Padraig Thornton Waste Disposal Ltd

Kilmainhamwood Compost

Waste Licence Reg. No. W0195-01

Annual Environmental Report 2011
Submitted March 2012

Certification Europe QMS ISO 9001

Certification Europe QMS ISO 9001

Certification Europe OHSAS OHSAS 18001

Repak Recovery Operator of the Year Large Company 2008

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1 Introduction

This report is the Annual Environmental Report for Kilmainhamwood Compost. It has been prepared in compliance with Condition 11.7 of the Waste Licence (Licence Reg. No. W0195-01) and includes emission details and reporting for the reporting period of 2011.

This licence was granted by the Environmental Protection Agency (EPA) to Padraig Thornton Waste Disposal Ltd (PTWDL) on the 30th January 2006. The contents of this report are as required by Schedule G of Waste Licence W0195-01.

1.1 Operator

The facility operator and licensee of licence number W0195-01 is Padraig Thornton Waste Disposal Ltd, T/A Thorntons Recycling. This AER relates to Kilmainhamwood Compost, Ballynalurgan, Kilmainhamwood, Kells, Co. Meath.

The address and contact details for the company headquarters are;

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Unit S3B Henry Road
Park West Business Park
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Mobile: 086-8563431

1.2 Reporting Period

The reporting period for this Annual Environment Report (AER) is between the 01/01/2011 to the 31/12/2011.

2 Facility Activities

2.1 Waste Activities carried out at the Facility

Part 1 of the current Waste Licence W0195-01 lists those activities contained in the Third and the Fourth Schedule of the Waste Management Act 1996, which are licensed to be carried out at Kilmainhamwood Compost, Ballynalurgan, Kilmainhamwood, Kells, Co. Meath. These activities are as follows:

Third Schedule

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 10 of this Schedule:**
Class 13.	**Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.**

Fourth Schedule

Class 2	**Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).**
Class 13.	**Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.**

2.2 Operation Processes – Waste Activities at the facility

The following section details the operational procedure for dealing with acceptable biodegradable waste that enters the Kilmainhamwood Compost Facility (Appendix 1 details the Facility layout with monitoring locations).

Standard Operation procedures in the Composting Building

On arrival the transportation vehicle bringing material to the facility is inspected and checked to ensure that it is clean and there are no residual materials on the truck body and that it is properly covered or netted. Passing inspection the vehicle is directed towards the weighbridge. After weighing the following information is recorded on our computerised system (WIMS);

a. Date
b. The name of the carrier (including if appropriate, the waste carrier registration details),
c. The vehicle registration number,
d. The name of the producer(s)/collector(s) of the waste as appropriate,
e. The name of the waste facility(if appropriate) from which the load originated including the waste licence or waste permit register number,
f. A description of the waste including the associated EWC codes,
g. The quantity of the waste, recorded in tonnes,
h. The name of the person checking the load.

Once weighed the vehicle is directed to the reception hall, the door of the reception is opened and the vehicle is directed in, once inside the reception hall the door is closed. On clearance the driver is directed to tip load and the facility operator inspects the load whilst the load is tipping.
The facility operator signs off the acceptance form and confirms if material is suitable for processing at the facility. Any material not suitable for processing or is in contravention of the licence is removed for temporary storage in a quarantine area. The quarantined material is removed off site by a licensed contractor for disposal as per waste acceptance procedure, EP14 for Kilmainhamwood Compost.

Once tipping is complete the facility operator washes down the container with a steam power washer ensuring no residual material remains. The door is opened and the driver is directed to the weighbridge for weighing where he will be given a weighbridge docket. The vehicle then leaves the facility taking the exit route.

Inside the building the organic waste material suitable for composting is mixed and blended by weight with an amendment material. The typical blend is made up of 45% Seed Material, 10% sludge/grease trap waste and 45% Brown Bin/ source segregated catering waste. This mixed material is conveyed by loading shovel to a collection area where a batch size of 120 tonnes is reached and then removed by a loading shovel and placed into an aerated bay. The material is given a unique sub-batch code which allows for full traceability of the ingredients of the batch and traceability of the batch through the facility. When the bay is full the operator places one temperature probe into the material. The aeration is switched on which is controlled by a plc that brings the temperature to the required level. The composting material stays in this bay for one week. After this period the material is taken out of the bay and placed over the wall into Zone 3. The material is then placed into another bay and moisture is amended to the required level. A temperature probe is placed into the material and the aeration switched on. The composting material will stay in this zone for 2 weeks and will get one turn using a machine and a moisture amendment material if required.

After this period the material is taken into Zone 4 and screened through a 12mm screen. The oversize material is sent back to the start of the process as seed compost and any residual plastic from the process comes out the end of the screener and is sent to a licensed landfill once a full load is collected. The screened 12mm material is placed into an enclosed tunnel for pasteurisation. The tunnel can hold up to 25 sub-batches and when full the total material will be given a unique Batch Number for traceability. Once inside the enclosed tunnel the aeration is switched on and the temperature is brought to over 70°C for 60 consecutive minutes to satisfy the Animal By-Product Regulations (ABPR). After pasteurisation the material is sampled in situ and the samples sent to an approved Laboratory for analysis. Once the material has passed the ABPR requirements and EPA standards it can be classified as compost and removed from the tunnel by a clean machine and loaded for transport off site to the appropriate end user.

Any material not meeting ABPR and EPA standards can be reworked in the facility to produce higher grade compost or transported to an appropriate landfill site as cover.

2.3 Weighbridge Calibration

The weighbridge was calibrated and certified by the legal metrology service on the 23rd September 2010. A copy of this certificate is contained within Appendix 2.

3 Quantity and Composition of Waste Received, Recovered and Disposed of During the Reporting Period

3.1 Waste Handled in Kilmainhamwood Compost

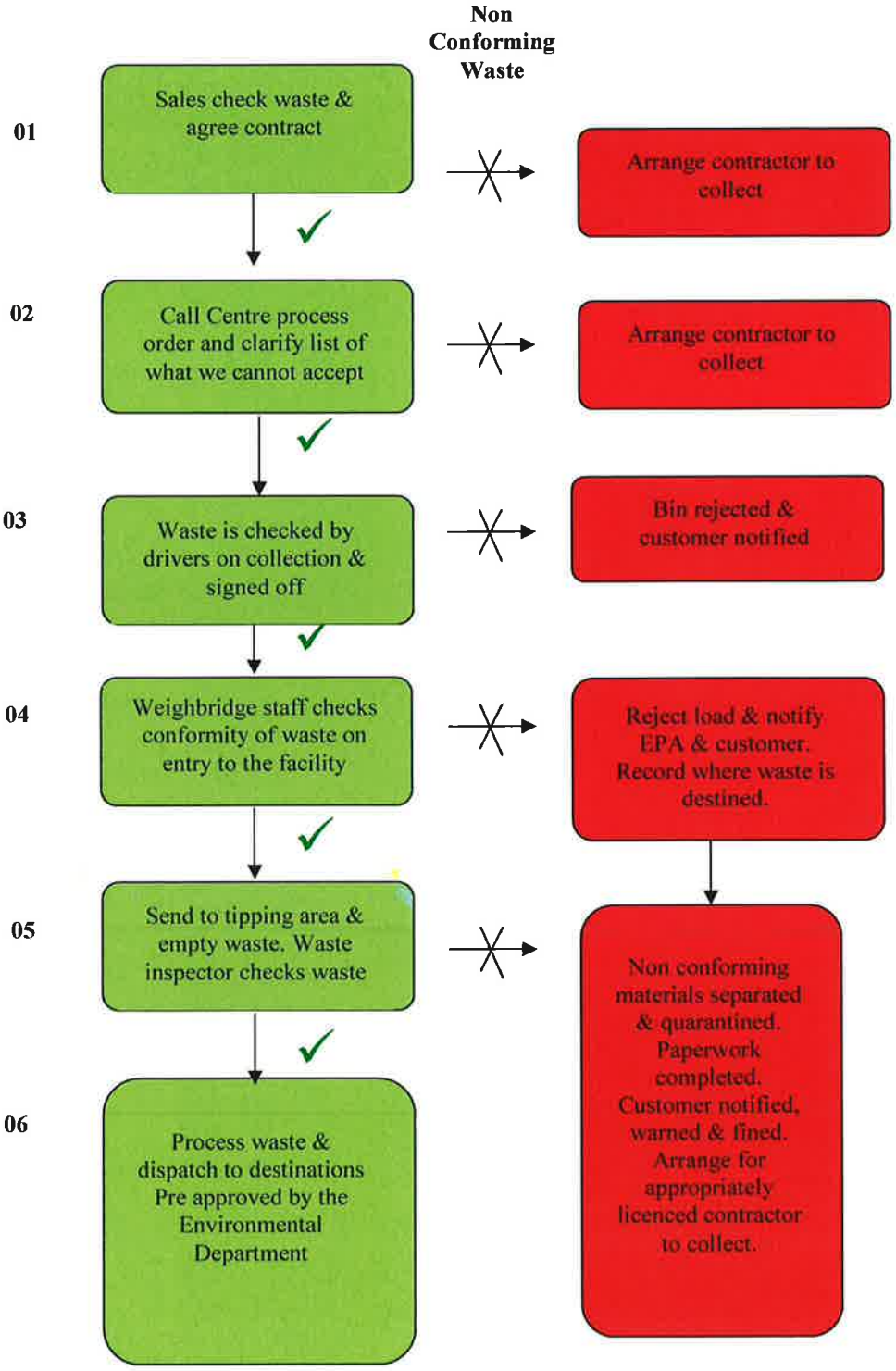
All waste is checked and documented at the weighbridge in accordance with our waste licence and our waste acceptance procedures as detailed in section 2.2. Waste is then inspected, processed and placed into our production system. The composting process takes up to 8 weeks to produce mature compost.

Mature compost started to leave the Facility on 14th April 2007 and was subjected to the quality analysis, as per Schedule E of the Licence W0195-01 and The Technical Amendment of the licence. Continued approval under the ABP Regulations from the Dept. of Agriculture, Fisheries and Food was received on 08th October 2011. A copy of the Approval Certificate is contained within Appendix 3.

Should any non-conforming waste come to the attention of our staff it is either rejected before collection or segregated and quarantined to be disposed of by a licensed contractor. Paperwork in relation to all non-conforming wastes is maintained on site.

3.2 Waste Acceptance

The following is a simplified diagram explaining our waste acceptance procedures at Kilmainhamwood Compost.



All staff employed by Kilmainhamwood Compost have received an Environmental Health and Safety Induction which includes licence training, waste acceptance procedures, good practice in composting, emergency procedures and environmental awareness. All staff employed at the facility are diligent in assisting in eliminating the occurrence of non-conforming waste and producing a good quality compost at the facility.

Kilmainhamwood Compost successfully maintained its certification for its management systems in ISO14001 Environmental, ISO 9001 Quality, OHSAS 18001 Health and Safety in 2011. The IMS system is available for inspection on the IMS drive at all company site offices.

3.3 Waste Received

A total of 26,889.94 tonnes of waste for composting was accepted at the facility in the reporting period from 1st January 2011 to 31st December 2011.

Table 3.3.1 Quantity and Composition of Waste Received 2009-2011

EWC Code	Materials Received	2009	2010	2011
19 08 05	Sludge Urban Waste Water	1139.70	1.12	-
02 02 04	Sludge Food Prep Animal Origin	1322.94	1023.82	833.60
20 01 25	Grease Trap Waste	655.00	760.36	823.66
02 03 04	Unsuitable food waste	1954.87	51.30	9.12
20 01 08	Compostable Food Waste	15503.47	18768.67	25011.96
02 07 04	Unsuitable Alcohol/Liquid	9.02	-	-
02 06 01	Bakers Waste	27.42	12.36	-
03 01 05	Wood/ Sawdust	40.36	-	10.50
02 07 05	Sludge Alcohol/non-Alcohol	67.72	-	-
19 09 01	Screening Waste Water	2.88	-	-
02 01 01	Sludge Agriculture Washing	-	48.84	-
02 01 06	Sludge Textile Industrial	-	149.18	201.10
10 01 03	Ash from Peat/Untreated Wood	25.46	-	-
	TOTAL TONNAGE	20, 748.84	20, 815.65	26,889.94

3.4 Waste Disposed

Of the total 26,889.94 tonnes accepted at the facility for composting in 2011 2,301.67 tonnes of the material was of a non-compostable fraction and was transferred from the material as a stabilised residual waste to landfill. The remaining material was suitable for composting and was sold as a product or returned into the operation to assist in the composting process and enable the production of compost.

3.5 Waste Recovered/Compost Produced

In 2011 6,285 tonnes of compost was produced at the facility and was either sold to landscape gardeners or arable farmers in the area.

4 Contribution to the achievement of recovery targets

4.1 Proposal for the contribution of the facility to the achievement of targets for the reduction of Biodegradable waste to landfill as specified in the landfill Directive

Progressive targets have been set out in the Landfill Directive (1999/31/EC) to reduce the proportion of biodegradable municipal waste landfilled. By 2006 Member States were restricted to land filling a maximum of 75% of the total weight of biodegradable municipal waste generated in 1995, the baseline year. This target is further reduced to 50% of the 1995 baseline by 2009 and 35% by 2016. According to the National Waste Report 2009, an estimated 1,939.524 tonnes of biodegradable municipal waste was generated in Ireland in 2009 of which 55% was land filled which is down from 57% on 2008 report. The quantity of organic waste collected from household kerbsides grew by 65% (62,447 tonne in 2009 from 37,920 tonnes in 2008). Ireland has made significant inroads into closing the gap between the EU targets and where we currently stand on diversion from landfill. The National Waste Database report for 2010 was not available at the time that this report was being compiled to compare the latest national statistics.

Kilmainhamwood Compost, Ballynalurgan, Kilmainhamwood, Kells, Co. Meath have been successfully contributing towards National Targets and diverted approximately 18,709 tonnes in 2007, 20,651 tonnes in 2008, 20,748.84 tonnes in 2009,20.815 tonnes in 2010 and some 26,889.94 tonnes in 2011 of biodegradable waste from landfill for composting. This material would have historically gone for disposal to licensed landfills It is hoped that in 2012 Kilmainhamwood Compost will extend its facility to 40,000 tonnes. It lodged a waste licence review with the EPA in June of 2010 and is waiting for response on same. This will further assist the country in diverting valuable food waste from landfill.

Thornton's Recycling offer all their customers the opportunity to segregate all biodegradable waste at source. The facility at Ballynalurgan, Kilmainhamwood, County Meath, (Waste License W0195-01) has proven to be very successful. The facility accepts non-hazardous biodegradable wastes (including industrial sludge's, household and commercial waste for composting).Thorntons Recycling offers a three bin collection service to all households it services in Kildare and Dublin and have a pilot scheme in Meath. It also offers a brown bin service to all commercial customers such as hospitals, hotels, restaurants etc. Kilmainhamwood Compost will aim to continue to increase the quantity of

biodegradable waste that can be diverted from landfill even further and assist Ireland in achieving Targets lay down by the landfill Directive (1999/31/EC).

4.2 The recovery of non hazardous biodegradable waste

All non hazardous biodegradable waste arrives at the facility and when accepted is tipped in the reception hall. After inspection the material is amended with other organic material such as wood chip or sawdust in order to create a blend with a Carbon: Nitrogen ratio of 30: 1, moisture content of 65% and with an open texture. This material will be placed into our composting bays and achieves temperatures in excess of 60°C. After 3 weeks the material is screened and the screened compost is placed into pasteurization in order to comply with the ABP Regulations, 70°C for 60mins with a 12mm particle size. After a total period of 8 weeks the composting material will have matured and using Schedule E of Licence W0195-01 can be classified in either a class I or class II compost. Any end product not meeting this standard can be reworked in the process or classified as a stabilized bio-waste and disposed of at an approved landfill site.

5.0 Summary Report and Interpretations on Environmental Monitoring and Emissions Data

In accordance with Schedule D of PTWDL waste licence W0195-01 monitoring of dust, noise, surface water, groundwater and air microbes where carried out during the reporting period of 2011. The following section details results obtained and interpretations of results.

5.1 Total Dust Deposition 2011

Three fixed monitoring locations (DA, DB and DC) were used to perform total dust deposition monitoring quarterly over the 30 day sampling period as per Waste license W0195-01. The monitoring locations are presented in Appendix 1. The results presented in *Table 5.1* illustrate that total depositional dust at all locations. All dust depositions levels were under the guideline limit, 350 mg/m^2/day, recommended by the EPA as per conditions of W0195-01. Quarterly reports were submitted to the EPA in 2011 as follows; quarter 1 W0195-01/11/TMD/10 8th April 2011, W0195-01/11/TMD/19 11th July 2011, W0195-01/11/TMD/24 1st November, W0195-01/12/TMD/01 January 2012

Table 5.1 Average ambient Total dust deposition concentrations at three monitoring locations at the Kilmainhamwood Compost 2010

Dust Location	Units	Mar-11	Jun-11	Aug-11	Nov-11
DA	mg/m2/day	74	68	168	99
DB	mg/m2/day	101	94	197	102
DC	mg/m2/day	89	114	128	76

5.2 Noise Monitoring 2010

The noise survey was carried out at the location N1 referenced in the waste licence (see monitoring location Appendix 1). Monitoring was carried out on a quarterly basis as per Schedule D of waste licence W0195-01. The monitoring results are presented in *Table 5.2*. The results presented in *Table 5.2* illustrate that recorded noise levels at all locations. Reports have been submitted to the EPA, as per waste licence requirements, and all levels displayed in Table 5.2 are below the emission levels set down by the waste licence W0915-01.

Table 5.2 Recorded Noise Levels dB(A) – Intervals 30 minutes 2010

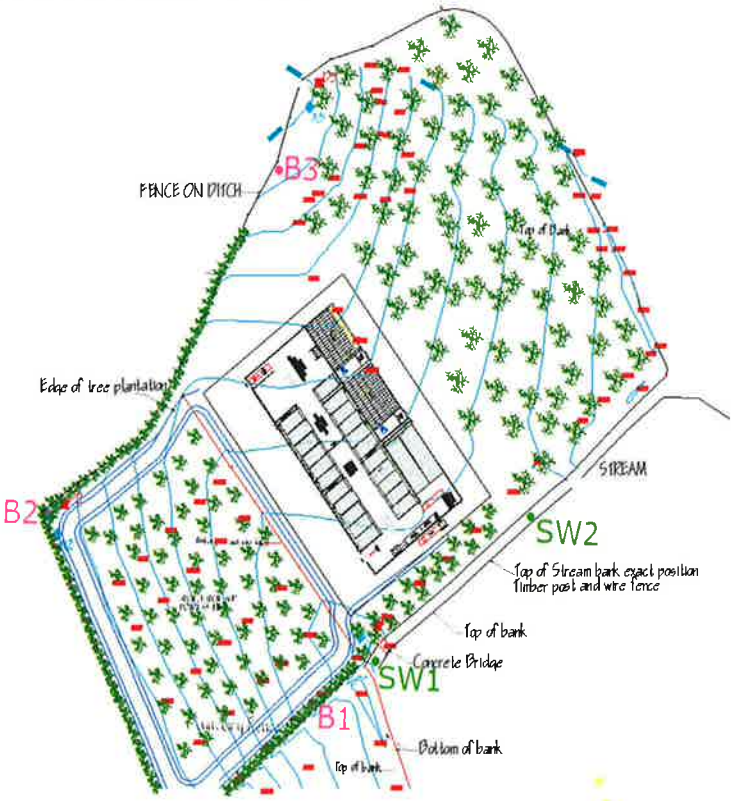
Noise Location	Time	unit	Mar-11	may-11	sept-11	Dec-11
	Day	Leq	47.9	53.2	43.1	53.6
	Day	L10	40.1	49.5	44.5	58
N1	Day	L90	28.2	39.9	38.9	40.1
	Night	Leq	38.5	33.2.	42.5	42.1
	Night	L10	35.7	43.7	43.5	50.9
	Night	L90	29.8	33.7	35.5	40

Quarterly Noise reports were submitted to the EPA as follows; quarter 1 W0195-01/11/TMD/07 29th March 2011, quarter 2 W0195-01/11/TMD/15 4th July 2011, quarter 3 W0195-01/11/TMD/23 27th October 2011 and quarter 4 W0195-01/12/TMD/05 January 2012

5.3 Groundwater and Surface Water

As per Schedule D of waste licence W0195-01 Groundwater was monitored at B1, B2 and B3 bore wells and Surface Water was monitored quarterly at SW1 and SW2. Figure 5.3.1 shows the locations of the monitoring points and the results are outlined in the tables below.

Figure 5.3.1 Monitoring Locations of Surface Water and Groundwater



SW1 -----Down stream Monitoring Point.
SW2------Up stream Monitoring Point.
B1 -------Groundwater Well No.1 Monitoring Point.
B2 -------Groundwater Well No.2 Monitoring Point.
B3 -------Groundwater Well No.3 Monitoring Point

Groundwater reports were submitted to the EPA on the 7th July 2011 W0195-01/11/TMD/17 and in January 2012 W0195-01/12/TMD/04. Any elevations were discussed in detail in these reports. The results of monitoring during the reporting period are recorded in the following tables;

Table 5.3.2

MONITORING WELL B1: Chemical Analysis of Groundwater.						
PARAMETERS	**UNIT**	**Limit**	**27/05/2010**	**22/11/2010**	**26/05/2011**	**13/12/2011**
FIELD ANALYSIS						
General Water Quality Parameters	**mAoD(malin)**		80.81m	80.81m	80.81m	80.81m
Colour	-	No abnormal change	Clear	-		
Conductivity @ 25°C	**uS/cm**	1,000	1,005	-		
Odour	-		No Odour	-		
pH	**pH Units**	6.5-9.5	7.44	7.4	7.3	7.3
Temperature	**deg C**	25	11	-		-
Ground Water Level	**M**		64.51	63.61	63.31	64.01
LABORATORY ANALYSIS						
General Water Quality Parameters						
pH	**pH Units**	6.5-9.5	7.44	7.4	7.3	7.3
Inorganics						
Ammonia	**NH_4 mg/l**	<0.15	0.13	<0.01	<0.01	0.015
Calcium	**Ca mg/l**	200	-	75.58	-	96.93
Chloride	**Cl mg/l**	30	23.8	18.65	24	16.9
Nitrate	**$N0_3$ mg/l**	25	-	<0.272	-	<0.272
Phosphorous	**P mg/l**		-	0.196	-	0.144
Potassium	**K mg/l**	5	-	2.15	-	5.124
Ortho Phosphate	**PO_4 mg/l**	0.03	-	0.026	-	0.07
Sodium	**Na mg/l**	150	-	20.05	-	18.78
Sulphate	**SO_4 mg/l**	200	267	171.86	230	165.79
Metals						
Boron	**B mg/l**	1	-	0.0834	-	0.1321
Cadmium	**Cd mg/l**	0.005	-	<0.00009	-	<0.00009
Chromium (Total)	**Cr mg/l**	0.03	-	0.0032	-	0.0024
Copper	**Cu mg/l**	0.03	-	<0.00011	-	0.007415
Iron	**Fe mg/l**	0.2	-	0.6089	-	0.1454
Lead	**Pb mg/l**	0.01	-	0.0091	-	0.02757
Magnesium	**Mg mg/l**	50	-	28.51	-	26.68
Manganese	**Mn mg/l**	0.05	-	0.0339	-	
Nickel	**Ni mg/l**	0.02	-	0.0029	-	0.0029
Zinc	**Zn mg/l**	0.01	-	0.23	-	0.3722
Bacteria						
Feacal Coliforms	**cfu/100ml**	0.00	-	20	-	270
Total Coliforms	**cfu/100ml**	0.00	-	920	-	286
List I/II						
Volatile Organic Compounds	**mg/l**		---		---	<0.001
Semivolatiles	**mg/l**		--		--	<0.001
Pesticides	**mg/l**		-		-	<0.00001

Table 5.3.3

MONITORING WELL B2: Chemical Analysis of Groundwater.						
PARAMETERS	**UNIT**	**Limit**	**27/05/2010**	**22/11/2010**	**29/06/2011**	**13/12/2011**
FIELD ANALYSIS						
	mAoD(malin)		86.93m	86.93m	86.93m	86.93m
General Water Quality Parameters						
Colour	-	No abnormal change	Clear	-		
Conductivity @ 25°C	uS/cm	1,000	1018	-		
Odour	-		No Odour	-		
pH	pH Units	6.5-9.5	7.23	7.3	7.1	7.2
Temperature	deg C	25	11			
Ground Water Level	M		65.19	65.13	64.43	64.63
LABORATORY ANALYSIS						
General Water Quality Parameters						
pH	pH Units	6.5-9.5	7.23	7.3	7.1	7.2
Inorganics						
Ammonia	NH_4 mg/l	<0.15	0.12	<0.01	<0.01	0.1285
Calcium	Ca mg/l	200	-	85.42	-	104
Chloride	Cl mg/l	30	17	14.02	14	13.26
Nitrate	NH_3 mg/l	25	-	<0.272	-	<0.272
Phosphorous	P mg/l		-	<0.011	-	0.048
Potassium	K mg/l	5	-	1.51	-	1.8174
Ortho Phosphate	PO_4 mg/l	0.03	-	<0.005	-	<0.005
Sodium	Na mg/l	150	-	26.32	-	29.55
Sulphate	SO_4 mg/l	200	277	179.94	325	166.51
Metals						
Boron	B mg/l	1	-	0.0347	-	0.0347
Cadmium	Cd mg/l	0.005	-	<0.00009	-	<0.00009
Chromium (Total)	Cr mg/l	0.03	-	<0.00214	-	<0.00214
Copper	Cu mg/l	0.03	-	<0.00011	-	0.004399
Iron	Fe mg/l	0.2	-	0.0566	-	0.3108
Lead	Pb mg/l	0.01	-	0.0009	-	0.009173
Magnesium	Mg mg/l	50	-	27.13	-	28.07
Manganese	Mn mg/l	0.05	-	0.3044	-	
Nickel	Ni mg/l	0.02	-	0.0008	-	0.000599
Zinc	Zn mg/l	0.01	-	0.0066	-	0.001532
Bacteria						
Feacal Coliforms	cfu/100ml	0.00	-	10	-	4
Total Coliforms	cfu/100ml	0.00	-	150	-	510
List I/II						
Volatile Organic Compounds	mg/l		-		-	<0.001
Semivolatiles	mg/l		-		-	<0.001
Pesticides	mg/l		-		-	<0.00001

Table 5.3.4

MONITORING WELL B3: Chemical Analysis of Groundwater.						
PARAMETERS	**UNIT**	**Limit**	**27/05/2010**	**22/11/2010**	**26/05/2011**	**13/12/2011**
FIELD ANALYSIS						
General Water Quality Parameters	**mAoD(malin)**					
Colour	-	No abnormal change	Clear	-		-
Conductivity @ 25°C	**uS/cm**	1,000	557	-		-
Odour	-		No Odour	-		-
pH	**pH Units**	6.5-9.5	7.2	-	7.5	-
Temperature	**deg C**	25	11	-		-
Ground Water Level	**M**		68.21	76.71	72.51	77.01
LABORATORY ANALYSIS						
General Water Quality Parameters						
pH	**pH Units**	6.5-9.5	7.2	7.4	7.5	7.3
Inorganics						
Ammonia	**NH_4 mg/l**	<0.15	0.13	<0.01	<0.01	<0.01
Calcium	**Ca mg/l**	200	-	83.17	-	88.86
Chloride	**Cl mg/l**	30	16.3	13.84	16	14.74
Nitrate	**NH_3 mg/l**	25	-	<0.272	-	0.57
Phosphorous	**P mg/l**		-	0.019	-	0.028
Potassium	**K mg/l**	5	-	2.08	-	2.048
Ortho Phosphate	**PO_4 mg/l**	0.03	-	0.016	-	0.028
Sodium	**Na mg/l**	150	-	18.58	-	13.91
Sulphate	**SO_4 mg/l**	200	91.14	94.02	122	113.80
Metals						
Boron	**B mg/l**	1	-	0.0356	-	0.02889
Cadmium	**Cd mg/l**	0.005	-	<0.00009	-	<0.00009
Chromium (Total)	**Cr mg/l**	0.03	-	<0.00214	-	<0.00214
Copper	**Cu mg/l**	0.03	-	0.0019	-	0.00011
Iron	**Fe mg/l**	0.2	-	0.0106	-	0.003956
Lead	**Pb mg/l**	0.01	-	0.00005	-	<0.00002
Magnesium	**Mg mg/l**	50	-	23.44	-	19.2
Manganese	**Mn mg/l**	0.05	-	0.0377	-	
Nickel	**Ni mg/l**	0.02	-	0.0003	-	<0.00014
Zinc	**Zn mg/l**	0.01	-	0.0105	-	0.00041
Bacteria						
Feacal Coliforms	**cfu/100ml**	0.00	-	**<1**	-	**0**
Total Coliforms	**cfu/100ml**	0.00	-	**51**	-	**0**
List I/II Volatile Organic Compounds	**mg/l**		-		-	**<0.001**
Semivolatiles	**mg/l**		-		-	**<0.001**
Pesticides	**mg/l**		-	-	-	**<0.0001**

LEGEND
- = No data reported or no analyses conducted
< = Less Than
Limit = EPA Report Towards setting the guideline values for groundwater protection
NDP = No Determination Possible

5.3. Surface Water Analysis

Results of the surface water were compared to the Salmonid Water Quality Standards - S.I. No 293 of 1988. Full detailed quarterly reports for surface water monitoring and additional reports as requested were forwarded to the Agency in 2011 as follows. W0195-01/11/TMD/06 8th April 2011, W0195-01/11/TMD/16 4th July 2011, W0195-01/11/TMD/20 5th October 2011 and W0195-01/12/TMD/02 January 2012

Samples taken for surface waste were taken from SW2 which represents the background water quality in the stream adjacent to the composting plant and from SW1 which is a monitoring location downstream of the main activities at the site. Table 5.3.5 and Table 5.3.6 display all results for surface water monitoring carried out in 2010.

Table 5.3.5: SW1 Results

PARAMETERS	UNIT	28/03/2011	13/06/2011	22/09/2011	08/12/2011
FIELD ANALYSIS					
General Water Quality Parameters					
Colour	-	Clear	Clear	Clear	Clear
Conductivity @ 25°C	uS/cm	-	-	-	-
Odour	-	No Odour	No Odour	No Odour	No Odour
pH	pH Units	-	-	-	
Temperature	deg C	9.2	14.7		7.1
LABORATORY ANALYSIS					
General Water Quality Parameters					
Total Suspended Solids	mg/l	4.5	4.67	<2	8
Mineral Oils	mg/l	<0.01	<0.01	<0.01	<0.01
pH	pH Units	8.35	8.24	7.54	7.52
Inorganics					
Total Ammonia	NH_4 mg/l	<0.2	<0.32	<0.2	<0.2
Chloride	Cl mg/l	14.6	16	11.2	12.6

Table 5.3.6: SW2 Results

PARAMETERS	UNIT	28/03/2011	13/06/2011	22/09/2011	08/12/2011
FIELD ANALYSIS					
General Water Quality Parameters					
Colour	-	Clear	Clear	Clear	Clear
Conductivity @ 25°C	uS/cm	-	-	-	-
Odour	-	-	No Odour	No Odour	No Odour
pH	pH Units	-	-	-	-
Temperature	deg C	9.1	14.0		6.8
LABORATORY ANALYSIS					
General Water Quality Parameters					
Total Suspended Solids	mg/l	3.5	4.67	<2	<6
Mineral Oils	mg/l	<0.01	<0.01	<0.01	<0.01
pH	pH Units	8.35	814	7.34	7.37
Inorganics					
Total Ammonia	NH_4 mg/l	<0.2	0.216	<0.2	<0.2
Chloride	Cl mg/l	14.5	16.6	12.6	12.7

5.4 Air Monitoring – Bacteria and Aspergillus Fumigatus

As per schedule D of the licence, bacteria and Aspergillus fumigates monitoring was carried out by independent consultants Odour Monitoring Ireland, a copy of this report is contained within Appendix 4 of this report

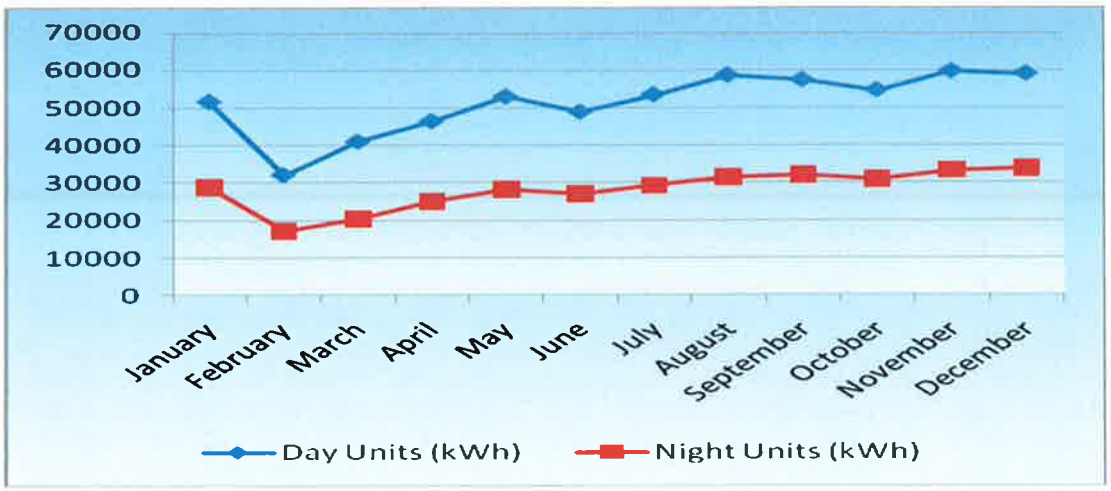
6.0 Resources and Energy Usage

The following section discusses resources such as Electricity, Fuel and Water used at Kilmainhamwood Compost in 2011. As per condition 5.7 of the licence a copy of the energy efficiency audit was carried out at the facility and was forwarded to the EPA in previous AER's. The company now has an energy management system in place which records trends and identifies management opportunities for savings in relation to electricity and diesel used at the facility monthly.

6.1 Electricity

Electricity consumption at the facility in 2011 was a total of 953,388kWh, while this was an increase in total usage compared to 2010 it represented a decrease in usage on kWh per tonne processed. Figures 6.1 display the monthly day and night time trend for the year's energy consumption at Kilmainhamwood Compost.

Figure 6.1 Energy Consumption 2011



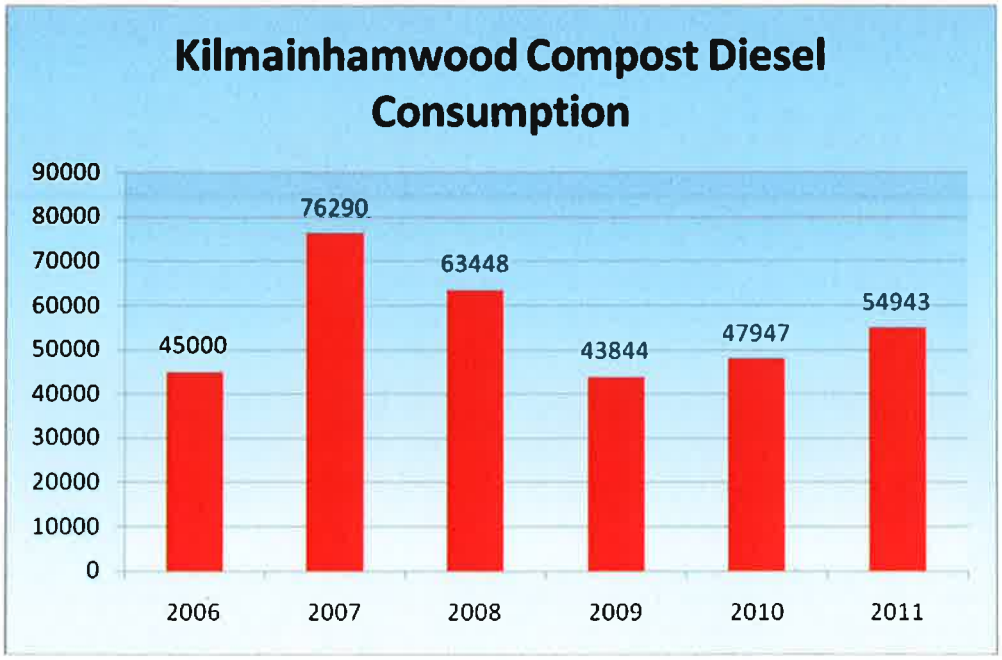
6.2 Water

Kilmainhamwood compost is not connected to the local water mains and uses its rain collection tank as a source of water at the facility. This water is used for washing trailers, equipment and floors. No water is used in the process as the incoming material contains excess moisture.
Drinking water is supplied by a contract water supplier and is bought in large bottles. For emergency purposes there is an over ground collection tank that holds 90,000 litres and is supplied by Bore well 3 if required.

6.3 Diesel

The main consumption of diesel in 2011 was the loading shovels and shredding machine used in the composting processes. A total of 54,943 litres of diesel were consumed during 2011. All machines are serviced regularly in order to achieve optimum fuel efficiency. The composting process at the facility is continuously monitored in order to assess energy efficiency and improvements which can be made.

Figure 6.3 Diesel Consumption 2006 – 2011



7.0 Development/Infrastructural Works

7.1 Site Developments 2011

During 2011 the facility accepted and processed 26,998.94 tonnes of biodegradable waste. The following developments were carried out on site in 2011;

- **Training -** Staff training including machinery operation and driver certification. Also the deputy manager attended a compost facility manager training programme.
- **ISO-** Kilmainhamwood Compost maintained certification in standards for ISO 14001 Environmental, ISO 9001 Quality and OHSAS 18001 in 2010.
- **Odour abatement upgrade -** During 2010 Kilmaimhamwood Compost commenced the installation of its odour abatement upgrade. Phase 1 was completed in 2009 which resulted in existing composting bays being enclosed. This allowed the processed air to be captured and with the installation of the acid scrubber in 2010 this process air can be treated to remove the ammonia before it is sent to the biofiltration system, thus increasing efficiency and effectiveness of the biofilters on site. The installation of the odour abatement upgrade was completed and commissioned in quarter 1 2011 and the biofilter media in Biofilter 2 was replaced in February 2011

7.2 Proposed Developments 2012

Additional composting infrastructure is needed in Ireland to treat biodegradable waste which has to be diverted away from landfill. It is hoped that Kilmainhamwood compost will be able to extend its facility to handle 40,000 tonnes in 2012. Thorntons Recycling lodged a review of their existing waste licence (W0195-01) with the EPA in June 2010 and we are awaiting the outcome of same. The company have secured planning and intend to extend the facility to 40,000 tonnes as per planning received. This development will include;

- A new reception processing area complete with a new waste acceptance area. Additional composting bays and a new sanitation/pasteurisation tunnel system. The new proposed infrastructure will enable the facility to add to value to their product with the possibility of bagging compost on site.
- It is proposed that a 15 acre willow plantation is developed at the facility. This will enhance the environment by its consumption of CO^2 and its timber can be used as a renewable source of Bio fuel.
- Continuous development of facility procedures in line with ISO certification and Animal By-Products Regulations.

7.3 Plant Capacity 2011

During 2011 26,889.94 tonnes of waste was processed at the facility. The facility contains the following plant which processes the waste on site;

- Three L90E Volvo Loading Shovels
- One KOMPTECH 5000S Slow speed shredder
- One McDonald International 50ft Screener

The L90E Volvo Loading Shovels can move over 100 tonne of material per hour so they are well within their working capacity.
The Komptech Shredder can shred 100 Tonne per hour.
The McDonald Screener has a capacity of 120 tonne per hour.

The average waste intake is 500 tonnes per week and all of the above plant is well within their working Capacity. Kilmainhamwood Compost is part of the Thornton's Recycling Group so if there were any emergency breakdowns or additional plant machinery required then they can be brought from another facility for use on site. Thorntons Recycling have a maintenance garage which is fully equipped with mechanics, fitters etc which are available for use by Kilmainhamwood Compost if required.

8.0 Schedule of Environmental Objectives and Targets for 2012

The contents of the Integrated Management System (IMS) are too large to contain within the main body of this report, however the Agency can access the system for inspection on a specially designated Drive (X Drive or IMS Drive) at any of the companies' site offices.

A new schedule of objectives and targets for the forthcoming year of 2012 for Kilmainhamwood Compost is contained within Appendix 5 of this report.

9.0 Report on the progress towards achievement of the Environmental Objectives and Targets contained in the previous year's report

An update on the Environmental Objectives and Targets for Kilmainhamwood Compost, waste licence W0195-01, as detailed in the Management Programme for the company for 2011 is contained in Appendix 5 of this report. Kilmainhamwood Compost established an Environmental Management System on commencement of activities in 2006. This was further expanded in 2007, 2008, 2009 2010 and 2011 to cover a number of additional procedures specific to composting and the Animal By-Products Regulations. The following is a summary of what is currently on the IMS and which relates to Kilmainhamwood Compost;

Top Level Manual
Legal Register
Emergency Response Plans
Polices – EHS and Quality
Key Performance Indicators
Training File – Skills Matrix
Third Party Contractors Files
Management Programme – Objectives and Targets
Staff Handbook

Environmental Procedures

- Communications Programme
- Waste Outlet Audit
- Environmental Monitoring and Analysis
- Odour Control
- Oil – Chemical Spill
- House Keeping
- Biofilters Monitoring Procedure Kilmainhamwood
- Waste Acceptance Kilmainhamwood
- Vehicle Emergency Response WCP Procedure
- Residual Waste Management Kilmainhamwood
- Tanker Emergency Response WCP Procedure
- Screen Sampling Procedure for Kilmainhamwood
- Housekeeping Procedure Kilmainhamwood
- Sampling Procedure Kilmanhaimwood
- Filling Pasteurisation Tunnel Procedure.
- Pasteurisation procedure
- Emptying Compost from Pasteurisation Tunnel Procedure
- Compost quality sampling procedure
- Biiofilter turning and media change procedure

Health and Safety

- A detailed Safety Statement with risk assessments is also contained within the EMS
- An emergency site specific plan is available for Kilmainhamwood Compost.

Quality

- Staff Appraisal
- Purchasing
- Weekly Operating Report Procedure
- Customer Focus
- Third Party Contractors

Generic Procedures

- Aspects
- Legal Identification and Evaluation
- Management Programmes
- Communications
- Training
- Emergency Response
- Monitoring and measurement
- Complaints
- Non-conformance and preventative actions
- Document control
- Internal auditing
- Management Review
- Records Management
- Risk Assessment
- Contractor Control
- Operational Control

10 Tank, drum, pipeline and bund testing.

At Kilmainhamwood Compost there is only one tank in use. This tank collects the leachate from the biofilters and from the wash bay. There are no fuel tanks on site and diesel is filled via a bunded mobile tank. Kilmainhamwood Compost commissioned White Young Green, environmental consultants to carry out an integrity test on the leachate process tank in December 2009 to BS8007 standards. The tank at the facility passed the integrity tests. A copy of the report was contained in last year's AER. This tank will be tested every three years as per Condition 3.10.5 of waste licence; therefore further tests are not due to be completed until the end of 2012.

10.1 Pipeline Tests

All pipe lines are running free and clear and will be serviced on a regular basis by Thornton's Tanker Services. Copies of worksheets are maintained on site for all services carried out.

11 Summary of Incidents and Complaints

11.1 Incidents

There were no incidents recorded in 2011.

11.2 Complaints

There were ten complaints made to the Facility during 2011 which was a reduction of 56% compared to 2010. All complaints were investigated in full and responded to. Full details of the complaints have been maintained on site at the facility as per our complaints procedure PM08 – Complaints
In Q1 2011 Kilmainhamwood Compost completed an upgrade to the odour abatement system on site. This included the installation of an acid scrubber and the total replacement of the biofilter media of Biofilter 2, this improved the effectiveness of the biofilter systems at the facility.

12 Review of Nuisance Controls

Potential nuisances at composting facilities include dust, noise, odour, litter, birds, vermin and mud. Kilmainhamwood Compost do their utmost to control any nuisance which may occur at the facility, checks on nuisances are carried out daily and corrective actions are carried out as required.

12.1 Dust

Kilmainhamwood Compost is required to carry out dust monitoring quarterly (please refer to section 5.1 of this report). As all waste processes take place indoors there are no dust emissions from the process. The main source of dust is from the roadways which are wetted down during dry weather conditions.
In an effort to further reduce dust emissions from the yard and roadways Kilmainhamwood compost use Thornton's road sweeper on a regular basis at the facility.

12.2 Noise

Noise monitoring surveys were conducted at the facility; see section 5.3 of this report. As all activities takes place inside the building noise levels are well within the permitted range.

12.3 Odour

All waste activities take place inside the fully enclosed building which is under negative pressure. A survey of the biofilter system was carried out it was proposed to upgrade the odour abatement system and install an acid scrubber. In 2009 the composting bays were enclosed in order to capture the process air. During 2010 installation of the acid scrubber was completed and the total upgrade was commissioned in quarter 1 of 2011. This has lead to the ammonia being removed from the processed air before entering the biofilter system and has thus enhanced the efficiency of the biofiltration system.
In February 2010 the media in biofilter 1 was removed and replaced with shredded roots and trees. This proved to be a great success. The media in biofilter 2 was replaced in February 2011 and has also proved to be a great success. This biofilter system is designed to breakdown any foul odours before it leaves the system. Daily monitoring of this system takes place and the biofilters were continuously assessed during 2011.

12.4 Litter

Daily checks are carried out on litter within and around the site boundary any litter which may escape is cleared up immediately. All waste transportation vehicles are either enclosed or have a net which covers waste, preventing littering while waste is in transit. All staff sweep and tidy picking areas constantly throughout the day and daily housekeeping checks are carried out by supervisors in all areas with random checks carried out by the site manager to ensure that these are completed. All housekeeping checks are maintained on file in the site office.

12.5 Birds

Kilmainhamwood Compost has no problems with birds at the facility. Doors at the facility are kept closed.

12.6 Vermin

Complete Pest Control are contracted to carry out pest control for the facility. This includes rodents and flies. They conduct regular checks of all bait points around the facility which effectively controls rodents at the facility, all documentation for site visits and reports are maintained on site.
Flies have not been a problem at the facility. However to ensure a fly problem never develops at the facility, Complete Pest Control carry out mitigation measures of spraying of areas where flies would most likely occur at regular intervals e.g. in the corridors.

12.6 Mud

All surfaces are hard standing and as such mud is not an issue at the facility. We also have a regular visit from Thornton's road sweeper that keeps these hard standings clean

13 Management Structure, Programme for Public Information

Programme of Public Information

Kilmainhamwood Compost operates an open door policy at the facility and has carried out tours with local representative groups, etc in 2011. The Environmental team also meet if requested, with Local representatives of the area to discuss operation of the facility and to ensure that clear channels of communication are kept open between the facility and the public for the future.

New and existing clients are brought through our waste acceptance procedures and are supplied with information by sales representatives or call centre agents in relation to what waste types we can accept at the facility. Thornton's Recycling has also upgraded its website so customers can access information such as waste collection permit numbers and waste licences etc.

All information relating to activities carried out at Kilmainhamwood Compost is maintained on site. Public information is accessible at the site at all times at the site office or at the Office of Environmental Enforcement. Detailed Communications Procedures (PM04- Communications, PM08 Complaints Procedure and EP01 – Communications Programme) has been implemented in our IMS and are used throughout the company.

Management Structure

Kilmainhamwood Compost is part of the Thornton's Recycling Group and as such has access to the Management Facilities of Thornton's Recycling. These facilities include an Environmental Department which includes Mercedes Kavanagh, David Duff and Tommy Rogers. Below is a brief outline of the management structure of the site;

Carmel Thornton Director **Paul Thornton Director** **Shane Thornton Director** **Anna Marie Thornton Director**

Gary Brady
Managing Director

Tom McDonnell
Facility Manager

Brendan Hilliard
Deputy Manager

General Operatives
(2)

The Facility Manager of Kilmainhamwood Compost is Tom Mc Donnell. Brendan Hilliard completed the course for Certificate in Compost Facility Operation is deputy manager when Tom Mc Donnell is not on site. There are two Loader Shovel Drivers, Fran Dowd and Thomas Tierney.

14 Quantity of Compost Produced 2011

The total amount of compost produced in Kilmainhamwood compost in 2011 was 6284.62 Tonnes. All compost produced met the parameters of Class II Standard.

There were five batches of compost analysed and a summary of their reports are outlined below;

Table 14.1 Summary Compost Quality Analysis 2011

Compost Record Summary 2011					
Parameters	Batch 20411A	Batch 22211A	Batch 23311A	Batch 24511A	Batch 24811A
Nutrients					
Nitrogen g/kg DM	3.08	4.4	3.85	3.85	3.33
Phosphorous mg/kg DM	6,640	7,45	5,730	5,810	5,590
Potassium mg/kg DM	17,400	12,000	13,900	12,300	14,400
Trace elements					
Cadmium mg/kg Dm	1.8	1.2	1.8	1.7	0.9
Chromium mg/kg DM	21.75	17.80	18.60	21	22.4
Mercury mg/kg DM	0.09	0.12	0.03	0.17	0.1
Lead mg/kg DM	83.50	85.2	81.20	91.8	100.4
Zinc mg/kg DM	241	288	237	261	255
Nickel mg/kg DM	21.16	23.2	21	21.5	18
Copper mg/kg DM	102	3.7	101	123	91.8
Arsenic mg/kg	7.43	4.26	6.16	4.29	7.11
Physical Contaminants					
Glass/Metal/Plastic %	0.0	0.6	0.5	0.12	0.14
Plastic %	0.1	.39	0.5	0.12	0.14
Stones % >5mm	4.0	2.10	3.2	2.78	0.83
Maturity testing					
Carbon:Nitrogen ratio	9.96	8.50	9.36	9.50	11
CO_2 evolution mgCO_2/g	-	5.55	1.44	11.80	-
Physical Characteristics					
Moisture content %	17.80	36.20	35.4	29.50	29
Organic Carbon %m/m	52.90	37.83	62.2	62.80	44.66
PH	5.9	7.2	6.1	6.3	6.85
Pathogen Testing					
Salmonella Species	Absent	Absent	Absent	Absent	**Absent**
E. coli cfu	<10	<10	<10	<10	<10
Compost Class Standard	**Class II**	**Class II**	**Class II**	**Class II**	**Class II**

AER 2011 List of Appendices

Appendix 1 – Facility Layout complete with Monitoring Locations

Appendix 2 – Weighbridge Certificate 2011

Appendix 3 – ABP Approval Certificate

Appendix 4 – Bioaerosol Impact Assessment

Appendix 5 – Progress on Objectives and Targets for 2011 and New Objectives and Targets for 2012

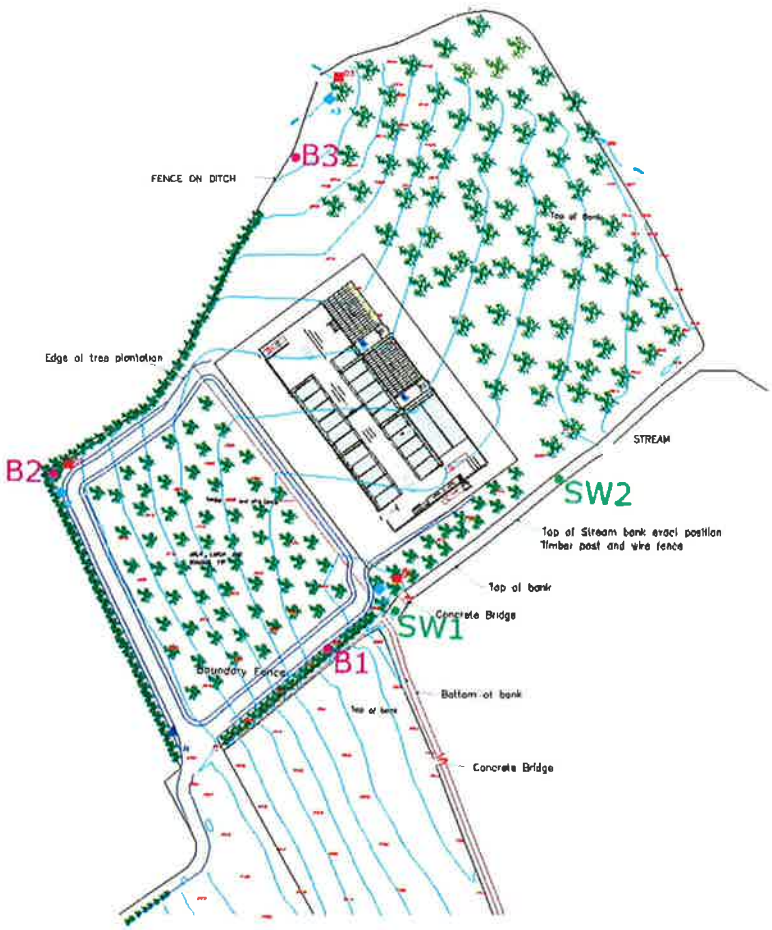
Appendix 6 – EPRTR

Appendix 1

LEGEND

- DUST MONITORING (D1, D2, D3)
- NOISE MONITORING (N)
- AIR MONITORING (A1, A2, A3)
- BOREHOLE (B1, B2, B3)
- SURFACE WATER (SW1, SW2)

N



Appendix 2

NSAI
Legal Metrology Service

NSAI ACCURACY CHECKED

Metrology Acts, 1980-1998

Certificate of Conformity

Certificate No: D/10/210

Client Name: Thornton Recycling

Address: Newcastle Kilmainhamwood, Kells, Co Meath

This is to certify that the metrological instrument described hereunder was e xaiined and tested by me on 23/09/10 and was found to be in conformity with the requirements of the Metrology Acts, 1980-1998 and that the Standards used to perform the tests are traceable to National Standards.

(NOTE: This Certificate only indicates that the instrument concerned conforms to the requirements of the Metrology Acts 1980 - 1998 and does not imply compliance with any other applicable regulations enforced by other Statutory Bodies.)

DESCRIPTION

Instrument Type: Weighbridge

Manufacturer	*Leon*
Model	*LD52xx*
Serial no.	*100427616*
Capacity	*50000 kg*
Scale Interval	*20 kg*
Type Approval No.	*DK0199.27/2*
Accuracy Class (where Applable)	*III*

Date: 08/05/10

Legal Metrology Inspector

LEGAL METROLOGY SERVICE
NSAI
08 NOV 2010
DUBLIN CENTRE

Appendix 3

Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara

Certificate of Approval

Approval under Regulation (EC) No. 1069 of 2009 of the European Parliament and of the Council and Commission Regulation (EU) No. 142/2011

Approval Number: Comp 06

The Department of Agriculture, Food and the Marine, in accordance with the provisions of the above legislation, hereby authorises:

Padraig Thornton Waste Disposal Ltd.,
T/a Thorntons Recycling Ltd.,
Unit S3B,
Parkwest Business Park,
Dublin 12.

to operate:-

Kilmainhamwood Compost located at **Ballynalurgan, Kilmainhamwood, Kells, Co. Meath as a Composting Plant**

This approval is valid from 8th October 2011 to **30th April 2012**

subject to the following conditions:-

SPECIFIC PLANT CONDITIONS:

1. The plant may accept Category 2 manure, digestive tract content separated from the digestive tract, and Category 2 and 3 milk as detailed in Regulation (EC) No. 1069/2009.

2. The plant may accept the following Category 3 material:

   - Feathers
   - Former foodstuffs of animal origin, or former foodstuffs containing products of animal origin, other than catering waste, which are no longer intended for human consumption for commercial reasons or due to problems of manufacturing or packaging defects or other defects, which do not present any risk to humans or animals,
   - Raw milk, originating from animals that do not show clinical signs of any disease communicable through that product to humans or animals
   - Fish or other sea animals, except sea mammals, caught in the open sea for the purposes of fishmeal production
   - Fresh by-products from fish from plants manufacturing fish products for human consumption
   - Shells, hatchery by-products and cracked eggs by-products originating from animals which did not show clinical signs of any disease communicable through that product to humans or animals
   - Catering waste which is defined as ' *all waste food including used cooking oil originating in restaurants, catering facilities and kitchens, including central kitchens and household kitchens.*'

3. The plant must not accept any other Animal By-Products, as defined in Regulation (EC) No. 1069/2009.

4. The plant must process the above mentioned approved Category 2 and 3 material using EU processing standards:

   (a) Maximum particle size before entering the composting reactor: 12mm
   (b) Minimum temperature in all material in the reactor: 70°C
   (c) Minimum time in the reactor at 70°C (all material): 60 minutes

5. The plant must adopt all measures necessary to comply with the requirements of Regulation (EC) No 1069/2009 and carry out its own checks as provided for under Article 28 of this Regulation. The plant HACCP plan must be implemented and must be updated as required under Article 29 of this Regulation.

6. Unless otherwise directed by the Department of Agriculture, Food and the Marine (DAFM), every batch of material, immediately after processing must be sampled for E-coli. Every batch of end product must be sampled for Salmonella. Batches for Salmonella testing may comprise of up to one month's production of compost. Microbiological analysis must be carried out at a DAFM approved laboratory. In the event of a sample failure, DAFM must be notified immediately.

7. The plant must adopt all measures necessary to comply with the requirements of Regulations (EC) 1069/2009 and 142/2011and carry out its own checks as provided for under **Articles 28 and 29** of this Regulation. The plant HACCP plan must be implemented and must be updated as required.

8. The plant, must ensure that wastewater from the plant is treated in accordance with all other relevant Community legislation.

GENERAL CONDITIONS

1. The plant must be operated in full compliance and meet the requirements of Regulation (EC) No. 1069/2009, Commission Regulation (EU) No. 142/2011and all other relevant legislation.

2. Plant management must ensure that all necessary conditions as outlined in the attached document: *"Conditions for approval and operation of composting plants treating animal by-products in Ireland" dated 27th March 2009* are complied with. These conditions may be subject to change.

3. All ABP material accepted into this plant must be processed unless otherwise agreed by DAFM.

4. Sale or supply of fertiliser or soil improvers must be in accordance with S.I. No. 253 of 2008, Regulation (EC) No. 1069/2009, Commission Regulation (EU) No. 142/2011 and 'the Conditions for approval and operation of composting plants treating animal by-products in Ireland'.

5. DAFM must be notified immediately of any changes in the registered company name or in plant management.

Please note that failure to comply with these conditions may result in enforcement proceedings or the suspension or withdrawal of your approval.

Dated this 21 day of October 2011

For the Minister for Agriculture, Food and the Marine

Mairéad Broderick

Mairéad Broderick
An Officer authorised in that behalf by the said Minister.

Appendix 4

ODOUR & ENVIRONMENTAL ENGINEERING CONSULTANTS

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BIOAEROSOL IMPACT ASSESSMENT AT KILMAINHAMWOOD COMPOST, NOBBER, CO. MEATH

PERFORMED BY ODOUR MONITORING IRELAND ON BAHALF OF KILMAINHAMWOOD COMPOSTING LTD

PREPARED BY:	Dr. Brian Sheridan
ATTENTION:	Mr. Tom McDonnell
DATE:	12th March 2012
REPORT NUMBER:	2012141(1)
DOCUMENT VERSION:	Version 1
REVIEWERS:	

TABLE OF CONTENTS

Document Amendment Record

Client: ***Kilmainhamwood Compost Ltd***

Title: Bioaerosol Impact Assessment at Kilmainhamwood Compost Ltd, Nobber, Co. Meath

Project Number: 2012141(1)			**Document Reference:** Bioaerosol Impact Assessment at Kilmainhamwood Compost Ltd, Nobber, Co. Meath		
2012141(1)	Document for review	B.A.S.	JMC	B.A.S	12/03/2012
Revision	**Purpose/Description**	**Originated**	**Checked**	**Authorised**	**Date**

1. Introduction

Odour Monitoring Ireland was commissioned to perform a bioaerosol assessment in the vicinity of Kilmainhamwood Compost, Nobber, Co. Meath. The bioaerosol assessment was carried out in accordance with the guidance document established by the UK Composting Association "Standardised protocol for the testing and enumeration of micro organisms". Total Mesophillic bacteria and Aspergillus *fumigatus* sampling was performed using equivalent Andersen single stage impactors. Triplicate sampling and plates / impactor blanks were performed at each of the three identified sampling locations within the vicinity of Kilmainhamwood Compost facility located at Nobber, Co. Meath.

The bioaerosol concentration levels were determined at each sampling location in triplicate. Three sampling locations were chosen including Loc 1, Loc 2 and Loc 3. Currently, there are no significant bioaerosol impacts in the vicinity of Kilmainhamwood Composting facility located at Nobber, Co. Meath with all reported bioaerosol ambient air concentrations lower than the guideline assessment criteria range for the operating facility.

1.1 Scope of the study

The main aims of the study were:

- To enumerate the ambient air concentration of two bioaerosols groups namely: Aspergillus *fumigatus* and Total Mesophillic bacteria during operation of the composting facility at Nobber, Co. Meath. These are the two most frequently requested bioaerosols to be monitored for composting plants.

2. Materials and methods

This section describes in detail the materials and methods used throughout the study period. Monitoring was carried out on the 18th December 2011 between the hours of 9.30AM and 13.30PM.

2.1 Sampling locations

Figure 5.1 and *Table 2.1* illustrates the sample location in the vicinity of the site. Sample locations were predominately chosen on the basis of meteorological conditions on the day of the survey whereby one upwind location and two downwind locations were chosen to determine the bioaerosol concentration levels in the vicinity of the facility.

Table 2.1. Monitoring locations and parameters monitored.

Location ID	Parameter monitored	Location details
Loc 1	Total Mesophillic bacteria and Aspergillus fumigatus	Upwind of site at boundary
Loc 2	Total Mesophillic bacteria and Aspergillus fumigatus	Downwind of site on boundary
Loc 3	Total Mesophillic bacteria and Aspergillus fumigatus	Downwind of site on boundary

2.2 Meteorological data

Table 2.2 illustrates the average wind direction during over the monitoring period. Average wind speed was low breeze. Cloud cover was high with an octave rating of 3 to 4 (i.e. on an 8 point scale). Barometric pressure was approximately 999 mbar. Relative humidity was high with an average reading of 89% while temperature was low with a value of 6.90 degrees Celsius recorded. This would be typical for this time period of the year in Eastern Ireland.

Table 2.2 Meteorological conditions during the monitoring period.

Parameter	Day 1-18th Dec 2011
Wind direction (From)	ESE
Wind speed (m s^{-1})	3.10
Cloud cover (Octaves)	3 to 4
Barometric pressure	999
Temperature (^{0}C)	6.90
Relative humidity (%)	89
Rainfall (mm)	0

2.3 Bioaerosols monitoring

Monitoring of bioaerosols was performed in strict accordance with available information and advice including the sources:

1. Standardised Protocol for the Sampling and Enumeration of Airborne Micro-organisms at Composting Facilities. (1999). The UK Composting Association.

2. Macher, J. (1999). Bioaerosol assessment and control. American Conference of Government Industrial Hygienists, Kemper Woods Centre, 1330 Kemper Meadow Drive, Cincinnati, OH.
3. Direct Laboratories, (formerly ADAS), Woodthorne, Wergs Road, Wolverhampton, WV6 8QT.
4. SKC Inc, 863 Valley View Road, Eighty-four, PA, 15330.

Impactor plate sampling was carried out in accordance with the document "Sampling Protocol for the Sampling and Enumeration of Airborne Micro-organisms at Composting facilities, The Composting Association, UK.

One sampling technique was employed namely:

- Biostage single stage 400 hole impactor (SKC Inc, PA)- This is directly equivalent to the Andersen N6 single stage impactor and meets the requirements of NIOSH 0800 and NIOSH 0801 biological sampling standards (i.e. this impactor is a direct copy of the Andersen N6 impactor with added benefits including the Surelok system which prevents any air leakages. This was an inherent problem of the Andersen N6 single stage impactor).

Generally, sampling times of 10 to 15 minutes were used to assess ambient background levels using the impactor plates as longer sampling times can lead to desiccation of the plate and impacted microbes. Sampling times of 10 minutes were used for the duration of this study.

The Biostage (i.e. Andersen N 6 equivalent impactor) was calibrated using a Bios Primary flow calibrator to a volumetric flow rate of 28.3 *litres* min^{-1} and Hi Flow 30 battery operated automatically timed pumps were used for suction airflow.

The Biostage impactors were fixed to tripods ensuring an adjustable sampling height of between 1.0 to 1.90 metres. The sampling height was fixed at 1.50 metres. Two Biostage impactors were used throughout the study period. The use of correctly designed sampling equipment ensured correct operation at all times throughout the study period.

The Irish Equine Centre (ISO 17025 accredited) tested two medias including Malt Extract Agar media (MEA) for Aspergillus *fumigatus*, and standard plate count agar (TVC) for total Mesophillic bacteria. MEA media facilitates the sporulation of Aspergillus *fumigatus*, which is used to identify the species. Sterile fresh 90mm plates were supplied by Fannin Healthcare accredited laboratory services and placed in sealed coolers. Fresh plates were used to eliminate the formation of a skin upon the plate upper surface (i.e. develops with age). It was thought that this may cause problems while using an impaction method (i.e. particle bounce off).

2.4. Transport of bioaerosol samples

All sampling plates during monitoring were allowed to equilibrate to ambient temperature before sampling. This allowed for the development of less harsh conditions upon impacted bioaerosols. It was also noticed that cooled plates (approximately 5^0C) formed an outer "skin" which could facilitate particle bounce. Following equilibration, it was apparent from observation, better "knitting" of impactor plates occurred. Before each sampling event, the Biostage impactors were sterilised using cotton wool and 70% iso-proponal. The impactors were autoclaved for complete sterilisation before sampling. Once sampled, all agar plates were inverted, sealed with parafilm, placed within a flexible plastic container, and neatly stacked within a mobile cooler for delivery to Irish Equine Centre laboratory located in Kill, Co. Kildare. Once received, they were incubated at the appropriate temperatures of 30^0C for Total viable counts (i.e. Mesophillic bacteria) and 37^0C for Aspergillus *fumigatus* by the laboratory technician. Results were received within 10 to 15 working days following sampling.

2.5 Bioaerosol assessment criteria

Table 2.3 illustrates the assessment criteria to be used for comparison of results during operations to ascertain ambient air quality in the vicinity of the Kilmainhamwood Composting facility located at Nobber, Co. Meath.

Table 2.3. Assessment criteria for the ambient bioaerosol air quality in the vicinity of Kilmainhamwood Composting facility.

Assessment criteria	Reference concentration range	Notes	Reference
Total fungi (includes Aspergillus *fumigatus*)[1]	1000 to 5,000 CFU m^{-3}	Environment Agency proposed concentration level, Reported concentration range in Swan, 2003 & Sheridan et al., 2004	McNeel et al., 1999 Wheeler et al., 2001, Swan et al., 2003 Sheridan et al., 2004
Mesophillic bacteria[1]	5,000 to 10,000 CFU m^{-3}	Environment Agency proposed concentration level, Reported concentration range in Swan, 2003 and Sheridan et al., 2004	Gorny and Dutkiewicz (2002) Wheeler et al., 2001 Swan et al., 2003 Dutch Occupational Health Association NWA 1989. Sheridan et al., 2004

Notes: [1] denotes the values of CFU m^{-3} refers to Colony Forming Unit per cubic metre of air sampled.

3. Results

3.1 Ambient Bioaerosol air quality

Table 3.1 illustrates the results from bioaerosol air quality monitoring. Both Aspergillus *fumigatus* and Total Mesophillic bacteria were assessed on the day of sampling namely 18th Dec 2011.

Table 3.1. Bioaerosols concentration levels in the vicinity of the Kilmainhamwood facility on 18th Dec 2011.

Location ID	Average Aspergillus *fumigatus* concentration (CFU m^{-3})[1]	Average Mesophillic bacteria concentration (CFU m^{-3})[1]	Sample count[2]
Loc 1	<7	21	3 ea.
Loc 2	96	330	3 ea.
Loc 3	109	428	3 ea.

Notes: [1] denotes a total of 6 blanks (3 plate and 3 impactor blanks for the monitored bioaerosol) were incorporated into the sampling exercise. All blanks were negative CFU m^{-3}.
[2] denote total number of sample counts for each parameter monitored at each location. The total number of sample plates was 30 plates.

Table 3.1 illustrates the ambient bioaerosol air quality within and in the vicinity of the Kilmainhamwood composting facility. As can be observed, Aspergillus *fumigatus* concentrations are low but incresed downwind of the facility biofilter. Total Mesophillic bacteria concentration levels at monitored location Loc 2 and Loc 3 were raised in comparison to monitoring location 1. International literature suggests that bioaerosol concentrations greatly dissipate with distance from the source (i.e. within 80 to 200 metres).

Following a review of literature, it is reported that concentration levels of bioaerosols in ambient environment range from 0 to 400 CFU m^{-3} for Aspergillus *fumigatus*, 0 to 15,673 CFU m^{-3} for Total fungi and 79 to 3204 CFU m^{-3} for Total bacteria. The data set measured is within the lower end of this range. Background monitoring of bioaerosols is important due to the complexities in monitoring once a facility is in operation. The main reasons for background monitoring include:

- Microbes are ubiquitous in the environment and air or surface samples will always contain some bacteria or fungi.
- Microbes grow and are released at irregular intervals and depend on some sort of air turbulence to be transported from their original source.
- Bioaerosols vary greatly in size and therefore some remain in ambient air for longer periods of time in comparison to larger, heavier particles that fall quickly to the ground. This is explained with Stokes law.
- Meteorological factors such as relative humidity, temperature and wind speed greatly effect ambient air concentrations.
- Due to the variety of size and sensitivity, the sampling methodology will greatly affect the measured concentration.
- Seasonal effects can increase of decrease ambient bioaerosol concentrations.

In accordance with the assessment criteria reported in *Table 2.3*, bioaerosols concentrations are within the lower ambient air concentration range for Aspergillus fumigatus and Total Mesophillic bacteria on the day of monitoring.

4. Conclusions

The following conclusions may be drawn from the study;

1. The bioaerosol concentration levels were determined at each sampling location in triplicate. Three sampling locations were chosen including Loc 1, Loc 2 and Loc 3.
2. Currently, there are no significant bioaerosol impacts in the vicinity of Kilmainhamwood Composting facility located at Nobber, Co. Meath with all reported bioaerosol ambient air concentrations lower than the guideline assessment criteria range for the operating facility.

5. *Appendix I*- Monitoring locations

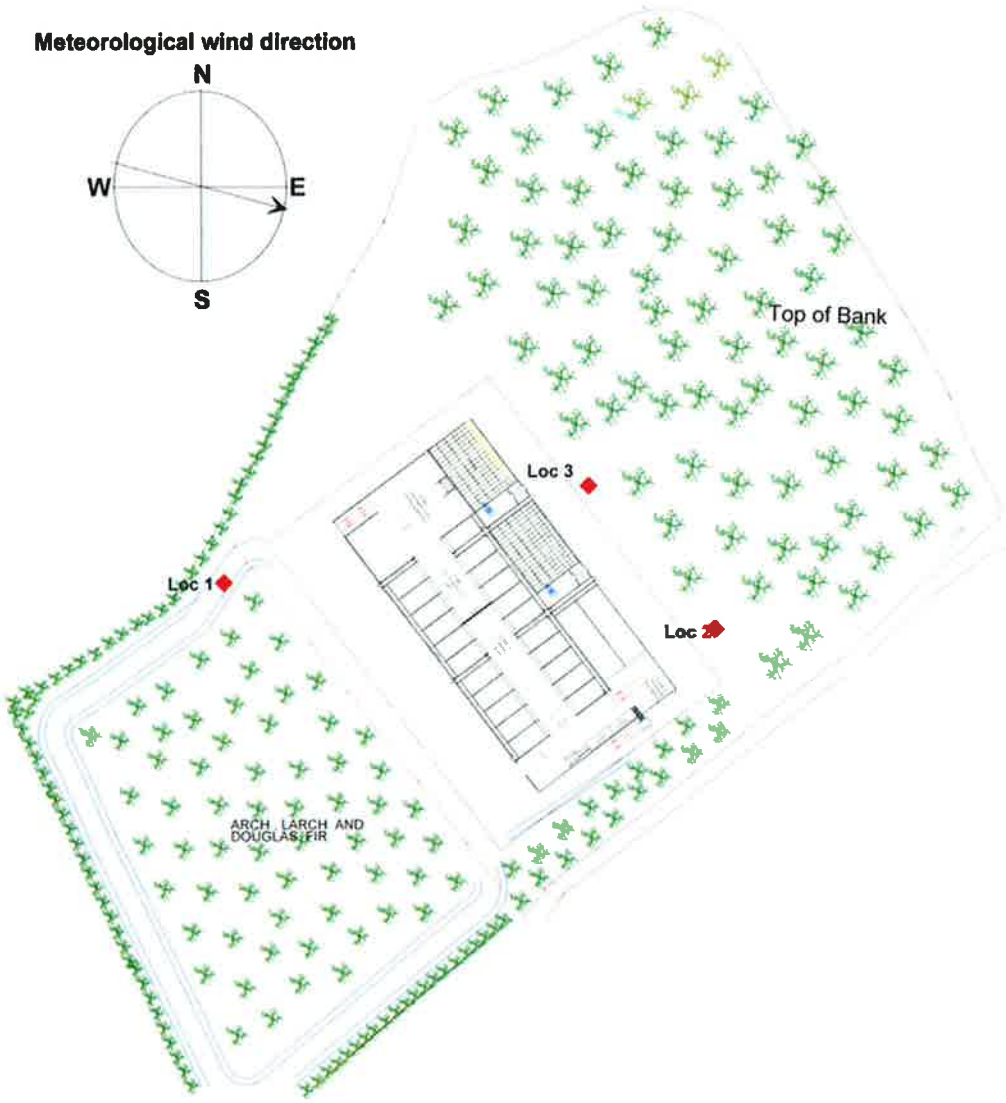

Figure 5.1. Schematic overview of Bioaerosol monitoring locations and wind direction on the day of monitoring.

Appendix 5

PM03- F01 Management Programme 2011

COMPLETED		CARRIED FORWARD FROM 2010			ON HOLD			
Ref Number	**Date**	**Type**	**Objective and Target**	**Location**	**Responsibility**	**Method**	**Time Frame**	**Status**
EP 01	Jan '09	Environmental	Site Expansion to 40,000 tonnes	Kilmainhamwood	TMCD/MK	1. MCC planning received Feb 2010 2. ABP Appeal lodged March 2010 3..Lodged licence with EPA in May 2010 4. Received full planning from An Bord Pleanala Jan 2011	Jun-12	**Started - Work in Progress**. Planning received Feb '10. ABP appeal completed. Licence lodge end May '10. ABP planning received Jan 2011. Awaiting decision from EPA with regards to license review . Full Planning Received in Feb 2011. Licence update with EPA is that we will not receive licence until 2012 due to back log in Licensing division in Wexford. MK
EP 02	Jan '09	Environmental	Upgrade of odour system and installation of an acid scrubber to improve efficiencies - Investigate possibility of scrubber etc	Kilmainhamwood	TMCD	1. Simeadean Appointed	Feb-11	Simeadean appointed commissioning and handover completed in Feb 2011. Completed 01/02/2011
EP 18	Oct-11	Environmental	Carry out an energy audit for Kilaminahamwood and determine the energy split on site between lights and plant	Kilmainhamwood	TMCD/DD	1. On site assessment to be carried out 2. Determine operating hours and levels of lumination on site 3. Complete report and submit to site management to review	Oct-11	Completed - One site assement completed and report forwarded to Tom McDonnel, Facility Mamager in Late October with site energy usage and recommendations

PM03- F01 Management Programme 2012

COMPLETED | CARRIED FORWARD FROM 2011

Ref Number	Date	Type	Objective and Target	Location	Responsibility	Method	Time Frame	Status
ENVIRONMENTAL								
EP 01	Dec-11	Environmental	Site Expansion to 40,000 tonnes	Kilmainhamwood	TMCD/MK	1. MCC planning received Feb 2010 2. ABP Appeal lodged March 2010 3. Lodged licence with EPA in May 2010 4. Received full planning from An Bord Pleanala Jan 2011	Jun-12	**Started - Work in Progress.** Planning received Feb '10. ABP appeal completed. Licence lodge end May '10. ABP planning received Jan 2011. Awaiting decision from EPA with regards to license review . Full Planning Received in Feb 2011. Licence update with EPA is that we will not receive licence until 2012 due to back log in Licensing division in Wexford. **AWAIT DECISION**
EP 02	Jan-12	Environmental	Site Expansion to 40,000 tonnes - Tender for suitable Project Team to carry out the extension build as per planning requirements	Kilmainhamwood	TMCD	1. Invitation to tender template to be designed for specification of build as per planning conditions 2. Invitation to be sent to at leaste four parties to quote for complete scope of works 3. Assess quotations and select suitable third party	Jun-12	**Work In Progress -** Drawings and tender completed in Jan 2012
EP 03	Jan-12	Environmental	Carry out specific recommendations in relation to lighting as per energy audit carried out in 2011	Kilmainhamwood	TMCD	1. On site light assessment completed, levels of lumination determined on site. 2. Assess what is available in market place for composting environments 3. Investigate the use of low energy LED ullumination 4. Determine suitable lumination and contract third party to install	Mar-12	**Work In Progress** - Project Started Jan 2012
EP 04	Jan-12	Environmental	Complete ISO certificaation audit in 2012	Kilmainhamwood	TMCD	1. Review system to ensure all in order as per certification requirements before audit in 2012	Dec-12	**Work In Progress -** IMS progress ongoing
EP 05	Jan-12	Environmental	Add value to end product	Kilmainhamwood	TMCD	1. Investigate new potential markets for end product 2. Look at possibility of bagging plant on site, review equipment required for same	Dec-12	**Not Started -** Awaiting extension

Appendix 6

Environmental Protection Agency

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.13

REFERENCE YEAR	2011

1. FACILITY IDENTIFICATION

Parent Company Name	Padraig Thornton Waste Disposal Limited
Facility Name	Kilmainhamwood Compost
PRTR Identification Number	W0195
Licence Number	W0195-01

Waste or IPPC Classes of Activity

No.	class_name
4.2	Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).
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.
3.6	The roasting, sintering or calcining of metallic ores in plants with a capacity exceeding 1,000 tonnes per year.
4.13	Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.
Address 1	Ballynalurgan
Address 2	Kilmainhamwood
Address 3	Kells
Address 4	Co Meath
	Meath
Country	Ireland
Coordinates of Location	-6.78888 53.8686
River Basin District	GBNIIENB
NACE Code	3832
Main Economic Activity	Recovery of sorted materials
AER Returns Contact Name	Tom McDonnell (W0195)
AER Returns Contact Email Address	Tom@thorntons-recycling.ie
AER Returns Contact Position	Facility Manager
AER Returns Contact Telephone Number	0868563431
AER Returns Contact Mobile Phone Number	0868563431
AER Returns Contact Fax Number	n/a
Production Volume	20800.0
Production Volume Units	Tonnes
Number of Installations	1
Number of Operating Hours in Year	2720
Number of Employees	4
User Feedback/Comments	There are no sewer emissions from the facility and the stream surface water is monitoried upstream and downstream as per the faciltiy licence. The treatment and transfers tab is largely a duplication of the WTS report submitted to the EPA.
Web Address	www.thorntons-recycling.ie

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?	
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					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
					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 AIR					Please enter all quantities in this section in KGs					
POLLUTANT		METHOD						QUANTITY		
			Method Used		DA	DB	DC			
Pollutant No	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
210	Dust	M	OTH	Standard Method	0.0373	0.045	0.0371	0.1194	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:
Please enter summary data on the quantities of methane flared and / or utilised

Kilmainhamwood Compost

	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m3 per hour	
Total estimated methane generation (as per site model)	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

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwat

RELEASES TO WATERS				
POLLUTANT			Method Used	
No. Annex II	Name	M/C/E	Method Code	Designation or Description

* 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				
POLLUTANT			Method Used	
No. Annex II	Name	M/C/E	Method Code	Designation or Description

* 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				
POLLUTANT			Method Used	
Pollutant No.	Name	M/C/E	Method Code	Designation or Description

* 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	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 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

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# W0195 | Facility Name Kilmainhamwood Compost | Filename W0195_2011_Kilmainhamwood.xls | Return Year 2011 |

Please enter all quantities on this sheet in Tonnes

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	19 05 01	No	1377.09	non-composted fraction of municipal and similar wastes	D5	M	Weighed	Offsite in Ireland	Bord na Mona Drehid Landfill,W0201-01	Drehid,.,Co. Kildare,.,Ireland		
Within the Country	19 05 01	No	900.42	non-composted fraction of municipal and similar wastes	D5	M	Weighed	Offsite in Ireland	Knockharley Landfill,W0146-01	Kentstown,.,Co. Meath,.,Ireland		
Within the Country	20 03 07	No	24.36	bulky waste	R13	M	Weighed	Offsite in Ireland	PTWDL T/A Thorntons Recycling Killeen Road,W0044-02	Killeen Road,Ballyfermot,Dublin,10,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