ANNUAL ENVIRONMENTAL REPORT

January-December 2008

For

Dundalk Landfill Site

Co. Louth

Waste Licence Reference W0034-02

By

Dundalk Town Council

To

Environmental Protection Agency

DUNDALK TOWN COUNCIL

DUNDALK LANDFILL & CIVIC WASTE FACILITY SITE (W0034-02)

JUNE 2009

ANNUAL ENVIRONMENTAL REPORT

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APPENDICIES

1.0 INTRODUCTION

This Annual Environmental Report (AER) has been prepared to meet the requirements of Waste Licence W0034-02 for Dundalk Landfill.

The site is owned by Dundalk Town Council and is located at Newry Road, Dundalk. It is situated on the northern bank of the Castletown River in an area of intertidal mudflats. The northern boundary of the site adjoins low lying and poorly drained agricultural lands. Residential and industrial properties adjoin the western boundary of the site.

Dundalk Landfill Site has been in operation since 1980. In 2000 Dundalk Town Council submitted an application to the Environmental Protection Agency (EPA) for the continued operation of the landfill site, as required by the Waste Management (Licensing) Regulations 1997. The landfill site ceased to accept waste in October 2002.

In March 2005, the EPA granted the Council a revised Waste Licence (registration number W0034-02) for the facility, in accordance with the Third and Fourth Schedule of the Waste Management Act, 1996-2003.

The site has been restored. Restoration works include the installation of capping layer, provision of storm water drainage, leachate collection trench, provision of gas collection system, provision of gas flare, grading of site to provide for future football pitches and provision of an access road.

1.1 REPORT PERIOD

The reporting period of this report refers to January to December 2008. The landfill site ceased to accept waste in October 2002. A Civic Waste Facility is currently in operation at the facility.

2.0 WASTE ACTIVITIES CARRIED OUT AT THE FACILITY

Wastes are no longer accepted at the landfill facility except for restoration purposes. The maximum tonnage of waste to be accepted at the Civic Waste Facility is 20,000 tonnes per annum in accordance with Table A1 of the Waste Licence.

The licensed disposal activities, in accordance with the Third Schedule of the Waste Management Act, 1996, are restricted to those listed as follows:

Class 11. Blending or mixture prior to submission to any activity referred to in a preceding
paragraph of this Schedule.
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.

Licensed waste recovery activities, in accordance with the Fourth Schedule of the Waste Management Act, 1996, are restricted to those listed as follows:

Class 2. Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).
Class 3. Recycling or reclamation of metals and metal compounds.
Class 4. Recycling or reclamation of other inorganic materials.
Class 10. The treatment of any waste on land with a consequential benefit for an agricultural activity or ecological system.
Class 11. Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.
Class 13. Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.

3.0 QUANTITY AND COMPOSITION OF WASTE RECEIVED AND DISPOSED OF DURING THE REPORTING PERIOD AND EACH PREVIOUS YEAR.

Waste data figures are derived from weighbridge readings. These figures are shown in Table 1.

Table 1 Waste quantities accepted (tonnes) at landfill.

Waste types	1997	1998	1999	2000	2001	2002	2003	2004
Total	37,060	37,560	38,000	36,000	32,000	32,420	27,417	3,018

*1997-2001 figures based on estimates

** The landfill site ceased to accept waste in October 2002 and waste is only brought on site for restoration purposes.

In accordance with Condition 5 of the waste licence only those wastes types and quantities listed in Schedule A shall be disposed of at the facility unless prior agreement of the Agency has been obtained. The maximum annual tonnage of individual waste categories for acceptance to the site is listed in Schedule A of the Waste Licence. The quantity of waste received during the reporting period at the Civic Amenity Facility (CWF) is 8,655.55 tonnes and breakdown is presented in Appendix A. The figures are taken from EPA Landfill and IWMF Survey, Part 3 2008.

4.0 SUMMARY REPORT ON EMISSIONS

4.1 MONITORING LOCATIONS

Monitoring is carried out at locations and frequencies as specified in Schedules D of the waste licence. Monitoring points are labelled and permanent access to all monitoring points is maintained.

The following parameters form the major part of Dundalk Urban District Council's monitoring programme:

- Groundwater Quality
- Groundwater Levels
- Surface Water Quality
- Leachate Quality
- Leachate Levels
- Landfill Gas Data

All ditches and drains around the perimeter of the facility are kept clear to allow for surface water monitoring points to be maintained.

All monitoring points are detailed in Drawing Monitoring Locations as shown in Appendix B.

The results contained in this report were assessed as follows:

- **Groundwater:** the European Communities (Drinking Water) (No. 2) Regulations 2007 parametric value (DWR) and Interim Guideline Value (IGV) Towards Setting Guideline Values for the Protection of Ground Water in Ireland. The following substances defined by the European communities (Drinking Water) (No. 2) Regulations 2007 were monitored in April and are referred to in the report.

  Total pesticides means the sum of all individual pesticides detected and quantified in the course of the monitoring procedure. The DWR is 0.50µg/l. (Only those pesticides which are likely to be present in a given supply require to be monitored - organic insecticides, organic herbicides, organic fungicides, organic nematocides, organic acaricides, organic algicides, organic rodenticides, organic slimicides , related products (*inter alia*, growth regulators and their relevant metabolites, degradation and reaction products).

  Polycyclic aromatic hydrocarbons are the sum of concentrations of specified compounds. The DWR is 0.10ug/l. The specified compounds are

benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene and indeno(1,2,3-cd)pyrene.

Total trihalomethanes are the sum of concentrations of specified compounds. The DWR is 100ug/l. The specified compounds are: chloroform, bromoform, dibrom-ochloromethane and bromodichloromethane

- **Surface Water:** Assessed against the Surface Water Quality Standards (SWQS) laid out in the European Communities Quality of Surface Water Intended for the Abstraction of Drinking Water Regulations 1989 and Dangerous Substances Regulations, 2001.

5.0 SUMMARY OF RESULTS AND INTERPRETATIONS OF ENVIRONMENTAL MONITORING, INCLUDING LOCATION PLAN OF ALL MONITORING LOCATIONS

5.1 LEACHATE QUALITY

Leachate quality can vary during the lifetime of landfill sites depending on the phase of decomposition of the waste. Leachate results for the reporting period are presented in Appendix C and some of the characteristic parameters of the leachate are listed in Table 2.

Raw leachate results have been compared to "Typical Leachate Composition of 30 Samples from UK/Irish Landfills accepting mainly Domestic Waste" (Landfill Operational Practices). As can be seen from the Table 2 all of the parameters are below the maximum concentration.

Table 2 Raw Leachate Concentrations

	Dundalk Landfill Site		From 30 samples from UK/Irish landfills accepting domestic waste Results in mg/l		
PARAMETER	Min.Conc	Max.Conc	Min.Conc	Max.Conc	Mean
Ammonia (mg/N)	47.65	708.87	<0.2	1700	491
BOD	6.30	211.2	4.5	>4800	>834
COD	96	1,049	<10	33,700	3078
Chloride (mg/l)	67	1,192	27	3410	1256
Iron (μg/l)*	14,047.60	30,812.80	0.4	664	54.4
Potassium (mg/l)	62.77	332.98	2.7	1480	491
Sodium (mg/l)	74.29	497.95	12	3000	904
TON (mg/l N)	<0.05	123.49	/	/	/
Conductivity (μS/cm)	1,693	9,220	503	19,200	7789
pH (pH units)	6.7	7.6	6.4	8.0	7.2

5.2 GROUNDWATER

As required under the Waste Licence, groundwater monitoring has been undertaken at the borehole locations as set out in Table D1.1 of the waste licence. Schedule D of the waste licence requires the monitoring of certain parameters on either a monthly, quarterly or annual basis; the frequencies of the monitoring of groundwater parameters are shown in Table 3 below.

Table 3 Groundwater Parameters Monitoring Frequencies

Monthly	Quarterly	Annually		
Groundwater Level	Visual Inspection/Odour	Aluminium	Manganese	Total Alkalinity
Ammoniacal Nitrogen	Dissolved Oxygen	Boron	Nickel	Orthophosphate
Chloride	pH	Cadmium	Potassium	TON
Electrical Conductivity	Temperature	Calcium	Sodium	Residue on Evaporation
	TOC	Chromium	Zinc	List I/II Organic
		Copper	Cyanide	
		Iron	Fluoride	
		Lead	Mercury	
		Magnesium	Sulphate	

The main groundwater flow path is generally towards the estuary, which is located to the south of the site. Groundwater monitoring has been undertaken at boreholes WM1, WM4, WM5, WM6, WM8, WM9 and WM10. Groundwater monitoring results are provided in full within Appendix D. These results are also presented graphically.

Groundwater was assessed against:

Groundwater: the European Communities (Drinking Water) (No. 2) Regulations 2007 parametric value (DWR) and Interim Guideline Value (IGV) Towards Setting Guideline Values for the Protection of Ground Water in Ireland.

The following substances defined by the European communities (Drinking Water) (No. 2) Regulations 2007 were monitored in April and are referred to in the report.

Total pesticides means the sum of all individual pesticides detected and quantified in the course of the monitoring procedure. The DWR is 0.50µg/l. (Only those pesticides which are likely to be present in a given supply require to be monitored - organic insecticides, organic herbicides, organic fungicides, organic nematocides, organic acaricides, organic algicides, organic rodenticides, organic slimicides , related products (*inter alia*, growth regulators and their relevant metabolites, degradation and reaction products).

Polycyclic aromatic hydrocarbons are the sum of concentrations of specified compounds. The DWR is 0.10ug/l. The specified compounds are benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene and indeno(1,2,3-cd)pyrene.

Total trihalomethanes are the sum of concentrations of specified compounds. The DWR is 100ug/l. The specified compounds are: chloroform, bromoform, dibrom-ochloromethane and bromodichloromethane

Parameters that are indicative of possible leachate contamination include Ammoniacal-N, Conductivity, Iron, Chloride and heavy metals.

5.3 BASELINE DATA

Monitoring was carried out up-gradient of the site in order to obtain an overview of the baseline monitoring water quality of the surrounding groundwater. This allows for a baseline to be established from which the actual impact caused by the site on the down-gradient groundwater can be assessed. WM1 is the up-gradient monitoring point. Monitoring is undertaken on a monthly, quarterly and annual basis.

5.3.1 Monthly Parameters

Electrical Conductivity in WM1 was above the IGV of 1500µScm throughout the monitoring period. Ammonia concentrations in WM1 were <0.03mg/l at times during the monitoring period. The highest ammonia reading recorded was 0.09mg/l in February; therefore all recordings were below the IGV 0.15mg/l and the DWR of 0.30mg/l. Chloride concentrations were above the IGV (30mg/l) and the DWR (250mg/l) throughout the monitoring period. The highest chloride reading recorded was 655mg/l in April.

5.3.2 Quarterly Parameters

Dissolved Oxygen (DO) levels were only measured in July and October and the recordings were 26% and 21% respectively. WM1 exhibits TOC values ranging from 2.3mg/l to 6.4mg/l.

5.3.3 Annually

Annual analysis of metal and non metal was carried out in April. These results show that all of the parameters are below the DWR for those comparable, with the exception of Magnesium, Potassium and Sodium. The Magnesium and Potassium concentration in WM1 in April was 69.92mg/l and 23.50mg/l respectively. These are above the IGV of 50mg/l for Magnesium and 5mg/l for Potassium. The Sodium concentration in WM1 in April was 351.23mg/l, which is above the IGV of 150mg/l and DWR of 200mg/l for Sodium.

Cyanide, Fluoride, Mercury and Sulphate were all below the relevant IGV and/or DWR.

Total Organic Nitrogen (TON) was recorded at 2.76mg/l in WM1 in April,

Orthophosphate forms are produced by natural processes, but major man-influenced sources include: partially treated and untreated sewage, runoff from agricultural sites and application of some lawn fertilisers. The Orthophosphate value upstream in WM1 was 0.03mg/l which is equal to the IGV.

Analysis for Polycyclic Aromatic Hydrocarbons (total 16 EPA PAHs) recorded <10ng/l and is below the DWR of 0.1μg/l for PAH.

Phenols levels were 0.02μg/l which is lower than the limit of detection for the methodology used for Phenols however this is higher than the appropriate IGV of 0.5μg/l.

Pesticides analysis was carried out in WM1 in April. The total pesticides were below the IGV (0.5μg/l) and are below the lower detection limit for the analytical methodology used.

Total-Trihalomethanes (THM) is the sum of Dichloromethane, Chloroform, Bromodichloromethane and Bromoform. Dichloromethane, Bromodichloromethane and Bromoform were below the lower detection limit for the analytical methodology used (>0.1μg/l), however Chloroform (0.132μg/l) was detected however does not exceed the DWR of 12μg/l. THM is below the DWR of 100μg/l total trihalomethanes.

Volatiles and semi volatiles parameters were either below the IGV or less than the detection limit for those comparable. The detection limit of 0.1ug/l is higher than the IGV for a number of parameters.

The remaining parameters were below the detection limit (0.1ug/l) for the analytical methodology used.

5.4 DOWN-GRADIENT DATA

The impact on the groundwater from leachate generated within the landfill can be identified from Boreholes WM4, WM5, WM6, WM8, WM9 and WM10.

5.4.1 Monthly Parameters

Results from downstream indicate elevated levels of Ammonia in the majority of boreholes. The highest Ammonia level recorded was 702.58mg/l in WM8 in November. Elevated levels of Ammonia are indicative of leachate contamination. Electrical Conductivity exceeds the DWR of 2,500μScm in all boreholes. The highest level was recorded in WM8 (27,700 μS/cm). Chloride levels also exceeded the DWR throughout the monitoring period except in WM6 in November and WM8 on November and December. The highest Chloride concentration recorded was 7,700mg/l in WM4. It should be noted that saline water intrusion may contribute

to the high levels of Chloride and Electrical Conductivity recorded down-stream of the site as seawater can contain Chloride levels up to 20,000mg/l.

5.4.2 Quarterly Parameters

TOC values provide a measure of organic contamination of the water, the higher the content the more oxygen is consumed. Organic contamination results in an increase in the growth of micro-organisms. TOC results are highest at WM8 (52mg/l).

Potassium and Magnesium exceed the IGV in WM4, WM5, WM6, WM8 and WM10 in April. DO ranges from 17% to 52%.

5.4.3 Annually

Aluminium, Cadmium, Copper, Fluoride, Lead, Mercury and Zinc concentrations were below the IGV and/or DWR in all boreholes.

Cyanide was recorded at <0.05mg/l in WM4, WM5, WM6, WM8 and WM10 in April. The IGV is 0.01mg/l, however, this is below the laboratory's lowest detection limit of <0.05mg/l for Cyanide. The readings are below the DWR of 0.5mg/l.

Boron concentrations exceeded the IGV and DWR level of 1000µg/l in boreholes WM4, WM5, WM6, WM8 and WM10. Chromium concentrations were below the DWR level of 50µg/l in boreholes WM4, WM5, WM6, WM8 and WM10. No reading was available in WM9 for Boron or Chromium.

Calcium concentrations are below the IGV (200mg/l) in all boreholes monitored except WM8 in April (233.7mg/l).

Iron, Sodium and Manganese and Magnesium are significantly higher than the IGV in all the monitored boreholes, this is shown in Table 4.

Table 4 Groundwater Metal/ Non Metal Monitoring Results

Parameters	IGV	Units	WM4	WM5	WM6	WM8	WM10
Iron	200	µg/l	2,410.50	420.30	5,896.60	7,332.70	1,856.30
Sodium	150	mg/l	1,626.75	1,052.03	333.42	581.37	1,655.44
Magnesium	50	mg/l	208.63	148.43	78.94	2,725	151.87
Manganese	50	µg/l	1,059.00	178.5	2,653.70	123.71	1,032.70

Sulphate in WM4 (377.5mg/l) exceeded the DWR of 250mg/l.

Orthophosphate values range from <0.02mg/l (WM6) to 0.71mg/l (WM10) down-stream. WM6 is the only borehole below the IGV of 0.03mg/l. Total Organic Nitrogen (TON) ranged from <0.05mg/l to 33.84mg/l.

Annual analysis for List I and II substances were undertaken at WM4, WM5 and WM10 downstream of the site and are included in Appendix D.

Polycyclic Aromatic Hydrocarbons (total 16 EPA PAHs) in the three boreholes recorded <10ng/l and are below the DWR of 0.1μg/l for PAH.

Phenols levels were 0.02µg/l and lower than the limit of detection for the methodology used for Phenols however this is higher than the appropriate IGV of 0.5µg/l

Pesticides analysis was carried out in WM4, WM8 and WM9 in April. The total pesticides were below the IGV (0.5µg/l) and were below the lower detection limit for the analytical methodology used.

Total-Trihalomethanes (THM) is the sum of Dichloromethane, Chloroform, Bromodichloromethane and Bromoform. All levels were below the lower detection limit for the analytical methodology used (>0.1μg/l) are below the DWR of 100μg/l total trihalomethanes.

All volatiles and semi volatiles parameters were either below the IGV or less than the detection limit for those comparable. The detection limit of 0.1ug/l is higher than the IGV for a number of parameters. Benzene (0.121µg/l) was detected in WM5 however is below the Drinking Water Directive limit of 1µg/l.

The remaining parameters were below the detection limit (0.1ug/l) for the analytical methodology used.

5.5 SURFACE WATER

The results contained in this report are assessed against the Surface Water Quality Standards (SWQS) laid out in the European Communities Quality of Surface Water Intended for the Abstraction of Drinking Water Regulations 1989, (EC Abstraction of Drinking Water Regulations) for surface water assessment and Dangerous Substances Regulations, 2001.

The frequencies of the monitoring of surface water parameters are shown in Table 5.

Table 5 Surface Water Parameters Monitoring Frequencies

Monthly	Quarterly	Annually	
Ammoniacal Nitrogen	BOD	Aluminium	Manganese
Chloride	COD	Boron	Nickel
Electrical Conductivity	Dissolved Oxygen	Cadmium	Potassium
	pH	Calcium	Sodium
	Total Suspended Solids	Chromium	Zinc
	Temperature	Copper	Mercury
	TON	Iron	Sulphate
		Lead	Alkalinity
		Magnesium	Orthophosphate

Samples SW1 to SW4 are taken along the course of the drainage ditch, which adjoins the northern boundaries of the landfill. Monitoring points SW5 to SW9, located adjacent to the estuary.

5.5.1 Monthly Parameters

Monthly chemical analyses of surface water are summarised in Appendix E. The results indicate elevated levels of Ammoniacal-N, the highest concentration recorded in the stream was 28.29mg/l in SW4 and in the estuary was 660.21mg/l in SW7. Elevated levels of Electrical Conductivity, and Chloride recorded at SW5 to SW9 maybe due to the presence of estuarine water.

5.5.2 Quarterly Parameters

The pH values range from 7.2 to 8.9 in all surface water locations which are between the SWQS of 5.5 to 9 except SW1 with a recording of 9.4.

Total Suspended Solids exceed the SWQS in all surface water monitoring locations with the highest exceedances in July. Chemical oxygen Demand (COD) concentrations exceeded the SWQS in all locations except SW5 and SW7 in January and SW8 in January and April. The

Total Organic Nitrogen (TON) showed no abnormal change throughout 2008. TON ranged from <0.05mg/l to 15.20mg/l up-stream and from 0.15mg/l to 4.21mg/l down-stream.

The majority of parameters assessed show that levels of contamination increase between sampling points SW1 and SW3, which are located along the drainage ditch running along the north of the site. It can be seen that elevated levels of Ammonia, DO, COD and BOD have been recorded at the various monitoring locations along the drainage ditch.

5.5.3 Annually

Cadmium, Lead, Mercury, Zinc and Chromium were below the SWQS. Copper falls into the SWQS A1 classification for all monitoring locations except SW9 which falls into the SWQS A2 classification. Nickel and Aluminium concentrations in all the locations were below the DWR. Calcium was below the IGV in all monitoring locations except SW9.

Iron in SW1 falls into the SWQS A1 classification, all other boreholes fall into the SWQS A2 classification. SW1, SW4 and SW8 are below the IGV for Magnesium. Manganese recordings in SW1 and SW7 fit into the SWQS A1 classification, SW2 falls into the A3 classification and all other monitoring locations fall into the SWQS A2 classification. Potassium exceeds the IGV of 5mg/l in all monitoring locations except SW8. Sodium exceeds the IGV and DWR in all monitoring locations except SW1 and SW8. These results can be seen in Table 6 below.

Boron, Cyanide and Fluoride were not measured in this monitoring period. Orthophosphate values range from <0.02mg/l to 0.04mg/l with SW2 being the only recording above the IGV.

Table 6 Surface Water Annual Parameters

Parameter	Iron	Magnesium	Manganese	Potassium	Sodium
SWQS	200	(IGV) 50	50	(IGV) 5	(IGV) 150
Units	µg/l	mg/l	µg/l	mg/l	mg/l
SW1	<50	7.21	8.50	15.25	48.04
SW2	1,383.60	54.92	614.60	41.84	258.61
SW3	314.60	54.04	164	51.42	210.54
SW4	398.60	49.26	202.10	52.73	241.75
SW5	315.70	309.93	56.90	96.48	2852.49
SW6	----	----	----	----	----
SW7	357.20	69.44	42.30	22.17	578.56
SW8	495.20	11.86	58.30	4.49	41.72
SW9	384.40	538.69	68.80	164.78	4,903.80

No annual analysis for List I and II substances was undertaken in 2008.

5.6 PERIMETER GAS MONITORING AND LANDFILL GAS EXTRACTION

Schedule D of the licence requires the licensee to conduct monthly monitoring of gas levels on the perimeter and in the waste of the landfill site. The gas is monitored using a GA2000 infra-red monitoring device. The monitoring locations are shown on Table 7.

Table 7 Landfill Gas Monitoring Locations

Landfill Gas within Waste and Boundary Locations	GW1 to GW47 inclusive (as shown on Drawing No. 004 of the Restoration Plan for 34-1 (Nov 2002) agreed by the Agency)
Boundary Locations:	G1, G2, G3, G4, G5, G6, G7, G8, G9, G10, G16, G17, GM1, GM2, GM3, GM4, GM5, GM6, GM7, GM8, GM24

Landfill gas around the periphery of the site is indicated by piezometers as shown in Table 7 above.

A landfill gas trench has been installed to the west of the active landfill site to intercept the potential pathway of the gas migrating from the current active landfill site. Piezometers GM5 to GM7, G4 to G10 are to the west of the landfill gas trench.

A permanent gas extraction system has been installed at the facility during 2005. This includes a gas collection layer and 47 landfill gas extraction wells laid out on a grid system over the main body of the site. The wells are connected via 63mm diameter pipework to a 250mm diameter main gas collection pipe. A 500m^3 enclosed Flare Unit and SCADA system has been installed. The boreholes in the area of historical fill have also been attached to the active gas collection system. This enclosed flare has now been commissioned and field balancing is being undertaken. Records of field balancing are maintained. Monitoring of emissions from the flare has been undertaken and report has been included in Appendix F.

Monthly monitoring of periphery piezometers around Dundalk Landfill site have indicated exceedances of licence requirements of Methane greater than or equal to 1.0% v/v in G4, G6, G8, G9, G10 and G20 over a period of time.

Monthly monitoring of periphery piezometers around Dundalk Landfill site have indicated exceedances of licence requirements of Carbon Dioxide greater than or equal to 1.5% v/v in G2, G4, G5, G6, G8, G9, G10, G16, G17, G20, G21, GM1, GM2 and GM24.

Subsequent monitoring of adjacent premises and houses using Flame Ionization Detector has not shown any raised methane levels. Landfill gas results for 2008 are included in Appendix F.

5.7 ESTUARINE SOIL SAMPLES

Sediment sampling was undertaken at five locations in the estuary in June 2008. These results are presented in Table 8. These results have been compared to the Dutch Target values and intervention values for soil remediation soil/sediment. The results are below the Target Value for all parameters except Zinc at all locations. The results are below the intervention value. No Targets Values are given for Iron, Manganese or Cyanide. Cyanide levels are below the lower detection limit for the analytical method used.

Table 8 Sediment Results

Date Sampled	30/06/08	30/06/08	30/06/08	30/06/08	30/06/08		
Parameter (mg/kg dry wt)	SW5	SW6	SW7	SW8	SW9	Target Value (Dutch)	Inter - vention Value (Dutch)
% Dry Weight	50.2	53.9	38.0	48.1	44.3		
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	12
Copper	29	32	20	16	27	36	190
Chromium	40	36	36	29	38	100	380
Iron	29,130	28,090	23,990	19,370	25,460		
Lead	63	62	28	48	36	85	530
Manganese	444	365	495	454	519		
Mercury	<0.3	<0.3	<0.3	<0.3	<0.3	0.3	10
Zinc	220	218	163	143	159	140	720
Total cyanide mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5		

5.8 DUST MONITORING

Dust monitoring was carried out three times in the year. Table 9 details the results of the three dust monitors installed on site. The waste licence requires dust deposition limits to be no more than **350** mg/m^2/day.

Table 9 Dust Monitoring Results

Sampling Period	Dust monitor 1	Dust monitor 2	Dust monitor 3
06/06/2008 - 08/07/2008	118.6	401.4	203.3
30/07/2008 - 28/08/2008	56.8	79.2	71.1
01/12/2008 - 30/12/2008	14.9	443.5	3.4

From Table 9 it can be seen that all dust deposition levels in all periods are below the limits except in June and December in DG2, which exceeds the licence requirements.

5.9 COMPOSTING MONITORING

V & W recycling compost hedge grass & hedge cuttings from Civic Amenity Users. 1,551.45 tonnes was composted to produce grade "A" compost and supplied on site to General Public

In January 2009, a sample of the compost was analysed by Euro Environmental Services and found to be in “good condition”. The composting monitoring results are included in Appendix G.

5.10 METEOROLOGICAL MONITORING

Temperature and rainfall readings are taken from Dublin Airport.

Table 10 Summary of Meteorological Monitoring for the Reporting Period

Total rainfall in millimeters for Dublin Airport													
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
2008	97.4	14.7	101.8	27.6	32.7	76.4	111.4	189.9	114.1	92.5	44.7	39.4	942.6
mean	69.5	50.4	53.5	51.1	54.8	55.8	50.0	71.1	66.4	70.1	64.3	75.8	732.7

Mean temperature in degrees C. for Dublin Airport													
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
2008	6.4	5.8	6.0	7.6	11.6	12.8	14.8	15.2	12.4	8.9	6.9	4.4	9.4
mean	5.0	5.0	6.3	7.9	10.5	13.4	15.1	14.9	13.1	10.6	7.0	5.9	9.6

5.11 SLOPE STABILITY ASSESSMENT

A slope stability assessment has been undertaken on the site. The results of this assessment can be seen in Appendix H.

6.0 RESOURCE AND ENERGY CONSUMPTION SUMMARY

Consumption of resources for the reporting period were

- Electricity consumption: 6,439 kW units.
- Diesel Usage: 6,150 litres

7.0 SCHEDULE OF ENVIRONMENTAL OBJECTIVES AND TARGETS FOR THE FORTHCOMING YEAR

The following developments works (Environmental Objectives and Targets) will be carried out in 2009.

- Review water ponding on Landfill.

8.0 REPORT ON THE PROGRESS TOWARDS ACHIEVEMENT OF THE ENVIRONMENTAL OBJECTIVES AND TARGETS CONTAINED IN THE PREVIOUS YEARS REPORT

Report on Progress of previous environmental objectives and targets.

- The EPA granted approval to increase the throughput at the composting facility up to a maximum of 4,000 tonnes per annum and installation of additional infrastructure subject to a number of conditions. Information relating to the conditions was sent to EPA and with having had no further queries in relation to the submission; it is Dundalk Town Councils intention to permit the natural increase in composting requirements, unless there is any objection from the EPA.

- A Leachate Assessment Report was sent to EPA investigating the effect of the completion of capping works has had on leachate generation and subsequently on groundwater quality to date. No comments have yet been received from the Agency.

The following tasks were carried out in 2008 with regard to non compliances and audit observations noted during audits/landfill site inspections undertaken in 2007 by EPA (W034-02) 07SIO5H).

Biofilter Monitoring

V & W purchased and now operate monitoring equipment and a sampling regime to comply with the biofilter monitoring. This is now an on-going process.

Water Ponding on Landfill

Monitoring of wet spots was undertaken during the course of the year. The areas concerned are slowly draining. This may have resulted from the removal of heavier stone during capping. Consultants investigating the slope stability have suggested that infill of these areas may help dispel the water; this matter will be addressed as a target in 2009.

Woodchip in Compost

Quality control of the wood chip operation has been improved to the point where contaminated timber is no longer used. The test results of the compost would indicate that this is no longer a problem.

Monitoring Wells

The open wells were closed

Dust Monitoring

Dust Monitoring locations were revised during 2008 and a map was forwarded to EPA showing these locations.

Leachate Assessment

A Leachate Assessment Report has been sent to EPA.

9.0 FULL TITLE AND A WRITTEN SUMMARY OF ANY PROCEDURES DEVELOPED BY THE LICENSEE IN THE YEAR, WHICH RELATES TO THE FACILITY OPERATION

The Environmental Management System and Environmental Management Plan were reviewed and updated in 2006 to include the procedures for the Civic Waste Facility and the closure of the Landfill site. No new procedures were developed in 2008.

10.0 REPORT ON INCIDENTS AND COMPLAINTS SUMMARIES

Incidents / Complaints: No complaints were received from the public. No incidents reported. A site inspection was carried out at the facility in November 2008.

Table 14 Summary of non compliances and audit observations noted during audits/landfill site inspections undertaken during the reporting period by EPA

Date and Reference	Summary of Inspection Report/Audit
Inspection date: 04/11/08 **Issue date: 17/12/08** **Inspection Reference No: (W0034-02) 08SIO7NH**	**Inspection findings** **Non Compliances** The licensee was found to have no non-compliances with the requirements of the Licence on the day of the Inspection **Inspection Observations** 1. Storage of WEEE 2. Dust Monitoring 3. Monitoring wells 4. Licence Boundary 5. Storage of Recovered Recyclable Material

11.0 REVIEW OF NUISANCE CONTROLS

11.1 DUST CONTROL

There was a breach of the dust deposition limit in 2008; however the exceedance was only slightly above permitted levels. In addition to relocation of monitoring equipment, operational activities to 'wet down' materials are in place and there have been no further instances of excessive dust levels.

11.2 LITTER

The landfill site was closed in October 2002 and therefore there is no wind blown litter arising from the landfill site.

V & W carry out regular clean up of the site; inspections by staff indicate this is being addressed adequately.

11.3 ODOURS

The landfill site was closed in October 2002 and therefore the potential for odours has been reduced. The permanent capping and installation of an active extraction system reduces the occurrence of odour from landfill gas. The doors to the waste processing building are kept closed where possible, the biofilters minimize the odours from the composting process in the CWF and municipal waste is placed in a closed container and removed within 96hours for appropriate disposal.

11.4 PEST CONTROL (VERMIN)

A pest control company are employed as part of an ongoing programme, regular inspections have shown that vermin is being controlled.

11.5 NOISE

Noise monitoring was undertaken in June 2008. A copy of the noise monitoring report can be found in Appendix I.

12.0 VOLUME OF LEACHATE PRODUCED AND VOLUME OF LEACHATE TRANSPORTED DISCHARGED OFF SITE

A leachate collection trench has been constructed on the southern slope of the landfill. The trench is lined on the estuary side of the trench and also to a level of 3.65mOD on the landfill side of the trench. The trench is connected to the foul sewer running along the western boundary of the site. A flow monitoring has been installed in this trench. Zero flow has been measured to date.

13.0 PRTR REPORTING

PRTR Reporting was undertaken for 2008. A copy of the PRTR EPA returns worksheet is provided in Appendix J.

APPENDIX A

EPA LANDFILL AND IWMF SURVEY, PART 3 2008

PART 3 - Household Waste Accepted at Civic Amentity Site in 2008

Enter information into white cells only.
Information on non-household waste is requested to ensure that respondents consider and apply a household/non-household split. It is not mandatory.
Please note that the information provided on this sheet may be subject to verification by audit.

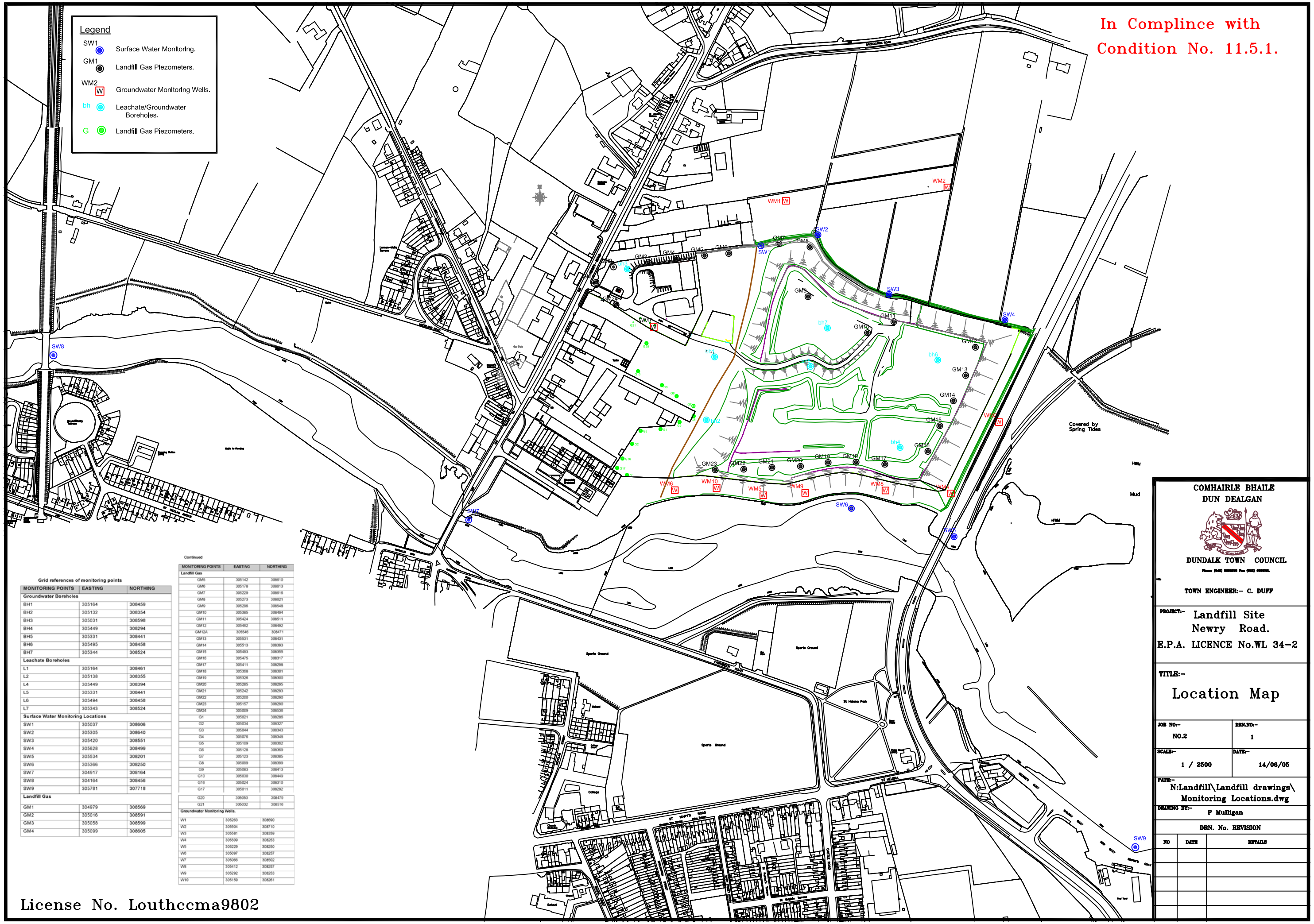
					DISPOSAL OR RECOVERY		
Material type	**Suggested EWC codes**		**Household waste**	**Non-household waste**	**Name of destination facility(ies), or collector(s) if directly exported**	**"D" or "R" or "Both"**	**Commentary (if needed)**
(If you must depart from this list, please provide details on a separate sheet)	**(overwrite as appropriate)**	**Notes**	**(tonnes)**	**(tonnes)**	**(please provide licence/permit number)**	**(if a mixture of both, please provide an explanation)**	
mixed residual waste	20 03 01					SELECT	
organic waste (food and garden)	20 01 08; 20 02 01					SELECT	
if segregated, provide specific information on food and garden waste							
food	*20 01 08*					SELECT	
garden	*20 02 01*					SELECT	
mixed dry recyclables	15 01 06; 20 03 01					SELECT	
cardboard, newspaper and other paper	15 01 01; 20 01 01		3,350		Peute Nederlands no:NL 6000076	R	
if segregated, provide the breakdown of cardboard and paper in the rows below							
cardboard packaging	*15 01 01*					SELECT	
cardboard non-packaging	*20 01 01*					SELECT	
paper packaging	*15 01 01*					SELECT	
paper non-packaging	*20 01 01*					SELECT	
newspaper and magazines	*20 01 01*					SELECT	
glass	20 01 02		622		glasson N.I no:L/N/06/08	R	
if segregated, provide the breakdown of glass in the next two rows							
glass packaging	*15 01 07*					SELECT	
glass non-packaging	*20 01 02*					SELECT	
metals	20 01 40		369		Tinnelly N.I no:WMEX 22/01	R	
if segregated, provide the breakdown of metals in the next four rows							
aluminium cans (packaging)	*15 01 04*		12			SELECT	
steel cans (packaging)	*15 01 04*		55			SELECT	
other metal packaging	*15 01 04*		85			SELECT	
other metals (non-packaging)	*20 01 40*		217			SELECT	
plastic	20 01 39		899		Shabra Plastics IRL no 15/5	R	
if segregated, provide the breakdown of plastic waste in the next two rows							
plastic packaging	*15 01 02*					SELECT	
plastic non-packaging	*20 01 39*					SELECT	
textiles	20 01 11		58		Cookstown N.I no:WMEX 01/11	R	
if segregated, provide the breakdown of textiles in the next two rows							
textiles, packaging	*15 01 09*					SELECT	
textiles, non-packaging	*20 01 11*		58			SELECT	
wood	15 01 03; 20 01 38;		1,173		Finsa Co. Clare no:	R	
if segregated, provide the breakdown of wood waste in the next four rows							
wood packaging	*15 01 03*					SELECT	
wood non-packaging	*20 01 38*					SELECT	
mixed, uncontaminated wood packaging and non-packaging	*15 01 03; 20 01 38*					SELECT	
wood, treated, hazardous	*20 01 37**					SELECT	
small batteries	20 01 34;		2.11		Returnbat IRL no:MH2001/61C	R	
lead acid batteries	16 06 01*		13.25		Returnbat IRL no:MH2001/61C	R	
waste mineral oils	13 02 04	lubrication, vehicle, machine, etc.	8.55		Enva IRL no:MH2001/107C	R	
oil filters (vehicles)						SELECT	
oil containers (mineral oil) - plastic + metal						SELECT	
waste cooking or vegetable oils	20 01 25		3.19		Enva IRL no:MH2001/107C	R	
waste paint and varnish (including containers)	20 01 27		0.4		Ceder IRL no:WO185/01	R	
WEEE	various		374		Ceder IRL no:WO185/01	R	
if segregated, provide the breakdown of WEEE in the next five rows							
fridges and freezers	*20 01 35*; 20 01 36; 16 02 11*; 16 02 14*	Chapter 16 codes should only be used where the waste is not MUNICIPAL waste.				SELECT	
white goods (electrical and electronic)	*20 01 36; 16 02 14*	Chapter 16 codes should only be used where the waste is not MUNICIPAL waste.				SELECT	
televisions and PC monitors	*20 01 35*; 16 02 13*;*	Chapter 16 codes should only be used where the waste is not MUNICIPAL waste.				SELECT	
fluorescent tubes and lighting	*20 01 21**		1.97		Ceder IRL no:WO185/01	R	
other electrical and electronic equipment	*16 02 14; 20 01 36; 20 01 35**	e.g. phones, computer equipment, small items incl. toasters, radios, etc.				SELECT	
bulky waste (provide summary below of waste types)	20 03 07	e.g. furniture, mattresses, mixed bulky waste				SELECT	
Building Rubble	17 01 07	Clean Rubble from Domestic Users	1353.414		Louth County Council no:WO060-02	R	
< other categories not included above>	<enter EWC code>					SELECT	
< other categories not included above>	<enter EWC code>					SELECT	
<other categories not included above>	<enter EWC code>					SELECT	
<other categories not included above>	<enter EWC code>					SELECT	

Bulky waste types - *Detailed Information*	**Use a row for the waste types typically accepted in each relevant bulky waste skip or container at your facility**
	e.g. furniture skip, wood skip etc.
	<insert description here>
	<insert description here>
	<insert description here>
	<insert description here>
	<insert description here>
	<insert description here>

APPENDIX B

MONITORING POINTS DRAWING

In Complince with
Condition No. 11.5.1.



Grid references of monitoring points

MONITORING POINTS	EASTING	NORTHING
Groundwater Boreholes		
BH1	305164	308459
BH2	305132	308354
BH3	305031	308598
BH4	305449	308294
BH5	305331	308441
BH6	305495	308458
BH7	305344	308524
Leachate Boreholes		
L1	305164	308461
L2	305138	308355
L4	305449	308394
L5	305331	308441
L6	305494	308458
L7	305343	308524
Surface Water Monitoring Locations		
SW1	305037	308606
SW2	305305	308640
SW3	305420	308551
SW4	305628	308499
SW5	305534	308201
SW6	305366	308250
SW7	304917	308164
SW8	304164	308456
SW9	305781	307718
Landfill Gas		
GM1	304979	308569
GM2	305016	308591
GM3	305058	308599
GM4	305099	308605

Continued

MONITORING POINTS	EASTING	NORTHING
Landfill Gas		
GM5	305142	308610
GM6	305178	308613
GM7	305229	308616
GM8	305273	308621
GM9	305296	308548
GM10	305385	308494
GM11	305424	308511
GM12	305462	308492
GM12A	305546	308471
GM13	305531	308431
GM14	305513	308393
GM15	305493	308355
GM16	305475	308317
GM17	305411	308298
GM18	305368	308301
GM19	305326	308300
GM20	305285	308295
GM21	305242	308293
GM22	305200	308290
GM23	305157	308290
GM24	305009	308536
G1	305021	308286
G2	305034	308327
G3	305044	308343
G4	305076	308348
G5	305109	308362
G6	305128	308369
G7	305123	308385
G8	305099	308399
G9	305083	308413
G10	305030	308449
G16	305024	308310
G17	305011	308292
G20	305053	308479
G21	305032	308516
Groundwater Monitoring Wells.		
W1	305263	308990
W2	305504	308710
W3	305581	308359
W4	305509	308253
W5	305229	308250
W6	305097	308257
W7	305066	308502
W8	305412	308257
W9	305292	308253
W10	305159	308261

License No. Louthccma9802

COMHAIRLE BHAILE
DUN DEALGAN

DUNDALK TOWN COUNCIL

TOWN ENGINEER:- C. DUFF

PROJECT:- Landfill Site
Newry Road.
E.P.A. LICENCE No.WL 34-2

TITLE:-

Location Map

JOB NO:-	DRN.NO:-
NO.2	1
SCALE:- 1 / 2500	DATE:- 14/06/05

PATH:- N:Landfill\Landfill drawings\Monitoring Locations.dwg

DRAWING BY:- P Mulligan

DRN. No. REVISION

NO	DATE	DETAILS

APPENDIX C

LEACHATE RESULTS

Dundalk Landfill Site

LEACHATE QUALITY

Monitoring Point:		LH1								
		RESULTS								
		Date								
PARAMETERS	Units	16-Jan-07	26-Apr-07	10-Jul-07	26-Sep-07	16-Oct-07	17-Jan-08	15-Apr-08	30-Jul-08	28-Oct-08
Alkalinity	mg/l CaCO3									
Aluminium	µg/l		1179.9					<50		
Ammonia	mg/l N	128.71	132.04	120.07		125.90	122.2	106.79	114.43	>80
B.O.D.	mg/l O2	11.3	21.9	17.8		5.7	8.8	8.5	25	23.1
Boron	µg/l		2075.6					1302.1		
Cadmium	µg/l		<0.10					<0.10		
Calcium	mg/l Ca		188.79					169.78		
C.O.D.	mg/l O2	145	170	206		116	125	132	147	238
Chloride	mg/l Cl	138	130	174		151	148	160	221	216
Chromium	µg/l		35.4					36		
Conductivity	µS/cm @ 25	2810	2920	2810		2690	2580	2500	2740	2760
Copper	µg/l		13.4					16		
Cyanide	mg/l CN		<0.05					<0.05		
Depth	m		3.6	3.4		3.7	3.2			2.6
D.O.	% Saturation									
Fluoride	mg/l		<0.150					<0.150		
Iron	µg/l		26158.8					21960.8		
Lead	µg/l		10.1					<1		
Magnesium	mg/l Mg		92.43					60.71		
Manganese	µg/l		579.1					529		
Mercury	µg/l		<0.10					0.2		
Nickel			89.7					32.9		
o-Phosphate	mg/l P		0.02					<0.02		
pH		6.8	6.9	6.8		6.8	6.8	6.9	6.7	6.8
Potassium	mg/l		75.34					62.77		
Residue on Evaporation										
Sodium	mg/l		136.02					74.29		
Sulphate	mg/l SO4		16.4					<2.0		
Temp	°C	7	12.0	15.0	nm	14.0	12	nm	12.9	11
Time Sampled		11	11.00	11.05	10.00	10.40	11	11	11.3	11.2
T.O.C.	mg/l									
T.O.N	mg/l N	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Total S Solids	mg/l									
Zinc	µg/l		179.9					25.5		

		LEACHATE QUALITY								
Monitoring Point:		LH2								
		RESULTS								
		Date								
PARAMETERS	Units	16-Jan-07	26-Apr-07	10-Jul-07	26-Sep-07	16-Oct-07	17-Jan-08	15-Apr-08	30-Jul-08	28-Oct-08
Alkalinity	mg/l CaCO3									
Aluminium	µg/l		557.9					36.8		
Ammonia	mg/l N	140.46	181.33	60.85		136.46	47.65	206.54	181.92	89.61
B.O.D.	mg/l O2	31.1	25.2	35.4		117.2	16.3	17.4	21.3	18.5
Boron	µg/l		2122.1					2402.4		
Cadmium	µg/l		<0.10					<0.10		
Calcium	mg/l Ca		221.31					185.29		
C.O.D.	mg/l O2	175	236	111		220	96	247	186	128
Chloride	mg/l Cl	145	223	67		193	64	236	197	115
Chromium	µg/l		40.1					64.6		
Conductivity	µS/cm @ 25	3120	3930	1927		3360	1693	4180	3700	2450
Copper	µg/l		8.8					10		
Cyanide	mg/l CN		<0.05					<0.05		
Depth	m		3.5	3.6		4	3			2.4
D.O.	% Saturation									
Fluoride	mg/l		<0.150					<0.150		
Iron	µg/l		28870.8					30812.8		
Lead	µg/l		6.5					3.1		
Magnesium	mg/l Mg		114.35					105.51		
Manganese	µg/l		1121.2					877.3		
Mercury	µg/l		<0.10					<0.10		
Nickel			54.7					48.2		
o-Phosphate	mg/l P		0.09					0.07		
pH		6.7	7	6.8		7	6.8	7	6.9	6.8
Potassium	mg/l		144.38					157.26		
Residue on Evaporation										
Sodium	mg/l		195.37					218.71		
Sulphate	mg/l SO4		8.5					14.8		
Temp	°C	7	12	15	nm	14	12	nm	12	11
Time Sampled		11.3	11.25	11.25	10.2	11.05	11.3	11.2	11.5	12.05
T.O.C.	mg/l									
T.O.N	mg/l N	<0.5	<0.05	0.48		0.26	1.23	<0.05	<0.05	0.54
Total S Solids	mg/l									
Zinc	µg/l		38.1					27		

Dundalk Landfill Site

LEACHATE QUALITY

Monitoring Point:		LH4								
		RESULTS								
		Date								
PARAMETERS	Units	16-Jan-07	26-Apr-07	10-Jul-07	26-Sep-07	16-Oct-07	17-Jan-08	15-Apr-08	30-Jul-08	28-Oct-08
Alkalinity	mg/l CaCO3									
Aluminium	µg/l		2267.6					338.4		
Ammonia	mg/l N	190.9	180.51	311.08		205.04	165.13	196.42	194.38	242.41
B.O.D.	mg/l O2	<30	39.0	<40		23.0	11.4	11.1	15.5	6.3
Boron	µg/l		1761.7					1737.5		
Cadmium	µg/l		0.5					<0.10		
Calcium	mg/l Ca		160.23					143.45		
C.O.D.	mg/l O2	332	629	600		447	175	210	212	209
Chloride	mg/l Cl	208	305	715		271	157	229	330	240
Chromium	µg/l		28.0					43.8		
Conductivity	µS/cm @ 25	3830	3830	6270		4380	3090	3720	3870	4480
Copper	µg/l		20.4					14.8		
Cyanide	mg/l CN		<0.05					<0.05		
Depth	m		9.1	9.4		8.6	6			8.5
D.O.	% Saturation									
Fluoride	mg/l		<0.150					<0.150		
Iron	µg/l		8312.6					20914.2		
Lead	µg/l		14.5					7.8		
Magnesium	mg/l Mg		87.65					79.47		
Manganese	µg/l		782.1					793.2		
Mercury	µg/l		<0.10					0.2		
Nickel			33.0					37.2		
o-Phosphate	mg/l P		0.05					0.17		
pH		6.9	7.0	7.1		7.1	6.8	7	6.9	7
Potassium	mg/l		156.66					147.02		
Residue on Evaporation										
Sodium	mg/l		236.80					202.64		
Sulphate	mg/l SO4		20.1					9.1		
Temp	°C	6	12.0	16.0	nm	15.0	12	nm	14.2	14
Time Sampled		12.05	12.10	12.00	10.40	11.40	12.05	11.5	12.35	12.3
T.O.C.	mg/l									
T.O.N	mg/l N	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Total S Solids	mg/l									
Zinc	µg/l		164.0					68.2		

Dundalk Landfill Site

LEACHATE QUALITY

Monitoring Point:		LH6								
		RESULTS								
		Date								
PARAMETERS	Units	16-Jan-07	26-Apr-07	10-Jul-07	26-Sep-07	16-Oct-07	17-Jan-08	15-Apr-08	30-Jul-08	28-Oct-08
Alkalinity	mg/l CaCO3									
Aluminium	µg/l		3368.1					913.5		
Ammonia	mg/l N	455.22	198.19	282.08		602.54	482.76	490.38	708.87	707.34
B.O.D.	mg/l O2	<100	213.9	81.2		69.5	53.8	75.6	211.2	35.6
Boron	µg/l		738.3					2936.9		
Cadmium	µg/l		<0.10					<0.10		
Calcium	mg/l Ca		245.08					119.02		
C.O.D.	mg/l O2	626	1035	587		1130	616	947	1035	818
Chloride	mg/l Cl	359	181	255		481	386	588	635	676
Chromium	µg/l		24.6					88.6		
Conductivity	µS/cm @ 25	6120	3650	5050		8990	6230	8070	8800	9220
Copper	µg/l		51.8					16.6		
Cyanide	mg/l CN		<0.05					<0.05		
Depth	m		4.2	4.9		9.5	8.6			7.5
D.O.	% Saturation									
Fluoride	mg/l		<0.150					<0.150		
Iron	µg/l		29436.3					14047.6		
Lead	µg/l		17.3					8		
Magnesium	mg/l Mg		77.31					106.44		
Manganese	µg/l		982.4					805.5		
Mercury	µg/l		<0.10					0.3		
Nickel			129.3					111.9		
o-Phosphate	mg/l P		3.79					2.3		
pH		6.9	7.1	7.1		7.2	7	7.2	7.1	7.1
Potassium	mg/l		85.34					332.98		
Residue on Evaporation										
Sodium	mg/l		213.63					497.95		
Sulphate	mg/l SO4		33.3					18.3		
Temp	°C	7	11.0	15.0	nm	16.0	14	nm	16.6	17
Time Sampled		12.35	12.30	12.30	11.00	12.00	12.3	12.3	12.15	12.5
T.O.C.	mg/l									
T.O.N	mg/l N	<0.05	<0.05	<0.05		0.08	<0.05	<0.05	<0.05	<0.05
Total S Solids	mg/l									
Zinc	µg/l		1418.6					320.1		

APPENDIX D

RESULTS FOR ALL GROUNDWATER MONITORING LOCATIONS

Dundalk Landfill Site

GROUNDWATER QUALITY

Monitoring Point: **WM1**

RESULTS

PARAMETERS	Units	Date												
		17-Dec-07	17-Jan-08	26-Feb-08	27-Mar-08	15-Apr-08	28-May-08	26-Jun-08	30-Jul-08	27-Aug-08	01-Oct-08	28-Oct-08	27-Nov-08	22-Dec-08
Alkalinity	mg/l CaCO3					388								
Aluminium	µg/l					2.4								
Ammonia	mg/l N	<0.03	0.05	0.09	0.05	<0.03	<0.03	<0.03	0.03	0.08	0.05	0.04	0.07	0.04
B.O.D.	mg/l O2													
Boron	µg/l					291.2								
Cadmium	µg/l					<0.10								
Calcium	mg/l Ca					165.64								
C.O.D.	mg/l O2													
Chloride	mg/l Cl	544	492	640	607	655	653	596	547	590	622	578	567	582
Chromium	µg/l					6.1								
Conductivity	µS/cm @ 25	2570	2480	2950	2940	2920	2930	2880	2580	2710	2750	2770	2790	2980
Copper	µg/l					3.5								
Cyanide	mg/l CN					<0.05								
Depth	m					nm								
D.O.	% Saturation		32			nm			26			21		
Fluoride	mg/l					<0.150								
Iron	µg/l					142.8								
Lead	µg/l					<1								
Magnesium	mg/l Mg					69.92								
Manganese	µg/l					19.3								
Mercury	µg/l					<0.10								
Nickel	µg/l					<1								
o-Phosphate	mg/l P					0.03								
pH			7.3			7.2			7.3			7.3		
Potassium	mg/l					23.5								
Residue on Evaporation						2008								
Sodium	mg/l					351.23								
Sulphate	mg/l SO4					151.6								
Temp	°C		8.8			nm			16			9		
Time Sampled		nt	12	14.1	11.15	10	nt	10	12.55	10.15	9.1	14	12.1	11.1
T.O.C.	mg/l		2.9			6.4			4.2			2.3		
T.O.N	mg/l N					2.76								
Total S Solids	mg/l													
Zinc	µg/l					<1								

Dundalk Landfill Site

GROUNDWATER QUALITY

Monitoring Point:		WM4												
		RESULTS												
		Date												
PARAMETERS	**Units**	**17-Dec-07**	**17-Jan-08**	**26-Feb-08**	**27-Mar-08**	**15-Apr-08**	**28-May-08**	**26-Jun-08**	**30-Jul-08**	**27-Aug-08**	**01-Oct-08**	**28-Oct-08**	**27-Nov-08**	**22-Dec-08**
Alkalinity	**mg/l CaCO3**					1030								
Aluminium	**µg/l**					<50								
Ammonia	**mg/l N**	26.16	27.08	23.14	32.04	30.32	23.15	21.35	17.7	14.67	15.16	25.76	16.83	13.3
B.O.D.	**mg/l O2**													
Boron	**µg/l**					1063.5								
Cadmium	**µg/l**					<0.10								
Calcium	**mg/l Ca**					183.59								
C.O.D.	**mg/l O2**													
Chloride	**mg/l Cl**	3134	3120	3742	2253	2709	3113	3689	>2400	7070	5441	4739	3621	3402
Chromium	**µg/l**					22.6								
Conductivity	**µS/cm @ 25**	10760	10860	10550	9920	9530	10160	11220	15000	21200	15870	11480	11790	11700
Copper	**µg/l**					16.1								
Cyanide	**mg/l CN**					<0.05								
Depth	**m**					nm								
D.O.	**% Saturation**		21			nm			37			17		
Fluoride	**mg/l**					0.45								
Iron	**µg/l**					2410.5								
Lead	**µg/l**					<1								
Magnesium	**mg/l Mg**					208.63								
Manganese	**µg/l**					1059								
Mercury	**µg/l**					<0.10								
Nickel	**µg/l**					8.7								
o-Phosphate	**mg/l P**					0.33								
pH			7			7.1			7			7		
Potassium	**mg/l**					119.82								
Residue on Evaporation						6129								
Sodium	**mg/l**					1626.75								
Sulphate	**mg/l SO4**					377.5								
Temp	**°C**		10.4			nm			16			9.6		
Time Sampled		nt	13	14.4	11.55	10.2	nt	nt	13.1	10.35	9.31	14.15	12.3	11.3
T.O.C.	**mg/l**		27			27.7			16.8			3.4		
T.O.N	**mg/l N**					0.45								
Total S Solids	**mg/l**													
Zinc	**µg/l**					6.6								

Dundalk Landfill Site

GROUNDWATER QUALITY

Monitoring Point:		WM5												
		RESULTS												
		Date												
PARAMETERS	Units	17-Dec-07	17-Jan-08	26-Feb-08	27-Mar-08	15-Apr-08	28-May-08	26-Jun-08	30-Jul-08	27-Aug-08	01-Oct-08	28-Oct-08	27-Nov-08	22-Dec-08
Alkalinity	mg/l CaCO3					860								
Aluminium	µg/l					<50								
Ammonia	mg/l N		45.16	28.87	55.1	53.14	95.68	59.79	43.72	43.5	26.68	31.75	29.43	22.08
B.O.D.	mg/l O2													
Boron	µg/l					975.2								
Cadmium	µg/l					<0.10								
Calcium	mg/l Ca					131.24								
C.O.D.	mg/l O2													
Chloride	mg/l Cl		1358	1050	1397	1728	2330	1355	>2400	1573	1390	1458	1406	1195
Chromium	µg/l					19.7								
Conductivity	µS/cm @ 25		5420	5060	6680	6850	8630	5590	19530	7210	5760	6060	6250	6680
Copper	µg/l					15.9								
Cyanide	mg/l CN					<0.05								
Depth	m					nm								
D.O.	% Saturation		48			nm			48			20		
Fluoride	mg/l					0.16								
Iron	µg/l					420.3								
Lead	µg/l					<1								
Magnesium	mg/l Mg					148.43								
Manganese	µg/l					178.5								
Mercury	µg/l					<0.10								
Nickel	µg/l					4.9								
o-Phosphate	mg/l P					0.24								
pH			7.4			7.3			7.1			7.3		
Potassium	mg/l					100.59								
Residue on Evaporation						4265								
Sodium	mg/l					1052.03								
Sulphate	mg/l SO4					177.6								
Temp	°C		11.2			nm			15.2			12.7		
Time Sampled			13.2	13.3	10.15	10.4	nt	10.3	11.35	nt	9.49	11.35	11	14.5
T.O.C.	mg/l		17.9			19.6			16.5			23.1		
T.O.N	mg/l N					33.84								
Total S Solids	mg/l													
Zinc	µg/l					5								

Dundalk Landfill Site

GROUNDWATER QUALITY

Monitoring Point: WM6

PARAMETERS	Units	RESULTS											
		Date											
		17-Dec-07	17-Jan-08	26-Feb-08	27-Mar-08	15-Apr-08	28-May-08	26-Jun-08	30-Jul-08	27-Aug-08	01-Oct-08	28-Oct-08	27-Nov-08	22-Dec-08
Alkalinity	mg/l CaCO3					1290								
Aluminium	µg/l					62								
Ammonia	mg/l N		107.51			94.35	87.27	82.7	76.01	65.71	52.79	60.68	0.31	86.33
B.O.D.	mg/l O2													
Boron	µg/l					1193.5								
Cadmium	µg/l					<0.10								
Calcium	mg/l Ca					148.83								
C.O.D.	mg/l O2													
Chloride	mg/l Cl		371			431	434	381	373	422	450	420	232	411
Chromium	µg/l					30.8								
Conductivity	µS/cm @ 25		3400			3440	3470	3420	3380	3330	3310	3190	3190	3180
Copper	µg/l					10.8								
Cyanide	mg/l CN					<0.05								
Depth	m					nm								
D.O.	% Saturation					nm			51			17		
Fluoride	mg/l					0.39								
Iron	µg/l					5896.6								
Lead	µg/l					<1								
Magnesium	mg/l Mg					78.94								
Manganese	µg/l					2653.7								
Mercury	µg/l					<0.10								
Nickel	µg/l					24.2								
o-Phosphate	mg/l P					<0.02								
pH			9.3			7.1			7.3			7.1		
Potassium	mg/l					98.62								
Residue on Evaporation						1865								
Sodium	mg/l					333.42								
Sulphate	mg/l SO4					21								
Temp	°C					nm			16.7			11.6		
Time Sampled						11.1	nt	11	12.05	9.3	9.59	12	10.1	14.3
T.O.C.	mg/l					32.9			16.6			35.5		
T.O.N	mg/l N					3.08								
Total S Solids	mg/l													
Zinc	µg/l					14.3								

Dundalk Landfill Site

GROUNDWATER QUALITY

Monitoring Point: **WM8**

PARAMETERS	Units	RESULTS												
		Date												
		17-Dec-07	17-Jan-08	26-Feb-08	27-Mar-08	15-Apr-08	28-May-08	26-Jun-08	30-Jul-08	27-Aug-08	01-Oct-08	28-Oct-08	27-Nov-08	22-Dec-08
Alkalinity	mg/l CaCO3					1640								
Aluminium	µg/l					<50								
Ammonia	mg/l N		80.2	120.5	146.64	137.69	125.17	121.31	63.61	153.66	134.89	132.75	702.58	120.06
B.O.D.	mg/l O2													
Boron	µg/l					2558.7								
Cadmium	µg/l					<0.10								
Calcium	mg/l Ca					233.7								
C.O.D.	mg/l O2													
Chloride	mg/l Cl		383	1149	973	1010	2206	4175	6730	413	422	1027	192	220
Chromium	µg/l					39.7								
Conductivity	µS/cm @ 25		3520	6530	5560	5550	8640	13510	27700	4020	3880	5610	3190	3230
Copper	µg/l					8.8								
Cyanide	mg/l CN					<0.05								
Depth	m					nm								
D.O.	% Saturation		52			nm			28			18		
Fluoride	mg/l					<0.150								
Iron	µg/l					7332.7								
Lead	µg/l					<1								
Magnesium	mg/l Mg					123.71								
Manganese	µg/l					2725								
Mercury	µg/l					<0.10								
Nickel	µg/l					25.5								
o-Phosphate	mg/l P					0.06								
pH			6.8			6.8			6.8			6.7		
Potassium	mg/l					112.39								
Residue on Evaporation						3340								
Sodium	mg/l					581.37								
Sulphate	mg/l SO4					57.3								
Temp	°C		12.3			nm			15.4			12.3		
Time Sampled			13.5	14	11.15	11.3	nt	11.3	11.45	10.3	10.2	12.3	12	15.15
T.O.C.	mg/l		36			37.6			2.4			52		
T.O.N	mg/l N					0.7								
Total S Solids	mg/l													
Zinc	µg/l					10.8								

Dundalk Landfill Site

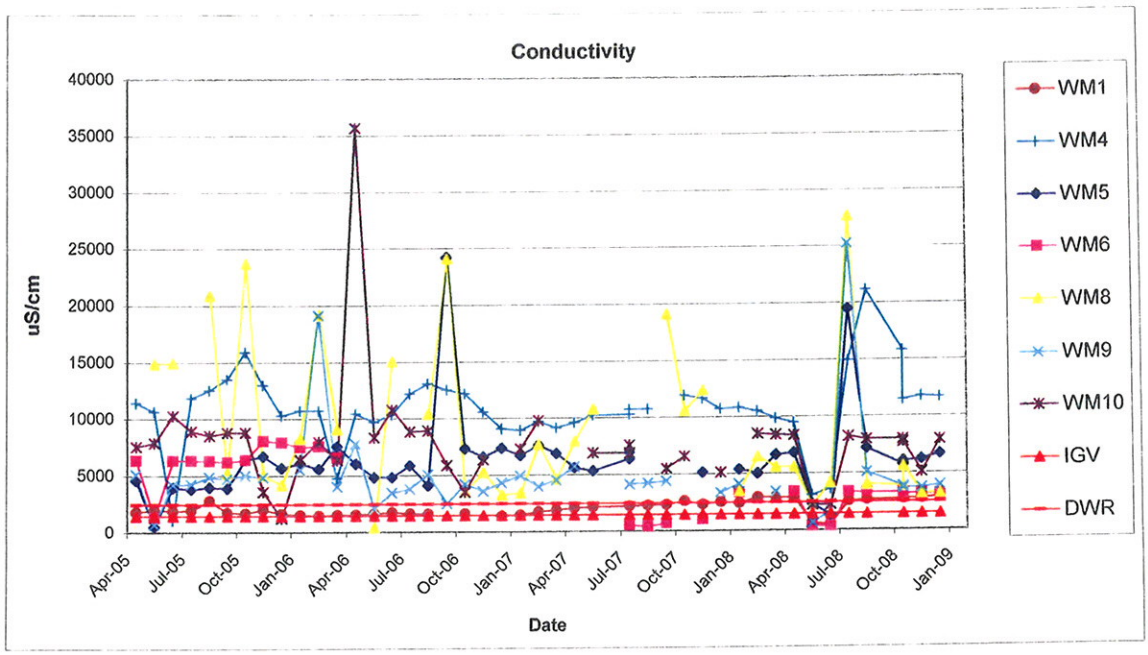
GROUNDWATER QUALITY

Monitoring Point:		WM9											
		RESULTS											
		Date											
PARAMETERS	**Units**	**17-Dec-07**	**17-Jan-08**	**26-Feb-08**	**27-Mar-08**	**15-Apr-08**	**28-May-08**	**26-Jun-08**	**30-Jul-08**	**27-Aug-08**	**01-Oct-08**	**28-Oct-08**	**27-Nov-08**	**22-Dec-08**
Alkalinity	**mg/l CaCO3**													
Aluminium	**µg/l**													
Ammonia	**mg/l N**	38.86	48.04		38.53		29.99	45.61	58.53	119.34	25.9	26.57	25.92	26.27
B.O.D.	**mg/l O2**													
Boron	**µg/l**													
Cadmium	**µg/l**													
Calcium	**mg/l Ca**													
C.O.D.	**mg/l O2**													
Chloride	**mg/l Cl**	366	775		568		711	1673	>2400	604	784	715	580	631
Chromium	**µg/l**													
Conductivity	**µS/cm @ 25**	3410	4160		3490		3720	6850	25300	5130	3880	3750	3740	3950
Copper	**µg/l**													
Cyanide	**mg/l CN**													
Depth	**m**													
D.O.	**% Saturation**		49						35			18		
Fluoride	**mg/l**													
Iron	**µg/l**													
Lead	**µg/l**													
Magnesium	**mg/l Mg**													
Manganese	**µg/l**													
Mercury	**µg/l**													
Nickel	**µg/l**													
o-Phosphate	**mg/l P**													
pH			7						6.9			7.1		
Potassium	**mg/l**													
Residue on Evaporation														
Sodium	**mg/l**													
Sulphate	**mg/l SO4**													
Temp	**°C**		11						15.2			14.2		
Time Sampled		nt	14.1		10.4		nt	12	12.2	11	10.5	13.05	11.25	15
T.O.C.	**mg/l**		24						16.5			11.9		
T.O.N	**mg/l N**													
Total S Solids	**mg/l**													
Zinc	**µg/l**													

Dundalk Landfill Site

GROUNDWATER QUALITY

Monitoring Point:		WM10												
		RESULTS												
		Date												
PARAMETERS	**Units**	**17-Dec-07**	**17-Jan-08**	**26-Feb-08**	**27-Mar-08**	**15-Apr-08**	**28-May-08**	**26-Jun-08**	**30-Jul-08**	**27-Aug-08**	**01-Oct-08**	**28-Oct-08**	**27-Nov-08**	**22-Dec-08**
Alkalinity	**mg/l CaCO3**					1420								
Aluminium	**µg/l**					33								
Ammonia	**mg/l N**	38.86		21.98	26.07	24.75	22.13	19.95	16.8	16.49	13.49	15.65	42.39	11.86
B.O.D.	**mg/l O2**													
Boron	**µg/l**					2100.8								
Cadmium	**µg/l**					<0.10								
Calcium	**mg/l Ca**					79.3								
C.O.D.	**mg/l O2**													
Chloride	**mg/l Cl**	1222		2137	1950	2180	2243	2262	2030	2004	2079	2118	929	2060
Chromium	**µg/l**					25.6								
Conductivity	**µS/cm @ 25**	5180		8530	8450	8410	8160	8250	8270	8000	8000	7740	5110	7960
Copper	**µg/l**					24								
Cyanide	**mg/l CN**					<0.05								
Depth	**m**					nm								
D.O.	**% Saturation**					nm			30			28		
Fluoride	**mg/l**					0.31								
Iron	**µg/l**					1856.3								
Lead	**µg/l**					<1								
Magnesium	**mg/l Mg**					151.87								
Manganese	**µg/l**					1032.7								
Mercury	**µg/l**					<0.10								
Nickel	**µg/l**					10.9								
o-Phosphate	**mg/l P**					0.71								
pH						7.3			7.3			7		
Potassium	**mg/l**					90.54								
Residue on Evaporation						5050								
Sodium	**mg/l**					1655.44								
Sulphate	**mg/l SO4**					20.5								
Temp	**°C**					nm			16.4			11.8		
Time Sampled		nt		14.3	9.55	11.5	nt	12.3	12.35	10	11.5	13.3	10.35	14.4
T.O.C.	**mg/l**					16.5			17			24.7		
T.O.N	**mg/l N**					<0.05								
Total S Solids	**mg/l**													
Zinc	**µg/l**					3								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uS/cm
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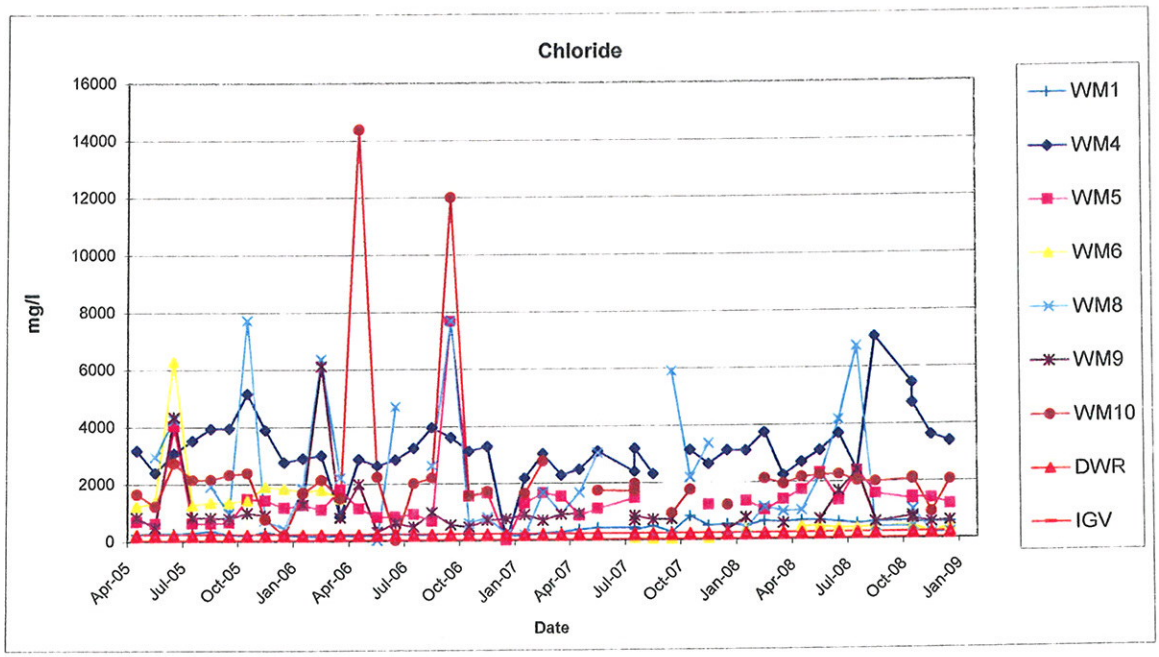
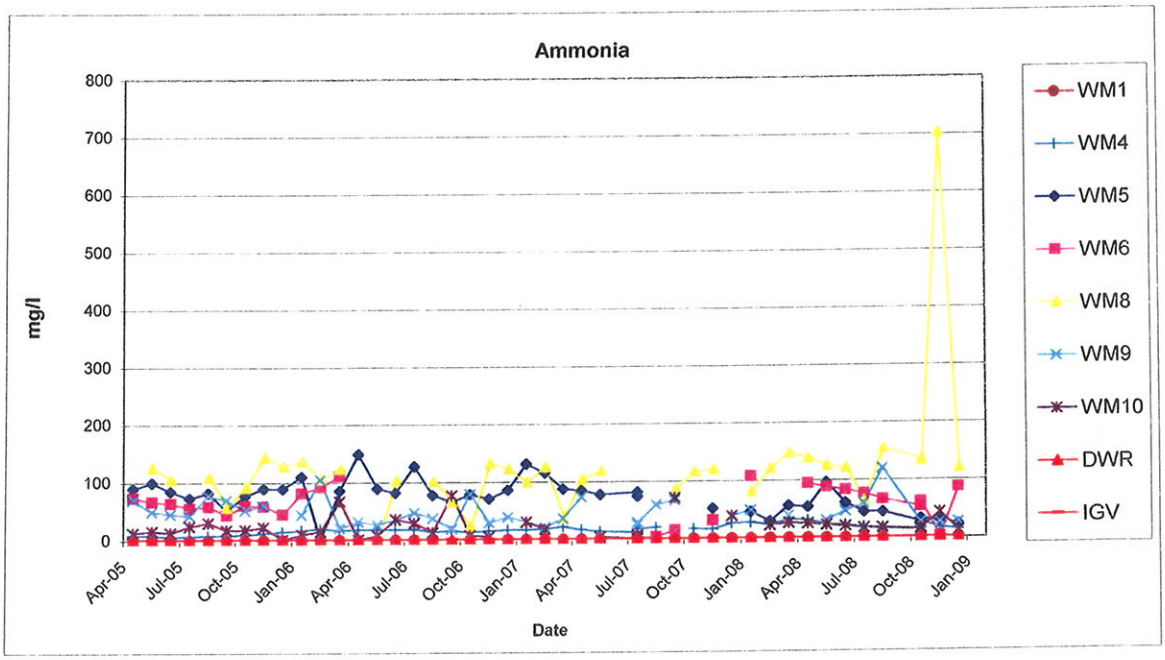
35000
30000
25000
20000
15000
10000
5000
0
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06
Jan-07
Apr-07
Jul-07
Oct-07
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
Date
WM1
WM4
WM5
WM6
WM8
WM9
WM10
IGV
DWR


Chloride
mg/l
16000
14000
12000
10000
8000
6000
4000
2000
0
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06
Jan-07
Apr-07
Jul-07
Oct-07
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
Date
WM1
WM4
WM5
WM6
WM8
WM9
WM10
DWR
IGV


Ammonia
mg/l
800
700
600
500
400
300
200
100
0
Apr-05
Jul-05
Oct-05
Jan-06
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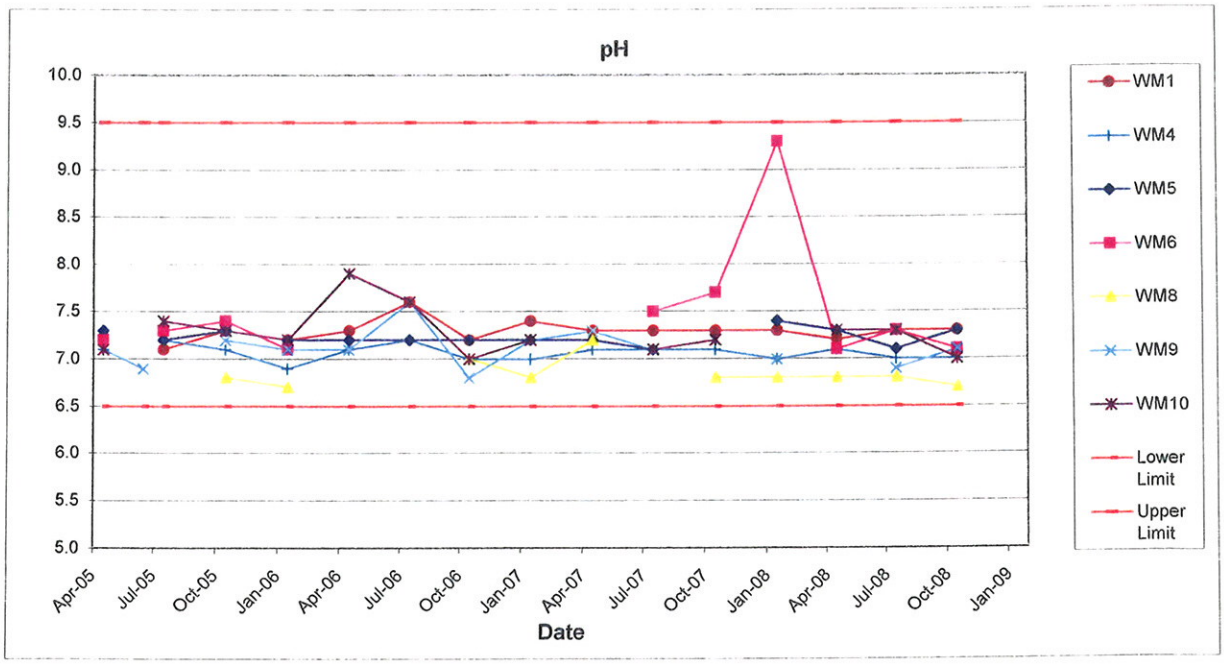
Jul-06
Oct-06
Jan-07
Apr-07
Jul-07
Oct-07
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
Date
WM1
WM4
WM5
WM6
WM8
WM9
WM10
DWR
IGV


pH
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9.0
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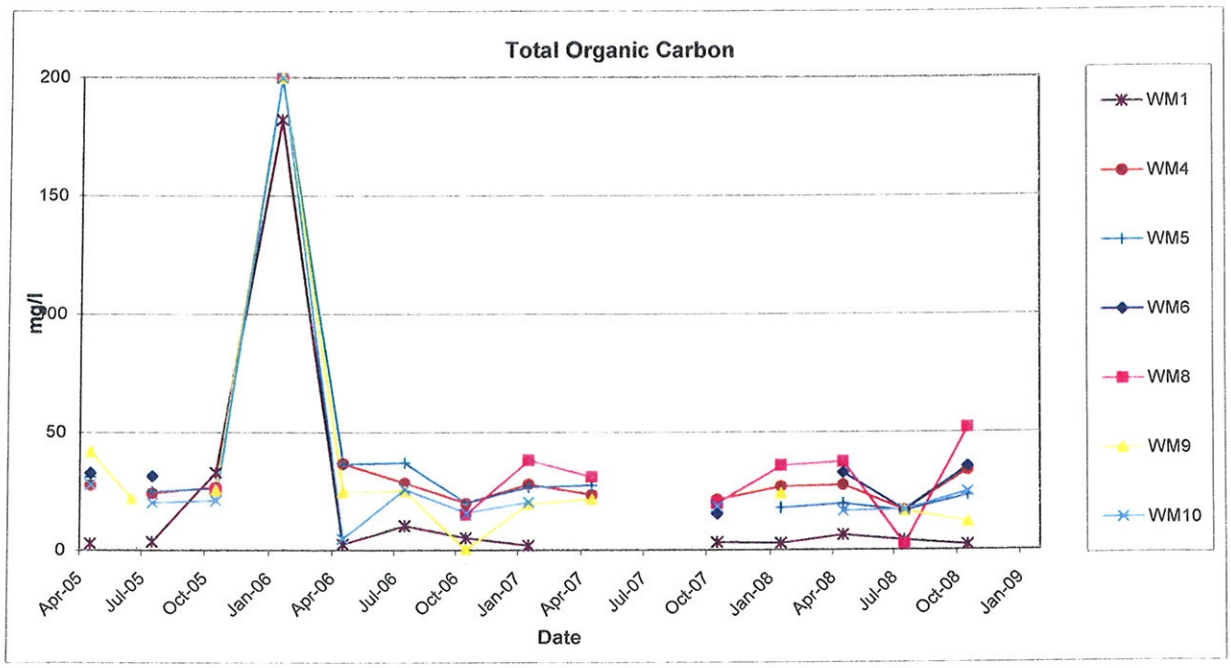
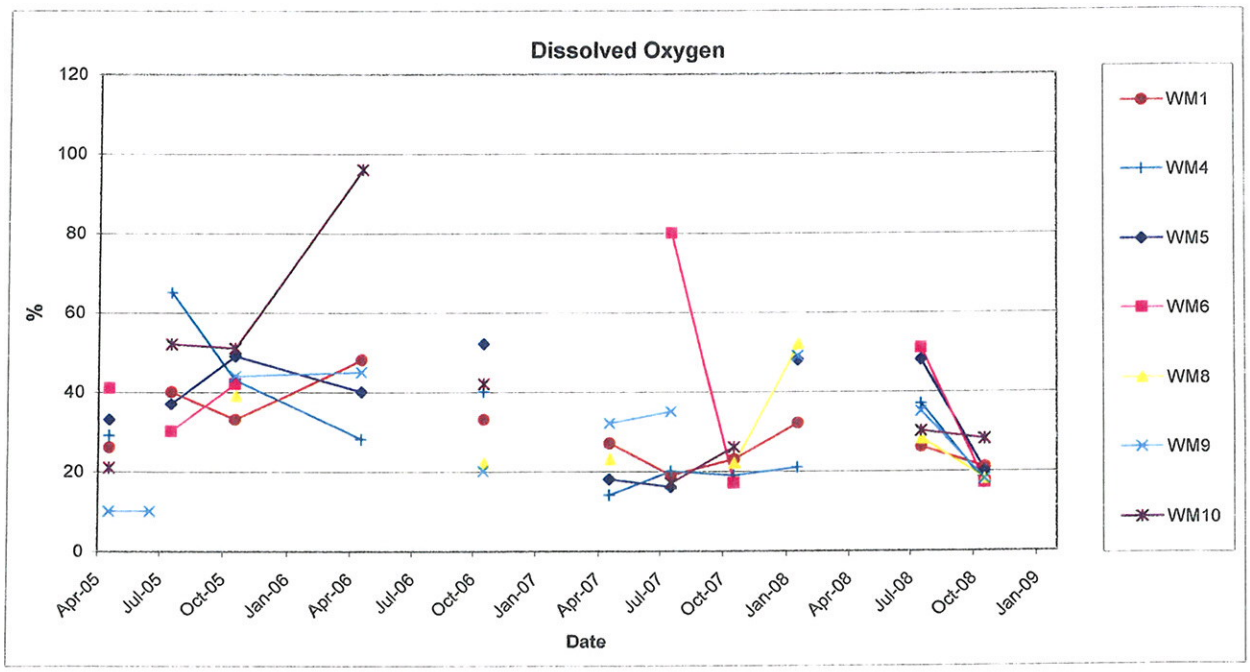
8.0
7.5
7.0
6.5
6.0
5.5
5.0
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06
Jan-07
Apr-07
Jul-07
Oct-07
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
Date
WM1
WM4
WM5
WM6
WM8
WM9
WM10
Lower Limit
Upper Limit


Total Organic Carbon
200
150
100
50
0
mg/l
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06
Jan-07
Apr-07
Jul-07
Oct-07
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
Date
WM1
WM4
WM5
WM6
WM8
WM9
WM10


Dissolved Oxygen
120
100
80
60
40
20
0
%
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06
Jan-07
Apr-07
Jul-07
Oct-07
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
Date
WM1
WM4
WM5
WM6
WM8
WM9
WM10

APPENDIX E

SUMMARY OF MONTHLY CHEMICAL ANALYSES OF SURFACE WATER

Dundalk Landfill Site

SURFACE WATER QUALITY

Monitoring Point: **SW1**

PARAMETERS	Units	Date																			
		26-Apr-07	23-May-07	02-Jul-07	10-Jul-07	30-Aug-07	26-Sep-07	16-Oct-07	30-Nov-07	17-Dec-07	17-Jan-08	26-Feb-08	27-Mar-08	15-Apr-08	28-May-08	26-Jun-08	30-Jul-08	27-Aug-08	01-Oct-08	28-Oct-08	27-Nov-08	22-Dec-08
Alkalinity	mg/l CaCO3	87												87								
Aluminium	µg/l	650												<50								
Ammonia	mg/l N	0.18	0.04	0.05	0.13	0.52	0.03	0.13	0.32	0.14	0.87	0.44	0.23	0.13	0.05	<0.03	0.18	0.17	0.06	0.66	0.65	1.67
B.O.D.	mg/l O2	8.2			7.6			>82			9.8			22.6			28.8			3.2		
Boron	mg/l																					
Cadmium	µg/l	<0.10												<0.10								
Calcium	mg/l Ca	45.16												49.23								
C.O.D.	mg/l O2	40			34			402			75			180			266			62		
Chloride	mg/l Cl	70	106	33	25	43	92	100	60	86	29	108	75	111	71	115	101	78	109	51	80	47
Chromium	µg/l	6.1												20.4								
Conductivity	µS/cm @ 25	591	858	351	372	648	771	706	646	690	243	677	683	650	752	757	670	680	8150	790	773	742
Copper	µg/l	6.1												5.3								
Cyanide	mg/l CN																					
Depth	m																					
D.O.	% Saturation	116			146			99			90			nm			55			50		
Fluoride	mg/l																					
Iron	µg/l	798.2												<50								
Lead	µg/l	4												<1								
Magnesium	mg/l Mg	8.35												7.21								
Manganese	µg/l	99.7												8.5								
Mercury	µg/l	<0.10												<0.10								
Nickel	µg/l	6.1												2.9								
o-Phosphate	mg/l P	<0.02												0.02								
pH		8.7			9.2			7.9			8.9			9.4			8			7.5		
Potassium	mg/l	17.44												15.25								
Residue on Evaporation																						
Sodium	mg/l	53.86												48.04								
Sulphate	mg/l SO4	96.2												87.4								
Temp	°C	15.2			17			12.1			7.3			nm			18			5.4		
Time Sampled		10.5	9.3	12.1	11.1	nt	13	10.3	8.05	nt	11	13	9.3	12.1	nt	10	11.2	9.15	10	11.15	9.3	10.3
T.O.C.	mg/l																					
T.O.N	mg/l N	0.05			0.23			1			0.39			0.76			0.67			0.13		
Total S Solids	mg/l	34			nm			460			1010			323			1633			48		
Zinc	µg/l	13.1												<1								

Dundelk Landfill Site

SURFACE WATER QUALITY

Monitoring Point:		SW2																			
PARAMETERS	**Units**	**26-Apr-07**	**23-May-07**	**02-Jul-07**	**10-Jul-07**	**30-Aug-07**	**26-Sep-07**	**16-Oct-07**	**30-Nov-07**	**17-Dec-07**	**17-Jan-08**	**26-Feb-08**	**27-Mar-08**	**15-Apr-08**	**28-May-08**	**26-Jun-08**	**30-Jul-08**	**27-Aug-08**	**01-Oct-08**	**28-Oct-08**	**27-Nov-08**	**22-Dec-08**
Alkalinity	mg/l CaCO3													653								
Aluminium	µg/l													155.9								
Ammonia	mg/l N		83.07	0.5	0.95	>20.0			1.69	7.36	3.73	11.59	8.45	19.09	23.04	1.18	0.09	3.77	5.95	10.33	14.41	11.66
B.O.D.	mg/l O2				7.4						11.7			15.3			23.7			77.2		
Boron	mg/l																					
Cadmium	µg/l													<010								
Calcium	mg/l Ca													160.01								
C.O.D.	mg/l O2				54						106			110			205			533		
Chloride	mg/l Cl		294	92	56	214			61	63	54	349	150	341	146	93	239	133	132	191	111	738
Chromium	µg/l													13.9								
Conductivity	µS/cm @ 25		3000	1122	837	1967			609	1009	609	2220	1220	2410	1881	789	1461	1359	11420	1709	1271	1660
Copper	µg/l													7.3								
Cyanide	mg/l CN																					
Depth	m																					
D.O.	% Saturation				54						74			nm			59			112		
Fluoride	mg/l																					
Iron	µg/l													1383.6								
Lead	µg/l													<1								
Magnesium	mg/l Mg													54.92								
Manganese	µg/l													614.6								
Mercury	µg/l													<0.10								
Nickel	µg/l													11.8								
o-Phosphate	mg/l P													0.04								
pH					7.4						7.6			7.5			7.4			7.4		
Potassium	mg/l													41.84								
Residue on Evaporation																						
Sodium	mg/l													258.61								
Sulphate	mg/l SO4													134.0								
Temp	°C				16.7						7			nm			17			7.4		
Time Sampled			9.45	12	11.20	nt			8.20	nt	11.1	13.2	9.5	12.30	nt	10.20	11.3	9.3	10.2	11.4	9.5	10.4
T.O.C.	mg/l																					
T.O.N	mg/l N				2.10						1.81			5.05			1.71			2.39		
Total S Solids	mg/l				nm						495			28			865			31		
Zinc	µg/l													5.1								

Dundalk Landfill Site

SURFACE WATER QUALITY

Monitoring Point: **SW3**

PARAMETERS	Units	Date																			
		26-Apr-07	23-May-07	02-Jul-07	10-Jul-07	30-Aug-07	26-Sep-07	16-Oct-07	30-Nov-07	17-Dec-07	17-Jan-08	26-Feb-08	27-Mar-08	15-Apr-08	28-May-08	26-Jun-08	30-Jul-08	27-Aug-08	01-Oct-08	28-Oct-08	27-Nov-08	22-Dec-08
Alkalinity	mg/l CaCO3	420												530							
Aluminium	µg/l	272.8												<50							
Ammonia	mg/l N	20.25	15.9	1.97	1.67	3.70	13.01	7.41	6.16	7.12	7.54	43.4	24.72	14.56	20.55	0.80	1.33	3.58	15.06	11.43	9.5	4.95
B.O.D.	mg/l O2	38.9			<5.0			22.4			10.3			9.7			16.6			5.2		
Boron	mg/l																					
Cadmium	µg/l	<0.10												<0.10								
Calcium	mg/l Ca	90.03												145.31								
C.O.D.	mg/l O2	434			103			174			68			98			131			80		
Chloride	mg/l Cl	212	372	92	99	162	251	228	97	165	72	359	284	292	399	148	293	166	252	197	146	119
Chromium	µg/l	8												10.8								
Conductivity	µS/cm @ 25	1646	2170	1109	1069	1700	1918	1842	1220	1890	1054	2530	2190	2140	2400	1077	1861	1696	2210	1921	1686	1272
Copper	µg/l	6.4												7.5								
Cyanide	mg/l CN																					
Depth	m																					
D.O.	% Saturation	100			72			44			58			nm			38			41		
Fluoride	mg/l																					
Iron	µg/l	1513.4												314.6								
Lead	µg/l	<1												<1								
Magnesium	mg/l Mg	45.93												54.04								
Manganese	µg/l	752.7												164								
Mercury	µg/l	1.9												<0.10								
Nickel	µg/l	10.4												9.7								
o-Phosphate	mg/l P	<0.02												<0.02								
pH		7.8			7.4			7.5			7.4			7.2			7.6			7.4		
Potassium	mg/l	48.63												51.42								
Residue on Evaporation																						
Sodium	mg/l	160.6												210.54								
Sulphate	mg/l SO4	96.9												113.7								
Temp	°C	16.6			17.0			12.0			7.4			nm			18			5.2		
Time Sampled		11.35	9.55	11.45	11.35	nt	13.50	10.55	8.40	nt	11.2	13.35	10.15	12.5	nt	10.40	11.35	9.45	9.4	11.55	10.15	10.5
T.O.C.	mg/l																					
T.O.N	mg/l N	5.43			2.29			10.61			4.37			15.2			<0.05			7.47		
Total S Solids	mg/l	62			nm			177			108			18			66			20		
Zinc	µg/l	9.9												3.4								

Dundalk Landfill Site

SURFACE WATER QUALITY

Monitoring Point: **SW4**

PARAMETERS	Units	Date																			
		26-Apr-07	23-May-07	02-Jul-07	10-Jul-07	30-Aug-07	26-Sep-07	16-Oct-07	30-Nov-07	17-Dec-07	17-Jan-08	26-Feb-08	27-Mar-08	15-Apr-08	28-May-08	26-Jun-08	30-Jul-08	27-Aug-08	01-Oct-08	28-Oct-08	27-Nov-08	22-Dec-08
Alkalinity	mg/l CaCO3	585												485							
Aluminium	µg/l	92.5												83							
Ammonia	mg/l N	8.96	1.29	0.8	0.89	3.56	3.53	4.78	5.36	6.81	5.72	28.29	17.77	5.72	2.16	<0.03	1.63	0.12	5.87	7.42	10.63	6.74
B.O.D.	mg/l O2	38.1			<5.0			46.2			17.1			44			>30.0			30.8		
Boron	mg/l																					
Cadmium	µg/l	<0.10												<0.10								
Calcium	mg/l Ca	139.94												133.6								
C.O.D.	mg/l O2	475			117			248			70			306			204			144		
Chloride	mg/l Cl	545	837	112	79	266	450	347	148	222	95	514	350	328	619	325	306	436	298	200	140	107
Chromium	µg/l	7.9												9.7								
Conductivity	µS/cm @ 25	2720	3270	1151	928	1881	2550	2250	1386	1971	1116	2540	2420	2150	2980	1666	1903	1663	2160	1843	1687	1358
Copper	µg/l	8.4												6.3								
Cyanide	mg/l CN																					
Depth	m																					
D.O.	% Saturation	>200			66			61			78			nm			29			28		
Fluoride	mg/l																					
Iron	µg/l	986.6												398.6								
Lead	µg/l	<1												<1								
Magnesium	mg/l Mg	85.25												49.26								
Manganese	µg/l	3054												202.1								
Mercury	µg/l	1.1												<0.10								
Nickel	µg/l	13.3												8.9								
o-Phosphate	mg/l P	0.03												<0.02								
pH		7.8			7.4			7.7			7.5			7.4			7.5			7.4		
Potassium	mg/l	48.83												52.73								
Residue on Evaporation																						
Sodium	mg/l	365.01												241.75								
Sulphate	mg/l SO4	160.6												122.5								
Temp	°C	16.7			16.6			11.8			7.1			nm			17			5.2		
Time Sampled		11.45	10.15	11.35	11.45	nt	14.20	11.05	9.00	nt	11.3	13.5	10.4	14.1	nt	11.00	11.45	10	9.2	12.25	10.3	11
T.O.C.	mg/l																					
T.O.N	mg/l N	7.5			1.33			14.15			4.84			10.97			<0.05			10.21		
Total S Solids	mg/l	610			nm			397			54			160			64			13		
Zinc	µg/l	8.5												<1								

Dundalk Landfill Site

SURFACE WATER QUALITY

Monitoring Point: **SW5**

PARAMETERS	Units	Date																			
		26-Apr-07	23-May-07	02-Jul-07	10-Jul-07	30-Aug-07	26-Sep-07	16-Oct-07	30-Nov-07	17-Dec-07	17-Jan-08	26-Feb-08	27-Mar-08	15-Apr-08	28-May-08	26-Jun-08	30-Jul-08	27-Aug-08	01-Oct-08	28-Oct-08	27-Nov-08	22-Dec-08
Alkalinity	mg/l CaCO3	94												127								
Aluminium	µg/l	153.2												<50								
Ammonia	mg/l N	0.3	0.52	0.28	0.21	0.33	0.43	0.75	0.19	0.41	0.62		0.19	0.13	0.51	0.49	0.55	3.59	0.22	0.39	0.31	0.19
B.O.D.	mg/l O2	2.7			<3.0			2.4			<1.5			<1.5			<1.5			<5.0		
Boron	mg/l																					
Cadmium	µg/l	<0.10												<0.10								
Calcium	mg/l Ca	46.31												145.69								
C.O.D.	mg/l O2	34			70			139			25			85			695			190		
Chloride	mg/l Cl	403	3920	1598	35	12789	14280	3875	104	3009	35		259	5251	3166	4152	15600	168	2023	9067	3096	67
Chromium	µg/l	2.5												8.1								
Conductivity	µS/cm @ 25	1584	12190	5990	277	34200	38600	13700	544	9440	330		1122	14990	8450	11730	41900	1699	6560	24800	9750	466
Copper	µg/l	6.3												40.5								
Cyanide	mg/l CN																					
Depth	m																					
D.O.	% Saturation	106			96			78			95			nm			88			80		
Fluoride	mg/l																					
Iron	µg/l	483												315.7								
Lead	µg/l	<1												<1								
Magnesium	mg/l Mg	35.19												309.93								
Manganese	µg/l	50.4												56.9								
Mercury	µg/l	<0.10												<0.10								
Nickel	µg/l	4.9												3.3								
o-Phosphate	mg/l P	0.05												0.02								
pH		8.1			7.7			7.8			7.9			8			7.9			7.8		
Potassium	mg/l	13.47												96.48								
Residue on Evaporation																						
Sodium	mg/l	230.35												2852.49								
Sulphate	mg/l SO4	67.1												556.6								
Temp	°C	14			13.8			11.9			6.7			nm			19			6.7		
Time Sampled		13.2	11.3	12.35	13.35	nt	12.00	13.00	9.30	nt	13.2		12.2	14.3	nt	11.30	11.55	10.55	10.43	12.55	10.5	11.4
T.O.C.	mg/l																					
T.O.N	mg/l N	3.16			1.62			2.46			3.88			2.54			0.18			1.08		
Total S Solids	mg/l	24			nm			22			34			12			114			26		
Zinc	µg/l	8.4												133.9								

Dundalk Landfill Site

SURFACE WATER QUALITY

Monitoring Point:		SW8																				
		Date																				
PARAMETERS	Units	26-Apr-07	23-May-07	02-Jul-07	10-Jul-07	30-Aug-07	26-Sep-07	16-Oct-07	30-Nov-07	17-Dec-07	17-Jan-08	26-Feb-08	27-Mar-08	15-Apr-08	28-May-08	26-Jun-08	30-Jul-08	27-Aug-08	01-Oct-08	28-Oct-08	27-Nov-08	22-Dec-08
Alkalinity	mg/l CaCO3																					
Aluminium	µg/l																					
Ammonia	mg/l N					0.46				141.82		1.34					0.51		0.53	0.32	0.31	
B.O.D.	mg/l O2																2.8			<5.0		
Boron	mg/l																					
Cadmium	µg/l																					
Calcium	mg/l Ca																					
C.O.D.	mg/l O2																855			230		
Chloride	mg/l Cl					11373				579		10870					15600		5673	7832	5817	
Chromium	µg/l																					
Conductivity	µS/cm @ 25					31300				4550		30900					41800		15640	21800	17860	
Copper	µg/l																					
Cyanide	mg/l CN																					
Depth	m																					
D.O.	% Saturation																89			92		
Fluoride	mg/l																					
Iron	µg/l																					
Lead	µg/l																					
Magnesium	mg/l Mg																					
Manganese	µg/l																					
Mercury	µg/l																					
Nickel	µg/l																					
o-Phosphate	mg/l P																					
pH																	7.9			7.8		
Potassium	mg/l																					
Residue on Evaporation																						
Sodium	mg/l																					
Sulphate	mg/l SO4																					
Temp	°C																19			7.9		
Time Sampled						nt				nt		13					12.05		11.17	11.15	9.4	
T.O.C.	mg/l																					
T.O.N	mg/l N																0.2			1.21		
Total S Solids	mg/l																134			<5		
Zinc	µg/l																					

Dundalk Landfill Site

SURFACE WATER QUALITY

Monitoring Point: **SW7**

PARAMETERS	Units	Date																			
		26-Apr-07	23-May-07	02-Jul-07	10-Jul-07	30-Aug-07	26-Sep-07	16-Oct-07	30-Nov-07	17-Dec-07	17-Jan-08	26-Feb-08	27-Mar-08	15-Apr-08	28-May-08	26-Jun-08	30-Jul-08	27-Aug-08	01-Oct-08	28-Oct-08	27-Nov-08	22-Dec-08
Alkallnity	mg/l CaCO3	91												125								
Aluminium	µg/l	114.2												51.4								
Ammonia	mg/l N	0.09	0.06	0.22	0.63	0.46	0.60	0.16	0.16	0.16	0.47	0.38	0.06	0.04	0.04	0.49	0.71	0.05	0.03	0.61	660.21	0.06
B.O.D.	mg/l O2	2.8			<5.0			1.5			<1.5			<1.5			2.6			<5.0		
Boron	mg/l																					
Cadmium	µg/l	<0.10												<0.10								
Calcium	mg/l Ca	39.36												68.8								
C.O.D.	mg/l O2	31			63			99			24			76			555			443		
Chloride	mg/l Cl	77	2523	235	14	7882	11925	1856	97	99	21	6701	165	1108	1313	4152	13600	46	182	2313	3151	24
Chromium	µg/l	<1												4.3								
Conductivity	µS/cm @ 25	543	7850	1016	209	22500	32700	6190	624	769	286	16570	813	3590	4580	11730	36500	388	1083	8290	9760	305
Copper	µg/l	5.2												10.7								
Cyanide	mg/l CN																					
Depth	m																					
D.O.	% Saturation	103			97			106			96			nm			74			84		
Fluoride	mg/l																					
Iron	µg/l	391.6												357.2								
Lead	µg/l	<1												<1								
Magnesium	mg/l Mg	10.87												69.44								
Manganese	µg/l	36												42.3								
Mercury	µg/l	<0.10												<0.10								
Nickel	µg/l	4.7												2.7								
o-Phosphate	mg/l P	0.05												0.02								
pH		8.1			7.7			8.0			7.8			8			7.8			7.7		
Potassium	mg/l	6.25												22.17								
Residue on Evaporation																						
Sodium	mg/l	52.02												578.56								
Sulphate	mg/l SO4	25.3												126.2								
Temp	°C	14.3			13.6			12.2			6.4			nm			19			6.3		
Time Sampled		13.45	nt	13.1	13.15	nt	12.30	13.40	9.45	nt	13.4	15.3	11.4	14.45	nt	11.30	12.2	11.5	11.5	13.1	11.1	12.3
T.O.C.	mg/l																					
T.O.N	mg/l N	3.29			1.64			2.88			3.89			3.52			0.43			1.89		
Total S Solids	mg/l	13			nm			11			20			8			116			16		
Zinc	µg/l	7.6												111.1								

Dundalk Landfill Site

SURFACE WATER QUALITY

Monitoring Point: **SW6**

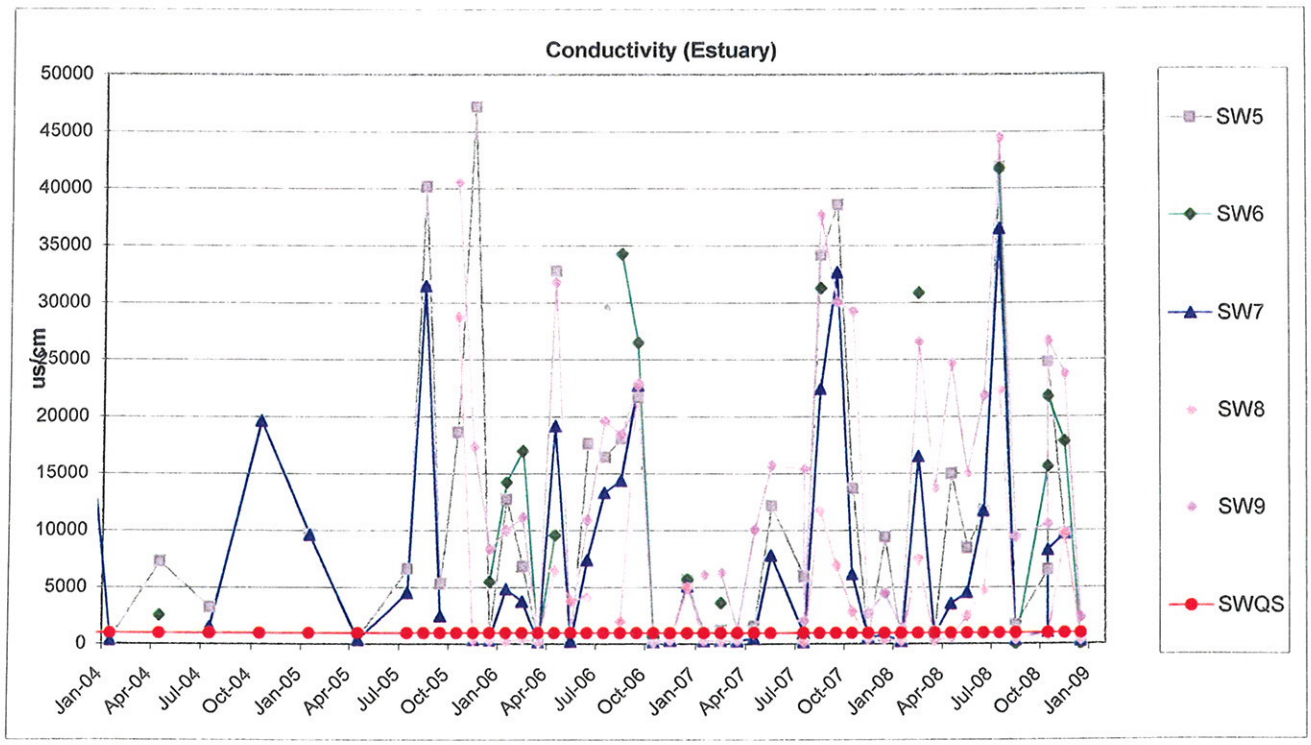
PARAMETERS	Units	Date																				
		26-Apr-07	23-May-07	02-Jul-07	10-Jul-07	30-Aug-07	26-Sep-07	16-Oct-07	30-Nov-07	17-Dec-07	17-Jan-08	26-Feb-08	27-Mar-08	15-Apr-08	28-May-08	26-Jun-08	30-Jul-08	27-Aug-08	01-Oct-08	28-Oct-08	27-Nov-08	22-Dec-08
Alkalinity	mg/l CaCO3	170												129								
Aluminium	µg/l	132.1												105.5								
Ammonia	mg/l N	0.08		0.06	0.12	0.32	0.13	0.10	0.20	0.07	0.53	0.21	0.08	<0.03	0.04	0.11	0.63	0.08	0.03	0.27	0.33	0.07
B.O.D.	mg/l O2	3.6			<4.0			1.8			1.5			<1.5			3.9			<2.0		
Boron	mg/l																					
Cadmium	µg/l	<0.10												<0.10								
Calcium	mg/l Ca	59.27												55.65								
C.O.D.	mg/l O2	35			65			44			26			20			490			44		
Chloride	mg/l Cl	146		50	14	2965	1900	542	86	50	23	2457	37	91	679	1391	7361	48	192	9871	3184	31
Chromium	µg/l	2.4												<1								
Conductivity	µS/cm @ 25	956		372	230	11800	6970	2970	508	457	330	7630	373	586	2610	4750	22400	450	963	820	9730	383
Copper	µg/l	4.4												3.5								
Cyanide	mg/l CN																					
Depth	m																					
D.O.	% Saturation	106			99			97			96			nm			81			90		
Fluoride	mg/l																					
Iron	µg/l	362.3												495.2								
Lead	µg/l	<1												<1								
Magnesium	mg/l Mg	23.64												11.86								
Manganese	µg/l	67												58.3								
Mercury	µg/l	<0.10												<0.10								
Nickel	µg/l	3.8												2.7								
o-Phosphate	mg/l P	0.06												0.02								
pH		7.8			7.7			8.0			7.8			8.1			7.8			7.9		
Potassium	mg/l	9.27												4.49								
Residue on Evaporation																						
Sodium	mg/l	114.06												41.72								
Sulphate	mg/l SO4	50.3												26.4								
Temp	°C	16.6			14.8			11.7			7.5			nm			18			6.5		
Time Sampled		13.5		11.4	14.00	nt	14.50	13.25	10.30	nt	12.15	15.2	12.15	15	nt	12.00	12.3	11.3	12.07	13.3	11.3	12.5
T.O.C.	mg/l																					
T.O.N	mg/l N	2.83			1.74			3.12			4.21			3.63			0.85			2.22		
Total S Solids	mg/l	55			<5			9			33			18			92			17		
Zinc	µg/l	6.3												7								

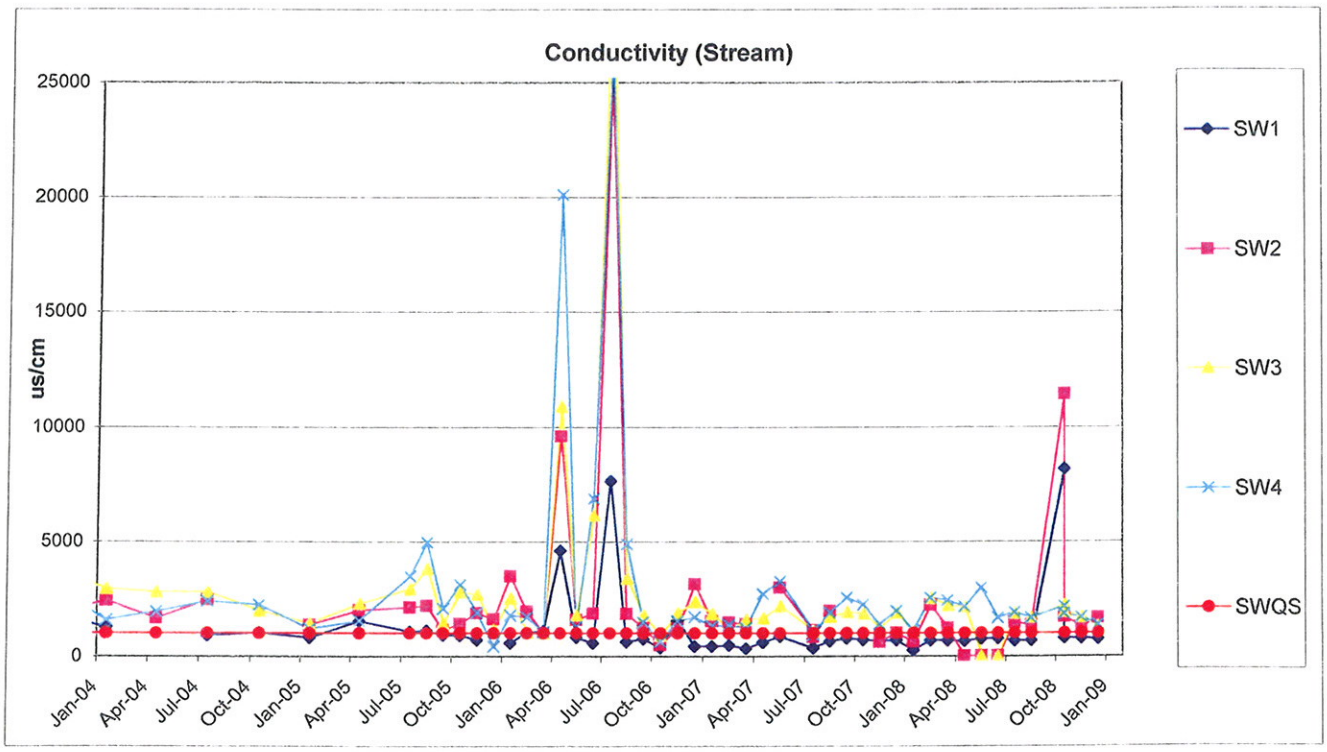
Dundalk Landfill Site

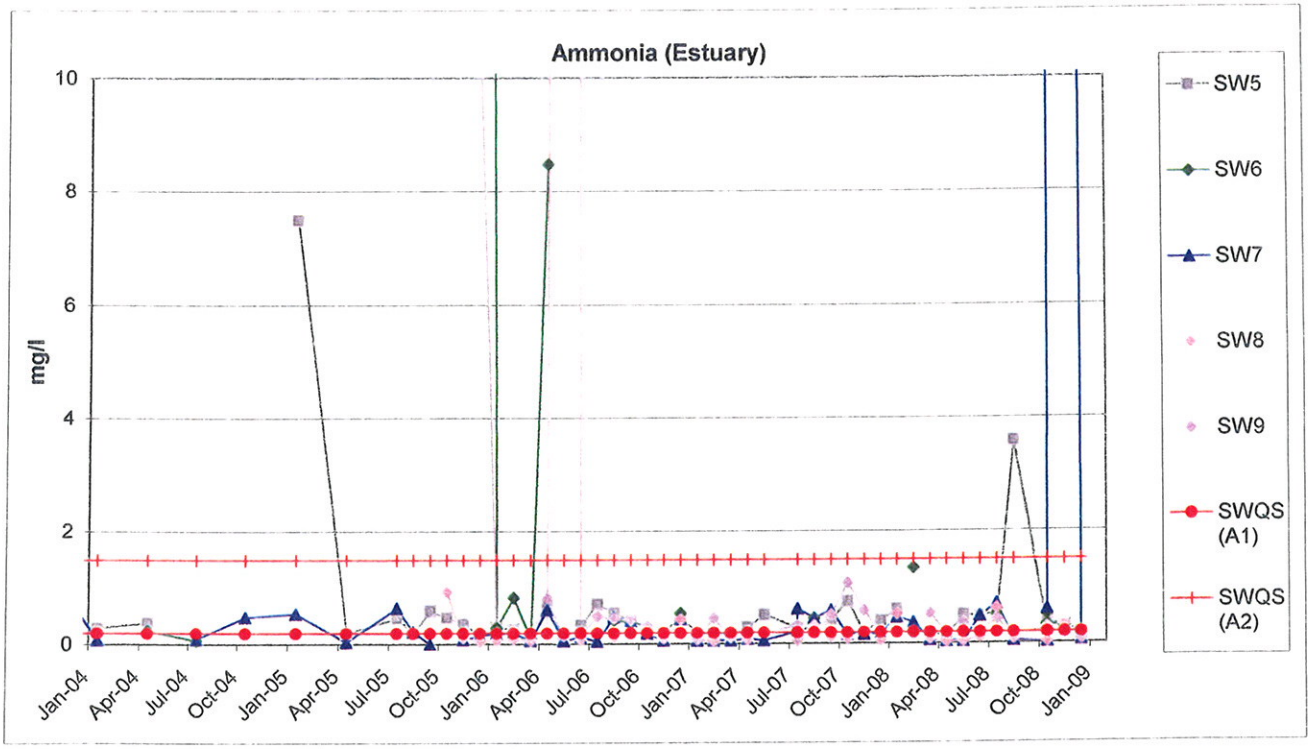
SURFACE WATER QUALITY

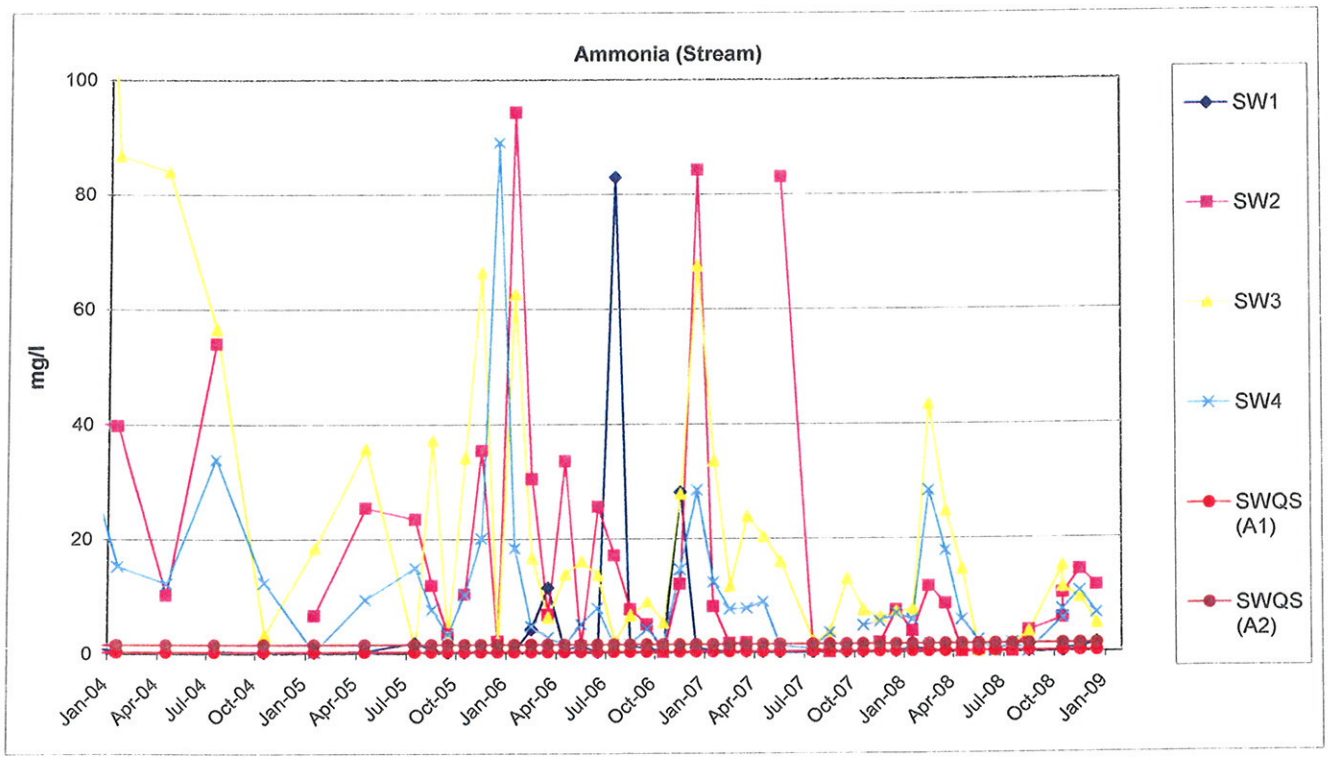
Monitoring Point: **SW9**

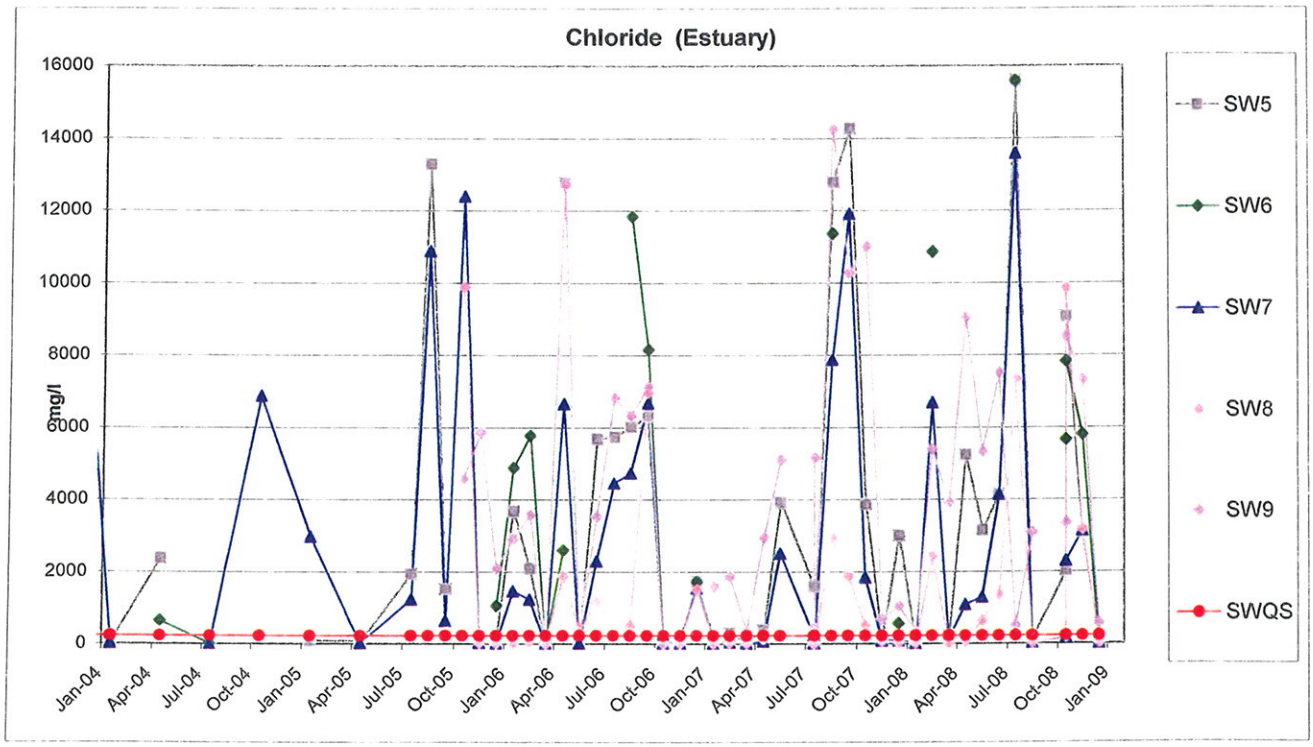
PARAMETERS	Units	Date																				
		26-Apr-07	23-May-07	02-Jul-07	10-Jul-07	30-Aug-07	26-Sep-07	16-Oct-07	30-Nov-07	17-Dec-07	17-Jan-08	26-Feb-08	27-Mar-08	15-Apr-08	28-May-08	26-Jun-08	30-Jul-08	27-Aug-08	01-Oct-08	28-Oct-08	27-Nov-08	22-Dec-08
Alkalinity	mg/l CaCO3	160												129								
Aluminium	µg/l	<500												<50								
Ammonia	mg/l N	0.23	0.21	0.33	0.1	0.24	0.52	1.09	0.6	0.18	0.2	0.16	0.55	0.16	0.37	0.22	0.44	0.14	0.28	0.29	0.18	0.09
B.O.D.	mg/l O2	3.6			<3.0			3.3			<1.5			<1.5			2.6			<10.0		
Boron	mg/l																					
Cadmium	µg/l	<1												<0.10								
Calcium	mg/l Ca	133.71												217.51								
C.O.D.	mg/l O2	38			54			363			50			680			810			440		
Chloride	mg/l Cl	2969	5132	5195	467	14271	10295	11034	711	1084	374	5424	3932	9073	5355	7545	547	3106	3378	8536	7331	595
Chromium	µg/l	17												12.3								
Conductivity	µS/cm @ 25	10120	15770	15480	2120	37700	30100	29300	2790	4570	1478	26600	13730	24700	15040	21900	44500	9470	10620	26700	23800	2430
Copper	µg/l	18.4												84.7								
Cyanide	mg/l CN																					
Depth	m																					
D.O.	% Saturation	90			91			77			97			nm			84			85		
Fluoride	mg/l																					
Iron	µg/l	394.4												384.4								
Lead	µg/l	<10												<1								
Magnesium	mg/l Mg	236.62												538.69								
Manganese	µg/l	93.7												68.8								
Mercury	µg/l	<0.10												<0.10								
Nickel	µg/l	<10												3.4								
o-Phosphate	mg/l P	0.06												0.02								
pH		7.9			7.8			7.7			7.8			8.1			7.9			7.8		
Potassium	mg/l	70.66												164.78								
Residue on Evaporation																						
Sodium	mg/l	>1000												4903.8								
Sulphate	mg/l SO4	468												1182.4								
Temp	°C	15.3			14.9			12.6			7			nm			19			6.8		
Time Sampled		13.3	11.5	12.55	14.15	nt	15.1	13.1	8.1	nt	12.3	15.1	12.45	15.3	nt	12.3	12.4	11.15	12.18	13.4	11.5	12
T.O.C.	mg/l																					
T.O.N	mg/l N	3.92			2.56			1.26			4.15			1.74			0.15			1.39		
Total S Solids	mg/l	37			15			115			95			37			152			11		
Zinc	µg/l	176.1												61.5								

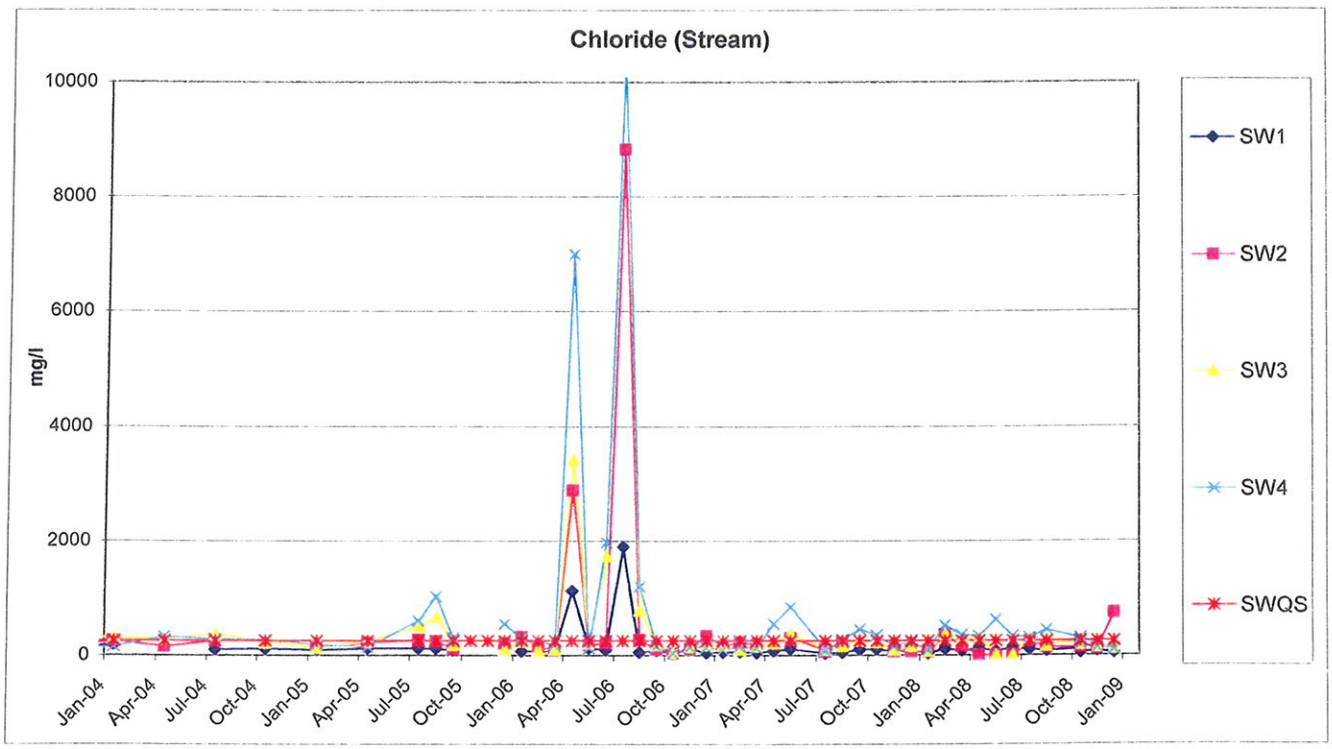

Conductivity (Estuary)
us/cm
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Jan-04
Apr-04
Jul-04
Oct-04
Jan-05
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06
Jan-07
Apr-07
Jul-07
Oct-07
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
SW5
SW6
SW7
SW8
SW9
SWQS


Conductivity (Stream)
us/cm
25000
20000
15000
10000
5000
0
Jan-04
Apr-04
Jul-04
Oct-04
Jan-05
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06
Jan-07
Apr-07
Jul-07
Oct-07
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
SW1
SW2
SW3
SW4
SWQS


Ammonia (Estuary)
mg/l
10
8
6
4
2
0
Jan-04
Apr-04
Jul-04
Oct-04
Jan-05
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06
Jan-07
Apr-07
Jul-07
Oct-07
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
SW5
SW6
SW7
SW8
SW9
SWQS (A1)
SWQS (A2)


Ammonia (Stream)
mg/l
100
80
60
40
20
0
Jan-04
Apr-04
Jul-04
Oct-04
Jan-05
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06
Jan-07
Apr-07
Jul-07
Oct-07
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
SW1
SW2
SW3
SW4
SWQS (A1)
SWQS (A2)


Chloride (Estuary)
16000
14000
12000
10000
8000
6000
4000
2000
0
mg/l
Jan-04
Apr-04
Jul-04
Oct-04
Jan-05
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06
Jan-07
Apr-07
Jul-07
Oct-07
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
SW5
SW6
SW7
SW8
SW9
SWQS


Chloride (Stream)
10000
8000
6000
4000
2000
0
mg/l
Jan-04
Apr-04
Jul-04
Oct-04
Jan-05
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06
Jan-07
Apr-07
Jul-07
Oct-07
Jan-08
Apr-08
Jul-08
Oct-08
Jan-09
SW1
SW2
SW3
SW4
SWQS

APPENDIX F

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 21:01:2008	**Time:** 12.30 pm
Instrument used: GA2000	**Normal Analytical Range:**	**Date Next Calibration:** Nov 2008	
Monitoring Personnel: aw		**Weather:** Dry/ Cold	**Barometric pressure:** 1006mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
G1	PIEZO		0	0	20.6	
G2	PIEZO		0	0.3	20.2	
G3	PIEZO		0	0.1	21	
G4	PIEZO		0.1	0.7	18.1	
G5	PIEZO		0	0.3	20	
G6	PIEZO		4.5	2.6	17.5	
G7	PIEZO		0.1	0.7	19.7	
G8	PIEZO		0	0.5	19.5	
G9	PIEZO		0	0.6	19.7	
G10	PIEZO		3.4	2	18.7	
G16	PIEZO		0	0.1	20.7	
G17	PIEZO		0	0.3	18.3	
G20	PIEZO		0	8.5	11.7	
G21	PIEZO		0	0.1	20.5	
GM1	PIEZO		0	5.1	14.9	
GM2	PIEZO		0	2	18.1	
GM3	PIEZO		0	0.2	20.2	
GM4	PIEZO		0	0.1	20.5	
GM5	PIEZO		0	0.3	20.3	
GM6	PIEZO		0	0.1	20.9	
GM24	PIEZO		0	4.2	15.2	

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)
Site Name: DUNDALK LANDFILL	**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL	**National Grid Reference:** 1632-12	
Site Status: Closed	**Date:** 21:01:2008	**Time:** 12.30 pm
Instrument used: GA2000/FID	**Normal Analytical Range:**	**Date Next Calibration:** Nov 2008
Monitoring Personnel: aw	**Weather:** Dry/Warm	**Barometric pressure:** 1006mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
FLARE	PIEZO		30.9	22.5	6.7	
HUT			0	0	22.9	

The following houses and commercial properties were visited and surveyed using GA2000 infra-red gas and FID analyser.

No's 2, 3, 4, 5, ,8, 9, 10, 11, 12, 15, 18,19,20, Riverside Crescent

.

No's 2, 3 & Newry Road

Mc Kevitts, Maxol, Yard Mace Shop, Autoglass, Peugeot Office, Lynch Mini Mix (Yard), Portway Travel Agents, Hardys (offices & Yard), Road Drains.

All levels detected using the FID where below 15 part per million (10,000ppm = 1% v/v).

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 11:02:2008	**Time:** 12.30 pm
Instrument used: GA2000	**Normal Analytical Range:**	**Date Next Calibration:** Nov 2008	
Monitoring Personnel: aw		**Weather:** Dry/ Cold	**Barometric pressure:** 997mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
G1	PIEZO		0	0	20.7	
G2	PIEZO		0	0.3	20.3	
G3	PIEZO		0	0.1	21	
G4	PIEZO		0.1	0.6	18.1	
G5	PIEZO		0	0.3	20.2	
G6	PIEZO		3.8	1.3	17.9	
G7	PIEZO		0.1	0.7	19.7	
G8	PIEZO		0.1	0.5	19.7	
G9	PIEZO		0	0.6	20.2	
G10	PIEZO		3.8	1.8	18.7	
G16	PIEZO		0	0.1	20.7	
G17	PIEZO		0	0.2	18.7	
G20	PIEZO		0	5.9	12.2	
G21	PIEZO		0	0.1	20.5	
GM1	PIEZO		0	3.9	15.2	
GM2	PIEZO		0	1.8	18	
GM3	PIEZO		0	0.2	20.3	
GM4	PIEZO		0	0.1	20.7	
GM5	PIEZO		0	0.2	20.2	
GM6	PIEZO		0	0.3	20.6	
GM24	PIEZO		0	4.2	15.3	

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 11:02:2008	**Time:** 12.30 pm
Instrument used: GA2000/FID	**Normal Analytical Range:**	**Date Next Calibration:** Nov 2008	
Monitoring Personnel: aw		**Weather:** Dry/Warm	**Barometric pressure:** 997mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
FLARE	PIEZO		30.6	20.1	7.3	
HUT			0	0	22.5	

The following houses and commercial properties were visited and surveyed using GA2000 infra-red gas and FID analyser.

No's 2, 3, 4, 5, ,8, 9, 10, 11, 12, 15, 18,19,20, Riverside Crescent

.

No's 2, 3 & Newry Road

Mc Kevitts, Maxol, Yard Mace Shop, Autoglass, Peugeot Office, Lynch Mini Mix (Yard), Portway Travel Agents, Hardys (offices & Yard), Road Drains.

All levels detected using the FID where below 15 part per million (10,000ppm = 1% v/v).

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 03:03:2008	**Time:** 12.30 pm
Instrument used: GA2000	**Normal Analytical Range:**	**Date Next Calibration:** Nov 2008	
Monitoring Personnel: aw		**Weather:** Dry/ Cold	**Barometric pressure:** 1003mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
G1	PIEZO		0.1	0.1	21	
G2	PIEZO		0.1	0.3	18.6	
G3	PIEZO		0.1	0.1	20.8	
G4	PIEZO		0.1	0.3	19.1	
G5	PIEZO		0.1	0.1	21	
G6	PIEZO		1	0.4	19.6	
G7	PIEZO		0.1	0.1	20.9	
G8	PIEZO		0.6	0.4	20.3	
G9	PIEZO		0.1	0.3	20.8	
G10	PIEZO		4.9	1.5	19.6	
G16	PIEZO		0.1	0.1	20.9	
G17	PIEZO		0.1	1.5	19.8	
G20	PIEZO		0.1	4	14.7	
G21	PIEZO		0	0.1	20	
GM1	PIEZO		0	1.6	18.5	
GM2	PIEZO		0	1.7	17.8	
GM3	PIEZO		0.2	0.1	20.7	
GM4	PIEZO		0	0.1	21	
GM5	PIEZO		0	0.4	20.2	
GM6	PIEZO		0	0.1	21	
GM24	PIEZO		0	4.4	15.8	

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 03:03:2008	**Time:** 12.30 pm
Instrument used: GA2000/FID	**Normal Analytical Range:**	**Date Next Calibration:** Nov 2008	
Monitoring Personnel: aw		**Weather:** Dry/Warm	**Barometric pressure:** 1003mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
FLARE	PIEZO		30.6	21.7	7.8	
HUT			0	0	22.6	

The following houses and commercial properties were visited and surveyed using GA2000 infra-red gas and FID analyser.

No's 2, 3, 4, 5, ,8, 9, 10, 11, 12, 15, 18,19,20, Riverside Crescent

.

No's 2, 3 & Newry Road

Mc Kevitts, Maxol, Yard Mace Shop, Autoglass, Peugeot Office, Lynch Mini Mix (Yard), Portway Travel Agents, Hardys (offices & Yard), Road Drains.

All levels detected using the FID where below 15 part per million (10,000ppm = 1% v/v).

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM	(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL	**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL	**National Grid Reference:** 1632-12	
Site Status: Closed	**Date:** 10:04:2008	**Time:** 12.30 pm
Instrument used: GA2000	**Normal Analytical Range:**	**Date Next Calibration:** April 2009
Monitoring Personnel: aw	**Weather:** Dry	**Barometric pressure:** 1001mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
G1	PIEZO		0	0	20.5	
G2	PIEZO		0	0.1	19.3	
G3	PIEZO		0	0	20.6	
G4	PIEZO		0.1	1.5	17.8	
G5	PIEZO		0	0	20.4	
G6	PIEZO		12.2	3.2	12.7	
G7	PIEZO		0	0	20.5	
G8	PIEZO		1.2	4.1	13.1	
G9	PIEZO		0	4.2	15.3	
G10	PIEZO		5.0	1.8	19.4	
G16	PIEZO		0	0	20.5	
G17	PIEZO		0	2.7	17.7	
G20	PIEZO		0	5.5	14.2	
G21	PIEZO		0	0.1	20.2	
GM1	PIEZO		0	1.6	18.4	
GM2	PIEZO		0	1.8	17.9	
GM3	PIEZO		0.1	0.1	20.6	
GM4	PIEZO		0	0.1	20.6	
GM5	PIEZO		0	0.1	20.6	
GM6	PIEZO		0	0.6	20.6	
GM24	PIEZO		0	4.3	15.6	

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 10:04:2008	**Time:** 12.30 pm
Instrument used: GA2000/FID	**Normal Analytical Range:**	**Date Next Calibration:** April 2009	
Monitoring Personnel: aw		**Weather:** Dry	**Barometric pressure:** 1001mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
FLARE	PIEZO		29.6	19.8	6.2	
HUT			0	0	22.1	

The following houses and commercial properties were visited and surveyed using GA2000 infra-red gas and FID analyser.

No's 2, 3, 4, 5, ,8, 9, 10, 11, 12, 15, 18,19,20, Riverside Crescent

.

No's 2, 3 & Newry Road

Mc Kevitts, Maxol, Yard Mace Shop, Autoglass, Peugeot Office, Lynch Mini Mix (Yard), Portway Travel Agents, Hardys (offices & Yard), Road Drains.

All levels detected using the FID where below 15 part per million (10,000ppm = 1% v/v).

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM	(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL	**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL	**National Grid Reference:** 1632-12	
Site Status: Closed	**Date:** 30:05:2008	**Time:** 12.30 pm
Instrument used: GA2000	**Normal Analytical Range:**	**Date Next Calibration:** April 2009
Monitoring Personnel: aw	**Weather:** Dry	**Barometric pressure:** 1014 mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
G1	PIEZO		0	0	20.2	
G2	PIEZO		0	1.9	16.7	
G3	PIEZO		0	0	20.2	
G4	PIEZO		8.7	6.9	5	High tide/valve further opened to flare to draw of gas
G5	PIEZO		0	1.9	17.4	
G6	PIEZO		8.3	8.2	10.6	High tide/valve further opened to flare to draw of gas
G7	PIEZO		0	0	20.3	
G8	PIEZO		0.3	8.2	4.8	
G9	PIEZO		0	3.6	15.9	
G10	PIEZO		6.4	8.2	11.4	High tide/valve further opened to flare to draw of gas
G16	PIEZO		0	0	20.2	
G17	PIEZO		0	1.1	18.7	
G20	PIEZO		0	5	13.8	
G21	PIEZO		0	0.1	20	
GM1	PIEZO		0	1.3	18.9	
GM2	PIEZO		0	1.8	18.1	
GM3	PIEZO		0	0.2	19.7	
GM4	PIEZO		0	0	19.9	
GM5	PIEZO		0	0.1	19.9	
GM6	PIEZO		0.1	0.6	20.5	
GM24	PIEZO		0	3.1	15.5	

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 30:05:2008	**Time:** 12.30 pm
Instrument used: GA2000/FID	**Normal Analytical Range:**	**Date Next Calibration:** April 2009	
Monitoring Personnel: aw		**Weather:** Dry	**Barometric pressure:** 1014mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
FLARE	PIEZO		25.2	18.2	7.9	
HUT			27	13	0	

The following houses and commercial properties were visited and surveyed using GA2000 infra-red gas and FID analyser.

No's 2, 3, 4, 5, ,8, 9, 10, 11, 12, 15, 18,19,20, Riverside Crescent

.

No's 2, 3 & Newry Road

Mc Kevitts, Maxol, Yard Mace Shop, Autoglass, Peugeot Office, Lynch Mini Mix (Yard), Portway Travel Agents, Hardys (offices & Yard), Road Drains.

All levels detected using the FID where below 15 part per million (10,000ppm = 1% v/v).

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM	(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL	**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL	**National Grid Reference:** 1632-12	
Site Status: Closed	**Date:** 08:06:2008	**Time:** 12.30 pm

Instrument used:	**Normal Analytical Range:**	**Date Next Calibration:**
GA2000		April 2009

Monitoring Personnel:	**Weather:**	**Barometric pressure:**
aw	Dry	1016 mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
G1	PIEZO		0	0	20.1	
G2	PIEZO		0	4.1	9.3	
G3	PIEZO		0	0.1	18.1	
G4	PIEZO		9.7	6.	15	High tide/
G5	PIEZO		0.1	0.2	16.9	
G6	PIEZO		12.6	4.1	13.2	High tide
G7	PIEZO		0	0	19.9	
G8	PIEZO		0.6	9.8	5.8	
G9	PIEZO		0.1	3.6	15.5	
G10	PIEZO		3	7.7	11.8	High tide/
G16	PIEZO		0	0	20.2	
G17	PIEZO		0	1.5	19.5	
G20	PIEZO		0	8.1	9.5	
G21	PIEZO		0	8	9.1	
GM1	PIEZO		0	1.5	19.2	
GM2	PIEZO		0	3	17.3	
GM3	PIEZO		0	0	20.2	
GM4	PIEZO		0	0	20.3	
GM5	PIEZO		0	0.2	20.3	
GM6	PIEZO		0	0.1	20.2	
GM24	PIEZO		0	0	20.5	

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 18:06:2008	**Time:** 12.30 pm
Instrument used: GA2000/FID	**Normal Analytical Range:**	**Date Next Calibration:** April 2009	
Monitoring Personnel: aw		**Weather:** Dry	**Barometric pressure:** 1016mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
FLARE	PIEZO		26	19.2	8.6	
HUT			27	11	0	

The following houses and commercial properties were visited and surveyed using GA2000 infra-red gas and FID analyser.

No's 2, 3, 4, 5, ,8, 9, 10, 11, 12, 15, 18,19,20, Riverside Crescent

No's 2, 3 & Newry Road

Mc Kevitts, Maxol, Yard Mace Shop, Autoglass, Peugeot Office, Lynch Mini Mix (Yard), Portway Travel Agents, Hardys (offices & Yard), Road Drains.

All levels detected using the FID where below 15 part per million (10,000ppm = 1% v/v).

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM (Baseline☐ Ambient☐)		
Site Name: DUNDALK LANDFILL	**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL	**National Grid Reference:** 1632-12	
Site Status: Closed	**Date:** 22:07:2008	**Time:** 14.30 pm
Instrument used: GA2000	**Normal Analytical Range:**	**Date Next Calibration:** April 2009
Monitoring Personnel: aw	**Weather:** Dry	**Barometric pressure:** 1026 mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
G1	PIEZO		0	0	20	
G2	PIEZO		0	1	15.8	
G3	PIEZO		0	0	19.2	
G4	PIEZO		13.9	8	7.8	
G5	PIEZO		0	0	19.3	
G6	PIEZO		18	4.	14.4	
G7	PIEZO		0	0	19.5	
G8	PIEZO		1.8	6.6	10.2	
G9	PIEZO		0.5	4.1	11.4	
G10	PIEZO		0	3.8	16.2	
G16	PIEZO		0	2.6	17.8	
G17	PIEZO		0	2.6	18.4	
G20	PIEZO		0	6.3	14.7	
G21	PIEZO		0	6.7	13	
GM1	PIEZO		0	3.1	18	
GM2	PIEZO		0	4	15.7	
GM3	PIEZO		0	0.1	19.8	
GM4	PIEZO		0	0	20	
GM5	PIEZO		0	0.3	19.5	
GM6	PIEZO		0	0	20.3	
GM24	PIEZO		0	3.3	18.5	

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 22:07:2008	**Time:** 14.30 pm
Instrument used: GA2000/FID	**Normal Analytical Range:**	**Date Next Calibration:** April 2009	
Monitoring Personnel: aw		**Weather:** Dry	**Barometric pressure:** 1026mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
FLARE	PIEZO		24.9	17.8	8.6	
HUT			25	11	0	

The following houses and commercial properties were visited and surveyed using GA2000 infra-red gas and FID analyser.

No's 2, 3, 4, 5, ,8, 9, 10, 11, 12, 15, 18,19,20, Riverside Crescent

.

No's 2, 3 & Newry Road

Mc Kevitts, Maxol, Yard Mace Shop, Autoglass, Peugeot Office, Lynch Mini Mix (Yard), Portway Travel Agents, Hardys (offices & Yard), Road Drains.

All levels detected using the FID where below 15 part per million (10,000ppm = 1% v/v).

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM	(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL	**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL	**National Grid Reference:** 1632-12	
Site Status: Closed	**Date:** 12:08:2008	**Time:** 12.30 pm

Instrument used:	**Normal Analytical Range:**	**Date Next Calibration:**
GA2000		April 2009

Monitoring Personnel:	**Weather:**	**Barometric pressure:**
aw	Dry	1012 mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
G1	PIEZO		0	0.1	19.6	
G2	PIEZO		0	1.8	18.3	
G3	PIEZO		0	0.1	18.6	
G4	PIEZO		11.3	3.2	4.1	
G5	PIEZO		0.2	1.7	18.2	
G6	PIEZO		7.5	6.3	12.9	
G7	PIEZO		0	0.2	19.7	
G8	PIEZO		0.4	8.7	6.2	
G9	PIEZO		0.2	2.5	17.1	
G10	PIEZO		5.5	7.6	12.6	
G16	PIEZO		0	0.2	18.9	
G17	PIEZO		0	1.1	17.9	
G20	PIEZO		0	5.7	12.9	
G21	PIEZO		0	0.2	18.6	
GM1	PIEZO		0	2.1	19.6	
GM2	PIEZO		0	2.7	18.6	
GM3	PIEZO		0	0.2	20.1	
GM4	PIEZO		0	0.1	20.2	
GM5	PIEZO		0	0.1	20.2	
GM6	PIEZO		0.1	0.6	20.5	
GM24	PIEZO		0	4	15.8	

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 22:07:2008	**Time:** 14.30 pm
Instrument used: GA2000/FID	**Normal Analytical Range:**	**Date Next Calibration:** April 2009	
Monitoring Personnel: aw		**Weather:** Dry	**Barometric pressure:** 1026mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
FLARE	PIEZO		24.7	18.6	7.9	
HUT			25	11	0	

The following houses and commercial properties were visited and surveyed using GA2000 infra-red gas and FID analyser.

No's 2, 3, 4, 5, ,8, 9, 10, 11, 12, 15, 18,19,20, Riverside Crescent

No's 2, 3 & Newry Road

Mc Kevitts, Maxol, Yard Mace Shop, Autoglass, Peugeot Office, Lynch Mini Mix (Yard), Portway Travel Agents, Hardys (offices & Yard), Road Drains.

All levels detected using the FID where below 15 part per million (10,000ppm = 1% v/v).

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 22:09:2008	**Time:** 14.30 pm
Instrument used: GA2000	**Normal Analytical Range:**	**Date Next Calibration:** April 2009	
Monitoring Personnel: aw		**Weather:** Dry	**Barometric pressure:** 1034 mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
G1	PIEZO		0	0	20.5	
G2	PIEZO		0	0.6	16.3	
G3	PIEZO		0	0	20.2	
G4	PIEZO		0	0	20.5	
G5	PIEZO		0	0	20.6	
G6	PIEZO		0	0	15.6	
G7	PIEZO		0	0	20.7	
G8	PIEZO		5.1	1.6	16.8	
G9	PIEZO		0	0.1	20.3	
G10	PIEZO		3.3	1.6	19.4	
G16	PIEZO		0	0	20.6	
G17	PIEZO		0	1.7	19.6	
G20	PIEZO		0.1	4.4	14.1	
G21	PIEZO		0	3	17.7	
GM1	PIEZO		0	1.8	18.7	
GM2	PIEZO		0	0.3	20	
GM3	PIEZO		0	0.2	20.1	
GM4	PIEZO		0	0	20.4	
GM5	PIEZO		0	0.2	20	
GM6	PIEZO		0	0.1	20.6	
GM24	PIEZO		0	0.1	20.2	

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM	(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL	**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL	**National Grid Reference:** 1632-12	
Site Status: Closed	**Date:** 22:07:2008	**Time:** 14.30 pm

Instrument used:	**Normal Analytical Range:**	**Date Next Calibration:**
GA2000/FID		April 2009

Monitoring Personnel:	**Weather:**	**Barometric pressure:**
aw	Dry	1026mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
FLARE	PIEZO		27.3	21.6	8	
HUT			26	18	7	

The following houses and commercial properties were visited and surveyed using GA2000 infra-red gas and FID analyser.

No's 2, 3, 4, 5, ,8, 9, 10, 11, 12, 15, 18,19,20, Riverside Crescent

.

No's 2, 3 & Newry Road

Mc Kevitts, Maxol, Yard Mace Shop, Autoglass, Peugeot Office, Lynch Mini Mix (Yard), Portway Travel Agents, Hardys (offices & Yard), Road Drains.

All levels detected using the FID where below 15 part per million (10,000ppm = 1% v/v).

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM	(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL	**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL	**National Grid Reference:** 1632-12	
Site Status: Closed	**Date:** 28:10:2008	**Time:** 14.30 pm
Instrument used: GA2000	**Normal Analytical Range:**	**Date Next Calibration:** April 2009
Monitoring Personnel: aw	**Weather:** Dry	**Barometric pressure:** 1012 mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
G1	PIEZO		0	0	20.5	
G2	PIEZO		0	0.7	14.5	
G3	PIEZO		0.1	0.1	18.9	
G4	PIEZO		0	0.3	19.5	
G5	PIEZO		0	0	20.6	
G6	PIEZO		0	1.2	18.6	
G7	PIEZO		0	0	20.6	
G8	PIEZO		6.9	2	17	
G9	PIEZO		4.7	1.9	18.4	
G10	PIEZO		2.7	1.6	19	
G16	PIEZO		0.1	0	20.4	
G17	PIEZO		0	3.2	18.3	
G20	PIEZO		1.4	0.6	19.8	
G21	PIEZO		0	3.4	17.1	
GM1	PIEZO		0	1.7	19.4	
GM2	PIEZO		0	1.8	19.1	
GM3	PIEZO		0	0.3	20.2	
GM4	PIEZO		0	0.1	20.4	
GM5	PIEZO		0	0.2	20.6	
GM6	PIEZO		0	0.2	20.5	
GM24	PIEZO		0	0.3	20.5	

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 28:10:2008	**Time:** 14.30 pm
Instrument used: GA2000/FID	**Normal Analytical Range:**	**Date Next Calibration:** April 2009	
Monitoring Personnel: aw		**Weather:** Dry	**Barometric pressure:** 1012mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
FLARE	PIEZO		32.2	22.6	8.4	
HUT			30.1	18	5	

The following houses and commercial properties were visited and surveyed using GA2000 infra-red gas and FID analyser.

No's 2, 3, 4, 5, ,8, 9, 10, 11, 12, 15, 18,19,20, Riverside Crescent

.

No's 2, 3 & Newry Road

Mc Kevitts, Maxol, Yard Mace Shop, Autoglass, Peugeot Office, Lynch Mini Mix (Yard), Portway Travel Agents, Hardys (offices & Yard), Road Drains.

All levels detected using the FID where below 15 part per million (10,000ppm = 1% v/v).

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 12:11:2008	**Time:** 11.30 pm
Instrument used: GA2000	**Normal Analytical Range:**	**Date Next Calibration:** April 2009	
Monitoring Personnel: aw		**Weather:** Dry	**Barometric pressure:** 1000 mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
G1	PIEZO		0.1	0	19.9	
G2	PIEZO		0.1	0	19.8	
G3	PIEZO		0.1	0.1	18.9	
G4	PIEZO		0.1	0.1	19.2	
G5	PIEZO		0.1	0	20	
G6	PIEZO		4	1.4	17.9	
G7	PIEZO		0.1	0	18.5	
G8	PIEZO		7.3	1.8	16.9	
G9	PIEZO		6.3	1.7	17	
G10	PIEZO		3.4	1.7	19	
G16	PIEZO		0	0	19.6	
G17	PIEZO		0.1	1.5	19.4	
G20	PIEZO		1.9	1.7	19.1	
G21	PIEZO		0.1	2.3	17.7	
GM1	PIEZO		0.1	1.2	19.5	
GM2	PIEZO		0.1	1.2	19.2	
GM3	PIEZO		0.1	0.3	19.2	
GM4	PIEZO		0.1	0.2	19.6	
GM5	PIEZO		0.1	0.3	20.1	
GM6	PIEZO		0.1	0.3	19.6	
GM24	PIEZO		0.1	0.3	19.4	

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 28:10:2008	**Time:** 14.30 pm
Instrument used: GA2000/FID	**Normal Analytical Range:**	**Date Next Calibration:** April 2009	
Monitoring Personnel: aw		**Weather:** Dry	**Barometric pressure:** 1012mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
FLARE	PIEZO		29	17.6	6	
HUT			28	16	6	

The following houses and commercial properties were visited and surveyed using GA2000 infra-red gas and FID analyser.

No's 2, 3, 4, 5, ,8, 9, 10, 11, 12, 15, 18,19,20, Riverside Crescent

.

No's 2, 3 & Newry Road

Mc Kevitts, Maxol, Yard Mace Shop, Autoglass, Peugeot Office, Lynch Mini Mix (Yard), Portway Travel Agents, Hardys (offices & Yard), Road Drains.

All levels detected using the FID where below 15 part per million (10,000ppm = 1% v/v).

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 17:12:2008	**Time:** 11.30 pm
Instrument used: GA2000	**Normal Analytical Range:**	**Date Next Calibration:** April 2009	
Monitoring Personnel: aw		**Weather:** Dry	**Barometric pressure:** 1014 mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
G1	PIEZO		0	0	20.4	
G2	PIEZO		0	1.2	15.2	
G3	PIEZO		0	1	19.7	
G4	PIEZO		0.3	0.2	19.6	
G5	PIEZO		0.2	0.4	18.6	
G6	PIEZO		3.6	1.7	13.8	
G7	PIEZO		0	0	20.4	
G8	PIEZO		6.8	1.4	15.6	
G9	PIEZO		5.3	1.2	15.7	
G10	PIEZO		4.3	1.2	18.5	
G16	PIEZO		0	0.1	20.4	
G17	PIEZO		0	1.2	18.6	
G20	PIEZO		1.2	4.7	13.6	
G21	PIEZO		0	2.1	18.5	
GM1	PIEZO		0	1.3	19.4	
GM2	PIEZO		0	0.2	18.3	
GM3	PIEZO		0.1	0.3	19.2	
GM4	PIEZO		0	0.6	18.3	
GM5	PIEZO		0	0.2	18.7	
GM6	PIEZO		0.1	0.2	20.3	
GM24	PIEZO		0	0.6	15.6	

LANDFILL GAS MONITORING

LANDFILL GAS MONITORING FORM		(Baseline☐ Ambient☐)	
Site Name: DUNDALK LANDFILL		**Site Address:** NEWRY ROAD, DUNDALK	
Operator: DUNDALK TOWN COUNCIL		**National Grid Reference:** 1632-12	
Site Status: Closed		**Date:** 17:12:2008	**Time:** 10.30 pm
Instrument used: GA2000/FID	**Normal Analytical Range:**	**Date Next Calibration:** April 2009	
Monitoring Personnel: aw		**Weather:** Dry	**Barometric pressure:** 1014mb

Results

Sample Station Number	Borehole/ spike/other	Survey Depth	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Comments
FLARE	PIEZO		31	18	5.6	
HUT			29	18	4.8	

The following houses and commercial properties were visited and surveyed using GA2000 infra-red gas and FID analyser.

No's 2, 3, 4, 5, ,8, 9, 10, 11, 12, 15, 18,19,20, Riverside Crescent

.

No's 2, 3 & Newry Road

Mc Kevitts, Maxol, Yard Mace Shop, Autoglass, Peugeot Office, Lynch Mini Mix (Yard), Portway Travel Agents, Hardys (offices & Yard), Road Drains.

All levels detected using the FID where below 15 part per million (10,000ppm = 1% v/v).

APPENDIX G

COMPOSTING MONITORING REPORT

EURO
environmental
services

Environmental Science & Management
Water,Soil & Air Testing

Unit 35,
Boyne Business Park,
Drogheda,
Co. Louth
Ireland
Tel: +353 41 9845440
Fax: +353 41 9846171
Web: www.euroenv.ie
email info@euroenv.ie

A copy of this certificate is available on www.euroenv.ie

Customer	Veronica Martin V & W Recycling [redacted] Newry Rd Dundalk Co Louth	*Lab Report Ref. No.*	1143/004/01
		Date of Receipt	23/01/2009
		Date Testing Commenced	23/01/2009
		Received or Collected	Delivered by Customer
Customer PO		*Condition on Receipt*	Acceptable
Customer Ref	Biofilter 1 23/01/09	*Date of Report*	30/01/2009
		Sample Type	Other

CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
% Moisture Content	0	Drying @ 104 C	55.26	%	
Ammonia (Solid)	114	Colorimetry	141.50	mg/Kg as N	
pH (Solid)	110	Electrometry	6.3	pH Units	
TVC's @ 22 (Solid)	141	Incubation @ 22C/ 72H	35000000	no/g	
TVC's @ 37 (Solid)	141	Incubation @ 37C/ 48H	4800000	no/g	

Signed : Donna Heslin

Donna Heslin - Laboratory Manager

Date : 30/1/09

Acc. : Accredited Parameters by ISO 17025:2005

All organic results are analysed as received and all results are corrected for dry weight at 104 C

Results contained in this report relate only to the samples tested

Daily Check Sheet for Biofilter Dundalk Civic Waste Facility W0034-02

2008

Date	Odour Assessment (Scale:0-5)	Depth of Bed (cm) from top	Condition of Bed		Checked By
			Good	Other (Provide Description)	
01/07/2008	0	120	✓		W.m
02/07/2008	1	"	✓		W.m
03/07/2008	0	"	✓	good	W.m
04/07/2008	1	"	✓		W.m
05/07/2008	0	"	✓	"	W.m
06/07/2008					
07/07/2008	1	"	✓		W.m
08/07/2008	0	"	✓		W.m
09/07/2008	1	"	✓		W.m
10/07/2008	1	"	✓		D.m
11/07/2008	0	"	✓	good	D.m
12/07/2008	0	"	✓		D.m
13/07/2008					D.m
14/07/2008	1	"	✓	good	
15/07/2008	0	"	✓		D.m
16/07/2008	0	"	✓		D.m
17/07/2008	0	"	✓		W.m
18/07/2008	0	"	✓	"	W.m
19/07/2008	0	"	✓		W.m
20/07/2008					W.m
21/07/2008	1	"	✓		
22/07/2008	1	"	✓		W.m
23/07/2008	1	"	✓		W.m
24/07/2008	0	"	✓		W.m
25/07/2008	0	"	✓		W.m
26/07/2008	0	"	✓	good	D.m
27/07/2008					D.m
28/07/2008	0	"	✓	"	D.m
29/07/2008	0	"	✓		D.m
30/07/2008	0	122	✓		W.m
31/07/2008	0	"	✓		W.m

Daily Check Sheet for Biofilter Dundalk Civic Waste Facility W0034-02

Date	Odour Assessment (Scale:0-5)	Depth of Bed (cm) from top	Condition of Bed		Checked By
			Good	Other (Provide Description)	
01/08/2008	0	122	✓		W.m
02/08/2008	0	〃	✓		W.m
03/08/2008	—	—	—	—	
04/08/2008	0	〃	✓		W.m
05/08/2008	0	〃	✓	good	W.m
06/08/2008	1	〃	✓		W.m
07/08/2008	0	〃	✓		W.m
08/08/2008	1	〃	✓		W.m
09/08/2008	0	〃	✓		W.m
10/08/2008	—	—	—	—	
11/08/2008	0	〃	✓		D.m
12/08/2008	0	〃	✓		D.m
13/08/2008	0	〃	✓		D.m
14/08/2008	0	〃	✓	good	W.m
15/08/2008	1	〃	✓		W.m
16/08/2008	1	〃	✓		W.m
17/08/2008	—	—	—	—	
18/08/2008	0	〃	✓	good	W.m
19/08/2008	0	〃	✓		W.m
20/08/2008	0	〃	✓		W.m
21/08/2008	0	〃	✓		D.m
22/08/2008	1	〃	✓		D.m
23/08/2008	—	—	—	—	
24/08/2008	—	—	—	—	
25/08/2008	0	〃	✓		W.m
26/08/2008	0	124	✓		D.m
27/08/2008	0	〃	✓		D.M.
28/08/2008	0	〃	✓		D.m
29/08/2008	0	〃	✓	good	D.m
30/08/2008	0	〃	✓		W.m
31/08/2008	—	—	—	—	

Daily Check Sheet for Biofilter Dundalk Civic Waste Facility W0034-02

Date	Odour Assessment (Scale:0-5)	Depth of Bed (cm) from top	Condition of Bed		Checked By
			Good	Other (Provide Description)	
01/09/2008	0	124	✓		W.M
02/09/2008	1	〃	✓		W.M
03/09/2008	0	〃	✓	good	W.M
04/09/2008	0	〃	✓		W.M
05/09/2008	0	〃	✓		W.M
06/09/2008	0	〃	✓		W.M
07/09/2008					W.M
08/09/2008					
09/09/2008	1	〃	✓	good	D.M
10/09/2008	0	〃	✓		D.M
11/09/2008	0	〃	✓		D.M
12/09/2008	0	〃	✓		D.M
13/09/2008	0	〃	✓		D.M
14/09/2008					D.M
15/09/2008					
16/09/2008	0	〃			
17/09/2008	0	〃	✓	good	D.M
18/09/2008	0	〃	✓		D.M
19/09/2008	0	〃	✓	〃	D.M
20/09/2008	0	〃	✓		D.M
21/09/2008					D.M
22/09/2008	0	〃			
23/09/2008	1	〃	✓		D.M
24/09/2008	0	〃	✓		D.M
25/09/2008	1	〃	✓	〃	W.M
26/09/2008	0	〃	✓		W.M
27/09/2008	1	〃	✓		W.M
28/09/2008		1		〃	W.M
29/09/2008	0	125	✓		W.M
30/09/2008	0	〃	✓		W.M

Daily Check Sheet for Biofilter Dundalk Civic Waste Facility W0034-02

Date	Odour Assessment (Scale:0-5)	Depth of Bed (cm) from top	Condition of Bed		Checked By
			Good	Other (Provide Description)	
01/10/2008	0	125	✓	good	W.M
02/10/2008	0	〃	✓	good	〃
03/10/2008	0	〃	✓	〃	W.M
04/10/2008	0	〃	✓	〃	W.M
05/10/2008					
06/10/2008	0	〃	✓	〃	W.M
07/10/2008	1	〃	✓		W.M
08/10/2008	1	〃	✓		W.M
09/10/2008	0	〃	✓	〃	W.M
10/10/2008	1	〃	✓		W.M
11/10/2008	0	〃	✓	〃	W.M
12/10/2008					
13/10/2008	0	〃	✓		W.M
14/10/2008	1	〃	✓		W.M
15/10/2008	0	〃	✓		W.M
16/10/2008	0	〃	✓	good	W.M
17/10/2008	1	〃	✓		W.M
18/10/2008	1	〃	✓		W.M
19/10/2008	0	〃	✓		W.M
20/10/2008					
21/10/2008	0	〃	✓	〃	D.M
22/10/2008	1	〃	✓		D.M
23/10/2008	0	〃	✓		D.M
24/10/2008	1	〃	✓	〃	D.M
25/10/2008	1	〃	✓		D.M
26/10/2008					
27/10/2008					
28/10/2008	0	〃	✓	〃	D.M
29/10/2008	1	〃	✓	good	D.M
30/10/2008	1	〃	✓	〃	D.M
31/10/2008	1	〃	✓	good	D.M

Daily Check Sheet for Biofilter Dundalk Civic Waste Facility W0034-02

Date	Odour Assessment (Scale:0-5)	Depth of Bed (cm) from top	Condition of Bed		Checked By
			Good	Other (Provide Description)	
01/11/2008	0	125	✓	good	W.M
02/11/2008					
03/11/2008	0	〃	✓	〃	
04/11/2008	0	〃	✓	good	D.M
05/11/2008	1	〃	✓	〃	D.M
06/11/2008	0	〃	✓	〃	D.M
07/11/2008	0	〃	✓	〃	D.M
08/11/2008	0	〃	✓	〃	D.M
09/11/2008					D.M
10/11/2008	0	〃	✓	〃	
11/11/2008	0	〃	✓	good	W.M
12/11/2008	1	〃	✓	〃	W.M
13/11/2008	0	〃	✓	〃	W.M
14/11/2008	1	〃	✓	〃	W.M
15/11/2008	0	〃	✓	〃	W.M
16/11/2008					W.M
17/11/2008	1	126	✓	good	
18/11/2008	0	〃	✓	〃	W.M
19/11/2008	0	〃	✓	〃	W.M
20/11/2008	1	〃	✓	〃	W.M
21/11/2008	0	〃	✓	〃	W.M
22/11/2008	1	〃	✓	〃	W.M
23/11/2008					
24/11/2008	0	〃	✓	good	
25/11/2008	0	〃	✓	〃	D.M
26/11/2008	1	〃	✓	〃	D.M
27/11/2008	0	〃	✓	〃	D.M
28/11/2008	1	〃	✓	〃	D.M
29/11/2008	0	〃	✓	〃	D.M
30/11/2008					D.M
01/12/2008	0	〃	✓	〃	W.M

Daily Check Sheet for Biofilter Dundalk Civic Waste Facility W0034-02

Date	Odour Assessment (Scale:0-5)	Depth of Bed (cm) from top	Condition of Bed		Checked By
			Good	Other (Provide Description)	
01/12/2008	0	126	✓		W.M
02/12/2008	0	"	✓	good	W.M
03/12/2008	0	"	✓		W.M
04/12/2008	0	"	✓	"	W.M
05/12/2008	0	"	✓		W.M.
06/12/2008	0	"	✓	"	W.M
07/12/2008					
08/12/2008	0	"	✓		W.M
09/12/2008	0	"	✓	"	W.M
10/12/2008	0	"	✓	good	W.M
11/12/2008	0	"	✓		W.M
12/12/2008	0	"	✓	"	D.M
13/12/2008	0	"	✓	good	D.M
14/12/2008					
15/12/2008	0	"	✓	good	W.M
16/12/2008	0	"	✓		D.M
17/12/2008	1	"	✓	"	D.M
18/12/2008	0	"	✓		D.M
19/12/2008	1	"	✓	good	W.M
20/12/2008	0	"	✓		W.M
21/12/2008					[redacted]
22/12/2008	0	"	✓		W.M
23/12/2008	0	"	✓		D.M
24/12/2008	1	"	✓	"	W.M
25/12/2008	0	"	✓	good	W.M
26/12/2008	0	"	✓		D.M
27/12/2008	0	"	✓		D.M
28/12/2008					
29/12/2008	1	"	✓	good	D.M
30/12/2008	0	"	✓	good	W.M
31/12/2008	0	"	✓		W.M

Biofilter Bi-Annual Monitoring Dundalk Civic Waste Facility W0034-02

		BED						Inlet & Outlet Gasses					
Date Checked	BY	No.	Moisture Content (%)	pH	Ammonia (ppm v/v)	TVC @22 deg C	TVC @37 degC	Ammonia In	Ammonia Out	Hyd. Sulph. In	Hyd. Sulph. Out	Mercaptans In	Mercaptans Out
23/1/09	Elero Environmental services.	①	55.26	6.3	14.50	3500000	4800000						
27/1/09	V&W Rec.	①						44	14	0	0	0	0

APPENDIX H

RESULTS OF SLOPE STABILITY ASSESSMENT

DUNDALK LANDFILL
Co. LOUTH

SLOPE STABILITY ASSESSMENT 2009

May 2009

TOBIN CONSULTING ENGINEERS

TOBIN
Patrick J. Tobin & Co. Ltd.

VISUAL SLOPE STABILITY ASSESSMENT

PROJECT: **Slope Stability Report at Dundalk Landfill**

CLIENT:

Dundalk Town Council
Town Hall
Crowe St.
Dundalk
Co. Louth

COMPANY:

TOBIN Consulting Engineers
Block 10 – 4,
Blanchardstown Corporate Park,
Dublin 15, Ireland

Tel: 01-8030406
Fax: 01-8030409
email: **dublin@tobin.ie**

www.tobin.ie

Document Amendment Record

Client: DUNDALK TOWN COUNCIL

Project: Slope Stability Report at Dundalk Landfill

PROJECT NUMBER: 5594				DOCUMENT REF: 5594-Slope Stability Assess RevA2009			
A	Issue to Client	LYC	14/05/09	HB	14/05/09	DC	14/05/09
Revision	**Description & Rationale**	**Originated**	**Date**	**Reviewed**	**Date**	**Authorised**	**Date**
TOBIN Consulting Engineers							

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

Tobin Consulting Engineers have been appointed by Dundalk Town Council to carry out a visual slope stability assessment of the Dundalk Landfill Co. Louth in accordance with Waste Licence Ref. No. WL0034-02.

This landfill site was closed since 2002.

The side slopes were checked for signs of instability that include tension cracks, seepages, bulges at the toe, rotation of pipework, scars of slope failure and offset of surface drains. The face of each side slope and the condition of the top of the landfill were inspected and the stability status of each slope is described below:

2.0 SITE DESCRIPTION

The assessment carried out was purely visual and did not include any site specific ground investigations. However a computerised slope stability analysis of the landfill slopes has been carried out and the design parameters were based on the previous ground investigation and empirical methods. Thus the results of the computerised slope stability analysis should be treated as for information/guidance only.

The top level of the Landfill mound is 13.51mOD and dipping to between 1.15mOD and 5.06 to the four sides of landfill.

The landfill side slopes were covered by very dense grass and trees.

Land Survey Drawing No. 16255/1 was provided by client that shows the most recent topographical survey of the landfill and also shows the areas of the landfill as outlined in Section 4 of this Report. Refer to Figure 1 for site location plan.

3.0 INFORMATION SOURCES

The following method/ documents were provided and used in the stability assessment:-

- Site Walkover
- Previous Ground Investigations
- Topographic Survey
- Leachate Level Monitoring

4.0 SITE WALKOVER

A site walkover was carried out on 05th May 2009 to establish the condition of the side slopes of the landfill. The slopes on each side of the landfill were inspected and the stability status of each slope is described below:

4.1 WESTERN SLOPE

The side slope showed no signs of instability. The slope is approximately 390m in length and the maximum side slope gradient is 1:2.5 (V:H).

Photo 1: General view of Western Slope (Toe)

Photo 2: General view of Western Slope (Top)

4.2 SOUTHERN SLOPE

The side slope showed no signs of instability. The slope is approximately 360m in length and the maximum side slope gradient is 1:2.5(V: H). However, small water pound was found on the top of the Southern side of the landfill possibly cause by tracks from vehicular traffic.

Photo 3:General view of Southern Slope (Toe)

Photo 4:General view of Southern Slope (Top)

Photo 5:Small water pound at top of Southern Slope

4.3 EASTERN SLOPE

The side slope showed no signs of instability. The slope is approximately 300m in length and the maximum side slope gradient is 1:4(V: H).

Photo 6:General view of Eastern Side Slope (Toe)

Photo 7:General view of Eastern Side Slope (Top)

4.4 NORTHERN SLOPE

The side slope showed no signs of instability. The slope is approximately 320m in length and the maximum side slope gradient is 1:4(V: H).

Photo 8: General view of Northern Side Slope (Toe)

Photo 9: General view of Northern Side Slope (Top)

5.0 GROUND PROFILE

The results of previous ground investigations, and the site walkover were used to establish the ground geology for the side slope stability analysis. The stratification for the landfill mound is given in Table 5.1.

Material	Thickness Range
Made Ground	0-2.5m
Capping	~1.0m
Domestic Waste	12-14m
Alluvium	>7m

Table 5.1 Ground Profile of Phase 1

6.0 GEOTECHNICAL PARAMETERS

For the purposes of the slope stability analysis the following range of effective stress parameters were derived from the site investigation information, and previous experience in other landfills. These parameters, presented in Table 6.1, are considered representative of the materials encountered in the Landfill:

Material	Unit Weight kN/m^3	Cohesion kN/m^2	Angle of Shearing Resistance/degrees
Made Ground	17	0	30
Capping	18	0	30
Waste	12	0	28
Alluvium	18	0	28

Table 6.1 Design Parameters

The surcharge of 5kPa has been included in the slope stability analysis to demonstrate a daily traffic load on the landfill mound.

7.0 HYDRAULIC CONDITIONS

On going Leachate monitoring results were provided by client, the most recent data is given in Table 7.1 and this data has been used to assess the effect of leachate levels on side slope stability.

Monitor Point	L1	L4	L6	L7
Level (mOD)	2.13	2.11	4.36	5.04

Table 7.1 Leachate record

8.0 SLOPE STABILITY ANALYSIS

Four cross sections, one for each side slope were selected for analysis by computer programme "Slope/ W". The results were reviewed in terms of the advice given in BS6031 Code of Practice for Earthworks, 1981. The standard recommends that a Factor of Safety of at least 1.3 should be adopted as the design Factor of Safety for permanent slopes.

The results of the Slope Stability Assessment are presented in Table 8.1. The location of the Sections is shown in Land Survey Drawing No. 16255/1 in Appendix B and programme outputs of the analysis are presented in Appendix C.

Slope	Minimum Factor of Safety
Section 1-1, Western Slope	1.600
Section 2-2, Southern Slope	1.447
Section 3-3, Eastern Slope	2.225
Section 4-4, Northern Slope	1.464

Table 8.1 Results of Slope Stability Analysis

Each Section modelled takes account of the existing slope gradients, leachate levels, and construction materials.

The results indicate that the side slopes of the landfill mound are stable based on the information available.

9.0 CONCLUSIONS AND RECOMMENDATIONS

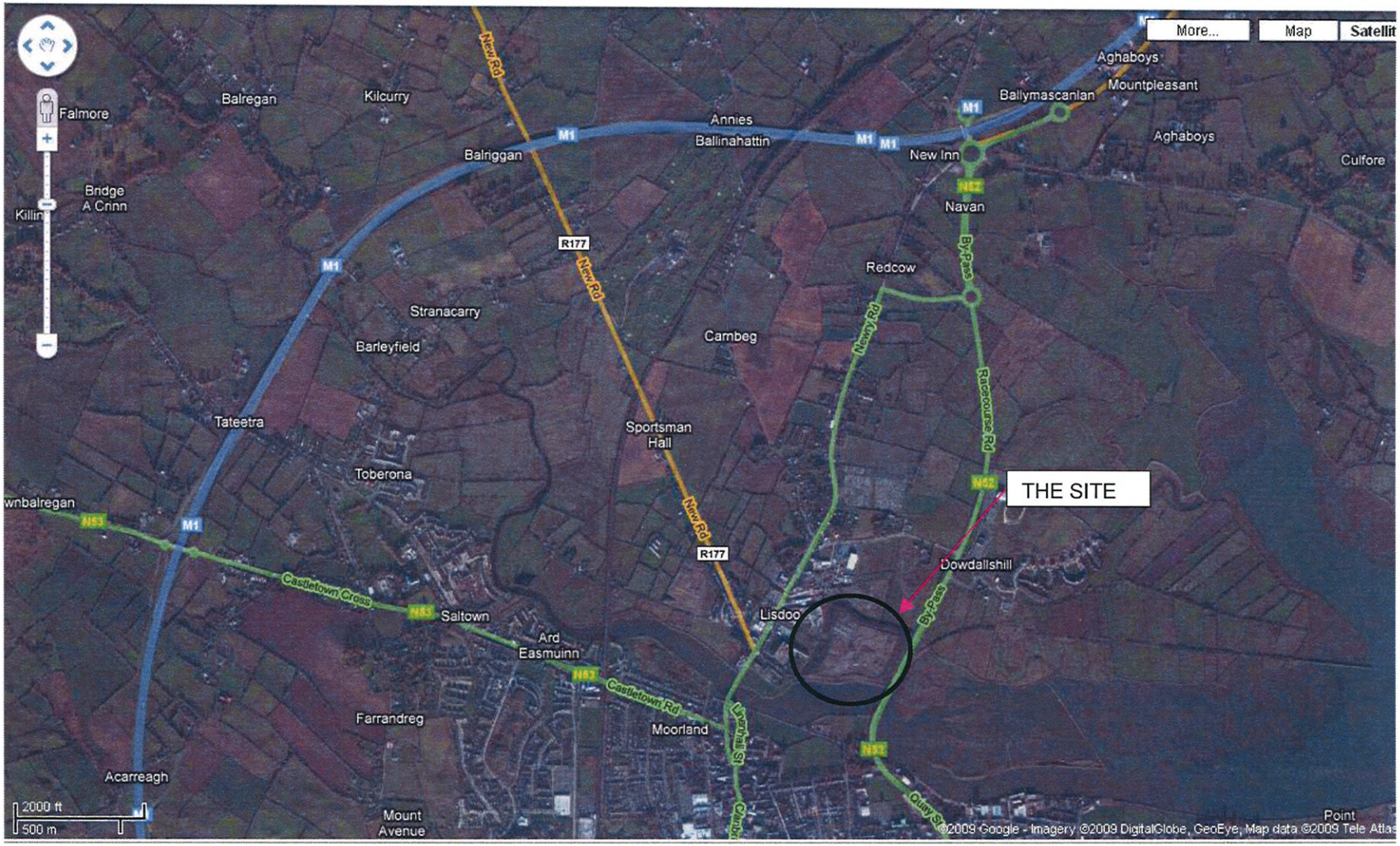
Based on the visual inspection, previous ground investigation results and a review of topographic survey and leachate levels, the stability of the side slopes of the landfill are satisfactory, however leachate levels should be continuously monitored and controlled

The small water pound at the southern side of landfill slope shall be backfilled as soon as is practicable to prevent softening, which could cause possible slope instability. A vehicle free zone should be enforced on the landfill cap within 8m of the side slope edge, i.e. vehicle trafficking in this zone should be prohibited.

If any significant change of slope condition arises as mentioned in Section 1, then a geotechnical professional should be consulted to assess the situation and to ensure the stability of the slope is maintained.

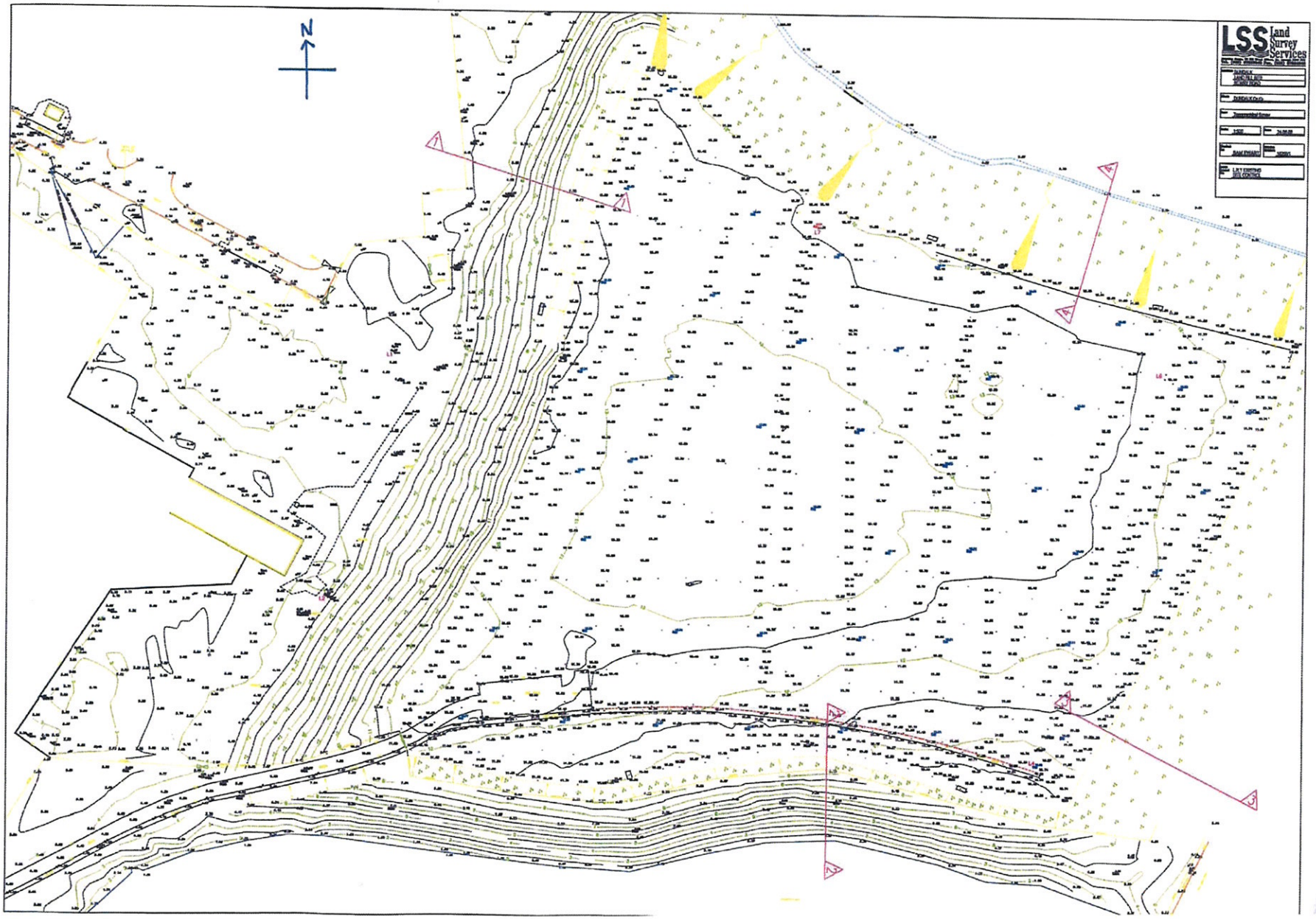
APPENDIX A

Figure 1: Site Location Plan


THE SITE
Falmore
Balregan
Kilcurry
Annies
Ballinahattin
Balriggan
Aghaboys
Mountpleasant
Ballymascanlan
New Inn
Navan
Culfore
Bridge
A Crinn
Redcow
Stranacarry
Barleyfield
Cambeg
Tateetra
Sportsman
Hall
Toberona
Dowdallshill
Lisdoo
Saltown
Ard
Easmuinn
Farrandreg
Moorland
Acarreagh
Mount
Avenue
Point
New Rd
R177
M1
N52
N53
By-Pass
Racecourse Rd
Castletown Cross
Castletown Rd
2000 ft
500 m
More...
Map
Satellit
©2009 Google - Imagery ©2009 DigitalGlobe, GeoEye, Map data ©2009 Tele Atlas

APPENDIX B

Land Survey Drawing No. 16255/1


N
LSS
Land
Survey
Services

APPENDIX C

Slope Stability Analysis

Dundalk Landfill Slope Stability Assessment 2009

Section 1-1: Permanent Western Slope Analysis

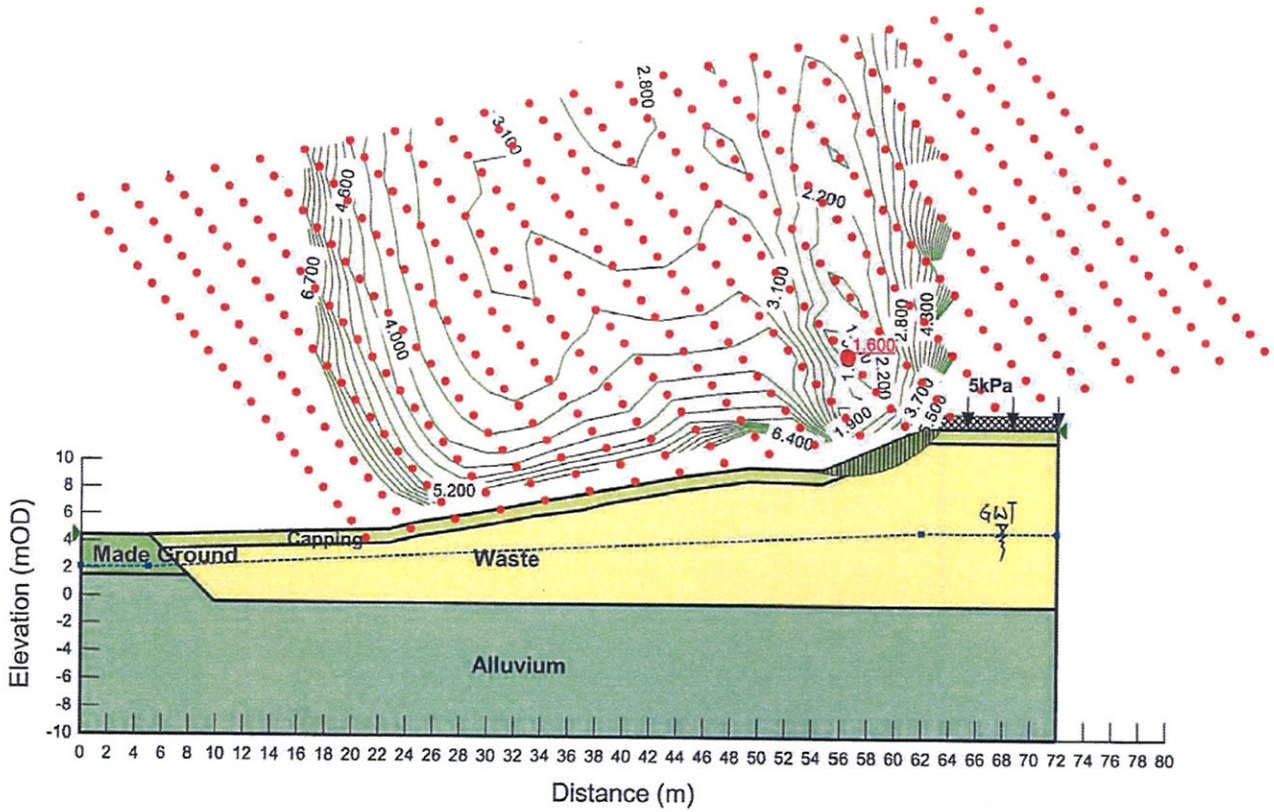
Scale: 1:400

Name: Waste
Model: Mohr-Coulomb
Unit Weight: 12 kN/m³
Cohesion: 0 kPa
Phi: 28 °
Piezometric Line: 1

Name: Capping
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 30 °

Name: Made Ground
Model: Mohr-Coulomb
Unit Weight: 17 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Piezometric Line: 1

Name: Alluvium
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 28 °
Piezometric Line: 1



Dundalk Landfill Slope Stability Assessment 2009

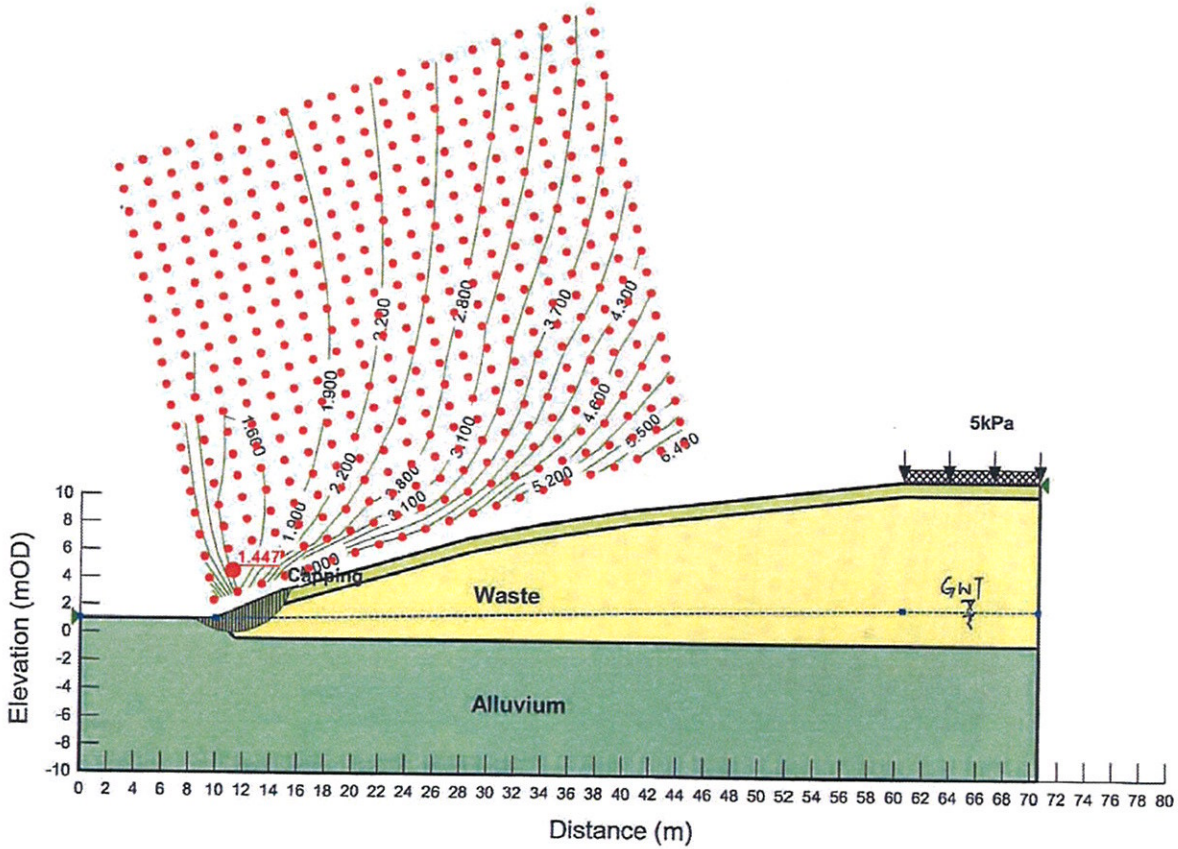
Section 2-2: Permanent Southern Slope Analysis

Scale: 1:400

Name: Waste
Model: Mohr-Coulomb
Unit Weight: 12 kN/m³
Cohesion: 0 kPa
Phi: 28 °
Piezometric Line: 1

Name: Capping
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 30 °

Name: Alluvium
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 28 °
Piezometric Line: 1



Dundalk Landfill Slope Stability Assessment 2009

Section 3-3: Permanent Eastern Slope Analysis

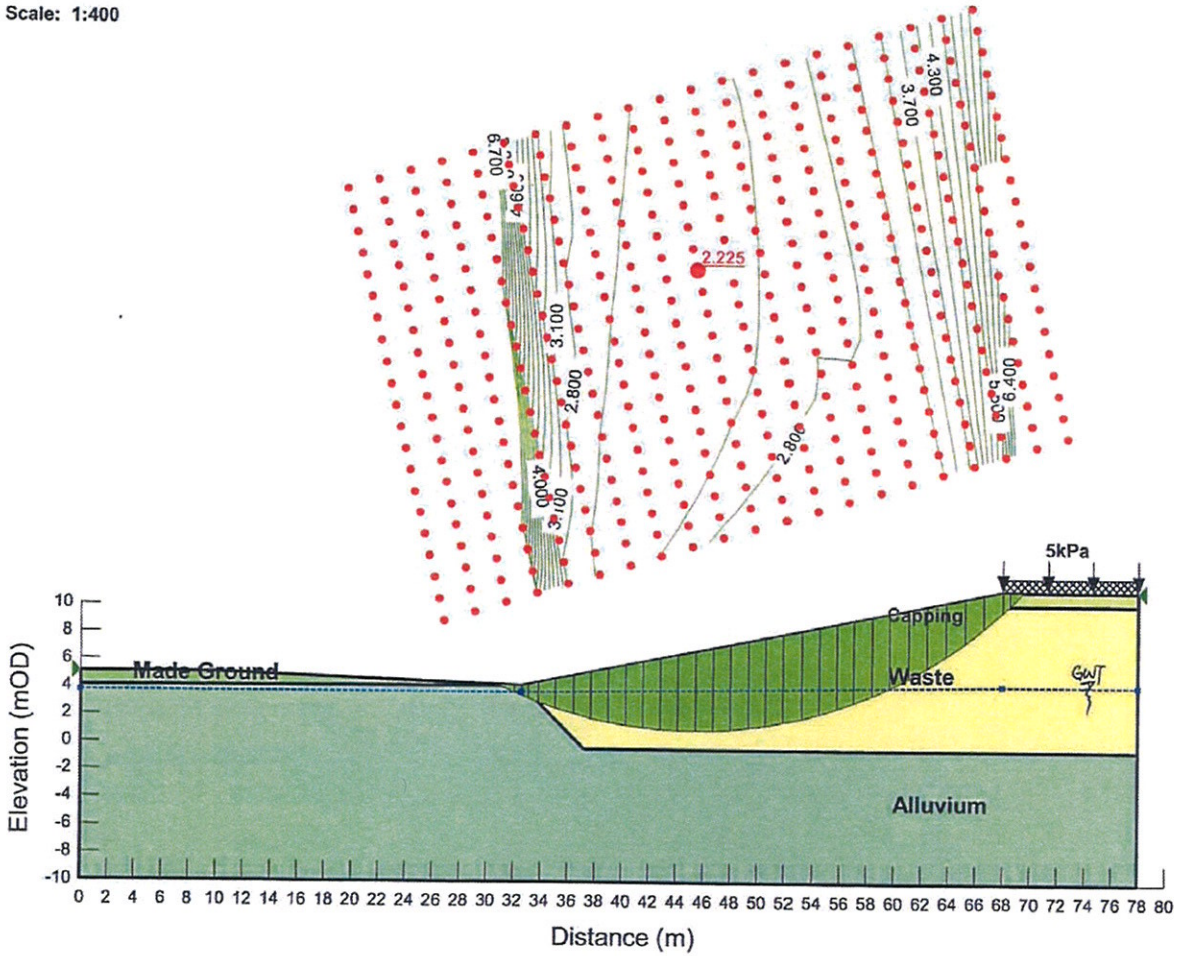
Scale: 1:400

Name: Waste
Model: Mohr-Coulomb
Unit Weight: 12 kN/m³
Cohesion: 0 kPa
Phi: 28 °
Piezometric Line: 1

Name: Capping
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 30 °

Name: Made Ground
Model: Mohr-Coulomb
Unit Weight: 17 kN/m³
Cohesion: 0 kPa
Phi: 30 °

Name: Alluvium
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 28 °
Piezometric Line: 1



Dundalk Landfill Slope Stability Assessment 2009

Section 4-4: Permanent Northern Slope Analysis

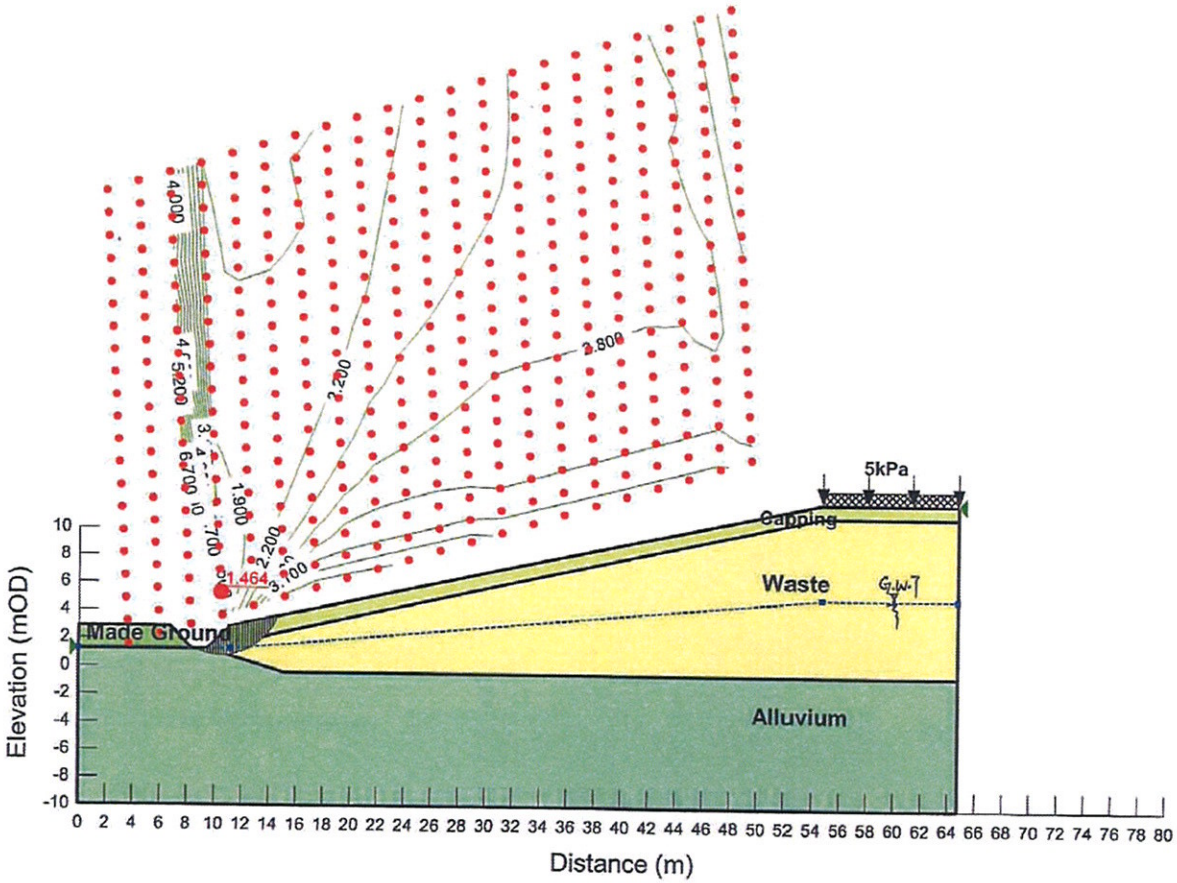
Scale: 1:400

Name: Waste
Model: Mohr-Coulomb
Unit Weight: 12 kN/m³
Cohesion: 0 kPa
Phi: 28 °
Piezometric Line: 1

Name: Capping
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 30 °

Name: Made Ground
Model: Mohr-Coulomb
Unit Weight: 17 kN/m³
Cohesion: 0 kPa
Phi: 30 °

Name: Alluvium
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 28 °
Piezometric Line: 1



APPENDIX I

NOISE REPORT

F. R. MARK & ASSOCIATES
Noise and Acoustic Consultants

155 Bloomfield Avenue, Belfast BT5 5AB
Tel: (028) 9045 7210 Fax: (028) 9045 7220
Email: acoustics@robinmark.com

EPA Waste License

Dundalk Landfill Site
Noise Monitoring Exercise

June 2008

Introduction

This report details the results of a noise monitoring exercise conducted at Dundalk Town Council's Landfill site on the Old Newry Road, Dundalk.

The terms of reference for the monitoring exercise are as set out in section E4 of the waste license and identify 4 fixed locations where L_{Aeq}, L_{A10}, L_{A90} and measurements are to be carried out. The measurements are required to be taken annually and this report details measurements recorded for June 2008.

The methodology used is with reference to ISO 1996, "Acoustics – Description and Measurement of Environmental Noise. (Parts 1,2 and 3)".

There is some noise impact at the measurement locations from other sources not connected with the landfill sites which have been identified and referred to, wherever possible.

Methodology and Equipment

Noise levels were recorded during daytime operations and night time closure on the 24th and 26th of June 2008.

Readings were recorded using a CR80 type 1 integrating sound level meter. A CR511D calibrator was used before and after measurements.

All instrumentation is within 1 year of factory calibration.

The sound level meter was tripod mounted between 1.2m and 1.5m high, and located away from any reflecting surfaces.

Weather conditions were fine with no rain and low wind speed. At the selected measurement locations there is considerable influence, over the required 20 minute period, from other noise sources such as road traffic and construction work which tends to present

Important Note regarding the Noise Climate

Noise levels at the boundaries of the site are greatly influenced by traffic and commercial activity on roads and other buildings near the boundaries. For example the noise levels at night, recorded as L_{aeq} for 20 minutes, are generally biased to passing and distant vehicles. During daytime the heavy traffic content on the main by-pass and the Old Newry Road have a major impact on recorded noise levels such that the L_{Aeq} value could not be attributed to the landfill site alone. We therefore submit that the noise level record most indicative of the actual site noise should be the La_{90} value, being indicative of the ambient noise from the landfill site. (At measurement location 1 the traffic during daytime is very consistent such that the L_{A90} value is still influenced by these other sources).

Results

(See Important Note above)

Daytime Monitoring
20 minute recordings

Location	Reference	L_{Aeq}	L_{A10}	L_{A90}	Comments
1	Landfill Site Gate	66.3	69.9	56.7	Heavy constant traffic
2	28 Riverside Cres.	50.7	53.1	47.6	Road traffic noise
3	R'course Rd.(Butterly)	69.4	74.4	48.0	Occasional Traffic – use L_{A90}
4	R'course Rd (Residence)	66.4	71.5	49.9	Adjacent building site, new houses

Night time Monitoring
20 minute recordings

Location	Reference	L_{Aeq}	L_{A10}	L_{A90}	Comments
1	Landfill Site Gate	66.3	66.0	46.1	Garage still busy, 64 cars passed in 20 minutes.
2	28 Riverside Cres.	48.6	51.0	44.8	
3	R'course Rd.(Butterly)	61.1	56.4	45.8	
4	R'course Rd (Residence)	59.1	57.1	48.3	Near to junction/rear of property Occasional Traffic – use L_{A90} Flare not audible at monitoring locations

Summary

Readings have been recorded as requested at the locations identified for the ongoing monitoring of noise impact from civic amenity facility at Dundalk Landfill site.

The readings refer to the year ending 2008. The site was operating normally at the times of measurement.

In general, noise from other activities around the site, including traffic movement and other commercial operations, generate greater noise impact than the landfill operations themselves at the boundaries and location points. The flare was not audible at noise measurement locations and the higher noise levels at location 3 were influenced by the close proximity of the junction and verge of the road. Noise from an adjacent construction site was evident at location 4 and influenced the recordings during the daytime.

Rey Gaston
For F.R.Mark and Associates

30th June 2008

Appendix 1 – Explanation of Noise Terms

Definitions of environmental noise terms are detailed in ISO1996 (BS7445), *Description and Measurement of Environmental Noise*.

The following explanations of the terms used in this assessment are meant to clarify the nature and use of each term and are made with reference to the glossary of terms in PPG24.

L_A A-weighted sound pressure level (in decibels, dB)
The measured sound level incorporating a logarithmic base and weighting system to approximate the manner in which humans perceive sound. An increase in 10 dB is approximately equivalent to a perceived doubling of loudness.

$L_{Aeq,T}$ Equivalent continuous A-weighted sound pressure level (in decibels, dB), over a given time interval
An average of the energy associated with the noise at a location over a given time interval. Where a time interval is not given it is typically considered as a continuous level.
Indicates the activity noise level of a source. Typical source descriptions include "ambient noise", "specific noise" and "residual noise" as defined in BS4142.

$L_{A10,T}$ A-weighted sound pressure level (in decibels, dB) obtained using "Fast" time-weighting that is exceeded for 10% of the given time interval.
Indicates the upper limit of a fluctuating noise source such as that from road traffic. For road traffic, it is typically expressed for peak hour, or as the arithmetic average of hourly L_{A10} values over an 18 hour day (06:00-24:00).

$L_{A90,T}$ A-weighted sound pressure level (in decibels, dB) obtained using "Fast" time-weighting that is exceeded for 90% of the given time interval.
Defined as the background noise level at a location in BS4142.

L_{Amax} The highest A-weighted sound pressure level (in decibels, dB) recorded during a measurement event.
May be obtained using either "Slow" time-weighting (as incorporated in PPG24) or "Fast" time-weighting (as incorporated in WHO *Guidelines for Community Noise* and BS8233)

Appendix 2- Noise Recordings

No. 1

Environmental Noise Measurement Report

Measurement Details

Location:	Dundalk Landfill 2008
Description:	Environmental Noise
Date of Measurement:	24/06/2008 00:14

Instrumentation Details

Sound Level Meter:	Cirrus Research plc CR:800 B1267SFF
Acoustic Calibrator:	Cirrus Research plc CR:511E
Calibration:	
Recalibration Due:	31/01/2009
Level Range:	10-80 dB
Time Weighting:	Slow (for Lmax and Lns)

Measurement Data

Start of Measurements:	24/06/2008 00:14
No. of Measurements:	11
Total Duration:	03:24:42
Highest Lmax:	84.2
Lmax Exceedance Count:	0, at or above 115dB

Date	Time	Run Duration (hh:mm:ss)	Leq dB	Lmax dB	Peak dBC	L1	L10	L50	L90	L95	L99
26/06/2008	11:18:14	00:23:02	66.4	80.3	90.7	75.5	71.5	59.6	49.9	48.4	46.8
26/06/2008	10:54:26	00:21:37	69.4	84.1	90.2	80.4	74.4	56.4	48	47.1	45.4
26/06/2008	10:32:08	00:20:01	66.3	77.6	89	74.4	69.9	64	56.7	55.4	48.8
26/06/2008	10:06:19	00:20:13	50.7	58.4	84.8	55	53.1	50.2	47.6	46.5	45.1
25/06/2008	00:13:04	00:20:05	59.1	78.9	90.6	73	57.1	52.1	48.5	47.5	46.3
24/06/2008	23:48:46	00:20:01	61.1	81.9	91	75.9	56.4	48.5	45.8	45.2	44.5
24/06/2008	23:25:58	00:20:45	63.3	84.2	89	74.6	66	52.2	46.1	45.2	42
24/06/2008	23:02:31	00:20:02	48.6	58.5	91.1	54.7	51	47.5	44.8	44.2	43.4
24/06/2008	00:44:50	00:12:10	42.2	50.7	75.1	47.8	45.6	40.2	38.1	37.8	37.2
24/06/2008	00:29:52	00:13:13	44.8	51.5	83.9	50.2	48	43.1	40.8	40.5	40.1
24/06/2008	00:14:07	00:13:33	64.3	76.7	88.5	73.9	69.7	53.9	42.9	40.6	38.9

APPENDIX J

PRTR REPORTING

Environmental Protection Agency

AER Returns Worksheet

Version 1.1.04

REFERENCE YEAR	2008

1. FACILITY IDENTIFICATION

Parent Company Name	Dundalk Town Council
Facility Name	Dundalk Landfill & Civic Waste Facility
PRTR Identification Number	W0034
Licence Number	W0034-02

Waste or IPPC Classes of Activity

No.	class_name
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.
4.10	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
3.11	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.

Address 1	Newry Road
Address 2	Dundalk
Address 3	Co. Louth
Address 4	
Country	Ireland
Coordinates of Location	613800,000
River Basin District	GBNIIENB
NACE Code	3832
Main Economic Activity	Recovery of sorted materials
AER Returns Contact Name	Peter McVeigh
AER Returns Contact Email Address	petermcveigh@dundalktown.ie
AER Returns Contact Position	
AER Returns Contact Telephone Number	042 9392936/ 087 7700031
AER Returns Contact Mobile Phone Number	
AER Returns Contact Fax Number	
Production Volume	0.0
Production Volume Units	
Number of Installations	1
Number of Operating Hours in Year	2448
Number of Employees	14
User Feedback/Comments	
Web Address	

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
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 ?	

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
01	**Methane (CH4)**				0 0	0 0	0.0	0 0
03	Carbon dioxide (CO2)	C	OTH	flare	236520 0	378432 0	23652 0	118260 0
		C	OTH		196005 0	313608 0	23520 0	94083 0

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

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR								
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)				0 0	0 0	0 0	0 0
		C	OTH		8637 0	13820 0	1040 0	4143 0

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

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

RELEASES TO AIR								
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
		C	OTH		0 0	0 0	0.0	0.0

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

Additional Data Requested from Landfill operators

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

Landfill: Dundalk Landfill & Civic Waste Facility

Please enter summary data on the quantities of methane flared and / or utilised

	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m3 per hour	
Total estimated methane generation (as per site model)	378432.0	C	OTH		N/A	
Methane flared	236520.0	C			600.0	(Total Flaring Capacity)
Methane utilised in engine/s	0 0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	141912.0	C			N/A	

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			
No. Annex II	Name	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
75	Chlorides (as Cl)	E	ESTIMATE		0.0	0.0	0.0	0.0
08	Nitrogen oxides (NO/NO2)	E	ESTIMATE		486.4	486.4	0.0	0.0
09	Ammonia (NH3)	E	ESTIMATE		3.7	3.7	0.0	0.0
					174.2	174.2	0.0	0.0

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

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

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

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

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR# W0034 | Facility Name Dundalk Landfill & Civic Waste Facility | Filename W0034_2008.xls | Return Year 2008 |

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	20 03 03	No	1061.0	street cleanings	D1	M	Weighed	Onsite in Ireland	v&w recycling wcp/mh/2001/90c	dundalk civic amenity site	whiteriver landfill	w0060-02
Within the Country	20 01 99	No	300.0	reisidual waste from public after recycling	D1	M	Weighed	Onsite in Ireland	v&w recycling wcp/mh/2001/90c	dundalk civic amenity site	whiteriver landfill	w0060-02

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