ODOUR MANAGEMENT PLAN

FINAL

Report Prepared For

Cowbridge Compost Ltd

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Quality Control		
Document Author	Lauren Briggs	
Quality Reviewer	Ben Brown	

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1.0 INTRODUCTION

WRM Ltd has been appointed by Cowbridge Compost Ltd (CCL) to prepare an Odour Management Plan (OMP) for their composting facility.

The site currently undertakes the composting of up-to 35,000 tonnes per annum (tpa) of waste using an In Vessel Composting system followed by an Open/Closed Windrow Composting system. Such operations will inevitably lead to the generation of odour due to the nature of material and the processes. Effective operation and management of such facilities is therefore required to minimise the odour emissions from routine operations and minimise the risk of abnormal operational conditions resulting in increased risk of odour generation at the site.

This Odour Management Plan (OMP) has been produced in accordance with Environment Agency (EA) guidance on OMPs[1] and EPR H4 Odour Management (consultation draft)[2] and follows the general monitoring procedures detailed in Environment Agency guidance document *Internal Guidance for the Regulation of Odour at Waste Management Facilities*[3]. Reference has been made to the Association for Organics Recycling *Industry guide for the prevention and control of odours at biowaste processing facilities*[4] and the Agency document *Technical Guidance on composting operations*[5] *(draft).*

This OMP is aimed at assisting the operator in effectively managing potential odour releases associated with the operations at the CCL facility and minimisation of the risk of abnormal operational conditions, which could result in increased risk of odour generation at the site.

1.1 Structure of the Odour Management Plan

The structure of the OMP is laid out in accordance with the EA guidance and considers:

- Feedstock Inventory;
- Process Management;
- Evaporation;
- Containment and abatement;
- Dispersion;
- Sensitive Receptors; and
- Incidents and Emergencies.

1.2 Material Recovery Operations

CCL are seeking consent to continue operating a resource recovery facility currently processing up to 35,000 tonnes a year of non-hazardous green and food wastes primarily from

[1] Appendix 8 of Application for an environmental permit - Guidance notes on part B3 new bespoke installation permit. EPB3 Version 1, January 2010. Environment Agency.
[2] Environment Agency Technical Guidance Note H4 – Odour management. Consultation Draft. June 2009.
[3] Environment Agency. Odour Guidance, Internal Guidance for the Regulation of Odour at Waste Management Facilities VERSION 3.0. (July 2002).
[4] The Compost Association. An industry guide for the prevention and control of odours at biowastes processing facilities. Jeremy Jacobs, Nick Sauer and E. Jane Gilbert (2007).
[5] Environment Agency. Technical Guidance on composting operations, Draft for Internal Consultation Version 3.0. October 2001.

kerbside collected, civic amenity and commercial waste streams. The current Permit allows composting of green and food wastes only up to 35,000 tonnes per annum.

The main change will include two systems being put in place; the first system will be for green waste only. The second system will be an IVC for food and compost oversize/woody amendments. The limit will remain as it is at 35,000 tonnes per annum to be open, and the tonnages will not be restricted by process type i.e. the limit of 500 tonnes of green waste at any one time will be lifted. The proposed waste recovery facility will include the following:

- **Open Windrow Composting**: Composting of source segregated kerbside, civil amenity and commercial green wastes for the production of an organic soil improver certified to PAS100 and QP.
- **In-Vessel Composting**: Composting of source segregated kerbside, civil amenity and commercial food and compost oversize/woody amendments for the production of an organic soil improver certified to PAS100 and QP.

CCL also intends to extend the site boundary to the east to accommodate a tank for the primary storage of leachate. The tank will have an access road 6m wide and approximately 100m in length leading from a gate which will be located north of the lagoon. The tank will be 18m in diameter with a bund around this extending 1m in height and 2m from the tank – the total concreted area will be 24m in diameter. There will be a pipe leading from the tank to the lagoon for secondary containment if both the tank and the bund were to fail. The leachate will be pumped using a submersible pump which will be located south of shed 6 on the location plan. The pipe for the submersible pump will be directed below the access road. A company called Storth will provide the tank. The tank will have a base area of 277m^2 and a gross capacity of 1,160m^3.

The recovery of organic waste has the potential to generate malodours from site operations. This odour management plan makes an assessment of likely sources of odour generation and sets out the good site practice and mitigation that is employed to minimise where reasonably practicable any odour emitted from site.

The likelihood and frequency of exposure to odour arising from the facility is determined by a combination of the magnitude of release, the prevailing meteorological conditions, and the distance and direction of receptors in relation to the facility. Each of these factors are discussed in the following sections.

1.3 Conceptual Model

The conceptual model for pollutant linkages identified for the release of odours from the composting facility is identified in Figure 1 below.

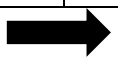
SOURCE	PATHWAY	RECEPTOR	
			
			
Release of odours during waste reception, processing and movements.	Airborne transportation.	Nearby sensitive receptors identified in section 7.	
HAZARD	Nuisance to local population.		

Figure 1 - Conceptual Model for Pollutant Linkages

2.0 FEEDSTOCK INVENTORY

The site operates a waste recovery operation through the composting of source-segregated biodegradable waste to produce quality compost that is quality assured to PAS100[6] and the compost Quality Protocol[7]. The green waste composting process deals with biodegradable materials which have the potential to produce odour. In order to understand the odour potential of the different waste streams that enter these processes, a feedstock inventory has been provided for the various waste types. Table 1 below provides an assessment of each waste type by source of material, identifying the typical and abnormal compositions of those waste types and providing and overall odour potential of that feedstock based upon the likelihood of abnormal compositions being encountered at site.

Table 1 - Assessment of Odour Potential from Feedstock Inventory

Waste Type	Waste Source	Typical Composition	Abnormal Composition	Likelihood	Odour Potential
Green Waste	Kerbside collected.	Mixture of grass clippings and woody plant material. Often several days old.	Mixture of grass clippings and woody plant material that has been stagnant for weeks.	Material is often received from these sources which is several days old.	**High** – Material may be wet and already started to degrade given the potential age of cut material.
	Civil amenity sites e.g. HWRC.	Mixture of grass clippings and woody plant material. Often several days old.	Mixture of grass clippings and woody plant material that has been stagnant for weeks. Seasonal exceptions e.g. Christmas trees.	Material is often received from these sources which is several days old.	**High** – Material may be wet and already started to degrade given the potential age of cut material.
	Commercial e.g. landscapers.	Fresh woody plant material and grass clippings / turf.	Large bulky tree stumps/logs. Large load of grass/turf.	Material usually delivered shortly after being collected.	**Med** – Material is typically fresh and mainly dry woody plant material.
Food Waste	Kerbside collected.	Mixture of all food types associated with kerbside collections which is several days old.	Mixture of food waste with a high moisture content that is several days old and has started to degrade.	Material is often received from these sources which is several days old.	**High** – Material is often wet and may have already started to degrade given the potential age of material.

[6] BSi (2011) *PAS 100: Specification for Composted Materials*. British Standards Institution: London.
[7] WRAP (2008) *The quality protocol for the production and use of quality compost from source-segregated biodegradable waste*. Waste and Resources Action Programme: Oxon.

Waste Type	Waste Source	Typical Composition	Abnormal Composition	Likelihood	Odour Potential
	Commercial e.g. food production wastes.	Mixture of different types of food waste in singular form and mixed type.	Mixture of food waste with a high moisture content that is several days old and has started to degrade.	Material is sometimes received from these sources which is several days old.	**High** – Material is often wet and may have already started to degrade given the potential age of material.

2.1 C:N Ratios

Nutrient content (typically the C:N ratio) is a critical factor as the micro-organisms require a range of nutrients to flourish. Nitrogen is used for protein manufacture and reproduction whereas carbon is used for energy and growth. Typically, biological organisms require 25 times more carbon than nitrogen and ratios of between 20:1 and 40:1 are generally accepted as capable of achieving good composting results.

Low C:N ratios (<20:1) allow the carbon to be fully utilised without stabilising the nitrogen, which may be lost as ammonia. Such conditions also lead to rapid composting process resulting in elevated temperatures and the need for frequent (possibly daily) turning to cool the composting mass. High C:N ratios (>40:1) require longer composting periods whilst the extra carbon is used. Typical C/N ratios for feed stocks are as follows:

- Grass clipping: 12-15
- Mixed grasses: 19
- Sawdust: 200-500
- Straw, wheat: 128-150

C:N ratio is typically controlled by operator experience as required through the mixing of feed stocks - mixing oversized material/cardboard (high carbon content) from product screening (i.e. carbon source). The decision is subjective but a visual mix of 1:4 green (fresh) to brown (dry non-green material) is appropriate

2.2 Feedstock Management

As identified in Table 1 there are various potential compositions for the waste types accepted onto site which have a med-high odour potential. In order to manage the feedstock inputs an assessment of the variation by waste source by season is provided, the implication on odour generation and the management controls to mitigate odours. Table 2 outlines the controls required at the waste feedstock stage.

Table 2 - Feedstock Variation and Management Controls

Waste Source	Seasonal Variation	Odour Implication	Management Controls	Age and Source of Material
Kerbside collected green waste.	**April – September:** Increasing grass clippings content (typically peaking at 40%+ in May-June from experience). Short, sharp, tonnage surges possible (e.g. collections around bank holiday weekends) Accordingly, loads increasingly compacted due to material density.	Degradation could begin rapidly. Excess nitrogen will form ammonia and odorous compounds.	Source additional "woody" / carbonaceous material in anticipation of warm, wet, weather when possible. In the event of sudden summer green waste "surge" overwhelming treatment capacity, broker material to other local compost facility.	Local Authority collections undertake on a bi-weekly basis. Material up to 14days old.
	October - March: Increase in "woody" type materials (branches etc), resulting in higher C:N ratios.	Material unlikely likely to compost rapidly, so odour potential is decreased, but still present if stored too long.	Green waste loads from October to March containing large amounts of "woody" type materials (branches etc) may need to be blended together to improve C:N ratio.	
Civic amenity green waste.	**April – September:** Increasing grass clippings content (peaking at 40%+ in May - June). Short, sharp, tonnage surges possible over bank holiday weekends. Accordingly, loads increasingly compacted due to material density, and contractors desire to maximise bin weights / payloads.	Degradation could begin rapidly. Excess nitrogen will form ammonia and odorous compounds. Increased risk of evaporation.	Source additional "woody" / carbonaceous material in anticipation of warm, wet, weather when possible. In the event of sudden summer green waste "surge" overwhelming treatment capacity, leading to green stockpile in reception building longer than 2 days, broker material to other local compost facility.	Local CA sites where material is stored between 1 and 2 weeks before arriving on site. Material up to 14 days old.

Waste Source	Seasonal Variation	Odour Implication	Management Controls	Age and Source of Material
	Potential for waste to be kept in warm conditions prior to delivery (waste exposed to direct sunlight in site bins).			
	October - March: Increase in "woody" type materials (branches etc), resulting in higher C:N ratios. Potential for significant "spike" post-Christmas (disposal of Christmas trees).	Material unlikely likely to compost rapidly, so odour potential is decreased, but still present if stored too long.	Adjust green to "woody" green waste ratios during October – March to meet desired C:N ratio. Green wastes loads may need to be blended together to improve C:N ratio.	
Commercial green waste.	**April – September:** Increasing grass clippings content (typically peaking at 40%+ in May – June from experience). Accordingly, loads increasingly compacted due to material density. Potential for waste to be kept in warm conditions prior to delivery (waste exposed to direct sunlight prior to delivery).	Degradation could begin rapidly. Excess nitrogen will form ammonia and odorous compounds. Increased risk of evaporation.	Source additional "woody" / carbonaceous material in anticipation of warm, wet, weather when possible. In the event of sudden summer green waste "surge" overwhelming treatment capacity, leading to green stockpile in reception building longer than 2 days, broker material to other local compost facility.	Sourced from a variety of local landscape contractors typically within a day of cutting, but potentially up to a week. Material up to 7 days old.
	October to March: Increase in "woody" type materials (branches etc), resulting in higher C:N ratios.	Material unlikely likely to compost rapidly, so odour potential is decreased, but still present if stored too long.	Adjust green waste to "woody" green waste ratios during October – March to meet desired C:N ratio. Green wastes loads may need to be	

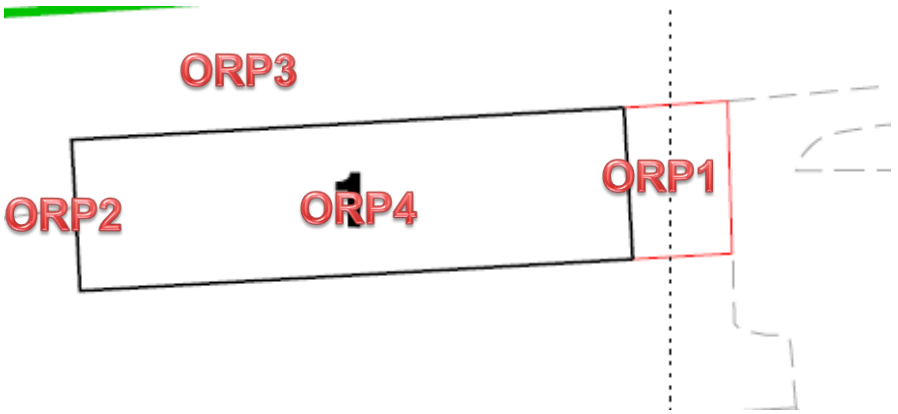
Waste Source	Seasonal Variation	Odour Implication	Management Controls	Age and Source of Material
			blended together to improve C:N ratio.	
Kerbside collected food waste.	Seasonal variation is minimal. Waste is collected in corn-starch liners from householders, most of which are sealed, reducing evaporation potential during warm weather. Waste produced over public holidays could be greater in amount and older / more compacted due to collection round disruptions.	The low C:N ratio of this waste (approx 15) means it is highly susceptible to degradation with age. Treatment as soon as possible is crucial to prevent / minimise nitrogen volatilisation in the form of ammonia and other odours.	Ensure food waste is processed as soon as delivered to site. Food waste blended with less odorous \ carbonaceous material immediately following shredding. All food waste material to be processed and loaded into vessels on same day – no storage in reception building overnight. If material significantly odorous consider alternative disposal: landfill or other local composting facility.	Local Authority collections undertake on a bi-weekly basis. Material up to 14days old.
Commercial food waste.	Some wastes are collected in corn-starch liners from customers. Liners will be sealed on collection, reducing evaporation potential during warm weather. Waste produced over public holidays could be variable: offices may produce less waste due to low staff levels, whilst pubs and restaurants could produce more due to increased business.	The low C:N ratio of this waste (approx 15) means it is highly susceptible to degradation with age. Treatment as soon as possible is crucial to prevent / minimise nitrogen volatilisation in the form of ammonia and other odours.	Ensure food waste is processed as soon as delivered to site. Food waste blended with less odorous \ carbonaceous material immediately following shredding. All food waste material to be processed and loaded into vessels on same day – no storage in reception building overnight. If material significantly odorous consider alternative disposal: landfill or other local composting facility.	Sourced from a variety of local food processing facilities. Material delivered as past sell/use by date. Material up to 7 days old.

3.0 ODOUR RELEASE POINTS

In order to determine the points that require odour assessment and management a review of the composting process has been undertaken. The assessment identifies at which physical locations odours may be released from the site to identify where management controls are required to mitigate such release events. The following section breaks down these release points by stage within the composting process and identifies where on site they are situated.

3.1 Reception Hall

The reception hall is utilised for the receipt of all waste materials, inspection, storage of physical contaminants and shredding. There is a single entry point to the west where all waste materials are received. A single exit point is located on the eastern wall where material is moved out to the compost vessels following sanitisation. These two odour release points (ORP) are identified below. A Biofilter is located to the north of the IVC.



3.2 IVC Treatment Clamps

The IVC treatment of biodegradable wastes takes place in the western portion of the site and consists of eight treatment clamps in Barrier 1 and eight treatment clamps in Barrier 2. The IVC also has a biofilter to treat the sixteen clamps within both barriers. A concrete apron is located between the barriers with a central point for collating leachate and runoff water from the impermeable surfacing. The odour release points are identified as the entrance and exit of the treatment clamps, the biofilters and the concrete apron where leachate and runoff waters may pool during heavy rainfall events. These ORPs are identified within the schematic presented above.

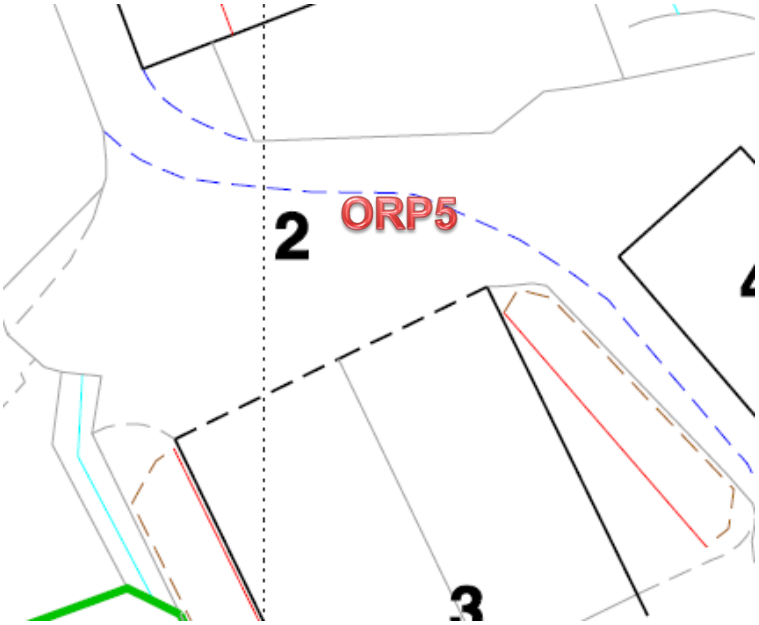
The IVC is fully sealed and doors are only opened during the receipt of wastes and during the movement of composts out of the clamps to the maturation pad.

See image above for ORPs.

3.3 Green Waste Reception Pad / Shredding Area

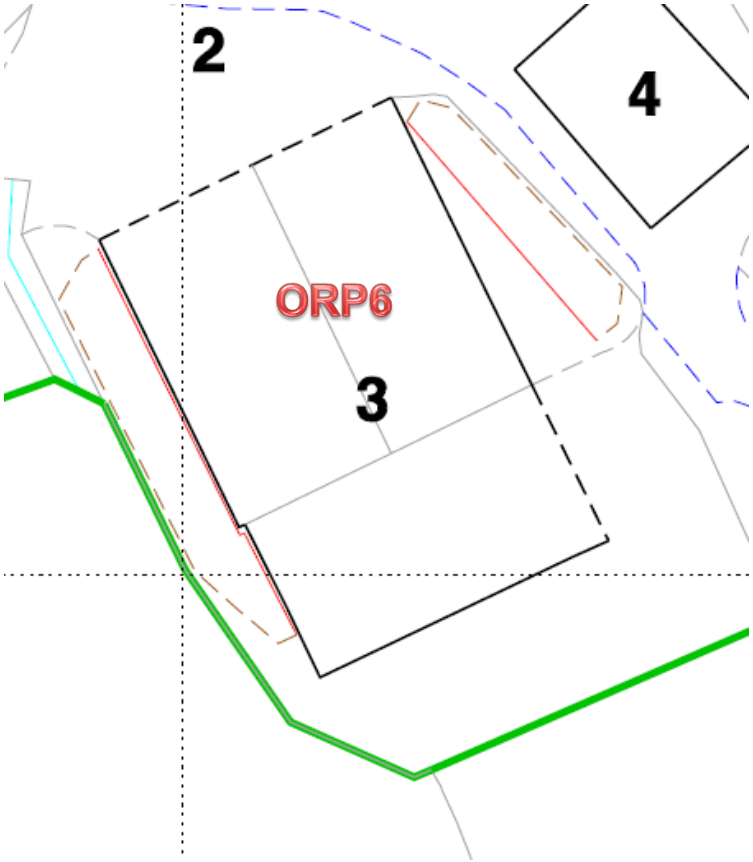
The Green waste reception area is utilised for the receipt of green wastes only which are stored and shred prior to being sent to the IVC to ensure the correct mix is going through the

IVC. The permit variation will allow the green wastes to be stored at this location then sent to the green waste sanitisation pad for a separate composting stream through the site. The storage of green waste is on a concrete pad and wastes are inspected for contamination prior to shredding.



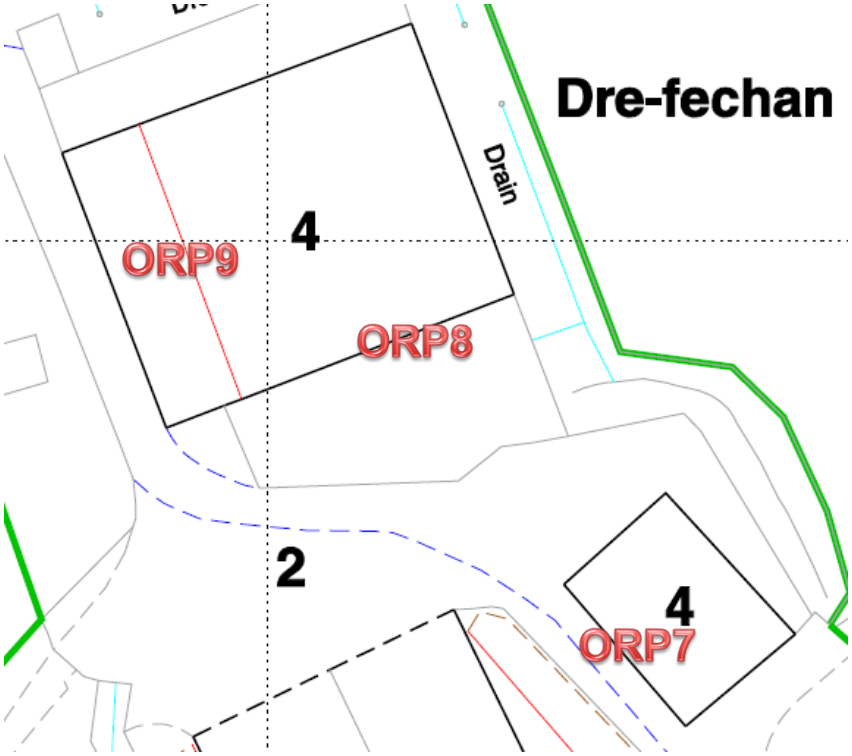
3.4 Green Waste Sanitisation Pad

The green waste sanitisation pad is located to the south of the site. The pad has 3 concrete walls to the west, south and east of the pad to ensure the sanitisation process is contained.



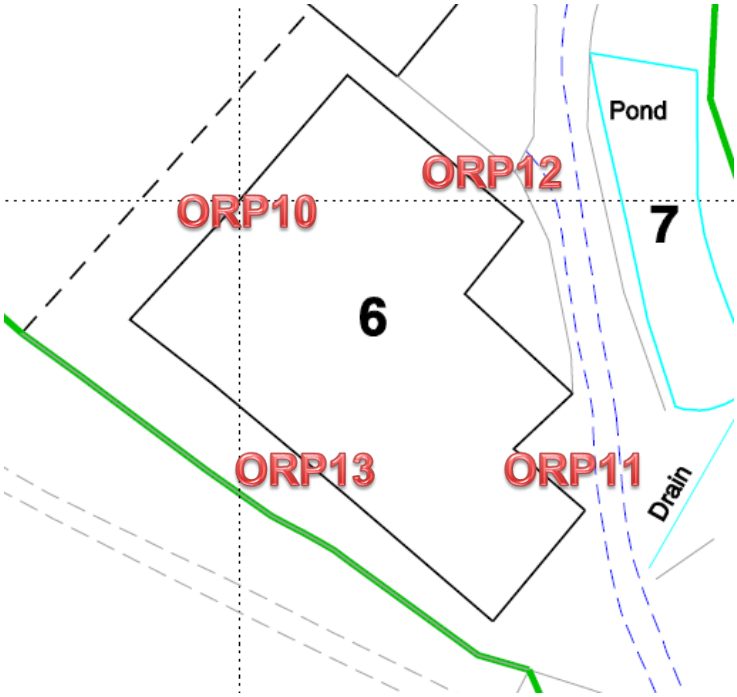
3.5 Feedstock Storage Area

There are two feedstock storage areas located to the east and centre of the site. The feedstock storage sheds are utilised for the storage of green waste only until the sanitisation and pad and IVC clamps are ready to receive the green waste feedstock. There are several odour release points as the sheds are not fully enclosed.



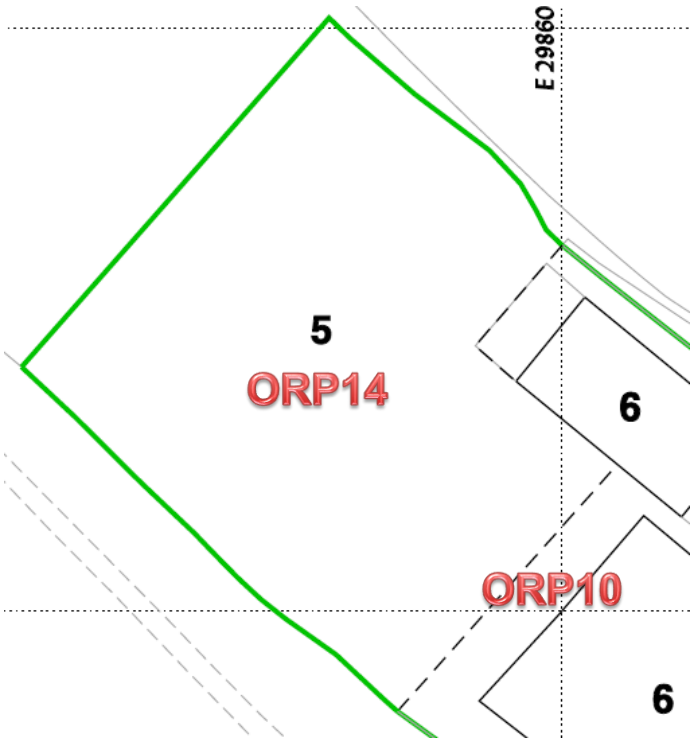
3.6 Screening Pad

The compost is screened under a shred which is not fully enclosed. The roof ensures that rain water is not mixing with the compost when it is being screened. The screening is mainly contained to the centre of the screening pad. ORP13 is located next to terrain which is high ensuring a natural barrier to odour release.



3.7 Maturation Pad

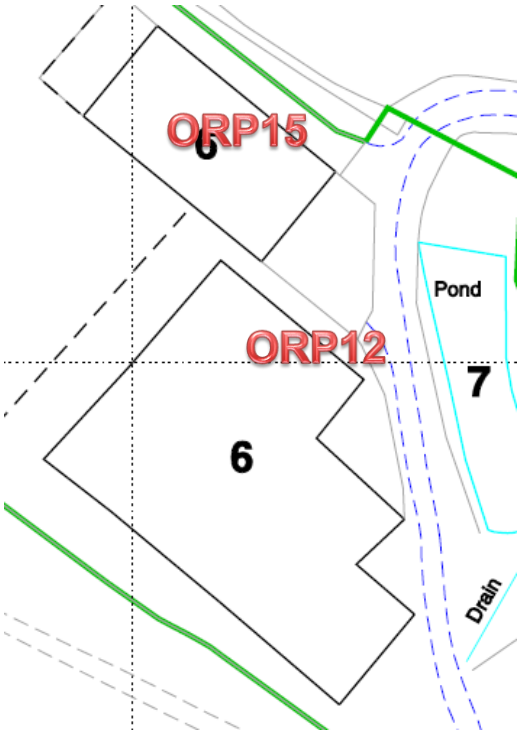
The external maturation pad is an open windrow process so all windrows are potential odour release points that require suitable management. The windrows have a final week under the screening pad.



3.8 Product Storage

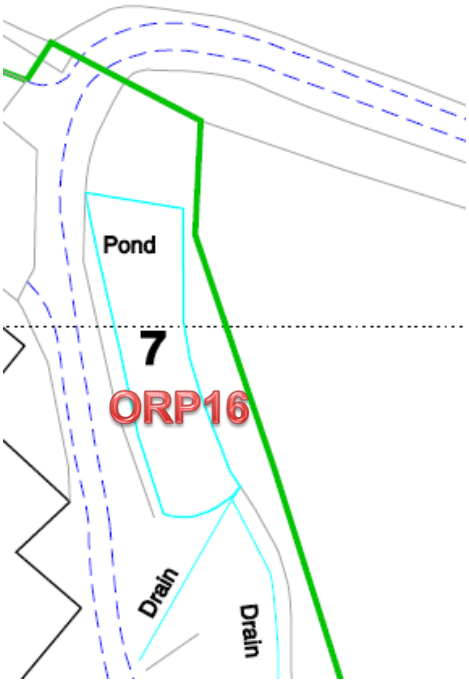
The north-eastern portion of the site is utilised for the storage of PAS100/QP compliant composts prior to removal from the site. Material is stored in open conditions but under a roof

with an odour release potential that requires management procedures to be implemented. Finished product is stored in the area marked 6 to the north of the picture below and to the north of the area marked 6 in the larger of the two areas.



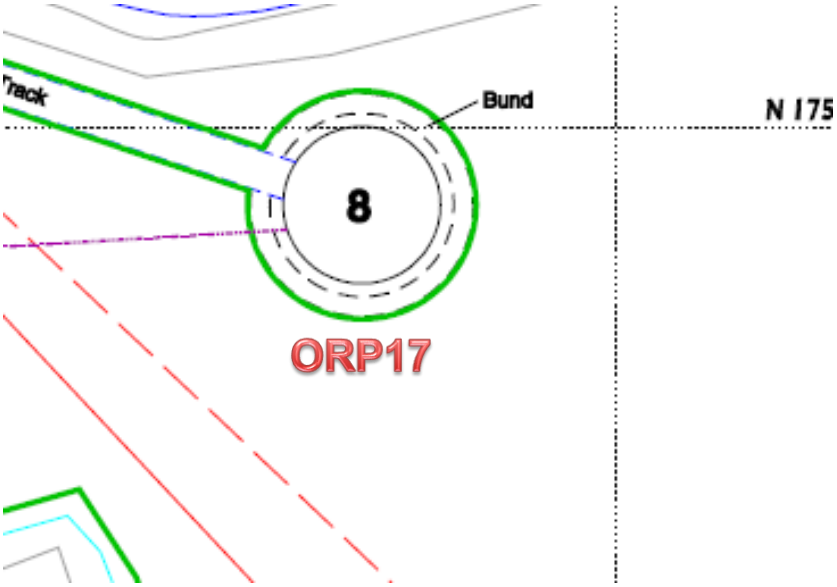
3.9 Leachate Lagoon

The leachate lagoon is a potential odour release point. With careful management the lagoon should cause no issues. The lagoon will house mainly surface water and rain water.



3.10 Leachate Tank

The leachate tank is a potential odour release point. With careful management the tank should cause no issues. The tank will house any leachate that is captured from the windrows.



4.0 ODOUR INVENTORY

In order to determine the points that require odour assessment and management a review of the composting process and odour potential for materials at each stage of the process is provided herein. The assessment identifies at which physical locations on site potentially odorous materials are stored, upper limits for storage amounts and the potential odour impact of those materials to inform management procedures.

4.1 Waste Reception

There are two separate waste reception areas on site; one located within the IVC building and one on the open windrow concrete pad. Green only waste is stored at the waste reception area in the reception barn which is covered by a roof; commingled and food only wastes are stored at the reception area within the IVC building. Storage limits defined by processing space on the concrete pad and batch size in each vessel as all material in the IVC is moved into tunnels at the end of each working day.

Location	Storage Limits	Odour Potential	Management
OW Concrete Pad Reception Area	>500t <7 days	Medium - High Material could be up to 2 weeks old and started to biodegrade. Depending upon the nature of the material, high nitrogen wastes e.g. cut grass, will have a higher odour potential.	Section 5.1
IVC Building Reception Hall	<300t <24hrs	Medium - High Material could be up to 2 weeks old and started to biodegrade when delivered to site. Food waste has a higher odour potential.	

4.2 Rejected Loads

In the abnormal incidents of loads requiring rejection there will be a requirement for holding material for a period of time prior to leaving the site. Depending on the contractual arrangements for the waste the material may be immediately loaded back onto the delivery vehicle thereby not requiring on site storage. Material can be rejected for different reasons, such as not being as described on the waste transfer note, being elevated in level of physical contamination, or being unsuitable for the composting process such as being too wet or too odorous. Storage limits will usually be set by the amount of waste to be rejected which is not expected to be above that of a usual delivery.

Location	Storage Limits	Odour Potential	Management
OW Concrete Pad Reception Area	<20t <24hrs	High Material could be rejected due to being abnormally odorous.	Section 5.1
IVC Building Reception Hall	<20t <2hrs	High Material could be rejected due to being abnormally odorous.	

4.3 Shredding

Material is shred in both processes prior to the active composting phase. Material is batch shredded and within 7 days for green only wastes and within 24hrs for food and commingled wastes. The odour potential of the material is elevated at this stage as material is agitated and the surface area is increased. In both systems material is continually moved from the shredding area into the active composting area to limit incidental storage. In the IVC material is moved into tunnels to form a new batch and on the OW pad shredded material is formed into windrows once shred. Incidental storage is therefore kept to a minimal 100t whilst waiting to be transferred for batch formation under both systems.

Location	Storage Limits	Odour Potential	Management
OW Concrete Pad Shredding Area	>500t <7 days	Medium - High Material processed within 7 days of receipt and agitation could release odour.	Section 5.2
IVC Building Reception Hall	<300t <24hrs	High Odour potential as per reception as material shred within 24hrs, increased release of odour due to agitation.	

4.4 Active Composting

Material is processed through two separate systems on site. Material is formed into 400t batches and processed through an open windrow turned system on the external composting pad for green only wastes. Within the IVC material is formed into 300t batches which are processed through a negative in-vessel aeration system for food only and commingled wastes.

Location	Storage Limits	Odour Potential	Management
OW Concrete Pad	<1200t <8 weeks	Medium - High Active phase has the potential for odour which diminishes as material ages.	Section 5.4
IVC Tunnels	<1600t <28 days	Medium - High Active phase has the potential for odour which diminishes as material ages.	

4.5 Optional Maturation

An optional period for external maturation in open windrows on product storage pad can take place for up to 2 weeks. Material is held for up to two weeks prior to screening and completion of the composting process.

Location	Storage Limits	Odour Potential	Management
Maturation pad.	<400t <2 weeks	Medium The material has completed the active composting phase and the odour potential of the material is reduced.	Section 5.5

4.6 Screening

Following the completion of each composting process, material is screened to remove small contaminants and to a grade suitable for the end market. Material at this stage has completed the active composting phase and is mature with a lower odour potential. Material is batch screened between completion of the composting process and moving into product storage. Given the losses during the composting process the amount in transitional storage during the screening is approximately half that of the batch at point of formation. Materials from both processes are screened at the dedicated screening area and only one batch at any one time.

Location	Storage Limits	Odour Potential	Management
Screening Area	<300t <5 days	Low - Medium The material has completed the active composting phase and the odour potential of the material is reduced. Agitation of the material may release odours.	Section 5.6

4.7 Product Storage

Following the completion of product screening, material will have completed the PAS100 requirements and reaches end of waste status. Material at this stage has completed the active composting phase and is mature with a low odour potential. Material is held often in combined batches of different grades prior to dispatch to end markets.

Location	Storage Limits	Odour Potential	Management
Product Storage Area	<1500t <12 months	Low The material has completed the active composting phase and the odour potential of the material is greatly reduced.	Section 5.7

4.8 Amendment Materials

In order to provide a suitable mix of carbonous and nitrogenous materials, a stock of amendment carbon based materials are held on site for blending purposes. This material is mainly used as an amendment for the IVC but can also be utilised for abnormal green waste loads such a large volumes of spring cut grass. The amendment material is a mix of compost oversize and large woody fresh materials, e.g. large branches and logs that are odour stable. These are specially selected by the operator to be held on site for addition as necessary to the IVC and abnormal green loads.

Location	Storage Limits	Odour Potential	Management
Amendment Materials Storage Area	<250t <6 months	Low The material is specially selected for low odour potential and is high in carbon for addition to the more unstable nitrogenous wastes.	Section 5.1

4.9 Leachate

All leachate resulting from composting operations on site is captured through the integral drainage and storage system. All external composting activities take place on concrete hardstanding and leachate drains to a dedicated leachate lagoon. Leachate arising within the IVC is retained within the integral drainage system and drained to a central leachate storage tank.

Location	Storage Limits	Odour Potential	Management
IVC Leachate Storage Tank	<90% capacity	High Leachate generation is elevated with high liquid content food wastes and with no dilution from rainwater has a high odour potential.	Section 5.8
External Leachate Lagoon	<90% capacity	Low - Medium Leachate within the lagoon is heavily diluted with rainwater falling on the pad, greatly reducing the odour potential.	

5.0 PROCESS MANAGEMENT

The following sections outline the waste recovery processes operated for the production of PAS100 compost through an IVC facility and then Open/Closed Windrow and the second process is a green waste open windrow system. The monitoring parameters, critical limits, process controls and records at each stage within the recovery process for the minimisation of the production of odours are provided herein.

The processing of source-segregated green and food waste is carried out in an IVC and Open Windrow composting system in line with PAS100 and the QP. Reference is made throughout to the sites Standard Operating Procedure (SOP) for the production of PAS100 compost.

5.1 Waste Reception

IVC

On arrival, vehicles are weighed on the site weighbridge and directed to the reception building where they unload into the specified tipping bay. Once offloaded, materials are inspected by site staff for contamination and any gross contamination removed by hand (i.e. large objects, plastics etc.).

At the same time the operator undertakes a visual assessment of the likely carbon to nitrogen balance and the likely moisture content to identify the need for the incorporation of other materials i.e. cardboard, woody material, water. Sufficient stocks of oversize and woody materials will be kept onsite to adjust the feedstock. Should the stock of amendments run low the site will either screen some compost to replenish the supply or shred some appropriate clean wood waste. Should the site exhaust all supplies of amendment materials, and not be able to obtain any further supplies, deliveries of feed stocks needing amendment materials will cease.

Potential Odour Issue	Monitoring	Critical Limits	Process Controls	Records
Delivery of moist highly nitrogenous material consisting mainly of grass or food.	Visual Inspection.	Present.	Isolate feedstock from remaining material, add amendment such as woodchip or oversize material and mix thoroughly to open up and aerate the material. On completion the blended material can be covered with woodchip or moistened screened compost which will aid in reducing any odorous emissions to the air.	Duty of Care Transfer Note.
Delivery of odorous material that is highly degraded which is not recoverable through mitigation measures.	Visual Inspection.	Present.	Reject load and inform waste supplier.	Duty of Care Transfer Note.
Feedstock material becoming odorous from storage prior to treatment.	Visual assessment and record sheets.	Feedstock shred within 24 hours of receipt and not stored over 300t.	Material will be shredded as soon as possible and within 24 hours of receipt. Stockpiled waste material shall not exceed 300t. Stockpiles will be “batch shredded” which will ensure that all the material available to be shred is processed, or failing that, the site will shred using a first in, first out system.	Batch record sheet.
ORP	1			

OWC

On arrival, vehicles are weighed on the site weighbridge and directed to the reception building where they unload into the specified tipping bay. Once offloaded, materials are inspected by site staff for contamination and any gross contamination removed by hand (i.e. large objects, plastics etc.).

At the same time the operator undertakes a visual assessment of the likely carbon to nitrogen balance and the likely moisture content to identify the need for the incorporation of other materials i.e. cardboard, woody material, water. Sufficient stocks of oversize and woody materials will be kept onsite to adjust the feedstock. Should the stock of amendments run low the site will either screen some compost to replenish the supply or shred some appropriate clean wood waste. Should the site exhaust all supplies of amendment materials, and not be able to obtain any further supplies, deliveries of feed stocks needing amendment materials will cease.

Potential Odour Issue	Monitoring	Critical Limits	Process Controls	Records
Delivery of moist highly nitrogenous material consisting mainly of grass or food.	Visual Inspection.	Present.	Isolate feedstock from remaining material, add amendment such as woodchip or oversize material and mix thoroughly to open up and aerate the material. On completion the blended material can be covered with woodchip or moistened screened compost which will aid in reducing any odorous emissions to the air.	Duty of Care Transfer Note.
Delivery of odorous material that is highly degraded which is not recoverable through mitigation measures.	Visual Inspection.	Present.	Reject load and inform waste supplier.	Duty of Care Transfer Note.
Feedstock material becoming odorous from storage prior to treatment.	Visual assessment and record sheets.	Feedstock shred within 7 days of receipt.	Material will be shredded as soon as possible and within 7 days of receipt. Stockpiles will be “batch shredded” which will ensure that all the material available to be shred is processed, or failing that, the site will shred using a first in, first out system.	Batch record sheet.
ORP	5			

5.2 Shredding

IVC

Following waste acceptance, a loading shovel is used to deposit the raw material into the hopper of the high speed shredder – a dedicated loading shovel is used to deposit the raw material in the hopper of the shredder (currently a Willibald 4800). The operator can select different loads to achieve the required mix; additionally the moisture content of the shredded material can be increased by spraying with leachate water captured from within the treatment tunnels.

Material is batch shredded before being loaded into the IVC tunnels, so obtaining the right carbon:nitrogen ratio during the shredding process is an important factor in reducing odour potential during the shredding and composting process. Typical C:N ratios of between 23:1 and 30:1 are optimal for the composting process. The site is adopting an optimal range of 25:1 to 30:1, given the inclusion of food waste, which equates to approximately 1 part green (nitrogenous) waste to 3/4 parts brown (carbonous) waste.

Potential Odour Issue	Monitoring	Critical Limits	Process Controls	Records
Release of odours to the environment during shredding.	Visual Assessment.	Dry material by visual assessment.	All shredding takes place within the sealed, negatively aerated waste reception hall. Should material entering the shredder be observed to be dry, tunnel leachate will be added to limit aerial dispersion.	Batch record sheet.
Odours released due to poor mix of feedstock materials.	Visual Assessment.	1:3/4 (green:brown) waste mix.	Waste selected for batch shredding is carried out by visual assessment of green:brown waste ratios. Where there is excessive green waste amounts, clean source-segregated wood is added to obtain the desired C:N ratio.	Batch record sheet.
Odours released from storage of feedstocks prior to tunnel loading.	Visual Assessment.	<300t	Waste awaiting to be loaded into the tunnels shall not exceed 300 tonnes and be loaded as soon as possible or within 24 hours of material being blended.	Batch record sheet.
ORP	1			

OWC

Following waste acceptance, a loading shovel is used to deposit the raw material into the hopper of the high speed shredder – a dedicated loading shovel is used to deposit the raw material in the hopper of the shredder (currently a Willibald 5500). The operator can select different loads to achieve the required mix; additionally the moisture content of the shredded material can be increased.

Material is batch shredded before being loaded into the sheds, so obtaining the right carbon:nitrogen ratio during the shredding process is an important factor in reducing odour potential during the shredding and composting process. Typical C:N ratios of between 23:1 and 30:1 are optimal for the composting process. The site is adopting an optimal range of 25:1 to 30:1 which equates to approximately 1 part green (nitrogenous) waste to 3/4 parts brown (carbonous) waste.

Potential Odour Issue	Monitoring	Critical Limits	Process Controls	Records
Release of odours to the environment during shredding.	Visual Assessment.	Dry material by visual assessment.	All shredding takes place within the sealed, negatively aerated waste reception hall. Should material entering the shredder be observed to be dry, tunnel leachate will be added to limit aerial dispersion.	Batch record sheet.
Odours released due to poor mix of feedstock materials.	Visual Assessment.	1:3/4 (green:brown) waste mix.	Waste selected for batch shredding is carried out by visual assessment of green:brown waste ratios. Where there is excessive green waste amounts, clean source-segregated wood is added to obtain the desired C:N ratio.	Batch record sheet.
Odours released from storage of feedstocks prior to tunnel loading.	Visual Assessment.	No limit.	Waste awaiting to be loaded into the tunnels shall not be limited to 500 tonnes but will be loaded as soon as possible or within 7 days of material being blended.	Batch record sheet.
ORP	5			

5.3 Concrete Apron

IVC

Material is moved between barriers via a concrete apron between each run of bays. This area drains the concrete hardstanding and where any leachate seeps out beneath the clamps. Management of this area is required in order to prevent blockages and ponding on the impermeable concrete surface.

Potential Odour Issue	Monitoring	Critical Limits	Process Controls	Records
Blockage of drainage system from spilt compost/wastes.	Visual Inspection.	Present.	Daily inspections of the concrete apron are made and following material movements. Drains and concrete areas are swept to prevent blockages.	Daily Checklist.
Ponding of concrete apron following heavy rainfall.	Visual Inspection.	Present.	If heavy rainfall leads to ponding on the apron surface, an operative will immediately brush excess surface waters into the drain.	Daily Checklist.
ORP	4			

5.4 Active Composting Phase

IVC

After shredding, the feedstock is transferred to the composting tunnels using a front loader. The IVC building consists of 16 bunkers forming barriers A-H and 1-8. Bunkers are loaded to an approximate amount of 80 – 100 tonnes and the rolling shutter door is closed.

The barrier 1 tunnels are actively aerated via pipes incorporated into the floor of the tunnels. A proportion of the air flow is re-circulated through the tunnels and the temperature (in the compost) and oxygen concentration (in the airflow) continuously monitored to ensure aerobic conditions and compliance with the requirements of the ABPR. Once the ABPR temperature (and retention time) requirements have been achieved, if temperatures rise to 70°C or oxygen depletes to less than 10% additional fresh air is introduced. Any air which is not recirculated is directed to dedicated biofiltration units to abate odours prior to release to atmosphere. After typically 4 weeks the waste will have been turned a minimum of 8 times and the batch at the end of the system goes to batch formation and mixed with the weeks batch. Turning days are Monday, Tuesday, Thursday and Friday. The material is cooled by turning between bays.

To minimise the potential for odours and to maintain air quality for operatives inside the doors of the IVC can be completely sealed, extractor fans create negative pressure in the building and the exhaust air from the fans are directed through biofilters in the roof.

A 'squeeze' test, for all moisture testing, of materials will be conducted using procedures in accordance with BS EN 12579 by a suitably trained site operative to check moisture content as per section 5.10.

Potential Odour Issue	Monitoring	Critical Limits	Process Controls	Records
Tunnel too dry leading to slow process and material backlog.	Moisture Monitoring.	Moisture Index: 5	Additions of water to compost should be done on a little and often basis. If additional moisture is required by monitoring moisture content less than the critical limit, fresh runoff water is applied directly to the tunnel.	Batch record sheet.
Tunnel too wet leading to anaerobic conditions.	Moisture Monitoring.	Moisture Index: 1-2	The compost tunnels are free draining onto an enclosed drainage system to enable runoff from excessive moisture content. Aeration of tunnels will aid the drying of material to prevent high moisture levels occurring. If elevated moisture levels are encountered, additional air is introduced as soon as possible to fully aerate.	Batch record sheet.
Tunnel not in optimal temperature range for composting.	Temperature Monitoring.	Barrier 1: > 60^{0}C.	Compost is formed into tunnels of adequate size in order to generate required temperatures during active composting phases. Should temperature become elevated above critical limits, tunnels will be flushed with fresh air as soon as possible to fully aerate.	Batch record sheet.

Tunnel becoming anaerobic due to lack of oxygen within the material.	Temperature and Moisture Monitoring.	Barrier 1: As above	Compost is fully aerated to ensure adequate levels of oxygen within the tunnels. Oxygen levels are directly related to temperature and moisture levels. Where these are elevated above critical limits, tunnels will be flushed with fresh air as soon as possible to fully aerate.	Batch record sheet.
ORP	4			

OWC

The Batch formation during the open windrow stage will be based on a maximum available batch size of 150 tonnes to progress through to the stabilisation stage of the process. Temperature logging is recorded daily in the first two weeks then weekly in the last six weeks. Moisture correction is undertaken during the shredding stage by mixing in green waste materials. Residency times are 2 weeks for the sanitisation stage of the process.

Potential Odour Issue	Monitoring	Critical Limits	Process Controls	Records
Tunnel too dry leading to slow process and material backlog.	Moisture Monitoring.	Moisture Index: 5	Additions of water to compost should be done on a little and often basis. If additional moisture is required by monitoring moisture content less than the critical limit, fresh runoff water is applied directly to the tunnel.	Batch record sheet.
Tunnel too wet leading to anaerobic conditions.	Moisture Monitoring.	Moisture Index: 1-2	The compost windrows are free draining onto an enclosed drainage system to enable runoff from excessive moisture content. Aeration of tunnels will aid the drying of material to prevent high moisture levels occurring. If elevated moisture levels are encountered, additional air is introduced as soon as possible to fully aerate.	Batch record sheet.
Tunnel not in optimal temperature range for composting.	Temperature Monitoring.	> 65^{0}C.	Compost is formed into windrows of adequate size in order to generate required temperatures during active composting phases. Should temperature become elevated above critical limits, tunnels will be flushed with fresh air as soon as possible to fully aerate.	Batch record sheet.
Tunnel becoming anaerobic due to lack of oxygen within the material.	Temperature and Moisture Monitoring.	Barrier 1: As above	Compost is fully aerated to ensure adequate levels of oxygen within the tunnels. Oxygen levels are directly related to temperature and moisture levels. Where these are elevated above critical limits, tunnels will be flushed with fresh air as soon as possible to fully aerate.	Batch record sheet.
ORP	6			

5.5 Windrow Formation

OWC	IVC

Following the sanitisation phase the compost is transferred to the batch formation shed batches are formed together ready for open windrow composting. **The dimensions of each windrow shall be approximately 2.5 metres high, 6 metres wide and 13 metres long**. Gaps of suitable width to enable turning/monitoring and litter picking will be left between the windrows. The base of the windrows will be formulated from compost oversize to allow the windrow to aerate.

When a windrow is small the core zone of the pile may not reach ambient temperatures and will therefore lose its heat very rapidly. As a result this can lead to moisture being retained in the windrow meaning it is a cooler windrow. High temperatures are required to ensure pathogens and weed seeds are killed off. The industry standard for the height of a windrow is 3m with height not being the cause of odour unless it is too small and anaerobic conditions start to occur. Oxygen consumption by microbes ensures the compost is degrading, however when there is a lack of oxygen the composting process slows down and odours may result. To reduce the likelihood of odours the windrow must be at the correct height (2.5m) with the optimum oxygen and moisture content. These can be achieved with regular monitoring and regular turning. The readings from the monitoring will determine when the windrows should be turned and when moisture needs to be added. Dr Kiara Zennaro, Senior Technical Officer of the Organics Recycling Group states that the typical height of the windrow is 3.5m and this is considered good practice.

A larger windrow will have a smaller surface area to volume ratio and will therefore reduce the surface area of an odorous material; this will cut the rate of evaporation

The stabilisation phase is a minimum 8 week process during which time monitoring equipment will be used for temperature monitoring and moisture levels will be assessed by grip test to ensure critical limits for composting are being met. During this period a minimum of 8 turns are made to fully incorporate the compost by loading shovel. The last week of stabilisation takes place under cover.

A 2 week optional maturation period can take place on the Maturation Pad. See section 5.10 for process monitoring frequencies.

Potential Odour Issue	Monitoring	Critical Limits	Process Controls	Records
Windrow oxygen levels low leading to anaerobic conditions	Temperature and Moisture Monitoring.	As below	Oxygen levels are directly related to temperature and moisture levels. Where these are elevated above critical limits, windrows will be turned as soon as possible to fully aerate.	Batch record sheet.

Windrow too dry leading to slow process and pad backlog.	Moisture Monitoring.	Moisture Index: 5	Additions of water to compost should be done on a little and often basis. If additional moisture is required by monitoring moisture content less than the critical limit, fresh runoff water is applied directly to the windrow. Too much water should not be added as it will generate excessive runoff onto the composting pad.	Batch record sheet.
Windrow too wet leading to anaerobic conditions.	Moisture Monitoring.	Moisture Index: 1-2	The compost windows are free draining onto a concrete pad to enable runoff from excessive moisture content. If elevated moisture levels are encountered, windrow is turned as soon as possible to fully aerate.	Batch record sheet.
Windrow not in optimal temperature range for composting.	Temperature Monitoring.	45-80^{0}C.	Compost is formed into windrows of adequate size in order to generate required temperatures during active composting phases. Should temperature become elevated above critical limits, windrows will be turned as soon as possible to fully aerate.	Batch record sheet.
Evaporation from windrow surface.	Visual Assessment.	Large amounts of steam from windrow by visual assessment.	Should there be large amounts of steam visible from a composting windrow, the windrow will be turned as soon as possible in order to fully aerate.	Batch record sheet.
Release of odour during windrow turning.	Visual assessment and record sheets.	Weekly turning.	A regular turning regime is implemented in line with PAS100 that ensures aerobic conditions within the windrow. Turning is carried out regularly but can be increased should there be visual signs of a requirement to do so e.g. steaming windrow.	Batch record sheet.
	Local Time.	Outside of core hours.	Where outside of core hours, turning of compost windrows shall not take place.	Site Diary.
ORP	10 and 14			

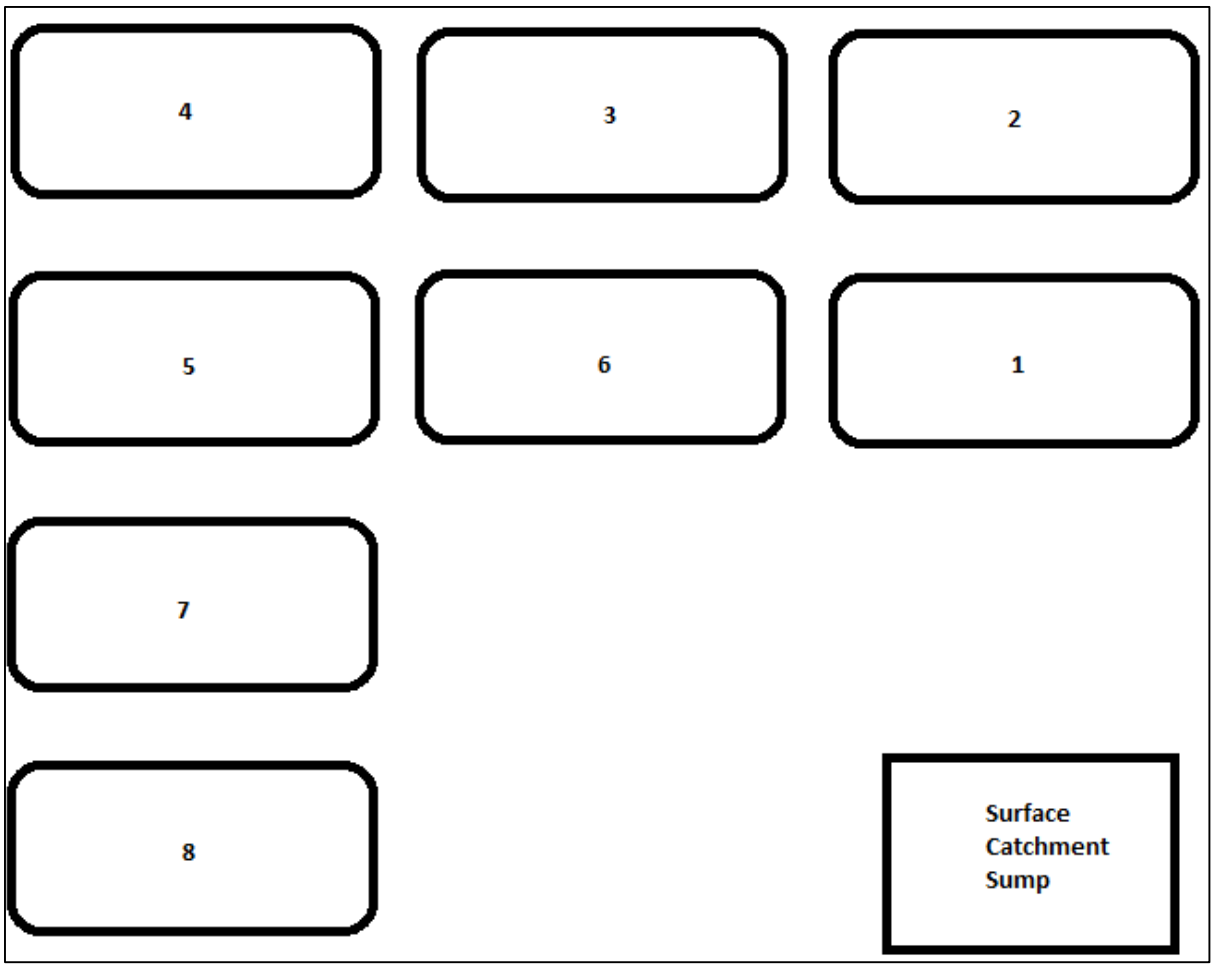


Figure 2 – General Windrow Layout with Drainage Sump (not to scale)

The composting pad has enough space to allow 8 windrows to be managed simultaneously with vehicles able to turn the windrows. The windrows are turned from windrow 1 into windrow 2, from windrow 2 to windrow 3 and so on until the composting phase is complete, there is also a 2m aisle between each windrow to allow turning and drainage to take place. There is a fall in the compost pad to ensure all liquid drains to the surface catchment sump. The leachate from windrows will be sanitised as the food and green waste will have gone through this phase as a result there will be no contamination. The windrows will not become saturated as all windrows are built in line with the fall in the pad.

Figure 3 below shows the core zone in which the temperature probe must be inserted to, this will ensure the core zone temperature is monitored. A hand held temperature probe should be inserted at a minimum of 0.5 metres below the windrow surface according to PAS100:2011.

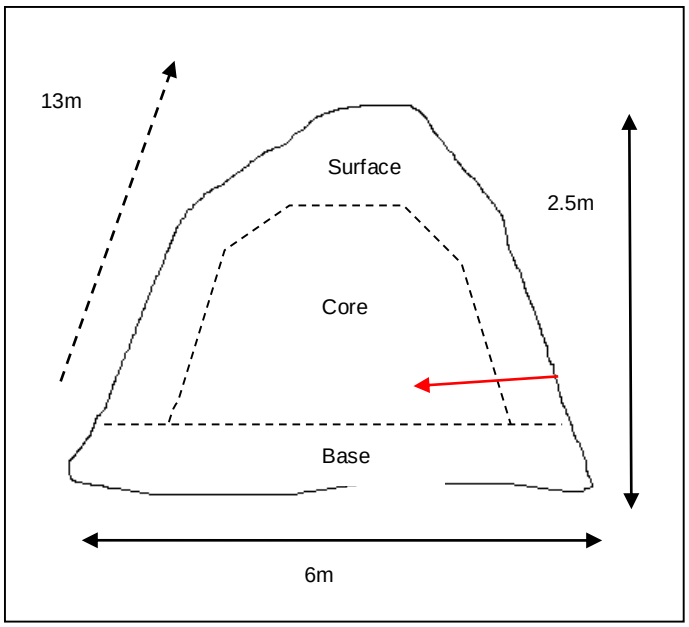


Figure 3 - Typical Batch Zones

5.6 Screening

IVC	OWC

Screening of the compost following the active composting phase shall be carried out with a Trommel and result in a 0-30 mm soil improver, certified to PAS 100 & CQP. Screening of the final product to remove contrary materials and produce a uniform sized product is undertaken using a Doppstadt 620. The date(s) on which each batch is screened and its batch code shall be recorded on the batch record sheet. Oversize material coming off the screen shall only be re-composted if visual assessment confirms that physical contaminants will not adversely affect the composting process or prevent effective control of compost quality (as stated in the quality policy). Addition of oversize material to a batch of composting material shall only be carried out when it is being formed. If the oversize material is too heavily contaminated for re-composting, it shall be rejected and disposed of.

Screening of matured material can result in increased emissions due to agitation. However screening is typically not a significant odour source unless the material has become anaerobic or is still actively composting. The latter is prevented through robust monitoring and management as identified in the table below.

Potential Odour Issue	Monitoring	Critical Limits	Process Controls	Records
Release of odorous compounds to the atmosphere.	Monitoring records.	Composting process complete.	Compost that is to be screened shall only take place if the material has completed the active composting phase and met the critical limits throughout this period.	Batch record sheet.
	Local Time.	Outside of core hours.	Where outside of core hours, screening of compost shall cease.	Site Diary.
ORP	10 to 13			

5.7 Product Storage

IVC	OWC

Products are stored on the concrete storage pad to the south of the site, following screening ready for dispatch to the end markets. Each product batch is identifiable in its storage location by a marker that displays its unique product batch code. Each product batch contains compost from no greater than 6 batches and may be stored for a maximum of 12 months before dispatch to the customer. Most of the compost goes to the land owned by Penllyn Estates however small proportions will be available to the public and for sale when PAS100 certification is in place. Most of the compost will therefore be sent out to land.

During product storage there is not a significant source of odour generation given the age of material at this point following a full 12 week minimum composting process. However if oxygen, moisture and temperature are not controlled the biological processes can re-accelerate and result in the onset of anaerobic conditions. The process control is outlined below.

Products will be stored no higher than 3m to ensure that the centre of the pile does not become too high in temperature with minimal levels of oxygen.

Potential Odour Issue	Monitoring	Critical Limits	Process Controls	Records
Release of odorous from anaerobic product storage conditions.	Visual Assessment.	Steaming from product storage piles. Temperature: >45^{0}C	Compost that is to be stored shall only be of material has completed the active composting phase and met the critical limits throughout this period. Should any visual signs of steaming from the product storage pile be identified, temperature readings are taken and if temperatures exceed the critical limit, stockpiles are turned to fully aerate.	Site Diary.
ORP	12 and 15			

5.8 Site Infrastructure

The dedicated composting facility has infrastructure to control emissions from site at various stages of the process, namely leachate management and biofilter units.

Biofilter

The 16 bunkers incorporate biofilters to abate odour generated during the most active stage of the compositing. The biofilters are constructed of chipped oversize material (effectively woodchip); the dimensions of the biofilters are 5m by 20m by 1m depth and receive an air flow rate of up to 17,500m^3/hour. Fans are also being constructed inside the building.

Management of the bio-filter includes moisture and temperature monitoring, performance monitoring and the establishment of a maintenance schedule. The efficacy of the biofilter will be reviewed at least biannually in line with ammonia monitoring of the biofilter.

When working at maximum capacity the biofilter system will require regular inspection, monitoring and maintenance to ensure optimal performance and therefore the following monitoring will be conducted: A daily visual inspection of the condition of the biofilter media of both biofilters shall be conducted by a trained operative, to identify areas of drying, weed growth, siltation, shrinkage of the bed, cracks and fissures, *etc.* The results will be recorded on the Biofilters Daily Inspection Form and any remedial action taken as necessary. There shall be regular monitoring of temperature and moisture levels of the biofilters. Results will be recorded electronically, and summarised on the Daily Biofilters Inspection Form.

Potential Odour Issue	Monitoring	Critical Limits	Process Controls	Records
Biofilter too dry leading ineffective absorption of odorous compounds.	Moisture Monitoring.	Moisture Index: 5	Additions of water to the biofilter should be done on a little and often basis. Water is added to the biofilter routinely to prevent drying out via a fresh water sprinkler system. Too much water should not be added as it will generate excessive runoff and potentially flood the biofilter media.	Site Diary.
Biofilter too wet leading to anaerobic conditions.	Moisture Monitoring.	Moisture Index: 1-2	Warm air from the IVC is constantly fed through the biofilter. Should moisture levels exceed the critical limit for the biofilter, the sprinkler system will be turned off and air purged through the aeration system to dry the biofilter material out.	Site Diary.
Biofilter not in optimal temperature range for performance.	Temperature Monitoring.	>40^{0}C.	Elevated temperature readings indicate that biodegradation of biofilter media is occurring. Should temperature become elevated above critical limits, media will be inspected and replaced as required.	Site Diary.
ORP	3			

Drainage System

The waste reception hall and in-vessel bays are connected to an integral drainage system which drain all sanitisation phase leachate and runoff waters. Gullies direct leachate to drains which feed separate leachate storage tanks. These tanks are sealed and stored underground to prevent odour release. Routine monitoring is carried out to ensure tanks are operating below maximum capacity. A HiSpect 2300 is used to tanker the leachate to a waste treatment facility.

Potential Odour Issue	Monitoring	Critical Limits	Process Controls	Records
Release of odorous from overflowing leachate storage tanks.	Dip reading.	<90% Capacity.	In order to prevent the overflowing of leachate storage lagoons, dip readings are taken weekly to ensure that levels are within 90% of tank capacity. When this critical limit is met, leachate is pumped out within 24hrs and disposed of to a suitably licensed facility.	Site Diary.
Blocking of drains leading to pooling of leachate on concrete surfacing.	Visual Assessment.	Particulate blockages.	Daily site inspections are made to ensure that no drains are blocked by loose compost. Where identified, material is swept up immediately and re-processed as soon as practicably possible.	Site Diary.

Leachate Tank

Leachate collecting on the maturation pad is drained to a submersible pump. The leachate is pumped to the tank when levels are appropriate for the pump to be triggered. If anaerobic conditions form in the tank there is the potential for odour to be emitted and therefore routine monitoring and control measures are required to prevent the onset of anaerobic conditions.

Potential Odour Issue	Monitoring	Critical Limits	Process Controls	Records
Release of odorous from anaerobic leachate storage conditions.	Visual Assessment.	Tank aerator operational.	In order to prevent odorous releases from the leachate tank, an aeration system will be installed to prevent anaerobic conditions occurring. The aeration system will be an expanded clay ball which floats on top of the liquid. The clay ball is inoculated with organisms which breaks down odours. Should there be a mechanical breakdown of the aerator, repairs will be made within 24hrs.	Site Diary.
ORP	17			

Leachate Lagoon

Liquid will only be collected in the lagoon as a secondary containment measure. If the tank fill or if the tank fails the liquids will be directed to the lagoon to protect the drains in the surrounding area.

Leachate at the IVC is collected via gullies leading to underground drainage and an underground tank.

Potential Odour Issue	Monitoring	Critical Limits	Process Controls	Records
Release of odorous from anaerobic leachate storage conditions.	Visual Assessment.	Lagoon aerator operational.	In order to prevent odorous releases from the leachate lagoon, an aeration system has been installed to agitate the leachate and prevent anaerobic conditions occurring. Should there be a mechanical breakdown of the aerator, repairs will be made within 24hrs.	Site Diary.
ORP	16			

5.9 Management System

The CCL Management System includes details of maintenance and housekeeping schedules. Housekeeping and cleaning schedules ensure organic material does not adhere or aggregate in any areas of the site to produce an odour. Each IVC tunnel shall be thoroughly cleaned after each batch to ensure odour control and prevent cross-contamination.

The IVC reception shall also be cleaned regularly to prevent odour and/or attraction of pests. The Management System shall also include within the Maintenance and Inspection Schedules for the Biofilter.

5.10 Process Monitoring

Additional information regarding the specific monitoring regimes for the waste treatment processes are presented within the sites Standard Operating Procedures. Table 3 below identifies the monitoring frequency for the various parameters as identified throughout section 3, as well as the calibration schedule for monitoring equipment.

Table 3 - Process Monitoring Frequency

Parameter	Process Stage	Frequency	Calibration
Temperature	Bunkers	Four probes per bay, taken every 2 minutes. Records kept on computer.	12 monthly.
	OW Sanitisation.	Hand held temperature probe measuring 4 points per windrow 1.5m below windrow surface.	

Parameter	Process Stage	Frequency	Calibration
	OW Stabilisation.	Hand held temperature probe measuring 3 points per windrow 1.5m below windrow surface.	
	Maturation (if applicable).	Hand held temperature probe measuring 4 points per windrow 1.5m below windrow surface.	
	Biofilter.	Weekly.	
Moisture	Bunkers	3 times a week.	Calibrated to dry oven and balance 12 monthly.
	OW Sanitisation	Daily.	
	OW Stabilisation	Weekly.	
	Maturation (if applicable).	Weekly.	
	Biofilter.	Weekly.	
Back Pressure	Biofilter.	Daily.	Annually.

5.11 Temperature

Temperature monitoring is carried out during the in-vessel stage and during maturation on the maturation pad. Details of the systems employed are identified below.

Table 4 - Temperature Monitoring Regime

Process Stage	Monitoring Procedure
In-Vessel (Bunkers)	Four probes per bay, taken every 2 minutes. Records kept on computer.
Open Air (Sanitisation)	Hand held temperature probe measuring 4 points per windrow 1.5m below windrow surface.
Open Air (Stabilisation)	Hand held temperature probe measuring 3 points per windrow 1.5m below windrow surface.
Open Air (Maturation – if applicable)	Hand held temperature probe measuring 4 points per windrow 1.5m below windrow surface.

Although the probes will reach the core zone where the temperatures will be read the temperatures at the edge of the windrow will be lower. However the turning schedule will ensure that this area does reach the temperatures required during sanitisation and stabilisation.

Under PAS100:

1 in core zone per 250 m^3 of batch if its total volume ≥ 750 m^3
Temperature monitoring points not required in surface and base zones as it is turned. The windrow size is 390m^3 and as such the number of monitoring points is adequate for its size.

5.12 Moisture

A 'squeeze' test, for all moisture testing, of materials will be conducted using procedures in accordance with BS EN 12579 by a suitably trained site operative to check moisture content as follows:

The sample of the material is selected in accordance with the standard then grasped and clenched in a gloved hand for approximately ten seconds, then the hand is opened and the moisture content assessed using the information below.

Table 5 - Moisture Assessment Index

Index number	Sample Moisture Behaviour	Interpretation
1	Water seeps out	Too wet
2	More than one droplet appears	Too wet
3	One droplet appears	OK
4	Compost particles remain packed together and no droplets appear	OK
5	Compost particles fall away from each other	Too dry

Figure 4 below shows the core area of the compost windrow. As the temperature probes will be inserted to a depth of 1.5m the readings will indicate core zone temperatures as the core area is large. A 1.5m probe will be more than effective at taking a core zone reading. For moisture the readings will be taken using the method stated in section 5.12 and by a suitably trained employee. The moisture can be read at a greater depth by collecting compost from within the core zone. The compost can be dug out of the windrow to ensure the reading is taken from the core zone.

A larger windrow will have a smaller surface area to volume ratio and will therefore reduce the surface area of an odorous material; this will cut the rate of evaporation.

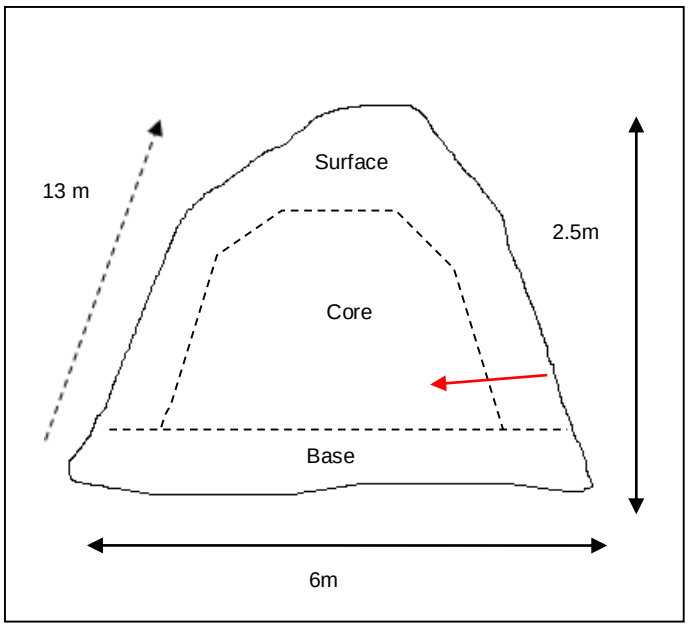


Figure 4 - Typical Batch Size and Zones

The red line shows that the 1.5m monitoring probe will penetrate to the core zone of the composting pile (this is also reflected in Figure 3).

5.13 Oxygen Monitoring

Oxygen monitoring is undertaken at the sanitisation phase with an automated system controlled as part of the in-vessel aeration system. The airflow into each vessel is controlled by an air handling system and have individual aeration arrangement. Optimum oxygen levels can be maintained within each vessel by adjusting the airflow. Fresh air is introduced into the vessel via the aeration fan. Oxygen is continually monitored to ensure that the aerobic conditions are maintained. The system automatically increases airflow where oxygen levels drop below optimum composting levels (10%).

Oxygen monitoring is not undertaken during open windrow composting on the external maturation pad. Obtaining accurate gas readings from an open structure are inherently complex and the accuracy of measured readings can be limited. Furthermore where high temperatures are encountered such as within compost windrows issues regarding evaporation at the sensor can lead to false readings. Oxygen measurements from composting systems operated at high temperatures cannot be used directly to assess whether conditions are aerobic or anaerobic[8]. Further uncertainty over the threshold values for oxygen levels dependent upon waste feedstocks indicate unsuitability of direct oxygen monitoring:

"..saturation concentrations below 2 parts per million (ppm) in active composting systems may not prevent anaerobic conditions from developing. Highly active or wet materials, such as food waste, may require 3 ppm or more of dissolved oxygen to prevent anaerobic conditions and their associated odours."[6]

[8] Environment Agency (2012) *Odour Technical Guide 03: Oxygen Solubility in Compost - Version 1.0.*

In order to ensure aerobic conditions are being met, management processes will be employed at all stages of the composting process including:

- Feedstock blending to appropriate structure and ratio
- Moisture and temperature monitoring to ensure active biodegradation can take place
- Turning as required by monitoring parameters to fully aerate each windrow.

CCL actively manage the composting process to ensure the correct structure and ratio is maintained. Moisture readings are undertaken regularly by a trained site operative and calibrated temperature probes take readings of the windrows. Turning is undertaken to ensure the windrows are fully aerated.

Should an appropriate method for accurately monitoring direct oxygen levels within an open windrow be made available then this will be carefully considered against current management processes and based upon odour history at the facility. Cowbridge Compost Ltd will not be undertaking oxygen monitoring as the EA recognise the inaccuracy of this procedure and as a result CCL do not consider it appropriate to at this stage.

5.14 Contingency Planning

Should the above process controls fail at any point within the processing of wastes through either of the operational processes, acceptance of waste into the site will cease and the odorous material taken off site for disposal at a suitably licensed waste management facility. Receipt of feedstock materials shall not recommence until a full review of this Odour Management Plan has been conducted and process controls (including critical limits) amended as required.

5.15 Internal Odour Assessment and Monitoring

CCL will carry out odour checks at 6 points around the perimeter of the site on a daily basis. Findings will be recorded in the Odour Assessment Report (Annex B) or noted in the site diary. The odour assessor may not be subject to significant compost odour in the 30 minutes prior to the assessment. This is to ensure that the assessor is not suffering from odour fatigue and will be sensitive to composting odours. Any odours found to be present onsite will be recorded and their source investigated and steps will be taken to mitigate the sources of odours using the strategies to control odour as outlined above. The internal monitoring procedure, including a survey of odour reports will be re-assessed on a yearly basis by the Operations Manager and the Managing Director, unless the number of odour incidents warrants additional reviews.

5.15.1 Passive Odour Management

There will be scraping up remaining areas to minimise, where reasonably practicable, any materials that are left on edges or corners of the site are undertaken daily.

The site operates to a standard operating procedure and to BSI PAS 100:2011 where material on site is batched and traceable. Batches will be monitored for temperature once they have

been placed in the maturation stockpile. Through undertaking recognised best practice will minimise any opportunities for odour generation from the site.

5.16 Daily Checks

A Daily Checklist (Annex C) has been produced which is to be carried out daily and available to the EA on inspection. The checklist will be filled in daily by the site manager in order to monitor the site cleanliness and weather conditions which may affect odour controls. The monitoring will take place on a daily basis and is designed to reduce the potential for odour. This checklist will be kept in the site office and will be produced upon the request of the EA.

6.0 EVAPORATION

Evaporation from the open-air stabilisation system is likely to be prevalent given the nature of the process and external location. Over the 8 weeks of managed stabilisation, compost moisture levels can drop from 65% to 40% representing a loss (predominantly of moisture) of the total weight of the windrow. The moisture within the compost is lost to the atmosphere through evaporation from the surface of the windrow, and may be the vector for odorous chemicals to enter the atmosphere. As detailed within Section 3 there are several process controls in place to minimise the evaporation potential of the composting processes.

In summary, the process controls include the moisture monitoring of PAS100 compost to ensure that the composting process is in line with industry guidelines. This will prevent an overly wet windrow being formed on the composting pad which could lead to elevated levels of evaporation from the site. In addition, the PAS100 compost is regularly turned in order to fully aerate and incorporate material from the windrow surface, core and basal zones. This turning, in addition to other process controls, will prevent the creation of anaerobic conditions which will enable the production of odorous compounds which could then be lost to the atmosphere through evaporation. In order to reduce the additional potential for odour during the management of the active composting process, turning of compost will not occur whilst the wind is blowing from an NNW direction.

6.1 Leachate Lagoon and Tank

The open air leachate lagoon is a potential source of evaporation from the site. There are currently no options available for containing evaporation from this source. Although the lagoon could be covered to reduce evaporation directly from the surface, the build-up of odorous compounds beneath such a cover would only lead to an exacerbated release during lagoon inspection for maintenance purposes. The connection of the lagoon to a biofilter is also not an option given the site logistics.

In order to control evaporation from the leachate tank the process controls are implemented through management techniques for the leachate storage. In order to reduce the potential odour, an aerator which is a clay ball will have been installed which prevents anaerobic conditions occurring within the tank by constant agitation. The tank will be regularly emptied to ensure capacity is not above 90% within which the aerator can competently still agitate the leachate to remain aerobic. The lagoon will be secondary containment, as a result only rain water should collect in here unless there are issues with the tank in which the tank needs to be emptied into the lagoon. If the tank over flows the bund around the tank will collect this and can be diverted into the lagoon.

7.0 CONTAINMENT AND ABATEMENT

The site currently employs containment, during the IVC facility phase, and abatement, during the open-air maturation phase, techniques for the control of odours. Details of both systems are outlined below.

7.1 IVC Containment System

Process air is passed through biofilters to abate odour generated during the most active stage of the compositing process. The biofilters are constructed of chipped oversize material (effectively woodchip); the dimensions of the biofilters are 20m (l) x 5m(w) x 1m (d) and receive an air flow rate of up to 17,500m^3/hour.

The media in the biofilters will overtime require both remixing and replenishment to maintain the level of odour abatement, or replacement. Whilst the need for such operations will be driven by the findings of the routine performance monitoring, the need for additional material to be added to the biofilters should be assessed on an annual basis to ensure the depth of media is adequate.

During media replacement, a quantity of the existing media will be incorporated into the replacement media to ensure rapid establishment of a suitable microbial population. The frequency of routine monitoring of emissions should be increased for 1-month following media replacement.

Given the open windrow system employed on site, there is little scope for a containment system at present time on the maturation pad. Should there be a change to the site operational procedures, the inclusion of containment systems will be assessed against the effectiveness of such a system and cost of installation. However, the batch formation takes place under a shed and will remain there for one week and the last week of stabilisation takes place under the shed.

7.2 Abatement System

Deodorisers are an optional odour control that can be employed on site at the maturation pad surrounding this portion of site activities and at the shredding stage prior to sending waste to the IVC. The efficacy of such systems will vary according to the meteorological conditions and is used as a back-up to the operational techniques to minimise odour generation as considered necessary by the operator.

All routine and non-routine maintenance on the system is recorded in the site diary. The deodorisers will be monitored and their effectiveness evaluated in controlling and or minimising odours in order to select the most effective system for the site and its specific requirements.

8.0 DISPERSION

The following section identifies the prevailing weather conditions on site, in particular the wind direction in order to predict the path of likely aerial dispersion of odours generated on site.

By constant monitoring and even forecasting of poor dispersion conditions, CCL can trigger contingency measures to temporarily enhance other odour controls.

Information on wind direction has been derived from the onsite weather station during 2012 (data collected automatically every 15 minutes). This data is illustrated by the wind rose in Figure 3. Wind data is collected daily as part of the routine monitoring on site. 16 point wind directions are provided below, note that calm days are also included to provide a complete data record.

Table 6 - Wind Direction Data

Wind Direction (from)	**N**	**NNE**	**NE**	**ENE**	**E**	**ESE**	**SE**	**SSE**
% Occurrence	6	7	11	31	15	2	4	2
Wind Direction (from)	**S**	**SSW**	**SW**	**WSW**	**W**	**WNW**	**NW**	**NNW**
% Occurrence	3	4	6	1	0	0	2	6

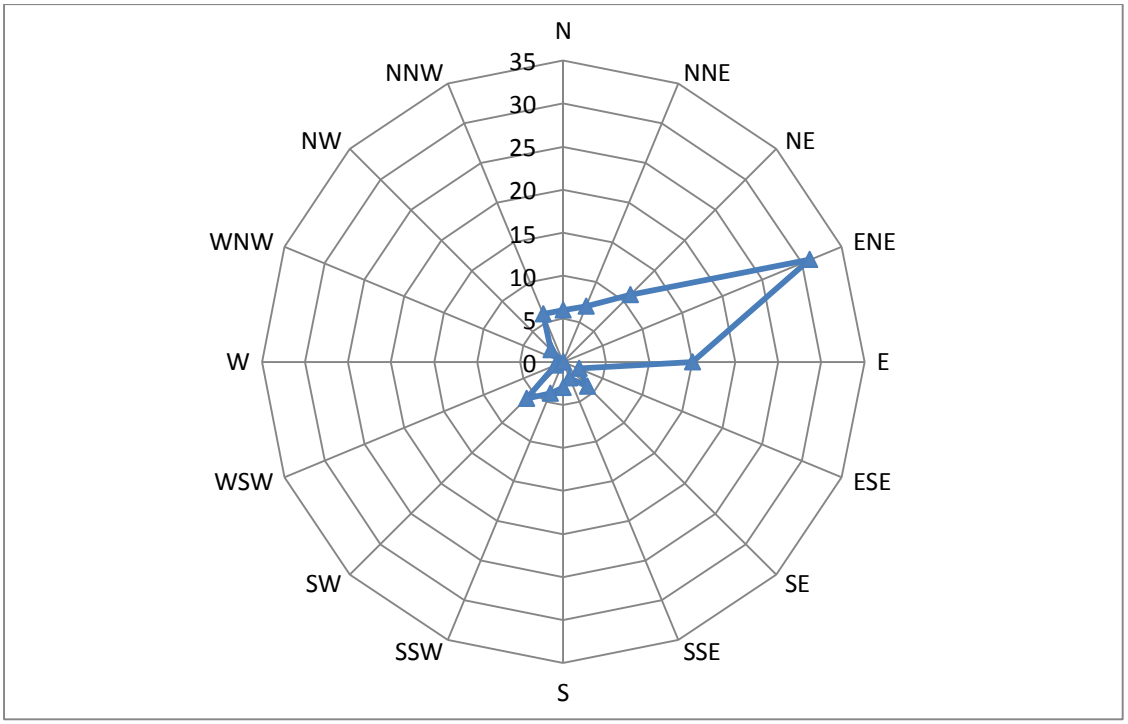


Figure 3 - Wind Direction Rose for CCL Weather Station 2012

CCL operate a Davis Vantage weather station on site. The station records wind speed and direction, temperature, relative humidity, and rainfall, and enables the site management team to monitor site specific weather conditions. In addition to the site weather monitoring station, the site has erected a wind sock to provide an instant visual guide as to the wind strength and direction to assist site operative carrying out daily operations on site.

7.0 SENSITIVE RECEPTORS

There are potential sensitive receptors within 250m of the main waste reception hall, sanitisation phase in-vessel processing and maturation pad. The distance from the processing tunnels by wind direction are provided in Table 7. This is presented on a map of the local area in Figure 4 with compass directions provided.

Table 7 - Distance to Nearest Identified Sensitive Receptors

General Wind Direction (To)	Occurrence (%)	Nearest Sensitive Receptor	Distance From Site (m)
N	3	Residential Properties	1930
NNE	4	Residential Property	2152
NE	6	Farm	1175
ENE	1	Farm	1351
E	0	Maendy Road	2151
ESE	0	Residential Properties	1937
SE	2	Residential Properties	376
SSE	6	Penllyn Estate Dairy Farm	>200
SSE	6	Penllyn Estate Residential Property	227
S	6	A48	594
SSW	7	Road	227
SW	11	Church	1189
WSW	31	Farm	984
W	15	Residential Property	1117
WNW	2	Residential Property	1247
NW	4	Residential Property	871
NNW	2	Residential Property	1206

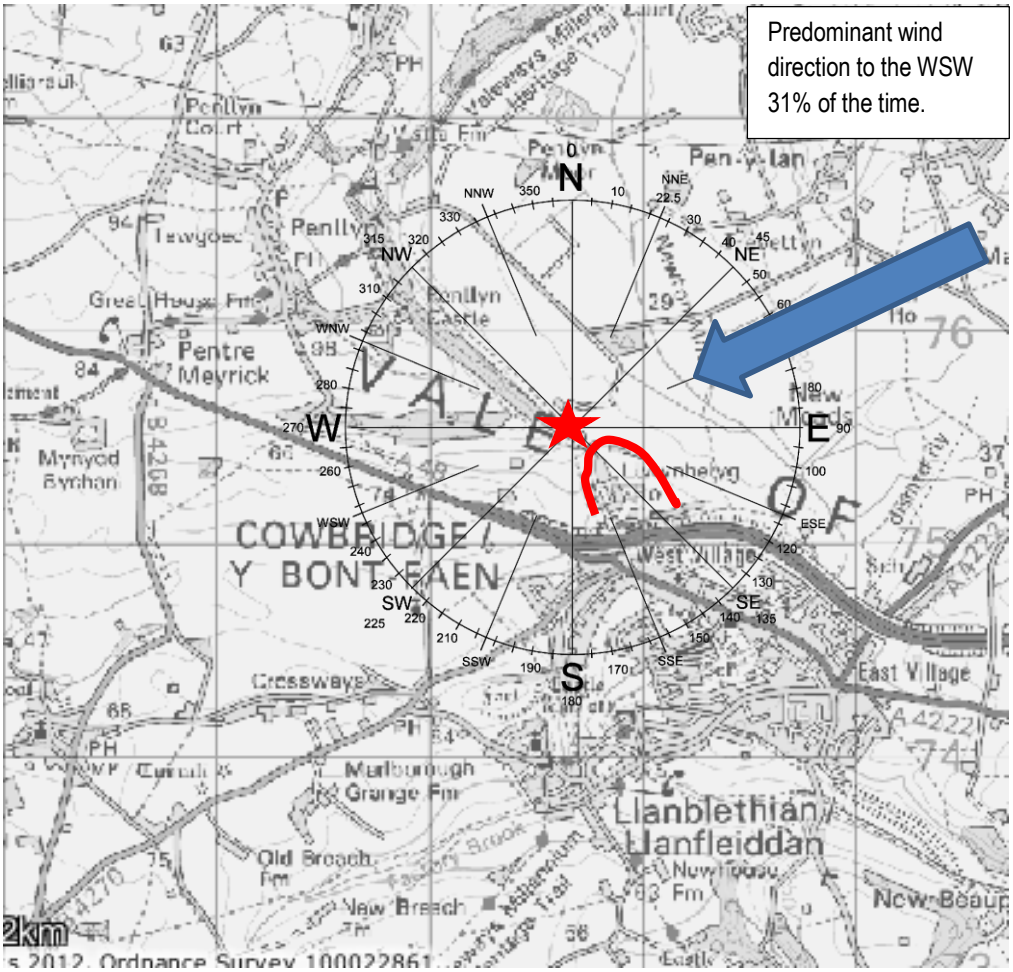


Figure 4 - Map of Neighbouring Sensitive Receptors

7.1 Dispersal Control

There are potential residential sensitive receptors within close proximity of the site in a SSE direction, but this property forms part of the farm and is owned by the farm. As such it would not be a practical solution to restrict material movements by wind direction. The surrounding receptors are residential, therefore control of material movements by time can be employed around core hours and when wind is blowing in a NNW direction which is 6% of the time.

Core hours are those times outside of which residents are most likely to be at home i.e. outside of normal working hours (09:00 to 17:00 - Monday to Friday). Windrow turning, screening and material movements should be restricted to core hours only.

7.2 Community Engagement

CCL will strive to educate the local community through the use of site tours both for schools and local resident groups including businesses.

If an action is being considered that may cause temporary odour, outside of the normal operational procedures identified previously, then before such action is taken the operations manager will be informed. The EA and neighbours who may be affected will be contacted to

advise them of the operation being undertaken, and that any increase in odour will be of a temporary nature.

All complaints will be recorded and actioned in accordance to the complaints procedure. In the event of a significant odour incidence caused by the facility, a letter of apology will be sent out within a week to all affected sensitive receptors. The apology will include a written commitment from CCL to try and prevent further odour occurrences, with an explanation of what those preventative methods will be. Feedback will be given to any complainants on the findings of odour investigations when/if they are known. A summary will be provided of any remedial measures taken to rectify odour problems and ensure that the problem has been suitably resolved.

7.3 Responsibilities

The overall responsibility for the site shall remain with the Companies' Site Manager, Mike Hallett. Day to day operational responsibility for the open windrow and IVC is maintained by the site's competent persons or COTC holders (Certificate Of Technical Competence holders); Mike Hallett (Site Manager).

In the event of an odour incident the odour accident plan will come into force which will initially deal with the accident, the causes and consequences of the accident, and then look to mitigate any potential odour issues which may have resulted from the accident.

7.4 Procedures when Odours Arise

CCL has an internal odour procedure (see Annex B) and an external complaints procedure (as outlined below and in Annex A) to ensure any odour issues are dealt with quickly and effectively.

7.4.1 External Complaints Procedure

Any complaints relating to the odour of the site will be taken seriously and channelled through a senior member of staff, in this case the Managing Director. Staff taking note of the complaint will use the appropriate Odour Complaint Form (see Annex A). Once the complaint is taken, the Managing Director will investigate the complaint and the site activities and respond to the complainant in writing outlining any findings and actions taken to mitigate the source of odours. Any complaints, investigations and mitigating actions will be recorded in the site diary. The complaints procedure, including a survey of the complaints to date will be re-assessed by the Operations Manager and the Managing Director on a yearly basis, unless the number of complaints warrants additional reviews.

7.4.2 Response to Complaints

Receipt of more than two odour complaints within a 1hr period during normal composting operations is treated as an exceedance of control levels. The primary response will be as detailed in accordance with the site's complaints procedure. An investigation shall be initiated into the cause of the complaint, this will involve as necessary:

- An olfactory survey as outlined below;
- An examination of the site activities at the time of the complaint;
- An examination of the meteorological conditions at the time of the complaint; and
- A review of the effectiveness of operational and odour control procedures.

If the complaint is validated it will be treated as an exceedance of the control level. The outcome of the investigation will determine the corrective actions to be implemented.

7.4.3 Detection of Moderate Odour during Olfactory Survey

Detection of a "distinct odour" (3+ on odour scale, Annex B) will initiate a more extensive olfactory survey to determine the extent of the odour plume. The composting facility Manager (or Deputy) will be notified immediately and the olfactory survey will continue to attempt to determine the scope and extent of the odour plume, as follows:

- A suitable location downwind of CCL and potentially sensitive receptor at which the odour plume is unlikely to extend will be selected for assessment;
- Survey will continue toward the composting facility until a composting odour is perceived; and
- Assessment points perpendicular to the plume axis and equidistant from the composting site will then be monitored, subject to access requirements.

An investigation will be initiated into the cause of the odour. This shall involve as necessary:

- A review of the site activities at CCL and other nearby potential sources at the time of the olfactory survey;
- A review of the meteorological conditions at the time of the olfactory survey; and
- A review of the effectiveness of process operations and odour control procedures.

7.4.4 Corrective Actions

The outcome of an investigation will determine the corrective actions to be implemented, they will consider, but not be limited to:

- Alteration to waste reception procedures and odour control measures employed;
- Effectiveness of methods used to mix waste to achieve a compost of suitable structure and moisture for composting and to avoid formation of anaerobic conditions;
- Review of compost process monitoring results;
- Turning frequencies and meteorological conditions under which turning should be carried out;
- Consider removal of material from site responsible for unacceptable offsite impacts;
- Consider ceasing the reception of further material from site until issue resolved;
- Activities that are necessary to bring the process back under control shall not be suspended without detailed consideration of risks; and
- Update of OMP if new procedures are created.

7.4.5 Reporting

Exceedance of the offsite odour control level will be investigated (as described above) and recorded in accordance with CCL current procedures. This includes recording the following:

- Nature of the incident;
- Date of occurrence/s;
- Results of the investigation;
- Details of responses/ action plans implemented; and
- The event will be marked within the site's incident log.

The report will be made available to the Environment Agency upon request.

7.4.6 Review of Control Mechanisms.

A full review, taking note of all the internal odour report forms and external complaints will be made on a yearly basis, or as necessary after an odour incident in order to assess the site's operational procedure and odour control management plan. Findings from the review will then be incorporated into an updated plan which will replace the original OMP.

8.0 INCIDENTS AND EMERGENCIES

In accordance with the requirements of Environment Agency's Technical Guidance Note H4, types of failure or abnormal events considered to have the potential to result in an odour impact have been considered. These have been identified as abnormal meteorological conditions and failure of aspects of the composting process during any of the process stages previously described. Failure and abnormal event scenarios with response requirements are summarised below.

8.1 Machinery Breakdown

Breakdown of shredding or turning equipment, which may result in a delay in processing the material received or turning of windrows. Magnitude of impacts will depend on the length of the breakdown, the type and volume of waste received and the prevailing meteorological conditions but could potentially result in elevated odour concentrations at receptor locations.

A- Machinery Breakdown	
Mitigation Measure	The potential failure would be minimised through routine maintenance of equipment, servicing in accordance with manufactures guidelines, provision of adequate spares, and a service level agreements to replace plant (or source hire plant) within 48 hours.

8.2 Staff Absence

Short-term staff shortages (such as a few days illness) will not affect the ability of the site to operate effectively as other staff members can be reassigned to critical operations. Magnitude of impacts will depend on the length of the absence, the number of staff absent at any one time, and the seniority of the staff member, but could potentially result in elevated odour concentrations at receptor locations should process controls not be managed effectively.

B - Staff Absence	
Mitigation Measure	In the event of prolonged absence of staff members, temporary staff will be recruited and appropriately trained to fulfil non critical roles whilst other more experienced staff members are reassigned. If widespread illness occurs amongst staff members (such as food poisoning), the delivery of waste to the site will be suspended until sufficient staff are present to operate the site. The maturation area does not require daily turning, so for a limited period of time the odour risk would not be significant.

B - Staff Absence	
	If prolonged, widespread absence occurs, the operators would contact alternative operators, such as other composting site operators for emergency assistance.

8.3 Flooding

If the site becomes flooded, this will inhibit effective aeration of the composting material and therefore increase the risk of anaerobic conditions. The composting pad is elevated from the surrounding area, so would not flood under any circumstances. Widespread flooding might prevent access to site, although this is very unlikely given the close proximity of the operators to the site.

C - Flooding	
Mitigation Measure	In a flooding situation no further waste would be able to access the site and priority would be given to ensuring the on-going effective processing of waste. Where waste is saturated and cannot be processed due to flood waters, waste will be disposed of from site to a suitably licensed waste management facility.

8.4 Fire

Fire at a composting site can spontaneously occur if the composting material is allowed to become too dry, equally it could be a result of accident or mechanical failures, arson or even lightning strike. As with all fires the immediate response would be the responsibility of the Fire Brigade and odour would not be the primary concern. Once the fire has been extinguished there is likely to be a quantity of saturated waste material that could become anaerobic and odorous.

D - Fire	
Mitigation Measure	Any waterlogged material present on site would with be remixed with dry feedstock and reprocessed. Where waste is saturated and cannot be processed due to flood waters, waste will be disposed of from site to a suitably licensed waste management facility. Any burnt compost material will be deemed not suitable for re-composting and will be disposed of from the site to a suitably licensed waste management facility. Depending on the severity of the fire, site critical equipment may have been damaged and no further reception or processing of waste would be undertaken until agreed with the EA. If equipment

D - Fire	
	will be inoperable for extended periods of time, consideration will be given to the removal of material from site until repairs are effectuated.

8.5 Site at Full Capacity

The site is currently operating below the permitted capacity on site. There is the potential that should new contracts be won for processing wastes that the site will be operating closer to full capacity which could lead to stretching of the sites resources during busy periods. The site could generate odours during this period if material is not processed as soon as is required within the process controls.

E - Site at Full Capacity	
Mitigation Measure	The site will not accept more waste that it can process effectively at any one time and not above the permitted tonnage per annum. In the event that the site reaches its maximum capacity, the operational manager will divert any further incoming waste from the sites to neighbouring facilities that are able to process the same types of waste until such a time when the site can resume operations within its normal operating capacity.

8.6 Odour Accident Management Plan

Procedures are in place as identified in Table 8 below for the management of odour accidents. The identified accident, potential for occurrence and anticipated consequences has been discussed. A set of actions to be taken in order to priority is presented to be carried out by the site operatives and management.

Table 8 - Odour Accident Management Plan

Accident Type	Potential Occurrence	Consequences	Actions
Plant or Equipment failure	Seldom. Stringent preventative maintenance procedures in place to ensure all	• If waste is not processed or a long period compaction reduces the available oxygen which will lead to odours once the	• Inform management • Establish time frame for repairs to be undertaken • Hire or source an alternative piece of equipment. • If no replacements are available divert waste to another site. • If diversion is not available cease accepting waste

Accident Type	Potential Occurrence	Consequences	Actions
	machinery remains functioning	machinery is fixed.	• Inform the EA if necessary • Record and review the incident
Fire - contaminated water and polluting smoke	Extremely rarely. Moisture content of delivered materials and temperature profile of process restricts excessive heat generation.	• Potentially polluting liquids flowing onto hard standing and leachate collection area where they will have the potential to generate odours. • Polluting smoke. • Exploding of fuel containers. • Wind dispersal of pollutants.	• Raise alarm on-site • Ensure personnel evacuated and accounted for from danger area. • Ensure all staff are alerted. • Call fire service and other emergency services as required. • Inform site management. • If necessary inform EA. • Post member of staff at entrance to site to direct emergency services. • Liaise and follow instructions of emergency team making them aware of any hazards on-site. • Consult site register for COSHH if appropriate. • Prevent fire waters causing pollution on-site. • Excess water should be removed from site to prevent odours • Address potential odour issue in waterlogged compost by spreading the compost thinly on the pad and adding additional course material (screened oversize) to it in order to aid the drainage of water and retention of airspaces. • Record and review incident.

ANNEX A: FORM 1 - ODOUR COMPLAINT REPORT

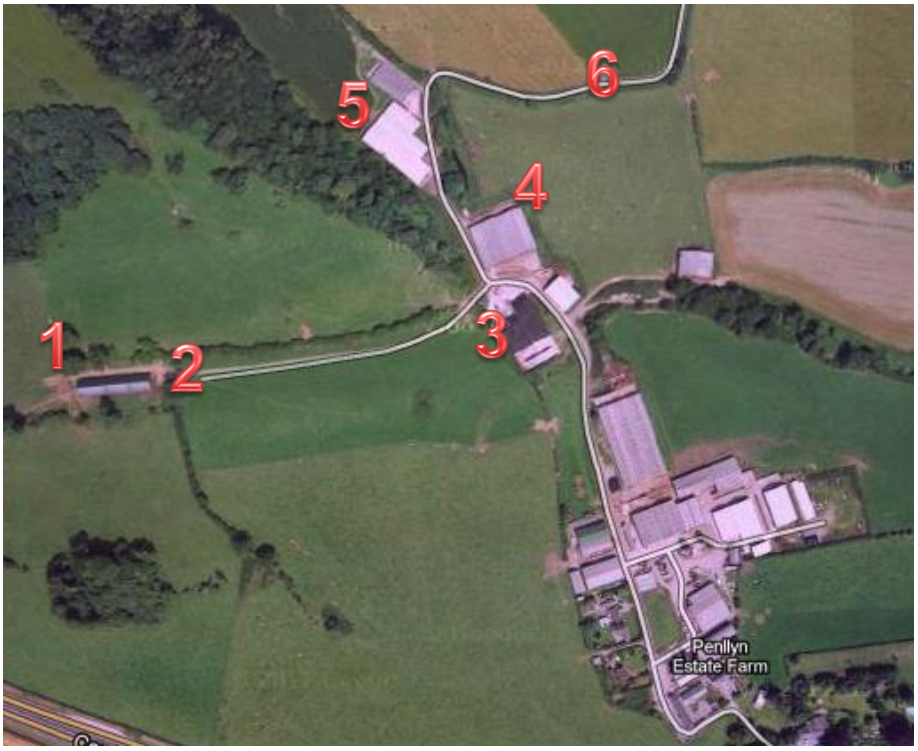
Date:		**Ref No.**	
Name, address and phone number of complainant.			
Time and date of complaint.			
Date, time and duration of offending odour.			
Weather conditions (dry, rain, fog, snow, sunshine).			
Cloud Conditions (quarter, half etc.).			
Wind strength and direction (e.g. light, steady, strong, gusting).			
Complainant's description of odour -What does it smell like -Intensity (use intensity scale) -Duration -Constant or intermittent			
Has complainant any other comments about the offending odour.			
Any other previous known complaints relating to installation (all aspects, not just odour).			
Any other relevant information.			
Location of Odour Source.			
Potential odour sources that could give rise to the complaint.			
Operating conditions at the time offending odour occurred.			
Action taken			
Final outcome			
Form completed by (signed):		**Date**	

Intensity Scale	1: Very faint odour	3: Distinct Odour	5: Very Strong Odour
0: No Odour	2: Faint Odour	4: Strong Odour	6: Extremely Strong Odour

ANNEX B: FORM 2 - ODOUR ASSESSMENT REPORT

Date and time	
Weather conditions	
Wind direction	
Assessor	

Location	Time		Odour				
	Start	Finish	Y/N	Intensity	Extent	Description	Source
1 - Biofilter							
2 –Reception IVC							
3 – Green Waste Shredding/Storage							
4 – Green Waste Storage							
5 – Maturation Pad							
6 - Track							



Where odour is present, classify the **intensity** as follows:
F – Faint (barely detectable) M – Moderate (easily detected) S – Strong (bearable but offensive)

Where odour is present, classify the **extent** of the odour:
I – Intermittent P – Persistent

ANNEX C: DAILY CHECKLIST

Date		**Time**	
Inspection Carried Out By			

Hardstanding Areas			
Observations (cracking, pooling, mud etc.)			
Issues			
Actions Required			
Action Taken			
Reception Shed			
Observations (integrity, air extraction, waste storage etc.)			
Issues			
Actions Required			
Action Taken			
Weather			
Temperature		**Conditions (heavy rain, dry, snow etc.)**	
Wind Direction		**Wind strength**	

ANNEX D: BIOFILTER INSPECTION FORM

Biofilter	Parameter	Results	Action Taken
A	Moisture		
	Temperature		
	Weed Growth		
	Compaction		
	Air Retention		
B	Moisture		
	Temperature		
	Weed Growth		
	Compaction		
	Air Retention		

WRM Limited
Churchill House, 90 Boroughgate, Otley, West Yorkshire
LS21 1AE

Tel: 01943 468138
Fax: 01943 461586

Email: info@wrm-ltd.co.uk Web: www.wrm-ltd.co.uk