Clare County Council

Tradaree Point Sludge Disposal Facility

Annual Environmental Report 2010

Waste Licence Reg. No. W0037-01

WYG Environmental & Planning (Ireland) Ltd.

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1.0 INTRODUCTION

WYG Environmental & Planning (Ireland) Ltd. was commissioned by Response Group on behalf of Clare County Council to compile an Annual Environmental Report (AER) required under Condition 11 of Waste Licence Reg. No. W0037-01 for a Sludge Disposal Facility situated at Tradaree Point, Shannon (Clonmoney South), Co. Clare for the period January 2010 to December 2010.

Report conditions are presented in Appendix A.

1.1 BACKGROUND

The Environmental Protection Agency (EPA) issued Shannon Free Airport Development Company Limited with a Waste Licence on 1st May 2003. The ownership of the facility was subsequently passed onto Clare County Council under the same Waste Licence.

Under Condition 11.6, Section 11 of the W0037-01, an Annual Environmental Report (AER) must be prepared and submitted to the EPA for approval. The AER for the facility includes the information specified in Schedule F of the Waste Licence, Content of the Environmental Report, and has been prepared in accordance with the EPA (1999) Waste Licensing – Draft Guidance Note on Environmental Management Systems and Reporting to the Agency, the EPA Guidance Note for the Annual Environmental Report and the EPA AER/PRTR Guidance Document.

1.2 REPORTING PERIOD

This AER details the activities carried out at the facility in the period from January 2010 to December 2010 in accordance with W0037-01.

1.3 SITE DESCRIPTION

The site is situated approximately 4.5km south east of Shannon Town to the south-west of Bunratty (OS National Grid Reference 143,600E, 160,100N). The site is located on a peninsula, which extends into Shannon Estuary. A grassland constructed clay embankment, average height 5.0 mOD, lies to the south of the site between Shannon Estuary and the site.

The site location is shown in Figure 1.

1.4 FACILITY LAYOUT

The landfill (sludge disposal facility) is divided into two sections - the capped historic sludge disposal area and the four newly constructed lined cells. The area where the new cells have been constructed has an average elevation of 1.5mOD. The cells are bounded to the south-east and north-east by an open land drain. The average drain bed level is 0.6mOD. This discharges to Shannon Estuary via an outlet pipe under the clay embankment which is controlled by a sluice valve. A 10m wide buffer zone exists along the southern perimeter of the site between the edge of the catchment drain and the capped sludge cells. No sludge or restoration material is stored within this zone.

The layout of the facility is illustrated in Figure 2.

Tradaree Point Wastewater Treatment Plant (WWTP) provides treatment of both domestic and industrial effluent from Shannon Town and Shannon Industrial Estate. The sludge facility only accepts waste sludge from the Tradaree Point sludge treatment facility. Sludge has been disposed on the site since approximately 1981.

2.0 FACILITY INFRASTRUCTURE AND OPERATION

2.1 WASTE ACTIVITIES CARRIED OUT AT THE FACILITY

The facility is licensed to handle a maximum of 2,500 tonnes of waste per annum. This comprises 750 tpa (tonnes per annum) treated dewatered non-hazardous domestic sludge (EWC code 19 08 05) and 1,750 tpa of industrial sludge (EWC code 19 08 12, 19 08 14) in engineered cells within the facility boundary. Waste activities licensed at the facility under the Third and Fourth Schedules of the Waste Management Act 1996, are detailed below.

Table 2.1 Licensed Waste Disposal Activities in Accordance with the Third Schedule of the Waste Management Act

Class 1	Deposit on, in or under land (including landfill)* This activity is limited to the disposal of treated dewatered non-hazardous domestic and industrial sludge in the existing active cells within the facility.
Class 4	Surface impoundment, including placement of liquid or sludge discards into pits, pond or lagoons
Class 5	Specially engineered landfill, including placement into lined discreet cells which are capped and isolated from one another and the environment.
Class 6	Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 5 or paragraphs 8 to 10 of this Schedule (including evaporation, drying and calcination).
Class 13	Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.

2.2 METHODS OF DEPOSITION OF SLUDGE

Two different waste effluent streams undergo separate treatment at Tradaree Point WWTP. Industrial wastewater is treated in the Industrial Treatment Plant and domestic wastewater is treated in the Domestic Treatment Plant.

The only waste disposed of at the sludge disposal facility is treated dewatered sludge from the WWTP. No other waste is accepted for disposal at the facility. In the unlikely event of a different waste type being presented for disposal at the facility, a separate storage area is provided to contain the materials separately until such time as it can be removed off site to a suitable facility.

Sludge generated in the WWTP is sent to a dewatering building to the east of the plant. Both domestic and industrial sludge are dewatered using two belt presses after which the sludge is conveyed into an open trailer. The dewatered sludge is then transported to the landfill area and unloaded using a dumper.

The sludge is further dried naturally in the open air. Older dried sludges are excavated from their initial deposition area and heaped into mounds where they are permitted to re-vegetate by natural succession. The new cells are being filled sequentially in a similar manner. Cell 1 is currently the active cell and sludge is transported for landfilling on a daily basis between Monday and Friday by a dumper. Transportation to the landfill is facilitated by the provision of a causeway at the cell entrance which provides a dry area for the unloading of the sludge.

2.3 QUANTITY AND COMPOSITION OF SLUDGE DISPOSED

2.3.1 Sludge Disposed - 2010

The facility is licensed to handle up to 2,500 tonnes of waste sludge per annum. The quantities of mixed industrial and domestic sludge disposed at the facility between January and December 2010 are presented in Table 2.2 overleaf.

As specified in Condition 1.1 of the Waste Licence, only those categories and quantities listed in Part 1 (Activities Licenced) [See also Schedule A] can be accepted at the facility. During 2010, approximately 489 tonnes of mixed industrial and domestic sludge were accepted at the facility. This quantity is below the maximum 2,500 tonnes of waste per annum permitted.

Table 2.2: Quantities of Sludge Disposed in 2010

Month	Quantity (Kg)
January	35,070
February	63,110
March	63,140
April	104,900
May	817
June	103,050
July	7,749
August	41,020
September	4,784
October	1,100
November	63,930
December	0 Note 1
TOTAL (kg)	**488,670**
TOTAL (tonnes)	**489**

Note 1: No sludge passed through the facility for the month of December 2010.

2.3.2 Sludge Disposed 2004-2010

Table 2.3 below details the quantities of sludge disposed at the facility between 2004 and 2010.

Table 2.3: Quantity of Sludge Disposed 2004-2010

Year	Quantity (Tonnes) Sludge Disposed/Annum
2004	1,022
2005	954
2006	408
2007	756
2008	548
2009	732
2010	489

2.4 CALCULATED REMAINING CAPACITY OF THE FACILITY

In 2006, the quantity of sludge accepted (408 tonnes) was low compared to previous years due to the machinery breakdowns experienced in the WWTP. This increased to 755.5 tonnes in 2007. The volume of sludge disposed during 2008 was 548 tonnes, which was lower than in 2007 – this was due to reduced throughput and belt press breakdowns. The quantity of sludge accepted increased to 732 tonnes in 2009 but decreased in 2010 to 489 tonnes. No sludge passed through the facility for the month of December 2010 due to machinery (belt press) breakdown.

The total capacity of the four lined cells is 12,029m^3. Landfilling in the lined cells commenced in Cell 1 in 2005. In 2010, approximately 489 tonnes of sludge (including both industrial and domestic) was disposed of at the facility.

The density of dewatered sludge varies depending on the dry matter concentration. In 2010, the average cake % dry matter reached in the sludge was 20.97%. At this rate, the bulk density is typically calculated at rate of 1.27 t/m^3 (assuming that the ratio of volatile and fixed sludge is 65%:35%). Therefore, at this density, the volume of waste sludge disposed of at the facility during 2010 was 385m^3.

Based on the 2010 figure, it is expected that the landfill should reach its full capacity by 2025. However, if yearly tonnages remain low this figure could be extended.

2.5 RESTORATION OF FORMER SLUDGE DISPOSAL AREAS & COMPLETED CELLS/PHASES

A restoration and aftercare management plan for the facility was prepared in consultation with the EPA Restoration and Aftercare Manual and was previously submitted to the Agency in January 2004. The Agency confirmed in a letter (Ref. 37-1/GEN03bd) that the plan was to their satisfaction.

All unlined sludge mounds have been capped along with all unlined cells after EPA approval. Waste sludge continues to be disposed of into the first of the newly lined active cells – Cell 1.

The total capped area occupied by waste in the facility is 15,742m^2. Since 2005, a total of 3,887 tonnes of waste has been deposited into Cell 1.

2.6 TOPOGRAPHICAL SURVEY

A topographical survey was undertaken during September 2003 as part of Licence Condition 8.10.1. The results of the survey were submitted to the Agency in the 6-month report on Drawing No.1, submitted in October 2003. No additional topographical surveys have taken place at the facility since 2003.

2.7 LEACHATE MANAGEMENT

2.7.1 Leachate Pumping Records

A total of 11,279 m^3 of leachate was pumped during the reporting period. Leachate is collected from the existing sludge disposal area (Cell 1), the inactive cells (Cells 2-4) and the capped unlined area via a network of drains which are connected to a leachate collection sump and from here it is pumped to Tradaree WWTP. The pump has a capacity to pump 75m^3 per hour. The monthly averages of leachate generated during 2010 are detailed in Table 2.4 below.

Table 2.4: The monthly averages of leachate generated in 2010

Month	Flow Rate (m^3/month)
January	1918
February	782
March	848
April	1341
May	383
June	356
July	831
August	412
September	803
October	657
November	2506
December	440
TOTAL (m^3/year)	**11,279**

2.8 ESTIMATED ANNUAL AND CUMULATIVE QUANTITIES OF LANDFILL GAS EMITTED

Landfill gas production is a function of the biodegradable portion of the wastes and other factors including the waste density and moisture content. According to the UK EA, total gas generation depends on the waste type being deposited on site and also the degradable carbon content. However the rate of decomposition depends on the site-specific factors. The time taken to decompose will directly influence the period over which landfill gas is generated.

Emissions through the in situ clay base and side walls of the landfill facility are expected to be small. The capped sludge disposal area does not have an engineered base lining. Site investigation results indicate that in situ clay has a hydraulic conductivity of less than 1 x 10^{-9}m/s. Gas levels are being measured in monitoring boreholes installed in the ground along the perimeter of the landfill to check if there are any emissions.

The UK Environment Agency's Guidance on the Management of Landfill Gas (November 2002) suggests that biodegradable wastes may be considered to have an approximate gas yield of between 5 - 10 m^3/t/yr over the first ten years of a sites life. In this instance, the waste sludge was dried to an average of 20.97% dry matter in 2010. Assuming that the dry matter content would equate to the biodegradable component of the sludge and based on a total input in 2010 of 103 tonnes of biodegradable waste (20.97% of 489 total tonnes), this would indicate that the following upper and lower quantities of landfill gas might be generated:

- At 5 m^3/t/yr an approximate production rate of 515m^3 per annum
- At 10 m^3/t/yr an approximate production rate of 1,030m^3 per annum

There are a number of significant controlling factors relating to landfill gas generation/extraction rates from biodegradable wastes including placement density, moisture content, quality of containment systems, climatic conditions and quantity of degradable cellulose available.

It must also be stressed that the above figure is based upon an estimation of the amount of available degradable waste deposited within the landfill body and therefore must only be considered to be an approximation.

The most recent landfill gas assessment at Tradaree was undertaken by Tobin Consulting Engineers in April 2008. The purpose of the assessment was to determine the total quantity of landfill gas produced at the facility in order to determine the viability of constructing a landfill gas flare on-site. The assessment was undertaken using a landfill gas generation model GasSim 2.0. Data from previous assessments undertaken in 2004 and 2007 were used in the assessment. The results show a peak in landfill gas production in 2003 (12.5 m^3/hr), with decreasing figures since that time. A total of 9.88 m^3/hr was predicted for 2007. The report concluded that owing to this low volume of gas being produced from the facility, it would not be considered a viable option to install a gas collection system and flaring unit. A gas collection system to operate successfully requires a volume of gas in the order of 75 m^3/hr.

A copy of the assessment report was included in the AER for the 2008 reporting period.

2.9 ESTIMATED ANNUAL AND CUMULATIVE QUANTITY OF INDIRECT EMISSIONS TO GROUNDWATER

Potential sources of indirect emissions into groundwater are:

Landfill Base

The naturally occurring low permeability clay underlying the site provides a natural liner for the capped area of the landfill. Previous site investigation results indicate that in situ clay has a hydraulic conductivity of less than 1 X $10m^{-9}$m/s. The new area of the landfill (Cells 1-4) is lined with a geotextile membrane as stipulated in the current waste licence consisting of a composite liner consisting of a 1m layer of compacted soil with a hydraulic conductivity of less than or equal to $1x10^{-9}$m/s. This is overlain by a geocomposite layer which in turn is overlain by a 2mm thick high density polyethylene (HDPE) layer.

Landfill Capping

The old sludge disposal areas were capped in 2004/2005. A five layer composite permanent capping was placed over all the old sludge cells as per the requirements of Condition 4.4 of the current licence. The five layers are comprised of the following;

(a) Geocomposite gas collection layer
(b) Barrier/Protection layer
(c) Geotextile protection layer

(d) Surface water drainage layer

(e) Subsoil layer

(f) Topsoil Layer

The capped layer is approximately 1 metre in thickness. The geosynthetic barrier has a minimum permeability of 1 x 10^{-9}m/s. This layer prevents surface water seeping into the sludge body and also facilitates the collection of gas. The surface water drainage layer collects surface water and extends to the system of open surface water drains at the base of the slopes from where it discharges to the existing catchment drains.

Surface Water Collection and Treatment System

Clean surface water from the uncapped existing sludge cells, is collected via a network of gravel drains which is then discharged to the perimeter drain. Visual inspection of the surface water locations and drains is conducted weekly.

Leachate Collection

Leachate is collected in the leachate pumping chamber from a series of collection drains at the site. The leachate is pumped via a 100mm diameter pipe to the effluent treatment plant for treatment.

In summary, as the landfill is contained by the provision of the features outlined above, the risk of indirect emissions to groundwater is greatly minimised.

3.0 MONITORING RESULTS

3.1 SUMMARY REPORT

This summary report has been compiled in accordance with the emission limit values (ELVs) for the following parameters as specified in Condition 6 and Schedule C of W0037-01:

- Dust
- Noise
- Landfill Gas

3.1.1 Dust Deposition

Dust deposition emission limit values as specified in W0037-01 are detailed in Table 3.1 below.

Table 3.1 Dust Deposition ELV

ELV ($mg/m^2/day$) Note 1
350

Note 1: 30 day composite sample

Annual dust monitoring was conducted by TE Laboratories Ltd. (TelLab) at four locations between 30th August and 29th September 2010. Dust monitoring locations are illustrated in Figure 2. 30-day composite samples were collected in accordance with licence requirements and forwarded to the TelLab accredited laboratory for analysis. The monitoring results are summarised in Table 3.2 below. Copies of the dust monitoring results are included in Appendix B.

Table 3.2 Dust Monitoring Results 2010

Location	N1	N3	N5	SS2
	$mg/m^2/day$			
October 2010	127	55	119	9*

*Dust location SS2 was re-sampled between 22nd November and 22nd of December 2010 due to anomalous result of 700$mg/m^2/day$ recorded during the September 2010 monitoring round.

Measured dust levels at all of the monitoring locations were below the ELV of 350 $mg/m^3/day$.

3.1.2 Noise Emissions

Noise emission limit values as specified in W0037-01 are detailed in Table 3.3 below. Day-time and night-time noise monitoring was conducted by Response Group at four boundary locations (N1, N2, N3, N5) on the 14th December 2010. The noise survey report is attached in Appendix C. The monitoring results are summarised in Table 3.4 and 3.5 below.

Table 3.3 Noise ELV's

Day dB(A)L_{Aeq}(30 minutes)	Night dB(A)L_{Aeq}(30 minutes)
55	45

Table 3.4: Day-time Noise Measurements 2010

Location	Date	Sampling Interval	$L_{Aeq\ 30min}$ dB(A)
N1	14/12/10	30 minutes	43
N2	14/12/10	30 minutes	39
N3	14/12/10	30 minutes	40
N5	14/12/10	30 minutes	42

Table 3.5: Night-time Noise Measurements 2010

Location	Date	Sampling Interval	$L_{Aeq\ 30min}$ dB(A)
N1	14/12/10	30 minutes	42
N2	14/12/10	30 minutes	41
N3	14/12/10	30 minutes	40
N5	14/12/10	30 minutes	43

Day-time and night time noise levels at all boundary locations did not exceed the daytime emission limit L_{Aeq} of 55dB and 45 dB respectively.

It is noted that the predominant source on site were non site related traffic noise, on-site pumps and birdsong.

3.1.3 Landfill Gas Emissions

The trigger levels for landfill gas emissions from the facility measured in any service duct or manhole on, at, or immediately adjacent to, the facility and/or at any other point located outside the body of the waste stipulated in Condition 6.3.1 of W0037-01 are detailed in Table 3.6 below:

Table 3.6 Landfill Gas Concentration

Methane	Carbon Dioxide (CO_2)
1% v/v (20% LEL)	1.5% v/v

During 2010, landfill gas concentrations were measured at the following locations: RD1, RD2, RD3, RD4, RD5, RD6, RD7, RD8, L6, L8, L10 and L12.

3.1.3.1 Methane

During 2010, monthly methane concentrations measured at gas monitoring location RD1 exceeded the threshold level of 1% v/v in February at a level of 2.2% v/v. All other monthly monitoring rounds were below the threshold level.

Methane levels in RD2 exceeded the threshold level of 1% v/v in all of the monthly monitoring rounds. Methane levels ranged from 37.7% v/v (May) to 1.8% v/v (July).

Methane levels measured at RD3 exceeded the threshold level of 1% v/v in ten of the monthly monitoring rounds. Methane levels ranged from 21.7% v/v (November) to 1% v/v (July).

Methane levels measured at RD4 exceeded the threshold level of 1% v/v in four of the twelve monthly monitoring rounds - January (5.4%), September (13.1%) and November (4.6%). All other monthly monitoring rounds were below the threshold level throughout the remainder of the monitoring period.

Methane levels measured at RD5 exceeded the threshold level of 1% v/v in seven of the 12 monthly monitoring rounds – January (1.4%), February (2.1%), August (2%), September (6.3%), October (14.1%), November (11.4%) and December (10.8%).

Methane levels measured at RD6 exceeded the threshold level of 1% v/v in eleven of the 12 monthly monitoring rounds – February (1.2%), March (3.5%), April (7.3%), May (2.7%), June (3.5%), July (12.3%), August (6.7%), September (9.8%), November (19.1%) and December (13.6%).

In RD8, methane concentrations were slightly above the threshold level of 1% v/v in eleven of the 12 monthly monitoring rounds – January (3.8%), February (1.5%), March (16.5%), April (7.3%) and June (16.5%).

Monthly recorded methane levels in the remaining monitoring boreholes (RD7, L6, L8, L10 and L12) were below 1% v/v.

3.1.3.2 Carbon Dioxide

Carbon dioxide concentrations exceeded the limit of 1.5% v/v at RD1 in nine of the 12 monthly monitoring rounds – January (6.1%), February (5.4%), March (2.1%), April (2.0%), May (6.9%), June (2.1%), October (1.9%), November (2.6%) and December (4.7%).

At RD2, carbon dioxide levels exceeded the threshold level of 1.5% v/v in 11 of the 12 monthly monitoring rounds – January (6.5%), February (5.1%), March (4.5%), April (4.1%), May (8.6%), June (4.5%), August (3.2%), September (6.7%), October (5.1%), November (5.4%) and December (6.0%).

In RD3, carbon dioxide concentrations were above the threshold level of 1.5% v/v in 11 of the 12 monthly monitoring rounds – January (14.3%), February (13.8%), March (15.1%), April (9.0%), May (13.2%), June (15.1%), July (12.5%), August (5.3%), September (16.8%), October (16.0%) and November (17.1%).

In RD4, elevated levels of carbon dioxide were detected during nine of the monthly in monitoring rounds – January (6.3%), February (5.3%), March (6.9%), April (4.8%), June (6.9%), July (5.1%), August (2.9%), September (13.1%), October (7.7%) and November (5.9%).

In RD5, carbon dioxide levels exceeded the threshold level of 1.5% in 11 of the monthly monitoring rounds - January (8.8%), February (8.4%), March (3.1%), May (9.4%), June (3.1%), July (5.8%), August (5.9%), September (11.3%), October (13.5%), November (10.0%) and December (10.3%).

In RD6, carbon dioxide levels exceeded the threshold level of 1.5% v/v in all of the monthly monitoring rounds but concentrations were recorded at less than 15% during each of the rounds.

In RD8, carbon dioxide levels exceeded the threshold level of 1.5% v/v in 11 of the monthly monitoring rounds - January (9.0%), February (4.3%), March (7.3%), June (7.3%), July (2.6%), September (1.6%), October (2.8%) and November (4.1%).

In L8, carbon dioxide levels exceeded the threshold level of 1.5% v/v in one of the monthly monitoring rounds - August (2.3%). All other monthly monitoring rounds were below the threshold level.

Monthly recorded carbon dioxide levels in the remaining monitoring boreholes (RD7, L6, L10 and L12) were below 1.5% v/v.

Landfill gas monitoring results are attached in Appendix D.

3.2 MONITORING RESULTS AND INTERPRETATION

3.2.1 Introduction

Environmental monitoring was conducted at the facility during 2010 in accordance with Schedule D of Waste Licence W0037-01. Details of monitoring and reporting frequencies are presented in Table 3.7 below.

The locations of all environmental monitoring points are illustrated on Figure 2. Monitoring results are presented in Appendices B to G. Copies of the laboratory certificates are included in Appendix H.

Table 3.7 Environmental Monitoring and Reporting Frequency

Environmental Monitoring Requirement	Monitoring Frequency	Reporting Frequency
Groundwater Quality	Biannually/Annually	Biannually
Groundwater Levels	Biannually	Biannually
Surface Water Quality	Biannually	Biannually
Surface Water Visual Inspection	Weekly	Biannually
Leachate Quality	Biannually	Biannually
Leachate Levels	Quarterly	Biannually
Landfill Gas	Monthly	Biannually
Dust Deposition	Annually	Annually
Noise Emissions	Annually	Annually
Meteorological Monitoring	Daily	Annually
Ecological Monitoring	Biennial after Yr 1	Biennially

In 2010, dust analysis and reporting was carried out by TE Laboratories Ltd. (TelLab), Tullow, Co. Carlow. Noise monitoring was carried out by Response Group. Groundwater and leachate level monitoring, groundwater, leachate, surface water and landfill gas analysis and reporting was carried out by Q Lab Ltd., Wexford.

Meteorological monitoring and surface water visual inspection is undertaken by facility management personnel at the facility.

3.2.2 Dust Monitoring

3.2.2.1 Dust Monitoring Locations

Dust monitoring was conducted at four monitoring locations in 2010 in accordance with Tables D.4.1 and D.3.1 of W0037-01. Dust monitoring locations are outlined in Table 3.8 below.

Table 3.8 Dust Monitoring Locations

Location	Easting	Northing
N1	144,001	159,988
N3	143,727	159,831
N5	143,937	160,076
SS2	143,879	159,874

3.2.2.2 Dust Monitoring Methods

Details of the dust monitoring results attached in Appendix B.

3.2.2.3 Dust Monitoring Results

The results of dust monitoring conducted at the facility during 2010 are presented in Table 3.9 below. Dust concentrations and emission limit values as detailed in Schedule C.3 of W0037-01 were discussed in Section 3.1.1.

Table 3.9 Dust Monitoring Results 2010

Location	N1	N3	N5	SS2
	mg/m^2/day			
September 2010	**127**	**55**	**119**	**9**

All monitoring results were below the ELV for dust of 350 mg/m^2/day.

3.2.3 Groundwater Monitoring

3.2.3.1 Groundwater Monitoring Locations

Groundwater monitoring was conducted at five locations during 2010 in accordance with Schedule D.1.1 and D.6.1 of the current licence. Co-ordinates for all monitoring locations are detailed in Table 3.10 and locations are also illustrated on Figure 2. Monitoring results are attached in Appendix E.

Monitoring location RD2 is located at the southern boundary of the site and RD3 is located at the southwestern boundary of the site adjacent to the capped sludge cells. BH3 is located at the north eastern boundary of the site. BH4 and BH5 are both located in the buffer zone adjacent to the southern boundary of the facility and close to Shannon Estuary.

Monitoring location BH3 was not sampled during the December monitoring round as the location was inaccessible at the time of sampling due to heavy bramble overgrowth. Monitoring location BH5 was not sampled during the December monitoring round as the borehole cover was unable to be removed due to frost.

Table 3.10 Groundwater Monitoring Locations

Location	Easting	Northing
RD2	143,866	159,855
RD3	143,799	159,855
BH3	143,952	160,085
BH4	143,935	159,930
BH5	143,984	159,959

3.2.3.2 Groundwater Levels

Groundwater levels were monitored on a biannual basis in accordance with Schedule D.6.1 of W0037-01 and are included in Appendix E with the groundwater monitoring results.

Groundwater levels recorded during 2010 varied between 0.15m below top of casing (BTOC) (in BH4 March 2010) and 1.2m BTOC (in RD2 November 2010).

3.2.3.3 Groundwater Analytical Results

Groundwater monitoring was conducted on a biannual and annual basis in accordance with Schedule D.6.1 of the licence. Monitoring was undertaken in March and December 2010.

Groundwater analytical results are attached in Appendix E.

There are no emission limits stipulated in Waste Licence W0037-01, therefore the groundwater analytical results have been compared to the Interim Guideline Values (IGVs) specified in the EPA document: 'EPA Interim Report - Towards Setting Guideline Values for the Protection of Groundwater in Ireland' (2003).

The pH in all of the groundwater samples analysed during both monitoring rounds ranged from 7.11 to 7.90, which is within the IGV range of 6.5-9.5.

Electrical conductivity measurements ranged from 2,200 µS/cm in RD3 (March) to 14,450 µS/cm in BH4 (March), which are similar to previous monitoring results. The IGV of 1,000 µS/cm was exceeded in all of the samples analysed.

Ammonia concentrations in BH3 (March 2010), BH4 (March 2010), BH5 (March 2010) and RD2 (March 2010) were detected at 26.9mg/l, 16.5mg/l, 18mg/l and 12.2mg/l respectively, which were above the IGV of 0.15 mg/l.

Total phosphorus/orthophosphate concentrations in BH4 (December 2010), and RD2 (December 2010) were detected at 4.2mg/l and 0.63mg/l respectively, which exceeded the IGV for orthophosphate of 0.03 mg/l.

Total Oxidised Nitrogen concentrations in RD2 (March 2010) was detected at 2.7mg/l, all other samples analysed for this parameter were below the laboratory detection. This is similar to previous monitoring rounds.

Following an observation made by the EPA during a site inspection in September 2009, salinity is analysed annually at the site. Concentrations ranged from 0.35 parts per thousand (ppt) in RD3 to 5 ppt in BH4.

Total organic carbon concentrations ranged from 170mg/l in BH4 (March 2010) to 6mg/l in RD3 (December 2010), TOC concentrations were similar to previous monitoring rounds.

Chloride concentrations ranged from 283 mg/l in RD3 (December 2010) to 5,422 mg/l in BH4 (March 2010). Chloride concentrations in all of the samples analysed exceeded the IGV of 30 mg/l.

A sodium concentration in BH4 was detected at 1,200mg/l (December 2010), which exceeded the IGV of 150 mg/l.

Potassium concentrations in all three samples analysed during the December monitoring round exceeded the IGV of 5 mg/l. Concentrations ranged from 12 mg/l in RD3 (December 2010) to 90 mg/l in BH4 (December 2010).

Exceedances of iron above the IGV of 0.2 mg/l were detected in BH4 (December 2010), RD2 (December 2010) and RD3 (December 2010) at concentrations of 34 mg/l, 8.9mg/l and 0.53 mg/l respectively.

Magnesium was detected in BH4 (December 2010) at a concentration of 80 mg/l which exceeds the IGV of 50 mg/l.

The chromium concentrations in BH4 (December 2011), RD2 (December 2010) and RD3 (December 2010) were detected at levels of 0.065mg/l, 0.046mg/l and 0.34mg/l respectively, which exceeded the IGV of 0.03 mg/l.

Total phenol concentrations were below the laboratory detection limit 0.0001mg/l in all the samples analysed during both monitoring rounds.

Concentrations of arsenic, boron, cadmium, calcium, copper, cyanide, fluoride, lead, mercury, nickel, sulphate, tin and zinc were below their respective IGVs and/or laboratory detection limits in all of the samples analysed.

The concentrations of volatile organic compounds (VOC) and semi-volatile organic compounds (SVOC) were below laboratory detection limits at all of the monitoring locations.

3.2.3.4 Conclusions

Overall, the groundwater results are similar to the 2009 biannual and annual monitoring rounds. This represents an improvement in groundwater quality at the facility since previous monitoring rounds.

However, concentrations of chromium exceeded the IGV of 0.03mg/l, during the December 2010 monitoring round, in all three samples analysed, which represents an increase on previous monitoring rounds.

Certain parameters such as electrical conductivity, chloride, iron, magnesium, potassium, sodium and total phosphorus concentrations remain elevated at most or all monitoring locations compared to the IGV's.

Consistently high conductivity, chloride, calcium, magnesium, potassium and sodium concentrations across most or all monitoring locations suggests there is a saline influence on the groundwater in the area due to the estuarine location of the site.

Concentrations of calcium were below the IGV of 200 mg/l and historically this parameter was elevated at most or all monitoring locations.

Salinity concentrations measured in December 2010 would appear to confirm that there is saline intrusion into groundwater monitoring wells most notably at location BH4. Measured concentrations ranged from 0.35 ppt in RD3 to 5 ppt in BH4 indicating brackish water (i.e. a mixture of freshwater and seawater with a salinity range of 0.5-30 ppt typical of an estuarine location).

TOC concentrations are broadly similar to those recorded in previous years.

3.2.4 Landfill Gas Monitoring

Measurements of landfill gas were carried out at all gas monitoring boreholes (RD1 to RD8) on a monthly basis in accordance with Table D.2.1 of the Waste Licence. Combined gas and leachate monitoring boreholes (L6, L8, L10, L12) were also monitored on a monthly basis for gas. All monitoring locations were sampled for methane, carbon dioxide, oxygen, temperature and pressure.

Results are compared against the EPA Guideline Emission Limits for methane (CH_4) and carbon dioxide (CO_2) at landfills, which are 1% v/v and 1.5% v/v, respectively (EPA Landfill Manuals: Landfill Monitoring, 2nd Edition, 2003). These are also the ELVs specified in Schedule C.2 of Waste Licence W0037-01.

3.2.4.1 Gas Monitoring Locations

Gas monitoring locations are detailed in Table 3.11 overleaf and illustrated in Figure 2. Gas monitoring results are presented in Appendix D.

Table 3.11 Gas Monitoring Locations

Location	Easting	Northing
RD1	143,761	159,997
RD2	143,876	159,883
RD3	143,801	159,851
RD4	143,760	160,092
RD5	143,906	159,999
RD6	143,928	160,071
RD7	144,000	159,979
RD8	143,939	159,938
L6	143,867	159,959
L8	143,924	159,995
L10	143,944	160,015
L12	143,940	160,064

3.2.4.2 Gas Monitoring Boreholes

Landfill gas measurements were undertaken using an Infrared Gas Analyser. The gas emitted is analysed for its content by % volume of the following constituents:

- Methane (CH_4)
- Carbon dioxide (CO_2)
- Oxygen (O_2)
- Atmospheric Pressure (mBar)

The LEL (lower explosive limit) for methane, atmospheric pressure (millibars) and temperature (^oC) were also recorded by the gas analyzer and relative pressure was calculated.

3.2.4.3 Gas Monitoring Results

Gas monitoring results are discussed Section 3.1.3.

3.2.5 Leachate Monitoring

3.2.5.1 Leachate Monitoring Locations

In accordance with Schedule D.1 of the licence, leachate composition and level monitoring was conducted at locations detailed in Table 3.12.

Table 3.12 Leachate Monitoring Locations

Parameter	Location	Easting	Northing
Leachate Level	L1	143,795	159,990
	L2	143,796	159,926
	L3	143,843	159,890
	L4	143,797	160,016
	L5	143,821	159,997
	L7	143,895	159,928
	L9	143,939	159,958
	L11	143,991	160,000
	L13	143,976	160,052
Leachate Composition	SS3	143,806	159,951

3.2.5.2 Leachate Composition Results

There are no emission limits stipulated in Waste Licence W0037-01, therefore the leachate analytical results have been compared to the Interim Guideline Values (IGVs) listed in the EPA document: 'EPA Interim Report - Towards Setting Guideline Values for the Protection of Groundwater in Ireland' (2003).

Appendix F contains monthly leachate composition results, annual and biannual leachate analytical results. Leachate monitoring at SS3 was undertaken in March and December 2010 as per Schedule D of the licence.

The electrical conductivity in SS3 was measured at 1,355 µS/cm in March 2010 and 1,870 µS/cm in December 2010, which exceeds the IGV of 1000 µS/cm. This is similar to previous monitoring rounds.

The chloride concentration in SS3 was detected at 141mg/l in March 2010 and 86mg/l in December 2010, which exceeds the IGV of 30 mg/l; however chloride concentrations have been consistently elevated since 2004.

The ammonia concentration in SS3 was detected at 7.20mg/l in March 2010 and 8.10mg/l in December 2010, which exceeds the IGV of 0.15 mg/l; however chloride concentrations have been consistently elevated since 2004.

Nickel and potassium concentrations were 0.28 mg/l and 9 mg/l respectively, which slightly exceed their respective IGVs of 0.02 mg/l and 5 mg/l.

The iron concentration in SS3 was detected at 9.8 mg/l in December 2010, which exceeded the respective IGV of 0.02 mg/l.

Comparison of results with the results from previous years, indicate that a number of parameters (conductivity, ammonia, chloride, iron, nickel and potassium) remain consistently elevated above their respective IGVs.

3.2.6 Noise Monitoring

3.2.6.1 Noise Monitoring Locations

Day-time and night-time annual noise monitoring was conducted at four boundary locations at the facility (N1, N2, N3, N5) on the 14th December as stipulated in Table D.4.1 of the licence. Noise monitoring locations are illustrated on Figure 2 and detailed in Table 3.13 below.

Table 3.13 Noise Monitoring Locations

Location	Easting	Northing
N1	144,001	159,988
N2	143,879	159,874
N3	143,727	159,831
N5	143,937	160,076

The noise survey report (including details of the methodology) is attached in Appendix C.

3.2.6.2 Noise Monitoring Results

The noise monitoring results are summarised in Table 3.14 and 3.15.

Table 3.14: Day-time Noise Measurements 2010

Location	Date	Sampling Interval	$L_{Aeq\ 30min}$ dB(A)
N1	14/12/10	30 minutes	42.5
N2	14/12/10	30 minutes	38.7
N3	14/12/10	30 minutes	39.6
N5	14/12/10	30 minutes	41.5

Table 3.15: Night-time Noise Measurements 2010

Location	Date	Sampling Interval	$L_{Aeq\ 30min}$ dB(A)
N1	14/12/10	30 minutes	42.2
N2	14/12/10	30 minutes	40.8
N3	14/12/10	30 minutes	39.6
N5	14/12/10	30 minutes	42.7

Day-time and night time noise levels at all boundary locations did not exceed the daytime emission limit L_{Aeq} of 55dB and 45 dB respectively.

It is noted that the predominant source on site were non site related traffic noise, on-site pumps and birdsong.

3.2.7 Surface Water Monitoring

3.2.7.1 Surface Water Monitoring Locations

In total, five surface water locations were monitored in 2010 with differing biannual and annual parameter requirements as outlined in Table D.6.1 of the waste licence (SS1, SS2, SS4, SS6 and SS7). The surface

water monitoring locations are located in the catchment drains along the perimeter of the facility. These drains collect surface water run-off from the site and ultimately discharge to the Shannon Estuary via a sluice gate.

Monitoring location SS1 is located in the catchment drain along the eastern boundary of the facility adjacent to Cell No. 3. Monitoring locations SS2 and SS4 are located in a drain at the southern tip of the landfill. SS6 and SS7 are both estuarine locations. Monitoring location SS7 was dry in March 2010 therefore no sample could be collected on the sampling date.

Monitoring locations are listed in Table 3.16 below and are illustrated on Figure 2.

Table 3.16 Surface Water Monitoring Locations

Location	Easting	Northing
SS1	144,000	160,040
SS2	143,879	159,874
SS4	143,936	160,003
SS6	143,907	159,862
SS7	143,927	159,873

3.2.7.2 Surface Water Monitoring

Surface water monitoring was conducted on a biannual basis at the five locations detailed in Table 3.16.

Sampling involved the submergence of the designated sample container into the surface water body. During submergence, every effort was made to keep the container steady so as to prevent sediment disturbance. Samples were collected and submitted to an accredited laboratory for analysis in March and December for the range of parameters outlined in Table D.6.1 of W0037-01.

Surface water analytical results are attached in Appendix G.

There are no surface water emission limits stipulated in waste licence W0037-01. Therefore, all surface water monitoring results have been compared to the Thresholds, AA-EQS's (Annual Average Environmental Quality Standard) and MAC-EQS's (Maximum Admissible Concentration Environmental Quality Standard Thresholds) specified in the Surface Water Quality Regulations SI 272 of 2009 applicable to transitional

waters (Shannon Estuary at Shannon). Surface monitoring locations SS2 and SS7 were dry at the time of sampling.

There were no exceedances of the relevant thresholds or EQS's for any of the parameters analysed during both monitoring rounds undertaken in 2010.

The analytical results indicate that surface water quality is generally good at and beyond the facility boundary.

3.2.7.3 Surface Water Visual Inspections

Visual inspections of surface water drains are carried out on a weekly basis and the visual inspection logs are available for inspection at the facility.

3.2.8 Meteorological Monitoring

Details of meteorological monitoring conducted at the facility in 2008 are attached in Appendix I.

Met Eireann publish meteorological data, which is obtained from their weather station at Shannon Airport. Meteorological data obtained from the Met Eireann weather station at Shannon Airport is summarised in the first three columns of Table 3.17 below.

Table 3.17 Summary Rainfall Data

Month	Rainfall (mm) Shannon Airport	Evapotranspiration (mm) Shannon Airport	Evaporation (mm) Shannon Airport	Estimated Effective Rainfall - Capped Area (mm)	Estimated Effective Rainfall - Active Cell (mm)
JAN	30.8	7.8	17.6	23	13.2
FEB	35.1	14.9	23	20.2	12.1
MAR	80.4	37.5	56.6	42.9	23.8
APR	71.4	65.7	77.1	5.7	0*
MAY	56.8	78.4	116.4	0*	0*
JUN	33.4	100.4	146.3	0*	0*
JUL	123.1	75.4	125.6	47.7	0*
AUG	39.1	72.2	93.2	0*	0*
SEP	138.9	47	68.6	91.9	70.3
OCT	76.8	27.6	38	49.2	38.8
NOV	133.3	10.7	21.4	122.6	111.9
DEC	26	5.1	7.2	20.9	18.8
TOTAL	**845.1**	**542.7**	**791**	**302.4**	**54.1**

*Denotes months where evaporation and/or evapotranspiration exceeded total rainfall

Rainfall data obtained from the Met Eireann weather station at Shannon Airport estimated that the site received approximately 845.1 mm of rainfall from January 2010 to December 2010.

Effective rainfall for capped and non-capped/active cells was calculated as follows:

Effective Rainfall (mm) = Net Precipitation (mm) – Loss by Evapotranspiration (mm) (for capped cells)

Effective Rainfall (mm) = Net Precipitation (mm) – Loss by Evaporation (mm) (for active cells)

3.2.9 Annual Water Balance Calculation and Interpretation for Cells

The water balance was calculated using the average monthly figure of sludge disposed in 2010, which was 41 tonnes. A water balance is used to calculate the difference between rainfall on landfilled areas and the various losses prior to leachate generation.

Water balance calculations are attached in Appendix J.

The method used is based on equation developed by Ehring (Quality and Quantity Sanitary Landfill Leachate, 1983). This method is based on the use of a mathematical equation, which provides a conservative estimate, which caters for the worst-case scenarios.

The equation is as follows: $L_0 = [(ER.a) + LW + IR] – [aW]$

Where:

L_0 :	Free Leachate Produced
ER:	Effective Rainfall (net precipitation after loss by evaporation)
A:	Area of Cell(s)
LW:	Liquid waste
IR:	Infiltration from restored areas
aW:	Absorptive capacity of waste
a_A:	Active area
aR:	Restored area
AL:	Lagoon area
WA:	Waste in active area
WR:	Waste in restored area

Based on the calculations it is estimated that approximately 1,906 m^3 (upper bound) and 1,370 m^3 (lower bound) of leachate was produced on site in 2010. As the majority of the landfill is capped the potential for leachate generation is reduced.

3.2.10 Resource and Energy Consumption Summary

The only consumer of electricity at the facility is the leachate pump, which pumps the leachate from the leachate collection sump to the WWTP. The contribution of this sump to the overall electrical output of the entire WWTP is minor. The leachate pump is in operation for approximately 4 hrs per day.

Diesel is used to fuel the vehicles used on site namely the sludge dumper trucks and the tractor. Diesel is stored in a 5,000 litre capacity bunded tank located on site. Approximately 1,500 litres of diesel were used in 2010.

Mains water is provided via the public mains supply, however water usage at the facility is not metered.

3.2.11 Tank, Pipeline and Bund Integrity Testing and Inspection

The facility contains one bunded diesel tank as outlined in Section 3.2.10. The bund was installed in 2006 and the integrity assessment report was forwarded to the Agency as part of the 2006 AER. The bund is regularly inspected and tested by site personnel to verify integrity.

3.2.12 Review of Nuisance Controls

The assistant landfill supervisor conducts daily inspections of the landfill and the facility and records any incidents in daily duty sheets which are stored at the facility. The inspections are undertaken to identify any environmental nuisances caused by vermin, birds, flies, mud, dust, litter, and odours.

No complaints or incidents were received by the facility in 2010.

Rentokil carry out pest control in the treatment plant but no incidences of vermin have been reported on the landfill site. Birds and flies do not pose a problem at the site as there is no domestic refuse being deposited in the landfill; therefore there are no nuisance controls in place for birds or flies.

According to facility management:

- No complaints regarding odours were received in 2010.
- There is no problem with litter at the facility and no complaints were received in 2010 in this regard.
- There are no noise sensitive locations in the immediate vicinity of the facility and no complaints regarding noise from the facility were received in 2010.

The only vehicles that use the site roads are a tractor owned by Clare County Council and a 5-tonne sludge dumper truck which is on hire. These are used to deposit the sludge to the landfill from the WWTP. The vehicles travel on a private road between the two sites and do not travel outside the boundary of the two sites.

In general, dust is not a problem encountered at the facility and thus no dust suppression measures are considered necessary. Dust monitoring is currently undertaken as per Table D.3.1 of the licence and no exceedances were detected in 2010.

4.0 MANAGEMENT OF THE FACILITY

4.1 MANAGEMENT AND STAFFING STRUCTURE

Clare County Council has been responsible for the facility since November 2004. The facility was previously managed by Shannon Development. The facility is under the operational control of the landfill manager – Edel Brennan. The assistant landfill managers are Ailish Johnston and Michael Lynch. In addition, there is one weighbridge operator, Christy Hanley. The current management structure is outlined in Table 4.1 below.

Table 4.1: Management and Staffing Structure

Name	Position	Responsibilities	Replacement
Edel Brennan	Landfill Manager	Landfill management	Ailish Johnston
Ailish Johnston	Assistant Landfill Manager	Landfill management, monthly reporting, environmental monitoring, nuisance control	Michael Lynch
Michael Lynch	Assistant Landfill Manager	Landfill management, monthly reporting, environmental monitoring, nuisance control	Christy Hanley
Christy Hanley	Weighbridge Operator	Weighing sludge	Henry Greensmith

4.2 ENVIRONMENTAL MANAGEMENT PROGRAMME/ENVIRONMENTAL OBJECTIVES AND TARGETS

The 2009 AER did not specify any environmental objectives and targets for 2010.

4.3 SCHEDULE OF ENVIRONMENTAL OBJECTIVES AND TARGETS FOR 2010

The licensee conducted a review of the EMS in 2009 and found that no changes to the EMS were required and therefore there are no amendments to the environmental objectives and targets required for the year 2010.

4.4 FACILITY PROCEDURES

No new procedures were developed or implemented at the site between January 2010 and December 2010.

4.5 FINANCIAL PROVISION

In accordance with Condition 12 of the licence, Charges and Financial Provisions, Clare County Council has the ability to meet any financial commitments or liabilities incurred by the undertaking of the activities relating to the facility. Clare County Council annually in the preparation of the "Book of Estimates" and the passing of these estimates shall make provisions for any capital works and maintenance works required to fulfill the conditions of the waste licence for the facility.

Clare County Council also carries adequate insurance to deal with their liabilities. The type and level of insurance is constantly monitored and updated as required.

4.6 STAFF TRAINING

An Environmental Awareness Programme has been developed and implemented at the facility. A copy of the Programme was included in the 2006 AER. The Programme sets out environmental issues relevant to all site staff, contractors and visitors to the facility. Training for all staff involved in the operation of the facility is recorded in the training and awareness programme which includes a sign out section for staff members to record their attendance to courses.

Spill kit and chemical handling training was undertaken for staff employed at the facility in October 2007 and copies of training records were included in the 2007 AER.

As there have been no changes to the facility staff structure since 2007, no additional environmental training was undertaken in 2010.

4.7 PROGRAMME FOR PUBLIC INFORMATION

All information and correspondence supplied to the EPA (other than commercially sensitive information) and received from the EPA, is available to the public to view at Tradaree Point WWTP, Shannon (Clonmoney South), Co. Clare. This includes a copy of the waste licence, all reports, monitoring results and interpretations required by the licence and other correspondence between the EPA and the facility. Any member of the public may view the information between the hours of 10.00 and 16.00 and by appointment only, at the below address.

All requests concerning the environmental performance of the facility should be forwarded to:

Ms. Edel Brennan,

Facility Manager,

Tradaree Point Sludge Disposal Facility,

Shannon (Clonmoney South),

Co. Clare

Tel: 061 364477

4.8 FACILITY NOTICE BOARD

In compliance with Condition 3.3 of Waste Licence W0037-01, a facility notice is in place at the entrance to the landfill site adjacent to the main gate, and contains all the details outlined in Section 3.3.3 of the licence.

5.0 REPORTED INCIDENTS AND COMPLAINTS SUMMARY

During the reporting period January 2010 to December 2010, no incidents occurred which would require reporting to the relevant authorities. No complaints or incidents were reported to the facility between January and December 2010.

5.1 INCIDENTS

None during the reporting period.

5.2 NON-COMPLIANCES

In June 2010, the EPA conducted a site inspection (ref: (W0037-01)10S1010MOR). No non-compliances were recorded. A number of observations were recorded and corrective actions specified. The licensee has since implemented the specified corrective actions and has forwarded relevant details to the Agency where required.

5.3 COMPLAINTS

None received during the reporting period.

5.4 WASTE RECORDS

Records of the amount and type of sludge (either industrial or domestic) disposed at the facility are kept on file at the facility. Receipts of incoming sludge are recorded at the weighbridge and filed. The weekly records from the weighbridge are then filed and stored in the administration building of the facility. The total quantity of the waste sludge is recorded on a weekly basis and is logged in a waste register that is kept on site at all times. Quantities of waste sludge disposed of to landfill are recorded in the monthly reports for the WWTP and also the AER.

The following information is recorded in the waste register;

- Name of the person transporting the load
- Date of transportation
- Sludge quantity
- Sludge type
- The name of the machine operator

- The cell in which the sludge is to be disposed

The site caretaker signs the logbook to confirm the sludge has been inspected prior to acceptance to the landfill. The records are then transferred to the site office where they are logged on a computer database.

The weighbridge was last calibrated in December 2010.

Section 2 contains further information regarding sludge management.

6.0 FACILITY DEVELOPMENT

6.1 DEVELOPMENTS DURING 2010

There were no other development works of note undertaken at the facility between January and December 2010.

6.2 PROPOSED DEVELOPMENT OF THE FACILITY AND ASSOCIATED TIMESCALES

At present, there are no facility development works planned for 2011.

Cell 1 is currently active and on reaching its full capacity it will be capped and landfilling of Cell 2 will commence. It is expected that this will occur towards the end of 2011.

FIGURE 1 – SITE LOCATION MAP

Tradaree Point Sludge Disposal Facility

Site Location Map

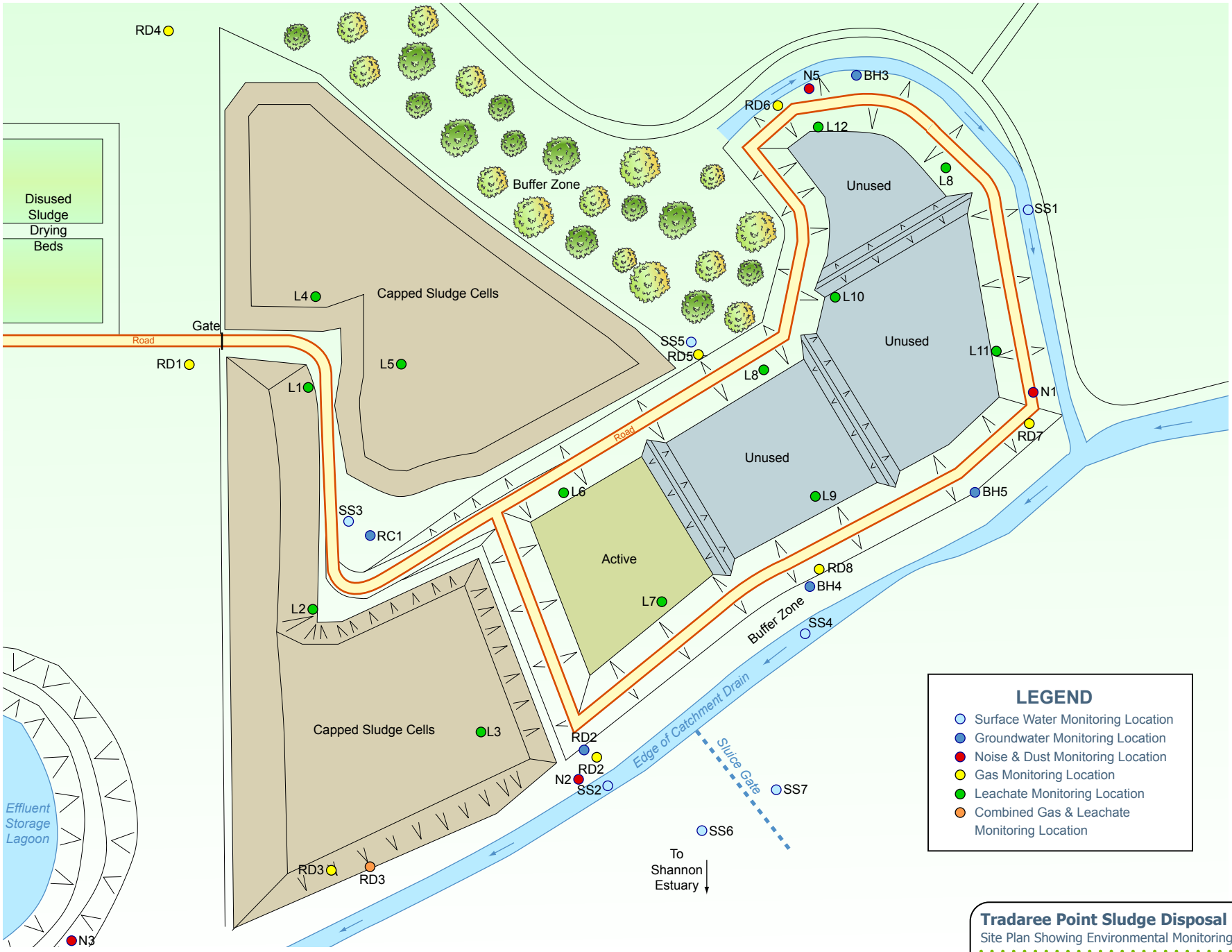
Figure No. 1

Job No. CE08478	**Date.** June 2010
Finalised By - TMC	**Office** - 1504
Drawn By: J Farrar - CS2,Illustrator	

WYG Ireland

NOTE: Drawing is for diagrammatic purposes only. No measurements to be taken.

FIGURE 2 – SITE PLAN SHOWING ENVIRONMENTAL MONITORING LOCATIONS



Tradaree Point Sludge Disposal Facility

Site Plan Showing Environmental Monitoring Locations

Figure No. 2

Job No. CE08478	**Date.** June 2010
Finalised By - TMC	**Office** - 1504
Drawn By: J Farrar - CS2,Illustrator	

WYG Ireland

NOTE: Drawing is for diagrammatic purposes only. No measurements to be taken.

APPENDIX A – REPORT CONDITIONS

WYG ENVIRONMENTAL AND PLANNING (IRELAND) LIMITED (WYG)

Appendix A - Report Conditions

This report is produced solely for the benefit of Response Group on behalf of Clare County Council and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise. This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

This report is limited to those aspects reported on, within the scope and limits agreed with the client under our appointment. It is necessarily restricted and no liability is accepted for any other aspect. It is based on the information sources indicated in the report. Some of the opinions are based on unconfirmed data and information and are presented as the best obtained within the scope for this report.

Reliance has been placed on the documents and information supplied to WYG by others but no independent verification of these has been made and no warranty is given on them. No liability is accepted or warranty given in relation to the performance, reliability, standing etc of any products, services, organisations or companies referred to in this report.

Whilst skill and care have been used, no investigative method can eliminate the possibility of obtaining partially imprecise, incomplete or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal and weather related conditions.

This report is based on a visual site inspection, study of readily accessible referenced historical record and information supplied by those parties noted in the text.

Although care is taken to select monitoring and survey periods that are typical of the environmental conditions being measured, within the overall reporting programme constraints, measured conditions may not be fully representative of the actual conditions. Any predictive or modelling work, undertaken as part of the commission will be subject to limitations including the representativeness of data used by the model and the assumptions inherent within the approach used. Actual environmental conditions are typically more complex and variable than the investigative, predictive and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions.

This report is prepared for the proposed uses stated in the report and should not be used in a different context without reference to WYG. The report is necessarily limited to those aspects of site investigation specifically reported on and no liability is accepted for any other aspect.

January 2009

APPENDIX B – DUST MONITORING RESULTS

TelLab

ANALYSIS OF DUST DEPOSITION GAUGES

Date Sampled: 22.11.2010 - 22.12.2010
Date Received: 23.12.2010
Date Analysis Commenced:10.01.2011
Our Ref.: WS-28726
Your Ref: Shannon Landfill
Certificate No. L/11/0068

Sample ID	Lab ID	Dustfall (mg/m^2d)* (n/a)	Dustfall (g/m^2d)* (n/a)
SS2	92960	9	0.009

*Note: d = sampling period in days (30)
m = collecting surface area (metre)
g = mass of dustfall (gram)
mg = mass of dustfall (milligram)

** = INAB Accredited Tests ++ = Subcontracted Tests n/a = Non-INAB Accredited Tests

The above results relate only to the sample tested
This report should not be regenerated except in full and with the consent of T.E. Laboratories Ltd.

TelLab

ANALYSIS OF DUST DEPOSITION GAUGES

Date Sampled: 30.08.2010-29.09.2010
Date Received: 30.09.2010
Date Analysis Commenced:30.09.2010
Our Ref.: WS-28128
Your Ref: Shannon Landfill
Certificate No. L/10/2013

Sample ID	Lab ID	Dustfall (mg/m^2d)* (n/a)	Dustfall (g/m^2d)* (n/a)
N1*	91401	127	0.127
N3	91402	55	0.055
N5#	91403	119	0.119
SS2#	91404	703	0.703

*Note: d = sampling period in days (30)
m = collecting surface area (metre)
g = mass of dustfall (gram)
mg = mass of dustfall (milligram)

** = INAB Accredited Tests ++ = Subcontracted Tests n/a = Non-INAB Accredited Tests

The above results relate only to the sample tested
This report should not be regenerated except in full and with the consent of T.E. Laboratories Ltd.

Notes:
* Small insects removed.
#Some organic matter and insects found and removed.

APPENDIX C – NOISE SURVEY REPORT

Tradaree WWTP

Environmental Noise Monitoring 14th December 2010

Code	Location	Time	Range dB	Average dB	Max dB	Background Noise	Compliant
N1 Daytime	Boundary @ Landfill Cell 3	10.45 – 11.15	30-90	42.5	61.5	Road Traffic	Yes
N2 Daytime	Boundary @ Landfill Cell 1	11.21 - 11:51	30-90	38.7	54.7	Road Traffic, On-site pumps, Birds	Yes
N3 Daytime	Boundary @ Lagoon	11.55 - 12:25	30-90	39.6	65.7	Road Traffic, Flow of Water, Birds	Yes
N5 Daytime	Boundary @ Landfill Cell 1	12.30 - 13:00	30-90	41.5	56.7	Birds, Bees, Road Traffic	Yes
N1 Night-Time	Boundary @ Landfill Cell 3	23.30 - 00:00	30-90	42.2	59.1	Road Traffic	Yes
N2 Night-Time	Boundary @ Landfill Cell 1	00:10 - 00:40	30-90	40.8	71.3	Road Traffic, On-site pumps, Flow of Water	Yes
N3 Night-Time	Boundary @ Lagoon	00:50 - 01:20	30-90	39.6	67.5	Road Traffic, On-site pumps, Flow of Water	Yes
N5 Night-Time	Boundary @ Landfill Cell 1	01:30 - 02:00	30-90	42.7	55.7	Road Traffic	Yes

The weather was dry and calm throughout the Daytime and Night-Time noise measurements.

The Noise meter was an INFOTECH – SLM – 1352A and was calibrated on the morning of the test.

Conclusion:

The average figures show that there are no noise issues on site. All results obtained from the measurements taken at the four locations by day and night are within the daytime and night-time limits of 55dBA and 45dBA The noises that were most evident on site were the road traffic, on-site pumps and birds. It is clear from carrying out this report that the Waste Water Treatment Plant is having a minimal impact on the local environment in terms of Noise Pollution.

APPENDIX D – LANDFILL GAS MONITORING RESULTS

Monthly Status Report

Month January-2010

Landfill Gas Analysis

Date	Location	CO2	Methane	O2	Pressure	Temp
		%	%	%	mBar	oC
28-Jan-10	RD1	6.1	0	9.5	1019	7
	RD2	6.5	17.5	14.4	1020	7
	RD3	14.3	14.9	2.9	1020	7
	RD4	6.3	5.4	3.0	1020	7
	RD5	8.8	1.4	7.4	1019	8
	RD6	6.7	0.1	11.0	1019	8
	RD7	0.1	0.0	20.2	1019	7
	RD8	9.0	3.8	12.2	1020	7
	L6	0.2	0.1	20	1019	8
	L8	0.0	0.0	20.2	1019	8
	L10	0	0.0	20.2	1019	8
	L12	0.1	0.0	20.1	1019	8
Trigger Level		1.5% v/v	1% v/v			

Shading indicates trigger level exceeded

Monthly Status Report

Month February-2010

Landfill Gas Analysis

Date	Location	CO2	Methane	O2	Relative Pressure	Temp
		%	%	%	mBar	oC
26-Feb-09	RD1	5.4	2.2	13.4	-0.5	6
	RD2	5.1	24.3	13.5	0.5	6
	RD3	13.8	12.2	0.1	0.1	6
	RD4	5.3	0.8	7.3	-9.6	6
	RD5	8.4	2.1	11.3	-23.8	6
	RD6	3.6	1.2	17.8	0.0	6
	RD7	0.9	0.3	20.1	0.4	6
	RD8	4.3	1.5	18.3	0.3	6
	L6	0.1	0.0	20.2	0.5	7
	L8	0.0	0.0	20.5	0.0	7
	L10	0.0	0.0	20.5	0.0	7
	L12	0.5	0.2	20.5	0.0	7
Trigger Level		1.5% v/v	1% v/v			

Shading indicates trigger level exceeded

Monthly Status Report

Month March-2010

Landfill Gas Analysis

Date	Location	CO2	Methane	O2	Pressure	Temp
		%	%	%	mBar	oC
29/3/10	RD1	2.1	0.0	16.7	988	6
	RD2	4.5	27.7	12.6	988	5
	RD3	15.1	12.9	4.6	988	5
	RD4	6.9	0.0	5.1	988	6
	RD5	3.1	0.0	17.8	986	5
	RD6	5.8	3.5	12.5	986	6
	RD7	0.1	0.0	20.3	986	6
	RD8	7.3	16.5	13.4	987	5
	L6	0.3	0.0	20.0	987	7
	L8	0.0	0.0	20.3	986	6
	L10	0.0	0.0	20.3	986	7
	L12	0.0	0.0	20.2	986	7
Trigger Level		1.5% v/v	1% v/v			

Shading indicates trigger level exceeded

Monthly Status Report

Month April-2010

Landfill Gas Analysis

Date	Location	CO2	Methane	O2	Pressure	Temp
		%	%	%	mBar	oC
26-Apr-10	RD1	2.0	0.3	18.3	1020	12
	RD2	4.1	24.1	13.5	1020	13
	RD3	9.0	6.1	10.6	1020	12
	RD4	4.8	0.0	12.7	1020	12
	RD5	1.2	0.0	20.2	1023	12
	RD6	6.6	7.3	11.9	1022	13
	RD7	0.2	0.0	20.8	1021	13
	RD8	0.0	0.0	18.3	1021	13
	L6	0.8	0.0	20.0	1020	14
	L8	0.0	0.0	20.8	1021	14
	L10	0.0	0.0	20.9	1021	14
	L12	0.1	0.0	20.7	1022	14
Trigger Level		1.5% v/v	1% v/v			

Shading indicates trigger level exceeded

Monthly Status Report

Month May-2010

Landfill Gas Analysis

Date	Location	CO2	Methane	O2	Pressure	Temp
		%	%	%	mBar	oC
20-May-10	RD1	6.9	0.8	10.3	1020	12
	RD2	8.6	37.7	7.4	1020	13
	RD3	13.2	11.6	4.5	1020	12
	RD4	0.0	0.0	0.0	1020	12
	RD5	9.4	0.5	8.9	1023	12
	RD6	8.9	2.7	9.5	1022	13
	RD7	0.2	0.0	20.2	1021	13
	RD8	0.0	0.0	0.0	1021	13
	L6	0.2	0.0	20.1	1020	14
	L8	0.0	0.0	20.2	1021	14
	L10	0.1	0.0	20.2	1021	14
	L12	0.3	0.0	19.6	1022	14
Trigger Level		1.5% v/v	1% v/v			

Shading indicates trigger level exceeded

Monthly Status Report

Month June-2010

Landfill Gas Analysis

Date	Location	CO2	Methane	O2	Pressure	Temp
		%	%	%	mBar	oC
	RD1	2.1	0.0	16.7	988	6
	RD2	4.5	27.7	12.6	988	5
	RD3	15.1	12.9	4.6	988	5
	RD4	6.9	0.0	5.1	988	6
	RD5	3.1	0.0	17.8	986	5
	RD6	5.8	3.5	12.5	986	6
	RD7	0.1	0.0	20.3	986	6
	RD8	7.3	16.5	13.4	987	5
	L6	0.3	0.0	20.0	987	7
	L8	0.0	0.0	20.3	986	6
	L10	0.0	0.0	20.3	986	7
	L12	0.0	0.0	20.2	986	7
Trigger Level		1.5% v/v	1% v/v			

Shading indicates trigger level exceeded

Monthly Status Report

Month July-2010

Landfill Gas Analysis

Date	Location	CO2	Methane	O2	Pressure	Temp
		%	%	%	mBar	oC
27-Jul-10	RD1	0.2	0.0	20.2	1017	17
	RD2	1.5	1.8	18.8	1017	16
	RD3	12.5	1	7.3	1017	17
	RD4	5.1	0.0	12.3	1017	17
	RD5	5.8	0.8	15.2	1020	15
	RD6	10.9	12.3	9.2	1019	17
	RD7	0.5	0.0	20.3	1018	16
	RD8	2.6	0.1	18.3	1018	16
	L6	7.1	0.0	12.7	1017	18
	L8	0.0	0.0	20.4	1018	17
	L10	0.0	0.0	20.6	1018	18
	L12	0.1	0.0	20.4	1019	18
Trigger Level		1.5% v/v	1% v/v			

Shading indicates trigger level exceeded

Monthly Status Report

Month August-2010

Landfill Gas Analysis

Date	Location	CO2	Methane	O2	Pressure	Temp
		%	%	%	mBar	oC
31-Aug-10	RD1	0.4	0.5	19.9	1016	20
	RD2	3.2	9.8	16.3	1017	20
	RD3	5.3	6.7	12.7	1017	20
	RD4	2.9	0.0	16.6	1016	20
	RD5	5.9	2.0	16.2	1018	22
	RD6	6.3	6.7	13.4	1017	23
	RD7	0.3	0.1	20.7	1018	23
	RD8	1.0	0.1	19.5	1017	20
	L6	0.1	0.0	20.4	1017	24
	L8	2.3	0.0	17.9	1017	25
	L10	0.0	0.1	20.4	1018	26
	L12	0.2	0.2	20.4	1018	26
Trigger Level		1.5% v/v	1% v/v			

Shading indicates trigger level exceeded

Monthly Status Report

Month September-2010

Landfill Gas Analysis

Date	Location	CO2	Methane	O2	Pressure	Temp
		%	%	%	mBar	oC
29-Sep-10	RD1	0.6	0.0	19.6	1014	10
	RD2	6.7	23.3	12.7	1015	11
	RD3	16.8	15.6	3.9	1015	11
	RD4	13.1	13.1	7.9	1014	10
	RD5	11.3	6.3	11.7	1019	10
	RD6	11.9	9.8	8.5	1017	10
	RD7	0.5	0.3	20.2	1017	10
	RD8	1.6	0.1	19.3	1016	11
	L6	0.2	0.0	20.6	1016	11
	L8	0.1	0.0	20.2	1016	10
	L10	0.1	0.0	20.4	1017	11
	L12	0.2	0.0	19.9	1017	11
Trigger Level		1.5% v/v	1% v/v			

Shading indicates trigger level exceeded

Monthly Status Report

Month October-2010

Landfill Gas Analysis

Date	Location	CO2	Methane	O2	Pressure	Temp
		%	%	%	mBar	oC
27-Oct-10	RD1	1.9	0.2	18.4	1011	14
	RD2	5.1	20.6	13.5	1011	14
	RD3	16.0	18.3	3.7	1011	14
	RD4	7.7	0.1	2.9	1011	13
	RD5	13.5	14.1	7.3	1011	14
	RD6	11.9	0.1	6.7	1011	16
	RD7	1.1	0.0	19.9	1010	14
	RD8	2.8	0.2	19.6	1011	14
	L6	0.7	0.0	19.7	1010	12
	L8	0.4	0.0	20.1	1010	12
	L10	0.1	0.0	20.4	1010	14
	L12	0.2	0.1	20.0	1011	15
Trigger Level		1.5% v/v	1% v/v			

Shading indicates trigger level exceeded

Monthly Status Report

Month November-2010

Landfill Gas Analysis

Date	Location	CO2	Methane	O2	Pressure	Temp
		%	%	%	mBar	oC
22-Nov-10	RD1	2.6	0.0	17.3	0	7
	RD2	5.4	5.3	17.5	0.1	7
	RD3	17.1	21.7	1.1	36.7	6
	RD4	5.9	26.1	5.2	-10.3	6
	RD5	10	11.4	8.1	-12.7	7
	RD6	14.3	19.1	0.7	-0.1	7
	RD7	1.8	0.0	18.6	0	8
	RD8	4.1	0.1	18.4	0	7
	L6	0.2	0.0	19.9	0	9
	L8	0.1	0.0	20.3	-0.4	8
	L10	0.1	0.0	20.3	0	8
	L12	0.2	0.0	19.9	0	9
Trigger Level		1.5% v/v	1% v/v			

Shading indicates trigger level exceeded

Monthly Status Report

Month December-2010

Landfill Gas Analysis

Date	Location	CO2	Methane	O2	Pressure	Temp
		%	%	%	mBar	oC
22-Dec-10	RD1	4.7	0.5	16.8	1021	6
	RD2	6.0	18.3	14.4	1018	5
	RD3	Tap Frozen	Tap Frozen	Tap Frozen	Tap Frozen	Tap Frozen
	RD4	1.4	0.2	18.2	1022	6
	RD5	10.3	10.8	9.7	1021	5
	RD6	7.7	13.6	8.1	1016	5
	RD7	0.3	0.1	19.9	1017	6
	RD8	0.5	0.2	19.7	1017	4
	L6	0.2	0.0	19.9	1018	4
	L8	0.1	0.1	19.9	1018	4
	L10	0.1	0.0	19.9	1018	4
	L12	0.1	0.1	19.6	1015	4
Trigger Level		1.5% v/v	1% v/v			

Shading indicates trigger level exceeded

APPENDIX E – GROUNDWATER MONITORING RESULTS

Table E.1 Biannual/Annual Groundwater Monitoring Results 2010 - Field Parameters, Inorganics, Metals

PARAMETER		EPA	BH3*		BH4		BH5		RD2		RD3	
	UNIT	IGV	Mar-10	Dec-10	Mar-10	Dec-10	Mar-10	Dec-10	Mar-10	Dec-10	Mar-10	Dec-10
pH	units	≥6.5-≤9.5	7.52	n/r	7.34	7.11	7.46	n/r	7.41	7.29	7.9	7.38
Temperature	°C	25	9.1	n/r	11.4	10.5	9.7	n/r	10.7	9.6	10.5	10.3
Conductivity	µS/cm	1000	12940	n/r	14450	13800	10220	n/r	3630	4140	2020	2090
Colour	-	-	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r
Odour	-	-	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r
Water Level	m	-	0.7	n/r	0.15	0.85	0.57	n/r	0.7	1.2	0.5	0.65
Ammonia	NH3-N	0.2	26.9	n/r	16.5	<0.02	18	n/r	12.2	<0.02	<0.02	<0.02
BOD	mg/l	-	n/a	n/r	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Chloride	Cl mg/l	30	4479	n/r	5422	5025	3772	n/r	872	1005	283	359
Salinity	ppt	-	n/a	n/r	n/a	5	n/a	n/r	n/a	1.0	n/a	0.35
COD	mg/l	-	n/a	n/r	n/a	n/a	n/a	n/r	n/a	n/a	n/a	n/a
Dissolved Oxygen	O_2 mg/l	NAC	n/a	n/r	n/a	5.9	n/a	n/r	n/a	7	n/a	7.8
Arsenic	As mg/l	0.01	n/a	n/r	n/a	0.029	n/a	n/r	n/a	0.0098	n/a	0.0026
Barium	Ba mg/l	0.1	n/a	n/r	n/a	n/a	n/a	n/r	n/a	n/a	n/a	n/a
Boron	B mg/l	1	n/a	n/r	n/a	1	n/a	n/r	n/a	0.66	n/a	0.04
Cadmium	Cd mg/l	0.005	n/a	n/r	n/a	0.0001	n/a	n/r	n/a	0.00002	n/a	<0.00002
Calcium	Ca mg/l	200	n/a	n/r	n/a	40	n/a	n/r	n/a	38	n/a	18
Chromium	Cr mg/l	0.03	n/a	n/r	n/a	0.065	n/a	n/r	n/a	0.046	n/a	0.34
Copper	Cu mg/l	0.03	n/a	n/r	n/a	0.036	n/a	n/r	n/a	0.0083	n/a	0.0052
Cyanide	Cn mg/l	0.01	n/a	n/r	n/a	<0.05	n/a	n/r	n/a	<0.05	n/a	<0.05
Fluoride	F mg/l	1	n/a	n/r	n/a	<2.5	n/a	n/r	n/a	<1.0	n/a	0.5
Iron	Fe mg/l	0.2	n/a	n/r	n/a	34	n/a	n/r	n/a	8.9	n/a	0.53
Lead	Pb mg/l	0.01	n/a	n/r	n/a	<0.0003	n/a	n/r	n/a	<0.0003	n/a	<0.0003
Magnesium	Mg mg/l	50	n/a	n/r	n/a	80	n/a	n/r	n/a	21	n/a	12
Manganese	Mn mg/l	0.05	n/a	n/r	n/a	n/a	n/a	n/r	n/a	n/a	n/a	n/a
Mercury	Hg mg/l	0.001	n/a	n/r	n/a	<0.00005	n/a	n/r	n/a	<0.00005	n/a	<0.00005
Nickel	Ni mg/l	0.02	n/a	n/r	n/a	0.024	n/a	n/r	n/a	0.005	n/a	0.003
Potassium	K mg/l	5	n/a	n/r	n/a	90	n/a	n/r	n/a	38	n/a	12
Selenium	Se mg/l	-	n/a	n/r	n/a	n/a	n/a	n/r	n/a	n/a	n/a	n/a
Sodium	Na mg/l	150	n/a	n/r	n/a	1200	n/a	n/r	n/a	n/a	n/a	78
Sulphate	SO_4 mg/l	200	n/a	n/r	n/a	<2	n/a	n/r	n/a	<2	n/a	60
Tin	Sn mg/l	-	n/a	n/r	n/a	<0.01	n/a	n/r	n/a	<0.01	n/a	<0.01
Total Phosphorous/Orthophosphate	P/PO_4 mg/l	0.03	n/a	n/r	n/a	4.2	n/a	n/r	n/a	0.63	n/a	<0.02
Total Organic Carbon	C mg/l	NAC	160	n/r	170	60	120	n/r	110	24	82	6
Total Oxidised Nitrogen (water)	N mg/l	NAC	<0.5	n/r	<0.5	<0.5	<0.5	n/r	2.7	<0.5	<0.5	<0.5
Total Phenols	mg/l	0.0005	<0.0001	n/r	<0.0001	<0.0005	<0.0001	n/r	<0.0001	<0.0005	<0.0001	<0.0005
Zinc	Zn mg/l	0.1	n/a	n/r	n/a	0.007	n/a	n/r	n/a	0.006	n/a	0.009
Detergents	mg/l	-	n/a	n/r	n/a	0.5	n/a	n/r	n/a	0.2	n/a	<0.20
Residue on evaporation	mg/l	-	n/a	n/r	n/a	7000	n/a	n/r	n/a	1800	n/a	700

IGV = Interim Guideline Value - from the EPA document "Towards Setting Guideline Values for the Protection of Groundwater in Ireland"
Results are shaded where they exceed the EPA IGV
NAC = No abnormal change
n/a = not analysed
n/r = not recorded
Analysis conducted by Q Lab Ltd. on 23rd March and 15th December 2010
Location RD3 was inaccessible at the time of sampling due to overgrowth
Location BH5 was not sampled during the December sampling round as the well cover was frozen shut

Table E.2 Biannual/Annual Groundwater Monitoring Results 2010 - VOC

PARAMETER	UNIT	EPA IGV	Limit of Detection	List I/ List II	BH3 Dec-10	BH4 Dec-10	BH5 Dec-10	RD2 Dec-10	RD3 Dec-10
1,1,1,2-Tetrachloroethane	µg/l	-		-	n/a	n/d	n/a	n/d	n/d
1,1,1-Trichloroethane	µg/l	500	0.5	I	n/a	n/d	n/a	n/d	n/d
1,1,2,2-Tetrachloroethane	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
1,1,2-Trichloroethane	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
1,1-Dichloroethane	µg/l	-		-	n/a	n/d	n/a	n/d	n/d
1,1-Dichloroethene	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
1,1-Dichloropropene	µg/l	-		-	n/a	n/d	n/a	n/d	n/d
1,2,3-Trichlorobenzene	µg/l	0.4	0.5	I	n/a	n/d	n/a	n/d	n/d
1,2,3-Trichloropropane	µg/l	-	2.0	-	n/a	n/d	n/a	n/d	n/d
1,2,4-Trichlorobenzene	µg/l	0.4	0.5	I	n/a	n/d	n/a	n/d	n/d
1,2,4-Trimethylbenzene	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
1,2-Dibromo-3-chloropropane	µg/l	-	2.0	-	n/a	n/d	n/a	n/d	n/d
1,2-Dibromoethane	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
1,2-Dichlorobenzene	µg/l	10	1	I	n/a	n/d	n/a	n/d	n/d
1,2-Dichloroethane	µg/l	3		I	n/a	n/d	n/a	n/d	n/d
1,2-Dichloropropane	µg/l	-	0.1	-	n/a	n/d	n/a	n/d	n/d
1,3,5-Trimethylbenzene	µg/l	-		-	n/a	n/d	n/a	n/d	n/d
1,3-Dichlorobenzene	µg/l	0.01/50*	0.5	I	n/a	n/d	n/a	n/d	n/d
1,3-Dichloropropane	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
1,4-Dichlorobenzene	µg/l	0.01/50*		I	n/a	n/d	n/a	n/d	n/d
2,2-Dichloropropane	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
2-Chlorotoluene	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
4-Chlorotoluene	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
4-Isopropyltoluene	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
Acetone	µg/l	-	2.0	-	n/a	n/d	n/a	n/d	n/d
Benzene	µg/l	1	0.1	I	n/a	n/d	n/a	n/d	n/d
Bromobenzene	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
Bromochloromethane	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
Bromodichloromethane	µg/l	-	2.0	-	n/a	n/d	n/a	n/d	n/d
Bromomethane	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
Carbontetrachloride	µg/l	-	1	-	n/a	n/d	n/a	n/d	n/d
Chlorobenzene	µg/l	1	0.5	I	n/a	n/d	n/a	n/d	n/d
Chloroethane	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
Trichloromethane/Chloroform	µg/l	12	1	I	n/a	n/d	n/a	n/d	n/d
Chloromethane	µg/l	-		-	n/a	n/d	n/a	n/d	n/d
cis-1,2-Dichloroethene	µg/l	30	0.5	II	n/a	n/d	n/a	n/d	n/d
cis-1,3-Dichloropropene	µg/l	-		-	n/a	n/d	n/a	n/d	n/d
Dibromochloromethane	µg/l	-	1	-	n/a	n/d	n/a	n/d	n/d
Dibromomethane	µg/l	-	0.1	-	n/a	n/d	n/a	n/d	n/d
Dichloromethane	µg/l	10	5	II	n/a	n/d	n/a	n/d	n/d
Dichlorofluoromethane	µg/l	-	10	II	n/a	n/d	n/a	n/d	n/d
Dichlorodifluoromethane	µg/l	-		-	n/a	n/d	n/a	n/d	n/d
Ethylbenzene	µg/l	10	0.5	II	n/a	n/d	n/a	n/d	n/d
Ethyl ether	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
Hexachlorobutadiene	µg/l	0.1	0.5	I	n/a	n/d	n/a	n/d	n/d
Isopropylbenzene	µg/l	-	0.6	-	n/a	n/d	n/a	n/d	n/d
Methyl tert-butyl ether (MTBE)	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
Naphthalene	µg/l	1	2	II	n/a	n/d	n/a	n/d	n/d
n-Butylbenzene	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
Nitrobenzene	µg/l	-	0.5		n/a	n/d	n/a	n/d	n/d
o-Xylene	µg/l	-	0.5		n/a	n/d	n/a	n/d	n/d
m/p-Xylene	µg/l	10	0.5	II	n/a	n/d	n/a	n/d	n/d
Propylbenzene	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
sec-Butylbenzene	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
Styrene	µg/l	0.5/300*	2.0	-	n/a	n/d	n/a	n/d	n/d
tert-Butylbenzene	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
Tetrachloroethene	µg/l	40	0.1	I	n/a	n/d	n/a	n/d	n/d
Tetrahydrofuran	µg/l	-	5.0	-	n/a	n/d	n/a	n/d	n/d
Toluene	µg/l	10		I	n/a	n/d	n/a	n/d	n/d
trans-1,2-Dichloroethene	µg/l	30		II	n/a	n/d	n/a	n/d	n/d
trans-1,3-Dichloropropene	µg/l	30	2	II	n/a	n/d	n/a	n/d	n/d
Trichloroethene	µg/l	70		II	n/a	n/d	n/a	n/d	n/d
Trichlorofluoromethane	µg/l	-		-	n/a	n/d	n/a	n/d	n/d
Trichloroethylene	µg/l	10		I	n/a	n/d	n/a	n/d	n/d
Vinyl Chloride/Chloroethene	µg/l	0.7*	0.5	-	n/a	n/d	n/a	n/d	n/d

IGV = Interim Guideline Value - from the EPA document "Towards Setting Guideline Values for the Protection of Groundwater in Ireland"
Results are shaded where they exceed the EPA IGV
NAC = No abnormal change
n/d = not detected
n/a = not analysed

Table E.3 Biannual/Annual Groundwater Monitoring Results 2010 - SVOC

PARAMETER	UNIT	EPA IGV	Limit of Detection	List I/ List II	BH3 Nov-09	BH4 Nov-09	BH5 Nov-09	RD2 Nov-09	RD3 Nov-09
1,3-Dichlorobenzene	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
1,4-Dichlorobenzene	µg/l	-	0.5	I	n/a	n/d	n/a	n/d	n/d
1,2-Dichlorobenzene	µg/l	10	0.5	I	n/a	n/d	n/a	n/d	n/d
1,2,4-Trichlorobenzene	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
Acenaphthylene	µg/l	-	0.01	-	n/a	n/d	n/a	n/d	n/d
Acenaphthene	µg/l	-	0.01	-	n/a	n/d	n/a	n/d	n/d
Anthracene	µg/l	10000	0.01	II	n/a	n/d	n/a	n/d	n/d
Benzo(b)fluoranthene	µg/l	0.5	0.01	II	n/a	n/d	n/a	n/d	n/d
Benzo(k)fluoranthene	µg/l	0.1	0.01	II	n/a	n/d	n/a	n/d	n/d
Benzo(a)pyrene	µg/l	0.0	0.01	II	n/a	n/d	n/a	n/d	n/d
Benzo(ghi)perylene	µg/l	0.1	0.01	II	n/a	n/d	n/a	n/d	n/d
Chrysene	µg/l	-	0.01	-	n/a	n/d	n/a	n/d	n/d
Dibenzo(ah)anthracene	µg/l	-	0.01	-	n/a	n/d	n/a	n/d	n/d
Fluorene	µg/l	-	0.01	-	n/a	n/d	n/a	n/d	n/d
Fluoranthene	µg/l	1	0.01	II	n/a	n/d	n/a	n/d	n/d
Hexachloroethane	µg/l	-	5	-	n/a	n/d	n/a	n/d	n/d
Hexachlorobutadiene	µg/l	-	0.5	-	n/a	n/d	n/a	n/d	n/d
Indeno(123-cd)pyrene	µg/l	0.1	0.01	II	n/a	n/d	n/a	n/d	n/d
Nitrobenzene	µg/l	10	0.5	II	n/a	n/d	n/a	n/d	n/d
Naphthalene	µg/l	-	0.01	II	n/a	n/d	n/a	n/d	n/d
Phenanthrene	µg/l	-	0.01	-	n/a	n/d	n/a	n/d	n/d
Pyrene	µg/l	-	0.01	-	n/a	n/d	n/a	n/d	n/d

IGV = Interim Guideline Value - from the EPA document "Towards Setting Guideline Values for the Protection of Groundwater in Ireland"
Results are shaded where they exceed the EPA IGV
NAC = No abnormal change
n/a = not analysed
n/d = not detected

APPENDIX F – LEACHATE MONITORING RESULTS AND PUMPING DATA

Table F.1 Biannual/Annual Leachate Monitoring Results 2010

PARAMETER		EPA	SS3 2010		SS3 2009		SS3 2008		SS3 2007		SS3 2006		SS3 2005		SS3 2004	
	UNIT	IGV	Mar-10	Dec-10	Mar-09	Nov-09	Sep-08	Dec-08	Jun-07	Nov-07	Aug-06	Dec-06	Aug-05	Dec-05	Mar-04	Dec-04
pH	units	≥6.5-≤9.5	6.83	7.59	6.79	7.03	7.4	7	n/r	6.7	6.9	7.16	6.98	6.89	6.53	6.79
Temperature	°C	25	7.8	7.7	11	12.7	13	7	n/r	n/r	18	12.9	11.8	11	10	11.2
Ammonia (as NH4)	NH_3-N mg/l	0.15	7.20	8.10	0.06	8	<0.1	1.2	n/a	9.5	5.5	3.5	7	9	1.7	<0.01
Odour	-	-	n/r	n/r	n/r	n/r	None	None	None	None	None	None	None	None	Slight odour	n/r
Colour	-	NAC	n/r	n/r	n/r	n/r	Slightly Yellow	Yellow	Cloudy	Cloudy	Slightly Yellow	Yellow	Clear/Straw	Clear/Straw	Turbid/ Brown	n/r
COD	mg/l	-	60.0	211.0	130	75	44	37	93	187	79	215	90	130	54	85
BOD	mg/l	-	25.0	11.0	5.4	7.5	<2	11	4	6	7.25	26.75	5	40	20	<1
Detergents (as MBAS)	mg/l	-	n/a	n/a	n/a	<0.001	n/a	n/a	0.21	n/a	n/a	0.011	0.012	n/a	0.036	n/a
Electrical Conductivity	µS/cm	1000	1355	1870	1581	1252	827	n/a	n/a	1822	1269	870	2030	1413	1277	2030
Suspended Solids	mg/l	-	n/a	n/a	n/a	n/a	41	22	n/a	80	n/a	n/a	n/a	n/a	n/a	n/a
Sulphate	SO_4 mg/l	200	n/a	560	n/a	94	n/a	n/a	220	n/a	n/a	225	65.52	n/a	534.8	n/a
Total Phosphorous	P mg/l	-	n/a	0.4	n/a	0.88	3.2	n/a	n/a	n/a	n/a	0.5	0.06	n/a	0.25	n/a
Total Oxidised Nitrogen	N mg/l	NAC	8.30	24.60	9.9	32.1	<0.46	0.6	<0.2	<0.17	59	2.37	2	3.1	10.16	n/a
Chloride	Cl mg/l	30	141	86	102	29	24	29	95	170	326	326	n/a	n/a	107.34	95
Total Organic Carbon	C mg/l	NAC	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	99	99	n/a	n/a	n/a	n/a
Arsenic	As mg/l	0.01	n/a	0.004	n/a	<0.02	n/a	n/a	0.001	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Boron	B mg/l	1	n/a	<0.01	n/a	0.04	n/a	n/a	0.1	n/a	n/a	1.59	0.196	n/a	0.274	n/a
Cadmium	Cd mg/l	0.005	n/a	0.0001	n/a	<0.01	n/a	n/a	<0.03	n/a	n/a	<0.0035	<0.0035	n/a	<0.0035	n/a
Calcium	Ca mg/l	200	n/a	135	n/a	120	n/a	n/a	235	n/a	n/a	193.1	260	n/a	209.85	n/a
Chromium	Cr mg/l	0.03	n/a	0.03	n/a	<0.01	n/a	n/a	<0.05	n/a	n/a	0.02	<0.01	n/a	0.012	n/a
Copper	Cu mg/l	0.03	n/a	0.01	n/a	0.02	n/a	n/a	<0.05	n/a	n/a	0.026	<0.015	n/a	<0.015	n/a
Cyanide	Cn mg/l	0.01	n/a	<0.05	n/a	<0.05	n/a	n/a	<0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Iron	Fe mg/l	0.2	n/a	9.8	n/a	3.2	n/a	n/a	1.57	n/a	n/a	4.718	33.53	n/a	0.013	n/a
Lead	Pb mg/l	0.01	n/a	<0.0003	n/a	<0.03	n/a	n/a	<0.2	n/a	n/a	0.006	<0.049	n/a	<0.002	n/a
Magnesium	Mg mg/l	50	n/a	18	n/a	20	n/a	n/a	36	n/a	n/a	26.44	51.79	n/a	43.6	n/a
Mercury	Hg mg/l	0.001	n/a	0.00005	n/a	<0.01	n/a	n/a	<0.02	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Nickel	Ni mg/l	0.02	n/a	0.28	n/a	0.07	n/a	n/a	0.12	n/a	n/a	0.126	0.117	n/a	0.288	n/a
Potassium	K mg/l	5	n/a	9	n/a	8	n/a	n/a	7	n/a	n/a	8.6	9.93	n/a	9.47	n/a
Sodium	Na mg/l	150	n/a	48	n/a	31	n/a	n/a	56	n/a	n/a	60.37	123.3	n/a	72.42	n/a
Zinc	Zn mg/l	0.1	n/a	1.2	n/a	0.1	n/a	n/a	0.04	n/a	n/a	0.176	0.04	n/a	0.078	n/a
Diesel Range Organics (DRO)	mg/l	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<0.01	n/a	n/a	n/a	n/a	n/a	n/a
List I organics	mg/l	0.01	n/a	n/a	n/a	n/a	n/a	n/a	<0.01	n/a	n/a	<0.001	n/a	n/a	<0.01	n/a
List II organics	mg/l	0.01	n/a	n/a	n/a	n/a	n/a	n/a	<0.01	n/a	n/a	<0.001	n/a	n/a	<0.01	n/a

IGV = Interim Guidleine Value - from the EPA document "*Towards Setting Guideline Values for the Protection of Groundwater in Ireland*"
Results are shaded where they exceed the EPA IGV
NAC = No abnormal change
n/a = not analysed
n/r = not recorded
Analysis conducted by Q Lab Ltd. on 23rd March & 15th December 2010

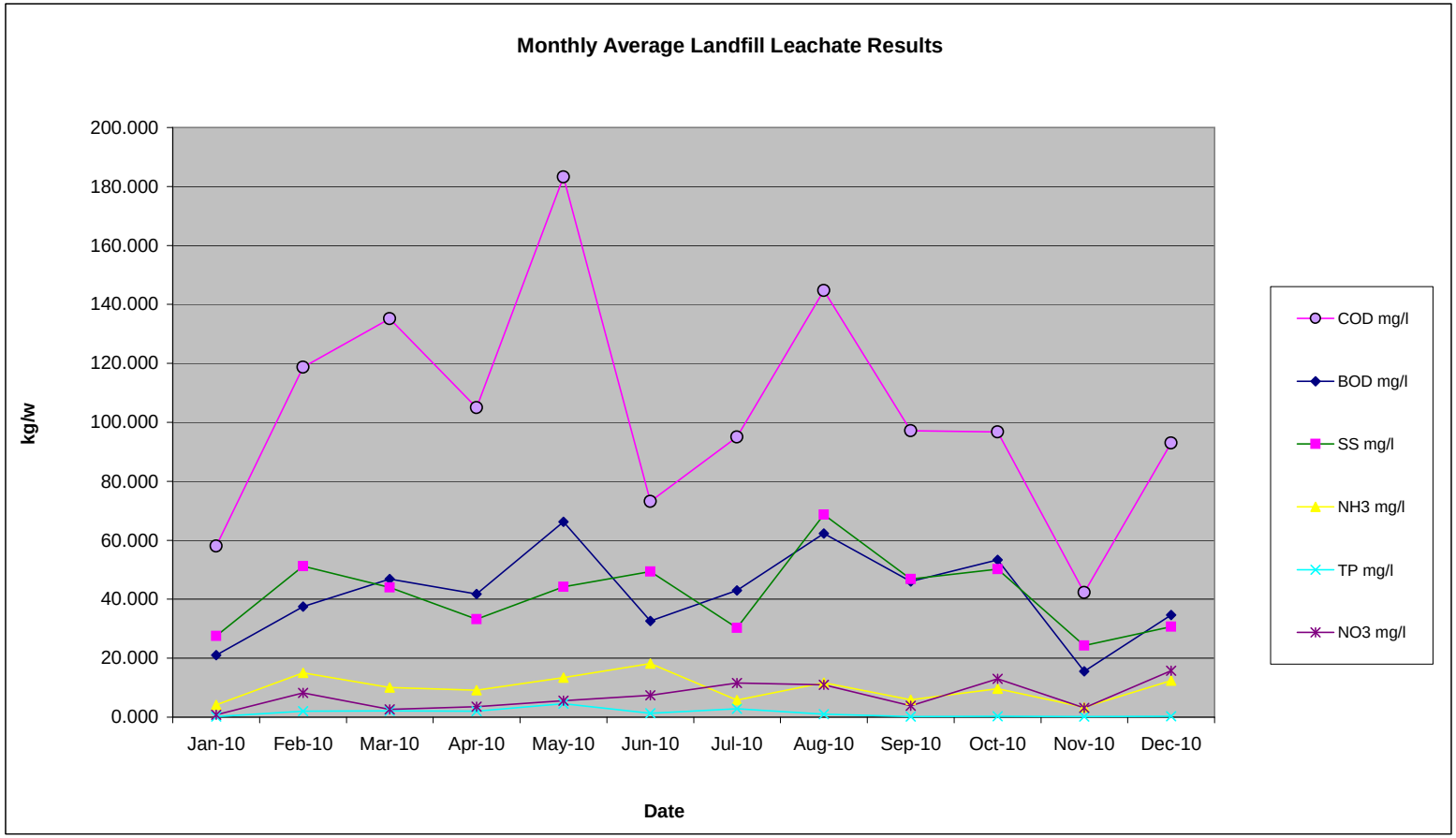
Table F.2 Monthly Leachate Pumping Data 2010

Leachate Results

Monthly Average Landfill Leachate Results

Date	Flow		COD	BOD	SS	NH3	TP	NO3	COD	BOD	SS	NH3	TP	NO3
	m3/week	m3/month	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	kg/Week	kg/Week	kg/Week	kg/Week	kg/Week	kg/Week
Jan-10	433.000	1918	58.000	21.000	27.500	4.167	0.197	0.800	24.422	8.923	12.809	1.928	0.089	0.339
Feb-10	195.500	782	118.750	37.500	51.250	15.063	2.025	8.250	21.069	6.693	9.606	2.640	0.369	2.032
Mar-10	191.400	848	135.200	46.800	44.000	10.110	2.180	2.660	24.843	8.625	8.330	1.908	0.427	0.492
Apr-10	313.000	1341	105.000	41.750	33.250	9.125	2.075	3.600	20.434	8.110	9.841	1.980	0.848	0.514
May-10	86.500	383	183.250	66.250	44.250	13.438	4.600	5.625	15.645	5.690	3.956	1.144	0.425	0.552
Jun-10	83.000	356	73.200	32.600	49.400	18.200	1.360	7.440	5.865	2.579	3.623	1.493	0.105	0.407
Jul-10	187.750	831	95.000	43.000	30.250	5.750	2.800	11.575	19.470	9.109	6.041	1.038	0.566	2.619
Aug-10	93.000	412	144.750	62.250	68.750	11.688	0.970	11.000	13.675	5.778	6.411	1.106	0.118	1.487
Sep-10	187.376	803	97.200	46.000	46.800	5.900	0.210	3.880	11.569	5.365	6.807	0.776	0.028	0.220
Oct-10	148.250	657	96.750	53.333	50.250	9.625	0.350	13.000	12.421	5.068	7.229	1.207	0.042	1.335
Nov-10	584.750	2506	42.250	15.500	24.250	3.313	0.208	3.200	24.234	7.574	14.504	1.769	0.124	1.915
Dec-10	99	440	93	34.67	31	12.42	0.34	15.7	10	3.8	3	1.29	0.03	1.4
Average	**216.9**	**939.7**	**103.5**	**41.7**	**41.7**	**9.9**	**1.4**	**7.2**	**17.0**	**6.4**	**7.7**	**1.5**	**0.3**	**1.1**
TOTAL		**11,276.3**	**1,242.4**	**500.7**	**500.6**	**118.8**	**17.3**	**86.8**	**203.7**	**77.3**	**92.2**	**18.3**	**3.2**	**13.4**

Table F.2 Monthly Leachate Pumping Data 2010



APPENDIX G – SURFACE WATER MONITORING RESULTS

Table G.1 Biannual/Annual Surface Water Monitoring Results 2010

PARAMETER	UNIT	Threshold/AA-EQS/MAC-EQS	SS1		SS2		SS4		SS6		SS7	
			Mar-10	Dec-10	Mar-10	Dec-10	Mar-10	Dec-10	Mar-10	Dec-10	Mar-10	Dec-10
pH	units	Hard water 6-9	7.59	7.4	8.04	n/r	7.77	7.38	8.19	n/r	n/r	n/r
Temperature	°C	<1.5° rise	8.5	6.2	8.7	n/r	7.8	5.9	8.3	n/r	n/r	n/r
Conductivity	µS/cm	1000	n/r	826	n/r	n/r	n/r	912	n/r	n/r	n/r	n/r
Suspended Solids	mg/l	-	8	8	4	n/r	8	6	12	n/r	n/r	n/r
Colour	-	NAC	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r
Odour	-	NAC	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r
Ammonia	NH3-N	-	<0.02	<0.02	0.02	n/r	0.04	<0.02	0.12	n/r	n/r	n/r
Total Phosphorous	P mg/l	0.06 (molybdate reactive phosphorus)**	n/a	<0.02	n/a	n/r	n/a	0.14	n/a	n/r	n/r	n/r
Total Organic Carbon	C mg/l	NAC	n/a	n/a	n/a	n/r	n/a	n/a	n/a	n/r	n/r	n/r
Total Oxidised Nitrogen	N mg/l	NAC	n/a	1	n/a	n/r	n/a	0.9	n/a	n/r	n/r	n/r
Total Phenols	mg/l	AA-EQS 0.008 MAC-EQS 0.046	n/a	n/a	n/a	n/r	n/a	n/a	n/a	n/r	n/r	n/r
BOD	mg/l	≤4 (95%ile)	1.3	1.5	0.8	n/r	1.3	<0.5	1.2	n/r	n/r	n/r
COD	mg/l	-	15	26	33	n/r	19	20	27	n/r	n/r	n/r
Oxygen Saturation	O_2 %	70-120% (95%ile) (summer)	68	36	82	n/r	87	71	75	n/r	n/r	n/r
Sodium	Na mg/l	-	n/a	60	n/a	n/r	n/a	38	n/a	n/r	n/r	n/r
Calcium	Ca mg/l	-	n/a	81	n/a	n/r	n/a	89	n/a	n/r	n/r	n/r
Chromium	Cr mg/l	CrVI: AA-EQS 0.0006 MAC-EQS 0.032	n/a	0.011	n/a	n/r	n/a	0.011	n/a	n/r	n/r	n/r
Copper	Cu mg/l	AA-EQS 0.005	n/a	0.0013	n/a	n/r	n/a	0.0011	n/a	n/r	n/r	n/r
Fluoride	F mg/l	AA-EQS 1.5	n/a	0.1	n/a	n/r	n/a	0.1	n/a	n/r	n/r	n/r
Iron	Fe mg/l	-	n/a	<0.02	n/a	n/r	n/a	0.77	n/a	n/r	n/r	n/r
Lead	Pb mg/l	AA-EQS 0.0072 MAC-EQS n/a	n/a	<0.0003	n/a	n/r	n/a	<0.0003	n/a	n/r	n/r	n/r
Magnesium	Mg mg/l	-	n/a	12	n/a	n/r	n/a	13	n/a	n/r	n/r	n/r
Manganese	Mn mg/l	-	n/a	0.278	n/a	n/r	n/a	0.374	n/a	n/r	n/r	n/r
Cadmium	Cd mg/l	-	n/a	0.00002	n/a	n/r	n/a	0.00003	n/a	n/r	n/r	n/r
Potassium	K mg/l	-	n/a	12	n/a	n/r	n/a	8	n/a	n/r	n/r	n/r
Sulphates	SO4 mg/l	-	n/a	112	n/a	n/r	n/a	160	n/a	n/r	n/r	n/r
Zinc	Zn mg/l	AA-EQS 0.04	n/a	0.029	n/a	n/r	n/a	0.014	n/a	n/r	n/r	n/r
Cyanide	Cn mg/l	AA-EQS 0.01	n/a	<0.05	n/a	n/r	n/a	<0.05	n/a	n/r	n/r	n/r
Arsenic	As mg/l	AA-EQS 0.02	n/a	0.0009	n/a	n/r	n/a	0.001	n/a	n/r	n/r	n/r
Boron	B mg/l	-	n/a	<0.01	n/a	n/r	n/a	<0.01	n/a	n/r	n/r	n/r
Mercury	Hg mg/l	-	n/a	<0.00005	n/a	n/r	n/a	<0.00005	n/a	n/r	n/r	n/r
Tin	Sn mg/l	-	n/a	<0.01	n/a	n/r	n/a	<0.01	n/a	n/r	n/r	n/r
Nickel	Ni mg/l	AA-EQS 0.02	n/a	0.006	n/a	n/r	n/a	0.007	n/a	n/r	n/r	n/r

AA-EQS: Annual Average Environmental Quality Standard
MAC-EQS: Maximum Admissible Concentration Environmental Quality Standard
Thresholds, AA-EQS's & MAC-EQS's taken from the Surface Water Quality Regulations SI 272 of 2009 for transitional waters
Results are shaded where they exceed the relevant Threshold/AA-EQS/MAC-EQS
NAC = No abnormal change
n/a = not analysed
n/r = not recorded
Analysis conducted by Q Lab Ltd. on 23rd March & 15th December 2010
*Location SS2 & SS7 were dry at the time of sampling in March 2010
** Locations SS6 & SS7 were inaccesible at the time of sampling in December 2010 due to a collapsed bridge

APPENDIX H – COPIES OF LABORATORY REPORTS

Hydro-G

Client:	**QLABS - Shannon**	**Date Samples Despatched:**	23/3/10 Interlink (3 no. coolboxes)
INVOICE ADDRESS:	Q Labs: RESPONSE GROUP Contract Shannon	**Project/Site Name:**	**Shannon - Tradaree Sludge Facility & Shannon Airport**
email: pamela@hydro-g.com	**Mobile 087-8072744**	**Sampler :**	Dr. Pamela Bartley

Date of Sampling	Location	Sample Ref. ID	Sample Filtered Y/N	Sample Preservation Y/N	SOURCE & Depth	Bottles: 1 litre plastic	Bottles: 1 litre Glass	Bottles: vial	Bottles: sterile jar	Field Measurement Results: DO (%)	pH	temp oC	Conductivity (uS/cm)	Total Dissolved Solids (ppm)	Salinity	Notes	Groundwater Monitoring Data: Water Level (m below casing)	Total Depth of Bore (m)	50 mm diam installation	Casing level above GL	Purged Volume (litres)	Notes
23/03/2010	Tradaree Sludge Fac/Shannon Landfill	SS1	N	N	SURFACE WATER	*x 1*				8	7.5	8.5	649	473	0.5	deep water, no real flow	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
23/03/2010	Tradaree Sludge Fac/Shannon Landfill	SS2	N	N	SURFACE WATER	*x 1*				9.5	7.8	8.7	737	540	0.5	VERY low WL but flowing	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
23/03/2010		SS3	N	N	LEACHATE (NOT SURFACE WATER)	*x 2*				0	6.5	7.8	1026	780	0.8	leachate: not surface water	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
23/03/2010	Tradaree Sludge Fac/Shannon Landfill	SS4	N	N	SURFACE WATER	*x 1*				10.2	7.7	8.3	640	469	0.47	good WL and some flow	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
23/03/2010		SS5	**There is no SS5(previuosly confirmed by Response Assistant at site)**														*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
23/03/2010	Tradaree Sludge Fac/Shannon Landfill	SS6	N	N	SURFACE WATER	*x 1*				9	7.7	7.4	5609	4149	4.6	VERY high Cond & TDS (Sal = Expected: tidal)	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
23/03/2010	Tradaree Sludge Fac/Shannon Landfill	SS7	N	N	LAGOON	*DRY = NO SAMPLE - tidal?*				*no sample*							*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
23/03/2010																						
23/03/2010	Tradaree Sludge Fac/Shannon Landfill	**SLUDGE**	N	N	**SLUDGE Press - Solid**	*X 1*			*X 1*	solid sample - not possible to measure field parameters							*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
23/03/2010	Tradaree Sludge Fac/Shannon Landfill	**Final Effient**	N	N	**final lagoon**	*X 1*				0.3	7.2	10.1	913	637	0.6		*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
23/03/2010																						
23/03/2010	Tradaree Sludge Fac/Shannon Landfill	RD2	N	N	**GROUNDWATER - BOREHOLE**	*X 1*	*X 1*			8	7.3	10.7	2926	2006		High Cond & TDS	0.7	16	√	0.4	41	> 1 x vol = DRIED UP, ALLOWED TO RECOVER & Sampled
23/03/2010	Tradaree Sludge Fac/Shannon Landfill	RD3	N	N	**GROUNDWATER - BOREHOLE**	*X 1*	*X 1*			0	7.4	10.45	1589	1093		High Cond & TDS	0.5	17	√	0.4	32	> 1 x vol stable cond = sampled
23/03/2010	Tradaree Sludge Fac/Shannon Landfill	BH3	N	N	**GROUNDWATER - BOREHOLE**	*X 1*	*X 1*			1	6.6	9.1	10.2*	7318	8.52	* mS/cm Cond - very High & high TDS & high Sal	0.7	6.5	√	0.3	6	fried up, allowed to recover, sampled
23/03/2010	Tradaree Sludge Fac/Shannon Landfill	BH4	N	N	**GROUNDWATER - BOREHOLE**	*X 1*	*X 1*			5	6.7	11.4	11.24*	7592	9	* mS/cm Cond - very High & high TDS & high Sal	0.15	6.4	√	0.3	30	>3 x vol = sampled
23/03/2010	Tradaree Sludge Fac/Shannon Landfill	BH5	N	N	**GROUNDWATER - BOREHOLE**	*X 1*	*X 1*			0.7	6.64	9.7	7974	5618	6.42	VERY High Cond & TDS & High Sal for GW	0.57	6.2	√	0.4	40	>3.5 x vol = sampled
23/03/2010	Shannon Airport WWT	GW1*	N	N	**GROUNDWATER**	*X 1*	*X 1**	*X 1*		*0*	*6.8*	*7.4*	*652*	*484*	*0.5*	black sediment persists (*glass sample bottle because not enough plastic)	1.95	6.4	√	0.4	9	1 X VOL BAILED
23/03/2010	Shannon Airport WWT	GW2*	N	N	**GROUNDWATER**	*x 2*	na	*X 1*		*1*	*6.7*	*8.9*	*1291*	*930*	*0.95*		2.28	6.2	√	0.45	8	1 X VOL BAILED
23/03/2010	Shannon Airport WWT	GW3*	N	N	**GROUNDWATER**	*x 2*	na	*X 1*		*0.7*	*6.8*	*9.5*	*731*	*515*	*0.5*		3.75	6.3	√	0.4	6	1 X VOL BAILED

Notes

Re Shannon Airport Groundwater boreholes: These are my sample IDs. There were no labels on these boreholes or map of site (Ailish provided these for the Tradaree Sludge landfill site). GW1 is the borehole closest to the airport (west); GW2 is the middle borehole; GW3 is the east borehole that is closest to the jetty.

Signature: Pamela Bartley

Hydro-G

Client:	**QLABS - Shannon**	**Date Samples Despatched:**	115/12/10 Interlink (2 no. coolboxes & 3 no. ELS Cardboard Boxes NB: ELS Boxes also contain 1 x 1 litre Glass Bottle for Q labs analysis)
INVOICE ADDRESS:	Q Labs: RESPONSE GROUP Contract Shannon	**Project/Site Name:**	**Shannon - Tradaree Sludge Facility & Shannon Airport**
email: pamela@hydro-g.com	**Mobile 087-8072744**	**Sampler :**	Dr. Pamela Bartley

						Bottles				**Field Measurement Results**						**Notes**	**Groundwater Monitoring Data**					
Date of Sampling	**Location**	**Sample Ref. ID**	**Sample Filtered Y/N**	**Sample Preservation Y/N**	**SOURCE & Depth**	1 litre plastic	1 litre Glass	vial	0.5 litre plastic	**ELS (2 litre glass & 2 vials)**	**pH**	**temp oC**	**Conductivity (uS/cm)**	**Total Dissolved Solids (ppm)**	**Salinity**	**Notes**	**Water Level (m below casing)**	**Total Depth of Bore (m)**	**50 mm diam installation**	**Casing level above GL**	**Purged Volume (litres)**	**Notes**
15/12/2010	Tradaree Sludge Fac/Shannon Landfill	SS1	N	N	SURFACE WATER	*x 2*			*x 1*		7.5	6.2	406	314	0.3	deep water, no real flow	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
15/12/2010	Tradaree Sludge Fac/Shannon Landfill	SS2	N	N	SURFACE WATER											NO WATER JUST MUCK	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*NO SAMPLE _ JUST MUCK AT BRIDGE*
15/12/2010	Tradaree Sludge Fac/Shannon Landfill	SS3	N	N	LEACHATE (NOT SURFACE WATER)	*x 3*		*x 1*			6.2	7.69	1382	1034	1.06	leachate: not surface water	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
15/12/2010	Tradaree Sludge Fac/Shannon Landfill	SS4	N	N	SURFACE WATER	*x 2*			*x 1*		6.8	5.9	310	241	0.2	good WL, no flow	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
15/12/2010		SS5	**There is no SS5(previuosly confirmed by Response Assistant at site)**														*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
15/12/2010	Tradaree Sludge Fac/Shannon Landfill	SS6	N	N	SURFACE WATER	*NO SAMPLES BECAUSE BRIDGE TO THESE SAMPLING POINTS HAS COLLAPSED INTO RIVER +*											*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*NO samples at SS 6 and SS7*
15/12/2010	Tradaree Sludge Fac/Shannon Landfill	SS7	N	N	LAGOON	*NO ACCESS*											*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
15/12/2010																						
15/12/2010	Tradaree Sludge Fac/Shannon Landfill	**SLUDGE**	N	N	**SLUDGE Press - Solid**	*Not on sampling lists this time*											*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
15/12/2010	Tradaree Sludge Fac/Shannon Landfill	**Final Effient**	N	N	**final lagoon**												*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	
15/12/2010																						
15/12/2010	Tradaree Sludge Fac/Shannon Landfill	RD2	N	N	**GROUNDWATER - BOREHOLE**	*x 3*	*X 1*			*Yes*	6.7	9.6	3179	2246	2.41	**High Cond, TDS & Sal**	1.2	16	√	0.4		> 1 x vol = DRIED UP, ALLOWED TO RECOVER & Sampled Bailed
15/12/2010	Tradaree Sludge Fac/Shannon Landfill	RD3	N	N	**GROUNDWATER - BOREHOLE**	*x 3*	*X 1*			*Yes*	6.9	10.3	1617	1137	1.18	**High Cond, TDS & Sal**	0.65	17	√	0.4		3 x vol stable cond = sampled pumped
15/12/2010	Tradaree Sludge Fac/Shannon Landfill	BH3	N	N	**GROUNDWATER - BOREHOLE**	*Not able to locate sampling point in near dark conditions - sign missing and heavy bramble overgrowth - requires attention by Response*																*No Sample*
15/12/2010	Tradaree Sludge Fac/Shannon Landfill	BH4	N	N	**GROUNDWATER - BOREHOLE**	*x 3*	*X 1*			*Yes*	6.96	10.5	**11.1 MS/cm**	**7685**	**9**	*** mS/cm Cond - very High & high TDS & high Sal**	0.85	6.4	√	0.3		>3 x vol = sampled
15/12/2010	Tradaree Sludge Fac/Shannon Landfill	BH5	N	N	**GROUNDWATER - BOREHOLE**	*Unable to remove lid - Frost damage?*																*No Sample*
15/12/2010	Shannon Airport WWT	GW1*	N	N	**GROUNDWATER**	*x 2*	na	*X 1*			*6.5*	*9.8*	*735*	*517*	*0.52*		2.1	6.1	√	0.4	25	> 3 x vol
15/12/2010	Shannon Airport WWT	GW2*	N	N	**GROUNDWATER**	*x 2*	na	*X 1*			*6.34*	*8.34*	*1335*	*974*	*1*		2.94	8	√	0.45	12	1 x vol then dried and recovered
15/12/2010	Shannon Airport WWT	GW3*	N	N	**GROUNDWATER**	*x 2*	na	*X 1*			*6.08*	*9.89*	*898*	*630*	*0.63*		3.32	6.4	√	0.4	22	> 3 x vol

Notes

Re Shannon Airport Groundwater boreholes: These are my sample IDs. There were no labels on these boreholes or map of site (Ailish provided these for the Tradaree Sludge landfill site). GW1 is the borehole closest to the airport (west); GW2 is the middle borehole; GW3 is the east borehole that is closest to the jetty.

Signature: Pamela Bartley

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Test Report

Customer: Response Engineering Tra
Response Engineering
Tradaree WWTP
Shannon
Co. Clare
Account.: 10038

Report No.: 55593
Report Date: 16/04/2010
Received Date: 24/03/2010
Analysis Date: 24/03/2010
Order No.:
Page: 1 of 1
RevisionDate:

Sample ID: 82191

Description: Borehole water sample RD2 taken 23.03.10 at Shannon Landfill

Ref No:

	ID	*Test*	*SOP*	*Results*
	82191	Phenols, ug/l	Subcontracted	<0.1
	82191	Total Organic Carbon mg/l	Subcontracted	110
	82191	Total Oxidised Nitrogen, mg/l	STM-C-30.1.0	2.7
	82191	Temperature, °C	STM-C-41.1.0	10.7
✓	82191	pH value	STM-C-3.1.00	7.41
✓	82191	Conductivity, uS/cm @ 20°C	STM-C-4.1.00	3630
✓	82191	Chloride as Cl, mg/L	STM-C-5.2.07	872
	82191	Ammonia as NH3-N, mg/l	STM-C-7.2.04	12.2
	82191	Groundwater level m	Subcontracted	0.7

Comments:

Report Authorised By: Peter O'Byrne — Peter O'Byrne Chem. Lab. Manager

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Test Report

Customer: Response Engineering Tra
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Tradaree WWTP
Shannon
Co. Clare
Account.: 10038

Report No.: 55594
Report Date: 16/04/2010
Received Date: 24/03/2010
Analysis Date: 24/03/2010
Order No.:
Page: 1 of 1
RevisionDate:

Sample ID: 82192

Description: Borehole water sample RD3 taken 23.03.10 at Shannon Landfill

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	82192	Phenols, ug/l	Subcontracted	<0.1
☐	82192	Total Organic Carbon mg/l	Subcontracted	82
☐	82192	Total Oxidised Nitrogen, mg/l	STM-C-30.1.0	<0.5
☐	82192	Temperature, °C	STM-C-41.1.0	10.5
☑	82192	pH value	STM-C-3.1.00	7.90
☑	82192	Conductivity, uS/cm @ 20°C	STM-C-4.1.00	2020
☑	82192	Chloride as Cl, mg/L	STM-C-5.2.07	283
☐	82192	Ammonia as NH3-N, mg/l	STM-C-7.2.04	<0.02
☐	82192	Groundwater level m	Subcontracted	0.5

Comments:

Report Authorised By: Peter O'Byrne Peter O'Byrne Chem. Lab. Manager

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Test Report

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Shannon
Co. Clare
Account.: 10038

Report No.: 55595
Report Date: 16/04/2010
Received Date: 24/03/2010
Analysis Date: 24/03/2010
Order No.:
Page: 1 of 1
RevisionDate:

Sample ID: 82193

Description: Borehole water sample BH3 taken 23.03.10 at Shannon Landfill

Ref No:

	ID	*Test*	*SOP*	*Results*
	82193	Phenols, ug/l	Subcontracted	<0.1
	82193	Total Organic Carbon mg/l	Subcontracted	160
	82193	Total Oxidised Nitrogen, mg/l	STM-C-30.1.0	<0.5
	82193	Temperature, °C	STM-C-41.1.0	9.1
✓	82193	pH value	STM-C-3.1.00	7.52
✓	82193	Conductivity, uS/cm @ 20°C	STM-C-4.1.00	12940
✓	82193	Chloride as Cl, mg/L	STM-C-5.2.07	4479
	82193	Ammonia as NH3-N, mg/l	STM-C-7.2.04	26.9
	82193	Groundwater level m	Subcontracted	0.7

Comments:

Report Authorised By: Peter O'Byrne Peter O'Byrne Chem. Lab. Manager

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Test Report

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Shannon
Co. Clare
Account.: 10038

Report No.: 55596
Report Date: 16/04/2010
Received Date: 24/03/2010
Analysis Date: 24/03/2010
Order No.:
Page: 1 of 1
RevisionDate:

Sample ID: 82194

Description: Borehole water sample BH4 taken 23.03.10 at Shannon Landfill

Ref No:

	ID	*Test*	*SOP*	*Results*
	82194	Phenols, ug/l	Subcontracted	<0.1
	82194	Total Organic Carbon mg/l	Subcontracted	170
	82194	Total Oxidised Nitrogen, mg/l	STM-C-30.1.0	<0.5
	82194	Temperature, °C	STM-C-41.1.0	11.4
✓	82194	pH value	STM-C-3.1.00	7.34
✓	82194	Conductivity, uS/cm @ 20°C	STM-C-4.1.00	14450
✓	82194	Chloride as Cl, mg/L	STM-C-5.2.07	5422
	82194	Ammonia as NH3-N, mg/l	STM-C-7.2.04	16.5
	82194	Groundwater level m	Subcontracted	0.15

Comments:

Report Authorised By: Peter O'Byrne Peter O'Byrne Chem. Lab. Manager

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Test Report

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Co. Clare
Account.: 10038

Report No.: 55597
Report Date: 16/04/2010
Received Date: 24/03/2010
Analysis Date: 24/03/2010
Order No.:
Page: 1 of 1
RevisionDate:

Sample ID: 82195

Description: Borehole water sample BH5 taken 23.03.10 at Shannon Landfill

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	82195	Phenols, ug/l	Subcontracted	<0.1
☐	82195	Total Organic Carbon mg/l	Subcontracted	120
☐	82195	Total Oxidised Nitrogen, mg/l	STM-C-30.1.0	<0.5
☐	82195	Temperature, °C	STM-C-41.1.0	9.7
☑	82195	pH value	STM-C-3.1.00	7.46
☑	82195	Conductivity, uS/cm @ 20°C	STM-C-4.1.00	10220
☑	82195	Chloride as Cl, mg/L	STM-C-5.2.07	3772
☐	82195	Ammonia as NH3-N, mg/l	STM-C-7.2.04	18.0
☐	82195	Groundwater level m	Subcontracted	0.57

Comments:

Report Authorised By: Peter O'Byrne Peter O'Byrne Chem. Lab. Manager

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Report No.: 63739
Report Date: 21/01/2011
Received Date: 16/12/2010
Analysis Date: 16/12/2010
Order No.:
Page: 1 of 1
RevisionDate:

Sample ID: 92862

Description: Shannon Landfill Borehole water (RD2) taken 15.12.10 by Pamela Bartley

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	92862	Phenols, ug/l	Subcontracted	<0.5
☐	92862	Total Organic Carbon mg/l	Subcontracted	24
☐	92862	Total Oxidised Nitrogen, mg/l	STM-C-30.1.0	<0.5
☐	92862	Temperature, °C	STM-C-41.1.0	9.6
☐	92862	pH value	STM-C-3.1.00	7.29
☐	92862	Conductivity, uS/cm @ 20°C	STM-C-4.1.00	4140
☐	92862	Chloride as Cl, mg/L	STM-C-5.2.07	1005
☐	92862	Ammonia as NH3-N, mg/l	STM-C-7.2.04	<0.02
☐	92862	Groundwater level m	Subcontracted	1.20

Comments:

Report Authorised By: Peter O'Byrne Peter O'Byrne Chem. Lab. Manager

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Test Report

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Report No.: 63740
Report Date: 21/01/2011
Received Date: 16/12/2010
Analysis Date: 16/12/2010
Order No.:
Page: 1 of 1
RevisionDate:

Sample ID: 92863

Description: Shannon Landfill Borehole water (RD3) taken 15.12.10 by Pamela Bartley

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	92863	Phenols, ug/l	Subcontracted	<0.5
☐	92863	Total Organic Carbon mg/l	Subcontracted	6
☐	92863	Total Oxidised Nitrogen, mg/l	STM-C-30.1.0	<0.5
☐	92863	Temperature, °C	STM-C-41.1.0	10.3
☐	92863	pH value	STM-C-3.1.00	7.38
☐	92863	Conductivity, uS/cm @ 20°C	STM-C-4.1.00	2090
☐	92863	Chloride as Cl, mg/L	STM-C-5.2.07	359
☐	92863	Ammonia as NH3-N, mg/l	STM-C-7.2.04	<0.02
☐	92863	Groundwater level m	Subcontracted	0.65

Comments:

Report Authorised By: Peter O'Byrne Peter O'Byrne Chem. Lab. Manager

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Test Report

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Report No.: 63741
Report Date: 21/01/2011
Received Date: 16/12/2010
Analysis Date: 16/12/2010
Order No.:
Page: 1 of 1
RevisionDate:

Sample ID: 92864

Description: Shannon Landfill Borehole water (BH4) taken 15.12.10 by Pamela Bartley

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	92864	Phenols, ug/l	Subcontracted	<0.5
☐	92864	Total Organic Carbon mg/l	Subcontracted	60
☐	92864	Total Oxidised Nitrogen, mg/l	STM-C-30.1.0	<0.5
☐	92864	Temperature, °C	STM-C-41.1.0	10.5
☐	92864	pH value	STM-C-3.1.00	7.11
☐	92864	Conductivity, uS/cm @ 20°C	STM-C-4.1.00	13800
☐	92864	Chloride as Cl, mg/L	STM-C-5.2.07	5025
☐	92864	Ammonia as NH3-N, mg/l	STM-C-7.2.04	<0.02
☐	92864	Groundwater level m	Subcontracted	0.85

Comments:

Report Authorised By: Peter O'Byrne Peter O'Byrne Chem. Lab. Manager

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Account.: 10038

Report No.: 63742
Report Date: 21/01/2011
Received Date: 16/12/2010
Analysis Date: 16/12/2010
Order No.:
Page: 1 of 2
RevisionDate:

Sample ID: 92865

Description: Shannon Landfill Borehole water (RD2) taken 15.12.10 by Pamela Bartley

Ref No:

ID	Test	SOP	Results
92865	Zinc as Zn mg/l	Subcontracted	0.006
92865	Calcium as Ca, mg/l	STM-C-22.1.0	38
92865	Chromium as Cr mg/l	Subcontracted	0.046
92865	Copper as Cu mg/l	Subcontracted	0.0083
92865	Fluoride as F, mg/l	Subcontracted	<1.0
92865	Iron as Fe, mg/l	STM-C-34.2.0	8.9
92865	Lead as Pb, mg/l	Subcontracted	<0.0003
92865	Magnesium as Mg, mg/l	STM-C-23.1.0	21
92865	Nickel as Ni mg/l	Subcontracted	0.005
92865	Potassium as K, mg/l	STM-C-32.1.0	38
92865	Cadmium as Cd mg/l	Subcontracted	0.00002
92865	Sulphates as SO4, mg/l	STM-C-18.2.0	<2
92865	List 1/11 Organic Substances ug/l	Subcontracted	
92865	Cyanide mg/l	Subcontracted	<0.05
92865	Residue on Evaporation mg/l	STM-C-47.1.0	1800
92865	Arsenic as As mg/l	Subcontracted	0.0098
92865	Boron as B mg/l	Subcontracted	0.66
92865	Mercury as Hg mg/l	Subcontracted	<0.00005
92865	Tin mg/l	Subcontracted	<0.01
92865	Dissolved oxygen, mg/l	STM-C-10.3.0	7.0
92865	Detergents as MBAS mg/l	Subcontracted	0.20
92865	Total Phosphorous as P, mg/l	STM-C-19.2.0	0.63

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☐	92865	Salinity		1.0
☐	92865	Sodium as Na, mg/l	STM-C-33.1.0	410

Comments:

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Report No.: 63743
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Sample ID: 92866

Description: Shannon Landfill Borehole water (RD3) taken 15.12.10 by Pamela Bartley

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	92866	Boron as B mg/l	Subcontracted	0.04
☐	92866	Iron as Fe, mg/l	STM-C-34.2.0	0.53
☐	92866	Lead as Pb, mg/l	Subcontracted	<0.0003
☐	92866	Magnesium as Mg, mg/l	STM-C-23.1.0	12
☐	92866	Nickel as Ni mg/l	Subcontracted	0.003
☐	92866	Potassium as K, mg/l	STM-C-32.1.0	12
☐	92866	Sodium as Na, mg/l	STM-C-33.1.0	78
☐	92866	Sulphates as SO4, mg/l	STM-C-18.2.0	60
☐	92866	Zinc as Zn mg/l	Subcontracted	0.009
☐	92866	Cyanide mg/l	Subcontracted	<0.05
☐	92866	Fluoride as F, mg/l	Subcontracted	0.50
☐	92866	Arsenic as As mg/l	Subcontracted	0.0026
☐	92866	Copper as Cu mg/l	Subcontracted	0.0052
☐	92866	Mercury as Hg mg/l	Subcontracted	<0.00005
☐	92866	Tin mg/l	Subcontracted	<0.01
☐	92866	Dissolved oxygen, mg/l	STM-C-10.3.0	7.8
☐	92866	Detergents as MBAS mg/l	Subcontracted	<0.20
☐	92866	Total Phosphorous as P, mg/l	STM-C-19.2.0	<0.02
☐	92866	Salinity		0.35
☐	92866	List 1/11 Organic Substances ug/l	Subcontracted	Not Detected
☐	92866	Cadmium as Cd mg/l	Subcontracted	<0.00002
☐	92866	Calcium as Ca, mg/l	STM-C-22.1.0	18

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☐	92866	Chromium as Cr mg/l	Subcontracted	0.034
☐	92866	Residue on Evaporation mg/l	STM-C-47.1.0	700

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Sample ID: 92867

Description: Shannon Landfill Borehole water (BH4) taken 15.12.10 by Pamela Bartley

Ref No:

ID	*Test*	*SOP*	*Results*
92867	Zinc as Zn mg/l	Subcontracted	0.007
92867	Calcium as Ca, mg/l	STM-C-22.1.0	40
92867	Chromium as Cr mg/l	Subcontracted	0.065
92867	Copper as Cu mg/l	Subcontracted	0.036
92867	Fluoride as F, mg/l	Subcontracted	<2.5
92867	Iron as Fe, mg/l	STM-C-34.2.0	34.0
92867	Lead as Pb, mg/l	Subcontracted	<0.0003
92867	Magnesium as Mg, mg/l	STM-C-23.1.0	80
92867	Nickel as Ni mg/l	Subcontracted	0.024
92867	Potassium as K, mg/l	STM-C-32.1.0	90
92867	Cadmium as Cd mg/l	Subcontracted	0.00010
92867	Sulphates as SO4, mg/l	STM-C-18.2.0	<2
92867	List 1/11 Organic Substances ug/l	Subcontracted	Not Detected
92867	Cyanide mg/l	Subcontracted	<0.05
92867	Residue on Evaporation mg/l	STM-C-47.1.0	7000
92867	Arsenic as As mg/l	Subcontracted	0.029
92867	Boron as B mg/l	Subcontracted	1.1
92867	Mercury as Hg mg/l	Subcontracted	<0.00005
92867	Tin mg/l	Subcontracted	<0.01
92867	Dissolved oxygen, mg/l	STM-C-10.3.0	5.9
92867	Detergents as MBAS mg/l	Subcontracted	0.50
92867	Total Phosphorous as P, mg/l	STM-C-19.2.0	4.2

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☐	92867	Salinity		5.0
☐	92867	Sodium as Na, mg/l	STM-C-33.1.0	1200

Comments:

Report Authorised By: Peter O'Byrne Peter O'Byrne Chem. Lab. Manager

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Report No.: 55598
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Sample ID: 82196

Description: Leachate water sample SS3 taken 23.03.10 at Shannon Landfill

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	82196	Total Oxidised Nitrogen, mg/l	STM-C-30.1.0	8.3
☑	82196	Conductivity, uS/cm @ 20°C	STM-C-4.1.00	1355
☑	82196	Chloride as Cl, mg/L	STM-C-5.2.07	141
☐	82196	Temperature, °C	STM-C-41.1.0	7.8
☑	82196	pH value	STM-C-3.1.00	6.83
☑	82196	COD mg/l	STM-C-11.2.0	60
☑	82196	BOD, mg/l	STM-C-10.2.0	25
☑	82196	Ammonia as NH3-N, mg/l	STM-C-7.2.04	7.2

Comments:

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Sample ID: 92853

Description: Shannon Landfill Leachate (SS3) taken 15.12.10 by Pamela Bartley

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	92853	Total Oxidised Nitrogen, mg/l	STM-C-30.1.0	24.6
☑	92853	Conductivity, uS/cm @ 20°C	STM-C-4.1.00	1870
☑	92853	Chloride as Cl, mg/L	STM-C-5.2.07	86
☐	92853	Temperature, °C	STM-C-41.1.0	7.7
☑	92853	pH value	STM-C-3.1.00	7.59
☑	92853	COD mg/l	STM-C-11.2.0	211
☑	92853	BOD, mg/l	STM-C-10.2.0	11
☐	92853	Ammonia as NH3-N, mg/l	STM-C-7.2.04	8.1

Comments:

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Sample ID: 92854

Description: Shannon Landfill Leachate (SS3) taken 15.12.10 by Pamela Bartley

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	92854	Potassium as K, mg/l	STM-C-32.1.0	9
☐	92854	Cadmium as Cd mg/l	Subcontracted	0.00012
☐	92854	Calcium as Ca, mg/l	STM-C-22.1.0	135
☐	92854	Chromium as Cr mg/l	Subcontracted	0.027
☐	92854	Copper as Cu mg/l	Subcontracted	0.0065
☐	92854	Fluoride as F, mg/l	Subcontracted	<0.50
☐	92854	Iron as Fe, mg/l	STM-C-34.2.0	9.8
☐	92854	Lead as Pb, mg/l	Subcontracted	<0.0003
☐	92854	Detergents as MBAS mg/l	Subcontracted	0.30
☐	92854	Nickel as Ni mg/l	Subcontracted	0.280
☑	92854	Total Phosphorous as P, mg/l	STM-C-19.2.0	0.41
☐	92854	Sodium as Na, mg/l	STM-C-33.1.0	48
☐	92854	Zinc as Zn, mg/l	STM-C-38.1.0	1.200
☐	92854	Cyanide mg/l	Subcontracted	<0.05
☐	92854	Arsenic as As mg/l	Subcontracted	0.0044
☐	92854	Boron as B mg/l	Subcontracted	<0.01
☐	92854	Mercury as Hg mg/l	Subcontracted	0.00005
☐	92854	Tin mg/l	Subcontracted	<0.01
☐	92854	Sulphates as SO4, mg/l	STM-C-18.2.0	560
☐	92854	Magnesium as Mg, mg/l	STM-C-23.1.0	18

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Sample ID: 82197

Description: Surface water sample SS1 taken 23.03.10 at Shannon Landfill

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	82197	Temperature, °C		
☑	82197	Suspended Solids, mg/l	STM-C-41.1.0	8.5
☑	82197	pH value	STM-C-2.1.00	8
☐	82197	%	STM-C-3.1.00	7.59
☑	82197	OD mg/l	STM-C-10.3.0	68
☑	82197	BOD, mg/l	STM-C-11.2.0	15
☐	82197	Ammonia as NH3-N, mg/l	STM-C-10.2.0	1.3
			STM-C-7.2.04	<0.02

Comments:

Report Authorised By: Peter O'Byrne Peter O'Byrne Chem. Lab. Manager

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Sample ID: 82198

Description: Surface water sample SS2 taken 23.03.10 at Shannon Landfill

Ref No:

	ID	*Test*	*SOP*	*Results*
☑	82198	Ammonia as NH3-N, mg/l	STM-C-7.2.04	0.02
☐	82198	Temperature, °C	STM-C-41.1.0	8.7
☑	82198	Suspended Solids, mg/l	STM-C-2.1.00	4
☑	82198	pH value	STM-C-3.1.00	8.04
☐	82198	Oxygen Saturation %	STM-C-10.3.0	82
☑	82198	COD mg/l	STM-C-11.2.0	33
☑	82198	BOD, mg/l	STM-C-10.2.0	0.8

Comments:

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Sample ID: 82199

Description: Surface water sample SS4 taken 23.03.10 at Shannon Landfill

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	82199	Temperature, °C	STM-C-41.1.0	7.8
☑	82199	Suspended Solids, mg/l	STM-C-2.1.00	8
☑	82199	pH value	STM-C-3.1.00	7.77
☐	82199	Oxygen Saturation %	STM-C-10.3.0	87
☑	82199	COD mg/l	STM-C-11.2.0	19
☑	82199	BOD, mg/l	STM-C-10.2.0	1.3
☐	82199	Ammonia as NH3-N, mg/l	STM-C-7.2.04	0.04

Comments:

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Sample ID: 82200

Description: Surface water sample SS6 taken 23.03.10 at Shannon Landfill

Ref No:

	ID	*Test*	*SOP*	*Results*
☑	82200	Ammonia as NH3-N, mg/l	STM-C-7.2.04	0.12
☐	82200	Temperature, °C	STM-C-41.1.0	8.3
☑	82200	Suspended Solids, mg/l	STM-C-2.1.00	12
☑	82200	pH value	STM-C-3.1.00	8.19
☐	82200	Oxygen Saturation %	STM-C-10.3.0	75
☑	82200	COD mg/l	STM-C-11.2.0	27
☑	82200	BOD, mg/l	STM-C-10.2.0	1.2

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Sample ID: 92855

Description: Shannon Landfill Surface water (SS1) taken 15.12.10 by Pamela Bartley

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	92855	Temperature, °C	STM-C-41.1.0	6.2
☐	92855	Suspended Solids, mg/l	STM-C-2.1.00	8
☐	92855	pH value	STM-C-3.1.00	7.40
☐	92855	Oxygen Saturation %	STM-C-10.3.0	36
☐	92855	COD mg/l	STM-C-11.2.0	26
☐	92855	BOD, mg/l	STM-C-10.2.0	1.5
☐	92855	Ammonia as NH3-N, mg/l	STM-C-7.2.04	<0.02

Comments:

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Sample ID: 92857

Description: Shannon Landfill Surface water (SS1) taken 15.12.10 by Pamela Bartley

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	92857	Sodium as Na, mg/l	STM-C-33.1.0	60
☐	92857	Calcium as Ca, mg/l	STM-C-22.1.0	81
☐	92857	Chromium as Cr mg/l	Subcontracted	0.011
☐	92857	Copper as Cu mg/l	Subcontracted	0.0013
☐	92857	Fluoride as F, mg/l	Subcontracted	0.10
☐	92857	Iron as Fe, mg/l	STM-C-34.2.0	<0.02
☐	92857	Lead as Pb, mg/l	Subcontracted	<0.0003
☐	92857	Magnesium as Mg, mg/l	STM-C-23.1.0	12
☑	92857	Manganese as Mn, mg/l	STM-C-35.2.0	0.278
☐	92857	Cadmium as Cd mg/l	Subcontracted	0.00002
☐	92857	Potassium as K, mg/l	STM-C-32.1.0	12
☐	92857	Total Phosphorous as P, mg/l	STM-C-19.2.0	<0.02
☐	92857	Sulphates as SO4, mg/l	STM-C-18.2.0	112
☐	92857	Total Oxidised Nitrogen, mg/l	STM-C-30.1.0	1.0
☐	92857	Zinc as Zn mg/l	Subcontracted	0.029
☐	92857	Cyanide mg/l	Subcontracted	<0.05
☐	92857	Arsenic as As mg/l	Subcontracted	0.0009
☐	92857	Boron as B mg/l	Subcontracted	<0.01
☐	92857	Mercury as Hg mg/l	Subcontracted	<0.00005
☐	92857	Tin mg/l	Subcontracted	<0.01
☐	92857	Conductivity, uS/cm @ 20°C	STM-C-4.1.00	826
☐	92857	Nickel as Ni mg/l	Subcontracted	0.006

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Sample ID: 92856

Description: Shannon Landfill Surface water (SS4) taken 15.12.10 by Pamela Bartley

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	92856	Temperature, °C	STM-C-41.1.0	5.9
☐	92856	Suspended Solids, mg/l	STM-C-2.1.00	6
☐	92856	pH value	STM-C-3.1.00	7.38
☐	92856	Oxygen Saturation %	STM-C-10.3.0	71
☐	92856	COD mg/l	STM-C-11.2.0	20
☐	92856	BOD, mg/l	STM-C-10.2.0	<0.5
☐	92856	Ammonia as NH3-N, mg/l	STM-C-7.2.04	<0.02

Comments:

Report Authorised By: Peter O'Byrne Peter O'Byrne Chem. Lab. Manager

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☑ *Indicates Accredited Test. Opinions and Comments are not included in the scope of Accreditation*

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Test Report

Copy

Customer: Response Engineering Tr
Response Engineering
Tradaree WWTP
Shannon
Co. Clare
Account.: 10038

Report No.: 63735
Report Date: 21/01/2011
Received Date: 16/12/2010
Analysis Date: 16/12/2010
Order No.:
Page: 1 of 2
RevisionDate:

Sample ID: 92858

Description: Shannon Landfill Surface water (SS4) taken 15.12.10 by Pamela Bartley

Ref No:

	ID	*Test*	*SOP*	*Results*
☐	92858	Sodium as Na, mg/l	STM-C-33.1.0	38
☐	92858	Calcium as Ca, mg/l	STM-C-22.1.0	89
☐	92858	Chromium as Cr mg/l	Subcontracted	0.011
☐	92858	Copper as Cu mg/l	Subcontracted	0.0011
☐	92858	Fluoride as F, mg/l	Subcontracted	0.10
☐	92858	Iron as Fe, mg/l	STM-C-34.2.0	0.77
☐	92858	Lead as Pb, mg/l	Subcontracted	<0.0003
☐	92858	Magnesium as Mg, mg/l	STM-C-23.1.0	13
☐	92858	Manganese as Mn, mg/l	STM-C-35.2.0	0.374
☐	92858	Cadmium as Cd mg/l	Subcontracted	0.00003
☐	92858	Potassium as K, mg/l	STM-C-32.1.0	8
☑	92858	Total Phosphorous as P, mg/l	STM-C-19.2.0	0.14
☐	92858	Sulphates as SO4, mg/l	STM-C-18.2.0	160
☐	92858	Total Oxidised Nitrogen, mg/l	STM-C-30.1.0	0.9
☐	92858	Zinc as Zn mg/l	Subcontracted	0.014
☐	92858	Cyanide mg/l	Subcontracted	<0.05
☐	92858	Arsenic as As mg/l	Subcontracted	0.0010
☐	92858	Boron as B mg/l	Subcontracted	<0.01
☐	92858	Mercury as Hg mg/l	Subcontracted	<0.00005
☐	92858	Tin mg/l	Subcontracted	<0.01
☑	92858	Conductivity, uS/cm @ 20°C	STM-C-4.1.00	912
☐	92858	Nickel as Ni mg/l	Subcontracted	0.007

APPENDIX I – METEOROLOGICAL DATA

Shannon Airport Weather Records 2010

Year	Month	Day	Mean Relative Humidity (%)	Mean MSL Pressure (hpa)	Mean wind Speed (kts)	Predominant Wind Direction (degrees)	Evaporation (mm)	Potential Evapotranspiration (mm)
2010	1	1	96	1012	2	330	0.13	0.037
2010	1	2	96	1019	2	80	0.013	0
2010	1	3	85	1022	8	45	0.457	0.354
2010	1	4	91	1022	5	355	0.168	0.108
2010	1	5	94	1011	6	320	0.119	0.073
2010	1	6	84	1014	9	335	0.386	0.298
2010	1	7	94	1018	3	105	0.004	0
2010	1	8	99	1027	2	50	0.228	0.166
2010	1	9	97	1031	2	15	0.163	0.115
2010	1	10	96	1025	8	15	0.416	0.283
2010	1	11	95	1015	7	100	0.355	0.252
2010	1	12	88	994	19	110	1.236	0.831
2010	1	13	96	995	8	120	0.458	0.327
2010	1	14	98	1001	8	120	0.323	0.237
2010	1	15	92	998	16	150	0.546	0.383
2010	1	16	87	997	9	195	0.464	0.354
2010	1	17	85	1014	8	195	0.558	0.464
2010	1	18	94	1021	7	115	0.226	0.154
2010	1	19	87	1010	17	120	0.705	0.465
2010	1	20	95	1009	4	105	0.126	0.046
2010	1	21	92	1004	15	145	0.739	0.495
2010	1	22	93	1016	3	150	0.358	0.215
2010	1	23	100	1025	1	150	0.18	0.129
2010	1	24	100	1026	3	125	0.238	0.165
2010	1	25	97	1034	4	110	0.24	0.146
2010	1	26	93	1042	3	130	0.233	0.097
2010	1	27	97	1036	7	260	0.419	0.284
2010	1	28	90	1020	9	265	0.539	0.377
2010	1	29	85	1004	12	310	0.466	0.316
2010	1	30	88	1007	4	295	0.493	0.346
2010	1	31	89	1011	4	300	0.444	0.269
JAN			**2873.0**	**31480.0**	**215.0**	**5220**	**11.4**	**7.8**

Shannon Airport Weather Records 2010

Year	Month	Day	Mean Relative Humidity (%)	Mean MSL Pressure (hpa)	Mean wind Speed (kts)	Predominant Wind Direction (degrees)	Evaporation (mm)	Potential Evapotranspiration (mm)
2010	2	1	91.6	1015.9	4.8	210	0.4	0.3
2010	2	2	97	1008	9.6	240	0.4	0.3
2010	2	3	93.3	1004.2	7.3	125	0.6	0.4
2010	2	4	93.5	991.9	9.7	105	0.6	0.4
2010	2	5	89.2	991.4	9.3	85	0.7	0.5
2010	2	6	98.9	1016.7	4.6	330	0.5	0.3
2010	2	7	89.3	1019.4	10	100	0.8	0.6
2010	2	8	77.3	1016.1	9	55	1	0.7
2010	2	9	74.5	1019.1	8.9	20	1.1	0.8
2010	2	10	77.6	1023.5	4	30	0.7	0.5
2010	2	11	83.8	1028.5	2.7	25	0.7	0.4
2010	2	12	85.5	1029.7	5.8	335	0.8	0.6
2010	2	13	90.5	1028.1	4.6	335	0.6	0.4
2010	2	14	89	1021.7	3.6	265	0.7	0.5
2010	2	15	90.7	1006.5	9	250	0.9	0.6
2010	2	16	88	990.6	7	215	0.9	0.6
2010	2	17	82.3	989.2	7.5	35	1	0.7
2010	2	18	94.3	994.9	4.2	320	0.7	0.4
2010	2	19	86.2	997.6	5.4	290	0.8	0.5
2010	2	20	96.2	996.2	5.3	120	0.7	0.5
2010	2	21	95	990.6	4.5	115	0.7	0.5
2010	2	22	97.5	989.8	2.6	20	0.4	0.3
2010	2	23	90	987.3	9	55	0.7	0.4
2010	2	24	94.1	987.2	5.9	340	0.6	0.4
2010	2	25	86.5	987.5	4.4	315	1	0.7
2010	2	26	84.2	990.6	13.2	255	1.3	0.8
2010	2	27	81.6	990.4	5.4	140	1.3	0.9
2010	2	28	84.9	997.1	5.6	270	1.4	0.9
FEB			**2482.5**	**28109.7**	**182.9**	**5000.0**	**22.0**	**14.9**

Shannon Airport Weather Records 2010

Year	Month	Day	Mean Relative Humidity (%)	Mean MSL Pressure (hpa)	Mean wind Speed (kts)	Predominant Wind Direction (degrees)	Evaporation (mm)	Potential Evapotranspiration (mm)
2010	3	1	82.5	1010.8	2.6	110	1.2	0.8
2010	3	2	81.5	1019.6	9.2	115	1.3	0.9
2010	3	3	92.1	1017	7.2	110	0.9	0.6
2010	3	4	85.7	1026.7	4.9	20	1.4	0.9
2010	3	5	89.5	1033.7	1.9	350	1.2	0.8
2010	3	6	82.8	1030	2.8	30	1	0.7
2010	3	7	73.4	1030.2	10.1	110	1.9	1.2
2010	3	8	60.9	1030	7.3	95	2.1	1.5
2010	3	9	63.7	1032.8	2.9	90	1.7	1.1
2010	3	10	73.9	1032.5	2.8	25	1.5	1
2010	3	11	75.8	1029.9	4.7	335	1.7	1.2
2010	3	12	81.8	1029.2	6.8	335	1.4	1
2010	3	13	82.6	1034.9	3.9	305	1.2	0.9
2010	3	14	78	1034.6	4.3	285	1.5	1.1
2010	3	15	75.5	1029.1	4.7	160	1.9	1.3
2010	3	16	75.8	1018.3	12.5	140	1.6	1.1
2010	3	17	82.5	1012.9	9.9	155	2	1.4
2010	3	18	80.1	1002.4	17.3	155	2.3	1.7
2010	3	19	81.8	1006	6.6	60	1.4	1
2010	3	20	80.8	1006.4	7.6	335	2.2	1.5
2010	3	21	76.7	1010.9	9.6	160	2.5	1.7
2010	3	22	78.2	1009.3	12.5	185	2.4	1.6
2010	3	23	85.1	1006.5	11.5	140	1.7	1.2
2010	3	24	79	997.4	6.4	260	2.4	1.7
2010	3	25	85	991.9	9.8	120	2.1	1.4
2010	3	26	81.5	993	6.1	110	2.3	1.6
2010	3	27	79.6	1007.4	8	270	2.4	1.6
2010	3	28	79.9	1007.1	4.1	250	1.8	1.3
2010	3	29	94.7	991.9	11.3	55	0.8	0.5
2010	3	30	83.5	989.9	19.2	300	2.4	1.4
2010	3	31	75.9	1002.9	14.9	300	2.9	1.8
MAR			**2479.8**	**31475.2**	**243.4**	**5470.0**	**55.1**	**37.5**

Shannon Airport Weather Records 2010

Year	Month	Day	Mean Relative Humidity (%)	Mean MSL Pressure (hpa)	Mean wind Speed (kts)	Predominant Wind Direction (degrees)	Evaporation (mm)	Potential Evapotranspiration (mm)
2010	4	1	79.5	1004.3	8	225	2.3	1.5
2010	4	2	83	992	8	120	2	1.3
2010	4	3	87.8	1001.8	8.2	325	1.9	1.3
2010	4	4	80.5	1012.5	8.9	185	1.8	1.1
2010	4	5	85.8	1005.6	18.1	180	2.3	1.4
2010	4	6	87.9	1005.8	6.8	255	2.4	1.7
2010	4	7	78.4	1023.5	7.3	270	2.9	2
2010	4	8	77	1030.9	4.8	230	2.7	1.9
2010	4	9	74	1031	10.6	145	3.7	2.6
2010	4	10	68.3	1031.2	8.9	120	3.9	2.8
2010	4	11	71	1030.6	3.8	345	3.6	2.6
2010	4	12	69.7	1029.8	4.8	25	3.7	2.7
2010	4	13	71.7	1027.9	7	360	3.8	2.7
2010	4	14	67	1025.7	7.2	40	3.5	2.4
2010	4	15	73.2	1026.9	8	20	4.1	2.8
2010	4	16	72	1028.7	4.9	135	3.6	2.5
2010	4	17	79.1	1022.1	4	175	2.9	2.1
2010	4	18	76	1017.6	5.1	325	3.5	2.4
2010	4	19	76.8	1019.7	5.2	325	2.9	2.1
2010	4	20	66.9	1022.6	4.1	10	2.8	2
2010	4	21	65	1023.2	4.9	140	3.1	2.2
2010	4	22	64	1018.2	4.8	120	3.8	2.7
2010	4	23	67.5	1013.4	9.2	140	4.7	3.2
2010	4	24	85.5	1011	11.3	115	2.4	1.6
2010	4	25	86.3	1015.9	8.7	240	3.4	2.3
2010	4	26	78.1	1023.5	5.5	170	3.8	2.8
2010	4	27	84.1	1020.3	14.1	150	2.8	1.8
2010	4	28	84.5	1012.4	12	165	3.6	2.4
2010	4	29	77.8	1010.3	9.5	245	3.2	2.3
2010	4	30	81.6	1007.5	9.3	255	3.7	2.5
APR			**2300.0**	**30545.9**	**233.0**	**5555.0**	**94.8**	**65.7**

Shannon Airport Weather Records 2010

Year	Month	Day	Mean Relative Humidity (%)	Mean MSL Pressure (hpa)	Mean wind Speed (kts)	Predominant Wind Direction (degrees)	Evaporation (mm)	Potential Evapotranspiration (mm)
2010	5	1	86.6	1010.4	4.7	260	2.7	2
2010	5	2	76.8	1020.5	10.6	340	3.3	2.3
2010	5	3	68.6	1030.1	8.2	330	3.6	2.5
2010	5	4	74.1	1032.5	6.7	325	2.3	1.7
2010	5	5	87.4	1025.2	8.3	325	2	1.4
2010	5	6	79.6	1016.6	10.7	335	3.2	2.1
2010	5	7	71.8	1016.7	9.5	30	3.7	2.5
2010	5	8	57.5	1018.5	10.7	35	5.4	3.7
2010	5	9	67.3	1016.5	7.6	345	4.1	2.8
2010	5	10	63.2	1017.1	10.2	15	3.7	2.5
2010	5	11	68	1018	6.2	355	3.4	2.4
2010	5	12	69.4	1018	7	330	3.8	2.6
2010	5	13	83.4	1011.3	8.1	225	2.5	1.7
2010	5	14	75.6	1012	9.8	295	4.3	2.8
2010	5	15	73.6	1017.9	10.7	260	3.5	2.3
2010	5	16	73.6	1019	8.2	285	4	2.7
2010	5	17	76.9	1025	4.5	240	2.6	1.9
2010	5	18	90.9	1024.6	10.3	140	2.3	1.6
2010	5	19	90.9	1026.3	4.4	235	2.8	2.1
2010	5	20	81.1	1030.6	4.6	115	4.3	3.3
2010	5	21	81.8	1030.2	5.9	150	3.4	2.5
2010	5	22	71.9	1027.9	7.5	135	6.4	4.7
2010	5	23	66.2	1023.4	4.2	130	6.1	4.6
2010	5	24	79.3	1017.5	6	20	4.2	3.1
2010	5	25	63	1014.8	8.2	30	5.7	4
2010	5	26	65.5	1013.7	8	360	5.3	3.7
2010	5	27	80.2	1013.4	8.2	275	2.7	1.8
2010	5	28	77.1	1012.9	5.3	235	2.8	2.1
2010	5	29	92.5	1005.8	6.5	290	1.4	1
2010	5	30	80	1016.5	3	80	2.3	1.7
2010	5	31	81.5	1017.7	11.5	145	3.3	2.3
MAY			**2355.3**	**31600.6**	**235.3**	**6670.0**	**111.1**	**78.4**

Shannon Airport Weather Records 2010

Year	Month	Day	Mean Relative Humidity (%)	Mean MSL Pressure (hpa)	Mean wind Speed (kts)	Predominant Wind Direction (degrees)	Evaporation (mm)	Potential Evapotranspiration (mm)
2010	6	1	81.4	1017	8.8	265	5.4	3.5
2010	6	2	76.4	1021.5	4.6	140	4.7	3.5
2010	6	3	69	1018.2	11	120	4.6	3.3
2010	6	4	74.1	1016.6	8.1	265	5.3	3.8
2010	6	5	79.3	1018.9	4.3	245	3.8	2.9
2010	6	6	74.5	1015.8	5.5	260	8.3	5.9
2010	6	7	90.2	1004.4	8.3	80	2.4	1.7
2010	6	8	89.2	1000.3	9.3	10	3.1	2.1
2010	6	9	89.1	1006.9	11.2	20	2.6	1.8
2010	6	10	73.6	1014.7	9.1	20	4.2	3
2010	6	11	77.1	1015.7	7.6	335	4.4	3.1
2010	6	12	69.9	1021	6.6	300	4	2.9
2010	6	13	76.9	1017.8	12.8	280	4.9	3
2010	6	14	76	1024.3	7.6	315	4.3	3.1
2010	6	15	74	1030.5	5.9	320	5.8	4.2
2010	6	16	81.9	1028.5	5.2	285	5.6	4.1
2010	6	17	76.8	1025.7	4.2	295	4.2	3.2
2010	6	18	78.8	1024.5	6.8	320	3.5	2.6
2010	6	19	66.1	1022.8	9.4	330	7	4.9
2010	6	20	68.9	1024	5.2	310	6.2	4.5
2010	6	21	70.4	1022.6	5.5	245	5.6	4.1
2010	6	22	73.8	1021.5	7.3	170	3.7	2.7
2010	6	23	80.1	1019.7	9	225	3.5	2.5
2010	6	24	72.8	1020	6.1	225	5.3	3.9
2010	6	25	73.6	1016.2	7.8	150	4.1	3.1
2010	6	26	71.2	1013.1	9.6	170	4.9	3.7
2010	6	27	71	1015.4	11.6	220	6.5	4.5
2010	6	28	88.9	1016.4	8	150	2.5	1.8
2010	6	29	73.5	1019.8	3.8	310	4.9	3.7
2010	6	30	81.9	1013.9	9.6	145	4.6	3.3
JUN			**2300.4**	**30547.7**	**229.8**	**6525.0**	**139.9**	**100.4**

Shannon Airport Weather Records 2010

Year	Month	Day	Mean Relative Humidity (%)	Mean MSL Pressure (hpa)	Mean wind Speed (kts)	Predominant Wind Direction (degrees)	Evaporation (mm)	Potential Evapotranspiration (mm)
2010	7	1	74.5	1002.4	13.5	190	5.3	3.5
2010	7	2	74.5	1006.7	13.2	220	4.6	3.1
2010	7	3	71.5	1016.4	10.9	205	4.1	3
2010	7	4	76.5	1014.5	16.3	250	4.8	2.9
2010	7	5	74.4	1024.6	9.8	255	4.5	3.1
2010	7	6	87.2	1020.2	10.5	160	3	2.1
2010	7	7	73.5	1014.2	13.8	235	5.4	3.6
2010	7	8	88.4	1014.1	8.7	185	2.7	1.9
2010	7	9	91.9	1011.9	6.7	340	2.2	1.5
2010	7	10	94.7	1009.2	8.4	20	2.1	1.5
2010	7	11	75.6	1013.7	7.5	240	4	2.9
2010	7	12	75.4	1012.8	4.1	85	2.7	2.1
2010	7	13	88.2	1003.8	6.8	95	2.9	2.1
2010	7	14	86.7	992.5	6.8	90	3.7	2.7
2010	7	15	87.2	995.4	11.3	235	2.9	2
2010	7	16	82.5	1005.5	11.3	265	3.9	2.7
2010	7	17	78.6	1016.7	10.5	230	4.3	2.8
2010	7	18	93.5	1015.8	7	170	2.6	1.8
2010	7	19	82.3	1013.2	8.4	170	3.6	2.6
2010	7	20	86.2	1008.2	4.5	195	3.5	2.6
2010	7	21	92.9	1005.5	8.8	320	3.1	2.1
2010	7	22	74.4	1015.6	11.7	330	5.6	3.8
2010	7	23	76.3	1021.9	5.3	200	3	2.3
2010	7	24	89.3	1020	8	245	2	1.4
2010	7	25	93	1021.1	8.9	250	2.6	1.8
2010	7	26	92.4	1020.5	10.1	240	3.5	2.6
2010	7	27	84.2	1019.3	9	250	2.4	1.7
2010	7	28	80.6	1020.3	8.8	270	3.3	2.5
2010	7	29	83.2	1019.5	3.1	275	3.5	2.7
2010	7	30	89.4	1013.1	8.8	255	2.6	1.8
2010	7	31	86.9	1012.6	10.8	255	3.3	2.2
JUL			**2585.9**	**31401.2**	**283.3**	**6725.0**	**107.7**	**75.4**

Shannon Airport Weather Records 2010

Year	Month	Day	Mean Relative Humidity (%)	Mean MSL Pressure (hpa)	Mean wind Speed (kts)	Predominant Wind Direction (degrees)	Evaporation (mm)	Potential Evapotranspiration (mm)
2010	8	1	84.4	1015.2	4.5	250	3.5	2.7
2010	8	2	86.6	1020.1	5.3	215	2.4	1.8
2010	8	3	85.7	1016.3	8.6	270	2.7	1.9
2010	8	4	82.1	1012.9	11.9	285	4.2	2.6
2010	8	5	82.9	1014.2	8.4	255	3.2	2.4
2010	8	6	91.6	1008.9	12.4	240	2.7	1.7
2010	8	7	82.5	1018.2	8	300	3.4	2.5
2010	8	8	81.6	1020.4	5.4	195	3.4	2.5
2010	8	9	81.5	1012.4	9	245	3.1	2.3
2010	8	10	76.1	1010.6	10	250	4.4	3.1
2010	8	11	80.8	1017	8.2	290	3.6	2.6
2010	8	12	80	1023.5	8.1	305	2.6	1.9
2010	8	13	78.8	1025.8	7.7	310	2.7	2.1
2010	8	14	86.7	1024.1	4.4	320	1.9	1.4
2010	8	15	80.6	1025.1	3.2	325	4.3	3.2
2010	8	16	91.2	1019.5	4.9	220	2	1.5
2010	8	17	78.8	1013.5	9.3	280	3.4	2.3
2010	8	18	85	1007.4	11.8	235	3.8	2.5
2010	8	19	89.9	1003.2	7.3	105	2	1.4
2010	8	20	79.7	1005.7	13.1	240	3.5	2.2
2010	8	21	83.5	1014.2	9.5	230	2.9	2.1
2010	8	22	84.7	1011	6.4	220	3.2	2.3
2010	8	23	81.6	1002.9	12	260	4	2.6
2010	8	24	77	1009.8	11.6	265	3.8	2.5
2010	8	25	80.5	1010.9	5.3	20	3	2.2
2010	8	26	77.2	1009.7	6.5	15	4	2.9
2010	8	27	77.8	1017.1	6.8	305	3.6	2.6
2010	8	28	78.7	1024.8	8.9	270	3.7	2.5
2010	8	29	74.5	1023.6	9.7	270	3.4	2.4
2010	8	30	70.9	1027.2	3.7	110	3.6	2.6
2010	8	31	72.7	1023.1	8.1	105	4	2.9
AUG			**2525.6**	**31488.3**	**250.0**	**7205.0**	**102.0**	**72.2**

Shannon Airport Weather Records 2010

Year	Month	Day	Mean Relative Humidity (%)	Mean MSL Pressure (hpa)	Mean wind Speed (kts)	Predominant Wind Direction (degrees)	Evaporation (mm)	Potential Evapotranspiration (mm)
2010	9	1	73.9	1018.9	8.3	100	3.2	2.5
2010	9	2	75	1018.1	9.1	105	3.3	2.5
2010	9	3	77.5	1017	9.7	115	4.2	3
2010	9	4	81.5	1014.6	7.4	175	2.9	2.1
2010	9	5	87	1008	11.2	120	1.6	1.2
2010	9	6	90.8	997.9	6.6	255	0.9	0.7
2010	9	7	87.7	995.3	8.2	230	2.4	1.7
2010	9	8	85.7	1001.3	10	235	2.8	1.9
2010	9	9	89.4	1012.6	8.6	220	2	1.3
2010	9	10	90.7	1009.3	8.7	230	2	1.4
2010	9	11	85.2	1013.6	9.8	255	3.1	2.1
2010	9	12	86.3	1025.4	8.9	235	1.9	1.4
2010	9	13	93.9	1020.3	16.8	230	1.9	1.3
2010	9	14	83.1	1016.1	15.4	260	2.2	1.4
2010	9	15	80.5	1015.6	14.1	260	3	2
2010	9	16	81.7	1017.3	6.6	280	2.6	1.9
2010	9	17	79.4	1021.8	4.3	320	2.3	1.7
2010	9	18	83.5	1018.5	8.9	210	1.6	1.2
2010	9	19	89.5	1009.6	11.1	215	1.7	1.2
2010	9	20	86.6	1010.4	8.5	225	2.4	1.7
2010	9	21	84.8	1011.8	11.1	140	2	1.4
2010	9	22	92	1008.3	8	210	2.1	1.5
2010	9	23	88.4	1007.7	10.2	315	1.9	1.3
2010	9	24	77.6	1017.2	8.3	330	1.7	1.2
2010	9	25	73.2	1022.9	4.5	10	1.8	1.3
2010	9	26	74.6	1018.2	6.1	105	1.7	1.3
2010	9	27	78.5	1013.2	10.7	115	2.2	1.6
2010	9	28	90.5	1011.3	6.7	125	1.2	0.8
2010	9	29	87.9	1013.4	4.1	200	1.9	1.3
2010	9	30	89.1	1006.2	8.1	125	1.6	1.1
SEP			**2525.5**	**30391.8**	**270.0**	**5950.0**	**66.1**	**47.0**

Shannon Airport Weather Records 2010

Year	Month	Day	Mean Relative Humidity (%)	Mean MSL Pressure (hpa)	Mean wind Speed (kts)	Predominant Wind Direction (degrees)	Evaporation (mm)	Potential Evapotranspiration (mm)
2010	10	1	79.8	993.5	13.1	225	2	1.3
2010	10	2	85.3	994.2	9.4	145	1.4	1
2010	10	3	88.2	992.7	6.8	220	1.7	1.2
2010	10	4	84.5	992.3	13.1	170	1.7	1.1
2010	10	5	75.4	991.9	12	185	2.2	1.6
2010	10	6	80.2	999.9	10.4	145	2.1	1.5
2010	10	7	80.5	1007.2	12.5	135	2	1.5
2010	10	8	86.1	1005.9	13.6	95	1.7	1.4
2010	10	9	82.4	1009.8	12.1	75	2.1	1.6
2010	10	10	85.7	1014	7.3	40	1	0.7
2010	10	11	90	1020.4	4.1	20	1.4	1
2010	10	12	94	1022.7	2.1	15	1.1	0.8
2010	10	13	97.8	1023.8	2.8	60	0.6	0.5
2010	10	14	85.3	1025.1	3.1	325	0.8	0.6
2010	10	15	89.1	1024.8	6	295	1.2	0.8
2010	10	16	88	1025.8	3.8	25	0.9	0.6
2010	10	17	93.8	1026.2	5.4	70	0.9	0.7
2010	10	18	87.4	1022.2	10	255	1.2	0.9
2010	10	19	82.2	1018.8	8.3	280	1.2	0.8
2010	10	20	77.2	1024.8	3.8	205	1.1	0.7
2010	10	21	84.2	1022.9	5.3	220	1.1	0.8
2010	10	22	89.7	1012.4	7.8	160	0.9	0.7
2010	10	23	87.5	1007.7	5.5	295	1	0.7
2010	10	24	87.9	1021.1	2.8	360	0.8	0.5
2010	10	25	85.8	1023	10	120	0.8	0.5
2010	10	26	92.3	1011.7	11.2	190	1.2	0.9
2010	10	27	86.2	1010.4	10.9	195	0.9	0.6
2010	10	28	87.4	1002.8	12.7	160	1	0.8
2010	10	29	91.2	988.6	7.7	180	0.9	0.7
2010	10	30	89.8	990.2	6	120	0.9	0.6
2010	10	31	93.7	1003.4	6.4	330	0.7	0.5
OCT			**2688.6**	**31330.2**	**246.0**	**5315.0**	**38.5**	**27.6**

Shannon Airport Weather Records 2010

Year	Month	Day	Mean Relative Humidity (%)	Mean MSL Pressure (hpa)	Mean wind Speed (kts)	Predominant Wind Direction (degrees)	Evaporation (mm)	Potential Evapotranspiration (mm)
2010	11	1	n/a	n/a	n/a	n/a	0.4	0.2
2010	11	2	n/a	n/a	n/a	n/a	0.9	0.6
2010	11	3	n/a	n/a	n/a	n/a	0.7	0.5
2010	11	4	n/a	n/a	n/a	n/a	2.2	1.8
2010	11	5	n/a	n/a	n/a	n/a	0.7	0.5
2010	11	6	n/a	n/a	n/a	n/a	0.4	0.3
2010	11	7	n/a	n/a	n/a	n/a	0.6	0.4
2010	11	8	n/a	n/a	n/a	n/a	0.6	0.5
2010	11	9	n/a	n/a	n/a	n/a	0.7	0.6
2010	11	10	n/a	n/a	n/a	n/a	0.5	0.4
2010	11	11	n/a	n/a	n/a	n/a	1.9	1.3
2010	11	12	n/a	n/a	n/a	n/a	0.8	0.6
2010	11	13	n/a	n/a	n/a	n/a	0.4	0.2
2010	11	14	n/a	n/a	n/a	n/a	0.4	0.2
2010	11	15	n/a	n/a	n/a	n/a	0.4	0.3
2010	11	16	n/a	n/a	n/a	n/a	0.6	0.4
2010	11	17	n/a	n/a	n/a	n/a	0.6	0.4
2010	11	18	n/a	n/a	n/a	n/a	0.4	0.3
2010	11	19	n/a	n/a	n/a	n/a	0.2	0.2
2010	11	20	n/a	n/a	n/a	n/a	0.5	0.3
2010	11	21	n/a	n/a	n/a	n/a	0.1	0
2010	11	22	n/a	n/a	n/a	n/a	0.4	0.3
2010	11	23	n/a	n/a	n/a	n/a	0.2	0.1
2010	11	24	n/a	n/a	n/a	n/a	0.2	0.1
2010	11	25	n/a	n/a	n/a	n/a	0	0
2010	11	26	n/a	n/a	n/a	n/a	0	0
2010	11	27	n/a	n/a	n/a	n/a	0.2	0.1
2010	11	28	n/a	n/a	n/a	n/a	0	0
2010	11	29	n/a	n/a	n/a	n/a	0	0
2010	11	30	n/a	n/a	n/a	n/a	0.2	0.1
NOV			**0.0**	**0.0**	**0.0**	**0.0**	**15.2**	**10.7**

Shannon Airport Weather Records 2010

Year	Month	Day	Mean Relative Humidity (%)	Mean MSL Pressure (hpa)	Mean wind Speed (kts)	Predominant Wind Direction (degrees)	Evaporation (mm)	Potential Evapotranspiration (mm)
2010	12	1	83.3	1018	6.5	355	0.4	0.3
2010	12	2	89.5	1018.2	5.8	335	0	0
2010	12	3	91.1	1008.4	5.6	115	0.3	0.3
2010	12	4	97	1004.2	3.6	350	0.1	0.1
2010	12	5	99.9	1008.4	1.8	65	0	0
2010	12	6	99.3	1002.7	4.8	120	0.3	0.2
2010	12	7	93.2	1008.1	4.8	330	0	0
2010	12	8	95.7	1022.3	4.2	330	0.1	0
2010	12	9	97	1035	2.2	95	0.2	0.1
2010	12	10	94.5	1035.4	3.9	240	0.2	0.1
2010	12	11	96.4	1029.9	3	80	0.3	0.2
2010	12	12	95	1023.9	5.1	70	0.3	0.2
2010	12	13	87.1	1026.7	7.8	80	0.6	0.5
2010	12	14	89.3	1038.2	2.8	325	0.1	0
2010	12	15	91.8	1042	3.2	315	0.4	0.3
2010	12	16	87.8	1020.5	11	310	0.4	0.2
2010	12	17	88.8	1004.7	5.6	285	0.2	0.1
2010	12	18	90.8	993.1	5.3	85	0.1	0
2010	12	19	79.5	994.3	8.2	60	0.5	0.4
2010	12	20	92	1002	5.8	25	0	0
2010	12	21	96.9	1006.2	1.8	100	0.1	0.1
2010	12	22	96	1013	1.7	340	0.1	0.1
2010	12	23	95.3	1020.5	2.2	325	0	0
2010	12	24	96.5	1027	1.1	20	0.1	0.1
2010	12	25	96.2	1028.7	1.9	110	0.2	0.1
2010	12	26	86.3	1015.6	13.8	145	0.4	0.3
2010	12	27	94.7	1000.7	10.3	115	0.5	0.3
2010	12	28	94.8	1004.7	8.7	140	0.1	0.2
2010	12	29	95.5	1013.8	6.4	115	0.4	0.3
2010	12	30	94.5	1022	6.2	90	0.4	0.3
2010	12	31	88.6	1026.8	2.8	55	0.4	0.3
DEC			**2874.3**	**31515.0**	**157.9**	**5525.0**	**7.2**	**5.1**
TOTAL	**2010**						**771.0**	**542.7**

Rainfall Calculations

Month	Rainfall (mm) Shannon Airport	Evapotranspiration (mm) Shannon Airport	Evaporation (mm) Shannon Airport	Estimated Effective Rainfall - Capped Area (mm)	Estimated Effective Rainfall - Active Cell (mm)
JAN	30.8	7.8	17.6	23	13.2
FEB	35.1	14.9	23	20.2	12.1
MAR	80.4	37.5	56.6	42.9	23.8
APR	71.4	65.7	77.1	5.7	0
MAY	56.8	78.4	116.4	0	0
JUN	33.4	100.4	146.3	0	0
JUL	123.1	75.4	125.6	47.7	0
AUG	39.1	72.2	93.2	0	0
SEP	138.9	47	68.6	91.9	70.3
OCT	76.8	27.6	38	49.2	38.8
NOV	133.3	10.7	21.4	122.6	111.9
DEC	26	5.1	7.2	20.9	18.8
TOTAL	**845.1**	**542.7**	**791**	**302.4**	**54.1**

APPENDIX J – WATER BALANCE CALCULATIONS

Water Balance Calculations 2010

Upper Bound 10% infiltration of actual rainfall on the area covered with capping and Cell 1

Period (Jan 2009 - December 2009)	Active cell (m2)	Effective Rainfall (m) - Active Cell	Volume of waste (t)	Effective Rainfall x Active area	Absorptive Capacity (m3)	Volume of free leachate	Final Capped Area (m2)	Effective Rainfall (m) - Capped Area	Volume of Leachate capped (m3)	Total Leachate produced
January	4,370	0.0132	41	57.684	3.468	54.22	15742	0.023	36.21	90.42
February	4,370	0.0121	41	52.877	3.468	49.41	15742	0.0202	31.80	81.21
March	4,370	0.0238	41	104.006	3.468	100.54	15742	0.0429	67.53	168.07
April	4,370	0	41	0	3.468	0.00	15742	0.0057	9	8.97
May	4,370	0	41	0	3.468	0.00	15742	0	0	0.00
June	4,370	0	41	0	3.468	0.00	15742	0	0.00	0.00
July	4,370	0	41	0	3.468	0.00	15742	0.0477	75	75.09
August	4,370	0	41	0	3.468	0.00	15742	0	0.00	0.00
September	4,370	0.0703	41	307.211	3.468	303.74	15742	0.0919	144.67	448.41
October	4,370	0.0388	41	169.556	3.468	166.09	15742	0.0492	77.45	243.54
November	4,370	0.1119	41	489.003	3.468	485.54	15742	0.1226	193.00	678.53
December	4,370	0.0188	41	82.156	3.468	78.69	15742	0.0209	32.90	111.59
						1238.22			**667.62**	**1905.84**

Lower Bound 2% Infiltration of actual rainfall on the area covered with capping and Cell 1

Period (Jan 2009 - December 2009)	Active cell (m2)	Effective rainfall (m)	Volume of waste (t)	Effective Rainfall x Active area	Absorptive Capacity (m3)	Volume of free leachate	Final Capped Area (m2)	Effective Rainfall (m) - Capped Area	Volume of Leachate capped (m3)	Total Leachate produced
January	4,370	0.0132	41	57.684	3.468	54.22	15742	0.023	7.24	61.46
February	4,370	0.0121	41	52.877	3.468	49.41	15742	0.0202	6.36	55.77
March	4,370	0.0238	41	104.006	3.468	100.54	15742	0.0429	13.51	114.04
April	4,370	0	41	0	3.468	0.00	15742	0.0057	2	0.00
May	4,370	0	41	0	3.468	0.00	15742	0	0	0.00
June	4,370	0	41	0	3.468	0.00	15742	0	0.00	0.00
July	4,370	0	41	0	3.468	0.00	15742	0.0477	15.02	15.02
August	4,370	0	41	0	3.468	0.00	15742	0	0.00	0.00
September	4,370	0.0703	41	307.211	3.468	303.74	15742	0.0919	28.93	332.68
October	4,370	0.0388	41	169.556	3.468	166.09	15742	0.0492	15.49	181.58
November	4,370	0.1119	41	489.003	3.468	485.54	15742	0.1226	38.60	524.13
December	4,370	0.0188	41	82.156	3.468	78.69	15742	0.0209	6.58	85.27
						1238.22			**133.52**	**1369.95**

PRTR DATASHEETS

Environmental Protection Agency

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.12

REFERENCE YEAR	2010

1. FACILITY IDENTIFICATION

Parent Company Name	Clare County Council
Facility Name	Tradaree Point E.T.P.
PRTR Identification Number	W0037
Licence Number	W0037-01

Waste or IPPC Classes of Activity

No.	class_name
3.7	Swaging by explosives where the production area exceeds 100 square metres.
3.1	The initial melting or production of iron and steel
3.13	Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.
3.4	##
3.5	The reaction of aluminium or its alloys with chlorine or its compounds, not included in paragraph 5.13.
3.6	The roasting, sintering or calcining of metallic ores in plants with a capacity exceeding 1,000 tonnes per year.

Address 1	Tradaree Point E.T.P.
Address 2	Shannon, (Clonmoney South)
Address 3	Co. Clare
Address 4	
Country	Ireland
Coordinates of Location	-8.83337 52.6899
River Basin District	IEGBNISH
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	Sean Ward
AER Returns Contact Email Address	swward@clarecoco.ie
AER Returns Contact Position	Senior Engineer
AER Returns Contact Telephone Number	065-6846379
AER Returns Contact Mobile Phone Number	
AER Returns Contact Fax Number	065-6828233
Production Volume	489.0
Production Volume Units	tonnes
Number of Installations	1
Number of Operating Hours in Year	2300
Number of Employees	5
User Feedback/Comments	
Web Address	

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
50.1	General
50.1	General

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

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

4.1 RELEASES TO AIR Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

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

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
03	Carbon dioxide (CO2)	C	PER		0.0	10575.75	0.0	10575.75
01	**Methane (CH4)**	C	PER		0.0	5694.63	0.0	5694.63

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

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

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

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

Additional Data Requested from Landfill operators

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

Landfill: Tradaree Point E.T.P.

Please enter summary data on the quantities of methane flared and / or utilised	**T (Total) kg/Year**	**M/C/E**	**Method Used**		**Facility Total Capacity m3 per hour**	
			Method Code	**Designation or Description**		
Total estimated methane generation (as per site model)	0.0				N/A	
Methane flared	0.0				0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0				N/A	

4.2 RELEASES TO WATERS Link to previous years emissions data | PRTR# : W0037 | Facility Name : Tradaree Point E.T.P. | Filename : W0037_2010 DRAFT.xls | Return Year : 2010 | 16/06/2011 17:04

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

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

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

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

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

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

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

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

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

4.3 RELEASES TO WASTEWATER OR SEWER

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs					
POLLUTANT		METHOD			QUANTITY					
			Method Used							
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
06	**Ammonia (NH3)**	M	PER		0.0	0.0	0.0	86263.7	0.0	86263.7
17	Arsenic and compounds (as As)	M	EN 26595:1992		0.0	0.0	0.0	49.6	0.0	49.6
79	Chlorides (as Cl)	M	EN ISO 15682:2001		0.0	0.0	0.0	1279860.1	0.0	1279860.1
18	Cadmium and compounds (as Cd)	M	EN ISO 5961:1995		0.0	0.0	0.0	1.4	0.0	1.4
19	Chromium and compounds (as Cr)	M	EN 1233:1996		0.0	0.0	0.0	304.5	0.0	304.5
20	Copper and compounds (as Cu)	M	EN ISO 11885:1997		0.0	0.0	0.0	73.3	0.0	73.3
82	Cyanides (as total CN)	M	EN ISO 14403:2002		0.0	0.0	0.0	0.0	0.0	0.0
23	Lead and compounds (as Pb)	M	EN ISO 11885:1997		0.0	0.0	0.0	0.0	0.0	0.0
21	Mercury and compounds (as Hg)	M	EN 13506:2001		0.0	0.0	0.0	0.56	0.0	0.56
22	Nickel and compounds (as Ni)	M	EN ISO 11885:1997		0.0	0.0	0.0	3157.4	0.0	3157.4
12	Total nitrogen	M	EN 12260:2003		0.0	0.0	0.0	185495.1	0.0	185495.1
13	Total phosphorus	M	EN ISO 15681-1 to 2:2004		0.0	0.0	0.0	4623.3	0.0	4623.3
24	Zinc and compounds (as Zn)	M	EN ISO 11885:1997		0.0	0.0	0.0	2846.5	0.0	2846.5

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

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

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

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

4.4 RELEASES TO LAND Link to previous years emissions data | PRTR# : W0037 | Facility Name : Tradaree Point E.T.P. | Filename : W0037_2010 DRAFT.xls | Return Year : 2010 | 16/06/2011 17:04

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

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

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

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

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

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE | PRTR# : W0037 | Facility Name : Tradaree Point E.T.P. | Filename : W0037_2010 DRAFT.xls | Return Year : 2010 | 16/06/2011 17:04

Please enter all quantities on this sheet in Tonnes 18

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country			489.0	Non-hazardous domestic sludge (mixed)	D1	M	Weighed	Onsite in Ireland				

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

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