



## **Odour Management Plan**

**Dundee City Council**

**Riverside Landfill and Composting  
Facility**

**Waste Management Licence  
WML/E/20079**

## 1.0 INTRODUCTION

This Odour Management Plan (OMP) has been produced in accordance guidance on Odour Management and reference has been made to the Association for Organics Recycling Industry guide for the prevention and control of odours at biowaste processing facilities (2007).

Riverside Landfill and Composting site is located on the foreshore of the Tay Estuary between Dundee Airport and Invergowrie Bay. The site currently undertakes composting of up-to 13,500 tonnes per annum of green waste only material through an open windrow composting system.

This OMP is aimed at assisting the operator in effectively managing potential odour releases associated with the operations at the Dundee City Council (DCC) 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 (OMP)

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

- Feedstock Inventory;
- Process Management;
- Dispersion/Sensitive Receptors;

Open Windrow Composting: Composting of source segregated kerbside, civil amenity and commercial green waste only material for the production of an organic soil improver certified to PAS100.

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.

### 1.2 Conceptual Model

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

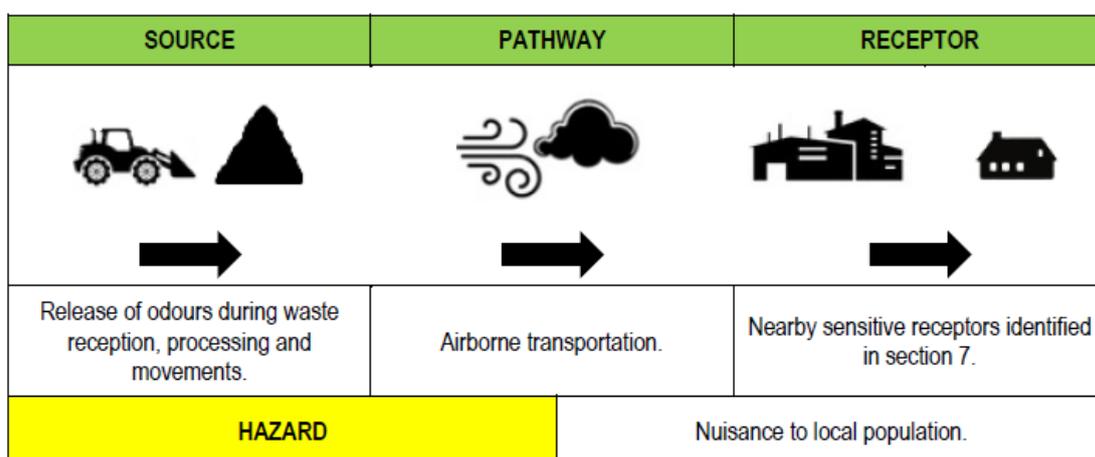


Figure 1 - Conceptual Model for Pollutant Linkages

The green waste composting processes deal 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 an 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.	<b>High</b> – 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.	<b>High</b> – 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.	<b>Med</b> – Material is typically fresh and mainly dry woody plant material.

## 2.1 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
Kerbside collected green waste.	<p><b>April – September:</b> 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.</p>	<p>Degradation could begin rapidly. Excess nitrogen will form ammonia and odorous compounds.</p>	<p>Source additional “woody” / carbonaceous material in anticipation of warm, wet, weather when possible.</p> <p>In the event of sudden summer green waste “surge” overwhelming treatment capacity, broker material to other local compost facility.</p>
	<p><b>October - March:</b> Increase in “woody” type materials (branches etc), resulting in higher C:N ratios.</p>	<p>Material unlikely likely to compost rapidly, so odour potential is decreased, but still present if stored too long.</p>	<p>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.</p>
Civil amenity green waste.	<p><b>April – September:</b> 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.</p> <p>Potential for waste to be kept in warm conditions prior to delivery (waste exposed to direct sunlight in site bins).</p>	<p>Degradation could begin rapidly. Excess nitrogen will form ammonia and odorous compounds. Increased risk of evaporation.</p>	<p>Source additional “woody” / carbonaceous material in anticipation of warm, wet, weather when possible.</p> <p>In the event of sudden summer green waste “surge” overwhelming treatment capacity, leading to green stockpile in reception area longer than 2 days, broker material to other local compost facility.</p>
	<p><b>October - March:</b> Increase in “woody” type materials (branches etc), resulting in higher C:N ratios. Potential for significant “spike” post-Christmas (disposal of Christmas trees).</p>	<p>Material unlikely likely to compost rapidly, so odour potential is decreased, but still present if stored too long.</p>	<p>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.</p>

Waste Source	Seasonal Variation	Odour Implication	Management Controls
Commercial green waste.	<p><b>April – September:</b> Increasing grass clippings content (typically peaking at 40%+ in May – June from experience). Accordingly, loads increasingly compacted due to material density.</p> <p>Potential for waste to be kept in warm conditions prior to delivery (waste exposed to direct sunlight prior to delivery).</p>	<p>Degradation could begin rapidly. Excess nitrogen will form ammonia and odorous compounds. Increased risk of evaporation.</p>	<p>Source additional “woody” / carbonaceous material in anticipation of warm, wet, weather when possible.</p> <p>In the event of sudden summer green waste “surge” overwhelming treatment capacity, leading to green stockpile in reception area longer than 2 days, broker material to other local compost facility.</p>
	<p><b>October to March:</b> Increase in “woody” type materials (branches etc), resulting in higher C:N ratios.</p>	<p>Material unlikely likely to compost rapidly, so odour potential is decreased, but still present if stored too long.</p>	<p>Adjust green waste 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.</p>

### 3.0 PROCESS MANAGEMENT

#### 3.1 Shredding of Green Waste

Following waste acceptance at the green waste reception area a loading shovel is used to deposit the raw green only material into the hopper of the high / low speed shredder. The operator can select different loads to achieve the required mix.

Material is batch shredded before being formed into windrows for sanitisation, 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.

<b>Shredding</b>				
<b>Green Waste Only Material</b>				
<b>Potential Odour Issue</b>	<b>Monitoring</b>	<b>Critical Limits</b>	<b>Process Controls</b>	<b>Records</b>
Odours released due to poor mix of feedstock materials.	Visual Assessment.	Excessive green waste by visual assessment.	Where there is excessive green waste amounts, clean source-segregated wood is added to obtain the desired C:N ratio.	Batch record sheet.

#### 3.2 Windrow turning

The sanitisation/stabilisation phase is carried out in line with PAS100.

<b>Windrow Formation - Sanitisation</b>				
<b>Windrow Formation - Stabilisation</b>				
<b>Green Waste Only Material</b>				
<b>Potential Odour Issue</b>	<b>Monitoring</b>	<b>Critical Limits</b>	<b>Process Controls</b>	<b>Records</b>
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.

#### 3.3 Screening

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.

Screening				
Green Waste Only Material				
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. Use of the deodoriser sprinkler system to suppress odours where required.	Batch record sheet.
	Local Time.	Outside of core hours.	Where outside of core hours, screening of compost shall cease.	Site Diary.

### 3.4 Odour Assessment and Monitoring

DCC will carry out odour checks at 6 points around the immediate vicinity (see Annex A) of the site on a daily basis during **shredding** and **windrow turning** operations. Findings will be recorded in the Odour Assessment Report (Annex A) 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 will be recorded and the source investigated and steps will be taken to mitigate the sources of odours using the management and process strategies to control odour as outlined above. The monitoring procedure, including a survey of odour reports will be re-assessed on a yearly basis by the Operations Manager, unless the number of odour incidents warrants additional reviews.

### 3.5 Passive Odour Management

With reference to green waste processing, the site operates to a standard operating procedure and to BSI PAS 100:2018 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 DCC will minimise any opportunities for odour generation from the site.

## **4.0 DISPERSION/SENSITIVE RECEPTORS**

### **4.1 Dispersal Control**

There are potential residential sensitive receptors within close proximity of the site in north, north east, north west directions. 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.

Core hours are those times outside of which residents are most likely to be at home i.e. normal working hours (07:30 to 15:30 - Monday to Friday). Windrow turning, screening and material movements should be restricted to core hours only.

### **4.2 Management of Complaints**

DCC has a complaints procedure to ensure any odour issues are dealt with quickly and effectively.

Any complaints relating to the odour of the site will be taken seriously and channelled through a senior member of staff, typically the Site Manager. Once the complaint has been documented in the QMS-Complaints log, the Site Manager will investigate the complaint and the site activities and respond to the complainant outlining any findings and actions taken to mitigate the source of odours. Any complaints, investigations and mitigating actions undertaken will be documented in the QMS-Complaints Log.

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

- An odour assessment 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.

The findings of the above will be documented in the QMS-Complaints Log, 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.

### **4.3 Detection of Moderate Odour during Odour assessment Survey**

Detection of a “distinct odour” (3+) on the odour scale, (Annex A) will initiate a more extensive odour assessment survey to determine the extent of the odour plume. The Site Manager (or Deputy) will be notified immediately and the odour assessment survey will continue to attempt to determine the scope and extent of the odour plume, as follows:

- A suitable location downwind of a 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 DCC and other nearby potential sources at the time of the odour assessment survey;

- A review of the meteorological conditions at the time of the odour assessment survey; and
- A review of the effectiveness of process operations and odour control procedures.

#### **4.4 Corrective Actions**

The procedure for corrective and preventative action, will be used to address any validated odour complaint. In doing so the following shall be considered:

- Alteration to waste reception procedures and odour control measures employed;
- Effectiveness of methods used to separate green waste to achieve a required material of suitable structure and moisture for the composting activities 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; and
- Cessation of operations

**Annex A**

<b>Date and Time</b>						
<b>Weather Conditions</b>						
<b>Wind direction</b>						
<b>Assessor</b>						
<b>Location</b>	<b>Time</b>		<b>Odour</b>			
	Start	Finish	Y/N	Intensity	Extent	Source
1 - Recycling Centre						
2 - Riverside Approach (at Vernonholme)						
3 - Perth Road (at Taypark House)						
4 - Glamis Road (at Balgay cemetary)						
5 - Perth Road (at South of Gore building)						
6 - Perth Road (at River Crescent)						

Where odour is present, classify the **intensity** as follows:

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

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

