

Information Sheet No. 1-6

Detailed site design and documenting an environmental management plan

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Steps to take after the planning focus meeting with government authorities

One of the most important outcomes of a planning focus meeting with relevant government authorities is to determine whether the site(s) selected are appropriate for the establishment of a composting facility, and if so, what type of environmental controls are required.

Design of a composting facility with details as to how impacts on the environment can be minimised is an essential component of *Environmental Impact Assessment (EIA)* — documented in the form of an *Environmental Impact Statement (EIS)*, a *Statement of Environment Effects (SEE)* or other type of

document.

An EIA helps the *consent authority* responsible for determining the *development application* to evaluate whether a development is appropriate for a site and if the development will adversely affect the environment.

It is the responsibility of the consent authority to inform the developer as to what form of EIA — an EIS or SEE or other impact assessment — should be submitted with the development application.

In an EIA, it is essential to document how the facility will be designed to minimise potential environmental impacts.

Good facility design, alone, is not always adequate for minimising impacts on the environment. To

Plate 1. Photograph of an indoor aerated static pile composting facility. Composting is performed indoors, achieving protection from rain, pests and vermin. Air ducted through the piles is extracted from the building and directed to a biofilter which removes odours. An environmental management plan is required to maintain appropriate working conditions in the building, and to other minimise impacts through the release of leachate and odour.



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ensure that the development will not adversely affect the environment, facility design should be coupled with a well planned and documented *Environmental Management Plan (EMP)*.

An EMP is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation (Landcom, 2000).

This Information Sheet briefly reviews essential elements of good facility design, and the necessary components of an EMP.

Designing a composting facility

The size of a proposed facility depends on the following factors:

- amount of feedstocks processed;
- technology used (in general, higher process control, less space required);
- equipment used; and
- projections for growth.

Although facility design will vary depending on technology used, the following steps are recommended for site development for an open air turned *windrow* composting operation, which tends to be the preferred option for most commercial operators in New South Wales presently.

- grade the site to a 2 to 4 percent slope to ensure no ponding of rainfall and efficient run-off;
- slope the site towards a collection pond for treatment and reuse of run-off;
- a pumping system to transfer run-off from the collection pond to a holding pond or tank for treatment (e.g. aerated pond);

- line sub-soil of appropriate areas of the site with a very low permeability or impermeable layer (e.g. geotextile membrane) to protect surface and groundwater;
- high traffic areas, such as roads, feedstock receipt, feedstock blending, processing and storage of final product areas should be performed on a hard wearing very low permeability or impermeable surface (e.g. asphalt, concrete, pavers, lime stabilised clay etc.);
- build bunds around the perimeter of the site to control run-off and run-on;
- plan areas for raw feedstocks, processing, composting, curing, storage and blending of end product — arrangement of individual components of the entire operation should be in a ‘one-way direction’ to minimise handling and potential for contaminating the end product with plant propagules and pathogenic microorganisms possibly present in raw feedstocks;
- set up equipment in locations convenient to the operation;
- construct retainer walls (and roofing if necessary) for storage piles;
- construct a screen / windbreak around the site (e.g. plants, shrubs, trees) to reduce wind velocity and potential for dust creation;
- build fencing and gates to control access to the site; and
- install appropriate utilities to support the composting system used (water main, storage and tool building, office, laboratory, maintenance shed) (Rynk *et al.*, 1992).

Definitions

Environmental Impact Assessment (EIA)¹

The critical appraisal of the likely effects of a policy, plan, program, project, or activity, on the environment. To assist the decision making authority, assessments are carried out independently of the proponent, who may have prepared an EIS (or other document). The decision making authority might be a level of government (local, state or federal) or a government agency (at local, state or federal level).

Environmental Impact Statement (EIS)¹

A document, prepared by the proponent, describing a proposed activity or development and identifying the possible, probable, or certain effects of the proposal on the environment; examining the alternatives to the proposal; setting out the mitigation measures to be adopted; proposing a program of environmental management; provisions for monitoring, auditing and plans for decommissioning and rehabilitation.

Statement of Environmental Effects (SEE)²

A document whose purpose is to specify: the environmental impacts of the development; how the environmental impacts of the development have been identified; and the steps to be taken to protect the environment or to lessen the expected harm to the environment.

Consent Authority³

In relation to a development application or an application for a complying development certificate, means: the council having the function to determine the application, or if a provision of the Environmental Planning and Assessment Act (1979), the regulations or an environmental planning instrument specifies a Minister or public authority (other than a council) as having the function to determine the application—that Minister or public authority, as the case may be.

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Some manufacturers of composting or like technologies can provide assistance in facility design.

The type of design employed will vary considerably on the site selected, separation distances and level of process control achievable with the composting system used.

Figure 1 is an example of a commercial composting facility located in a rural area. The facility has been designed to efficiently process co-mingled, source separated food and garden organics.

The example in Figure 1 employs a covered, *aerated static pile* stage to carry out the initial stage of composting.

A controlled aerated static pile stage decomposes the putrescible food organic fraction present in the food and garden organics mix.

The pre-composted mix is then transferred to open air turned windrows where the composting process is completed.

Documenting an environmental management plan (EMP)

All composting operations require a well planned and executed EMP.

An EMP is a tool to ensure that the commitments in the EIA, subsequent assessment reports and approval or license conditions are fully implemented.

A draft EMP is required as a component of an EIS or SEE so that the consent and regulatory authorities can be assured that the proposed development can deliver appropriate environmental outcomes (NSW DUAP, 1996; NSW EPA, 2000).

It should be noted that the content of an EMP will differ depending on:

- the nature of the composting system used and its

“A carefully planned [draft] EMP is required by the consent authority and government regulating authorities during the assessment of development applications for composting facilities in the *integrated development* approvals

environmental performance (Information Sheet No. 1-2);

- types of feedstocks processed (Information Sheet No. 1-2);
- location of the composting facility, including separation distances (Information Sheet Nos. 1-2 and 1-3); and
- sensitivity of the area surrounding the composting facility (Information Sheet No. 1-3).

After a site has been identified and deemed (tentatively) appropriate for the establishment of a composting facility by the consent authority, the facility should be designed with an EMP in mind.

The [draft] Environmental Guidelines: Composting and Related Facilities (NSW EPA, 2000) provides an excellent overview of performance objectives that must be met by developers of composting facilities.

An outline of how these performance objectives will be achieved needs to be addressed in an EMP.

NSW EPA licenses which are issued as a part of the integrated development approvals process incorporate these objectives.

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Development Application³

An application for consent under Part 4 of the Environmental Planning and Assessment Act (1979) to carry out development but does not include an application for a complying development certificate.

Environmental Management Plan (EMP)⁴

An EMP is a site specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.

Windrow (with or without aeration)⁵

System of composting involving the aeration of horizontally extended piles formed by a front-end loader or windrow turner. Extended piles are generally 1.5 to 3 m in height, and length is limited by the size of the composting pad. Aeration can be achieved by mechanical turning and/or the delivery of air from the base of the windrow (aerated static pile).

Aerated Static Pile⁶

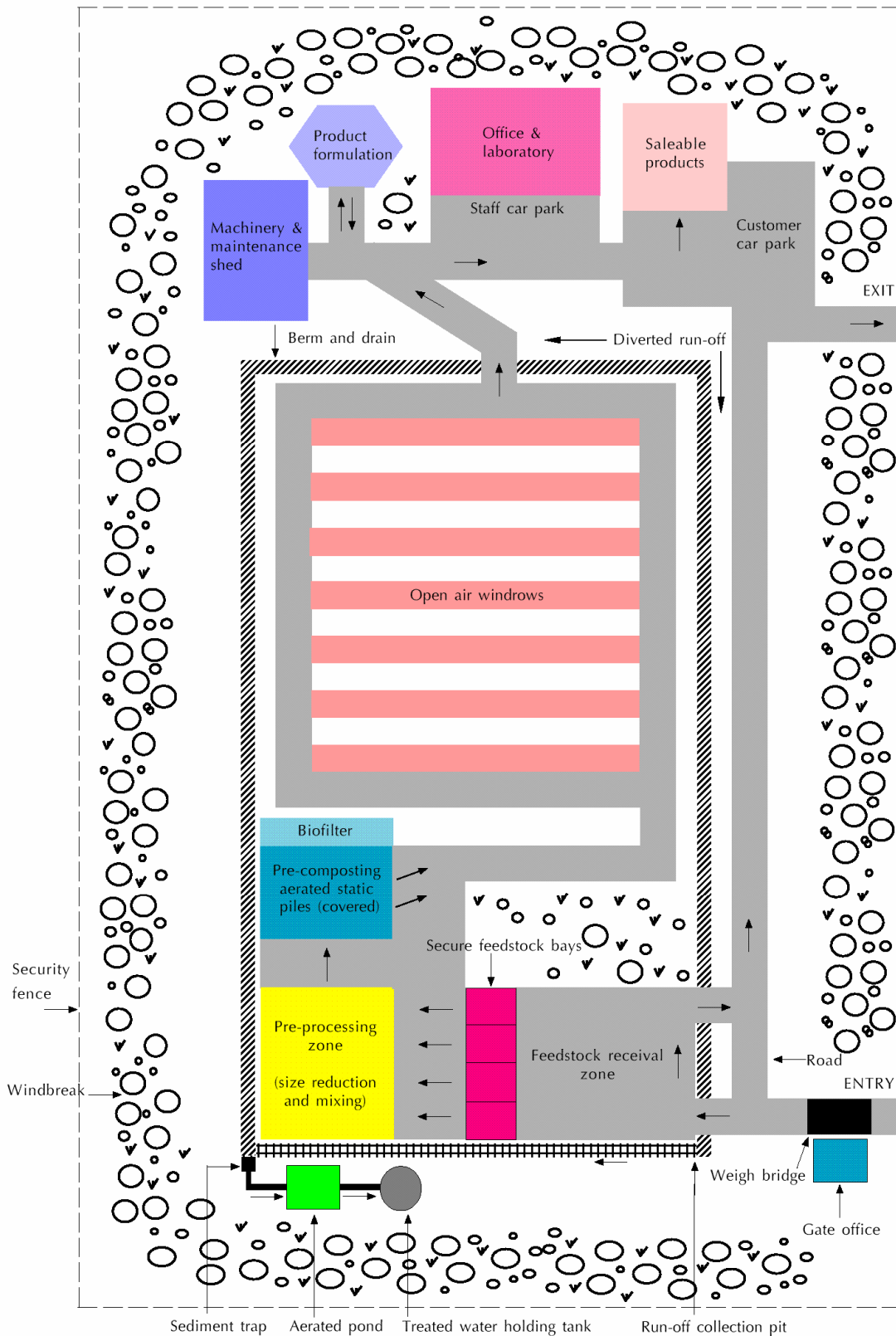
Forced aeration method of composting in which a free standing pile is aerated by a blower moving air through perforated pipes located beneath the pile.

Integrated Development³

Integrated development is development (not being complying development) that, in order for it to be carried out, requires development consent and one or more of the following approvals: Fisheries Management Act (1994); Heritage Act (1977); Mine Subsidence Compensation Act (1961); National Parks and Wildlife Act (1974); Protection of the Environment Operations Act (1997); Rivers and Foreshores Improvement Act (1948); Roads Act (1993); Water Act, (1912).

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Figure 1. Example of a composting operation which processes co-mingled, source separated food and garden organics. Important facility design features are indicated. The facility has been designed so that materials flow in one direction, to minimise handling and to avoid contamination of the final product with raw feedstocks. Note that this design is site specific.



The [draft] Environmental Guidelines: Composting and Related Facilities (2000) notes that each environmental objective contains three key parts:

- 1) An *outcome* that sets out the expected environmental results, and guides the formulation of strategies to achieve the objective;
- 2) A *performance requirement* that provides quantifiable or qualifiable characteristics of the desired outcome so that success in achieving it can be assessed; and
- 3) A *performance measure* that sets out the process for measuring the quantifiable or qualifiable characteristics to determine whether the desired outcome is being achieved.

These environmental objectives are shown in Table 1.

In keeping with the performance based approach to environmental management reported in the Environment Guidelines: Composting and Related Facilities (NSW EPA, 2000), the NSW EPA encourages proponents to develop their own site-specific performance measurement methodologies and monitoring techniques for their EMPs.

To assist proponents with the task of developing an EMP, the guidelines provide extensive examples, referred to as sample environmental techniques (NSW EPA, 2000).

This Information Sheet does not review these suggested sample environmental techniques. Readers should consult the guidelines for

detailed information.

Once a composting facility has been designed to suit the site and surrounding land uses, in conjunction with a suitably detailed EMP, an EIS, SEE or other form of EIA can be prepared to allow the consenting authority to fully evaluate the development application.

Additional guidance in the development of an EMP can be obtained from the ISO 14000 Environmental Management Systems standards.

Information Sheet No. 1-7 provides guidance to the preparation of an EIS or SEE, which comprises the last step in the preparation of a development application.

Table 1. Strategies to meet the following sixteen environmental performance objectives are required in an environmental management plan. These strategies allow the consent authority and government regulating authorities to consider the likely impacts of a composting development on the environment, and whether development consent and an environmental protection licence (if needed) should be issued to the proponent, subject to conditions if necessary. Proponents should consult the [draft] Environmental Guidelines: Composting and Related Facilities (NSW EPA, 2000) for detailed information on how these performance objectives may be achieved.

Performance Objective	Outcome
Prevent water pollution	Surface or underground discharges of leachate and water from the facility must not pollute groundwater and/or surface waters at or near the processing facility.
Minimise methane gas emissions and explosion hazards	Minimise emissions of methane to air and ground and the risk of explosions.
Minimise nitrogen oxide and non methane organic compound emissions	Minimise emissions of nitrogen oxides and non-methane organic compounds whenever using biogas combustion processes.
Minimise odour emissions	Minimise odour emissions.
Minimise bioaerosol emissions	Minimise bioaerosol emissions.
Ensure suitability of incoming feedstock	Incoming feedstocks must not create negative environmental or amenity impacts.
Ensure environmental quality of reprocessed products and stabilised wastes	Ensure that the output of products from the facility can be beneficially and sustainably used, and that any stabilised wastes are suitable for disposal at the facility that receives the waste.
Ensure safe storage and disposal of residual wastes and contaminated materials	Process residues and contaminated products must be stored appropriately and disposed of lawfully.
Minimise stockpiling	Stockpiles of raw materials and finished products must be kept as small as practicable to avoid potential negative environmental impacts.
Prevent unauthorised entry	Prevent unauthorised entry to the site
Minimise noise emissions	Noise emissions must not be intrusive or detract from the local amenity.
Minimise dust emissions	Minimise dust emissions from the facility.
Prevent proliferation of pests and vermin	Prevent pests and vermin from proliferating at and/or near the facility to avoid health risks to facility personnel and the local community.
Prevent proliferation of weeds	Prevent weeds from proliferating to preserve local amenity and to prevent their propagation via compost, soil conditioner and mulch products.
Minimise litter	Litter and site materials are effectively controlled and retained on the facility.
Ensure adequate fire fighting capability	Adequate fire prevention measures are in place and that fire fighting equipment can be accessed and staff are trained and able to manage fire outbreaks at any part of the processing facility.

