Padraig Thornton Waste Disposal Ltd

Kilmainhamwood Compost

Waste Licence Reg. No. W0195-01

Annual Environmental Report 2012
Submitted March 2013

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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 2012.

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;

Thorntons Recycling Head Office
Unit S3B Henry Road
Park West Business Park
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Site Contact: Tom McDonnell
Mobile: 086-8563431

1.2 Reporting Period

The reporting period for this Annual Environment Report (AER) is between the 01/01/2012 to the 31/12/2012.

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 certified by Percia Molen in June 2012 and 31st January 2013. A copy of the service reports is available within Appendix 2. These prove that seal was not broken on the weighbridge and bridge was certified.

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

3.1 Waste Handled in Kilmainhamwood Compost

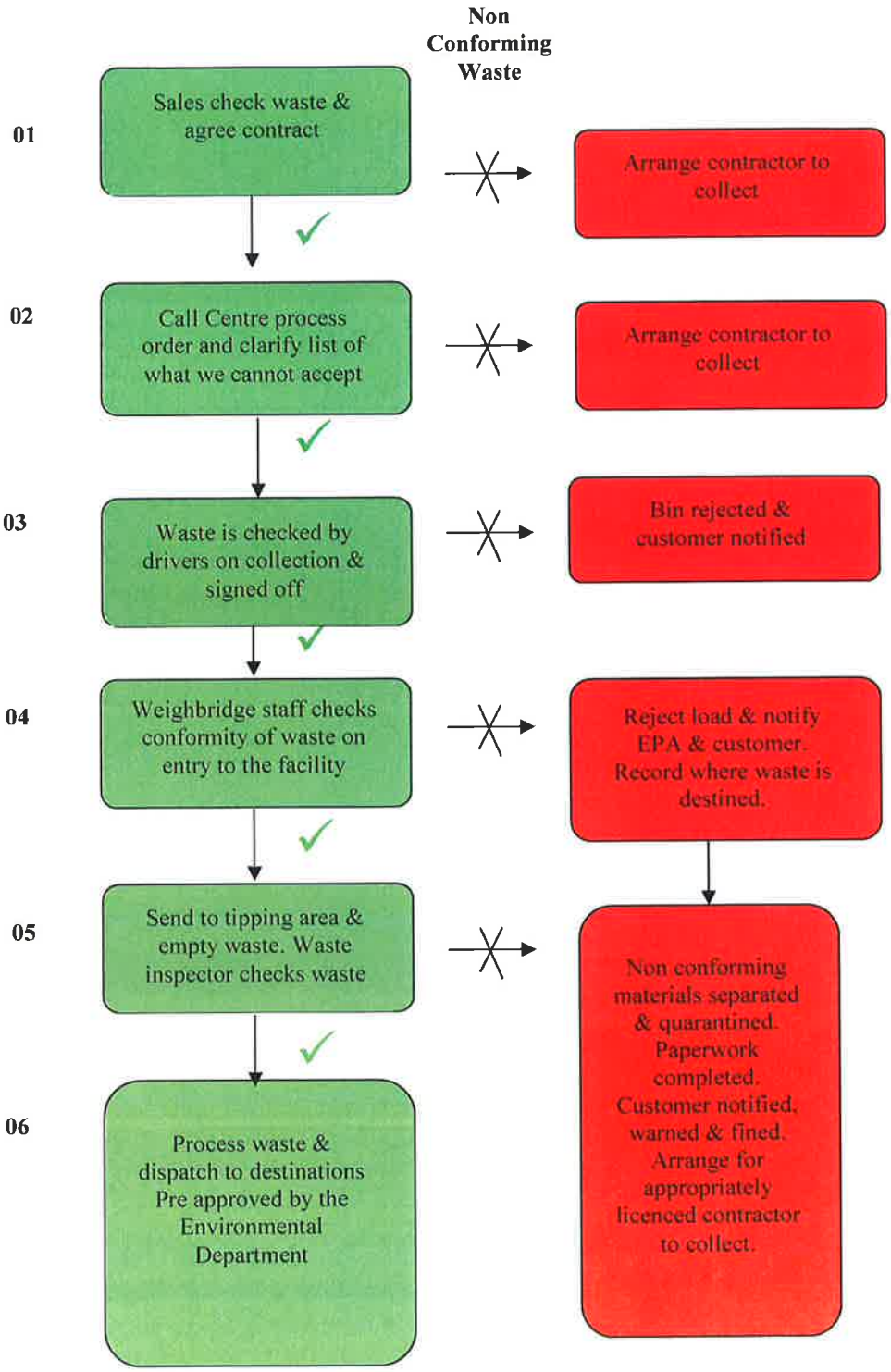
All waste is checked and documented at the weighbridge in accordance with our waste licence and our waste acceptance procedures as detailed in section 2.2. Waste is then inspected, processed and placed into our production system. The composting process takes up to 8 weeks to produce mature compost.

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 3rd December 2012. 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 31,382.87 tonnes of waste for composting was accepted at the facility in the reporting period from 1st January 2012 to 31st December 2012.

Table 3.3.1 Quantity and Composition of Waste Received 2010-2012

EWC Code	Materials Received	2010	2011	2012
19 08 05	Sludge Urban Waste Water	1.12	-	-
02 02 04	Sludge Food Prep Animal Origin	1023.82	833.60	-
20 01 25	Grease Trap Waste	760.36	823.66	798.45
02 03 04	Unsuitable food waste	51.30	9.12	20.50
20 01 08	Compostable Food Waste	18768.67	25011.96	26659.86
02 07 04	Unsuitable Alcohol/Liquid	-	-	-
02 06 01	Bakers Waste	12.36	-	-
03 01 05	Wood/ Sawdust	-	10.50	16.42
02 05 02	Sludge Dairy Industry	-	-	1027.39
20 02 01	Green Waste	-	-	56.78
02 01 01	Sludge Agriculture Washing	48.84	-	-
02 01 06	Sludge Textile Industrial	149.18	201.10	170.36
20 01 08	Compostable Food Waste (Commercial)	-	-	2633.11
	TOTAL TONNAGE	20, 815.65	26,889.94	31382.87

3.4 Waste Disposed

Of the total 31,382.87 tonnes accepted at the facility for composting in 2012 2,487.36 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 2012 7,920.41 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 (1,220,840), 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 2010, an estimated 1,817,983 tonnes of biodegradable municipal waste was generated in Ireland in 2010.

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, 26,889.94 tonnes in 2011 and 31,383 tonnes in 2012 of biodegradable waste from landfill for composting. Since its establishment in 2006 the facility has diverted successfully some 142,935 tonnes of biodegradable material away from landfill and produces an excellent resource in the form of compost.This material would have historically gone for disposal to licensed landfills. It is hoped that in 2013 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 2012. The following section details results obtained and interpretations of results.

5.1 Total Dust Deposition 2012

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 2012 as follows; quarter 1 W0195-01/12/TMD/09.1 10th May 2012, quarter 2 W0195-01/12/TMD/14 27th July 2012, quarter 3 W0195-01/12/TMD/21 19th November, W0195-01/12/TMD/25 22nd January 2012

Table 5.1 Average ambient Total dust deposition concentrations at three monitoring locations at the Kilmainhamwood Compost 2012

Dust Location	Units	Q1 2012	Q2 2012	Q3 2012	Q4 2012
DA	mg/m2/day	111	144	133	89
DB	mg/m2/day	84	156	201	121
DC	mg/m2/day	106	139	188	94

5.2 Noise Monitoring 2012

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 2012

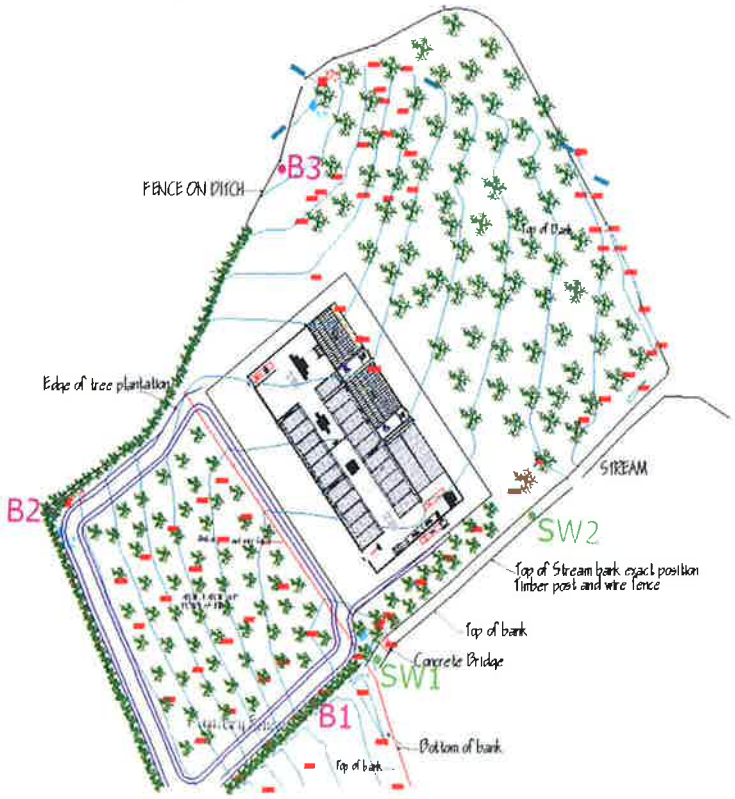
Noise Location	Time	unit	FEB 12	MAY 12	AUG 12	DEC 12
	Day	Leq	45.8	44.8	44.5	43.4
	Day	L10	52.0	50.8	40.3	49.86
N1	Day	L90	40.6	40.3	27.9	39.6
	Night	Leq	37.1	38.0	34.7	33.9
	Night	L10	45.4	44.2	37.7	43.1
	Night	L90	35.1	35.6	29.1	34.2

Quarterly Noise reports were submitted to the EPA as follows; quarter 1 W0195-01/12/TMD/09 24th April 2012, quarter 2 W0195-01/12/TMD/10 14th May 2012, quarter 3 W0195-01/12/TMD/20 5th October 2012 and quarter 4 W0195-01/13/TMD/04 January 2013

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 in July 2012 W0195-01/12/TMD/13 and in January 2013 W0195-01/13/TMD/22. 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**	**26/05/2011**	**13/12/2011**	**13/07/12**	**19/11/12**
FIELD ANALYSIS						
General Water Quality Parameters	**mAoD(malin)**		80.81m	80.81m	80.81	80.81
Colour	-	No abnormal change				
Conductivity @ 25°C	**uS/cm**	1,000				
Odour	-					
pH	**pH Units**	6.5-9.5	7.3	7.3	7.5	7.4
Temperature	**deg C**	25		-		
Ground Water Level	**M**		63.31	64.01	63.83	63.71
LABORATORY ANALYSIS						
General Water Quality Parameters						
pH	**pH Units**	6.5-9.5	7.3	7.3	7.5	7.4
Inorganics						
Ammonia	**NH_4 mg/l**	<0.15	<0.01	0.015	<0.01	<0.01
Calcium	**Ca mg/l**	200	-	96.93	-	105.2
Chloride	**Cl mg/l**	30	24	16.9	21	18
Nitrate	**$N0_3$ mg/l**	25	-	<0.272	-	0.22
Phosphorous	**P mg/l**		-	0.144	-	0.043
Potassium	**K mg/l**	5	-	5.124	-	5.811
Ortho Phosphate	**PO_4 mg/l**	0.03	-	0.07	-	0.04
Sodium	**Na mg/l**	150	-	18.78	-	28.87
Sulphate	**SO_4 mg/l**	200	230	165.79	641.61	171.5
Metals						
Boron	**B mg/l**	1	-	0.1321	-	0.08814
Cadmium	**Cd mg/l**	0.005	-	<0.00009	-	<0000.9
Chromium (Total)	**Cr mg/l**	0.03	-	0.0024	-	<0.0024
Copper	**Cu mg/l**	0.03	-	0.007415	-	0.000995
Iron	**Fe mg/l**	0.2	-	0.1454	-	0.1806
Lead	**Pb mg/l**	0.01	-	0.02757	-	0.003386
Magnesium	**Mg mg/l**	50	-	26.68	-	38.86
Manganese	**Mn mg/l**	0.05	-		-	0.158
Nickel	**Ni mg/l**	0.02	-	0.0029	-	0.002224
Zinc	**Zn mg/l**	0.01	-	0.3722	-	0.1245
Bacteria						
Feacal Coliforms	**cfu/100ml**	0.00	-	270	-	6
Total Coliforms	**cfu/100ml**	0.00	-	286	-	100
List I/II					-	
Volatile Organic Compounds	**mg/l**		---	<0.001	-	<0.001
Semivolatiles	**mg/l**		--	<0.001	-	<0.0005
Pesticides	**mg/l**		-	<0.00001	-	<0.0001

Table 5.3.3

MONITORING WELL B2: Chemical Analysis of Groundwater.						
PARAMETERS	**UNIT**	**Limit**	**29/06/2011**	**13/12/2011**	**13/07/2012**	**19/11/2012**
FIELD ANALYSIS						
	mAoD(malin)		**86.93m**	**86.93m**	**86.93**	**86.93**
General Water Quality Parameters						
Colour	-	No abnormal change				
Conductivity @ 25°C	**uS/cm**	1,000				
Odour	-					
pH	**pH Units**	6.5-9.5	7.1	7.2	7.2	7.2
Temperature	**deg C**	25				
Ground Water Level	**M**		64.43	64.63	64.73	64.86
LABORATORY ANALYSIS						
General Water Quality Parameters						
pH	**pH Units**	6.5-9.5	7.1	7.2	7.2	7.2
Inorganics						
Ammonia	**NH_4 mg/l**	<0.15	<0.01	0.1285	<0.01	<0.01
Calcium	**Ca mg/l**	200	-	104	-	127
Chloride	**Cl mg/l**	30	14	13.26	13	13.94
Nitrate	**NH_3 mg/l**	25	-	<0.272	-	<0.110
Phosphorous	**P mg/l**		-	0.048	-	<0.024
Potassium	**K mg/l**	5	-	1.8174	-	2.805
Ortho Phosphate	**PO_4 mg/l**	0.03	-	<0.005	-	0.01
Sodium	**Na mg/l**	150	-	29.55	-	42.71
Sulphate	**SO_4 mg/l**	200	325	166.51	178.73	259.06
Metals						
Boron	**B mg/l**	1	-	0.0347	-	0.06888
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	-	0.004399	-	0.000228
Iron	**Fe mg/l**	0.2	-	0.3108	-	0.006903
Lead	**Pb mg/l**	0.01	-	0.009173	-	0.000141
Magnesium	**Mg mg/l**	50	-	28.07	-	45.04
Manganese	**Mn mg/l**	0.05	-		-	0.3387
Nickel	**Ni mg/l**	0.02	-	0.000599	-	0.000273
Zinc	**Zn mg/l**	0.01	-	0.001532	-	0.03372
Bacteria						
Feacal Coliforms	**cfu/100ml**	0.00	-	4	-	14
Total Coliforms	**cfu/100ml**	0.00	-	510	-	100
List I/II						
Volatile Organic Compounds	**mg/l**		-	<0.001	-	<0.001
Semivolatiles	**mg/l**		-	<0.001	-	<0.0005
Pesticides	**mg/l**		-	<0.00001	-	<0.0001

Table 5.3.4

MONITORING WELL B3: Chemical Analysis of Groundwater.						
PARAMETERS	UNIT	Limit	26/05/2011	13/12/2011	13/07/2012	19/11/2012
FIELD ANALYSIS						
General Water Quality Parameters	mAoD(malin)				86.51	86.51
Colour	-	No abnormal change		-		
Conductivity @ 25°C	uS/cm	1,000		-		
Odour	-			-		
pH	pH Units	6.5-9.5	7.5	-	7.3	7.4
Temperature	deg C	25		-		
Ground Water Level	M		72.51	77.01	68.41	69.91
LABORATORY ANALYSIS						
General Water Quality Parameters						
pH	pH Units	6.5-9.5	7.5	7.3	7.3	7.4
Inorganics						
Ammonia	NH_4 mg/l	<0.15	<0.01	<0.01	<0.01	<0.01
Calcium	Ca mg/l	200	-	88.86	-	94.59
Chloride	Cl mg/l	30	16	14.74	12	14.28
Nitrate	NH_3 mg/l	25	-	0.57	-	0.56
Phosphorous	P mg/l		-	0.028	-	0.038
Potassium	K mg/l	5	-	2.048	-	2.581
Ortho Phosphate	PO_4 mg/l	0.03	-	0.028	-	0.033
Sodium	Na mg/l	150	-	13.91	-	17.03
Sulphate	SO_4 mg/l	200	122	113.80	127.41	118.42
Metals						
Boron	B mg/l	1	-	0.02889	-	0.06207
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	-	0.000221
Iron	Fe mg/l	0.2	-	0.003956	-	0.1243
Lead	Pb mg/l	0.01	-	<0.00002	-	0.000129
Magnesium	Mg mg/l	50	-	19.2	-	20.96
Manganese	Mn mg/l	0.05	-		-	0.04571
Nickel	Ni mg/l	0.02	-	<0.00014	-	0.000318
Zinc	Zn mg/l	0.01	-	0.00041	-	0.009455
Bacteria						
Feacal Coliforms	cfu/100ml	0.00	-	**0**	-	**0**
Total Coliforms	cfu/100ml	0.00	-	**0**	-	**0**
List I/II Volatile Organic Compounds	mg/l		-	**<0.001**	-	**<0.001**
Semivolatiles	mg/l		-	**<0.001**	-	**<0.0005**
Pesticides	mg/l		-	**<0.0001**	-	**<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 2012 as follows. W0195-01/12/TMD/07 9th April 2012, W0195-01/12/TMD/11 9th July 2012, W0195-01/12/TMD/18 1st October 2012 and W0195-01/12/TMD/23 7 7th January 2013

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 2012.

Table 5.3.5: SW1 Results

Surface Water Monitoring Location SW1: Chemical Analysis

			2012	2012	2012	2012
PARAMETERS	UNIT	Limit	9/03/2012	13/06/2012	3/09/2012	3/12/2012
Notes						
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
Temperature	deg C	<21.5	7.4	11.6	12.4	8.2
LABORATORY ANALYSIS						
General Water Quality Parameters						
Total Suspended Solids	mg/l	<25	3	2.5	5.5	2.5
Mineral Oils	mg/l	<5	<0.01	<0.01	<0.01	<0.01
pH	pH Units	>6- <9	7.71	7.27	7.25	7.44
Inorganics						
Total Ammonia	NH_4 mg/l	<1	0.212	<0.3	<0.2	<0.2
Chloride	Cl mg/l		15.1	11.1	10.9	12.2

Limit - Salmonid Water Quality Standards - S.I. No 293 of 1988

LEGEND
- = No data reported or no analyses conducted
< = Less Than
NDP = No Determination Possible

Table 5.3.6: SW2 ResultS

Surface Water Monitoring Location SW2: Chemical Analysis

			2012	2012	2012	
PARAMETERS	**UNIT**	**Limit**	**9/03/2012**	**13/06/2012**	**3/09/2012**	**3/12/2012**
Notes						
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
Temperature	**deg C**	**<21.5**	7.2	11.4	11.8	8.4
LABORATORY ANALYSIS						
General Water Quality Parameters						
Total Suspended Solids	**mg/l**	**<25**	<2	3.5	5.5	2.5
Mineral Oils	**mg/l**	**<5**	<0.01	<0.01	<0.01	<0.01
pH	**pH Units**	**>6- <9**	7.66	7.26	7.63	7.47
Inorganics						
Total Ammonia	**NH_4 mg/l**	**<1**	<0.2	1.61	<0.2	<0.2
Chloride	**Cl mg/l**		14.4	11.2	11.5	12.2

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

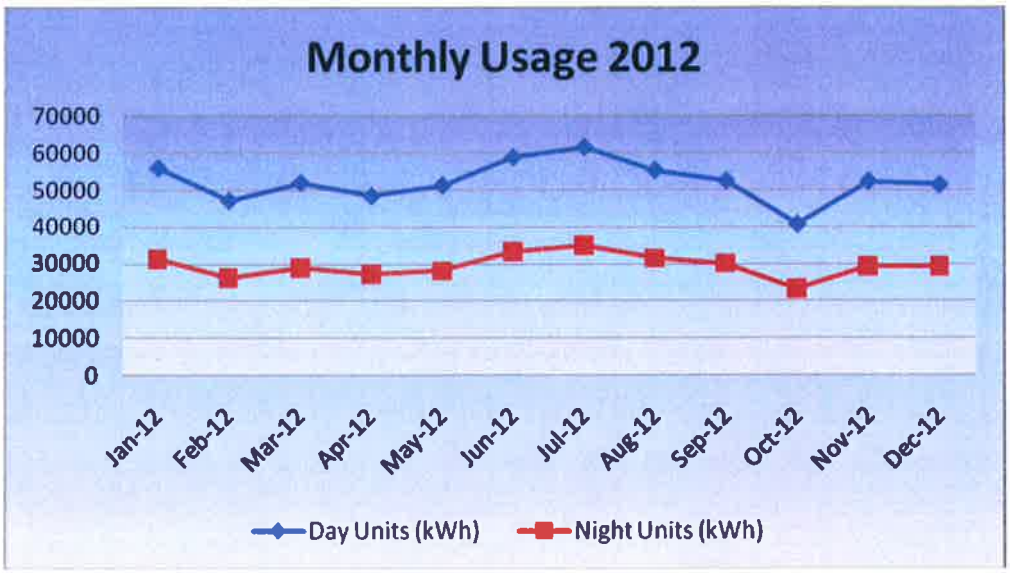
6.0 Resources and Energy Usage

The following section discusses resources such as Electricity, Fuel and Water used at Kilmainhamwood Compost in 2012. 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 2012 was a total of 981,173 (KWh) a slight increase on 2011 total usage but may be attributed to the increase in tonnage at the facility. 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 2012



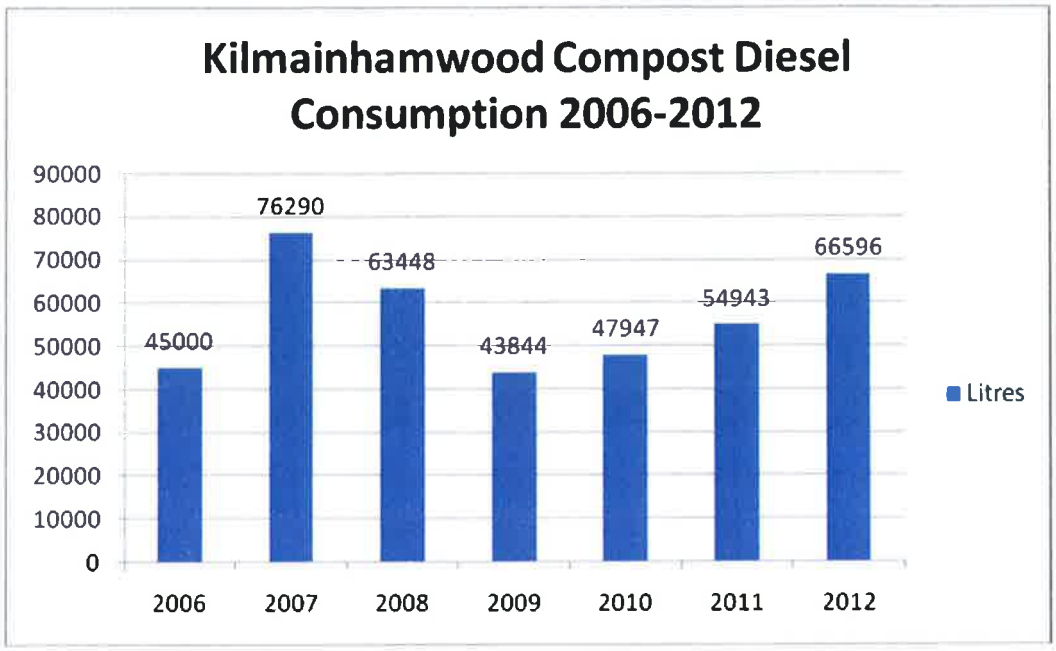
6.2 Water

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 2012 was the loading shovels and shredding machine used in the composting processes. A total of 66,596 litres of diesel was consumed in 2012, an increase from 54,943 litres in 2011. The increase in diesel usage may be attributed to the increase in tonnage processed at the facility. 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 – 2012



7.0 Development/Infrastructural Works

7.1 Site Developments 2012

During 2012 the following developments were carried out;

- **Training** - Staff training including machinery operation and driver certification.
- **ISO-** Kilmainhamwood Compost maintained certification in standards for ISO 14001 Environmental, ISO 9001 Quality and OHSAS 18001 in 2012.

7.2 Proposed Developments 2013

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 2013. 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.

- Continuous development of facility procedures in line with ISO certification and Animal By-Products Regulations.

7.3 Plant Capacity 2012

During 2012 31,382.87 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 600 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 2013 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 2012 is contained within the Integrated management system on site. Kilmainhamwood Compost established an Environmental Management System on commencement of activities in 2006. This was further expanded in recent years 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 a previous AER. During Quarter 1 of 2013 the planned extension to the facility has started. It is planned to carry out an integrity test on this tank when this site extension project is completed in Quarter 2 2013.

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 2012.

11.2 Complaints

There were 22 complaints made to the Facility and/or to the EPA during 2012 (91% of complaints received came from the same complainant). 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

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 2012.

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 2012. 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 2012

The total amount of compost produced in Kilmainhamwood compost in 2012 was 7920.41 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 14.1a Summary Compost Quality Analysis 2012

Compost Record Summary 2012				
Parameters	Batch 20512A	Batch 21812A	Batch 22212A	Batch 23112A
Nutrients				
Nitrogen g/kg DM	3.39	2.96	4.10	2.12
Phosphorous mg/kg DM	6,890	5,120	4,700	4,950
Potassium mg/kg DM	12,200	12,500	11,600	661
Trace elements				
Cadmium mg/kg Dm	0.8	1.0	1.91	0.949
Chromium mg/kg DM	15.90	42.40	45.50	44.70
Mercury mg/kg DM	0.08	0.16	0.11	0.22
Lead mg/kg DM	74.80	90.4	78.30	68.02
Zinc mg/kg DM	251	275	212	207
Nickel mg/kg DM	17.5	30.2	29	26.4
Copper mg/kg DM	108	131	93.4	77.90
Arsenic mg/kg	5.47	5.59	5.61	4.93
Physical Contaminants				
Glass/Metal/Plastic %	0.04	0.0	0.26	0.29
Plastic %	0.04	0.0	0.0	0.12
Stones % >5mm	1.10	5.70	5.25	2.93
Maturity testing				
Carbon:Nitrogen ratio	10.80	6.03	9.10	12.60
CO_2 evolution mgCO_2/g	2.67	0.18	8.84	20.61
Physical Characteristics				
Moisture content %	49.30	41	29.30	31.50
Organic Carbon %m/m	31.99	40.71	64.30	72.50
PH	5.70	5.98	6.31	7.4
Pathogen Testing				
Salmonella Species	Absent	Absent	Absent	Absent
E. coli cfu	<10	<10	<10	<10
Compost Class Standard	**Class II**	**Class II**	**Class II**	**Class II**

Table 14.1b Summary Compost Quality Analysis 2012

Compost Record Summary 2012				
Parameters	Batch 23612A	Batch 23812A	Batch 24512A	Batch 24912A
Nutrients				
Nitrogen g/kg DM	2.38	2.75	2.59	3.34
Phosphorous mg/kg DM	7,380	4,420	5,120	5,500
Potassium mg/kg DM	11,700	17,500	15,10	14,100
Trace elements				
Cadmium mg/kg Dm	0.755	0.803	0.844	0.747
Chromium mg/kg DM	49.60	93	76.70	54.7
Mercury mg/kg DM	0.10	0.14	0.27	0.11
Lead mg/kg DM	114.98	74.76	80.91	90.36
Zinc mg/kg DM	244	235	377	230
Nickel mg/kg DM	40.10	40.2	37.2	27.6
Copper mg/kg DM	112	62.80	82.70	80.7
Arsenic mg/kg	8.90	6.14	4.60	6.90
Physical Contaminants				
Glass/Metal/Plastic %	0.0	0.0	0.0	0.1
Plastic %	0.0	0.0	0.0	0.1
Stones % >5mm	4.12	4.32	9	<1.0
Maturity testing				
Carbon:Nitrogen ratio	13.60	12.70	14.4	11.50
CO_2 evolution mgCO_2/g	1.73	2.37	3.71	17.97
Physical Characteristics				
Moisture content %	46.20	34	15.90	30.90
Organic Carbon %m/m	55.69	60.10	64.5	66.40
PH	7.4	8.4	6.24	5.91
Pathogen Testing				
Salmonella Species	Absent	Absent	Absent	Absent
E. coli cfu	<10	<10	<10	<10
Compost Class Standard	**Class II**	**Class II**	**Class II**	**Class II**

Appendix 1

LEGEND

DUST MONITORING (D1, D2, D3)

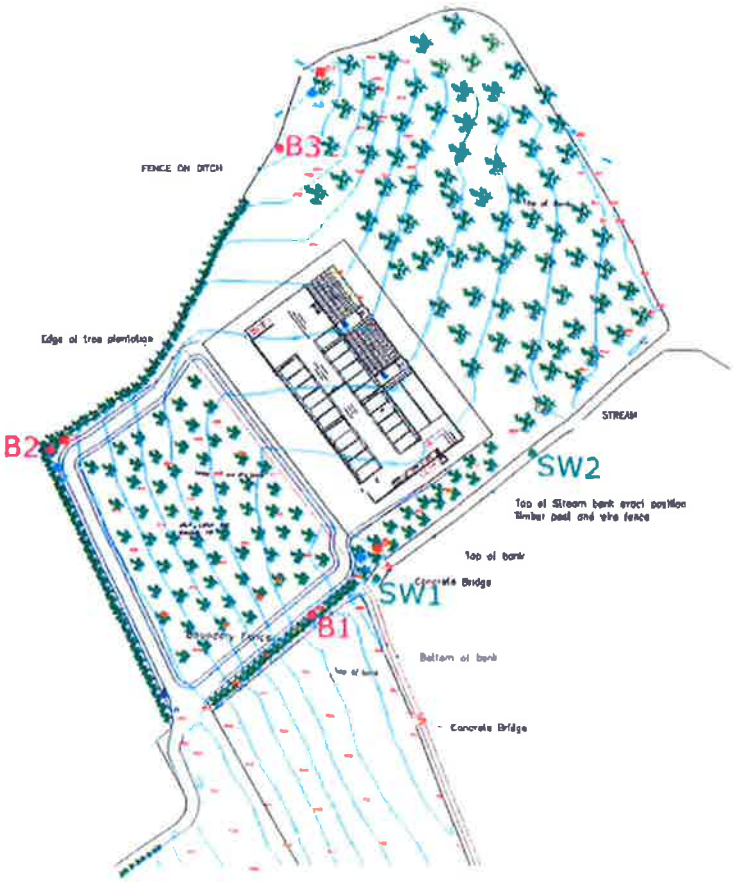
NOISE MONITORING (N)

AIR MONITORING (A1, A2, A3)

BOREHOLE (B1, B2, B3)

SURFACE WATER (SW1, SW2)

N



Appendix 2

PRECIA MOLEN™ WORLDWIDE WEIGHING

Engineer's Work Report

NOVA WEIGH

Unit F5, Maynooth Business Campus, Maynooth, Co. Kildare. Tel: (01) 835 3084 Fax: (01) 835 1213

CUSTOMER: Thorntons

ADDRESS: Kilmacanogue Wood

PHONE NUMBER:

ENGINEER: Mikey Feeney

CONTACT: Tadg

ORDER NO: MC

DATE	ON SITE HOURS	TRAVEL TIME	MILEAGE
31/1/13	1	3	

EQUIPMENT DETAILS

MAKE:

MODEL: LD 5204 Desk

SIZE: 16 x 3

LOADCELL TYPE:

SERIAL NO.

CAPACITY:

DETAILS OF PARTS SUPPLIED/FITTED

QUANTITY	PART NUMBER	DESCRIPTION

REASON FOR VISIT: INSTALLATION ☐ SERVICE ☑ REPAIR ☐ CALIBRATION ☐ OTHER ☐ Specify:

DESCRIPTION OF WORK CARRIED OUT

Checked swing on bridge. Did end middle and with 45490kg. Was out 12cm from one end to the other. Packed Loader on Bridge and freed it up. Did repeatability it was fine. Keep bridge clean for it to work properly. Indication sealed.

ENGINEER'S COMMENTS

CUSTOMER'S COMMENTS

We hereby approve/confirm the above is a true record of the work undertaken which has been carried out to our satisfaction

WORK COMPLETE: Yes ☑ No ☐

REPORT TO FOLLOW: Yes ☐ No ☐

FOLLOW UP REQUIRED: Yes ☐ No ☐

ENGINEER	For Client:
SIGNED: Mikey Feeney	SIGNED: Tom McDonnell
NAME:	NAME:
TITLE:	TITLE:

SO 55643

No. 15002

PRECIA MOLEN

Engineer's Work Report

NOVA WEIGH

Block F, Unit 5, Maynooth Business Campus, Maynooth, Co.Kildare Tel: (01) 835 3084 Fax: (01) 835 1213

CUSTOMER: Thorntons

ADDRESS: Kilmainhamwood

PHONE NUMBER:

ENGINEER: Milly Reilly

CONTACT: Tommy

ORDER NO.

DATE	ON SITE HOURS	TRAVEL TIME	MILEAGE
18-6-12	1	3	

EQUIPMENT DETAILS

MAKE: Leon.

MODEL: LD 5204

SIZE: 18 x 3

LOADCELL TYPE:

SERIAL NO

CAPACITY: 50000 kg

DETAILS OF PARTS SUPPLIED/FITTED

QUANTITY	PART NUMBER	DESCRIPTION

REASON FOR VISIT: INSTALLATION ☐ SERVICE ☑ REPAIR ☐ CALIBRATION ☐ OTHER ☐ Specify:

DESCRIPTION OF WORK CARRIED OUT:

Checked indicator, indicator sealed. Checked end middle end with 36 & 40 kg it was the same in the places. Did repeatibility. was okay checked Swing and byoff. it was fine, bridge need to be clean around the load cells.

ENGINEER'S COMMENTS:

CUSTOMER'S COMMENTS:

We hereby approve/confirm the above is a true record of the work undertaken which has been carried out to our satisfaction

WORK COMPLETE: Yes ☑ No ☐

REPORT TO FOLLOW: Yes ☐ No ☐

FOLLOW UP REQUIRED: Yes ☐ No ☐

ENGINEER	For Client:
SIGNED: Milly Reilly	SIGNED: Tom McDonnell
NAME:	NAME:
TITLE:	TITLE:

No 13855

Appendix 3

Department of
Agriculture,
Food and the Marine

Talmhaíochta,
Bia agus Mara

Certificate of Approval

Approval under the European Communities (Transmissible Spongiform Encephalopathies and Animal By-products) Regulations (S.I. No 252 of 2008) (as amended) and in accordance with Regulation (EC) No. 1069 of 2009 and Regulation (EU) No. 142 of 2011.

This is to certify that

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

has been approved by the Minister for Agriculture, Food and the Marine, in accordance with the provisions of the above regulations, to continue to operate Kilmainhamwood Compost, located at Ballynalurgan, Kilmainhamwood, Kells, Co. Meath **as a Composting Plant**

Approval Number: Comp 06

This approval is valid from 3rd December 2012 to 3rd December 2013

The approval is subject to the general and specific conditions set out overleaf.

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

Dated this 3rd Day of December 2012

For the Minister for Agriculture, Food and the Marine

Mairéad Broderick

An Officer authorised in that behalf by the said Minister.

Grattan House, Grattan Business Centre, Dublin Road, Portlaoise, Co Laois
Teach Grattan, Ionan Gnó Grattan, Bóthar Bhaile Atha Cliath, Portlaoise,
Co Laoise
Fax: 057 8694386

Appendix 4

ODOUR & ENVIRONMENTAL ENGINEERING CONSULTANTS

Unit 32 De Granville Court, Dublin Rd, Trim, Co. Meath

Tel: +353 46 9437922
Mobile: +353 86 8550401
E-mail: info@odourireland.com
www.odourireland.com

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:	15th Feb 2013
REPORT NUMBER:	2013626(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: 2013626(1)			**Document Reference:** Bioaerosol Impact Assessment at Kilmainhamwood Compost Ltd, Nobber, Co. Meath		
2013626(1)	Document for review	B.A.S.	JMC	B.A.S	15/02/2013
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 04th Dec 2012 between the hours of 11.45AM and 14.15PM.

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 4 to 5 (i.e. on an 8 point scale). Barometric pressure was approximately 100.10 mbar. Relative humidity was high with an average reading of 90% while temperature was low with a value of 6.10 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 1-04th Dec 2012
Wind direction (From)	NW
Wind speed (m s^{-1})	4.80
Cloud cover (Octaves)	4 to 5
Barometric pressure	100.10
Temperature (^{0}C)	6.10
Relative humidity (%)	90
Rainfall (mm)	0.0

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]	500 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]	1,000 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 04th Dec 2012.

Table 3.1. Bioaerosols concentration levels in the vicinity of the Kilmainhamwood facility on 04th Dec 2012.

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	14	105	3 ea.
Loc 3	42	448	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 increased 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 from the emission source).

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

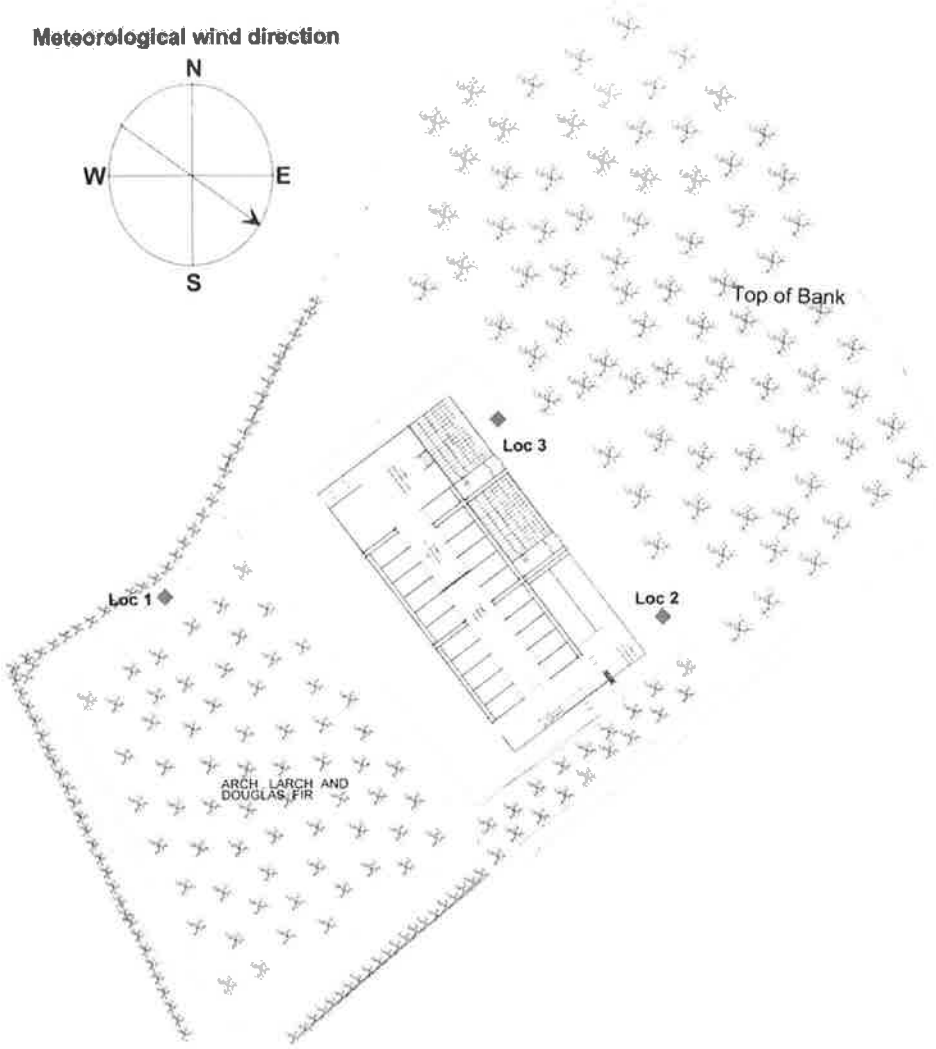


Figure 5.1. Schematic overview of Bioaerosol monitoring locations and wind direction on the day of monitoring.

Appendix 5

PM03- F01 Management Programme 2013

COMPLETED | CARRIED FORWARD FROM 2012 | ON HOLD

Ref Numb	Date	Type	Objective and Target	Location	Responsibili...	Method	Time Fram	Status
ENVIRONMENTAL								
EP 01	Jan-13	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. Shane Thornton appointed Main conytract0r - Moreloch construction 2. TMCD deal with planning authority on commencement notice 3. TMCD deal with EPA on license 4. TMCD to deal with DAFF re stage 2 approval on extension	Jul-13	Started - Permission granted for planning, EPA sent out artcile 16. Contractor commenced works on site
EP 02	Jan-12	Environmental	New Lighting within building as per energy audit	Kilmainhamwood	TMCD	1. On site light assessment completed, levels of lumination determined on site. Assess what is available in market place for composting environments 2. Obtain quote for LED iullumination	Jul-13	Started - Quote obtained to put in LED lights and hoping to complete as part of the main build
EP 03	Jan-13	Environmental	Recycling of PET from MSW line	Killeen Road	DD	1. Plan with Paul a trial to confrim the report conducted in 2012. 2. Set up a temporary picking station after the ballistic and have a cage for the PET to be dropped in to. 3. Have a 35 cubic yard skip by the wash bay for temporary bulking	Jun-13	Not Started
EP 04	Jan-13	Environmental	Civic Amenity Site Monthly Reports	Dunboyne	DD	1. Review current work practices on Civic Amenity site. 2. Liase with site manager on a monthly basis and review costs and turn over. 3. Review containers been used on site.	Mar-13	Not Started
EP 05	Jan-13	Environmental	Dunboyne Weighbridge Manual	Dunboyne	DD	1. Review and update the unmanned weighbridge operational manual	Aug-14	Not Started
EP 06	Jan-13	Environmental	Terms and Conditions for Householder r e domestic waste	Company	MK	1. Review T & C's in paice with other waste companies. 2 Collate terms and include our exitsing terms from Website	Mar-13	Completed - Forwarded to relevant personnel 13.03.13
EP 07	Jan-13	Environmental	Dunboyne - Convert MRF to stroage racilty for SRF approval from EPA. Bale storage outside	Dunboyne	MK	1. Liase with EPA re storage of loose SRF inside main MRF and baled SRF externally 2. Receive necessary permissions under current conditions of the license without a review/technical amendment	Mar-13	Started - Permission granted for storage of loose SRF 2,000 tonnes for a maximium period of 6 weeks. Awaiting permission for storage of baled SRF off EPA. FI sent in and a new request /proposal Feb 2013
EP 08	Jan-13	Environmental	Odour Project - Killleen Road	Killeen Road	MK	1. Send OMI a provsuion of services document re what is required from the odour trial and what we what included in report 2. Liase with BS on trial - receive report 3. Get prices off two companies for sealing of building 3 liase with insurance on requirements	Mar-13	Stared - Sampling done awaiting report from OMI. Prices received from two companies for PU foam prices forwarded to PT and GB
EP 09	Jan-13	Environmental	Planning permission for roof extension at Killeen Road	Killeen Road	MK	1. Obtain quotes for planning and drawings for roof extension 2. Lodge planning	Jun-13	Started -- planning Lodged 13/05/13 awaiting decision From DCC
EP 10	Mar-13	Environmental	Household Brown Bin Regualations	Company	MK/ TMCD	1. Review regulations and create summary for relevant personnel save to Environmental Guidance file	May-13	Not Started
EP 11	Jan-13	Environmental	NDR - Review new permit and ensure all conditions adhered to	MDR	MK	1. Meet Site Supervisor and Manager and go through every condition of permit and ensure all conditions adhered to. 2. Create an action liist and forward to relevant	Mar-13	Completed - Audit saved Legal register action list forarded to site Manager FEB 2013
EP 12	Jan-13	Environmental	Shredding - Internal Audit on conditions of permit	Shredding	MK	1. MeetManager and go through every condition of permit and ensure all conditions adhered to. 2. Create an action liist and forward to relevant people	Mar-13	Completed - Audit saved Legal register action list forarded to site Manager FEB 2013
EP 13	Feb-13	Environmental	Wood Waste Guidelines issued by EPA	PDM	MK	1 Review guidelines and create summary for relevant personnel i.e. PF and PT 2. Check current outlets being used re guidelines	May-13	Started
EP 14	Jan-13	Environmental	Dunboyne - Review of Environmental Files on Site	Dunboyne	MK	1. Review and update the environmental files on site.	May-13	Not Started

Appendix 6

Guidance to completing the PRTR workbook

AER Returns Workbook

REFERENCE YEAR	2012

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 Mc Donnell
AER Returns Contact Email Address	Tom@thorntons-recycling.ie
AER Returns Contact Position	Facility Manager
AER Returns Contact Telephone Number	086 856 3431
AER Returns Contact Mobile Phone Number	086 856 3431
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	2860
Number of Employees	4
User Feedback/Comments	There are no sewer emissions from the facility and the stream surface water is monitored upstream and downstream as per the facility licence.
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?	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. WASTE IMPORTED/ACCEPTED ONTO SITE

Guidance on waste imported/accepted onto site

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	

This question is only applicable if you are an IPPC or Quarry site

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
					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	Emission Point 4	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
210	Dust	M	OTH	Standard Method	0 04	0 05	0 04	0 0	0 13	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: Kilmainhamwood Compost

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

	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m3 per hour	
Total estimated methane generation (as per site model)	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 groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this only concerns Releases from your faci

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

4.4 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

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	1873.84	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	613.52	non-composted fraction of municipal and similar wastes	D5	M	Weighed	Offsite in Ireland	Knockharley Landfill,W0146-01	Kentstown, ,Co. Meath, ,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