



# Instructions for E-RAMP:

## Environmental Risk Assessment and Mitigation Package for Small Waste Facilities

Version 2.0

[www.epa.nsw.gov.au](http://www.epa.nsw.gov.au)

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## **E-RAMP – Seeking further information or providing feedback**

If you experience any problems using E-RAMP or need further information on any aspect of the package, or if you have some useful feedback, please contact:

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NSW Voluntary Regional Waste Groups:

Midwaste Regional Waste Forum  
MurrayROC Waste Group  
Netwaste  
North East Waste Forum  
Northern Inland Regional Waste  
RENEW NSW  
Riverina East Regional Organisation of Councils Waste Forum  
Riverina Regional Organisation of Councils Waste Group  
South East Resource Recovery Regional Organisation of Councils

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## Purpose

The NSW Environment Protection Authority (EPA) has developed the Environmental Risk Assessment and Mitigation Package (E-RAMP) software to help small waste facility operators assess and manage potential issues at their sites.

Operators of small waste facilities (primarily local councils) are presented with the challenge of providing an essential service that meets the community's expectations, often with limited budgets and resources, while at the same time minimising the environmental impacts.

The E-RAMP was developed, after consulting with council waste managers across NSW, to provide guidance in undertaking a risk analysis and prioritising mitigation plans for smaller waste facilities, and to support councils' decision-making processes.

## Background

Since the introduction of the *Protection of the Environment Operations Act 1997*, operators of large waste facilities, such as landfills and transfer stations, have needed licences to conduct their operations; however, smaller waste facilities, especially landfills receiving less than 5000 tonnes of solid waste per annum, have been exempt from licensing.

Small waste facilities typically deal with amenity issues including smoke from fires, odours, flies, vermin and wind-blown litter; however, there may be other potential environmental impacts from these facilities that may not be as obvious (such as groundwater contamination).

The EPA is aware that many operators of small waste facilities are currently examining potential improvements in their waste management practices, including establishment of engineered environmental controls, regionalisation of waste facilities, rationalisation of small landfills and establishment of small transfer stations.

The NSW Government's plan, *NSW 2021: A plan to make NSW number one*<sup>1</sup>, sets ambitious targets to increase recycling and reduce litter and illegal dumping across NSW. Regional action plans, supporting NSW 2021, were developed in collaboration with local communities to highlight priorities and actions for each region. Many of the action plans encourage groups of councils to develop regional waste strategies. The regional strategies identify areas for regional waste and recycling infrastructure and upgrades.

Through the generation of risk analysis reports, the E-RAMP tool can support council decisions to invest capital and operational expenditure in implementing improvements.

The E-RAMP is designed to support the other guidance documents provided by the NSW EPA:

- *Environmental guidelines: Solid waste landfills* (EPA 1996) – This document was intended as guidance for larger landfills (those accepting over 5000 tonnes of waste per annum).
- *Handbook for design and operation of rural and regional transfer stations* (DEC 2006) – This handbook provides assistance to operators intending to develop resource recovery and/or waste transfer facilities in rural and regional areas in NSW, drawing on the successful experiences of other operators.

The EPA examined several approaches to providing direction to operators of small waste facilities, particularly small landfills. After consultation with council waste managers it was decided a risk management approach offered several distinct advantages:

- it would be site-specific
- the risks identified could be prioritised and dealt with within the operator's budget
- it could be part of the process of deciding whether to open a new small landfill, extend an existing one or convert operations from a landfill to a transfer station
- it could support 'due diligence' procedures.

To examine the risk management approach further, the EPA developed a trial Environmental Risk Assessment and Mitigation Package (E-RAMP) in consultation with the operators of small waste facilities, voluntary regional waste groups, EPA regional officers, various EPA documents and information from site inspections of a sample of these small facilities. The main component of the trial E-RAMP was a Microsoft Excel-based risk assessment tool that undertakes and documents approximately 90% of the risk management process, as outlined by Standards Australia in *AS/NZS 4360:2004*.

In developing the trial E-RAMP tool, the EPA was also mindful to ensure that:

- the risk assessment process was based on information from differing circumstances across NSW, such as waste facility types, landfill operations, rainfall, average wind speed/direction and surrounding land use, which could then be applied anywhere in the state
- the required information inputs could be sourced directly by the operator and/or be readily available from other sources
- operators could perform the risk assessment without the need to engage specialist waste, environmental or risk management expertise
- the assessment process could be done in a timely and cost-effective manner whilst providing meaningful information.

The response to the trial E-RAMP package was very positive resulting in this final product now being available for use by all small waste facility operators in NSW. While the use of this package is not mandatory, the EPA believes it offers many benefits for the operators of small waste facilities.

## **Risk management process**

The E-RAMP follows the risk management process as detailed in *AS/NZS 4360:2004* (Standards Australia 2004), as shown in Figure 1. This figure also identifies the steps in the risk management process that E-RAMP attempts to capture.

In summary, the key steps of the risk management process are as follows.

### **Communicate and consult**

Communication and consultation engages internal and external stakeholders in the exchange of information. It is essential to communicate the objectives of the risk management process, and identify, analyse, evaluate and treat risks, and set the risk evaluation criteria.

### **Establish the context**

An understanding of the context defines the basic parameters within which risks must be managed and sets the scope for the rest of the risk management process. Context includes the broad external environment in which the organisation operates ('external' context) and the factors that drive decisions or influence an organisation's ability to manage risks ('internal' context). This step also determines the objectives of the risk management process and the risk criteria to be assessed.

### **Identify risks**

A well-structured, systematic process is used to identify potential risks. This step is critical as any risks not identified here may be excluded from future analysis. It involves identification of potential sources of risk as well as potential environmental impacts.

### **Analyse risks**

The analysis of risk is the examination of the combination of the likelihood of an event occurring and the potential severity of the consequences. This process can employ one or several quantitative, semi-quantitative or qualitative methods to analyse risks.

### **Evaluate risks**

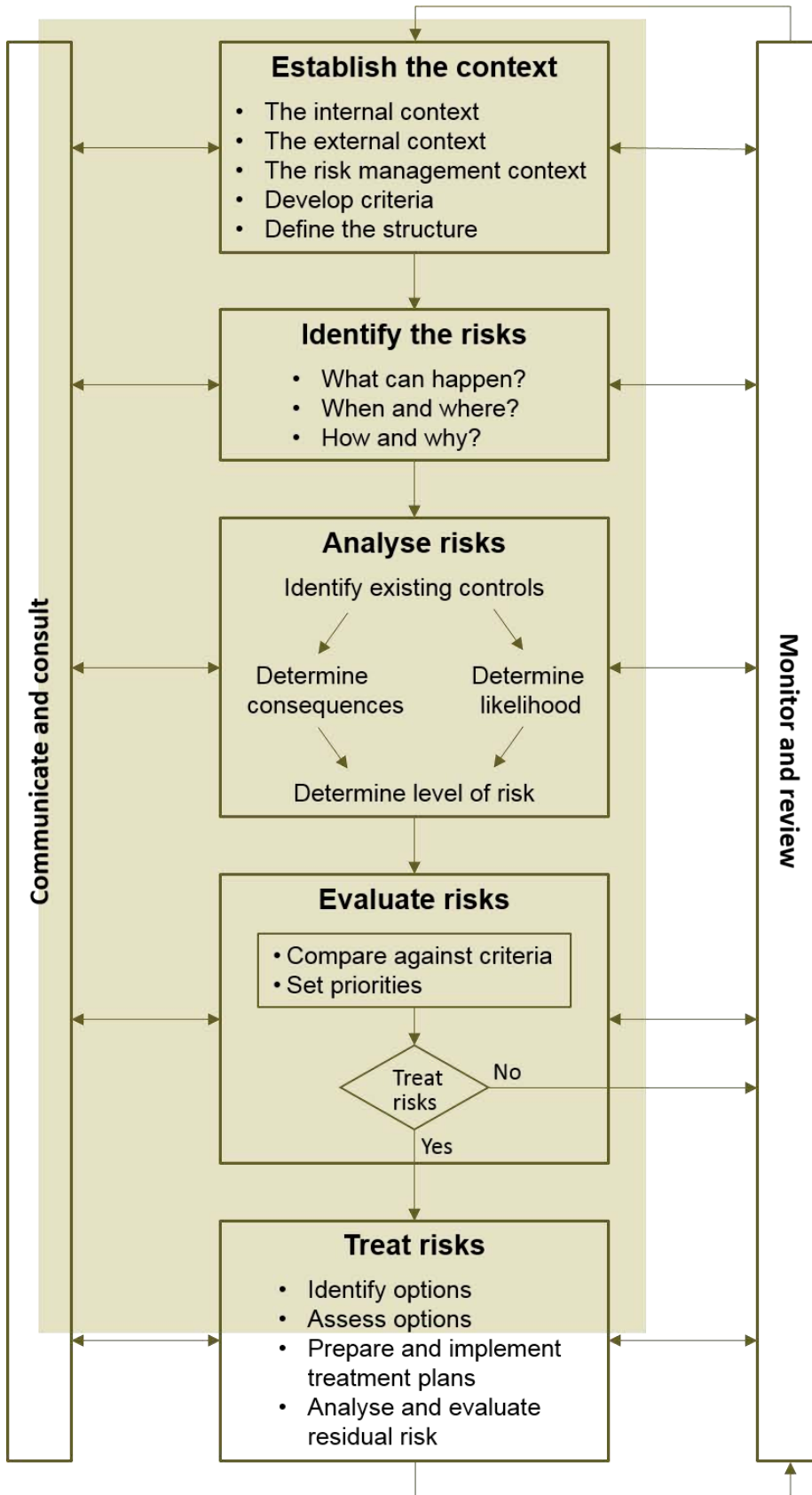
This step concerns setting priorities for decisions about risk, based on a comparison between the risk analysis and the risk criteria. The outcome of this process is typically categorisation of risks into three groups: acceptable risks, tolerable risks (unacceptable risks that can be treated) and unacceptable risks.

### **Treat risks**

Risks that are not acceptable require treatment. This step of the risk management process identifies the risk treatment options available and assesses them in terms of the impact on the level of risk and cost-effectiveness. Risk management plans are also developed in this step, which schedule the risk treatment work(s).

### **Monitor and review**

Factors may change over time, when new processes/procedures are implemented and/or as new information comes to light. Ongoing monitoring and review identifies any impact these changing factors may have on the level of risk and, if necessary, triggers a re-evaluation of risks and the development of updated treatment plans.



**Figure 1: The risk management process, with steps captured by E-RAMP represented by shading (adapted from AS/NZS 4360:2004)**



## Context

There is a wide degree of operational and environmental variation between small waste facility sites in NSW. For example:

- The quantity of waste received each year at small landfill facilities can range from less than 20 tonnes to 5000 tonnes.
- The quantity of waste received at small transfer stations can range from less than 100 tonnes to 30,000 tonnes per year.
- Precipitation at these facilities can range from less than 200 mm a year to over 2000 mm.
- The landscapes where facilities are located vary widely, from coastal floodplains to alpine ridgelines.
- Some facilities are extremely remote, while others are close to large population centres.
- Facilities may service a range of population numbers and include householders and local small businesses.
- The proximity to alternative landfill and transfer station facilities may range from a few kilometres to hundreds of kilometres.
- The level of management at facilities also varies.

Regardless of the local variations, all small waste facilities play an important role in local waste management. In their absence, widespread and significant environmental harm would almost certainly result from the inappropriate management of waste.

The operators of small waste facilities (mostly local councils) face several considerable challenges. While providing an essential service to local communities, these facilities can pose significant environmental risks. Their operators have a statutory obligation to minimise these risks, while meeting the community's expectations of the service. Often, this has to be achieved with very limited budgets and resources.

This is where a risk management approach can be beneficial in focusing budgets and resources in areas where they will achieve the greatest environmental outcomes. Risk management can also discover previously unidentified risks for a particular facility.

E-RAMP is designed to assist operators to assess the environmental risks of small waste facilities under their management and control. Using information about the operation and management of the facility and the surrounding environment, a number of hypothetical mitigation measures can be examined to gauge how they will change the level of environmental risk. The expected benefits of using E-RAMP are:

- reduction in the time and resources ordinarily required to undertake risk assessments of small waste facilities
- generation of environmental information about small waste facilities which operators may not have previously had access to
- provision of environmental risk information to assist operators of small waste facilities to make management decisions.

## Communication and consultation

A communication and consultation exercise was undertaken for the development of both the trial and first version of E-RAMP with a representative cross-section of stakeholders. Communication and consultation had two objectives:

- inform stakeholders about the exercise being undertaken and its objectives
- obtain feedback in relation to the risk assessment process, potential sources of risks and constraints.

The consultation was achieved primarily through presentations and information sessions with stakeholders, and direct feedback from council waste officers and EPA officers.

Another important opportunity for consultation was the E-RAMP trial. Participants had an opportunity to provide their opinions and suggestions for improvement on the use of E-RAMP and the consistency between perceived and calculated risk. This feedback was incorporated into the final version of E-RAMP.

## Risk identification

In parallel with the communication and consultation, a list of potential environmental risks from small waste facilities was compiled. This process was supplemented by:

- a review of EPA files in relation to small waste facilities across NSW
- information on public complaints to EPA's Environment Line
- inspections of 49 small waste facilities across 38 local government areas
- a thorough examination of relevant EPA documents, in particular, *Environmental guidelines: Solid waste landfills* (EPA 1996) and the *Handbook for design and operation of rural and regional transfer stations* (DEC 2006).

The potential sources of risk identified were primarily related to any, some or all of the following:

- sensitivity of the surrounding environment
- types and quantities of wastes received, stored and/or disposed at the premises
- presence or absence of management controls and measures to minimise the likelihood of emissions to the environment.

As a result of this exercise, 'sources of risk' were identified and these are listed in Appendix A. It should be noted that it is highly unlikely that all of the identified sources of risk would apply to a particular site.

## Risk analysis

For the purposes of the E-RAMP risk analysis, the potential risks associated with a small waste facility have been grouped into seven categories:

1. **Groundwater** – the potential risk to groundwater from landfill leachate and leaks/spills of hazardous substances.
2. **Surface water** – the potential risk to surface water from landfill leachate, leaks/spills of hazardous substances, sediments, saline and/or acidic soils.
3. **Air** – the potential risk to air quality from smoke, fine particulates (dust) and odours.
4. **Noise** – the potential risk from noise to neighbouring residences/land uses.
5. **Fire** – the potential risk of fire occurring at a premises and the potential risk that any such fire poses to the immediate surrounds.
6. **Amenity** – the potential risk to amenity from litter, smoke, dust, odours, vermin and general site operations.
7. **Conservation and heritage** – the potential risk to surrounding areas of high environmental and/or heritage value.

E-RAMP uses a semi-quantitative risk analysis: values have been assigned to the answer options in E-RAMP which are then calculated to produce the overall risk score; however, it should be noted that the risk scores obtained are not intended to be a quantitative estimate of risk – a risk score of 50 out of 100 does not necessarily mean that there is a 1-in-2 chance of a pollution incident occurring.

The risk score is calculated by taking the normal logarithm of the product of the individual risk scores applicable to each category and then normalising this result as a percentage of the total possible score, i.e. a score out of 100. A weighting factor has also been applied to the scores based on the facility type, i.e. active landfill, closed landfill or transfer station. In addition, the 'inverse square' law<sup>1</sup> has been applied to the noise category.

E-RAMP requires site-specific information and information that is likely to be held by the operator of the facility. E-RAMP also draws upon several sources of data, most of which are contained in online NSW Government data bases. E-RAMP provides links to the relevant sources of data and online databases.

E-RAMP makes two main assumptions:

1. The operator of the small waste facility will not take any action to increase environmental risk at the premises, such as discontinuing groundwater monitoring, removing litter fences, etc. Increasing risk works against the intent of the risk management process.
2. The existing situation options and proposed mitigation options match (or closely match) the options presented in E-RAMP.

E-RAMP accommodates potential information gaps by providing an 'unknown' answer option to some questions; however, it should be noted that in the absence of information, E-RAMP assumes a conservative level of risk, i.e. a risk level that is likely to be higher than the actual level of risk, should the relevant information be available. The default options may also assume a conservative level of risk.

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<sup>1</sup> The inverse square law is applicable to noise measurements where every doubling of distance from the noise source (in a free field situation under ideal conditions) results in a reduction of the sound pressure level of 6 decibels (dB).

It should also be noted that due to the complexity of environmental interactions, a single source of risk may have differing likelihoods of impact/severities of impact on the surrounding environment. In addition, multiple sources of risk can combine to increase the likelihood and/or severity of impacts on the surrounding environment. E-RAMP has attempted to capture as many of these interactions as possible, although there may be some situations where these differences/interactions have not been accounted for.

To validate the E-RAMP process, several scenarios were examined using information obtained from site inspections. The results were checked for consistency (for similar situations), contrast (for vastly different situations), sensitivity (for slightly different situations) and sensibility, e.g. larger facilities having higher risk than smaller facilities in the same environmental settings with the same management/controls.

## Evaluation of risks

The evaluation of risks associated with small waste facilities is undertaken within the risk assessment model of E-RAMP. Five risk categories have been established as part of this process, as described below.

<b>Very high</b>	The risk posed is very high because of the high likelihood of an event occurring and the significant environmental consequences of this. Very high risks should be treated as soon as possible as a priority, and may include closure of the facility. Frequent monitoring and review after treatment is necessary to ensure the level of risk is reduced to a level where it is either acceptable or where further treatment can be scheduled once the initial very high risk is alleviated.
<b>High</b>	The risk posed is high because of the high likelihood of an event occurring and/or the significant environmental consequences of this. High risks should have the highest priority in scheduled risk treatment plans. Frequent monitoring and review before and after treatment should be undertaken to ensure the risk treatment is effective.
<b>Medium</b>	The risk posed is medium because of the moderate likelihood of an event occurring and the environmental consequences of this. Medium risks should be prioritised for treatment and regularly monitored and reviewed to ensure changing circumstances do not also change the level of risk. Medium risks are only acceptable in situations where there are no reasonable or feasible risk mitigation options available. Stringent monitoring programs should be in place to identify potential impacts, and procedures established to respond to situations where the monitoring identifies a potential issue.
<b>Low</b>	The risk posed is low because of the low likelihood of an event occurring and/or the environmental consequences of this. Low risks can be accepted, subject to justification in terms of the cost-effectiveness of treatment options and ongoing monitoring and review. Otherwise low risks should be prioritised for treatment and monitored and reviewed to ensure changing circumstances do not also change the level of risk.
<b>Very low</b>	The risk posed is very low because of the low likelihood of an event occurring and the insignificant environmental consequences if it did. Very low risks can be accepted, contingent upon regular monitoring and review to ensure changing circumstances do not also change the level of risk.

## Risk treatment

E-RAMP presents potential risk treatment options based on data collected in the communication and consultation and risk identification stages. The focus of mitigation options is primarily on reducing the likelihood and/or severity of an event, but can include avoiding risks, for example, closing a landfill where uncontrolled fires are an ongoing problem.

By utilising hypothetical treatments, the results on the overall risk can be observed in E-RAMP. Once a risk treatment program is selected, the operator of a small waste facility can then formulate a risk treatment that outlines accountabilities, responsibilities, resource/budget allocations and time frames for implementation. This need not be a lengthy document and can be attached as an addendum to the risk report from E-RAMP.

Examples of actions that have been undertaken by councils to mitigate risk can be found in Appendix C.

## Monitoring and review

Monitoring and review is a crucial component of the overall risk management process. It is particularly important for environmental risks because of some of their unique characteristics including:

- the complexity of the environment and natural variability
- a general lack of data, or limited data sets, and the need to make assumptions
- the long timespans in which environmental changes may emerge due to natural delays and a lack of clear or direct links between causes and effects.

E-RAMP assessment should be repeated at the lesser of the following intervals:

- after an incident occurs that directly affects the level of environmental risk assessed as part of the previous assessment
- upon the availability of new or updated information directly relevant to the previous risk assessment
- after risk mitigation measures are employed at the small waste facility. This will allow a review of mitigation measures to be undertaken
- after a period of 12 months from the previous assessment.

Re-assessment should start afresh with the master copy of E-RAMP, as older assessment files will not re-assess information about the surrounding environment that may change over time, such as residential encroachment, newly installed groundwater bores, new national parks, etc.

Documentation relating to the re-assessment process should be produced and kept to demonstrate that the monitoring and review step in the risk management process is being undertaken.

## Appendix A: Sources of risk

### Waste facilities – Common sources of risk

#### Operational

Area (size) of the facility  
 Quantity of waste received  
 Quantity of segregated wastes stored  
 Types of waste received (incl. liquid and special)  
 Bunding/containment of stored wastes  
 Supervision/waste screening (incl. fees charged)  
 Security of premises  
 Hours of operation  
 Size of disturbed areas/sediment management  
 Litter control  
 Signage  
 Controlled burning  
 Access/drop-off area construction  
 Dust controls  
 Plant/equipment used and frequency  
 Pest management  
 Fire controls/prevention  
 Absence of documented procedures/plans  
 On-site segregation/recycling  
 Household waste/recyclable collection service  
 Hazardous/chemical waste collection service  
 Staff training

#### Incident

Uncontrolled fires  
 Disposal of unlawful/hazardous waste  
 Public complaints  
 Leachate contamination of waters  
 Landfill gas generation

#### Physical

Annual rainfall/evaporation  
 Prevailing winds  
 Surrounding land use  
 Distance to nearest resident  
 Distance to nearest major centre  
 Distance to nearest watercourse  
 Site hydrology  
 Site slope/morphology  
 Soil type/characteristics/chemistry  
 Depth to groundwater  
 Depth to bedrock  
 Geology  
 Proximity to sensitive areas, e.g. bushfire-prone land  
 Visibility of site  
 Proximity to threatened species  
 Proximity to endangered ecological communities  
 Proximity to Aboriginal cultural heritage  
 Proximity to Sydney Metropolitan Area  
 Proximity to Extended Regulated Area

#### Information

Lack of environmental information  
 Absence of monitoring  
 Data reliability  
 Community education programs  
 Regulation/enforcement activities

### **Small transfer station-specific sources of risk**

Type of transfer station	Construction/completion of transfer station
Quantity of waste for transfer stored	Previous land use (i.e. former landfill)
Frequency of removal	

### **Small landfill-specific sources of risk**

Amount of waste in place	Covering (frequency and materials)
Type of landfill (trench, above ground, etc.)	Construction/completion of cells/pits/trenches
Compaction (frequency and method)	Post-closure land use

## Appendix B: Using E-RAMP

### Introduction

E-RAMP is a Microsoft Excel-based program developed to assess the risks posed by small waste facilities and suggest potential mitigation measures to treat identified risks. This version has been developed in consultation with small waste facility operators and EPA regional and technical officers.

The primary objective of E-RAMP is to condense the time taken for a risk assessment of a small waste facility (as outlined in AS/NZS 4360:2004) from days/weeks down to hours. Other key considerations were also taken into account during the development:

- There is significant variation between waste facilities across NSW in terms of type, size, wastes received, climate, environmental sensitivities, etc. The risk assessment process must be able to draw on information relevant across all of NSW and be applied to any site-specific location within the state.
- Information inputs should not be onerous, that is, the information required to undertake the risk assessment is either readily available to small waste facility operators or easily accessible from other sources.
- The program should be easy to use without the need to engage specialist waste, environmental or risk management expertise.

E-RAMP has as much information as possible incorporated into the tool to avoid the need to consider volumes of reference material prior to commencing the risk assessment process. In this way, only the information relevant to the particular situation being assessed is accessed, again saving time.

Throughout E-RAMP, there are links to various external online information sources. They are current at the time of production; however, if any link in E-RAMP fails to connect with the desired source, please contact the person nominated on page iv of this document.

E-RAMP makes regular use of online information resources, in particular:

- **Spatial Information Exchange** administered by the NSW Office of Finance and Services – provides fast and easy access to high resolution satellite imagery across the whole of NSW as well as 1:100,000 topographic maps, cadastral (land tenure) and address information that can be searched against. Use of this resource may require the download of a plug-in, which can be done automatically from the Spatial Information Exchange website at <http://imagery.maps.nsw.gov.au>.
- **Bureau of Meteorology** website administered by the Bureau of Meteorology – includes immediate and historic climate conditions for local areas.

It is recommended that E-RAMP users familiarise themselves with the *Spatial Information Exchange* prior to using E-RAMP to ensure the most efficient use of their time in undertaking a risk assessment of a small waste facility or facilities.

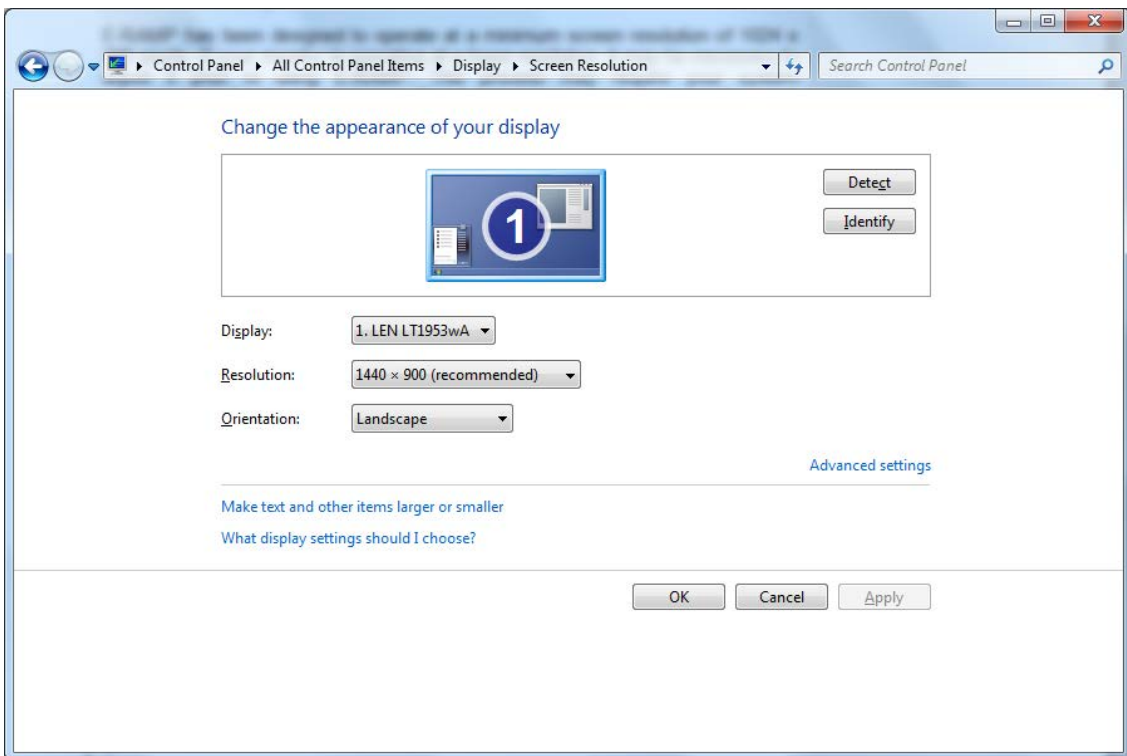


## Getting started

### Screen resolution

E-RAMP has been designed to operate at a minimum screen resolution of 1024 x 768 pixels. If your monitor is operating at a lower resolution, it may be necessary to adjust it prior to using E-RAMP. This process may require your system administrator's assistance; however, if you are using a stand-alone machine, it is possible to adjust the screen resolution by the following steps (this may be slightly different depending on your version of Microsoft Windows):

1. Open the Windows Start Menu and type 'screen resolution' into the search box at the bottom of the panel. Choose 'Adjust screen resolution' from the search results.
2. In the resulting dialog box, illustrated below, ensure that the value for 'Resolution' is set to a minimum of 1024 x 768 pixels. Use the pull-down slider to increase the resolution if necessary.



### Adjusting macro security

The next step is to configure Excel's security settings to enable it to run macros. E-RAMP contains numerous macros to assist with the user input and risk analysis. If the macros in E-RAMP are disabled, the program will not function. Again, you may require the assistance of your system administrator with this step depending on the operating system and version of Excel.

### Opening E-RAMP

Having completed these two steps, you are now ready to open E-RAMP.

When you initially open E-RAMP you may see a warning that macros have been disabled. Choose the option to enable macros. This will allow E-RAMP to function and generate a report.

## Using E-RAMP

E-RAMP has been designed for ease of use via a 'Q&A' format. Almost all of the responses required are via selection from lists, check boxes and yes/no buttons. The only keyboard input required in E-RAMP is on the 'Premises' page where the name of the operator of the facility, the name of the facility itself and the location of the facility are required to be input.

The possible responses to the questions asked have been designed to closely reflect the most common situations encountered during the information gathering stage of E-RAMP development. If a situation at your particular waste facility does not appear on the list of possible answers, just select the option that most closely describes the situation. Alternatively, if you feel your situation is unique please contact the EPA for further guidance. Below is a sample E-RAMP screen and a key to the various elements.

**E-RAMP Progress - Part 1: Existing Facility Information**

**Surrounding Environment**

Soils at the facility (USCS description)

Surface (<0.1m BGL) Sub-surface (>0.1m BGL)

Silt (ML, OL, MH, OH) Clay (CL, OL, CH, OH)

[Soil classification methodology](#)  
[Assessing Texture of your Soil](#)

Inherent Sheet Erosion Risk (tonnes / hectare / year)

Unknown

[NSW State of Environment Reports](#)

Are the soils at the facility dispersive?

Unknown

Dispersiveness is a measure of how readily a soil will break down and disperse when exposed to water.

Sodicity of soils at the facility

Not identified as sodic

[OEH eSPADE](#)

Slope of ground at the facility (%)

0 - 2

[Department of Lands - Spatial Information Exchange](#)

Are any of the erosion types present at / near the facility?

Wind erosion  Gully erosion

Sheet erosion  Tunnel erosion

Rill erosion  Mass movement

Salinity hazard

No hazard identified

[NSW State of Environment Reports](#)

Acid sulfate soil risk

No risk identified

[OEH eSPADE](#)

Distance to nearest watercourse (m)

500 - 1,000

[Department of Lands - Spatial Information Exchange](#)

Back

Start over

Next

Save & Close

### Key

- 1** **Progress bar** – shows the user their progress in the assessment process
- 2** **Page heading** – each page of E-RAMP contains a related group of questions
- 3** **Comment marker** – hover over these to reveal additional information
- 4** **Comment** – pops up to provide additional information to assist the user
- 5** **Drop-down list** – click on the down arrow to reveal available responses
- 6** **Hyperlink** – links to an external data source to assist in answering the question
- 7** **Input question** – details the information sought for this part of the assessment
- 8** **Check boxes** – these and the Yes/No buttons elsewhere operate in a similar way
- 9** **Navigation buttons** – these guide the user through the E-RAMP process
- 10** **Save & Close button** – saves progress and closes the input session

## Structure of E-RAMP

The E-RAMP process contains three main parts:

### 1. Existing facility information

This initial part of E-RAMP collects information about:

- the premises itself (name, type, size, location, etc.)
- the surrounding environment (local meteorology, premises soil types, surrounding land use, topography, proximity to environmentally significant areas, etc.)
- available environmental information for the premises, including any monitoring undertaken
- operational management practices and control measures employed at the premises
- community education.

At the completion of this step, you will be prompted to review the information or proceed to the mitigation options. It is important to note that once the 'proceed' option is selected, the information provided is locked in and cannot be changed for the particular assessment being undertaken. After 'proceed' is selected, the risk profile for the premises, based on the information provided, will be displayed.

### 2. Potential mitigation options

From this point, you will move to the mitigation section, where you can apply hypothetical mitigation measures to your existing situation to assess the difference made to the level of risk. These screens look very similar to the existing premises data input screens with some differences to the navigation button:

- 'Reset' button – This button will return the mitigation options for the page to the existing situation (i.e. the status quo). The 'Reset' button is very useful when comparing many different scenarios of hypothetical control measures as you can always return to the existing situation and level of risk.
- 'Risk Profile' button – This button will take you to the risk profile so you can view what effect the hypothetical mitigation measures will have on the overall risk profile of the premises.

The mitigation options section only asks questions in relation to factors that can be changed at a facility. For example, questions regarding depth to bedrock will not appear in the mitigation section as it is assumed that this will not change (at least significantly) over the life of the facility. However, questions regarding things like fencing of the premises will appear in the mitigation section as this is within the power of the operator to change.

### 3. Risk analysis and risk profile

The risk analysis part of E-RAMP operates simultaneously with the existing premises data and potential mitigation options. Each response is fed into the risk analysis model and used in the assessment of the overall level of risk. Some of these calculations are very long and intricate so to avoid confusion, they occur in the background of E-RAMP.

Refer to Appendix C for examples of practices that could be considered to mitigate risk at small landfills.

The risk profile is the main output of E-RAMP. This graphical display allows the user to see at a glance the level of risk the assessed facility poses and the effect that the hypothetical mitigation measures will have on this existing level of risk.

Once the E-RAMP process is complete, you can print a report. The report compiles all the information used for the risk assessment, along with the risk profile. This report can then form part of the documented record of the risk management process for the premises.

## **Saving E-RAMP**

You can save your data at any time by selecting the 'Save & Close' button that is located on each data input page. The file will be automatically renamed when saved. If E-RAMP is saved from a data input page, the format used for the file name is:

'E-RAMP [name of facility] (in progress) [today's date]'

For example, when using E-RAMP to assess the environmental risks at the Smallville Tip on 27 August 2014, the file will be saved as 'E-RAMP Smallville Tip (in progress) 27 August 2014'.

On the Risk Profile page, the 'Finalise, Save & Close' button will finalise the E-RAMP assessment. The name of the file is slightly different:

'E-RAMP [name of facility] (final) [today's date]'

This naming convention is important to ensure that the history of the risk management process can be accurately documented and that the most current version of the assessment for a particular facility is being used to make management decisions.

## **Appendix C: Observed practices to minimise risk**

### **Introduction**

As part of the information gathering exercises for E-RAMP, a range of operational practices were observed to be more effective in minimising environmental risk at small waste facilities. This list is not an exhaustive inventory of risk minimisation practices, and not all of the practices listed may be applicable, suitable or feasible for all small waste facilities. However, sites that had implemented some of the practices below reported a significant reduction in the frequency of complaints, environmental incidents and regulatory interventions.

### **Strategic management**

- Rationalisation / consolidation of small landfill sites, particularly those located in areas posing high environmental risk
- Detailed site selection process for new waste facilities, using exclusion mapping (or similar process)
- Detailed planning and design of the waste facility to minimise the site footprint while maintaining maximum functionality
- Documented and implemented waste management procedures
- Training of operators of waste facilities, customised to the needs for the particular site(s)
- A considered landfill closure management plan taking into account future use of the area or surrounding land uses.

### **Environmental information and monitoring**

- Detailed environmental investigation of site(s) for proposed new waste facilities, or existing sites where potential environmental sensitivities exist
- Environmental monitoring where warranted by risk
- Undertaking a groundwater investigation on sites in high groundwater vulnerability areas to confirm potential or actual groundwater pollution. If there is no evidence of groundwater pollution then further investigation is not required. If there is evidence of pollution then further investigation and notification to EPA Regional Officers is required to consider further mitigation measures.

### **Community information, education and awareness**

- Clear, communicative and uniform signage at waste facility sites
- Providing information to the community through several means (media, internet, council newsletter, directly by operating staff, etc.)
- Targeting community information where / when required (e.g. penalties for unlawful dumping of waste)
- Active and consistent investigation and enforcement of identified waste related offences.

## Operational

- Minimising the quantity of waste stored on site at any one time
- Minimising the time waste is stored on site
- The storage of liquid / hazardous wastes in impermeable bunds
- The exclusion of liquid wastes from landfill disposal
- Minimising the amount of wastes received requiring special management (e.g. asbestos, clinical waste, animal carcasses, biosolids and contaminated soil) where viable alternatives exist
- Restricting the time the waste facility is open to specified hours on specified days, supported with an education program to inform the local community of the facility's operating hours and the reasons for limiting access
- Effectively securing the waste facility outside of the restricted opening hours through fencing and securing access points
- Supervision by an operator of the waste facility at all times it is open to the public
- Minimising the size of 'dirty' water catchments (disturbed and waste handling/disposal areas)
- Preventing or minimising surface run-on into areas where wastes are being landfilled / stored, including the removal of waste out of drainage channels and excluding landfilling from one-in-100 year flood zoned land
- Minimising areas and stockpiles of disturbed soil
- The use of litter fences/cages and regularly scheduled litter clean-ups
- The provision of a community hazardous waste collection / drop off service
- The elimination of controlled burning
- A documented and implemented fire response plan prepared in consultation with Fire & Rescue NSW / Rural Fire Service
- The preparation and regular updating of a site filling plan, detailing the capacity of the cells, sequence of filling and rehabilitation of the disposal cells
- Regularly scheduled covering of landfilled waste
- Progressive capping with virgin excavated natural material (VENM) or excavated natural material (ENM) and rehabilitation of completed landfill areas. Final capping should form a low permeability barrier and separate the waste from the surface layer to minimise water infiltration. The area should be contoured to minimise water entering the landfill area.

## References and further reading

DEC 2006, *Handbook for design and operation of rural and regional transfer stations*, Department of Environment and Conservation NSW, Sydney.

Environment Agency 2000, *Licensed waste management facility site inspection methodology and consistent scoring guidance*, UK Environment Agency, Bristol, UK.

Environment Agency 2004, *Guidance on assessment of risks from landfill sites*, UK Environment Agency, Bristol, UK.

EPA 1996, *Environmental guidelines: Solid waste landfills*, NSW Environment Protection Authority, Sydney.

EPA 2002, *Industry sector: Rural waste landfill facilities – Compliance performance report*, Environment Protection Authority, Sydney.

Golder Associates (NZ) Ltd 2002, *Risk assessment for small closed landfills*, Ministry for the Environment, Christchurch, NZ.

NSW Government 2011, *NSW 2021: A plan to make NSW number one*, NSW Department of Premier and Cabinet, Sydney.

Standards Australia 2004, *AS/NZS 4360:2004: Risk management*, SAI Global, Sydney.

Standards Australia 2006, *HB 203:2006: Environmental risk management – Principles and Process*, SAI Global, Sydney.

United States Environment Protection Agency 2005, *Introduction to municipal solid waste disposal facility criteria (USEPA)*, Office of Solid Waste and Emergency Response, United States Environment Protection Agency, Washington DC, USA.