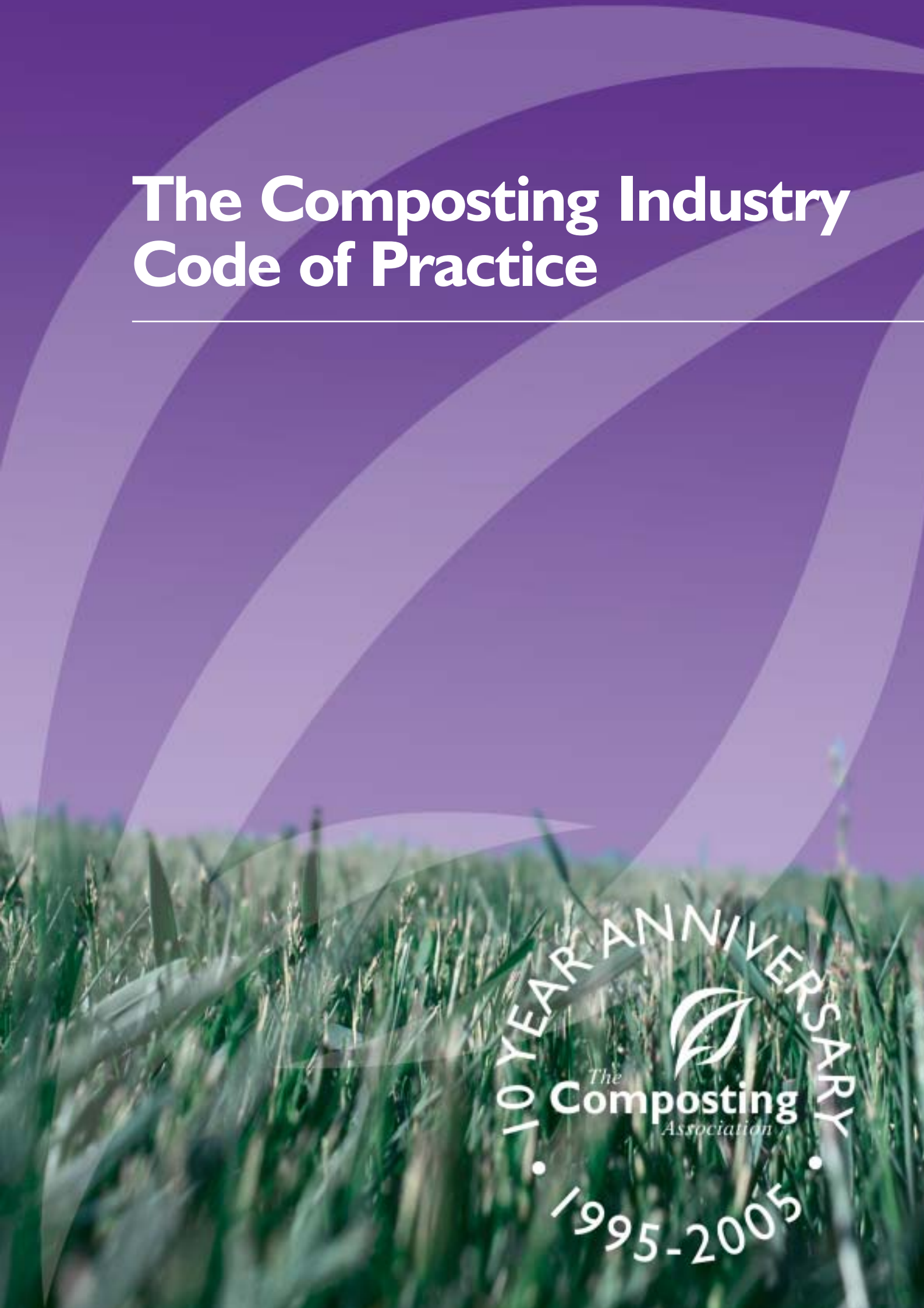
The Composting Industry Code of Practice



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Foreword

Since 2000 when the Government set out its programme to minimise waste and to obtain more value from the waste that is produced, composting has grown into an important element in the Government's drive towards a sustainable waste strategy.

The composting industry has also grown in stature and this Code of Practice to disseminate good practice throughout the industry is to be welcomed.

The Code of Practice demonstrates a growing maturity in the relationship between the industry and its regulators that will continue to develop as the code is adopted by the industry.

Elliot Morley MP
Minister of State for Environment and Agri-Environment

Scotland's National Waste Plan outlines how we will move to sustainable management of our waste and resources. Composting is recognised as a sustainable core treatment technology within an integrated waste management framework contributing to waste minimisation.

However, composting must be carried out in a controlled manner under high standards to protect the environment and human health.

This Code of Practice provides such guidance in addition to advice on the technical and practical processes and regulatory regimes involved in composting operations.

I therefore welcome the Code as a demonstration of the composting industryís desire to achieve high standards in the safe production of good quality compost.

Ross Finnie MSP
Scottish Executive Minister for Environment and Rural Development

Wise about Waste: The National Waste Strategy for Wales was published in 2002 with a primary objective to achieve sustainable waste management in Wales. Composting is an important component of an integrated waste management framework. Two principal drivers for composting are firstly for the protection of soils, in line with the EUís thematic strategy for soil, by replenishment of organic matter and nutrients and secondly, by diversion of waste from landfill that will help reduce greenhouse gas emissions. Primary targets are set in the waste strategy for Wales to increase the amount of municipal waste being composted.

In order to deliver the strategy, waste needs to be managed with the preferred waste management techniques in the waste hierarchy but in compliance with technical standards to prevent endangering human health or harming the environment. Regulation will be necessary, but the Assembly sees the provision of guidance to regulated businesses as an important aspect of achieving good working practices at sites. The Assembly also encourages a co-ordinated approach, where good practice is shared within the UK and Europe for everyone to benefit.

This Code of Practice is an industry initiative that can support businesses by identifying what is needed to establish and operate a composting facility efficiently and to operate it to a high standard. It provides a reference document for businesses and it will give reassurance to regulators and local authorities. It is to be commended and supported as a further positive step towards sustainable waste management.

Carwyn Jones, AM
Welsh Assembly Government, Minister for Environment, Planning and Countryside

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Executive Summary

The Composting Industry is set to under go considerable growth. This Industry Code of Practice has been developed to assist in the establishment and expansion of composting facilities, of any size, throughout the UK.

The Code of Practice provides a route map through the maze of legislative requirements that have to be complied with. It provides a plain English summary, in one place, of how to obtain the various authorisations, including planning permission, waste management licence (or exemption) and approval for the composting of animal by-products and catering wastes.

The Code of Practice sets a benchmark against which regulatory authorities may assess proposed operations, and in doing so may quicken the process of obtaining the relevant authorisations. In following the Code of Practice regulators, customers and the general public will have greater confidence in the ability of the operator to run a composting facility effectively.

Underpinning the Code of Practice is the "fit for intended purpose" principle. There is no "one size fits all" standard that can be applied across all composting techniques or facilities of different sizes using the same technique. The adoption of the "suitable for intended use" principle does provide a greater consistency of approach across the whole industry. Married to this concept is the risk assessment approach to site location, design and operations, including the required type and frequency of environmental monitoring.

The Composting Association will keep the Code of Practice under review to ensure that its use is meeting the stated aims. It will be updated as necessary following feedback on how it is being used and its effectiveness.

Preface

General

1.1 It is widely recognised that to meet the Landfill Directive diversion targets for municipal biodegradable waste and Government policy objectives, including the movement of waste up the Waste Hierarchy, more composting facilities are required. Government targets will not be satisfied by composting green waste alone, therefore this Code of Practice applies to all types or organic waste including catering waste, animal by-products and mixed municipal waste.

1.2 It has been estimated that in the region of 18 million tonnes per annum of biodegradable municipal waste needs to be managed via alternative facilities to meet the Landfill Directive diversion targets. This equates to approximately 600 new facilities needed by 2020[1].

Definitions

1.3 Composting for the purpose of this Code of Practice is defined as the "process of controlled biological decomposition of biodegradable materials under managed conditions that are predominantly aerobic and that allow the development of thermophilic temperatures as a result of biologically produced heat[2]."

1.4 Compost is a "solid particulate material that is the result of composting, that has been sanitized and stabilized and that confers beneficial effects when added to soil, used as a component of a growing medium, or is used in another way in conjunction with plants[3]".

1.5 A number of regulatory permits, consents, licences and permissions are required to establish and operate a composting facility. In this Code of Practice they are collectively referred to as "authorisations".

Why a Code of Practice?

1.6 Properly managed composting can have great benefit in a number of areas including:

Environmentally:

- Replenishing organic matter and nutrients in the soil
- Reducing the amount of greenhouse gases that would be generated if the material was landfilled
- Using resources sustainably
- Helping meet the requirements of a waste management licence or exemption

Economically:

- Promoting self-sufficiency
- Reducing disposal and transport costs
- Reducing the use of artificial fertilizers

Nationally:

* Meeting Government targets in reducing the amount of biodegradable waste that is landfilled
* Aiding in the development of a more sustainable society

1.7 Good site management practices can prevent pollution of the environment, harm to human health and help produce good quality compost with carefully controlled feedstocks. However composting activities can, if not managed properly, cause pollution of the environment, harm to human and animal health or become a nuisance to surrounding neighbours.

1.8 An Industry Code of Practice that is followed and complied with may influence policy makers in Government departments in developing guidance to regulators and in drafting regulations.

Aims and Objectives

1.9 This Code of Practice has the following aims, namely to:

- Provide a route map for obtaining the necessary authorisations and consents, including:
  - Planning Permission
  - Waste Management Licence (or registering an exemption)
  - Animal By-Products and Catering Waste Approval
- Identify good site management practices that can act as a benchmark for industry and Regulatory Authorities and therefore meet the regulatory requirements of various authorisations
- Highlight the importance of contingency planning
- Dovetail with the requirements of:
  - Health and Safety legislation
  - British Standards Institution Publicly Available Specification for Composted Materials (BSI PAS 100 (2002)
- Be an educational tool to decision makers that are not familiar with composting practices, particularly Elected Members and their officers involved in the

1 Composting Association provisional estimates.

2 BSI Publicly Available Specification (PAS) 100 (2002). Thermophilic temperatures are greater than 45 degrees centigrade.

3 BSI PAS 100 (2002)

grant of planning permissions
- Aid in stakeholder management at both the planning and operational stages
- Provide greater confidence in the composting process and end product

Why follow a Code of Practice?

1.10 This Code of Practice will enable operators to identify good practice for their own sites, enable them to identify the potential hazards and put preventative or remedial measures in place thus reducing the potential of a problem being realised.

1.11 Following simple contingency planning, procedures and control measures can be put in place that should avoid pollution, harm or detriment to the locality.

1.12 Using the Code of Practice will help operators comply with the conditions of the various regulatory authorisations.

What the Code of Practice covers and what it doesn't cover

1.13 This Code of Practice is applicable to waste recovery operations that result in a product that, amongst other things, could be beneficial when used on land. This includes operations that work on source separated feedstocks and processes treating mixed wastes. Mixed waste treatment facilities also include Mechanical Biological Treatment (MBT) or Biological Mechanical Treatment (BMT) facilities. Many of the principles in this Code of Practice are directly applicable to facilities that provide biological pre-treatment prior to landfilling wastes.

1.14 Many of the principles listed here, particularly for obtaining approvals, contingency planning, site planning, etc. will also be relevant to sites using anaerobic digestion as a process. The main differences will be in the operational aspects.

1.15 The Code of Practice emphasises the "fit for intended purpose" principle in relation to all aspects of composting.

1.16 Neither the various issues associated with the quality and subsequent use of composted material nor home composting, are detailed here.

1.17 This Code of Practice relates to composting facilities of any size from small community facilities to large industrial scale composting facilities. It will be relevant to all composting activities detailed in Box 1.

Box 1 Scope of the Code of Practice

a) Static Aerated Windrow

Air is forced through the compostable waste via dedicated pipework or sunken troughs and air blowers.

b) Windrow composting

This entails the placement of shredded organic waste in linear heaps allowing the aerobic decomposition of the organic matter. Mechanical turning ensures that the material is subjected to periodic increased aeration and that all parts of the composting materials are exposed to the process.

Windrow composting takes place predominantly outdoors, but increasingly within buildings or undercover.

c) In-vessel composting

Composting is carried out within an enclosed container, where moisture content, temperature and oxygen levels can be regulated. The key advantage is that operating parameters can be optimized reducing environmental impacts.

d) Mechanical – Biological Treatment (MBT)

MBT plants generally receive unsorted municipal waste. Various techniques are employed to remove recyclables such as glass, metals and plastics. This Code of Practice will be of relevance to the remaining organic fraction and the biological treatment phase of the process.

The resultant organic material is then either:

i) Composted aerobically
The process may be as a treatment to reduce biodegradability prior to landfill disposal)

ii) Digested anaerobically
The outputs ('compost' or digestate) are generally of a poorer quality than "source segregated" composts because of the higher risk of contamination from mixed wastes. Its use on land may therefore be restricted

Status

1.18 This document is non-statutory. It is intended to aid composters, especially those people and organisations, who are considering establishing and operating a composting facility, of any scale. It provides a route map through the regulatory requirements and sets good operational performance standards for a composting facility.

1.19 The Code of Practice has no legal status. It will nevertheless be useful to the regulatory authorities and it has been developed with their full support.

1.20 By following this Code of Practice operators are more likely to ensure that they do comply with their licence operating conditions and are thus less likely to be subject to the risk of formal action on the part of the regulators. In all cases, the detail of the regulatory authorisation must be complied with.

Intended audience

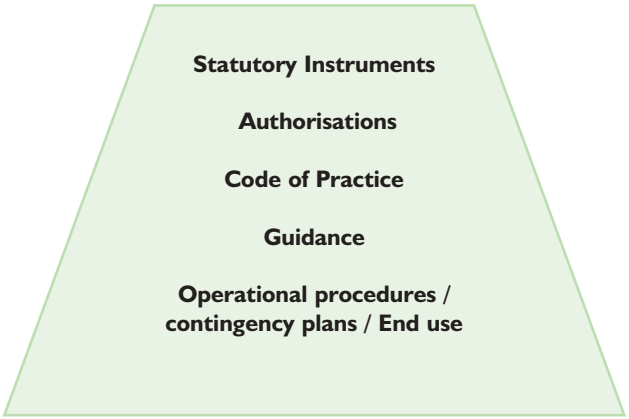
1.21 This Code of Practice has been produced to cover composting operations throughout the United Kingdom (UK).

1.22 It is relevant to operators, potential operators and regulatory decision makers, including Elected Members of Local Authorities, their officers and other professionals that issue permits and approvals that are required for composting activities.

This Code of Practice – where it fits

1.23 The Code of Practice can be visualised as a document that pulls together in one place the various drivers for composting, the approval requirements and associated technical and procedural guidance for good practice. This is shown schematically in Figure 1.

Figure 1 Where the Code of Practice fits



The Structure of the Code of Practice

1.24 The Code of Practice is structured into five parts:

Part 1 – Introduction
Part 2 – Site Establishment
Part 3 – Pre-Composting
Part 4 – Managed Composting
Part 5 – Post Composting

1.25 Information relating to issues that can change relatively quickly, such as regulations and policies, has been provided in the reference section at the end of the document. Given this proviso, it is recommended that readers consult the relevant web sites for the latest updates.

1.26 The composting process can be visualised as a sequence of steps that need to be followed. Figure 2 provides such an illustration of the steps associated with establishing and operating a composting facility. There are a number of iterations in the process and links to other procedures and guidance. However for simplicity, these have not been included within the flow chart. The structure of this Code of Practice follows the general steps identified in Figure 2.

1.27 The Code of Practice will be periodically reviewed and where necessary updated. For example, the development of measures on the management of biowastes by the European Commission may be such a trigger for a review. The Code of Practice should therefore be considered as a living document.

1.28 Published versions are available from the Composting Association and available to download at www.compost.org.uk. The website will contain the most up to date version following any amendments and additions.

Acknowledgements

1.29 The Code of Practice has been developed in collaboration and consultation with the following organisations:

- Composting Association members
- Environment Agency
- Scottish Environment Protection Agency
- Department of the Environment Northern Ireland
- Department for Environment, Food and Rural Affairs
- Cabinet Office - Regulatory Impact Unit
- Welsh Assembly Government
- Scottish Executive

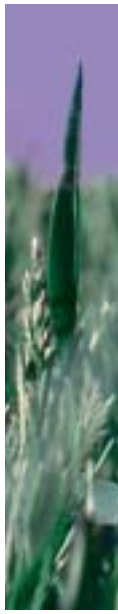
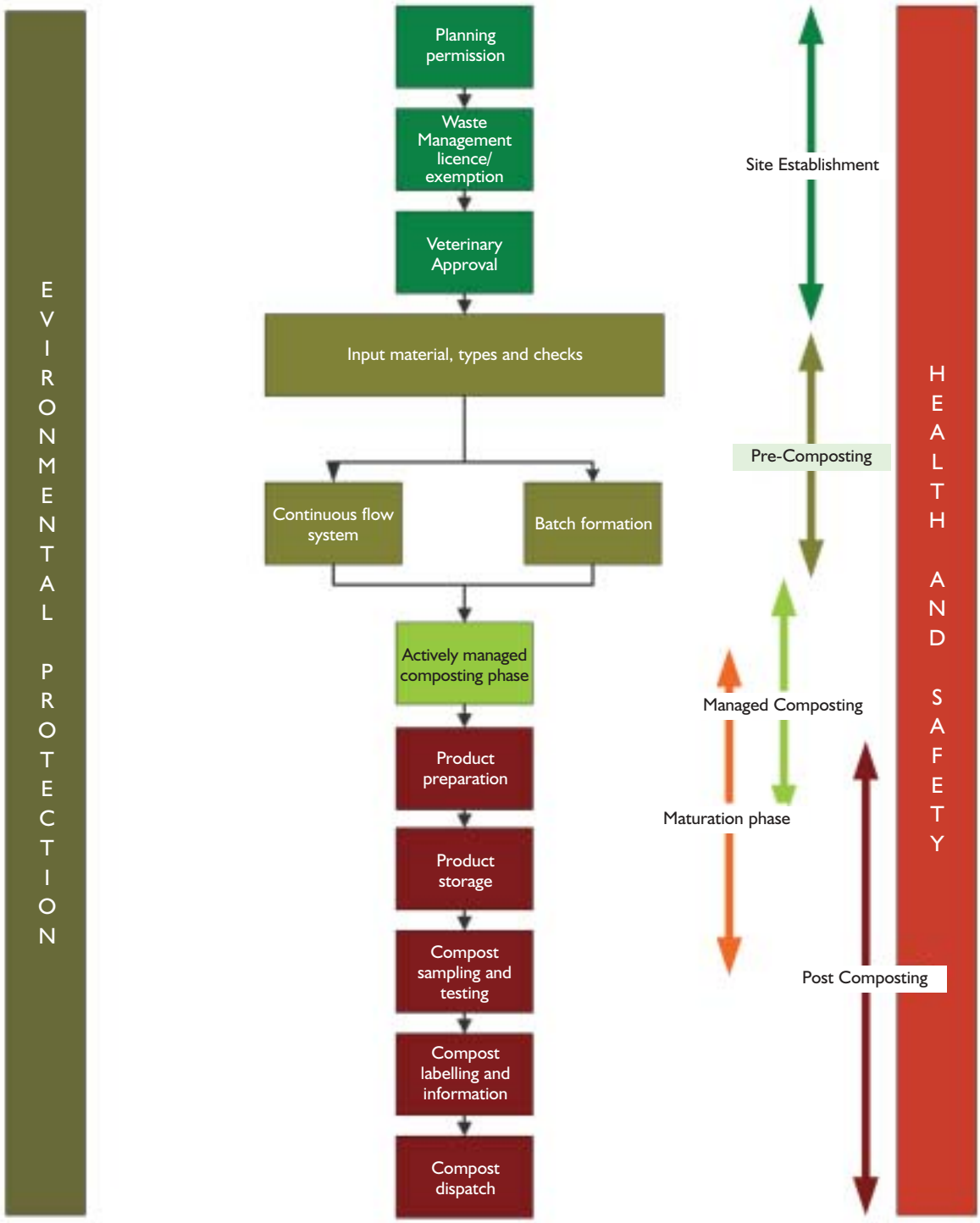


Figure 2 Establishing and operating a composting facility

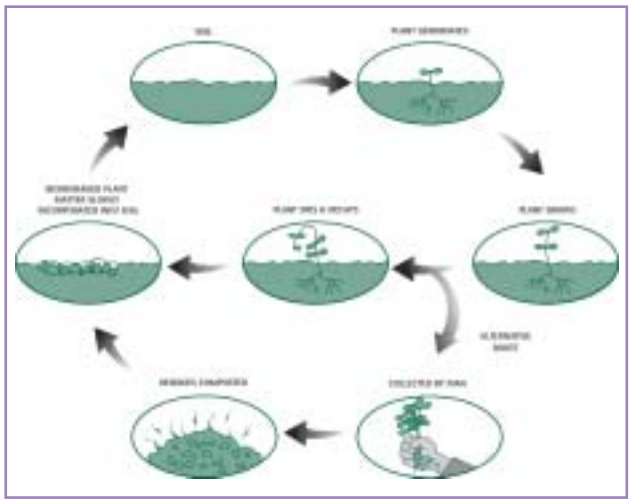


Part 1 Introduction

Historical context

1.30 The decomposition of organic matter goes on in nature on a daily basis. Micro-organisms break down substances resulting in a cycle that returns nutrients and organic matter back to the soil. Figure 3 illustrates this on-going cycle. Humans have exploited this process for centuries, particularly in agricultural processes with the application of manures to fields. With the development of artificial fertilizers to help increase crop productivity, natural soil improvers lost favour. However, increasingly policies and legislation, underpinned by the principle of sustainability, are leading to the re-emergence of the use of natural materials for soil and land improvement.

Figure 3 Cycles of plant growth, biodegradation and return to the soil



Composting – the need for new facilities

1.31 There are a number of drivers resulting in the increasing need for composting facilities throughout the UK. These range from international agreements, European Council Directives, UK policy and legislation to a single personís need and desire to use compost instead of artificial fertilisers. All of which are interlinked to varying degrees.

a) Sustainability

For many years compostable materials have been landfilled in the UK. Disposal to landfill has been favoured as a cheap and easy way of dealing with society's wastes. This has been primarily as a result of the favourable UK geology. However, the polluting potential of landfills may persist for many centuries. Composting biodegradable materials reduces landfill gas emissions and using the composted product to return organic matter to the soil is a far more sustainable solution than disposal to landfill.

b) Landfill Directive

The Landfill Directive, amongst other things, has introduced targets for the diversion of biodegradable municipal wastes away from landfill sites. The commitment for the UK[4] is:

- By not later than 17 July 2010 to reduce the amount of BMW going to landfill to 75% of that produced in 1995
- By not later than 17 July 2013 to reduce the amount of BMW going to landfill to 50% of that produced in 1995
- By not later than 17 July 2020 to reduce the amount of BMW going to landfill to 35% of that produced in 1995

The composting of biodegradable municipal waste will play a pivotal role in achieving these targets. To achieve these targets there is the immediate need for additional investment into new and expanded facilities.

c) Landfill Allowance Schemes

The Landfill Allowance and the Landfill Allowance and Trading Schemes[5] were brought into force under the Waste and Emissions Trading Act 2003.

Each of the devolved administrations has individual targets for the amount of biodegradable municipal waste it can send to landfill in the Landfill Directive target years. These limits were set by the Landfill (Scheme Year and Maximum Landfill Amount) Regulations 2004 and are included in Table 1).

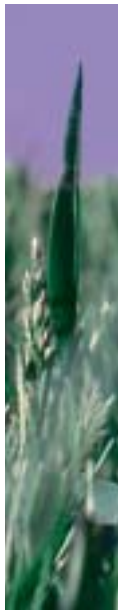
These limits have been divided between the constituent Waste Disposal Authorities, which have been given an allowance for the amount of biodegradable waste that they can dispose of to landfill. The remainder has to be treated or disposed of at other waste management facilities.

If a local authority does not use its full allowance in one year it may "bank" that allowance and use it another year. This will be on top of the subsequent year's allowance. Alternatively the local authority can sell the allowance to another local authority on the open market. Local authorities that cannot meet their diversion target may buy an "allowance" from other local authorities.

Note: the trading element described here dos not apply in Wales.

4 http://www.scotland.gov.uk/consultations/environment/lasc-02.asp

5 LATS in England and LAS in Northern Ireland, Scotland and Wales. Guidance can be found at www.defra.gov.uk Guidance for Scotland will be issued by the Scottish Executive. For Northern Ireland, guidance will be provided by the Department of Environment Northern Ireland.



d) Waste strategies

Each of the devolved administrations of the UK has produced their own waste strategy, but there is no overarching strategy for the UK. Each strategy includes recycling and composting targets for municipal waste.

The waste hierarchy advocates the movement of waste up the waste hierarchy. After the reduction in the production of waste, reuse, recycling (including composting) of waste are the preferred ways of dealing with society's wastes.
Note: Although Mechanical and Biological Treatment (MBT) facilities carry out composting processes, MBT may still be pre-treatment before disposal.

1.32 The Waste Framework Directive advocates the "proximity principle" such that waste is dealt with as near to the place of production as possible. Regional planning bodies are guided towards incorporating this principle in their waste strategies and plans, along with the principle of self-sufficiency.

	Maximum Amount (tonnes)		
Area	Target Year ending in 2010	Target Year ending in 2013	Target Year ending in 2020
United Kingdom	13,700,000	9,130,000	6,390,000
England	11,200,000	7,460,000	5,220,000
Scotland	1,320,000	880,000	620,000
Wales	710,000	470,000	330,000
Northern Ireland	470,000	320,000	220,000

Table 1 Landfill Allowances

Part 2 Site establishment

Introduction

2.1 This part of the Code of Practice covers the considerations and what needs to be done in relation to setting up a composting facility. It identifies certain aspects that are mandatory and provides an overview of the risk assessment approach that is required for environmental protection and employee Health and Safety. It is structured under the following headings:

- The law – a regulatory summary
- The process of risk assessments and risk management
- Site selection
- Preliminary site design
- General workforce considerations

Authorisation	Competent Authority
Planning Permission	Local Authority County Council or Unitary Authority Department of Environment Northern Ireland (DoE NI)
Waste Management Licence or Registered Exemption	Environment Agency (EA) Scottish Environment Protection Agency (SEPA)
Pollution Prevention and Control permit (where applicable)	Environment and Heritage Service Northern Ireland (EHSNI)[6]
Liquid Discharge consents	Foul Sewer: The Water Company Surface and Groundwater Discharges: EA, SEPA, Scottish Water, DoE NI
Animal By-Products	Approval: State Veterinary Service (England) Welsh Assembly Government (Wales) Scottish Executive (Scotland) Department of Agriculture and Rural Development for Northern Ireland (Northern Ireland) Enforcement:[8] Generally Local Authority Trading Standards officers but may include the Environmental Health Departments or others depending on the location of the facility.
Health and Safety	Health and Safety Executive (England) Health and Safety Executive for Northern Ireland

Table 2 Competent authorities for the issue of authorisations

The Law – A Regulatory Summary

2.2 A number of regulatory regimes come into play prior to, during and following composting activities. All these regimes seek to ensure, to varying degrees that the proposed facility is appropriate in terms of land use and to minimise the impact operational activities may have on human health, animal health and the environment. These regimes cover:

- Planning Permission
- Waste Management Licensing
- Water Protection Legislation
- Animal By-Products
- Catering Wastes
- Health and Safety

2.3 The approvals that are granted are collectively termed authorisations in this Code of Practice. The following sections provide a summary of each regime and how it applies to composting activities.

Early dialogue is extremely useful in identifying what information needs to be gathered. This will help to satisfy legal requirements, identify the procedural steps that have to be followed, establish likely timescales and to allay any fears of the local community. The process may vary slightly in different areas of the United Kingdom.

It is important to remember that the regulatory authorities are there to help. They are ideally positioned to provide advice in what they will be looking for in making their determination.

There is considerable benefit in maintaining close liaison with the various regulatory bodies throughout the site establishment and the operational phase.

2.4 Table 2 identifies the competent authority for each of the various authorisations that are needed.

Town and Country Planning

2.5 This section covers the following issues:

- The role of Town and Country Planning
- Existing planning permission
- Applying for a new permission

6 The EHSNI is an Agency within the Department of Environment Northern Ireland (DOENI)

8 The organisation for the enforcement duty various in different locations

- Environmental Impact Assessment – is one needed?
- Interaction with the waste management regime

Principal aims of Town and Country Planning

2.6 The Government's overarching aim for the planning system is the better delivery of sustainable development. The planning system determines that the proposed use of land is appropriate and acceptable in that particular location and that the UK's policies in relation to land use are achieved. With regard to composting this is particularly relevant to delivering sustainable waste management[9].

2.7 There are differences in the planning system for each of the UK's administrative areas and there are different waste planning guides for each of the devolved administrations e.g., Planning Policy Statement for Waste (PPS10) in England. Planning Policy and Technical Advisory Notes (PPW/TAN) for Wales and Scottish Planning Policies (SPP) in Scotland.

2.8 The Department of the Environment for Northern Ireland (DOENI) will provide planning advice for Northern Ireland.

2.9 The provision of composting facilities will go towards the achievement of many of the UK's Minerals and Waste Plans and Local Waste Plans.

Planning Permission for composting facilities

2.10 The planning status of the proposed location needs to be determined. Box 2 gives some examples.

Box 2 Example questions to determine the planning status of a location

Questions to consider:

1. What activities does the existing planning permission and attached planning conditions allow?
2. Is the proposed composting activity a change of use for the site[10]?
3. Does the proposed composting activity fall under "permitted development rights"?

For example:

1. Disused farm buildings are to be used for a composting activity. A change of use may have to be applied for.
2. Composting has taken place for many years on a farm, with associated use of the compost product on the farm's fields. A change to commercial composting activities may be covered by a certificate of lawful use.

9 Draft consultation document "Planning Policy Statement 10 – Planning for Sustainable Waste Management" (2004)

10 Waste activities generally fall within Use Class B2

Applying for a new permission

2.11 Where the existing planning status does not permit a waste management activity then a planning application will need to be submitted to the relevant planning authority.

2.12 A planning application will have to be completed:

- In writing
- Normally on a form supplied by the relevant planning authority
- Formally submitted with the prescribed fee
- Advertised in the local press and at the proposed site

2.13 In England the determination of waste management planning applications, where there are county and district councils, rests with the County Council except where the district council itself proposes to operate a waste management facility on its own land.

Note: in NI, S & W all the local authorities are Unitary

2.14 Advice on making a planning application in England and Wales is available at www.planningportal.gov.uk

In Scotland advice on making a planning application is available at www.scotland.gov.uk/Topics/Planning-Building/Planning

In Northern Ireland, advice on making a planning application is available at http://www.planningni.gov.uk/

Environmental Impact Assessment – is one needed?

2.15 Dependent upon the nature, scale and location of a proposed operation or if the proposal may have a significant affect on the environment an Environmental Impact Assessment (EIA) may have to be carried out. The EIA process leads to the production of an Environmental Statement that is submitted in support of a planning application. Procedural arrangements are outlined in Box 3.

Box 3 EIA Screening and scoping opinion

Obtaining an opinion:
A potential applicant can seek a "screening opinion" from the Planning Authority to determine if an EIA is required by the regulations or not.

What should the EIA address?
Where it is confirmed that an EIA is required the potential applicant can then seek a "scoping opinion" from the planning authority of what the EIA should address.
The planning authority may consult with others, e.g. the EA or SEPA, to ascertain their opinion on what the scope of the EIA should be.

2.16 Generally, community composting schemes and remote on-farm composting will not need an EIA in support of a planning permission. However, large scale composting facilities will generally require an EIA. Advice from the planning authority should be sought.

2.17 The process of producing an EIA and subsequent Environmental Statement to support a planning application is mandatory if the proposal falls within the scope of the Environmental Impact Assessment Regulations.

2.18 In addition to the findings of the assessment the following is required:

- A non-technical summary
- A description of the nature of the proposals
- Their likely impacts
- A consideration of alternatives

Even when the EIA Regulations do not apply, the production of an environmental statement following the principles of environmental impact assessment represents good practice. If the environmental implications have not been properly considered and appropriate mitigation proposed then the application is likely to be rejected.

Consultation

2.19 The planning authority is legally obliged to consult with statutory consultees.

In England and Wales the statutory consultees are set out in the General Development Procedure Order 1995. The consultees are organisations and bodies whose functions or responsibilities could be affected by the planning decision. The planning authority will normally consult with others that it considers would have an interest in, or could be affected by, the proposals.

In Scotland the statutory consultees are set out in the Town and Country Planning (General Development Procedure) (Scotland) Order 1992

2.20 Planning authorities consider the spatial planning strategy, the likely impact on the local environment and amenity. This can include, but is not restricted to; noise, odours, potential for vermin or birds to be attracted, access and hours of working.

2.21 The decision is normally made by the Waste Planning Authority's Planning Committee. Alternatively the decision may be referred to a full Local Authority council meeting, or the decision making power may be delegated to an officer of the Local Authority council. At what level the decision is made is often dependent upon specified criteria established by the planning authority. For example, how contentious the application is, the proposed size of operation, the potential environmental impact.

The Environment Agency, SEPA or EHSNI cannot issue a waste management licence unless the planning status for that land allows for a waste management activity. However, the process of applying for both can start at the same time. Such parallel tracking of applications has distinct advantages.

2.22 The length of time taken to gain planning permission varies from site to site. For example, permission for a composting scheme can take one year, permission for a Materials Recycling Facility up to 2 years, and for an Energy-from-Waste plant up to 10 years.

The timeframe therefore can be quite variable and dependent upon local circumstances.

Smaller operators should be aware of this and take this into consideration in preparing their business plans.

Emphasis needs to be placed on education in terms of helping local government understand the intrinsic merits of composting as a local, sustainable waste management solution and the benefits of early and continuous consultation with the public should not be underestimated.

Waste Management Legislation

2.23 This section deals with the following issues:

- The need for a waste management licence
- Registering an exemption from licensing

- When the Pollution Prevention and Control (PPC) regime applies
- The Duty of Care
- When composted waste materials may cease to be waste

The Need for a Waste Management Licence

2.24 The feedstock for a composting facility often includes varying amounts of waste materials. To treat, keep or dispose of waste a waste management licence is needed, unless an exemption from licensing exists and the operator has registered that exemption with the regulatory authority.

It is an offence to treat, keep or dispose of waste except in accordance with a waste management licence or registered exemption. To operate outside the conditions of a waste management licence or the specified criteria of an exemption is also an offence.

2.25 The European Waste Catalogue (EWC) code needs to be quoted on Duty of Care transfer notes and are quoted in new and recently issued licences.

Process of applying and obtaining a licence

2.26 The process of applying and obtaining a waste management licence is a series of procedural steps. Box 4 below shows the general procedures of obtaining a waste management licence.

Box 4 The general procedure for obtaining a waste management licence

The applicant:

Pre-application discussions with EA, SEPA or EHSNI officers

Obtaining relevant information (including the risk assessment process)

Completing and submitting the application form in writing accompanied with the:

- Correct fee
- Working plan detailing how the site will be operated[12]
- Proof of planning status
- Fit and Proper Person (FAPP) status demonstrated:
  - Technically competence i.e. relevant WAMITAB certificate
  - Financial Provision
  - Relevant Convictions (these are primarily environmental in nature)

The EA, SEPA or EHSNI:

Assess the information provided

Conduct "financial health check"

Prepare draft licence

Consultation with the statutory consultees:

- Health and Safety Executive
- Relevant planning authority
- Appropriate nature conservation body[13] where applicable

Consider representations made by consultees

Determine the application

Issue a waste management licence or refuse the application

The applicant:

Start composting in accordance with the licence terms and conditions having paid the annual subsistence charge

Appeal to the Secretary of State against decision to refuse to issue a licence.

Appeal to Secretary of State against the conditions imposed in the licence. An operator is unable to start composting whilst an appeal is underway

2.27 The conditions imposed in a waste management licence must meet the following criteria:

- Necessary
- Unambiguous
- Comprehensive
- Enforceable

12 The EA is developing standard licences which may mean that a working plan may not be needed.

13 English Nature, Countryside Council for Wales, Scottish Natural Heritage, Natural Heritage Section of DoENI.

2.28 Once a licence has been issued the licence holder can:

- Apply to have the conditions modified, following a similar procedure to the above
- Apply to transfer the licence to another person, who will have to demonstrate that they meet the Fit and Proper Person criteria

2.29 Whilst a licence is in force the regulatory authority is under a statutory duty to ensure:

- That the conditions of the licence are being complied with and that the activities do not cause:
  - o Pollution of the environment
  - o Harm to human health or
  - o Serious detriment to the amenities of the locality

Surrender of a licence

2.30 A licence cannot be surrendered unless the regulatory authority accepts the surrender. They will only accept the surrender when the licence holder demonstrates that the condition of the land, from the activities authorised by the licence, will not cause pollution of the environment or harm to human health.

2.31 Until the licence is formally surrendered the conditions in the licence still have to be complied with and the annual subsistence fee paid.

Standard Waste Management Licence

2.32 In England and Wales the EA have developed standard licences[14] for certain waste activities. The advantages of standard licences are that:

- The applicant can see what the conditions imposed will be before applying for a licence
- There will be no need for a detailed working plan
- Operating several facilities under the same standard licence, instead of several bespoke licences, allows for easier compliance, training of staff and easier movement of staff from one site to another

Registering an Exemption from Licensing

2.33 Lower risk waste management activities such as recycling are usually not seen to be a threat to the environment or human health. Under specific conditions they may be exempt from the Waste Licensing Regulations although they must be registered. Composting is included in recycling activities for which an exemption may be obtained. However, the detail of each may be different in each of the devolved administrations.

2.34 To benefit from an exemption the operator must register with the EA, SEPA or EHSNI prior to starting composting operations.

2.35 The details required are:

- Name and address of the operator
- Location type and scale of the proposed exempt activity
- That there is consent of the occupier of the land

The exemption does not apply to hazardous waste.

2.36 The activity must be carried out within the limiting criteria set out in the exemption. In carrying out the activity, pollution of the environment, harm to human health or serious detriment to the amenity of the locality must not occur. To ensure this a risk assessment needs to be carried out.

If a site operating under a waste management licence exemption is composting catering waste or animal by-products, it must still comply with the Animal by-Products Regulation.

Public Register

2.37 The information in support of a licence and exemption is placed on a public register which can be viewed free of charge at reasonable times. The registers are normally located in the EA / SEPA local offices. In Northern Ireland information on licences issued can be obtained from the DOE. They are a valuable source of information for people who are considering establishing and operating a composting facility.

When the Pollution Prevention and Control (PPC) regime applies

2.38 A waste recovery operation is classified such if its principal objective is that the waste serves a useful purpose in replacing other materials which would have had to be used for that purpose[15].

2.39 Composting is normally considered a waste recovery operation and in this instance the PPC regulations are unlikely to apply.

2.40 However if greater than 10 t / day of animal by-products are being processed, PPC will apply.

2.41 The primary purpose of the composting activity will determine if the PPC regulations apply or not. If the

14 There are currently no plans to develop standard licences by SEPA.

15 ECJ ruling – Abfall Services Case C-6/00

primary intention is to pre-treat waste prior to disposal to landfill then PPC will generally be applicable. Advice should be sought from the regulatory authority during pre-application discussions. This will be particularly relevant for proposed MBT or BMT plants given that they are predominantly operated as a pre-treatment activity prior to landfilling i.e. a disposal operation.

2.42 PPC relates to the whole installation. Where composting is carried out within the installation boundaries of an activity regulated under PPC then the PPC permit conditions will normally cover the composting activity e.g. a PPC permitted landfill.

2.43 The spreading of composts on to the farmer's fields would not normally be regulated under PPC[16].

2.44 As with Waste Management Licensing, planning permission and PPC application should be twin tracked.

Duty of Care and Registered Waste Carriers

2.45 When waste is transferred, from one person to another Duty of Care[17] transfer notes have to be completed. An adequate description of the waste has to be made on the note and the note is transferred with the waste. Waste can only be transferred to an authorised person, such as:

- A registered waste carrier or broker
- A person holding a waste management licence
- A person operating under a registered exemption from licensing

2.46 The licence or exemption must specifically allow for that type of waste. Alternatively the waste can be transferred to a person operating a Specified Waste Management Activity with a valid PPC permit.

When composted waste materials cease to be waste

2.47 The point at which composted material ceases to be waste varies dependent upon a number of factors. Making a decision on this matter is very complex.

2.48 Composted material for which there is no market does not cease to be waste. For example, having exceeded storage capacity at the site, the material may have to be disposed of.

2.49 However rulings by the European Court of Justice (ECJ) have resulted in a number of guiding principles that can be applied to composted material.[18]

2.50 In Scotland, the SEPA have issued a position statement in which the SEPA current position is that compost which is produced for a market, is able to meet the quality standards before any blending of the compost with other wastes, materials, composts, products or additives (where the standards are designed to ensure that the compost can be used with no adverse impact on the environment or human health), which has certainty of market and can be put to use without further recovery is likely to be taken to be fully recovered.

2.51 The point at which the intent not to discard is demonstrated will vary in each case since at all stages, compost can become waste again or may remain waste if it s not used and is consigned to a disposal operation.

2.52 The EA (for England and Wales) do not have a similar position and consider compost to remain a waste until it has been used.

Animal By-Products Regulations 2003

2.53 The Animal By-Products Regulations 2003 and the EC Animal By-Products Regulation 1774/2002, which has been amended by Commission Regulation No 808/2003 in combination regulate the:

- Collection
- Transportation
- Storage
- Handling
- Processing and
- Disposal of animal by-products not intended for human consumption.

2.54 The following section provides a summary of the regulatory requirements. More comprehensive guidance has been provided by Defra in "Guidance On the Treatment in Approved Composting or Biogas Plants of Animal By-Products and Catering Waste" (v.7 Dec 2004)[19].

16 See Example 11, relating to the scope of PPC and the spreading of manures, in Integrated Pollution Prevention and Control – A Practical Guide (Defra 3rd Edition page 97)

17 Waste Management – The Duty of Care, A Code of Practice.

18 Defra are currently reviewing their guidance in relation to the definition of waste contained in Circular 11/94. The EA is also working on draft guidance for the composting industry on the issue of when compost ceases to be waste.

19 Available at www.defra.gov.uk ñ this includes the full definition of the waste classes

2.55 SEPA have prepared some guidance for Scotland

2.56 Animal by-products include animal carcases, parts of animal carcases (including blood) or products of animal origin not intended for human consumption.

2.57 There are three categories of animal by-products. These are:

- Category 1 – includes certain animal by-products and catering waste[20] from international transport. These wastes cannot be treated by composting.
- Category 2 – includes products of animal origin containing veterinary residues, slaughtered animals and parts thereof that are not for human consumption may be composted if they have been treated in an approved processing plant using processing method 1 specified in EU Regulation 1774 i.e. 133 °C, 3 bar pressure for 20 minutes (the EU Pressure cooking standard).
- Category 3 – includes animals or parts of animals that are fit for human consumption but are no longer intended for human consumption. This includes catering wastes and food processing industry wastes.

Treatment – Method, Temperature, Duration and Particle Size

2.58 The EU Regulation requires treatment to the following standard:

- Minimum temperature of 70 °C (produced by exothermic reaction of microbial activity, although external heating to prevent cold spots is allowed)
- Temperature maintained for a minimum of 60 minutes
- Maximum particle size of 12 mm

2.59 National rules apply for catering waste, which are summarised in Box 5.

Box 5 Treatment of Animal By-Products

Catering waste meat excluded, i.e., source separated from all meat products.	
Either:	
i) Closed reactor	ii) Enclosed windrow
70 °C for 1 hour – 6 cm (max. particle size)	60 °C for 8 days – 40 cm (max. particle size)
or 60 °C for 2 days – 40 cm (max. particle size)	Turned every 2 days
Stored for 18 days post treatment	Stored for 18 days post treatment

Catering waste with meat – a two barrier process	
Barrier 1	**Barrier 1**
Closed reactor	Enclosed Windrow
70 °C for 1 hour – 6 cm (max. particle size)	60 °C for 8 days – 40 cm (max. particle size)
Or 60 °C for 2 days – 40 cm (max. particle size)	Turned every 2 days
Barrier 2	**Barrier 2**
This needs to be a repeat of stage 1 either in a closed reactor or housed windrow or in an open windrow at 60 °C for 8 days – 40 cm max particle size, turned every 2 days.	

2.60 Box 6 describes the additional mandatory requirements of the EU Animal By-Product Regulations 1774 that apply to each of the devolved administrations.

20 Catering waste is all waste food including used cooking oil originating in restaurants, catering facilities and kitchens, including central kitchens and household kitchens.

Box 6 Summary of the mandatory requirements of the Animal By-Products Regulations

Livestock restriction
No livestock are allowed on the premises where animal by-products are being composted. In order to be classed as a separate premises the facility must have a defined boundary, a separate entrance, dedicated staffing and separate equipment.

Plant Layout
A separate and covered reception area is required for untreated animal by-products.
Adequate facilities for cleaning and disinfection[21] of vehicles and containers must be provided.
A clean area where treated compost is to be stored in order to prevent cross-contamination is required.

Unprocessed material
Waste should be treated immediately or stored and treated without undue delay.

Measures to prevent contamination
These need to:

- Prevent the contamination of treated material from untreated, partially treated materials or liquids arising from them
- Prevent the contamination of partially treated material from material that has not been treated to the same extent or liquids arising from it
- Identify, control and monitor suitable critical points in the operation of the plant to demonstrate how the above has been achieved and the regulations are being complied with

Security
No unauthorised access to the site is permitted.
Preventative measures against birds, insects and other vermin must be taken systematically.

Hygiene
Inspection schedules and results must be documented. Regular inspection of equipment and the premises is required.

Equipment
Equipment and the premises must be kept in a good state of repair. Measuring equipment must be calibrated at regular intervals.

Composting plants
Composting activities must be enclosed (except when open windrows are permitted in Barrier 2 treatment).

Monitoring
Composting units must have a system of monitoring temperature against time continuously.
An adequate safety system to prevent insufficient heating is required.

Facility checks
Permanent procedures need to be put in place, following the principles of Hazard Analysis and Critical Control Point (HACCP) assessment. The procedures should include identification and control of critical control points (CCPs), monitoring and recording of CCPs, sampling each batch and recording the results and establishing a traceability system for each batch dispatched.

Product monitoring
Samples need to be taken during or upon withdrawal from storage and subjected to testing.

21 Disinfectants should be approved under the Diseases of Animals (Approved Disinfectants) Order

Approval from the Competent Authority

2.61 The procedure for obtaining approval is a two staged process:

- Stage one involves pre-validation of the proposed operating system by the manufacturer or the operator
- Stage two involves validation of the site's operations to demonstrate that the system is capable of being operated properly at the specific site

Pre-validation

2.62 Pre-validation requires the submission of evidence, data and plans to the competent authority to demonstrate that the proposed system can comply with the requirements of the regulations. That is to:

- Treat appropriate feedstocks
- Achieve the specified time and temperature requirements
- Destroy pathogens effectively

Pre-validation should also set out the conditions under which the system operates, including seasonal variations.

Site Validation

2.63 Once the first stage has been accepted by the competent authority, the next stage requires operators to demonstrate that the system works given the site- specific conditions. This involves the development of a HACCP

Plan (see below) and the identification of the system's Critical Control Points (CCPs). The HACCP assessment should detail how the CCPs will be measured and monitored to demonstrate compliance with the regulatory requirements. Particularly important are the details of what action will be taken if a CCP fails.

It is recommended that for new sites planning to operate under the Animal By-Products Regulations that plans of the processing equipment and site layout be submitted to the competent authority to seek an opinion of whether they are capable of complying with the appropriate requirements of the regulations, before capital expenditure is incurred.

2.64 An inspection is carried out once the competent authority is satisfied, in principle, that the system will be effective. The inspection involves the operator demonstrating that he can properly operate the system.

2.65 If satisfactory a time-limited approval will be issued which may contain a condition requiring the disposal i.e. landfilling, incineration or rendering of the composted material. Alternatively, separate storage may be required until validation is successfully completed.

2.66 Each batch of compost is tested for *Salmonella* and also *Enterobacteriaceae*. The latter is not required for catering waste. Four consecutive results below the limit values set in the Regulations mean that the site has passed the first validation stage.

Positive Release Stage

2.67 The positive release stage (second site validation stage) allows composted product to leave the site and be spread on non-pasture land[22] or be disposed of.

2.68 During the positive release stage consecutive batches need to be sampled and tested. Once results have been below the limit values set in the Regulations for three months the competent authority will take four samples and have them tested. If these samples microbiologically fall below the specified thresholds then the validation will be deemed successful. A further inspection is then made by the competent authority and the site assessed. Subject to this assessment a full approval can then be given.

2.69 Once fully validated and approved the microbiological testing may be reduced subject to the ongoing monitoring of the CCPs identified in the HACCP.

22 The regulations ban the application to pastureland. Pastureland is defined in the Animal By-Products Regulations.

2.70 If microbiological testing were to show a failure then the competent authority must be notified. The reasons for failure need to be assessed and the appropriate corrective actions taken, which may involve site decontamination and the validation process revisited.

2.71 Records must be made of the test results and the destination of the compost that leaves the site, in addition to records that track batches through the composting process.

Hazard Analysis and Critical Control Point (HACCP)

2.72 A HACCP plan will be required in support of the application[23]. Procedures need to be developed following the principles of HACCP to identify and control critical control points.

2.73 There are seven principles to be followed in the HACCP system[24]. They are to:

- Conduct a hazard analysis
- Determine the Critical Control Points (CCPs)
- Establish Critical Limits
- Establish a system to monitor control of the CCPs
- Establish the corrective action to be taken when monitoring indicates that a particular CCP is not under control
- Establish procedures for verification to confirm that the HACCP system is working effectively
- Establish documentation concerning all procedures and records appropriate to those principles and their application

Record Keeping

2.74 The Animal By-Products Regulations require the following information to be recorded:

- The date of delivery of the material
- The quantity and a description of the material
- Name of the haulier
- Dates of treatment
- Quantity and description of material treated
- CCP check results
- Treatment parameters of the treatment process

2.75 For meat excluded catering waste, a record indicating the measures taken to ensure it had not been in contact with meat prior to delivery is required.

23 Guidance is provided in "Hazard Analysis and Critical Control Point (HACCP) for composters" (Composting Association 2003)

24 Hazard Analysis and Critical Control Point (HACCP) for Composters: Figure 4 The Seven Principles of HACCP (Composting Association)

2.76 The records have to be kept, by the operator, for two years.

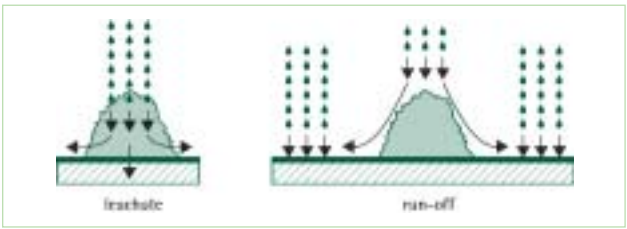
Water Protection

2.77 Definitions: Composting produces a liquid residue, termed leachate, which is potentially polluting and which has to be handled and disposed of without causing pollution of waters, including groundwater.

Rainwater falling on the composting facility has to be managed.

The combination of leachate and rainfall is termed site run-off or liquor as shown in Figure 4.

Figure 4 Leachate and site run-off (liquor)



2.78 This section deals with:

- Discharge to water and foul sewer
- Disposal off site via road tanker

Note: It is an offence to discharge to surface water, groundwater or the foul sewer without a relevant consent. Both quantity and quality limits imposed in the consent have to be complied with.

It is good practice to keep clean water and leachate separate. Allowing them to mix will increase operational and disposal costs. The leachate may contaminate treated compost.

2.79 If there is any doubt about the composition of any liquid that could potentially enter a watercourse or enter the groundwater, contact the EA, SEPA or EHSNI for advice.

2.80 Dependent upon the chosen method of liquid management one or more of the following will be needed:

- Discharge consent to water course
- Groundwater Regulations authorisation to groundwater
- Trade effluent discharge consent to foul sewer

2.81 The operator has to apply in writing and pay the appropriate fee.

2.82 The effect of the discharged liquids on the receiving water body, or foul sewer, has to be assessed.

2.83 Once issued there is an ongoing charge based on the quantity and composition of the disposed liquids.

2.84 It is important to note that discharges of clean water are regulated. Suspended solids in the water can have an adverse impact on surface waters in the following ways

- By causing siltation which may cover gravels used for spawning
- Turbidity that blocks out sun light
- Abrasion resulting in damage to fish gills and scales

2.85 Containment and management of leachate will be required with dedicated drainage to blind sumps, tanks or purpose built leachate lagoons.

Disposal off site via road tanker

2.86 Contaminated water or leachate that is taken off site by road tanker must be carried by a registered waste carrier. The appropriate documentation describing the waste must be completed[25]. Where the waste meets the definition of hazardous waste then the consignment note procedure must be followed[26]. The waste must be delivered to a suitable permitted facility that is authorised to treat that waste.

Health and Safety

2.87 The Health and Safety at Work Act 1974 provides the framework for the protection of workers and the general public from hazards associated with a work activity. A number of regulations have been implemented which have a direct bearing on the establishment and operation of a composting facility.

2.88 Notwithstanding the specific legal scope of particular regulations it is fundamental that the individual work activities are assessed for risk and where necessary appropriate controls implemented. This starts at the site selection and preliminary site design stages.

2.89 The safe routing of vehicles has been identified by the Health and Safety Executive (HSE) as a major issue that should be addressed.

25 Duty of Care transfer notes

26 Special Waste Regulations 1996 to be replaced by the Hazardous Waste Regulations. Guidance is provide in EA document WM2

2.90 Table 3 identifies some key regulations and guidance[27] is provided in the Risk Assessment section below.

Table 3 Regulations relevant to the composting industry

Regulation	Employers' Obligations
Management of Health and Safety at Work Regulations 1999 (the Management Regulations)	This requires employers to undertake risk assessments on all work activities, plan effectively for health and safety, undertake the principles of prevention, provide health surveillance (where required), appoint competent persons to help carry out employers' responsibilities, provide information and training to employees, and set up emergency procedures.
Control of Substances Hazardous to Health (COSHH) Regulations 1999	This requires employers to assess the risks associated with exposure to hazardous substances, then to introduce procedures to either prevent or minimise the risk.
Personal Protective Equipment (PPE) Regulations 2002	This requires that PPE be supplied and used at work wherever there are risks to health and safety that cannot be controlled in other ways.
Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR)	This requires employers to report injuries, diseases and dangerous occurrences.
Health and Safety (Consultation with Employees) Regulations 1996	This means that employers must consult with employees about matters that affect their health and safety.
Health and Safety (Safety Signs and Signals) Regulations 1996	This requires employers to display a safety sign where there is a significant risk to health and safety that has not been avoided or cannot be controlled by other means, provided that the use of a sign can help reduce the risk.
Electricity At Work Regulations 1989	This requires people in control; of electrical systems to ensure they are safe to use and maintained in a safe condition.
Employers' Liability (Compulsory Insurance) Act 1969, as amended by the Employers' Liability (Compulsory Insurance) Regulations 1998	This requires employers to take out insurance against accidents and ill health to their employees.
Health and Safety (First Aid) Regulations 1981	This covers the requirements for first aid.
Health and Safety Information for Employees Regulations 1989	This requires employers to display a poster telling employees what they need to know about health and safety.
Manual Handling Operations Regulations 1992	This covers the moving of objects by hand or by bodily force.
Noise at Work Regulations 1989	This requires employers to take action to protect employees' hearing.
Provision and Use of Work Equipment Regulations (PUWER) 1998	This requires that equipment provided for use at work is safe.
Workplace (Health, Safety and Welfare) Regulations 1992	This covers a wide range of basic health, safety and welfare issues.
Construction (Design and Management) Regulations 1994 (CDM)	This covers construction work and requires the preparation of a Health and Safety file

(Adapted from Health and Safety at Composting Sites: A Guide for Site Managers, The Composting Association, 2004)

27 Additional gguidance is provided in "Hazard Analysis and Critical Control Point (HACCP) for composters" and "Health and Safety at Composting Sites: A Guide for Site Managers"

Holistic Approach to Authorisations

2.91 It is important to note that the information gathered and the procedures and decisions that arise from that information are not solely for the regulatory authorities. They are there to ensure that the operator establishes and operates a composting facility in the most efficient and effective way in terms of safety, cost and environmental protection.

2.92 As can be seen from the information table shown in Table 4 there are considerable overlaps in the type of information that each of the regulatory authorities require.

2.93 It is good practice to take a holistic approach to the gathering of information and setting out issues such that information can be presented for the different processes without starting again for each.

2.94 Table 4 provides examples of the types of information, why the information is requested, how certain aspects of a facility can be managed and the regulatory approvals associated with it. The location, scale, feedstock and type of composting technique will determine what is relevant for each individual composting facility.

Table 4 Type of information and the relevant authorisation

Type of information	Why it is requested	How the issue can be managed	Which authorisation requires it
Information arising from a Risk Assessment	To identify unacceptable risks that must be managed.	• Implementation of procedures, monitoring and physical controls	ABPR/ PP/WML/HS
Access and site security	Keep livestock and unauthorised people out of the facility.	• Construction of an appropriate security fencing and gates	ABPR / PP/ WML / HS
Reception Area	Inspection of incoming feedstock to identify its suitability and conformance with documentation. Quarantining of contaminated materials.	• Construction of a designated area for visual and olfactory inspection • Provision of a quarantine area / enclosed skip for the removal of contaminated feedstock • Contract clauses for the return of off-specification materials to the supplier	ABPR / WML / PP / HS
Cleaning facilities	To destroy harmful pathogens To prevent cross contamination and odours. To prevent mud and debris entering the pubic highway. To protect of workers' health.	• Designated decontamination area typically with all or any of the following; hose pipes, pressure jets, disinfectants, a wheel wash and or shaker bars • Welfare facilities for staff including hot water for washing • Documented cleaning procedures, inspection and verification	ABPR / WML / HS
Drainage	To prevent pollution and cross contamination of liquids, processing materials and compost product. To manage liquids on site.	• Dedicated drainage and blind sumps or lagoons to collect and retain leachate and or site run-off • Provision of low permeability surfaces laid to a fall • Collection of clean water, e.g., surface water run-off from roofs and clean areas may be discharged to a soak away or surface waters via a settlement tank or pond	ABPR / WML / PP / HS / Discharge consent / Trade Effluent consent / Consignment Notes / Transfer Notes
Designated Areas	To prevent pollution and cross contamination of liquids processing materials and compost product. To manage liquids on site.	• Surfaces laid to a fall • Bunding • Physical distance • Storage facilities • Procedures to track materials at various stages of treatment	ABPR / WML / HS

Type and scale of equipment	Visual impact. To demonstrate that it is suitable for the intended purpose e.g. turning. To assess the physical impact on the proposed standard of surfacing. To assess likely noise levels	• Visibility screening e.g. close board fencing, screening mounds or trees. • Noise silencers, • Regular maintenance and servicing, • Acoustic housing. • Sympathetic location • Enclosed in a building.	ABPR / PP / WML / HS
Treatment method	Associated treatment process / standard. To assess environmental controls that are applicable.	• Catering waste – in-vessel treatment. • Methods to control odours, dusts and bioaerosols (see contingency planning section)	ABPR / PP / WML / HS

ABPR Animal By-Products Regulations
WML Waste Management Licence
PP Planning Permission
HS Health and Safety

2.95 Government guidance is that the different regulatory bodies should aim not to duplicate the controls of other regulatory bodies.

However, the information sought is often used to make different decisions, i.e., a planning officer may will need to know the treatment method in order to assess possible odours and dust emissions whereas an environment officer will need to know the treatment method in order of assess the possible environmental impact.

It is good practice to twin track applications, particularly planning and waste management licences such that the authorities have an understanding of what is going to be controlled by the other approval and therefore minimise duplication of controls.

2.96 Some of the key issues that have been identified from experience of establishing and operating composting facilities are included in Box 7 below.

Box 7 Some key issues to consider before deciding whether to compost

- Planning permissions can be refused on the basis of justifiable objections from local residents
- There is the need for several authorisations issued by various bodies
- It will take time to gather the appropriate information for the applications to be completed and submitted; for the regulatory bodies to assess, consult, determine and issue or reject the authorisations
- There is a fee associated with the application and maintaining certain authorisations
- Operating without the appropriate authorisations is an offence
- The detail of the site design and proposed management procedures will be scrutinised and additional information may have to be supplied
- Risk assessment and risk management will be required
- Operations will be subject to periodic inspection
- Odours can and will occur; plan to prevent, minimise and manage this
- Active management throughout the whole composting process is vital
- A Waste Management Licence (WML) or Pollution, Prevention and Control (PPC) permit have to be formally surrendered following the completion of the operations. If the regulatory authority does not accept the surrender application the WML or PPC permit remains in force. The terms and conditions still need to be complied with and the subsistence fees paid
- Waste materials are a natural consequence of composting e.g. screened contaminants, leachate. Appropriate disposal arrangements need to be in place. Unwanted compost may have to be disposed of as a waste, as storage capacity is used up and contracted feedstock is delivered
- Contingency planning is vital
- Health & Safety
- Site Location, e.g., distance from sensitive receptors

Risk Assessment and Managing Risk

2.97 This section provides a general overview of risk assessment and management of risks.

2.98 In establishing and operating a composting facility it is necessary to identify what hazards the facility and its operation may present and conduct a risk assessment. The next step is to consider the various control options and decide on the most appropriate control for that risk in association with other risks.

The overall approach to risk assessment and management is:

1) Hazard identification
2) Assessment of risk
3) Appraisal of the options for management of those risks
4) Implementation of the most appropriate control measures for all of the identified risks

2.99 A holistic approach, particularly at the information gathering stage and where necessary site investigation, is far more effective in terms of cost and time.

2.100 A record of the identified hazards and the associated assessment of risk should be made. Furthermore the appraisal of the risk management options and the reason for adopting the chosen control should be documented. This is the first step towards best practice in adopting a formal Risk Management System.

Risk is assessed using the Source – Pathway – Receptor relationship.

The concept of a hazardous source that is connected to a receptor via an identified pathway i.e. source-pathway-receptor relationship, underpins the UK approach to risk assessment. Where one of the three elements is absent then there is no identifiable risk.

2.101 The scope and objectives of a risk assessment should be set out clearly. The whole process is an iterative one. Where new information is collected or a new risk is identified the proposed control measures will need to be revisited.

Mandatory Risk Assessments

2.102 The formal assessment of risk is contained in a number of regulatory requirements. Box 8 shows some of these requirements.

Box 8 Examples of where mandatory risk assessments are required

- Environmental Impact Assessment
- Management of Health and Safety at Work Regulations
- Control of Substances Hazardous to Health
- Construction (Design and Management) Regulations
- Animal By-Products Regulations

2.103 The Health and Safety Executive has provided guidance on how to carry out risk assessments for legislation that it is responsible for administering. The document is provided in "Five steps to risk assessment"[28].
Box 9 shows these steps.

Box 9 Health and Safety Risk Assessment process

Step 1: Look for the Hazards
Step 2: Decide who might be harmed and how
Step 3: Evaluate the risks and decide whether the existing precautions are adequate or whether more should be done
Step 4: Record findings
Step 5: Review assessment and revise it if necessary.

2.104 Detailed guidance has been provided in relation to environmental risk and human health in:

- A Guide to Risk Assessing Composting Facilities [29]
- Guidelines for Environmental Risk Assessments and Management[30]
- The above is under pinned by "CLR 11 Model Procedures for the Management of Land Contamination"[31]. Readers are referred to these documents for further guidance on risk assessment and the management of risks

2.105 The UK approach to risk assessment is a tiered approach. As the complexity of a site and the uncertainty surrounding a potential risk increases the amount of effort and resources that are put in to the risk assessment increases.

2.106 Three distinct tiers of risk assessment can be conducted either sequentially or individually dependent on the state

28 Five Steps to Risk Assessments (HSE INDG 163 (REV 1))

29 Environment Agency. Available from the EA Area office or www.environment-agency.gov.uk

30 DETR, Environment Agency and Institute of Environment and Health. Available at www.defra.gov.uk

31 (Defra and Environment Agency 2004) Available at www.environment-agency.gov.uk -

of information available or knowledge of the risk assessor. The amount of effort that is put into each of the tiers increases from one to the other. The tiers are:

- Preliminary risk assessment
- Generic quantitative risk assessment
- Detailed quantitative risk assessment

2.107 The primary aim of the risk assessment is to determine if an unacceptable risk exists. The risk assessment in itself does not provide an exact answer. Risk management is tempered with elements of cost benefit and policy issues.

2.108 Following the risk assessment the options to manage the unacceptable risks need to be evaluated. Again adopting a holistic approach has considerable benefits in that choosing one risk management option may effectively deal with a number of identified risks. The risk management strategy should be kept under review and amended as appropriate.

Example:
The provision of a properly designed and installed low permeability surface with drainage provides risk management control and good site management in the following ways:

- Preventing pollution of surface and groundwater
- Segregation of clean and dirty water
- Keeping the surface clean minimises the release of dusts
- Providing a safer working surface for vehicles and people using the site.

Site Selection

2.101 Selecting the right site in the right location is a critical factor in establishing and operating a composting facility.

Good Practice – Early Dialogue

It is important to establish an early dialogue with the regulatory authorities and those living close to the proposed composting facility to inform them of the intended operation, provide information, ascertain what will be required in establishing and operating a composting facility and start to develop good working relationships. This applies equally to situations relating to "change of use" under planning legislation.

This may include discussions with:

- parish, district, unitary and county council local authority officers and elected members
- local schools and
- community groups

2.102 When selecting a site the factors and reasons in Box 10 need to be taken in to account.

Box 10 Typical factors to be taken into account when selecting a site and the relevance of that factor

Operations:

Proposed scale and type of composting technique (see Box 1) determines the size of site required[32].

Size of land holding determines the scope of operations and the potential for expansion.

Availability and distance to feedstock supplies, markets and disposal facilities influences the financial viability of operating in that location. The feedstocks will influence the technique to be used.

Existing infrastructure if suitable for intended purpose provides considerable cost savings. Repairs are often far cheaper than providing new infrastructure.

Existing authorisations allows operations to start that much quicker. Need to ensure that they are completely appropriate and where necessary capable of being transferred.

Good transport networks influence the ability to receive supplies and get products to market.

Access provisions need to be assessed such that it is capable of accommodating the proposed additional vehicles and it is safe to use, otherwise may require further work to meet safety requirements.

Utilities are needed e.g. water supplies; for welfare facilities and cleaning vehicles, production and storage areas.

Environmental:

Proximity to residential, commercial and other industrial premises determines the amount and type of environmental control needed. The combined environmental effect from other sources, and the proposed facility, needs to be assessed.

Proximity to protected sites and species[33] must be identified. Authorisations may be refused because the proposed activity could have a significant adverse effect by itself, or in combination with other activities, on such sites and species. Biological and ecological surveys may be required and where necessary appropriate mitigation or habitat creation.

32 See Composting Association guidance in Large Scale Composting : A practical manual for the UK (2001) and A Guide to In-Vessel Composting (2004)

33 As required by the Habitats Directive (92/43/EEC) and The Conservation (Natural Habitats &c) Regulations 1994, referred to as "the Habitats Regulations,"

Proximity to surface water, which may be used as a water supply and or liquid disposal route, needs to be assessed. Appropriate control and monitoring may be required e.g. settlement facilities.

Groundwater source protection zones need to be identified. The groundwater may be used as a water supply. EA, SEPA or EHSNI may object to planning permission if the site is within a Zone I or II groundwater source protection zone. They may refuse the waste management licence or PPC permit application. Where granted the monitoring and groundwater protection measures may be considerably greater than in other locations.

Prevailing weather conditions play an important part in risk assessment and site control. Topographical surveys and modelling may be required to assess potential odour, dust or bioaerosol impacts in highly sensitive areas or where there are known climatic or topographical anomalies. Where authorisations are obtained the type and scale of control measures will need to be such that dust, odours and bioaerosols are managed to an acceptable level.

Topography determines overall drainage requirements and visibility of the facility.

Health and Safety:

Existing infrastructure may provide facilities that meet Health and Safety requirements e.g. safe, stable working surfaces that are compatible with the vehicles and machinery that will use the site. Suitable welfare facilities may already exist that meet hygiene requirements.

A one-way system for traffic provides greater safety on a site especially where third parties e.g. landscapers are allowed access on to site.

2.103 The above factors are not exhaustive. Site specific issues will undoubtedly come into play. The sections relating to infrastructure and contingency planning discuss how the factors can be managed to varying degrees.

2.104 The size, shape or location of the site may limit the activities that can be carried out. It is recognised that potential operators may already own the site that they propose to use which may not be in the ideal location. In such circumstances additional control measures that are incorporated into the facility and good practice management procedures will go a long way to overcoming most, if not all, the potential problems.

Preliminary Site Design

2.105 The preliminary site design should have regard to all of the factors above on a locational basis and any other site -specific factors.

2.106 The design may have to incorporate specific requirements following:

- Decisions on the waste types to be composted, particularly if the Animal By-Products Regulations apply
- Discussions with the regulatory authorities and local neighbours (including commercial and industrial occupiers) and
- The risk assessment and chosen risk management options

2.107 The decisions relating to the proposed activity in terms of business strategy, procurement, machinery type and size, environmental and Health and Safety issues, for example, can influence the site design[34].

2.108 It is therefore highly unlikely that one site design will be identical to another. A schematic example for an in-vessel composting facility is provided in Figure 5 below.

For example:

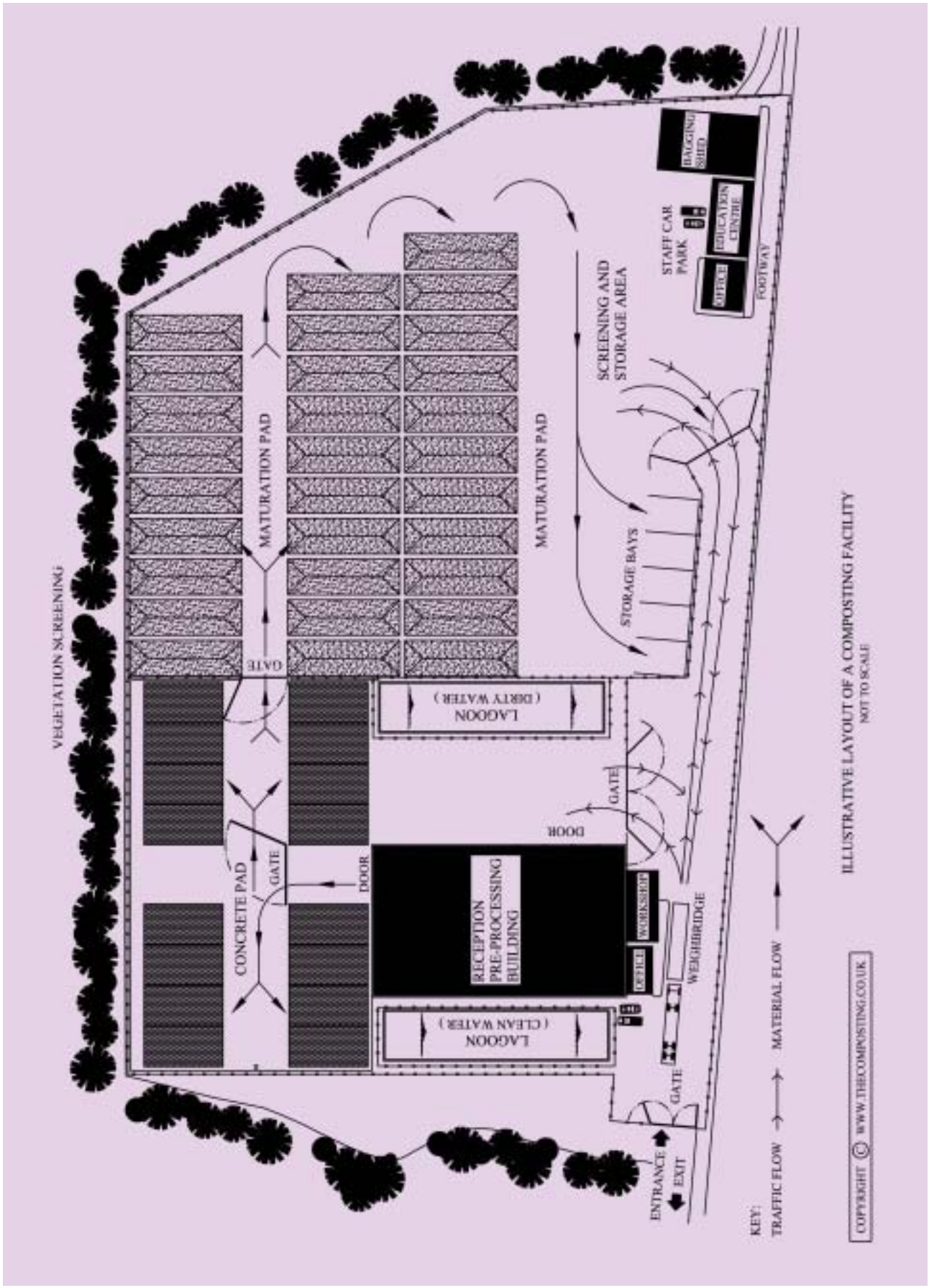
1. Collection and retention of liquor for subsequent moisture adjustment of windrows will require sufficient space and specific engineering solutions or it may be discharged to foul sewer, particularly if it is a source of odour or there is insufficient space.

2. The decision to accept catering waste means mandatory requirements are imposed that must feature in the site design.

3. Different surface types may be required, given different pollution risks and vehicle use at the site e.g. tractor and trailer compared to road lorries. The surface needs to be "suitable for intended purpose".

34 See Composting Association guidance Large-scale Composting: A Practical Manual for the UK (2001) and A Guide to In-Vessel Composting. (2004)

Figure 5 Schematic site layout for an in-vessel composting site



General workforce considerations

2.109 The appropriate number of staff and the required combined skill set will be dependent upon the scale and type of composting technique that is to be carried out.

2.110 There are certain mandatory requirements in relation to the technical ability of certain employees, training requirements and those people that may be at a particular risk. Examples are provided in Box 11 below.

Box 11 Example of mandatory requirements

1. Technically Competent Management

Prior to the issue of a waste management licence the applicant has to demonstrate that the operations will be in the hands of a technically competent manager. This is demonstrated either by:

i) Holding a relevant WAMITAB certificate for composting facilities

ii) Being registered and seeking to obtain a relevant WAMITAB certificate[35]

The operations have to remain in the hands of a technically competent manager, if they do not then the regulatory authority can suspend the activities authorised by the licence.

2. Health and Safety

A number of Health and Safety Regulations require that employees be adequately trained to carry out their work such that they do not harm themselves or others. Training has to be provided in the use and maintenance of Personal Protective Equipment.

2.111 It is good practice to ensure that all members of staff are appropriately trained in what they are required to do. This helps ensure that the composting process does not go wrong or if it does that staff have the ability to quickly correct things.

2.112 Good contingency planning, training and drills ensure that emergency procedures will be carried out effectively.

2.112 The BSI PAS 100 (2002) requires that staff involved with quality planning, management and control are adequately trained, instructed and supervised and requires that organisations establish and maintain training programmes.

35 There is a two-year period from the start of operations for that person to obtain the relevant certificate. The technically competent manager does not necessarily have to be on site all of the time, but must be contactable during site operations. The time required to be physically on site is determined by the facility's "Operator and Pollution Risk Appraisal (OPRA)" score.

Part 3 Pre-composting

3 This section details issues associated with:

- Infrastructure
- Contingency planning
- A check list of contracts that may have to be negotiated and entered into
- Background environmental monitoring

Infrastructure

3.1 Careful design and planning of infrastructure can minimise costs and maximise benefits. The infrastructure not only provides the practical elements of a composting operation, it also provides a number of the risk management controls for a site. The design and provision of infrastructure that is ìsuitable for intended purposeî will differ from site to site.

3.2 Mandatory requirements are set out in the Animal By-Products Regulations in relation to infrastructure. The waste management licence and planning permission may also specify additional requirements. Providing the right infrastructure, that protects workers from harm, with help in complying with Health and Safety requirements.

3.3 The principal infrastructure required at a composting facility and some of the reasons for having them are detailed below. They include:

- Provision of impermeable paving, bunding and sealed drainage systems to prevent pollution of the environment and cross contamination
- The Animal By-Products Regulations requires enclosed buildings to prevent vermin, scavengers and birds from gaining access to food stuffs and carrying it away from the site to the surrounding environs
- Fixed storage bays and containers to provide adequate segregation of materials and storage of liquids
- Site security to prevent access by livestock and unauthorised people. Again to prevent them coming into contact with harmful pathogens and / or carrying materials away to the surrounding environs

Construction Quality Assurance Plans should be developed and adhered to for the main engineering aspects of the site.

3.4 Table 5 identifies various options in relation to how the infrastructural requirements can be provided. The detailed engineering specification is a matter for the operator and will vary given that the specification will need to be such that the end product is suitable for the intended purpose. For example, a storage tank for water will be different than that needed for the storage of fuel or leachate.

Table 5 Meeting the requirement for infrastructure

Infrastructure	How it can be achieved
Low permeability pavements	1) Concrete provided to a suitable strength (e.g. strong enough for the building, machinery, and containers to be placed on it and fully loaded vehicles that will transverse it) constructed with the minimum number of expansion joints. Sealants and concrete that are chemically compatible with the leachate that may be generated or liquids that may spill on it.
Liquid, sludge and powder storage and bunding	2) Geomembranes that are factory or in-field welded and tested, chemically compatible with the potential leachate. Covered with a protection layer e.g. 300 mm of sand to prevent damage during windrow turning. Containers must be strong enough to hold the contents without leaking or rupturing. Ideally above ground tanks should be located away from vehicle traffic to avoid damage or collision. Bunds must be able to contain 110% of the maximum sized container or 25% of the total storage capacity, whichever is the greater. Bund walls and floor must be impermeable to the liquid they hold and water ?? and checked regularly for leaks. No drainage valve must be fitted to drain water from the bund. The bund needs to be pumped or bailed out.

	Above ground pipework must be adequately supported and suitably located to avoid traffic. Any underground pipework carrying potentially polluting liquids must be protected from damage and any mechanical joints in the pipework should be accessible for inspection.
Sealed drainage	Potentially polluting liquids (e.g. used disinfectants, leachate) need to be directed and collected in sealed, or blind, sumps. This is achieved by laying the low permeability surfaces with a gradient e.g. 1:50 towards the collection containment. This may be impermeable tanks either made of concrete or man made materials which are chemically compatible e.g. High Density Polyethylene (HDPE) with the liquid they will contain and strong enough not to rupture when full. There must be a way of measuring or detecting when they are nearly full. They should be inspected and emptied at a frequency determined by the catchment of the drainage area and the volume of liquid they can contain.
Enclosed building	Enclosed buildings must be suitably constructed to house the plant and machinery to be used at the facility. Typically, it needs to be designed and operated to minimise dust, collect and treat odours and bioaerosols e.g. biofilters, activated carbon, acid scrubbers. Air exchange rates to reduce air emissions to an acceptable level to ensure worker health should be taken into account at the design stage. The building must be secure enough to prevent access by livestock, vermin, scavengers and birds.
Fixed storage bays and containers	The various feedstocks, bulking agents and compost treated to varying stages should be segregated. This can be by physical distance and or fixed storage bays that do not allow cross contamination. The bays must be strong enough given the loading effect of stockpiled materials and the additional forces exerted during shovelling and loading. They may be constructed, for example, of concrete or railway sleepers. Containers used at the site need to be strong enough for the load placed in them, chemically compatible, may need to be easily moved and provide easy access and egress for the materials they contain. The latter may result in the need for specialist lifting equipment e.g. skips and skip lorry. Containers may be made of steel, plastic or textiles. Systematic labelling of areas and containers is good practice. It helps ensure that incompatible materials are not mixed resulting in an adverse reaction or contamination.
Site security	Site security must be in place prior to commencement of composting activities. Site security is needed to prevent unauthorised access to the site[36]. The standard of fencing erected should typically provide security equivalent to 1.8 metre high chain link security fencing and must have a lockable gate to at least the same height and standard at the site access. Close board fencing provides better visual and noise abatement. In rural areas animal proof fencing may provide adequate security around a whole field without the need for additional dedicated fencing for the composting activity (except if treating Animal By-Products).

36 The Waste Framework Directive requires that a permit that authorises waste disposal must contain a provision requiring site security.

Maintenance

3.5 The entire above infrastructure needs to be inspected and kept in good repair. It is good practice to develop maintenance schedules, record inspections and what repairs have been undertaken. For example, security fencing and gates should be inspected daily, repairs need to be carried out as soon as possible on the day defects are detected and repaired back to the original standard within seven days.

3.6 Minor spillages and leaks of liquids must be cleared as soon as possible following their discovery using suitable absorbent materials. Containers should be emptied of the remaining liquids, repaired or replaced as soon as possible. Major spills and leaks must be controlled immediately and measures taken to prevent liquids from entering any watercourse or un-surfaced areas. The EA, SEPA or EHSNI must be contacted in the event of a major spill. Operators will need to ascertain the quantity of liquid involved and the amount that was recovered. The action taken should be recorded.

Contingency Planning

Contingency planning plays a vital role in the effective and efficient running of a composting facility. It is never too early to start thinking about what to do if things were to start to go wrong. Plans, procedures and appropriate equipment should already be under consideration at the site establishment stage. They need to be in place prior to the start of composting activities.

3.7 Most complaints relating to composting facilities are odour related. Simple contingency planning can prevent such occurrences. The same applies to noise, dust, bioaerosols and water pollution. A framework on how to approach contingency planning for composting and several key examples are provided in Part 4 Managed Composting.

3.8 Another major issue is equipment breakdown, especially shredders. This is very important where sites are operating to near capacity. A shredder breakdown particularly during the summer months can cause significant problems. Suppliers that can repair and service equipment quickly are a key advantage. These are issues that should be considered in contingency planning and equipment selection.

Background Monitoring

3.9 Adequate background monitoring is essential for the following reasons:

- Feed into the risk assessments
- Establishment of environmental trigger controls, e.g., noise, dust, odours and bioaerosols
- A site report is a legal requirement of PPC permits
- Background levels of contamination or pollution will not be considered when applying to surrender a waste management licence or PPC permit (if unknown it will be likely that the compost operator will be held liable for the remediation of any contamination found)

3.10 For example composting facilities are often held responsible for higher concentrations of bioaerosols. Background monitoring will help identify other sources of bioaerosols in the vicinity[37].

Sources of background bioaerosols:

- Agriculture
- Food processing
- Forestry
- Landfill sites accepting biodegradable wastes

3.11 One-off surveys normally only provide a snapshot of the background conditions. Monitoring over an extended period that is targeted (e.g. harvesting time, various wind conditions) provides the best understanding in relation to surrounding conditions and other sources. In obtaining background information a risk-based approach will provide the best information at the lowest cost.

Contracts – A Check List

3.12 Prior to the design, construction and operation of a composting facility the following issues may involve the negotiation and agreement of contracts, in addition to the regulatory approvals.

3.13 The Waste Resources Action Programme (WRAP) has developed a useful guidance document "A Guide to Contracts in Recycling and Waste Management"[38] and "Agreement for the Supply of Organic Waste for Composting" (Model Contract)[39]

3.14 Box 13 identifies some of the contracts that composting operators need to enter into. Certain aspects of the contracts will form part of the operatorís contingency planning.

37 Standardised Protocol for the Sampling of Airborne Micro-organisms at Composting Facilities, the Composting Association, 1999

38 Available at www.wrap.org.uk

39 Agreement for the supply of Organic Waste for Composting, Model Contract, WRAP, 2005

Examples of issues that may be covered in contracts

Feedstock:
Regular supplies of different waste types and materials
Quality of source segregation, time limits, no-odourous material, verification by nominated person (including the exclusion of specified weeds and other contaminants)
Quantity issues in relation to the delivery vehicle type and / or containers, the requirement to sheet loads or other means of containment
Return of loads where they are found to be odourous, contaminated, outside agreed limits to include financial penalty clauses
Delivery times specified such that the load is not too early or too late, within operational times imposed by the licence and / or planning permission.

Composted materials:
Marketing and sales including advertisements and information sheets
Specified quality limits given different standards for different applications
Guaranteed quantity to the customer, otherwise storage capacity may be exceeded and disposal costs increase
Agreed delivery point and times so that the compost is dispatched within operational times imposed in the licence and / or planning permission of the compost facility and the customer's facility.

Waste disposal:
Quantity and composition of waste arisings e.g. extracted screened materials, surplus compost, canteen waste, and etc.
Different contracts for inert, non-hazardous and hazardous waste.
Ensure that Duty of Care and conditions of the registered exemption, waste management licence or PPC permit, as appropriate, are complied with.

Equipment:
Supply and maintenance contracts covering how quickly new equipment can be supplied to site
Service level agreements relating to repairs, within a specified time or the provision of replacement equipment
Lease agreements with an option to buy
Personnel Protective Equipment needs to be procured and provided to appropriate site staff.

Specialist and background monitoring:
Air dispersion modelling requiring the provision of an interpretative report and the raw data
Sampling and monitoring of water, dust, noise, bioaerosols
Specified frequency, sampling equipment, sample containers, preservatives, calibration, recorded sampling procedure, sample storage, transport, delivery to laboratory, analytical protocols, detection limits, agreed environmental standards for results to be compared against.

Intrusive Site Investigation:
Geotechnical for construction purposes
Geoenvironmental to support regulatory approvals and establish background conditions.

Infrastructure:
Suppliers of the various materials
Construction contractor with construction quality assurance plans and provision of as built drawings within quality assurance reports
Warranties and guarantees associated with the infrastructure provided and details of operational windows that may be relevant
Specifications drawn up such that the infrastructure is suitable for its intended use
Maintenance and repair clauses e.g. regular re-sealing, agreed trigger events (size of hole in concrete surface within a specified number months of laying, corrosion of sealants, wind damaged fencing).

Staffing:
Employment contracts with appropriately skilled and experienced staff, possibly a WAMITAB certification or registration requirement
Training providers with the appropriate experience and can provide continuous professional development certification.

Part 4 Managed composting

4.1 This section deals with the following issues:

- Process control
- Monitoring for fugitive emissions, vermin and birds
- Contingency planning
- Record keeping

Process control

Quality Management Systems play a fundamental part in good processing and product and are encouraged. Providing written procedures, monitoring of the process, recording and auditing that procedures have been followed and remain efficient, practical and effective are key to process control.

4.2 Quality Management Systems are designed to ensure that things go right from the outset. However it must include planning for when things go wrong. This section identifies contingency planning for the areas where composting activities have caused problems in relation to environmental impact and to the local neighbourhood.

4.3 Process control starts at the contract stage. For example, suppliers should have trained staff that can identify contaminants e.g. prohibited weeds, objects that could damage equipment or create operational risks when the wastes are delivered to the composting facility.

Material and Waste Acceptance

4.4 Upon arrival at the compost facility, procedures and equipment must be in place to confirm that the load is what is expected, it conforms with its description on consignment or transfer notes, meets the criteria specified in the waste management licence, as applicable, and in the contract.

4.5 Loads need to be inspected visually at the reception point. This can be achieved via a CCTV camera and monitor, strategically placed mirror and / or by an operative on a securely constructed gantry. Olfactory senses should also be employed at this point. In certain cases an operator may wish to sample and test the incoming material.

4.6 Further visual and olfactory inspection can be made once the material or waste is unloaded and spread out in a designated quarantine area. Previous problem materials or waste streams should be given extra attention to ensure that any agreed controls with the supplier have been implemented and are being met continuously.

4.7 The load should be kept separate until it has been formally accepted by the compost facility operative, who needs to record the delivery and acceptance of it.

4.8 Any load that is to be rejected must either not be unloaded and returned to the supplier or directed to a suitable authorised facility. Examples of a rejected load include:

- Unacceptable level of contamination,
- Unacceptable waste type

The regulatory authority should be informed.
A record of what action was taken needs to be made.

4.9 Alternatively it may be accepted where sufficient infrastructure exists on site and immediate contingency plans can be put into action. An enclosed area with active odour controls may be within the site's contingency plan and allow for an odorous load to be accepted as opposed to causing an odour problem elsewhere. Operators must ensure that their waste management licence and / or planning permission allows for such a situation. Loads that could cause litter problems should be handled in a manner to prevent the escape of litter.

4.10 Where only part of the load is unacceptable or the load has been unloaded and the delivery vehicle departed the site, then it must be located in a designated quarantine area or container e.g. a rejects skip.

4.11 The amount of unacceptable materials and waste must be kept within the quarantine areas and not exceed the storage capacity of that area. It should be removed from site as soon as possible and ideally no later than seven days from the day of receipt, unless the waste management licence specifies a shorter time.

4.12 Appropriate control must be exercised in relation to the storage of the unacceptable materials and waste awaiting its removal e.g. segregation from other incompatible materials and waste, not mixed with another category of waste (e.g. hazardous and non-hazardous), odour and / or dust control must be applied as detailed in the contingency plan.

4.13 Litter control, especially windblown plastics is an important issue in the good management of composting sites. Not only should this be addressed as part of Waste Management Licence and planning conditions but it is also important from the Health and Safety viewpoint.

4.14 The unacceptable materials and waste must only be dispatched when the operator is satisfied that the relevant legislation is being complied with and any waste will go to an appropriately authorised facility.

Accepted Materials and Waste

4.15 Following acceptance at the composting facility material must be appropriately stored. Feedstock for composting, following screening and shredding, as appropriate, should be placed on to the active composting area or into a vessel.

a) Feedstock composition

4.16 When considering feedstock, operators should also consider the end use and contingency plan for the disposal of the composted materials if the markets should fail.

4.17 The composition of the feedstock will determine the amount of active management needed prior to the start of composting and will have an influence on the whole composting process. Contract conditions should be established such that the consignor has procedures in place to ensure the right material is dispatched to the right site for composting.

Active Composting

4.18 Managing the composting process involves the balancing of a number of different variables, all of which impact on the others. These interactions therefore need to be managed. Operators need to encourage the right conditions to aid microbial growth and activity.

4.19 Management of the process is determined by the objectives for composting that is directly linked to the proposed end use for the composted material and the composting technique. A careful balance of these variables results in a good product, in minimum time, and considerably reduces the potential environmental impacts from the composting activity.

The principal variables that need to be balanced are:
* Feedstock composition and ratios
* Particle size and porosity
* Windrow construction*
* Oxygen
* Moisture content
* Temperature – residence time
* Carbon:Nitrogen ratio
* Turning frequency*

* Primarily in relation to windrowing

4.20 The organic feedstock and other materials (which may not be waste), provides the nutrients for microbial activity and the beneficial properties that good compost needs, for example carbon, potassium, phosphorus and nitrogen. Bulking agents, such as wood chip provides added texture and structure to the compost.

4.21 Site operators should record and review their sources of feedstock and where necessary carry out laboratory analysis of inbound materials and wastes. This information can then be used to assist blending of materials to attain the optimum biological, chemical and physical properties of the compost. In turn this will also help achieve optimum facility performance.

4.22 Some biologically stable waste materials may be stored to aid in the composting process at a later date, for example high carbon content or bulking agents.

b) Particle size and porosity

4.23 The smaller the particle size the greater the surface area for microbial activity. However, if too fine the material will have a porosity that is insufficient to allow aeration. Appropriate shredding to the desired particle size and mixing with bulking agents is carried out to provide beneficial conditions for the composting process.

The Animal By-Product Regulations specifies particle sizes of regulated wastes, dependent upon the treatment technique chosen.

4.24 Enclosed systems or in-vessel systems maintain porosity by forced aeration or by internal turning or by rotation of the vessel.

c) Windrow construction

4.25 The windrow should be constructed to optimise the composting process, which in itself is a balance between the various parameters.

4.26 The construction of a windrow will be constrained by the available area and capacity of the turning equipment.

4.27 If too small the windrow may lack insulating properties with consequent loss of temperatures and hence microbial activity may be reduced.

4.28 If too large, turning may be difficult and uniformity of treatment may be less.

d) Oxygen

4.29 The importance of oxygen is its availability for the aerobic micro-organisms. Oxygen measurements only measure the freely available oxygen in the composting mass and do not take into account the Oxygen Uptake Rate. At high activity rates, oxygen can be consumed as fast as it is available with little if any "free" oxygen left for measurement. This situation by itself does not necessarily indicate a stalled or oxygen-starved process or any risk of the system becoming anaerobic. However, turning or other means of aerating the composting mass e.g. increased airflow in a vessel, at this point may be appropriate to aid aeration.

e) Moisture Content

4.30 Water is essential for chemical and biological reactions within the composting process. Moisture transports nutrients and micro-organisms aiding the uniformity of the process. The guideline moisture content is generally between 40 % and 60 %. Under specific processing requirements the moisture content can be outside this range.

4.31 If the moisture content is too high, the permeability to air flow will be reduced and anaerobic conditions may set in. Cooling may also occur, reducing microbial activity.

4.32 The "squeeze" test is subjective assessment but reliable when carried out by an experienced operator. An alternative is sample weighing before and after drying in an oven which enables calculation of the moisture percentage.

4.33 If the composting material is too dry, water may be added. In some cases, leachate may be used subject to odours and its chemical and microbiological properties, however leachate should only be added at the start of sanitization to prevent contamination of the composting material.

4.34 The monitoring frequency in PAS 100 should be carried out at the frequency stated.

4.35 For in-vessel composting moisture loss may be greater than for open windrows particularly for forced aeration systems and moisture monitoring is important. Some in-vessel systems may incorporate integral moisture measuring systems.

f) Temperature

4.36 Temperature is as an indicator of microbial activity. Micro-organisms generate heat as a result of their biological activity. Temperature measurements can indicate a number of aspects of the process. Examples include:

- The rate of microbiological activity
- The degree of microbiological activity (related to stability/maturity)
- The predominant type of micro-organisms (mesophilic or thermophilic)
- The degree of insulation of the windrow or vessel

4.34 Temperature is one of the mechanisms involved in sanitisation of the material and plant, animal and pathogen kill. The required temperature is dependent upon the composition of the feedstock, the intended quality and end use of the resultant compost.

4.35 If temperatures are too high water evaporates, micro-organisms die or become dormant and when combined with a very high Carbon to Nitrogen ratio and a large batch size, there is the possibility of spontaneous combustion. If temperatures are too low microbial activity drops and biodegradation slows.

4.36 In windrow composting turning the material releases heat, adds more oxygen and mixes the particles. This improves sanitization performance.

The minimum monitoring frequency recommended in PAS 100 should be carried out at the frequency and location stated except under justifiable variations e.g. operating to non-PAS 100 product standards

g) Carbon: Nitrogen ratio

4.37 Micro-organisms require carbon and nitrogen. The nitrogen is used for protein manufacture and reproduction. The carbon is used for energy and growth. The ratio of the two elements is important in managing the composting process.

4.38 Below 20:1, nitrogen is lost as ammonia or nitrous oxides, which are odourous. To counteract this more material with a high carbon content can be mixed into the material. In order to control the odour a biofilter can be used e.g. matured compost or acid scrubber.

4.39 The form that the carbon is in may be such that it is slower to decompose than the rest of the material e.g. wood chips. This can be screened out and mixed with

another batch that is being prepared for composting. Non-biodegradable physical contaminants can also be screened out and disposed of as waste.

h) Turning Frequency (Windrows only)

4.40 The importance of turning composting materials is:

- To ensure that all the material is exposed to the composting process
- To aerate the material to ensure that there is sufficient oxygen available to the micro-organisms
- To distribute moisture throughout the material evenly

4.41 Insufficient turning may result in overheating of the material or lead to anaerobic conditions and increased malodours. Too much turning can result in unnecessary cooling of the process, reduction in particle size and the unnecessary generation of dusts and bioaerosols.

4.42 Compost may be turned after high rate composting in-vessel and may be required between the process barriers when composting catering waste

The Animal By-Products Regulations specify turning every two days during sanitization.

Stabilisation

4.43 Stabilisation is the process of biological activities combined with the other conditions within the composting mass, which gives rise to stable compost. The compost is said to be stable when microbial respiration will not significantly resurge under altered conditions e.g. changes of moisture, oxygen levels or temperature. The rate of carbon dioxide and heat release decreases with increased stability.

4.44 The degree of stability is related to the intended end use of the compost i.e. most sensitive end uses require a greater degree of stability. There is no single method of test and stability limit agreed amongst the EU member states. Box 13 is provided as a guide in what is a developing scientific area[40].

4.45 Respiration rate is the rate at which the compost releases carbon dioxide, therefore is a measure of the activity of the micro-organisms in the compost

4.46 Maturation is an essential part of the managed composting phase. It is a process whereby phytotoxic compounds in composts formed during the active composting phase are metabolised by micro-organisms into compounds that do not harm plants. This is generally characterised by a drop in pH (from alkaline towards neutral), the conversion of ammonium compounds into nitrates and the re-colonisation of the compost by beneficial soil micro-organisms destroyed during the active composting phase. The duration of the maturation phase will be dependent on the end use of the compost and the quality required.

Box 13 Typical respiration rate and stability

Respiration rate	Description	Composting time
>20 mg CO_2/g VS/day	Active and highly unstable	Typically < 6 weeks
16.0 – 19.9 mg CO_2/g VS/day	Very immature and unstable	Typically 6-8 weeks
12.0 – 15.5 mg CO_2/g VS/day	Immature and unstable	Typically 8-10 weeks
8.0 – 11.9 mg CO_2/g VS/day	Maturing and stabilising	Typically 10-14 weeks
6.0 – 7.9 mg CO_2/g VS/day	Mature and relatively stable	Typically 14-20 weeks
<6.0 mg/CO_2/gVS/day	Very stable and mature	Typically >20 weeks

VS – Volatile Solids
CO_2 – Carbon dioxide

Monitoring for fugitive emissions

4.47 Operators need to have written procedures to identify and control fugitive emissions of dusts, fibres, particulates, vapours and odours from the site. Monitoring will normally be specified in the planning permission and / or the waste management licence.

4.48 Establishing background conditions prior to the start of any activities on the site plays a fundamental part of the on-going monitoring regime and decision-making process, both for the operator and for the regulatory authority. The results of background monitoring provide a benchmark against which the impacts from the composting facility can be judged. Without background monitoring there is a danger that operational and regulatory decisions may be taken assuming that the composting facility is the source of any related fugitive emissions.

40 WRAP research Project ORG0020 Development of standard laboratory based test method too measure compost stability. 2005

4.49 Monitoring should not be seen as an end in itself. It is a critical management tool for operating a composting facility and is strongly linked to the contingency planning section detailed below.

Where to monitor

4.50 The monitoring location will be site specific. However, it should ideally match with the sensitive receptor locations chosen in the background monitoring surveys or positions identified that are more appropriate following those surveys.

4.51 The risk assessments carried out prior to gaining regulatory authorisations may have already identified the most effective and practical position for monitoring. Monitoring locations will be related to the identified receptor(s) and associated pathway(s). Up-wind and / or up-gradient locations will also require monitoring to enable effective interpretation of the monitoring results.

How to monitor

4.52 Site staff must be trained to monitor for fugitive emissions visually and olfactory such as dust, fibres, particulates, vapour releases and odours. In addition dedicated monitoring equipment strategically located may be used to subsequently quantify how much material has been transported from the site e.g. British Standards for dust monitoring. Different equipment is available dependent upon the type of monitoring required e.g. grab samples or continuous sampling.

4.53 The frequency of monitoring may be determined on the basis of previous results, seasonal considerations or specific activities being carried out. Some techniques are more expensive than others and indicator monitoring may be appropriate e.g. monitoring for dusts, that if a trigger level is exceeded then bioaerosol monitoring may need to be carried out, although the presence of dust does not necessarily mean that bioaerosols will be present.

4.54 Certain sampling and analysis requires specialist expertise that may have to be sourced externally.

Recording results

4.55 All monitoring results need be recorded to aid in investigating complaints and improving operational management. The results may have to be submitted to the regulatory authority. This is normally a requirement of a waste management licence.

4.56 In developing a monitoring strategy early dialogue with the regulatory authorities is recommended such that the monitoring location, sampling and analysis techniques and procedures can be agreed prior to embarking on a strategy that may not meet their requirements. Trigger levels above which specified action is needed can also be agreed.

Monitoring and control of vermin

4.57 Operators need to have written procedures for the inspection and control of vermin. Inspections should be carried out weekly by a nominated person and the results recorded. All operatives should report any sightings to the nominated person immediately.

4.58 If vermin is detected then immediate action needs to be taken to control the situation. This may be by instigating better house keeping, clearing spillages and so forth. Where an infestation is likely, or occurs, it is recommended that professional pest control contractors are brought in to eradicate the problem immediately. Appropriate control measures need to be instigated to prevent a reoccurrence. All action taken must be recorded.

Monitoring and control of scavengers

4.59 Operators should have written procedures for the inspection and control of scavengers. Inspections must be carried out weekly by a nominated person and the results recorded. All operatives must report any sightings to the nominated person immediately.

4.60 Upon detection immediate action must be taken to remove the scavengers from the site. The materials, or wastes, that are attracting the scavengers need to be isolated and secured to deter further scavengers. Appropriate control measure need to be instigated to prevent a reoccurrence. All action taken must be recorded.

Monitoring and control of litter

4.61 Litter needs to be collected during operations and by the end of each working day. Litter must be controlled by appropriate storage or covering with heavier material or sheeting. Potentially wind blown material or waste should not be unloaded, loaded or turned during windy conditions. Where litter could be a problem, litter fencing should be provided.

Contingency Planning

4.62 Contingency planning starts at the design stage e.g. site layout in relation to sensitive receptors, location of the quarantine area and at pre-contract discussions e.g. quality control of feedstock. Contingency plans will be needed for noise, dust, odours, fires, and bioaerosols. Other aspects of the composting process should be reviewed that could have an adverse impact e.g. break down of key machinery, stocks of essential spare parts. The following sections demonstrate contingency planning for odours, fires, noise and airborne emissions.

4.63 The following explains the reasons for odours, options for their control and what is needed for a contingency plan to manage odours:

Where are odours likely?

- Waste reception
- Stored contaminants
- Active composting area – windrow construction and turning
- Leachate lagoon
- Tanks, drains and gullies

How are odours generated?

- Chemical and biological reactions
- Incorrect balance of carbon and nitrogen
- Anaerobic conditions e.g. excessive moisture, reduced porosity
- Poor maintenance

When are odours most likely?

- Warm weather
- Seasonal changes in feedstocks e.g. May bank hols – lots of grass!!
- Wind blowing in the direction of sensitive receptors
- Turning of windrows
- Emptying in-vessel systems especially if composted for only a few days
- Cleaning out tanks drains and gullies
- Waste collection and subsequent extended delivery periods e.g. bank holidays

How can they be prevented and controlled?

- Contract conditions requiring trained competent people to recognise odourous material and not have it delivered in the first place
- Contract conditions for the supplier to receive the load back
- Stop accepting a waste stream that has caused odour problems in the past
- Immediate removal to another authorised facility that is capable of handling the material
- Incorporated into the compost with biofilters applied immediately
- Enclosed storage
- Optimise carbon: nitrogen ratio, moisture and structure
- Air suction and treatment e.g. acid scrubbers, activated carbon
- Adjust aeration rate by turning open windrows or by adjusting aeration for in-vessel systems
- Drain the leachate lagoon and use dedicated tanks with covers and filters
- Odourising / masking sprays.
- Control or restrict operations if possible during adverse meteorological conditions such as wind direction, or temperature inversions

Responsibilities:

Name the staff responsible for:

- Inspection
- Action (dependent upon the necessary action)
- Communication with the complainant, regulatory authority, operatives
- Recording of climatic conditions and operations at the time of the odour, the action taken, including discussions with the complainant

Other consideration:

- Training, particularly in respect of odour awareness and the risk of odour desensitisation
- Background surveys

4.64 The following highlights contingency planning for fires:

Where are fires likely?

- Waste reception
- Active composting area
- Stockpiled product

How are they generated?

- Excess heat from exothermic reactions from biological activity
- Excess oxygen
- Anaerobic conditions releasing methane
- Arson or accident

When are they most likely?

- Hot dry days
- When turning has not occurred for an extended period
- Piling materials high and not managing them

How can they be prevented?

- Inspection
- Temperature monitoring
- Turning / agitation to releases heat
- Moisture adjustment
- Not stockpiling
- Not storing dry materials e.g. woodchips next to composting materials

How can they be controlled?

- Raking the active area out to isolate the combusting material is often the most effective action to take
- Fire fighting e.g. spreading equipment / water supplies
- Means of applying water to all areas where fire is likely
- Temperature monitoring
- Inspections
- Maintenance and testing of equipment
- Communication
- Contact others that may be affected so they can take appropriate action to prevent spreading
- In consultation with the fire service allow a controlled burn

Other environmental considerations

- Containment of fire fighting water i.e. means of blocking drains
- Testing and removal of fire fighting water from the site

Health and Safety considerations:

- Site security
- Register of attendees at the site
- Evacuation routes
- Assembly points
- Nominated fire warden
- Drills

4.65 The following details the reasons for noise, options for its control and what is needed for a contingency plan to manage noise:

Noise

Where are likely noise sources?

- Waste reception including the unloading and vehicle noise
- Screening, shredding, bagging areas. – i.e. use of machinery during composting activities
- Reversing bleepers

When are unacceptable noises most likely?

- Delivery and dispatch of material to and from the site
- Construction and turning of windrows
- Screening and shredding operations
- Adverse wind direction and speed towards a sensitive receptor

How can they be controlled?

- Selection of machinery to be used
- Maintenance and servicing, provision of silencers
- Lower noise reversing beepers in consultation with the HSE. Revise the site layout to minimise three point turns
- Enclosure of noisy operations
- Acoustic bunding, fencing and / or landscaping
- Restricting the timing of operations (evenings, weekends or during adverse weather conditions)

Other considerations

- Background surveys

4.66 The following details the reasons for dust and bioaerosols, options for their control and what is needed for a contingency plan to manage dust and bioaerosols:

Dust and bioaerosols

Where are dust and bioaerosols most likely?

- Loading and unloading areas
- Screening, shredding, bagging areas
- Active composting, maturation and storage areas
- Roads and yards

When are they most likely?

- Dry materials
- Moving composting materials around – they are only really produced when materials are agitated
- Dry windy days
- Loading and unloading materials
- Construction and turning of windrows
- Trafficking over unconsolidated ground or dirt roads

How are they controlled?

- Moisture adjustment using water bowsers, spray irrigation system, hose pipes
- Good house keeping
- Road sweeping
- Restricted operations in dry windy weather
- Application of covers including heavier feedstock materials
- Indoor operations (although this will have implications in relation to Health and Safety e.g. requiring the use of Personal Protective Equipment (PPE) and / or Personal Respiratory Equipment (PRE)

Other considerations

- Background surveys
- Dust clouds resulting in reduced visibility increasing risks to traffic and pedestrians
- It is worth noting that the existence of dust does not necessarily mean that bioaerosols are present

4.67 When complaints are received they need to be always acted upon and the complainant informed of the action taken.

4.68 All complaints need to be recorded, including the steps taken to investigate the compliant and the outcome of that compliant. A complaints procedure needs to be in place.

4.69 Background surveys, monitoring and recording of weather conditions possibly using continuous monitoring with a data recorder and logging particular composting activities greatly aids in determining if the cause of the complaint is the from the composting facility or from some other source.

Record keeping

4.70 The creation, maintenance and submission of records play an important part of operating a composting facility.

4.71 Records are needed in relation to:

- Waste acceptance and disposal
- Validation and on-going assessment (includes process monitoring and sample testing)
- Traceability
- Environmental monitoring
- Dispatched material (whether for use or disposal)

The requirement for record keeping is mandatory in the Animal By-Products Regulations and Duty of Care. It is normally a requirement of issued authorisations e.g. waste management licences, maintaining a Quality Management System overall is good practice. PAS 100 requires the maintenance of records throughout the operations, from feedstock acceptance to dispatch.

4.72 The specific record keeping requirements of the Animal By-Products Regulations are detailed in the section summarising the regulatory regime.

Part 5 Post Composting

5.1 This section deals with product:

- Preparation
- Storage
- Sampling and testing
- Labelling
- Dispatch

Product preparation

5.2 Following sanitisation and maturation the compost should be prepared such that it meets the desired specification applicable for its intended use. WRAP have prepared a number of documents in relation to the various uses compost products can be put to.[41]

5.3 Preparation may take the form of:

- Screening to remove oversized material, grading to specified particle sizes
- Blending with other waste, additives or products
- Adjusting moisture by wetting or drying

5.4 Materials that do not meet the required end user specification should be either:

- Re-treated
- Disposed of
- Mixed with other product to meet the appropriate specification

5.5 Control measures need to be applied to product preparation activities such that noise and dust are controlled. Appropriate segregation e.g. physical distance, separated buildings or walls should be used to prevent contamination from untreated and partially treated compost.

5.6 Products should be prepared under appropriate conditions, for example, product should not be stored at the bottom of a slope where raw materials are accepted / composted.

Product storage

5.7 The compost must be stored such that it is recognisable from other batches. This is particularly important whilst awaiting the results of laboratory testing in case of the need for corrective action.

5.8 Product can be stored in bags or stockpiled subject to the potential customer's delivery and / or handling requirements. Where stored in a stockpile particular care is needed to ensure the compost is not carried off site into watercourses.

5.9 Storage areas need to be inspected regularly to ensure that fires are identified as soon as possible and the appropriate action taken. Fire fighting contingency planning and procedures need to contain measures to prevent uncontrolled release of fire fighting water. This includes the foul sewer as well as surface waters. The fire fighting water can have a high Biological Oxygen Demand (BOD) that could have an adverse affect on the biological treatment of the receiving sewage works.

Sampling and testing

Where the Animal By-Products Regulations are applicable, the taking of five samples per batch of compost is required and the samples have to be tested for the presence of *Salmonella* and *Enterobacteriaceae*.

Salmonella must be absent from all five samples.

Enterobacteriaceae must not exceed 300 cfu/g* in any one sample.

For Catering waste only the *Salmonella* test is required

The testing is only allowed in approved laboratories.

* cfu = colony forming units, g = grams

5.10 Other recommended testing is set out in the BSI PAS 100 (2002). As a minimum the following will require testing:

- Physical contaminants
- Stones
- Stability
- Potentially Toxic Elements (PTE)
- Pathogens
- Plant response
- Weed propagules

5.11 The frequency of sampling is set out in PAS 100[42] and is considered to represent good practice.

41 These relate to various agricultural, horticultural and landscaping uses. Available from WRAP , Putting Compost to Work factsheets.

42 PAS 100 Clause 11 Compost sampling and analysis, BSI, 2002

Labelling and Documentation

5.12 Compost may be transported loose, in containers or bagged. Appropriate documentation needs to be completed and transported with the material.

5.13 Labelling of the compost product needs to comply with relevant standards and the law. Labelling must describe accurately the material contained in the bag. The information must not mislead potential purchasers.

5.14 The compost or products that contains it should be classified as[43]:

- Soil improver
- Mulch
- Growing medium*
- Turf dressing*
- Turf dressing constituent
- Top soil*
- Biofilter
- Biofuel
- Other (describe)

* Where compost is a constituent.

5.15 Where the compost is destined for agricultural use, the end user must be advised if the compost has been produced from animal by-products or catering waste. Typically this can be done by labelling or on sales documentation.

Dispatch

5.16 Where the material is still considered a waste then the Duty of Care requirements will have to be met.

5.17 The appropriate documentation will need to accompany the load to ensure that the compost product reaches the right destination.

43 PAS 100 Clause 13 Classification and designation, BSI, 2002

References

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Environmental Protection Act 1990
Health and Safety at Work Act 1974
Planning (Listed Buildings and Conservation Areas) Act 1990
Pollution Prevention and Control Act 1999
Town and Country Planning Act 1990
Waste and Emissions Trading Act 2003
Water Act 2003
Water Industry Act 1991
Water Resources Act 1991

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Conservation (Natural Habitats &c.) Regulations 1994
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Waste Management Licensing Regulations 1994

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Composting

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1 This is under revision at the time of printing

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WM2 Hazardous Waste: Interpretation and Classification of Hazardous Waste (Environment Agency 2003)

PPC

Guidance on the Protection of Land under the PPC Regime: Application Site Report and Site Protection And Monitoring Programme (Environment Agency 2003)

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Discharge Consents

See Environment Agency applications guidance and Pollution Prevention Guidance (PPGs) note series available on the Agency website.

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