# OXIGEN ENVIRONMENTAL LTD.

## CORRANURE LANDFILL
## WASTE LICENCE
## W077-02

# ANNUAL ENVIRONMENTAL REPORT
# (AER) 2009

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# 1 INTRODUCTION

Cavan County Council are the licensed operators of Corranure Landfill under EPA Waste Licence Register No. W077-02. In October 2007, Oxigen Environmental Ltd. commenced operation of the landfill under a contractual operational agreement with Cavan County Council who remain as the licensee.

This AER has been prepared in accordance with the conditions of the Waste Licence and the EPA "Draft Guidance on Environmental Management Systems and Reporting to the Agency, 1999".

# 2 SITE DESCRIPTION

Corranure Landfill is located within the townlands of Corranure and Lismagratty adjacent to the Cavan-Cootehill Rd (R188) approximately 3 kilometres North-East of Cavan Town. The total landfilling footprint covers an area of 11 hectares.

Waste Licence 77-1 was granted by the EPA in June 2001 allowing an annual waste intake of 30,050 tonnes. An application for a review of Waste Licence 77-1 for Corranure Landfill was submitted to the EPA in April 2003 by Cavan County Council. A revised Waste Licence 77-2 was issued by the EPA on the 10$^{th}$ May 2005. Under this revised licence, the facility boundary was extended to allow for two new lined cells to be constructed (Phase 3 including Cells 3 and 4) and the waste intake increased to 90,000 tonnes per annum.

The Civic Amenity Facility opened in February 2002 and is used by the general public for recycling. Domestic waste is also accepted for disposal at this facility. At present the Civic Amenity Facility accepts the following waste types: segregated recyclables from householders, newspapers and magazines, cardboard, tetra pak, glass bottles and jars, aluminium and steel cans, plastic containers and plastic shrink wrap, wood, textiles/footwear, electrical goods, fluorescent tubes, batteries wet and household, scrap steel, waste engine oil and oil filters, vegetable oil, C& D waste, gypsum material and green waste.

Table 2.1 below shows the waste categories which the facility is licensed to accept under Waste Licence WL0077-02:

*Table 2.1 Waste Categories and Quantities accepted under Waste Licence WL0077-02*

| Waste Type | Maximum Tonnes per Annum |
|---|---|
| Household Waste | 50,000 |
| Commercial Waste | 32,000 |
| Construction and Demolition Waste | 5,000 |
| Green Waste | 2,000 |
| Street Cleaning Residues | 900 |
| Hazardous Waste | 100 |
| **TOTAL** | **90,000** |

Licensed waste disposal and recovery activities are carried out in accordance with the 3rd and 4th Schedule of the Waste Management Act as per Part 1 of Waste Licence WL0077-02.

# 3 QUANTITY AND COMPOSITION OF WASTE

## 3.1 WASTE QUANTITIES RECEIVED AT LANDFILL FOR DISPOSAL

Table 3.1 below shows the quantity and composition of waste landfilled in Corranure Landfill in 2009. A monthly breakdown for waste landfilled is included in Appendix A.

*Table 3.1: Quantity and Composition of Waste Landfilled in 2009*

| Waste Acceptance | EWC Code | Disposal (tonnes) |
|---|---|---|
| Hse/General | 20 03 01 | 490.36 |
| Municipal waste | 20 03 01 | 71771.74 |
| Paint Filters | 08 01 18 | 2.02 |
| Paint Sludge | 08 01 14 | 164.68 |
| Sweepers | 20 03 03 | 25 |
| Toner | 08 03 18 | 71.22 |
| Council Clean up | 20 03 03 | 24.06 |
| Non-Recyclable waste | 20 03 99 | 1771.34 |
| Insulation Material | 17 06 07 | 512.78 |
| C&D Residue | 19 12 12 | 13709.68 |
| Dry Recycling Residue | 19 12 12 | 383 |
| Human & Animal Health Care | 18 01 04 | 4.18 |
| Bulky Waste | 20 03 07 | 2.9 |
| **Total** | | **88932.96** |

Table 3.2 provides figures for the total tonnage of waste accepted for disposal at Corranure Landfill in previous years.

*Table 3.2: Quantity of Waste Landfilled pre-2009*

| Period | Quantity (Tonnes) |
|---|---|
| 11th March 2002 – 31st June 2002 | 4,469.25 |
| 1st July 2002 – 31st June 2003 | 36,206.21 |
| 1st July 2003 – 31st December 2003 | 19,911.21 |
| 1st January 2004 – 31st December 2004 | 53,813.44 |
| 1st January 2005 – 31st December 2005 | 45,889.47 |
| 1st January 2006 – 31st December 2006 | 85,869.00 |
| 1st January 2007 - 31st December 2007 | 83,262.91 |
| 1st January 2008 - 31st December 2008 | 87,238.32 |
| 1st January 2009 - 31st December 2009 | 88,932.96 |

## 3.2 WASTE QUANTITIES RECEIVED AT CIVIC AMENITY FACILITY

The quantities of recyclables accepted at the Civic Amenity Facility from 1st January 2009 to 31st December 2009 are shown in Table 3.3. The majority of Construction and Demolition (C&D) waste accepted at the Civic Amenity Facility was used on site for internal roads, landfill cover and landscaping. Quantities of these materials are shown in Table 3.4.

*Table 3.3: Quantity and Composition of Waste Received for Recovery in the Civic Amenity Site in 2009*

| Waste Type | EWC Code | Total (Tonnes) |
|---|---|---|
| AL Packaging | **15 01 04** | 7.56 |
| Green Waste | **20 02 01** | 321.9 |
| Metals | **20 01 40** | 134.42 |
| Mixed Glass | **15 01 07** | 158.14 |
| Newspapers | **20 01 01** | 263.74 |
| Plastic Packaging | **15 01 02** | 55.46 |
| Steel Packaging | **15 01 04** | 21.78 |
| Tetra Pak | **15 01 05** | 12.04 |
| Batteries | **16 06 01** | 11.76 |
| Wood | **15 01 03** | 237.38 |
| CA C&D waste | **17 01 07** | 172.02 |
| Cardboard | **15 01 01** | 215.92 |
| Textiles | **20 01 10** | 48.2 |
| WEEE | **20 01 36 /20 01 35** | 182.46 |
| Fluorescent tubes | **20 01 21** | 0.86 |
| Waste Oil/filters | **08 03 18 /16 01 07** | 5.28 |
| Hard Plastic | **20 01 39** | 0.5 |
| Bulbs | **20 01 21** | 0.06 |
| Municipal Waste | **20 03 01** | 42.94 |
| Gypsum | **17 08 02** | 36.7 |
| **Total** | | **1929.12** |

*Table 3.4: C&D Waste Used on Site for Internal Roads, Landfill Cover and Landscaping*

| Waste Acceptance | EWC Code | Recovery (tonnes) |
|---|---|---|
| Rubble/Cover Material | 17 01 07 | 11722 |
| Fine Material | 19 12 12 | 11008.48 |
| Soil & Stones | 17 05 04 | 1826.36 |
| Woodchip cover | 20 01 38 | 1229.12 |
| Ash | 10 01 01 | 1238.98 |
| CA C&D Waste | 17 01 07 | 163.84 |
| **Total** | | **27188.78** |

## 3.3 REMAINING CELL 3 CAPACITY

Filling of waste in Cell 2 commenced in October 2005. A total of 14,990 tonnes of waste was landfilled between October 2005 and December 2005. From 1st January 2006 to 31st December 2006, 85,869 tonnes of waste were landfilled in Cell 2. Filling continued in Cell 2 in 2007 with a total of 30,846 tonnes landfilled during the period January – June 2007. By this time Cell 2 had reached full capacity and the cell capping works commenced post filling.

Filling in Cell 3 commenced in June 2007. Cell 3 has an overall capacity of 239,000 tonnes approximately. During the period June - December 2007, 50,416 tonnes of waste were placed in Cell 3. During January to December 2008, 87,238 tonnes was placed in Cell 3. During January to December 2009, 88,933 tonnes was placed in Cell 3.The remaining capacity in Cell 3 from January 2009 onwards is estimated at approximately 4,800 tonnes.

## 3.4 METHODS OF DEPOSITION OF WASTE

Waste disposal trucks enter the site via the main entrance gate and proceed onto the weighbridge where the trucks are weighed. The truck then proceeds to the active cell. The driver is directed to the operational area of cell where the waste is tipped. Waste is checked at the working face. Any waste not suitable for acceptance is removed for recovery or disposal to an appropriate alternative licensed facility. The truck then leaves the cell and passes through an automated wheel wash which removes debris from wheels and undercarriage of truck. The truck then proceeds to the weighbridge. The truck is again weighed and the duplicate weight docket produced is signed by both the truck driver and weighbridge operator. Oxigen Environmental operate the Precia Molen GeneSYS PC based Weighbridge Management System. Both hardcopies and electronic copies of the following records are maintained for all transactions:

- Time/date of arrival/departure,
- Unique identification number of each load,
- Carrier details,
- Vehicle registration number,
- Waste producer,
- Waste description (EWC Code)
- Quantity of waste disposed, and
- Signed By Driver/Weighbridge Operator.

Condition 5.4.1 of Waste Licence WL0077-02 allows for a maximum working face of 25 metres in width and 2.5 metres in height with a slope no greater than 1:3. Once tipped the waste is pushed out over the working face by a steel-wheeled compactor. Large hollow objects in the waste tipped are crushed to avoid the creation of void spaces. At the end of each working day the face is covered with inert material.

When landfilling operations move to another part of cell the previous area is covered by temporary capping consisting of 0.5 metres of soil. Waste acceptance procedures are in place at Corranure Landfill, which detail the procedures used when dealing with waste which has been accepted or rejected from the site.

# 4 ENVIRONMENTAL MONITORING

The required monitoring programme at Corranure Landfill is specified in Schedule D of Waste Licence 77-02. The Emission Limit Values (ELV) are specified in Schedule C of the Waste Licence. The environmental monitoring period for this AER is 1st January 2009 to 31st December 2009.

The following sections summarise the environmental monitoring undertaken at Corranure Landfill during the reporting period. During 2009 all environmental monitoring was carried out by BHP Laboratories, New Road, Thomondgate, Limerick.

## 4.1 GROUNDWATER

The locations of the various groundwater monitoring locations are shown in Appendix B Map of Monitoring Locations No.102. The results of the chemical and microbiological analysis conducted on the groundwaters are presented in detail in the quarterly and annual monitoring reports which were submitted to the Agency during the reporting period.

GW01 is located at the south-eastern corner of the remediated landfill and at the entrance to the facility. The groundwater was coloured and turbid on all sampling occasions. Levels of alkalinity, sulphate, as well as the majority of other metals tested were similar in concentration to 2008 values. Iron levels increased slightly to 0.444mg/l compared with the previous year, while Boron decreased to 0.061mg/l. Levels of chloride were recorded between 12.1mg/l and 33.4mg/l during Quarterly monitoring which were similar to 2008. During annual sampling, no Faecal Coliforms, and 8 no. T. Coliforms were detected in this borehole which is further improvement to previous sampling in 2008 (22 no. Total Coliforms detected in 2008).

GW04 is located on the north western corner of the site. This location exhibited some evidence of microbiological contamination with 82 no. Total Coliforms and no Faecal Coliforms recorded during annual sampling. The Chloride level for Quarter 3 was at 50.2 mg/l which was above the recommended standard of 30mg/l with the remaining Quarters (16.6 mg/l, 14.7mg/l and 16.5 mg/l respectively). Groundwater samples were turbid and coloured on all sampling occasions.

GW05 is located to the north of the site. This location exhibited some evidence of microbiological contamination with 435 no. Total Coliforms with 9 no. Faecal Coliforms recorded during annual sampling. Chloride levels were all within the recommended limits (9.5 mg/l to 37.7mg/l). Groundwater samples were clear during all quarterly samples.

Groundwater levels remained fairly constant throughout the year, with depths varying in wells from 2.1m in GW01 to GW05 recorded as being consistently full for the year.

In summary, all locations indicated the presence of coliform bacteria and were free from synthetic organic and heavy metal concentrations. Chloride levels were in all locations were found to be typical of natural levels in rivers and other fresh waters

Access was obtained to the private well locations PW02, PW07, PW05BT, PW8, PW9, PW10, PW11, PW13, PW15, and PW16. Quarterly monitoring involved sampling for levels of Dissolved

Oxygen and Chloride, as well as visual and olfactory inspection. Annual sampling of various other parameters was carried out on the 21st April '09.

During the year all waters were clear and odourless except for well locations PW7 and PW02, which were were turbid in colour in Quarter 4. Levels of Chloride varied throughout the year with elevated concentrations at PW07 in quarter 1 and 4 (48.2mg/l and 150mg/l), PW10 quarter 1 (66mg/l), PW05BT (64.3mg/l, 45.2mg/l and 47.5mg/l) and at PW11 in quarter 3 (50.2mg/l).All locations were free from microbial contaminations except PW02, PW05BT, PW07, PW09 and PW13, which exhibited low levels of coliform bacteria.

With the exception of elevated levels of coliforms at some of the locations and some locally high concentrations in Chloride, the quality of the water met the criteria as outlined in the European Communities (Drinking Water) (No. 2) Regulations, 2007.

## 4.2 LEACHATE

The annual samples of leachate were taken from the leachate storage tank in April and analysed for a suite of parameters (as set out in the Waste Licence for Corranure). Overall the values for the various parameters are at the lower end of the expected range of values for leachate as per the EPA Landfill Site Design Manual, 2000 (see Table 4.1).

*Table 4.1: Comparison of Typical Leachate Composition Values and Values at Corranure Landfill*

| Parameter | Unit | Overall Range of Values for Young Landfill | Overall Range of Values for Old Landfill | Values at Corranure Landfill |
|---|---|---|---|---|
| pH | - | 5.12 – 7.8 | 6.8 – 8.2 | 7.32 |
| Conductivity | µS/cm | 5,800 – 52,000 | 5,990 – 19,300 | 4410 |
| COD | mg/l | 2,740 – 152,000 | 622 – 8,000 | 1700 |
| $BOD_5$ | mg/l | 2,000 – 68,000 | 97 – 1,770 | 806 |
| Chloride | mg/l | 659 – 4,670 | 570 – 4,710 | 208.6 |
| Magnesium | mg/l | 25 – 820 | 40 – 1,580 | 99.4 |
| Potassium | mg/l | 350 – 3,100 | 100 – 1,580 | 186.7 |
| Chromium | mg/l | 0.03 – 0.3 | <0.03 – 0.56 | 0.025 |
| Manganese | mg/l | 1.40 – 164.0 | 0.04 – 3.59 | 1.107 |
| Iron | mg/l | 48.3 – 2,300 | 1.6 – 160 | 7.332 |
| Copper | mg/l | 0.02 – 1.1 | <0.02 – 0.62 | 0.231 |
| Zinc | mg/l | 0.09 – 140.0 | 0.03 – 6.7 | 0.098 |
| Cadmium | mg/l | <0.01 – 0.1 | <0.01 – 0.08 | 0.066 |
| Mercury | mg/l | <0.0001 – 0.0015 | <0.0001 – 0.0008 | <0.0005 |
| Lead | mg/l | <0.04 – 0.65 | <0.04 – 1.9 | 0.003 |
| Ammoniacal Nitrogen $NH_3$-N | mg/l | 194 – 3,610 | 283 – 2,040 | 56 |
| Boron | mg/l | - | - | 1.875 |
| Calcium | mg/l | 270 – 6,240 | 23 -501 | 298.7 |
| Sodium | mg/l | 474 – 2,400 | 474 – 3,650 | 354.7 |
| Cyanide | mg/l | - | - | 0.02 |
| Fluoride | mg/l | - | - | 3 |
| List I/II Organics | mg/l | - | - | 0.111 |
| Sulphate | mg/l | <5 – 1,560 | <5 - 322 | 979 |
| Total Phosphorus | mg/l | - | | 32 |
| Total Oxidised Nitrogen | mg/l | - | | 0.42 |

Source: EPA Site Design Manual, 2000

Leachate wells L/G4, L/G11, L/G13, L/G20, and L/G24 are on the Scada System. This system digitally records the leachate levels and the levels controlled by automatic pumping system.

## 4.3 SURFACE WATER

The Surface Water Monitoring Maps No.100 Corranure Stream and No. 101 Lismagratty Stream in Appendix B show the locations of the 3 no. surface water sampling locations (SW3, SW4 and SW5) and 2 no. surface water discharge monitoring points, SW1 and SW2. SW1, SW4 and SW5 are located on the Corranure Stream and SW2 and SW3 on the Lismagratty Stream. These samples were analysed in each of the four quarters of 2009. SW1 and SW2 monitoring are completed monthly.

Annual monitoring was completed in April '09 to include additional parameters to the Quarterly monitoring. In addition, a biological assessment of 10 no. stream locations (A1 – A5 and B1 – B5) was carried out by Ecofact in June 2009.
The following interpretation summarises the overall surface water quality as per the Quarterly monitoring reports. More detailed interpretations can be found within the monthly and annual monitoring reports which were submitted to the Agency.

### 4.3.1 Physico / Chemical Monitoring

The results of analysis carried out were then compared with the following:

- The EC Quality of Surface Water intended for Abstraction of Drinking Water Regulations, 1989,
- The EPA's Environmental Quality Objectives and Environmental Quality Standards discussion document (1997),
- The Fresh Water (FW) Fish Directive 78/659/EEC, and
- European Communities (Drinking Water) (No. 2) Regulations, 2007.

**pH levels** were all within the limits recommended (between 6 and 9 in the Freshwater Fish Directive 78/659/EEC). There was little overall variation between the results with a maximum of 7.97 at SW3 in the 2nd Quarter and a minimum of 7.05 at SW1 in the 4th Quarter.

One exceedence of the recommended limit of **BOD** (5 mg/l as per the 1989 Surface Water Regulations) was recorded in the 4th quarter at SW5 on the Corranure stream (7mg/l).

**Ammonia** concentrations for Quarterly monitoring, exceeded the recommended standard (0.2 mg/l) in Quarter 2 at SW1 (0.49), SW2 (0.39) and SW3 (0.26), and at SW3 in Quarter 4 (0.27). All other sampling results were below the recommended standard (0.2 mg/l).

Levels of **COD** in excess of the recommended limit (40 mg/l as per the 1989 Surface Water Regulations) occurred at one sample location SW2 on Quarter 3 (42 mg/l). Levels remained under the relevant standard on all sampling occasions at the reminder of the sampling locations.

Elevated levels of **Suspended Solids** were recorded at SW2 and SW5 in the 2nd Quarter and SW5 in the 3rd Quarter. The highest recorded level (83 mg/l) was noted at SW5 in the 3rd

Quarter. These were above the Licence limits of 35mg/l. The reminder of the sampling results was well with the licence limits.
Weekly samples of suspended solids were also taken at SW2 throughout the year. Exceedences from these weekly samples were found intermediately throughout the year, usually following heavy rainfall.

**Chloride:** The 1989 Regulations set a limit of 250 mg/l for chloride in surface water; all monitoring results were within this limit value on both the Corranure and Lismagratty Streams.

All quarterly results for **Electrical Conductivity** were within the required limit of 1,000 µS/cm. Values ranged from a low of 284 µS/cm, in Quarter 2 at SW2, to a high of 901 µS/cm, in Quarter 4 at SW5.

All of the sampling points were within the recommended standards for **Dissolved Oxygen** throughout the reporting period of the A3 standard for surface water of >30%. **Temperature** was only monitored during annual sampling and was under the recommended limit of 25˚C at all monitoring locations.

An olfactory inspection of the water quality showed there was no odour evident at any time. Water quality at SW1, SW2 was observed to be turbid/straw coloured during the sampling. Water quality at SW3 and SW5 were recorded as clear/straw coloured, and SW4 was found to be clear during sampling periods.

Annual sampling of a broad range of other parameters, carried out in April 2009, showed no exceeded limits for **Calcium, Cadmium, Chromium, Copper, Lead, Manganese, Sodium, Zinc and Mercury**.

In general the results indicate a significant improvement in the water quality from the previous year, with improvement evident in BOD levels, Ammonia readings and Suspended Solid levels.

Summary of the monthly BOD levels, Ammonia, Total P, pH, and Suspended Solid levels for SW1 and SW2 are illustrated in the figures 4.2 and 4.3

*Figure 4.2 Monthly Summary of key parameters at SW1*

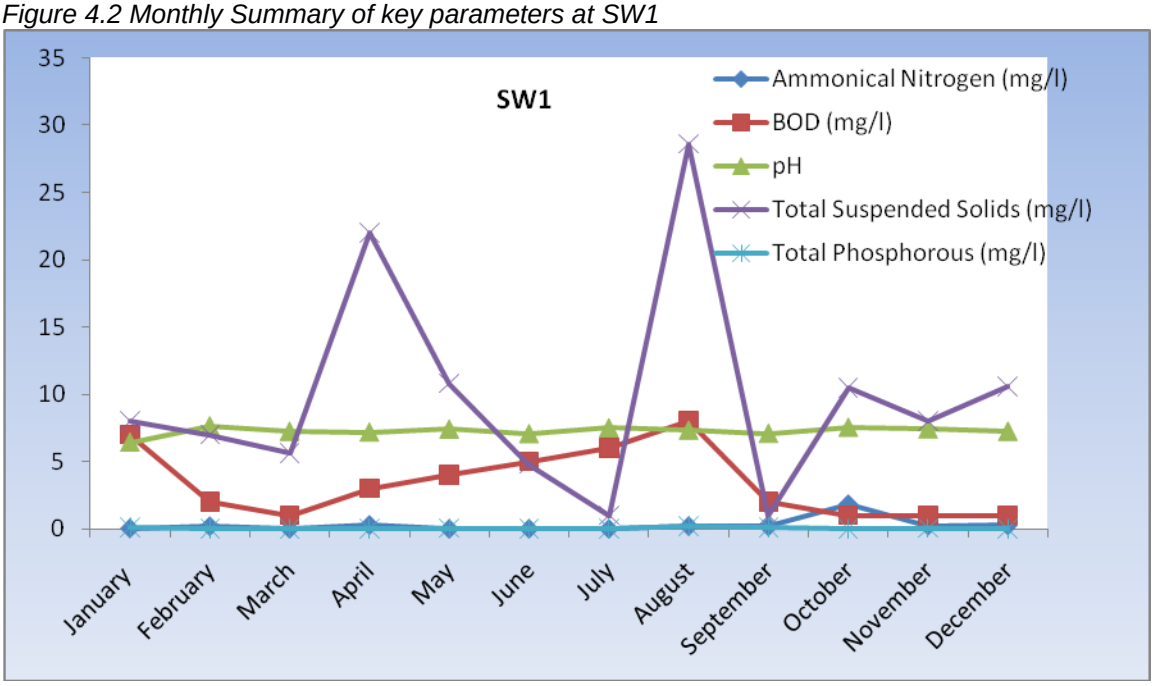
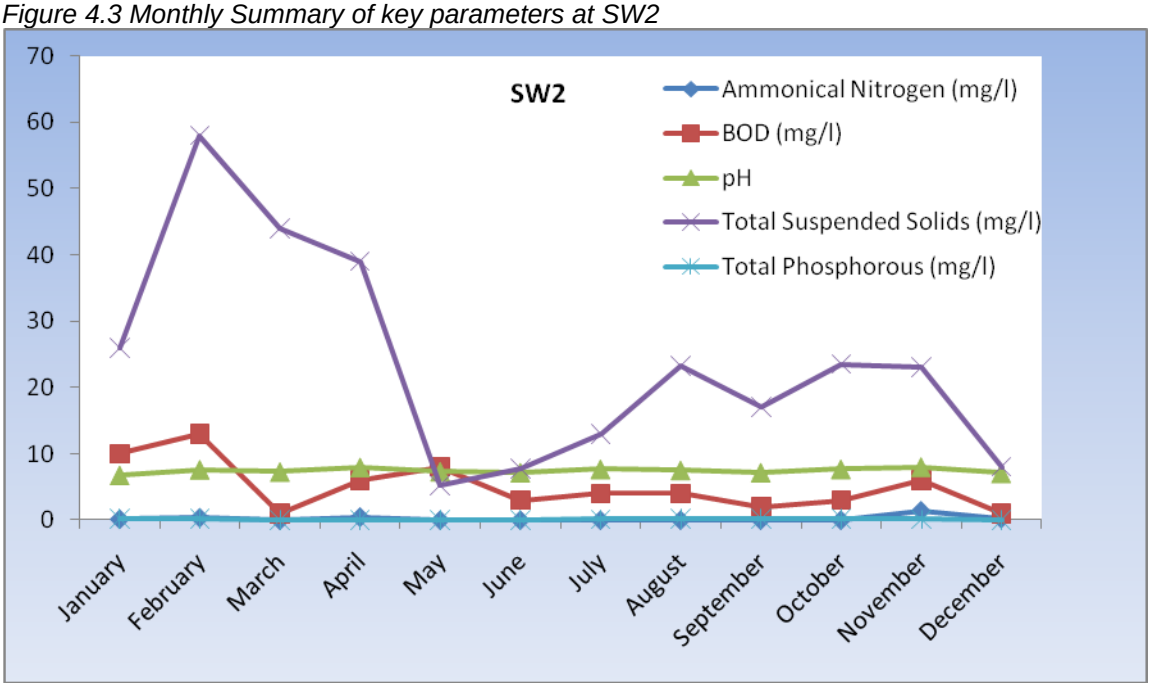



*Figure 4.3 Monthly Summary of key parameters at SW2*




### 4.3.2 Biological Monitoring

In June 2009 a detailed biological assessment was undertaken on watercourses in the vicinity of Corranure Landfill. Macroinvertebrate surveys were carried out at 10 no. sites; 5 no. (A1 – A5) on the Corranure Stream and 5 no. (B1 – B5) on the Lismagratty Stream. Drawing No. 102 Monitoring Points shows the locations of these sites (included in Appendix B).

The monitoring site A1 could not sampled as these locations were dry. Monitoring location B1 had very low flows at the time of sampling, and as a result the macroinvertebrate community at this site was not considered to truly reflect water quality in this part of the stream. Sampling was last undertaken in 2006 at both these locations, Site A1 had a Q2 rating and a Q3 rating for site B1. In comparison with the biological assessment carried out in 2008 there has been no change on the Lismagratty stream with a Q3 rating at monitoring sites B2, B3, B4, B5. These remain a Class 3 rating (Moderately polluted).

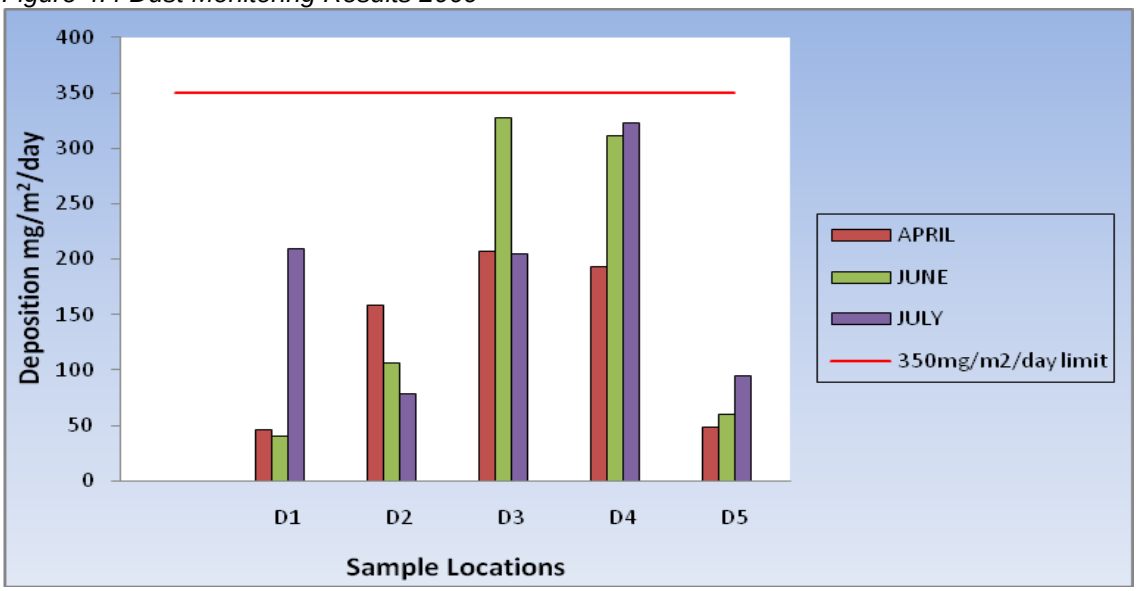
On the Corranure stream there was an improvement at monitoring site A5 (Q2 rating in 2008) to rating of Q2-3 in 2009. Site A2, A3 and A4 remained consistent to the previous year rating of Q3.

## 4.4 DUST MONITORING

Dust monitoring was carried out at the landfill three times during the period June-July and once in April at the locations shown in Monitoring Points No. 102. Monitoring stations are labelled D1-D5. (An additional monitoring period was completed, with the licence requiring three times periods per year). Figure 4.4 provides a summary of dust monitoring results for 2008. The results were as follows:

- D1 is located at Cell 0 towards the Southwest corner of the site. Levels of deposition were between 41 mg/$m^2$/day in June to a high of 209 mg/$m^2$/day in July.
- D2 is located close to the active part of the landfill. All results for April, June and July were within the licence limits of 350 mg/$m^2$/day.
- D3 is located adjacent to the site access road and wheel wash. The highest dust levels experienced at this location was 323 mg/$m^2$/day and within the stated licence limits.
- D4 is located close to the entrance of the landfill and all results were within the licence limits.
- D5 is located towards the back of the site, beyond Cell 4 construction and experienced no dust results above the recommended licence limits.

*Figure 4.4 Dust Monitoring Results 2009*




## 4.5 LANDFILL GAS

### 4.5.1 Landfill Gas

Corranure Landfill currently has two 1500m$^3$/hr Flares extracting gas from cells 0 to 3. Concentrations of methane ($CH_4$), carbon dioxide ($CO_2$), oxygen ($O_2$), temperature and flow are continuously monitored through the SCADA system. The average monthly concentrations for flare 1 and flare 2 are shown in figures 4.5 and 4.6

*Figure 4.5: Average monthly concentrations for Flare 1*

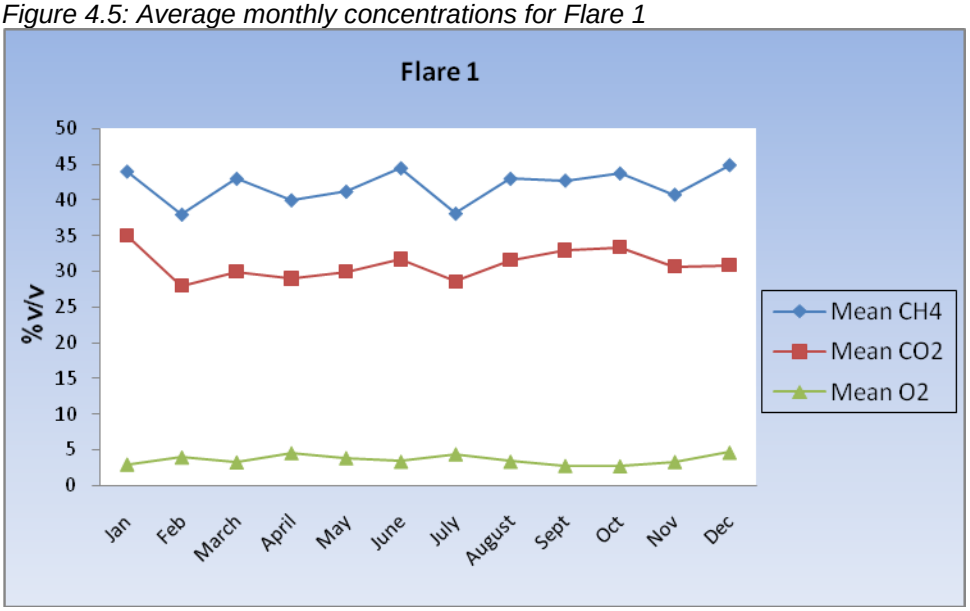
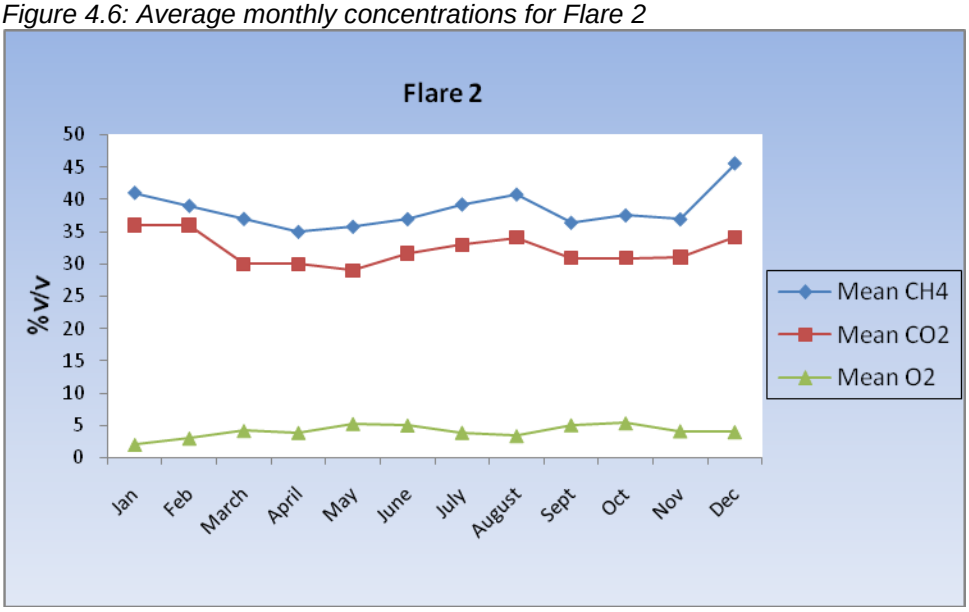
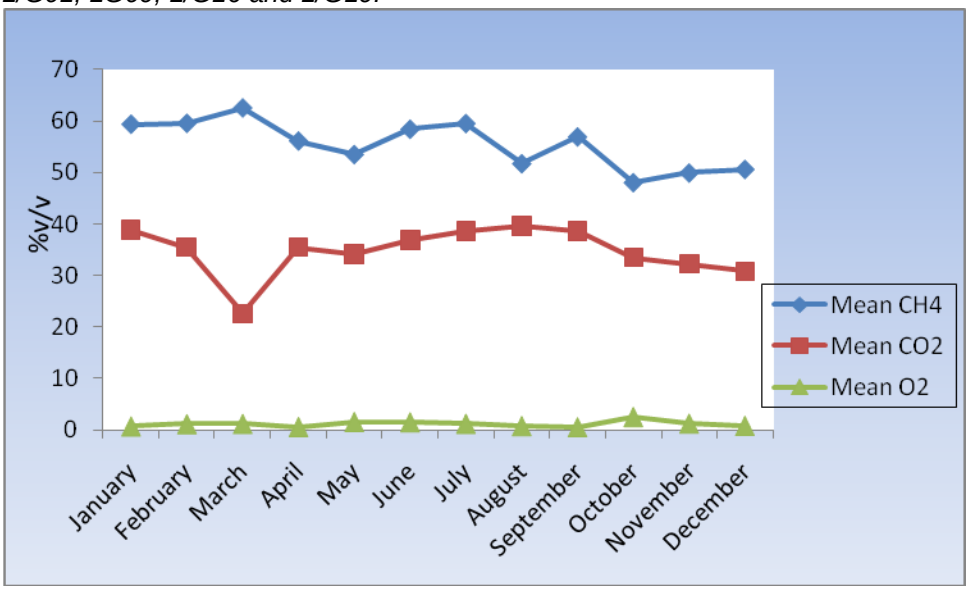


*Figure 4.6: Average monthly concentrations for Flare 2*




Landfill Gas monitoring was undertaken on a monthly basis at 4 no. gas extraction boreholes located within the waste body as shown on Drawing No. 102 in Appendix B. These locations are L/G01, L/G09, L/G16, and L/G19. Analyses were performed on each sample for methane ($CH_4$), carbon dioxide ($CO_2$), oxygen ($O_2$), temperature and pressure.

*Figure 4.7: Summary of the mean concentrations of main components of landfill gas from boreholes L/G01, LG09, L/G16 and L/G19.*



Appendix B shows the locations of perimeter boreholes used to monitor off-site gas migration. The emission limit values for off-site gas migration in the Waste Licence are 1%v/v for methane and 1.5%v/v for carbon dioxide. The monitoring locations include G01, G02, G05 and G06 Methane levels were exceeded in G01 in July and August. All other monitoring results during the reporting period were within the 1%v/v limit at all locations. Carbon dioxide levels were exceeded during the reporting period on a number of occasions, at locations G01, G05 and G06 with values of up to 9.2%v/v recorded.

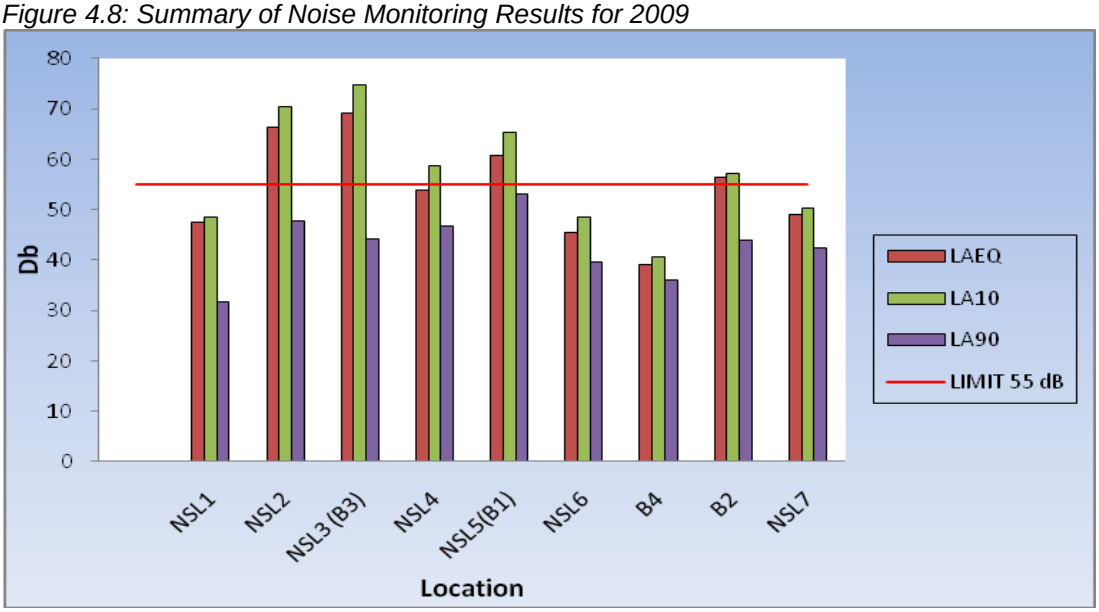
## 4.6 NOISE

Noise monitoring was carried out at the landfill on 16th of December 2009. This monitoring consisted of 30 minute daytime levels measured at 9 no. noise monitoring points: NSL1, NSL2, NSL3 (B3), NSL4, NSL5 (B1), NSL6, NSL7, B4 and B2. The locations of these monitoring points are included in Appendix B.

The daytime limit for noise sensitive locations near Corranure Landfill, Co. Cavan is $L_{Aeq}$ < 55 dB(A). $L_{Aeq}$ noise levels at locations NSL2, NSL3(B3), NSL5(B1) and B2 exceeded the daytime limit of 55 dB(A). Noise monitoring points at both NSL2 and NSL3 are located adjacent to the R188 which has significant volumes of traffic. As such, the $L_{A90}$ values at these locations are more representative of the noise emanating from the landfill. The $L_{A90}$ values recorded at both of these locations were below the daytime noise limit of 55 dB(A). Figure 4.8 shows a summary of the noise monitoring results.

Monitoring Locations NSL4 and B2 are located inside the boundary of the landfill and noise emissions are from general operations on site which include internal traffic and machinery operating at the working face. NSL5 (B1) is located in the CA site and representative of internal traffic movements and site operations.

*Figure 4.8: Summary of Noise Monitoring Results for 2009*




Frequency Analysis (1/3 Octave band analysis) was also completed and reported in the following table.

*Table 4.9: Frequency Analysis (1/3 Octave band analysis) for 2009*

| Octave Band | NSL1 | NSL2 | NSL3 (B3) | NSL4 | NSL5 (B1) | NSL6 | B4 | B2 | NSL7 |
|---|---|---|---|---|---|---|---|---|---|
| **31.5** | 42.3 | 71.4 | 70.8 | 61.9 | 60.1 | 70.7 | 50 | 61.9 | 53.2 |
| **63** | 38.2 | 75 | 69 | 62.9 | 59.1 | 74.8 | 44.6 | 63.7 | 60 |
| **125** | 19.6 | 69.6 | 67.3 | 69.4 | 60.8 | 78 | 38.6 | 75 | 38.3 |
| **250** | 42.8 | 66.1 | 64.2 | 67.6 | 59.7 | 72.6 | 40.6 | 61.9 | 31.5 |
| **500** | 35.1 | 50.3 | 52.7 | 66.4 | 49.8 | 64.9 | 39.7 | 50.7 | 30.5 |
| **1K** | 37.2 | 44.6 | 46.9 | 53.3 | 52.4 | 60.3 | 40.4 | 45.8 | 32.8 |
| **2K** | 32.5 | 41.1 | 43.7 | 54.3 | 54.1 | 49.9 | 45.9 | 37 | 27.7 |
| **4K** | 26.2 | 38.1 | 42.6 | 42.8 | 45.8 | 48.4 | 46 | 38.3 | 24 |
| **8K** | 10.6 | 28.8 | 33.7 | 40.4 | 26.2 | 34.6 | 33.1 | 35.4 | 11.4 |

## 4.7 METEOROLOGICAL DATA

A “Davis Weather Station II” is used to record the following meteorological data at the Corranure Landfill.

- Temperature,
- Precipitation, and
- Wind speed and direction.

The following additional data is recorded at Clones Weather Station as per Schedule D of the Waste licence:

- Humidity,
- Atmospheric Pressure, and
- Evapotranspiration.

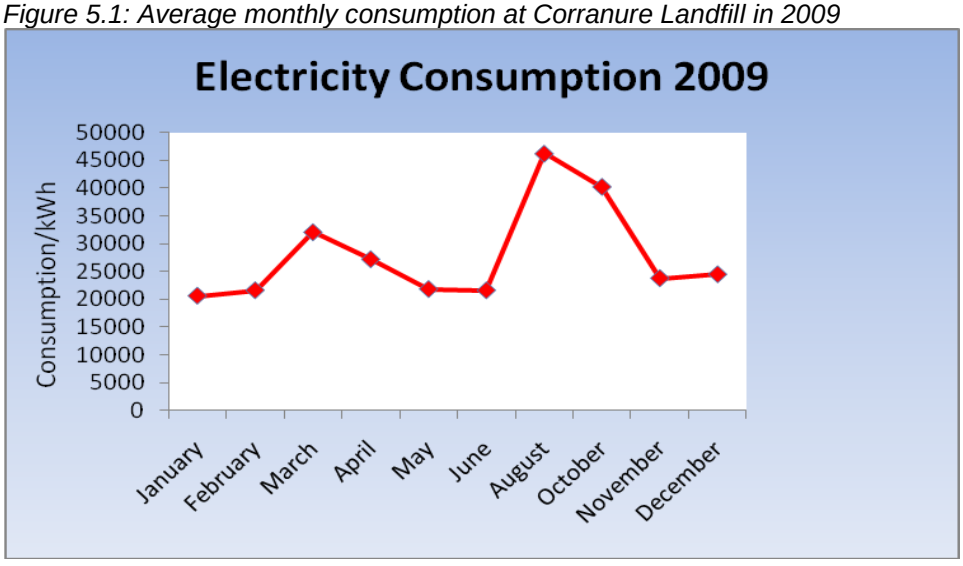
An annual summary of all meteorological data for 2009 is contained in Appendix C; this includes the monthly reports showing daily weather conditions.

# 5 MASS BALANCE OF SPECIFIED SUBSTANCES

## 5.1 RESOURCE AND ENERGY CONSUMPTION SUMMARY

A total of 279,315 kWh of electricity were used at the facility throughout the year.

*Figure 5.1: Average monthly consumption at Corranure Landfill in 2009*



Fuel usage for the year amounted to 179,317 litres.

## 5.2 EMISSIONS TO GROUNDWATER

There are currently no direct emissions to groundwater. The old landfill (Cell 0) is underlain by stiff clays and was designed as a dilute and disperse landfill. Cells 1 to 3 are fully lined cells with separate leachate and surface water management systems. Monitoring of groundwater and leachate showed the levels of List I and List II compounds to be within the allowable limits.

## 5.3 LEACHATE VOLUME

A glass-lined steel leachate tank was installed at the facility in 2006 with a capacity of 1,531 $m^3$ and replacing the leachate lagoon as the primary leachate storage unit at the facility. Leachate is pumped via a 110mm rising main from the leachate storage tank at the facility to the current discharge point at the entrance to the Rocklands Estate and from here it flows to the Cavan WWTP.

In 2009 a total of 49,755.28 $m^3$ of leachate was produced from Corranure Landfill. A total of 48,288.43 $m^3$ was pumped directly from the landfill to Cavan WWTP. An additional 1466.85$m^3$ of leachate was tankered by a contractor during the months of January and August 2009.

## 5.4 GAS VOLUMES

The rate of gas generation at a landfill site varies throughout the life of a landfill and is dependent on a number of factors including:

- The physical dimensions of the landfill site
- The types of waste deposited and the associated input rate
- The age of the waste
- Moisture content, pH, temperature and density of waste deposited and
- The application of cover, compaction and capping

Under optimum conditions one tonne of degradable waste can theoretically produce 400-500$m^3$ of landfill gas (including moisture content). In practical terms the rate at which landfill gas may be collected for utilisation purpose may be much lower.

Currently at Corranure Landfill two 1500m$^3$/hr enclosed landfill gas flares are operating at the site. Flare No.1 is treating ~800m$^3$/hr of bulk landfill gas which is generated from the old landfill (Cell 0), Cell 1 and Cell 2. The 2$^{nd}$ Flare (Flare No.2) is treating ~1000m$^3$/hr from Cell 3. It is estimated that the volume of gas treated during the year is ~13,207,890 m$^3$/a

# 6 SITE DEVELOPMENT WORKS

## 6.1 DEVELOPMENT WORKS DURING THE REPORTING PERIOD

### 6.1.1 Landfill Gas Management System

- Placement of temporary capping (clay and Geo Hess lining) for Cell 3B,
- Installation of 2 no. new gas abstraction wells in Cell 3A,
- Installation of 9 horizontals pipes and 17 no. new gas abstraction wells in Cell 3B,
- Provision of condensate management infrastructure including isolation control valves, 1 no. knock-out pot and driplegs on the main gas line.
- Repair and replace works to gas abstraction wells and pipework in the older part of the landfill,
- Maintenance and upgrade works to the existing enclosed flares (Flare No.1) and (Flare No. 2) by Biogas,
- Training landfill management staff on the control and operation of landfill gas systems,
- Regular monitoring and dewatering of the gas collection system,
- Continual site attendance by specialist firms (Biogas, Hibernia Plas-fuse services, EMR)
- Sealing /reworking of clay around gas and leachate well in Cell 0, Cell 1 and Cell 2.

### 6.1.2 Odour Control

- Daily Odour Patrol of site and surrounds by personnel.
- FID gas analyser purchased by Oxigen for daily odour detection.
- Establishment of an odour management plan to reduce odour emissions onsite.

- Commissioning of independent odour monitoring reports by Odour Monitoring Ireland.
- Modifications to pipework feeding into the leachate tank to prevent leachate splash.

### 6.1.3 Leachate Management System

- Installation and maintenance of new leachate extraction pumps,
- Installation of additional pump at leachate storage tank,
- Installation of dual function wellheads to facilitate gas and leachate extraction from boreholes,
- Continuous monitoring of leachate levels

### 6.1.4 Active Cell 3

- Installation of sacrificial horizontal gas extraction pipework,
- Temporarily capping of Cell 3B,
- Installation of 19 no.gas extraction wells,
- Development of detailed Environmental Management Plan.

### 6.1.5 Infrastructure Works

- Construction and maintenance of access route to Cell 3B,
- Upgrade of site access road from weighbridge to wheel wash and maintenance of site roads and security fencing
- Renovated old farm shed for use as aviary.
- Surface water attenuation to Lismagratty stream.

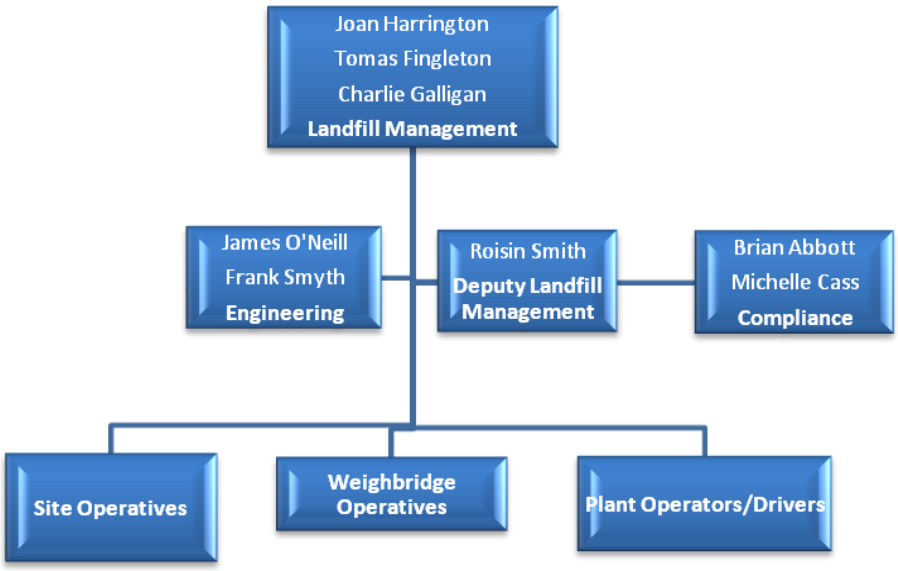
## 6.2 PROPOSED DEVELOPMENT WORKS IN 2010

- Construction of Cell 4.
- Construction of final cap on Cell 3 once final settlement has been established.
- Continued upgrading and modification works to gas collection pipe work.
- Continued remedial and resealing works to the temporary capping system and wells in Cell 3A and Cell 3B.

- Continual training for landfill management staff
- Continued improvements in landfill management structure.

# 7 STAFFING AT CORRANURE LANDFILL

*Figure 7.1 Site Management Structure at Corranure Landfill during 2009*




# 8 ENVIRONMENTAL MANAGEMENT

## 8.1 ENVIRONMENTAL MANAGEMENT SYSTEM

Corranure Landfill attained ISO: 14001 certification in September 2009. A new Environmental Management System (EMS) was written which covered all environmental and operational aspects of the facility. The EMS was designed so as to achieve and demonstrate sound environmental performance by controlling the impacts of the facility's activities, products and services on the environment, in a manner which is consistent with the relevant environmental policies and objectives. A copy of the facility's EMS is kept on file.

## 8.2 REVIEW OF OBJECTIVES AND TARGETS FOR 2009

A number of objectives and targets were outlined for 2009. Table 8.1 shows the progress made on these objectives.

*Table 8.1: Status of Objectives and Targets for 2009*

| Objective | Target Date | Status |
|---|---|---|
| Improvements to the degassing system.<br>• Continuing the gas monitoring in short intervals (daily, until conditions in the gas flow and quality are reached)<br>• A flare maintenance programme to be operational.<br>• Commence degassing in the open cell (Cell 3B) as soon as possible<br>• Compiling an as build of the degassing system (P1 scheme)<br>• Evaluation of the gas flow captured in relation to the theoretical gas production. | • December '09 | • Ongoing<br>• Ongoing<br>• Completed<br>• Completed<br>• Ongoing |
| Capping of Cell 3A<br>• Capping work to cell 3A will be carefully monitored<br>• Surveys conducted of cell 3A for landfill settlement | • Continuous | • Ongoing<br>• Completed |
| Complete construction of Cell 4<br>• Completion of dig and preparation of cell.<br>• Completion of CQA Report.<br>• Monitoring of SW2 suspended solids | • December '09 | • To be completed by August '10.<br>• Commenced<br>• Ongoing |
| To improve facility infrastructure<br>• To construct a tarcadem roadway from the CA site to the wheelwash | • July '09 | • Completed |
| Gas Usage Possibilities<br>• Complete feasibility study on the utilisation of landfill gas as an energy source<br>• Potential for power generation | | • Completed<br>• Awaiting grid connection |
| Staff Training<br>• Training to be provided to all Oxigen staff | • Continuous | • Ongoing |
| Maintenance Programmes | • As they arise | • Ongoing |
| Stock Control<br>• Establish and maintain a stock control list | • Continuous | • Ongoing |
| Interaction with Public<br>• Programme of interaction with the public to include meetings and letters | • Continuous | • Ongoing |
| Brown Bin Roll-out<br>• Pre-treatment of waste prior to acceptance | • November '09 | • Due to commence September '10 |
| Proposal<br>• Permanent capping in cell 3A<br>• Surface management for Cell 4 | • December '09<br>• May '09 | • December '10<br>• Completed |

## 8.3 SCHEDULE OF ENVIRONMENTAL OBJECTIVES AND TARGETS FOR 2010

*Table 8.2: Schedule of Environmental Objectives and Targets for 2010*

| Objective | Target | Completion Date |
|---|---|---|
| Gas Management | 1. To integrate a new gas management plan. This is to include<br>• The establishment of a new gas management protocol.<br>• A dedicated person who is responsible for managing landfill gas and extraction.<br>• A monitoring schedule which will include gas monitoring and gas field balancing.<br>• Improvements in control measures and collections systems.<br>2. Adhere to the flare maintenance programme.<br>3. Commence degassing in the open cell (Cell 4) as soon as possible with horizontal degassing pipes and vertical pin wells connected to the extraction system. | Completed<br>Completed<br>Ongoing<br>Ongoing<br>Ongoing<br>Dependent on rate of waste acceptance |
| Capping Cell 3B | 1. Capping works to Cell 3B will be carefully monitored<br>2. Surveys conducted of Cell 3B for landfill settlement | Ongoing<br>May '09 |
| Construction of Cell 4 | 1. Preparation and construction of the cell.<br>2.Completion of CQA report<br>3. Monitoring of SW 2 for Suspended Solids | August '10<br>August '10<br>Weekly |
| Gas Usage Possibilities | 1. Review establishment of power generation as soon as practical from the site.<br>2. Continuous monitoring and study of gas quality and flows so as to establish the feasibility of gas utilisation as an energy resource. | December '10<br>Ongoing |
| Final cap of Cell 3 | 1. Final cap of Cell 3 to be completed once final settlement of Cell 3B has occurred.<br>2. Regular surveys of Cell 3 settlement to be completed. | |
| Complaints Handling | 1. Establish a complaints handling protocol that includes a 24/7 phone answering service. | January '10 |
| Maintenance Programmes | 1. Wheel wash operation, cleaning<br>2. Weighbridge operation, cleaning, calibration<br>3. Flare-Operation, cleaning<br>4. Maintain stock of all materials including geohess pipes etc in order to carry out immediate repairs in all areas.<br>5. Review CA site infrastructure so as to reduce traffic congestion and improve health and safety of the public within the CA yard.<br>6. Programme of interaction with Local Community to include meetings and letters of information.<br>7. Improve security on the site | Ongoing<br>Ongoing<br>Ongoing<br>Ongoing<br>Review July '10<br>Ongoing<br>August '10 |

## 8.4 REVIEW OF NUISANCE CONTROLS

Environmental nuisances are monitored on site inspection and recorded on either daily or weekly site inspection forms.

### 8.4.1 Vermin

The objective of the vermin control programme at Corranure Landfill is to make 'food' sources inaccessible and living conditions as unattractive as possible. The following landfill procedures are implemented as mitigating measures against vermin and pests:

- The tipping face is kept as small as possible,
- Waste is compacted with a high tonnage steel wheel compactor,
- The tipping area is covered every evening with inert cover material,
- All other areas except the tipping area are covered with 300mm of soil, and
- Contracted rodent control programme by Rentokil, which service the baits every six weeks.

### 8.4.2 Birds

As for vermin and fly control the objective of the bird control programme at Corranure Landfill is to make 'food' sources inaccessible and living conditions as unattractive as possible. The following landfill procedures are implemented as mitigating measures against birds:

- The tipping face is kept as small as possible,
- The waste is compacted with a high tonnage steel wheel compactor, and
- The tipping area is covered every evening with inert cover material

Avian Bird Control (December '08) and Bird Control Ireland (BCI) Ltd (November '09) were appointed to operate a bird control programme at Corranure; this is completed in conjunction with site personnel, bangers, squawkers and helium balloons.

### 8.4.3 Flies

The following landfill procedures are implemented as mitigating measures against flies and insects:

- The tipping face is kept as small as possible,
- Waste is compacted with a high tonnage steel wheel compactor,
- The tipping area is covered every evening with Clay cover material,
- Appropriately covered waste lorries on site, and

- Application of insecticide on tipping area, offices, machinery and residents' houses as appropriate during fly season.

### 8.4.4 Dust

The following landfill procedures are implemented as mitigating measures against dust:

- Prevention of dust nuisance in dry weather by spraying site roads and other areas used by site vehicles with water. During 2009 Corranure landfill acquired their own tanker which is used when necessary to water site roads.
- Prevention of dust nuisance by appropriate maintenance of clay stock pile on site

### 8.4.5 Mud

The following landfill procedures are implemented as mitigating measures against mud:

- All lorries / tractors must use the wheelwash facilities on leaving the tipface.
- An onsite sweeper is used on a daily basis to sweep and maintain the site roadway and civic amenity site.

### 8.4.6 Odours

The following landfill procedures are implemented as mitigating measures against odours:

- The tipping face is kept as small as possible,
- The waste is compacted with a high tonnage steel wheel compactor,
- The tipping area is covered every evening with inert cover material,
- Appropriately covered waste lorries on site, and
- Landfill gas is captured where possible and all flares are permanently monitored.

### 8.4.7 Litter

On a day to day basis litter management on site includes the following:

- The working face in enclosed by 6-metre high litter fencing,
- Litter trapped in the netting is removed as soon as practicable,
- Litter on or in the vicinity of the facility is removed, subject to the agreement of the landowners, immediately and in any event by 10.00am of the next working day after such waste is discovered or reported,

- A Landfill Operative carries out the active management of litter on site,
- All waste deposited at the working face is compacted using a steel wheeled compactor, and
- The working face is covered with suitable material at the end of the day.

# 9 REPORTS ON FINANCIAL PROVISIONS

Oxigen Environmental Ltd. Official Estimates make an annual allowance for financial provision as required under Condition 13.2 of the Waste Licence Ref. WL0077-02.

# 10 STATEMENT OF CHARGES AND COSTS OF LANDFILL

The Landfill fee in January to December 2009 was €120 per tonne including a €20 levy. A full financial statement will be submitted separately to the Agency as the content is considered commercially sensitive.

# 11 REPORTED INCIDENTS AND COMPLAINTS SUMMARY

## 11.1 REPORTED INCIDENTS

There were two hundred and twenty three incidents reported by Oxigen between January and December 2009 in relation to odour. The number of odour incidents relates to the number of odour patrols carried out, (up to four patrols daily) with offsite odour reported as a category 2 incident. There were eleven incidents (category 3) relating to power failure of the flares. On the occasions of these power failures, the onsite generator was able to provide power for the flares until the problem was solved. Seven surface water incidents were reported for suspended solids in SW2, this occurred when sample results were greater than 35mg/l. There was one incident for fire when a vehicle went on fire while onsite. In total, two hundred and forty two incidents are on record for 2009.

## 11.2 COMPLAINTS RECEIVED

A total of 261 complaints were received to Corranure landfill in 2009. All complaints received related to odour at the landfill. Some complainants made reference to other issues including litter, birds and the quality of local streams. Additional complaints were made to the EPA offices and these are recorded and filed at the site.

## 11.3 ACTION TAKEN

Complaints received to Corranure Landfill and incidents were recorded, EPA complaints received are also recorded and kept on file, the complainants were contacted and remedial measures put in place. Corrective action was taken in response to all complaints and incidents. As detailed in Section 6.1 corrective action for odour issues included, daily odour patrol of site and surrounds by personnel, installation of gas extraction infrastructure, application of gas barrier membrane, FID gas surveys for odour detection, establishment of an odour management plan to reduce odour emissions onsite, commissioning of independent odour monitoring reports by Odour Monitoring Ireland, modifications to pipework feeding into the leachate tank, and sealing of individual leachate sumps.

Corrective action in response to suspended solids at SW2 included the installation of surface water attenuation system which resulted in surface water passing through several sediment ponds before discharging at SW2. A stringent monitoring schedule was also established whereby sample results are taken on a weekly basis.

In order to facilitate any possible reported complaints, an out of hour's answering service was established in 2009. This service operates on a 24/7 basis and ensures that all complaints are answered and that each complaint results in corrective action.

# 12 TOPOGRAPHICAL SURVEY

A topographical survey was completed in June, October and December 2009. Copies of these surveys are included in Appendix D.

# 13 SLOPE STABILITY

An assessment was carried on the 17th of October 2009 by Tobins Consulting to establish the condition of the side slopes of the landfill. The side slopes were checked for signs of instability, which include tension cracks, seepages, bulges at the toe, rotation of the pipework and offset of surface drains. The southern slope, eastern slopes of cell 0, 1, 2 and 3A and northern slope of Cell3A showed no sign of instability. Some localised over-steeping was present on the western slope of Cell 2 and parts of Cell 3. The slopes are checked periodically for leachate seepage and/or slope movement.

The conclusion of the survey was that the global or overall stability of the Landfill mound is satisfactory with the Factor of Safety ranging from 2.132 to 2.610. The side slope stability of the individual slopes of the landfill is satisfactory with the Factor of Safety ranging 1.136 to 1.868.

# 14 SITE TRAINING

Details of site management qualifications and training were submitted to the Agency when commencing work at the facility.

Training of site staff throughout 2009 included:

- As stated in the section 8.1 Corranure Landfill attained ISO: 14001 certification in September 2009 at which time a new environmental management system was established. All site staff were trained on all relevant procedures and environmental aspects of the site, with relevant staff updated of any changes made to procedures or protocol.
- Fire training.
- Safe Pass certificates.
- Tickets for Bomag compactors and dump trucks.
- Electrofusion welding.
- SCADA training
- Manual Handling.
- First Aid Training.

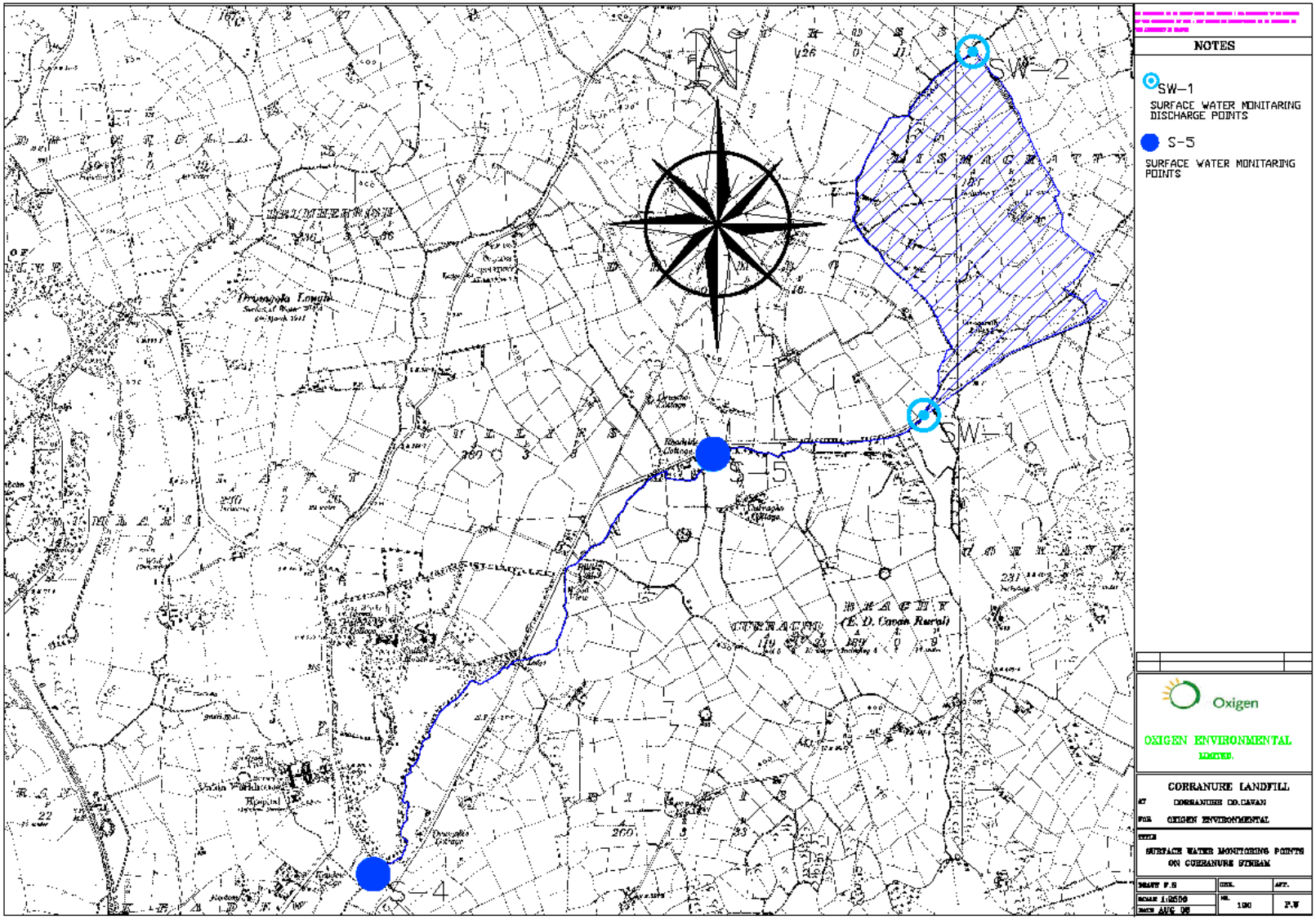
# APPENDIX A

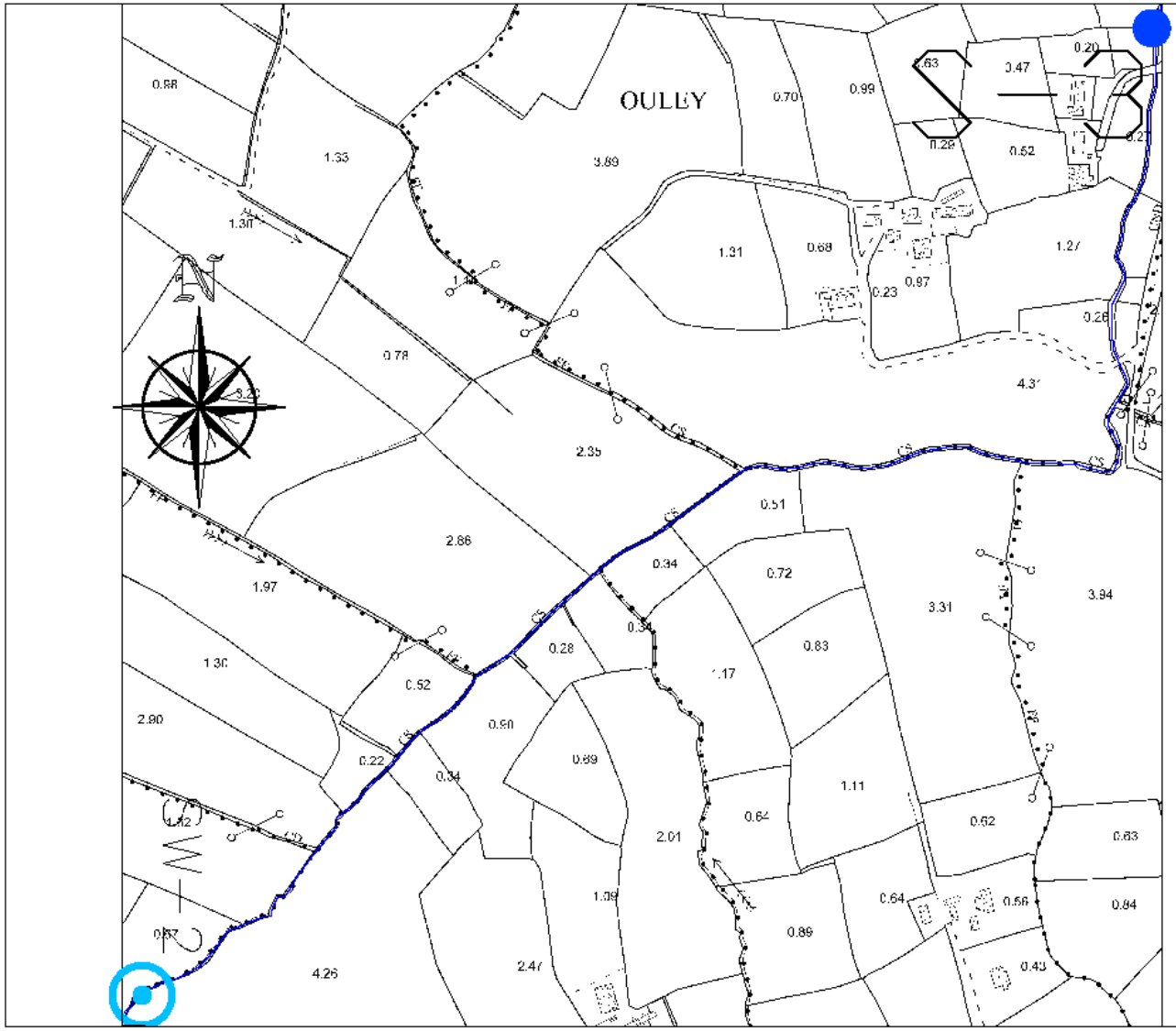
# Monthly Breakdown of Landfilled waste

| Waste Acceptance | EWC Code | January | February | March | April | May | June | July | August | September | October | November | December | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hse/General | 20 03 01 | 53.66 | 43 | 41.44 | 52.06 | 36.3 | 39.68 | 47.54 | 42.48 | 42.76 | 32.48 | 38.9 | 20.06 | **490.36** |
| Ash | 10 01 01 | 201.02 | 131.62 | 121.66 | 107.16 | 95.74 | 61.02 | 60.26 | 77.06 | 69.26 | 109.44 | 88.1 | 116.64 | **1238.98** |
| Municipal waste | 20 03 01 | 5,628.94 | 6,567.92 | 7,139.88 | 8,012.94 | 7,402.13 | 7,950.27 | 8,062.16 | 6,426.44 | 3,922.98 | 3,523.30 | 3,930.90 | 3,203.88 | **71771.74** |
| Paint Filters | 08 01 18 | 0 | 0.62 | 0 | 0 | 0 | 0.52 | 0 | 0.34 | 0 | 0.54 | 0 | 0 | **2.02** |
| Paint Sludge | 08 01 14 | 0 | 29.64 | 10.9 | 14.66 | 11.84 | 15.06 | 13.02 | 13.26 | 12.7 | 15.5 | 14.72 | 13.38 | **164.68** |
| Sweepers | 20 03 03 | 6.48 | 3.92 | 6.9 | 7.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **25** |
| Toner | 08 03 18 | 8.68 | 9.58 | 0 | 8.42 | 0 | 8.4 | 8.34 | 0 | 9.42 | 9 | 0 | 9.38 | **71.22** |
| Woodchip cover | 20 01 38 | 68.24 | 196.02 | 320.06 | 222.82 | 80.62 | 20.76 | 150.58 | 39.68 | 13.14 | 39.92 | 57.3 | 19.98 | **1229.12** |
| Council Clean up | 20 03 03 | 4 | 1.66 | 1.7 | 1.42 | 2.08 | 0.84 | 0.72 | 0.92 | 1.58 | 1.34 | 2.62 | 5.18 | **24.06** |
| Rubble/Cover Material | 17 01 07 | 908.82 | 956.72 | 830.88 | 1,086.60 | 1,552.64 | 1,586.66 | 1,055.66 | 908.3 | 955.44 | 704.74 | 593.42 | 582.12 | **11722** |
| Fine Material | 19 12 12 | 914.96 | 0 | 342.06 | 1,755.44 | 2,349.30 | 0 | 189.32 | 808.6 | 1339.24 | 1,158.32 | 1,032.36 | 1,118.88 | **11008.48** |
| Non-Recyclable waste | 20 03 99 | 290.44 | 154.84 | 225.38 | 187.08 | 141.62 | 123.66 | 104.24 | 101.86 | 121.46 | 107.76 | 116.52 | 96.48 | **1771.34** |
| Insulation Material | 17 06 07 | 49.9 | 48.6 | 45.26 | 44.26 | 43.82 | 38.34 | 44.44 | 38.2 | 45.18 | 43.04 | 35.56 | 36.18 | **512.78** |
| Soil & Stones | 17 05 04 | 16.7 | 86.2 | 66.28 | 164.16 | 69.36 | 104.06 | 309.66 | 156.64 | 323.58 | 284.54 | 154.4 | 90.78 | **1826.36** |
| CA C&D Waste | 17 01 07 | 5.92 | 11.48 | 20.62 | 11.86 | 19.82 | 14.7 | 17.98 | 11.5 | 18.32 | 12.7 | 12.16 | 6.78 | **163.84** |
| C&D Residue | 19 12 12 | 663.56 | 804.58 | 966.6 | 1,293.86 | 1,350.66 | 1,365.60 | 1,887.64 | 1,757.68 | 1,262.96 | 669.54 | 829.58 | 857.42 | **13709.68** |
| Dry Recycling Residue | 19 12 12 | 0 | 0 | 0 | 0.00 | 0.00 | 369.94 | 13.06 | 0 | 0 | 0 | 0 | 0 | **383** |
| Human & Animal Health Care | 18 01 04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.78 | 1.14 | 1.26 | **4.18** |
| Bulky Waste | 20 03 07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.26 | 0 | 1.64 | **2.9** |
| **Total** | | **8821.32** | **9046.4** | **10139.62** | **12970.44** | **13155.93** | **11699.51** | **11964.62** | **10382.96** | **8138.02** | **6715.2** | **6907.68** | **6180.04** | **116121.7** |

# APPENDIX B

# Location Maps of Monitoring Points


SW-2
SW-1
S-5
S-4
NOTES
SW-1
SURFACE WATER MONITARING DISCHARGE POINTS
S-5
SURFACE WATER MONITARING POINTS
Oxigen
OXIGEN ENVIRONMENTAL
LIMITED.
CORRANURE LANDFILL
AT CORRANURE CO.CAVAN
FOR OXIGEN ENVIRONMENTAL
SURFACE WATER MONITORING POINTS ON CORRANURE STREAM
DRAWN F.S
CHK.
APP.
SCALE 1:2500
NO. 100
F.W
DATE AUG 08




NOTES

SW–1
SURFACE WATER MONITARING DISCHARGE POINTS

S–3
SURFACE WATER MONITARING POINTS (ambient)

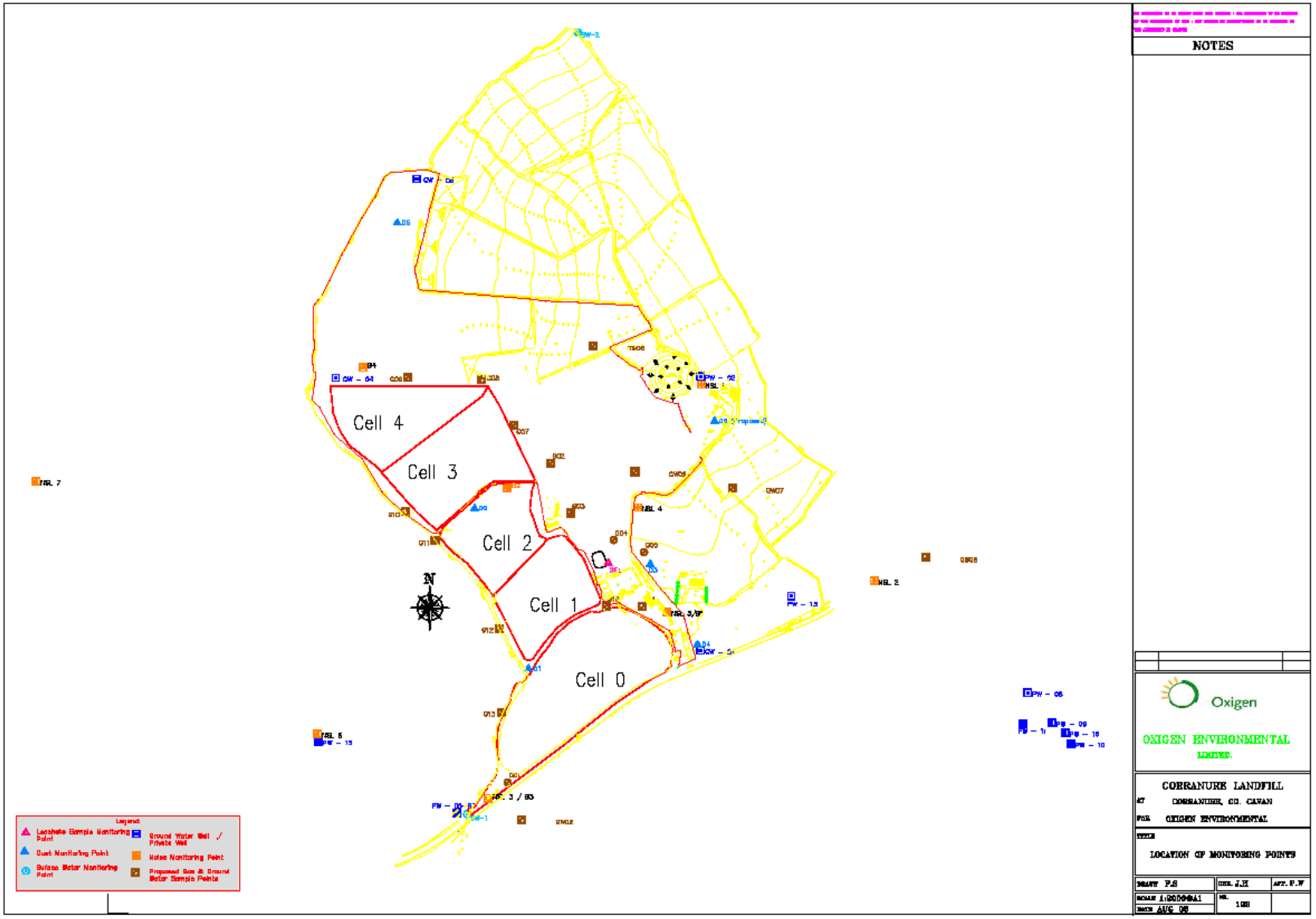
Oxigen

OXIGEN ENVIRONMENTAL
LIMITED.

CORRANURE LANDFILL
AT CORRANURE, CO. CAVAN
FOR OXIGEN ENVIRONMENTAL

TITLE
SURFACE WATER MONITORING POINTS ON LISMAGRATTY STREAM

| | | |
|---|---|---|
| DRAWN P.H | CHK. | APP. |
| SCALE 1:2500 | NO. 101 | P.W |
| DATE AUG 08 | | |




NOTES

Oxigen

OXIGEN ENVIRONMENTAL LIMITED.

CORRANURE LANDFILL

AT CORRANURE, CO. CAVAN

FOR OXIGEN ENVIRONMENTAL

TITLE

LOCATION OF MONITORING POINTS

| | | |
|---|---|---|
| DRAFT P.S | CHK. J.H | APP. P.W |
| SCALE 1:2000@A1 | NO. 108 | |
| DATE AUG 08 | | |

# APPENDIX C

# METEOROLOGICAL DATA

MONTHLY CLIMATOLOGICAL SUMMARY for JAN. 2009

NAME: Cavan Landfill CITY: STATE:
ELEV: LAT: LONG:

TEMPERATURE (°C), RAIN (in), WIND SPEED (mph)

| DAY | MEAN TEMP | HIGH | TIME | LOW | TIME | HEAT DEG DAYS | COOL DEG DAYS | RAIN | AVG WIND SPEED | HIGH | TIME | DOM DIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 69.9 | 74.2 | 0:30 | 56.1 | 22:00 | 0.0 | 46.9 | 0.01 | 5.4 | 16.0 | 18:30 | E |
| 2 | 67.0 | 69.3 | 14:30 | 57.2 | 0:30 | 0.0 | 45.0 | 0.00 | 4.4 | 20.0 | 11:00 | SE |
| 3 | 68.3 | 69.7 | 19:00 | 67.4 | 17:00 | 0.0 | 50.3 | 0.00 | 2.4 | 10.0 | 19:30 | SE |
| 4 | 58.8 | 69.0 | 0:30 | 25.3 | 10:30 | 0.0 | 28.9 | 0.00 | 2.0 | 9.0 | 3:00 | W |
| 5 | 65.9 | 77.2 | 13:30 | 31.4 | 5:00 | 0.0 | 36.1 | 0.02 | 3.0 | 12.0 | 13:30 | E |
| 6 | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |
| 9 | 53.5 | 66.1 | 20:30 | 27.5 | 16:30 | 0.0 | 0.0 | 0.00 | 10.9 | 24.0 | 23:30 | SW |
| 10 | 51.4 | 72.4 | 24:00 | 30.3 | 9:00 | 0.0 | 33.1 | 0.42 | 18.1 | 42.0 | 16:00 | WSW |
| 11 | 68.1 | 72.4 | 22:00 | 53.4 | 5:00 | 0.0 | 44.6 | 0.64 | 19.7 | 42.0 | 4:00 | WSW |
| 12 | 62.1 | 73.8 | 23:00 | 38.4 | 21:00 | 0.0 | 37.8 | 0.04 | 9.9 | 32.0 | 2:00 | W |
| 13 | 60.8 | 76.0 | 2:00 | 33.0 | 6:00 | 0.0 | 36.2 | 0.01 | 3.2 | 11.0 | 12:30 | W |
| 14 | 52.5 | 76.4 | 8:00 | 4.4 | 12:30 | 0.0 | 22.1 | 0.65 | 12.1 | 40.0 | 24:00 | S |
| 15 | 34.0 | 51.2 | 17:30 | 8.4 | 17:00 | 0.0 | 11.5 | 0.23 | 15.6 | 43.0 | 3:00 | SW |
| 16 | 47.6 | 56.9 | 14:30 | 34.7 | 1:30 | 0.0 | 27.5 | 0.03 | 12.6 | 33.0 | 11:30 | SW |
| 17 | 55.5 | 63.2 | 24:00 | 44.3 | 10:30 | 0.0 | 35.5 | 3.84 | 17.8 | 63.0 | 19:00 | WSW |
| 18 | 62.8 | 65.7 | 14:00 | 52.5 | 23:00 | 0.0 | 40.8 | 0.27 | 14.4 | 38.0 | 11:30 | WSW |
| 19 | 54.2 | 64.6 | 3:00 | 39.6 | 20:30 | 0.0 | 33.8 | 0.20 | 11.0 | 34.0 | 23:30 | WSW |
| 20 | 39.7 | 46.8 | 5:30 | 31.6 | 2:30 | 0.0 | 20.9 | 0.23 | 10.2 | 29.0 | 10:30 | W |
| 21 | 52.2 | 67.3 | 13:30 | 30.8 | 0:30 | 0.0 | 30.8 | 0.26 | 10.7 | 30.0 | 24:00 | SW |
| 22 | 47.1 | 59.9 | 1:30 | 28.1 | 12:30 | 0.0 | 25.7 | 0.20 | 12.7 | 38.0 | 3:30 | W |
| 23 | 37.8 | 49.7 | 1:30 | 29.3 | 21:30 | 0.0 | 21.2 | 0.01 | 7.7 | 28.0 | 14:30 | W |
| 24 | 54.7 | 78.9 | 21:30 | 6.2 | 3:30 | 0.0 | 24.2 | 0.08 | 7.9 | 29.0 | 21:30 | WSW |
| 25 | 70.6 | 81.4 | 11:30 | 52.6 | 5:00 | 0.0 | 48.7 | 0.13 | 7.0 | 33.0 | 3:30 | WSW |
| 26 | 75.9 | 77.8 | 23:30 | 73.9 | 0:30 | 0.0 | 57.6 | 0.05 | 5.0 | 21.0 | 22:30 | SW |
| 27 | 79.8 | 81.6 | 13:00 | 75.2 | 23:00 | 0.0 | 60.1 | 0.04 | 5.3 | 20.0 | 0:30 | WSW |
| 28 | 77.2 | 80.7 | 12:30 | 63.7 | 19:30 | 0.0 | 53.9 | 0.01 | 5.8 | 18.0 | 12:30 | SW |
| 29 | 69.0 | 72.6 | 23:30 | 68.2 | 18:30 | 0.0 | 52.1 | 0.11 | 12.6 | 34.0 | 14:30 | S |
| 30 | 73.0 | 73.4 | 7:30 | 72.4 | 15:30 | 0.0 | 0.0 | 0.61 | 12.0 | 34.0 | 9:30 | S |
| 31 | | | | | | | | | | | | |
| | 59.6 | 81.6 | 27 | 4.4 | 14 | 0.0 | 925.3 | 8.09 | 9.6 | 63.0 | 17 | WSW |

Max >= 32.0: 27
Max <= 0.0: 0
Min <= 0.0: 0
Min <= -18.0: 0
Max Rain: 3.84 ON 17/01/09
Days of Rain: 19 (>.01 in) 13 (>.1 in) 1 (>1 in)
Heat Base: 18.3 Cool Base: 18.3 Method: (High + Low) / 2

MONTHLY CLIMATOLOGICAL SUMMARY for FEB. 2009

NAME: Cavan Landfill CITY: STATE:
ELEV: LAT: LONG:

TEMPERATURE (°C), RAIN (in), WIND SPEED (mph)

| DAY | MEAN TEMP | HIGH | TIME | LOW | TIME | HEAT DEG DAYS | COOL DEG DAYS | RAIN | AVG WIND SPEED | HIGH | TIME | DOM DIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | |
| 2 | 67.5 | 69.5 | 24:00 | 66.7 | 9:00 | 0.0 | 49.8 | 0.00 | 11.0 | 27.0 | 15:00 | ENE |
| 3 | 66.1 | 73.1 | 10:00 | 49.4 | 23:30 | 0.0 | 43.0 | 0.22 | 12.0 | 33.0 | 21:30 | ESE |
| 4 | 58.4 | 70.3 | 7:00 | 42.3 | 6:00 | 0.0 | 38.1 | 0.01 | 6.6 | 23.0 | 0:30 | E |
| 5 | 68.8 | 75.3 | 13:00 | 55.5 | 0:30 | 0.0 | 47.1 | 0.06 | 8.7 | 28.0 | 15:30 | NNE |
| 6 | 64.6 | 69.7 | 19:00 | 40.8 | 13:30 | 0.0 | 36.9 | 0.00 | 5.6 | 25.0 | 16:00 | N |
| 7 | 63.9 | 68.1 | 2:30 | 48.6 | 4:30 | 0.0 | 40.1 | 0.00 | 6.8 | 26.0 | 4:30 | N |
| 8 | 65.0 | 71.9 | 16:30 | 57.6 | 12:00 | 0.0 | 46.5 | 0.07 | 4.7 | 15.0 | 14:00 | S |
| 9 | 74.2 | 75.6 | 22:30 | 51.9 | 1:00 | 0.0 | 45.5 | 0.01 | 3.7 | 11.0 | 12:30 | WSW |
| 10 | 73.8 | 75.4 | 0:30 | 63.0 | 14:30 | 0.0 | 50.9 | 0.01 | 5.0 | 17.0 | 13:30 | N |
| 11 | 71.0 | 73.4 | 1:30 | 64.0 | 10:00 | 0.0 | 50.4 | 0.01 | 4.5 | 12.0 | 13:00 | W |
| 12 | 70.3 | 71.7 | 15:00 | 68.9 | 1:00 | 0.0 | 52.1 | 0.01 | 6.7 | 16.0 | 14:30 | WNW |
| 13 | 68.4 | 69.8 | 9:00 | 65.7 | 17:30 | 0.0 | 49.4 | 0.00 | 3.6 | 11.0 | 13:00 | WNW |
| 14 | 59.3 | 66.8 | 0:30 | 52.1 | 22:30 | 0.0 | 41.2 | 0.00 | 5.9 | 18.0 | 23:30 | WSW |
| 15 | 53.5 | 58.8 | 3:30 | 45.7 | 23:30 | 0.0 | 34.0 | 0.00 | 6.9 | 17.0 | 12:30 | W |
| 16 | 51.8 | 53.1 | 5:30 | 48.2 | 9:30 | 0.0 | 32.4 | 0.00 | 6.2 | 16.0 | 15:30 | W |
| 17 | 52.6 | 56.1 | 12:30 | 46.4 | 6:30 | 0.0 | 33.0 | 0.00 | 3.4 | 14.0 | 13:00 | WNW |
| 18 | 52.5 | 54.2 | 2:30 | 48.5 | 2:30 | 0.0 | 33.1 | 0.00 | 5.6 | 15.0 | 14:30 | SW |
| 19 | 55.2 | 60.0 | 10:30 | 49.3 | 3:00 | 0.0 | 36.4 | 0.03 | 3.9 | 14.0 | 0:30 | N |
| 20 | 54.7 | 57.1 | 13:30 | 47.4 | 1:00 | 0.0 | 34.0 | 0.00 | 4.6 | 18.0 | 13:30 | W |
| 21 | 54.3 | 56.6 | 22:30 | 50.6 | 21:30 | 0.0 | 35.3 | 0.01 | 8.6 | 25.0 | 16:30 | W |
| 22 | 54.6 | 57.1 | 2:30 | 51.0 | 24:00 | 0.0 | 35.8 | 0.01 | 7.3 | 23.0 | 13:30 | NW |
| 23 | 55.3 | 56.8 | 16:30 | 49.3 | 23:30 | 0.0 | 34.8 | 0.01 | 4.7 | 16.0 | 13:30 | N |
| 24 | 56.1 | 58.8 | 15:30 | 46.6 | 18:00 | 0.0 | 34.4 | 0.03 | 4.2 | 18.0 | 24:00 | W |
| 25 | 56.1 | 57.7 | 14:00 | 51.5 | 9:30 | 0.0 | 36.3 | 0.01 | 8.5 | 25.0 | 15:30 | WNW |
| 26 | 54.8 | 56.9 | 23:30 | 53.6 | 1:30 | 0.0 | 37.0 | 0.00 | 10.1 | 30.0 | 20:30 | W |
| 27 | 57.3 | 59.7 | 6:30 | 54.3 | 5:30 | 0.0 | 38.8 | 0.01 | 10.3 | 26.0 | 1:30 | W |
| 28 | 58.0 | 63.2 | 24:00 | 55.0 | 14:30 | 0.0 | 40.8 | 0.08 | 8.7 | 22.0 | 14:30 | WSW |
| | 60.7 | 75.6 | 9 | 40.8 | 6 | 0.0 | 1086.9 | 0.59 | 6.6 | 33.0 | 3 | W |

Max >= 32.0: 27
Max <= 0.0: 0
Min <= 0.0: 0
Min <= -18.0: 0
Max Rain: 0.22 ON 3/02/09
Days of Rain: 6 (>.01 in) 1 (>.1 in) 0 (>1 in)
Heat Base: 18.3 Cool Base: 18.3 Method: (High + Low) / 2

MONTHLY CLIMATOLOGICAL SUMMARY for MAR. 2009

NAME: Cavan Landfill CITY: STATE:
ELEV: LAT: LONG:

TEMPERATURE (°C), RAIN (in), WIND SPEED (mph)

| DAY | MEAN TEMP | HIGH | TIME | LOW | TIME | HEAT DEG DAYS | COOL DEG DAYS | RAIN | AVG WIND SPEED | HIGH | TIME | DOM DIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 60.8 | 65.2 | 9:30 | 53.8 | 17:30 | 0.0 | 41.3 | 0.00 | 7.0 | 31.0 | 12:30 | NW |
| 2 | 54.5 | 56.8 | 16:30 | 46.4 | 4:30 | 0.0 | 33.4 | 0.06 | 9.2 | 31.0 | 17:00 | W |
| 3 | 59.2 | 64.4 | 17:30 | 48.9 | 23:30 | 0.0 | 38.4 | 0.17 | 10.1 | 30.0 | 12:30 | WSW |
| 4 | 51.1 | 60.7 | 24:00 | 40.3 | 2:30 | 0.0 | 32.3 | 0.02 | 5.0 | 15.0 | 2:00 | W |
| 5 | 60.9 | 67.8 | 9:30 | 53.6 | 17:00 | 0.0 | 42.4 | 0.02 | 5.3 | 25.0 | 13:30 | WNW |
| 6 | 56.5 | 64.0 | 17:00 | 43.9 | 5:30 | 0.0 | 35.7 | 0.00 | 6.7 | 20.0 | 12:30 | WSW |
| 7 | 63.5 | 67.1 | 19:30 | 57.6 | 5:30 | 0.0 | 44.1 | 0.16 | 14.2 | 37.0 | 18:30 | W |
| 8 | 68.8 | 71.6 | 23:00 | 67.2 | 0:30 | 0.0 | 51.1 | 0.33 | 12.9 | 40.0 | 13:00 | WNW |
| 9 | 72.2 | 74.3 | 23:30 | 69.8 | 12:30 | 0.0 | 53.8 | 0.17 | 10.6 | 27.0 | 12:30 | WNW |
| 10 | 72.9 | 74.9 | 6:00 | 70.0 | 22:30 | 0.0 | 54.2 | 0.02 | 5.2 | 22.0 | 3:30 | ENE |
| 11 | 74.5 | 76.1 | 11:00 | 71.7 | 0:30 | 0.0 | 55.6 | 0.22 | 12.7 | 32.0 | 13:00 | W |
| 12 | 73.1 | 75.8 | 5:30 | 64.8 | 22:30 | 0.0 | 52.0 | 0.01 | 7.7 | 30.0 | 12:30 | W |
| 13 | 68.3 | 72.1 | 22:30 | 65.6 | 13:30 | 0.0 | 50.6 | 0.05 | 10.8 | 31.0 | 23:30 | SW |
| 14 | 69.8 | 73.6 | 2:00 | 64.2 | 16:30 | 0.0 | 50.6 | 0.03 | 10.6 | 33.0 | 6:30 | WNW |
| 15 | 64.5 | 66.5 | 10:30 | 52.1 | 23:30 | 0.0 | 41.0 | 0.00 | 7.8 | 26.0 | 12:30 | W |
| 16 | 57.1 | 65.1 | 24:00 | 51.9 | 0:30 | 0.0 | 40.2 | 0.00 | 7.2 | 24.0 | 11:30 | WSW |
| 17 | 68.9 | 72.2 | 10:00 | 62.0 | 19:00 | 0.0 | 48.8 | 0.00 | 5.8 | 25.0 | 11:30 | SSE |
| 18 | 63.1 | 67.6 | 10:00 | 50.9 | 15:00 | 0.0 | 40.9 | 0.00 | 3.7 | 16.0 | 9:30 | SW |
| 19 | 59.1 | 62.3 | 10:30 | 56.3 | 3:00 | 0.0 | 41.0 | 0.01 | 5.3 | 18.0 | 12:30 | SSE |
| 20 | 55.6 | 61.1 | 14:00 | 45.9 | 22:30 | 0.0 | 35.3 | 0.00 | 5.6 | 20.0 | 12:30 | SSW |
| 21 | 55.1 | 61.6 | 13:30 | 44.0 | 2:00 | 0.0 | 34.5 | 0.01 | 4.1 | 18.0 | 15:00 | W |
| 22 | 50.3 | 56.2 | 1:30 | 42.8 | 23:00 | 0.0 | 31.2 | 0.00 | 9.2 | 27.0 | 12:30 | WNW |
| 23 | 49.2 | 55.8 | 11:30 | 40.7 | 2:00 | 0.0 | 29.9 | 0.05 | 13.5 | 35.0 | 13:30 | N |
| 24 | 52.9 | 59.3 | 21:30 | 45.0 | 3:00 | 0.0 | 33.9 | 0.03 | 10.3 | 35.0 | 17:00 | WNW |
| 25 | 56.1 | 60.1 | 3:30 | 45.3 | 21:30 | 0.0 | 34.4 | 0.03 | 13.4 | 34.0 | 14:30 | NW |
| 26 | 54.4 | 57.2 | 6:30 | 41.0 | 9:30 | 0.0 | 30.8 | 0.25 | 14.2 | 38.0 | 7:30 | NW |
| 27 | 56.2 | 58.0 | 20:30 | 43.0 | 3:30 | 0.0 | 32.2 | 0.09 | 13.1 | 33.0 | 21:30 | WNW |
| 28 | 50.6 | 57.8 | 0:30 | 35.7 | 16:00 | 0.0 | 28.5 | 0.00 | 11.8 | 33.0 | 2:00 | NNE |
| 29 | 52.3 | 60.4 | 21:00 | 44.9 | 7:30 | 0.0 | 34.4 | 0.02 | 7.7 | 26.0 | 10:00 | WSW |
| 30 | 52.7 | 55.8 | 1:30 | 46.6 | 22:30 | 0.0 | 32.9 | 0.01 | 6.2 | 20.0 | 9:30 | W |
| 31 | 54.8 | 59.1 | 9:30 | 46.6 | 1:30 | 0.0 | 34.6 | 0.00 | 4.9 | 16.0 | 5:00 | W |
| | 60.0 | 76.1 | 11 | 35.7 | 28 | 0.0 | 1239.9 | 1.76 | 8.8 | 40.0 | 8 | W |

Max >= 32.0: 31
Max <= 0.0: 0
Min <= 0.0: 0
Min <= -18.0: 0
Max Rain: 0.33 ON 8/03/09
Days of Rain: 17 (>.01 in) 6 (>.1 in) 0 (>1 in)
Heat Base: 18.3 Cool Base: 18.3 Method: (High + Low) / 2

MONTHLY CLIMATOLOGICAL SUMMARY for APR. 2009

NAME: Cavan Landfill CITY: STATE:
ELEV: LAT: LONG:

TEMPERATURE (°C), RAIN (in), WIND SPEED (mph)

| DAY | MEAN TEMP | HIGH | TIME | LOW | TIME | HEAT DEG DAYS | COOL DEG DAYS | RAIN | AVG WIND SPEED | HIGH | TIME | DOM DIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 50.0 | 52.6 | 14:30 | 44.7 | 6:30 | 0.0 | 30.4 | 0.00 | 6.0 | 19.0 | 14:30 | SW |
| 2 | 49.3 | 52.8 | 16:00 | 45.2 | 6:00 | 0.0 | 30.7 | 0.00 | 5.6 | 17.0 | 12:00 | S |
| 3 | 47.6 | 53.2 | 22:30 | 43.3 | 1:30 | 0.0 | 29.9 | 0.19 | 7.8 | 22.0 | 14:00 | SW |
| 4 | 51.5 | 56.4 | 5:30 | 42.3 | 23:00 | 0.0 | 31.1 | 0.17 | 8.5 | 29.0 | 10:00 | NW |
| 5 | 40.9 | 47.1 | 0:30 | 33.4 | 20:30 | 0.0 | 22.0 | 0.00 | 9.2 | 26.0 | 10:30 | WSW |
| 6 | 43.7 | 47.0 | 9:30 | 36.2 | 3:30 | 0.0 | 23.3 | 0.09 | 9.2 | 28.0 | 8:30 | S |
| 7 | 52.1 | 60.6 | 11:30 | 44.2 | 1:30 | 0.0 | 34.1 | 0.41 | 13.9 | 45.0 | 14:30 | WSW |
| 8 | 50.6 | 53.3 | 13:30 | 45.5 | 5:00 | 0.0 | 31.1 | 0.05 | 10.5 | 30.0 | 0:30 | WNW |
| 9 | 48.9 | 54.1 | 6:00 | 41.7 | 16:30 | 0.0 | 29.6 | 0.73 | 14.3 | 39.0 | 14:00 | SW |
| 10 | 49.0 | 52.8 | 9:30 | 38.5 | 1:30 | 0.0 | 27.4 | 0.14 | 5.6 | 23.0 | 16:30 | W |
| 11 | 47.4 | 49.9 | 8:30 | 42.0 | 13:30 | 0.0 | 27.7 | 0.08 | 6.8 | 19.0 | 11:00 | WSW |
| 12 | 50.5 | 58.3 | 10:00 | 41.5 | 22:00 | 0.0 | 31.6 | 0.01 | 6.0 | 22.0 | 21:30 | SSW |
| 13 | 48.3 | 53.9 | 22:00 | 40.2 | 15:00 | 0.0 | 28.8 | 0.15 | 8.7 | 24.0 | 14:00 | S |
| 14 | 44.8 | 53.1 | 0:30 | 39.3 | 19:00 | 0.0 | 27.9 | 0.07 | 5.1 | 22.0 | 13:00 | SSE |
| 15 | 34.2 | 41.8 | 2:30 | 25.2 | 6:30 | 0.0 | 15.2 | 0.13 | 10.5 | 29.0 | 15:30 | E |
| 16 | 34.2 | 38.4 | 4:30 | 28.9 | 0:30 | 0.0 | 15.4 | 0.00 | 12.3 | 27.0 | 11:00 | E |
| 17 | 31.7 | 36.0 | 15:00 | 22.0 | 24:00 | 0.0 | 10.7 | 0.00 | 9.4 | 23.0 | 11:30 | E |
| 18 | 29.0 | 33.6 | 17:30 | 20.8 | 0:30 | 0.0 | 8.9 | 0.02 | 6.0 | 17.0 | 14:00 | SE |
| 19 | 28.9 | 35.6 | 16:00 | 19.1 | 3:30 | 0.0 | 9.1 | 0.00 | 5.0 | 17.0 | 12:30 | S |
| 20 | 28.9 | 34.0 | 15:30 | 23.1 | 23:00 | 0.0 | 10.2 | 0.00 | 3.9 | 14.0 | 11:30 | W |
| 21 | 26.7 | 30.8 | 17:00 | 19.5 | 9:00 | 0.0 | 6.9 | 0.05 | 7.0 | 21.0 | 10:00 | N |
| 22 | 26.3 | 32.2 | 14:00 | 18.9 | 5:30 | 0.0 | 7.3 | 0.02 | 11.8 | 33.0 | 16:30 | SW |
| 23 | 24.1 | 28.8 | 14:00 | 20.0 | 7:00 | 0.0 | 6.1 | 0.42 | 5.4 | 20.0 | 16:00 | W |
| 24 | 23.7 | 26.3 | 0:30 | 20.7 | 4:30 | 0.0 | 0.0 | 0.34 | 2.2 | 10.0 | 6:00 | NNW |
| 25 | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | |
| 27 | 23.4 | 26.6 | 14:30 | 17.0 | 13:30 | 0.0 | 0.0 | 0.21 | 4.3 | 18.0 | 17:30 | NE |
| 28 | 23.6 | 29.1 | 19:30 | 17.9 | 3:00 | 0.0 | 5.2 | 0.05 | 2.8 | 11.0 | 18:30 | N |
| 29 | 23.1 | 25.6 | 21:30 | 19.8 | 6:00 | 0.0 | 4.4 | 0.27 | 5.5 | 24.0 | 17:30 | E |
| 30 | 26.8 | 32.9 | 15:30 | 22.6 | 4:00 | 0.0 | 9.5 | 0.08 | 4.2 | 14.0 | 18:00 | N |
| | 37.8 | 60.6 | 7 | 17.0 | 27 | 0.0 | 514.6 | 3.68 | 7.4 | 45.0 | 7 | SW |

Max >= 32.0: 22
Max <= 0.0: 0
Min <= 0.0: 0
Min <= -18.0: 0
Max Rain: 0.73 ON 9/04/09
Days of Rain: 20 (>.01 in) 11 (>.1 in) 0 (>1 in)
Heat Base: 18.3 Cool Base: 18.3 Method: (High + Low) / 2

MONTHLY CLIMATOLOGICAL SUMMARY for MAY. 2009

NAME: Cavan Landfill  CITY:  STATE:
ELEV:  LAT:  LONG:

TEMPERATURE (°C), RAIN (in), WIND SPEED (mph)

| DAY | MEAN TEMP | HIGH | TIME | LOW | TIME | HEAT DEG DAYS | COOL DEG DAYS | RAIN | AVG WIND SPEED | HIGH | TIME | DOM DIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 25.8 | 29.2 | 16:30 | 19.4 | 10:00 | 0.0 | 6.0 | 0.22 | 12.1 | 35.0 | 13:00 | W |
| 2 | 23.9 | 28.6 | 16:00 | 14.8 | 23:30 | 0.0 | 3.4 | 0.03 | 8.1 | 27.0 | 21:00 | W |
| 3 | 20.3 | 24.2 | 9:30 | 15.1 | 1:00 | 0.0 | 1.4 | 0.03 | 7.0 | 25.0 | 17:30 | WNW |
| 4 | 22.7 | 31.5 | 24:00 | 15.7 | 8:30 | 0.0 | 5.3 | 0.08 | 12.3 | 31.0 | 13:30 | W |
| 5 | 29.4 | 35.0 | 13:30 | 23.8 | 17:30 | 0.0 | 11.1 | 0.19 | 14.4 | 37.0 | 14:30 | W |
| 6 | 28.4 | 32.2 | 10:30 | 23.8 | 1:00 | 0.0 | 9.7 | 0.35 | 15.7 | 39.0 | 16:30 | W |
| 7 | 27.5 | 31.6 | 13:00 | 19.3 | 1:30 | 0.0 | 7.2 | 0.87 | 17.4 | 64.0 | 18:30 | W |
| 8 | 26.2 | 33.0 | 1:30 | 20.3 | 5:30 | 0.0 | 8.4 | 0.31 | 15.0 | 39.0 | 0:30 | W |
| 9 | 26.4 | 33.1 | 7:30 | 18.5 | 21:30 | 0.0 | 7.5 | 0.24 | 8.9 | 26.0 | 3:30 | WNW |
| 10 | 27.3 | 31.7 | 16:30 | 19.3 | 5:30 | 0.0 | 7.2 | 0.00 | 2.2 | 13.0 | 18:00 | SE |
| 11 | 26.3 | 30.1 | 8:30 | 20.3 | 23:30 | 0.0 | 6.9 | 0.00 | 8.7 | 28.0 | 17:30 | SE |
| 12 | 23.4 | 27.0 | 16:30 | 18.8 | 7:00 | 0.0 | 4.6 | 0.00 | 10.5 | 29.0 | 15:30 | SE |
| 13 | 23.3 | 26.6 | 12:30 | 20.4 | 5:30 | 0.0 | 5.2 | 0.02 | 11.2 | 32.0 | 16:30 | SE |
| 14 | 26.2 | 30.2 | 9:30 | 21.2 | 23:30 | 0.0 | 7.4 | 0.18 | 7.1 | 17.0 | 5:00 | ESE |
| 15 | 21.2 | 23.5 | 13:00 | 17.9 | 8:30 | 0.0 | 2.4 | 0.49 | 5.4 | 15.0 | 2:30 | E |
| 16 | 19.9 | 24.9 | 12:30 | 15.5 | 10:30 | 0.0 | 1.9 | 0.32 | 10.4 | 31.0 | 18:00 | SE |
| 17 | 18.3 | 21.4 | 15:30 | 15.5 | 8:30 | 0.0 | 0.2 | 0.15 | 8.8 | 30.0 | 9:30 | SE |
| 18 | 19.0 | 23.2 | 13:30 | 15.3 | 6:30 | 0.0 | 0.9 | 0.12 | 5.3 | 21.0 | 15:30 | W |
| 19 | 20.5 | 30.1 | 19:30 | 15.5 | 20:00 | 0.0 | 4.5 | 0.34 | 6.2 | 19.0 | 14:30 | WSW |
| 20 | 20.3 | 26.4 | 18:30 | 17.3 | 4:30 | 0.0 | 3.6 | 0.02 | 4.5 | 18.0 | 15:00 | W |
| 21 | 18.6 | 23.2 | 15:00 | 14.7 | 6:30 | 0.0 | 0.7 | 0.29 | 4.1 | 21.0 | 11:30 | WNW |
| 22 | 20.3 | 26.4 | 20:30 | 16.9 | 4:00 | 0.0 | 3.4 | 0.00 | 4.2 | 14.0 | 16:30 | WSW |
| 23 | 20.9 | 24.7 | 18:00 | 17.4 | 9:30 | 0.0 | 2.8 | 0.14 | 7.5 | 31.0 | 11:30 | SW |
| 24 | 20.5 | 25.4 | 16:00 | 15.8 | 3:30 | 0.0 | 2.3 | 0.00 | 9.2 | 25.0 | 11:30 | W |
| 25 | 21.5 | 23.9 | 13:30 | 17.2 | 23:00 | 0.0 | 2.3 | 0.01 | 5.1 | 16.0 | 16:30 | WSW |
| 26 | 18.9 | 23.7 | 17:00 | 13.1 | 5:00 | 0.0 | 0.1 | 0.03 | 8.1 | 32.0 | 17:30 | WNW |
| 27 | 20.3 | 25.2 | 14:30 | 14.0 | 2:00 | 0.0 | 1.3 | 0.06 | 10.2 | 25.0 | 4:30 | WNW |
| 28 | 18.6 | 23.9 | 15:30 | 13.9 | 7:30 | 0.0 | 0.6 | 0.00 | 8.2 | 23.0 | 4:00 | W |
| 29 | 21.2 | 27.9 | 19:30 | 14.4 | 3:30 | 0.0 | 2.9 | 0.00 | 5.4 | 22.0 | 16:00 | SW |
| 30 | 24.6 | 30.4 | 15:30 | 17.5 | 22:30 | 0.0 | 5.7 | 0.00 | 6.2 | 19.0 | 12:30 | SSE |
| 31 | 23.5 | 28.7 | 17:30 | 13.2 | 23:30 | 0.0 | 2.7 | 0.00 | 3.5 | 15.0 | 14:30 | SE |
|  | 22.7 | 35.0 | 5 | 13.1 | 26 | 0.0 | 129.8 | 4.49 | 8.5 | 64.0 | 7 | W |

Max >= 32.0: 4
Max <= 0.0: 0
Min <= 0.0: 0
Min <= -18.0: 0
Max Rain: 0.87 ON 7/05/09
Days of Rain: 21 (>.01 in) 14 (>.1 in) 0 (>1 in)
Heat Base: 18.3 Cool Base: 18.3 Method: (High + Low) / 2

MONTHLY CLIMATOLOGICAL SUMMARY for JUN. 2009

NAME: Cavan Landfill CITY: STATE:
ELEV: LAT: LONG:

TEMPERATURE (°C), RAIN (in), WIND SPEED (mph)

| DAY | MEAN TEMP | HIGH | TIME | LOW | TIME | HEAT DEG DAYS | COOL DEG DAYS | RAIN | AVG WIND SPEED | HIGH | TIME | DOM DIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 20.8 | 28.2 | 17:30 | 13.1 | 0:30 | 0.0 | 2.3 | 0.00 | 2.0 | 12.0 | 13:30 | ESE |
| 2 | 24.0 | 31.8 | 16:30 | 13.3 | 2:30 | 0.0 | 4.3 | 0.00 | 1.4 | 15.0 | 20:30 | SSE |
| 3 | 22.1 | 29.9 | 18:30 | 14.8 | 4:30 | 0.0 | 4.1 | 0.00 | 3.3 | 13.0 | 11:30 | E |
| 4 | 20.9 | 26.8 | 16:30 | 13.3 | 4:00 | 0.0 | 1.8 | 0.00 | 4.4 | 15.0 | 18:00 | NE |
| 5 | 16.6 | 22.1 | 15:30 | 11.6 | 3:30 | 1.4 | 0.0 | 0.00 | 6.1 | 23.0 | 14:30 | NE |
| 6 | 15.0 | 19.1 | 10:30 | 9.9 | 2:30 | 3.8 | 0.0 | 0.05 | 9.4 | 30.0 | 15:00 | ENE |
| 7 | 16.0 | 21.2 | 11:00 | 9.4 | 22:30 | 3.0 | 0.0 | 0.00 | 6.0 | 17.0 | 11:30 | E |
| 8 | 18.5 | 24.0 | 15:30 | 10.8 | 4:30 | 0.9 | 0.0 | 0.00 | 5.4 | 18.0 | 12:00 | ESE |
| 9 | 18.6 | 25.9 | 16:30 | 12.1 | 5:30 | 0.0 | 0.7 | 0.00 | 3.8 | 14.0 | 13:00 | ENE |
| 10 | 18.0 | 24.9 | 14:00 | 10.8 | 4:30 | 0.4 | 0.0 | 0.01 | 3.0 | 15.0 | 14:00 | NE |
| 11 | 17.9 | 25.9 | 18:00 | 8.8 | 5:00 | 0.9 | 0.0 | 0.00 | 2.9 | 14.0 | 10:30 | NE |
| 12 | 17.5 | 25.1 | 18:30 | 12.1 | 22:00 | 0.0 | 0.3 | 0.03 | 5.1 | 17.0 | 13:00 | SSE |
| 13 | 20.0 | 28.5 | 17:30 | 15.1 | 22:00 | 0.0 | 3.5 | 0.04 | 5.2 | 19.0 | 12:30 | WSW |
| 14 | 18.6 | 26.3 | 16:30 | 14.8 | 5:30 | 0.0 | 2.3 | 0.04 | 3.8 | 16.0 | 17:30 | SW |
| 15 | 21.8 | 29.2 | 17:30 | 14.8 | 1:30 | 0.0 | 3.7 | 0.01 | 1.4 | 11.0 | 13:30 | SW |
| 16 | 22.7 | 28.1 | 13:30 | 13.3 | 6:30 | 0.0 | 2.4 | 0.01 | 5.4 | 22.0 | 23:30 | WSW |
| 17 | 19.3 | 23.4 | 12:30 | 14.9 | 20:00 | 0.0 | 0.9 | 0.48 | 9.5 | 25.0 | 5:30 | WNW |
| 18 | 19.3 | 23.9 | 14:30 | 16.1 | 18:00 | 0.0 | 1.7 | 0.40 | 11.3 | 38.0 | 15:00 | WNW |
| 19 | 19.7 | 25.5 | 16:30 | 16.5 | 23:30 | 0.0 | 2.7 | 0.05 | 8.4 | 23.0 | 7:30 | NW |
| 20 | 20.8 | 23.2 | 13:30 | 16.4 | 0:30 | 0.0 | 1.5 | 0.03 | 6.5 | 20.0 | 14:30 | NW |
| 21 | 22.2 | 27.7 | 18:30 | 18.7 | 0:30 | 0.0 | 4.9 | 0.01 | 4.2 | 15.0 | 15:30 | NW |
| 22 | 24.0 | 30.2 | 12:30 | 19.0 | 22:30 | 0.0 | 6.3 | 0.02 | 2.8 | 10.0 | 9:30 | WNW |
| 23 | 25.0 | 31.9 | 16:30 | 16.4 | 1:30 | 0.0 | 5.9 | 0.02 | 3.1 | 15.0 | 17:30 | SSE |
| 24 | 24.9 | 30.4 | 17:00 | 17.7 | 1:30 | 0.0 | 5.8 | 0.00 | 5.3 | 23.0 | 14:00 | SE |
| 25 | 23.1 | 28.8 | 19:00 | 17.5 | 0:30 | 0.0 | 4.9 | 0.00 | 6.3 | 25.0 | 16:30 | SE |
| 26 | 25.4 | 29.2 | 15:30 | 19.9 | 0:30 | 0.0 | 6.3 | 0.00 | 6.3 | 20.0 | 10:30 | SE |
| 27 | 24.7 | 32.2 | 14:30 | 20.1 | 5:00 | 0.0 | 7.8 | 0.06 | 2.8 | 14.0 | 18:30 | SE |
| 28 | 23.7 | 29.8 | 13:30 | 19.2 | 4:30 | 0.0 | 6.2 | 0.04 | 3.9 | 16.0 | 14:00 | SE |
| 29 | 25.3 | 30.3 | 17:00 | 19.6 | 1:00 | 0.0 | 6.7 | 0.01 | 3.2 | 12.0 | 17:30 | S |
| 30 | 25.3 | 29.5 | 10:30 | 19.3 | 3:00 | 0.0 | 6.1 | 0.00 | 4.8 | 21.0 | 14:00 | S |
| | 21.1 | 32.2 | 27 | 8.8 | 11 | 10.4 | 93.2 | 1.31 | 4.9 | 38.0 | 18 | SE |

Max >= 32.0: 1
Max <= 0.0: 0
Min <= 0.0: 0
Min <= -18.0: 0
Max Rain: 0.48 ON 17/06/09
Days of Rain: 12 (>.01 in) 2 (>.1 in) 0 (>1 in)
Heat Base: 18.3 Cool Base: 18.3 Method: (High + Low) / 2

MONTHLY CLIMATOLOGICAL SUMMARY for JUL. 2009

NAME: Cavan Landfill CITY: STATE:
ELEV: LAT: LONG:

TEMPERATURE (°C), RAIN (in), WIND SPEED (mph)

| DAY | MEAN TEMP | HIGH | TIME | LOW | TIME | HEAT DEG DAYS | COOL DEG DAYS | RAIN | AVG WIND SPEED | HIGH | TIME | DOM DIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 24.8 | 29.2 | 12:30 | 21.7 | 6:30 | 0.0 | 7.2 | 0.14 | 3.6 | 17.0 | 19:30 | SSW |
| 2 | 23.9 | 27.2 | 19:00 | 20.2 | 2:00 | 0.0 | 5.4 | 0.25 | 3.4 | 14.0 | 14:30 | SSE |
| 3 | 21.7 | 26.4 | 11:00 | 15.4 | 21:30 | 0.0 | 2.6 | 0.15 | 4.9 | 19.0 | 13:30 | WSW |
| 4 | 20.1 | 27.0 | 18:30 | 14.2 | 21:00 | 0.0 | 2.3 | 0.28 | 5.4 | 27.0 | 16:00 | SSW |
| 5 | 17.6 | 23.4 | 10:30 | 12.4 | 22:00 | 0.4 | 0.0 | 0.24 | 5.4 | 24.0 | 16:30 | SSW |
| 6 | 18.9 | 23.8 | 15:30 | 16.2 | 2:30 | 0.0 | 1.7 | 0.07 | 3.1 | 16.0 | 14:00 | N |
| 7 | 19.4 | 23.8 | 16:00 | 15.7 | 4:30 | 0.0 | 1.5 | 0.03 | 7.8 | 23.0 | 11:30 | N |
| 8 | 17.6 | 22.1 | 17:00 | 11.8 | 23:30 | 1.3 | 0.0 | 0.02 | 5.9 | 18.0 | 13:00 | N |
| 9 | 15.2 | 21.3 | 15:30 | 11.1 | 4:30 | 2.1 | 0.0 | 0.00 | 4.1 | 18.0 | 18:30 | N |
| 10 | 17.3 | 22.5 | 9:30 | 11.1 | 3:30 | 1.5 | 0.0 | 0.00 | 1.8 | 12.0 | 22:30 | NNE |
| 11 | 17.6 | 21.8 | 10:30 | 13.8 | 2:30 | 0.5 | 0.0 | 0.46 | 6.9 | 28.0 | 24:00 | SSE |
| 12 | 18.7 | 24.6 | 12:30 | 11.7 | 23:00 | 0.1 | 0.0 | 0.14 | 9.0 | 28.0 | 0:30 | WSW |
| 13 | 17.9 | 23.6 | 11:00 | 11.8 | 0:30 | 0.6 | 0.0 | 0.23 | 5.4 | 24.0 | 13:30 | SSW |
| | 19.3 | 25.7 | 12:30 | 10.2 | 1:30 | 0.3 | 0.0 | 0.41 | 2.5 | 11.0 | 13:30 | SSW |
| 15 | 22.4 | 28.1 | 18:30 | 17.9 | 0:30 | 0.0 | 4.7 | 0.00 | 2.5 | 20.0 | 15:30 | ESE |
| 16 | 21.0 | 27.9 | 14:30 | 17.8 | 1:30 | 0.0 | 4.6 | 0.20 | 3.8 | 16.0 | 15:30 | W |
| 17 | 19.3 | 23.2 | 18:30 | 15.5 | 7:00 | 0.0 | 1.1 | 0.01 | 8.8 | 26.0 | 13:00 | N |
| 18 | 18.8 | 24.5 | 15:30 | 14.9 | 4:30 | 0.0 | 1.4 | 0.12 | 3.2 | 19.0 | 12:30 | NW |
| 19 | 20.9 | 27.5 | 17:30 | 15.4 | 5:30 | 0.0 | 3.2 | 0.17 | 3.9 | 18.0 | 15:00 | NW |
| 20 | 22.0 | 26.2 | 14:30 | 17.3 | 3:30 | 0.0 | 0.0 | 0.01 | 7.5 | 25.0 | 13:30 | W |
| 21 | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| 26 | 22.0 | 22.3 | 24:00 | 21.7 | 24:00 | 0.0 | 0.0 | 25.85 | 21.0 | 35.0 | 24:25 | WSW |
| 27 | 22.1 | 27.1 | 12:30 | 16.3 | 6:30 | 0.0 | 3.4 | 0.05 | 9.7 | 32.0 | 15:00 | W |
| 28 | 21.4 | 23.8 | 10:00 | 18.9 | 2:30 | 0.0 | 3.1 | 0.06 | 10.2 | 28.0 | 15:00 | WSW |
| 29 | 20.8 | 26.2 | 12:30 | 16.3 | 6:30 | 0.0 | 2.9 | 0.21 | 4.5 | 19.0 | 16:00 | WSW |
| 30 | 21.1 | 27.5 | 16:00 | 14.6 | 2:00 | 0.0 | 2.7 | 0.13 | 4.9 | 29.0 | 13:00 | W |
| 31 | 21.8 | 24.2 | 15:30 | 18.8 | 3:30 | 0.0 | 3.2 | 0.38 | 11.3 | 33.0 | 18:30 | SSW |
| | 20.1 | 29.2 | 1 | 10.2 | 14 | 6.8 | 51.1 | 29.61 | 6.2 | 35.0 | 26 | WSW |

Max >= 32.0: 0
Max <= 0.0: 0
Min <= 0.0: 0
Min <= -18.0: 0
Max Rain: 25.85 ON 26/07/09
Days of Rain: 21 (>.01 in) 16 (>.1 in) 1 (>1 in)
Heat Base: 18.3 Cool Base: 18.3 Method: (High + Low) / 2

MONTHLY CLIMATOLOGICAL SUMMARY for AUG. 2009

NAME: Cavan Landfill CITY: STATE:
ELEV: LAT: LONG:

TEMPERATURE (°C), RAIN (mm), WIND SPEED (m/s)

| DAY | MEAN TEMP | HIGH | TIME | LOW | TIME | HEAT DEG DAYS | COOL DEG DAYS | RAIN | AVG WIND SPEED | HIGH | TIME | DOM DIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 21.1 | 25.4 | 11:00 | 17.5 | 7:30 | 0.0 | 3.2 | 0.0 | 4.6 | 13.9 | 14:30 | WNW |
| 2 | 21.7 | 26.1 | 15:00 | 17.4 | 7:30 | 0.0 | 3.4 | 0.5 | 2.7 | 7.6 | 18:00 | W |
| 3 | 23.3 | 27.3 | 11:00 | 19.8 | 20:30 | 0.0 | 5.3 | 4.3 | 4.4 | 11.2 | 11:00 | SW |
| 4 | 24.0 | 29.8 | 17:30 | 17.7 | 22:00 | 0.0 | 5.5 | 0.3 | 4.2 | 12.1 | 12:00 | SW |
| 5 | 23.1 | 27.4 | 13:30 | 18.7 | 5:00 | 0.0 | 4.7 | 2.0 | 4.3 | 14.3 | 13:30 | SW |
| 6 | 21.6 | 27.9 | 16:00 | 16.7 | 6:30 | 0.0 | 4.0 | 0.3 | 2.5 | 8.5 | 14:00 | WSW |
| 7 | 22.1 | 28.0 | 15:30 | 16.1 | 8:00 | 0.0 | 3.8 | 0.0 | 1.9 | 7.2 | 13:00 | W |
| 8 | 22.5 | 26.7 | 17:30 | 17.2 | 23:30 | 0.0 | 3.7 | 1.0 | 2.8 | 7.6 | 5:30 | WSW |
| 9 | 20.5 | 23.0 | 12:00 | 17.2 | 5:30 | 0.0 | 1.8 | 0.3 | 2.0 | 7.6 | 24:00 | WSW |
| 10 | 23.0 | 28.8 | 14:30 | 18.0 | 24:00 | 0.0 | 5.1 | 1.8 | 3.0 | 9.4 | 1:30 | N |
| 11 | 20.8 | 24.7 | 17:00 | 15.7 | 3:00 | 0.0 | 1.9 | 0.5 | 2.7 | 10.7 | 14:30 | W |
| 12 | 22.7 | 26.7 | 15:00 | 18.2 | 5:00 | 0.0 | 4.2 | 1.0 | 1.8 | 7.2 | 13:30 | NW |
| 13 | 23.8 | 27.2 | 16:00 | 18.2 | 2:30 | 0.0 | 4.4 | 0.0 | 0.2 | 3.1 | 14:00 | N |
| 14 | 23.1 | 26.3 | 12:30 | 19.9 | 7:00 | 0.0 | 4.8 | 5.1 | 4.6 | 16.1 | 16:00 | WSW |
| 15 | 23.3 | 26.4 | 17:00 | 20.3 | 24:00 | 0.0 | 5.1 | 11.4 | 4.6 | 13.0 | 17:30 | WNW |
| 16 | 22.2 | 25.3 | 18:30 | 19.4 | 20:30 | 0.0 | 4.1 | 5.3 | 5.0 | 13.0 | 5:00 | W |
| 17 | 23.1 | 27.4 | 14:30 | 18.7 | 4:00 | 0.0 | 4.8 | 2.3 | 3.2 | 8.5 | 2:00 | W |
| 18 | 24.7 | 29.3 | 17:00 | 19.1 | 6:00 | 0.0 | 5.9 | 4.1 | 3.9 | 11.2 | 14:30 | SW |
| 19 | 25.3 | 28.7 | 11:30 | 22.3 | 22:00 | 0.0 | 7.2 | 21.3 | 3.5 | 12.1 | 6:00 | SW |
| 20 | 22.0 | 24.8 | 7:30 | 17.5 | 23:30 | 0.0 | 2.9 | 26.4 | 3.6 | 13.0 | 18:00 | W |
| 21 | 20.7 | 24.9 | 15:30 | 16.1 | 6:30 | 0.0 | 2.2 | 2.3 | 4.2 | 13.4 | 15:30 | W |
| 22 | 21.5 | 25.6 | 15:00 | 17.4 | 6:00 | 0.0 | 3.2 | 9.9 | 2.8 | 11.2 | 24:00 | SW |
| 23 | 23.3 | 25.6 | 10:00 | 21.1 | 8:00 | 0.0 | 5.0 | 18.3 | 5.5 | 14.8 | 11:30 | SW |
| 24 | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | |
| | 22.6 | 29.8 | 4 | 15.7 | 11 | 0.0 | 96.3 | 118.4 | 3.4 | 16.1 | 14 | W |

Max >= 32.0: 0
Max <= 0.0: 0
Min <= 0.0: 0
Min <= -18.0: 0
Max Rain: 26.42 ON 20/08/09
Days of Rain: 20 (> .2 mm) 12 (> 2 mm) 2 (> 20 mm)
Heat Base: 18.3 Cool Base: 18.3 Method: (High + Low) / 2

MONTHLY CLIMATOLOGICAL SUMMARY for SEP. 2009

NAME: Cavan Landfill CITY: STATE:
ELEV: LAT: LONG:

TEMPERATURE (°C), RAIN (mm), WIND SPEED (mph)

| DAY | MEAN TEMP | HIGH | TIME | LOW | TIME | HEAT DEG DAYS | COOL DEG DAYS | RAIN | AVG WIND SPEED | HIGH | TIME | DOM DIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | |
| 11 | 26.3 | 30.6 | 16:10 | 16.5 | 9:10 | 0.0 | 5.3 | 0.0 | 0.9 | 10.0 | 12:00 | ENE |
| 12 | 24.2 | 31.7 | 15:30 | 9.4 | 7:55 | 0.0 | 2.3 | 0.2 | 0.8 | 9.0 | 17:00 | ESE |
| 13 | 24.1 | 31.9 | 16:50 | 13.2 | 4:45 | 0.0 | 4.3 | 0.2 | 2.1 | 12.0 | 12:50 | ESE |
| 14 | 23.9 | 31.0 | 17:00 | 17.7 | 2:25 | 0.0 | 6.1 | 0.2 | 1.5 | 10.0 | 12:40 | S |
| 15 | 23.9 | 27.9 | 21:00 | 13.5 | 7:30 | 0.0 | 2.4 | 0.0 | 3.3 | 14.0 | 15:00 | NE |
| 16 | 22.5 | 27.1 | 5:30 | 14.2 | 22:00 | 0.0 | 2.4 | 0.0 | 4.7 | 15.0 | 10:30 | NE |
| 17 | 16.7 | 22.6 | 13:30 | 9.5 | 6:00 | 2.2 | 0.0 | 0.0 | 1.5 | 10.0 | 13:00 | ENE |
| 18 | 21.0 | 24.7 | 17:30 | 13.6 | 1:30 | 0.0 | 0.8 | 0.0 | 2.4 | 14.0 | 17:00 | S |
| 19 | 22.2 | 29.9 | 15:00 | 12.9 | 9:30 | 0.0 | 3.2 | 0.2 | 5.2 | 18.0 | 6:00 | N |
| 20 | 22.2 | 27.4 | 12:00 | 6.7 | 8:00 | 1.2 | 0.0 | 0.0 | 7.1 | 27.0 | 21:30 | W |
| 21 | 20.8 | 26.8 | 0:30 | 12.4 | 4:30 | 0.0 | 1.3 | 1.2 | 13.5 | 32.0 | 14:00 | WSW |
| 22 | 29.7 | 32.9 | 11:00 | 25.8 | 1:00 | 0.0 | 11.1 | 0.6 | 10.6 | 33.0 | 3:00 | W |
| 23 | 29.6 | 33.5 | 16:30 | 26.4 | 2:00 | 0.0 | 11.7 | 0.0 | 7.5 | 29.0 | 13:00 | W |
| 24 | 28.6 | 31.4 | 14:30 | 26.2 | 23:30 | 0.0 | 10.6 | 0.0 | 6.9 | 20.0 | 11:00 | W |
| 25 | 27.2 | 32.1 | 16:30 | 23.2 | 4:00 | 0.0 | 9.4 | 0.0 | 7.0 | 22.0 | 15:30 | W |
| 26 | 26.0 | 29.7 | 13:00 | 19.9 | 21:00 | 0.0 | 6.5 | 0.0 | 5.0 | 16.0 | 10:30 | W |
| 27 | 20.8 | 25.4 | 13:00 | 12.3 | 4:00 | 0.0 | 0.6 | 0.0 | 7.0 | 20.0 | 11:00 | W |
| 28 | 22.9 | 25.7 | 19:00 | 13.3 | 5:30 | 0.0 | 1.2 | 0.0 | 7.7 | 21.0 | 12:00 | WNW |
| 29 | 23.1 | 29.3 | 24:00 | 13.1 | 8:30 | 0.0 | 2.9 | 0.0 | 6.5 | 19.0 | 0:30 | WNW |
| 30 | 25.5 | 31.7 | 6:00 | 12.3 | 20:00 | 0.0 | 3.7 | 0.8 | 6.2 | 18.0 | 13:30 | WNW |
| | 24.1 | 33.5 | 23 | 6.7 | 20 | 3.4 | 85.7 | 3.4 | 5.4 | 33.0 | 22 | WNW |

M >= 32.0: 3
Max <= 0.0: 0
Min <= 0.0: 0
Min <= -18.0: 0
Max Rain: 1.20 ON 21/09/09
Days of Rain: 3 (> .2 mm) 0 (> 2 mm) 0 (> 20 mm)
Heat Base: 18.3 Cool Base: 18.3 Method: (High + Low) / 2

MONTHLY CLIMATOLOGICAL SUMMARY for OCT. 2009

NAME: Cavan Landfill CITY: STATE:
ELEV: LAT: LONG:

TEMPERATURE (°C), RAIN (mm), WIND SPEED (mph)

| DAY | MEAN TEMP | HIGH | TIME | LOW | TIME | HEAT DEG DAYS | COOL DEG DAYS | RAIN | AVG WIND SPEED | HIGH | TIME | DOM DIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 18.1 | 24.4 | 10:00 | 9.0 | 5:00 | 1.6 | 0.0 | 0.0 | 3.4 | 13.0 | 0:30 | N |
| 2 | 18.2 | 22.7 | 24:00 | 11.9 | 7:30 | 1.0 | 0.0 | 0.8 | 9.5 | 32.0 | 23:30 | WNW |
| 3 | 16.7 | 23.1 | 1:00 | 7.9 | 21:00 | 2.8 | 0.0 | 2.4 | 12.3 | 38.0 | 11:00 | NW |
| 4 | 25.4 | 30.0 | 15:30 | 18.8 | 0:30 | 0.0 | 6.1 | 0.2 | 4.0 | 16.0 | 13:00 | W |
| 5 | 27.6 | 32.0 | 14:00 | 14.6 | 16:30 | 0.0 | 5.0 | 0.0 | 3.7 | 16.0 | 15:00 | SW |
| 6 | 24.1 | 33.1 | 17:00 | 10.7 | 7:30 | 0.0 | 3.6 | 2.0 | 4.8 | 19.0 | 15:30 | NE |
| 7 | 25.5 | 29.8 | 14:30 | 20.2 | 7:30 | 0.0 | 6.7 | 0.0 | 3.3 | 13.0 | 13:00 | W |
| 8 | 24.3 | 30.1 | 15:00 | 14.6 | 7:00 | 0.0 | 4.0 | 0.2 | 2.7 | 11.0 | 20:30 | NW |
| 9 | 27.8 | 41.4 | 24:00 | 16.1 | 14:00 | 0.0 | 10.5 | 7.6 | 5.6 | 23.0 | 11:00 | S |
| 10 | 41.7 | 48.3 | 14:00 | 35.1 | 19:00 | 0.0 | 23.4 | 0.2 | 4.7 | 15.0 | 19:00 | W |
| 11 | 36.7 | 39.3 | 0:30 | 32.3 | 22:30 | 0.0 | 17.6 | 0.6 | 6.1 | 23.0 | 11:00 | N |
| 12 | 35.8 | 40.0 | 16:30 | 27.9 | 6:30 | 0.0 | 15.7 | 0.2 | 1.5 | 10.0 | 15:00 | N |
| 13 | 36.3 | 39.6 | 20:30 | 28.7 | 6:00 | 0.0 | 15.8 | 0.0 | 3.5 | 10.0 | 14:30 | W |
| . | 39.3 | 42.8 | 15:00 | 35.0 | 2:00 | 0.0 | 20.6 | 0.0 | 1.6 | 9.0 | 15:00 | WSW |
| 15 | 39.3 | 44.1 | 12:00 | 33.7 | 24:00 | 0.0 | 20.6 | 1.2 | 1.6 | 11.0 | 22:00 | NE |
| 16 | 39.3 | 43.1 | 13:00 | 31.0 | 22:00 | 0.0 | 18.8 | 0.0 | 1.6 | 9.0 | 12:00 | NE |
| 17 | 36.1 | 39.9 | 15:30 | 30.3 | 2:00 | 0.0 | 16.9 | 0.0 | 2.9 | 14.0 | 12:30 | E |
| 18 | 40.3 | 46.3 | 24:00 | 34.4 | 17:30 | 0.0 | 22.1 | 7.0 | 7.4 | 17.0 | 3:30 | WSW |
| 19 | 42.7 | 47.1 | 4:00 | 35.0 | 21:00 | 0.0 | 22.8 | 0.8 | 10.2 | 28.0 | 17:00 | WSW |
| 20 | 40.1 | 46.4 | 17:00 | 30.2 | 8:30 | 0.0 | 20.0 | 7.4 | 8.9 | 29.0 | 6:30 | SSE |
| 21 | 41.7 | 48.1 | 24:00 | 34.0 | 2:30 | 0.0 | 22.8 | 5.4 | 9.2 | 26.0 | 14:00 | SSE |
| 22 | 56.8 | 62.2 | 17:30 | 46.1 | 0:30 | 0.0 | 35.8 | 23.6 | 6.3 | 20.0 | 6:00 | SE |
| 23 | 57.3 | 63.4 | 13:00 | 45.9 | 23:30 | 0.0 | 36.4 | 0.4 | 4.9 | 13.0 | 5:30 | WSW |
| 24 | 50.5 | 56.0 | 20:00 | 43.6 | 0:30 | 0.0 | 31.5 | 11.4 | 16.6 | 47.0 | 18:30 | SSE |
| 25 | 60.6 | 65.9 | 14:00 | 41.3 | 1:30 | 0.0 | 35.4 | 4.0 | 12.5 | 31.0 | 4:00 | WNW |
| 26 | 48.6 | 60.2 | 0:30 | 39.2 | 24:00 | 0.0 | 31.4 | 0.6 | 4.4 | 20.0 | 23:00 | WNW |
| 27 | 61.0 | 69.2 | 22:30 | 38.7 | 2:00 | 0.0 | 35.6 | 4.4 | 10.6 | 30.0 | 16:30 | SSW |
| 28 | 60.3 | 68.9 | 0:30 | 47.0 | 14:00 | 0.0 | 39.7 | 0.4 | 8.3 | 23.0 | 7:00 | WSW |
| 29 | 58.7 | 69.9 | 24:00 | 46.4 | 5:00 | 0.0 | 39.9 | 0.8 | 9.0 | 26.0 | 10:00 | SSW |
| 30 | 72.0 | 73.1 | 16:30 | 69.9 | 0:30 | 0.0 | 53.2 | 14.8 | 11.1 | 30.0 | 13:30 | SSW |
| 31 | 59.7 | 72.6 | 0:30 | 44.1 | 11:00 | 0.0 | 40.1 | 0.2 | 10.1 | 27.0 | 14:30 | WSW |
| | 40.7 | 73.1 | 30 | 7.9 | 3 | 5.3 | 652.0 | 96.6 | 6.5 | 47.0 | 24 | WSW |

Max >= 32.0: 25
Max <= 0.0: 0
Min <= 0.0: 0
Min <= -18.0: 0
Max Rain: 23.60 ON 22/10/09
Days of Rain: 19 (> .2 mm) 10 (> 2 mm) 1 (> 20 mm)
Heat Base: 18.3 Cool Base: 18.3 Method: (High + Low) / 2

MONTHLY CLIMATOLOGICAL SUMMARY for NOV. 2009

NAME: Cavan Landfill CITY: STATE:
ELEV: LAT: LONG:

TEMPERATURE (°C), RAIN (mm), WIND SPEED (mph)

| DAY | MEAN TEMP | HIGH | TIME | LOW | TIME | HEAT DEG DAYS | COOL DEG DAYS | RAIN | AVG WIND SPEED | HIGH | TIME | DOM DIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 65.6 | 73.6 | 15:30 | 49.7 | 3:30 | 0.0 | 43.4 | 21.2 | 7.3 | 24.0 | 17:00 | WNW |
| 2 | 65.0 | 73.5 | 24:00 | 46.6 | 13:30 | 0.0 | 41.8 | 2.0 | 8.6 | 21.0 | 5:00 | W |
| 3 | 62.9 | 74.4 | 4:30 | 37.8 | 21:00 | 0.0 | 37.8 | 7.2 | 10.9 | 32.0 | 4:30 | W |
| 4 | 61.8 | 75.7 | 21:00 | 37.9 | 1:00 | 0.0 | 38.5 | 10.8 | 9.8 | 27.0 | 11:00 | W |
| 5 | 68.5 | 76.3 | 11:30 | 57.1 | 7:30 | 0.0 | 48.4 | 2.6 | 8.1 | 29.0 | 12:00 | NW |
| 6 | 70.3 | 72.8 | 12:00 | 59.7 | 16:00 | 0.0 | 48.0 | 3.0 | 9.4 | 28.0 | 17:00 | W |
| 7 | 72.0 | 75.6 | 17:00 | 66.6 | 6:00 | 0.0 | 52.8 | 1.0 | 7.9 | 25.0 | 2:00 | WSW |
| 8 | 67.5 | 74.1 | 0:30 | 59.9 | 8:30 | 0.0 | 48.8 | 0.0 | 3.1 | 13.0 | 1:30 | N |
| 9 | 60.6 | 65.6 | 24:00 | 50.9 | 17:30 | 0.0 | 40.0 | 9.6 | 6.0 | 20.0 | 15:00 | SSW |
| 10 | 63.0 | 70.3 | 12:00 | 49.1 | 22:00 | 0.0 | 41.4 | 0.2 | 2.4 | 11.0 | 13:30 | WNW |
| 11 | 59.3 | 72.3 | 13:30 | 37.4 | 10:00 | 0.0 | 36.6 | 6.8 | 3.8 | 19.0 | 14:30 | N |
| 12 | 68.2 | 72.2 | 5:00 | 56.9 | 17:30 | 0.0 | 46.3 | 5.2 | 10.8 | 37.0 | 14:00 | WSW |
| 13 | 60.4 | 62.3 | 0:30 | 45.8 | 24:00 | 0.0 | 35.8 | 2.4 | 8.3 | 23.0 | 23:30 | WSW |
| 14 | 45.0 | 60.1 | 1:00 | 33.3 | 11:00 | 0.0 | 28.4 | 8.2 | 7.4 | 26.0 | 1:00 | WSW |
| 15 | 47.7 | 51.6 | 21:00 | 34.3 | 23:00 | 0.0 | 24.7 | 3.0 | 8.5 | 24.0 | 20:00 | SW |
| 16 | 38.2 | 44.9 | 6:30 | 27.8 | 22:00 | 0.0 | 18.1 | 17.0 | 12.1 | 35.0 | 12:00 | W |
| 17 | 32.6 | 36.9 | 17:00 | 27.4 | 9:30 | 0.0 | 13.9 | 5.8 | 9.8 | 28.0 | 13:00 | WSW |
| 18 | 46.7 | 54.1 | 23:30 | 35.9 | 16:30 | 0.0 | 0.0 | 3.0 | 16.8 | 38.0 | 19:00 | WSW |
| 19 | 49.5 | 53.7 | 0:30 | 40.5 | 15:30 | 0.0 | 28.8 | 25.6 | 15.5 | 39.0 | 9:00 | WSW |
| 20 | 35.0 | 37.2 | 10:00 | 27.9 | 12:30 | 0.0 | 14.3 | 0.0 | 8.8 | 26.0 | 12:00 | W |
| 21 | 41.5 | 59.1 | 12:30 | 35.2 | 1:00 | 0.0 | 28.9 | 4.4 | 11.2 | 37.0 | 12:30 | SSE |
| 22 | | | | | | | | | | | | |
| 23 | 62.1 | 69.1 | 9:30 | 52.9 | 24:00 | 0.0 | 42.7 | 0.2 | 9.1 | 29.0 | 15:30 | WNW |
| 24 | 67.2 | 73.2 | 6:30 | 50.8 | 1:30 | 0.0 | 43.7 | 11.8 | 15.6 | 43.0 | 12:00 | WSW |
| 25 | 65.9 | 73.6 | 14:30 | 35.3 | 3:30 | 0.0 | 36.2 | 15.8 | 17.2 | 49.0 | 6:00 | W |
| 26 | 69.1 | 75.9 | 2:30 | 64.3 | 11:00 | 0.0 | 51.8 | 1.6 | 10.4 | 25.0 | 13:30 | W |
| 27 | 66.7 | 68.2 | 12:00 | 65.3 | 1:00 | 0.0 | 48.4 | 0.4 | 6.7 | 21.0 | 15:30 | W |
| 28 | 61.9 | 67.8 | 24:00 | 33.8 | 7:30 | 0.0 | 32.5 | 0.0 | 3.0 | 13.0 | 19:30 | WSW |
| 29 | 65.8 | 71.1 | 10:30 | 62.5 | 16:30 | 0.0 | 48.5 | 0.2 | 12.1 | 33.0 | 10:00 | NE |
| 30 | 60.5 | 64.1 | 0:30 | 55.6 | 3:00 | 0.0 | 41.5 | 0.0 | 4.7 | 17.0 | 3:00 | N |
| | 58.6 | 76.3 | 5 | 27.4 | 17 | 0.0 | 1061.9 | 169.0 | 9.1 | 49.0 | 25 | WSW |

Ma.. >= 32.0: 29
Max <= 0.0: 0
Min <= 0.0: 0
Min <= -18.0: 0
Max Rain: 25.60 ON 19/11/09
Days of Rain: 22 (> .2 mm) 18 (> 2 mm) 2 (> 20 mm)
Heat Base: 18.3 Cool Base: 18.3 Method: (High + Low) / 2

MONTHLY CLIMATOLOGICAL SUMMARY for DEC. 2009

NAME: Cavan Landfill CITY: STATE:
ELEV: LAT: LONG:

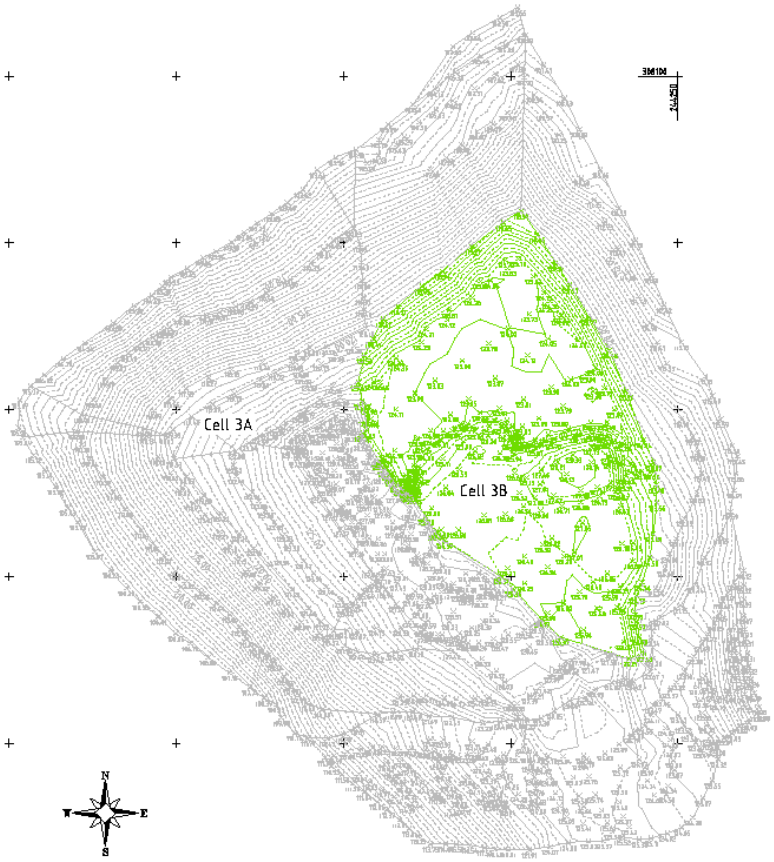
TEMPERATURE (°C), RAIN (mm), WIND SPEED (mph)

| DAY | MEAN TEMP | HIGH | TIME | LOW | TIME | HEAT DEG DAYS | COOL DEG DAYS | RAIN | AVG WIND SPEED | HIGH | TIME | DOM DIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 62.1 | 69.5 | 18:30 | 46.4 | 9:30 | 0.0 | 39.7 | 7.8 | 11.3 | 38.0 | 11:00 | SSW |
| 2 | 45.2 | 66.4 | 0:30 | 26.7 | 21:00 | 0.0 | 28.3 | 0.0 | 5.2 | 21.0 | 5:00 | S |
| 3 | 46.1 | 59.4 | 11:30 | 31.3 | 0:30 | 0.0 | 27.1 | 3.2 | 6.6 | 25.0 | 1:00 | WNW |
| 4 | 47.2 | 57.9 | 20:30 | 27.0 | 4:00 | 0.0 | 24.2 | 7.8 | 6.8 | 20.0 | 19:00 | SSW |
| 5 | 58.8 | 74.7 | 22:30 | 34.8 | 15:30 | 0.0 | 36.5 | 6.6 | 9.4 | 37.0 | 21:30 | WSW |
| 6 | 53.8 | 73.8 | 0:30 | 37.7 | 6:30 | 0.0 | 37.5 | 1.6 | 15.6 | 37.0 | 14:30 | WSW |
| 7 | 70.5 | 79.7 | 19:30 | 45.4 | 5:30 | 0.0 | 44.3 | 2.2 | 8.6 | 25.0 | 1:30 | W |
| 8 | 74.5 | 78.2 | 0:30 | 65.1 | 23:30 | 0.0 | 53.4 | 3.2 | 11.4 | 31.0 | 11:30 | WSW |
| 9 | 66.0 | 69.2 | 4:30 | 51.1 | 15:30 | 0.0 | 41.8 | 1.0 | 9.0 | 25.0 | 2:30 | WSW |
| 10 | 67.1 | 71.4 | 14:30 | 64.2 | 3:30 | 0.0 | 49.5 | 0.4 | 3.4 | 13.0 | 19:00 | W |
| 11 | 65.8 | 69.9 | 15:30 | 29.8 | 24:00 | 0.0 | 31.6 | 0.0 | 6.2 | 17.0 | 3:00 | SSE |
| 12 | 56.6 | 63.2 | 12:00 | 31.8 | 10:30 | 0.0 | 29.2 | 0.0 | 3.1 | 14.0 | 2:30 | SSE |
| 13 | 62.6 | 69.8 | 19:00 | 51.2 | 9:00 | 0.0 | 42.3 | 0.2 | 0.9 | 6.0 | 17:00 | S |
| 14 | 57.1 | 70.9 | 3:00 | 18.1 | 24:00 | 0.0 | 26.2 | 0.4 | 5.2 | 16.0 | 15:30 | N |
| 15 | 34.8 | 41.1 | 22:00 | 20.9 | 1:00 | 0.0 | 12.7 | 0.2 | 3.8 | 21.0 | 14:00 | NE |
| 16 | 47.4 | 63.4 | 24:00 | 38.2 | 0:30 | 0.0 | 32.5 | 0.6 | 4.7 | 15.0 | 14:00 | N |
| 17 | 44.4 | 63.1 | 0:30 | 32.7 | 10:30 | 0.0 | 29.6 | 0.2 | 4.0 | 17.0 | 15:30 | ENE |
| 18 | 41.9 | 45.3 | 23:00 | 39.3 | 6:00 | 0.0 | 24.1 | 0.0 | 2.7 | 12.0 | 21:00 | ENE |
| 19 | 50.4 | 65.9 | 21:00 | 40.9 | 12:00 | 0.0 | 35.1 | 1.8 | 4.8 | 24.0 | 17:30 | WNW |
| 20 | 63.1 | 65.2 | 20:00 | 55.2 | 7:30 | 0.0 | 41.9 | 1.4 | 8.2 | 21.0 | 14:00 | N |
| 21 | 68.2 | 71.1 | 14:00 | 62.8 | 0:30 | 0.0 | 48.7 | 1.2 | 5.8 | 21.0 | 1:00 | WNW |
| 22 | 68.0 | 71.0 | 13:30 | 66.4 | 9:00 | 0.0 | 50.4 | 0.6 | 6.0 | 18.0 | 17:30 | WNW |
| 23 | 66.9 | 67.8 | 4:00 | 65.5 | 22:30 | 0.0 | 48.4 | 0.0 | 1.3 | 9.0 | 1:00 | WSW |
| 24 | 58.6 | 67.6 | 0:30 | 40.6 | 23:30 | 0.0 | 35.8 | 0.2 | 0.0 | 0.0 | 0:30 | --- |
| 25 | 53.5 | 69.9 | 24:00 | 39.8 | 6:00 | 0.0 | 36.6 | 1.4 | 1.8 | 16.0 | 16:30 | SSW |
| 26 | 69.2 | 71.8 | 6:30 | 67.3 | 15:00 | 0.0 | 51.3 | 4.4 | 6.8 | 20.0 | 5:00 | WSW |
| 27 | 62.6 | 69.4 | 6:30 | 39.3 | 22:30 | 0.0 | 36.1 | 1.2 | 4.9 | 30.0 | 10:30 | WNW |
| 28 | 46.3 | 54.3 | 9:30 | 33.7 | 4:00 | 0.0 | 25.7 | 0.2 | 3.1 | 12.0 | 21:30 | WNW |
| 29 | 51.9 | 66.8 | 24:00 | 42.8 | 2:00 | 0.0 | 36.5 | 3.0 | 11.6 | 26.0 | 20:30 | E |
| 30 | 66.2 | 66.9 | 2:30 | 58.4 | 24:00 | 0.0 | 44.4 | 15.2 | 16.3 | 39.0 | 22:00 | E |
| 31 | 41.8 | 58.8 | 0:30 | 34.3 | 12:30 | 0.0 | 28.3 | 0.0 | 6.4 | 33.0 | 0:30 | NE |
| | 57.1 | 79.7 | 7 | 18.1 | 14 | 0.0 | 1129.5 | 66.0 | 6.3 | 39.0 | 30 | WNW |

Max >= 32.0: 31
Max <= 0.0: 0
Min <= 0.0: 0
Min <= -18.0: 0
Max Rain: 15.20 ON 30/12/09
Days of Rain: 20 (> .2 mm) 9 (> 2 mm) 0 (> 20 mm)
Heat Base: 18.3 Cool Base: 18.3 Method: (High + Low) / 2

# APPENDIX D

# TOPOGRAPHICAL SURVEYS




LEGEND

Survey June and Oct. 2009 (Oxigen)

Survey Dec. 2009 (Oxigen)

Oxigen

OXIGEN ENVIRONMENTAL LIMITED.

WMT

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CORRANURE LANDFILL

AT CORRANURE CO.CAVAN

FOR OXIGEN ENVIRONMENTAL

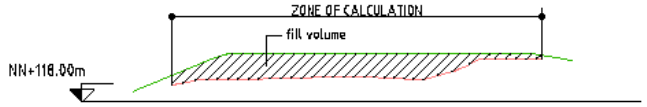
TITLE

CURRENT CONTOUR OF CELL 3

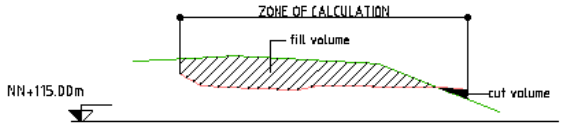
14.12.2009

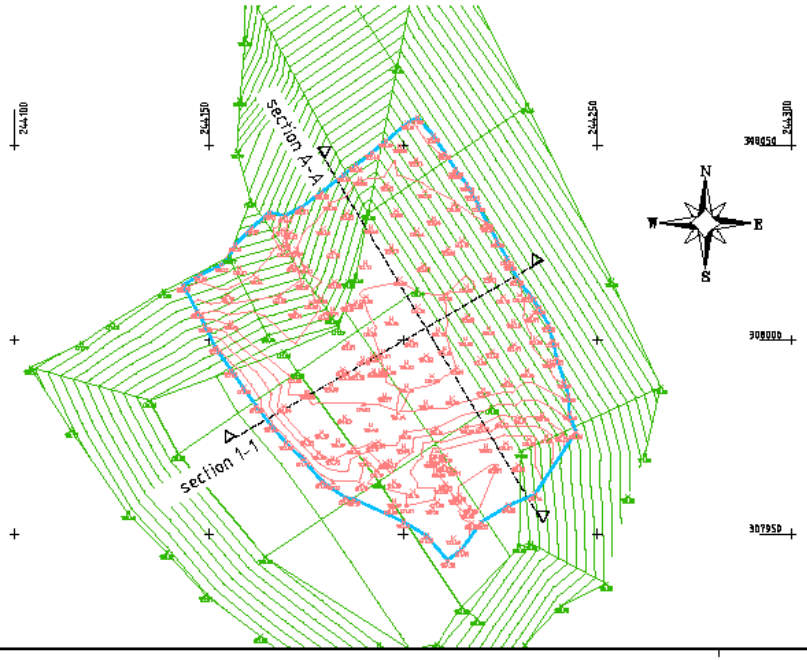
| | | |
|---|---|---|
| DRAWN SI. | CHK. RK | APP. |
| SCALE 1:1000 | NO. | REV. |
| DATE 16.12.2009 | 41.96010161100.002 | |

section A-A
M=1:1000




section 1-1
M=1:1000




## LEGEND

- dutyline of calculation
- contour Cell 3b (Oct. 09) measurement from Oxigen
- contour of the proposed final filling Cell 3a+b

VOLUME - CALCULATION

| | | |
|---|---|---|
| total area 1.model (3D) | : | 6,772 m² |
| total area 2.model (3D) | : | 6,625 m² |
| total cut volume | : | 778 m³ |
| total fill volume | : | 25,590 m³ |

basics of calculation :
measurement from Oxigen (Oct. 2009)
filling plan Cell 3 (61.960101161100.001 - 20.10.2008)

(All coordinates and levels referring to map "Cell 3 contour.dwg", Oxigen, October 2009)

Oxigen

OXIGEN ENVIRONMENTAL
LIMITED.

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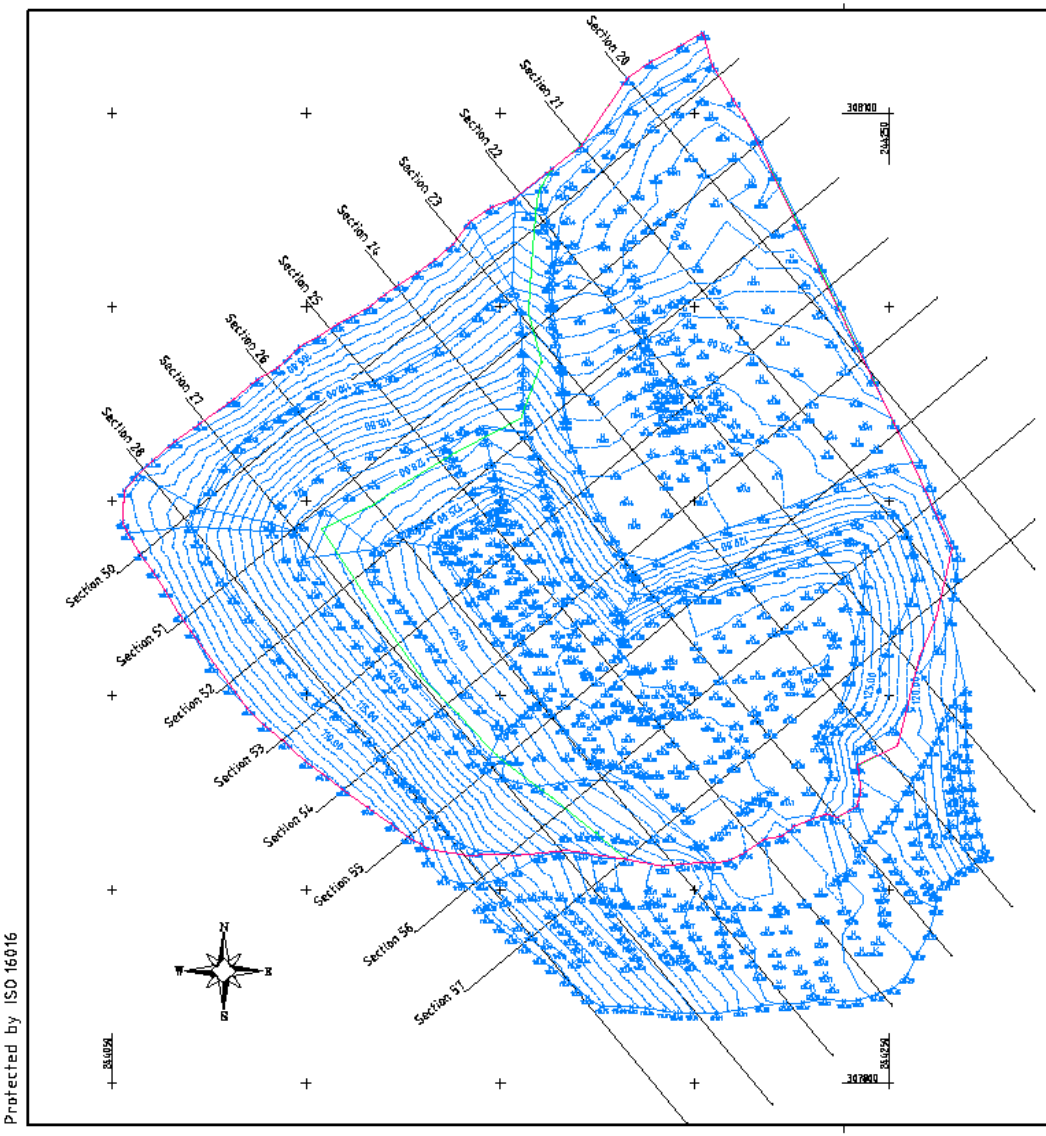
Tel.: +49(0)2162 / 81926-0

CORRANURE LANDFILL
AT CORRANURE CO.CAVAN
FOR OXIGEN ENVIRONMENTAL

TITLE
FILLING PLAN CELL 3
REMAINING SPACE CELL 3B

| | | |
|---|---|---|
| DRAWN SI. | CHK. RK | APP. |
| SCALE 1:1000 | NO. | REV. |
| DATE 21.10.2009 | 71.960101161100.015 | |




Dutyline Calculation 1

Dutyline Calculation 2

Oxigen

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CORRANURE LANDFILL

AT CORRANURE CO.CAVAN

FOR OXIGEN ENVIRONMENTAL

TITLE

SURVEY CELL 3A/B
JUNE 2009
CALCULATION – FILLING VOLUME

| DRAWN SI. | CHK. RK | APP. |
|---|---|---|
| SCALE 1:1000 | NO. | REV. |
| DATE 01.07.2009 | 71.96010161100.012 | |

# APPENDIX E

# PRTR Emissions Data