

Youghal Landfill Site

ANNUAL ENVIRONMENTAL REPORT

December 31st 2008
To December 31st 2009



Cork County Council

Original

Environmental Protection Agency
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Waste
Licence Reg.
No.

W0068 - 02

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1. INTRODUCTION

1.1. Scope and Purpose of the Report

Cork County Council holds a Waste Licence (Register No.W0068-02) to operate Youghal Landfill Site. The aim of this Annual Environmental Report (AER) is to provide a review of activities at Youghal Landfill Site within the past 12 months. The required scope of the report is outlined in Schedule F (Content of the Annual Environmental Report) of the Waste Licence.

1.2. Background to the Report

The landfill facility has been in operation since 1972. The Environmental Protection Agency (EPA) granted Cork County Council with a review of the waste management licence on January 18th 2005 (Waste Licence No. W0068-02). This review proposed to increase the waste intake tonnage from 37,000 to 170,000 tonnes per annum and to increase the final profile level from 11m to 15m OD. The facility has been operating under the reviewed licence since that date.

In accordance with the requirements of Condition 11.4.1 and Schedule E of the Waste Licence, the Annual Environmental Report (AER) for the facility is to be submitted to the EPA by March 31st of each year.

This is the ninth AER to be submitted to the EPA and covers the reporting period December 31st 2008 to December 31st 2009.

1.3. Site Location

The facility is located at:

Youghal Mudlands,
Youghal,
Co. Cork

Tel/Fax: (024) 93834
(024) 91084

The location of the site is shown on Figure 1.1.

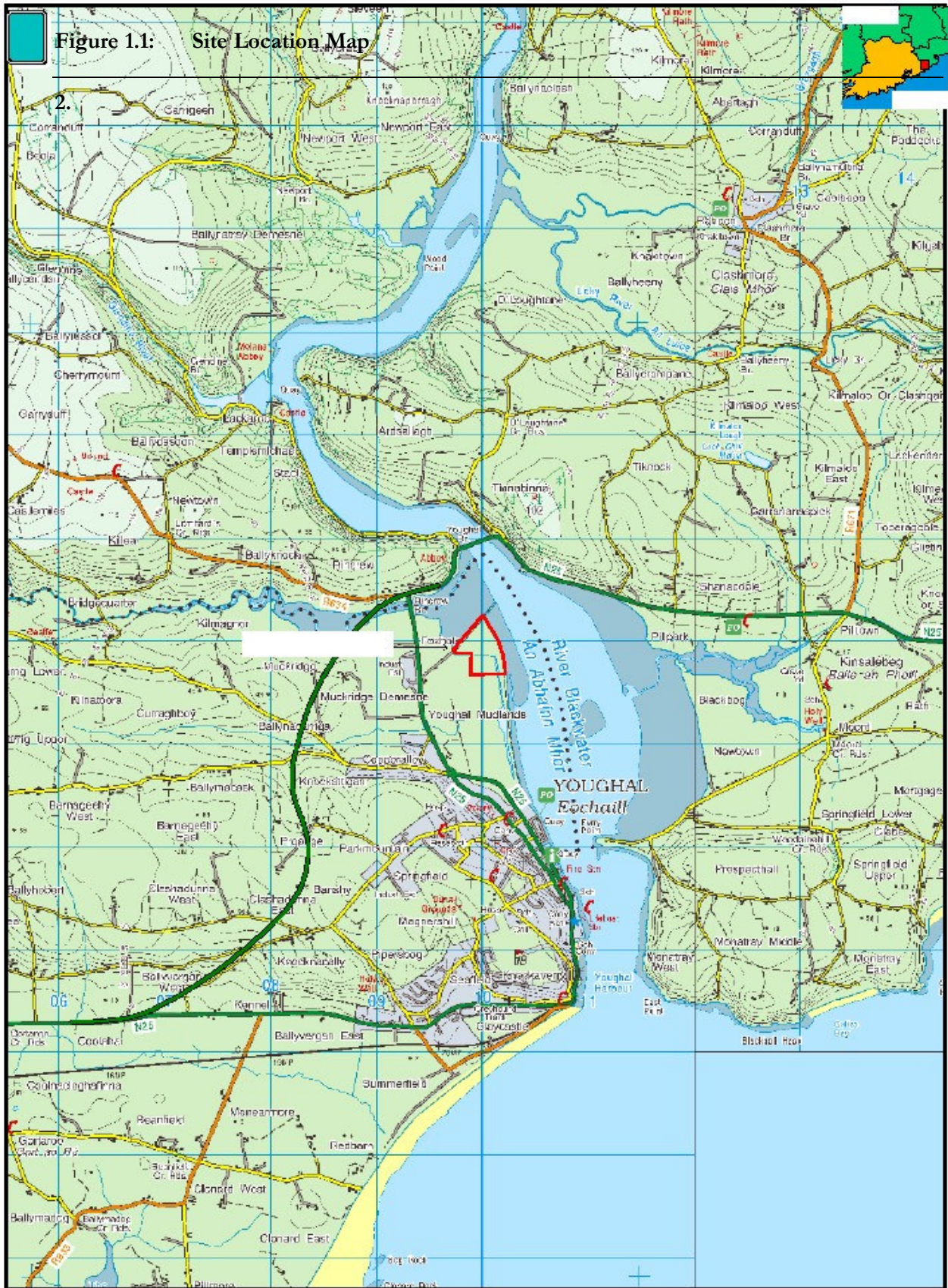
The National Grid Reference for the site is 2100E, 0800N.

1.4. Environmental Policy

Cork County Council is committed to conducting all activities such that they have a minimal effect on the environment.

The main objectives of the Council are:

- A commitment to comply with the Waste Licence and all relevant environmental legislation and approved code of practice.
- To reduce negative environmental impacts by continually developing and modifying all procedures.
- To provide adequate training and awareness to all employees with regard to minimising environmental risks.
- To ensure that management and all personnel working on the site are familiar with the conditions of the waste licence, the content of the Environmental Management Plan and the Emergency Response Procedures.



2. SITE DESCRIPTION AND ACTIVITIES

2.1 Description of the Site

Youghal Landfill Site occupies an area of approximately 15 hectares and is located in the townland of Youghal Mudlands, 1.8km north of Youghal town.

The site lies adjacent to the River Blackwater estuary. Surface water on the site drains southwards along man-made drainage channels. An east-west drainage ditch separates the active landfill area and the proposed extension to the south.

There are no major water abstractions within the immediate catchment of the landfill. The groundwater quality is indicative of the overburden geology, being high in chloride, sodium, magnesium, sulphate and electrical conductivity.

Unconsolidated deposits at the site vary from peats and clays to gravels. The type and thickness of unconsolidated material varies laterally beneath the site. Grey silty clays and silty sands representing typical tidal mudflat deposits are widespread across the site, occurring in the upper 5 m.

Peat deposits are encountered in the upper metre of the uncultivated portions of the mudflats. Beneath these deposits there is evidence of a former river channel. Sands, silts and gravels represent these associated, unconsolidated materials. A significant thickness of stiff clay is encountered particularly under the western area of the site. This is 'brick' clay formerly extracted from clay pits to the west of the site. It is likely to be glacial in origin.

Bedrock is anticipated to be between 35 and 40 m below ground surface. This Waulsortian limestone is classified as a locally important aquifer. It is likely to be confined by the overlying clay layer that acts as a barrier between the overburden groundwater and the bedrock groundwater. As a result the bedrock has a low to moderate vulnerability. Peat, which covers the Youghal mudflats, confines the overburden groundwater but is only one metre thick therefore the overburden groundwater has an extreme vulnerability rating. Saline intrusion to the overburden groundwater indicates hydraulic continuity with the Blackwater Estuary.

The meteorological station at Rossmore Landfill indicates prevailing winds from the southwest, as per other years. Our rainfall data is taken from Rossmore Landfill weather station as Roches Point is no longer a manned station. The annual rainfall at the site during 2009 is outlined in Table 2.1.

Table 2.1: Rainfall at Rossmore Landfill 2009

Month	Rainfall/mm
January	176.8
February	16.2
March	33.8
April	161.4
May	69.6
June	91.6
July	230.6
August	152.4
September	52.2
October	77.2
November	240.1
December	171.8
Total	1473.7

2.2 Waste Activities carried out at the Facility

Waste activities at Youghal landfill facility are restricted to those outlined in Schedule A of the Waste Licence as outlined below: -

Third Schedule

- Class 1 Deposit on, in or under land (including landfill).
- Class 5 Specially engineered landfill, including placement into lined discrete cells, which are capped and isolated from one another and the environment.
- Class 6 Biological treatment not referred to elsewhere in this Schedule that results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 10 of this Schedule.
- Class 7 Physico-chemical treatment not referred to elsewhere in this Schedule (including evaporation, drying and calcination) which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 10 of this Schedule (including evaporation, drying and calcination).
- Class 12 Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.
- Class 13 Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.

Fourth Schedule

<u>Class 2</u>	Recycling or reclamation of organic substances that are not used as solvents (including composting and other biological transformation processes).
<u>Class 3</u>	Recycling or reclamation of metals and metal compounds.
<u>Class 4</u>	Recycling or reclamation of other inorganic materials.
<u>Class 9</u>	Use of waste principally as a fuel or other means to generate energy.
<u>Class 10</u>	Use of waste obtained from any activity referred to in a preceding paragraph of the Schedule.
<u>Class 11</u>	Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.
<u>Class 13</u>	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.

The main activity at the site is the landfilling of non-hazardous domestic and commercial waste.

The facility accepts domestic, commercial and industrial non-hazardous waste only.

2.3 Waste Quantity and Composition

The quantity and composition of waste received and disposed of during the reporting period is outlined in Table 2.2 and Table 2.3, respectively.

Table 2.2: Quantities of Waste Received and Disposed of during the Reporting Period:

	Quantity of Waste tonnes			Inert Cover Material Tonnes ¹
	Domestic Waste	Commercial Waste	Industrial Waste	
January	1,972.34	411.55	5.28	2,005.45
February	1,584.86	403.71	1.74	3,147.3
March	1,778.86	422.47	7.52	2,226.16
April	1,905.81	378.45	6.5	1,922.18
May	1,903.03	433.71	0	672.62
June	1,951.74	406.81	7.78	580.74
July	5,757.89	1,519.89	0	947.17
August	4,792.8	2,250.26	2.12	827.68
September	4,803.23	2,434.73	1.4	3,745.02
October	4,675.35	2,191.69	27.6	438.82
November	4,654.42	2,380.97	1.68	556.02
December	5,015.81	2,586.05	8.67	1,269.68
Total	40,796.14	15,820.29	70.29	18,338.84

Note 1: Table 2.2 includes inert cover material for which there is no limit at the facility.

	January	February	March	April	May	June	July	August	September	October	November	December
Aerosol Containers	0	0	0	0	0	0	0	0	0	0	0	0
Beverage Cans	0.92	0.44	0.34	0.32	0.26	0.28	0.18	0.16	0	0.1	0.29	0.22
Cardboard	18.62	6.9	7.82	6.52	9	7.16	10.34	6.54	10.48	8.62	7.32	12.5
DIY Waste	0	0	0	0	0	0	0	0	0	0	0	0
Fluorescent Tubes	0	0	0	0	0	0	0	0	0	0	0	0
Food Tins	1.1	0.78	0.62	1.08	0.12	1.02	0.5	0.6	0.98	0.88	0.58	1.16
Glass Bottles	10.08	7.5	7.14	5	8.5	5.08	8.98	7	6.38	6.22	4.44	5.63
Green Waste	2.62	0	4.24	5.58	7.54	9.4	8.82	16.22	5.46	6.12	6.12	0
Household Batteries	0	0	0	0	0	0	0	0	0	0.47	0	0
Lead Acid Batteries	0	0	0	0	0	0	0	0.95	0.93	0	0.6	0
Magazines & Paper	17.06	13.58	14.44	13.82	12.76	11.88	16.92	14.4	14.96	12.86	12.46	14.29
Paint	0	0.14	0	1.92	0	0.74	0	1.32	0	0	0	0
Plastic Bottles	3.38	2.1	2.8	2.38	2.94	3.04	2.98	2.42	2.6	2.22	0	2.42
Plate Glass	0	0	0	7.14	0	0	0	0	0	0	0	0
Plaster Board	0	0	0	0	0	0	0	0	0	0	1.78	0
Polystyrene	0	0	0	0	0	0	0	0	0	0	0	0
Scrap Metal	8.02	4.44	3.66	10.6	7.46	5.72	7.68	5.22	8.72	4.8	4.04	4.8
Textiles	1.7	1.1	0.98	1.12	1.2	1.28	1.96	1.38	1.3	0.88	1.24	1.18
Timber	7.26	7.72	13.38	7.68	6.95	14.68	14.08	9.36	10.46	7.95	7.62	6.2
Waste Cooking Oil	0	0	0	0	0.58	0	0	0	0	0	0	0
Waste Engine Oil	0	0	0	0	2.48	0	0	0	0	0	0	0
WEEE	7.76	16.36	22.5	15.44	19.68	19.72	7.58	21.52	19.48	10.62	12.52	20.74
Totals	78.52	61.06	77.92	78.6	79.47	80	80.02	87.09	81.75	61.74	59.01	69.14
Cumulative Totals	78.52	139.58	217.5	296.1	375.57	455.57	535.59	622.68	704.43	766.17	825.18	894.32
Domestic Waste Total	60.82	49.4	67.06	47.36	34.78	50.74	32.3	46.12	18.94	31.32	54.9	45.47
Cumulative Dom. Total	60.82	110.22	177.28	224.64	259.42	310.16	342.46	388.58	407.52	438.84	493.74	539.21
Total Materials - Mth.	139.34	110.46	144.98	125.96	114.25	130.74	112.32	133.21	100.69	93.06	113.91	114.61
Cumulative Total Materials	139.34	249.8	394.78	520.74	634.99	765.73	878.05	1011.26	1111.95	1205.01	1318.92	1433.53
Recycling Rate - Mth.	56.35%	55.28%	53.75%	62.40%	69.56%	61.19%	71.24%	65.38%	81.19%	66.34%	51.80%	60.33%
Recycling Rate - Yr.	56.35%	55.88%	55.09%	56.86%	59.15%	59.49%	61.00%	61.57%	63.35%	63.58%	62.56%	62.39%

Table 2.4: Quantities of waste received and disposed of during the lifetime of the Site

Year	Quantity of Waste / tonnes
1988 - 1998	174,635
1999	28,000
2000	28,000
2001	14,808 ¹
2002	47,505.12
2003	29,646.02
2004	5,376.67
2005	3,092.89
2006	12,280.59
2007	128,996.08
2008	104,453.27
2009	56,686.76
Total	632,480.4

Note 1: This is an estimated total figure for MSW accepted to the facility for 2001. This quantity includes the 2,000 tonnes deposited by the general public.

2.4 Remaining Capacity

On the 31st December 2009 the remaining capacity at Youghal Landfill is estimated to be approx 55,000 m³. This is the estimated remaining capacity of the existing Cell 9.

Final capacity, depending on the rate of waste intake, will be reached in early 2011 at which stage the landfill facility will cease to accept waste. The civic amenity facility will continue to operate with the associated waste materials being transferred offsite for disposal or recovery as appropriate.

2.5 Methods of waste deposition

In 2009, all waste accepted on site was deposited in the constructed Cell 9 within the existing active area. The refuse vehicles entered the working cell and deposited the waste at the working face. The working face was approximately 18 m wide on average.

Once the waste was deposited a steel-wheeled waste compactor (sheep footed compactor weighing 58 tonnes) and a bulldozer were used to place and compact the waste. To prevent the formation of voids, all hollow objects and large articles deposited on the site were crushed, broken up, flattened or otherwise treated.

At the end of each working day, the working face was covered with compost material/clay material in order to minimise any nuisance.

3 SUMMARY OF MONITORING AND EMISSIONS

3.1 Landfill Gas

Condition 8 and Schedule E of the licence requires that the licensee conduct monthly monitoring in the gas borehole monitoring wells in order to detect landfill gas on site and offsite gas migration. The gas is monitored using a "GA94" infrared gas analyser, which detects percentage levels of carbon dioxide, methane and oxygen. Continuous 24 hour monitoring in the site manager's office and caretakers office is carried out in order to detect accumulation of landfill gas. Calibration of these monitoring systems is carried out on annual basis.

The location of landfill gas monitoring boreholes are illustrated in Drawing No. 2005-004-01 Rev A:- Location Map of Environmental Monitoring Points, which is included in Appendix 1.

Results of gas within the landfilled area shows varying levels of methane and carbon dioxide at boreholes G1, G2, and G3.

G1 is situated in waste, near the caretaker shut and carbon dioxide was detected here ranging from 0% to 3.4%. G2 is again situated in waste near the CA site. Carbon dioxide levels varied between 0% and 19%. G3 is situated near the entrance to the landfill road and the waste at this location is the oldest on site. The concentration of carbon dioxide ranged from 1.6% to 17.1%.

G2 and G3 exceeded methane limits a number of times during 2009. Methane levels at G2 varied from 0%- 17% (September), while G3 levels ranged from 0% to 6.4% (March).

Gas well G4 was inaccessible during the reporting period due to site works and newly erected fencing. G5 was destroyed in 2008 due to capping.

G6 and G7 are perimeter wells on the public walkway around the site. The carbon dioxide reading varied from 0% to 0.4% in G6 and 0% 2.8% in G7. Monitoring of gas wells G6 and G7 showed raised levels of carbon Dioxide during the reporting period.

Long term trends

The monitoring of all wells shows a similar profile to previous year's results. Monitoring of the perimeter wells will be maintained to insure that gas exceedence can be identified.

There is no evidence of the build up of landfill gas in the site buildings.

3.2 Surface Water

Condition 8 and Schedule E.2 of the licence requires the licensee to conduct surface water monitoring at various locations on and surrounding the site. The frequency of monitoring varies from weekly to annually depending on the location.

Surface water results for the licensed year have been submitted to the EPA in two six monthly reports (June 2009 and January 2010). These results have been compared to the following surface water criteria:

- Salmonid Water Regulations;
- Water Quality (Dangerous Substances) Regulations, 2001 (S.I.No.12 of 2001);
- Surface Water Regulations S.1 No. 294 of 1989 Surface Water Directive (75/440 EEC).

For the quarterly monitoring events, parameters analysed indicated elevated levels of:

- electrical conductivity
- ammoniacal nitrogen
- chemical oxygen demand
- chloride
- BOD
- COD

While some of the exceedences e.g., conductivity, chloride and sodium may be attributable to tidal influence, others may be due to landfilling operations at the site.

In the reporting period 2009, the concentration of all analytes, were within the criteria given for surface waters. This is similar to 2008 and 2007 results, with the exception of minor exceedence on zinc in 2006.

GA127

Surface water at monitoring point GA127, flows in a northerly direction towards the landfill along the western boundary of the cells 8 and 9. It then flows eastwards in a drainage ditch and discharges to the main drainage channel along the eastern site boundary. The water quality analysis over the reporting period 2009, at GA127 indicates that the water quality is good. Concentrations of all analytes are all within the parameters set down.

There is an increase in Ammoniacal nitrogen throughout the reporting year from <0.1 mg N/l (Q1) TO 5.67 mg N/l (Q3) and 4.54 mg M/l (Q4). Suspended solids recorded

their highest levels at Q1 (77 mg/l), a steady decrease is seen throughout the reporting year to 8.5 mg/l in Q4. BOD and COD levels increased in the last two quarters of 2009.

As discussed in last year's report the area close to GA127 has become ponded and the flow restricted. Pond weed has developed and this has led to low dissolved oxygen readings. This is still the case and possible solutions will have to be investigated in 2010.

SW1

Surface water monitoring location SW1 is located inside the sluice gate, west of the site, adjacent to the site entrance. The results for the reporting period indicate that the water quality at this location is good. Surface water at this location is tidally influenced, although flow rate is poor. Parameters, which were exceeded at SW1 during the licensed year, were:

- Chloride concentrations of 509 mg/l & 620 mg/l were recorded in Q1 and Q2.
- Electrical Conductivity of 1.9 mS/cm Q1 and 2.23 mS/cm during Q2.
- Total suspended solids of 66 mg/l during Q1.

Elevated levels of chloride and electrical conductivity detected, without other criteria limits being exceeded, are attributed to tidal impact.

The 2009 results compare favourably in comparison to previous reporting periods (December 2000 to December 2008). The overall surface water results at this location show the following parameters have exceeded the surface water criteria used, since 2000:

- chromium (February 2001)
- chloride (June 2001, July 2002, April 2003, May and August 2004, Feb 2005, March/June/October 2006, August and October 2007, March/May/December 2008).
- electrical conductivity (June/September 2001, July 2002, August/November 2003, August 2004, Feb 2005, June 2006, March 2007, March 2008)
- ammoniacal nitrogen (January 2002)
- manganese (July 2002)
- sulphate (July 2002)
- total suspended solids (February/April 2003, February 2004, June 2006)
- chemical oxygen demand (August/November 2003)
- sodium (April 2003, May 2004)

SW2

Sampling point SW2 is located within the site boundary to the east of the active filling area. SW2 is in the main drainage channel from the site. Flow at SW2 is low with little dilution of any runoff from the landfill. Contract works in this area led to contaminated run-off entering the waterway in September 2008. This monitoring point (along with SW6) was monitored monthly, thereafter, to assess any effect on water quality. Elevated readings of Chloride were recorded throughout the monitoring period, ranging from 5800 mg Cl/l (Q1) to 1960 mg Cl/l (Q3). COD levels breached the limits set under the directive ranging from 150 mg/l (Q2) to 89.4 mg/l (Q3). BOD level breached the limits set during Q2. It should be noted that no annual monitoring parameters were breached during 2009 monitoring period.

The following parameters exceeded surface water criteria at SW2 during the reporting period:

- Electrical conductivity ranged from 6.11 mS/cm (Q3) to 15 mS/cm (Q1)
- Ammoniacal nitrogen ranging from 4.54 mg N/l (Q2) and 6.6 mg N/l (Q3)
- Sulphates ranging from 670 mg SO₄/l (Q1) to 462 mg SO₄/l (Q2)

In comparison to previous reporting periods (December 2000 to December 2008), the following parameters exceeded surface water criteria at SW2:

- electrical conductivity (February/June/September/November 2001, April/October 2002, February/April 2003, August and February 2004, November 2005, March/June/October/December 2006, March/May/August/October 2007, Q1/Q2/Q3/Q4 2008)
- ammoniacal nitrogen (February 2001, December 2006, March/May/August/October 2007, Q1/Q2/Q3/Q4 2008)
- chemical oxygen demand (February/June/September/November 2001, April/October 2002, August/November 2003, August 2004)
- calcium (February 2001)
- chloride (February/June/September/November 2001, April & October 2002, February & November 2003, February & November 2004, February/May/ July/November 2005, March/June/October/December 2006, March/May/August/October 2007)
- magnesium (February 2001, May 2004)
- potassium (February 2001)
- sodium (February 2001, May 2004)
- sulphate (February 2001, Q1/Q2/Q3/Q4 2008)
- lead (November 2001)
- fluoride (November 2001)
- sulphate (July 2002)
- total suspended solids >50mg/l⁻¹ (July 2002, June 2006)
- biochemical oxygen demand (February 2003)
- Manganese (April 2003).

The water quality at SW2 is similar to previous years results.

SW3

Surface water sampling location SW3 is located approximately 1,000m downstream of SW6, inside the sluice gate. This area is influenced by saline intrusion as indicated by the elevated conductivity, chloride and sodium results over the licensed year. The following parameters exceeded surface water criteria at SW3 during the reporting period:

- .Electrical conductivity ranging from 10.9 mS/cm (Q3) to 43.9 mS/cm (Q4)
- BOD level exceeded limits during Q3 (8 mg/l)
- COD exceeded limits during 2009, ranging from 65.4 mg/l (Q3) to 358 mg/l (Q4).
- TSS was breached during Q4 period 105 mg/l.
- Chloride levels ranged from 21,000 mg Cl/l (Q1) to 3980 mg Cl/l (Q3)

In comparison to the previous reporting periods (December 2000 to December 2008), the following parameters exceeded surface water criteria at SW3:

- electrical conductivity (February/June/September/November 2001, July/October 2002, February/April/September/November 2003, February/May/August/November 2004, February/May/ July/November 2005, March/June/October/December 2006, March/May/August/October 2007, Q1/Q2/Q3/Q4 2008)
- chemical oxygen demand (February/June/November 2001, July/October 2002, April/August 2003, February 2004, Q1/Q2/Q3/Q4 2008)
- calcium (February 2001)
- chloride (February/June/September/November 2001, July/October 2002, February/April 2003, February/May/August/November 2004, February/May/ July/November 2005, March/June/October/December 2006, March/May/August/October 2007, Q1/Q2/Q3/Q4 2008)
- magnesium (February 2001)
- potassium (February 2001)
- sodium (February 2001, May 2004)
- sulphate (February 2001)
- lead (November 2001)
- fluoride (November 2001)
- zinc (July 2005, October 2006)
- ammoniacal nitrogen (March 2006)

SW6

Sampling point SW6 is located, approximately 30 meters southeast of the boundary of the cells 6&7. Water at this location is tidally influenced as indicated by the elevated conductivity and chloride results over the licensed year. Exceedences of the following parameters occurred at SW6 over the reporting period:

- Elevated conductivity concentrations ranging from 40.2 mS/cm (Q2) to 8.30 m S/com (Q4)
- Chloride concentrations ranging from 11,000mg Cl/l (Q1) to 2870 mg Cl/l (Q4)
- BOD levels exceeded limits during Q2 (10 mg/l).
- COD levels of 270 mg/l (Q1) to 71.60 mg/l (Q4).
- Sulphates levels exceeded limits 1300 and 2220 mg SO4/l, Q1 and Q2 respectively.

In comparison to the previous reporting periods (December 2000 to December 2008), the following parameters exceeded surface water criteria at SW6:

- electrical conductivity (February/June/September/November 2001, July/October 2002, April/August 2003, February/May/August/November 2004, February/May/July/November 2005, March/June/October/December 2006, March/May/August/October 2007, Q1/Q2/Q3/Q4 2008)
- ammoniacal nitrogen (February/June/November 2001, April 2002, February/April 2003, February/May/August/November 2004, Q2/Q3/Q4 2008)
- chemical oxygen demand (February/June/September/November 2001, July/October 2002, February/August 2003, August 2004, Q1/Q2/Q3/Q4 2008)
- chloride (February/June/September/November 2001, July/October 2002, April/November 2003, February/May/August/November 2004, February/May/July/November 2005, March/June/October/December 2006, March/May/August/October 2007, Q2/Q3/Q4 2008)
- magnesium (February 2001)
- potassium (February 2001)
- sodium (February 2001)
- sulphate (February 2001)
- copper (November 2001)
- fluoride (November 2001)
- BOD (February/May/ July 2005, March 2006, Q1/Q2/Q3 2008)

Long Term Trends

Figure 3.1 shows the trend in ammoniacal nitrogen levels for 2009 at surface water monitoring locations and SW1, SW2, SW3, SW6 and GA127. Levels of ammoniacal nitrogen at all monitoring points are similar to 2008 results. SW2 shows decrease from high levels recorded in 2008.

Figure 3.1: Surface Water Ammoniacal Nitrogen Levels

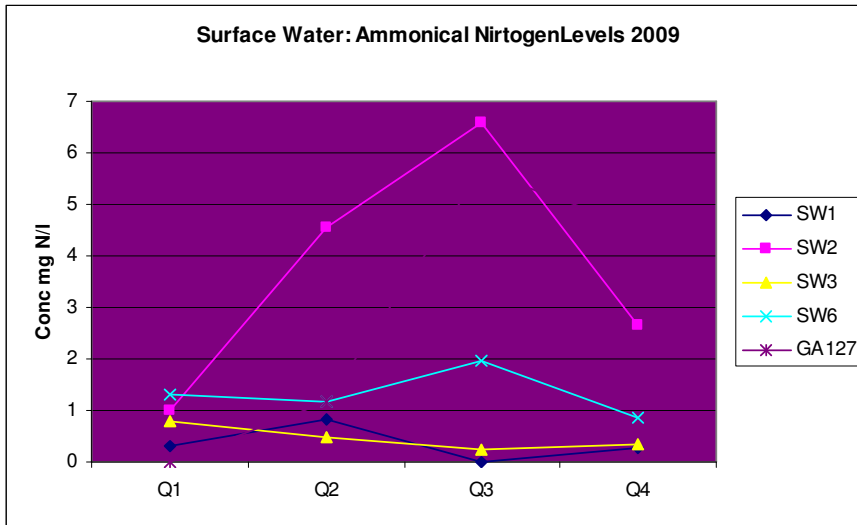
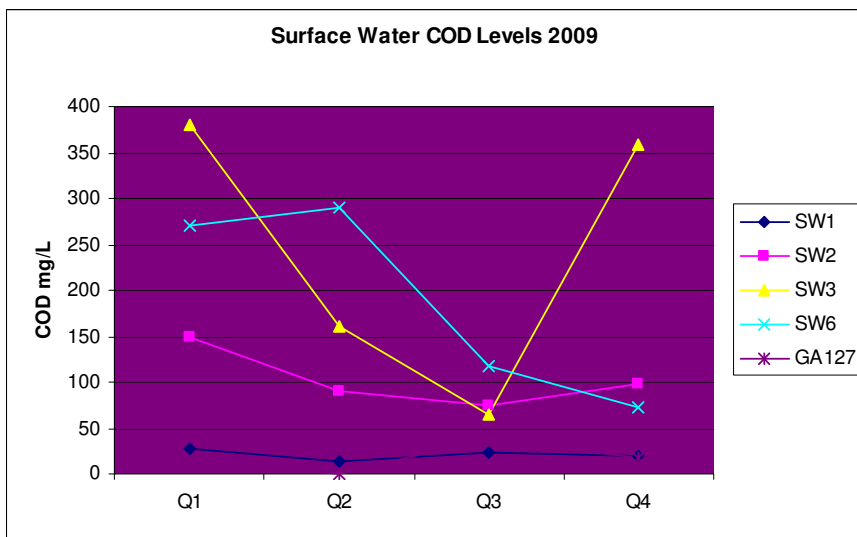


Figure 3.2 shows the trend in COD Concentration. The results for all monitoring points were acceptable with some exceedence. There has been a noticed increase in COD levels at sites SW3, SW6 and SW2.

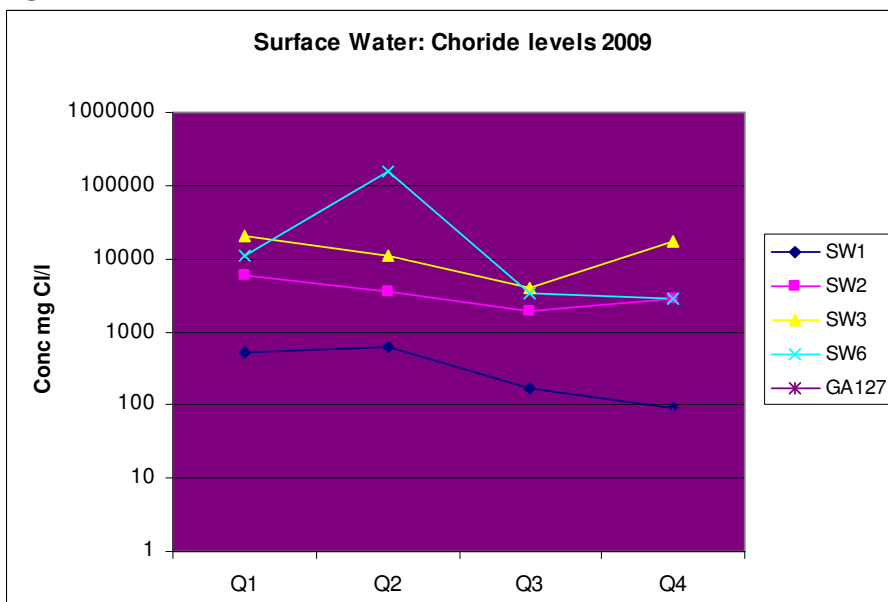
Figure 3.2: Surface Water COD Levels



Levels of pH do not differ significantly between upstream and downstream of the site and generally remain between 7.67 and 8.27.

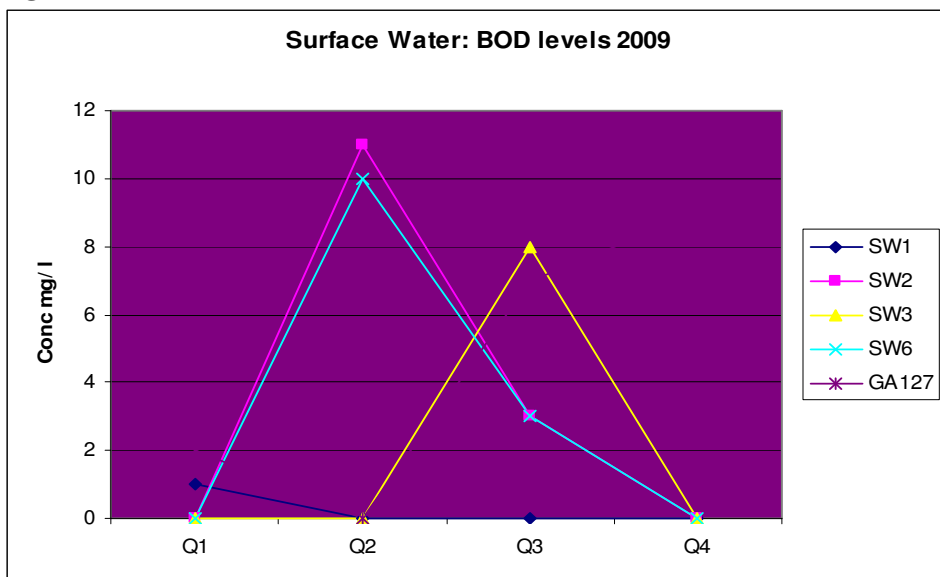
Chloride concentrations (see Figure 3.3) are within the surface water limit regulations of 250 mg l^{-1} at GA127. This stream is not influenced by tidal action or from activities at the landfill. Chloride concentrations at SW1, SW2, SW3 & SW6 are elevated. Chloride concentrations may be attributed to tidal action at these locations and by the construction of the “flow control structure” in the area, which is causing stagnation in the area. The construction a surface-water drainage system, started in November 2009, may alleviate the current situation in the area. If a regular flow can be introduced to the area then the current level of stagnation can be halted. Over time it can be reversed.

Figure 3.3: Surface Water Chloride Levels



Biochemical oxygen demand (BOD) concentrations have decreased around the site, especially SW2 and SW6. (Figure 3.4).

Figure 3.4: Surface Water BOD Levels



Overall there has been a continued improvement in results for surface water in 2009. The maximum readings have, in most cases, reduced in comparison to recent years. The installation of a surface water drainage scheme in 2010 for the capped Cell 6, 7 and 8 should improve water quality within the site. The addition of significant rainwater flows to the area should improve the water caused by stagnation due to construction works and flow control devices.

3.3 Groundwater

Condition 8 and Schedule E.2 of the licence require the licensee to conduct groundwater monitoring at locations (MW1, MW4 and MW7) within the site on a quarterly basis. Certain parameters (groundwater level and temperature) are monitored on a monthly basis. It was agreed with the Agency that ground water monitoring locations MW5, MW6 and MW8 are no longer required. MW2 and MW3 were included in the 2006 monitoring schedule to give results down-gradient from the new cells 6, 7, 8 & 9.

Groundwater monitoring results for the licensed year have been submitted to the EPA in two six monthly reports. These have been compared where possible to the Maximum Admissible Concentrations (MAC values) as set out in the "Drinking Water Regulations" European Community (Quality of Water Intended for Human Consumption) 1988 (Statutory Instrument S.I No. 81 of 1988). Comparison has also been made to the *Dutch List* groundwater quality on intervention and desired values.

MW1

MW1 is located at the northern perimeter of the site. This monitoring well is influenced by tidal action.

Groundwater monitoring of MW1 over the reporting period indicates the following trends:

- Electrical conductivity ranging from 26 (Q1) to 25.3 mS/cm (Q3).
- Chloride ranging from 10500 (Q3) to 12000 mg Cl/l (Q1).
- Ammoniacal Nitrogen and TOC are within trigger levels set by the EPA.

In comparison to the previous reporting periods (December 2000 to December 2008), the following parameters exceeded ground water criteria at MW1:

- Electrical conductivity level of 26 ms/cm.
- Chloride level of 12,000 mg/l.

MW2

MW2 is located at the south-eastern end of the site in an area that is approximately 50 m from in Cell 6. This monitoring well is influenced by tidal action. Wells were not accessible due to capping works in adjacent cells.

MW3

MW3 is located at the south-western end of the site in an area that is approximately 15m from Cell 8. This monitoring well is influenced by tidal action. Wells were not accessible due to capping works in adjacent cells.

MW4

MW4 is located near the entrance to the facility along the western boundary. MW4 is influenced by tidal action. The results for MW4 showed the following trends:

- Electrical conductivity levels ranged 1.39 (Q3) to 3.03 mS/cm(Q2)
- Ammoniacal nitrogen levels ranged 9.37 (Q3) to 38 mg N/l (Q1).
- Chloride levels ranged 119 (Q3) to 530 mg Cl/l (Q1).
- TOC levels ranged from <6 (Q1) to <15 mg C/l (Q3).

MW7

MW7 is located south west of Cell 5 on the western boundary of the next phase of development of the landfill. This well became covered over, in September 2006, when the landfill activity moved into the new Cell 6. A new MW7 well was drilled in April 2007. Unfortunately further work in the area destroyed the new drilled well. A new well will be

drilled once all capping works and surface-water drainage works have been completed in 2010.

Long Term Trends

As already outlined previously, levels of chloride, sodium, electrical conductivity, and ammoniacal nitrogen are naturally elevated in the groundwater as a result of the geology of the site and tidal influence.

Research has shown that the normal indicative parameters of leachate contamination include ammonia, chloride, TOC, conductivity, pH, iron and heavy metals such as cadmium, nickel, zinc, copper and lead. This research would indicate that there is no leachate contamination of groundwater in Youghal Landfill.

Levels of cyanide, phenols, VOC and total chromium are below laboratories detection limits. Magnesium and manganese levels have increased in MW1 in 2009. Cadmium levels have decreased to normal levels recorded in MW1 and are below the laboratories detection limits in MW4. Copper has decreased, while mercury and zinc are below detection limits.

While the seawater entering the site is probably causing elevated levels of some parameters, landfilling activities are also responsible for the elevated levels of parameters such as ammoniacal nitrogen and potassium.

Total organic Carbon and Ammoniacal nitrogen for sites MW1 and MW4 are within the EPA trigger levels set.

3.4 Leachate

Indicators of leachate include BOD, COD, conductivity, pH, chloride, sodium, iron, manganese, cadmium and VOCs. Generally leachate constituents tend to rise during landfill operation, peaking approximately at the time of closure followed by a gradual post closure decrease (Krug and Ham, 1997: Proceedings of the Sixth International Landfill Symposium).

Monitoring of leachate quality at L1, L2, L3 & L4 is carried out on a quarterly basis for some parameters and on an annual basis for additional parameters as per the licence requirements.

Analyses of parameters, which are above the groundwater criteria used, are typical leachate characteristics.

Table 3.1 summarises the concentration of analytes in the leachate in comparison to typical leachate composition of 30 samples from U.K./Irish landfills accepting mainly domestic waste.

Table 3.1: Summary of leachate concentration range in comparison to typical leachate concentrations.

Parameter	L1 Range	L2 Range	L3 Range	L4 Range	Typical Range
PH	7.44-8.02	6.32-7.95	6.76-7.83	6.61-8.12	6.4 - 8.0
Electrical conductivity EC(ms/cm)	1.78-3.02	4.95-6.65	2.44-5.87	0.89-1.27	503-19,200
Ammoniacal nitrogen NH ₄ -N	67.7-180	228-466	109-330	1.19-4.66	<0.2-1,700
Chemical Oxygen Demand mg/l	144-354	251-293	165-500	40.3-80	<10-33,700
Biochemical Oxygen Demand mg/l	<1-59	<1-42	<1-25	<1-6	<0.5->4,800
Cadmium Cd µg/l	<0.22	<0.22	<0.22	0.758	<0.01-0.03
Chromium Cr µg/l	9.1	13.5	14.4	<3.0	40-560
Chloride Cl	68.6-220	180-440	194-610	23.9-67	64-3,410
Copper Cu µg/l	<1.6	3.18	4.73	<1.6	20-160
Lead Pb µg/l	<0.4	<0.4	0.632	3.38	<0.04-0.28
Mercury Hg (µg/l)	<0.01	<0.01	<0.01	<0.01	<0.1-1.0
Total oxidised nitrogen (TON)	<0.1-<0.3	<0.1-0.537	<0.1-<0.3	<0.1-<0.3	<0.01-6.7

Table 3.1 shows that, with the exception of **Lead at L4** the concentration of the analytes found in the leachate are within the typical leachate concentration range. It can be concluded that the quality of leachate generated at Youghal landfill site is typical of other landfill sites disposing of similar materials.

In 2009, a total of 19,590m³ of leachate was tankered off the site for disposal at Carrigtohill Wastewater Treatment Plant. The total emission of Total N for 2009 was 4.705 tonnes. The total emission of COD for 2009 was 2.21 tonnes.

Figure 3.6 illustrates electrical conductivity concentrations from leachate samples taken at L1, L2, L3 & L4. This figure clearly illustrates that electrical conductivity at the site has remained constant during the sampling period.

Figure 3.5: Leachate Conductivity

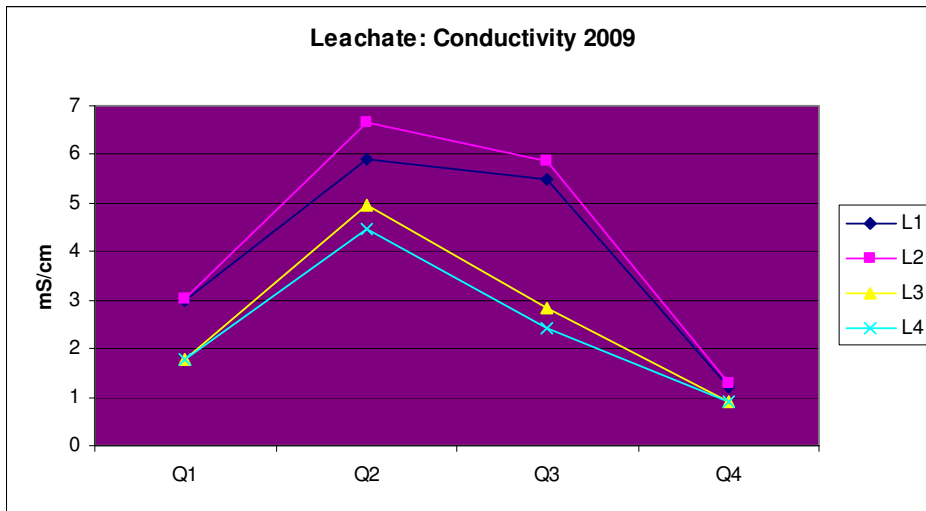


Figure 3.6: Leachate COD

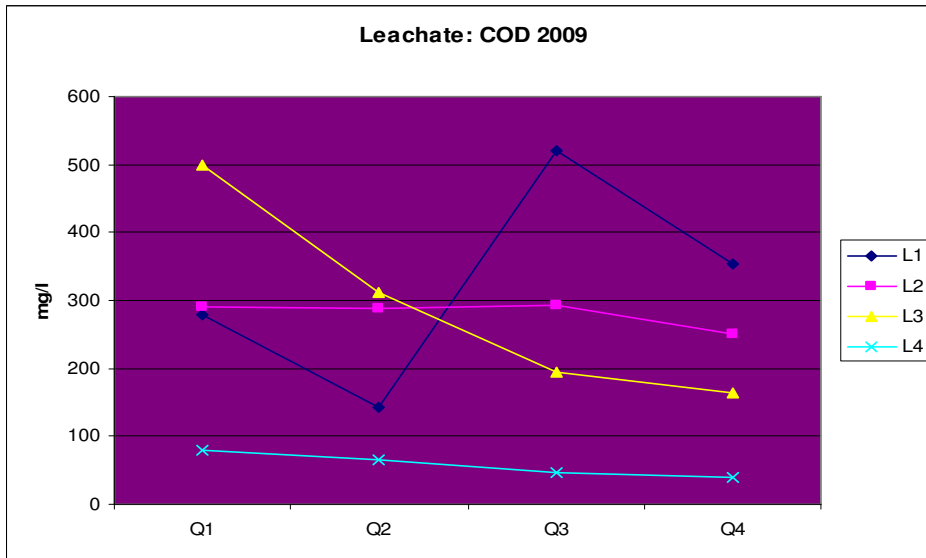


Figure 3.7 illustrates chemical oxygen demand at monitoring locations L1, L2, L3 & L4. All concentrations were within the limit values. L1 had the highest concentration of COD Q3.

Figure 3.7: Leachate Chloride

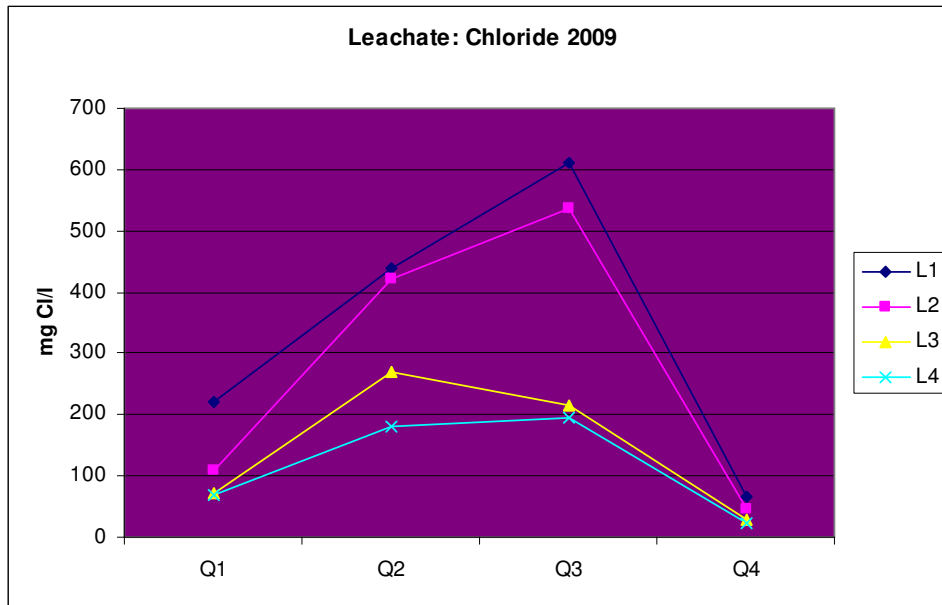


Figure 3.8 illustrates concentrations of Chloride at monitoring locations L1, L2, L3 and L4. Concentrations of chloride were stable at L1, L2, L3 and L4 during all sampling events.

Long Term Trends

From the analysis of leachate quality results it appears that the strength of the leachate is strongest at L2. Waste was placed in the area of L3 & L4 in 2001/2002. Waste was placed in the area of L2 between 2002 and 2006. The placement of waste in this area, especially with regard to L2, has given rise to higher concentrations of some parameters within the leachate of this well.

However, the ecological assessment of the site and surrounding area concludes that activities at the landfill site are not impacting significantly on the surrounding ecology.

3.5 Noise

A daytime noise survey was carried out at the site in accordance with Schedule E of the Waste Licence on the 12th of August 2009.

Four boundary reference measurements were recorded at the southern, northern, western and eastern boundaries of the site. Monitoring at each location was for 30 minutes duration. During sampling the L_{Aeq} , L_{A10} and L_{A90} were recorded.

All results for the monitoring period were within the limits set down in the Waste Licence.

Results from monitoring at sensitive areas (S1 and S2) show that the noise levels were 50dB(A) and 52dB (A), respectively.

3.6 Dust

In accordance with Schedule E.2 of the Waste Licence, dust monitoring is carried out at the facility three times during the licensable year. Total dust deposition was monitored over a period of 30 days starting from 6th July-4th August, 7th September -6th October and 17th November- 16th December 2009.

Dust jars left out in August and October was disregarded due to contamination by algae and dead birds.

The results of the dust deposition monitoring conducted at the site at locations ST1, ST2, ST3 and ST4 are presented in Table 3.2 below. Results showed that, the levels of dust at the site were below the allowable concentration of 350 mg/m²/day, except for ST3 during the period 6th July to 4th August. The high reading at ST3 is anomalous. This dust station has always returned low concentration readings and there was no contract work or landfilling activities in the immediate area.

Table 3.2: Results of Total Dust Deposition Monitoring Results for 2009

Station No.	Date	Dust Conc. (mg)	Dust Conc. (mg/m ² /Day)
ST1	6 th July to 4 th August	30	169.49
	7 th September to 6 th October	12.9	72.88
	17 th November to 16 th December	5.9	33.33
ST2	6 th July to 4 th August	34.7	196.04
	7 th September to 6 th October	11.3	63.84
	17 th November to 16 th December	5.8	32.76
ST3	6 th July to 4 th August	160.9	909.03
	7 th September to 6 th October	15.6	88.13
	17 th November to 16 th December	10.2	57.62
ST4	6 th July to 4 th August	57.1	322.59
	7 th September to 6 th October	6.5	36.72
	17 th November to 16 th December	14.4	81.35

3.7 Landfill Gas Quantities

A software program was used to predict the total gas generated from the input waste for the entire site. The Landfill Gas Emissions Model (GasSim) provides an automated tool for quantifying emission rates for methane, carbon dioxide, non-methane organic compounds, and individual air pollutants from municipal solid waste (MSW) landfills.

For last year's AER Cork County Council felt it would prudent to revise the gas prediction model as a significant amount of site works had been finished and a dramatic change in waste intake had also occurred. It was felt by the site management that these changes would lead to improved gas production and a higher capture rate. Our consultants, Fehily Timoney & Co Ltd, produced a revised gas model in January 2008.

The AP-42 set of default values was used in the Youghal prediction. This set of values is based on emissions factors in the USEPA's *Compilation on Air Pollutant Emissions Factors, AP-42*. This set of default values produces more representative emission values and can be used to produce typical emission estimates in the absence of site-specific test data. The peak rate of gas production for the site will occur during year 2010, with the rate of gas decreasing from then on.

The total amount of landfill gas emitted from the site up to the end of 2009 is outlined in Table 3.3. Further data from the gas prediction model (GasSim) is presented in Appendix 2.

Table 3.3: Landfill Gas Emissions

Year	Methane Gas Yield (M ³ /yr) ¹	Total Landfill Gas Yield (m ³ /yr) ¹
1996	399,941	799,882
1997	409,671	819,343
1998	419,020	838,040
1999	428,002	856,004
2000	521,229	1,042,458
2001	610,801	1,221,601
2002	645,030	1,290,060
2003	806,380	1,612,761
2004	891,238	1,782,476
2005	877,414	1,754,828
2006	855,162	1,710,324
2007	872,624	1,745,249
2008	1,345,221	2,690,443
2009	1,575,909	3,151,818

Table 3.4, overleaf, shows the figures for the methane production by the facility during the reporting period. The LandGEM model gives the annual total of methane generated by the facility. Methane burned off by the flare can be measured from the constant telemetry available. The flow rates and the % of methane can be used to get an accurate volume of the gas burned off. The difference between these corresponds to the amount of methane that the facility has emitted during the reporting period.

Table 3.4: Methane Gas Totals

Year	Methane generated by Facility (kg/annum)	Methane burned off by Flares (kg/annum)	Net fugitive emissions of methane from facility (kg/annum)
2009	1,074,769.94	1,046,112.00	28,657.94

3.8 Ecological Monitoring

Cuthbert Environmental is carrying out the 2009-2010 ecology survey at Youghal Landfill. This two-year timeframe was agreed with the Agency in 2006. The report will be included in next year's AER.

4 SITE DEVELOPMENT WORKS

The landfill site has been in operation since 1972. The site was licensed by the EPA (68-1) in December 2000 and a review of that licence (W0068-02) was granted in January 2005.

4.1 Site Development Works during the Reporting Period

Site development works that have been carried out and that are currently ongoing at the site in accordance with the conditions of the licence during the reporting period are outlined in Table 4.1 below.

Table 4.1: Site Development Works during the Reporting Period

Licence Requirement	Status
Condition 3.6 Site Roads and Hardstanding Area	Ongoing
Condition 3.14 Installation of Landfill Gas Extraction/Control System in Cells 6, 7 & 8	Installed
Condition 4.3 Landfill Restoration Capping Installation at Cells 6, 7 & 8	Installed
Condition 3.14.1 Installation of Horizontal Gas Extraction pipework in Cell 9	Ongoing

4.2 Progress towards Site Restoration

Lining Technology has installed a restoration cap on Cells 6, 7 & 8. Cells 6, 7 & 8 have been connected to the gas extraction system. Cell 9 will be capped in accordance with Condition 4.3 of the Waste Licence on its completion in 2011.

4.3 Site Survey

In accordance with Condition 8.9.1 of the Licence, a topographical survey of the site was conducted in January 2010. A void space survey was done on December 31st 2009. The void space available, on this date, was 55,000m³. This void space is the only remaining capacity left in Cell 9. No other cells have been constructed at Youghal Landfill. This total void space does not allow for settlement. The contour drawing of the survey is included in

Appendix 3. Any depressions will be filled and re-graded during the implementation of final capping layer and the landscaping proposal.

4.4 Indirect Emissions to Groundwater

Groundwater monitoring data indicates that there are no indirect emissions to the groundwater from the landfill site.

4.5 Monthly Water Balance Calculations

The monthly water balance calculations have been calculated as outlined in Appendix 4. The results are summarised in Table 4.2. This shows that there has been a large decrease in leachate production compared to 2008 (29,000m³ approx). Although annual rainfall rates decreased in comparison to 2008 the completion of the capping contract and surface water infrastructure has also contributed to less rainwater entering the waste body.

Table 4.2: Water Balance Calculations 2009

Month	Predicted Leachate/m ³
January	2,382.76
February	0.00
March	0.00
April	1,911.95
May	0.00
June	167.56
July	2,229.26
August	1,126.94
September	0.00
October	244.98
November	3,041.71
December	2,054.66
Total	13,159.80m³

More leachate was taken off-site in 2009 than the water balance calculations estimate. This indicates that some of the 10,000m³ of absorbed leachate from 2008 has now flowed out of the capped waste body.

5 WASTE RECEIVED BY THE FACILITY

Youghal Landfill Facility provides a final disposal point for municipal solid waste and a civic amenity facility for recycling. A waste transfer form, as per the EPA guidance manual, accompanies each consignment of waste entering the facility.

Every licensed contractor using the landfill facility has been issued with waste transfer forms. The weighbridge operator correlates the contents of the waste transfer form against the waste catalogue list for each load at the weighbridge. The site foreman visually inspects each load as it is deposited at the tip head.

A written record is kept of each waste load arriving at the site. The weighbridge operator maintains a register of the following information: -

- Date and time of delivery of the waste
- Description of the waste (including EWC Code)
- Quantity of waste
- Name of producer/carrier/collector/source of waste
- Vehicle registration number
- Waste collection permit of haulier
- Name of person checking the load
- Details of unacceptable waste loads where relevant
- Driver of load details

The waste categories and quantities accepted into Youghal Landfill site during the reporting period are summarised in Table 2.2-Quantities of Waste Received and Disposed of during the Reporting Period and Table 2.3 -Quantities of was received at the Civic Amenity Facility at the Site. The waste quantities are illustrated in Figure 5.1 and Figure 5.2 respectively.

Figure 5.1: Waste Composition 2009: Waste Received and disposed of during the reporting period

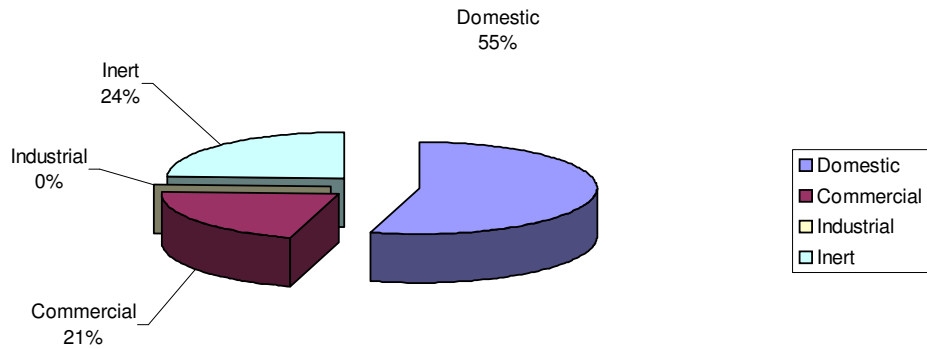
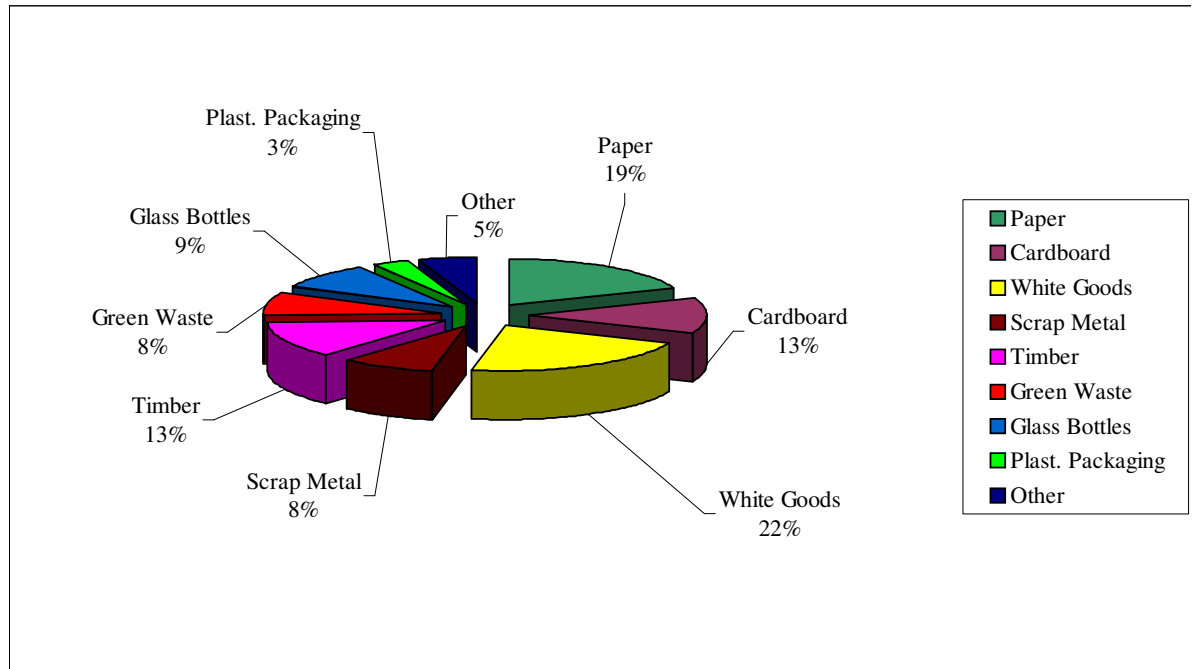


Figure 5.2: Waste Composition 2009: Quantities of Waste Recycled at the Civic Amenity Facility



6 ENVIRONMENTAL INCIDENTS AND COMPLAINTS

6.1 Incident Summary

Condition 11.2 of the Waste Licence requires that the licensee shall make written records of environmental incidents. Table 6.1, overleaf, shows details of the incidents recorded in 2009, relating to odour. As stipulated through EPA correspondence all odour complaints from September 2009 are to be treated as incidents for the site records.

Complaints

74 complaints were received by the facility in 2009. This is a decrease on the 86 complaints in 2008. All, but 2, of the complaints were relating to odour.

As outlined in previous reports Cork County Council has undertaken engineering works in 2008 & 2009 to mitigate the off-site odour problem. This work was completed in July 2009. Although the number of complaints was 74 in 2009, only 16 complaints were registered after July 2009. The completion of the capping contract and the ongoing installation of horizontal gas extraction pipework in Cell 9 have seen a 75% reduction in complaint numbers to the site office. The intensity and radius of influence of the landfill odour has been reduced significantly due to the completed work.

The trend in complaint reduction has continued in 2010 with 10 complaints registered in the first 3 months of the year. All 10 complaints have been made from one residence.

Table 6.1: Recordable Incidents during the Reporting Period

Date	Nature Of Incident	Complainant	Cause	Corrective Action
09/09/2009	Odour Complaint	Mrs. M Martin	Working Face	Extra Cover placed. Deodoriser spray placed.
10/09/2009	Odour Complaint	Mrs. M Martin	Working Face	Extra Cover placed. Deodoriser spray placed.
05/10/2009	Odour Complaint	Mrs. M Martin	Working Face	Extra Cover placed. Deodoriser spray placed.
12/10/2009	Odour Complaint	Mrs. M Martin	Working Face	Extra Cover placed. Deodoriser spray placed.
16/10/2009	Odour Complaint	Mrs. M Martin	Working Face	Extra Cover placed. Deodoriser spray placed.
20/10/2009	Odour Complaint	Mrs. M Martin	Working Face	Extra Cover placed. Deodoriser spray placed.
23/10/2009	Odour Complaint	Mrs. M Martin	Working Face	Extra Cover placed. Deodoriser spray placed.
13/11/2009	Odour Complaint	Mrs. M Martin	Working Face	Extra Cover placed. Deodoriser spray placed.
28/11/2009	Odour Complaint	Mrs. M Martin	Working Face	Extra Cover placed. Deodoriser spray placed.
03/12/2009	Odour Complaint	Mrs. M Martin	Working Face	Extra Cover placed. Deodoriser spray placed.
22/12/2009	Odour Complaint	Mrs. M Martin	Working Face	Extra Cover placed. Deodoriser spray placed.
23/12/2009	Odour Complaint	Mr. J Martin	Working Face	Extra Cover placed. Deodoriser spray placed.

7 ENVIRONMENTAL MANAGEMENT PROGRAMME

7.1 Introduction

In accordance with Condition 2 (Management of the Facility) of the Waste Licence (W0068-02), Cork County Council (CCC) is required to establish and maintain a documented Environmental Management System (EMS) for the facility.

Condition 2.3.2.1 requires CCC to prepare a Schedule of Environmental Objectives & Targets, which shall be implemented over a five-year time frame.

A list of Objectives and Targets are given below, in compliance with Condition 2.3 of the Licence. These Objectives and Targets will be managed by Cork County Council at the landfill in Youghal and will continue for a minimum of five years, to be reviewed and submitted annually to the Agency. In consultation with the Agency these objectives and targets have been developed for implementation in 2009. As part of the Environmental Management System (EMS) review for 2009 we have targeted specific improvements deemed necessary for completion in 2009. They are as follows:

Objective 1

To monitor and control landfill gas and odour emissions at the facility.

- Target 1.1** Reduce the emission of landfill gas from the facility and reduce the number of odour complaints at the facility by 50% by September 2010.

Objective 2

To monitor and control leachate levels and emissions from the facility.

- Target 2.1** Achieve compliance with Condition 5.12 of the waste licence for the lined cells. Minimum freeboard of 0.50m will be maintained in the leachate lagoon at all times. Leachate levels in the waste shall not exceed a level of 1.0m over the top of the liner at the base of the landfill. Prevent escape of leachate from historic waste at the facility.

Objective 3

To control environmental nuisances at the facility.

- Target 3.1** Achieve compliance with Condition 7 of the waste licence.

Objective 4

To provide facility operators training and awareness on landfill gas.

Target 4.1 Organise a landfill gas training course by October 2010.

Objective 5

To increase site security at the facility.

Target 5.1 Reduce the number of security breaches at the facility by 10% by September 2010.

Objective 6

To maximise the efficiency and continuously improve operations at the facility.

Target 6.1 Increase annual recycling rate at the Civic Amenity facility to 70% in 2010.

Objective 7

To monitor, record and control environmental parameters at the facility.

Target 7.1 Achieve compliance with Schedule D of the Waste Licence.

Table 7.1: Long Term Environmental Monitoring:

Report Title	REPORT FREQUENCY	REPORT SUBMISSION DATE
Environmental Management System Updates	Annually	By July 18 th 2005 and annually thereafter
Annual Environment Report (AER)	Annually	By March 31 st on annual basis
Bund, tank and container integrity assessment	Every three years	Six months from the date of licence and one month after end of the three year period being reported on.
Record of Incidents	As they occur	Within 5 days of the incident.
Topographical survey	Twice yearly	By January 18 th annually
Monitoring of landfill gas	Quarterly	Ten days after end of the quarter being reported on.
Monitoring of Surface Water Quality	Quarterly	Ten days after end of the quarter being reported on.
Monitoring of Groundwater Quality	Quarterly	Ten days after end of the quarter being reported on.
Monitoring of Leachate	Quarterly	Ten days after end of the quarter being reported on.
Meteorological Monitoring	Daily	By March 31 st on annual basis
Dust Monitoring	Three times per year	Ten days after end of the quarter being reported on.
Noise Monitoring	Annually	By January 18 th on annual basis

Definition of responsibilities

Overall responsibility for achievement of Objectives 1 through 7 lies with the Landfill Engineering Manager and Deputy Managers.

8 FACILITY AND ENVIRONMENTAL PROCEDURES

8.1 General Overview

Operational procedures have been drawn up to control the significant environmental aspects of the landfill. These procedures were addressed in an Environmental Management System review in 2009. This review was completed in February 2009 and details are included in this year's AER.

Environmental Monitoring Procedure

In early 2001, a site audit was undertaken to assess the level of compliance of the facility and the site operations with the EPA Waste Licence and the conditions therein. This was used in conjunction with knowledge of operations on site to identify the environmental aspects of the activities and services over which CCC, as the operators of Youghal Landfill, have control or could be expected to have an influence. To this end a comprehensive monitoring regime has been put in place and is maintained annually.

Particular areas of examination to consider when identifying environmental aspects are:

- emissions to air
- waste management
- resource usage
- sensitivity of receptors
- any other relevant issues
- release to water
- ecological impact
- land contamination
- noise, dust, odour, visible impact, etc.

Aspects, impacts and the environmental management programme are reviewed as required and annually as part of the environmental management review.

CCC has established and maintained an environmental management programme within which it sets environmental objectives and targets to be achieved each year. Responsibility for achieving objectives and targets is designated and the necessary mechanisms and timeframes for achieving each of the objective and targets are detailed.

Control and Management of Documents:

The environmental management system has been developed to provide a description of the core of the environmental programme for Youghal Landfill and the interactions within the system. The environmental management system refers to the environmental management

programme, which includes the procedures used by CCC to meet the sites environmental policy. In turn the procedures identify the records, forms and other support materials, which provide evidence of the operation of the EMS.

All documentation relating to the implementation and control of the licence is held in the environmental management file system in the Youghal Landfill site office. The register of information will be available for viewing at Floor 6 in County Hall. This includes the environmental policy, environmental management procedures, register of legislation and all site correspondence to the Agency.

A document control procedure has been developed to ensure that environmental management system documentation:

- can be located and is available at key locations
- is reviewed at least annually, revised as necessary and approved by authorised personnel
- is current. Obsolete documents are removed from work areas to ensure against unintended use
- is legible, dated for revision, identified and maintained in an orderly manner.

The document control procedure deals with the creation and modification of various types of documents. It is the facility manager's responsibility to ensure that the information contained in the procedures manual and associated documentation is kept up to date and accurate at all times.

Refuse Drivers Operational Procedures:

The purpose of this procedure is to ensure that all refuse drivers comply with the operational rules on Youghal Landfill and to ensure the safety of members of the public, all refuse drivers and landfill personnel at the Youghal facility. This procedure also minimises the generation of environmental nuisances such as dust and litter generated by movement of vehicles and waste at the facility.

8.2 Awareness and Training Procedure

Purpose of Procedure:

- To record training that personnel have obtained prior to this procedure being set up and implemented.
- To ensure that future training needs are identified and appropriate training is provided for facility personnel.
- To ensure that all staff performing tasks at the landfill are aware of the requirements of the Waste Licence.
- To comply with Condition 2.1.2 and Condition 2.4 of Waste Licence 68-2.

Scope of the procedure:

This procedure applies to all training requirements for all landfill operatives in the implementation of the waste licence 68 -2 applicable to Youghal Landfill.

Description of the tasks involved with this procedure:**Training**

- The Landfill Manager will assess all personnel for training requirements based on their roles and responsibilities within the licensed facility, especially those associated with activities which have the potential to cause significant environmental aspects.
- The Facility Manager, in conjunction with the Cork County Council Senior Engineer, will arrange that all appropriate training will be provided for site personnel.
- The Landfill Manager will prepare and maintain a current training record for scheduling, tracking of attendance, and recording completion of required training for all personnel.
- At least annually, the environmental training requirements will be reviewed and updated for personnel.
- For new personnel, a training record will be prepared within 30 days after their arrival.
- All training shall be recorded (previous and future training) will be recorded on the attached training record sheet. Training records, including copies of relevant certificates etc., shall be located on site in the Landfill managers Office.

Awareness

- All employees at Youghal Landfill will receive environmental awareness training.
- All new employees will receive environmental awareness training as part of the general induction-training programme.
- Environmental Awareness training will address the following:
 - The environmental aspects and potential impacts of activities related to their work at the facility.
 - Introduction of the facilities environmental objectives and targets and importance of compliance.
 - Introduction to Environmental Management System (EMS) developed at the facility
 - An understanding of their role and responsibility in procedures required to control potentially significant impacts.
 - Importance of adherence to operational procedures and consequences of non-conformance.
 - Reporting/communication procedures with regard to issues or concerns with the environmental management system (EMS) and environmental practices or in the event of an incident or non-compliance with the waste licence.

- The environmental awareness training programme will be reviewed and updated annually and/or more regularly, in accordance with any significant changes to the EMS system i.e. changes of operations on-site.
- All employees will attend refresher/revision courses annually and/or more regularly, if there are any significant changes to the EMS system.
- A copy of the Waste Licence and the EMS Manual is available at designated areas at the facility so that all employees can access it, for reference.
- Any updates to the EMS manual or procedures will be communicated to all personnel.

8.3 Prevention and Corrective Action Procedure

Purpose of Procedure:

To ensure that all non – compliance's with the waste licence and public complaints are investigated, corrected and that effective preventative measures or modifications to the operational procedures of the facility are put in place and implemented so that the non – compliance does not reoccur.

In the event of an incident occurring at the landfill (incident situations listed below), it is of **higher priority to immediately investigate**, identify and execute measures to minimise any environmental emissions, and the effects caused by the incident.

Table 8.1: List of Operational Procedures 2009

	Contents	Reference / Comment
<p>This list of procedures has been prepared in accordance with the EMS as required by Condition 2 of the site licence. The EMS procedures for Youghal Landfill site has been developed by Cork County Council</p>	<p>Waste Acceptance Procedure Waste Characterisation Procedure Waste Placement and Covering Procedure Communication and Public Awareness Procedure Awareness and Training Procedure Control and Management of Documents Prevention and Corrective Action Procedure Refuse Drivers Operational Procedure Site Security Procedure Leachate Control and Handling Absorbent Materials Procedure Environmental Monitoring Procedure Environmental Nuisance Procedure Site Inspection Procedure</p>	

8.4 Management and Staff Structure

Cork County Council operates the landfill facility under the management structure illustrated in Figure 8.1, overleaf. Detailed curricula are presented in Appendix 5.

8.5 Budget

Cork County Council is committed to environmental protection and will ensure the provision of the necessary funds to maintain waste licence compliance.

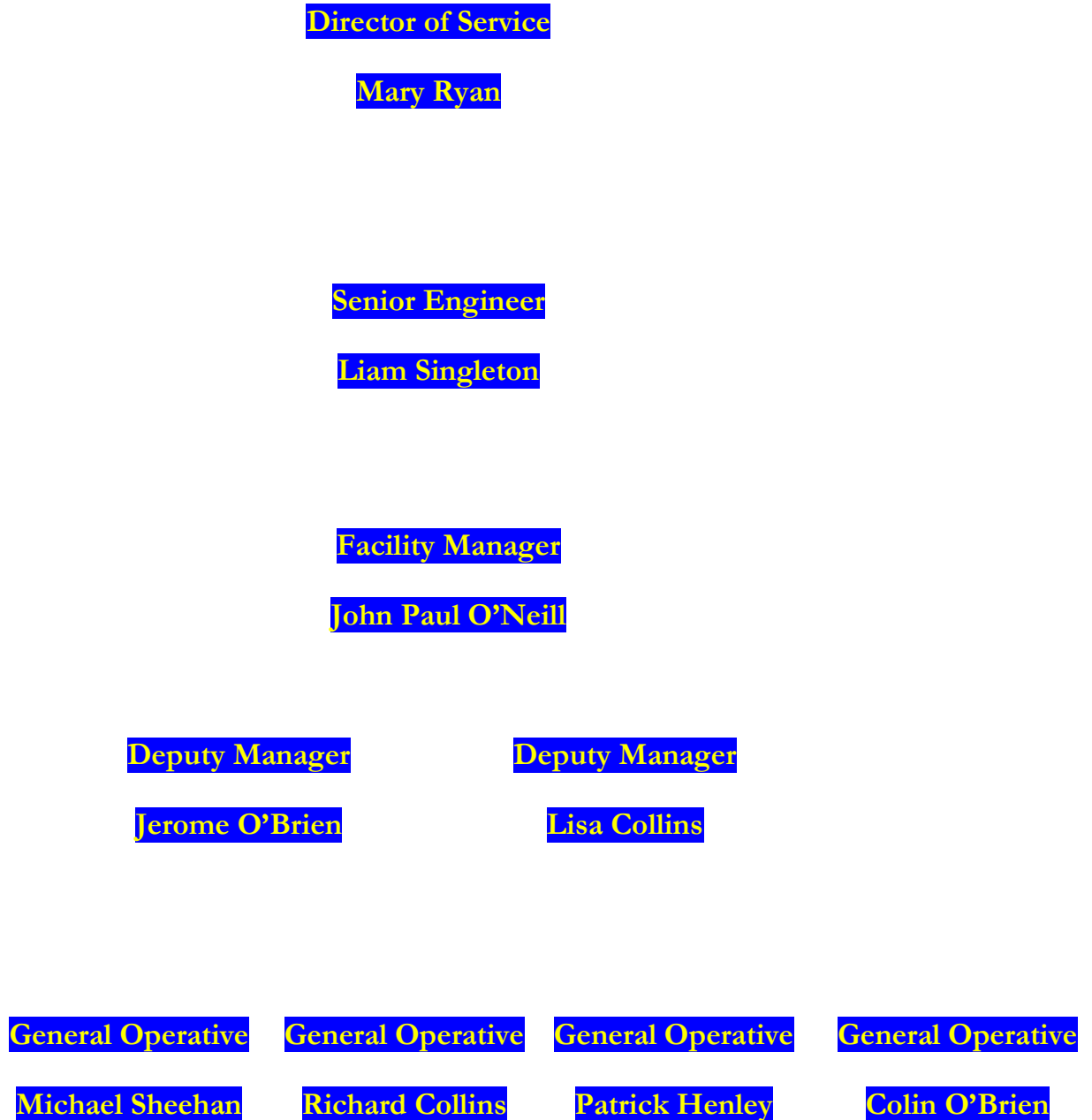
8.6 Program for Public Information

Purpose of Programme:

- To ensure that clear guidelines for internal communications exist for resolving environmental issues/concerns between landfill operatives and the Landfill Manager during the day-to-day operations of the facility.
- To ensure that all external communication related to the environmental performance at the facility is received, documented and responded to in a standard and effective manner. External communication includes communications from regulatory bodies, such as the EPA or the Local Council, customers or members of the public, environmental groups or media.

To comply with Condition 2.4 of the waste licence and ensure that members of the public can obtain information at the facility, at all reasonable times, concerning the environmental performance of the facility.

Figure 8.1: Management Structure



8.7 Bund Testing and Inspection Report

Waste engine oil is contained in a new triple skinned PVC tank. This tank has replaced the double walled PVC tank, which was contained in an open top steel tank. This new tank has been subject to all the regulatory and manufacturing testing required during construction. Bund testing will no longer be required on the open top steel tank as it has been removed.

The only other fuel used on site is diesel for earth moving plant. This fuel is delivered by tanker delivery truck and transferred directly to the machines. At no time is fuel for plant stored on site, as per the requirements of the licence.

8.8 Any Other Items Specified by the Agency

The Agency has not specified any additional items to be included in this report.

9 RESOURCE CONSUMPTION

During the year 2009 the following resources were utilised at the site:

Energy Consumption

- Diesel 220,000 litres
- Electricity 14,000 kilowatt hours
- Heavy fuel oil 1,300 litres

The machinery on site all use diesel. These machines are used for waste deposition, compaction and site maintenance. All the site offices use electricity and also the cardboard compactor in the Civic Amenity site. Heavy fuel oil is used to keep all the site machinery in good working order.

Water Consumption

- Water consumption at the facility is estimated at 11,500 litres.

Water use on site was for domestic use, spraying requirements and wash down purposes.

APPENDIX 1

**Drawing No. 2005-004-01 Rev A:-
Location Map of Environmental Monitoring Points**

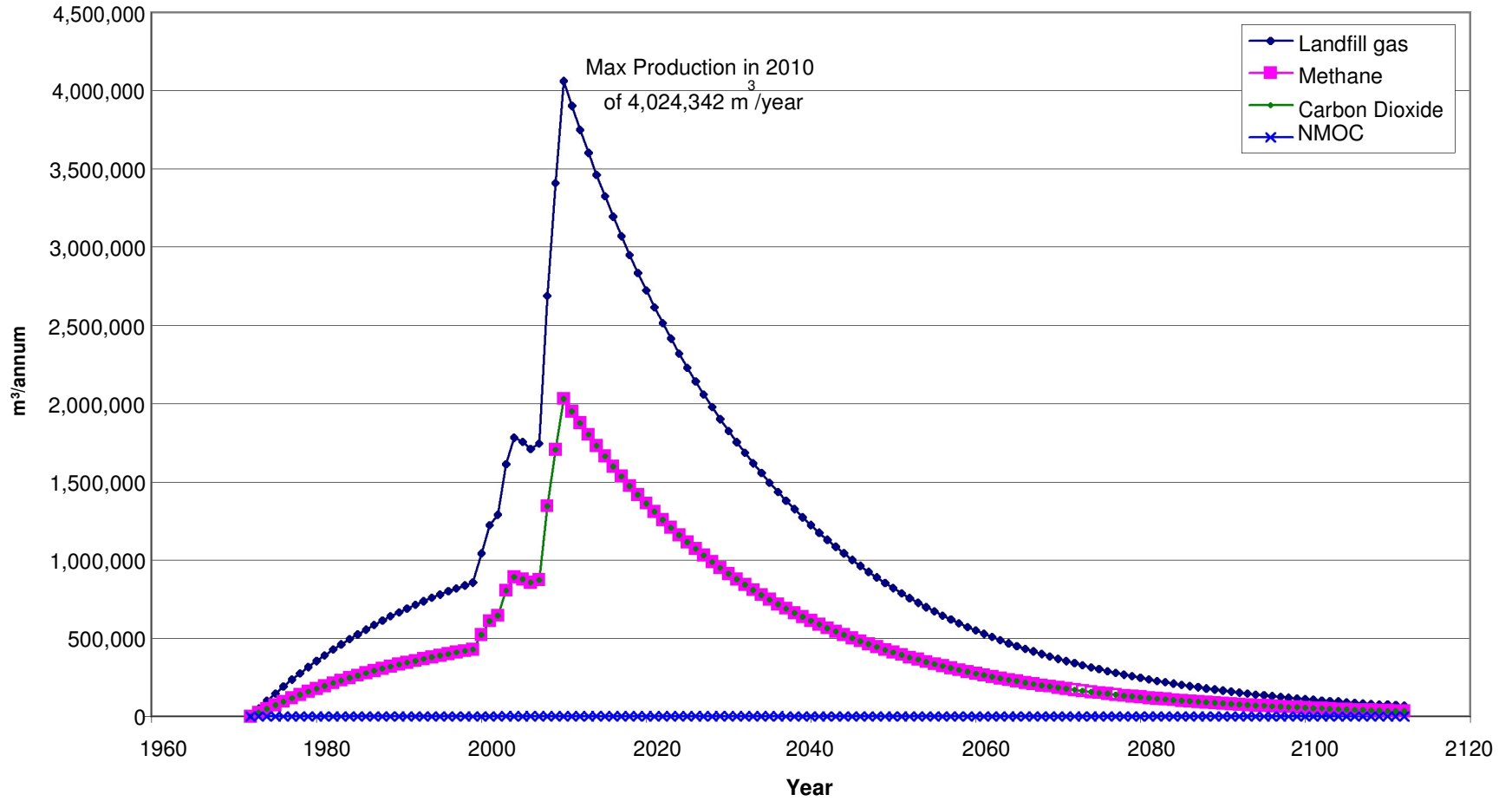
APPENDIX 2

Methane Gas Emissions

Year	Landfill Gas	CH ₄	CO ₂	NMOC	Landfill Gas	Methane	Waste Placed
	(m ³ /year)	(m ³ /year)	(m ³ /year)	(m ³ /year)	(m ³ /hr)	(m ³ /hr)	tonnes
1972	0	0	0	0	0	0	0
1973	50,824	25,412	25,412	30	6	3	6,468
1974	99,655	49,828	49,828	60	11	6	12,936
1975	146,572	73,286	73,286	88	17	8	19,404
1976	191,648	95,824	95,824	115	22	11	25,872
1977	234,958	117,479	117,479	141	27	13	32,340
1978	276,569	138,284	138,284	166	32	16	38,808
1979	316,548	158,274	158,274	190	36	18	45,276
1980	354,960	177,480	177,480	213	41	20	51,744
1981	391,866	195,933	195,933	235	45	22	58,212
1982	427,325	213,662	213,662	256	49	24	64,680
1983	461,393	230,697	230,697	277	53	26	71,148
1984	494,126	247,063	247,063	296	56	28	77,616
1985	525,575	262,787	262,787	315	60	30	84,083
1986	555,791	277,895	277,895	333	63	32	90,551
1987	584,822	292,411	292,411	351	67	33	97,019
1988	612,715	306,357	306,357	368	70	35	103,487
1989	639,514	319,757	319,757	384	73	37	109,955
1990	665,262	332,631	332,631	399	76	38	116,423
1991	690,001	345,000	345,000	414	79	39	122,891
1992	713,769	356,885	356,885	428	81	41	129,359
1993	736,606	368,303	368,303	442	84	42	135,827
1994	758,547	379,274	379,274	455	87	43	142,295
1995	779,628	389,814	389,814	468	89	44	148,763
1996	799,882	399,941	399,941	480	91	46	155,231
1997	819,343	409,671	409,671	492	94	47	161,699
1998	838,040	419,020	419,020	503	96	48	168,167
1999	856,004	428,002	428,002	514	98	49	174,635
2000	1,042,458	521,229	521,229	625	119	60	202,635
2001	1,221,601	610,801	610,801	733	139	70	230,635
2002	1,290,060	645,030	645,030	774	147	74	245,443
2003	1,612,761	806,380	806,380	968	184	92	292,948
2004	1,782,476	891,238	891,238	1,069	203	102	322,594
2005	1,754,828	877,414	877,414	1,053	200	100	327,970
2006	1,710,324	855,162	855,162	1,026	195	98	331,063
2007	1,745,249	872,624	872,624	1,047	199	100	344,042
2008	2,462,597	1,231,299	1,231,299	1,478	281	141	444,042
2009	3,151,818	1,575,909	1,575,909	1,891	360	180	544,042
2010	3,814,014	1,907,007	1,907,007	2,288	435	218	644,042
2011	3,795,423	1,897,711	1,897,711	2,277	433	217	660,708
2012	3,646,602	1,823,301	1,823,301	2,188	416	208	660,708
2013	3,503,617	1,751,808	1,751,808	2,102	400	200	660,708
2014	3,366,238	1,683,119	1,683,119	2,020	384	192	660,708
2015	3,234,246	1,617,123	1,617,123	1,941	369	185	660,708
2016	3,107,429	1,553,715	1,553,715	1,864	355	177	660,708

2017	2,985,585	1,492,793	1,492,793	1,791	341	170	660,708
2018	2,868,519	1,434,259	1,434,259	1,721	327	164	660,708
2019	2,756,042	1,378,021	1,378,021	1,654	315	157	660,708
2020	2,647,977	1,323,988	1,323,988	1,589	302	151	660,708
2021	2,544,148	1,272,074	1,272,074	1,526	290	145	660,708
2022	2,444,390	1,222,195	1,222,195	1,467	279	140	660,708
2023	2,348,544	1,174,272	1,174,272	1,409	268	134	660,708
2024	2,256,457	1,128,228	1,128,228	1,354	258	129	660,708
2025	2,167,980	1,083,990	1,083,990	1,301	247	124	660,708
2026	2,082,972	1,041,486	1,041,486	1,250	238	119	660,708
2027	2,001,298	1,000,649	1,000,649	1,201	228	114	660,708
2028	1,922,826	961,413	961,413	1,154	220	110	660,708
2029	1,847,431	923,715	923,715	1,108	211	105	660,708
2030	1,774,992	887,496	887,496	1,065	203	101	660,708
2031	1,705,393	852,697	852,697	1,023	195	97	660,708
2032	1,638,524	819,262	819,262	983	187	94	660,708
2033	1,574,276	787,138	787,138	945	180	90	660,708
2034	1,512,548	756,274	756,274	908	173	86	660,708
2035	1,453,240	726,620	726,620	872	166	83	660,708
2036	1,396,258	698,129	698,129	838	159	80	660,708
2037	1,341,510	670,755	670,755	805	153	77	660,708
2038	1,288,909	644,454	644,454	773	147	74	660,708
2039	1,238,370	619,185	619,185	743	141	71	660,708
2040	1,189,813	594,906	594,906	714	136	68	660,708
2041	1,143,159	571,580	571,580	686	130	65	660,708
2042	1,098,335	549,168	549,168	659	125	63	660,708
2043	1,055,269	527,635	527,635	633	120	60	660,708
2044	1,013,891	506,946	506,946	608	116	58	660,708
2045	974,136	487,068	487,068	584	111	56	660,708
2046	935,940	467,970	467,970	562	107	53	660,708
2047	899,241	449,620	449,620	540	103	51	660,708
2048	863,981	431,991	431,991	518	99	49	660,708
2049	830,104	415,052	415,052	498	95	47	660,708
2050	797,555	398,778	398,778	479	91	46	660,708
2051	766,283	383,141	383,141	460	87	44	660,708
2052	736,236	368,118	368,118	442	84	42	660,708
2053	707,368	353,684	353,684	424	81	40	660,708
2054	679,632	339,816	339,816	408	78	39	660,708
2055	652,983	326,491	326,491	392	75	37	660,708
2056	627,379	313,690	313,690	376	72	36	660,708
2057	602,779	301,390	301,390	362	69	34	660,708
2058	579,144	289,572	289,572	347	66	33	660,708
2059	556,435	278,218	278,218	334	64	32	660,708
2060	534,617	267,309	267,309	321	61	31	660,708
2061	513,655	256,827	256,827	308	59	29	660,708
2062	493,514	246,757	246,757	296	56	28	660,708
2063	474,163	237,081	237,081	284	54	27	660,708
2064	455,571	227,785	227,785	273	52	26	660,708
2065	437,708	218,854	218,854	263	50	25	660,708

2066	420,545	210,272	210,272	252	48	24	660,708
2067	404,055	202,028	202,028	242	46	23	660,708
2068	388,212	194,106	194,106	233	44	22	660,708
2069	372,990	186,495	186,495	224	43	21	660,708
2070	358,365	179,182	179,182	215	41	20	660,708
2071	344,313	172,156	172,156	207	39	20	660,708
2072	330,812	165,406	165,406	198	38	19	660,708
2073	317,841	158,920	158,920	191	36	18	660,708
2074	305,378	152,689	152,689	183	35	17	660,708
2075	293,404	146,702	146,702	176	33	17	660,708
2076	281,900	140,950	140,950	169	32	16	660,708
2077	270,846	135,423	135,423	163	31	15	660,708
2078	260,226	130,113	130,113	156	30	15	660,708
2079	250,023	125,011	125,011	150	29	14	660,708
2080	240,219	120,110	120,110	144	27	14	660,708
2081	230,800	115,400	115,400	138	26	13	660,708
2082	221,750	110,875	110,875	133	25	13	660,708
2083	213,055	106,528	106,528	128	24	12	660,708
2084	204,701	102,351	102,351	123	23	12	660,708
2085	196,675	98,337	98,337	118	22	11	660,708
2086	188,963	94,481	94,481	113	22	11	660,708
2087	181,554	90,777	90,777	109	21	10	660,708
2088	174,435	87,217	87,217	105	20	10	660,708
2089	167,595	83,798	83,798	101	19	10	660,708
2090	161,024	80,512	80,512	97	18	9	660,708
2091	154,710	77,355	77,355	93	18	9	660,708
2092	148,644	74,322	74,322	89	17	8	660,708
2093	142,815	71,408	71,408	86	16	8	660,708
2094	137,215	68,608	68,608	82	16	8	660,708
2095	131,835	65,917	65,917	79	15	8	660,708
2096	126,666	63,333	63,333	76	14	7	660,708
2097	121,699	60,850	60,850	73	14	7	660,708
2098	116,927	58,464	58,464	70	13	7	660,708
2099	112,342	56,171	56,171	67	13	6	660,708
2100	107,937	53,969	53,969	65	12	6	660,708
2101	103,705	51,853	51,853	62	12	6	660,708
2102	99,639	49,819	49,819	60	11	6	660,708
2103	95,732	47,866	47,866	57	11	5	660,708
2104	91,978	45,989	45,989	55	10	5	660,708
2105	88,372	44,186	44,186	53	10	5	660,708
2106	84,907	42,453	42,453	51	10	5	660,708
2107	81,577	40,789	40,789	49	9	5	660,708
2108	78,379	39,189	39,189	47	9	4	660,708
2109	75,305	37,653	37,653	45	9	4	660,708
2110	72,353	36,176	36,176	43	8	4	660,708
2111	69,516	34,758	34,758	42	8	4	660,708
2112	66,790	33,395	33,395	40	8	4	660,708



APPENDIX 3

Topographical Survey Contour Drawing

APPENDIX 4

Water Balance Calculations

Water Balance Calculation Sheet

Month	Active Cell No.	Active Area (m ²)	Waste Input (t)	Waste Input (m ³)	Rainfall (mm)	Active Infiltration (m ³)	Total Leachate (m ³)	Cumulative Leachate (m ³)	Absorptive Capacity (m ³)	Leachate Generation (m ³)
January	9.00	17000.00	2389.17	2389.17	150.00	2550.00	2550.00	2550.00	167.24	2382.76
February	9.00	17000.00	1990.31	1990.31	0.00	0.00	0.00	2550.00	139.32	0.00
March	9.00	17000.00	2208.85	2208.85	0.00	0.00	0.00	2550.00	154.62	0.00
April	9.00	17000.00	2290.76	2290.76	121.90	2072.30	2072.30	4622.30	160.35	1911.95
May	9.00	17000.00	2336.74	2336.74	5.20	88.40	88.40	4710.70	163.57	0.00
June	9.00	17000.00	2366.33	2366.33	19.60	333.20	333.20	5043.90	165.64	167.56
July	9.00	17000.00	7277.78	7277.78	161.10	2738.70	2738.70	7782.60	509.44	2229.26
August	9.00	17000.00	7045.18	7045.18	95.30	1620.10	1620.10	9402.70	493.16	1126.94
September	9.00	17000.00	7239.36	7239.36	0.00	0.00	0.00	9402.70	506.76	0.00
October	9.00	17000.00	6894.64	6894.64	42.80	727.60	727.60	10130.30	482.62	244.98
November	9.00	17000.00	7037.07	7037.07	207.90	3534.30	3534.30	13664.60	492.59	3041.71
December	9.00	17000.00	7610.53	7610.53	152.20	2587.40	2587.40	16252.00	532.74	2054.66
									Total	13,159.80

APPENDIX 5

Detailed Staff Curriculum Vitae/Details of Operator/Management Structure

Details of Operator

Operator Name: Cork County Council

Operator Address: County Hall,
Victoria Cross,
Carrigrohane,
Cork City
021 - 4276891

Site Name: Youghal Landfill

Site Address: Youghal Mudlands,
Youghal,
Co Cork
024-93834 / 91084

Details of Management Structure

Cork County Council has overall responsibility for the management and operation of the Youghal Landfill site. The Senior Engineer, Waste Management (Operations), Southern Division is responsible for the management of municipal waste and waste facilities in the Southern Division. The site manager with responsibility for day-to-day site operation and implementation of the Waste Licence is an Executive Engineer, who is supported by a Senior Executive Engineer, an Executive Engineer and an Environmental Technician in their roles of deputy managers.

Cork County Council has appointed outside consultants in various fields to provide technical, management and site engineering support. These consultants have been authorised to assist Cork County Council with the following site management activities: -

- Provision of site engineering assistance and support;
- Leachate assessment and management;
- Landfill gas assessment and management;
- Environmental Monitoring in accordance with the waste licence; and
- Engineering design and document preparation.

Details of Curriculum Vitae:

Senior Engineer:

Mr. Liam Singleton

021 - 4276891

Executive Engineer: Manager

Mr. John Paul O'Neill

024-93834 / 91084/
086 - 3898364

Qualifications

- *Bachelor of Civil & Environmental Engineering* 1997
- *FAS Waste Management Training Course*
- *Project Management Course* 2005/2006
- *Safe Pass Course* 2004
- *FAS Landfill Site Assessment* 2003
2006

Relevant Experience

*Cork County Council
Landfill Manager
Youghal Landfill
Waste Licence 68-2* Mar.2005 – Present

*Cork County Council
Deputy Landfill Manager
East Cork Landfill
Waste Licence 22-1* Mar 2005 - Present

*RPS Engineering Consultants
Design Engineer
Derryconnell Landfill
Waste Licence 89-1* Jan 2000 – Jan 2001

Executive Engineer

Mr. Enda Kiernan

086 - 6076039

Qualifications

- *Degree in Civil Engineering.* 1995
- *Masters Degree in Construction & Project Management* 1996
- *Waste Management Training Course* 1999
- *Waste Management Training Site Assessment – Landfill* 1999
- *Waste Management Training Site Assessment – Recovery Facilities* 1999
- *Certified Waste Disposal and Recovery Facility Manager* 2000
- *Chartered Waste Manager* 2001

Relevant Experience

- *Meath County Council
Landfill Manager, Basketstown Landfill
Waste Licence 10-1* Apr.1997 - Oct 2000
- *Meath County Council,
Facility Manager,
Navan Civic Amenity Facility* Feb. 2000 – Oct.2000
- *Cork County Council
Deputy Landfill Manager
East Cork Landfill
Waste Licence 22-1* Nov. 2000 - 2003
- *Cork County Council
Landfill Manager,
Youghal Landfill
Waste Licence 68-1* Dec. 2000 - 2003

Environmental Technician

Miss Lisa Collins

021-4533934

Qualifications

- *National Certificate in Environmental Engineering.* 1996-1998
- *National Diploma in Environmental Engineering.* 1999-2000
- *Course on Health & Safety*
- *Waste Management Training Course* 2000
- *Course on Waste Minimisation.* 2000

Relevant Experience

- *Cork County Council
Deputy Landfill Manager
East Cork Landfill
Waste Licence 22-1* Oct 2000 – Present
- *Cork County Council
Deputy Landfill Manager
Youghal Landfill
Waste Licence 68-2* Dec 2000 - Present