Australian Government
Asbestos Safety and Eradication Agency

Asbestos-Cement Water and Sewer Pipe Management Guidelines

JANUARY 2022

This document has been prepared by:

Australian Government
Asbestos Safety and Eradication Agency

with support from:

WATER SERVICES ASSOCIATION OF AUSTRALIA

WorkSafe Western Australia

NSW GOVERNMENT SafeWork NSW

This document was first published in December 2021. In January 2022, amendments were made to the text box on page 11 to reflect updated information from the World Health Organisation (WHO) about research into drinking water.

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1. Introduction

These guidelines aim to assist organisations providing water and/or sewerage services (referred to as 'water agencies') eliminate or minimise the risk of exposure to asbestos fibres being released from asbestos-cement (AC) pipes. Exposure to airborne asbestos fibres can cause life-threatening diseases like cancer.

In 2018, it was estimated that over 40,000 km of AC water pipes and 5,000 km of AC sewer main pipes remain in place across Australia. Since that time some of those AC pipes have been removed but there is still a significant amount of legacy AC pipe that needs to be effectively managed.

These guidelines apply to all AC pipes managed or controlled by water agencies including those that have been decommissioned but remain in situ and those which have been removed and are being temporarily stored before disposal.

These guidelines reference key requirements under state and territory environment protection laws and work health and safety (WHS) laws[1] but should not be used as a substitute for the law and cannot be relied upon to comply with the law.

WHS laws and public health laws apply to all AC water and sewer pipes managed by water agencies. Public health laws in Queensland and Western Australia include specific requirements to manage asbestos risks which are similar to those under WHS laws. For water agencies, compliance with WHS duties will likely ensure compliance with public health law. For that reason, public health laws are not specifically considered in these guidelines. However, water agencies should ensure they understand their legal obligations under public health laws.

The guidelines complement policies and procedures of water agencies as well as regulatory guidance to assist water agencies understand how AC pipes can be effectively managed. The guidelines should be read in conjunction with those documents as well as the laws.

A glossary of terms used in these guidelines is provided in Appendix A.

[1] The term work health and safety laws, or WHS laws, is used throughout this document to refer to laws – sometimes also called occupational health and safety laws – that involve the management of risks to the health and safety of everyone in a workplace. Links to the WHS Regulations in each state and territory are provided in Appendix B.

2. General risk management principles

AC pipes become hazardous when the asbestos fibres are no longer bonded securely with cement and are instead released into the air or soil. This can occur when AC pipes deteriorate due to age or when they are disturbed or damaged, for example during maintenance work.

Under WHS laws a water agency (as a person conducting a business or undertaking[2]) must ensure that:

- exposure of people at the workplace to airborne asbestos is eliminated or, if elimination is not reasonably practicable, exposure is minimised so far as is reasonably practicable (from herein this will be referred to as **the duty to ensure that persons are not exposed to airborne asbestos**), and
- the exposure standard for asbestos is not exceeded at the workplace. [3]

Under environment protection laws a water agency must:

- prevent harm to human health, and
- ensure the environment is not polluted with asbestos waste.

Eliminating or minimising exposure to asbestos fibres from AC pipes involves the following steps:

1. **identify hazards** – for example, find out which pipes contain, or may contain, asbestos
2. **assess risks** – for example, understand how likely it is that asbestos fibres could be released and how easily people could be exposed
3. **control risks** – for example, implement the most effective control measure that is reasonably practicable in the circumstances
4. **review control measures** – for example, ensure control measures are working as planned and remain effective over time.

2.1 Hierarchy of risk control

Eliminating exposure to airborne asbestos from AC pipes is not always reasonably practicable. For example, removing AC pipes can eliminate exposure occurring in the future, but creates a risk of exposure to the workers carrying out the removal. If removal of AC pipes is not reasonably practicable, the release of airborne asbestos fibres can be minimised by ensuring that in situ AC pipe is not exposed, damaged or disturbed. Control measures include enclosing, encapsulating, or sealing the surface of the AC pipe.

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[2] In Victoria, a water agency has these duties as a person who manages or controls a workplace and/or as an employer.

[3] The exposure standard for asbestos is a respirable fibre level of 0.1 fibres/ml of air measured in a person's breathing zone and expressed as a time weighted average fibre concentration calculated over an eight-hour working day and measured over a minimum period of four hours in accordance with:

- the Membrane Filter Method
- a method determined by the relevant regulator.

The risk of airborne asbestos exposure during maintenance work, remediation or removal of AC pipes must be eliminated or minimised so far as is reasonably practicable, for example by using work methods and tools that control the release of asbestos fibres and wearing suitable personal protective equipment.

It is important to ensure that control measures remain effective over time. For instance, if a decision is made to leave decommissioned AC pipes in situ, they must be covered with enough soil to prevent future exposure due to ground erosion. Measures to eliminate or minimise the risk of accidental encounters with AC pipes must also be considered, such as registering with Dial-Before-You-Dig. Other measures could include, for example, installing warning signs where reasonably practicable.

If AC pipes are located on private agricultural land, then control measures suitable for private land must be used to prevent exposure so far as is reasonably practicable. Ensuring the effectiveness of control measures on private property may be more difficult than on publicly owned land or land owned by a water agency, as water agencies have less influence and control over a landowner's activities in relation to the ground surrounding the AC pipe.

2.2 Consultation

Consultation with workers, worker representatives and other persons that have duties in relation to the work on AC pipes is a legal requirement under WHS laws and an essential part of managing health and safety risks.

Consultation facilitates sharing information and receiving input about the hazards associated with planned work and how to effectively control risks.

Before commencing work on or in relation to AC pipes, a water agency must consult, so far as is reasonably practicable, with:

- workers who will be carrying out the work or who are affected by the work, about the risks associated with the work
- businesses or organisations, including local government, that have work health and safety duties in relation to the site, so that all duty holders can cooperate and coordinate work to minimise risks of asbestos exposure.

A water agency can determine the most appropriate form of consultation in the circumstances. For example, it may involve informing the local council via email where and when the work will take place and providing contact details to discuss the project before it commences. Information on the scope of the work and the measures that will be taken to minimise risks of asbestos exposure can be included in notices sent to affected residents advising of interruptions to service while work is carried out.

Further guidance on consultation can be found in WHS Codes of Practice (listed in Appendix B).

3. Risk Identification

Like all asbestos-containing materials (ACM) at a workplace, a pipe must be inspected by a competent person to confirm if it contains asbestos. Otherwise, it must be assumed to be an AC pipe unless the water agency has reasonable grounds to believe that it is not an AC pipe. For example, a water agency would have reasonable grounds to believe that a water or sewer pipe manufactured after 31 December 2003 would not be made of AC.

A water agency may confirm the presence of asbestos by arranging for a sample of the pipe material to be analysed by a laboratory accredited by the National Association of Testing Authorities (NATA).[4]

3.1 Asbestos registers

An asbestos register is a document that lists the known locations, or likely presence, of asbestos in a workplace.

Under WHS laws, an up-to-date asbestos register must be kept for all workplaces where asbestos is present or assumed to be present.[5]

> The term **workplace** is broadly defined in WHS laws, meaning that the requirement to prepare and maintain an asbestos register applies to the site of the AC pipe, being a place where a worker goes, or is likely to be, while at work.

The purpose of an asbestos register is to prevent exposure to airborne asbestos fibres by ensuring workers and others at the workplace do not accidentally disturb asbestos-containing materials.

Generally, an asbestos register must:

- record the location, type (i.e., friable or non-friable) and condition of all AC pipes identified or assumed to be present at the workplace, including AC pipes that are in use, decommissioned or abandoned
- record the date on which the presence of AC pipe was identified
- be revised if an AC pipe is removed, disturbed, sealed or enclosed.

Photographs or site plans may be included in asbestos registers to show the location of asbestos. An asbestos register can be incorporated with or as a part of other documentation that a water agency keeps, such as a GIS (Geographic Information System).

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[4] See www.nata.com.au for further information.

[5] Under WHS Regulations in Queensland, New South Wales, the Australian Capital Territory, Tasmania, South Australia and Northern Territory an asbestos register must also be prepared and kept for a workplace constructed before 1 January 2004 when no asbestos or ACM is identified at the workplace or is not likely to be present from time to time. The register must state that no asbestos is present.

An asbestos register must be easily accessible to workers and a copy must be given to any contractors who carry out work on AC pipes.

A template asbestos register can be found in the WHS asbestos management codes of practice of each State and Territory, listed in Appendix B.

The presence of asbestos can also be indicated with a label or warning sign on or near the pipe, where reasonably practicable.

4. Risk Assessment

Although there is no requirement to carry out a formal risk assessment, or record it in writing, a risk assessment process will assist in determining the likelihood of asbestos fibres being released from deteriorating AC pipes into the air or soil, as well as determining the most effective way to manage exposure risks.

Factors to consider when assessing risks relating to AC pipes include:

- presumed or known condition of the pipe
- AC pipe age
- AC pipe diameter
- depth of the AC pipe
- AC pipe run length
- history of failure events associated with the AC pipe
- remediation history
- the type of soil the AC pipe is buried in
- proposed and existing land use, for instance, whether the AC pipe will need to be excavated in the future because of land use
- adjacent infrastructure which may cause damage or disturbance to the AC pipe
- the type of work that is conducted on the AC pipe, including routine maintenance and infrequent activities (such as emergency repairs) and whether these tasks increase the risk of exposure
- availability of relevant documentation for current and future land users
- whether any chemicals used in the water supply or sewerage system causes deterioration of the AC pipe.

4.1 Determining the condition of AC pipe

Determining the condition of AC pipes, or the extent of deterioration, is an essential part of a risk assessment. There are both destructive and non-destructive processes for assessing the condition of an AC pipe. Where appropriate, non-destructive processes should be used as they prevent airborne asbestos from being released. An example of a non-destructive process is predictive modelling which can be carried out by applying knowledge of how AC pipes deteriorate and failure rates. For many water agencies this condition monitoring is standard practice in their day-to-day operations.

Other non-destructive methods for assessing the condition of AC pipes include ultrasonic techniques and in situ CT scanning. The problem with these methods is that while they can help to determine whether a pipe can still hold internal pressure, they cannot determine whether it is deteriorating.

If non-destructive testing is not practical or determinative, then a small section of the AC pipe can be removed to assess its condition. Typical destructive methods of condition assessment include:

- the phenolphthalein dye test
- crush testing.

Removing a section of AC pipe for condition assessment is not prohibited under WHS laws as it can fall within one of the exceptions to the prohibition (for example, maintenance or service work on non-friable asbestos or ACM, fixed or installed before 31 December 2003; or as genuine research and analysis). However, persons undertaking the condition assessment must be suitably trained in managing asbestos risks and carry out the work with appropriate safety measures in place.

Removal methods must eliminate or minimise the risks of exposure to airborne asbestos so far as is reasonably practicable. The section of AC pipe must be suitably wrapped and/or sealed, and labelled clearly as containing asbestos, to ensure safe transport and disposal. In the Australian Capital Territory, removing a section of AC pipe for condition assessment may only be done by a licensed asbestos removalist.

Once the assessment is complete, a water agency must ensure the proper disposal of the section at a landfill licensed to accept asbestos waste. This requirement can be incorporated into the agreement with the consultant who has been engaged to undertake the condition assessment.

Drinking water

There is no routine monitoring of Australian drinking water supplies for the presence of asbestos, but it is known that the deterioration of AC pipes can result in asbestos fibres being released into water supplies. The *Australian Drinking Water Guidelines* which provide guidance to water agencies on monitoring and managing drinking water quality state that, based on the weight of evidence of the available toxicological data, ingested asbestos is not hazardous to health.

The World Health Organization (WHO) updated its *Asbestos in Drinking-water: Background document for development of WHO Guidelines for Drinking-water Quality for Asbestos* in December 2021. The WHO has maintained its conclusion which is reflected in the *Australian Drinking Water Guidelines* (noted above). However, the WHO noted that due to the uncertainties and limitations of the epidemiological data, 'it is appropriate to try to minimise the concentrations of asbestos fibres in drinking-water as far as practical'. The WHO further notes that measures taken to manage risks of airborne asbestos exposure – which are outlined in these AC water and sewer pipe management guidelines – also serve to eliminate or minimise ingestion of asbestos fibres in drinking water.

5. Risk control

5.1 Training of workers and appropriate licences

Any workers who are or may be involved in asbestos removal work or asbestos-related work[6], including carrying out maintenance or repairs on AC pipes, must be trained in:

- the identification of asbestos and ACM
- the safe handling of asbestos and ACM
- suitable control measures for asbestos and ACM.

There are additional training requirements for carrying out licensed asbestos removal work.

In most circumstances, WHS laws require asbestos to be removed from workplaces by a licensed asbestos removalist. There are two classes of licensed asbestos removalist:[7]

- Class A: authorised to remove friable and non-friable asbestos
- Class B: authorised to remove only non-friable asbestos.

No more than 10m^2 of non-friable asbestos can be removed without a licence, except in the Australian Capital Territory where any amount of asbestos material must be removed by a licensed asbestos removalist. In Victoria there is an additional requirement that removal of less than 10m^2 of non-friable asbestos can only be done without a licence where the total time for all asbestos removal work is less than one hour in any period of 7 days, or when removing asbestos contaminated dust, is no more than 10 minutes.

Although the removal of a small amount of AC pipe is permitted without a licence in most jurisdictions, there are safety and cost benefits of having all AC pipe removal carried out by a licensed asbestos removalist. Among other things, it can avoid the delay and associated costs involved when risks are encountered, such as friable asbestos, which must be removed by a licensed asbestos removalist. In addition, a licensed asbestos removalist has the necessary insurance if something goes wrong.

5.2 Monitor your workers' health

In addition to ensuring all workers are appropriately trained, water agencies should check whether workers removing or undertaking work on or near AC pipes require health monitoring. Health monitoring is required in certain circumstances including if there is a risk of exposure. Detailed guidance is provided in Safe Work Australia's Health Monitoring: Guide for asbestos. In the Victorian WHS laws, health monitoring of workers engaged in asbestos-related activities is referred to as medical examinations. Guidance for Victoria can be found in WorkSafe Victoria's Compliance Code Managing Asbestos in Workplaces.

Health monitoring must only be carried out by a registered medical practitioner with relevant experience.

[6] Known as asbestos-related activities in Victoria.

[7] Terminology for licence classes may vary, such as in Western Australia.

5.3 Asbestos management plan

In most states and territories, a written asbestos management plan must be prepared for each work site where AC pipe is located.[8] In Victoria, an asbestos management plan does not need to be prepared or maintained, but is described in WorkSafe Victoria's Compliance Code for Managing asbestos in workplaces as a beneficial tool for managing the risks associated with asbestos in the workplace.

An asbestos management plan must include details about the work that will be carried out on or in relation to an AC pipe, including:

- the asbestos register for the site
- details of work that has been carried out previously on or in relation to the AC pipe
- the consultation processes that will be followed prior to the work being carried out
- decisions about AC pipe management options, for example, reasons why specific management methods were or were not chosen
- procedures for detailing incidents or emergencies involving the AC pipe
- arrangements for monitoring the condition of the AC pipe
- the roles and responsibilities of people involved in the plan
- training arrangements and/or details of training completed
- the procedure and timeline for reviewing and revising the asbestos management plan, including the asbestos register
- safe work methods.

Like an asbestos register, an asbestos management plan must be kept up to date, including to reflect condition assessments or maintenance or removal that has been carried out.

Asbestos registers and asbestos management plans must be easily accessible to anyone who uses the site. One method of ensuring accessibility of these documents is to register with Dial-Before-You-Dig. Water agencies can provide up-to-date asbestos information using this service. Before any excavation work is carried out at the site, the Dial-Before-You-Dig service should be contacted to obtain the asbestos register so that appropriate safety measures can be implemented.

5.4 Safe Work Method Statement

Repairing or removing AC pipes is classified as 'high risk construction work' under WHS laws because it involves, or is likely to involve, the disturbance of asbestos. A Safe Work Method Statement (SWMS) must be prepared before high-risk construction work commences and must include details on the controls that are to be implemented to eliminate or minimise the risk of asbestos exposure, so far as is reasonably possible. Workers, including employees and contractors, need to carry out the work in accordance with the SWMS.

[8] Guidance about asbestos management plans can be found in the relevant WHS Codes of Practice, as listed in Appendix B.

Guidance on high-risk construction work, including SWMS, can be found in WHS construction work codes of practice or in SWMS guidance of each state or territory (links provided in Appendix B).

5.5 Asbestos removal notification

The state or territory WHS regulator must be notified of asbestos removal work before it is carried out. This requirement applies to the removal of any amount of asbestos in the Australian Capital Territory. In other states and territories, notification is required for any amount of friable asbestos and the removal of more than 10m^2 of non-friable asbestos.

In most instances, notice must be provided at least 5 days before the work commences. There are exceptions for emergencies. Further information and links to asbestos removal notification forms are listed below:

- **WorkSafe ACT** – Asbestos removal notice
- **SafeWork NSW** – Asbestos notifications
- **WorkSafe NT** – Asbestos notification
- **Workplace Health and Safety Queensland** – Asbestos notifications
- **SafeWork SA** – Notification of asbestos removal
- **WorkSafe Tasmania –** Notification of the commencement of asbestos removal
- **WorkSafe Victoria** – Asbestos removal notification
- **WorkSafe Western Australia –** Notification of unrestricted asbestos removal work. NB: this form must be used for the removal of any amount of *friable* asbestos. Notification is not currently required for the removal of non-friable asbestos.[9]
- **Comcare** – Asbestos notifications. NB: notification to Comcare is required when an asbestos removalist is carrying out asbestos removal work at a workplace of an Australian Government agency, statutory authority or for a self-insured licensee.

5.6 Signs and barricades

While work is being carried out on AC pipes, the water agency must ensure that there are barricades and clear warning signs to alert people in the vicinity that asbestos-related work is taking place.

5.7 Use of equipment

WHS laws restrict how tools and equipment may be used on asbestos and asbestos-containing materials, including AC pipes.

Power tools and brooms, or other implements that may cause the release of asbestos fibres may be used on AC pipes only if the tools, brooms, or implements are enclosed or otherwise used in a way that captures or suppresses asbestos fibres safely.

The use of compressed air and high-pressure water spray on AC pipes is prohibited by WHS laws, except in Victoria, where it is permitted if the use is controlled or if airborne asbestos

[9] These requirements may change when new Western Australian WHS legislation is expected to commence in January 2022.

fibre levels do not exceed 0.01 f/ml while the tool or instrument is in use.[10] In other states and territories, water jetting to clear blockages from water and sewer pipes must not be used unless an exemption for the activity has been granted by the WHS regulator.

Applying for a general exemption

The WHS regulator in each state and territory is the decision-maker for granting exemptions from requirements in their WHS regulations including exemptions to use high pressure water spray.

In deciding whether to grant an exemption the WHS regulator must consider all relevant matters including:

- whether granting the exemption will result in a standard of health and safety that is at least equivalent to the standard that would be achieved by compliance with the provision(s)
- whether at least an equivalent standard of health and safety can be achieved by granting a conditional exemption
- whether exceptional circumstances justify the granting of the exemption, for example emergency situations, practicality of applying a regulatory provision or technological change
- if the proposed exemption relates to a particular thing, whether the risk associated with that thing is not significant if the exemption is granted
- whether the applicant has carried out consultation.

Although each WHS regulator has discretion as to whether to grant an exemption, there are agreed national principles for granting exemptions from requirements in the WHS regulations.

Guidance on applying for a general WHS exemption is provided by the following WHS regulators. In other jurisdictions it is recommended that a water agency contact the WHS regulator.

- **SafeWork NSW –** Guide for applicants for exemptions
- **WorkSafe NT –** Exemptions
- **WorkSafe Qld –** Exemptions to the regulation
- **WorkSafe Tasmania –** Exemptions under the Work Health and Safety Regulations
- **WorkSafe Victoria –** Applying for an exemption from complying with Victoria's health and safety regulations
- **WorkSafe Western Australia –** Request for exemption, Department of Mines, Industry Regulation and Safety
- **Comcare –** Regulatory guide – general exemptions.

[10] Victorian *Occupational Health and Safety Regulations 2017*, r.216.

5.8 Air monitoring

Air monitoring during licensed asbestos removal work may be required, even if the work involves the removal of non-friable asbestos, for example, where there is uncertainty about whether the exposure standard may be exceeded or, such as in South Australia, where air monitoring after both friable and non-friable licensed asbestos removal is required under WHS laws.

If the work involves the removal of any friable asbestos (and therefore must be carried out by a Class A licensed removalist) air monitoring must be carried out before and during the work by an independent licensed assessor or competent person. Air monitoring before and during the work is not required in Victoria if the removal of friable asbestos or asbestos contaminated dust is performed outdoors and will not constitute a risk to other persons.[11]

5.9 Decontamination and cleaning of the site

The work area, tools and workers must be decontaminated immediately after completing any work on or around AC pipes to remove asbestos fibres that can be carried on clothing, equipment, tools, or people.

Any clothing, equipment or tools that cannot be decontaminated or are not intended for re-use must be disposed of as asbestos waste.

Advice on decontamination procedures can be found in Codes of Practice or by consulting an asbestos professional.

5.10 Clearance inspections

If the work involves licensed asbestos removal, a clearance inspection must be carried out and a clearance certificate must be issued. In all states and territories apart from the Australian Capital Territory, Victoria and Western Australia, a clearance inspection must be undertaken by:

- an independent licensed asbestos assessor, for work carried out by a Class A licensed asbestos removalist (for example, if the removal work involved friable asbestos)
- an independent competent person, for all other asbestos removal work.

In the Australian Capital Territory, clearance inspections must be done by an independent licensed asbestos assessor and in Victoria and Western Australia by an independent competent person.

A clearance inspection must involve air-monitoring if the removal work was carried out by a Class A licensed removalist and may involve air-monitoring for all other asbestos removal work. The licensed assessor or competent person engaged to complete the clearance inspection will provide advice on this.

Until a clearance certificate is issued all measures required for an asbestos worksite must remain in place including signs and barricades even if the asbestos-related work itself has been completed.

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[11] Victorian *Occupational Health and Safety Regulations 2017*, r.292. Note there is no requirement for air monitoring in Victoria if the work involved only non-friable asbestos.

5.11 Site contamination

Laws dealing with contaminated land are designed to prevent risks to human health and to the environment. Determining potential risk to human health will depend on the circumstances at each site and generally includes assessing the likelihood that asbestos will be disturbed and therefore pose a risk due to the release of airborne asbestos fibres.

Depending on the jurisdiction, the main factors that will need to be considered for site contamination are:

- whether the amount of asbestos in the soil is equal to or above the prescribed levels
- the potential risk to human health
- the risk of material or serious environmental harm, as defined in the relevant environment protection law.

Notification

Water agencies are required to notify environment protection regulators of asbestos contamination in or on the land. However, determining if land is considered contaminated for these purposes is not straight forward; the mere presence of AC pipe in situ will not trigger these requirements.

Environment protection laws in all states and territories except Victoria rely on the health screening levels defined in the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (the NEPM) to assist land users determine if a site is contaminated and/or whether there is a level of contamination that must be notified to the environment protection regulator.

In Victoria, the obligation to report contamination is triggered when a person is, or is likely to be, exposed to airborne asbestos fibre levels of above 0.01 fibres/ml of air measured in a person's breathing zone and expressed as a time weighted average fibre concentration calculated over an 8-hour period.

If it is unclear whether notification is required, the water agency should seek advice from the environment protection regulator.

If a water agency has advised the environment protection regulator that a site is contaminated, the environment protection regulator may determine that the contamination is significant and requires further action by the water agency.

Alternatively, the environment protection regulator may determine that no further action is required if there is appropriate in situ management to prevent potential exposure from the asbestos contamination. If this is the case, the water agency will need to continue to manage the site in accordance with legislative requirements. If there are intentions to change the existing land use, the local planning authority may require a water agency to remediate the site for the proposed new use.

Further guidance on managing asbestos in soil is provided in the following guides:

- **Environment Protection Authority, NSW –** Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1998
- **SafeWork NSW –** Managing asbestos in or on soil guide
- **Department of Health, WA –** Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia – 2021 and Management of Small-Scale Low-Risk Soil Asbestos Contamination – 2009

5.12 Asbestos waste management

Under WHS laws ‘asbestos waste’ is defined as asbestos or ACM which has been removed, as well as disposable items used during removal. Asbestos waste must be disposed of as soon as practicable at a site authorised to accept asbestos waste. The requirements are slightly different in Western Australia and Victoria. For example, in Victoria asbestos waste must be disposed of as soon as reasonably possible at permitted premises.

The Asbestos Safety and Eradication Agency’s website has a searchable map of Australia where you can find your nearest licensed asbestos facility.

Under environment protection laws ‘waste’ has a broad meaning which includes ‘discarded’, ‘surplus’ or ‘abandoned’ substances or matter. In some jurisdictions there is a threshold for determining if waste is asbestos waste. In NSW no threshold exists for asbestos waste which is defined in the *Protection of the Environment Operations Act 1997* as any waste that contains asbestos, which includes soil with unwanted, surplus, or abandoned ACM pipe.

Decommissioned AC pipes that remain in-situ

A decommissioned AC pipe that remains in the ground is likely to be ‘asbestos waste’ for the purposes of environment protection laws because it is ‘discarded’ or ‘surplus’. However, there is no requirement to remove these pipes unless removal is determined necessary to manage the risk to human health.

Risks associated with AC pipes that remain in the ground must be controlled and the control measures need to be recorded in the asbestos management plan. This should include procedures to eliminate or minimise accidental exposure by other land users so far as is reasonably practicable.

Additionally, the duty to ensure that persons are not exposed to airborne asbestos and the duty to not pollute the environment extends to the external surface of the AC pipe. Therefore, condition monitoring of AC pipes must be ongoing to identify any deterioration and subsequent contamination of surrounding soil. Methods to assess deterioration that do not involve removing surface soils are preferable, as they minimise the risk of exposure to asbestos fibres. Excavation and exposure of the in-situ pipe to assess the condition should be by exception, such as during maintenance activities or if the pipe is likely to be exposed through excavation or erosion of the surrounding soil or due to environmental change. See Section 4.1 of these Guidelines for guidance on various condition assessment methods.

AC pipes that have been disturbed or damaged

Asbestos-related work, such as maintenance or repair work on AC pipes, may disturb or damage the AC and create asbestos waste in the form of broken pieces and debris. AC pipe may also break or become fragmented during pipe rehabilitation processes, resulting in soil contamination. This may occur, for example, when connecting new pipe to existing AC pipe.

Any remnants of broken or damaged AC pipe, as well as the contaminated soil should be removed from the ground and disposed of in accordance with WHS and environment protection laws.

Temporary storage

Asbestos waste that is temporarily stored on site until the overall asbestos removal work is completed must be contained, correctly labelled, and secured to prevent unauthorised access. For example, waste drums or skip bins should be lined with heavy duty polyethylene (PE) sheeting (minimum 200 µm thickness), and warning labels should be placed on the top

and sides of each drum or bin with the words, ‘Danger: Asbestos – do not break seal’ or a similar warning.

Under WHS laws asbestos waste may be temporarily stored at a depot or holding facility, provided that safe storage requirements are met, and the site is authorised for this purpose by the environment protection regulator. For example, to minimise exposure risks so far as is reasonably practicable, asbestos waste from multiple jobs may be stored in one central location, before being transported in a single trip to a final disposal site.

As requirements for off-site temporary storage vary in each jurisdiction, for example, in relation to the amount of asbestos waste that may be stored, water agencies should seek advice from the relevant environment protection regulator.

Transport

In most cases, asbestos waste must be transported for disposal by a person licensed by the environment protection regulator to transport that material (in accordance with the Australian Dangerous Goods Code). Licences contain a set of conditions aimed at preventing pollution, managing risks, monitoring impacts, and reducing waste.

However, there are exceptions. For example, in New South Wales a licence is not needed to transport asbestos waste from a removal site to a depot for temporary storage. In Queensland there is a threshold and an environmental authority is required for transporting more than 175 kg of asbestos waste. The relevant environment protection regulator can provide guidance on licencing requirements in your state or territory.

6. Common methods for managing deteriorating AC pipe

There are several common methods for managing ageing AC pipes that are permitted under current laws to control the risk of airborne asbestos fibres being released.

Figure 1 shows the common management methods in a hierarchy based on how effective the method is for eliminating or minimising exposure to airborne asbestos fibres while the work is being carried out and for any future work on that site. These methods are described below.

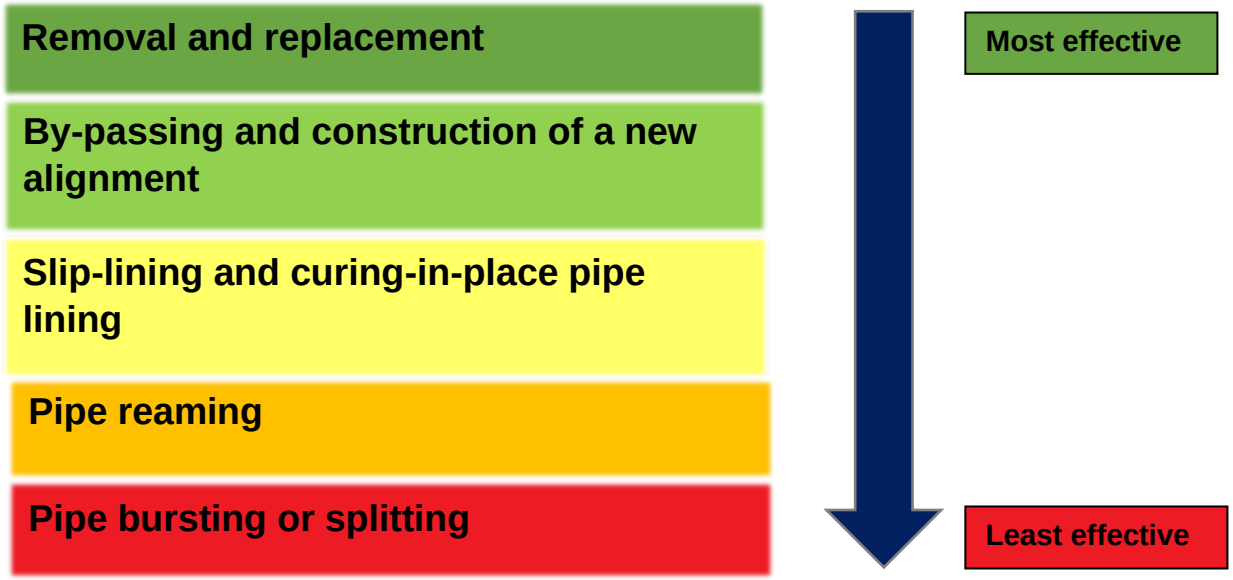

Figure 1: Hierarchy of AC pipe management methods

6.1 Removal of AC pipe and replacement

Full removal of existing AC pipes, including associated debris and replacement with new pipe is the only method of rehabilitation that completely removes future exposure risks.

Typically pipe lengths are removed in whole segments from collar to collar, reducing breakage of the AC pipe and therefore reducing the risk of exposure to airborne asbestos fibres. If the AC pipe is broken or damaged during the process, surrounding soil may require removal in conjunction with the pipe.

This is the most expensive AC pipe rehabilitation option as full excavation is required and asbestos must be removed and disposed of in accordance with WHS and environment protection laws. However, the benefit of this method is that there are no ongoing risks and costs that are usually associated with managing decommissioned AC pipe in situ.

Removal must be carried out by a licensed asbestos removalist (other than in the Australian Capital Territory) unless the amount of AC pipe being removed is less than 10m^2.

6.2 By-passing and construction of a new alignment

The most common approach to AC pipe rehabilitation is by-passing. It involves making an AC pipe section redundant by disconnecting it and installing a brand-new service pipeline alongside. This method leaves the redundant AC pipe section in-situ.

Although the redundant pipe will be decommissioned, it remains the responsibility of the water agency to manage the risks associated with it. This includes recording the decommissioned AC pipe in an asbestos register and ensuring that exposure to airborne asbestos is eliminated or minimised so far as is reasonably practicable. Any decommissioned AC pipe should also be recorded in all asset information requests, such as the Dial-Before-You-Dig service, to confirm ownership and prevent accidental encounters with the decommissioned AC pipe.

6.3 Slip-lining and curing-in-place pipe lining

Slip lining involves using plant to pull through a smaller diameter pipe inside the existing AC pipe. Curing-in-place involves lining an existing AC pipe with a resin saturated fabric tube. This is done by inserting the fabric via inversion or with a winch, and then inflating the fabric tube with air or water until the resin saturated fabric hardens to fully line the internal pipe surface. The tube is constructed with a mix of polyester or glass fibre plastic-coated fabric.

6.4 Pipe reaming

Pipe reaming involves pumping drilling fluid into the existing AC pipe and, as the reaming tool attached to the new pipe comes forward, the existing pipe is then broken. The pipe fragments of the redundant AC pipe are captured in the drilling fluid along with some of the soil, these are then flushed down stream to a receiving pit.

6.5 Pipe bursting or splitting

Pipe bursting or splitting techniques involve machinery that is pushed up the AC pipe section to expand, split or break the pipe, creating a cavity for a replacement pipe to be inserted into the void.

A disadvantage of these methods is that removing all the fragments of the AC pipe from the surrounding soil is difficult to achieve with current technologies, and generally requires excavation, remediation, and validation by sampling to meet clean-up requirements. This method should only be chosen if no other methods are reasonably practicable. Additionally, if using this method, an exemption from disposal requirements is needed from the WHS regulator to allow the asbestos waste to remain in the ground.

This method may also result in asbestos contaminated soil, which triggers notification requirements under environment protection laws. Hence, advice from the environment protection regulator should be sought.

6.6 New and emerging methods

New trenchless methods for rehabilitating AC pipes are emerging and may be used so long as compliance with all applicable laws is maintained.

Examples that are currently being explored involve:

- *In situ encapsulation of broken AC pipe*: this method involves guiding various types of heads into an AC pipe to split, crack or grind the AC pipe in situ, while simultaneously drawing a new pipe into the old pipe alignment. At the same time, an

encapsulating material, in a vibrant colour, is pumped into the head to simultaneously encapsulate any asbestos fibres and broken AC pipe – this occurs at the point where the head is decommissioning the old pipe. The vibrant colour of the encapsulated materials in contrast with the new pipe, ensures they are easily identifiable to future users of the site.

- *Pipe extraction also known as the 'pipe pull & split' process*: this method involves removing AC pipes by pulling it into an open pit where it is split into a filter bag for wrapping and disposal. This method is useful in circumstances where removal of vegetation or infrastructure to access the AC pipe may cause significant environmental and/or community impact.
- *Lining by die reduction*: this method involves reducing the new polyethylene (PE) pipe in diameter so it can be pulled into the existing AC pipe and then reverting it to its original size. With this method, the AC pipe is only disturbed at connection points, resulting in minimal removal of AC pipe.
- *Spirally wound PVC*: this method involves spirally winding a single uPVC plastic strip into an existing AC pipe via a machine placed in the channel of the access chamber. The edges of the strip are securely locked together by a built-in interlocking channel to form a strong structural liner inside the AC pipe. A section pipe is then installed and radially expanded (with a patented mechanism) to make contact with the inside wall of the AC pipe. This technique is only intended for non-pressure applications such as gravity sewers and stormwater applications.

APPENDIX A: GLOSSARY

AC pipes

Asbestos cement (AC) water and sewer pipes (including pressure pipes and gravity mains) that are part of a water agency's water supply and sewerage system.

Environment protection regulator

The state or territory regulator/s for environment protection including asbestos contamination of soil, illegal dumping of asbestos waste and the transport and disposal of asbestos.

Reasonably practicable

What is reasonably practicable means that which is, or was at a particular time, reasonably able to be done to ensure health and safety, taking into account and weighing up all relevant matters including:

a) the likelihood of the hazard or the risk occurring
b) the degree of harm that might result from the hazard or the risk
c) what the person knows, or ought to reasonably know, about the hazard or risk, and ways of eliminating or minimising the risk
d) the availability and suitability of ways to eliminate or minimise the risk, and
e) after assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk.

Further guidance on what is 'reasonably practicable' in the context of work health and safety can be found in Safe Work Australia's Interpretive guideline – Model Work Health and Safety Act The meaning of 'reasonably practicable'

Safe Work Method Statement (SWMS)

A written document that is required for high-risk construction work, including asbestos removal, under WHS law. A SWMS must identify the high-risk work, the hazards and risks of that work and describe control measures to be implemented. Refer to jurisdictional-specific requirements in WHS regulations, codes of practice and guidance listed in Appendix B.

Water agency

A public or private utility organisation or business providing water and/or sewerage services. May include a local council in some areas.

Worker

For the purposes of these Guidelines, the term 'worker' is used to refer to employees, contractors, labour hire workers or any other persons who carry out work for a business or undertaking or an employer.

APPENDIX B: REGULATIONS, CODES OF PRACTICE AND GUIDANCE MATERIALS

Australian Capital Territory

WHS Regulations	*Work Health and Safety Regulation 2011*
WHS Codes of Practice	*Work Health and Safety (How to Manage and Control Asbestos in the Workplace Code of Practice) Approval 2020*
	Work Health and Safety (How to Safely Remove Asbestos Code of Practice) Approval 2020
	Work Health and Safety (Work Health and Safety Consultation, Cooperation and Coordination Code of Practice) Approval 2018
	Work Health and Safety (Construction Work Code of Practice) Approval 2018
Guidance materials and other resources	Asbestos - WorkSafe ACT

New South Wales

WHS Regulations	*Work Health and Safety Regulation 2017*
WHS Codes of Practice	*Code of Practice - How to manage and control asbestos in the workplace*
	Code of Practice - How to safety removal asbestos
	Code of Practice – Work health and safety consultation, cooperation and coordination
	Code of Practice – Construction Work
Guidance materials and other resources	SafeWork NSW – Managing asbestos in or on soil - 2014
	Asbestos in NSW

Northern Territory

WHS Regulations	*Work Health and Safety (National Uniform Legislation) Regulations 2011*
WHS Codes of Practice	*How to manage and control asbestos in the workplace | NT WorkSafe*
	How to safely remove asbestos | NT WorkSafe
	Work health and safety consultation, cooperation and coordination | NT WorkSafe
	Construction work | NT WorkSafe
Guidance materials and other resources	Asbestos in the NT

Queensland

WHS Regulations	*Work Health and Safety Regulation 2011*
WHS Codes of Practice	*How to manage and control asbestos in the workplace Code of Practice 2021 (worksafe.qld.gov.au)*
	How to safely remove asbestos Code of Practice 2021 (worksafe.qld.gov.au)
	Work health and safety consultation, cooperation and coordination Code of Practice 2021 (worksafe.qld.gov.au)
Guidance materials and other resources	Queensland Government – Asbestos website
	Safe work method statements | WorkSafe.qld.gov.au

South Australia

WHS Regulations	*Work Health and Safety Regulations 2012*
WHS Codes of Practice	*How to manage and control asbestos in the workplace – Code of Practice*
	How to safely remove asbestos – Code of Practice
	Work health and safety consultation, cooperation and coordination - Code of Practice
Guidance materials and other resources	Wastes containing asbestos – removal, transport and disposal (epa.sa.gov.au)
	Asbestos.sa.gov.au
	SWMS for high risk construction work | SafeWork SA

Tasmania

WHS Regulations	*Work Health and Safety Regulations 2012*
WHS Codes of Practice	*How to manage and control asbestos in the workplace: Code of practice (worksafe.tas.gov.au)*
	How to safely remove asbestos: Code of practice (worksafe.tas.gov.au)
	Work health and safety consultation, cooperation and coordination: Code of practice (worksafe.tas.gov.au)
	Construction work: Code of practice (worksafe.tas.gov.au)
Guidance materials and other resources	Asbestos safety (worksafe.tas.gov.au)

Victoria

WHS Regulations	*Occupational Health and Safety Regulations 2017*
WHS Codes of Practice	*Compliance code: Managing asbestos in workplaces - WorkSafe*
	Compliance code: Removing asbestos in workplaces - WorkSafe
Guidance materials and other resources	Asbestos-cement water pipe management - WorkSafe
	How to manage asbestos waste – for industry | Environment Protection Authority Victoria (epa.vic.gov.au)
	Asbestos in Victoria | asbestos.vic.gov.au
	Safe work method statements (SWMS) - WorkSafe
	WorkSafe Victoria's Compliance Code Managing Asbestos in Workplaces

Western Australia

WHS Regulations	*Occupational Safety and Health Regulations 1996*[12]
WHS Codes of Practice	*National code of practice for the management and control of asbestos in workplaces [NOHSC:2018 (2005)]* | Department of Mines, Industry Regulation and Safety (commerce.wa.gov.au)[13]
	National code of practice for the safe removal of asbestos 2nd edition [NOHSC:2002(2005)] | Department of Mines, Industry Regulation and Safety (commerce.wa.gov.au)[14]
Guidance materials and other resources	Western Australia Department of Health – Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia – 2021
	Western Australia Department of Health – Management of Small-Scale Low-Risk Soil Asbestos Contamination – 2009
	Safe Work Method Statements | Department of Mines, Industry Regulation and Safety (commerce.wa.gov.au).
	OHSE Subbypack (commerce.wa.gov.au), includes a template Safe Work Method Statement.

Commonwealth

Guidance materials and other resources	Health Monitoring: Guide for asbestos

[12] New WHS laws are expected to commence in Western Australia in January 2022. These Guidelines will be updated to include links to the news laws and Codes of Practice when they apply.

[13] This code of practice may be updated to reflect the new WHS laws when they commence. These Guidelines will be updated to include links to new Codes of Practice when they apply.

[14] This code of practice may be updated to reflect the new WHS laws when they commence. These Guidelines will be updated to include links to new Codes of Practice when they apply.

APPENDIX C: JURISDICTIONAL CONTACTS AND INFORMATION

Australian Capital Territory

WHS Regulator	**WorkSafe ACT**
Environment Regulator	**ACT Environment, Planning and Sustainable Development Directorate**

New South Wales

WHS Regulator	**SafeWork NSW**
Environment Regulator	**NSW Environment Protection Authority**
Public Health Regulator	**NSW Health**
Local Government Association	**Local Government NSW**
State-wide asbestos guidance	**NSW Government Asbestos website**
Other relevant agencies and organisations	**The Office of Local Government**

Northern Territory

WHS Regulator	**NT WorkSafe**
Environment Regulator	**Northern Territory Environment Protection Authority**
Public Health Regulator	**Department of Health**
State-wide asbestos guidance	**NT Government – Asbestos in the NT**

Queensland

WHS Regulator	**Workplace Health and Safety Queensland**
Environment Regulator	**Department of Environment and Science**
Public Health Regulator	**Queensland Health**
Local Government Association	**Local Government Association Queensland**
State-wide asbestos guidance	**Queensland Government Asbestos website**

South Australia

WHS Regulator	**SafeWork SA**
Environment Regulator	**EPA South Australia**
Public Health Regulator	**SA Health**
Local Government Association	**Local Government Association of South Australia**
State-wide asbestos guidance	**Government of South Australia Asbestos website**
Other relevant agencies and organisations	**Department for Infrastructure and Transport**

Tasmania

WHS Regulator	**WorkSafe Tasmania**
Environment Regulator	**EPA Tasmania**
Local Government Association	**Local Government Association Tasmania**

Victoria

WHS Regulator	**WorkSafe Victoria**
Environment Regulator	**EPA Victoria**
Local Government Association	**Victorian Local Governance Association** **Municipal Association of Victoria**
State-wide asbestos guidance	**Victorian Government Asbestos website**
Other relevant agencies and organisations	**Know Your Council** **Local Government Victoria**

Western Australia

WHS Regulator	**WorkSafe WA**
Environment Regulator	**Department of Water and Environmental Regulation**
Public Health Regulator	**Department of Health**
Local Government Association	**WA Local Government Association**
Other relevant agencies and organisations	**Department of Local Government, Sport and Cultural Industries**

Commonwealth

WHS Regulator	**Comcare**
Other agencies	**Safe Work Australia**
	Asbestos Safety and Eradication Agency

Water industry associations

National association	**Water Services Association of Australia**
NSW association	**The Water Directorate (NSW)**
Queensland association	**Queensland Water Directorate**

APPENDIX D: CHECKLIST

The below list of questions may assist in ensuring that relevant factors are considered when determining an appropriate and safe method for managing AC pipe. It is not an exhaustive list.

Relevant matters	Comments/considerations
Have you accessed and reviewed the **asbestos register** for the site? Is the AC pipe listed on the register, including details about its condition?	
Is there an **asbestos management plan** for the AC pipe? If so, have you accessed and reviewed the plan?	
Have you reviewed relevant **laws and codes of practice** as well as the water agency's policies and procedures for managing AC pipes?	
What is the process for consultation with all relevant persons with management or control of the workplace? For instance, if it is public land, how will the local council be consulted about the method of AC pipe management?	
Is **sampling and testing** needed to determine the condition of the AC pipe? If so, how will asbestos exposure risks be managed?	
Has a **risk assessment** been completed to determine the risk of exposure to asbestos fibres? Did the risk assessment include consideration of: > **Location** of the AC pipe (depth in the soil, on public or private land, near public facilities or other service infrastructure)? > **Condition** of the AC pipe (failure rates, signs of deterioration, whether the pipe is whole or fragmented)? > Whether the AC pipe is **decommissioned** or still **in use** (to assess future maintenance requirements)?	
What **methods of managing the AC pipe** are reasonably practicable considering the risks of asbestos exposure? > Will any of those methods eliminate exposure to asbestos fibres now and/or into the future? > If elimination of asbestos exposure is not reasonably practicable, what methods will best minimise the risk of asbestos exposure?	

Are **regulatory approvals** required for the work? For example, environment protection or work health and safety regulators' approval for specific activities.	
Is **public communication** required to address any community concern about the work?	
Is the work being carried out in accordance with the **Safe Work Method Statement** (SWMS)?	
Is the work being undertaken or supervised by someone with an **asbestos removal licence**? What type of licence do they have? Is it current?	
Are all workers appropriately **trained**?	
Is the appropriate **personal protective equipment** provided and worn?	
Does the work area have **barricades and clear warning signs** to alert people in the vicinity of the potential risk of asbestos exposure?	
How will the resulting **asbestos waste**, including contaminated disposable materials and PPE be disposed of?	
Is a **clearance inspection** required to ensure all asbestos is removed?	
How will any remaining AC pipe left in-situ be managed?	
Is notification of **site contamination** under environment protection laws required?	
Who will be responsible for revising the **asbestos register** after the work is completed?	