Landfilling

EIS Guideline

New South Wales
Department of Urban Affairs and Planning

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Executive summary

This guideline identifies some important factors to be considered when preparing an environmental impact statement (EIS).

The preparation of the EIS should be preceded by early effective consultation and technical discussions with relevant government agencies and councils.

A high priority should be given to:

- considering environmental factors in site selection
- evaluating alternative sites
- ascertaining the suitability of the intended location.

There should be an early evaluation of alternatives, taking into consideration the factors in Part 4 of this guideline.

The analysis of alternative design, processing and management practices should consider the environmental implications of options. The justification for the selection of the preferred options should consider biophysical, social and economic factors, and the consistency with ecological sustainability principles.

The assessment process should focus on key environmental issues. These issues should be identified early in the environmental impact assessment (EIA) process, usually at a planning focus meeting and through consultation with the community. The assessment process should clearly identify the environmental (including biophysical, social and economic) costs and benefits of the proposal.

Key issues for landfills usually include:

- waste management
- surface and groundwater quality issues
- traffic
- air quality issues
- the visual impact.

The EIS should outline commitments to the ongoing environmental management of the proposal, including monitoring.

The level of analysis of individual issues in the EIS should reflect the level of significance of their impacts. The analysis should focus on key issues. The information in the EIS should be accurate and presented clearly and concisely. There should be emphasis on quality and not quantity. The EIS need not be long.

Contents

1. Purpose and scope of the guideline

1.1 Background

A major function of an environmental impact statement (EIS) is to provide information on the potential environmental impacts of a proposal. This guideline outlines the matters which an EIS for a landfill proposal may need to include to fulfil this function. The details in the EIS should reflect the level of significance of the potential impacts on the environment. The guideline will also be relevant for landfill proposals requiring a lesser degree of environmental assessment.

As well as providing advice to applicants of landfill proposals, the guideline will also be of assistance to government authorities responsible for the approval or regulation of waste management facilities.

The guideline addresses the following specific matters for landfill proposals:

- site selection procedures consistent with 'locational principles'
- planning and other factors to consider when preparing an EIS
- requirements to be addressed in an EIS.

This guideline should be seen in the context of the State Government's overall policy on waste management. This policy emphasises the need to reduce, reuse and recycle wastes. It is underpinned by the principle of ecologically sustainable development, which provides for efficient use of natural resources. The NSW Environment Protection Authority (EPA) should be approached for further information about the Government's waste minimisation and management policy.

Landfilling is the final stage in the waste management hierarchy. It is a process of disposing of waste from generators such as industry and domestic activities. Although alternative methods of waste management, such as minimising waste, waste recovery and recycling of materials will reduce the volume of waste needing to be disposed of, there will be, for the foreseeable future, a need to landfill waste.

Landfills have the potential to cause significant environmental impacts on groundwater and surface water and on the amenity of the community. Careful site selection, landfill design and management practices are necessary to ensure that the facility operates in an ecologically sustainable manner. The degree of relevance of matters in the guideline to a landfill proposal will depend upon its proposed location, the quantity and nature of the wastes involved and the proposed operational regime. The greater the potential environmental impacts, the more carefully the site must be chosen and greater attention paid to environmental assessment.

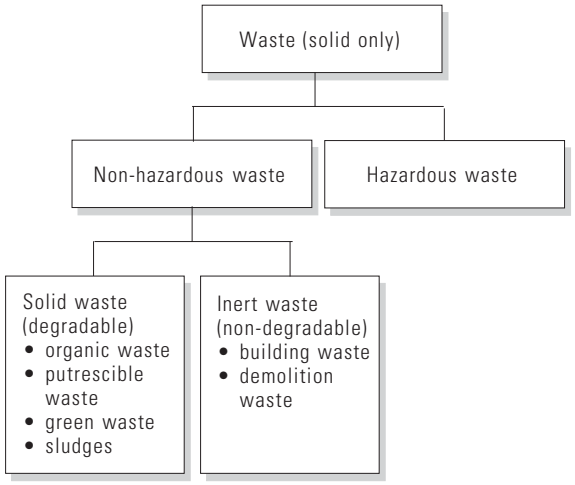
This guideline should be read in conjunction with a companion document entitled *Environmental Guidelines: Solid Waste Landfills* (EPA, 1996). The latter sets out performance objectives for the design and operation of landfills, provides environmental goals and recommends benchmark techniques for the design, construction, operation, closure and post-closure management of landfills. It encourages innovation and promotes cost-effective solutions for achieving the environmental goals. Any queries concerning the classification of a particular waste, or methods of meeting these performance criteria, should be referred to the EPA.

1.2 Landfills covered by this guideline

This EIS guideline applies to the landfills which principally dispose of solid wastes (see figure 1). For the purposes of this guideline, solid waste is defined as any non-hazardous, solid, degradable waste and includes putrescible waste, garden wastes, uncontaminated biosolids, and clinical and industrial wastes which meet EPA criteria for solid waste landfills. Appendix 7 provides full definitions of solid wastes and other forms of wastes and landfills.

This guideline does not specifically address landfills that dispose of inert or hazardous wastes. Although most of the issues outlined in this guideline will apply, other issues may be relevant, particularly for landfills for hazardous wastes, depending upon the type and characteristics of waste.

Figure 1. Wastes



The construction and operation of a landfill may include:

- facilities for the transport, receipt and inspection of wastes
- facilities for the sorting, storage, processing or transfer of recyclable wastes
- works to excavate, line and drain the landfill area
- works to extract, transport, store or use cover material
- drainage works including stormwater management systems
- facilities for leachate and gas collection, storage, treatment, use or disposal
- access and internal road systems, parking, and unloading areas, vehicle cleaning facilities
- facilities for administration, maintenance or storage of plant, equipment and chemicals
- security systems including fencing, lights and firefighting facilities
- works to progressively rehabilitate the site.

Any landfill proposal should also include an outline of the proposed final use of the site, including the proposed land formation and vegetation plan and a security, monitoring and maintenance program.

1.3 When is an EIS required?

An EIS may be required for a landfill proposal under Part 4 or Part 5 of the *Environmental Planning and Assessment (EP&A) Act, 1979*.

Environmental impact assessment (EIA) under Part 4 applies when a landfill requires development consent under the provisions of an environmental planning instrument. If this is the case, then Schedule 3 of the EP&A Regulation 1994 applies. Schedule 3 lists landfills within the category of 'waste management facilities or works' with designation thresholds based on the type and quantity of waste as well as locational factors (Appendix 6). Most solid waste landfill proposals will be designated developments.

If a development is designated, an EIS must be prepared and lodged with a development application (DA). If a landfill is not designated, then a statement of environmental effects (SEE) must be prepared to accompany the DA. This practice guideline is equally applicable for identifying the range of issues which may need to be addressed in a SEE. Appendix 2 provides a summary of the EIA procedures under the EP&A Act.

Part 5 of the EP&A Act applies to any landfill proposals not requiring development consent but requiring an approval from the EPA or another government authority. Under Part 5 a determining authority (i.e. an authority required to grant a licence, lease or approval for funding) must consider whether the proposal has the potential to cause significant environmental impacts. If significant impacts are likely to result, an EIS must be prepared. The publication *Is an EIS required?* (Department of Planning, 1995) provides guidance on how to decide whether an EIS is required. If an EIS is not required, a review of environmental factors (REF) should be prepared to assess impacts and proposed mitigation strategies. This guideline is applicable for identifying issues which may need to be addressed in a REF prior to granting an approval.

This guideline applies to EISs for proposals which fall under Part 4 or Part 5 of the Act.

1.4 Application of SEPP 48

Under SEPP 48 — Major Putrescible Landfill Sites, the Minister for Urban Affairs and Planning is the consent authority for major putrescible landfills. SEPP 48 applies to any landfill in NSW that will be used for the purpose of disposing of putrescible waste, or waste including putrescible waste, brought to the site from more than one local government area (LGA), and that has a capacity to receive:

- more than 75 000 tonnes per annum of total waste, or
- more than 650 000 tonnes of total waste over the life of the site.

For developments involving extensions or additions, the policy applies when the combined total of the waste currently disposed of plus the waste to be disposed of under the extension exceeds either of the above thresholds. The SEPP applies to applications to convert existing landfills from receiving only non-putrescible waste to receiving putrescible waste.

Under the provisions of the policy, development consent is required for all landfills which meet the threshold criteria even in circumstances when the local environment plan may not require development consent. The policy also applies in circumstances where a landfill has previously been assessed and approved under Part 5 of the EP&A Act but has not commenced within 1 year of the policy's commencement, or if an application was lodged but was not determined before the SEPP commenced.

The SEPP does not apply to landfills which receive waste from just one LGA or do not exceed either of the above thresholds. The responsibility for determining these landfills remains with the relevant local council. It should also be noted that SEPP 48 has no effect on existing permissibilities or prohibitions of landfills under any planning instrument. Nor does it affect existing provisions relating to the planning and assessment of applications for designated development.

When determining whether to approve or refuse the DA for landfill proposals, the consent authority must have regard to the 'heads of consideration' in Section 90(1) of the EP&A Act. For landfills where SEPP 48 applies, the Minister must take into consideration the following matters set out in clause 12 of the SEPP when determining a DA:

a) whether a justifiable demand exists for landfill sites, having regard to waste disposal capacity requirements identified from time to time by the EPA
b) whether the landfill site as proposed in the development application, is included in waste management or waste disposal strategies identified in a regional waste plan applying to the site
c) the views of such other public authorities as the consent authority considers relevant
d) whether or not the proposed location of the landfill is consistent with the locational principles included in this guideline.

In determining whether there is demand to justify the development or expansion of a landfill as required in clause 12(a), consideration should be given to any strategies for waste minimisation and management in any existing waste management plan for the region, or waste catchment area which generates the waste or where the landfill proposal is located. If no plan exists, particular attention should be given to the assessment of factors outlined in this guideline (Section B2, Part 6 — 'Review of waste management practices') to establish justifiable demand.

The consideration of the strategic context in site selection is particularly important for proposals to which the provisions of SEPP 48 and the *Waste Minimisation and Management (WMM) Act 1995* apply. In determining a landfill proposal receiving waste from an area where a regional waste plan must be or has been developed under the WMM Act, the Minister must consider (under clause 12(b) of SEPP 48) whether the landfill site is consistent with the provisions of the waste disposal strategies proposed in the regional waste plan. Until regional waste plans have been prepared, it will be difficult to identify preferred waste disposal facilities to service waste management regions. It is intended that plans for Sydney, Hunter and Illawarra regions will be completed by mid-1997.

2. Factors to consider when preparing an EIS

The aim of environmental impact assessment (EIA) is to enable the approving authority, the public, the local council, government authorities and the proponent to properly consider the potential environmental consequences of a proposal. It is important to provide sufficient information for the approving authority to make a decision on whether to approve a proposal and if so, under what conditions. The EIS provides the basis for sound ongoing environmental management.

It is the proponent's responsibility to identify and address, as fully as possible, the matters relevant to the specific proposal and to comply with the statutory requirements for EIS preparation. The following factors are important when preparing an EIS.

2.1 Early consideration of the strategic context

The need for the proposal should be clearly identified along with its relationship to broader strategic plans and goals. Consideration of the strategic context is essential when selecting options for the proposal. Strategic mechanisms such as policies and plans which illustrate how the proposal has been developed, should be discussed in the EIS so that the information is available and relevant. It is not the role of the project EIS to undertake an environmental assessment of strategic mechanisms related to the proposal. However the EIS should report upon and apply them to the proposal.

Any existing relevant cumulative or strategic environmental studies should be considered when formulating and justifying undertaking a proposal. Air and water quality studies, state of the environment reports and local and regional environmental studies should also be taken into consideration as applicable.

2.2 Early assessment of options

The objectives for the proposal should be developed to fulfil any identified need and should encompass the principles of ecologically sustainable development (ESD). ESD principles (outlined in Appendix 1) should be considered when identifying options for all aspects of the proposal. All feasible alternatives that could satisfy the objectives of the proposal should be considered. When weighing up options, the biophysical, economic and social costs and benefits throughout the whole life cycle of the proposal should be considered. The 'do nothing' option should also be included in these considerations.

Careful option selection can lower community concerns and reduce potential costs of mitigation and management required to control environmental (including social) impacts. Early adoption of ecologically sustainable strategies can reduce possible conflicts, and additional costs and delays at later stages of the approval process.

2.3 Identifying issues

The general framework for an EIS is prescribed in Schedule 2 of the EP&A Regulation (see Appendix 1). The Director-General's requirements provide specific matters to be addressed in an EIS. In addition to the specific legal requirements, the proponent has a broader responsibility to consider all potential environmental issues in relation to the proposal.

As a precursor to identifying potential environmental issues, the proponent must be able to outline:

- the important characteristics of the project which will determine the scope of the potential impacts
- the proposed site and a preliminary assessment of the sensitivity of the site.

If either the project characteristics or the site should change, then the potential impacts may also change. If at any time changes occur, the scoping process for the EIS should be reviewed. If major changes occur, the Director-General may need to be reconsulted to amend their requirements.

In addition to the issues outlined in this guideline, other sources of information which may assist in the identification of potential issues include:

- any relevant guidelines produced by other NSW government authorities, e.g. *Environmental Noise Control Manual* (EPA, 1994a), other States or overseas
- EISs for similar projects, and any relevant commission of inquiry report, determination report and conditions of approval
- relevant research and reference material on similar proposals.

There are a number of approaches or mechanisms which help identify issues relating to a particular proposal in a particular location. They may involve fairly unstructured mechanisms with a low level of consultation or a structured process with a high level of consultation with all stakeholders. The choice of the approach should depend on the scale and type of proposal and the sensitivity of the environment. These may include:

- consultation outlined in Part 3
- checklist, matrix, network, GIS or overlay methods or similar approaches such as the tables in *Is an EIS required*? (Department of Planning, 1995).

2.4 Prioritising issues

The EIA process generally will benefit from focusing attention on key issues of concern. Not all issues identified will have the same degree of relevance for all proposals. The relative importance placed on different issues will vary from case to case, and is a function of the type and size of the proposal and the sensitivity of the receiving environment. Issues should therefore be prioritised according to their importance in the decision-making process.

When prioritising issues, consideration should be given to the potential severity, temporal and spatial extent of any beneficial and adverse effects; their direct impacts as well as any indirect, secondary, tertiary or cumulative impacts; and whether the effects are continuous or intermittent, temporary and reversible or permanent and irreversible.

The outcome of the identification and prioritisation process should result in:

1. **a list of all issues with a preliminary estimate of the relative significance of their impacts**
2. **identification of the key issues**
3. **an explanation as to why other issues are not considered to be key.**

The EIS should address the key issues as fully as practicable. However the level of analysis should reflect the level of significance of the impacts and their importance for the proposal. Lesser attention should be given to those issues which have lesser significance. For these latter issues, there should be sufficient analysis to develop a sustainable mitigation strategy for any potential adverse impacts.

2.5 Impact analysis, prediction and presentation

Discussion of likely impacts should include predictions of the nature and extent of potential impacts and the effectiveness of mitigation strategies. This information is fundamental to deciding the potential ecological sustainability and hence the acceptability of a particular proposal.

a) Presentation

Information provided should be clear, succinct, objective and where appropriate, supported by maps or other descriptive detail. Repetitive or general non-specific data is distracting and is not relevant to the decision-making process. The use of jargon should be avoided. It is recommended that the EIS be edited to ensure consistency of style and accuracy of transference of information from any appendices to the main document. External review of technical analysis will help ensure that the information to be included is relevant.

The EIS should make reference to all relevant studies and investigations that have been carried out in support of the proposal or other studies, reports or literature used in the EIS. These should be made available during the public display of the EIS.

b) Baseline information

Where baseline data is to be collected first-hand, careful consideration must be given to the design of the sampling program. Matters to consider include:

- the degree of understanding of the processes in question
- the reasons for the data collection program
- sampling program design
- data collection procedures
- data analysis methodologies
- relevant quality assurance procedures.

The need for long-term sampling to discern the variability of the environment should also be assessed as early as possible so that it is not overlooked or avoided due to time constraints. Assumptions and extrapolations used to draw conclusions from the data should be justified.

In some circumstances, there may be sufficient existing data available for assessment purposes without the need for additional data collection. Where existing data is used, its adequacy and appropriateness for impact assessment of the proposal should be reviewed and discussed, taking into consideration the above points for first-hand data collection. Shortfalls or uncertainty in knowledge should be clearly identified.

In all cases, sampling programs and analysis procedures should reflect current scientific approaches. Peer review of study design, sampling methodology, data analysis and interpretation of results may help identify inadequacies.

c) Predictions of impacts and mitigation

Impact prediction should consider magnitude, duration, extent, direct and indirect effects, beneficial and adverse effects and whether impacts are reversible or permanent. All predictions of impacts and the likely success of mitigation strategies have an element of uncertainty associated with them. The proponent should identify and, where possible, indicate the level of uncertainty associated with these predictions and mitigation measures. This information is fundamental in developing appropriate management strategies and informs the proponent, community, government agencies and the decision-maker of the degree of risk associated with the proposal and the importance of that risk.

When predicting impacts, a clear distinction must be made between those impacts which can be assessed quantitatively and those for which only a qualitative assessment can be made. Predictive models used should be justified in terms of appropriateness for the task, outlining its strengths and weaknesses. Whenever conclusions and recommendations have been made based substantially on judgements instead of facts or objective analytical results, the basis of the judgements should be clearly identified. A precautionary approach should be adopted where there is a significant chance a proposal may lead to irreversible consequences.

d) Reference to standards or indicators

Where possible, discussion of impact assessment and mitigation measures should make reference to recognised standards or indicators for sustainability. Standards such as the *Australian Water Quality Guidelines for Fresh and Marine Waters* (ANZECC, 1992) will provide a useful reference against which to measure the acceptability of potential outcomes. In some cases, indicators may have been developed for a region or area, for instance by the Healthy Rivers Commission for specific catchments. In other cases they may be developed as a result of regional strategic environmental or cumulative studies. Some indicators for sustainability may relate to the specific characteristics of the location and can only be developed as a result of the analysis undertaken in the EIS.

e) Mitigation strategies

Mitigation strategies must be considered both in relation to individual impacts and collectively for all impacts. This helps to avoid conflict between mitigation strategies and ensures that measures applied with respect to one (or more) potential impacts do not increase the magnitude or significance of other likely impacts. The mitigation strategy should include the

environmental management principles which would be followed in the planning, design, construction and operation of the proposal and include:

- a compilation of locational, layout, design or technology features described in the EIS
- an outline of ongoing environmental management and monitoring plans.

Predictions made in the EIS should be monitored in an environmental management plan (EMP). With projects with potentially controversial environmental impacts, it may be appropriate to:

- consult with government authorities, council and the community when preparing the EMP
- establish a community committee to consult in relation to the ongoing management of the proposal
- exhibit an annual environmental management report outlining the environmental performance of the proposal.

It is not expected that a detailed EMP be prepared for the EIS. However an outline of the content and structure and commitment to prepare an EMP is required.

2.6 A question of adequacy

The NSW Land and Environment Court has made a number of observations about the adequacy of EISs during its judgements (see Gilpin, 1995). Gilpin's summary of the Court's observations includes:

- The purpose of an EIS is to bring matters to the attention of members of the public, the decision-maker, and the Department of Urban Affairs and Planning so the environmental consequences of a proposal can be properly understood
- The purpose of the EIS is to assist the decision-maker. An EIS is not a decision-making end in itself, but a means to a decision-making end
- The EIS must be sufficiently specific to direct a reasonably intelligent and informed mind to possible or potential environmental consequences
- The EIS should be written in understandable language
- The EIS should contain material which would alert both lay persons and specialists to potential problems
- An EIS would be unacceptable if it was superficial, subjective or non-informative
- An EIS would be acceptable if it was objective in its approach and alerted relevant parties to the environmental effects and community consequences of carrying out or not carrying out the proposal.

2.7 Ecologically sustainable development

Under the EP&A Regulation, it is necessary to justify the proposal having regard to biophysical, economic and social considerations and the principles of ecologically sustainable development (ESD).

Ecological sustainability requires a combination of good planning and an effective and environmentally sound approach to design, operation and management. The proponent should have regard to the principles of ESD throughout the whole project life cycle, and especially:

- when developing the objectives for the project
- during project formulation, planning and design
- when considering project options and alternatives
- during construction
- for the operational life of the proposal
- afterwards during decommissioning, site rehabilitation and reuse.

Continual reference should be made to the question 'Is this proposal ecologically sustainable?'

3. Consultation

Early consultation with the local community, industry, councils and government agencies can be of great assistance when making a preliminary assessment of the potential viability of a proposal at a particular site. It can also assist in ensuring that the EIS is focused on those matters which will add value to the decision-making process.

Effective consultation should enable an applicant to:

- clarify the objectives for the proposal in terms of community needs and concerns, and the relationship of the proposal to any relevant strategic plans, government policy directions and statutory or planning constraints
- identify feasible alternatives (in particular alternative sites) and clarify their relative merits in terms of biophysical, social and economic factors
- identify environmental issues to:
  - prioritise the issues and identify those key to the decision-making process
  - establish the scope of the studies for key issues so that there will be adequate information for the decision-making process
  - where possible, identify performance objectives or indicators for key issues
  - when appropriate, identify experts (in government agencies or from other sources) who can assist in guiding the assessment of a key issue or peer review the assessment
- if appropriate, identify processes for continued community involvement.

The following consultation procedures are recommended:

3.1 Consultation with government agencies

It is intended that this guideline should replace the need to undertake routine consultation with government agencies on general matters to be included in an EIS, statement of environmental effects (SEE) or review of environmental factors (REF).

However, consultation with councils and relevant government agencies is recommended to help identify alternatives and to provide a preliminary view on their acceptability within the strategic context. To maximise the benefits of consultation with government authorities, requests for advice should be accompanied by adequate information on the proposal and proposed locations. The consultation request should be targeted towards identifying key issues, and should specifically relate to the particulars of the location, design and operation of the proposed facility.

To facilitate consultation with relevant government agencies, it may be appropriate to hold a planning focus meeting (PFM). The Department recommends that PFMs be held for all major or potentially controversial proposals. The principal approval authority would usually be responsible for organising the PFM. In addition to including government authorities which have an approval role, other agencies with expertise in the area, catchment management committees or independent technical experts may also need to be included depending on the location, site characteristics and management options.

For a landfill proposal, the following organisations should be invited to a PFM or otherwise consulted:

- **relevant local councils**
- **Department of Urban Affairs and Planning**
- **Environment Protection Authority**
- **Department of Land and Water Conservation**
- **NSW Health**
- **any relevant waste management authority or board.**

Appendix 4 lists other organisations who may need to be consulted to identify key issues for particular proposals.

For smaller projects, less formal meetings or discussions with relevant authorities, particularly the local council, should be undertaken. Issues such as whether a proposal is consistent with the council's strategic plan for the area and is permissible at the particular site should be clarified at the outset.

3.2 Formal consultation required under legislation

Under the provisions of the EP&A Regulation, an applicant or proponent must formally consult the Director-General of the Department of Urban Affairs and Planning (DUAP) regarding the content of an EIS. It is recommended that the PFM or preliminary discussions with council occur before the proponent consults the Director-General and that the minutes of the PFM or issues canvassed in the discussions be forwarded to DUAP when the Director-General's requirements are requested.

If a proposal is on land that contains a 'critical habitat' or is likely to significantly affect threatened species, populations or ecological communities or their habitats, the Director-General of National Parks and Wildlife should be consulted regarding the contents of a species impact statement (see Appendix 3 for further information).

3.3 Consultation with the community

The community likely to be affected, whether directly or indirectly, should be informed of the proposal and consulted early in the EIA process. Consultation should aim to include affected individuals, community groups and groups with special interests such as local Aboriginal Land Councils.

For major or controversial projects, a program of community consultation may need to be undertaken as part of the preparation of the EIS. This program would usually include two phases, one seeking to inform the community (for instance involving public meetings, public displays or newsletters) and one seeking to gain input on issues of community concern, to identify community values and to identify and evaluate alternatives (for instance involving community focus meetings, 'issues' workshops and community surveys).

4. Site selection procedures

Principles of site selection for landfill site proposals

Consideration must be given to whether:

- **the location has been identified in any strategic waste management plan**
- **the land use is permissible**
- **environmentally sensitive areas are avoided**
- **the use is compatible with nearby land uses**
- **initial site investigations indicate the site is fundamentally suitable for landfill.**

It is recommended that site selection based on locational principles be undertaken before an applicant commits to a landfill project at a particular location.

4.1 Site selection

Site selection is a critical issue for landfill proposals. Appropriate site selection can avoid or reduce many of the environmental problems in landfill proposals, and:

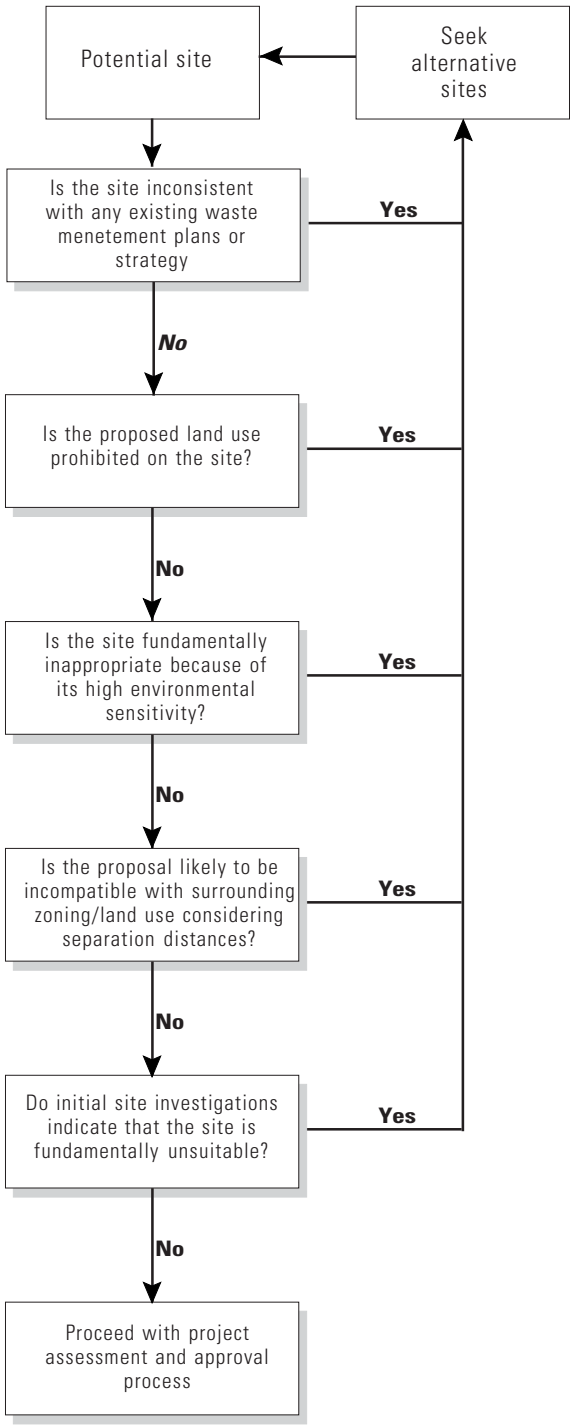
- reduce the need for technically based environmental mitigation measures and ongoing management measures
- result in substantial savings in establishment and operation
- reduce levels of public concern, and avoid potential delays in approval processes.

A systematic and rigorous approach to site selection based on '5 locational principles' is therefore recommended as set out in Figure 2.

4.2 The importance of the strategic context in site selection

When selecting a particular site, it is essential that any strategic planning for waste minimisation and management be considered. Waste Boards in Sydney, Hunter, and Illawarra regions will develop regional waste plans for

Figure 2. Site Selection



management of all waste streams generated in the regions under the provisions of the WMM Act. Waste Boards may also be formed in other regions to develop plans to manage waste. The regional waste plans should identify landfill requirements for the regions as a component of an integrated strategy for regional waste management.

In addition to planning by Waste Boards under the provisions of the WMM Act, individual councils or groups of councils (not in Waste Board regions), may develop waste minimisation and management plans which provide an integrated approach to managing the waste requirements for the area. These plans may identify the waste minimisation strategies, waste management needs, types and potential capacity of waste facilities as well as providing an indication as to the potential locations of the facilities for efficient use.

4.3 Permissibility of land use

At a very early stage in the site selection process, it is essential to consult with the local council to ensure that the proposed landfill is a permissible use of the site under the relevant planning controls. If the proposal is not permissible, discussions should be held with council to determine its attitude towards rezoning the site.

There may also be a need for councils to review the application of their local environmental plan (LEP) to landfills. In order to clarify any uncertainty about the permissibility provisions applying to landfills, some councils may need to amend the LEP to specifically include landfills within the land use table, and nominate zones in which landfills are or are not permissible. In this regard, councils should consider the need to protect areas identified in Table 1.

4.4 Environmentally sensitive areas

It is inappropriate to locate landfills in areas of high environmental value, or in areas subject to a significant environmental constraint with associated high environmental risks.

On environmental grounds, areas in Table 1 should be excluded from further consideration from the outset. This table may not be exhaustive and there may be other areas of high environmental significance protected under other legislation. As part of the site selection process, early consultation with relevant councils and government authorities will help identify any areas of the type identified in Table 1.

For most sites identified in Table 1, landfills are unlikely to be a permissible land use under existing planning controls. If they are permissible, it is possible that an application for a landfill in these types of areas would be refused on merit grounds. To ensure consistency in the environmental protection of these areas, government authorities responsible for management or regulation of landfill facilities should consider the recommendations of Table 1 in their own landfill policies.

4.5 Compatibility with land uses

The proximity of a site to nearby existing or proposed land uses should be considered as part of the site selection process. Sites which incorporate separation distances to preserve the amenity of land uses permitted in surrounding zonings, are more likely to be acceptable. Where possible, this buffer area should be owned or controlled by the operator of the landfill.

The need for and extent of buffer areas should be determined on a case specific basis.

Table 2 suggests land uses which might require separation from nearby landfills and suggests performance objectives which could be used to determine an appropriate separation distance.

As the establishment of buffer areas around landfill facilities can lead to unacceptable land sterilisation, the use of separation distances should not be the preferred option for containing emissions or reducing loss of amenity. Rather, they are a secondary feature, providing backup for the primary controls.

4.6 Initial site investigations

The purpose of preliminary site investigations is to provide an early evaluation of the suitability of the proposed site in terms of waste management, engineering and environmental factors (Table 3). The initial site investigations also provide a basis for a comparative evaluation of a number of potential sites. These investigations can provide a cost-effective device to determine if any particular

sites should be excluded from further consideration based on environmental factors.

In addition to assessing the suitability of sites for new facilities, site feasibility studies should be undertaken to assess the acceptability of an existing landfill being extended, or altered from receiving inert waste to receiving solid waste. As a further means of assessing site suitability, investigations for existing landfills should consider any monitoring results.

The level of detail of the initial site investigations should be commensurate with the scale and type of proposal, and the potential environmental sensitivity of the site. Some aspects of site investigations for inert waste landfills could be less rigorous than for solid waste landfills, but should still address all issues necessary to demonstrate site suitability. On the other hand, initial site investigations for any landfill likely to receive any form of hazardous

Table 1. List of Environmentally Sensitive Areas to be Avoided

Area	Objective
A site* within 250 metres of an area of significant environmental or conservation value identified under relevant legislation or environmental planning instruments, including: • national parks, marine national parks • historic and heritage areas, building or sites protected under the Heritage Act or National Parks and Wildlife Act or areas on the register of the National Estate • any reserves for environmental protection, e.g. aquatic, marine, nature, karsts • areas covered by a conservation agreement or identified as a critical habitat under the Threatened Species Conservation Act • wilderness areas identified or declared under the Wilderness Act • world heritage areas • areas mapped under SEPP 14 — Coastal Wetlands, SEPP 26 — Littoral Rainforests • areas zoned under a LEP or REP for environmental protection purposes, e.g. high conservation, scenic, scientific, cultural or heritage • other areas protected under the National Parks and Wildlife (NP&W) Act, Crown Lands Act Fisheries Administration Act or any other legislation	To avoid the risk of damaging areas of high environmental value
Sites within an identified sensitive location within a drinking water catchment, including: • any lands nominated or mapped as 'special areas' under the Sydney Water Regulation • lands within 3 kilometres from the top water level of the following storages: Wingecarribee Reservoir, Fitzroy Falls Reservoir, and the Tallowa Dam • any lands nominated as Special Areas (or similar wording) by local water supply authorities or in the vicinity of a groundwater bore used as drinking water	To avoid the risk of polluting drinking water should failure of the landfill occur
Sites within 250 metres: • of a residential zone • of a dwelling, school or hospital not associated with the facility	To protect the amenity of residential areas
Sites located: • in or within 40 metres of a permanent or intermittent waterbody (including rivers, lakes, bays or wetlands) • in an area overlying an aquifer which contains drinking water quality groundwater which is vulnerable to pollution (consult DLWC for criteria to determine the vulnerability of groundwater)	To protect groundwater and surface water resources
Sites located: • within a karst region (either protected under the NP&W Act or not) • with substrata which are prone to land slip or subsidence	To avoid sites with unsuitable substrata
Sites within a floodway which may be subject to washout during a major flood event. Councils should be consulted for information about local flooding characteristics. A major flood event is considered to be a 1 in 100 year event	To avoid landfill washout risk if a significant flood event was to occur

Note: * The provisions in this table are not intended to preclude the operation of an existing landfill which is ancillary to and an integral component of a national park, reserve or world heritage area

substances should rigorously investigate all hydrogeological aspects of alternative sites.

Results of the initial investigations should be assessed to determine if a site is fundamentally suitable or unsuitable for proceeding with a development application. In some circumstances, the acceptability of some sites for landfilling may be still uncertain following an initial site investigation.

Before proceeding with these types of sites, the views of the EPA and any relevant authorities should be sought regarding:

- the nature of the environmental constraint and its significance for the proposal's likely impacts
- the availability of impact mitigation measures
- the comparative merits of alternative sites.

The availability of impact mitigation measures alone should not lead to the conclusion that a site is suitable. A balanced judgment should be made taking account of all environmental factors. If the site is deemed to be suitable, the EIS should include results of the initial investigations and a full explanation of the rationale for selecting the site and for concluding that the site is suitable for landfilling.

The statutory requirements for an EIS are prescribed in Schedule 2 of the EP&A Regulation (Appendix 1).

Table 2. Appropriate Separation Distances from Certain Land Uses

Land use	Performance objectives	Factors for determining appropriate separation distances
Airports*	• Ensure that air traffic is not exposed to bird hazard	• What is the likelihood of the performance objectives being achieved by the mitigation measures alone? • What is the likelihood of the mitigation measures failing? • What is the likelihood of an 'incident' (e.g. accident, system failure, natural disaster) which will result in a failure to meet the performance objectives? • What backup mitigation measures are available? • What is the likely geographic extent of impacts, taking into consideration the proposed performance of mitigation measures and the local environment (topography, climate)? • What is the likely geographic extent of the impacts if mitigation measures fails or an 'incident' occurs, taking into consideration the local environment (e.g. topography, climate)? • What separation distances are required to achieve the performance objective: — under normal operational and mitigation performance conditions — if mitigation measures fail or an 'incident' occurs? • What is the extent of separation distances required by any legislation?
Residential areas	• Protect residential amenity and health: odour, visual amenity, noise, dust, seepage	
Surface waters**	• Ensure that surface waters are protected from pollutants in the waste • Ensure that no existing or likely future uses of surface waters are compromised • Ensure that no significant impacts occur to flora and fauna which use the waters • Ensure that the ecological value of the waters will be maintained	
Groundwater recharge zones	• Ensure that there is no deterioration in the quality of the groundwater • Ensure that no existing or likely future uses of groundwater are compromised	
Environmentally sensitive areas (Table 1)	• Ensure that environmental qualities of the particular area are not compromised by the landfill	

Note: * The Federal Airports Corporation and Civil Aviation Authority both support the separation distances recommended by the International Civil Aviation Organisation (ICAO) publication Land Use and Environmental Control (Second Edition - 1985). The separation distance recommended by this publication is 8 kilometres for a landfill used for food garbage disposal. No separation distances are specified for other types of landfills.
** The EPA advises that pollution reduction by using separation distances is not acceptable for water or air pollution. Therefore, any separation distances in these cases should **not** be seen as a primary means of reducing impacts.

Table 3. Initial Investigations for Landfilling

Operational requirements	• Does the site provide sufficient land area for present and future requirements? • Is there easy access and transport networks of an appropriate standard? • Is this an efficient site relative to the waste management catchment? • Will this location meet the requirements of any relevant waste management strategies or policies?
Geological and soils assessment	• Are there environmental risks associated with the underlying strata e.g. highly permeable soils or substrata; highly permeable seams or structural faults, significant seismic, subsidence or landslip risk; karst area or other structural instability? Evaluate the underlying geological strata for its suitability as a landfill • Are the extractive materials on the site suitable for cover material? • Are the soils on the site suitable for use in the construction of dams and drainage systems? • Are the soils highly erodible? Identify any potential sediment management problems • Are there existing soils problems e.g. contaminated soils, acid sulfate or saline soils? • Are there any topography or geological characteristics which will assist in minimising impacts?
Hydrological assessment **a. Surface water** **b. Groundwater**	• Are there risks of surface water pollution because of the proximity or pathways to watercourses and wetlands, in particular waterbodies used for drinking water or aquaculture? • Are there risks to groundwater because of shallow or rising groundwater, or because of the proximity to groundwater recharge areas or to areas classified as having a high vulnerability to pollution? (This will require consultation with the DLWC) • Is the site subject to flooding (1 in 100 year event)? • Can any separation requirements from waterbodies (under any relevant legislation or guidelines) be complied with?
Topographic and meteorological assessment	• Are the rainfall patterns or prevailing wind directions likely to cause management difficulties, taking into consideration leachate generation and odour dispersal? • Are the local climatic conditions (e.g. air movement, rainfall) in combination with the topography likely to result in microclimatic conditions which will adversely increase impacts on the community (consider land slope, wind strength and directions, and potential for katabatic drift)?
Flora and fauna assessment	• Can clearing of natural vegetation be avoided? • Can clearing of vegetation of high significance be avoided e.g. vegetation used for visual screening, riparian vegetation, vegetation used as corridors for the movement of fauna? • Are threatened flora or fauna species, populations and ecological communities or their habitats liked to be affected? Will an SIS be required? • Will a development application for vegetation clearing be required under SEPP 46?
Transport issues	• Can the standard and capacity of the road network accommodate traffic likely to be generated by the proposal? • Can truck traffic avoid residential areas? • If inadequacies exist, can the road network or traffic management be changed to minimise any impacts, particularly on residential areas?
Community issues	• Is the proposal likely to be compatible with surrounding existing or proposed land uses, particularly residential zones and any special land uses such as hospitals, schools or airports? • Is the proposal likely to pose health risks, including from air or water pollution or through contamination of produce from surrounding agricultural land? • Is the proposal likely to affect the heritage significance of any Aboriginal or non-Aboriginal heritage items found or likely to be found on the site? • Is there likely to be a problem in meeting sustained compliance with odour, noise, water quality or health requirements? • Is the site highly visible? Will there be significant visual impacts? • Can all separation requirements (under any relevant legislation or guidelines) be complied with?
Cumulative issues	• Is the proposal at this site likely to contribute to any existing cumulative problems?

5. Summary of EIS requirements

A summary of the specific requirements for an EIS for a landfill proposal are provided in the box on the right. These requirements are discussed in detail in Part 6. All issues nominated will not have the same degree of relevance for all proposals. Depending on the characteristics of the proposal, some of the requirements may be more relevant than others, while others will not be applicable at all. The EIS should be tailored to the specific proposal and should focus on the key issues.

Summary of requirements

A. Executive summary

B. The proposal
1. Objectives of the proposal
2. Review of waste management practices
3. Permitted wastes
4. Review of any landfill on or near the site
5. Establishment and operation of the landfill
6. Site layout plans
7. Site rehabilitation, closure and end use
8. Consideration of alternatives and justification for the preferred option

C. The location
1. Planning context, site description and locality information
2. Overview of the affected environment

D. Identification and prioritisation of issues
1. Overview of the methodology
2. Outcomes of the process

E. The environmental issues
1. Infrastructure issues
2. Groundwater issues
3. Surface water issues
4. Flooding issues
5. Soil issues
6. Air quality issues
7. Health issues
8. Social issues
9. Noise issues
10. Visual issues
11. Flora and fauna issues
12. Heritage issues
13. Hazards issues
14. Economic issues
15. Cumulative impacts

F. List of approvals and licences

G. Compilation of mitigation measures

H. Justification for the proposal

6. Specific requirements for an EIS

A. Executive summary

An executive summary should be provided in the EIS and should be available separately for public information. The summary should give a short overview of the proposal and the potential environmental impacts. It should include a clear map or aerial photograph of the location. It should be written in non-technical language to facilitate understanding of the proposal by the general public.

B. The proposal

1. Objectives of the proposal

The objectives of the proposal should be clearly stated and justified in terms of ecological sustainability. The objectives should refer to:

a) the role of the proposal in any relevant local, regional or State waste management strategies
b) the role of the proposal within a waste management hierarchy of reducing, reusing and recycling wastes, and the Government policies on waste minimisation
c) the anticipated level of performance in meeting present and future community waste management needs
d) the anticipated level of performance in meeting environmental and health performance objectives.

2. Review of waste management practices

Outline any relevant issues in relation to strategic planning for waste minimisation and management:

a) in any existing regional waste plans prepared by a Waste Board under the *Waste Minimisation and Management (WMM) Act 1995*
b) if no plan exists under the WMM Act, in any waste management plan for all or part of the waste catchment, including any waste reduction or recycling programs or any commitments by councils to use particular facilities, including the proposed landfill
- in any recommendations by the EPA with regard to the waste disposal capacity requirements of the region or catchment
- if no plans or EPA recommendations, any practices relevant to the proposal.

In reviewing existing and potential future waste practices, the following factors should be considered when establishing a legitimate demand for the landfill proposal. (Note: all these factors must be addressed for landfills which fall under SEPP 48). Consider:

a) the population and development profile for the waste region or catchment; local government areas within the region or catchment
b) significant sources and generators of waste; the potential growth of these sources and generators
c) the quantity (in tonnes/annum) and waste stream classification of waste currently generated in the region or catchment; the potential growth of each of these classes taking into consideration any waste minimisation strategies
d) existing waste management facilities in the region, including:
    i) existing facilities such as landfills, tips, transfer and collection stations, composting, reprocessing or recycling facilities
    ii) the local government areas in the region or catchment serviced by each of the facilities
    iii) the existing capacity of these facilities
    iv) an assessment of their ability to meet future catchment or region needs or target
    v) any commitment to close any existing facilities
    vi) if relevant, the appropriateness of the location of the facilities to the principal sources or generators of waste
e) any waste management options as alternatives to landfilling for all major waste classes; alternative facilities required and the markets for reused waste or use of waste products from recycling or reprocessing;
f) the outcomes of any existing waste minimisation strategies in terms of impact on waste disposal requirements

g) any monitoring of existing plans, strategies or practices with regard to waste minimisation and management; any targets identified in any plan or strategy and the potential to meet these targets
h) existing and proposed waste minimisation and management plans or strategies and targets; future landfill needs relative to principal sources or generators of material not suitable for alternative waste management options.

3. Permitted wastes

Outline wastes to be permitted at the landfill, including:

a) the quantity (in tonnes/annum) and characteristics (such as waste stream classification, source) of wastes to be accepted
b) the quantity (in tonnes/annum) and characteristics of wastes to be accepted only with specific EPA approval, or which will require special management procedures
c) the quantity (in tonnes/annum) and characteristics of wastes to be accepted for recycling
d) the characteristics of wastes which will be specifically excluded
e) major sources or generators of the wastes, including local government areas
f) any contractual agreements with waste sources, generators or local councils to receive wastes.

4. Review of any landfill on or near the site

Issues to consider include:

a) the catchment and performance of the existing landfill in terms of quantity and quality of waste received; the shortcomings of the present landfill in terms of meeting community's existing or future needs, or environmental or health goals
b) the future roles of the existing landfill in any local or regional waste management plan, including any proposal for modifying, upgrading or decommissioning any component of the facility, or to integrate the facility into the new proposal.

5. Establishment and operation of the landfill

Issues to consider include:

Waste reception procedures

a) waste reception areas for trucks and smaller vehicles; any waste transfer facilities to the working face
b) procedures for inspecting, testing and sorting wastes; this may require assessment of particular waste streams including Toxicity Characteristic Leaching Potential Testing (TCLP) of decomposition products of the wastes — see *Environmental Guidelines: Solid Waste Landfills* (EPA, 1996)
c) any pre-landfilling treatment procedures such as shredding, compacting, baling or chemical treatment, and the effectiveness in minimising landfill space requirements or environmental impacts
d) procedures for monitoring compliance with permitted waste protocols at the gatehouse, recycling centre and within the cells
e) protocols for handling wastes not permitted at the facility if discovered
f) proposals for record keeping of wastes received.

Recycling procedures

Issues to consider include:

a) procedures for waste recovery and transfer to other sites; procedures for identifying, sorting or separating, shredding, compacting, and temporarily storing wastes; other handling processes in preparation for the recycling or reuse of wastes
b) any on-site reprocessing such as composting — see *EIS Guideline: Composting and Related Facilities* (Department of Urban Affairs and Planning, 1996)
c) any measures associated with these activities to prevent unacceptable odour, noise, dust or visual impacts.

Cell preparation

Issues to consider include:

a) if a purpose constructed void is to be used for landfilling or an on-site quarry is required to

obtain cover or landscaping material:
   i) outline methods of extracting, processing, transporting and storing extracted material given the geological characteristics of the material to be extracted and the underlying geological formation; staged excavation, slope of the excavated area, void erosion and water controls, haul roads
   ii) the potential for use of the extracted material on-site as cover material or landscaping, or off-site for minerals recovery or as building material
   iii) the material requirements for landfill cover and landscaping, and the adequacy of the on-site material to meet the requirements
b) if an existing void is to be used for landfilling:
   i) works required in preparation for landfilling, including stabilisation or adjustments to the floor or walls of the void
   ii) the construction of haul roads, void erosion and water controls.

Cell management

Issues to consider include:

a) the proposed sequence for filling the void; any areas reserved for the disposal of wastes which require special management; special management protocols
b) cell filling procedures, including maximum lifts, working face size and slope, compaction density and mechanisms, any additional stabilisation works; daily, intermediate and final cover protocols including cover materials, thickness and management
c) daily dust, litter, bird, pest and vermin management program.

Leachate and gas emission management system

Issues to be considered include:

a) predicted major constituents of leachate and gas emissions likely to be generated, and the likely generation rates during various phases of the waste decomposition, considering:
   i) proposed management practices, including the cover material type and management, and surface water management controls
   ii) waste material to be landfilled
b) the proposed barrier to prevent leachate or gas emissions from contaminating surrounding soil or water (surface or ground) considering:
   i) characteristics of the barriers including thickness, co-efficient permeability and flexibility of components, or layers of the barrier system
   ii) the integrity of the barrier; the likely presence of imperfections or joins which could compromise its effectiveness; the likely reaction between barrier material and leachate
   iii) the efficacy of the barrier to contain or immobilise hazardous components of the leachate
   iv) the risk of rupture or failure of the barrier (e.g. the effect of blasting, root intrusion, cracks, corrosion, effects of operational activities)
c) the design parameters of the cover material used during filling and on completion including:
   i) the characteristics of the cover material, the thickness, permeability and method of laying
   ii) the monitoring program to ensure the design standards are met
   iii) any maintenance program to maintain the efficacy of the system
d) the design and location of the leachate management system including:
   i) the location of drains, holding tanks and pits and their capacities
   ii) design parameters in terms of the volume of leachate allowed to accumulate over the liner or in storage
   iii) any maintenance program to maintain the efficiency of the drainage and storage system
   iv) measures to deal with flood or high rainfall events
e) the leachate treatment system, including:
   i) proposed use or disposal options for leachate
   ii) the proposed quality of leachate to be discharged to sewer, recycled, reused, irrigated or discharged to a natural water body
   iii) the proposed water treatment system
f) the design and location of the gas management system, including:
   i) extraction system components, and any storages
   ii) the management system for any condensate

iii) any maintenance program to maintain the efficacy of the system
iv) systems for the disposal or use of the gas
v) performance standards of any combustion or oxidation including risk management and gas emissions
vi) the performance standards of any power generation systems, including the efficiencies of gas use, and emissions.

Surface water management system
Outline relevant issues in relation to a surface water management system, including:

a) bunding or other measures to prevent off-site surface water running onto any landfilling, working or storage areas on the site
b) measures to contain, collect and manage surface water within any landfilling, working or storage areas, the parameters of any first flush or storage systems
c) proposed use or disposal options for surface water collected on the site
d) the proposed quality of water to be discharged to sewer, recycled, reused, irrigated or discharged to a natural waterbody
e) any proposed water treatment system.

Other infrastructure and management issues
Outline relevant issues in relation to:

a) the establishment of access roads, any relevant road or rail interchange, parking, weighbridges, administration, the maintenance compound, stores, the washdown area and any other infrastructure needs
b) the establishment of security facilities, including gatehouse, fencing, lights
c) the establishment of landscaping and bunding for visual and noise barriers
d) site operating hours
e) the establishment of a network of monitoring stations, including any computer management system
f) the establishment of facilities or systems to deal with incidents or emergencies such as spills, fires, floods.

6. Site layout plans

Provide a plan or plans clearly indicating the following:

a) existing site contours; significant environmental features on the site including all above and below groundwater systems; any significant vegetation communities or items of heritage significance to be cleared or affected
b) all components of the landfill facility including:
   i) the full extent of the landfill operation; the proposed stages and final contours
   ii) any other areas to be excavated for cover or top soil material; storage and processing areas for material, storage of barrier materials
   iii) a schematic overview of the water and leachate management system, including stormwater, sedimentation and leachate dams, bunds, leachate treatment and management facilities, any irrigation areas
   iv) gas collection, treatment or management facilities
   v) access and haul roads, gatehouse, weighbridge, tipping areas, wash-down areas, parking areas
   vi) recycling, reprocessing and transfer facilities
   vii) administration and maintenance buildings; stores for pipes, fuels, chemicals, explosives and any other dangerous goods
   viii) monitoring locations
   ix) security facilities, fencing, lights, firefighting equipment
   x) landscaping and rehabilitation works
c) any proposed buffer areas separating the facilities and nearby land uses.

7. Site rehabilitation, closure and end use

The following information should be provided:

a) end use objectives for the site
b) a landscaping plan showing final contours for the site, species to be planted, the staging of rehabilitation and measures to ensure the long-term stability of the landfill
c) proposals for progressive rehabilitation of the landfill, including weed control
d) proposals for post closure management, including after-care arrangements for the site for:
   i) gas collection, disposal or use
   ii) water and leachate management
   iii) landscaping maintenance
   iv) ownership responsibilities and liability
   v) ongoing monitoring to ensure compliance with relevant standards for use.

8. Consideration of alternatives and justification for the preferred option

Consider the environmental impacts or consequences of adopting alternatives including:

a) structural and non-structural options to remove the need for the proposal, including waste minimisation, recycling and reuse options or other administrative practices to remove the need for additional landfill capacity
b) transferring the waste to another landfill facility instead of the proposed facility
c) alternative waste disposal network options e.g. providing one large regional facility with options for a network of transfer stations; recycling, reprocessing and composting depots compared with several local or smaller landfills (or vice versa)
d) alternative landfill site locations
e) alternative transport options, access routes
f) alternative site configurations
g) alternative waste services offered at the site including recycling and reprocessing options
h) alternative landfill management options including:
    i) cell configuration and management
    ii) leachate and gas emission containment, use or disposal; in particular consider cover and barrier options
    iii) litter, pest, vermin, odour, dust and visual impact management options
    iv) risk management options
i) alternative site rehabilitation and end use options
j) the do-nothing option — the consequences of not proceeding with the proposal should be considered.

Some of the issues which may need to be considered in the analysis and justification for the selection of a preferred option are the:

a) ability to satisfy the objectives of the proposal
b) acceptability of environmental impacts including biophysical, economic and social (including health) impacts
c) acceptability of any environmental risks or uncertainties, particularly in relation to leachate and gas emissions containment; the reliability of the preferred landfill options to meet acceptable environmental standards and to minimise public health risks; the reliability of individual environmental impact mitigation
d) ability of the options to handle abnormal events such as fires, earthquakes, stormwater intrusion, flooding or accidental discharge of chemicals
e) efficiency with which the proposal meets present demand
f) flexibility of the proposal to meet future demand
g) opportunity to maximise the recycling and reuse of wastes
h) efficient use of land, extracted material, energy, water and other resources
i) relative environmental, economic and social costs and benefits of each alternative — significant non-monetary and non-quantifiable costs and benefits should be described and qualitatively assessed.

C. The location

1. Planning context, site description and locality information

The following information should be provided:

a) zonings, permissibility
b) the compatibility of the proposal with any planning provisions or land use constraints including:
    i) any easements or other restrictions affecting the site, including any heritage or environmental protection provisions
    ii) any relevant provisions of any state environmental planning policy, regional or local environmental plans, or development control plan
    iii) any relevant catchment management plans, regional strategies or management plans for the area
c) title details; land tenure; owner's consent (if not the proponent)
d) where Crown land is involved, any constraint associated with the form of lease or tenure; where appropriate, the Native Title status of the land should be addressed and an outline provided of the procedures to be followed to satisfy the requirements of the Commonwealth's *Native Title Act (1993)*
e) maps, plans or aerial photographs clearly identifying the location of the proposal in relation to:
    i) the surrounding roads, adjoining communities or dwellings and any land

use or natural features likely to be affected by the proposal, in particular any nearby airports or water supply resources (ground or surface)
ii) utilities including transmission lines, pipelines, cables or easements
iii) sight-lines from dwellings or public places such as roads
iv) other activities which in combination with the landfill have the potential to generate significant cumulative impacts (such as traffic, air, noise or water impacts).

2. Overview of the affected environment

An overview of the environment should be provided in order to place the proposal in its local and regional environmental context. This overview should be general. Specific details should be provided when assessing the environmental impacts of the proposal.

General information to be provided includes an overview of:

a) meteorological characteristics which may influence flooding, erosion, evaporation, dust, odour or noise impacts — these may include wind direction and intensity, rainfall intensity, frequency, duration and seasonal distribution
b) the geomorphological factors such as major landform features; slope gradients, geological characteristics
c) the use and vulnerability of any natural waterbodies including wetlands, estuaries likely to be affected by the proposal; general hydrological and water quality characteristics
d) the use and vulnerability of groundwater; general hydrological and water quality factors
e) characteristics of land likely to be affected in terms of general soil characteristics; any existing soil problems including salinity, acid sulfate soils potential or erosion problems
f) predominant vegetation communities in areas to be disturbed, their potential habitat and conservation values
g) the heritage, conservation, archaeological, historical, cultural, scientific, or scenic significance of any buildings, items, places or areas likely to be affected by the proposal.

D. Identification and prioritisation of issues

1. Overview of the methodology

Outline the procedures or methodology used to identify and prioritise issues. Factors to consider may include:

a) the outcome of a review of relevant sources of information on potential issues including:
   i) any relevant guidelines produced by other NSW government authorities, relevant guidelines from other States or overseas
   ii) EISs for similar projects, any relevant commission of inquiry reports, determination reports and conditions of approval
   iii) relevant research and reference material on landfills
   iv) other similar projects particularly if operating in similar locations
   v) relevant strategic plans or policies (waste management, REPs, LEPs)
   vi) relevant preliminary studies or pre-feasibility studies
b) the outcome of consultation with stakeholders including:
   i) planning focus meetings, community focus meetings, community workshops or issues groups
   ii) meetings with stakeholders (e.g. government agencies, particularly EPA, Waste Boards, councils, waste sources, generators and transporters)
c) the use of methodology such as *Is an EIS required?* (Department of Planning, 1995) or checklists or similar approaches.

2. Outcomes of the process

Summarise the outcome of the identification and prioritisation process including:

a) all the issues identified
b) the key issues which will need a full analysis in the EIS (including comprehensive baseline assessment)
c) the issues which will not need a full analysis in the EIS though they may be addressed in the mitigation strategy; the justification for the proposed level of analysis.

E. The environmental issues

The following specific issues are nominated as potentially important when assessing impacts, and for decision-making in relation to landfills. The outline of the issues is not exhaustive and the degree of relevance of each will vary. The EIS should only deal with relevant issues as applicable to the particular proposal.

Assessment of potential impacts

The following should be included for any potential impact which is relevant for the assessment of a specific proposal:

- **a description of the existing environmental conditions (baseline conditions)**
- **a detailed analysis of the potential impacts of the proposal on the environment; the analysis should indicate the level of confidence in the prediction outcomes and the resilience of the environment to cope with the impacts**
- **the proposed mitigation, management and monitoring program including the level of confidence that the measures will effectively mitigate or manage the impacts.**

With each issue, the level of detail should match the level of importance of the issue in decision-making.

1. Infrastructure issues

The following should be considered:

energy issues:

a) energy requirements
b) the electricity supply for the operation of the landfill, and ancillary facilities including standby electricity supply provisions; any new or upgraded transmission facilities including lines and substations; potential impacts from the provision of these services
c) an assessment of the efficiency of energy use
d) a consideration of alternatives with respect to energy use management and design measures
e) the potential for landfill gas use as a power source; the efficiency of power generation facilities and the impact of on-site generation on grid requirements
f) potential greenhouse implications

water supply issues:

a) the impact of the proposal on the local water supply system, including the need to upgrade or augment the water supply or reticulation system
b) an assessment of the efficiency of use of water in the operation of the landfill, taking into consideration any proposed water management plan including use, storage, reuse or recycling of water on the site

stormwater management issues:

a) a review of those aspects of the proposal which will result in increased stormwater impacts on neighbouring properties
b) the need for augmentation of stormwater management infrastructure or the diversion of natural flow channels

transport issues:

a) any road, rail or shipping modes and routes for the transport of waste, cover materials or chemicals
b) alternative routes or transport modes
c) assess the ability of the roads, rails or waterways to handle the traffic:
    i) the physical condition of the roads, rail or bridges on the proposed routes
    ii) any upgrading proposals or requirement for additional infrastructure
d) the potential impact of the proposal on the route maintenance program

traffic issues:

a road traffic impact study should be undertaken for all proposals involving significant numbers of vehicle movements during establishment or operation, including:

a) current traffic on roads leading to the site, including volumes and vehicle types
b) the estimated average and maximum daily and weekly truck movements to be generated by the proposal
c) noise and odour sensitive land uses along the route such as schools, hospitals, nursing homes; potential impacts on these land uses and proposed mitigation measures
d) road safety issues, including:
    i) the adequacy of the road network to deal with the traffic
    ii) potential conflicts (particularly if truck routes are used by school buses) or areas of high risk including any sight distance

constraints, existing congestion or poor road standards
iii) potential risks associated with the transport of any hazardous substances given the road and traffic regime
iv) proposed measures to improve safety; the need for turning bays, additional traffic management devices, road upgrades

other infrastructure issues:
consider:

a) utility service requirements of the proposal, such as telecommunications, gas
b) measures to protect any existing easements, cables and pipelines which may be affected by the proposal.

2. Groundwater issues

Issues to consider include:

a) the depth to groundwater aquifers; overlying geological characteristics in relation to the vulnerability of the groundwater to pollution
b) for all aquifers at risk, the:
   i) groundwater gradients; rates and directions of flow, location of any recharge areas, seeps or springs
   ii) baseline water quality assessment in accordance with the EPA guidelines (specific analysis requirements and sampling program may be established at the planning focus meeting or in consultation with the EPA)
c) an assessment of the potential risk of contamination of groundwater, given the proposed location, design and management of the landfill and any leachate disposal sites; include:
   i) an assessment of the likely impact of the location of the landfill on groundwater movement or aquifer recharge areas
   ii) an assessment of the adequacy of any means to prevent transmission of leachate to the groundwater (e.g. liner or natural barrier)
   iii) proposals for remedial action, should containment of the leachate fail
   iv) a demonstration that the proposed method of leachate disposal will not result in significant adverse impacts upon the groundwater or upon users of the groundwater
   v) proposals for monitoring groundwater to identify early stages of contamination
d) the location of any nearby bores, current and potential users and uses of groundwater in the area; an assessment of the potential impacts on existing and future uses of groundwater in the area
e) the location and nature of any rising groundwater or salinisation problems in the area; an assessment of the potential for the proposal to contribute to rising groundwater levels in the area or any salinity problems
f) an assessment of the adequacy of the proposed measures to prevent contamination of groundwater; the proposed monitoring program.

3. Surface water issues

Issues to consider include:

a) the condition of any natural waterbodies or wetlands (expressed as level of compliance with relevant water quality objectives established for the waterbody)
b) a description of the potential sources of pollution, and assessment of the pollution characteristics likely to be impacted by the scheme; the magnitude and probable frequency of pollution events and the assimilation capacity of the receiving environment, including:
   i) intentional or accidental discharges, leakage, seepage, spillage or discharges, flood inundation, failure or overload of the leachate or on-site surface water drainage or storage system
   ii) sedimentation from cell establishment or management, quarrying, landscaping, road construction, storage or closure activities
   iii) discharges or wastes from workshops, washing down facilities, plant and equipment, fuel and chemical storage
c) if the proposal involves upgrading an existing scheme, comparing the results of the performance of the existing scheme with the likely improvement in water quality due to better performance of the proposed scheme
d) assessing the potential impacts on other users of the waterbodies from any change to the water quality
e) assessing the adequacy of stormwater management proposals to prevent off-site stormwater from entering the site

f) assess the adequacy of design and management measures to minimise impacts, including those to:
   i) manage any leachate or contaminated stormwater runoff at the landfill facility or any irrigation area (including appropriate buffers or management systems) to prevent contamination of surface water or soil
   ii) minimise sedimentation and erosion
   iii) prevent contamination of water from accidental spillage of chemicals, untreated leachate or waste material
g) a plan for ongoing maintenance and monitoring of water quality controls for each component of the landfill facility to ensure their correct installation, operation and effectiveness
h) a monitoring program at the proposal site as well as nearby natural waterbodies (upstream, adjacent and downstream) likely to be affected by point sources or non-point runoff from the site.

4. Flooding issues

For landfill facilities on flood prone areas, the following issues should be considered:

a) flooding status including the likely frequency of flooding
b) if flood liable:
   i) the direction of flood flow
   ii) the vulnerability of the cells, dams, ponds or storage facilities and access roads to inundation or damage
   iii) potential impacts from inundation of the facility on:
      - the future operation of the facility
      - the management of contaminated waters and litter on the adjoining land and in waterbodies
   iv) the adequacy of measures to prevent breakthrough during floods into any cells, dams or ponds; proposals for monitoring stormwater to identify early warning of potential inundation
c) the potential for the proposal to increase the flood liability of surrounding land by any land formation or levelling, construction of dams or bunding; potential impacts of any increased flooding levels
d) any future proposed flood mitigation systems that may influence the impacts of the proposal on the environment.

5. Soil issues

This section is particularly important if major earthworks are to be undertaken; if hazardous chemicals have previously been used on the site or are to be used on site; if effluent is to be applied to the land; if acid sulfate soils are to be disturbed; or if the soils are highly erodible. Issues to consider include:

a) a brief description of existing surface characteristics, including contours, terrain stability, slope gradient and length, susceptibility to erosion or landslip
b) a soils and geological survey of areas to be affected by the proposal, indicating profile characteristics which may be relevant to the sustainable management of the proposal (the Department of Land and Water Conservation has soil landscape maps for some parts of the State)
c) a description of potential direct or indirect effects on soils, and any constraints on the proposal due to soil characteristics, including:
   i) the existing level of contamination of the proposed site with identification of the type and extent of contamination if possible; the suitability for use without any further remediation; if appropriate, the level of remediation; proposed methods for remediation and measures to prevent contamination of surrounding areas during decontamination works; the monitoring program to track decontamination progress
   ii) the potential for erosion, having regard to the soil characteristics, landform and meteorological characteristics
   iii) the potential for lateral or vertical movement to groundwater, considering the permeability and subsoil structure or surface sealing characteristics; if relevant, an assessment of the likelihood of vertical or lateral seepage or flow of leachate or contaminated stormwater to neighbouring properties, natural waterbodies or groundwater
   iv) the suitability of the soils for rehabilitation works or irrigation disposal of leachate or effluent considering soil fertility; the potential to develop salinity or any other characteristics which could affect root growth; if relevant, the sustainability of the proposed leachate

irrigation scheme given the soil, climate and leachate characteristics — see *The Utilisation of Treated Effluent by Irrigation* (EPA, 1995)

v) the potential for acid related issues due to the presence of acid sulfate soils — refer *Assessing and Managing Acid Sulfate Soils* (EPA, 1995)

d) proposed measures to manage and monitor impacts including:
   i) the proposed management program to mitigate potential impacts from erosion and sedimentation including:
      - measures to minimise the area denuded at any one time
      - stormwater drainage and sediment control
      - stabilisation works for cuttings, embankments, trenches and open channels
      - earth material management measures including wind and water erosion control measures or minimising the stockpiling of soil
      - a maintenance program of all erosion control works
   ii) if relevant, the proposed management program to mitigate potential impacts from disturbance of acid sulfate soils, including minimisation of disturbance of the material or the watertable; the treatment of disturbed soils or acid water; the monitoring program and response strategies should deleterious impacts be observed
   iii) if relevant, the proposed management program to mitigate potential impacts from any irrigation scheme, including the monitoring program of soil and crop responses and response strategies should deleterious impacts be observed
   iv) measures to avoid causing site contamination during the operation of the landfill facility, and remediation measures if contamination occurs.

6. Air quality issues

Issues to consider include:

a) identifying the local and regional air quality; any existing cumulative air quality issues; any nearby land uses likely to be sensitive to air quality impacts

b) identifying fixed and mobile sources of air pollution including landfill gases and other sources of air pollution such as odour, dust, fumes, smoke or aerosols from the establishment and operation of the site and the transport, sorting and storage of wastes, recyclables, chemicals, cover or other material

c) assessing the performance of any landfill gas containment, extraction, disposal or use system considering:
   i) the leachate barrier system
   ii) the type and management of the cover material
   iii) the design and management of the extraction system
   iv) the disposal or use system (gas and any condensate)
   v) air quality goals of any combustion, oxidation or electricity-generation options
   vi) the adequacy of measures to prevent landfill gases from:
      - migrating off-site in the subsurface
      - accumulating in any buildings or structures on- or off-site or in any underground utilities or manholes in the vicinity
      - creating a fire or health hazard
      - affecting rehabilitation and landscaping plans

d) assessing the likely performance of any controlled burning facility or incinerator

e) assessing the likely impact of the proposal on the local and regional air quality considering sensitivity of nearby land uses; assessing the likely chronic or acute risks on humans and the natural ecology; greenhouse and ozone layer implications; if significant include:
   i) the likely type, quantity, quality, frequency and times of emissions
   ii) dispersion characteristics having regard to the influence of local topography and weather conditions (particularly katabatic drift) — this may involve the preparation of odour and dust contours
   iii) consideration of relevant advice in SEPP - No. 33 — Potentially Hazardous and Offensive Industries with regard to potentially offensive industries

f) operational and meteorological conditions under which nearby dwellings and sensitive land are likely to be affected; the likely frequency of their occurrence

g) mitigation and management measures to control the generation and impacts of landfill gases, odour, fumes, smoke, dust, aerosols and other air pollutants including:
   i) windbreaks, buffer zones
   ii) odour measures such as restriction or protocols for waste likely to cause odour problems, management of waste on site prior to compaction, working face protocols to minimise odour
   iii) dust management practices such as ceasing dust generating activities during certain meteorological conditions; dust control measures on open stockpiles, in the working and unloading areas; sealing roads and parking areas or watering of roads and stockpiles, rehabilitation of finished areas, grassing of interim finished areas
h) monitoring programs including monitoring stations; nomination of an acceptable level of gas at various locations; proposals for remedial action if these levels are exceeded.

7. Health issues

The analysis would be expected to focus primarily on human health. Animal and plant health should also be considered where relevant. Issues to consider include:

a) an overview of the public health risk associated with any existing landfill or waste disposal facilities
b) an assessment of the potential health implications of the proposal, including potential chronic and acute risks associated with:
   i) the likelihood of the facility increasing any existing health problems in the community
   ii) air quality, water quality, soil contamination, road safety and the potential for the transmission of pathogens, carcinogens, mutagens, or teratogens likely to affect health
   iii) potential exposure pathways
c) if there is a significant health risk, a full health assessment considering potential impacts:
   i) from direct exposure to or aspiration of substances (gas, liquid or solid) with high health risk implications during the operation of the facility or following its rehabilitation
   ii) from consumption by humans or animals of vegetation, fish or shellfish which have come in contact with the leachate (directly by irrigation or from surface or groundwater affected by leachate)
   iii) from transmission by vermin or pests
   iv) from recreational exposure to leachate discharged to any waterbodies
d) an assessment of the adequacy of the proposed design, management, mitigation and monitoring program with regard to health risks
e) an assessment of the adequacy of buffer zones from dwellings, recreational areas and public roads, given the potential health risk
f) an assessment of the potential improvements to community health as a result of the proposal.

8. Social issues

Issues to consider include:

a) an assessment of the affect of the proposal on future development in the area; the potential impact on the community's profile, structure or cohesion
b) potential impacts of the construction or operation on the amenity of the area considering factors such as noise, dust, odour, traffic, litter, vermin
c) social equity considerations such as means to offset any inequities (for example proposed post-closure uses which may benefit the host community)
d) a review of the community consultation process which occurred; any other relevant issues raised in community consultation.

9. Noise issues

Issues to consider include:

a) the existing acoustic environment, including meteorological conditions, topographical features and buffer zones which will influence the noise impacts; nearby land uses likely to be affected by noise from the facility
b) proposed hours of operation, in particular vehicle movement
c) potential fixed and mobile noise sources during:
   i) site establishment and winning of cover material, any blasting or crushing operations
   ii) operation of the facility including landfilling and covering processes
   iii) waste transport, reception, sorting or processing

d) prediction of noise levels at potentially affected dwellings
e) assessment of the adequacy of mitigation and management measures to control the generation of noise to meet appropriate noise standards, such as the *Environmental Noise Control Manual* (EPA, 1994); for instance:
   i) the alternative location of site access and ancillary noise generating activities, design or management strategies to reduce impacts such as bunding (size, type and location) or noise barrier proposals
   ii) the use of equipment with silencers
   iii) control of hours of operation
f) for proposals involving blasting:
   i) identifying areas or properties within 2 km likely to be affected
   ii) outlining the management strategies for drilling and blasting, frequency of blasting
   iii) predicting vibration, overpressure and flyrock impacts given the proposed blasting pattern on any neighbouring dwellings and on the leachate barrier
   iv) outlining mitigation and management measures to ensuring compliance with relevant blast overpressure and ground vibration standards, and minimise potential damages to nearby structures or infrastructure
g) the proposed monitoring program including location of monitoring sites.

10. Visual issues

For landfills located in areas where visual impacts are a concern, issues to consider include:

a) the visibility from surrounding areas; consideration of the site in the context of any landscapes of local or regional significance
b) visual impacts (from strategic viewpoints adjacent to and in the vicinity of the site) caused by the clearing of vegetation, landfill operation, stockpiles or other structures, lights, litter on access roads, the intermediate and final landform and final use for the site
c) proposed mitigation and management measures to reduce visual impacts such as:
   i) layout, design or visual treatment
   ii) landscaping
   iii) working face protocols to minimise on-site litter
   iv) protocols for transport vehicles and for the removal of windblown litter from access roads, fences and within the site.

11. Flora and fauna issues

If land is to be cleared, or vegetation or fauna habitats are likely to be disturbed, issues to consider include:

a) identifying plant and animal habitats and ecological communities and where appropriate, populations and species in areas that may be directly or indirectly affected by the proposal
b) indicating the local and regional scarcity of these habitats, ecological communities, populations and species — if relevant, identify the following, indicating their incidence on the site:
   i) threatened species, populations or ecological communities listed in Schedule 1 or 2 of the *Threatened Species Conservation Act 1995* (see Appendix 3)
   ii) rare plant species listed in *Rare or Threatened Australian Plants* (ROTAP) (Briggs J.D, 1988)
   iii) areas protected under SEPP 14 — Coastal Wetlands, SEPP 26 — Littoral Rainforests, SEPP 44 — Koala Habitat Protection or other environmental planning instruments
   iv) vegetation or fish species protected under the *Fisheries Management Act 1994*; the economic significance of any potentially affected fish species
   v) trees listed in councils' Significant Tree Registers
c) potential impacts on species, populations or ecological communities or their habitats:
   i) directly through removal by clearing
   ii) indirectly through changes in water quantity, quality or groundwater regime
   iii) through impacts on the number, distribution and size of habitats
d) the sensitivity of species or communities to disturbance, potential impacts of disturbance on biodiversity; the potential for recolonisation following rehabilitation — if relevant, assess the significance of the area for koalas under the provisions of SEPP 44 — Koala Habitat Protection
e) the significance of flora or fauna for other biota, including biota not directly affected by the proposal but which interact with potentially disturbed flora and fauna
f) landscaping and rehabilitation proposals and their role in mitigating impacts such as compensatory rehabilitation with indigenous species; the provision of new appropriate

habitats; opportunities for colonisation; timing of major disturbances

g) identifying potential weed and introduced species, pest species such as fruit fly or plant and soil diseases, and a description of measures to control and prevent infestations at the site and to control spread into localities adjacent to the proposal
h) identifying potential vermin, feral and introduced species including silver gulls, and the impact of 'pest' species on native populations; describing measures to control and prevent infestations at the site and to control spread into localities adjacent to the proposal
i) proposed monitoring to determine the effectiveness of mitigation and to verify predictions.

Note: Appendix 3 provides guidance on determining when a species impact statement (SIS) is required. An SIS must accompany any proposal in critical habitats or where there is likely to be a significant effect on threatened species, populations or ecological communities or their habitats.

12. Heritage issues

This section is relevant if land clearing, earthworks, disturbance of existing items (buildings, works, relics or places) or reduction of the heritage curtilage will occur as a result of the proposal. Issues which may need to be considered include:

a) identifying any items of heritage significance on the site (including underwater) and in the area affected by the proposal. This should include two steps:
   Step 1: collate information from any relevant heritage study or conservation plan for the site or area — this source may need to be supplemented with information from the following:
   i) relevant historical research on the area
   ii) consultation with the Aboriginal Land Council, local historical societies and the local council
   iii) inspection of heritage registers, schedules, databases or lists, Heritage Council Register, heritage and conservation registers (various government agencies), local or regional environmental plans, archaeological zoning plans, Aboriginal Sites Register (National Parks and Wildlife Service (NPWS)), National Estate Register (Australian Heritage Commission), other registers (National Trust, Institution of Engineers Australia, Royal Australian Institute of Architects)
   Step 2: survey the area likely to be affected, to identify any items of potential heritage significance.

For non-Aboriginal heritage:

a) assess the significance of any non-Aboriginal heritage items identified on the site, using criteria for assessing heritage significance published in the *NSW Heritage Manual 1996*
b) assess the potential impacts of the proposal on the heritage significance — non-Aboriginal heritage items, protected under the *Heritage Act 1977* or a conservation instrument, require approval from the Heritage Council before disturbance can be undertaken; items identified in planning instruments require the consent of the nominated consent authority (usually council); shipwrecks protected under the *Historic Shipwrecks Act 1976* require the approval of the Director of the NSW Heritage Office
c) propose measures to mitigate impacts to conserve items of heritage significance — if items of significance are to be disturbed a conservation management plan may need to be prepared in consultation with the Heritage Office.

For Aboriginal heritage:

a) assess the archaeological and anthropological significance of any Aboriginal relic or place identified on the site in consultation with the Land Council, Department of Aboriginal Affairs and NPWS
b) assess the potential impact of the proposal on the heritage significance; Aboriginal relics or places cannot be disturbed without written consent from the Director-General of National Parks and Wildlife
c) propose measures to mitigate impacts or to conserve the heritage significance of the area, relic or place — if items of significance are to be disturbed, a conservation management plan may need to be prepared in consultation with the NPWS, Land Councils, the Department of Aboriginal Affairs and the Heritage Office.

For natural heritage:

a) assess the heritage significance of any natural areas including geological or palaeontological features or ecological communities
b) assess the potential impact of the proposal on the heritage significance (note: items identified in planning instruments or in conservation areas require the consent of the nominated approval authority)
c) propose measures to mitigate impacts or to conserve the heritage significance — if natural areas of heritage significance are to be disturbed a conservation management plan may need to be prepared in consultation with the relevant authorities.

Consider the acceptability of impacts on heritage significance and assess the adequacy of the measures to mitigate impacts during all stages of the proposal.

13. Hazards issues

Consider the following potential hazards:

a) fires (including bushfires or controlled burning)
b) explosions (including methane gas or any explosive chemicals used on site)
c) the accidental release of toxic substances (including chemicals or leachate)
d) natural events (including seismic activity, landslip, flooding or subsidence).

All potential hazards and associated scenarios should be identified, and the significance of their consequences assessed. Hazard mitigation measures should be described.

Bushfire hazard

For landfills located in areas of high bushfire hazard risk or when undertaking controlled burning, the following issues should be considered:

a) an assessment of the risks given the climate, surrounding topography, vegetation and on-site management practices
b) an assessment of the adequacy of fire management protocols, including:
    i) measures to reduce the risks of on-site fires including firebreaks around filled areas, stockpiles of combustibles, gas extraction equipment
    ii) provision for firefighting on the site including access, water supply and firefighting equipment
    iii) the provision of training and maintenance.

Explosions or accidental chemical releases

For landfills with a risk of explosions or accidental chemical releases, the following issues should be considered:

a) a list of hazardous chemicals and quantities used, transported, stored or disposed of on site, identification of possible causes of potentially hazardous incidents, their likelihood of occurrence and their consequences to public safety or the environment
b) any relevant advice in SEPP 33 — Potentially Hazardous and Offensive Industries and *Hazardous Industry Planning Advisory Paper No. 4 - Risk Criteria for Land Use Safety Planning* (Department of Planning, 1992) with regard to potentially hazardous industries; details of storage, usage and transport arrangements for the hazardous materials, with an outline of operational and organisational safety controls to reduce their hazard risk and environmental impacts
c) an assessment of the adequacy of operational and emergency procedures involving dangerous and hazardous goods.

Natural hazards

For landfills with the risk of natural hazards, the following issues should be considered:

a) an assessment of the risks given the climate, location or geological formation, and on-site management practices
b) an assessment of the likely performance of the landfill (in particular its leachate barrier and management systems) during exposure to natural hazards such as earthquakes, subsidence, flooding or severe storms
c) an assessment of the adequacy of design and management procedures to maintain the integrity of the landfill.

14. Economic issues

Issues to consider include:

a) the cost and benefits of providing, operating and maintaining the landfill facility — costs and benefits of the environmental impacts identified in the EIS should be considered as

well as the project factors; significant non-monetary costs and benefits should be described and qualitatively assessed — if relevant, the analysis should consider:

i) costs and benefits from any change in waste management strategies resulting from the proposal
ii) possible economic benefits from the reuse or recycling of wastes or from electricity generation
iii) flow-on costs from the need to augment any infrastructure; the offset of s. 94 contributions or other contributions for the provision or upgrading of infrastructure
iv) any additional employment as a result of the proposal
v) the potential impact on property values; the economic impact of establishing restricted use buffer zones around any facilities
vi) any impacts on economic activities in the region, such as industrial development, agriculture or activities in waterbodies likely to be affected by the proposal, including through the introduction of pest species or plant or soil diseases
vii) any economic benefits from the rehabilitation and use of land after decommissioning the facilities

b) the proposed funding arrangement for the scheme; the financial implications per household or on industry
c) any proposal for a performance bond, which could consider the following issues:
   i) appropriate site rehabilitation and site closure arrangements
   ii) failure of safeguards resulting in a significant environmental impact
   iii) issues resulting from the sterilisation of any land.

15. Cumulative impacts

Cumulative impacts may result from a number of activities with similar impacts interacting with the environment in a region. They may also be caused by synergistic and antagonistic effects of different individual impacts interacting with each other. They may be due to the temporal or spatial characteristics of the activities and impacts. Issues to consider that relate to landfill proposals include:

a) the potential for cumulative impacts from:
   i) other existing or planned landfills in the area or region
   ii) other nearby point or non-point activities with similar impacts
b) any advantages or disadvantages from clustering industry in this area considering the environmental characteristics
c) any likely long-term and short-term cumulative impacts having regard to surface water and groundwater quality issues, air quality, noise or traffic disturbance, public health, visual impacts or loss of heritage items, vegetation or fauna habitat
d) considering the receiving environment's ability to achieve and maintain the water quality objectives established for that system.

F. List of approvals and licences

All approvals and licences required under any legislation must be identified. This is to alert other relevant authorities as early as possible to their potential involvement in the project and to ensure an integrated approach to the granting of approvals. This list also identifies for the community the relevant authorities involved in the assessment and regulation of the proposal.

G. Compilation of mitigation measures

A critical component in the EIS is the proposed impact mitigation strategy to prevent, minimise or mitigate adverse impacts. The EIS should demonstrate how the proposal and its environmental safeguards would be implemented and managed in an ecologically sustainable manner. It is also essential to demonstrate that the proposal is capable of complying with statutory obligations under other licences or approvals.

The mitigation strategy should include the environmental management principles which would be followed when planning, designing, establishing and operating the landfill, and include:

- specific locational, layout, design or technology features (which are described under each of the key issues) and
- an outline of ongoing management and monitoring plans.

Mitigation strategies for the establishment and operation stages of the project should be distinguished and in some circumstances, separate environmental management plans prepared.

A landfill environmental management plan

A landfill environmental management plan (LEMP) is a comprehensive technical document designed to ensure that the commitments in the EIS and conditions of consent or licence conditions are fully implemented. A LEMP is usually finalised during or following development application approval and should consider all relevant matters in the EPA guideline.

This level of detailed technical information required in the LEMP is not usually considered necessary in the EIS. However it is expected that the EIS should contain a comprehensive outline of the structure of the LEMP and key management issues. It should be noted that with key issues, where there are high levels of risk or uncertainty, it may be essential to present details of the proposals to manage these issues in the EIS. At the development approval stage, it is essential the applicant can establish that environmental impacts can be managed in an integrated and feasible manner.

With major or controversial projects, it may be appropriate to:

- establish a community committee to consult in relation to the ongoing management and monitoring of the proposal
- plan to exhibit an annual environmental management report outlining the environmental performance of the proposal.

The LEMP should provide a framework for managing or mitigating environmental impacts for the life of the proposal. It should also make provisions for auditing the effectiveness of the proposed environmental protection measures and procedures. Two sections should be included, one setting out the program for managing the proposal (section a. below) and the other outlining the monitoring program with a feedback loop to the management program (section b. below).

a) Environmental management plan outline

The management strategy should demonstrate sound environmental practice during the establishment, operation, rehabilitation and end use of the landfill facility, including:

i) the management of establishment impacts; if appropriate include:
   - erosion and sedimentation management plans
   - rehabilitation and revegetation plans

ii) the management of operational impacts; if appropriate include:
   - maintenance plans
   - litter management plans
   - contingency plans to respond to emergencies, incidents or any breakdown in environmental performance

iii) strategies to feed information from the monitoring program back into the management practices and action plans, to improve the environmental performance and sustainability of all components of the proposal

iv) training programs for operational staff and incentives for environmentally sound performance

v) an indication of how the plan can be integrated into the organisation's broader environmental management framework

vi) an indication of how compliance with licensing and approval requirements will be achieved and due diligence attained

vii) if applicable, a reporting mechanism on environmental performance

viii) if applicable, performance bond and relevant performance parameters.

b) Monitoring outline

This program should be carefully designed and related to the predictions made in the EIS and the key environmental indicators which would demonstrate the potential ecological sustainability of the proposal. The EIS should outline the need for and use of any proposed monitoring, monitoring intervals and reporting procedures.

Parameters which may be relevant include:
i) waste qualities and quantities
ii) performance indicators in relation to recycling and reuse
iii) performance indicators in relation to critical operational problems or abnormalities including:
    - leachate and gas emissions, in particular in relation to groundwater, surface water or soil contamination
    - noise, odour, pest, vermin or litter issues
    - any relevant public health indicators.

The program outline should describe the following monitoring details:
i) the key information that will be monitored, their criteria and the reasons for doing so (which may be compliance with regulatory requirements)
ii) the monitoring locations, intervals and duration
iii) procedures to be undertaken if the monitoring indicates a non-compliance or abnormality
iv) internal reporting procedures and links to management practices and action plans
v) reporting procedures to relevant authorities and, if appropriate to the consent authority and the community.

H. Justification for the proposal

Reasons justifying undertaking the proposal in the manner proposed should be outlined considering potential health, biophysical, economic and social impacts, including costs and benefits and compliance with the principles of ecologically sustainable development.

The principles of ecologically sustainable development include:

a) the precautionary principle — namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
b) inter-generational equity — namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
c) conservation of biological diversity and ecological integrity
d) improved valuation and pricing of environmental resources.

The sustainability of the proposal should be outlined in terms of the ability of the proposal to:

a) meet objectives and goals established within any State, regional or local waste minimisation or management strategies
b) demonstrate economic efficiency in meeting the short- and long-term community requirements for waste minimisation and management
c) meet environmental performance requirements including improved conservation or protection of natural resources and reduced environmental costs
d) meet site specific environmental performance requirements considering the vulnerability of the groundwater, surface waters, soil, ecological communities, heritage or social factors
e) safeguard public health.

Appendix 1. Schedule 2 — Environmental Impact Statements

This appendix contains an extract from the *Environmental Planning and Assessment Regulation* 1994. Schedule 2 outlines the matters that must be addressed in an EIS pursuant to clauses 51 and 84 of the EP&A Regulation.

1. A summary of the environmental impact statement.
2. A statement of the objectives of the development or activity.
3. An analysis of any feasible alternatives to the carrying out of the development or activity, having regard to its objectives, including:
   a) the consequences of not carrying out the development or activity; and
   b) the reasons justifying the carrying out of the development or activity.
4. An analysis of the development or activity, including:
   a) a full description of the development or activity; and
   b) a general description of the environment likely to be affected by the development or activity, together with a detailed description of those aspects of the environment that are likely to be significantly affected; and
   c) the likely impact on the environment of the development or activity, having regard to:
      i) the nature and extent of the development or activity; and
      ii) the nature and extent of any building or work associated with the development or activity; and
      iii) the way in which any such building or work is to be designed, constructed and operated; and
      iv) any rehabilitation measures to be undertaken in connection with the development or activity; and
   d) a full description of the measures proposed to mitigate any adverse effects of the development or activity on the environment.
5. The reasons justifying the carrying out of the development or activity in the manner proposed, having regard to biophysical, economic and social considerations and the principles of ecologically sustainable development.
6. A compilation (in a single section of the environmental impact statement) of the measures referred to in item 4 (d).
7. A list of any approvals that must be obtained under any other Act or law before the development or activity may lawfully be carried out.

Note: For the purposes of this Schedule, **"the principles of ecologically sustainable development"** are as follows:

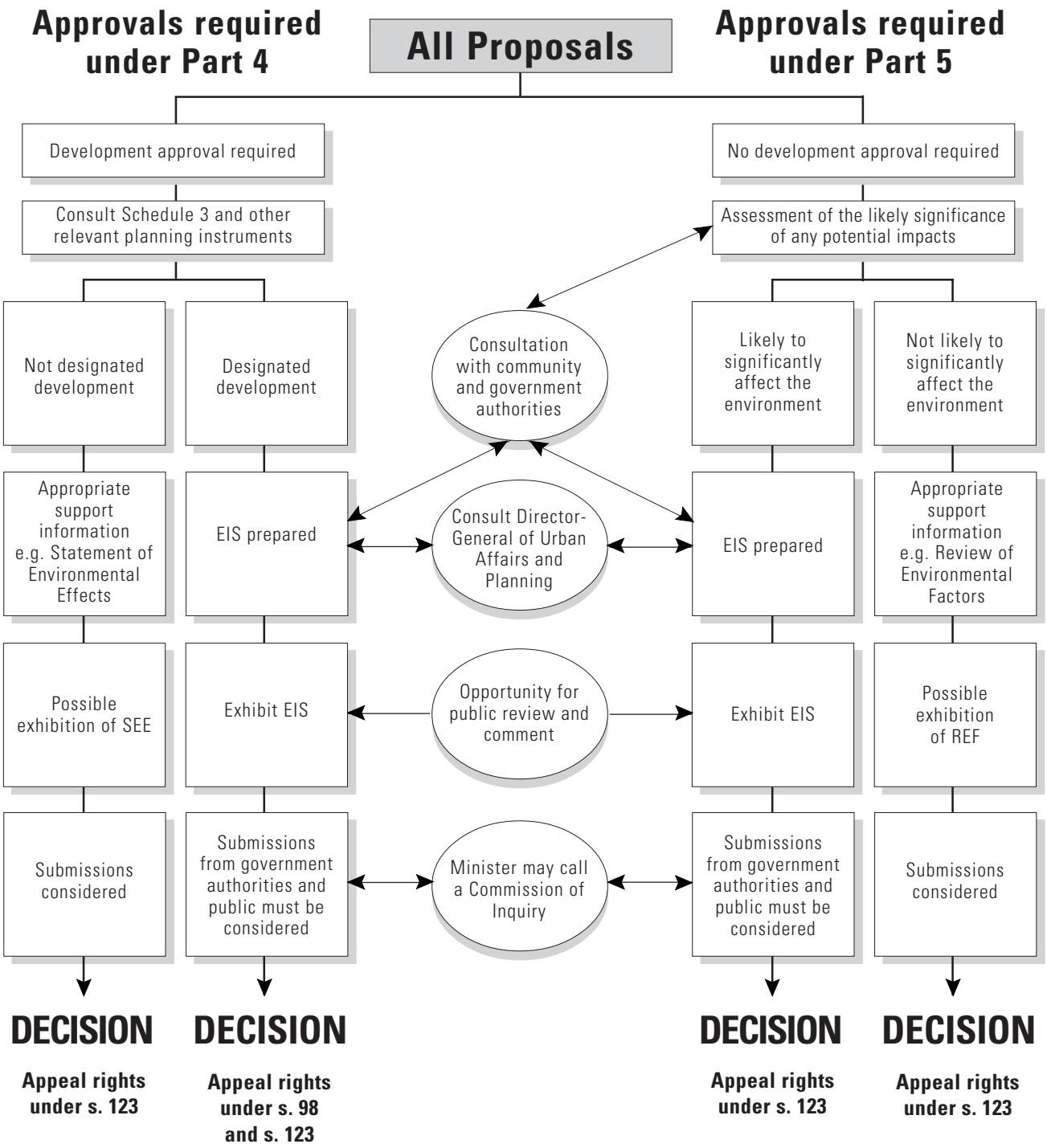
a) The precautionary principle — namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
b) Inter-generational equity — namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
c) Conservation of biological diversity and ecological integrity.
d) Improved valuation and pricing of environmental resources.

Note: The matters to be included in item 4 (c) might include such of the following as are relevant to the development or activity:

a) the likelihood of soil contamination arising from the development or activity;
b) the impact of the development or activity on flora and fauna;
c) the likelihood of air, noise or water pollution arising from the development or activity;
d) the impact of the development or activity on the health of people in the neighbourhood of the development or activity;
e) any hazards arising from the development or activity;
f) the impact of the development or activity on traffic in the neighbourhood of the development or activity;

g) the effect of the development or activity on local climate;
h) the social and economic impact of the development or activity;
i) the visual impact of the development or activity on the scenic quality of land in the neighbourhood of the development or activity;
j) the effect of the development or activity on soil erosion and the silting up of rivers or lakes;
k) the effect of the development or activity on the cultural and heritage significance of the land.

Appendix 2. EIA procedures under the EP&A Act



Appendix 3. Threatened Species Conservation Act

This appendix contains an extract from the *Threatened Species Conservation Act 1995* and the provisions for assessing impacts on the conservation of critical habitats and threatened species, populations or ecological communities and their habitats.

What are critical habitats, threatened species, populations or ecological communities and threatening processes?

Critical habitats are prescribed in Part 3 of the *Threatened Species Conservation (TSC) Act 1995*. Threatened species, populations or ecological communities and threatening processes are prescribed in Part 2 and Schedules 1 and 2 of the TSC Act.

When is a Species Impact Statement required?

Under section 77 (3) (d1) and section 112 (1B) of the EP&A Act, if a proposal:

- is on land that contains a "critical habitat" or
- is likely to significantly affect threatened species, populations or ecological communities, or their habitats,

a species impact statement (SIS) must be prepared in accordance with Division 2 of Part 6 of the *TSC Act*.

Factors when deciding if an SIS is required

The following factors must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats:

a) in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction,
b) in the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised,
c) in relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed,
d) whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community,
e) whether critical habitat will be affected,
f) whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region,
g) whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process,
h) whether any threatened species, population or ecological community is at the limit of its known distribution.

Form and content of an SIS

Under section 110 of the TSC Act, the general requirements on the form and content of an SIS are as follows.

General information

1. A species impact statement must include a full description of the action proposed, including its nature, extent, location, timing and layout and, to the fullest extent reasonably practicable, the information referred to in this section.

Information on threatened species and populations

2. A species impact statement must include the following information as to threatened species and populations:
   a) a general description of the threatened species or populations known or likely to be present in the area that is the subject of the action and in any area that is likely to be affected by the action,
   b) an assessment of which threatened species or populations known or likely to be present in the area are likely to be affected by the action,
   c) for each species or population likely to be affected, details of its local, regional and State-wide conservation status, the key threatening processes generally affecting it, its habitat requirements and any recovery plan or threat abatement plan applying to it,
   d) an estimate of the local and regional abundance of those species or populations,
   e) a general description of the threatened species or populations known or likely to be present in the area that is the subject of the action and in any area that is likely to be affected by the action,
   f) a full description of the type, location, size and condition of the habitat (including critical habitat) of those species and populations and details of the distribution and condition of similar habitats in the region,
   g) a full assessment of the likely effect of the action on those species and populations, including, if possible, the quantitative effect of local populations in the cumulative effect in the region,
   h) a description of any feasible alternatives to the action that are likely to be of lesser effect and the reasons justifying the carrying out of the action in the manner proposed, having regard to the biophysical, economic and social considerations and the principles of ecologically sustainable development,
   i) a full description and justification of the measures proposed to mitigate any adverse effect of the action on the species and populations, including a compilation (in a single section of the statement) of those measures,
   j) a list of any approvals that must be obtained under any other Act or law before the action may be lawfully carried out, including details of the conditions of any existing approvals that are relevant to the species or population.

Information on ecological communities

3. A species impact statement must include the following information as to ecological communities:
   a) a general description of the ecological community present in the area that is the subject of the action and in any area that is likely to be affected by the action,
   b) for each ecological community present, details of its local, regional and State-wide conservation status, the key threatening processes generally affecting it, its habitat requirements and any recovery plan or any threat abatement plan applying to it,
   c) a full description of the type, location, size and condition of the habitat of the ecological community and details of the distribution and condition of similar habitats in the region,
   d) a full assessment of the likely effect of the action on the ecological community, including, if possible, the quantitative effect of local populations in the cumulative effect in the region,
   e) a description of any feasible alternatives to the action that are likely to be of lesser effect and the reasons justifying the carrying out of the action in the manner proposed, having regard to the biophysical, economic and social considerations and the principles of ecologically sustainable development,
   f) a full description and justification of the measures proposed to mitigate any adverse effect of the action on the ecological community, including a compilation (in a single section of the statement) of those measures,
   g) a list of any approvals that must be obtained under any other Act or law before the action may be lawfully carried out, including details of the conditions of any existing approvals that are relevant to the ecological community.

Credentials of persons undertaking an SIS

4. A species impact statement must include details of the qualifications and experience in threatened species conservation of the person preparing the statement and of any other person who has conducted research or investigations relied on in preparing the statement.

State-wide conservation status

5. The requirements of subsections (2) and (3) [above] in relation to information concerning the State-wide conservation status of any species or population, or any ecological community, are taken to be satisfied by the information in that regard supplied to the principal author of the species impact statement by the NPWS, which information that Service is by this subsection authorised and required to provide.

Procedures for preparing an SIS

Under Section 111 of the TSC Act, the Director-General of National Parks and Wildlife must be consulted in writing for the requirements for an SIS. These requirements must be provided within 28 days from when a request is made.

Because of the circumstances of the case, the Director-General of National Parks and Wildlife may limit or modify the extent of matters prescribed in section 110. In other cases if the impacts are considered to be trivial or negligible, the Director-General of National Parks and Wildlife may dispense with the requirement for an SIS to be prepared.

An SIS may be prepared as a separate document or incorporated in an EIS. If the SIS is separate to the EIS, it must be exhibited concurrently with the EIS.

The SIS must be in writing and be signed by the principal author of the document and the applicant/proponent.

Appendix 4. Consultation and approvals

It is the responsibility of the person preparing the EIS to determine what approvals will be required as a result of the proposal and to demonstrate that the proposal can meet all approval and licensing requirements. In preparing the EIS, consultation with relevant parties should be undertaken early in the EIA process and their comments taken into account in the EIS.

Approvals or consultation which may be required include:

local councils for development approvals under Part 4 of the EP&A Act and any building approval under the *Local Government Act 1993*, also for any alteration to local roads or buildings or trees of local heritage significance

Department of Urban Affairs and Planning for concurrence if the proposal impacts on SEPP 14 — Coastal Wetlands, SEPP 26 — Littoral Rainforest, potential or actual koala habitat under SEPP 44 — Koala Habitat Protection

Environment Protection Authority for air, water and noise licences, approvals and certificates of registration under relevant pollution control legislation; regulation of waste generation, transportation and disposal; licences for transport of dangerous goods under the Dangerous Goods Act; licences for chemicals subject to chemical control orders under the Environmentally Hazardous Chemicals Act

Department of Land and Water Conservation
Soil and Vegetation Management for information on soils; design and construction of erosion and sediment controls and rehabilitation; approvals on protected lands;
State Lands Services regarding effect of development on any Crown land; for leasing, licence, or purchase; whether the land is subject to Aboriginal land claim or Native Title legislation; if Crown Reserves and dedicated lands exist, whether the proposal is compatible with the stated public purpose;
State Water Management regarding impact on ground or surface water resources; clearing riparian vegetation; works within 40 metres of a stream;
Coastal and Rivers Management regarding flooding and coastal areas;
Water Services Policy regarding approvals under the *Local Government Act 1993*

relevant service authorities such as water, electricity, gas, telecommunication, drainage, flood mitigation, sewerage or other utility organisations

National Parks and Wildlife Service if land clearing or impacts on natural vegetation are likely, particularly in relation to the provisions of the Threatened Species Conservation Act; or if sites of Aboriginal heritage significance or land managed by the Service are likely to be affected

NSW Fisheries if fish or fish habitat is affected (including dredging or reclamation works, impeding fish passage, damaging marine vegetation, desnagging, use of explosives or other dangerous substances in or adjacent to a waterway which may result in fish kills)

NSW Agriculture if the proposal is on land with high agricultural value or will cause dislocation to the agricultural industry

NSW Health Department with regard to the potential health hazard caused by the operation and siting of the facility

WorkCover for responsibilities regarding handling of dangerous goods and hazardous substances

Heritage Council of NSW if the proposal is likely to affect any place or building having State heritage significance or if the proposal is affected by Interim Conservation Orders (ICO) or Permanent Conservation Orders (PCO)

Department of Aboriginal Affairs if the proposal is in an area of significance to the Aboriginal community

Department of Mineral Resources if a resource management plan applies or if the proposal is in an area of important mineral resources, concerning its responsibilities under Sydney REP No 9 — Extractive Industry, and for safety and blasting

Mining Subsidence Board if the proposal is in an underground mining area

State Rail Authority (SRA) if the proposal impacts on SRA operations

Office of Marine Safety and Port Strategy on any activities on navigable waters

Roads and Traffic Authority if the proposal is likely to result in significant traffic impacts

State Forests of NSW in relation to impacts on State Forests

Department of Bushfire Services if the area is in a location of bushfire hazard

Catchment Management Committees or Trusts

Local Aboriginal Land Councils

relevant industry organisations

Commonwealth EPA, if Commonwealth land is likely to be affected or if Commonwealth funding applies

the owner or operator of any nearby airports and airport safety organisations.

Appendix 5. References

The following references provide information on landfills.

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Appendix 6. Schedule 3 — Designated development

This appendix is an extract from Schedule 3 of the EP&A Regulation 1994 and prescribes waste management facilities including landfills which are designated under Part 4 of the EP&A Act. This designation only applies to proposals which require development consent under the provisions of a planning instrument.

Waste management facilities or works that store, treat, purify or dispose of waste or sort, process, recycle, recover, use or reuse material from waste and that:

1. dispose (by landfilling, incinerating, storing, placing or other means) of solid or liquid waste:
   a) that includes any substance classified in the Australian Dangerous Goods Code or medical, cytotoxic or quarantine waste; or
   b) that comprises more than 100,000 tonnes of "clean fill" (such as soil, sand, gravel, bricks or other excavated or hard material) in a manner that, in the opinion of the consent authority, is likely to cause significant impacts on drainage or flooding; or
   c) that comprises more than 1,000 tonnes per annum of sludge or effluent; or
   d) that comprises more than 200 tonnes per annum of other waste material; or
2. sort, consolidate or temporarily store waste at transfer stations or materials recycling facilities for transfer to another site for final disposal, permanent storage, reprocessing, recycling, use or reuse and:
   a) handle substances classified in the Australian Dangerous Goods Code or medical, cytotoxic or quarantine waste; or
   b) have an intended handling capacity of more than 10,000 tonnes per annum of waste containing food or livestock, agricultural or food processing industries waste or similar substances; or
   c) have an intended handling capacity of more than 30,000 tonnes per annum of waste such as glass, plastic, paper, wood, metal, rubber or building demolition material; or
3. purify, recover, reprocess or process more than 5,000 tonnes per annum of solid or liquid organic materials; or
4. are located:
   a) in or within 100 metres of a natural waterbody, wetlands, coastal dune fields or an environmentally sensitive area; or
   b) in an area of high watertable, highly permeable soils, acid sulfate, sodic or saline soils; or
   c) within a drinking water catchment; or
   d) within a catchment of an estuary where the entrance to the sea is intermittently open; or
   e) on a floodplain; or
   f) within 500 metres of a residential zone or 250 metres of a dwelling not associated with the development and, in the opinion of the consent authority, having regard to topography and local meteorological conditions, are likely to significantly affect the amenity of the neighbourhood by reason of noise, visual impacts, air pollution (including odour, smoke, fumes or dust), vermin or traffic.

This designation of waste management facilities or works does not include:

a) development comprising or involving any use of sludge or effluent if:
   i) the dominant purpose is not waste disposal; and
   ii) the development is carried out in a location other than one listed in paragraph (4) above; or
b) development comprising or involving waste management facilities or works specifically listed elsewhere in this Schedule.

Are alterations or additions designated development?

Is there a significant increase in the environmental impacts of the total development?

1. Development involving alterations or additions to development (whether existing or approved) is not designated development if, in the opinion of the consent authority, the alterations or additions do not significantly increase the environmental impacts of the total development (that is the development together with the additions or alterations) compared with the existing or approved development.

Factors to be taken into consideration

2. In forming its opinion, a consent authority is to consider:
   a) the impact of the existing development having regard to factors including:
      i) previous environmental management performance, including compliance with:
         - conditions of any consents, licences, leases or authorisations by a public authority
         - any relevant codes of practice
      ii) rehabilitation or restoration of any disturbed land; and
      iii) the number and nature of all past changes and their cumulative effects; and
   b) the likely impact of the proposed alterations or additions having regard to factors including:
      i) the scale, character or nature of the proposal in relation to the development; and
      ii) the existing vegetation, air, noise and water quality, scenic character and special features of the land on which the development is or is to be carried out and the surrounding locality; and
      iii) the degree to which the potential environmental impacts can be predicted with adequate certainty; and
      iv the capacity of the receiving environment to accommodate changes in environmental impacts; and
   c) any proposal:
      i) to mitigate the environmental impacts and manage any residual risk; and
      ii) to facilitate compliance with relevant standards, codes of practice or guidelines published by the Department of [Urban Affairs and] Planning or other public authorities.

Appendix 7. Definitions of wastes and landfills

The following definitions are sourced from the Environmental Planning and Assessment Regulations (1), Waste Minimisation and Management Act (2) and the EPA Environmental Guidelines: Solid Waste Landfills (3). The definitions from the latter source are subject to change following the finalisation of the Waste Minimisation and Management Regulations to be promulgated later in 1996.

1. Definition of waste

waste[1] includes:

- any matter or thing whether solid, gaseous or liquid or a combination that is discarded or is refuse from processes or uses (such as domestic, medical, industrial, mining, agricultural or commercial processes or uses)

A substance is not precluded from being waste for the purposes of this Schedule merely because it can be reprocessed, re-used or recycled or because it is sold or intended for sale

waste[2] includes:

- any substance (whether solid, liquid or gaseous) that is discharged, emitted or deposited in the environment in such a volume, consistency or manner as to cause an alteration in the environment
- any discarded, rejected, unwanted, surplus or abandoned substance
- any otherwise discarded, rejected, unwanted, surplus or abandoned substance intended for sale or for recycling, reprocessing, recovery or purification by a separate operation from that which produced the substance,
- any substance prescribed by the Waste Minimisation and Management Regulations to be a waste

A substance is not precluded from being waste merely because it can be reprocessed, re-used or recycled

inert waste[3] includes wastes which do not undergo environmentally significant physical, chemical or biological transformations and have no potentially hazardous contents once landfilled. It includes building and demolition waste (including bricks, concrete, glass, plastics, metal, and timber). They must not be contaminated or mixed with any other material. (Levels of unacceptable contamination are defined by relevant EPA guidelines or seek EPA advice.)

Inert waste does not include excavated natural material containing no other waste material

hazardous waste[3] means any waste that:

a) because of its physically, biologically or chemically damaging properties, may constitute a danger to the life or health of any living thing when released into the environment, and
b) is a substance specified in Schedule 1 of the Waste Minimisation and Management Regulation 1996

organic waste[3] includes one of more of the following types of waste: garden, untreated wood, fibrous, vegetable, fruits, cereals, biosolids, manures, fatty foods, meat, fish and fatty sludges

putrescible waste[2] includes food waste, dead animals or animal parts, or poorly stabilised or untreated biosolids

solid waste[3] is any non-hazardous, solid, degradable waste. This includes putrescible wastes, garden wastes, uncontaminated biosolids, and clinical and related wastes (including contaminated waste only where sterilised to a standard acceptable to NSW Health). Solid waste shall contain less than 200 mL/tonne or 200 g/tonne of hazardous wastes. All solid waste shall have an angle of repose of greater than five degrees and have no free liquids

sludge[1] means semi-liquid particulate matter produced as a by-product of agricultural produce industries, aquaculture or mariculture, breweries or distilleries, livestock intensive industries, livestock processing industries, paper pulp or pulp product industries or sewerage systems or works

sludge[3] is any semi-liquid waste produced as a by-product of an industrial process.

2. Definitions of Landfills

Hazardous waste landfill[3] is any landfill that accepts hazardous waste (see definition on previous page)

Inert waste landfill[3] is any landfill that accepts only inert wastes (see definition on previous page). Inert waste landfills are subdivided into two classes:

- Class 1 — all inert wastes including stabilised asbestos cement and physically, chemically or biologically fixed, treated or processed waste, in accordance with any special requirements that may be set by the EPA
- Class 2 — all inert wastes except stabilised asbestos cement or physically, chemically or biologically fixed, treated or processed waste.

Solid waste landfill[3] is any landfill that accepts solid wastes (irrespective of whether it also accepts some inert wastes). Solid waste landfills are subdivided into two classes:

- Class 1 — all solid waste including putrescible wastes and other wastes approved by the EPA
- Class 2 — all solid waste with the exception of putrescible wastes and other wastes approved by the EPA.

It should be noted that the Government envisages banning garden waste from landfill in the near future.