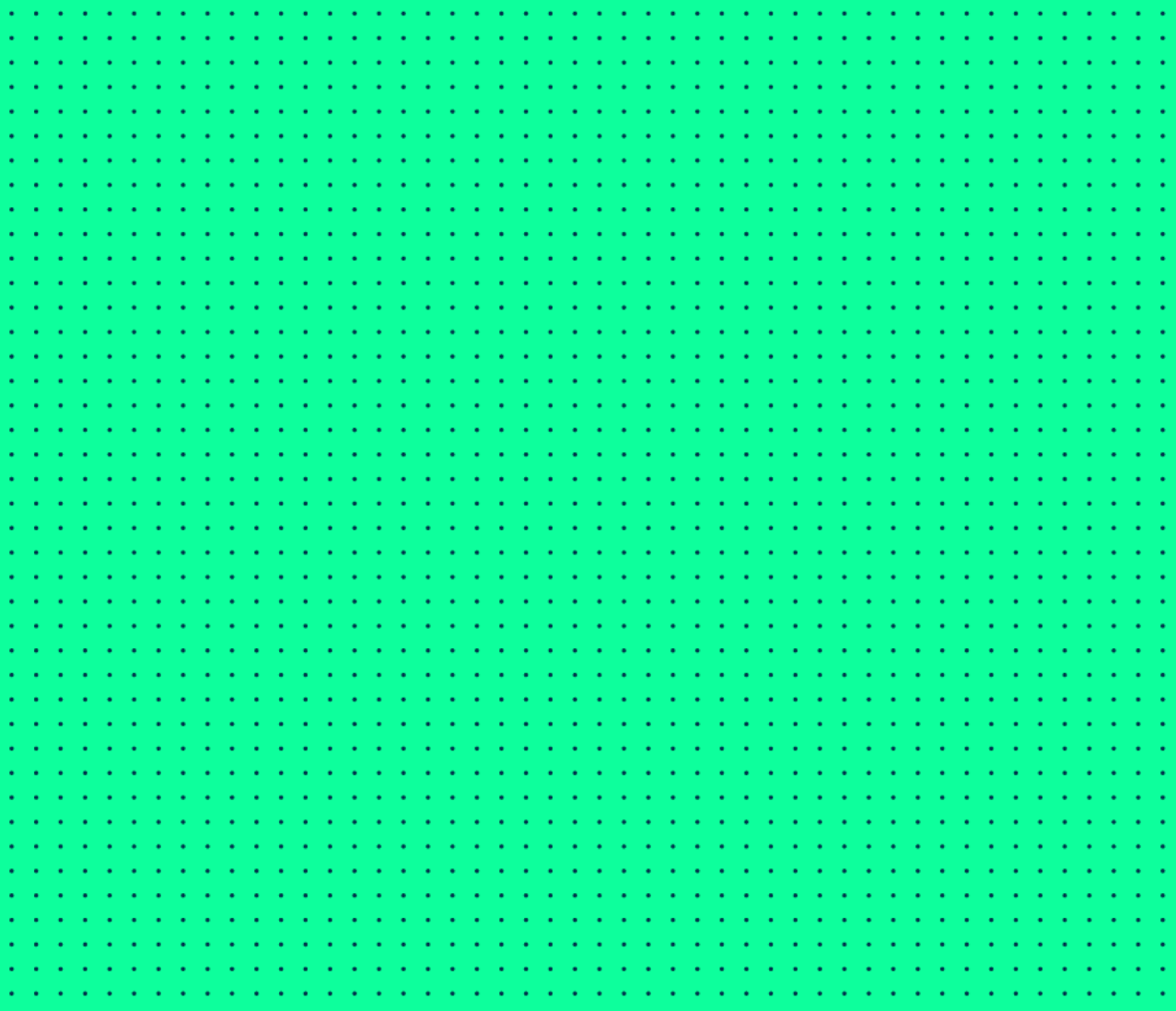
Environment Protection Authority

Preparing environmental management plans for contaminated land

Practice note



Published by:
NSW Environment Protection Authority
4 Parramatta Square
12 Darcy Street, Parramatta NSW 2150
Locked Bag 5022, Parramatta NSW 2124

Phone: +61 2 9995 5000 (switchboard)
Phone: 131 555 (NSW only – environment information and publications requests)
Fax: +61 2 9995 5999
TTY users: phone 133 677, then ask
for 131 555
Speak and listen users:
phone 1300 555 727, then ask for 131 555

Email: info@epa.nsw.gov.au
Website: www.epa.nsw.gov.au

Report pollution and environmental incidents
Environment Line: 131 555 (NSW only) or info@epa.nsw.gov.au
See also www.epa.nsw.gov.au

ISBN 978 1 922447 99 9

EPA 2022P3473

January 2022

Acknowledgment

The NSW Environment Protection Authority acknowledges **ZOIC Environmental Pty Ltd** for contributing to this practice note.

Contents

1. Introduction

1.1. About this practice note

The aim of this practice note is to guide contaminated land consultants (practitioners) engaged by site owners, and anyone else who is preparing a **contaminated land environmental management plan** (EMP), in drafting a plan suited to long-term management of contamination. It does not relate to EMPs prepared for the construction or operational phases of a project.

This practice note will also help anyone who has to review, implement or regulate EMPs for contaminated land, including site auditors and planning authorities.

The document describes:

- roles and responsibilities for preparing, reviewing, implementing and regulating EMPs
- how to prepare an EMP and what to consider, including management considerations
- mechanisms for making an EMP legally enforceable, and for public notification.

The practice note does not address legal questions about enforceability.

Remediation strategies and action plans should lead to the selection of the most appropriate clean-up option for the specific circumstances of each contaminated site. Before you decide on any option that will result in residual contamination remaining on site and so require an EMP, consider (with appropriate legal advice):

- who will be responsible for managing the EMP and the contamination left behind
- how can clear and enforceable administrative and legal controls be established.

This practice note is guidance only and is not legally binding. It does not affect the requirements of NSW environmental and planning laws, or the requirements of any guidelines made under legislation. All EMPs for contaminated land should be prepared in accordance with relevant legislation and environmental and planning guidelines, including contaminated land guidelines made and approved by the EPA under section 105 of the *Contaminated Land Management Act 1997* (CLM Act), and planning guidelines on managing contamination.

The contaminated land guidelines, and information on the NSW contaminated land management framework, are published on the EPA website.

1.2. Roles and responsibilities

The EPA and planning authorities (including local councils) have approval and enforcement roles in the management of contaminated land. They may require a landowner or public land manager (or another responsible party) to prepare an EMP.

An EMP is usually prepared by a contaminated land consultant (practitioner) and may be reviewed as part of a site audit. This allows the site auditor to issue a statement indicating that a site is suitable for a particular use or uses if managed in line with the plan.

A contaminated land environmental management plan should be prepared whenever residual contamination requires management, or where any restrictions on use apply to the land under the NSW contaminated land management framework.

1.2.1. The EPA

The EPA uses its powers under the CLM Act to manage contamination that is significant enough to warrant regulation, given the site's current or approved use. The EPA may:

- require an appropriate person, such as a landowner or land manager, to prepare an EMP as part of a management order or ongoing maintenance order under the CLM Act
- request a landowner or other responsible person submitting a voluntary management proposal to include an EMP as part of the proposal.

1.2.2. Planning authorities

Planning authorities, including councils, manage other contamination through the planning and development process under the *Environmental Planning and Assessment Act 1979* and environmental planning instruments and guidelines. They:

- must consider, at the development approval and rezoning stage, if contamination will adversely affect the suitability of a site for its proposed use: if it does, the land must be remediated before it can be developed
- may require EMPs from proponents as part of the development consent process.

The organisation that assesses and determines a development application (or complying development certificate) is called the **consent authority**. The consent authority is usually the local council.

1.2.3. Landowners and/or land managers

Landowners or land managers:

- must comply with requirements by environment and planning regulators to prepare an EMP
- are responsible for involvement in the development of the EMP and its long-term legal and operating requirements
- should be familiar with their responsibilities for implementing an EMP and seek appropriate advice if necessary.

1.2.4. Consultants

Consultants with expertise in contamination management are generally engaged to prepare an EMP by the person responsible for remediation (who could be the polluter, landowner, land manager and/or developer).

The EMP should be consistent with the requirements set out in the EPA's *Consultants reporting on contaminated land: Contaminated Land Guidelines* (EPA 2020), or as updated from time to time, including that:

- any report, including an EMP, that is prepared to comply with the CLM Act, must be prepared, or reviewed and approved, by a contaminated land consultant who is certified under a certification scheme recognised by the EPA (recognised certification schemes are listed on the EPA's website)
- consultants preparing a remedial action plan must identify the need for, and nature of, any long-term management and/or monitoring following the completion of remediation and, if necessary, include the outline of an EMP in the remedial action plan.

1.2.5. Site auditors

Site auditors can be engaged to review the work of consultants to help ensure appropriate standards in the management of contaminated land. When undertaking their work, site auditors must consider the relevant statutory guidelines made or approved by the EPA under the CLM Act.

Site auditors may issue a site audit statement (conclusions of the site audit) based on the outcome of the review of a contaminated land consultant's work. Where appropriate, this may indicate that a site is suitable for a particular use or uses if managed in compliance with an EMP which requires either an active or passive system to manage contamination.

Under the EPA's *Guidelines for the NSW Site Auditor Scheme* (3rd edition [October 2017]), a site auditor must not include implementation of an EMP as a condition on a site audit statement, nor accept implementation of the EMP as a means of managing contamination, unless certain conditions have been met. (These conditions are set out in section 3.4.6, 'Environmental management plans', of the *Guidelines for the NSW Site Auditor Scheme.*)

2. Preparing the EMP

This section describes EMPs, what to consider when deciding if an EMP is appropriate, how to prepare an EMP, and what to consider when preparing it.

2.1. Overview

An EMP can be used to manage risks posed by residual contamination. It can also be used in some circumstances where contamination has not been subject to initial remediation.

An **environmental management plan** for contaminated land documents mitigation measures and/or monitoring requirements where full clean-up of a site is not feasible, or on-site containment of contamination is proposed.

Before deciding whether an EMP is necessary or desirable, site owners and their consultants need to know what contamination remains on site, or might remain after remediation, where it is and what it might do. They should consider:

- the **conceptual site model**. This is typically developed through site investigations, including the exposure scenarios for human and environmental receptors. Do these investigations show that an EMP will be an appropriate option? If not, another remediation method may be necessary
- expert advice from experienced environmental consultants
- the proposed future use of the land, including any foreseeable property transactions or changes of use
- appropriate legal advice on whether the proposed EMP can be legally enforced to ensure that the plan is carried out for as long as it is necessary.

If the decision is made that an EMP is an appropriate method of addressing contamination at the site, the EMP document should concisely describe the nature and location of contamination remaining on site and outline what long-term site management is needed to ensure the ongoing protection of human health and the environment, both on and off site. It should be able to be made legally enforceable (section 2.5, *Legal Mechanisms and public notification*).

Decisions around how an EMP can be maintained into the future require clear thought and direction from the outset. If an EMP cannot be legally enforced, then other remediation actions not requiring an EMP should be considered instead.

An EMP should clearly state:

- its objectives
- who is responsible for implementing it
- the time frames for completing the actions it specifies, and who will undertake those actions

- its key stakeholders, and how they have been engaged in developing it
- a mechanism for monitoring its implementation
- where it will be recorded and how the public will be made aware of it.

The plan must also address how feasible it is to implement over the long term and show that the consequences of not implementing it adequately have been considered.

The EMP must be clear and readily understood without referring to other documents. It should contain only information that is relevant to implementing the EMP actions: there is no need for exhaustive information about the site's history and investigations carried out. The EMP should be easy to follow by anyone responsible for implementing the actions it requires.

A short, concise plan may be enough for non-complex contaminated sites, such as those where contamination has been capped and retained on site. A more detailed plan will be required for more complex contaminated sites: for example, sites with vapour management systems that require ongoing maintenance and monitoring, or sites with restrictions on their use.

When preparing an EMP, site owners/proponents and/or their consultants should seek appropriate advice to ensure that the EMP is fit for purpose. Advice may include, but is not limited to:

- legal advice, to ensure that the EMP can be enforced legally into the future
- site owners, to ensure they agree with the proposed actions. For example, if the EMP states that the landowner and local council will apply a covenant to the land, both must have agreed to this.
- advice from planning authorities, including local councils or the EPA on the appropriateness of the plan, where these authorities are actively involved in the site
- input from a NSW-accredited auditor for the project, to ensure that the EMP meets their requirements. Any differences that may arise between the consultant preparing the plan and a site auditor reviewing the plan should be resolved before the EMP is finalised.

The EMP should provide clear direction and requirements, without uncertainty. It should be written so that it can be followed by people who are not contaminated land practitioners. The EMP should make clear what the reader is required to do if tasked with carrying out any part of the plan. The EMP should also make clear:

- any actions that should not be undertaken
- what to do if a requirement has not been followed
- what to do if an action has been undertaken that should not have been.

The EMP should also be written to allow for staff turnover over time. Some years after an EMP is prepared there may be no-one with first-hand knowledge of the project who is still available to help implement the plan or clarify any issues that arise.

The plan should outline a review process and who is responsible for that, to ensure that the EMP remains up to date, relevant and effective for managing the contamination remaining at the site. The process should include checking that the EMP remains consistent with changes in legislative and regulatory requirements or changes in industry best practice. The plan itself should contain review time frames, including a minimum review time frame, and identify what would trigger an immediate review. These time frames will depend on site-specific factors and consultation with (and agreement between) relevant stakeholders.

2.2. Style

An EMP should always be written in clear and concise language, and contain enough information to be readily understood by:

- a landowner (or other party) who is responsible for its implementation but who lacks specific technical skills

- interested members of the public, including potential purchasers or occupiers
- environmental and planning regulators, including local council officers who lack specific technical skills.

Prepare the environmental plan with enough information to be readily understood by different stakeholders. Include clear directions and requirements and avoid unnecessary background material or technical language.

The EMP should present and discuss information in an accessible format and 'plain English' style. Where technical terms are required, explain them in the plan to avoid misinterpretation.

When developing the EMP, use a level of detail that is appropriate to the risks of the residual contamination and the complexity of the site-management issues. Include background documents only if they are relevant to the contamination remaining on site and actions required by the EMP.

An EMP should include all relevant site maps, diagrams and drawings to make it easier for readers to understand where both the contamination and any mechanisms used to manage it are located. It may be beneficial to use a decision tree, flow chart and/or tables to present information explaining what actions to take, and when. Supporting text should be provided for any abbreviated information that might need to be explained further.

Location plans and/or containment cells should include survey plans and/or 'as built' drawings. Survey plans and 'as built' drawings should be provided in a format that can be readily used by site auditors and consent authorities and that can be reproduced clearly.

Include geospatial reference points for containment cells, for any contamination remaining at specific areas on the site, and for structures such as underground storage tanks. Specify the coordinate reference system used for any geospatial reference points.

2.3. Structure

The most appropriate structure for the plan will depend on site-specific factors. In general, summary information should appear in the body of the EMP and detailed information (such as background, technical and procedural details) in appendices.

2.3.1. Document status and title

Required information

- Document title
- Other document information: date, version control, author and reviewer names (and certification details where applicable), and who commissioned the report

What to consider

Check all details are accurate and complete.

Use 'environmental management plan' in the document title, not 'site management plan' or other wording.

2.3.2. Purpose

Required information

- Reason for, and purpose of, the plan and time period
- How the plan will be made legally enforceable
- Whether the EMP specifies active or passive management systems

- Approach to management of the active or passive management systems
- Parties responsible for implementation and review/maintenance of the plan, and their tasks
- Where the plan will be recorded and made public

What to consider

The objectives for long-term monitoring and maintenance measures should establish the required environmental outcomes and define performance indicators to measure achievement.

They should:

- be outcomes-based i.e. indicate the status that should be achieved
- use active verbs such as 'identify', 'monitor', 'enhance', 'increase' and 'develop'
- be SMART: specific, measurable, achievable, realistic and time-bound.

Design the plan with a specific scope in mind, including:

- a spatial extent (i.e. where does the EMP apply?)
- a temporal extent (i.e. for what time period does the EMP apply?)
- an operational scope (i.e. what site activities does the EMP apply to?)
- a contamination scope (i.e. what contaminants in what media does the EMP apply to?).

Summarise these considerations in the 'purpose' section of the plan.

Under 'purpose', also:

- specify the intended mechanism for making the plan **legally enforceable**. The mechanism should not be finalised until affected stakeholders have been consulted. This should include seeking written agreement to the plan from the authorities with the responsibility of enforcing obligations under the plan (section 2.5, *Legal mechanisms and public notification*)
- include a brief description of **key management activities and legal obligations**, such as conditions of consent under a planning instrument (if applicable). Outline who is responsible for implementing, reviewing and maintaining the plan and include expected time frames for management e.g. monitored natural attenuation over 20 years. In some cases, management may have to continue indefinitely
- clearly state where the plan will be recorded and **how it can be accessed** by the public.

2.3.3. Background

Required information

- Site identification, including
  - street number
  - street name and suburb
  - lot and deposited plan (DP) numbers
  - coordinates
  - locality map
  - site survey plan
- Site owner
- Local government area
- Consent authority
- Site zoning (current and future)

- Summary of site history as it relates to the site contamination now requiring management

What to consider

The background should include key details about the land, including:

- the responsible person's details (including legal name)
- a clear description identifying the land (using Lot and DP, street address and map)
- land use/zoning for the site and adjacent areas.

Include information about the site history **only** if it relates to the site contamination that requires management under the EMP.

2.3.4. Description of existing/residual contamination

Required information

- Identify the contaminants of concern, contaminated media, concentrations and location(s) of the contaminants. Use a site plan to show location(s). Give details of the potential migration of the contaminants, if relevant.
- Summarise the geology and hydrogeology that is relevant to the EMP.

What to consider

When describing the contamination, include only enough information to identify:

- residual contaminants of concern
- contaminated media, such as
    - soils
    - soil vapour/landfill gas
    - vegetation
    - groundwater
    - surface drainage
- concentrations and location(s) of the contaminants and migration of contamination (if relevant).

Show the location(s) of the contaminants on a site plan and provide supporting text.

Use a conceptual site model as the basis for designing controls in the EMP that will address the exposure pathways and receptors of most significance. Include the conceptual site model in the EMP if it will help readers understand and implement the EMP.

Consider the land characteristics such as geology and hydrogeology, and include a summary of only the details relevant to the EMP. Describe existing or proposed site infrastructure if its maintenance and land-use orientation may be critical to maintaining ongoing suitability of a site for its specific land use (e.g. through maintaining existing ground-gas flow pathways or existing concrete hardstand over contaminated soil).

2.3.5. Management activities

Required information

- Outline of the management activity or activities, and details of the procedures that are to be applied
- Management structure and responsibilities
- How the plan sits within an existing environmental management system (if applicable)
- Monitoring of site conditions and site management measures

- Approval and licensing requirements (if applicable)
- How the EMP is consistent with conditions of consent under a planning instrument (if applicable)
- Reporting requirements for EMP implementation. Say
  - who is responsible for preparing the reports
  - who receives the reports
  - when the reports need to be received and how
- Communications protocols (if applicable)
- Emergency contacts and response, including a 24-hour emergency phone number (if applicable)
- Operating hours (if applicable)
- Contingency plans (if applicable)

What to consider

The 'contamination management actions' section of an EMP should outline the management activities and control measures to be used to mitigate identified risks from the residual contamination. When presenting the goal of each measure, state which risk it will address and give the applicable source, pathway and receptor(s). When designing controls to mitigate risks associated with contamination:

- consider the conceptual site model to determine the risks that require mitigation, based on the typical site activities and the environmental setting of the site
- consider other risks that may emerge during non-typical site activities such as maintenance of site surfaces, structures or remediation systems
- determine the most appropriate means of mitigating risks, including the
  - technology available
  - hierarchy of controls
  - impact of the controls on site activities (i.e. the nature and extent of restrictions imposed)
  - practicality and cost of implementation
- consider the principle of ALARP (i.e. mitigating risk to a level that is '**a**s **l**ow **a**s **r**easonably **p**racticable') when determining how much risk mitigation is appropriate
- consider the relationship to work health and safety, including integration of controls with existing safety management arrangements or the need for new or enhanced arrangements.

Roles and responsibilities

The EMP should clearly document who is responsible for overall implementation of the plan, the roles and responsibilities for implementing each management action, and who those roles and responsibilities are allocated to. The key milestones and actions should have clear deadlines. In general, management and reporting actions should be set out in tables with supporting text.

Actions required as part of the EMP should be achievable, clearly written, and the responsibility for carrying them out should be allocated to a specific party.

For example, if the plan sets out work health and safety requirements for undertaking works on site, it should require the responsible party (the site owner or manager) to provide workers with a copy of the requirements before any works commence and take reasonable steps to ensure the requirements can and are being followed. These steps may include actions to minimise the exposure of workers to contamination in the event of any intrusive works being required on site, such as restriction of, or controls on, certain works on part of the site.

The EMP should also identify the appropriate authority or expert who will review compliance with the plan, and/or approve any modifications of the plan. This section of the plan may include the need for any review of EMP modifications to be undertaken by a site auditor as part of a site audit, with a site audit statement being issued at the end of the site audit.

Legal obligations

The EMP should identify any legal obligations and describe any actions needed to achieve compliance with general legislative requirements and specific approvals, including any of the following that may be applicable:

- a management order, approved voluntary management proposal, or ongoing maintenance order under the CLM Act
- environmental planning instrument and development consent conditions under the *Environmental Planning and Assessment Act 1979* (EP&A Act)
- required licences or permits, such as licences for ongoing contaminated groundwater treatment under the *Protection of the Environment Operations Act 1997* (POEO Act).

Information on legal obligations under the *Work Health and Safety Act 2011* and regulations is available from SafeWork NSW. If asbestos has been identified on site there may be specific requirements, such as preparing an asbestos management plan.

Waste management requirements

If relevant, the EMP should specify requirements for handling and disposing of any potentially contaminated waste arising from anticipated or unanticipated works on site.

Waste disposal and classification requirements are published on the EPA's website.

Compliance with EMP

Authors of an EMP should check if the EMP is consistent with, for example, any requirements of a notice under the CLM Act, or applicable conditions of development consent issued by a planning authority. The EMP should clearly set out:

- the actions needed to meet the plan's reporting requirements
- who is responsible for taking those actions.

It is important to outline how often, and by when, any reports required as part of any regulation involving the EMP should be submitted to the appropriate regulatory authority (usually the EPA or local council).

The EPA does not approve and 'sign off' on EMPs. EPA involvement with sites likely to have EMPs will be limited to those sites being regulated under the CLM Act, or sites with environment protection licences issued under the POEO Act.

Planning authorities, such as the Department of Planning, Industry and Environment or local councils, will regulate development conditions that require EMPs.

2.3.6. Monitoring and review of the EMP

Required information

- Monitoring checklist
- Description of corrective actions and triggers for these actions
- When and how to notify the regulator and/or consent authority with a request to amend or end management activities (if applicable)
- Schedule for EMP review

What to consider

Plan review

The EMP should be periodically reviewed to check it remains relevant, effective, consistent with changes in legislative requirements (including any applicable management order, ongoing maintenance order or licences), and consistent with changes in industry best practice. The review process should be described and include agreed review time frames.

Factors that would trigger an earlier review should be identified. They include:

- significant changes in site conditions
- changes in any assumptions that underlie the defined scope of the EMP
- site modifications or construction activities.

Monitoring program requirements

If at least one medium will need ongoing monitoring, either on or off site, the EMP should outline the monitoring program. It should clearly state:

- the objectives of the monitoring program
- monitoring parameters and frequency (in a table)
- all environmental media to be monitored/sampled
- monitoring locations (by marking them on a site map or maps)
- monitoring method(s) to be followed
- a decision process for additional actions and for ending monitoring
- reporting actions and frequency
- who must undertake the monitoring and reporting e.g. a certified contaminated land consultant.

The EMP should also outline the procedures for data recording, data quality assurance and data quality control during monitoring.

The monitoring program should be designed so that it is possible to determine whether monitoring objectives are being met. Monitoring objectives should include:

- detecting and acting on signs that the contamination has changed behaviour
- detecting and responding to changes in the performance of remedial measures.

Monitoring may be needed to show, for example:

- attenuation of residual contaminants after remediation
- ongoing containment of contamination.

The monitoring included in an EMP is intended to ensure that the remedial strategy for a site continues to be effective and, if it is not, that the resulting issues are identified and appropriate actions taken. However, monitoring should not be relied on to validate the remedial strategy. The relevant authority (or an auditor) and/or the landowner or land manager needs to be satisfied **before** an EMP is prepared that any remedial measures implemented at the site will protect future users and environmental receptors from residual contamination.

Where remediation has not been successful

Where post-remediation testing indicates that remediation criteria set out in a remedial action plan (RAP) have not be achieved, this information should be used to determine if further site works are required and/or an EMP should be put in place (*Consultants reporting on contaminated land*, section 1.5, ‘Remedial action plan’ and section 1.6, ‘Site remediation and validation’). An EMP should not be developed in response to remediation failings unless further assessment has determined that an EMP is the most appropriate means of addressing residual contamination. The

remediation strategy and RAP should be revisited to ensure the follow-up actions meet the original goals of the site clean-up.

Reporting requirements

Internal and external reporting requirements should include:

- who is responsible for reporting
- how often reporting is to be done (e.g. quarterly, biannually or annually).

The requirements may also include:

- integrity inspection or testing, or maintenance inspection (for example where capping exists)
- monitoring reports
- comparison with relevant trigger values for action.

Deadlines for reporting should line up with the corresponding actions and milestones. The EMP should specify who will prepare the reports (for example, a certified consultant) and who will receive them.

Contingency plan and corrective actions

The EMP should outline triggers and corrective actions to be taken if monitoring indicates an objective of the plan is not being achieved, or if a planned action is not carried out. It should also document procedures for responding to an unanticipated incident that compromises the management arrangements.

Procedures should outline:

- job title and contact details of relevant personnel
- steps to follow, including investigation and contingency measures
- steps for notifying relevant authorities and residents/community.

Further site sampling

There may be no further sampling required under the EMP. Where further environmental sampling is required on the site, a sampling and analysis quality plan (SAQP) should be developed to provide the context, justification and details of the selected sampling and analysis approach. The SAQP needs to consider the remaining contamination on site and should be reviewed by appropriately experienced experts for suitability.

Record keeping

While the EMP is in operation, records should be kept of any reports, monitoring results, self-evaluation or any other required documentation. Such records may be needed to evaluate whether the requirements of the EMP are being met.

2.3.7. Communications and notifications

Required information

- List of stakeholders
- Details of how affected stakeholders, including potential purchasers, will be notified of the existing/residual contamination and the EMP
- How the EMP is communicated and made (legally) enforceable, including any financial assurance requirements
- Details of how stakeholders will be informed of changes to activities and/or responsible parties

What to consider

Stakeholder engagement

Maintaining effective engagement with stakeholders is important for managing contamination.

The EMP should identify how the responsible party will identify and communicate with anyone likely to be affected by the plan, or likely to have a real interest in it. Such people may include users of the site, contractors, utility workers, nearby residents, tenants, potential purchasers and visitors.

Financial assurance

A financial assurance is a type of security provided by a person or company who is responsible for a licence or management order regulated by the EPA. It provides the EPA with access to money to cover the costs of clean-up or remediation actions required under the person's or company's licence or management order if the responsible person or company fails to carry them out. (These costs may include the costs the EPA incurs in directing and supervising the carrying out of actions.) For example, a financial assurance may be required for the ongoing management and monitoring of a containment cell.

Financial assurance is only relevant to EPA-regulated sites subject to:

- a management order issued by the EPA under the CLM Act, and/or
- an environment protection licence under the POEO Act.

Disclosing the EMP

The owner of a site with an EMP should inform anyone who proposes to buy or lease the site about the existence and location of residual contamination on the site (and off-site if applicable), and the requirements for managing it. Disclosing an EMP makes it more widely known who is responsible for implementing its actions. (See section 2.5, *Legal mechanisms and public notification*.)

2.3.8. Review and closure

Required information

If appropriate, the EMP should specify how it is to be reviewed and closed out when ongoing management is no longer required.

What to consider

Ongoing management may no longer be required:

- if, at the end of a specified period, it is certain when management objectives will be achieved
- after a specified event or set of circumstances.

2.4. Management considerations

Where an EMP has to be implemented to ensure a site remains suitable for a specified use, certain management issues have to be considered. They include:

- suitable management systems (active or passive) and potential disturbance
- potential for intrusive works e.g. arising from maintenance of service infrastructure by utilities or exempt and complying development works
- ecologically sustainable development
- management of off-site contamination.

2.4.1. When to use active or passive management systems

Active management systems are continuous control measures used to manage site contamination. These systems usually incorporate mechanical components and/or require monitoring, and they need regular maintenance and inspection. For example, it may be necessary to control hazardous ground gases and interrupt the pathway between a gas source and a receptor outside building footprints or at the building level. Depending on the site, active management systems for this situation could include forced ventilation systems, fans and blowers.

Active management systems should only be considered for properties where enforcement of effective long-term management is feasible. Generally, EMPs requiring active management are **not** suitable for residential developments, although strata developments where a building manager and/or strata managing agent has been appointed for the strata development under the *Strata Scheme Management Act 2015* may be acceptable where clearly defined management responsibilities are in place.

Passive management systems do not require human intervention (other than periodic inspection and maintenance) once installed. Again, consider the example of where it is necessary to control hazardous ground gases and interrupt the pathway between a gas source and a receptor outside building footprints or at the building level. Depending on the site, it might be appropriate to apply passive control measures to prevent or restrict gas from migrating or accumulating, for instance by using gas-proof membranes and ventilation.

Passive and active gas control measures are detailed in the EPA's *Assessment and management of hazardous ground gases: Contaminated Land Guidelines* (December 2019, amended May 2020):

- section 5.2, 'Approaches to site management'
- appendix 6, 'Further guidance on risk mitigation and site management'
- appendix 8, 'Further guidance on environmental management plans'.

Passive management systems may be used to contain or cap contamination. The integrity of a cap over time should be confirmed by regular inspections. If the contamination is placed in areas that may be disturbed, such as landscaping, parks, areas with services, or roads, there must be regular inspections to check the integrity of the physical barrier. There must also be measures to ensure that if the contamination is disturbed, it will be handled in an appropriate manner to avoid any increase in potential risks to human health or the environment.

Passive management systems may also be used where contamination:

- is at depth below a building footprint or a cap
- has no services running through it
- has no potential access to it.

These situations do not typically require regular inspection.

Any passive management systems used to contain or cap contamination, or to manage contamination at depth, must be appropriate for the contaminants of concern. The contaminants must not adversely affect groundwater quality and any contaminant vapours must not migrate to the surface and pose a risk to human health.

EMPs requiring passive management systems should also be avoided in residential developments, particularly if intrusive works at the site may create an unacceptable risk from the residual contamination. EMPs on residential developments often result in complex management systems and/or onerous requirements for home owners in relation to the remaining contamination.

Remedial action plans

The EPA guideline, *Consultants reporting on contaminated land*, lists information that a remedial action plan must contain. The list includes 'identify the need for, and nature of, any long-term

management and/or monitoring following remediation and, if required, provide an outline of an EMP and include this in the remedial action plan'.

The remedial action plan (rather than the EMP) may cover the selection and design of a suitable management system, with the EMP documenting the requirements for ongoing operation and maintenance of that system.

2.4.2. Potential for intrusive works

When preparing an EMP, consider what intrusive future works may take place on site – for example, during development – and how they should be managed. Intrusive works could include maintenance, excavation and construction activities (such as repairing pipelines or other service infrastructure, carrying out earthworks and installing car parks and swimming pools).

The EMP should include management procedures to guide where, how and by whom such works could be conducted on site. These procedures should be designed to protect both the integrity of the ongoing management systems on site and the health of workers.

2.4.3. Risk assessment

Any risk assessment of a site will include some assumptions. When preparing an EMP, those assumptions will need to be considered to ensure the plan is fit for purpose.

Consider, for example, the situation where an EMP is being prepared for a building with a basement over a groundwater plume with volatile compounds. The risk assessment may have found the risk to be acceptable provided that the building is constructed in compliance with the Building Code of Australia. This finding relies on an assumption about air exchanges in the basement – for example, that a certain number of exchanges will take place each day. If the assumption is not spelled out in the EMP, a strata body will be unaware of the ongoing requirement to maintain certain air exchanges in the basement. To save money, it might agree to reduce the air exchanges in the basement, without knowing the potential risk this could pose to residents.

2.4.4. Ecologically sustainable development

Ecologically sustainable development (ESD), as defined in the CLM Act, requires decision-making processes to effectively integrate economic and environmental considerations. ESD can be achieved by implementing the principles and programs set out in section 9 of the CLM Act. When undertaking its functions, the EPA is required to have regard to the principles of ESD and to seek to implement those principles where contaminated land is managed by other people.

The EPA must, for example, take ESD principles and programs into account when preparing a management order, and document how it has considered the relevant factors. Consultants are also expected to consider ESD principles when preparing remediation plans and document the relevant considerations.

Long-term issues that should be considered include:

- ongoing monitoring and maintenance costs, and who will incur them
- the effectiveness of information management systems to support the EMP, now and in the future.

A situation where consultants would need to balance the precautionary principle, practical inputs and incomplete investigation could be where it is known, from a conceptual site model that asbestos (e.g. asbestos fill) has been encountered to a limited extent on site, or is likely to be present.

Factors to consider when preparing an EMP for the site might include:

- How much sampling is required to characterise the asbestos fill?
- Is it appropriate to manage the risk posed by the asbestos fill on site? Or is it appropriate to move the asbestos-impacted soil from the site to a landfill licensed to receive it?
- ESD-related items such as:
  - environmental impacts of the management system (energy consumption, natural resource and water consumption, air and noise impacts, waste generation etc.)
  - social impact of the management system on workers and the surrounding community
  - full life-cycle costs of establishment, operation and decommissioning.

2.4.5. Management of off-site contamination

If an EMP is prepared for a site with known off-site migration of contamination, the EMP must discuss how the off-site contamination is to be managed to prevent unacceptable risks to human health and the environment.

Before determining if off-site monitoring actions are included as part of the EMP, consider if it will be practical to obtain access to the relevant off-site land. You will need to consider factors such as the process for, and likelihood of, obtaining permission from private landowners to access the land, including any mechanism for requiring access.

Assuming the off-site land can be accessed, other matters to consider include:

- how to protect monitoring points
- how to keep records
  - which records
  - how they can be accessed
  - how long they are to be kept for
  - who will manage these records
- how to provide monitoring results to the landowner
- how to protect workers accessing off-site land
- the potential for future subdivision, and how that would affect access to off-site land.

2.5. Legal mechanisms and public notification

2.5.1. Legal mechanisms

The obligations in an EMP must be legally enforceable.

Common legal mechanisms for achieving this in NSW are provided under:

- *Conveyancing Act 1919* (Conveyancing Act) – restrictions or public positive covenants on land (which run with the land), which
  - can be imposed by a prescribed authority (including EPA and Council) on any land not vested in the authority, with landowner consent (section 88E)
  - may be created by deed of agreement between private parties owning land (section 88)
- CLM Act – ongoing maintenance orders (section 28)
- EP&A Act – development consent conditions (section 4.17)
- Work Health and Safety Regulation 2017 – asbestos management plan (Part 8.3, cl 429).

Orders made under section 124 of the *Local Government Act 1993* might also be considered.

It is appropriate to obtain legal advice on the legal enforceability of an EMP at the point you have decided to use one and again prior to finalising this (should anything have changed). Where required, you may also need to check with the appropriate regulatory authority to ensure this meets any requirements they have, for example in the case that an EMP is required by development consent conditions or as part of an order issued by the EPA under the CLM Act.

These legal mechanisms for EMPs are binding on the specified person(s), usually the landowner, public land manager, occupier, or owners corporation responsible for implementing the EMP.

An environmental management plan for contaminated land should not be finalised without identifying and considering – with input from affected stakeholders – the legal mechanism intended to make it enforceable.

When preparing an EMP, discuss the proposed legal mechanism with all stakeholders (including infrastructure owners) early in the process, so actions and conditions can be framed appropriately. Before finalising the EMP, seek written in-principle agreement from the authority that is responsible for enforcing compliance with the EMP, to confirm the conditions are legally enforceable.

Note that – where they are required to be involved - the relevant authority may not agree to accept an EMP that places undue costs or responsibility on it or on future site owners, occupiers or owners corporations. For example, authorities may not agree to the EMP specifying active management systems that will require future site owners, occupiers or owner's corporations to carry out substantial maintenance and monitoring (section 2.4.1, *When to use active or passive management systems*).

2.5.2. Public notification

Public accountability and transparency are important aspects of the management of contaminated land. To keep the public informed, environmental and planning regulators are required to keep and maintain public records about contaminated land and (in certain circumstances) provide copies of those records to interested parties.

Consider including specific conditions in the EMP requiring the site owner to disclose the existence of the plan to new or potential owners or occupiers.

Public notification mechanisms for communicating that an EMP exists include:

- planning certificates
- land title
- the EPA's public record of notices (where an EMP forms part of EPA regulation of a site).

Planning certificates

Planning certificates issued by local authorities (typically councils) under section 10.7(2) of the EP&A Act must include certain information about land contamination. Schedule 4(7) of the EP&A Regulation sets out these matters in full. They include, but are not limited to, whether the land is subject to any:

- council policy or restriction on the land's use
- notice, such as an ongoing maintenance order, issued by the EPA under the CLM Act
- site audit statement previously provided to council.

Councils may choose to include other information on a certificate issued for any property under section 10.7(5) of the EP&A Act. This is usually done in response to a specific request by a person applying for a land title search. For example, where a council holds a site audit statement about a remediated property, the council may on request provide a copy of that statement, including any associated EMP and related documents (e.g. monitoring reports).

Land title

Any covenant or restriction under the Conveyancing Act is recorded on the land title and disclosed to any person who conducts a title search. Consultants preparing an EMP may wish to propose that the site owner register a covenant on the land title for the site (section 88B), to increase transparency about the residual contamination and its management.

Regulators may also provide additional information, on request, about contaminated land, such as an EMP and associated documents (including monitoring reports).

Information about contaminated land can also be included in site-specific **standard operating procedures** or **safe work method statements** prepared by utilities e.g. Sydney Water or Energy Australia.

Capped and contained areas on land

The implementation of a mechanism for legal enforceability, such as a development consent condition, will not necessarily provide enough transparency about the management of contamination to support long-term protection of contaminated areas from any unintentional or uncontrolled disturbance that could breach the integrity of the physical barrier of a capped or contained area.

Site owners should make information about capped or contained areas of land available to the public on request. An EMP should indicate how interested parties will be informed about residual contamination and its appropriate management (for example, through public notices).

EPA's public record of notices

The EPA website has a database, searchable by the public, of notices issued under the CLM Act. The EPA must inform councils when a notice is issued under the Act – for example, when the EPA has issued an ongoing maintenance order that requires an EMP to be implemented.

Glossary

Active management systems
Active management systems usually incorporate mechanical components and/or require monitoring, and regular maintenance and inspection are necessary. Most active management systems are applied at sites where, if the systems are not implemented, an unacceptable risk may occur. Active management systems must be considered only for properties where effective long-term management is feasible.

Contamination of land
The presence in, on or under the land of a substance at a concentration above the concentration at which the substance is normally present in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment.

Contingency plans
Plans to address any accidental or unplanned disturbance of residual contamination.

Corrective actions
Actions to be taken if monitoring indicates an objective of the plan is not being achieved, or if a planned action is not undertaken.

Environment management plan
A long-term management plan for contaminated land that is a site-specific plan to manage contamination, and which integrates environmental mitigation and monitoring measures for soil, groundwater or hazardous ground gases throughout an existing or proposed land use.

Legal enforceability
Capable of being complied with (physically, practically, reasonably and financially) and able to be legally enforced – for example, under a condition of consent under the EP&A Act, an ongoing maintenance order under the CLM Act, or a restriction or covenant on the land under the *Conveyancing Act 1919*.

Management of land (or of contamination of land)
Management in relation to the actual or possible contamination of the land, including investigation into the existence, nature and extent of the contamination of the land and the remediation of contaminated land.

Management order
The EPA may order an appropriate person or a public authority to carry out action in relation to the management of 'significantly contaminated land' (section 14(1), CLM Act).

Monitoring
The sampling, analysis and reporting on environmental media such as soil, groundwater, surface water, soil vapour, air and biota. It also includes inspection and reporting on protective measures such as a concrete cap or geofabric.

Monitored natural attenuation
The process of monitoring the effect of natural attenuation on remediation and contamination objectives.

Natural attenuation
The decrease in both quantity and concentration of contaminants in groundwater over time as a result of physical, chemical and biological processes that occur naturally in soil and groundwater.

Operation manual
A written description of the policies, procedures and processes to be followed to safely and effectively implement the management actions.

Passive management systems
Passive management systems usually require minimal management and maintenance and do not usually incorporate mechanical components. Passive systems may include notification of residual contamination, to ensure that mechanisms for managing risks are applied. For example, if groundwater is contaminated, the environmental management plan should include notification procedures to be put in place to ensure mechanisms are applied to protect people who could come into contact with it, such as workers undertaking excavations below the water table.

Polluter
An individual or a corporation who has caused the contamination.

Public notification
A process to inform anyone, including potential purchasers or other interested individuals, about any restrictions applying to the land. Examples of a public notification are a notation on a planning certificate under section 10.7 of the EP&A Act (formerly section 149), or a covenant registered on the title to land under section 88B of the Conveyancing Act. A public notification is not a mechanism for making an EMP legally enforceable.

Remediation of contaminated land
This may include:

- removing, dispersing, destroying, reducing, mitigating or containing the contamination of the land
- eliminating or reducing any hazard arising from the contamination of the land (including by preventing the entry of persons or animals on the land).
- where contamination cannot be completely removed and risks may remain, preparing a long-term management plan for the land

Residual contamination
Contamination that remains after initial remediation of contaminated land.

Run with the land
Transfer of any covenants or restrictions on land when the land is sold, meaning that any obligations or restrictions applying to the property transfer to the purchaser with the sale of the land.

Site audit
A review as defined in the CLM Act:

a. that relates to management of the actual or possible contamination of land, and

b. that is conducted for the purpose of determining any one or more of the following matters:

   i. the nature and extent of any contamination of the land,

   ii. the nature and extent of any management of actual or possible contamination of the land,

   iii. whether the land is suitable for any specified use or range of uses,

   iv. what management remains necessary before the land is suitable for any specified use or range of uses,

   v. the suitability and appropriateness of a plan of management, long-term management plan or a voluntary management proposal.

Site auditor
A person accredited under Part 4 of the CLM Act as a site auditor.

Statutory site audit
An audit that must be carried out by law, and which can only be carried out by a site auditor. A statutory site audit may be required by:

- a regulatory instrument issued under the CLM Act, including an approved voluntary management proposal issued by the EPA
- the EP&A Act, an environmental planning instrument or a development consent condition
- any other Act.

Unexpected finds
'Unexpected finds' protocols should relate only to hazardous substances and/or contaminants that could not have been reasonably foreseen and tested for during assessment and remediation.

Voluntary management proposal
A proponent may provide the EPA with a proposal for voluntary site management of 'significantly contaminated land' (section 17(1), CLM Act).

References and additional information

ANZG 2018, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, www.waterquality.gov.au/anz-guidelines/about/how-to-use

DUAP and EPA 1998, *Managing Land Contamination: Planning Guidelines, SEPP 55 – Remediation of Land*, NSW Department of Urban Affairs and Planning *and* NSW Environment Protection Authority, Sydney.

EPA 2015, *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*, NSW Environment Protection Authority, Sydney.

EPA 2017, *Contaminated Land Management: Guidelines for the New South Wales Site Auditor Scheme (3rd edition)*, NSW Environment Protection Authority, Sydney.

EPA 2020, *Assessment and management of hazardous ground gases: Contaminated Land Guidelines*, NSW Environment Protection Authority, Sydney.

EPA 2020, *Consultants reporting on contaminated land: Contaminated Land Guidelines*, NSW Environment Protection Authority, Sydney.

EPA 2015a, *Contaminated Sites: Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*, NSW EPA, 2015.

EPA 1995, *Sampling Design Guidelines*, NSW EPA, 1995 (or update).

HEPA 2020, *PFAS National Environmental Management Plan Version 2.0*, National Chemicals Working Group of the Heads of EPAs Australia and New Zealand, n.p., https://www.environment.gov.au/protection/publications/pfas-nemp-2

NEPC 2013, *National Environment Protection (Assessment of Site Contamination) Measure 1999*, as amended by the *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)*, National Environment Protection Council, Canberra.

NHMRC, NRMMC 2011 (updated 2018), *National Water Quality Management Strategy: Australian Drinking Water Guidelines 6*, National Health and Medical Research Council, Natural Resource Management Ministerial Council, Canberra, https://www.nhmrc.gov.au/about-us/publications/australian-drinking-water-guidelines