600mm | 53.40 | 30.40 | 0.30 | New gas well |
| **VP27** | Cell No. 11 Vent | 600mm | 63.50 | 33.50 | 0.90 | New gas well |
| **VP28** | Cell No. 11 Vent | 600mm | 40.20 | 28.80 | 0.20 | New gas well |
| **VP29** | Cell No. 11 Vent | 600mm | 42.10 | 29.00 | 0.60 | New gas well |
| **VP30** | Cell No. 8 Vent | 600mm | 9.10 | 5.10 | 18.30 | New gas well |
| **VP31** | Cell No. 8 Vent | 600mm | 52.70 | 30.80 | 3.00 | New gas well |
| **VP32** | Cell No. 9 Vent | 600mm | 66.30 | 32.90 | 0.20 | New gas well |
| **VP33** | Cell No9 Vent | 600mm | 64.00 | 36.60 | 2.50 | New gas well |
| **VP34** | Cell No10 Vent | 600mm | 22.40 | 10.60 | 13.80 | New gas well |
| **VP35** | Cell No. 10 Vent | 600mm | 21.40 | 12.20 | 13.80 | New gas well |
| **VP36** | Cell No. 10 Vent | 600mm | 63.20 | 35.10 | 0.40 | New gas well |
| **VP37** | Cell No. 11 Vent | 600mm | 55.30 | 34.30 | 1.70 | New gas well |
| **VP38** | Cell No. 12 Vent | 600mm | 46.60 | 31.10 | 0.20 | New gas well |
| **VP39** | Cell No. 12 Vent | 600mm | 45.70 | 31.40 | 1.40 | New gas well |
| **VP40** | Cell No. 12 Vent | 600mm | 41.80 | 30.20 | 3.70 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP41** | Cell No. 12 Vent | 600mm | 39.90 | 29.10 | 0.30 | New gas well |
| **VP42** | Cell No. 8 Vent | 600mm | 63.80 | 39.00 | 0.10 | New gas well |
| **VP43** | Cell No. 8 Vent | 600mm | 54.10 | 32.90 | 0.20 | New gas well |
| **VP44** | Cell No. 9 Vent | 600mm | | | | disconnected |
| **VP45** | Cell No. 9 Vent | 600mm | | | | disconnected |
| **VP46** | Cell No. 9 Vent | 600mm | 31.80 | 25.10 | 1.90 | New gas well |
| **VP47** | Cell No. 13 Vent | 600mm | 27.40 | 27.70 | 1.50 | New gas well |
| **VP48** | Cell No. 13 Vent | 600mm | 52.50 | 39.30 | 0.30 | New gas well |
| **VP49** | Cell No. 13 Vent | 600mm | 26.30 | 23.30 | 4.40 | New gas well |
| **VP50** | Cell No. 13 Vent | 600mm | 20.20 | 16.30 | 10.60 | New gas well |
| **VP51** | Cell No. 13 Vent | 600mm | 25.90 | 22.60 | 5.60 | New gas well |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Site Name:** Dunmore Landfill Site | | | | **Site Address:** Dunmore, Co. Kilkenny | | |
| **Operator:** Kilkenny County Council | | | | **National Grid Reference: 160572N 249519E** | | |
| **Site Status:** Active | | | | **Date: 09/06/08** | | **Time: 12:13** |
| **Instrument Used:** Infra Red Gas Analyser - GA 94 | | | | | **Date of Calibration: May'08** **Next Calibration Due: May'10** | |
| **Monitoring Personnel:** Alan Rhatigan | | | | **Weather:** dry | | **Barometric Pressure (mb) :** 1021 |
| **RESULTS** | | | | | | |
| **Sample Station Number** | **Borehole/ Spike/ Other** | **Survey Depth** | **$CH_4$ % v/v** | **$CO_2$ % v/v** | **$O_2$ % v/v** | **Comments** |
| **VP1** | Cell No. 1 Vent | 600mm | 47.90 | 29.20 | 0.80 | New gas well |
| **VP2** | Cell No. 1 Vent | 600mm | 11.10 | 15.70 | 6.50 | New gas well |
| **VP3** | Cell No. 1 Vent | 600mm | 16.40 | 19.20 | 4.40 | New gas well |
| **VP4** | Cell No. 3 Vent | 600mm | 23.10 | 17.00 | 7.80 | New gas well |
| **VP5** | Cell No. 2 Vent | 600mm | 30.90 | 21.70 | 2.00 | New gas well |
| **VP6** | Cell No. 2 Vent | 600mm | 29.90 | 19.80 | 6.90 | New gas well |
| **VP7** | Cell No. 3 Vent | 600mm | 43.90 | 23.50 | 5.70 | New gas well |
| **VP8** | Cell No. 7 Vent | 600mm | 16.20 | 8.20 | 14.80 | New gas well |
| **VP9** | Cell No. 7 Vent | 600mm | 14.80 | 10.70 | 12.50 | New gas well |
| **VP10** | Cell No. 6 Vent | 600mm | 6.70 | 11.10 | 11.30 | New gas well |
| **VP11** | Cell No. 6 Vent | 600mm | 6.40 | 8.60 | 13.20 | New gas well |
| **VP12** | Cell No. 5 Vent | 600mm | 44.20 | 25.10 | 3.00 | New gas well |
| **VP13** | Cell No. 5 Vent | 600mm | 32.70 | 23.40 | 4.70 | New gas well |
| **VP14** | Cell No. 7 Vent | 600mm | 25.80 | 14.60 | 10.60 | New gas well |
| **VP15** | Cell No. 7 Vent | 600mm | 25.50 | 18.80 | 8.40 | New gas well |
| **VP16** | Cell No. 4 Vent | 600mm | 32.10 | 19.10 | 8.40 | New gas well |
| **VP17** | Cell No. 4 Vent | 600mm | 25.70 | 16.30 | 9.70 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP18** | Cell No. 10 Vent | 600mm | 25.50 | 18.30 | 9.70 | New gas well |
| **VP19** | Cell No. 10 Vent | 600mm | 18.30 | 13.50 | 11.60 | New gas well |
| **VP20** | Cell No. 10 Vent | 600mm | 29.70 | 19.20 | 8.60 | New gas well |
| **VP21** | Cell No. 9 Vent | 600mm | 23.10 | 17.70 | 9.20 | New gas well |
| **VP22** | Cell No. 8 Vent | 600mm | 36.80 | 21.50 | 7.90 | New gas well |
| **VP23** | Cell No. 11 Vent | 600mm | 28.30 | 19.40 | 8.10 | New gas well |
| **VP24** | Cell No. 11 Vent | 600mm | 36.20 | 27.30 | 0.40 | New gas well |
| **VP25** | Cell No. 11 Vent | 600mm | 60.50 | 36.00 | 0.30 | New gas well |
| **VP26** | Cell No. 11 Vent | 600mm | 48.80 | 29.90 | 0.50 | New gas well |
| **VP27** | Cell No. 11 Vent | 600mm | 60.30 | 33.70 | 0.90 | New gas well |
| **VP28** | Cell No. 11 Vent | 600mm | 41.00 | 29.70 | 0.20 | New gas well |
| **VP29** | Cell No. 11 Vent | 600mm | 42.40 | 29.90 | 0.60 | New gas well |
| **VP30** | Cell No. 8 Vent | 600mm | 30.20 | 43.40 | 2.00 | New gas well |
| **VP31** | Cell No. 8 Vent | 600mm | 40.40 | 29.30 | 1.60 | New gas well |
| **VP32** | Cell No. 9 Vent | 600mm | 53.30 | 30.50 | 1.00 | New gas well |
| **VP33** | Cell No9 Vent | 600mm | 63.00 | 36.10 | 0.40 | New gas well |
| **VP34** | Cell No10 Vent | 600mm | 45.20 | 23.30 | 6.00 | New gas well |
| **VP35** | Cell No. 10 Vent | 600mm | 32.10 | 19.10 | 9.70 | New gas well |
| **VP36** | Cell No. 10 Vent | 600mm | 64.50 | 35.90 | 0.50 | New gas well |
| **VP37** | Cell No. 11 Vent | 600mm | 50.80 | 33.90 | 1.70 | New gas well |
| **VP38** | Cell No. 12 Vent | 600mm | 43.10 | 30.80 | 0.20 | New gas well |
| **VP39** | Cell No. 12 Vent | 600mm | 36.80 | 27.70 | 2.30 | New gas well |
| **VP40** | Cell No. 12 Vent | 600mm | 40.40 | 30.30 | 3.10 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP41** | Cell No. 12 Vent | 600mm | 31.60 | 26.40 | 1.00 | New gas well |
| **VP42** | Cell No. 8 Vent | 600mm | 60.90 | 38.20 | 0.30 | New gas well |
| **VP43** | Cell No. 8 Vent | 600mm | 38.50 | 29.60 | 0.50 | New gas well |
| **VP44** | Cell No. 9 Vent | 600mm | | | | disconnected |
| **VP45** | Cell No. 9 Vent | 600mm | | | | disconnected |
| **VP46** | Cell No. 9 Vent | 600mm | 27.20 | 22.90 | 3.50 | New gas well |
| **VP47** | Cell No. 13 Vent | 600mm | 58.40 | 40.90 | 0.10 | New gas well |
| **VP48** | Cell No. 13 Vent | 600mm | 60.30 | 39.00 | 0.00 | New gas well |
| **VP49** | Cell No. 13 Vent | 600mm | 49.40 | 37.70 | 0.00 | New gas well |
| **VP50** | Cell No. 13 Vent | 600mm | 23.20 | 20.00 | 7.50 | New gas well |
| **VP51** | Cell No. 13 Vent | 600mm | 21.20 | 18.10 | 9.70 | New gas well |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Site Name:** Dunmore Landfill Site | | | **Site Address:** Dunmore, Co. Kilkenny | | | |
| **Operator:** Kilkenny County Council | | | **National Grid Reference: 160572N 249519E** | | | |
| **Site Status:** Active | | | **Date: 30/06/08** | | **Time: 16:07** | |
| **Instrument Used:** Infra Red Gas Analyser - GA 94 | | | | **Date of Calibration: May'08** **Next Calibration Due: May'10** | | |
| **Monitoring Personnel:** Alan Rhatigan | | | **Weather:** dry | | **Barometric Pressure (mb) :** 1009 | |
| **RESULTS** | | | | | | |
| **Sample Station Number** | **Borehole/ Spike/ Other** | **Survey Depth** | **$CH_4$ % v/v** | **$CO_2$ % v/v** | **$O_2$ % v/v** | **Comments** |
| **VP1** | Cell No. 1 Vent | 600mm | 46.50 | 29.70 | 1.30 | New gas well |
| **VP2** | Cell No. 1 Vent | 600mm | 31.80 | 19.40 | 4.20 | New gas well |
| **VP3** | Cell No. 1 Vent | 600mm | 19.70 | 19.10 | 2.90 | New gas well |
| **VP4** | Cell No. 3 Vent | 600mm | 22.60 | 17.70 | 7.40 | New gas well |
| **VP5** | Cell No. 2 Vent | 600mm | 30.80 | 22.20 | 2.00 | New gas well |
| **VP6** | Cell No. 2 Vent | 600mm | 33.90 | 22.10 | 5.20 | New gas well |
| **VP7** | Cell No. 3 Vent | 600mm | 44.00 | 25.20 | 5.10 | New gas well |
| **VP8** | Cell No. 7 Vent | 600mm | 21.00 | 10.50 | 13.50 | New gas well |
| **VP9** | Cell No. 7 Vent | 600mm | 20.30 | 14.80 | 9.40 | New gas well |
| **VP10** | Cell No. 6 Vent | 600mm | 14.10 | 12.20 | 10.00 | New gas well |
| **VP11** | Cell No. 6 Vent | 600mm | 8.60 | 8.60 | 13.30 | New gas well |
| **VP12** | Cell No. 5 Vent | 600mm | 45.40 | 26.90 | 2.40 | New gas well |
| **VP13** | Cell No. 5 Vent | 600mm | 21.30 | 15.40 | 9.70 | New gas well |
| **VP14** | Cell No. 7 Vent | 600mm | 60.00 | 32.10 | 1.20 | New gas well |
| **VP15** | Cell No. 7 Vent | 600mm | 18.70 | 11.10 | 12.60 | New gas well |
| **VP16** | Cell No. 4 Vent | 600mm | 34.70 | 20.20 | 7.80 | New gas well |
| **VP17** | Cell No. 4 Vent | 600mm | 11.30 | 10.20 | 13.40 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP18** | Cell No. 10 Vent | 600mm | 52.50 | 31.60 | 2.40 | New gas well |
| **VP19** | Cell No. 10 Vent | 600mm | 50.00 | 30.70 | 3.10 | New gas well |
| **VP20** | Cell No. 10 Vent | 600mm | 47.10 | 29.00 | 4.20 | New gas well |
| **VP21** | Cell No. 9 Vent | 600mm | 23.00 | 13.60 | 12.00 | New gas well |
| **VP22** | Cell No. 8 Vent | 600mm | 28.60 | 16.90 | 10.40 | New gas well |
| **VP23** | Cell No. 11 Vent | 600mm | 34.30 | 22.60 | 5.80 | New gas well |
| **VP24** | Cell No. 11 Vent | 600mm | 41.40 | 28.50 | 0.60 | New gas well |
| **VP25** | Cell No. 11 Vent | 600mm | 62.70 | 36.50 | 0.10 | New gas well |
| **VP26** | Cell No. 11 Vent | 600mm | 54.40 | 31.30 | 0.30 | New gas well |
| **VP27** | Cell No. 11 Vent | 600mm | 61.00 | 34.20 | 0.80 | New gas well |
| **VP28** | Cell No. 11 Vent | 600mm | 43.70 | 30.30 | 0.30 | New gas well |
| **VP29** | Cell No. 11 Vent | 600mm | 44.00 | 30.20 | 0.60 | New gas well |
| **VP30** | Cell No. 8 Vent | 600mm | 58.10 | 34.30 | 0.30 | New gas well |
| **VP31** | Cell No. 8 Vent | 600mm | 52.10 | 36.10 | 0.30 | New gas well |
| **VP32** | Cell No. 9 Vent | 600mm | 65.30 | 33.10 | 0.20 | New gas well |
| **VP33** | Cell No9 Vent | 600mm | 62.10 | 36.50 | 0.40 | New gas well |
| **VP34** | Cell No10 Vent | 600mm | 43.30 | 21.60 | 6.50 | New gas well |
| **VP35** | Cell No. 10 Vent | 600mm | 43.40 | 26.20 | 5.80 | New gas well |
| **VP36** | Cell No. 10 Vent | 600mm | 61.50 | 36.20 | 1.20 | New gas well |
| **VP37** | Cell No. 11 Vent | 600mm | 60.60 | 37.60 | 0.10 | New gas well |
| **VP38** | Cell No. 12 Vent | 600mm | 44.80 | 31.70 | 0.00 | New gas well |
| **VP39** | Cell No. 12 Vent | 600mm | 31.70 | 26.90 | 2.50 | New gas well |
| **VP40** | Cell No. 12 Vent | 600mm | 33.70 | 27.50 | 2.40 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP41** | Cell No. 12 Vent | 600mm | 41.90 | 30.10 | 0.20 | New gas well |
| **VP42** | Cell No. 8 Vent | 600mm | | | | Disconnected |
| **VP43** | Cell No. 8 Vent | 600mm | 61.50 | 37.60 | 0.30 | New gas well |
| **VP44** | Cell No. 9 Vent | 600mm | | | | Disconnected |
| **VP45** | Cell No. 9 Vent | 600mm | | | | Disconnected |
| **VP46** | Cell No. 9 Vent | 600mm | 62.20 | 33.10 | 0.10 | New gas well |
| **VP47** | Cell No. 13 Vent | 600mm | 36.20 | 32.70 | 0.00 | New gas well |
| **VP48** | Cell No. 13 Vent | 600mm | 54.70 | 39.90 | 0.40 | New gas well |
| **VP49** | Cell No. 13 Vent | 600mm | 32.10 | 26.20 | 3.60 | New gas well |
| **VP50** | Cell No. 13 Vent | 600mm | 26.70 | 21.50 | 7.20 | New gas well |
| **VP51** | Cell No. 13 Vent | 600mm | 36.70 | 28.80 | 4.60 | New gas well |

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|---|---|---|---|---|---|---|
| **Site Name:** Dunmore Landfill Site | | | **Site Address:** Dunmore, Co. Kilkenny | | | |
| **Operator:** Kilkenny County Council | | | **National Grid Reference: 160572N 249519E** | | | |
| **Site Status:** Active | | | **Date: 07/08/08** | | **Time: 11:50** | |
| **Instrument Used:** Infra Red Gas Analyser - GA 94 | | | | **Date of Calibration: May'08** Next Calibration Due: May'10 | | |
| **Monitoring Personnel:** Alan Rhatigan | | | **Weather:** dry | | **Barometric Pressure (mb) :** 1000 | |
| **RESULTS** | | | | | | |
| **Sample Station Number** | **Borehole/ Spike/ Other** | **Survey Depth** | **$CH_4$ % v/v** | **$CO_2$ % v/v** | **$O_2$ % v/v** | **Comments** |
| **VP1** | Cell No. 1 Vent | 600mm | 53.10 | 32.60 | 0.40 | New gas well |
| **VP2** | Cell No. 1 Vent | 600mm | 48.70 | 24.20 | 0.90 | New gas well |
| **VP3** | Cell No. 1 Vent | 600mm | 34.70 | 27.00 | 0.60 | New gas well |
| **VP4** | Cell No. 3 Vent | 600mm | 36.90 | 24.50 | 2.20 | New gas well |
| **VP5** | Cell No. 2 Vent | 600mm | 43.50 | 25.30 | 1.20 | New gas well |
| **VP6** | Cell No. 2 Vent | 600mm | 50.80 | 29.60 | 2.20 | New gas well |
| **VP7** | Cell No. 3 Vent | 600mm | 49.70 | 27.30 | 3.90 | New gas well |
| **VP8** | Cell No. 7 Vent | 600mm | 31.40 | 18.70 | 8.90 | New gas well |
| **VP9** | Cell No. 7 Vent | 600mm | 51.80 | 27.20 | 1.90 | New gas well |
| **VP10** | Cell No. 6 Vent | 600mm | 47.90 | 26.50 | 1.20 | New gas well |
| **VP11** | Cell No. 6 Vent | 600mm | 41.70 | 22.60 | 0.00 | New gas well |
| **VP12** | Cell No. 5 Vent | 600mm | 47.30 | 28.50 | 1.40 | New gas well |
| **VP13** | Cell No. 5 Vent | 600mm | 33.50 | 20.20 | 5.40 | New gas well |
| **VP14** | Cell No. 7 Vent | 600mm | 24.20 | 14.00 | 11.30 | New gas well |
| **VP15** | Cell No. 7 Vent | 600mm | 59.70 | 33.00 | 0.70 | New gas well |
| **VP16** | Cell No. 4 Vent | 600mm | 12.10 | 18.30 | 11.40 | New gas well |
| **VP17** | Cell No. 4 Vent | 600mm | 47.70 | 32.70 | 3.00 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP18** | Cell No. 10 Vent | 600mm | 59.70 | 38.80 | 0.60 | New gas well |
| **VP19** | Cell No. 10 Vent | 600mm | 53.10 | 32.90 | 2.70 | New gas well |
| **VP20** | Cell No. 10 Vent | 600mm | 62.00 | 37.10 | 0.10 | New gas well |
| **VP21** | Cell No. 9 Vent | 600mm | 55.40 | 33.00 | 0.20 | New gas well |
| **VP22** | Cell No. 8 Vent | 600mm | 45.90 | 28.30 | 4.60 | New gas well |
| **VP23** | Cell No. 11 Vent | 600mm | 45.50 | 27.00 | 4.40 | New gas well |
| **VP24** | Cell No. 11 Vent | 600mm | 62.20 | 33.90 | 0.30 | New gas well |
| **VP25** | Cell No. 11 Vent | 600mm | 62.00 | 37.10 | 0.10 | New gas well |
| **VP26** | Cell No. 11 Vent | 600mm | 66.50 | 32.50 | 0.20 | New gas well |
| **VP27** | Cell No. 11 Vent | 600mm | 59.40 | 35.40 | 0.90 | New gas well |
| **VP28** | Cell No. 11 Vent | 600mm | 53.90 | 32.40 | 0.10 | New gas well |
| **VP29** | Cell No. 11 Vent | 600mm | 53.30 | 32.40 | 0.60 | New gas well |
| **VP30** | Cell No. 8 Vent | 600mm | 55.80 | 32.80 | 0.90 | New gas well |
| **VP31** | Cell No. 8 Vent | 600mm | 55.90 | 38.60 | 0.00 | New gas well |
| **VP32** | Cell No. 9 Vent | 600mm | 65.10 | 33.10 | 0.00 | New gas well |
| **VP33** | Cell No9 Vent | 600mm | 53.90 | 32.40 | 2.10 | New gas well |
| **VP34** | Cell No10 Vent | 600mm | 64.20 | 33.90 | 0.00 | New gas well |
| **VP35** | Cell No. 10 Vent | 600mm | 61.90 | 36.40 | 0.00 | New gas well |
| **VP36** | Cell No. 10 Vent | 600mm | 57.50 | 33.30 | 0.60 | New gas well |
| **VP37** | Cell No. 11 Vent | 600mm | 51.70 | 34.30 | 2.20 | New gas well |
| **VP38** | Cell No. 12 Vent | 600mm | 55.50 | 33.10 | 0.00 | New gas well |
| **VP39** | Cell No. 12 Vent | 600mm | 56.20 | 36.00 | 0.00 | New gas well |
| **VP40** | Cell No. 12 Vent | 600mm | 55.80 | 35.70 | 0.30 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP41** | Cell No. 12 Vent | 600mm | 59.90 | 33.70 | 0.30 | New gas well |
| **VP42** | Cell No. 8 Vent | 600mm | | | | Disconnected |
| **VP43** | Cell No. 8 Vent | 600mm | 61.50 | 35.40 | 0.00 | New gas well |
| **VP44** | Cell No. 9 Vent | 600mm | 64.90 | 32.10 | 0.20 | New gas well |
| **VP45** | Cell No. 9 Vent | 600mm | 63.10 | 34.30 | 0.00 | New gas well |
| **VP46** | Cell No. 9 Vent | 600mm | 64.90 | 33.60 | 0.00 | New gas well |
| **VP47** | Cell No. 13 Vent | 600mm | | | | Disconnected |
| **VP48** | Cell No. 13 Vent | 600mm | 53.70 | 39.40 | 0.00 | New gas well |
| **VP49** | Cell No. 13 Vent | 600mm | 32.40 | 29.10 | 2.40 | New gas well |
| **VP50** | Cell No. 13 Vent | 600mm | 31.40 | 30.50 | 0.40 | New gas well |
| **VP51** | Cell No. 13 Vent | 600mm | 55.00 | 36.90 | 0.60 | New gas well |

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|---|---|---|---|---|---|---|
| **Site Name:** Dunmore Landfill Site | | | **Site Address:** Dunmore, Co. Kilkenny | | | |
| **Operator:** Kilkenny County Council | | | **National Grid Reference: 160572N 249519E** | | | |
| **Site Status:** Active | | | **Date: 15/09/08** | | **Time: 09:46** | |
| **Instrument Used:** Infra Red Gas Analyser - GA 94 | | | | **Date of Calibration: May'08** **Next Calibration Due: May'10** | | |
| **Monitoring Personnel:** Alan Rhatigan | | | **Weather:** dry | | **Barometric Pressure (mb) :** 11019 | |
| **RESULTS** | | | | | | |
| **Sample Station Number** | **Borehole/ Spike/ Other** | **Survey Depth** | **$CH_4$ % v/v** | **$CO_2$ % v/v** | **$O_2$ % v/v** | **Comments** |
| **VP1** | Cell No. 1 Vent | 600mm | 48.20 | 30.60 | 2.00 | New gas well |
| **VP2** | Cell No. 1 Vent | 600mm | 33.50 | 23.10 | 3.40 | New gas well |
| **VP3** | Cell No. 1 Vent | 600mm | 22.60 | 22.00 | 1.50 | New gas well |
| **VP4** | Cell No. 3 Vent | 600mm | 27.00 | 20.90 | 5.50 | New gas well |
| **VP5** | Cell No. 2 Vent | 600mm | 29.20 | 22.50 | 1.60 | New gas well |
| **VP6** | Cell No. 2 Vent | 600mm | 44.50 | 28.00 | 2.60 | New gas well |
| **VP7** | Cell No. 3 Vent | 600mm | 54.10 | 30.30 | 2.60 | New gas well |
| **VP8** | Cell No. 7 Vent | 600mm | 36.50 | 23.00 | 5.50 | New gas well |
| **VP9** | Cell No. 7 Vent | 600mm | 40.60 | 25.30 | 2.20 | New gas well |
| **VP10** | Cell No. 6 Vent | 600mm | 10.30 | 17.90 | 3.80 | New gas well |
| **VP11** | Cell No. 6 Vent | 600mm | 43.90 | 29.00 | 0.60 | New gas well |
| **VP12** | Cell No. 5 Vent | 600mm | 46.50 | 28.90 | 1.20 | New gas well |
| **VP13** | Cell No. 5 Vent | 600mm | 23.20 | 16.30 | 11.10 | New gas well |
| **VP14** | Cell No. 7 Vent | 600mm | 25.40 | 22.20 | 7.90 | New gas well |
| **VP15** | Cell No. 7 Vent | 600mm | 64.50 | 33.50 | 0.20 | New gas well |
| **VP16** | Cell No. 4 Vent | 600mm | 24.60 | 17.20 | 10.90 | New gas well |
| **VP17** | Cell No. 4 Vent | 600mm | 31.30 | 23.50 | 5.50 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP18** | Cell No. 10 Vent | 600mm | 60.60 | 37.90 | 0.30 | New gas well |
| **VP19** | Cell No. 10 Vent | 600mm | 53.50 | 32.10 | 2.80 | New gas well |
| **VP20** | Cell No. 10 Vent | 600mm | 36.50 | 22.40 | 7.80 | New gas well |
| **VP21** | Cell No. 9 Vent | 600mm | 51.50 | 31.30 | 3.30 | New gas well |
| **VP22** | Cell No. 8 Vent | 600mm | 38.20 | 22.90 | 7.30 | New gas well |
| **VP23** | Cell No. 11 Vent | 600mm | 27.60 | 17.40 | 10.60 | New gas well |
| **VP24** | Cell No. 11 Vent | 600mm | 23.60 | 7.00 | 8.20 | New gas well |
| **VP25** | Cell No. 11 Vent | 600mm | 63.30 | 36.70 | 0.10 | New gas well |
| **VP26** | Cell No. 11 Vent | 600mm | 66.70 | 32.50 | 0.00 | New gas well |
| **VP27** | Cell No. 11 Vent | 600mm | 63.60 | 36.50 | 0.00 | New gas well |
| **VP28** | Cell No. 11 Vent | 600mm | 64.50 | 34.20 | 0.00 | New gas well |
| **VP29** | Cell No. 11 Vent | 600mm | 63.80 | 34.30 | 0.20 | New gas well |
| **VP30** | Cell No. 8 Vent | 600mm | 58.20 | 34.40 | 0.60 | New gas well |
| **VP31** | Cell No. 8 Vent | 600mm | 58.70 | 37.90 | 0.30 | New gas well |
| **VP32** | Cell No. 9 Vent | 600mm | 65.70 | 32.90 | 0.10 | New gas well |
| **VP33** | Cell No9 Vent | 600mm | 62.10 | 37.00 | 0.60 | New gas well |
| **VP34** | Cell No10 Vent | 600mm | 28.50 | 9.50 | 6.10 | New gas well |
| **VP35** | Cell No. 10 Vent | 600mm | 62.10 | 36.20 | 0.00 | New gas well |
| **VP36** | Cell No. 10 Vent | 600mm | 58.90 | 35.10 | 0.40 | New gas well |
| **VP37** | Cell No. 11 Vent | 600mm | 63.10 | 35.90 | 0.30 | New gas well |
| **VP38** | Cell No. 12 Vent | 600mm | 48.40 | 32.20 | 0.30 | New gas well |
| **VP39** | Cell No. 12 Vent | 600mm | 52.40 | 35.30 | 1.60 | New gas well |
| **VP40** | Cell No. 12 Vent | 600mm | 52.30 | 35.70 | 0.00 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP41** | Cell No. 12 Vent | 600mm | 62.90 | 34.40 | 0.30 | New gas well |
| **VP42** | Cell No. 8 Vent | 600mm | 62.40 | 37.20 | 0.00 | New gas well |
| **VP43** | Cell No. 8 Vent | 600mm | 59.80 | 34.30 | 0.00 | New gas well |
| **VP44** | Cell No. 9 Vent | 600mm | 58.90 | 33.20 | 0.10 | New gas well |
| **VP45** | Cell No. 9 Vent | 600mm | 65.90 | 33.20 | 0.00 | New gas well |
| **VP46** | Cell No. 9 Vent | 600mm | 65.90 | 33.10 | 0.00 | New gas well |
| **VP47** | Cell No. 13 Vent | 600mm | 44.40 | 37.30 | 0.30 | New gas well |
| **VP48** | Cell No. 13 Vent | 600mm | 23.70 | 21.00 | 7.80 | New gas well |
| **VP49** | Cell No. 13 Vent | 600mm | 34.50 | 31.10 | 0.00 | New gas well |
| **VP50** | Cell No. 13 Vent | 600mm | 26.80 | 28.20 | 0.80 | New gas well |
| **VP51** | Cell No. 13 Vent | 600mm | 40.20 | 35.00 | 0.70 | New gas well |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Site Name:** Dunmore Landfill Site | | | **Site Address:** Dunmore, Co. Kilkenny | | | |
| **Operator:** Kilkenny County Council | | | **National Grid Reference: 160572N 249519E** | | | |
| **Site Status:** Active | | | **Date: 29/09/08** | | **Time: 09:06** | |
| **Instrument Used:** Infra Red Gas Analyser - GA 94 | | | | **Date of Calibration: May'08** **Next Calibration Due: May'10** | | |
| **Monitoring Personnel:** Alan Rhatigan | | | **Weather:** dry | | **Barometric Pressure (mb) :** 1016 | |
| **RESULTS** | | | | | | |
| **Sample Station Number** | **Borehole/ Spike/ Other** | **Survey Depth** | **$CH_4$ % v/v** | **$CO_2$ % v/v** | **$O_2$ % v/v** | **Comments** |
| **VP1** | Cell No. 1 Vent | 600mm | 58.40 | 31.80 | 0.70 | New gas well |
| **VP2** | Cell No. 1 Vent | 600mm | 65.10 | 24.50 | 0.30 | New gas well |
| **VP3** | Cell No. 1 Vent | 600mm | 46.70 | 24.90 | 0.30 | New gas well |
| **VP4** | Cell No. 3 Vent | 600mm | 36.60 | 23.70 | 2.90 | New gas well |
| **VP5** | Cell No. 2 Vent | 600mm | 45.50 | 25.20 | 1.50 | New gas well |
| **VP6** | Cell No. 2 Vent | 600mm | 54.80 | 30.00 | 2.00 | New gas well |
| **VP7** | Cell No. 3 Vent | 600mm | 52.10 | 27.70 | 3.40 | New gas well |
| **VP8** | Cell No. 7 Vent | 600mm | 28.00 | 15.10 | 10.90 | New gas well |
| **VP9** | Cell No. 7 Vent | 600mm | 45.80 | 25.30 | 2.70 | New gas well |
| **VP10** | Cell No. 6 Vent | 600mm | 44.60 | 23.00 | 2.00 | New gas well |
| **VP11** | Cell No. 6 Vent | 600mm | 51.40 | 29.40 | 0.20 | New gas well |
| **VP12** | Cell No. 5 Vent | 600mm | 48.10 | 27.90 | 1.60 | New gas well |
| **VP13** | Cell No. 5 Vent | 600mm | 61.40 | 37.20 | 0.00 | New gas well |
| **VP14** | Cell No. 7 Vent | 600mm | 30.40 | 12.60 | 7.90 | New gas well |
| **VP15** | Cell No. 7 Vent | 600mm | 64.40 | 34.20 | 0.30 | New gas well |
| **VP16** | Cell No. 4 Vent | 600mm | 34.20 | 14.70 | 6.40 | New gas well |
| **VP17** | Cell No. 4 Vent | 600mm | 60.70 | 37.00 | 0.30 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP18** | Cell No. 10 Vent | 600mm | 48.10 | 30.50 | 2.60 | New gas well |
| **VP19** | Cell No. 10 Vent | 600mm | 30.60 | 21.00 | 7.00 | New gas well |
| **VP20** | Cell No. 10 Vent | 600mm | 31.20 | 19.90 | 7.10 | New gas well |
| **VP21** | Cell No. 9 Vent | 600mm | 38.90 | 26.50 | 4.10 | New gas well |
| **VP22** | Cell No. 8 Vent | 600mm | 33.80 | 18.60 | 9.10 | New gas well |
| **VP23** | Cell No. 11 Vent | 600mm | 21.70 | 14.20 | 11.10 | New gas well |
| **VP24** | Cell No. 11 Vent | 600mm | 11.00 | 8.30 | 13.80 | New gas well |
| **VP25** | Cell No. 11 Vent | 600mm | 63.80 | 35.00 | 0.20 | New gas well |
| **VP26** | Cell No. 11 Vent | 600mm | 50.60 | 28.70 | 0.00 | New gas well |
| **VP27** | Cell No. 11 Vent | 600mm | 61.90 | 33.30 | 0.70 | New gas well |
| **VP28** | Cell No. 11 Vent | 600mm | 39.90 | 27.40 | 1.20 | New gas well |
| **VP29** | Cell No. 11 Vent | 600mm | 60.60 | 36.30 | 0.80 | New gas well |
| **VP30** | Cell No. 8 Vent | 600mm | 42.60 | 23.50 | 6.40 | New gas well |
| **VP31** | Cell No. 8 Vent | 600mm | 40.70 | 26.70 | 6.10 | New gas well |
| **VP32** | Cell No. 9 Vent | 600mm | 59.60 | 30.40 | 0.60 | New gas well |
| **VP33** | Cell No9 Vent | 600mm | 64.40 | 35.70 | 0.00 | New gas well |
| **VP34** | Cell No10 Vent | 600mm | 54.00 | 29.90 | 0.10 | New gas well |
| **VP35** | Cell No. 10 Vent | 600mm | 59.20 | 33.00 | 2.30 | New gas well |
| **VP36** | Cell No. 10 Vent | 600mm | 61.60 | 34.50 | 0.80 | New gas well |
| **VP37** | Cell No. 11 Vent | 600mm | 61.00 | 36.50 | 0.00 | New gas well |
| **VP38** | Cell No. 12 Vent | 600mm | 38.30 | 27.50 | 0.90 | New gas well |
| **VP39** | Cell No. 12 Vent | 600mm | 55.70 | 36.50 | 0.00 | New gas well |
| **VP40** | Cell No. 12 Vent | 600mm | 54.30 | 36.70 | 0.80 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP41** | Cell No. 12 Vent | 600mm | 16.40 | 10.40 | 12.90 | New gas well |
| **VP42** | Cell No. 8 Vent | 600mm | 54.60 | 36.60 | 0.40 | New gas well |
| **VP43** | Cell No. 8 Vent | 600mm | 45.90 | 29.70 | 0.20 | New gas well |
| **VP44** | Cell No. 9 Vent | 600mm | 40.10 | 27.30 | 0.40 | New gas well |
| **VP45** | Cell No. 9 Vent | 600mm | 59.60 | 34.40 | 3.80 | New gas well |
| **VP46** | Cell No. 9 Vent | 600mm | 50.60 | 31.10 | 0.40 | New gas well |
| **VP47** | Cell No. 13 Vent | 600mm | 56.40 | 38.00 | 1.80 | New gas well |
| **VP48** | Cell No. 13 Vent | 600mm | 57.80 | 39.70 | 1.20 | New gas well |
| **VP49** | Cell No. 13 Vent | 600mm | 49.90 | 31.40 | 3.50 | New gas well |
| **VP50** | Cell No. 13 Vent | 600mm | 49.50 | 33.90 | 2.10 | New gas well |
| **VP51** | Cell No. 13 Vent | 600mm | 52.40 | 36.90 | 0.60 | New gas well |

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|---|---|---|---|---|---|---|
| **Site Name:** Dunmore Landfill Site | | | **Site Address:** Dunmore, Co. Kilkenny | | | |
| **Operator:** Kilkenny County Council | | | **National Grid Reference: 160572N 249519E** | | | |
| **Site Status:** Active | | | **Date: 30/10/08** | | **Time: 13:00** | |
| **Instrument Used:** Infra Red Gas Analyser - GA 94 | | | | **Date of Calibration: May'08** **Next Calibration Due: May'10** | | |
| **Monitoring Personnel:** Alan Rhatigan | | | **Weather:** dry | | **Barometric Pressure (mb) :** 995 | |
| **RESULTS** | | | | | | |
| **Sample Station Number** | **Borehole/ Spike/ Other** | **Survey Depth** | **$CH_4$ % v/v** | **$CO_2$ % v/v** | **$O_2$ % v/v** | **Comments** |
| **VP1** | Cell No. 1 Vent | 600mm | 51.00 | 27.10 | 1.80 | New gas well |
| **VP2** | Cell No. 1 Vent | 600mm | 30.40 | 18.50 | 5.60 | New gas well |
| **VP3** | Cell No. 1 Vent | 600mm | 30.70 | 22.00 | 2.10 | New gas well |
| **VP4** | Cell No. 3 Vent | 600mm | 20.20 | 14.20 | 10.10 | New gas well |
| **VP5** | Cell No. 2 Vent | 600mm | 33.50 | 18.70 | 2.90 | New gas well |
| **VP6** | Cell No. 2 Vent | 600mm | 35.70 | 21.40 | 5.90 | New gas well |
| **VP7** | Cell No. 3 Vent | 600mm | 42.60 | 23.10 | 6.50 | New gas well |
| **VP8** | Cell No. 7 Vent | 600mm | 2.90 | 7.30 | 16.80 | New gas well |
| **VP9** | Cell No. 7 Vent | 600mm | 33.50 | 21.30 | 5.50 | New gas well |
| **VP10** | Cell No. 6 Vent | 600mm | 56.10 | 21.00 | 2.00 | New gas well |
| **VP11** | Cell No. 6 Vent | 600mm | 50.20 | 28.60 | 0.40 | New gas well |
| **VP12** | Cell No. 5 Vent | 600mm | 50.00 | 30.10 | 0.10 | New gas well |
| **VP13** | Cell No. 5 Vent | 600mm | 48.00 | 27.30 | 3.80 | New gas well |
| **VP14** | Cell No. 7 Vent | 600mm | 8.90 | 6.30 | 16.10 | New gas well |
| **VP15** | Cell No. 7 Vent | 600mm | 52.40 | 30.80 | 1.50 | New gas well |
| **VP16** | Cell No. 4 Vent | 600mm | 20.80 | 14.10 | 12.90 | New gas well |
| **VP17** | Cell No. 4 Vent | 600mm | 18.90 | 12.80 | 14.00 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP18** | Cell No. 10 Vent | 600mm | 24.40 | 17.90 | 10.10 | New gas well |
| **VP19** | Cell No. 10 Vent | 600mm | 35.50 | 19.70 | 9.00 | New gas well |
| **VP20** | Cell No. 10 Vent | 600mm | 25.10 | 16.30 | 10.50 | New gas well |
| **VP21** | Cell No. 9 Vent | 600mm | 24.20 | 17.60 | 10.30 | New gas well |
| **VP22** | Cell No. 8 Vent | 600mm | 29.20 | 21.50 | 8.50 | New gas well |
| **VP23** | Cell No. 11 Vent | 600mm | 51.70 | 32.60 | 0.40 | New gas well |
| **VP24** | Cell No. 11 Vent | 600mm | 23.50 | 23.30 | 0.90 | New gas well |
| **VP25** | Cell No. 11 Vent | 600mm | 64.50 | 35.80 | 0.00 | New gas well |
| **VP26** | Cell No. 11 Vent | 600mm | 38.80 | 25.60 | 1.70 | New gas well |
| **VP27** | Cell No. 11 Vent | 600mm | 66.00 | 34.60 | 0.00 | New gas well |
| **VP28** | Cell No. 11 Vent | 600mm | 47.20 | 27.70 | 1.50 | New gas well |
| **VP29** | Cell No. 11 Vent | 600mm | 62.50 | 37.70 | 0.20 | New gas well |
| **VP30** | Cell No. 8 Vent | 600mm | 25.90 | 5.90 | 7.10 | New gas well |
| **VP31** | Cell No. 8 Vent | 600mm | 58.90 | 33.70 | 2.20 | New gas well |
| **VP32** | Cell No. 9 Vent | 600mm | 64.00 | 32.30 | 0.60 | New gas well |
| **VP33** | Cell No9 Vent | 600mm | 62.80 | 34.60 | 0.60 | New gas well |
| **VP34** | Cell No10 Vent | 600mm | 12.70 | 2.00 | 16.00 | New gas well |
| **VP35** | Cell No. 10 Vent | 600mm | 64.20 | 36.10 | 0.60 | New gas well |
| **VP36** | Cell No. 10 Vent | 600mm | 63.30 | 35.40 | 1.00 | New gas well |
| **VP37** | Cell No. 11 Vent | 600mm | 57.90 | 35.80 | 0.00 | New gas well |
| **VP38** | Cell No. 12 Vent | 600mm | 43.50 | 29.70 | 0.20 | New gas well |
| **VP39** | Cell No. 12 Vent | 600mm | 56.80 | 37.70 | 0.30 | New gas well |
| **VP40** | Cell No. 12 Vent | 600mm | 56.60 | 37.60 | 0.00 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP41** | Cell No. 12 Vent | 600mm | 20.80 | 23.10 | 1.30 | New gas well |
| **VP42** | Cell No. 8 Vent | 600mm | 59.70 | 18.70 | 3.90 | New gas well |
| **VP43** | Cell No. 8 Vent | 600mm | 41.60 | 29.60 | 0.00 | New gas well |
| **VP44** | Cell No. 9 Vent | 600mm | 50.40 | 29.60 | 0.30 | New gas well |
| **VP45** | Cell No. 9 Vent | 600mm | 47.10 | 30.70 | 1.90 | New gas well |
| **VP46** | Cell No. 9 Vent | 600mm | 38.00 | 27.90 | 1.30 | New gas well |
| **VP47** | Cell No. 13 Vent | 600mm | 60.90 | 39.40 | 0.10 | New gas well |
| **VP48** | Cell No. 13 Vent | 600mm | 60.90 | 39.60 | 0.70 | New gas well |
| **VP49** | Cell No. 13 Vent | 600mm | 61.30 | 39.50 | 0.00 | New gas well |
| **VP50** | Cell No. 13 Vent | 600mm | 63.90 | 37.50 | 0.00 | New gas well |
| **VP51** | Cell No. 13 Vent | 600mm | 62.60 | 39.60 | 0.00 | New gas well |

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|---|---|---|---|---|---|---|
| **Site Name:** Dunmore Landfill Site | | | | **Site Address:** Dunmore, Co. Kilkenny | | |
| **Operator:** Kilkenny County Council | | | | **National Grid Reference: 160572N 249519E** | | |
| **Site Status:** Active | | | | **Date: 30/10/08** | | **Time: 13:00** |
| **Instrument Used:** Infra Red Gas Analyser - GA 94 | | | | | **Date of Calibration: May'08** **Next Calibration Due: May'10** | |
| **Monitoring Personnel:** Alan Rhatigan | | | | **Weather:** dry | | **Barometric Pressure (mb) :** 995 |
| **RESULTS** | | | | | | |
| **Sample Station Number** | **Borehole/ Spike/ Other** | **Survey Depth** | **$CH_4$ % v/v** | **$CO_2$ % v/v** | **$O_2$ % v/v** | **Comments** |
| **VP1** | Cell No. 1 Vent | 600mm | **No Results** | | | New gas well |
| **VP2** | Cell No. 1 Vent | 600mm | | | | New gas well |
| **VP3** | Cell No. 1 Vent | 600mm | | | | New gas well |
| **VP4** | Cell No. 3 Vent | 600mm | | | | New gas well |
| **VP5** | Cell No. 2 Vent | 600mm | | | | New gas well |
| **VP6** | Cell No. 2 Vent | 600mm | | | | New gas well |
| **VP7** | Cell No. 3 Vent | 600mm | | | | New gas well |
| **VP8** | Cell No. 7 Vent | 600mm | | | | New gas well |
| **VP9** | Cell No. 7 Vent | 600mm | | | | New gas well |
| **VP10** | Cell No. 6 Vent | 600mm | | | | New gas well |
| **VP11** | Cell No. 6 Vent | 600mm | | | | New gas well |
| **VP12** | Cell No. 5 Vent | 600mm | | | | New gas well |
| **VP13** | Cell No. 5 Vent | 600mm | | | | New gas well |
| **VP14** | Cell No. 7 Vent | 600mm | | | | New gas well |
| **VP15** | Cell No. 7 Vent | 600mm | | | | New gas well |
| **VP16** | Cell No. 4 Vent | 600mm | | | | New gas well |
| **VP17** | Cell No. 4 Vent | 600mm | | | | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP18** | Cell No. 10 Vent | 600mm | | | | New gas well |
| **VP19** | Cell No. 10 Vent | 600mm | | | | New gas well |
| **VP20** | Cell No. 10 Vent | 600mm | | | | New gas well |
| **VP21** | Cell No. 9 Vent | 600mm | | | | New gas well |
| **VP22** | Cell No. 8 Vent | 600mm | | | | New gas well |
| **VP23** | Cell No. 11 Vent | 600mm | | | | New gas well |
| **VP24** | Cell No. 11 Vent | 600mm | | | | New gas well |
| **VP25** | Cell No. 11 Vent | 600mm | | | | New gas well |
| **VP26** | Cell No. 11 Vent | 600mm | | | | New gas well |
| **VP27** | Cell No. 11 Vent | 600mm | | | | New gas well |
| **VP28** | Cell No. 11 Vent | 600mm | | | | New gas well |
| **VP29** | Cell No. 11 Vent | 600mm | | | | New gas well |
| **VP30** | Cell No. 8 Vent | 600mm | | | | New gas well |
| **VP31** | Cell No. 8 Vent | 600mm | | | | New gas well |
| **VP32** | Cell No. 9 Vent | 600mm | | | | New gas well |
| **VP33** | Cell No9 Vent | 600mm | | | | New gas well |
| **VP34** | Cell No10 Vent | 600mm | | | | New gas well |
| **VP35** | Cell No. 10 Vent | 600mm | | | | New gas well |
| **VP36** | Cell No. 10 Vent | 600mm | | | | New gas well |
| **VP37** | Cell No. 11 Vent | 600mm | | | | New gas well |
| **VP38** | Cell No. 12 Vent | 600mm | | | | New gas well |
| **VP39** | Cell No. 12 Vent | 600mm | | | | New gas well |
| **VP40** | Cell No. 12 Vent | 600mm | | | | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP41** | Cell No. 12 Vent | 600mm | | | | New gas well |
| **VP42** | Cell No. 8 Vent | 600mm | | | | New gas well |
| **VP43** | Cell No. 8 Vent | 600mm | | | | New gas well |
| **VP44** | Cell No. 9 Vent | 600mm | | | | New gas well |
| **VP45** | Cell No. 9 Vent | 600mm | | | | New gas well |
| **VP46** | Cell No. 9 Vent | 600mm | | | | New gas well |
| **VP47** | Cell No. 13 Vent | 600mm | | | | New gas well |
| **VP48** | Cell No. 13 Vent | 600mm | | | | New gas well |
| **VP49** | Cell No. 13 Vent | 600mm | | | | New gas well |
| **VP50** | Cell No. 13 Vent | 600mm | | | | New gas well |
| **VP51** | Cell No. 13 Vent | 600mm | | | | New gas well |

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|---|---|---|---|---|---|---|
| **Site Name:** Dunmore Landfill Site | | | **Site Address:** Dunmore, Co. Kilkenny | | | |
| **Operator:** Kilkenny County Council | | | **National Grid Reference: 160572N 249519E** | | | |
| **Site Status:** Active | | | **Date: 08/01/09** | | **Time: 10:51** | |
| **Instrument Used:** Infra Red Gas Analyser - GA 94 | | | | **Date of Calibration: May'08** **Next Calibration Due: May'10** | | |
| **Monitoring Personnel:** Alan Rhatigan | | | **Weather:** dry | | **Barometric Pressure (mb) :** 1019 | |
| **RESULTS** | | | | | | |
| **Sample Station Number** | **Borehole/ Spike/ Other** | **Survey Depth** | **$CH_4$ % v/v** | **$CO_2$ % v/v** | **$O_2$ % v/v** | **Comments** |
| **VP1** | Cell No. 1 Vent | 600mm | 52.30 | 27.00 | 0.60 | New gas well |
| **VP2** | Cell No. 1 Vent | 600mm | 33.40 | 19.20 | 4.00 | New gas well |
| **VP3** | Cell No. 1 Vent | 600mm | 40.60 | 25.90 | 1.00 | New gas well |
| **VP4** | Cell No. 3 Vent | 600mm | 48.90 | 23.50 | 2.30 | New gas well |
| **VP5** | Cell No. 2 Vent | 600mm | 44.10 | 23.60 | 1.30 | New gas well |
| **VP6** | Cell No. 2 Vent | 600mm | 62.80 | 28.80 | 1.10 | New gas well |
| **VP7** | Cell No. 3 Vent | 600mm | 54.90 | 26.60 | 3.20 | New gas well |
| **VP8** | Cell No. 7 Vent | 600mm | 54.60 | 26.80 | 3.30 | New gas well |
| **VP9** | Cell No. 7 Vent | 600mm | 51.70 | 25.80 | 1.80 | New gas well |
| **VP10** | Cell No. 6 Vent | 600mm | 24.00 | 18.10 | 4.40 | New gas well |
| **VP11** | Cell No. 6 Vent | 600mm | 50.20 | 26.60 | 0.50 | New gas well |
| **VP12** | Cell No. 5 Vent | 600mm | 52.00 | 27.10 | 0.40 | New gas well |
| **VP13** | Cell No. 5 Vent | 600mm | 41.80 | 24.10 | 4.30 | New gas well |
| **VP14** | Cell No. 7 Vent | 600mm | 7.60 | 4.00 | 17.50 | New gas well |
| **VP15** | Cell No. 7 Vent | 600mm | | | | Disconnected due to capping works |
| **VP16** | Cell No. 4 Vent | 600mm | | | | Disconnected due to capping works |
| **VP17** | Cell No. 4 Vent | 600mm | 51.30 | 26.00 | 5.00 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP18** | Cell No. 10 Vent | 600mm | 30.20 | 23.10 | 6.40 | New gas well |
| **VP19** | Cell No. 10 Vent | 600mm | 29.30 | 17.00 | 8.80 | New gas well |
| **VP20** | Cell No. 10 Vent | 600mm | 58.80 | 29.70 | 3.00 | New gas well |
| **VP21** | Cell No. 9 Vent | 600mm | 59.40 | 29.90 | 2.00 | New gas well |
| **VP22** | Cell No. 8 Vent | 600mm | 58.40 | 29.30 | 2.40 | New gas well |
| **VP23** | Cell No. 11 Vent | 600mm | 59.80 | 30.00 | 0.20 | New gas well |
| **VP24** | Cell No. 11 Vent | 600mm | 36.00 | 23.70 | 0.00 | New gas well |
| **VP25** | Cell No. 11 Vent | 600mm | 65.90 | 35.60 | 0.00 | New gas well |
| **VP26** | Cell No. 11 Vent | 600mm | 40.00 | 24.00 | 2.00 | New gas well |
| **VP27** | Cell No. 11 Vent | 600mm | 67.30 | 32.30 | 0.00 | New gas well |
| **VP28** | Cell No. 11 Vent | 600mm | 58.20 | 25.00 | 2.30 | New gas well |
| **VP29** | Cell No. 11 Vent | 600mm | 64.30 | 36.30 | 0.20 | New gas well |
| **VP30** | Cell No. 8 Vent | 600mm | 51.20 | 29.10 | 1.20 | New gas well |
| **VP31** | Cell No. 8 Vent | 600mm | 63.80 | 34.70 | 0.60 | New gas well |
| **VP32** | Cell No. 9 Vent | 600mm | 64.70 | 35.30 | 0.30 | New gas well |
| **VP33** | Cell No9 Vent | 600mm | 55.80 | 30.00 | 1.50 | New gas well |
| **VP34** | Cell No10 Vent | 600mm | 9.10 | 3.20 | 18.60 | New gas well |
| **VP35** | Cell No. 10 Vent | 600mm | 64.60 | 35.30 | 1.20 | New gas well |
| **VP36** | Cell No. 10 Vent | 600mm | 65.60 | 34.40 | 0.30 | New gas well |
| **VP37** | Cell No. 11 Vent | 600mm | 55.10 | 28.80 | 1.10 | New gas well |
| **VP38** | Cell No. 12 Vent | 600mm | 64.30 | 30.30 | 0.30 | New gas well |
| **VP39** | Cell No. 12 Vent | 600mm | 43.80 | 31.90 | 0.30 | New gas well |
| **VP40** | Cell No. 12 Vent | 600mm | 50.10 | 32.70 | 0.00 | New gas well |

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **VP41** | Cell No. 12 Vent | 600mm | 32.70 | 23.40 | 0.00 | New gas well |
| **VP42** | Cell No. 8 Vent | 600mm | 65.90 | 36.10 | 0.00 | New gas well |
| **VP43** | Cell No. 8 Vent | 600mm | 65.70 | 35.50 | 0.00 | New gas well |
| **VP44** | Cell No. 9 Vent | 600mm | 68.70 | 32.60 | 0.00 | New gas well |
| **VP45** | Cell No. 9 Vent | 600mm | 69.10 | 31.20 | 0.00 | New gas well |
| **VP46** | Cell No. 9 Vent | 600mm | 39.50 | 24.50 | 4.00 | New gas well |
| **VP47** | Cell No. 13 Vent | 600mm | 26.50 | 26.60 | 1.70 | New gas well |
| **VP48** | Cell No. 13 Vent | 600mm | 42.60 | 32.20 | 0.70 | New gas well |
| **VP49** | Cell No. 13 Vent | 600mm | 67.50 | 35.00 | 1.10 | New gas well |
| **VP50** | Cell No. 13 Vent | 600mm | 24.00 | 25.10 | 0.60 | New gas well |
| **VP51** | Cell No. 13 Vent | 600mm | 24.20 | 20.10 | 9.10 | New gas well |

# LANDFILL GAS MIGRATION MONITORING FORM

| | | |
|---|---|---|
| **Site Name:** Dunmore Landfill Site | **Site Address:** Dunmore, Co. Kilkenny | |
| **Operator:** Kilkenny County Council | **National Grid Reference:** 160572N 249519E | |
| **Site Status:** Active | **Date:** 30/01/08 | **Time:** 17:13 |
| **Instrument Used:** Infra red Gas Analyser - GA 94 | **Date Of Calibration:** March '07<br>**Next Calibration Due:** April '08 | |
| **Monitoring Personnel:** Alan Rhatigan | **Weather:** Dry | **Barometric Pressure (mb):** 1017 |

## RESULTS

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **GM1** | Spike | 600mm | 0.00 | 0.60 | 20.00 | |
| **GM2** | Spike | 600mm | 0.00 | 0.80 | 19.20 | |
| **GM3** | Spike | 600mm | 0.00 | 0.80 | 20.30 | |
| **GM4** | Spike | 600mm | 0.00 | 0.10 | 20.80 | |
| **GM5** | Spike | 600mm | 0.00 | 1.40 | 19.00 | |
| **GM7** | Spike | 600mm | 0.00 | 1.30 | 18.80 | |
| **GM8** | Spike | 600mm | 0.00 | **1.90** | 18.90 | |
| **GM9** | Spike | 600mm | 0.00 | **2.10** | 19.20 | |
| **GM10** | Spike | 600mm | 0.00 | 1.00 | 19.9 | |
| **GM11** | Spike | 600mm | 0.00 | 0.30 | 20.8 | |
| **GM12** | Spike | 600mm | 0.00 | 0.30 | 20.8 | |
| **GM13** | Spike | 600mm | 0.00 | 0.10 | 20.8 | |
| **GM14** | Spike | 600mm | 0.00 | 0.50 | 20.50 | |
| **GM15** | Spike | 600mm | 0.00 | 0.40 | 20.70 | |
| **GM16** | Spike | 600mm | 0.00 | 0.30 | 20.60 | |
| **GM17** | Spike | 600mm | 0.00 | 0.30 | 20.70 | |
| **GM18** | Spike | 600mm | 0.00 | 0.20 | 20.80 | |
| **GM19** | Spike | 600mm | 0.00 | 0.60 | 17.60 | |
| **GM20** | Spike | 600mm | 0.00 | 0.00 | 20.90 | |
| **GM21** | Spike | 600mm | 0.00 | 0.00 | 21.00 | |
| **GM22** | Spike | 600mm | 0.00 | 0.00 | 21.00 | |
| **GM23** | Spike | 600mm | 0.00 | 0.70 | 19.80 | |

# LANDFILL GAS MIGRATION MONITORING FORM

| | | |
|---|---|---|
| **Site Name:** Dunmore Landfill Site | **Site Address:** Dunmore, Co. Kilkenny | |
| **Operator:** Kilkenny County Council | **National Grid Reference:** 160572N 249519E | |
| **Site Status:** Active | **Date:** 04/03/08 | **Time:** 9:45 |
| **Instrument Used:** Infra red Gas Analyser - GA 94 | **Date Of Calibration:** March '07<br>**Next Calibration Due:** April '08 | |
| **Monitoring Personnel:** Alan Rhatigan | **Weather:** Dry | **Barometric Pressure (mb):** 1024 |

## RESULTS

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **GM1** | Spike | 600mm | 0.00 | 0.20 | 20.40 | |
| **GM2** | Spike | 600mm | 0.00 | 0.20 | 20.40 | |
| **GM3** | Spike | 600mm | 0.00 | 0.00 | 21.00 | |
| **GM4** | Spike | 600mm | 0.00 | 0.40 | 20.80 | |
| **GM5** | Spike | 600mm | 0.00 | 1.00 | 19.90 | |
| **GM7** | Spike | 600mm | 0.00 | 0.90 | 18.60 | |
| **GM8** | Spike | 600mm | 0.00 | 1.00 | 20.40 | |
| **GM9** | Spike | 600mm | 0.00 | 1.30 | 20.20 | |
| **GM10** | Spike | 600mm | 0.00 | **2.00** | 19.7 | |
| **GM11** | Spike | 600mm | 0.00 | 0.70 | 20.6 | |
| **GM12** | Spike | 600mm | 0.00 | 0.20 | 20.8 | |
| **GM13** | Spike | 600mm | 0.00 | 0.00 | 21 | |
| **GM14** | Spike | 600mm | 0.00 | **3.80** | 15.90 | |
| **GM15** | Spike | 600mm | 0.00 | **2.00** | 16.90 | |
| **GM16** | Spike | 600mm | 0.00 | 0.30 | 20.70 | |
| **GM17** | Spike | 600mm | 0.00 | **2.80** | 17.00 | |
| **GM18** | Spike | 600mm | 0.00 | **2.50** | 18.20 | |
| **GM19** | Spike | 600mm | 0.00 | 0.50 | 12.40 | |
| **GM20** | Spike | 600mm | 0.00 | 0.20 | 21.00 | |
| **GM21** | Spike | 600mm | 0.00 | 0.00 | 21.00 | |
| **GM22** | Spike | 600mm | 0.00 | 0.00 | 21.10 | |
| **GM23** | Spike | 600mm | 0.00 | 0.70 | 20.50 | |

# LANDFILL GAS MIGRATION MONITORING FORM

| | | |
|---|---|---|
| **Site Name:** Dunmore Landfill Site | **Site Address:** Dunmore, Co. Kilkenny | |
| **Operator:** Kilkenny County Council | **National Grid Reference:** 160572N 249519E | |
| **Site Status:** Active | **Date:** 02/05/08 | **Time:** 09:15 |
| **Instrument Used:** Infra red Gas Analyser - GA 94 | **Date Of Calibration:** March '07<br>**Next Calibration Due:** April '08 | |
| **Monitoring Personnel:** Alan Rhatigan | **Weather:** Dry | **Barometric Pressure (mb):** 1005 |

## RESULTS

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| GM1 | Spike | 600mm | 0.00 | 1.50 | 17.40 | |
| GM2 | Spike | 600mm | 0.00 | 1.90 | 17.10 | |
| GM3 | Spike | 600mm | 0.00 | 1.10 | 20.10 | |
| GM4 | Spike | 600mm | 0.00 | 0.10 | 20.20 | |
| GM5 | Spike | 600mm | 0.00 | 1.40 | 19.10 | |
| GM7 | Spike | 600mm | 0.00 | 0.00 | 20.90 | |
| GM8 | Spike | 600mm | 0.00 | 0.10 | 20.40 | |
| GM9 | Spike | 600mm | 0.00 | 0.10 | 20.70 | |
| GM10 | Spike | 600mm | 0.00 | 2.00 | 18.90 | |
| GM11 | Spike | 600mm | 0.00 | 0.30 | 20.40 | |
| GM12 | Spike | 600mm | 0.00 | 0.40 | 20.30 | |
| GM13 | Spike | 600mm | 0.00 | 0.10 | 20.40 | |
| GM14 | Spike | 600mm | 0.00 | 0.80 | 20.50 | |
| GM15 | Spike | 600mm | 0.00 | 0.30 | 20.80 | |
| GM16 | Spike | 600mm | 0.00 | 0.20 | 20.70 | |
| GM17 | Spike | 600mm | 0.00 | 0.90 | 20.00 | |
| GM18 | Spike | 600mm | 0.00 | 0.90 | 20.50 | |
| GM19 | Spike | 600mm | 0.00 | 1.60 | 18.90 | |
| GM20 | Spike | 600mm | 0.00 | 0.00 | 20.70 | |
| GM21 | Spike | 600mm | 0.00 | 0.10 | 20.70 | |
| GM22 | Spike | 600mm | 0.00 | 1.80 | 18.60 | |
| GM23 | Spike | 600mm | 0.00 | 1.00 | 18.80 | |

# LANDFILL GAS MIGRATION MONITORING FORM

| | | |
|---|---|---|
| **Site Name:** Dunmore Landfill Site | **Site Address:** Dunmore, Co. Kilkenny | |
| **Operator:** Kilkenny County Council | **National Grid Reference:** 160572N 249519E | |
| **Site Status:** Active | **Date:** 16/05/08 | **Time:** 12:27 |
| **Instrument Used:** Infra red Gas Analyser - GA 94 | **Date Of Calibration:** May '08<br>**Next Calibration Due:** May '10 | |
| **Monitoring Personnel:** Alan Rhatigan | **Weather:** Dry | **Barometric Pressure (mb):** 1002 |

## RESULTS

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **GM1** | Spike | 600mm | 0.00 | 0.30 | 19.90 | |
| **GM2** | Spike | 600mm | 0.00 | **3.10** | 13.50 | |
| **GM3** | Spike | 600mm | 0.00 | 0.20 | 20.60 | |
| **GM4** | Spike | 600mm | 0.00 | 0.60 | 19.90 | |
| **GM5** | Spike | 600mm | 0.00 | **2.00** | 15.60 | |
| **GM7** | Spike | 600mm | 0.00 | **2.00** | 16.30 | |
| **GM8** | Spike | 600mm | 0.00 | 1.30 | 19.60 | |
| **GM9** | Spike | 600mm | 0.00 | 0.10 | 20.90 | |
| **GM10** | Spike | 600mm | 0.00 | **2.50** | 17.50 | |
| **GM11** | Spike | 600mm | 0.00 | **2.60** | 16.90 | |
| **GM12** | Spike | 600mm | 0.00 | 1.30 | 18.40 | |
| **GM13** | Spike | 600mm | 0.00 | 0.90 | 17.50 | |
| **GM14** | Spike | 600mm | 0.00 | 0.40 | 20.50 | |
| **GM15** | Spike | 600mm | 0.00 | 0.10 | 20.80 | |
| **GM16** | Spike | 600mm | 0.00 | 0.30 | 20.70 | |
| **GM17** | Spike | 600mm | 0.00 | 1.20 | 19.90 | |
| **GM18** | Spike | 600mm | 0.00 | **1.50** | 19.70 | |
| **GM19** | Spike | 600mm | 0.00 | **1.50** | 7.70 | |
| **GM20** | Spike | 600mm | 0.00 | 0.60 | 19.80 | |
| **GM21** | Spike | 600mm | 0.00 | 1.20 | 17.40 | |
| **GM22** | Spike | 600mm | 0.00 | **1.70** | 18.70 | |
| **GM23** | Spike | 600mm | 0.00 | **1.70** | 18.70 | |

# LANDFILL GAS MIGRATION MONITORING FORM

| | | |
|---|---|---|
| **Site Name:** Dunmore Landfill Site | **Site Address:** Dunmore, Co. Kilkenny | |
| **Operator:** Kilkenny County Council | **National Grid Reference:** 160572N 249519E | |
| **Site Status:** Active | **Date:** 06/06/08 | **Time:** 09:05 |
| **Instrument Used:** Infra red Gas Analyser - GA 94 | **Date Of Calibration:** May '08<br>**Next Calibration Due:** May '10 | |
| **Monitoring Personnel:** Alan Rhatigan | **Weather:** Dry | **Barometric Pressure (mb):** 1011 |

## RESULTS

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| GM1 | Spike | 600mm | 0.00 | 0.70 | 19.40 | |
| GM2 | Spike | 600mm | 0.00 | 0.80 | 19.20 | |
| GM3 | Spike | 600mm | 0.00 | 0.10 | 20.60 | |
| GM4 | Spike | 600mm | 0.00 | 0.20 | 20.20 | |
| GM5 | Spike | 600mm | 0.00 | **1.80** | 16.70 | |
| GM7 | Spike | 600mm | 0.00 | 0.60 | 20.00 | |
| GM8 | Spike | 600mm | 0.00 | 1.40 | 19.50 | |
| GM9 | Spike | 600mm | 0.00 | **2.30** | 18.90 | |
| GM10 | Spike | 600mm | 0.00 | **2.50** | 18.4 | |
| GM11 | Spike | 600mm | 0.00 | **2.00** | 19.4 | |
| GM12 | Spike | 600mm | 0.00 | 0.80 | 19.8 | |
| GM13 | Spike | 600mm | 0.00 | 0.90 | 17.2 | |
| GM14 | Spike | 600mm | 0.00 | 0.90 | 20.00 | |
| GM15 | Spike | 600mm | 0.00 | 0.20 | 20.60 | |
| GM16 | Spike | 600mm | 0.00 | 0.40 | 20.40 | |
| GM17 | Spike | 600mm | 0.00 | **1.80** | 19.10 | |
| GM18 | Spike | 600mm | 0.00 | **1.50** | 20.00 | |
| GM19 | Spike | 600mm | 0.00 | 0.40 | 18.50 | |
| GM20 | Spike | 600mm | 0.00 | 0.40 | 20.00 | |
| GM21 | Spike | 600mm | 0.00 | 0.50 | 19.80 | |
| GM22 | Spike | 600mm | 0.00 | 0.60 | 20.10 | |
| GM23 | Spike | 600mm | 0.00 | **2.10** | 18.50 | |

# LANDFILL GAS MIGRATION MONITORING FORM

| | | |
|---|---|---|
| **Site Name:** Dunmore Landfill Site | **Site Address:** Dunmore, Co. Kilkenny | |
| **Operator:** Kilkenny County Council | National Grid Reference: 160572N 249519E | |
| **Site Status:** Active | **Date:** 30/06/08 | **Time:** 12:37 |
| **Instrument Used:** Infra red Gas Analyser - GA 94 | **Date Of Calibration:** May '08<br>**Next Calibration Due:** May '10 | |
| **Monitoring Personnel:** Alan Rhatigan | **Weather:** Dry | **Barometric Pressure (mb):** 1011 |

## RESULTS

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| GM1 | Spike | 600mm | 0.00 | 2.20 | 17.40 | |
| GM2 | Spike | 600mm | 0.00 | 3.60 | 16.40 | |
| GM3 | Spike | 600mm | 0.00 | 0.30 | 20.30 | |
| GM4 | Spike | 600mm | 0.00 | 0.10 | 20.30 | |
| GM5 | Spike | 600mm | 0.00 | 1.70 | 14.90 | |
| GM7 | Spike | 600mm | 0.00 | 0.00 | 19.50 | |
| GM8 | Spike | 600mm | 0.00 | 1.50 | 17.70 | |
| GM9 | Spike | 600mm | 0.00 | 0.10 | 20.30 | |
| GM10 | Spike | 600mm | 0.00 | 3.60 | 15.3 | |
| GM11 | Spike | 600mm | 0.00 | 2.50 | 17 | |
| GM12 | Spike | 600mm | 0.00 | 0.50 | 19.5 | |
| GM13 | Spike | 600mm | 0.00 | 0.30 | 20 | |
| GM14 | Spike | 600mm | 0.00 | 1.60 | 18.30 | |
| GM15 | Spike | 600mm | 0.00 | 0.90 | 20.00 | |
| GM16 | Spike | 600mm | 0.00 | 1.00 | 19.80 | |
| GM17 | Spike | 600mm | 0.00 | 2.20 | 18.30 | |
| GM18 | Spike | 600mm | 0.00 | 3.70 | 16.90 | |
| GM19 | Spike | 600mm | 0.00 | 2.40 | 4.40 | |
| GM20 | Spike | 600mm | 0.00 | 0.30 | 19.80 | |
| GM21 | Spike | 600mm | 0.00 | 1.10 | 18.90 | |
| GM22 | Spike | 600mm | 0.00 | 0.90 | 18.90 | |
| GM23 | Spike | 600mm | 0.00 | 1.90 | 17.60 | |

# LANDFILL GAS MIGRATION MONITORING FORM

| | | |
|---|---|---|
| **Site Name:** Dunmore Landfill Site | **Site Address:** Dunmore, Co. Kilkenny | |
| **Operator:** Kilkenny County Council | **National Grid Reference:** 160572N 249519E | |
| **Site Status:** Active | **Date:** 07/08/08 | **Time:** 09:19 |
| **Instrument Used:** Infra red Gas Analyser - GA 94 | **Date Of Calibration:** May '08<br>**Next Calibration Due:** May '10 | |
| **Monitoring Personnel:** Alan Rhatigan | **Weather:** Dry | **Barometric Pressure (mb):** 999 |

## RESULTS

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| GM1 | Spike | 600mm | 0.00 | 0.10 | 20.20 | |
| GM2 | Spike | 600mm | 0.00 | 0.20 | 19.80 | |
| GM3 | Spike | 600mm | 0.00 | 0.50 | 19.40 | |
| GM4 | Spike | 600mm | 0.00 | 0.80 | 19.30 | |
| GM5 | Spike | 600mm | 0.00 | **1.70** | 15.80 | |
| GM7 | Spike | 600mm | 0.00 | 1.10 | 18.40 | |
| GM8 | Spike | 600mm | 0.00 | 1.20 | 18.70 | |
| GM9 | Spike | 600mm | 0.00 | **1.80** | 17.10 | |
| GM10 | Spike | 600mm | 0.00 | **2.00** | 15.9 | |
| GM11 | Spike | 600mm | 0.00 | **1.80** | 17.8 | |
| GM12 | Spike | 600mm | 0.00 | **1.60** | 15.8 | |
| GM13 | Spike | 600mm | 0.00 | 0.90 | 16 | |
| GM14 | Spike | 600mm | 0.00 | **1.50** | 18.10 | |
| GM15 | Spike | 600mm | 0.00 | 0.20 | 20.20 | |
| GM16 | Spike | 600mm | 0.00 | 1.10 | 19.50 | |
| GM17 | Spike | 600mm | 0.00 | **1.70** | 18.40 | |
| GM18 | Spike | 600mm | 0.00 | **1.60** | 17.40 | |
| GM19 | Spike | 600mm | 0.00 | **1.70** | 11.90 | |
| GM20 | Spike | 600mm | 0.00 | 0.30 | 19.30 | |
| GM21 | Spike | 600mm | 0.00 | 1.40 | 18.90 | |
| GM22 | Spike | 600mm | 0.00 | **1.50** | 18.70 | |
| GM23 | Spike | 600mm | 0.00 | **2.60** | 16.10 | |

# LANDFILL GAS MIGRATION MONITORING FORM

| | | |
|---|---|---|
| **Site Name:** Dunmore Landfill Site | **Site Address:** Dunmore, Co. Kilkenny | |
| **Operator:** Kilkenny County Council | **National Grid Reference:** 160572N 249519E | |
| **Site Status:** Active | **Date:** 15/09/08 | **Time:** 09:15 |
| **Instrument Used:** Infra red Gas Analyser - GA 94 | **Date Of Calibration:** May '08<br>**Next Calibration Due:** May '10 | |
| **Monitoring Personnel:** Alan Rhatigan | **Weather:** Dry | **Barometric Pressure (mb):** 1019 |

## RESULTS

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| GM1 | Spike | 600mm | 0.00 | 0.40 | 20.10 | |
| GM2 | Spike | 600mm | 0.00 | 0.20 | 20.40 | |
| GM3 | Spike | 600mm | 0.00 | 0.10 | 20.40 | |
| GM4 | Spike | 600mm | 0.00 | 1.00 | 19.10 | |
| GM5 | Spike | 600mm | 0.00 | **1.60** | 16.90 | |
| GM7 | Spike | 600mm | 0.00 | **1.60** | 19.20 | |
| GM8 | Spike | 600mm | 0.00 | 1.40 | 18.70 | |
| GM9 | Spike | 600mm | 0.00 | **7.50** | 13.60 | |
| GM10 | Spike | 600mm | 0.00 | **1.60** | 17.5 | |
| GM11 | Spike | 600mm | 0.00 | 1.40 | 16.6 | |
| GM12 | Spike | 600mm | 0.00 | 1.40 | 15.4 | |
| GM13 | Spike | 600mm | 0.00 | 0.90 | 16.4 | |
| GM14 | Spike | 600mm | 0.00 | **3.20** | 16.70 | |
| GM15 | Spike | 600mm | 0.00 | 1.00 | 18.80 | |
| GM16 | Spike | 600mm | 0.00 | 1.30 | 19.20 | |
| GM17 | Spike | 600mm | 0.00 | **1.70** | 17.30 | |
| GM18 | Spike | 600mm | 0.00 | **1.80** | 16.10 | |
| GM19 | Spike | 600mm | 0.00 | **1.50** | 13.00 | |
| GM20 | Spike | 600mm | 0.00 | 0.10 | 20.40 | |
| GM21 | Spike | 600mm | 0.00 | 0.90 | 18.70 | |
| GM22 | Spike | 600mm | 0.00 | 0.90 | 18.40 | |
| GM23 | Spike | 600mm | 0.00 | **1.70** | 17.50 | |

# LANDFILL GAS MIGRATION MONITORING FORM

| | | |
|---|---|---|
| **Site Name:** Dunmore Landfill Site | **Site Address:** Dunmore, Co. Kilkenny | |
| **Operator:** Kilkenny County Council | **National Grid Reference:** 160572N 249519E | |
| **Site Status:** Active | **Date:** 29/09/08 | **Time:** 11:48 |
| **Instrument Used:** Infra red Gas Analyser - GA 94 | **Date Of Calibration:** May '08<br>**Next Calibration Due:** May'10 | |
| **Monitoring Personnel:** Alan Rhatigan | **Weather:** Dry | **Barometric Pressure (mb):** 1015 |

## RESULTS

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **GM1** | Spike | 600mm | 0.00 | 0.80 | 19.70 | |
| **GM2** | Spike | 600mm | 0.00 | **1.70** | 14.40 | |
| **GM3** | Spike | 600mm | 0.00 | 1.20 | 17.60 | |
| **GM4** | Spike | 600mm | 0.00 | 0.30 | 20.10 | |
| **GM5** | Spike | 600mm | 0.00 | **1.60** | 18.20 | |
| **GM7** | Spike | 600mm | 0.00 | 1.30 | 15.10 | |
| **GM8** | Spike | 600mm | 0.00 | 0.90 | 18.80 | |
| **GM9** | Spike | 600mm | 0.00 | 1.30 | 18.30 | |
| **GM10** | Spike | 600mm | 0.00 | **1.60** | 17.1 | |
| **GM11** | Spike | 600mm | 0.00 | 1.00 | 19.7 | |
| **GM12** | Spike | 600mm | 0.00 | **2.00** | 18.8 | |
| **GM13** | Spike | 600mm | 0.00 | 0.90 | 16.9 | |
| **GM14** | Spike | 600mm | 0.00 | **1.60** | 19.00 | |
| **GM15** | Spike | 600mm | 0.00 | 0.40 | 19.70 | |
| **GM16** | Spike | 600mm | 0.00 | 0.00 | 20.70 | |
| **GM17** | Spike | 600mm | 0.00 | **1.90** | 19.20 | |
| **GM18** | Spike | 600mm | 0.00 | **1.80** | 18.50 | |
| **GM19** | Spike | 600mm | 0.00 | **1.70** | 9.50 | |
| **GM20** | Spike | 600mm | 0.00 | 0.60 | 19.70 | |
| **GM21** | Spike | 600mm | 0.00 | 1.40 | 18.50 | |
| **GM22** | Spike | 600mm | 0.00 | 0.00 | 20.50 | |
| **GM23** | Spike | 600mm | 0.00 | **2.30** | 17.40 | |

# LANDFILL GAS MIGRATION MONITORING FORM

| | | |
|---|---|---|
| **Site Name:** Dunmore Landfill Site | **Site Address:** Dunmore, Co. Kilkenny | |
| **Operator:** Kilkenny County Council | **National Grid Reference:** 160572N 249519E | |
| **Site Status:** Active | **Date:** 29/10/08 | **Time:** 10:30 |
| **Instrument Used:** Infra red Gas Analyser - GA 94 | **Date Of Calibration:** May '08<br>**Next Calibration Due:** May'10 | |
| **Monitoring Personnel:** Alan Rhatigan | **Weather:** Dry | **Barometric Pressure (mb):** 1002 |

## RESULTS

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| **GM1** | Spike | 600mm | 0.00 | 0.20 | 20.70 | |
| **GM2** | Spike | 600mm | 0.00 | 0.00 | 20.80 | |
| **GM3** | Spike | 600mm | 0.00 | 0.90 | 18.40 | |
| **GM4** | Spike | 600mm | 0.00 | 1.10 | 19.30 | |
| **GM5** | Spike | 600mm | 0.00 | 1.00 | 16.80 | |
| **GM7** | Spike | 600mm | 0.00 | 1.00 | 20.00 | |
| **GM8** | Spike | 600mm | 0.00 | 0.70 | 20.00 | |
| **GM9** | Spike | 600mm | 0.00 | 1.30 | 18.40 | |
| **GM10** | Spike | 600mm | 0.00 | **2.40** | 18.9 | |
| **GM11** | Spike | 600mm | 0.00 | 1.40 | 17.1 | |
| **GM12** | Spike | 600mm | 0.00 | 1.20 | 16.6 | |
| **GM13** | Spike | 600mm | 0.00 | 0.30 | 20 | |
| **GM14** | Spike | 600mm | 0.00 | 1.30 | 20.10 | |
| **GM15** | Spike | 600mm | 0.00 | 0.30 | 20.90 | |
| **GM16** | Spike | 600mm | 0.00 | 0.00 | 21.00 | |
| **GM17** | Spike | 600mm | 0.00 | **1.50** | 20.40 | |
| **GM18** | Spike | 600mm | 0.00 | 1.30 | 19.90 | |
| **GM19** | Spike | 600mm | 0.00 | **1.50** | 7.30 | |
| **GM20** | Spike | 600mm | 0.00 | 0.40 | 19.30 | |
| **GM21** | Spike | 600mm | 0.00 | 0.50 | 19.70 | |
| **GM22** | Spike | 600mm | 0.00 | 0.70 | 19.50 | |
| **GM23** | Spike | 600mm | 0.00 | 1.00 | 18.90 | |

# LANDFILL GAS MIGRATION MONITORING FORM

| | | |
|---|---|---|
| **Site Name:** Dunmore Landfill Site | **Site Address:** Dunmore, Co. Kilkenny | |
| **Operator:** Kilkenny County Council | **National Grid Reference:** 160572N 249519E | |
| **Site Status:** Active | **Date:** 29/10/08 | **Time:** 10:30 |
| **Instrument Used:** Infra red Gas Analyser - GA 94 | **Date Of Calibration:** May '08<br>**Next Calibration Due:** May'10 | |
| **Monitoring Personnel:** Alan Rhatigan | **Weather:** Dry | **Barometric Pressure (mb):** 1002 |

## RESULTS

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| GM1 | Spike | 600mm | | | | **No Results** |
| GM2 | Spike | 600mm | | | | |
| GM3 | Spike | 600mm | | | | |
| GM4 | Spike | 600mm | | | | |
| GM5 | Spike | 600mm | | | | |
| GM7 | Spike | 600mm | | | | |
| GM8 | Spike | 600mm | | | | |
| GM9 | Spike | 600mm | | | | |
| GM10 | Spike | 600mm | | | | |
| GM11 | Spike | 600mm | | | | |
| GM12 | Spike | 600mm | | | | |
| GM13 | Spike | 600mm | | | | |
| GM14 | Spike | 600mm | | | | |
| GM15 | Spike | 600mm | | | | |
| GM16 | Spike | 600mm | | | | |
| GM17 | Spike | 600mm | | | | |
| GM18 | Spike | 600mm | | | | |
| GM19 | Spike | 600mm | | | | |
| GM20 | Spike | 600mm | | | | |
| GM21 | Spike | 600mm | | | | |
| GM22 | Spike | 600mm | | | | |
| GM23 | Spike | 600mm | | | | |

# LANDFILL GAS MIGRATION MONITORING FORM

| | | |
|---|---|---|
| **Site Name:** Dunmore Landfill Site | **Site Address:** Dunmore, Co. Kilkenny | |
| **Operator:** Kilkenny County Council | **National Grid Reference:** 160572N 249519E | |
| **Site Status:** Active | **Date:** 08/01/09 | **Time:** 11:02 |
| **Instrument Used:** Infra red Gas Analyser - GA 94 | **Date Of Calibration:** May '08<br>**Next Calibration Due:** May'10 | |
| **Monitoring Personnel:** Alan Rhatigan | **Weather:** Dry | **Barometric Pressure (mb):** 1019 |

## RESULTS

| Sample Station Number | Borehole/ Spike/ Other | Survey Depth | $CH_4$ % v/v | $CO_2$ % v/v | $O_2$ % v/v | Comments |
|---|---|---|---|---|---|---|
| GM1 | Spike | 600mm | 0.00 | 0.70 | 19.90 | |
| GM2 | Spike | 600mm | 0.00 | 0.00 | 21.00 | |
| GM3 | Spike | 600mm | 0.00 | 0.20 | 20.90 | |
| GM4 | Spike | 600mm | 0.00 | 0.20 | 20.70 | |
| GM5 | Spike | 600mm | 0.00 | **1.70** | 13.50 | |
| GM7 | Spike | 600mm | 0.00 | 0.00 | 20.50 | |
| GM8 | Spike | 600mm | 0.00 | 0.40 | 20.90 | |
| GM9 | Spike | 600mm | 0.00 | 0.90 | 20.40 | |
| GM10 | Spike | 600mm | 0.00 | 0.90 | 20.3 | |
| GM11 | Spike | 600mm | 0.00 | 0.30 | 20.7 | |
| GM12 | Spike | 600mm | 0.00 | 0.20 | 20.7 | |
| GM13 | Spike | 600mm | 0.00 | 0.20 | 20.3 | |
| GM14 | Spike | 600mm | 0.00 | 1.40 | 19.80 | |
| GM15 | Spike | 600mm | 0.00 | **1.50** | 18.70 | |
| GM16 | Spike | 600mm | 0.00 | 0.10 | 20.10 | |
| GM17 | Spike | 600mm | 0.00 | **1.60** | 18.50 | |
| GM18 | Spike | 600mm | 0.00 | 1.30 | 19.50 | |
| GM19 | Spike | 600mm | 0.00 | **1.60** | 7.90 | |
| GM20 | Spike | 600mm | 0.00 | **1.50** | 18.80 | |
| GM21 | Spike | 600mm | 0.00 | 1.00 | 20.60 | |
| GM22 | Spike | 600mm | 0.00 | **1.50** | 19.40 | |
| GM23 | Spike | 600mm | 0.00 | 1.40 | 19.10 | |

# Appendix C

Surface, Ground Water Monitoring

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Leachate Monitoring

| Upstream 'A' | 1st 1/4 2004 | 2nd 1/4 2004 | 3rd 1/4 2004 | 4th 1/4 2004 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | 8.1 | 8.4 | | 8.3 | 8.2 | 8.3 | | | 8 | 8.3 | | 8.3 | 7.4 | | | 8 | 8.3 | | 8.1 | 8.3 |
| Temperature oC | 9.3 | 11.7 | | 11.3 | 8.6 | 10.1 | | | 7.3 | 8.1 | | 12.8 | 7.4 | | | 11.1 | 6.7 | | 13.2 | 8.2 |
| Conductivity uS/CM 20oC | - | - | | | | | | | | | | | | | | | | | | |
| Conductivity uS/CM 25oC | 389 | 410 | | 434 | 382 | 390 | | | 367 | 418 | | 434 | 412 | | | 420 | 317 | | 381 | 558 |
| C.O.D. | 25 | <8 | | 10 | <8 | 16 | | | 22 | 8 | | <8 | 27 | | | <8 | 38 | | 22 | 24 |
| B.O.D. | 0.5 | 1.3 | | 0.8 | 0.7 | 1 | | | 0.8 | 0.5 | | 0.9 | 1.5 | | | 0.8 | 1.6 | | 1.2 | 1.2 |
| Ammonia mg/l N | 0.01 | 0.034 | | 0.008 | 0.022 | 0.018 | | | 0.007 | 0.01 | | 0.011 | 0.003 | | | 0.019 | 0.012 | | 0.021 | 0.022 |
| Dissolved Oxygen %sat | 96.8 | 102.4 | | 95.2 | 96.4 | 91.5 | | | 113.5 | 101 | | 112 | 99.3 | | | 92 | 99.2 | | 97.2 | 100 |
| Calcium mg/l Ca | 55.3 | - | | | | | | | | 64.5 | | | | | | | | | | |
| Cadmium mg/l Cd | <0.0001 | - | | | | | | | | <.0001 | | | | | | | | | | |
| Chromium mg/l Cr | 0.00241 | - | | | | | | | | <.001 | | | | | | | | | | |
| Chloride mg/l Cl | 18 | 21 | | 18 | 18 | 18 | | | 15 | 18 | | 18 | 15 | | | 14 | 14 | | 13 | 54 |
| Copper mg/l Cu | <0.001 | | | | | | | | | <.001 | | | | | | | | | | |
| Iron mg/l Fe | 0.163 | - | | | | | | | | 0.0815 | | | | | | | | | | |
| Lead Mg/l Pb | <0.0001 | - | | | | | | | | 0.001 | | | | | | | | | | |
| Magnesium mg/l Mg | 5.26 | - | | | | | | | | 6.01 | | | | | | | | | | |
| Manganese mg/l Mn | 0.00466 | - | | | | | | | | 0.0027 | | | | | | | | | | |
| Mercury mg/l Hg | - | - | | | | | | | | | | | | | | | | | | |
| Nickel mg/l Ni | <0.001 | - | | | | | | | | <.001 | | | | | | | | | | |
| Potassium mg/l K | 1.1 | - | | | | | | | | 0.78 | | | | | | | | | | |
| Sodium mg/l Na | 8.95 | | | | | | | | | 8.37 | | | | | | | | | | |
| Sulphate mg/l SO4 | 13.5 | - | | | | | | | | | | | | | | | | | | |

No Available Sample

| Upstream 'A' | 1st 1/4 2004 | 2nd 1/4 2004 | 3rd 1/4 2004 | 4th 1/4 2004 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | |
| Zinc mg/l Zn | 0.00831 | - | | | | | | | | <.001 | | | | | | | | | | |
| Alkalinity CaCO3 | - | - | | | | 161 | | | | 157 | | | | | | | | | | |
| TOC mg/l C | - | - | | | | | | | | | | | | | | | | | | |
| TON mg/l N | 4.5 | 4.2 | | 3.7 | 2.8 | 3.3 | | | 3.7 | 6 | | 5.2 | 4 | | | | | | | |
| o-Phosphate mg/l P | 0.009 | 0.048 | | 0.014 | 0.013 | 0.021 | | | 0.011 | 0.0037 | | 0.02 | 0.01 | | | | | | | |
| Flouride mg/l F | <0.1 | - | | | | | | | | | | | | | | | | | | |
| Phosphorous mg/l P | - | - | | | | | | | | | | | | | | | | | | |
| Nitrite mg/l N | 0.002 | 0.013 | | | 0.001 | 0.005 | | | 0.002 | 0.006 | | 0.005 | 0.001 | | | | | | | |
| Nitrate mg/l N | - | - | | 0.003 | | | | | | | | | | | | | | | | |
| Suspended Solids mg/l | - | <6 | | <6 | 9 | <6 | | | <10 | 65.4 | | <6.0 | <6.0 | | | | 7 | | 34 | 42 |
| Colour Hazen | - | - | | | | | | | | | | | | | | | | | | |
| Total Coliforms/100ml | - | - | | | | | | | | | | | | | | | | | | |
| Faecal Coliforms/100ml | - | - | | | | | | | | | | | | | | | | | | |

| Downstream 'A' | 1st 1/4 2004 | 2nd 1/4 2004 | 3rd 1/4 2004 | 4th 1/4 2004 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | 8.1 | 8.6 | | | 8.4 | 8.4 | | | 7.9 | 8.1 | | | 8 | | | 8.2 | 8.3 | | 8.2 | 8.3 |
| Temperature oC | 8.2 | 7.1 | | | 8.1 | 9.5 | | | 7.9 | 8.1 | | | 7.1 | | | 11.1 | 7.5 | | 13 | 8 |
| Conductivity uS/CM 20oC | - | - | | | | | | | | | | | | | | | | | | |
| Conductivity uS/CM 25oC | 459 | 367 | | | 402 | 360 | | | 487 | 412 | | | 408 | | | 455 | 294 | | 411 | 487 |
| C.O.D. | 29 | <8 | | | <8 | 9 | | | 16 | 24 | | | 31 | | | <8 | 46 | | 13 | <8 |
| B.O.D. | 1 | 0.6 | | | 0.7 | 1.6 | | | 1 | 0.6 | | | 0.9 | | | 0.8 | 2.2 | | 0.7 | 0.9 |
| Ammonia mg/l N | 2.1 | <0.003 | | | 0.004 | 0.12 | | | 0.4 | 0.008 | | | 0.009 | | | 0.012 | 0.031 | | 0.059 | 0.018 |
| Dissolved Oxygen %sat | 89 | 103.6 | | | 98.4 | 94.2 | | | 114.4 | 104 | | | 99.9 | | | 89 | 101.2 | | 98 | 100 |
| Calcium mg/l Ca | 44.2 | - | | | | | | | | 64.5 | | | | | | | | | | |
| Cadmium mg/l Cd | <0.0001 | - | | | | | | | | <.0001 | | | | | | | | | | |
| Chromium mg/l Cr | 0.00354 | - | | | | | | | | 0.00242 | | | | | | | | | | |
| Chloride mg/l Cl | 31 | 19 | | | 17 | 19 | | | 19 | 17 | | | 15 | | | 14 | 14 | | 14 | 30 |
| Copper mg/l Cu | 0.00177 | - | | | | | | | | 0.00289 | | | | | | | | | | |
| Iron mg/l Fe | 0.135 | | | | | | | | | 0.0778 | | | | | | | | | | |
| Lead Mg/l Pb | <0.001 | - | | | | | | | | <.001 | | | | | | | | | | |
| Magnesium mg/l Mg | 6.25 | - | | | | | | | | 6.08 | | | | | | | | | | |
| Manganese mg/l Mn | 0.00443 | - | | | | | | | | 0.0335 | | | | | | | | | | |
| Mercury mg/l Hg | - | - | | | | | | | | | | | | | | | | | | |

Available Sample

| Downstream 'A' | 1st 1/4 2004 | 2nd 1/4 2004 | 3rd 1/4 2004 | 4th 1/4 2004 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | |
| Nickel mg/l Ni | 0.00224 | - | NO | NO | | | NO | NO | | <.001 | NO | NO | | NO | NO | | | NO | | |
| Potassium mg/l K | 5.74 | - | | | | | | | | 0.92 | | | | | | | | | | |
| Sodium mg/l Na | 25.1 | | | | | | | | | 9.5 | | | | | | | | | | |
| Sulphate mg/l SO4 | 7.1 | - | | | | | | | | | | | | | | | | | | |
| Zinc mg/l Zn | 0.00893 | - | | | | | | | | <1 | | | | | | | | | | |
| Alkalinity CaCO3 | - | - | | | | 153 | | | | 150 | | | | | | | | | | |
| TOC mg/l C | - | - | | | | | | | | | | | | | | | | | | |
| TON mg/l N | 6.9 | 4 | | | 3.1 | 3 | | | 6.1 | 5.7 | | | 5 | | | | | | | |
| o-Phosphate mg/l P | 0.009 | 0.041 | | | 0.01 | 0.012 | | | 0.008 | 0.006 | | | 0.01 | | | | | | | |
| Flouride mg/l F | 0.19 | - | | | | | | | | | | | | | | | | | | |
| Phosphorous mg/l P | - | - | | | | | | | | | | | | | | | | | | |
| Nitrite mg/l N | 0.035 | 0.01 | | | 0.002 | 0.007 | | | 0.001 | 0.004 | | | 0.003 | | | | | | | |
| Nitrate mg/l N | - | - | | | | | | | | | | | | | | | | | | |
| Suspended Solids mg/l | - | <6.3 | | | <6 | <6 | | | 21.6 | 61.3 | | | <6.0 | | | | 8 | | <6 | <7.5 |
| Colour Hazen | - | - | | | | | | | | | | | | | | | | | | |
| Total Coliforms/100ml | - | - | | | | | | | | | | | | | | | | | | |
| Faecal Coliforms/100ml | - | - | | | | | | | | | | | | | | | | | | |

| GW2 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | 7.5 | 7.5 | 7.1 | 7.3 | 7.4 | | 7.5 | 7.3 | 7.6 | 7.3 | 7.5 | 7.4 | 7.4 | 7.4 | 7.4 | 7.6 |
| Temperature $^{o}C$ | 10.8 | 10.5 | 10.9 | 10.9 | 10.5 | | 11.9 | 11.7 | 10.7 | 11.4 | 11 | 11.2 | 10.3 | 11.3 | 10.9 | 10.3 |
| Conductivity uS/CM 20$^{o}C$ | | | | | | | | | | | | | | | | |
| Conductivity uS/CM 25$^{o}C$ | 632 | 629 | 621 | 631 | 647 | | 653 | 639 | 592 | 600 | 593 | 602 | 607 | 617 | 625 | 621 |
| Ammonia mg/l N | 0.031 | 0.008 | <0.003 | 0.004 | <.003 | | 0.065 | 0.026 | <0.003 | 0.014 | 0.016 | 0.011 | 0.005 | 0.008 | 0.005 | 0.008 |
| Dissolved Oxygen %sat | 67.2 | 57.8 | 51 | 32.6 | 78.5 | | 55.1 | 55 | 71.8 | 65.2 | 85.2 | 31.1 | 84.8 | 64.9 | 68.9 | 58 |
| Calcium mg/l Ca | | | 95 | 96 | 99 | | 108 | 100 | 95 | 91.7 | 96.5 | | | 106 | | |
| Cadmium mg/l Cd | | | | <0.0001 | | | | | | <0.005 | <0.005 | | | <0.001 | | |
| Chromium mg/l Cr | | | | 0.00741 | | | | | | <0.005 | <0.005 | | | 0.00197 | | |
| Chloride mg/l Cl | 19 | 18 | 17 | 21 | 16 | | 19 | 20 | 20 | 20 | 19 | 18 | 18 | 19 | 18 | 17 |
| Copper mg/l Cu | | | | <.001 | | | | | | <0.005 | <0.005 | | | 0.00107 | | |
| Iron mg/l Fe | 0.505 | 0.769 | 1.66 | 1.13 | 2.79 | | 0.109 | | | 0.162 | 0.134 | | | 0.633 | | 0.846 |
| Lead Mg/l Pb | | | | | | | | | | <0.005 | <0.005 | | | <0.001 | | |
| Magnesium mg/l Mg | | | 14.3 | 18.2 | 15.1 | | 14.1 | 15.5 | 13.3 | 1.4 | 11.9 | | | 14.4 | | |
| Manganese mg/l Mn | | | | 0.326 | | | | | | <0.050 | <0.050 | | | 0.158 | | |
| Mercury mg/l Hg | | | | | | | | | | <0.0005 | <0.005 | | | <0.0005 | | |
| Nickel mg/l Ni | | | | 0.00389 | | | | | | <0.005 | <0.005 | | | 0.00194 | | |
| Potassium mg/l K | | 0.4 | 0.9 | 1.15 | 0.9 | | 0.9 | 1.7 | 0.8 | <1 | <5.0 | | | 1.34 | | 1.1 |
| Sodium mg/l Na | | 11.6 | 11.3 | | 11.1 | | 11 | 12.3 | 10.5 | 10.6 | 9.78 | | | 14.1 | | 9.5 |
| Sulphate mg/l $SO_4$ | | | | 18.3 | | | | | | 16.4 | | | | 17.9 | | |
| Zinc mg/l Zn | | | | 0.0289 | | | | | | <0.030 | <0.03 | | | 0.0168 | | |
| Alkalinity $CaCO_3$ | | 288 | | 289 | | | | | | 256 | | | | 285 | | |
| TOC mg/l C | - | 1.2 | | <0.5 | | | | 1.7 | 1 | 0.8 | 0.6 | <0.5 | 1.1 | <0.5 | 0.9 | 0.7 |
| TON mg/l N | 5.6 | 5.3 | 3.5 | 2.3 | 5.7 | | 5 | 3.1 | 5.3 | 6.4 | 6.4 | 2.2 | 5 | 4.1 | 4.6 | 3.4 |
| Nitrate+Nitrite mg/l N | | | | | | | | | | | | | | | | |

NO Sample Available

| GW2 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flouride mg/l F | | | | 0.3 | | | | | | 0.26 | | | | 0.21 | | |
| Phosphorous mg/l P | | | | | | | | | | | | | | | | |
| Nitrite mg/l N | <0.001 | <0.001 | <0.001 | <0.001 | <.001 | | <.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | | <0.001 | <0.001 | |
| Suspended Solids mg/l | | | | | | | | | | | | | | | | |
| o-Phosphate mg/l P | <0.006 | <0.006 | <0.006 | <0.006 | <.006 | | <0.006 | <0.006 | <0.006 | <0.006 | <0.006 | 0.33 | | <0.006 | | |
| Colour Hazen | | | | | | | | | | | | | | | | |
| Total Coliforms/100ml | 0 | 0 | 0 | 0 | 0 | | 63 | 0 | 2 | 0 | <10 | 10 | 0 | 0 | 0 | <10 |
| Faecal Coliforms/100ml | | | | | | | | | | | | | | | | |
| Aluminium mg/l | | | | 0.668 | | | | | | 0.167 | 0.025 | | | 0.418 | | |
| e-coli | 0 | 0 | 0 | 0 | 0 | | <10 | 0 | 0 | 0 | <10 | <10 | 0 | 0 | 0 | <10 |

| GW 3 | 1st 1/4 2004 | 2nd 1/4 2004 | 3rd 1/4 2004 | 4th 1/4 2004 | 1st1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | 7.3 | 7.3 | 7.3 | | 7.4 | | | | | | |
| Temperature $^{o}C$ | 11.6 | 12 | 13.2 | | 12.2 | | | | | | |
| Conductivity uS/CM 20$^{o}C$ | - | - | - | - | - | | | | | | |
| Conductivity uS/CM 25$^{o}C$ | 755 | 777 | 748 | | 751 | | | | | | |
| Ammonia mg/l N | 0.006 | <0.003 | <0.003 | | <0.003 | | | | | | |
| Dissolved Oxygen %sat | 73.6 | 71.2 | 75.3 | | 72.5 | | | | | | |
| Calcium mg/l Ca | 121 | - | - | | | | | | | | |
| Cadmium mg/l Cd | <0.0001 | - | - | | | | | | | | |
| Chromium mg/l Cr | 0.0060 | | | | | | | | | | |
| Chloride mg/l Cl | 19 | 18 | 18 | | 20 | | | | | | |
| Copper mg/l Cu | 0.00197 | - | - | | | | | | | | |
| Iron mg/l Fe | 0.187 | <0.060 | <0.006 | | <60 | | | | | | |
| Lead Mg/l Pb | <0.0001 | - | - | | | | | | | | |
| Magnesium mg/l Mg | 10.4 | - | - | | | | | | | | |
| Manganese mg/l Mn | <0.001 | - | - | | | | | | | | |
| Mercury mg/l Hg | - | - | - | | | | | | | | |
| Nickel mg/l Ni | 0.00184 | - | - | | | | | | | | |
| Potassium mg/l K | 1.76 | 2.1 | 1.6 | | | | | | | | |
| Sodium mg/l Na | 9.5 | 9 | 9.1 | | | | | | | | |
| Sulphate mg/l $SO_4$ | 13.3 | | | | | | | | | | |
| Zinc mg/l Zn | 0.013 | - | - | | | | | | | | |
| Alkalinity $CaCO_3$ | - | - | - | | | | | | | | |
| TOC mg/l C | 0.68 | - | 0.42 | | 0 | | | | | | |
| TON mg/l N | 8.5 | 8.6 | 8.1 | | 8.9 | | | | | | |

NO Sample Available | NO Sample Available | NO Sample Available | NO Sample Available | NO Sample Available | NO Sample Available

| GW 3 | 1st 1/4 2004 | 2nd 1/4 2004 | 3rd 1/4 2004 | 4th 1/4 2004 | 1st1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrate+Nitrite mg/l N | - | - | - | | | | | | | | |
| Flouride mg/l F | <0.1 | - | - | | | | | | | | |
| Phosphorous mg/l P | - | - | - | | | | | | | | |
| Nitrite mg/l N | <0.001 | 0.001 | <0.001 | | <0.001 | | | | | | |
| Suspended Solids mg/l | - | - | - | | | | | | | | |
| o-Phosphate mg/l P | <0.006 | <0.006 | <0.006 | | <0.006 | | | | | | |
| Colour Hazen | - | - | - | | | | | | | | |
| Total Coliforms/100ml | 0 | 0 | 0 | | 0 | | | | | | |
| Faecal Coliforms/100ml | - | - | - | | | | | | | | |
| Aluminium mg/l | <0.05 | - | - | | | | | | | | |
| e-coli | | | | | 0 | | | | | | |

| GW 4 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | 7.4 | 7.3 | 7 | 7.3 | 7.3 | 7.2 | 7.5 | 7.2 | 7.4 | 7.2 | 7.3 | 7.2 | 7.2 | 7.3 | 7.3 | 7.2 |
| Temperature $^{o}C$ | 11.6 | 11.3 | 12.4 | 12.3 | 11.6 | 11.8 | 13.1 | 13 | 11.4 | 13.1 | 12.4 | 12.4 | 12 | 13 | 12.6 | 12.4 |
| Conductivity uS/CM 20$^{o}C$ | | | | | | | | | | | | | | | | |
| Conductivity uS/CM 25$^{o}C$ | 677 | 734 | 737 | 766 | 694 | 638 | 643 | 748 | 688 | 720 | 695 | 698 | 712 | 731 | 701 | 699 |
| Ammonia mg/l N | <0.003 | <0.003 | <0.003 | <0.003 | <0.003 | | 0.032 | 0.021 | 0.003 | 0.006 | 0.013 | 0.063 | 0.008 | 0.51 | 0.004 | 0.04 |
| Dissolved Oxygen %sat | 46.9 | 48.9 | 54.5 | 59.4 | 65.8 | 62.2 | 61.2 | 64.5 | 61.2 | 62.9 | 56.8 | 51.6 | 63.4 | 62.5 | 56.5 | 61 |
| Calcium mg/l Ca | | | 113 | 127 | 124 | 110 | 113 | 135 | 120 | | 119 | | | 139 | | |
| Cadmium mg/l Cd | | | | <01 | | <.1 | | | | | <0.005 | | | <0.001 | | |
| Chromium mg/l Cr | | | | 0.0107 | | 0.00223 | | | | | <0.005 | | | 0.00221 | | |
| Chloride mg/l Cl | 21 | 22 | 20 | 22 | 20 | | 22 | 23 | 22 | 22 | 23 | 22 | 20 | 21 | 22 | 19 |
| Copper mg/l Cu | | | | 0.00311 | | <.001 | | | | | <0.005 | | | 0.00193 | | |
| Iron mg/l Fe | 0.599 | 0.875 | 0.321 | 0.266 | 0.139 | 0.203 | 0.06 | | | | 0.152 | | | 0.184 | | 0.116 |
| Lead Mg/l Pb | | | | <.001 | | <.001 | | | | | <0.005 | | | <0.001 | | |
| Magnesium mg/l Mg | | | 9 | 8.48 | 9.3 | 7.8 | 7 | 9.8 | 8.6 | | 8.24 | | | 8.99 | | |
| Manganese mg/l Mn | | | | 0.018 | | 0.0154 | | | | | <0.050 | | | <0.01 | | |
| Mercury mg/l Hg | | | | | | | | | | | <0.0005 | | | <00005 | | |
| Nickel mg/l Ni | | | | 0.00213 | | 0.001 | | | | | <0.005 | | | 0.00122 | | |
| Potassium mg/l K | | 4.3 | 2.2 | 1.99 | 2 | 1.92 | 1.9 | 2.1 | 2 | | <5.0 | | | 3.24 | | <0.3 |
| Sodium mg/l Na | | 11.2 | 11.5 | 7.3 | 10.5 | | 9.8 | 10 | 10.8 | | 10.1 | | | 13.8 | | 17.5 |
| Sulphate mg/l $SO_4$ | | | | 14.2 | | 12.3 | | | | 18.5 | | | | 35.3 | | |
| Zinc mg/l Zn | | | | 0.0172 | | 0.101 | | | | | <0.030 | | | 0.0154 | | |
| Alkalinity $CaCO_3$ | | 317 | | 324 | | 241 | | | | 279 | | | | | | |
| TOC mg/l C | - | 1.89 | <0.05 | <0.5 | | | | 1.2 | 1.1 | 1 | 0.7 | <0.5 | 1.2 | | 0.9 | 1.2 |
| TON mg/l N | 7.6 | 10 | 9.5 | 10 | 9.5 | | 10 | 10 | 12 | 14 | 12 | 11 | 9.9 | 10 | 9.7 | 9.5 |
| Nitrate+Nitrite mg/l N | | | | | | | | | | | | | | | | |

| GW 4 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flouride mg/l F | | | | <0.1 | | <0.1 | | | | 0.13 | | | | <0.10 | | |
| Phosphorous mg/l P | | | | | | | | | | | | | | | | |
| Nitrite mg/l N | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | | 0.007 | <0.001 | |
| Suspended Solids mg/l | | | | | | | | | | | | | | | | |
| o-Phosphate mg/l P | <0.01 | <0.006 | <0.006 | <0.006 | 0.056 | | <0.006 | <0.006 | <0.006 | <0.006 | 0.025 | 0.29 | | <0.006 | | |
| Colour Hazen | | | | | | | | | | | | | | | | |
| Total Coliforms/100ml | 0 | 0 | 0 | 1 | 0 | 0 | <10 | 0 | 0 | 0 | <5 | <5 | 0 | 0 | 0 | <10 |
| Faecal Coliforms/100ml | | | | | | | | | | | | | | | | |
| Aluminium mg/l | | | | 98.4 | | 0.0691 | | | | | <0.025 | | | <0.005 | | |
| e-coli | 0 | 0 | 0 | 0 | 0 | 0 | <10 | 0 | 0 | 0 | <5 | <5 | 0 | 0 | 0 | <10 |

| MW 1 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | 7.3 | 7.3 | 7 | 7.5 | 7.2 | 7.1 | 7.3 | 7.2 | 7.2 | 7.1 | 7.3 | 7.2 | 7.2 | 7.2 | 7.2 | 7.3 |
| Temperature $^{o}C$ | 11.3 | 11.2 | 12.4 | 11.5 | 10.7 | 11.6 | 14.1 | 11.9 | 10.8 | 12.2 | 11.8 | 11.6 | 10.9 | 12.1 | 11.7 | 10.3 |
| Conductivity uS/CM 20$^{o}C$ | | | | | | | | | | | | | | | | |
| Conductivity uS/CM 25$^{o}C$ | 797 | 803 | 776 | 776 | 788 | 799 | 789 | 768 | 808 | 807 | 759 | 743 | 760 | 793 | 748 | 755 |
| Ammonia mg/l N | 0.041 | <0.003 | <0.003 | 0.004 | 0.01 | | 0.042 | 0.014 | <0.003 | 0.014 | 0.058 | 0.015 | 0.008 | 0.007 | 0.004 | 0.011 |
| Dissolved Oxygen %sat | 53.8 | 39.2 | 38 | 35.9 | 54.9 | 53.3 | 55.6 | 50.3 | 47 | 52.2 | 53.6 | 54.8 | 49 | 59.1 | 53 | 60 |
| Calcium mg/l Ca | | | 135 | 128 | 143 | 139 | 142 | 137 | 146 | 147 | 128 | | | | | |
| Cadmium mg/l Cd | | | | <.0001 | | 0.0001 | | | | <0.005 | <0.005 | | | | | |
| Chromium mg/l Cr | | | | <.00643 | | 0.00373 | | | | <0.005 | <0.005 | | | | | |
| Chloride mg/l Cl | 23 | 23 | 18 | 22 | 21 | | 22 | 22 | 21 | 22 | 23 | 24 | 21 | 23 | 21 | 21 |
| Copper mg/l Cu | | | | <.0107 | | 0.001 | | | | <0.005 | <0.005 | | | | | |
| Iron mg/l Fe | 0.754 | 0.07 | 0.106 | 0.143 | 0.183 | 0.141 | <.06 | | | 0.0637 | 0.125 | | | | | 0.175 |
| Lead Mg/l Pb | | | | <0.001 | | <.001 | | | | <0.005 | <0.005 | | | | | |
| Magnesium mg/l Mg | | | | 12.3 | 13 | 12.1 | 11.4 | 11.3 | 12.7 | 1.4 | 11.6 | | | | | |
| Manganese mg/l Mn | | | | 0.00233 | | <.001 | | | | <0.050 | <0.050 | | | | | |
| Mercury mg/l Hg | | | | | | | | | | <0.0005 | <0.0005 | | | | | |
| Nickel mg/l Ni | | | | <.001 | | <0.001 | | | | <0.005 | <0.005 | | | | | |
| Potassium mg/l K | | 2.2 | 1.4 | 1.4 | 1.3 | 1.23 | 1.4 | 1.2 | 1.1 | <1 | 1.06 | | | | | 1.2 |
| Sodium mg/l Na | | 12.3 | 11.6 | 11.2 | 11.5 | | 11.1 | 11.2 | 11 | 12.6 | 10.7 | | | | | 9.9 |
| Sulphate mg/l $SO_4$ | | | | 13.8 | | 11.7 | | | | 15.8 | | | | 30.6 | | |
| Zinc mg/l Zn | | | | 0.0206 | | <.001 | | | | <0.030 | <0.030 | | | | | |
| Alkalinity $CaCO_3$ | | 364 | 343 | 343 | | | | | | 239 | | | | 364 | | |
| TOC mg/l C | - | 1.22 | 0.6 | | | | | 1.2 | 1.3 | 1 | <0.5 | <0.5 | 1.1 | 0.9 | 0.9 | 1 |
| TON mg/l N | 7.5 | 8 | 6.8 | 7.5 | 7.8 | | 12 | 8.1 | 8.5 | 10 | 9.3 | 8.3 | 7.7 | 8.4 | 7.9 | 7.1 |
| Nitrate+Nitrite mg/l N | | | | | | | | | | | | | | | | |

| MW 1 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flouride mg/l F | | | | <.1 | | <0.1 | | | | 0.1 | | | | <0.1 | | |
| Phosphorous mg/l P | | | | | | | | | | | | | | | | |
| Nitrite mg/l N | <0.001 | <0.001 | <0.001 | <0.001 | <.001 | | <0.001 | <0.001 | <0.001 | <0.001 | 0.001 | 0.005 | | <0.001 | <0.001 | |
| Suspended Solids mg/l | | | | | | | | | | | | | | | | |
| o-Phosphate mg/l P | 0.007 | <0.006 | <0.006 | <0.006 | 0.062 | | <.006 | <0.006 | <0.006 | <0.006 | 0.12 | 0.31 | | 0.006 | | |
| Colour Hazen | | | | | | | | | | | | | | | | |
| Total Coliforms/100ml | 1046 | 51 | 99 | 816 | 1203 | 659 | >2419 | 225 | 2419 | 79 | 2359 | 1533 | 1 | 115 | >2419 | 2247 |
| Faecal Coliforms/100ml | | | | | | | | | | | | | | | | |
| Aluminium mg/l | | | | 0.005 | | 0.005 | | | | <0.025 | <0.025 | | | | | |
| e-coli | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | <10 | <10 | 0 | 0 | 0 | <10 |

| Well 3 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | 7.5 | 7.5 | 7.3 | 7.6 | | | 7.5 | 7.4 | 7.4 | 7.3 | 7.5 | 7.3 | 7.5 | 7.3 | 7.5 | |
| Temperature $^{o}C$ | 8.2 | 9.2 | 14.3 | 7.2 | | | 16.3 | 12.3 | 7.1 | 14.5 | 12.7 | 10.5 | 7.4 | 12.1 | 12.2 | |
| Conductivity uS/CM 20$^{o}C$ | - | - | | | | | | | | | | | | | | |
| Conductivity uS/CM 25$^{o}C$ | 590 | 620 | 648 | 599 | | | 656 | 644 | 592 | 637 | 648 | 625 | 589 | 653 | 596 | |
| Ammonia mg/l N | 0.009 | <0.003 | 0.22 | <0.003 | | | 0.021 | 0.01 | 0.013 | <0.003 | 0.013 | 0.02 | 0.005 | <0.003 | 0.003 | |
| Dissolved Oxygen %sat | 36 | 38.4 | 71.6 | 103.1 | | | 50.5 | | | 61.3 | 82.4 | 58 | 36.7 | 67.8 | 43.7 | |
| Calcium mg/l Ca | - | - | 109 | 100 | | | 113 | 111 | 91 | 102 | 106 | | | | | |
| Cadmium mg/l Cd | - | - | | | | | | | | <0.005 | <0.005 | | | | | |
| Chromium mg/l Cr | | | | | | | | | | <0.005 | <0.005 | | | | | |
| Chloride mg/l Cl | 22 | 25 | 23 | 21 | | | 25 | 25 | 23 | 22 | 23 | 19 | 22 | 23 | 23 | |
| Copper mg/l Cu | - | - | | | | | | | | 0.0127 | 0.0116 | | | | | |
| Iron mg/l Fe | <0.06 | 0.089 | <0.06 | 0.156 | | | <.06 | | | 0.0986 | 0.113 | | | | | |
| Lead Mg/l Pb | - | - | | | | | | | | <0.005 | <0.005 | | | | | |
| Magnesium mg/l Mg | - | - | 8.4 | 12.1 | | | 7.8 | 8 | 15.5 | <1 | 8.59 | | | | | |
| Manganese mg/l Mn | - | - | | | | | | | | <0.050 | <0.050 | | | | | |
| Mercury mg/l Hg | - | - | | | | | | | | <0.0005 | <0.0005 | | | | | |
| Nickel mg/l Ni | - | - | | | | | | | | <0.005 | <0.005 | | | | | |
| Potassium mg/l K | | 0.4 | 0.8 | 1 | | | 0.9 | 1 | 1.3 | <1 | <1.0 | | | | | |
| Sodium mg/l Na | | 12.1 | 11.9 | 11.2 | | | 11.8 | 12.3 | 11 | 12 | 12 | | | | | |
| Sulphate mg/l $SO_4$ | | | | | | | | | | 22 | | | | 33.4 | | |
| Zinc mg/l Zn | - | - | | | | | | | | 0.227 | 0.113 | | | | | |
| Alkalinity $CaCO_3$ | - | 271 | | | | | | | | 231 | | | | 252 | | |
| TOC mg/l C | - | 1.24 | | | | | | 1 | 0.7 | 0.7 | 1.1 | 0.6 | 1.-0 | 1 | 0.9 | |
| TON mg/l N | 2.1 | 5.3 | 9.2 | 3.7 | | | 9.7 | 8.7 | 2.5 | 9.8 | 10 | 7.5 | 2.8 | 9.4 | 2.9 | |

No Sample Available

| Well 3 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrate+Nitrite mg/l N | - | - | | | | | | | | | | | | | | |
| Flouride mg/l F | - | - | | | | | | | | 0.12 | | | | <0.10 | | |
| Phosphorous mg/l P | - | - | | | | | | | | | | | | | | |
| Nitrite mg/l N | <0.001 | <0.001 | <0.001 | <0.001 | | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | | <0.001 | <0.001 | |
| Suspended Solids mg/l | - | - | | | | | | | | | | | | | | |
| o-Phosphate mg/l P | <0.006 | <0.006 | <0.006 | 0.0041 | | | <0.006 | <0.006 | <0.006 | <0.006 | <0.006 | 0.012 | | <0.006 | | |
| Colour Hazen | - | - | | | | | | | | | | | | | | |
| Total Coliforms/100ml | 102 | 173 | 2419 | 249 | | | 167 | 57 | 96 | 501 | 455 | 29 | 38 | 308 | 613 | |
| Faecal Coliforms/100ml | - | - | | | | | | | | | | | | | | |
| Aluminium mg/l | - | - | | | | | | | | <0.025 | <0.025 | | | | | |
| e-coli | 0 | 1 | 0 | 0 | | | 19 | 3 | 1 | 0 | <5 | 0 | 0 | 1 | 0 | |

| Well 6 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th1/4 2005 | 1st1/4 2006 | 2nd1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | 7.3 | 7.4 | 7.3 | 7.8 | 7.3 | 7.2 | 7.6 | 7.2 | 7.3 | 7.2 | 7.3 | 7.2 | 7.3 | 7.3 | 7.3 | 7.4 |
| Temperature $^{o}C$ | 10.9 | 10.5 | 13.1 | 12.3 | 9.7 | 10.7 | 15.3 | 12.9 | 10.8 | 12.2 | 11.4 | 10.6 | 10.4 | 11.9 | 11.8 | 9.8 |
| Conductivity uS/CM 20$^{o}C$ | | - | | | | | | | | | | | | | | |
| Conductivity uS/CM 25$^{o}C$ | 737 | 739 | 730 | 780 | 741 | 749 | 631 | 744 | 769 | 724 | 756 | 748 | 760 | 766 | 750 | 753 |
| Ammonia mg/l N | <0.003 | 0.023 | <.003 | 0.004 | <.003 | | 0.21 | 0.01 | <0.003 | 0.12 | 0.028 | 0.013 | <0.003 | <0.003 | 0.006 | 0.005 |
| Dissolved Oxygen %sat | 14.7 | 16.8 | 30 | 66.7 | 27.4 | 15.3 | 46 | 51.5 | 18.1 | 35.4 | 16.5 | 22 | 25 | 27.1 | 27.5 | 39 |
| Calcium mg/l Ca | | - | 122 | 129 | 129 | 129 | 107 | 130 | 132 | 125 | 121 | | | | | |
| Cadmium mg/l Cd | | - | | <0.0001 | | <.0001 | | | | <0.005 | <0.005 | | | | | |
| Chromium mg/l Cr | | | | 0.00531 | | 0.00373 | | | | <0.005 | <0.005 | | | | | |
| Chloride mg/l Cl | 21 | 23 | 21 | 24 | 16 | | 19 | 22 | 23 | 22 | 23 | 23 | 22 | 22 | 22 | 22 |
| Copper mg/l Cu | | - | | <.0227 | | <.001 | | | | <0.005 | <0.005 | | | | | |
| Iron mg/l Fe | <0.06 | <0.06 | 0.085 | 0.143 | <0.06 | 137 | <.06 | | | 0.05 | 0.119 | | | | | 0.23 |
| Lead Mg/l Pb | | - | | <.001 | | <.001 | | | | <0.005 | <0.005 | | | | | |
| Magnesium mg/l Mg | | - | | 11.3 | 13.3 | 12.3 | 10.6 | 11.4 | 13.3 | 1.3 | 11.6 | | | | | |
| Manganese mg/l Mn | | - | 12.3 | 0.015 | | 0.0915 | | | | <0.050 | <0.050 | | | | | |
| Mercury mg/l Hg | | - | | | | | | | | <0.0005 | <0.0005 | | | | | |
| Nickel mg/l Ni | | - | | 0.00213 | | <.001 | | | | <0.005 | <0.005 | | | | | |
| Potassium mg/l K | | 3 | 2.6 | 2.33 | 2.6 | 2.61 | 2.4 | 2.8 | 2.7 | <1 | 2.7 | | | | | 2.6 |
| Sodium mg/l Na | | 13.5 | 12.8 | 10.9 | 12.2 | | 10.5 | 11.1 | 13.1 | 12 | 10.9 | | | | | 9.8 |
| Sulphate mg/l $SO_4$ | | | | - | | 9.2 | | | | 19.2 | | | | 31.2 | | |
| Zinc mg/l Zn | | - | | 0.122 | | <.001 | | | | <0.030 | <0.030 | | | | | |
| Alkalinity $CaCO_3$ | | 322 | | 306 | | | | | | 297 | | | | 341 | | |
| TOC mg/l C | | 1.56 | - | - | | | | 1.6 | 0.8 | 1.2 | 0.5 | <0.5 | 3 | <0.5 | 1.2 | 1.1 |
| TON mg/l N | 7.2 | 8.2 | 7.9 | 6.2 | 7.6 | | 7.8 | 8.5 | 8.3 | 9.6 | 9.9 | 9 | 8.8 | 9 | 8.9 | 8.5 |
| Nitrate+Nitrite mg/l N | | - | | | | | | | | | | | | | | |

| Well 6 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th1/4 2005 | 1st1/4 2006 | 2nd1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flouride mg/l F | | - | | - | | <0.1 | | | | 0.12 | | | | 0.1 | | |
| Phosphorous mg/l P | | - | | | | | | | | | | | | | | |
| Nitrite mg/l N | <0.001 | <0.001 | <0.001 | <0.001 | <.001 | | 0.012 | <0.001 | <0.001 | 0.003 | <0.001 | <0.001 | | 0.001 | 0.001 | |
| Suspended Solids mg/l | | - | | | | | | | | | | | | | | |
| o-Phosphate mg/l P | <0.006 | 0.02 | <0.006 | <0.006 | 0.027 | | 0.024 | <0.006 | 0.022 | <0.006 | 0.019 | 0.026 | | 0.01 | | |
| Colour Hazen | | - | | | | | | | | | | | | | | |
| Total Coliforms/100ml | 387 | 2419 | 47 | >2420 | 12 | 30 | >2419 | 461 | 3 | 866 | 1049 | 34 | 16 | >2419 | 51 | <10 |
| Faecal Coliforms/100ml | | - | | | | | | | | | | | | | | |
| Aluminium mg/l | | - | | <0.05 | | <.050 | | | | <0.025 | <0.025 | | | | | |
| e-coli | 0 | 1 | 0 | 517 | 0 | 0 | 0 | 0 | 0 | 0 | <5 | 0 | 1 | 0 | 10 | <10 |

| Well 14 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | 7.5 | 7.7 | 7.1 | 7.5 | 7.5 | 7.4 | 7.4 | 7.5 | 7.6 | 7.2 | 7.4 | 7.5 | 7.6 | 7.6 | 7.6 | 7.7 |
| Temperature $^{o}C$ | 10.7 | 10.8 | 14.3 | 16.5 | 11 | 11.9 | 16.7 | 16.4 | 9.5 | 14.3 | 14.9 | 13.4 | 10.6 | 13.9 | 14.8 | 9.8 |
| Conductivity uS/CM 20$^{o}C$ | - | - | | | | | | | | | | | | | | |
| Conductivity uS/CM 25$^{o}C$ | 414 | 434 | 524 | 585 | 539 | 438 | 567 | 532 | 441 | 679 | 771 | 637 | 508 | 582 | 459 | 436 |
| Ammonia mg/l N | 0.006 | 0.018 | 0.05 | 0.033 | <0.003 | | 0.082 | 0.022 | 0.024 | 0.012 | 0.023 | 0.019 | 0.017 | 0.23 | 0.02 | 0.14 |
| Dissolved Oxygen %sat | 71.6 | 63.3 | 21 | 44.2 | 102.5 | 72 | 46.2 | 67.3 | 78.5 | 37.9 | 58.3 | 61.3 | 74 | 51.1 | 75.6 | 91 |
| Calcium mg/l Ca | - | - | 89 | 96.3 | 92 | 69.8 | 90 | 77 | 71 | 110 | 133 | | | 102 | | |
| Cadmium mg/l Cd | - | - | | <.0001 | | <.0001 | | | | <0.005 | <0.005 | | | <0.001 | | |
| Chromium mg/l Cr | | | | 0.00562 | | <.001 | | | | <0.005 | <0.005 | | | 0.00191 | | |
| Chloride mg/l Cl | 16 | 18 | 17 | 18 | 17 | | 26 | 49 | 16 | 24 | 13 | 16 | 17 | 15 | 13 | 14 |
| Copper mg/l Cu | - | - | | 0.01 | | 0.0224 | | | | <0.005 | <0.005 | | | 0.00126 | | |
| Iron mg/l Fe | 0.1 | 0.153 | 0.077 | 0.605 | 0.785 | 0.329 | 0.062 | | | 0.0572 | 0.166 | | | 0.152 | | 0.199 |
| Lead Mg/l Pb | - | - | | <.001 | | <.001 | | | | <0.005 | <0.005 | | | <0.001 | | |
| Magnesium mg/l Mg | - | - | | 6.16 | 6.6 | 5.54 | 5.5 | 4.1 | 6.3 | <1 | 9.43 | | | 7.92 | | |
| Manganese mg/l Mn | - | - | 6.4 | 45.4 | | 0.0136 | | | | <0.050 | 0.0663 | | | 0.0156 | | |
| Mercury mg/l Hg | - | - | | | | | | | | <0.0005 | <0.005 | | | <0.0005 | | |
| Nickel mg/l Ni | - | - | | 0.00294 | | 0.00208 | | | | <0.005 | <0.005 | | | 0.00114 | | |
| Potassium mg/l K | | 2 | 1.8 | 2.11 | 1.7 | 1.33 | 1.7 | 1.5 | 1 | <1 | 1.49 | | | 1.99 | | <0.3 |
| Sodium mg/l Na | | 10.4 | 10.6 | 12 | 11.1 | | 16 | 23 | 10.5 | 19.2 | 14.9 | | | 14.6 | | 6.9 |
| Sulphate mg/l $SO_4$ | | | | - | | 9.7 | | | | 73.8 | | | | 50.2 | | |
| Zinc mg/l Zn | - | - | | 0.0213 | | <.001 | | | | <0.030 | <0.030 | | | 0.0188 | | |
| Alkalinity $CaCO_3$ | - | 177 | | 272 | | | | | | 226 | | | | | | |
| TOC mg/l C | - | 4.48 | | - | | | | 3.6 | 4.2 | 3.7 | 2.5 | 3.3 | 3.1 | | 5.3 | 3.9 |
| TON mg/l N | 2.9 | 3.6 | 2.7 | 2.2 | 6.7 | | 5.9 | 4.9 | 4.1 | 5.1 | 3 | 3 | 4.7 | 4 | 3.5 | 3.3 |
| Nitrate+Nitrite mg/l N | - | - | | | | | | | | | | | | | | |

| Well 14 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flouride mg/l F | - | - | | - | | <.1 | | | | 0.16 | | | | <0.10 | | |
| Phosphorous mg/l P | - | - | | | | | | | | | | | | | | |
| Nitrite mg/l N | 0.002 | 0.003 | 0.004 | 0.003 | 0.001 | | 0.016 | 0.006 | 0.002 | 0.016 | 0.015 | 0.002 | | 0.006 | 0.002 | |
| Suspended Solids mg/l | - | - | | | | | | | | | | | | | | |
| o-Phosphate mg/l P | 0.016 | 0.026 | <0.006 | <0.006 | 0.019 | | <.006 | <0.006 | 0.012 | 0.012 | 0.03 | 0.036 | | 0.04 | | |
| Colour Hazen | - | - | | | | | | | | | | | | | | |
| Total Coliforms/100ml | >2419 | >2419 | 3448 | 2420 | >2419 | 549 | >2419 | 1986 | >2419 | >2419 | 6867 | 5475 | >2419 | 1986 | >2419 | 1198 |
| Faecal Coliforms/100ml | - | - | | | | | | | | | | | | | | |
| Aluminium mg/l | - | - | | 0.439 | | 0.22 | | | | <0.025 | <0.025 | | | 0.0322 | | |
| e-coli | 27 | 147 | 89 | 161 | 649 | 17 | 613 | 108 | 38 | 326 | <10 | 275 | 1203 | 99 | 461 | 74 |

| Well 15 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | 7.1 | 7.3 | 7.2 | 7.2 | 7.2 | 7.2 | 7.3 | 7.2 | 7.2 | 7.1 | 7.3 | 7.5 | 7.2 | 7.2 | 7.2 | 7.3 |
| Temperature $^{o}C$ | 10.1 | 9.7 | 13.4 | 13.4 | 9.2 | 9.5 | 14.3 | 14.5 | 9 | 12.8 | 13.4 | 11.4 | 8.5 | 12.1 | 13.7 | 8.5 |
| Conductivity uS/CM 20$^{o}C$ | - | - | | | | | | | | | | | | | | |
| Conductivity uS/CM 25$^{o}C$ | 739 | 727 | 744 | 742 | 721 | 730 | 734 | 737 | 705 | 721 | 714 | 637 | 721 | 734 | 732 | 728 |
| Ammonia mg/l N | 0.005 | <0.003 | 0.75 | <0.003 | 0.087 | | 0.032 | 0.008 | 0.005 | 0.036 | 0.075 | 0.024 | 1.2 | 0.009 | <0.003 | 0.017 |
| Dissolved Oxygen %sat | 16.3 | 16.9 | 31 | 25.1 | 21 | 31.4 | 25.9 | 47 | 23.1 | 20.1 | 16.3 | 15.2 | 22.5 | 16.9 | 24.1 | 34 |
| Calcium mg/l Ca | - | - | 130 | 122 | 130 | 129 | 136 | 131 | 126 | 116 | 121 | | | | | |
| Cadmium mg/l Cd | - | - | | <0.001 | | <.0001 | | | | <0.005 | <0.005 | | | | | |
| Chromium mg/l Cr | | | | 0.00604 | | 0.00406 | | | | <0.005 | <0.005 | | | | | |
| Chloride mg/l Cl | 21 | 21 | 21 | 27 | 19 | | 22 | 23 | 21 | 22 | 22 | 21 | 25 | 22 | 23 | 23 |
| Copper mg/l Cu | - | - | | 0.00773 | | <.001 | | | | <0.005 | <0.005 | | | | | |
| Iron mg/l Fe | 0.278 | 0.466 | 1.24 | 0.502 | 0.526 | 0.479 | <.06 | | | 0.14 | 0.158 | | | | | 0.382 |
| Lead Mg/l Pb | - | - | | <0.001 | | <.001 | | | | <0.005 | <0.005 | | | | | |
| Magnesium mg/l Mg | - | - | 11.2 | 11.5 | 11.6 | 11 | 10.8 | 10.7 | 10.9 | 1 | 9.98 | | | | | |
| Manganese mg/l Mn | - | - | | 0.297 | | 0.151 | | | | 0.101 | 0.0813 | | | | | |
| Mercury mg/l Hg | - | - | | | | | | | | <0.0005 | <0.0005 | | | | | |
| Nickel mg/l Ni | - | - | | 0.00253 | | 2.68 | | | | <0.005 | <0.005 | | | | | |
| Potassium mg/l K | | 2.2 | 2.1 | 2.16 | 1.8 | 1.73 | 2 | 2.1 | 1.7 | <1 | 1.95 | | | | | 1.8 |
| Sodium mg/l Na | | 10.5 | 10.7 | 10.1 | 10 | | 10.4 | 10.8 | 9.9 | 9 | 9.08 | | | | | 7.9 |
| Sulphate mg/l $SO_4$ | | | | 19.3 | | 14.6 | | | | 16.7 | | | | 26.8 | | |
| Zinc mg/l Zn | - | - | | 0.0216 | | 0.00653 | | | | <0.030 | <0.030 | | | | | |
| Alkalinity $CaCO_3$ | - | 330 | | 324 | | | | | | | | | | 323 | | |
| TOC mg/l C | - | 1.58 | | <.5 | | | | 1.8 | 1.7 | <0.5 | 0.8 | <0.5 | 1.4 | 0.6 | 2.1 | 1.1 |
| TON mg/l N | 5 | 5.6 | 6.9 | 6.7 | 5.5 | | 6 | 6.5 | 5.6 | 7.5 | 7.8 | 6.1 | 6.5 | 7.5 | 6.8 | 7 |
| Nitrate+Nitrite mg/l N | - | - | | | | | | | | | | | | | | |

| Well 15 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flouride mg/l F | - | - | | <0.1 | | <.1 | | | | 0.13 | | | | <0.10 | | |
| Phosphorous mg/l P | - | - | | | | | | | | | | | | | | |
| Nitrite mg/l N | 0.002 | 0.001 | <0.001 | <0.001 | <.001 | | <0.001 | <0.001 | <0.001 | | 0.006 | 0.001 | | 0.001 | 0.007 | |
| Suspended Solids mg/l | - | - | | | | | | | | | | | | | | |
| o-Phosphate mg/l P | 0.011 | <0.006 | <0.006 | <0.006 | <.009 | | <0.006 | <0.006 | <0.006 | 0.016 | 0.019 | 0.035 | | 0.006 | | |
| Colour Hazen | - | - | | | | | | | | | | | | | | |
| Total Coliforms/100ml | 548 | 1414 | 20 | 11 | 86 | 93 | 8664 | 727 | 1733 | 10 | 1266 | 66 | 435 | 22 | 2419 | 295 |
| Faecal Coliforms/100ml | - | - | | | | | | | | | | | | | | |
| Aluminium mg/l | - | - | | 0.16 | | 0.138 | | | | <0.025 | <0.025 | | | | | |
| e-coli | 75 | 225 | 9 | 0 | 4 | 14 | 52 | 0 | 46 | 0 | 265 | 26 | 23 | 3 | 345 | 74 |

| Leachate Lagoon | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | 7.5 | 7.8 | 7.8 | 8 | 7.5 | 7.3 | 8.2 | 7.2 | 7.3 | | | | 7.7 | 7.8 | 7.5 | 7.1 |
| Temperature oC | 9 | 11 | 17 | 13 | 8 | 14 | 20 | 20 | 10 | | | 7.3 | 7 | 14 | 15 | 13.1 |
| Conductivity uS/CM 20oC | | | | | | | | | | | | | | | | |
| Conductivity uS/CM 25oC | 10810 | 12160 | 17050 | 12720 | 6690 | 5900 | 8930 | 6910 | 7870 | | | 6750 | 4910 | 14650 | 6200 | 4540 |
| C.O.D. | 726 | 1097 | 2135 | 1036 | 436 | 454 | 660 | 791 | 910 | | | 903 | 1484 | 1291 | 659 | 696 |
| B.O.D. | - | 150 | 720 | 140 | 10 | 88 | 60 | 248 | 440 | | | 45 | 548 | 45 | 158 | 150 |
| Ammonia mg/l N | 570 | 680 | 310 | 780 | 330 | 290 | 680 | 470 | 850 | | | 330 | 100 | 670 | 260 | 150 |
| Dissolved Oxygen %sat | | | | | | | | | | | | | | | | |
| Calcium mg/l Ca | | | | 95.1 | | 193 | | | | | | | | 164 | | |
| Cadmium mg/l Cd | | | | 0.21 | | >0.002 | | | | | | | | <0.001 | | |
| Chromium mg/l Cr | | | | 115 | | 0.0601 | | | | | | | | 0.0582 | | |
| Chloride mg/l Cl | 1535 | 1846 | 727 | 1756 | 762 | 666 | 1782 | 1575 | 1093 | | | 909 | | >1416 | 811 | 475 |
| Copper mg/l Cu | | | | 28.4 | | 0.0165 | | | | | | | | 0.0285 | | |
| Iron mg/l Fe | | | | 4.42 | | 8.55 | | | | | | | | 10.12 | | |
| Lead Mg/l Pb | | | | 0.00383 | | >0.02 | | | | | | | | 0.00257 | | |
| Magnesium mg/l Mg | | | | 169 | | 72.2 | | | | | | | | 98.9 | | |
| Manganese mg/l Mn | | | | 570 | | 2.03 | | | | | | | | 1.27 | | |
| Mercury mg/l Hg | | | | | | | | | | | | | | <0.0005 | | |
| Nickel mg/l Ni | | | | 0.136 | | 0.073 | | | | | | | | 0.15 | | |
| Potassium mg/l K | | | | 583 | | 197 | | | | | | | | 510 | | |
| Sodium mg/l Na | | | | | | 503 | | | | | | | | 1750 | | |
| Sulphate mg/l SO4 | | | | 106 | | 24.4 | | | | | | | | 185.9 | | |
| Zinc mg/l Zn | | | | 0.107 | | 0.666 | | | | | | | | 0.0601 | | |
| Alkalinity CaCO3 | | | | | | | | | | | | | | | | |
| TOC mg/l C | | | | | | | | | | | | | | | | |
| TON mg/l N | <0.06 | 0.2 | 0.6 | 0.2 | <10 | 0.4 | 5.8 | 8.9 | 0.3 | | | 12 | 0.2 | 1.1 | 0.4 | 0.2 |

NO Sample Available

NO Sample Available

| Leachate Lagoon | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | |
| o-Phosphate mg/l P | 0.86 | 0.97 | 0.9 | 1.7 | 0.68 | 0.27 | 0.26 | 0.62 | 0.62 | | | 0.22 | | 1.9 | | |
| Flouride mg/l F | | | | <1 | | 0.75 | | | | | | | | 3.46 | | |
| Phosphorous mg/l P | | | | | | | | | | | | | | | | |
| Nitrite mg/l N | <0.001 | <0.001 | <0.001 | <0.001 | 0.036 | >0.001 | 0.039 | | <0.001 | | | 0.75 | | <0.001 | | |
| Nitrate mg/l N | | | | | | | | | | | | | | | | |
| Suspended Solids mg/l | | | | | | | | | | | | | | | | |
| Colour Hazen | | | | | | | | | | | | | | | | |
| Total Coliforms/100ml | | | | 5510 | | 4044 | | | | | | | | 7945 | | |
| E Coli/100ml | | | | 4718 | | 1514 | | | | | | | | 30 | | |
| Faecal Coliforms/100ml | | | | | | | | | | | | | | | | |
| Aluminium mg/l | | | | 0.21 | | >1 | | | | | | | | 0.203 | | |

| Manhole 1 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | | | | | | | | 7.2 | | | | | | | | |
| Temperature oC | | | | | | | | 14 | | | | | | | | |
| Conductivity uS/CM 20oC | | | | | | | | | | | | | | | | |
| Conductivity uS/CM 25oC | | | | | | | | 15920 | | | | | | | | |
| C.O.D. | | | | | | | | 1281 | | | | | | | | |
| B.O.D. | | | | | | | | 188 | | | | | | | | |
| Ammonia mg/l N | | | | | | | | 1200 | | | | | | | | |
| Dissolved Oxygen %sat | | | | | | | | | | | | | | | | |
| Calcium mg/l Ca | | | | | | | | | | | | | | | | |
| Cadmium mg/l Cd | | | | | | | | | | | | | | | | |
| Chromium mg/l Cr | | | | | | | | | | | | | | | | |
| Chloride mg/l Cl | | | | | | | | 2493 | | | | | | | | |
| Copper mg/l Cu | | | | | | | | | | | | | | | | |
| Iron mg/l Fe | | | | | | | | | | | | | | | | |
| Lead Mg/l Pb | | | | | | | | | | | | | | | | |
| Magnesium mg/l Mg | | | | | | | | | | | | | | | | |
| Manganese mg/l Mn | | | | | | | | | | | | | | | | |
| Mercury mg/l Hg | | | | | | | | | | | | | | | | |
| Nickel mg/l Ni | | | | | | | | | | | | | | | | |
| Potassium mg/l K | | | | | | | | | | | | | | | | |
| Sodium mg/l Na | | | | | | | | | | | | | | | | |
| Sulphate mg/l SO4 | | | | | | | | | | | | | | | | |
| Zinc mg/l Zn | | | | | | | | | | | | | | | | |
| Alkalinity CaCO3 | | | | | | | | | | | | | | | | |
| TOC mg/l C | | | | | | | | | | | | | | | | |

NO Sample Available

| Manhole 1 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | |
| TON mg/l N | | | | | | | | 6.6 | | | | | | | | |
| o-Phosphate mg/l P | | | | | | | | 1.2 | | | | | | | | |
| Flouride mg/l F | | | | | | | | | | | | | | | | |
| Phosphorous mg/l P | | | | | | | | | | | | | | | | |
| Nitrite mg/l N | | | | | | | | | | | | | | | | |
| Nitrate mg/l N | | | | | | | | | | | | | | | | |
| Suspended Solids mg/l | | | | | | | | | | | | | | | | |
| Colour Hazen | | | | | | | | | | | | | | | | |
| Total Coliforms/100ml | | | | | | | | | | | | | | | | |
| E Coli/100 ml | | | | | | | | | | | | | | | | |
| Faecal Coliforms/100ml | | | | | | | | | | | | | | | | |
| Aluminium mg/l | | | | | | | | | | | | | | | | |

| Manhole 2 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | no sample taken | 7.3 | 7.2 | 7.3 | 7.2 | 8 | 7.3 | 7.3 | 7.3 | 7.1 | No Sample Available | | | | | |
| Temperature oC | | 18 | 18 | 17 | 18 | 16 | 18 | 17 | 14 | 16 | | | | | | |
| Conductivity uS/CM 20oC | | | | | | | | | | | | | | | | |
| Conductivity uS/CM 25oC | | 15370 | 15960 | 15130 | 14060 | 13900 | 13600 | 12000 | 4800 | 10890 | | | | | | |
| C.O.D. | | 1275 | 1274 | 919 | 933 | 881 | 851 | 715 | 741 | 571 | | | | | | |
| B.O.D. | | 87 | 116 | 60 | 70 | 10 | 97.5 | 40 | >320 | 54 | | | | | | |
| Ammonia mg/l N | | 960 | 540 | 930 | 610 | 610 | 710 | 1200 | 570 | | | | | | | |
| Dissolved Oxygen %sat | | | | | | | | | | | | | | | | |
| Calcium mg/l Ca | | | | 132 | | 180 | | | | 187 | | | | | | |
| Cadmium mg/l Cd | | | | <0.0001 | | >.002 | | | | <0.005 | | | | | | |
| Chromium mg/l Cr | | | | 0.0749 | | 0.102 | | | | 0.0338 | | | | | | |
| Chloride mg/l Cl | | 2337 | 1519 | 2441 | 1911 | 2229 | 1944 | 2002 | 535 | | | | | | | |
| Copper mg/l Cu | | | | 0.0428 | | 0.0418 | | | | 0.0269 | | | | | | |
| Iron mg/l Fe | | | | 17400 | | 3.73 | | | | 14 | | | | | | |
| Lead Mg/l Pb | | | | 3.64 | | >0.2 | | | | <0.005 | | | | | | |
| Magnesium mg/l Mg | | | | 137 | | 158 | | | | 9.5 | | | | | | |
| Manganese mg/l Mn | | | | 1.01 | | 0.572 | | | | 2.34 | | | | | | |
| Mercury mg/l Hg | | | | | | | | | | <0.0005 | | | | | | |
| Nickel mg/l Ni | | | | 0.111 | | 0.136 | | | | 0.0883 | | | | | | |
| Potassium mg/l K | | | | 545 | | 550 | | | | 30 | | | | | | |
| Sodium mg/l Na | | | | 1640 | | 1520 | | | | 33.8 | | | | | | |
| Sulphate mg/l SO4 | | | | 35.6 | | 47.8 | | | | 69 | | | | | | |
| Zinc mg/l Zn | | | | 0.0791 | | 1.62 | | | | 0.0516 | | | | | | |
| Alkalinity CaCO3 | | | | | | | | | | | | | | | | |
| TOC mg/l C | | | | | | | | | | | | | | | | |

| **Manhole 2** | **1st 1/4 2005** | **2nd 1/4 2005** | **3rd 1/4 2005** | **4th 1/4 2005** | **1st 1/4 2006** | **2nd 1/4 2006** | **3rd 1/4 2006** | **4th 1/4 2006** | **1st 1/4 2007** | **2nd 1/4 2007** | **3rd 1/4 2007** | **4th 1/4 2007** | **1st 1/4 2008** | **2nd 1/4 2008** | **3rd 1/4 2008** | **4th 1/4 2008** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | |
| TON mg/l N | | 2.9 | 70 | 13 | 41 | | 48 | 17 | 6.3 | | | | | | | |
| o-Phosphate mg/l P | | 1.4 | 0.86 | 1.7 | 0.79 | 0.29 | 0.64 | 0.55 | 0.38 | | | | | | | |
| Flouride mg/l F | | | | <0.1 | | 1.2 | | | | 8.4 | | | | | | |
| Phosphorous mg/l P | | | | | | | | | | | | | | | | |
| Nitrite mg/l N | | 1.1 | 8.8 | 0.22 | 0.23 | 0.54 | 0.19 | 0.53 | 0.001 | | | | | | | |
| Nitrate mg/l N | | | | | | | | | | | | | | | | |
| Suspended Solids mg/l | | | | | | | | | | | | | | | | |
| Colour Hazen | | | | | | | | | | | | | | | | |
| Total Coliforms/100ml | | | | >2419 | | >24192 | | | | 19860 | | | | | | |
| E Coli/100 ml | | | | 54 | | 0 | | | | 60 | | | | | | |
| Faecal Coliforms/100ml | | | | | | | | | | | | | | | | |
| Aluminium mg/l | | | | 147 | | 1 | | | | 0.0677 | | | | | | |

| Manhole 3 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | 7.7 | 7.8 | 7.6 | 7.3 | 7.4 | 7.3 | 7.3 | 7.6 | 7.2 | 7.3 | 7.5 | 7 | 7.3 | 7.2 | 7.4 | 7.1 |
| Temperature oC | 13 | 15 | 16 | 16 | 15 | 15 | 17 | 17 | 11 | 15 | 15 | 12 | 10 | 14 | 16 | 13.5 |
| Conductivity uS/CM 20oC | | | | | | | | | | | | | | | | |
| Conductivity uS/CM 25oC | 10330 | 12300 | 12970 | 16340 | 16400 | 15930 | 14160 | 4450 | 5900 | 10890 | 4960 | 4110 | 16490 | 5710 | 2330 | 6690 |
| C.O.D. | 531 | 787 | 997 | 935 | 109 8 | 1075 | 890 | 210 | 1527 | 1059 | 226 | 273 | 1144 | 374 | 94 | 557 |
| B.O.D. | | 19.5 | 6 | 52.5 | 50 | 45 | 80 | 8 | >656 | 42 | 22.6 | 10 | 79 | 31 | 4.4 | 109.5 |
| Ammonia mg/l N | 580 | 750 | 280 | 990 | 920 | 980 | 940 | 300 | 240 | 630 | >298 | 200 | <0.003 | 190 | 78 | 0.98 |
| Dissolved Oxygen %sat | | | | | | | | | | | | | | | | |
| Calcium mg/l Ca | | | | 96 | | 110 | | | | 149 | | | | 306 | | |
| Cadmium mg/l Cd | | | | <0.0001 | | >0.002 | | | | <0.005 | | | | <0.001 | | |
| Chromium mg/l Cr | | | | 0.142 | | 0.142 | | | | 0.0319 | | | | 0.0234 | | |
| Chloride mg/l Cl | 1576 | 1835 | 272 | 2551 | 1648 | 2248 | 2241 | 679 | 688 | 1503 | 690 | 570 | | >696 | 269 | 825 |
| Copper mg/l Cu | | | | 25.5 | | 0.0309 | | | | 0.0126 | | | | 0.0112 | | |
| Iron mg/l Fe | | | | 8260 | | 8.53 | | | | 9.28 | | | | 7.823 | | |
| Lead Mg/l Pb | | | | <1 | | >0.02 | | | | <0.005 | | | | 0.00186 | | |
| Magnesium mg/l Mg | | | | 132 | | 145 | | | | 0.012 | | | | 69.3 | | |
| Manganese mg/l Mn | | | | 0.838 | | 0.657 | | | | 1.66 | | | | 3.549 | | |
| Mercury mg/l Hg | | | | | | | | | | <0.0005 | | | | <0.0005 | | |
| Nickel mg/l Ni | | | | 0.116 | | 0.146 | | | | 0.0767 | | | | 0.0581 | | |
| Potassium mg/l K | | | | 572 | | 575 | | | | 37.5 | | | | 194 | | |
| Sodium mg/l Na | | | | 1680 | | 1660 | | | | 32.6 | | | | 581 | | |
| Sulphate mg/l SO4 | | | | 27 | | >2 | | | | 26.5 | | | | 330.9 | | |
| Zinc mg/l Zn | | | | 0.0421 | | 1.36 | | | | 0.0343 | | | | 0.11 | | |
| Alkalinity CaCO3 | | | | | | | | | | | | | | | | |
| TOC mg/l C | | | | | | | | | | | | | | | | |
| TON mg/l N | <0.06 | 0.5 | 1.4 | 0.5 | <10 | 3.1 | 7.5 | 8.4 | 4 | 17 | 1.3 | 17 | 0.3 | 1.1 | 0.1 | 0.1 |

| **Manhole 3** | **1st 1/4 2005** | **2nd 1/4 2005** | **3rd 1/4 2005** | **4th 1/4 2005** | **1st 1/4 2006** | **2nd 1/4 2006** | **3rd 1/4 2006** | **4th 1/4 2006** | **1st 1/4 2007** | **2nd 1/4 2007** | **3rd 1/4 2007** | **4th 1/4 2007** | **1st 1/4 2008** | **2nd 1/4 2008** | **3rd 1/4 2008** | **4th 1/4 2008** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | |
| o-Phosphate mg/l P | 0.22 | 0.72 | 0.59 | 1.7 | 2.1 | 2.2 | 1.3 | 0.039 | 0.28 | 0.55 | 0.32 | 0.1 | | 0.25 | | |
| Flouride mg/l F | | | | 1.3 | | 1 | | | | 8.07 | | | | 1.31 | | |
| Phosphorous mg/l P | | | | | | | | | | | | | | | | |
| Nitrite mg/l N | 0.016 | 0.017 | 0.63 | <0.001 | <0.001 | >0.001 | 0.071 | | <0.001 | 0.18 | 0.48 | 0.085 | | <0.001 | | |
| Nitrate mg/l N | | | | | | | | | | | | | | | | |
| Suspended Solids mg/l | | | | | | | | | | | | | | | | |
| Colour Hazen | | | | | | | | | | | | | | | | |
| Total Coliforms/100ml | | | | 4660 | | >9677 | | | | 24190 | | | | >9677 | | |
| E Coli/100 ml | | | | 8 | | 30 | | | | 10 | | | | 147 | | |
| Faecal Coliforms/100ml | | | | | | | | | | | | | | | | |
| Aluminium mg/l | | | | 69.1 | | >1000 | | | | 0.268 | | | | 0.0876 | | |

| Manhole 4 | 1st1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | | | | | | | | | | | 7.3 | | | | | |
| Temperature oC | | | | | | | | | | | 15 | | | | | |
| Conductivity uS/CM 20oC | | | | | | | | | | | | | | | | |
| Conductivity uS/CM 25oC | | | | | | | | | | | 6660 | | | | | |
| C.O.D. | | | | | | | | | | | 623 | | | | | |
| B.O.D. | | | | | | | | | | | 129.6 | | | | | |
| Ammonia mg/l N | | | | | | | | | | | >326 | | | | | |
| Dissolved Oxygen %sat | | | | | | | | | | | | | | | | |
| Calcium mg/l Ca | | | | | | | | | | | | | | | | |
| Cadmium mg/l Cd | | | | | | | | | | | | | | | | |
| Chromium mg/l Cr | | | | | | | | | | | | | | | | |
| Chloride mg/l Cl | | | | | | | | | | | 746 | | | | | |
| Copper mg/l Cu | | | | | | | | | | | | | | | | |
| Iron mg/l Fe | | | | | | | | | | | | | | | | |
| Lead Mg/l Pb | | | | | | | | | | | | | | | | |
| Magnesium mg/l Mg | | | | | | | | | | | | | | | | |
| Manganese mg/l Mn | | | | | | | | | | | | | | | | |
| Mercury mg/l Hg | | | | | | | | | | | | | | | | |
| Nickel mg/l Ni | | | | | | | | | | | | | | | | |
| Potassium mg/l K | | | | | | | | | | | | | | | | |
| Sodium mg/l Na | | | | | | | | | | | | | | | | |
| Sulphate mg/l SO4 | | | | | | | | | | | | | | | | |
| Zinc mg/l Zn | | | | | | | | | | | | | | | | |
| Alkalinity CaCO3 | | | | | | | | | | | | | | | | |
| TOC mg/l C | | | | | | | | | | | | | | | | |

No Sample Available

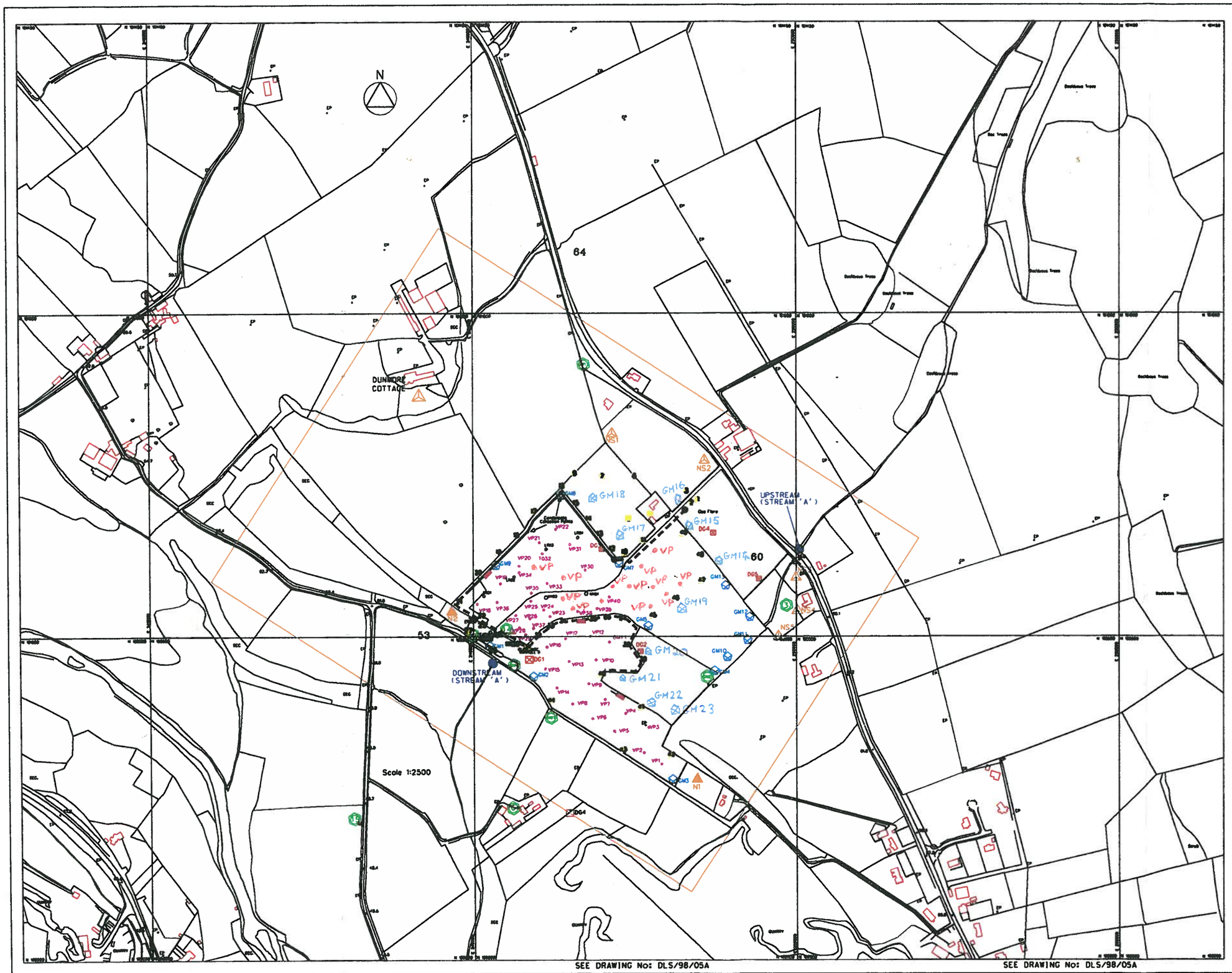
| **Manhole 4** | **1st1/4 2005** | **2nd 1/4 2005** | **3rd 1/4 2005** | **4th 1/4 2005** | **1st 1/4 2006** | **2nd 1/4 2006** | **3rd 1/4 2006** | **4th 1/4 2006** | **1st 1/4 2007** | **2nd 1/4 2007** | **3rd 1/4 2007** | **4th 1/4 2007** | **1st 1/4 2008** | **2nd 1/4 2008** | **3rd 1/4 2008** | **4th 1/4 2008** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | |
| TON mg/l N | | | | | | | | | | | 0.4 | | | | | |
| o-Phosphate mg/l P | | | | | | | | | | | 1.6 | | | | | |
| Flouride mg/l F | | | | | | | | | | | | | | | | |
| Phosphorous mg/l P | | | | | | | | | | | | | | | | |
| Nitrite mg/l N | | | | | | | | | | | <0.001 | | | | | |
| Nitrate mg/l N | | | | | | | | | | | | | | | | |
| Suspended Solids mg/l | | | | | | | | | | | | | | | | |
| Colour Hazen | | | | | | | | | | | | | | | | |
| Total Coliforms/100ml | | | | | | | | | | | | | | | | |
| Faecal Coliforms/100ml | | | | | | | | | | | | | | | | |

| Manhole 5 | 1st 1/4 2005 | 2nd 1/4 2005 | 3rd 1/4 2005 | 4th 1/4 2005 | 1st 1/4 2006 | 2nd 1/4 2006 | 3rd 1/4 2006 | 4th 1/4 2006 | 1st 1/4 2007 | 2nd 1/4 2007 | 3rd 1/4 2007 | 4th 1/4 2007 | 1st 1/4 2008 | 2nd 1/4 2008 | 3rd 1/4 2008 | 4th 1/4 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH | 7.5 | 7.3 | 7.7 | 7.8 | 7.5 | 7 | 7.6 | 7.2 | 7.3 | 7.2 | 7.3 | 7.2 | 7.7 | 7.8 | 7.3 | 7 |
| Temperature oC | 9 | 11 | 16 | 14 | 9 | 12 | 16 | 19 | 10 | 13 | 15 | 13 | 7 | 14 | 14 | 11.2 |
| Conductivity uS/CM 20oC | | | | | | | | | | | | | | | | |
| Conductivity uS/CM 25oC | 9040 | 15110 | 17900 | 13710 | 8120 | 5740 | 15870 | 7690 | 7970 | 15280 | 6640 | 7730 | 5250 | 14770 | 7380 | 5090 |
| C.O.D. | 685 | 979 | 2570 | 1169 | 547 | 309 | 1071 | 756 | 915 | 5380 | 666 | 814 | 1575 | 1196 | 524 | 435 |
| B.O.D. | | 52.5 | 760 | 132 | 48 | 39 | 96 | 208 | 380 | >2400 | 126.6 | 46 | 540 | 39 | 110 | 114 |
| Ammonia mg/l N | 430 | 1100 | 748 | | 450 | 320 | 1200 | 420 | 850 | 840 | >350 | 410 | 110 | 980 | 390 | 260 |
| Dissolved Oxygen %sat | | | | | | | | | | | | | | | | |
| Calcium mg/l Ca | | | | 97.8 | | 178 | | | | 532 | | | | 157 | | |
| Cadmium mg/l Cd | | | | 0.22 | | 0.002 | | | | <0.005 | | | | <0.001 | | |
| Chromium mg/l Cr | | | | 0.17 | | 0.0718 | | | | 0.0635 | | | | 0.0641 | | |
| Chloride mg/l Cl | 1151 | 2390 | 1110 | | 924 | 592 | 2664 | 1083 | 1054 | 2248 | 872 | 960 | | >1676 | 1009 | 525 |
| Copper mg/l Cu | | | | 0.0557 | | 0.0286 | | | | 0.0667 | | | | 0.0229 | | |
| Iron mg/l Fe | | | | 4.49 | | 22.8 | | | | 8.15 | | | | 6.239 | | |
| Lead Mg/l Pb | | | | 0.00294 | | >0.02 | | | | <0.005 | | | | 0.00198 | | |
| Magnesium mg/l Mg | | | | 161 | | 61.9 | | | | 22.1 | | | | 126 | | |
| Manganese mg/l Mn | | | | 586 | | 1.67 | | | | 6.33 | | | | 1.296 | | |
| Mercury mg/l Hg | | | | | | | | | | <0.0005 | | | | <0.0005 | | |
| Nickel mg/l Ni | | | | 0.135 | | 0.0624 | | | | 0.0902 | | | | 0.1564 | | |
| Potassium mg/l K | | | | 593 | | 185 | | | | 41 | | | | 569 | | |
| Sodium mg/l Na | | | | 1380 | | 453 | | | | 43.7 | | | | 1922 | | |
| Sulphate mg/l SO4 | | | | | | 17.9 | | | | 34.7 | | | | 197.2 | | |
| Zinc mg/l Zn | | | | 0.125 | | 1.47 | | | | 0.209 | | | | 0.0504 | | |
| Alkalinity CaCO3 | | | | | | | | | | | | | | | | |
| TOC mg/l C | | | | | | | | | | | | | | 4 | | |
| TON mg/l N | <0.06 | 0.4 | 0.1 | | <10 | 0.7 | 6.7 | 6.8 | 2.6 | <0.1 | 0.4 | 3.2 | 0.2 | 1.1 | 0.4 | 0.7 |

| **Manhole 5** | **1st 1/4 2005** | **2nd 1/4 2005** | **3rd 1/4 2005** | **4th 1/4 2005** | **1st 1/4 2006** | **2nd 1/4 2006** | **3rd 1/4 2006** | **4th 1/4 2006** | **1st 1/4 2007** | **2nd 1/4 2007** | **3rd 1/4 2007** | **4th 1/4 2007** | **1st 1/4 2008** | **2nd 1/4 2008** | **3rd 1/4 2008** | **4th 1/4 2008** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | |
| o-Phosphate mg/l P | 0.52 | 2 | 0.86 | | 0.95 | 0.26 | 1.8 | 0.57 | 0.62 | 1.5 | 29 | 0.37 | | 2 | | |
| Flouride mg/l F | | | | <0.1 | | 0.2 | | | | 98.7 | | | | 4.77 | | |
| Phosphorous mg/l P | | | | | | | | | | | | | | | | |
| Nitrite mg/l N | <0.001 | <0.001 | 0.028 | | <0.001 | >0.001 | <0.001 | | <0.001 | <0.005 | <0.001 | <0.001 | | <0.001 | | |
| Nitrate mg/l N | | | | | | | | | | | | | | | | |
| Suspended Solids mg/l | | | | 101.1 | | | | | | | | | | | | |
| Colour Hazen | | | | | | | | | | | | | | | | |
| Total Coliforms/100ml | | | | >48400 | | 2764 | | | | >24190 | | | | >9677 | | |
| E Coli/100 ml | | | | 2240 | | 575 | | | | 19863 | | | | 54 | | |
| Faecal Coliforms/100ml | | | | | | | | | | | | | | | | |
| Aluminium mg/l | | | | 164 | | >1 | | | | 0.219 | | | | 0.227 | | |

# Appendix D

Sampling Points Drawing




EXTRACT FROM O.S.S. Nos: 4645-C & 4645-D
OS Licence No.Kilkenny CCMA9802

LEGEND:

- GROUNDWATER MONITORING POINTS
- SURFACE WATER MONITORING POINTS
- NOISE MONITORING POINTS
- GAS MONITORING POINTS — VP
- GAS MIGRATION MONITORING POINTS — GM
- DUST MONITORING POINTS — DG
- BAIT BOXES — 13

| REVISION | DESCRIPTION | BY | DATE |
|---|---|---|---|
| K | Alteration of Noise, Dust, Leachate, Gas Monitoring Points | MG | June '06 |
| J | Alteration of Bait Monitoring Points | MG | Mar '06 |
| I | Alteration of Gas Well Points | MG | JAN '05 |
| H | Alteration of Noise Monitoring Points | BOD | OCT '03 |
| G | Vermin Baits Pts. 7-11 Removed | BOD | SEP '02 |
| F | Vermin Bait Box Points Added Pts. 1-40 | BOD | JAN '01 |
| E | GAS MONITORING POINTS (VP19,VP20 & VP21) ADDED<br>DUST MONITORING POINT (DG 5) ADDED | BOD | JAN '00 |
| D | GROUNDWATER MONITORING POINTS MW1 ADDED | ROC | MAY '99 |
| C | GAS MONITORING POINTS (VP17 & VP18) ADDED<br>GROUNDWATER MONITORING POINTS GW1 TO GW4 ADDED | ROC | APR '99 |
| B | GAS MONITORING POINTS (VP15 & VP16) ADDED | ROC | NOV '98 |
| A | GAS MIGRATION MONITORING POINTS ADDED<br>DUST MONITORING POINTS ADDED<br>CPC GAS REMOVAL LOCATION ADDED<br>GROUNDWATER MONITORING POINT 13 - RELOCATED TO CORRECT POSITION | ROC | AUG '98<br>AUG '98<br>AUG '98<br>AUG '98 |

PROJECT: DUNMORE LANDFILL SITE

ENVIRONMENT SECTION
KILKENNY CO.CO.
COUNTY HALL,
JOHN STREET,
KILKENNY.

DESC: MONITORING POINTS
DATE: MAY '99 BY: ROC
SCALES: Not to Scale
DRAWING NO: DLS/98/05/RevE

...\monitoring-Rev-2dmg.dgn 06/07/2006 10:03:26

# Appendix E

Meteorological Monitoring

| METEOROLOGICAL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Jan 2008** | | | | | | | | |
| **year** | **month** | **day** | **max. temperature (degrees Celsius)** | **min. temperature (degrees Celsius)** | **rainfall (mm)** | **mean wind speed (knots)** | **mean relative humidity (%)** | **mean CBL pressure (hPa)** |
| 2008 | 1 | 1 | 11.1 | 7.4 | 0.7 | 7.7 | 91.0 | 1009.3 |
| 2008 | 1 | 2 | 7.9 | 3.8 | 0.0 | 11.7 | 73.6 | 1000.1 |
| 2008 | 1 | 3 | 3.9 | -1.7 | 0.0 | 9.2 | 70.7 | 993.9 |
| 2008 | 1 | 4 | 7.8 | -2.0 | 6.6 | 7.1 | 92.7 | 984.9 |
| 2008 | 1 | 5 | 7.1 | 1.4 | 3.5 | 9.8 | 85.7 | 987.9 |
| 2008 | 1 | 6 | 6.5 | -2.0 | 4.1 | 5.8 | 93.5 | 995.4 |
| 2008 | 1 | 7 | 7.2 | 2.1 | 3.3 | 12.5 | 80.0 | 998.9 |
| 2008 | 1 | 8 | 10.5 | 1.3 | 16.7 | 12.0 | 91.5 | 992.4 |
| 2008 | 1 | 9 | 9.0 | 0.7 | 18.7 | 9.0 | 90.5 | 993.3 |
| 2008 | 1 | 10 | 9.9 | -1.2 | 14.9 | 6.0 | 93.0 | 985.9 |
| 2008 | 1 | 11 | 4.9 | -1.5 | 0.0 | 4.3 | 92.2 | 989.7 |
| 2008 | 1 | 12 | 10.6 | -1.4 | 8.9 | 6.2 | 95.9 | 993.1 |
| 2008 | 1 | 13 | 10.7 | 5.0 | 8.4 | 10.8 | 94.1 | 980.7 |
| 2008 | 1 | 14 | 9.1 | 5.9 | 4.0 | 9.6 | 90.2 | 979.3 |
| 2008 | 1 | 15 | 9.5 | 1.8 | 0.7 | 5.2 | 93.6 | 971.0 |
| 2008 | 1 | 16 | 6.0 | 0.1 | 1.3 | 3.2 | 94.5 | 984.0 |
| 2008 | 1 | 17 | 9.9 | 2.6 | 6.7 | 12.0 | 85.4 | 987.3 |
| 2008 | 1 | 18 | 13.9 | 3.9 | 9.4 | 11.6 | 92.2 | 995.4 |
| 2008 | 1 | 19 | 12.6 | 8.7 | 10.3 | 5.8 | 96.7 | 1006.2 |
| 2008 | 1 | 20 | 12.7 | 9.5 | 2.9 | 7.2 | 94.6 | 1008.6 |
| 2008 | 1 | 21 | 12.1 | 2.6 | 2.9 | 11.2 | 88.8 | 1002.3 |
| 2008 | 1 | 22 | 11.7 | 2.1 | 4.0 | 4.3 | 98.0 | 1012.2 |
| 2008 | 1 | 23 | 13.9 | 7.7 | 1.3 | 11.0 | 89.5 | 1009.4 |
| 2008 | 1 | 24 | 8.3 | 2.5 | 0.2 | 9.5 | 77.7 | 1018.9 |
| 2008 | 1 | 25 | 12.6 | 7.0 | 0.0 | 11.5 | 75.0 | 1024.1 |
| 2008 | 1 | 26 | 11.8 | 3.9 | 0.0 | 7.2 | 81.2 | 1024.7 |
| 2008 | 1 | 27 | 12.7 | 0.4 | 0.0 | 4.2 | 87.9 | 1025.5 |
| 2008 | 1 | 28 | 10.7 | -0.1 | 0.2 | 4.4 | 94.0 | 1021.9 |
| 2008 | 1 | 29 | 11.5 | 2.8 | 6.4 | 8.3 | 87.9 | 1016.1 |
| 2008 | 1 | 30 | 7.4 | -0.9 | 0.1 | 9.3 | 83.1 | 1019.6 |
| 2008 | 1 | 31 | 8.5 | 1.5 | 5.7 | 16.0 | 79.6 | 993.5 |
| | | | | **Total monthly rainfall** | **141.9** | | | |

| potential evapotranspiration (mm) | Class A pan evaporation (mm) |
|---|---|
| 13.0 | |

| METEOROLOGICAL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Feb 2008** | | | | | | | | |
| **year** | **month** | **day** | **max. temperature (degrees Celsius)** | **min. temperature (degrees Celsius)** | **rainfall (mm)** | **mean wind speed (knots)** | **mean relative humidity (%)** | **mean CBL pressure (hPa)** |
| 2008 | 2 | 1 | 3.9 | -2.3 | 0.1 | 8.8 | 85.6 | 997.5 |
| 2008 | 2 | 2 | 8.7 | -3.0 | 0.6 | 9.7 | 88.2 | 999.8 |
| 2008 | 2 | 3 | 8.7 | -1.6 | 9.5 | 12.7 | 88.0 | 979.2 |
| 2008 | 2 | 4 | 9.5 | -2.6 | 5.5 | 8.2 | 87.8 | 983.3 |
| 2008 | 2 | 5 | 10.9 | 4.9 | 1.4 | 11.0 | 86.6 | 982.7 |
| 2008 | 2 | 6 | 10.0 | -0.4 | 2.2 | 7.8 | 83.3 | 1014.1 |
| 2008 | 2 | 7 | 14.9 | 9.5 | 0.6 | 12.9 | 90.0 | 1016.0 |
| 2008 | 2 | 8 | 11.1 | 9.9 | 1.4 | 13.9 | 91.5 | 1014.6 |
| 2008 | 2 | 9 | 12.4 | 8.1 | 0.0 | 10.5 | 86.8 | 1017.6 |
| 2008 | 2 | 10 | 8.6 | 6.7 | 0.0 | 5.0 | 87.2 | 1023.5 |
| 2008 | 2 | 11 | 12.6 | 1.6 | 0.0 | 6.0 | 90.2 | 1022.2 |
| 2008 | 2 | 12 | 13.5 | -2.1 | 0.1 | 2.2 | 89.1 | 1025.7 |
| 2008 | 2 | 13 | 15.9 | -2.1 | 0.0 | 1.5 | 83.7 | 1028.5 |
| 2008 | 2 | 14 | 8.9 | -2.4 | 0.0 | 2.9 | 88.4 | 1029.0 |
| 2008 | 2 | 15 | 6.0 | -2.5 | 0.0 | 2.4 | 90.7 | 1030.4 |
| 2008 | 2 | 16 | 6.6 | -0.4 | 0.0 | 2.8 | 82.5 | 1032.9 |
| 2008 | 2 | 17 | 8.1 | -4.3 | 0.0 | 2.4 | 88.8 | 1030.9 |
| 2008 | 2 | 18 | 9.6 | -6.2 | 0.1 | 2.5 | 89.8 | 1024.3 |
| 2008 | 2 | 19 | 7.2 | -4.6 | 0.0 | 2.8 | 91.3 | 1014.7 |
| 2008 | 2 | 20 | 9.2 | -1.1 | 0.0 | 3.9 | 92.5 | 1010.1 |
| 2008 | 2 | 21 | 12.7 | 5.2 | 0.0 | 12.2 | 80.8 | 1010.4 |
| 2008 | 2 | 22 | 13.2 | 2.2 | 0.2 | 10.6 | 79.8 | 1012.6 |
| 2008 | 2 | 23 | 12.5 | 3.0 | 0.0 | 11.6 | 84.4 | 1010.8 |
| 2008 | 2 | 24 | 10.9 | -0.7 | 2.4 | 7.0 | 79.3 | 1008.2 |
| 2008 | 2 | 25 | 10.9 | -1.7 | 1.3 | 13.8 | 86.0 | 1001.0 |
| 2008 | 2 | 26 | 11.1 | 3.6 | 0.6 | 10.8 | 73.9 | 998.4 |
| 2008 | 2 | 27 | 12.5 | 0.3 | 0.0 | 3.2 | 83.6 | 1009.6 |
| 2008 | 2 | 28 | 10.0 | 0.7 | 0.0 | 3.1 | 88.8 | 1012.4 |
| 2008 | 2 | 29 | 12.8 | 1.5 | 1.3 | 15.9 | 87.6 | 1000.6 |
| | | | | **Total monthly rainfall** | **27.3** | | | |

| potential evapotranspiration (mm) | Class A pan evaporation (mm) |
|---|---|
| 17.6 | |

| METEOROLOGICAL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Mar 2008** | | | | | | | | |
| **year** | **month** | **day** | **max. temperature (degrees Celsius)** | **min. temperature (degrees Celsius)** | **rainfall (mm)** | **mean wind speed (knots)** | **mean relative humidity (%)** | **mean CBL pressure (hPa)** |
| 2008 | 3 | 1 | 12.8 | 6.1 | 0.2 | 13.4 | 74.8 | 1002.6 |
| 2008 | 3 | 2 | 11.6 | 2.0 | 0.7 | 9.3 | 70.8 | 1004.5 |
| 2008 | 3 | 3 | 5.3 | 0.0 | 7.8 | 9.5 | 88.8 | 1004.7 |
| 2008 | 3 | 4 | 10.0 | 1.8 | 0.2 | 7.2 | 78.5 | 1024.4 |
| 2008 | 3 | 5 | 9.5 | 2.2 | 0.0 | 6.2 | 83.6 | 1026.8 |
| 2008 | 3 | 6 | 10.3 | 4.3 | 4.7 | 11.6 | 77.4 | 1012.9 |
| 2008 | 3 | 7 | 10.4 | 1.4 | 1.6 | 9.9 | 83.3 | 1001.4 |
| 2008 | 3 | 8 | 12.2 | 3.0 | 1.2 | 13.5 | 80.6 | 989.3 |
| 2008 | 3 | 9 | 8.6 | 0.8 | 7.6 | 10.5 | 81.5 | 983.6 |
| 2008 | 3 | 10 | 8.7 | 1.8 | 11.6 | 13.4 | 85.7 | 957.9 |
| 2008 | 3 | 11 | 12.0 | 2.8 | 2.5 | 15.3 | 75.1 | 976.2 |
| 2008 | 3 | 12 | 10.1 | 3.4 | 2.2 | 15.2 | 71.1 | 994.0 |
| 2008 | 3 | 13 | 12.0 | 2.2 | 0.5 | 6.2 | 86.0 | 1001.3 |
| 2008 | 3 | 14 | 9.2 | 3.0 | 0.0 | 4.0 | 91.2 | 1001.8 |
| 2008 | 3 | 15 | 10.2 | 7.7 | 4.4 | 4.9 | 96.1 | 993.3 |
| 2008 | 3 | 16 | 10.4 | 3.3 | 2.5 | 7.4 | 79.1 | 1002.3 |
| 2008 | 3 | 17 | 9.9 | 0.4 | 0.0 | 5.6 | 71.2 | 1012.4 |
| 2008 | 3 | 18 | 9.8 | -0.5 | 0.0 | 4.7 | 69.4 | 1017.1 |
| 2008 | 3 | 19 | 10.8 | -0.4 | 0.0 | 5.5 | 77.7 | 1020.9 |
| 2008 | 3 | 20 | 11.8 | 2.6 | 0.2 | 11.6 | 86.4 | 1010.1 |
| 2008 | 3 | 21 | 10.8 | 2.3 | 1.2 | 14.8 | 69.1 | 995.1 |
| 2008 | 3 | 22 | 8.7 | 1.2 | 0.0 | 11.6 | 62.9 | 1005.1 |
| 2008 | 3 | 23 | 10.1 | 1.8 | 0.3 | 10.7 | 70.8 | 999.6 |
| 2008 | 3 | 24 | 10.0 | 1.3 | 2.1 | 5.5 | 83.5 | 998.5 |
| 2008 | 3 | 25 | 11.6 | -2.1 | 0.0 | 4.6 | 82.1 | 1001.2 |
| 2008 | 3 | 26 | 10.0 | 3.5 | 0.8 | 7.2 | 78.2 | 993.4 |
| 2008 | 3 | 27 | 11.9 | -2.2 | 0.9 | 6.2 | 76.3 | 993.0 |
| 2008 | 3 | 28 | 11.1 | 2.3 | 6.0 | 12.7 | 81.5 | 985.3 |
| 2008 | 3 | 29 | 11.8 | 1.6 | 5.1 | 12.9 | 80.9 | 986.5 |
| 2008 | 3 | 30 | 11.1 | 0.7 | 24.0 | 6.8 | 85.7 | 988.3 |
| 2008 | 3 | 31 | 12.1 | 2.2 | 0.7 | 9.5 | 83.4 | 1003.0 |
| | | | | **Total monthly rainfall** | **89.0** | | | |

| **potential evapotranspiration (mm)** | **Class A pan evaporation (mm)** |
|---|---|
| 36.7 | |

| METEOROLOGICAL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Apr 2008** | | | | | | | | |
| **year** | **month** | **day** | **max. temperature (degrees Celsius)** | **min. temperature (degrees Celsius)** | **rainfall (mm)** | **mean wind speed (knots)** | **mean relative humidity (%)** | **mean CBL pressure (hPa)** |
| 2008 | 4 | 1 | 13.4 | 8.1 | 0.1 | 17.4 | 68.9 | 1008.9 |
| 2008 | 4 | 2 | 14.9 | 8.1 | 0.0 | 9.7 | 86.2 | 1019.4 |
| 2008 | 4 | 3 | 17.4 | 7.3 | 0.0 | 3.1 | 80.3 | 1024.4 |
| 2008 | 4 | 4 | 13.3 | 6.5 | 0.8 | 6.7 | 81.0 | 1020.4 |
| 2008 | 4 | 5 | 9.9 | 1.1 | 0.7 | 9.8 | 74.0 | 1014.7 |
| 2008 | 4 | 6 | 7.7 | -0.3 | 1.6 | 9.8 | 78.4 | 1006.1 |
| 2008 | 4 | 7 | 8.7 | 0.2 | 2.1 | 6.2 | 84.5 | 998.8 |
| 2008 | 4 | 8 | 8.7 | -0.6 | 0.0 | 2.6 | 85.0 | 996.1 |
| 2008 | 4 | 9 | 10.4 | 1.8 | 0.0 | 4.4 | 78.9 | 992.3 |
| 2008 | 4 | 10 | 9.3 | 1.8 | 0.5 | 6.9 | 80.1 | 987.4 |
| 2008 | 4 | 11 | 10.1 | 3.5 | 2.3 | 10.1 | 83.3 | 985.8 |
| 2008 | 4 | 12 | 10.8 | 2.2 | 3.0 | 6.5 | 86.0 | 994.0 |
| 2008 | 4 | 13 | 12.0 | 3.4 | 0.7 | 5.7 | 84.1 | 1003.6 |
| 2008 | 4 | 14 | 12.2 | 2.3 | 0.0 | 4.9 | 73.0 | 1014.5 |
| 2008 | 4 | 15 | 12.7 | 0.1 | 0.0 | 2.6 | 74.5 | 1015.2 |
| 2008 | 4 | 16 | 10.9 | 1.3 | 0.0 | 7.7 | 76.6 | 1009.4 |
| 2008 | 4 | 17 | 9.4 | 3.9 | 0.0 | 10.3 | 71.2 | 1000.5 |
| 2008 | 4 | 18 | 11.7 | 1.1 | 0.0 | 10.3 | 73.3 | 993.4 |
| 2008 | 4 | 19 | 9.6 | 6.6 | 0.0 | 9.1 | 72.8 | 993.7 |
| 2008 | 4 | 20 | 10.6 | 6.8 | 0.0 | 5.1 | 83.7 | 997.8 |
| 2008 | 4 | 21 | 14.7 | 4.3 | 0.0 | 3.6 | 78.3 | 1001.6 |
| 2008 | 4 | 22 | 14.9 | 1.4 | 4.1 | 7.5 | 85.4 | 1001.0 |
| 2008 | 4 | 23 | 15.6 | 4.6 | 1.1 | 9.8 | 83.8 | 1005.2 |
| 2008 | 4 | 24 | 14.4 | 6.2 | 3.2 | 9.3 | 79.3 | 1007.6 |
| 2008 | 4 | 25 | 13.7 | 7.6 | 0.4 | 10.9 | 91.8 | 1012.7 |
| 2008 | 4 | 26 | 14.5 | 7.2 | 1.1 | 9.1 | 90.8 | 1009.7 |
| 2008 | 4 | 27 | 15.6 | 4.1 | 7.1 | 4.8 | 84.7 | 1003.4 |
| 2008 | 4 | 28 | 13.5 | 3.7 | 2.8 | 6.0 | 86.3 | 993.7 |
| 2008 | 4 | 29 | 13.1 | 2.0 | 0.0 | 7.0 | 77.2 | 987.2 |
| 2008 | 4 | 30 | 12.0 | 4.8 | 0.2 | 9.6 | 79.0 | 986.2 |
| | | | | **Total monthly rainfall** | **31.8** | | | |

| **potential evapotranspiration (mm)** | **Class A pan evaporation (mm)** |
|---|---|
| 51.7 | |

| METEOROLOGICAL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **May 2008** | | | | | | | | |
| **year** | **month** | **day** | **max. temperature (degrees Celsius)** | **min. temperature (degrees Celsius)** | **rainfall (mm)** | **mean wind speed (knots)** | **mean relative humidity (%)** | **mean CBL pressure (hPa)** |
| 2008 | 5 | 1 | 14.9 | 3.4 | 7.4 | 6.4 | 82.3 | 995.9 |
| 2008 | 5 | 2 | 15.3 | 2.5 | 0.8 | 8.4 | 83.7 | 1007.6 |
| 2008 | 5 | 3 | 17.3 | 9.8 | 0.3 | 12.7 | 83.0 | 1007.2 |
| 2008 | 5 | 4 | 18.7 | 8.6 | 6.4 | 9.2 | 80.2 | 1008.8 |
| 2008 | 5 | 5 | 18.9 | 5.9 | 0.0 | 5.0 | 79.8 | 1017.3 |
| 2008 | 5 | 6 | 20.0 | 8.4 | 0.0 | 5.3 | 74.0 | 1014.1 |
| 2008 | 5 | 7 | 20.9 | 6.7 | 0.0 | 4.5 | 77.1 | 1010.2 |
| 2008 | 5 | 8 | 22.1 | 8.7 | 0.4 | 6.1 | 75.8 | 1003.6 |
| 2008 | 5 | 9 | 15.1 | 11.6 | 0.7 | 4.6 | 91.2 | 1005.0 |
| 2008 | 5 | 10 | 16.5 | 10.4 | 4.7 | 4.3 | 94.9 | 1011.0 |
| 2008 | 5 | 11 | 22.1 | 10.4 | 0.1 | 2.9 | 86.2 | 1013.1 |
| 2008 | 5 | 12 | 21.9 | 11.1 | 0.0 | 3.9 | 75.3 | 1011.8 |
| 2008 | 5 | 13 | 21.0 | 8.9 | 0.0 | 4.7 | 72.6 | 1012.2 |
| 2008 | 5 | 14 | 18.5 | 7.4 | 0.0 | 5.4 | 76.5 | 1009.3 |
| 2008 | 5 | 15 | 16.6 | 6.4 | 0.0 | 5.6 | 77.4 | 1005.0 |
| 2008 | 5 | 16 | 16.3 | 6.6 | 0.0 | 3.4 | 83.5 | 1002.4 |
| 2008 | 5 | 17 | 14.4 | 4.1 | 0.0 | 3.6 | 85.1 | 1002.6 |
| 2008 | 5 | 18 | 13.7 | 4.9 | 0.0 | 4.2 | 79.2 | 1008.5 |
| 2008 | 5 | 19 | 14.1 | 5.0 | 0.0 | 5.6 | 75.3 | 1010.5 |
| 2008 | 5 | 20 | 14.0 | 2.8 | 0.0 | 5.9 | 74.5 | 1009.5 |
| 2008 | 5 | 21 | 13.8 | 9.9 | 0.7 | 9.3 | 76.4 | 1005.4 |
| 2008 | 5 | 22 | 13.2 | 9.4 | 4.0 | 7.3 | 93.7 | 1002.7 |
| 2008 | 5 | 23 | 18.1 | 8.6 | 3.9 | 5.3 | 84.3 | 1004.2 |
| 2008 | 5 | 24 | 17.6 | 9.0 | 0.6 | 7.7 | 73.1 | 1007.7 |
| 2008 | 5 | 25 | 17.6 | 7.0 | 0.0 | 11.9 | 72.0 | 1009.7 |
| 2008 | 5 | 26 | 15.8 | 9.8 | 0.7 | 12.4 | 60.1 | 1009.5 |
| 2008 | 5 | 27 | 12.6 | 8.7 | 0.8 | 7.4 | 82.8 | 1005.9 |
| 2008 | 5 | 28 | 14.9 | 7.1 | 0.0 | 3.7 | 88.1 | 999.4 |
| 2008 | 5 | 29 | 18.1 | 8.5 | 0.0 | 4.8 | 81.0 | 1004.7 |
| 2008 | 5 | 30 | 19.6 | 11.8 | 0.2 | 2.4 | 85.5 | 1007.6 |
| 2008 | 5 | 31 | 22.8 | 10.6 | 5.4 | 2.9 | 86.3 | 1010.2 |
| | | | | **Total monthly rainfall** | **37.1** | | | |

| **potential evapotranspiration (mm)** | **Class A pan evaporation (mm)** |
|---|---|
| 75.4 | |

| METEOROLOGICAL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Jun 2008** | | | | | | | | |
| **year** | **month** | **day** | **max. temperature (degrees Celsius)** | **min. temperature (degrees Celsius)** | **rainfall (mm)** | **mean wind speed (knots)** | **mean relative humidity (%)** | **mean CBL pressure (hPa)** |
| 2008 | 6 | 1 | 21.4 | 8.0 | 0.1 | 4.6 | 81.7 | 1008.9 |
| 2008 | 6 | 2 | 19.8 | 7.2 | 0.1 | 4.9 | 84.2 | 1005.3 |
| 2008 | 6 | 3 | 18.4 | 7.0 | 0.0 | 6.9 | 69.6 | 1007.4 |
| 2008 | 6 | 4 | 13.2 | 6.3 | 5.7 | 6.8 | 91.6 | 1005.9 |
| 2008 | 6 | 5 | 14.4 | 5.9 | 2.0 | 4.3 | 84.5 | 1009.2 |
| 2008 | 6 | 6 | 16.1 | 5.9 | 4.1 | 4.1 | 83.4 | 1012.5 |
| 2008 | 6 | 7 | 20.1 | 4.6 | 0.0 | 3.6 | 76.1 | 1014.4 |
| 2008 | 6 | 8 | 21.3 | 7.6 | 0.0 | 2.2 | 82.0 | 1018.1 |
| 2008 | 6 | 9 | 22.6 | 13.7 | 0.0 | 7.1 | 80.3 | 1019.8 |
| 2008 | 6 | 10 | 20.7 | 13.0 | 0.0 | 6.5 | 72.4 | 1020.3 |
| 2008 | 6 | 11 | 15.3 | 10.2 | 7.2 | 4.8 | 93.5 | 1017.9 |
| 2008 | 6 | 12 | 15.4 | 7.6 | 0.1 | 6.6 | 77.8 | 1015.6 |
| 2008 | 6 | 13 | 16.2 | 8.9 | 0.0 | 5.3 | 73.8 | 1012.8 |
| 2008 | 6 | 14 | 16.8 | 6.2 | 0.8 | 3.7 | 77.2 | 1009.4 |
| 2008 | 6 | 15 | 15.7 | 6.1 | 0.0 | 4.7 | 77.4 | 1006.3 |
| 2008 | 6 | 16 | 16.3 | 6.7 | 0.0 | 4.3 | 71.7 | 1006.0 |
| 2008 | 6 | 17 | 18.1 | 9.8 | 2.9 | 10.5 | 73.6 | 1000.1 |
| 2008 | 6 | 18 | 14.4 | 9.3 | 11.2 | 7.7 | 93.6 | 994.8 |
| 2008 | 6 | 19 | 18.8 | 7.6 | 0.0 | 10.2 | 76.9 | 1000.6 |
| 2008 | 6 | 20 | 18.5 | 7.2 | 0.0 | 5.1 | 71.6 | 1009.0 |
| 2008 | 6 | 21 | 16.2 | 10.6 | 31.3 | 7.2 | 95.7 | 1001.4 |
| 2008 | 6 | 22 | 16.3 | 8.3 | 1.2 | 15.7 | 80.7 | 997.5 |
| 2008 | 6 | 23 | 17.3 | 6.7 | 0.1 | 4.7 | 83.2 | 1011.4 |
| 2008 | 6 | 24 | 15.7 | 10.9 | 2.2 | 9.0 | 88.5 | 1006.1 |
| 2008 | 6 | 25 | 18.9 | 11.0 | 0.3 | 13.3 | 75.6 | 1002.4 |
| 2008 | 6 | 26 | 15.4 | 8.8 | 13.8 | 6.5 | 90.5 | 1005.8 |
| 2008 | 6 | 27 | 19.8 | 8.1 | 2.1 | 8.2 | 91.3 | 1006.2 |
| 2008 | 6 | 28 | 19.1 | 12.2 | 0.2 | 9.4 | 80.0 | 1007.5 |
| 2008 | 6 | 29 | 18.4 | 11.1 | 1.4 | 9.2 | 79.6 | 1007.7 |
| 2008 | 6 | 30 | 18.9 | 11.1 | 0.0 | 11.4 | 81.0 | 1008.6 |
| | | | | **Total monthly rainfall** | **86.8** | | | |

| **potential evapotranspiration (mm)** | **Class A pan evaporation (mm)** |
|---|---|
| 75.1 | |

| METEOROLOGICAL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Jul 2008** | | | | | | | | |
| **year** | **month** | **day** | **max. temperature (degrees Celsius)** | **min. temperature (degrees Celsius)** | **rainfall (mm)** | **mean wind speed (knots)** | **mean relative humidity (%)** | **mean CBL pressure (hPa)** |
| 2008 | 7 | 1 | 17.4 | 13.2 | 7.4 | 13.9 | 85.4 | 997.7 |
| 2008 | 7 | 2 | 16.8 | 11.2 | 3.0 | 8.5 | 86.1 | 995.5 |
| 2008 | 7 | 3 | 16.9 | 9.8 | 16.5 | 4.1 | 91.5 | 1000.6 |
| 2008 | 7 | 4 | 17.0 | 6.4 | 5.2 | 6.8 | 84.5 | 1003.3 |
| 2008 | 7 | 5 | 16.6 | 12.1 | 21.1 | 8.4 | 91.4 | 992.3 |
| 2008 | 7 | 6 | 17.4 | 11.8 | 8.0 | 6.3 | 93.2 | 989.1 |
| 2008 | 7 | 7 | 17.5 | 10.3 | 0.4 | 7.8 | 83.4 | 992.1 |
| 2008 | 7 | 8 | 18.4 | 9.8 | 0.0 | 7.5 | 74.0 | 1000.0 |
| 2008 | 7 | 9 | 19.8 | 12.3 | 1.8 | 7.6 | 91.9 | 996.2 |
| 2008 | 7 | 10 | 16.9 | 12.2 | 7.7 | 7.1 | 89.3 | 994.0 |
| 2008 | 7 | 11 | 15.7 | 10.9 | 0.9 | 6.9 | 83.3 | 999.8 |
| 2008 | 7 | 12 | 17.6 | 8.4 | 0.0 | 5.7 | 77.4 | 1004.3 |
| 2008 | 7 | 13 | 20.2 | 5.9 | 0.0 | 5.7 | 82.3 | 1007.1 |
| 2008 | 7 | 14 | 22.7 | 14.4 | 0.0 | 6.3 | 87.3 | 1013.4 |
| 2008 | 7 | 15 | 21.7 | 12.2 | | 8.8 | 74.6 | 1017.7 |
| 2008 | 7 | 16 | 17.3 | 11.4 | | 8.2 | 76.1 | 1016.4 |
| 2008 | 7 | 17 | 18.5 | 13.0 | 0.1 | 8.5 | 77.9 | 1007.3 |
| 2008 | 7 | 18 | 20.8 | 13.6 | 3.0 | 8.8 | 81.1 | 1001.7 |
| 2008 | 7 | 19 | 18.7 | 9.6 | 0.0 | 9.3 | 70.9 | 1004.3 |
| 2008 | 7 | 20 | 18.8 | 8.1 | 0.0 | 7.0 | 70.5 | 1015.2 |
| 2008 | 7 | 21 | 19.5 | 6.1 | 0.0 | 5.0 | 77.4 | 1019.6 |
| 2008 | 7 | 22 | 22.3 | 13.6 | 0.0 | 4.4 | 78.6 | 1018.5 |
| 2008 | 7 | 23 | 20.8 | 11.2 | 0.0 | 4.9 | 86.0 | 1014.7 |
| 2008 | 7 | 24 | 23.4 | 14.7 | 1.0 | 5.4 | 77.0 | 1006.7 |
| 2008 | 7 | 25 | 21.6 | 15.3 | 0.5 | 4.6 | 81.0 | 1001.4 |
| 2008 | 7 | 26 | 22.2 | 12.6 | 0.0 | 4.5 | 74.3 | 1008.4 |
| 2008 | 7 | 27 | 22.7 | 11.8 | 0.0 | 4.7 | 77.5 | 1010.3 |
| 2008 | 7 | 28 | 24.6 | 9.4 | 8.0 | 3.9 | 78.1 | 1006.0 |
| 2008 | 7 | 29 | 19.7 | 13.7 | 3.4 | 8.1 | 86.5 | 999.4 |
| 2008 | 7 | 30 | 20.2 | 13.5 | 24.2 | 8.9 | 85.0 | 1001.0 |
| 2008 | 7 | 31 | 18.3 | 12.9 | 24.5 | 7.2 | 93.8 | 997.9 |
| | | | | **Total monthly rainfall** | **136.7** | | | |

| potential evapotranspiration (mm) | Class A pan evaporation (mm) |
|---|---|
| 76.1 | |

| METEOROLOGICAL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Aug 2008** | | | | | | | | |
| **year** | **month** | **day** | **max. temperature (degrees Celsius)** | **min. temperature (degrees Celsius)** | **rainfall (mm)** | **mean wind speed (knots)** | **mean relative humidity (%)** | **mean CBL pressure (hPa)** |
| 2008 | 8 | 1 | 21.3 | 12.4 | 18.5 | 8.2 | 84.2 | 997.3 |
| 2008 | 8 | 2 | 21.8 | 11.4 | 0.8 | 6.9 | 77.4 | 1001.7 |
| 2008 | 8 | 3 | 19.6 | 13.6 | 2.3 | 7.2 | 75.0 | 1000.6 |
| 2008 | 8 | 4 | 19.9 | 13.2 | 0.0 | 4.9 | 76.8 | 1002.4 |
| 2008 | 8 | 5 | 20.9 | 13.3 | 5.1 | 7.5 | 89.8 | 999.8 |
| 2008 | 8 | 6 | 20.8 | 13.7 | 12.9 | 6.8 | 89.9 | 998.3 |
| 2008 | 8 | 7 | 19.5 | 12.8 | 0.4 | 6.2 | 87.1 | 999.2 |
| 2008 | 8 | 8 | 18.7 | 12.3 | 0.0 | 5.8 | 72.2 | 1006.7 |
| 2008 | 8 | 9 | 21.5 | 13.9 | 10.4 | 10.6 | 88.6 | 995.4 |
| 2008 | 8 | 10 | 19.6 | 12.5 | 1.1 | 12.3 | 79.5 | 991.3 |
| 2008 | 8 | 11 | 18.7 | 12.4 | 17.6 | 9.3 | 84.7 | 988.3 |
| 2008 | 8 | 12 | 16.0 | 10.8 | 0.9 | 7.3 | 84.9 | 980.5 |
| 2008 | 8 | 13 | 15.6 | 10.8 | 4.5 | 7.8 | 89.3 | 990.6 |
| 2008 | 8 | 14 | 19.7 | 9.0 | 0.0 | 6.7 | 72.8 | 1002.8 |
| 2008 | 8 | 15 | 17.2 | 11.1 | 1.5 | 7.9 | 82.0 | 1003.8 |
| 2008 | 8 | 16 | 17.0 | 11.8 | 47.7 | 9.6 | 89.4 | 991.1 |
| 2008 | 8 | 17 | 16.9 | 12.1 | 2.6 | 10.0 | 86.8 | 991.6 |
| 2008 | 8 | 18 | 18.0 | 12.8 | 4.4 | 7.7 | 91.8 | 984.4 |
| 2008 | 8 | 19 | 19.0 | 13.9 | 0.5 | 8.5 | 83.5 | 994.7 |
| 2008 | 8 | 20 | 18.1 | 13.3 | 6.6 | 3.9 | 87.7 | 1000.4 |
| 2008 | 8 | 21 | 19.8 | 10.8 | 0.1 | 5.3 | 79.4 | 1006.1 |
| 2008 | 8 | 22 | 17.3 | 10.0 | 0.0 | 5.2 | 75.4 | 1010.9 |
| 2008 | 8 | 23 | 15.4 | 9.8 | 4.3 | 9.2 | 90.8 | 1003.1 |
| 2008 | 8 | 24 | 19.6 | 12.6 | 0.0 | 8.4 | 78.7 | 998.2 |
| 2008 | 8 | 25 | 18.7 | 14.8 | 0.0 | 9.8 | 83.3 | 1000.9 |
| 2008 | 8 | 26 | 19.5 | 15.7 | 0.0 | 8.2 | 83.8 | 1009.0 |
| 2008 | 8 | 27 | 18.4 | 15.6 | 0.0 | 7.4 | 84.0 | 1012.8 |
| 2008 | 8 | 28 | 22.3 | 14.7 | 0.0 | 6.6 | 83.6 | 1013.7 |
| 2008 | 8 | 29 | 21.2 | 14.4 | 0.0 | 5.4 | 89.0 | 1011.5 |
| 2008 | 8 | 30 | 17.1 | 13.2 | 0.2 | 6.5 | 88.0 | 1006.2 |
| 2008 | 8 | 31 | 18.3 | 12.2 | 0.0 | 5.3 | 78.4 | 1003.6 |
| | | | | **Total monthly rainfall** | **142.4** | | | |

| **potential evapotranspiration (mm)** | **Class A pan evaporation (mm)** |
|---|---|
| 60.9 | |

| METEOROLOGICAL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sep 2008** | | | | | | | | |
| **year** | **month** | **day** | **max. temperature (degrees Celsius)** | **min. temperature (degrees Celsius)** | **rainfall (mm)** | **mean wind speed (knots)** | **mean relative humidity (%)** | **mean CBL pressure (hPa)** |
| 2008 | 9 | 1 | 18.7 | 10.4 | 4.7 | 7.9 | 80.1 | 998.4 |
| 2008 | 9 | 2 | 16.2 | 8.7 | 3.7 | 9.3 | 84.6 | 990.7 |
| 2008 | 9 | 3 | 16.7 | 8.1 | 8.7 | 9.8 | 85.9 | 988.1 |
| 2008 | 9 | 4 | 16.6 | 9.1 | 1.2 | 3.8 | 83.0 | 988.2 |
| 2008 | 9 | 5 | 16.1 | 9.2 | 25.0 | 7.0 | 92.5 | 981.0 |
| 2008 | 9 | 6 | 15.3 | 9.2 | 4.6 | 10.4 | 83.5 | 992.3 |
| 2008 | 9 | 7 | 16.9 | 7.1 | 0.0 | 4.3 | 78.9 | 1002.6 |
| 2008 | 9 | 8 | 16.3 | 8.8 | 0.7 | 6.2 | 85.0 | 1003.3 |
| 2008 | 9 | 9 | 17.4 | 10.3 | 8.8 | 13.4 | 88.4 | 993.5 |
| 2008 | 9 | 10 | 16.6 | 7.2 | 6.8 | 12.8 | 90.8 | 992.9 |
| 2008 | 9 | 11 | 16.6 | 9.6 | 0.1 | 12.1 | 83.8 | 991.4 |
| 2008 | 9 | 12 | 17.3 | 8.6 | 0.6 | 4.4 | 87.3 | 1006.7 |
| 2008 | 9 | 13 | 18.6 | 6.5 | 0.0 | 4.9 | 83.8 | 1011.7 |
| 2008 | 9 | 14 | 14.8 | 13.1 | 9.2 | 6.8 | 93.1 | 1014.2 |
| 2008 | 9 | 15 | 16.5 | 9.7 | 2.5 | 4.3 | 89.8 | 1015.2 |
| 2008 | 9 | 16 | 14.4 | 9.1 | 1.2 | 4.9 | 92.0 | 1016.3 |
| 2008 | 9 | 17 | 17.6 | 8.7 | 0.0 | 3.7 | 83.1 | 1015.6 |
| 2008 | 9 | 18 | 17.3 | 7.9 | 0.1 | 6.7 | 85.7 | 1015.4 |
| 2008 | 9 | 19 | 17.1 | 11.7 | 0.0 | 4.4 | 85.4 | 1019.5 |
| 2008 | 9 | 20 | 19.0 | 9.9 | 0.0 | 6.1 | 82.7 | 1021.3 |
| 2008 | 9 | 21 | 18.3 | 7.3 | 0.2 | 3.6 | 83.4 | 1019.4 |
| 2008 | 9 | 22 | 16.3 | 7.3 | 0.0 | 7.4 | 80.3 | 1022.8 |
| 2008 | 9 | 23 | 16.5 | 4.8 | 0.0 | 5.3 | 81.5 | 1022.3 |
| 2008 | 9 | 24 | 15.6 | 4.0 | 0.1 | 2.6 | 87.5 | 1022.4 |
| 2008 | 9 | 25 | 18.0 | 5.7 | 0.0 | 2.3 | 88.5 | 1026.2 |
| 2008 | 9 | 26 | 17.4 | 6.1 | 0.0 | 3.8 | 88.4 | 1027.0 |
| 2008 | 9 | 27 | 17.7 | 7.8 | 0.2 | 3.6 | 85.3 | 1023.4 |
| 2008 | 9 | 28 | 14.6 | 7.3 | 0.3 | 4.3 | 80.8 | 1020.7 |
| 2008 | 9 | 29 | 14.7 | 6.0 | 0.1 | 9.4 | 84.7 | 1012.7 |
| 2008 | 9 | 30 | 15.4 | 11.8 | 2.7 | 14.4 | 87.7 | 998.6 |
| | | | | **Total monthly rainfall** | **81.5** | | | |

| **potential evapotranspiration (mm)** | **Class A pan evaporation (mm)** |
|---|---|
| 41.6 | |

| METEOROLOGICAL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Oct 2008** | | | | | | | | |
| **year** | **month** | **day** | **max. temperature (degrees Celsius)** | **min. temperature (degrees Celsius)** | **rainfall (mm)** | **mean wind speed (knots)** | **mean relative humidity (%)** | **mean CBL pressure (hPa)** |
| 2008 | 10 | 1 | 13.4 | 6.9 | 0.6 | 12.6 | 75.7 | 995.8 |
| 2008 | 10 | 2 | 11.2 | 5.1 | 0.5 | 10.8 | 78.6 | 1001.0 |
| 2008 | 10 | 3 | 11.0 | 4.7 | 0.0 | 6.8 | 70.6 | 1011.9 |
| 2008 | 10 | 4 | 16.0 | 6.5 | 12.0 | 10.0 | 87.8 | 996.1 |
| 2008 | 10 | 5 | 12.3 | 3.3 | 10.0 | 6.9 | 82.6 | 994.6 |
| 2008 | 10 | 6 | 15.7 | 3.3 | 1.1 | 8.3 | 91.8 | 996.7 |
| 2008 | 10 | 7 | 14.4 | 7.4 | | 6.3 | 93.1 | 993.3 |
| 2008 | 10 | 8 | 16.0 | 5.1 | 0.1 | 3.7 | 85.5 | 1011.8 |
| 2008 | 10 | 9 | 15.0 | 5.9 | 1.0 | 12.4 | 91.4 | 1016.2 |
| 2008 | 10 | 10 | 15.6 | 11.4 | 6.4 | 12.9 | 95.2 | 1012.3 |
| 2008 | 10 | 11 | 15.3 | 6.9 | 0.0 | 3.1 | 89.3 | 1015.4 |
| 2008 | 10 | 12 | 15.8 | 5.3 | 0.2 | 3.7 | 95.1 | 1012.9 |
| 2008 | 10 | 13 | 16.8 | 10.3 | 2.1 | 7.0 | 89.0 | 1008.8 |
| 2008 | 10 | 14 | 14.4 | 8.1 | 16.9 | 4.2 | 98.4 | 1007.5 |
| 2008 | 10 | 15 | 12.9 | 5.9 | 0.2 | 6.6 | 90.0 | 1005.9 |
| 2008 | 10 | 16 | 12.8 | 4.6 | 0.0 | 6.5 | 83.0 | 1010.6 |
| 2008 | 10 | 17 | 12.8 | 2.5 | 0.1 | 5.2 | 90.0 | 1012.4 |
| 2008 | 10 | 18 | 13.4 | 6.0 | 0.4 | 7.7 | 90.3 | 1008.7 |
| 2008 | 10 | 19 | 14.4 | 9.0 | 2.5 | 14.5 | 90.1 | 1000.7 |
| 2008 | 10 | 20 | 14.3 | 5.1 | 1.5 | 14.6 | 79.6 | 992.2 |
| 2008 | 10 | 21 | 10.9 | 4.1 | 0.8 | 8.8 | 78.7 | 1003.3 |
| 2008 | 10 | 22 | 13.3 | 4.5 | 0.1 | 8.2 | 82.0 | 1011.0 |
| 2008 | 10 | 23 | 14.9 | 8.0 | 10.3 | 16.1 | 88.8 | 1001.2 |
| 2008 | 10 | 24 | 12.2 | 4.9 | 0.0 | 9.1 | 78.1 | 1012.9 |
| 2008 | 10 | 25 | 14.7 | 6.6 | 7.8 | 14.7 | 88.5 | 1009.7 |
| 2008 | 10 | 26 | 13.5 | 3.9 | 3.3 | 9.1 | 82.4 | 1006.7 |
| 2008 | 10 | 27 | 8.8 | 2.8 | 0.1 | 7.5 | 82.5 | 1006.3 |
| 2008 | 10 | 28 | 7.0 | -2.2 | 0.3 | 7.3 | 83.6 | 1008.6 |
| 2008 | 10 | 29 | 7.6 | -2.2 | 8.2 | 5.8 | 91.8 | 997.0 |
| 2008 | 10 | 30 | 6.4 | 1.6 | 0.5 | 8.4 | 85.8 | 993.4 |
| 2008 | 10 | 31 | 8.2 | 0.6 | 0.0 | 6.6 | 83.1 | 1006.9 |
| | | | **Total monthly rainfall** | | **87.0** | | | |

| **potential evapotranspiration (mm)** | **Class A pan evaporation (mm)** |
|---|---|
| 23.4 | |

| METEOROLOGICAL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Nov 2008** | | | | | | | | |
| **year** | **month** | **day** | **max. temperature (degrees Celsius)** | **min. temperature (degrees Celsius)** | **rainfall (mm)** | **mean wind speed (knots)** | **mean relative humidity (%)** | **mean CBL pressure (hPa)** |
| 2008 | 11 | 1 | 8.9 | 0.7 | 0.0 | 6.5 | 85.0 | 1008.7 |
| 2008 | 11 | 2 | 10.1 | 2.0 | 0.0 | 5.1 | 88.0 | 1014.1 |
| 2008 | 11 | 3 | 10.5 | 2.6 | 0.1 | 6.3 | 94.5 | 1013.4 |
| 2008 | 11 | 4 | 9.6 | 4.0 | 0.1 | 3.0 | 94.8 | 1013.3 |
| 2008 | 11 | 5 | 10.8 | 4.8 | 0.1 | 1.2 | 97.0 | 1014.0 |
| 2008 | 11 | 6 | 10.5 | 5.3 | 5.5 | 6.3 | 95.6 | 1002.6 |
| 2008 | 11 | 7 | 9.6 | 5.2 | 1.7 | 12.1 | 86.1 | 990.3 |
| 2008 | 11 | 8 | 11.9 | 4.5 | 12.8 | 11.6 | 90.0 | 988.8 |
| 2008 | 11 | 9 | 8.0 | 2.3 | 7.2 | 13.4 | 86.8 | 990.7 |
| 2008 | 11 | 10 | 9.4 | 3.3 | 2.5 | 14.0 | 77.7 | 988.8 |
| 2008 | 11 | 11 | 10.3 | 4.8 | 0.7 | 11.6 | 82.0 | 998.8 |
| 2008 | 11 | 12 | 10.4 | 3.8 | 0.1 | 5.9 | 88.4 | 1012.0 |
| 2008 | 11 | 13 | 12.6 | 6.6 | 2.9 | 9.4 | 91.6 | 1012.7 |
| 2008 | 11 | 14 | 13.1 | 11.2 | 0.0 | 8.1 | 86.1 | 1015.3 |
| 2008 | 11 | 15 | 12.6 | 9.7 | 0.7 | 5.1 | 90.6 | 1017.7 |
| 2008 | 11 | 16 | 12.0 | 8.0 | 3.6 | 5.4 | 96.0 | 1024.1 |
| 2008 | 11 | 17 | 11.5 | 8.4 | 1.6 | 9.4 | 94.3 | 1016.6 |
| 2008 | 11 | 18 | 10.9 | 7.4 | 0.0 | 7.7 | 87.2 | 1015.8 |
| 2008 | 11 | 19 | 12.2 | 4.2 | 0.1 | 8.3 | 91.7 | 1018.5 |
| 2008 | 11 | 20 | 12.7 | 10.9 | 0.0 | 11.8 | 84.9 | 1014.7 |
| 2008 | 11 | 21 | 11.3 | 7.5 | 0.2 | 11.0 | 83.9 | 1015.1 |
| 2008 | 11 | 22 | 9.5 | 6.6 | 1.2 | 7.5 | 89.5 | 1014.7 |
| 2008 | 11 | 23 | 10.9 | 3.7 | 2.7 | 14.6 | 84.5 | 995.8 |
| 2008 | 11 | 24 | 7.4 | 0.2 | 2.3 | 11.9 | 82.9 | 1001.3 |
| 2008 | 11 | 25 | 7.9 | 1.5 | 0.1 | 7.1 | 87.6 | 1020.8 |
| 2008 | 11 | 26 | 12.3 | 7.6 | 0.1 | 7.7 | 90.0 | 1019.3 |
| 2008 | 11 | 27 | 9.6 | 1.8 | 1.1 | 9.5 | 82.3 | 1001.0 |
| 2008 | 11 | 28 | 6.3 | -2.7 | 0.0 | 3.1 | 89.0 | 990.2 |
| 2008 | 11 | 29 | 0.8 | -4.0 | 0.0 | 2.5 | 99.0 | 990.0 |
| 2008 | 11 | 30 | 2.7 | -1.7 | 0.0 | 4.4 | 96.5 | 995.6 |
| | | | | **Total monthly rainfall** | **47.4** | | | |

| **potential evapotranspiration (mm)** | **Class A pan evaporation (mm)** |
|---|---|
| 12.6 | |

| METEOROLOGICAL DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Dec 2008** | | | | | | | | |
| **year** | **month** | **day** | **max. temperature (degrees Celsius)** | **min. temperature (degrees Celsius)** | **rainfall (mm)** | **mean wind speed (knots)** | **mean relative humidity (%)** | **mean CBL pressure (hPa)** |
| 2008 | 12 | 1 | 5.0 | -2.3 | 0.0 | 4.4 | 92.5 | 1004.1 |
| 2008 | 12 | 2 | 4.9 | 0.2 | 0.7 | 5.9 | 90.4 | 998.4 |
| 2008 | 12 | 3 | 6.4 | -2.8 | 7.3 | 5.8 | 94.5 | 993.3 |
| 2008 | 12 | 4 | 8.0 | 3.8 | 9.1 | 10.5 | 87.4 | 971.5 |
| 2008 | 12 | 5 | 8.4 | 1.9 | 0.6 | 8.8 | 88.8 | 984.7 |
| 2008 | 12 | 6 | 2.7 | -3.5 | 0.0 | 2.3 | 98.0 | 1009.0 |
| 2008 | 12 | 7 | 5.8 | -5.0 | 0.0 | 3.5 | 95.6 | 1017.8 |
| 2008 | 12 | 8 | 6.8 | 2.2 | 4.1 | 6.2 | 91.9 | 1013.6 |
| 2008 | 12 | 9 | 6.2 | 0.4 | 0.0 | 6.9 | 84.8 | 1019.2 |
| 2008 | 12 | 10 | 6.5 | -0.8 | 0.0 | 3.9 | 96.2 | 1015.5 |
| 2008 | 12 | 11 | 5.9 | 0.2 | 5.3 | 2.7 | 99.0 | 1004.7 |
| 2008 | 12 | 12 | 10.2 | 0.7 | 14.0 | 10.1 | 94.3 | 992.7 |
| 2008 | 12 | 13 | 6.4 | 1.2 | 0.0 | 5.1 | 89.7 | 980.8 |
| 2008 | 12 | 14 | 4.1 | 0.1 | 0.0 | 6.8 | 92.0 | 996.3 |
| 2008 | 12 | 15 | 6.1 | -1.9 | 0.0 | 4.2 | 90.8 | 1011.0 |
| 2008 | 12 | 16 | 10.5 | 4.2 | 3.0 | 9.8 | 91.7 | 1002.9 |
| 2008 | 12 | 17 | 11.0 | 1.6 | 0.0 | 8.6 | 87.5 | 1006.3 |
| 2008 | 12 | 18 | 11.1 | 2.1 | 1.2 | 9.9 | 83.2 | 1007.3 |
| 2008 | 12 | 19 | 12.1 | 1.8 | 0.5 | 13.0 | 88.4 | 1011.5 |
| 2008 | 12 | 20 | 12.9 | 8.9 | 2.0 | 9.0 | 90.7 | 1015.8 |
| 2008 | 12 | 21 | 13.0 | 9.6 | 0.0 | 8.8 | 89.0 | 1019.9 |
| 2008 | 12 | 22 | 12.2 | 7.5 | 0.0 | 8.6 | 90.2 | 1025.2 |
| 2008 | 12 | 23 | 8.2 | 2.6 | 0.0 | 6.2 | 85.2 | 1026.5 |
| 2008 | 12 | 24 | 7.7 | 2.5 | 0.0 | 1.5 | 93.0 | 1026.9 |
| 2008 | 12 | 25 | 8.1 | 5.0 | 0.0 | 3.1 | 83.7 | 1027.2 |
| 2008 | 12 | 26 | 6.8 | -2.3 | 0.0 | 3.4 | 81.0 | 1029.7 |
| 2008 | 12 | 27 | 3.4 | -4.2 | 0.0 | 1.9 | 96.0 | 1028.4 |
| 2008 | 12 | 28 | 6.1 | -4.9 | 0.0 | 2.9 | 87.6 | 1021.7 |
| 2008 | 12 | 29 | 3.1 | -4.6 | 0.0 | 4.1 | 88.5 | 1019.3 |
| 2008 | 12 | 30 | 5.4 | 2.1 | 0.0 | 7.3 | 86.4 | 1019.7 |
| 2008 | 12 | 31 | 6.4 | -1.5 | 0.0 | 5.1 | 87.6 | 1019.3 |
| | | | | **Total monthly rainfall** | **47.8** | | | |

| **potential evapotranspiration (mm)** | **Class A pan evaporation (mm)** |
|---|---|
| 7.0 | |

# Appendix F

Restoration Plan

&

Aftercare Plan

DUNMORE
COTTAGE

EP

Total Depth
of Lagoon
3.45m

62m

MH1 Base depth 50.46
Present Height 64m
Final Height 62m

MH2 Base depth 50.11m (Blocked)
Present Height 60.684m
Final Height 61.5m

61m

60m

54m

MH3 Base depth 48.836m
Final & Present Height 55.341m

MH7 Base depth 50.136
Side Riser 8.2m

MH6 Base depth 49.946
Side Riser 6.5m

MH4 Base depth 49.616
Final & Present Height 53.036m

MH5 Base depth 49.23
Final & Present Height 53.22m

Total Depth
of Lagoon
3.25m

54m
56.5
58.5m
60.5
61.5m

61.5m
56.5m
58.5m
60.5m

60.1

61.2

61.8

DEC.

Revision Description By Da

Restotation Plan
01/07/03 800
1:2500
30-2-DWG03

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DUNMORE
COTTAGE

Road Edge Planting to be completed as part of road contract

Existing hedge line retained, protected and replaced as necessary

Ornamental planting for Civic Amenity Site

New hedge row to be established

Road Edge Planting to be completed as part of road contract

Woodland to be established as part of the final cap on landfilled areas

Grassed Area

Existing hedge line retained, protected and replaced as necessary

Woodland to be established as part of the final cap on landfilled areas

All landfill infrastructure to be removed

Entrance to lagoon and lagoon to be retained

Hedgeline to be renewed in this area

New Hedge Line to be established

Grassed Area

Grassed Area

Existing hedge line retained, protected and replaced as necessary

DEC.

EP

60.1

61.2

61.8

## List of Species to be Used

| *Tree/plant type* | *Species* |
|---|---|
| Common Ash | Fraxinus Excelsior |
| Hawthorn | Crataegus Monogyna |
| Whitebeam | Sorbus Hibernica |
| Blackthorn | Prunus Spinosa |
| Elder | Sambucas Nigra |
| Cherry | Prunus Avium |
| Gorse | Ulex Europaeus |
| Bristly ox tongue | Picris Hieracioides |
| Holly | Ilex Aquifolium |
| Hazel | Corylus Avellana |
| Common Beech | Figus Sylvatica |
| Silver Beech | Betula Pendula |

OS Licence Number
Kilkenny CCMA 9802

| Revision | Description | By | Da |
|---|---|---|---|

Restotation Plan
01/07/03 BOD
1:2500
30-2-DWG02

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# Appendix G

Status of Objectives and Targets

| **Objectives** | | **Status** | **Comments** |
|---|---|---|---|
| **Objective 1** | | | |
| Ensure that all waste acceptance requirements are met | | | |
| **Target 1.1** | All waste accepted at the facility are within the criteria set out in Part I of the Waste Licence | Compliant | |
| **Target 1.2** | The amounts of each category of waste recovered and disposed if at the facility does not exceed that specified in Schedule A of the Waste Licence | Compliant | |
| **Target 1.3** | Any restriction on waste entering the facility shall be strictly enforced | Compliant | |
| **Target 1.4** | All waste accepted for recovery and disposal shall be done so within the opening hours i.e. 8.00 – 4.30 Mon –Fri. and 8.00 12.00 Sat. | Compliant | |
| **Objective 2** | | | |
| Establish and Environmental Management System to fulfil the obligation of the Waste Licence. | | | |
| **Target 2.1** | The facility shall employ a suitably qualified facility manager as the person in charge | In place since licence granted | |

| | | | |
|---|---|---|---|
| | and that this person or a nominated deputy shall be present at all times at the facility, this person will be in place from the grant date of the licence. | | |
| **Target 2.2** | The facility manager and deputy shall complete the FAS Waste Management Training Program within 12 months of their appointment. | Completed | |
| **Target 2.3** | All personnel performing specially assigned tasks shall receive all appropriate instruction prior to carrying out that function | Ongoing as part of awareness and training | |
| **Target 2.4** | Submission of details of management structure for Dunmore Landfill Facility by the end of August 2002, which will be reviewed annually or as required. | Completed and reviewed as required | Submitted 04/12/02<br>Oct 2004<br>Jan 2007 |
| **Target 2.5** | Preparation and submission of an Environmental Management Program (EMP) to the Environmental Protection Agency by the end of November 2002, which will be reviewed annually in November and submitted to the Agency or as required. | Completed and reviewed as required | Submitted 09/04/04 |
| **Target 2.6** | Preparation and submission of an | Completed | |

| | | | |
|---|---|---|---|
| | Environmental Management System (EMS) to the Environmental Protection Agency by the end of November 2002, which will be reviewed annually in November and submitted to the Agency or as required. | and reviewed as required | Submitted 09/04/04 |
| **Target 2.7** | Establish awareness and training procedures for personnel at Dunmore Landfill Facility which will form part of the EMS | Ongoing | |
| **Target 2.8** | Submission to the EPA of a communications program as part of the EMS | Completed | Submitted as part of EMS 09/04/03 |
| **Target 2.9** | Preparation and submission of a corrective action procedure, which will be submitted to the Agency as part of the EMS | Completed | Submitted as part of EMS 09/04/03 |
| **Target 2.10** | First Annual Environment Report (AER) of Waste Licence 30-2 submitted to Agency by the end of January 2003. | Completed | Submitted 14/08/03 |
| **Target 2.11** | Review of AER by the end of January annually thereafter | Every January | |
| **Objective 3** | | | |
| Provision of required infrastructure at the facility with the agreement of the agency | | | |
| **Target 3.1** | An updated site notice board will be provided at the new | Completed by 08/03 | |

| | | | |
|---|---|---|---|
| | facility entrance by end June 2002. The new Waste Licence reference number will be provided, contacted details including revised telephone numbers and location of all environmental monitoring information | | |
| **Target 3.2** | Security fencing and security measures will be provided as part of the provision of the new access by May 2003 | Completed 07/03 | |
| **Target 3.3** | A new access will be provided from the N77 by April 2003. Detailed SEW will be submitted on the project will be submitted to the Agency, when the safety audit on the alignment has been approved by the NRA. | Completed 04/03 | |
| **Target 3.4** | Facility roads and hardstanding areas will be provided at the new access by April 2003, which will be designed to ensure safe access and movement within the site. All area will be provided with appropriate surface water drainage systems. | Complete 04/03 | |
| **Target 3.5** | New facility offices, will be provided, which will incorporate telephones and an electronic communication facility by April | Completed 04/03 | |

| | | | |
|---|---|---|---|
| | 2003. Offices shall be fitted with gas monitoring equipment, in accordance with 'Protection of New Buildings and Occupants from Landfill Gas. | | |
| **Target 3.6** | A Waste Inspection and Quarantine Area will be provided by May 2003, subject to Agreement with the Agency. Drainage from these areas will go directly to the leachate lagoon. | Completed 05/03 | |
| **Target 3.7** | The present weighbridge at the facility will be relocated or a new weighbridge will be provided at the new facility entrance, subject to agreement with the Agency, by May 2003. This weighbridge will not be made operational until approval is given by Legal Metrology Services. | Completed 05/03 | |
| **Target 3.8** | A wheel cleaning as set out in the EIS area will be provided at the facility entrance by May 2003, subject to agreement with the Agency. | Completed 05/03 | |
| **Target 3.9** | As part of the development of the new offices, a wastewater treatment plant will be provide at the new facility offices by | Complete by 05/03 | |

| | | | |
|---|---|---|---|
| | May 2003, subject to agreement with the Agency. The discharge from this unit will go directly to the new leachate lagoon. | | |
| **Target 3.10** | A revised tank and drum storage area will be provided by April 2003, to ensure any spillage that may occur is contained. | Completed by 04/03 | |
| **Target 3.11** | Four new cells will be provided (cell 11-14), between 2002 and 2005 and will be constructed to that specified in condition 3.13, subject to agreement with the Agency. | One and a half cells completed by 12/02<br><br>Others ongoing until 12/05 | QA/QC for cell 11a submitted 24/10/02<br><br>QA/QC for cell12 30/05/03 |
| **Target 3.12** | A new larger leachate lagoon shall be construction to the specified standard to provide sufficient capacity for storage by May 2003, subject to agreement with the Agency. | Completed by 05/03 | |
| **Target 3.13** | A revised landfill gas management system will be provided by November 2003, which will contain a proposal for the utilisation of Landfill Gas as an energy source. A proposal on the system will be submitted to the Agency by March 2003. | Completed by 11/03 | |
| **Target 3.14** | A SCADA system or equivalent will be installed at the facility by | Phase I completed | |

| | | | |
|---|---|---|---|
| | April 2003, where the hardware and software will be incorporated into the new facility offices, subject to the Agencies agreement. | by 11/03 other phases as landfill develops | |
| **Target 3.15** | A full surface water management system will be incorporated as infrastructure and capping is provided, subject to the Agencies agreement. Surface water from the extension will be diverted to the surface water stream once the capping system is provided. | Ongoing as part of develop. | |
| **Target 3.16** | All new infrastructures provided will have regard to the ground water in the area which is monitored on a monthly basis. | Ongoing | |
| **Target 3.17** | A construction and demolition storage area will be provided by April 2003 as part of the revised access, subject to the agreement of the Agency. | Will not be provided C&D waste Accepted direct to tip face | |
| **Target 3.18** | The civic amenity site will be provided by May 2003 and will be maintained to the highest environmental standards. It is anticipated that this area in conjunction with other County Council initiatives will increase recovery rates in the County. | Completed by 05/03 | |

| | | | |
|---|---|---|---|
| **Target 3.19** | A household hazardous waste facility will be provided at the new civic waste facility. This facility will be widely advertised and will raise awareness of the need to source segregate household hazardous waste. | Completed by 05/03 | |
| **Target 3.20** | A proposal on the provision of compost facilities will be completed by May 2003 and submitted to the Agency. Composting/shredding facilities will increase recovery rates for green waste in the County. | Proposal will be examined and submitted to the Agency | |
| **Target 3.21** | A revised proposal for the provision of berms at the facility will be submitted to the Agency by January 2003. All revision made will be as a result of consultation with adjacent properties. | Complete by 01/03 | |
| **Target 3.22** | All monitoring points required to meet the conditions of the Waste Licence will be provided as infrastructure develops, subject to the Agencies agreement. | Ongoing | |
| **Target 3.23** | A storage and shredding area for Christmas Trees shall be provided and shredded trees to be reused as landfill cover | Set up December 2003 Annually there after | |

| | | | |
|---|---|---|---|
| **Objective 4**<br>Establishment of a detailed plan for the restoration and aftercare of the facility | | | |
| **Target 4.1** | A full revised restoration and aftercare plan will be submitted to the Agency by May 2003, which will incorporate a proposal for treatment of cells 1-7 | Complete by 05/03 | |
| **Target 4.2** | Capping at the facility will commence in May 2003 in accordance with condition 4.3, subject to agreement with the Agency and will continue on a phased basis as the facility develops. | To commence 05/03<br>Ongoing until site is complete | |
| **Target 4.3** | Assessment of the capping adequacy of cells 1-7 will commence in February 2003. A proposal for the capping and collection of gas from cells 1-7 will be submitted to the Agency by May 2003. All works on this area will be completed by May 2004. | Ongoing | |
| **Target 4.4** | All material excavated for the purpose of the development of infrastructure will be reused with the facility boundary and will be stored appropriately until | Ongoing | |

| | | | |
|---|---|---|---|
| | required. | | |
| **Objective 5**<br>The facility shall be operated to ensure there are no adverse environmental effects as a result of the operation of the facility. | | | |
| **Target 5.1** | Waste shall not be disposed of in any part of the facility until approval is sought and granted by the Agency | Ongoing | 04/12/03 |
| **Target 5.2** | A procedure for the acceptance of waste at the facility shall be submitted to the Agency for agreement by August 2002 and updated annually thereafter. | Completed | |
| **Target 5.3** | All waste shall be covered appropriately at the end of each day | Ongoing | |
| **Target 5.4** | A full leachate management plan will be drawn up which shall include procedures for monitoring leachate levels, removal of leachate by tanker and control procedures to ensure that leachate levels remain within parameters set out in condition 5.11. This plan will form part of the AER and will be revised as necessary. | Completed as part of AER<br><br>SCADA System- on Going monitoring Of leachate Levels in cells and lagoons | |
| **Target 5.5** | Written records of maintenance of all monitoring and emission equipment. Maintenance of | Ongoing | |

| | | | |
|---|---|---|---|
| | these systems will take place as recommended by the manufacturer | | |
| **Target 5.6** | All lagoons structures at the site will be independently tested every three years. | Ongoing | |
| **Target 5.7** | The wheel wash at the site entrance shall be maintained and cleaned as required | Ongoing Wheel shakeout unit by 06/03 | |
| **<u>Objective 6</u>**<br>Control of emissions at the facility | | | |
| **Target 6.1** | Any emission exceeding trigger levels or unauthorised emission will be notified to the Agency. | Ongoing | |
| **Target 6.2** | Monitoring of the landfill gas flare will commence once the installation of the flare is complete. All emission values shall comply with the terms of the Waste Licence. | New flare unit installed 07/04 | |
| **Objective 7**<br>Continuing minimisation of Environmental Nuisances associated with Dunmore Landfill Facility. | | | |
| **Target 7.1** | That any potential nuisance resulting from the operation of the facility will be minimised and any methods that may eliminate nuisance will be implemented. Ongoing | Ongoing | |

| | | | |
|---|---|---|---|
| | community consultation and inspections at the facility will ensure nuisance is minimised. Full compliance with the requirements set out in Condition 7 of the Waste Licence will continue. | | |
| **Objective 8** | | | |
| Continuation of Environmental Monitoring at the facility | | | |
| **Target 8.1** | All environmental monitoring at the facility as specified in Schedule D of the Waste Licence shall commence by 10th July, 2002. | Ongoing | Submitted 08/04/03 |
| **Target 8.2** | An initial topographical survey of cells 1-10 and all areas to be developed as part of the revised licence to be completed by June 2002, and two more survey to be completed by January 2003 and May 2003, to map development of the site. A topographical survey shall be completed by January each year thereafter. | Completed | |
| **Target 8.3** | A drawing of all monitoring locations shall be submitted to the Agency by August 2002. Any changes to the location of monitoring locations will be immediately updated on this drawing and will be communicated to the Agency. | Ongoing | |
| **Target 8.4** | A stability assessment of the site will be completed by November 2002 and annually thereafter and submitted to the Agency. | Complete by 05/03 | |
| **Target 8.5** | A revised weekly nuisance monitoring system will be introduced at the site and implemented by January 2003; | Completed | |

| | | | |
|---|---|---|---|
| | all records will be held at the site. | | |
| **Objective 9** | | | |
| Contingency measures shall be put in place in the event of an incident or emergency at the site | | | |
| **Target 9.1** | An Emergency response procedure will be developed and submitted to the Agency by November 2002 and submitted to the Agency. The procedure will be revised as necessary. | Completed | Submitted by 06/12/03 |
| **Target 9.2** | An adequate supply of absorbent booms and material will be provided and maintained at the site. | Completed Continually assessed | |
| **Target 9.3** | Waste oil containers shall be bunded**.** | Completed By March 2005 | |
| **Objective 10** | | In place | |
| Records shall be maintained and available for inspection at all reasonable times | | | |
| **Target 10.1** | All records for the site shall be available at the facility office for inspection | Ongoing | |
| **Target 10.2** | Ongoing maintenance of waste records as per Condition 10.2 of the Waste Licence. | Completed 06/03 | |
| **Target 10.3** | A procedure shall be developed to log all waste leaving the civic amenity site once the project has been completed. | In place | |
| **Target 10.4** | A complaints book shall be kept at the facility office and any complaint shall be logged as per | Ongoing | |

| | | | |
|---|---|---|---|
| | condition 10.4 | | |
| **Target 10.5** | A record of all leachate leaving the facility shall be kept in accordance with condition 10.5 | Ongoing | |
| **Target 10.6** | A record shall be kept of the program for the control of vermin and flies as per condition 10.7 | Ongoing | |
| **Target 10.7** | A record of bird control activities shall be kept and regular bird counts made. | Ongoing | |
| **Target 10.8** | A written record shall be kept of the type of daily cover that is used on the site as per condition 10.9 | Ongoing | |
| **Target 10.9** | Long term environmental monitoring to continue. | | |
| **Objective 11** | | | |
| To submit all relevant reports and notifications to the Agency in the timeframes specified | | Ongoing | |
| **Target 11.1** | Any incident at the site shall be notified in accordance with the corrective action procedure | Complete 05/03 | |
| **Target 11.2** | A new contract will be entered into for the recovery/disposal white goods/brown goods by end May 2003 | Completed 04/03 | |
| **Target 11.3** | Waste recovery reports shall be submitted to the Agency by | Form part | |

| | | | |
|---|---|---|---|
| | November 2002 as outlined in condition 11.3 | of SEW reports | Report 06/12/03 |
| **Target 11.4** | A report on the achievement of the final profile at the site shall be submitted by November 2002 | Submitted | |
| **Target 11.5** | An operations procedure shall be developed for operation in adverse wind conditions and submitted to the agency by November 2002. | Submitted | Report 04/12/03 |
| **Target 11.6** | A report on procedure to control vermin and flies shall be submitted to the Agency by November 2002 | Submitted 14/08/03<br>Complete | Report 12/07/02 |
| **Target 11.7** | The first AER of the License will be submitted by May 2003 | | |
| **Target 11.8** | A conditioning plan in accordance with Council Directive 1991/31/EC shall be submitted to the Agency by 16th July 2002 | | |
| **Objective 12** | | | |
| To operate the landfill to compliment relevant legislation and the Landfill Directive | | In place since 03/02 | |
| **Target 12.1** | All packaging waste as defined in SI No. 61 of 2003 will be restricted from the landfill | Phased in through 2002 | |
| **Target 12.2** | All contractors using the site shall be in full compliance with SI No. 402 of 2001 | Complete by 06/03 | |

| | | | |
|---|---|---|---|
| **Target 12.3** | Whole used tyres shall be restricted from the site from 1st of June 2003, in compliance with Council Directive 1991/31/EC. Shredded tyres will be restricted from 1st June 2006 | Ongoing | |
| **Target 12.4** | The landfill site will be operated with regard to the South East Waste Management and any measures necessary to meet the terms and targets of the plan shall be implemented. This will include the acceptance of waste from outside the Kilkenny area from the partners in the South East Region | | |
| **Objective 13** | | | |
| To provide infrastructure to reduce visual impact and minimise nuisance | | Ongoing | |
| **Target 13.1** | Continuation of odour modelling and testing at the site and local properties. Recommendations will be implemented. | Ongoing | |
| **Target 13.2** | Provision of extensive planting and renewal of hedgerows. Berms will be placed in locations in order to minimise visual impact. | Ongoing | |
| **Target 13.3** | The road access and roadway along the front of the site will be | | |

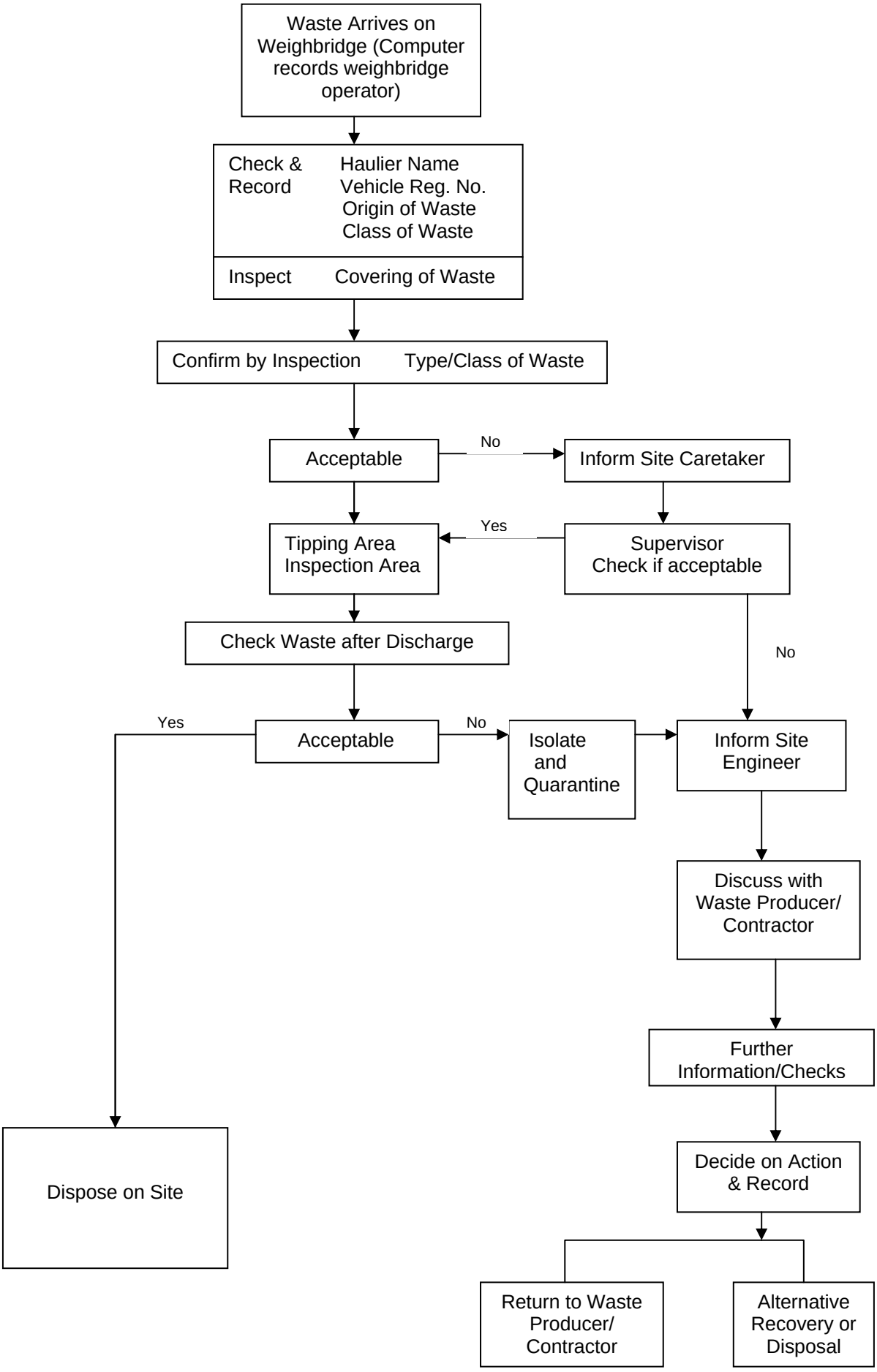
| | | | |
|---|---|---|---|
| | maintained and cleaned in order to minimise visual nuisance at the entrance to the facility. | | |
| **Objective 14** | | | |
| To reduce the quantity of recycling and biodegradable materials going to landfill. | | | |
| **Target 14.1** | To achieve a 50% reduction by commercial establishments. | Dec 06 | |
| **Target 14.2** | To set up a communication procedure and reporting mechanism between landfill and enforcement officers regarding offenders. | Completed Jan 06 | |
| **Target 14.3** | Provide awareness to companies of restricted landfill materials. | Ongoing | |

# Appendix H

Waste Acceptance Procedure Flowchart

# DUNMORE LANDFILL

## WASTE ACCEPTANCE PROCEDURE



# Appendix I

Bird Control

Bird Control Ireland Ltd.

Littlebridge Inches, Cappoquin, Co. Waterford, Ireland

# Year End Report for Dunmore Landfill Site

## April 2007 – March 2008

**Location:** Dunmore Landfill, Dunmore, Kilkenny

**Type:** Landfill Site

**Client:** Kilkenny, County Council

Bird Control Ireland Ltd operated a bird control programme and Dunmore Landfill Site between April 2007 and March 2008.

During each visit to the site a visit log was completed giving details of activities undertaken during the period of time on site and also note was made of bird pressure and number of birds on site. A monthly report is then completed from these sheets and sent to Dunmore Landfill Site where the report is put into the Bird Control Manual.

Throughout the 12 month period of April 07 to March 08 various types of bird scaring devices were employed. A range of equipment is used to include:

- Visual Deterrents
  Kites, falcons, hawks
- Acoustic Deterrents
  One shot system, handheld distress caller, and falcon
- Pyrotechnics
  Bird scaring pistol, shotgun

Site staff were responsible for the daily deployment of site equipment. A suggested plan of action was marked out on a site planner at the beginning of each week and staff adapted as necessary.

When visual deterrents such as kites and birds of prey could not be flown, the Bird Scaring Pistol was used as required. Every other bird control measure was then employed to ensure that no pest birds visited the site.

During the period of time on site birds were noted to be on site 2 out of 12 visits. This is an excellent level of bird control.

The mean of BH Gulls has decreased from 42.50(06/07) to 0.00 (07/08) and also Magpie 1.66 (06/07) to 0.00 (07/08). Rooks and Jackdaws are the main group of pest birds noted at Dunmore Landfill Site. These however were easily cleared and once moved on they would stay away fro extended periods of time.

The site is virtually free of birds during operational hours.

Site staff were enthusiastic and helpful with the programme.

In conclusion, Bird Control Ireland Ltd are pleased with the excellent level of results that were achieved at Dunmore Landfill Site.

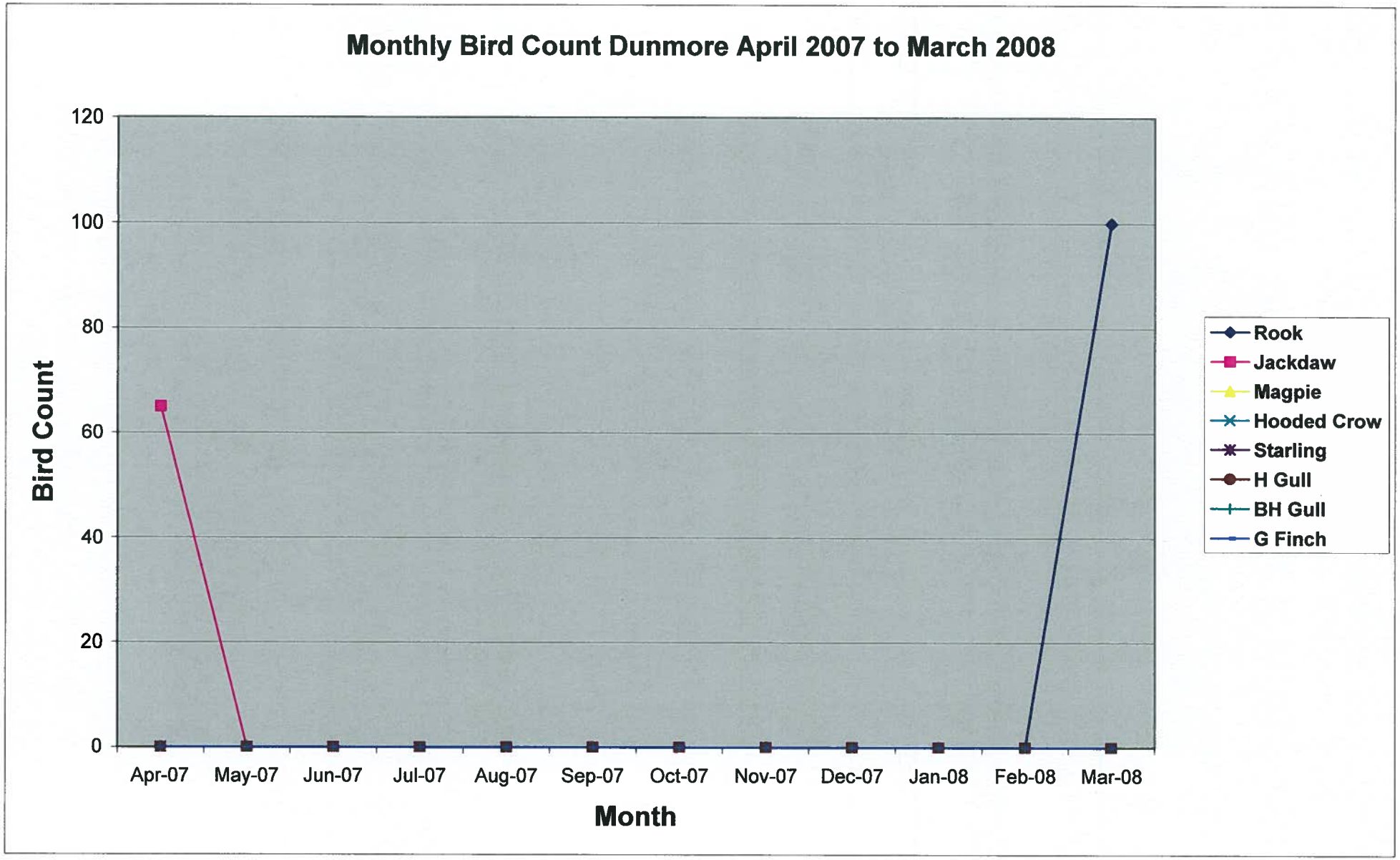
**Jeremy Nicholson**
**Managing Director**

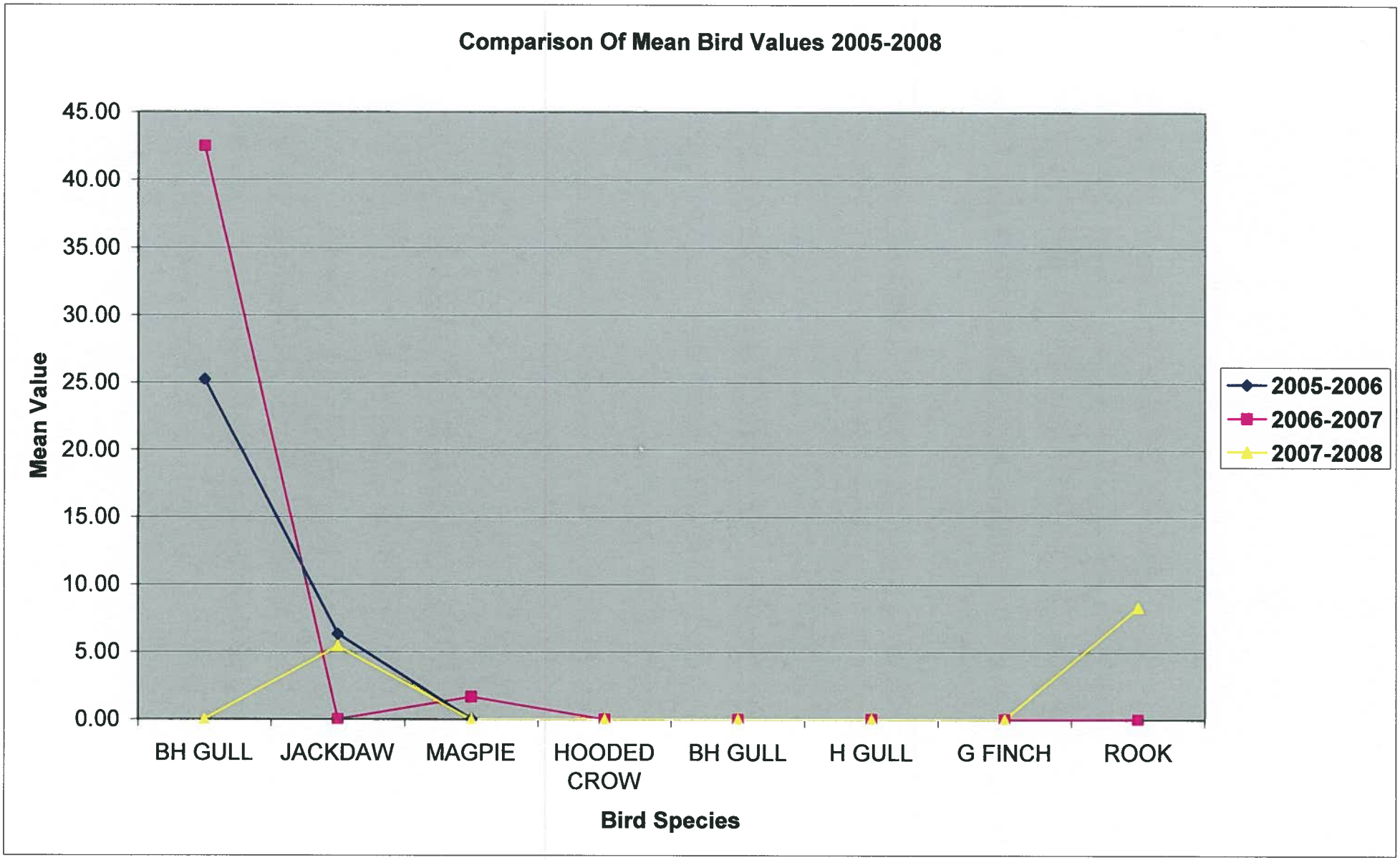
## Year End Report Dunmore Landfill, Kilkenny April 2007 to March 2008

| | Rook | Jackdaw | Magpie | Hooded Crow | Starling | H Gull | BH Gull | G Finch | Month Total |
|---|---|---|---|---|---|---|---|---|---|
| Apr-07 | 0 | 65 | 0 | 0 | 0 | 0 | 0 | 0 | 65 |
| May-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Jun-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Jul-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Aug-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sep-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oct-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nov-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dec-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Jan-08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feb-08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mar-08 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| Total | 100 | 65 | 0 | 0 | 0 | 0 | 0 | 0 | |

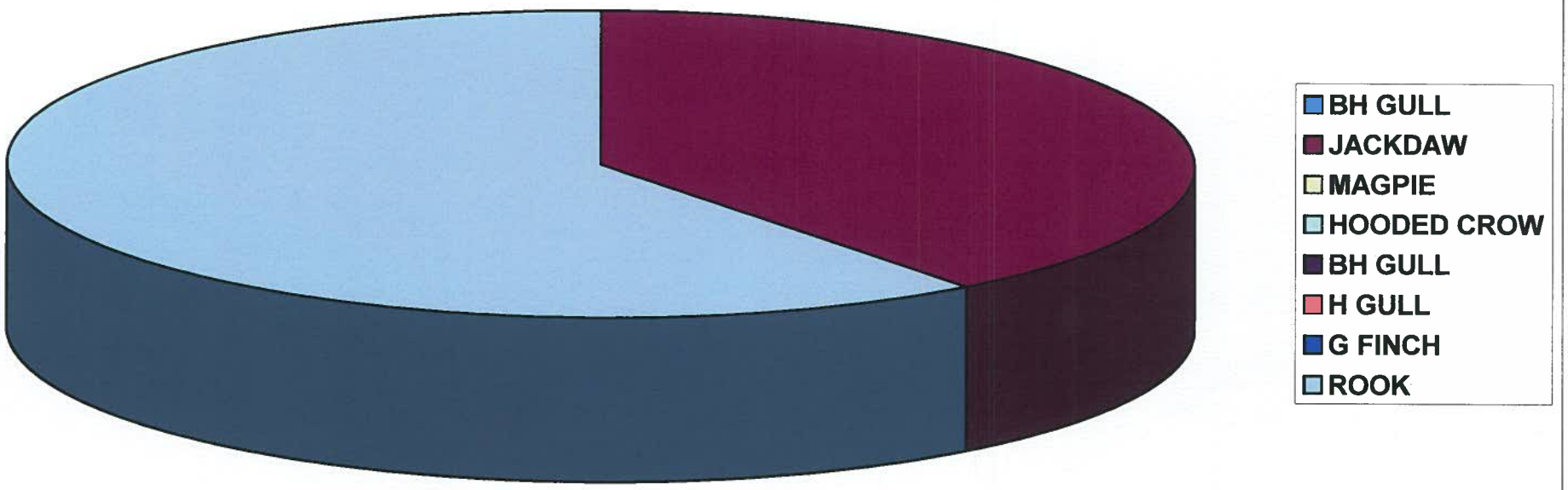
| | ROOK | JACKDAW | MAGPIE | HOODED CROW | STARLING | H GULL | BH GULL | G FINCH |
|---|---|---|---|---|---|---|---|---|
| MEAN | 8.33 | 5.42 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| STANDARD | 28.87 | 18.76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

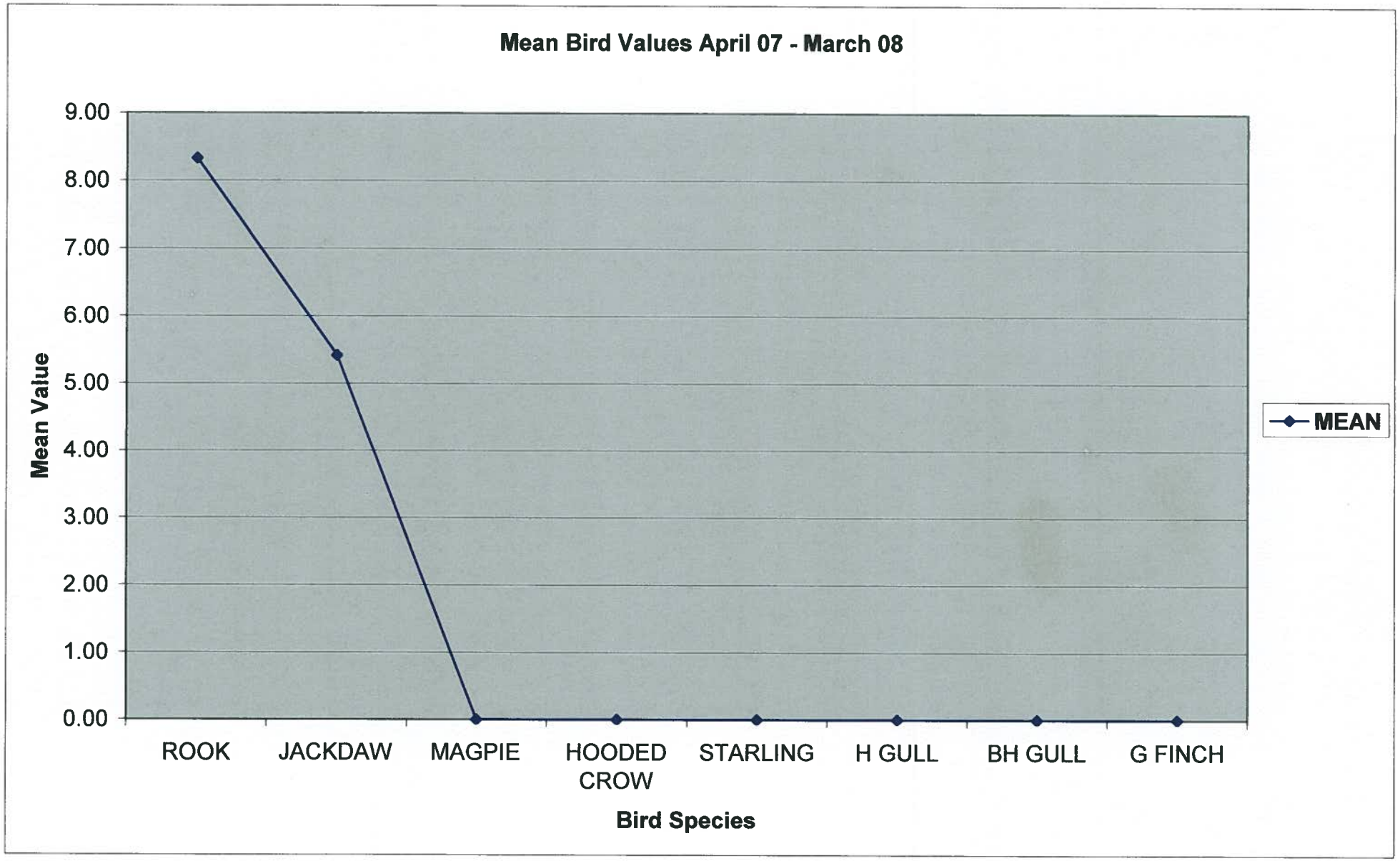
| | 2005-2006 | 2006-2007 | 2007-2008 |
|---|---|---|---|
| BH GULL | 25.25 | 42.50 | 0.00 |
| JACKDAW | 6.33 | 0.00 | 5.42 |
| MAGPIE | 0.00 | 1.66 | 0.00 |
| HOODED CROW | 0.00 | 0.00 | 0.00 |
| BH GULL | 0.00 | 0.00 | 0.00 |
| H GULL | 0.00 | 0.00 | 0.00 |
| G FINCH | 0.00 | 0.00 | 0.00 |
| ROOK | 0.00 | 0.00 | 8.33 |


Monthly Bird Count Dunmore April 2007 to March 2008
Bird Count
120
100
80
60
40
20
0
Apr-07
May-07
Jun-07
Jul-07
Aug-07
Sep-07
Oct-07
Nov-07
Dec-07
Jan-08
Feb-08
Mar-08
Month
Rook
Jackdaw
Magpie
Hooded Crow
Starling
H Gull
BH Gull
G Finch


Comparison Of Mean Bird Values 2005-2008
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Mean Value
BH GULL
JACKDAW
MAGPIE
HOODED CROW
BH GULL
H GULL
G FINCH
ROOK
Bird Species
2005-2006
2006-2007
2007-2008

## Distribution of Main Problem Birds
## April 07 to March 08

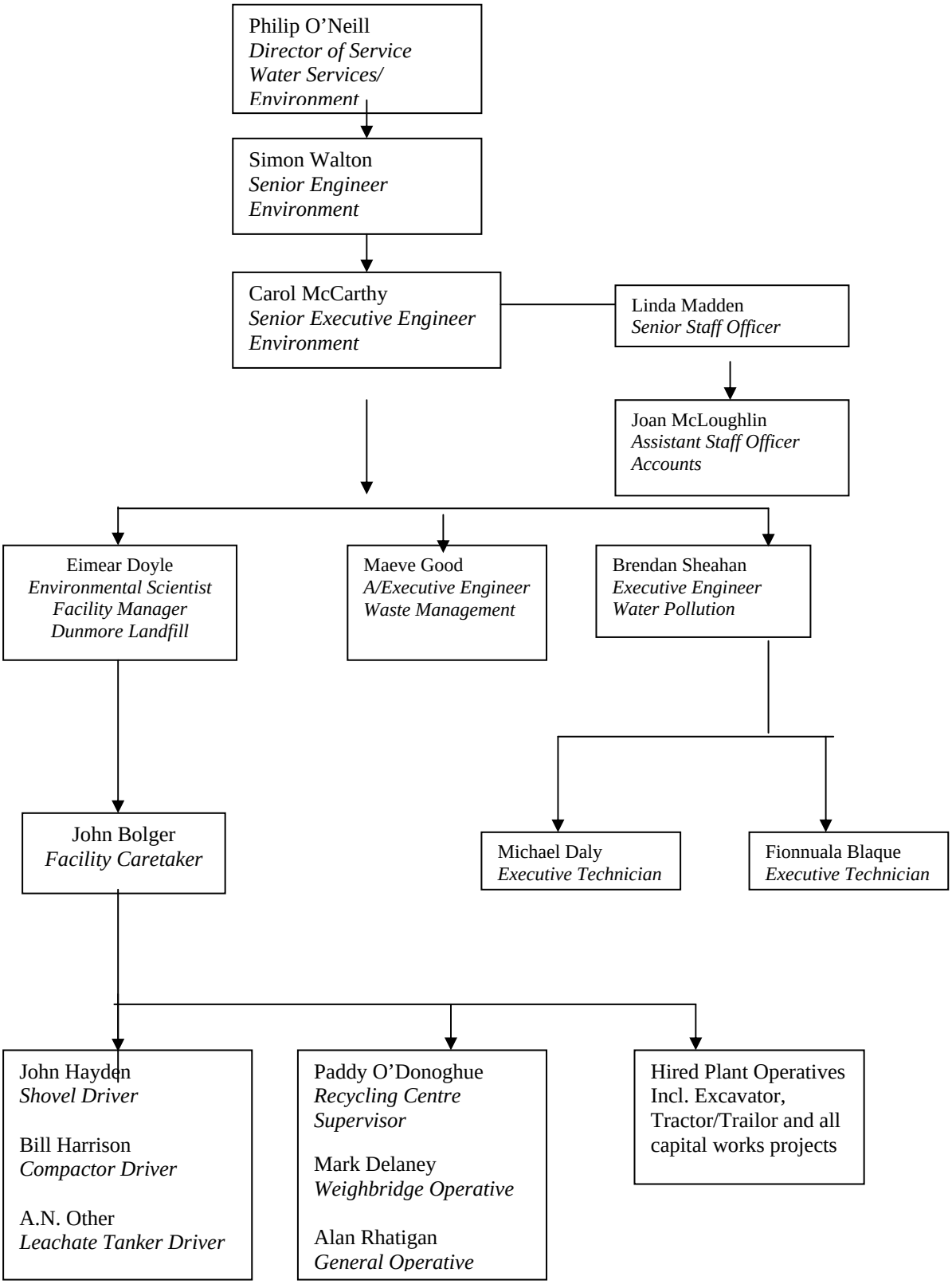



Mean Bird Values April 07 - March 08
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Mean Value
ROOK
JACKDAW
MAGPIE
HOODED CROW
STARLING
H GULL
BH GULL
G FINCH
Bird Species
MEAN

# Appendix J

Management Structure

## Staff Structure – Dunmore Landfill



**Contingency Arrangements**

The contingency arrangements for the absences of the main persons from the facility are outlined below;

| **Person Absent** | **Replacement** |
|---|---|
| Senior Engineer,<br>Mr. Simon Walton | Senior Executive Engineer,<br>Ms. Carol McCarthy |
| Facility Manager,<br>Ms. Eimear Doyle | Senior Executive Engineer,<br>Ms. Carol McCarthy |
| Caretaker,<br>Mr. John Bolger | Facility Manager,<br>Ms. Eimear Doyle |
| Weighbridge Operator,<br>Mr. Mark Delaney | Caretaker/General Operative |

# Appendix K

Sample Flare Data

| DATE | TIME | MS | MARKER | INDEX | STATUS | VALUE |
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| 8 | {::[Logix_PLC]Program:MainProgram.TEMPER |

# Appendix L

AER Returns Worksheet

# AER Returns Worksheet

Version 1.1.04

| | |
|---|---|
| **REFERENCE YEAR** | 2008 |

## 1. FACILITY IDENTIFICATION

| | |
|---|---|
| Parent Company Name | Kilkenny County Council |
| Facility Name | Dunmore Landfill |
| PRTR Identification Number | W0030 |
| Licence Number | W0030-02 |

Waste or IPPC Classes of Activity

| No. | class_name |
|---|---|
| 3.5 | Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment. |
| 3.11 | Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule. |
| 3.12 | Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule. |
| 3.13 | Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced. |
| 4.2 | Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes). |
| 4.3 | Recycling or reclamation of metals and metal compounds. |
| 4.4 | Recycling or reclamation of other inorganic materials. |
| 4.9 | Use of any waste principally as a fuel or other means to generate energy. |
| 4.10 | The treatment of any waste on land with a consequential benefit for an agricultural activity or ecological system. |
| 4.11 | Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule. |
| 4.13 | Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced. |
| 3.1 | Deposit on, in or under land (including landfill). |
| 3.2 | Land treatment, including biodegradation of liquid or sludge discards in soils. |
| 3.4 | Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons. |

| | |
|---|---|
| Address 1 | Dunmore |
| Address 2 | Co. Kilkenny |
| Address 3 | |
| Address 4 | |
| | |
| | |
| Country | Ireland |
| Coordinates of Location | 410200.000 |
| River Basin District | IESE |
| NACE Code | 382 |
| Main Economic Activity | Waste treatment and disposal |
| **AER Returns Contact Name** | Eimear Doyle |
| **AER Returns Contact Email Address** | eimear.doyle@kilkennycoco.ie |
| **AER Returns Contact Position** | Landfill Manager |
| **AER Returns Contact Telephone Number** | 056 7767848 /087 2290912 |
| **AER Returns Contact Mobile Phone Number** | 087 9933503 |
| **AER Returns Contact Fax Number** | 056 7767859 |
| **Production Volume** | 18240.0 |
| **Production Volume Units** | tonnage |
| **Number of Installations** | 1 |
| **Number of Operating Hours in Year** | 2418 |
| **Number of Employees** | 10 |
| **User Feedback/Comments** | There were no release of emissions to waters, wastewater / sewer or land with regards to Dunmore Landfill. As per schedule D.7 of W0030-02 the monitoring frequency of nitrogen oxides and sulphur oxides is biannual and therefore no figures available for 2008. |
| **Web Address** | |

**2. PRTR CLASS ACTIVITIES**

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

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

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

## 4.1 RELEASES TO AIR

### SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

| RELEASES TO AIR | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | METHOD | | | | QUANTITY | | |
| | | | Method Used | | | | | |
| No. Annex II | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year |
| 02 | Carbon monoxide (CO) | E | ESTIMATE | | 1.23 | 1.23 | 0.0 | 0.0 |

### SECTION B : REMAINING PRTR POLLUTANTS

| RELEASES TO AIR | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | METHOD | | | | QUANTITY | | |
| | | | Method Used | | | | | |
| No. Annex II | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |

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

| RELEASES TO AIR | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | METHOD | | | | QUANTITY | | |
| | | | Method Used | | | | | |
| Pollutant No. | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |

## 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:** Dunmore Landfill

| **Please enter summary data on the quantities of methane flared and / or utilised** | **T (Total) kg/Year** | **M/C/E** | **Method Used** | | **Facility Total Capacity m3 per hour** | |
|---|---|---|---|---|---|---|
| | | | **Method Code** | **Designation or Description** | | |
| Total estimated methane generation (as per site model) | 0.0 | | | | N/A | |
| Methane flared | 409000.0 | E | ESTIMATE | ESTIMATE | 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) | 0.0 | | | | N/A | |

## 4.2 RELEASES TO WATERS



### SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

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

| RELEASES TO WATERS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | | | | | QUANTITY | | |
| | | | Method Used | | | | | |
| No. Annex II | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |

### SECTION B : REMAINING PRTR POLLUTANTS

| RELEASES TO WATERS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | | | | | QUANTITY | | |
| | | | Method Used | | | | | |
| No. Annex II | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |

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

| RELEASES TO WATERS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | | | | | QUANTITY | | |
| | | | Method Used | | | | | |
| Pollutant No. | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |

## 4.3 RELEASES TO WASTEWATER OR SEWER

### SECTION A : PRTR POLLUTANTS

**OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER**

| POLLUTANT | | METHOD | | | | QUANTITY | | |
|---|---|---|---|---|---|---|---|---|
| | | | Method Used | | | | | |
| No. Annex II | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |

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

**OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER**

| POLLUTANT | | METHOD | | | | QUANTITY | | |
|---|---|---|---|---|---|---|---|---|
| | | | Method Used | | | | | |
| Pollutant No. | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |

## 4.4 RELEASES TO LAND



### SECTION A : PRTR POLLUTANTS

| RELEASES TO LAND | | | | | | | |
|---|---|---|---|---|---|---|---|
| POLLUTANT | | METHOD | | | | QUANTITY | |
| | | | Method Used | | | | |
| No. Annex II | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 |

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

| RELEASES TO LAND | | | | | | | |
|---|---|---|---|---|---|---|---|
| POLLUTANT | | METHOD | | | | QUANTITY | |
| | | | Method Used | | | | |
| Pollutant No. | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 |

## 5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE



| Transfer Destination | European Waste Code | Hazardous | Quantity T/Year | Description of Waste | Waste Treatment Operation | Method Used | | Location of Treatment | Name and Licence / Permit No. of Recoverer / Disposer / Broker | Address of Recoverer / Disposer / Broker | Name and Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY) | Licence / Permit No. of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | M/C/E | Method Used | | | | | |
| **Within the Country** | **19 07 03** | **No** | 13041.02 | Landfill Leachate | D6 | M | Weighed | Onsite in Ireland | Purcellsinch Waste Water Treatment Plant Kilkenny | Purcellsinch County Kilkenny | | |