STATE EMERGENCY MANAGEMENT PLAN

DISASTER WASTE MANAGEMENT GUIDELINES

PART 2: STRATEGIES, GUIDELINES AND FRAMEWORKS

Government of South Australia

STATE EMERGENCY MANAGEMENT PLAN (SEMP)		
Part 1: Arrangements	Part 2: Strategies, guidelines and frameworks	Part 3: Supporting plans
Governance arrangements, roles and responsibilities, and structures in place to reduce risk from hazards, and to plan and prepare for, respond to and recover from emergencies.	Various strategies, guidelines and frameworks that support the state's emergency management arrangements.	Required plans that support the state's emergency management arrangements (including hazard risk reduction plans, capability plans, control agency plans, functional support group plans, zone emergency management plans and operations manuals).

Figure 1: The SEMP is a series of documents split over 3 parts with accompanying annexes. This guideline sits under Part 2 of the SEMP.

The Disaster Waste Management Guidelines can be found on the Green Industries SA website.

The Disaster Waste Management Guidelines are reviewed every 3 years.

The custodian of the Disaster Waste Management Guidelines is the State Emergency Management Committee (SEMC) who may delegate this responsibility. At the time of publication, Green Industries SA has been delegated this responsibility.

AUTHORISATION

All emergency management arrangements in South Australia are governed by the *Emergency Management Act 2004* (the Act).

The State Emergency Management Plan (SEMP) is prepared under Section 9(1)(b) of the Act to guide the management of all emergencies. It is a function of the State Emergency Management Committee (SEMC) to prepare and keep the SEMP under review, and to ensure arrangements reflect best practice.

ACKNOWLEDGMENTS

The *Disaster Waste Management Guidelines* were commissioned by Green Industries SA in 2018 with funding assistance from the State Emergency Management Committee via the National Disaster Resilience Program.

Version 1 of the guidelines were prepared by Rawtec in consultation with South Australian stakeholders under the guidance of the Project Steering Committee and overseen by SEMC. Version 2 of the guidelines were updated in 2022 by Rawtec and Green Industries SA, in consultation with key stakeholders in SA and interstate.

This document, version 3, was updated in 2025 by Rawtec in consultation with Green Industries SA, Aboriginal Affairs and Reconciliation, the Department of the Premier and Cabinet, Local Government Functional Support Group, SA Environment Protection Authority (SA EPA), SafeWork SA, SA Police, Sustainable Solutions, and Waste and Management Services Pty Ltd.

GREEN INDUSTRIES SA

Green Industries SA is an enabler and driver of change, supporting development of the circular economy through diverse collaborations and partnerships which improve productivity, resilience, resource efficiency and the environment.

Its activities are guided by the primary objectives of the *Green Industries SA Act 2004* to promote:

- waste management practices that, as far as possible, eliminate waste or its consignment to landfill
- innovation and business activity in the waste management, resource recovery and green industry sectors, recognising that these areas present a valuable opportunity to contribute to the state's economic growth.

STATE EMERGENCY MANAGEMENT COMMITTEE

The State Emergency Management Committee provides leadership and oversight of emergency management arrangements in South Australia. The State Emergency Management Plan is the key mechanism for ensuring an efficient and consistent approach to planning and preparing for, responding to, and recovering from disasters.

Its activities are guided by the objectives of the *Emergency Management Act 2004* to:

- establish an emergency management framework that:
  - promotes prompt and effective decision-making associated with emergencies
  - makes provision for comprehensive and integrated planning in relation to emergencies
- promote community resilience and reduce community vulnerability in the event of an emergency.

PROJECT STEERING COMMITTEE

The Project Steering Committee provided governance to the project. It comprised government agencies involved with state emergency management and waste management, including representatives from Green Industries SA, the Environment Protection Authority South Australia, the Attorney-General's Department, the Department for Human Services, the Department of

Premier and Cabinet, the Local Government Association of South Australia, SafeWork SA, the South Australian Fire and Emergency Services Commission, and SA Police.

ACKNOWLEDGEMENT OF COUNTRY

We acknowledge and respect the Traditional Custodians whose ancestral lands we live and work upon and we pay our respects to their Elders past, present and emerging. We acknowledge and respect their deep spiritual connection and the relationship that Aboriginal and Torres Strait Islanders people have to Country. We extend our respect to all Aboriginal and Torres Strait Islander people and their nations in South Australia and across Australia.

DISCLAIMER

The information contained within this document is based upon sources, experimentation, and methodology which at the time of preparing this document were believed to be reasonably reliable. However, the information may become outdated subsequent to this date. Use your own judgment and consult relevant authorities for the latest regulations and guidance on disaster waste management.

Document control

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ACRONYMS

AAR	Aboriginal Affairs and Reconciliation
ADF	Australian Defence Force
BESS	Battery Energy Storage Systems
C&D	Construction and demolition
C&I	Commercial and industrial
CCA	Copper chrome arsenate
DEW	Department for Environment and Water
DIT	Department for Infrastructure and Transport
DWM	Disaster waste management
EMS	Environmental Management System
EP Act	Environment Protection Act 1993
SA EPA	Environment Protection Authority South Australia
EPP	Environment Protection Policy
FSG	Functional Support Group
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
GISA	Green Industries SA
ICA	Insurance Council of Australia
LIB	Lithium-ion Battery
PIRSA	Department of Primary Industries and Regions
PPE	Personal protection equipment
RCS	Respirable Crystalline Silica
RORO	Roll-on-roll-off
RSPCA	Royal Society for the Prevention of Cruelty to Animals
SA	South Australia
SDS	Safety Data Sheets
SEMP	State Emergency Management Plan
WHS	Workplace health and safety

Part A – Introduction

OVERVIEW

Part A provides an overview of the guidelines, including what is covered, who should use them, and when to use them. It identifies principles for disaster waste management (DWM) that should be followed for all events. It also identifies the level of state government support provided to DWM stakeholders.

GUIDELINES

A1: About the guidelines
A2: Disaster waste management principles
A3: State government support

A1: ABOUT THE GUIDELINES

Managing debris and other waste following a disaster event can have real and lasting impacts on affected communities and the environment. It can:

- involve complex interactions with search and rescue and emergency response
- affect longer term economic and social recovery
- affect human health and environmental outcomes as a direct or indirect consequence of a disaster.

Disaster waste management (DWM) can also have positive impacts, such as:

- improving the mental health and wellbeing of people in the affected area, which may see the clean-up of waste as a return to normalcy and give them sense of control
- providing local employment following the disaster
- delivering recycled products to support rebuilding infrastructure and associated economic benefits.

The *Disaster Waste Management Guidelines* (the guidelines) provide advice on best-practice DWM during the response and recovery phases of an event in South Australia. The guidelines were developed based on past DWM experience – both local and international – and in consultation with South Australian stakeholders.

The guidelines can also be used during the preparedness phase to support planning, training exercises, and identifying gaps, thereby strengthening the state's DWM capabilities.

The guidelines are an annex to the *Disaster Waste Management Capability Plan* (DWM Capability Plan). The capability plan establishes emergency management arrangements and defines roles and responsibilities, while these guidelines provide practical advice for delivering DWM support after an event.

A1.1 WHAT THE GUIDELINES COVER

The guidelines consider management of all waste types, with a focus on all solid waste (including non-hazardous, hazardous, and medical) arising from natural disasters. This includes:

- debris generated by damage to property and infrastructure by the event, once it has been released by first responders
- materials deployed during disaster response stages (such as sandbags used in flood events)
- relief waste generated during the response and recovery phases (such as unwanted donated goods, medical waste)
- waste from demolished buildings and structures
- agricultural waste (including animal carcasses) resulting from the event.

Excluded from the scope of these guidelines are waste types, such as liquid waste, radioactive waste, and agricultural waste (including animal carcasses), that are generated from controlling or eradicating an exotic disease or contaminant. Extensive work has occurred nationally on the

disposal requirements for animal carcasses arising from controlling a disease.[1] Further work is still required to provide detailed guidance on managing liquid and radioactive waste.

A1.2 WHO SHOULD USE THE GUIDELINES

These guidelines are for stakeholders involved in DWM activities. This document should be read in conjunction with the State Emergency Management Plan and the DWM Capability Plan. These plans establish emergency management arrangements and corresponding roles and responsibilities for DWM.

A1.3 WHEN TO USE THE GUIDELINES

The guidelines may be used in all emergency phases, as outlined in *Table A1.1*. The guidelines apply once the DWM Capability Plan is activated. However, stakeholders may still use the guidelines for other events.

Table A1.1: Emergency phases and when to use the guidelines

Emergency phase	Objective of using the guidelines	
Preparedness	To assess how prepared South Australia is to carry out DWM during the response and recovery phases.	
Response	To guide DWM during the response phase, with a focus on addressing the most acute waste issues required to save lives, alleviate suffering, facilitate rescue operations and counter-disaster operations, and minimise harm to the environment and human health.	
Recovery	Early recovery	To guide DWM during the early recovery phase, with a focus on laying the groundwork for implementing a DWM program during the recovery phase. The DWM program provides guidance on addressing key issues such as managing different types of waste, identifying, establishing, and managing interim storage and disposal sites, streamlining logistics for waste collection, transportation, and reuse/recycling initiatives.
	Medium- to long-term recovery	To guide DWM during the recovery phase, with a focus on implementing the DWM program designed in the early recovery phase and continued monitoring and evaluation of the disaster waste situation.
Post-recovery	To guide and manage any long-term environmental and/or other impacts resulting from DWM activities.	

[1] AUSVETPLAN (Australian Veterinary Emergency Plan) *Operational Manual – Disposal* (2021), available from AUSVETPLAN-_Operational_Disposal_Manual.pdf

A1.4 UPDATING THE GUIDELINES

These guidelines should be revised every 3 years, or as required to incorporate any new information, changes in regulations, and best-practice guidance. Responsibility and timeframes for revising the guidelines are provided in the DWM Capability Plan.

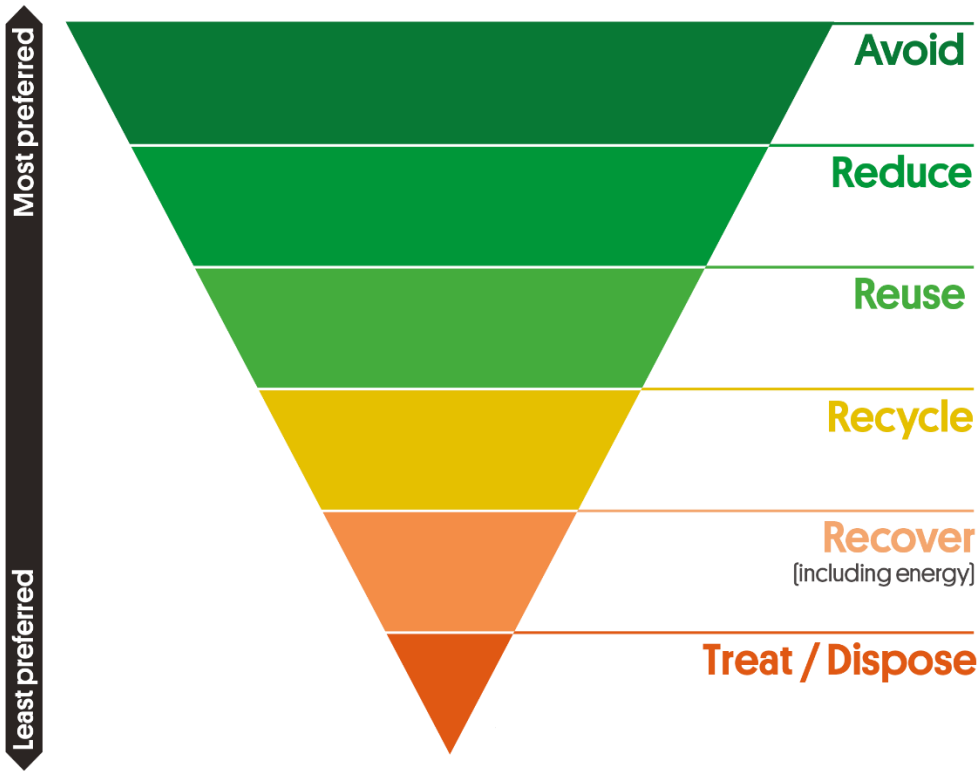
A2: DISASTER WASTE MANAGEMENT PRINCIPLES

DWM should be carried out in line with the principles in *Table A2.1*.

Table A2.1: Principles for disaster waste management

Principle	Description
Community resilience	Build capacity in communities to prepare for and carry out responsible DWM practices. Ensure that disaster waste management is embedded in state emergency management arrangements to support local communities.
Protection of health, economic assets, and the environment	Identify and avoid or minimise risks of harm to human health (including workplace health and safety considerations), economic assets (including agriculture and tourism) and the environment.
Sustainable resource management	Sustainable resource management helps mitigate the impact of climate change. Undertake DWM in accordance with the waste management hierarchy (see *Figure A2.1*), where safe and practical to do so. Where circumstances give rise to unacceptable levels of risk, waste is likely to be sent to landfill.
Recognition of practical constraints and community expectations	Recognise practical constraints and community expectations when deciding on methods for waste management, including the ability to act in a timely manner, and availability of skilled labour, equipment, and facilities, including transport logistics when designing a waste management strategy. Sometimes streamlined processes are needed in a crisis, which may not follow business-as-usual approaches.
Support positive recovery outcomes	Consider how decisions related to DWM will affect the recovery of communities. Where possible, a DWM program should support local businesses, and provide economic opportunities, including local job creation and use of recovered materials for reconstruction.
Empathy	Be empathetic when liaising with the affected community. Be mindful of the losses that have occurred and long-term impacts. Be aware of sensitivities relating to the removal of materials and demolition of damaged structures.
Accountability	Clearly define roles and responsibilities, lines of authority and communications for DWM. Ensure that adequate procedures are in place and adhered to for record keeping.

Figure A2.1: Waste management hierarchy



The waste management hierarchy is an internationally accepted guide for prioritising waste management practices with the objective of achieving optimal environmental outcomes. It sets out the preferred order of waste management practices, from most to least preferred. The waste management hierarchy is one of the guiding principles of the *Green Industries SA Act 2004* and is regarded in *South Australia's Waste Strategy 2020–2025* as a key element for guiding waste management practices in South Australia, while still recognising the need for flexibility based on local and regional economic, social, and environmental conditions.

A3: STATE GOVERNMENT SUPPORT

Once the DWM Capability Plan has been activated for an event, the functional lead for DWM is responsible for identifying and coordinating delivery of state government support to affected communities and other stakeholders. The level of state government support available to DWM stakeholders will be in line with the principles and guidance set out in the guidelines and in consultation with key stakeholders. If the DWM Capability Plan has not been activated, these guidelines can still be referred to, and the functional lead may be contacted for advice.

State government support includes advisory and operational support to landowners and other relevant DWM stakeholders. Depending on the scale and nature of waste generated by the event, state government advisory support may include (but is not limited to):

- assessing and reporting waste volumes, types, locations, sources, and the number of impacted owners
- identifying key waste issues that pose a threat to human health, economic assets (including agriculture and tourism) and the environment and/or may impede the recovery of the affected community
- providing information and advice to state government agencies and organisations (via the State Emergency Centre) on options and considerations for managing waste during the response phase
- providing information and advice to local councils (via the State Recovery Planning and Coordination Group) on options for re-establishing municipal waste collections, managing waste on council land, and council services to residents (and local businesses in some cases) to manage volumes of waste
- providing information and advice to the public via the Public Information Functional Support Group (FSG) on the options and considerations for managing waste generated on private land
- liaising with the Environment Protection Authority South Australia (SA EPA) on appropriate regulatory mechanisms to facilitate DWM.
- assessing the affected community's capability to manage waste volumes and issues.

The state government shall provide operational support to affected communities and other stakeholders to assist with managing waste volumes and issues when the following 2 conditions concurrently exist:

a. The affected community or communities (including landowners, residents, animal and livestock owners, businesses, and local government) do not have the capacity to deal with the waste volumes and issues

and

b. The nature of the waste volumes or issue means there are high consequences to human health, economic assets (including agriculture and tourism) the environment and/or community recovery if it is not appropriately managed.

If condition (a) <u>or</u> (b) does not exist, the state government may still decide to provide operational support if delivering this support is considered significant to support the overall recovery needs of affected communities. For example, if providing this support improves outcomes for the

psychological wellbeing of individuals, the speed and/or cost of recovery and/or increased recycling outcomes.

Figure A3.1 provides a framework for identifying the need for state government DWM operational support.

Figure A3.1: Framework for identifying the need for state government DWM operational support

		Do affected communities have the capacity to manage the waste volumes or issue?	
		Yes	No
Consequences to human health, economic assets, the environment and/or community recovery of not managing the waste volumes or issue properly	Low	Advisory support (Business as usual)	Advisory support and potential operational support
	High	Advisory support and potential operational support	Advisory and operational support

Operational support may include, but is not limited to:

- implementing a state-supported or coordinated clean-up of waste
- coordinating volunteer clean-up operations
- contracting waste service providers to collectively manage waste on behalf of the affected community
- finding a location and setting up an interim storage facility and/or reprocessing/disposal facility to manage volumes of waste generated by an event
- coordinating logistics for waste collection, transportation, reuse, recycling and/or disposal initiatives
- coordinating a commercial agreement with the Insurance Council of Australia (ICA) on cooperation and cost sharing for state-supported or coordinated clean-up.

Part B – General guidelines

Overview

Part B provides guidance for the functional lead and participating agencies for DWM on how to carry out DWM activities from the response phase through to post-recovery. This guidance applies to events where the DWM Capability Plan has been activated, however it may also be referred to by other stakeholders when the plan has not been activated. It includes guidance on key decisions, including identifying the level of state government support provided to DWM stakeholders.

Guidelines

B1: Overview of DWM processes and activities
B2: Undertake initial waste assessment
B3: Identify short-term support needed to address acute waste issues
B4: Oversee delivery of short-term support
B5: Identify potential waste management methods and risks in recovery phase
B6: Identify needs for delivering support during recovery phase
B7: Develop and resource a DWM program
B8: Oversee implementation of program until completion
B9: Review DWM outcomes

Key considerations

The guidelines have been developed to cover 'all events' and 'all waste types'. They exclude managing waste following a biosecurity event (such as foot-and-mouth disease outbreak and Avian Flu) but include management of incidental biosecurity waste that arises from disaster events (such as flood-affected crops that may carry disease).

The scope of activities involved with DWM can vary greatly depending on the nature of the event, the types of waste generated and the issues that arise. The guidelines provide a framework to enable decision-makers to identify the scope of DWM activities needed to manage the waste, and the appropriate level of state government support to help affected communities and other stakeholders.

B1: OVERVIEW OF DWM PROCESSES AND ACTIVITIES

DWM is a function that often cuts across both the response and the recovery phases. The scope and methods of DWM is specific to an event, including the type of event (such as bushfire, earthquake, flood, and so on), its location, and the extent of damage caused.

Figure B1.1 provides a framework for key steps and activities to be carried out by the functional lead for DWM following an event, to facilitate responsible DWM. Key steps include:

- undertaking an initial assessment to identify the scale of waste generated by the event
- identifying short-term support needed to address the most acute waste issues
- overseeing delivery of short-term support
- identifying potential waste management methods and issues/risks arising during the recovery phase
- identifying longer-term support needed to manage waste
- developing a program for DWM support
- overseeing the program until completion
- reviewing DWM outcomes.

These activities are carried out with support from participating agencies for DWM in line with the roles and responsibilities identified in the DWM Capability Plan.

Part B provides practical guidance on how to undertake key DWM activities, as well as frameworks for decision-making.

Further technical guidance on managing waste streams is provided in **Part C**, including considerations for:

- on-property waste assessments
- on-property handling of waste
- collection and transport
- establishing an interim waste storage facility
- recycling and disposal options
- further technical guidance by waste stream.

Figure B1.1: Steps/processes and activities undertaken by functional lead for DWM to fulfil responsibilities

TIMELINE				STEP/PROCESS	ACTIVITIES	GUIDELINES
RESPONSE			1	Undertake initial waste assessment	• Undertake initial disaster waste assessment to identify key waste issues arising and estimate (at a high level) waste sources, streams, volumes, locations, and ownership based on information from impact assessment and other sources • Consider potential timing for delivery of support to help manage expectations • Assemble a team of subject matter experts and advisers	See B2
			2	Identify short-term support needed to address acute waste issues	• Identify short-term advisory, and potentially operational, support needed by stakeholders to address the most acute waste issues to alleviate suffering, facilitate rescue and counter-disaster operations, and minimise acute risks to public health and the environment	See B3
					•	
			3	Oversee delivery of short-term support	• Prepare Cabinet submission, if needed • Liaise with control agency on DWM issues, and coordinate delivery of short-term support • Liaise with regulators on DWM regulations and potential emergency authorisations or exemptions • Provide information to Public Information FSG for dissemination	See B4
					•	
	RECOVERY		4	Identify potential waste management methods and risks in recovery phase	• Assess potential options for managing waste during the recovery phase • Identify waste risks and issues that may arise during the recovery phase	See B5
					•	
			5	Identify longer-term support needed to manage waste	• Liaise with stakeholders via State Recovery Coordination and Planning Group to assess capability of community to manage identified waste volumes and issues, and support needed • Identify state government support needed to help affected communities •	See B6
					•	
			6	Develop and resource a program for DWM support	• Prepare Cabinet submissions, as required • Develop a DWM program to deliver support outlining objectives, actions and timeframes that support community recovery objectives	See B7
					•	

				7	Oversee implementation of DWM program until completion		• Coordinate resources to deliver DWM program • Regular reporting of progress against timelines in DWM program • Monitor disaster waste situation and identify and manage any emerging issues		See B8
							•		
		POST- RECOVERY		8	Review DWM outcomes		• Review outcomes from DWM activities on recovery of affected communities • Monitor long-term environmental, human, social and economic impacts from DWM • Review and update DWM Capability Plan and guidelines based on findings from review and any new developments		See B9

B2: UNDERTAKE INITIAL WASTE ASSESSMENT

As soon as possible after an event, the functional lead for DWM should develop a high-level understanding of the waste stream types and volumes. This information will help identify any acute waste issues that may arise, which require immediate attention and management. The collected information can be built on during the recovery phase to generate a more accurate and complete understanding of the waste sources, types, volumes, and owners. This can then be used to develop a DWM program to support recovery of the affected community.

Step 1: Identify potential waste types generated by the event

The type of waste generated by an event will depend on the type of the event (such as storm, earthquake, flood, bushfire, and so on) and its location (such as what type of building stock was affected by the event). Typical waste streams generated by different event types are listed in *Table B2.1*. The table also references Part C of the guidelines, which provides waste stream specific guidance.

Table B2.1: Typical waste streams by event type and relativity of waste volumes across different event types (L – low, M – medium, H – high)

Typical sources	Waste stream (see guidelines in Part C for definitions)	Guideline reference	Bushfire	Urban fire	Earthquake	Flood	Severe storm	Animal or plant disease
Common waste streams								
Damaged buildings and other structures	Asbestos-containing material	C8	M–H	M–H	H	L–M	L	–
	E-waste and whitegoods	C11	L–M	L–M	L–M	L–M	L–M	–
	Household hazardous waste	C12	L–M	L–M	L–M	L–M	L–M	–
	Construction and demolition inert waste (bricks, concrete, rubble, etc.)	C17	M–H	M–H	H	L–M	L	–
	Hard waste (including furniture, carpets, etc.)	C21	M	M	M–H	M–H	L–M	–
	Metal waste	C22	M	M	M	L	M	–
	Mixed waste	C23	M–H	M–H	H	L–M	L	–
Damaged and/or displaced vehicles	Vehicle waste	C27	L–M	L–M	L–M	L–M	L–M	–
Fallen trees and/or other damaged vegetation	Green (vegetative) waste	C20	M–H	M–H	L	L–M	H	L
Displaced soil and sediment	Soil and sediment waste	C25	L	L	L–H	M–H	L–M	–

Typical sources	Waste stream (see guidelines in Part C for definitions)	Guideline reference	Bushfire	Urban fire	Earthquake	Flood	Severe storm	Animal or plant disease
Spoiled perishable food from supermarkets, restaurants, and households	Food waste	C19	L	L	L–M	L–M	L–M	–
Additional common waste streams in regional areas								
Agricultural properties	Animal carcass waste	C7	M–H	–	L–M	L–M	L–M	H
	Chemical (hazardous) waste	C9	L–M	–	L–M	L–M	L–M	–
	Copper chrome arsenate posts and CCA ash	C10	L–M	–	L–M	L–M	L–M	–
	Agriculture (including greenhouse) waste	C16	L–M	–	L–M	L–M	L–M	L–M
	Empty chemical drums	C18	L–M	–	L–M	L–M	L–M	–
	Fencing wire*	C22	L–M	–	L–M	L–M	L–M	–
Other waste streams								
Hospitals and medical centres	Medical and pharmaceutical waste	C14	L–M	L–M	L–M	L–M	L–M	–
Flood prone properties	Sandbag waste	C24	–	–	–	L–M	L–M	–
Non-profit organisations and relief centres	Unwanted donated goods	C26	L–M	L–M	L–M	L–M	L–M	–

** Considered as metal waste and covered under Guideline C22: Metal waste.*

Step 2: Undertake high-level estimate of potential waste volumes

The volume of waste generated by a given event depends on the extent of damage it causes. Information can be obtained from damage assessments on:

- properties including number and type (residential, commercial, industrial) of properties damaged, their location (address and GPS coordination) and extent of damage (minor, major, destroyed)
- number of vehicles damaged
- number and type of deceased animals.

Alternatively, where property level damage is not immediately available, aerial or satellite imagery can be used to determine a rough order estimate of damage extent.

This information can be converted into high-level estimates of waste volumes (tonnes and cubic metres) using the SA Disaster Debris Estimation Tool (Green Industries SA 2021) and/or using the following method and applying estimated material compositions in *Table B2.2*.

Number of damaged dwellings	×	Material composition per dwelling	×	Extent of damage per dwelling (%)	=	High-level estimate of waste volumes
From damage assessments or satellite imagery		See *Table B2.1*		Based on estimates on % damage if available		In tonnes and cubic metres

Table B2.2: Estimated material composition of average SA dwelling

Building structure	Tonnes
Concrete, bricks, stones, footings	144.0
Asbestos sheeting	0.1
Fittings	1.5
Roof tiles	9.4
Plasterboard	1.7
Timber	7.9
Metals (from structures, sheds, fences, etc.)	1.4
Total tonnes	**165.8**
Total m^3	**207.3**

Building contents	Tonnes
Furniture	3.8
Carpet	0.1
Electronic/electrical equipment	0.2
Whitegoods	0.2
Total tonnes	**4.3**
Total m^3	**17.2**

Note: Discrepancies in the sum of contents reflects rounding. Source: Rawtec (2015).

Step 3: Identify acute waste issues

Acute waste issues are those that need to be addressed to save lives, alleviate suffering, facilitate rescue and counter-disaster operations, and minimise risks to public health, economic assets (including agriculture and tourism) and the environment. *Table B2.3* identifies acute waste issues that could potentially need attention following an event. Note that managing some acute waste issues are already partly, or fully, covered by other arrangements under the SEMP.

To identify and understand acute waste issues, the functional lead for DWM should assemble a team of subject matter experts. The make-up of the team will depend on the types of waste generated and issues to be addressed. See *Table 5* of the DWM Capability Plan for guidance on possible subject matter experts.

Table B2.3: Potential acute DWM waste issues

Timeframe	Acute waste issue	Responsibility (landowner/other)	Guidelines	Potential DWM method
Immediate	Debris is blocking road access for first responders, or search and rescue operations	Road owner (council, SA Department for Infrastructure and Transport or federal government)	Refer to existing arrangements under SEMP	First responders clear debris to the roadside or other location.
Immediate	Debris preventing critical infrastructure service restoration/operation (e.g. trees fallen on powerlines)	Utility providers	Refer to existing arrangements under SEMP	First responders clear fallen trees from powerlines and landowners manage resulting waste.
Immediate	Escape of hazardous materials including CCA ash or respirable crystalline silica (RCS)	Owner of hazardous materials	Refer to existing arrangements under SEMP or guideline C15 for RCS	First responders deal with escape of hazardous materials to contain and make safe on-property; landowners then arrange collection and disposal.
Immediate	Radioactive waste	Owner of radioactive waste	Refer to SA EPA for advice	Refer to SA EPA, Radiation Emergency Response Team on 1800 307 733 for advice.
Within 1–3 days	Medical waste across hospitals and medical centres (where systems have been interrupted)	Hospitals and medical centres	Guideline C14	Set up temporary systems for collection of medical waste, and/or short-term storage, until normal systems can be re-established.
Within 1–3 days	Animal carcass waste from the event	Animal owners and primary producers/landowners	Guideline C7	Manage animal carcass waste in line with Guideline C7.
Within 1–3 days	Spoiled perishable food (from prolonged power outages)	Supermarkets, food retailers, cafes, restaurants, households, other	Guideline C19	Collect and dispose/recycle spoiled food waste in line with Guideline C19.
Within one week (or as early as possible)	Friable asbestos	Landowners where friable asbestos is located	Guideline C8	Issue public information on safety measures as per Guideline C8. Spray the contaminated waste with a polymer-based solution

Timeframe	Acute waste issue	Responsibility (landowner/other)	Guidelines	Potential DWM method
				to contain asbestos fibres until safe removal options can be identified and implemented.
Within one week	Dust from burnt soil on roadways affecting visibility for road users	Road owner (council, SA Department for Infrastructure and Transport or federal government)		Clear and remove dust from roads.
Within one week	Municipal solid waste (if system disrupted)	Local councils		Re-establish municipal solid waste collections where safe and possible, or if not, set up interim systems (e.g. skip bins across the community) until regular systems can be re-established.
Within one week	Waste from temporary accommodation camps	Housing SA		Consider waste reduction (minimise packaging) for delivery of goods to camps. Set up collections for waste generated across temporary accommodation camps, including recycling systems where practical.

Step 4: Identify preliminary considerations for medium to longer term management of waste

During the response phase, the functional lead for DWM should identify any preliminary considerations for medium- to longer-term management of waste, such as:

- potentially setting up an interim storage facility where estimated volumes of debris are likely to exceed the capacity of local infrastructure, including considerations for licensing and planning approvals
- identifying public information needs
- identifying the potential need for a waste levy waiver (refer to Table B3.3), emergency authorisations and/or licence exemptions or removal of landfill bans
- communication with and providing information to spontaneous volunteer groups, local recovery centres and industry participants (such as contractors and landfills) involved with clean-up and managing waste
- potential for cultural heritage.

B3: IDENTIFY SHORT-TERM SUPPORT NEEDED TO ADDRESS ACUTE WASTE ISSUES

Step 1: Identify appropriate level of state government support

Once acute waste issues have been identified the functional lead for DWM, in collaboration with the control agency and subject matter experts, needs to determine the necessary level of state government support to help landowners, local councils, individuals responsible for animals and livestock and other stakeholders to manage acute waste issues.

In all instances, this would include providing advisory support, including delivering information and advice to stakeholders on appropriate management of acute waste issues (see *Figure B2.3*). In addition, the state government may provide operational support, such as engaging contractors to manage hazardous waste streams.

Toolboxes 1 and 2 provide a decision-making framework to assist the functional lead for DWM to identify the appropriate level of support to help manage the different types of acute waste issues.

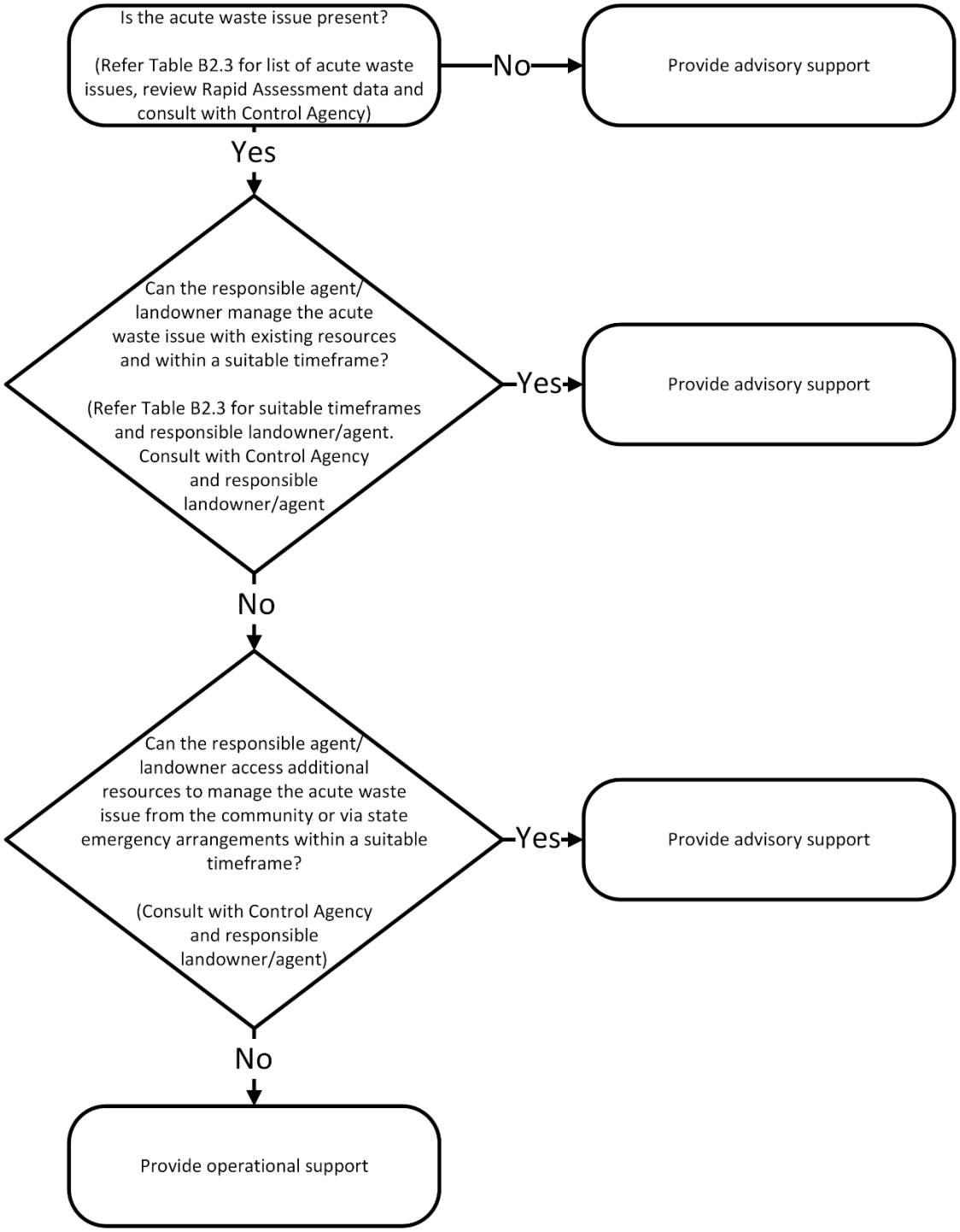
Toolbox 1 provides a generic decision-making framework for managing acute waste issues.

Toolbox 2 provides an example decision-making framework for managing municipal solid waste where the service has been interrupted or damaged by an event. This includes a list of guiding questions to help the functional lead for DWM identify the appropriate level of state government advisory and operational support.

TOOLBOX 1: DECISION-MAKING FRAMEWORK FOR MANAGING ACUTE WASTE ISSUES

Figure B3.1 provides a generic decision-making framework for identifying the appropriate level of state government support to manage an acute waste issue following activation of the DWM Capability Plan.

Figure B3.1: Generic decision-making framework for managing acute waste issues



TOOLBOX 2: EXAMPLE DECISION-MAKING FRAMEWORK FOR MUNICIPAL WASTE

Figure B3.2 provides an example decision-making framework for identifying the level of state government support to manage municipal solid waste following activation of the DWM Capability Plan.

Figure B3.2: Example decision-making framework for collecting municipal solid waste

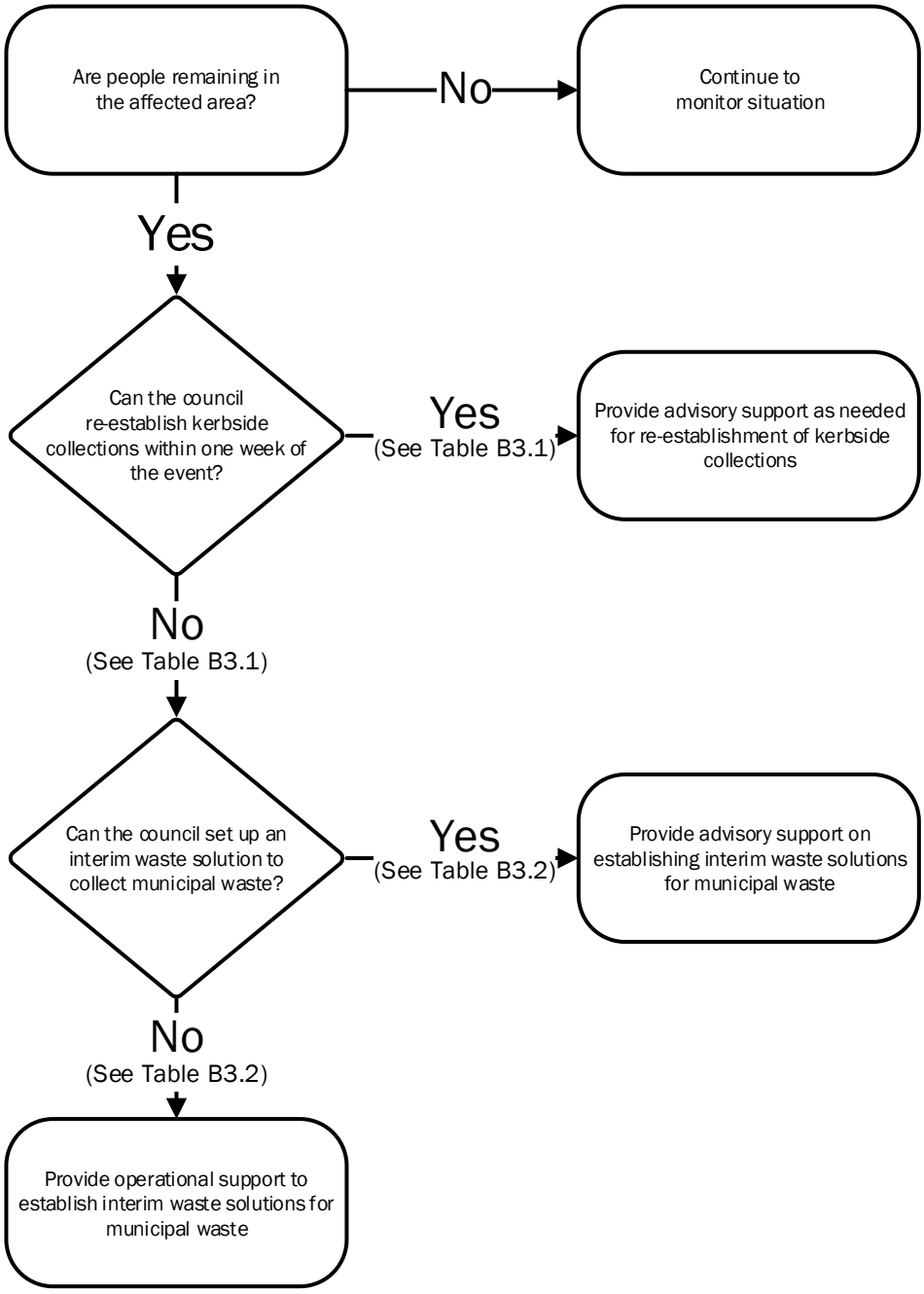


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Table B3.1 provides an assessment framework to help identify whether council can re-establish kerbside services or set up an alternative interim system for municipal waste. Where possible, this assessment will be carried out by the affected council/s and reported back to the functional lead for DWM to determine the appropriate level of state government support.

Table B3.1: Key considerations when deciding the appropriate level of state government support for managing municipal waste following an event.

Question	Key considerations	Yes	No	Notes
Is the council able to re-establish kerbside collections within one week?	Can the council safely access streets to collect bins from occupied dwellings?			
	Are waste management vehicles in service and accessible?			
	Are employees/service providers available to collect the waste?			
	Is fuel available for the vehicles and/or are roads open/navigable?			
	Are the waste disposal/reprocessing facilities in operation and accessible? If not, are any alternative facilities available nearby? Note the distance from the affected areas.			
If you answered 'no' to one or more of the considerations above, continue with the following:				
Is the council able to set up an alternative municipal waste management system?	Can the council set up a suitable interim arrangement (e.g. neighbourhood skip bins in an accessible location, providing bags) for residents to dispose of their municipal waste? (e.g. through assistance from nearby councils)			
	Can the council collect and dispose of the waste collected via the interim solution?			
	Can the council effectively communicate alternative waste plans with residents?			

Continued overleaf

Table B3.2 summarises potential advisory and/or operational support that the state government may provide to stakeholders depending on the assessment outcomes from *Table B3.1.*

Table B3.2: Potential advisory and operational support

Level of support	Potential support
Advisory	◆ Refer councils to relevant sections in the *Disaster Waste Management Guidelines* (this document) ◆ Advise councils on considerations (e.g. risks to workers) and appropriate controls for re-establishing kerbside services following an event ◆ Advise councils on options for interim municipal waste services, such as: ◆ setting up bins in public spaces ◆ providing bags ◆ contracting labour, plant, and equipment ◆ assistance from neighbouring councils ◆ alternative disposal/reprocessing locations ◆ Provide input into Public Information FSG, such as: ◆ options for disposal of municipal waste ◆ potential risks to human health, economic assets (including agriculture and tourism) and the environment if waste is not collected, and/or if it is dumped or inappropriately disposed
Operational	◆ Engage and oversee contractors for temporary delivery of municipal waste services

Step 2: Liaise with the EPA regulators to identify options for obtaining appropriate approvals for clean-up.

Once the needs for managing acute waste issues have been identified, the functional lead for DWM may liaise with regulators to identify the regulatory mechanisms necessary to facilitate clean-up. Provisions of the *Environment Protection Act (EP Act) 1993*, *Environment Protection Regulations 2009*, and *Environment Protection (Waste to Resources) Policy 2010 (W2R EPP)* may be explored by the SA EPA. This includes case of a kind[2] for waste levy, emergency authorisations, prescribed factors, exemptions, or removal of landfill bans to support managing acute issues in a responsible and timely manner.

Table B3.3 identifies existing provisions and considerations for:

- general environmental duty
- licensing requirements
- exemptions
- emergency authorisations
- powers of authorised offers
- case of a kind for waste levy
- unlawful disposal
- other key legislative tools.

[2] cases of a kind refers to a specific provision within the EP Act that allows for full or partial waivers of the waste levy in certain approved, predefined circumstances.

Table B3.3: Legislation/regulations and existing provisions and considerations

Legislation/regulations	Existing provisions and considerations
General Environmental Duty	◆ Under Section 25 of the EP Act, a person must not undertake an activity that pollutes, or might pollute, the environment unless the person takes all reasonable and practicable measures to prevent or minimise any resulting environmental harm. This applies to everyone in the state and not specifically to non-compliances.
Licensing requirements	◆ The EP Act contains legislative tools, including provisions of section 36, which may be used in certain circumstances such as an emergency. These may be used at the discretion of the SA EPA (see Exemptions and Emergency Authorisations), including prescribed factors, exemption, and emergency authorisations.
Exemptions	◆ Under section 37 of the EP Act, the SA EPA may issue a licence in the form of an exemption to a person for a specified activity, such as a waste recovery facility or waste transporters licence, thereby permitting these activities to be undertaken which would otherwise require a section 36 licence. Exemptions are publicly notifiable, and the EPA will seek planning authority consent for sites which are subject to planning approvals.
Emergency authorisations	◆ Emergency authorisations (section 105 of the EP Act) may be issued by the SA EPA in writing to a person authorising an act or omission that might otherwise constitute a contravention of this Act if the authority is satisfied that circumstances of urgency exists that it is not practicable for the person to obtain a section 37 exemption and that the act or omission is justified by the need to protect life, the environment or property. As an example, during an emergency, a person without an existing licence for the transportation of waste may be granted an emergency authorisation.
Powers of authorised officers	◆ Section 87 of the EP Act – Powers of authorised officers (i.e. for direction 87(1)(c) and (ia) and (m) and 87(6) and (7)).
Waste levy	◆ In cases of a kind, the Minister for Climate, Environment and Water may approve the waiver of payment, or refund, the whole or part of a fee or levy administered by the SA EPA. In the case of DWM, a relevant levy administered by the SA EPA includes the waste levy pursuant to section 116 of the EP Act. Cases of a kind, may include major incidents, major emergencies, or disasters (as defined by the Emergency Management Act 2004, sections 22, 23 and 24) ◆ If a case of a kind for DWM cannot be justified (i.e. the event has not been declared a major incident, major emergency, or disaster), the functional lead for DWM may seek waiver of payment, or refund, the whole or part of the waste levy for select waste streams. ◆
Unlawful disposal	◆ The W2R EPP specifies a person must not dispose of waste except at an appropriately licensed or approved waste depot. ◆ Any activity involving sorting, aggregating, compacting, baling, packaging, storage, or disposal of liquid and/or solid waste may require SA EPA authorisation, if anticipated DWM volumes trigger threshold values.
Landfill bans	◆ The W2R EPP specifies in Schedule 4 those wastes and areas within the state that landfill bans apply. ◆ The SA EPA may seek to use section 37 (exemption) or section 104 (emergency authorisation) in a disaster situation with regards to landfill bans.

Mass balance reporting	◆ Mass balance reporting may assist to quantify the full scale of clean-up undertaken post-disaster.

B4: OVERSEE DELIVERY OF SHORT-TERM SUPPORT

B4.1: STRATEGY DEVELOPMENT

The functional lead for DWM should develop and document a strategy to deliver short-term support which:

- identifies acute waste issues
- outlines the method for managing each acute waste issue
- identifies what support will be provided by the state government (advisory or operational), and the resources required (human resources, budget, other) to deliver the support
- identifies potential preliminary considerations and advice for medium to longer term management of waste.

B4.2 REPORTING AND COMMUNICATIONS

During the response phase, the functional lead for DWM shall report to the control agency. Where unbudgeted state costs are likely to be incurred, the functional lead for DWM will liaise with DPC and prepare a Cabinet submission with preliminary considerations and advice on managing waste.

B4.3 INCIDENT MANAGEMENT SYSTEM

The functional lead for DWM should adopt an incident management system methodology (such as the Australasian Inter-service Incident Management System). Key elements of this methodology include:

- management objectives to ensure all incident personnel are working towards one set of objectives
- functional management into 5 areas:
- control
- planning
- public information
- operations
- logistics
- scalable arrangements to ensure effective span of control for the number of groups or people that can be successfully managed.

B4.4 PUBLIC INFORMATION AND WARNINGS

The functional lead for DWM should help develop information related to waste management to be approved by the control agency for dissemination with the assistance of the Public Information FSG. The types of information to be communicated include:

- human health and safety issues, in particular information on appropriate management of hazardous waste streams and risks associated with the waste streams
- municipal waste collection arrangements (even if the service remains unchanged, communities need to be reassured of this).

The technical guidelines in Part C list suggested messages for the public on managing key waste streams.

B4.5 RECORD KEEPING

The functional lead for DWM should ensure that the following information is collected during the response phase for activities where it is providing operational support:

- Acute waste issue description
- Source/location of issue
- Estimated volume (tonnes/cubic metres) or, if deceased animals, the number and species
- Actual volume of waste managed to date
- Management method
- Ongoing management considerations, including monitoring risks to human health, economic assets (including agriculture and tourism) and the environment (refer to the General Disposal Schedule 33 for Across-Government Emergency Management)

Table B4.1 is a template for record keeping during the response phase. The functional lead for DWM should ask contractors to provide:

- volumes of waste managed to date
- volumes (tonnes) of waste (or equivalent estimate) deposited at waste/recycling facility(ies) and disposed of at landfill.

Table B4.1: Template for record keeping during the response phase

Date	Acute waste issue description	Source/ location	Estimated volume (t/m^3)	Actual volume managed to date	Management method	Ongoing management considerations

B4.6 ENGAGING CONTRACTORS

If operational support is provided for DWM, the functional lead for DWM should oversee the engagement of contractors and/or other organisations to deliver operational support.

Mobilising resources in a timely manner is critical to addressing acute waste issues. A sample template for the contract service specifications is provided in Toolbox 3. This template can be adjusted as needed to meet the requirements of the service specifications.

In many instances, due to limited information and associated uncertainty around scope of waste management requirements, it is best to set up contracts based on:

- hourly rate ($/hr) <u>or</u> service fee ($/lift) (excluding disposal/reprocessing gate fees)
- waste disposal/reprocessing gate fee ($/tonne), if applicable.

The functional lead for DWM and participating agencies should use standard government terms and conditions for engaging contractors, in alignment with the SA government's policies and procedures for emergency procurement. Contract management will be required to monitor these

contract types in accordance with Treasurer's Instruction 18 and/or the Office of the Industry Advocate.

TOOLBOX 3: TEMPLATE FOR SPECIFICATIONS TO ENGAGE CONTRACTOR DURING RESPONSE PHASE

Table B4.2: Template for specifications to engage contractor during response phase

Description of services	Collection, transport and disposal of municipal solid waste dropped off by residents into temporary skip bins located on Mawson Oval, Example Park and at end of Smith Street.		
Contract type	Rate-based contract with a capped total value based on an estimated 4-week term. Should include option to extend term/increase capped value at the discretion of the principal.		
Contract details	Start date		16/08/2017
	End date		4 weeks from start date
Waste stream service details	Waste Stream(s)		Municipal solid waste
	Collection details (mode and frequency)		Daily collection of 12 x 3m^3 skip bins provided by contractor
	Total volume		36.0 m^3 per day
	Disposal/reprocessing method, facility name, address & EPA licence number		Contractor to specify for each stream collected
Special handling, transport or disposal licensing requirements	None		
Fees	Hourly rate ($/hr.) <u>or</u> per service ($/lift) (including all fees excl. disposal/reprocessing gate fees)		Contractor to specify
	Disposal/reprocessing gate fee ($/tonne)		Contractor to specify
Invoicing	Weekly invoicing based on work completed (e.g. hours or bins lifted) together with timesheets providing evidence of hours spent delivering services, and receipts from facility showing the total tonnes of waste deposited. Invoice to be issued within 7 days of the month ending. 60-day payment terms upon receival of invoice.		
Any other considerations	Insurance		

B5: ASSESS METHODS AND ISSUES FOR MANAGING WASTE DURING RECOVERY PHASE

The functional lead for DWM should identify methods for managing waste and potential challenges requiring support for stakeholders during the recovery phase. This information is used to work out the level of state government support to provide to affected communities and other stakeholders during the recovery phase and is incorporated into a DWM program. It is important to note Steps 1 and 2 may occur concurrently rather than sequentially.

Step 1: Assess methods for managing waste streams during recovery phase

The functional lead for DWM should assess methods for managing waste streams identified in the initial waste assessment (see B2). This evaluation should consider a range of factors including:

- potential methods for recycling or disposal of waste streams
- practical limitations, including:
- facility locations, licensing, availability, and accessibility
- the costs of sending waste to the facility (gate fees)
- implications for additional resource needs (such as needs for on-property or offsite pre-processing, transport, and interim storage)
- economic and practical feasibility of handling, storage and recyclability of waste streams
- impacts on community recovery, where possible and practical, such as:
- impact on local employment and businesses during the recovery phase
- impact on vulnerable communities and psychosocial recovery
- impact on environment
- delivery of recycled products for recovery and rebuild efforts.

Table B5.1 lists the key considerations and potential data sources to help identify and assess options for recycling or disposing of waste.

Table B5.1: Assessing options for managing waste during recovery phase

Factor	Key considerations	Potential data sources
Potential methods for recycling or disposal of waste	What are the best options for recycling/disposing of identified waste streams?	See Part C of guidelines
Facility locations	What waste and resource recovery facilities exist in the region? What is the distance/travel time from the waste source to the facility and hence what is the cost of transporting waste to the facility? This can be estimated from the haulage rate ($/km), the transport distance to facility, and the number of loads.	See Part C of guidelines SA Disaster Facilities Database (Confidential Attachment 2 of Disaster Waste Scoping Study, Green Industries SA, 2015) SA EPA Public Register Directory Consult waste specialists

Factor	Key considerations	Potential data sources
Facility licensing	What waste streams are facilities licensed to receive?	As above
	If no facilities are licensed to accept the waste stream, can an exemption be granted from the SA EPA?	Consult SA EPA
Facility availability and accessibility	Are identified facilities in full operation, or were they impacted by the event (e.g. via power outages, limited staffing, or physical destruction)?	Consult Security, Emergency and Recovery Management in DPC, local councils, Waste Management and Resource Recovery Association of Australia network and individual owners/operators of waste facilities
	Are the facilities accessible via roads and/or other transport networks, or were transport networks damaged by the event?	
	If the operation or access to a facility was impacted by the event, how long will it take to restore the facility and/or transport networks?	
	Is it feasible for waste to be sent directly to facilities or is it beneficial to use a temporary storage facility to increase efficiency of waste transportation and clearance of affected sites?	
Facility capacities	What is the processing capacity of each identified facility (tonnes/month)?	As above
	How long (in weeks, months, or years) would it take for the facility to process waste volumes?	
	Is the facility willing and/or able to increase its processing capacity (e.g. through extended operating hours), subject to approvals?	
	If this facility is used, will it have capacity remaining to process other volumes of waste from the community post-recovery?	
Waste costs	How much will it cost to send waste to the facility? (i.e. gate rates – $/tonne).	Consult individual owners/operators of waste facilities and waste specialists
	If considering a landfill option, has the waste levy been waived, or is it potentially beneficial to seek a waiver of the levy?	Consult SA EPA
	Who owns and operates the facilities and, consequently, who will receive payment for managing disaster waste volumes? Is it a local council, where any	

Factor	Key considerations	Potential data sources
	surplus income would be reinvested into the community? Or is it a large corporate organisation, where profits may be directed elsewhere?	
	Has the functional lead for DWM or representative negotiated disposal gate fees with the approved landfill to ensure appropriate disposal and manage costs?	
Resource needs and timing	Does the waste need pre-processing before being sent to the facility (e.g. sorting or sizing on property or offsite?) If so, what resources and costs are involved with pre-processing?	See Part C3 of guidelines Consult waste specialists and with individual owners/operators of waste facilities
	What types and numbers of vehicles are needed to transport waste volumes to the facility?	
	Will the EPA be required to issue temporary waste transport licence approvals?	
	Will the waste need to be placed in interim storage prior to being sent to the final location for disposal/reprocessing?	
Impact on recovery of communities	How many jobs are estimated to be provided to people in the disaster-affected areas through processing/disposal of waste?	As above
	What products (if any) will be produced from processing the waste, which can be used locally to rebuild the affected community (e.g. using recycled masonry products in the construction of new buildings)?	As above

The findings from the above assessments should be documented to help prepare for procurement of contractors for delivery of operational support.

Step 2: Identify waste issues arising during recovery phase

Waste issues may occur during the recovery phase, which need to be addressed to minimise harm to human health, economic assets (including agriculture and tourism) and the environment and/or to assist with recovery of the community. *Table B5.2* identifies waste issues that could potentially need attention.

Table B5.2: Potential waste issues for DWM during recovery phase

Waste issue	Responsibility (landowner/other)	Guidelines	Potential DWM method(s)
Large volumes of unwanted donated goods	Organisation accepting unwanted donated goods	Guideline C26	Consult with DPC prior to informing the public about what items are needed and those that are not. Manage unwanted donated goods in line with the guidance in C26
Vulnerable groups do not have the physical and/or mental capacity to manage their waste and materials	Owners of the waste	Guideline C3 (Box 8)	Provide operational support to vulnerable groups in collaboration with Security, Emergency and Recovery Management. The type of support would depend on the disaster type and needs, but could include, for example, engaging/deploying non-government organisations to undertake muck outs
Volunteer groups helping to clean up properties are not managing waste responsibly	Volunteer group	See waste stream guidelines in Part C for information on responsible management of waste streams	Inform, through 'just in time' training and regular briefings, volunteer groups on responsible management of waste streams, and make them aware of potential hazards to human health, economic assets (including agriculture and tourism) and the environment
Illegal dumping and/or inappropriate stockpiling of waste	Perpetrators	Refer to SA EPA processes to manage illegal dumping	Refer to SA EPA processes to manage illegal dumping
Volumes of waste generated are greater than the capacities of local waste and recycling infrastructure	Owners of waste	See guidelines in Part C for potential management methods	Provide advisory support, funding, and/or operational support to help facility owners to expand their capacity to handle disaster waste Potentially set up an interim waste storage facility for waste
Slow removal of waste, hindering return of economic activity and community services	Owners of waste	See guidelines in Part C for potential management methods for collecting and managing waste	SA EPA may use legislative powers to require persons to remove the waste (i.e. clean up orders and/or Environment Protection Order) Potential state government advisory or operational support to collect and manage waste
Inaction by private property or animal/livestock owners – where waste poses a risk to wider public	Owners of waste	See guidelines in Part C for potential management methods for collecting and managing waste	Potential state government advisory or operational support to collect and manage waste

B6: IDENTIFY NEEDS FOR DELIVERING SUPPORT DURING RECOVERY PHASE

Step 1: Identify appropriate level of state government support

The functional lead for DWM should identify the level of state government support that may be required in accordance with the DWM Capability Plan.

In all instances, the state government will provide advisory support, including delivering information and advice to stakeholders on responsible management of waste, such as:

- considerations for safe handling and transport of waste streams
- options for recycling or disposal of waste streams
- facility locations, licensing, availability, and accessibility
- the costs of sending waste to the facility (gate fees)
- implications of waste management methods on additional resource needs (such as the need for on-property or offsite pre-processing, transport, and interim storage)
- economic and practical feasibility of handling, storing, and recycling waste streams
- potential impacts of waste management methods on the recovery of the community
- liaison with regulators on managing illegal dumping, stockpiling of waste, regulatory and legislative exemptions, as needed.

In addition, the state government may provide operational support, such as:

- establishing an interim waste storage facility
- a government-led, centrally coordinated, clean-up for all or selected waste streams.

This operational support is delivered in line with the principles set out in section A2 of the guidelines.

Toolbox 4 provides an example decision-making framework for identifying the level of state government support to set up an interim storage facility.

TOOLBOX 4: EXAMPLE DECISION-MAKING FRAMEWORK FOR ESTABLISHING AN INTERIM STORAGE FACILITY

Figure B6.1 provides an example decision-making framework for identifying the level of state government support to establish an interim storage facility.

Figure B6.1: Decision-making framework for establishing an interim storage facility

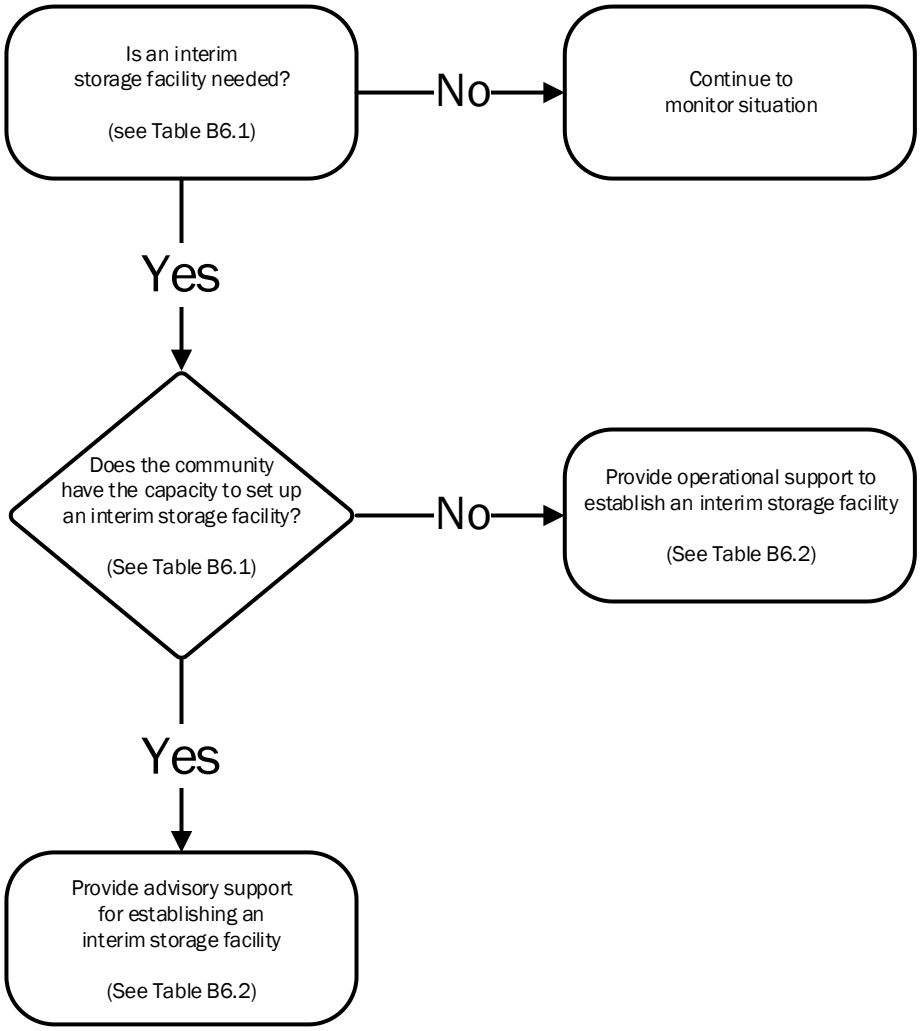

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Table B6.1 summarises key considerations to help the functional lead for DWM identify the level of state government assistance for establishing an interim storage facility.

Table B6.1: Key considerations for decision-making to identify the level of state government support for establishing interim storage facility

Question	Key considerations	Yes	No	Notes
Is an interim storage facility needed?	Is the volume of waste generated greater than the capacity of local facilities to process the waste within a reasonable timeframe?			
	Is the disposal facility damaged or out of operation following the event?			
	Is access to disposal facilities limited due to damaged roads and/or other transport infrastructure?			
	Is an interim storage facility necessary to centrally control the flow of disaster debris and other waste, prior to recycling or final disposal?			
	Is more time needed to examine the waste to determine the appropriate reuse, recycling or disposal method?			
Does the community have the capacity to set up an interim storage facility?	Can the council easily identify and agree on a suitable site(s)?			
	Are there suitably qualified contractors to operate the site?			
	Does the council have capacity to gain regulatory approvals in a timely manner and adequately monitor the operation(s)?			
	Does the site have an existing authorisation? Will/can the EPA approve a temporary variation?			

Continued overleaf

Table B6.2 lists potential levels of advisory and operational support for establishing an interim storage facility.

Table B6.2: Potential advisory and operational support

Level of support	Potential support
Advisory	◆ Refer council(s) and/or other stakeholders to relevant sections in the *Disaster Waste Management Guidelines* (this document) ◆ Advise councils and/or other stakeholders on considerations and appropriate controls for establishing an interim storage facility following an event ◆ Advise stakeholders on potential options for an interim storage facility, such as: ▪ locations ▪ design ▪ options for contracting labour, plant and equipment ▪ approvals needed ◆ Provide input into Public Information FSG, such as potential risks to human health and the environment if waste is not collected from occupied dwellings, and/or if it is dumped or inappropriately disposed
Operational	◆ Engaging and overseeing contractors to deliver the interim storage facility

STEP 2: LIAISE WITH REGULATORS TO IDENTIFY REGULATORY MECHANISM TO FACILITATE CLEAN-UP

The functional lead for DWM should liaise with regulators to identify the potential need for an exemption to reporting requirements, waiver of the waste levy, emergency authorisations and/or exemptions or removal of landfill bans to help support DWM activities during the recovery phase. Refer to information and considerations in Step 2 of Guideline B3 above.

B7: DEVELOP AND RESOURCE A DWM PROGRAM

Once the support needed during the recovery phase has been identified, the functional lead for DWM should develop a DWM Program detailing how to deliver that support. The DWM Program should be documented and include:

- a description of key waste streams identified
- recommended methods for managing waste from onsite handling through to final disposal/reprocessing
- capacity of the community to responsibly manage waste steams
- level of support to be provided by the state government to stakeholders for DWM
- resources required to deliver state government support including agencies, personnel, budgets (if required) and timelines.

This program should be developed in consultation with relevant stakeholders and in line with the principles listed in section A2 of these guidelines. It should be supported by other documentation as needed, such as:

- Cultural Heritage Plan (Toolbox 5)
- **Environmental Management Plan** to minimise the environmental impact of the DWM Program by identifying, assessing, and managing potential risks.
- **WHS Plan** to ensure a safe and healthy work environment by identifying, assessing, and managing risks associated with a DWM Program and operational processes.

A risk register should be developed and maintained for all environmental, WHS, and any additional project-specific hazards. Audits should be undertaken throughout the program delivery to check compliance with the plans.

TOOLTIP 1: IDENTIFYING AND PROTECTING CULTURAL HERITAGE

All Aboriginal heritage in South Australia is protected under the *Aboriginal Heritage Act 1988* whether recorded or not. Damage or interference to sites, objects or remains is unlawful without authorisation from the Minister for Aboriginal Affairs. Project proponents are encouraged to engage early with relevant Traditional Owners and should complete a search of Aboriginal Affairs and Reconciliation's (AAR) Central Archives.

Aboriginal heritage should be considered early in the planning stages of any DWM project, so that known sites can be avoided and monitoring coordinated with other works. During the project, if cultural heritage is found, work must stop in the immediate area, the Minister, through AAR, must be notified, and Traditional Owner group representatives must be consulted. If avoidance is not possible, authorisation must be obtained from the Minister before any work can proceed.

The functional lead for DWM should ideally develop a Cultural Heritage Plan in consultation with Traditional Owners and AAR. This plan should identify Traditional Owners and other stakeholders. It should outline methods for identifying potential or known cultural heritage, such as reviewing database searches and/or site walkthroughs.

AAR is available to provide legislative awareness or site recording training with project teams and contractors to aid understanding of heritage identification and responsibilities under the Act.

B7.1: ROLES AND RESOURCING

Table B7.1 below describes potential roles, tasks and resource needs to support the roll out of a DWM Program. This includes roles for:

- program management and oversight
- communications
- procurement
- data management
- operations (only applicable for programs that deliver operational support).

This list of potential DWM Program roles, tasks and resource needs is neither prescriptive, nor exhaustive. The exact nature, structure and level of resources needed will depend on the scale of the disaster and the program scope.

The level of resources needed depends on the scale of the disaster and the program scope. Specialist contractors may be engaged by the functional lead for DWM to support with delivery of the program, providing services such as site assessments, in-field operational support, technical consultation, and quantity surveying. These contractors are considered additional resources and are not included in *Table B7.1*.

Table B7.1: Potential roles and resourcing for a DWM Program

Role(s)	Tasks	Resource needs
	Program management and oversight	
Program director	◆ Recruit a program manager ◆ Review and approve DWM Program ◆ Set WHS strategy, ensure regulatory compliance, and secure resources for safety initiatives ◆ Strategic oversight of DWM Program	1 FTE
Program manager	◆ Develop and execute DWM Program ◆ Assemble team ◆ Assign roles and responsibilities ◆ Develop and implement Cultural Heritage Plan, WHS plans, Environment Management Plan, integrate safety into operations, and oversee compliance reporting ◆ Project meetings and reporting ◆ State reporting ◆ Budget management and tracking	1 FTE
Program officer	◆ Assist program manager with project meetings, project coordination, project tasks,	Scalable as needed

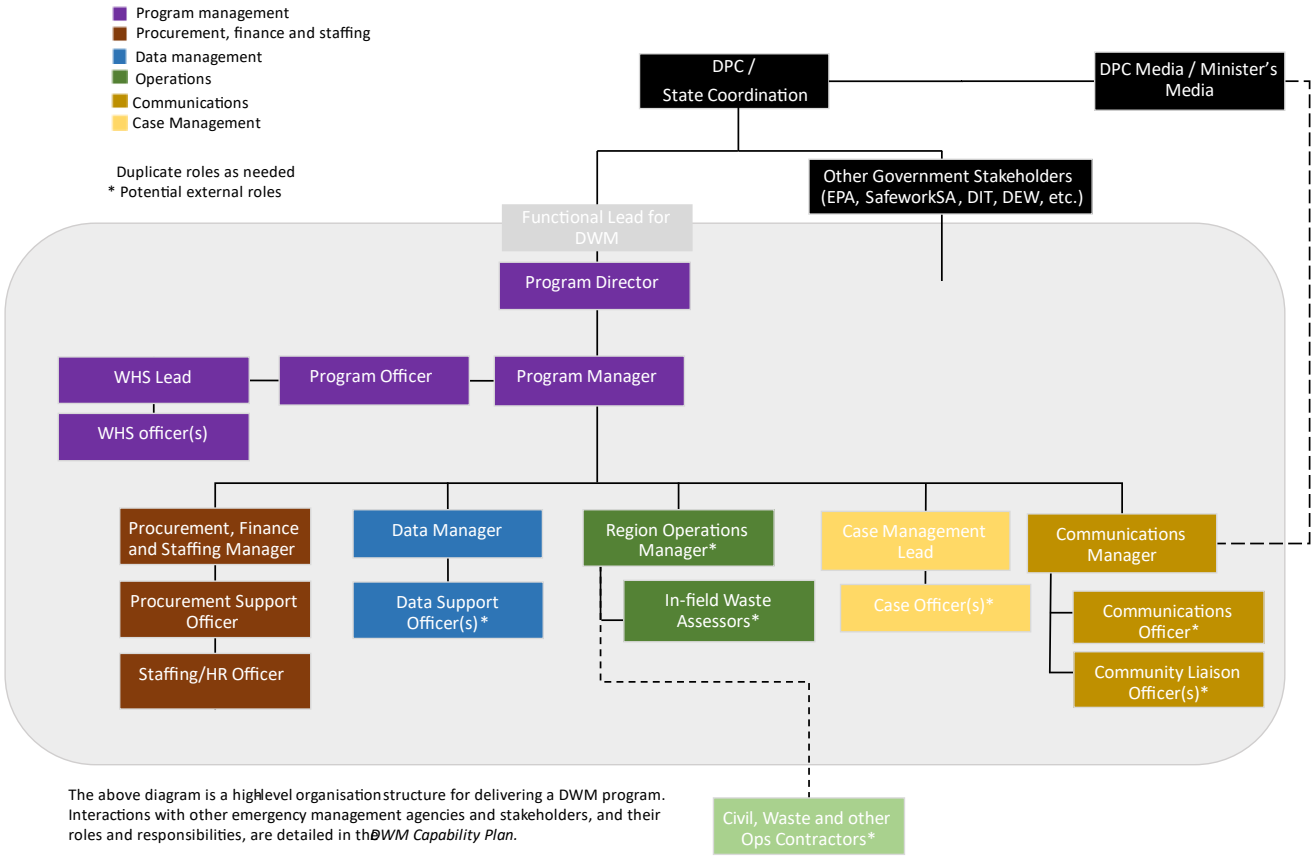
Role(s)	Tasks	Resource needs
	progress tracking, budgeting, liaison with outside agencies/organisations, travel and accommodation booking, records management	
WHS lead	◆ Provide expert advice, conduct risk assessments and audits, and ensure corrective actions are implemented	1 FTE
WHS officer (s)	◆ Assists with the WHS lead as required	Scalable as needed
Communications		
Communications manager	◆ Liaise with DPC ◆ Coordinate media releases ◆ Develop and execute communications plan ◆ Develop and update communications collateral and digital assets ◆ Assign resources as required to support communications	1 FTE
Communications officer	◆ Support communications manager with developing and updating communications collateral and digital assets if/as needed	Scalable as needed
Community liaison officer(s)	◆ Provide support at local recovery centre (e.g. taking registrations, issuing vouchers, providing information) ◆ Attend community meetings	Scalable as needed
Case management		
Case management lead	◆ Coordinates workflow for case management team ◆ Escalation point for complaints and review process ◆ Other tasks, as per case officer	1 FTE
Case officer(s)	◆ Receive and respond to queries from the affected residents/landowners relating to DWM support and clean up (where applicable) ◆ Obtain and manage property owner approvals for carrying out work on their property	Scalable as needed, approx. 1 FTE per 100 affected landowners/residents
Procurement		
Procurement, finance and	◆ Assess resourcing needs in consultation with program manager	1 FTE

Role(s)	Tasks	Resource needs
staffing manager	◆ Define individual job scope and specifications ◆ Seek staff and external contractors for roles ◆ Develop specifications, contracts, and reporting templates ◆ Procure services and goods needed to support program ◆ Contract management and invoicing	
Procurement support officer	◆ Support with reporting and processing invoices if/as needed ◆	Scalable as needed
Staffing/HR officer	◆ Support with staff mobilisation and recruitment as required ◆	Scalable as needed
Data management		
Data manager	◆ Design data collection systems such as: ▪ registration forms for affected landowners/residents to receive assistance ▪ data collection sheet/program for on-property waste assessments ▪ program dashboard ◆ Prepare property lists and maps to aid operational manager(s) with their tasks ◆ Collate and analyse data from on-property waste assessments ◆ Design and update progress dashboard ◆ Support data manager with other tasks as needed	1 FTE
Data support officer	◆ Support data manager with tasks if/as needed	Scalable as needed
Operations		
Region operations manager	◆ Operations planning ◆ Coordinate and oversee in-field waste assessors ◆ Liaise closely with community liaison officer(s), procurement and staffing manager, and data manager	1 FTE per affected region

Role(s)	Tasks	Resource needs
	◆ Manage civil and waste contractors ◆ Enforce WHS protocols on-site, address immediate risks, and report incidents and compliance issues ◆ Inspect and sign-off on works completed ◆ Report any emerging issues ◆ Provide regular updates to program manager	
In-field waste assessors	◆ Complete on-property waste assessments Note: The planning and commencement of these assessments may commence before the full DWM Program is developed and resourced (see Step B5).	Scalable as needed, allow for approx. 1 hour per assessment plus travel between properties, or approx. 4 to 6 assessments per person, per day
Civil and waste management contractors	◆ Undertake demolitions, clean-ups, and other operational tasks	Scalable as needed

Figure B7.1 provides a potential organisational and reporting structure for delivering a DWM Program.

Figure B7.1: Potential organisational and reporting structure for delivering a DWM Program.
Note: Operational roles only applicable where operational support is provided



The above diagram is a high-level organisation structure for delivering a DWM program. Interactions with other emergency management agencies and stakeholders, and their roles and responsibilities, are detailed in the *DWM Capability Plan*.

B7.2 ENGAGING CONTRACTORS

If operational support is provided for DWM, the functional lead for DWM should oversee the engagement of contractors and/or other organisations to deliver the operational support.

During the recovery phase, detailed specifications should be developed by the functional lead for DWM with specialist input. Lump sum contracts for well-defined, low-risk work packages should be considered, to allow simpler control of costs. When developing work packages, consideration should be given to:

- enabling local contractors to be involved (where they have appropriate capabilities and licensing)
- grouping packages geographically to increase clean-up efficiency.

Specifications for waste management services should consider the minimum requirements during the response phase, with a possible increased focus on recovery and recycling, enhanced reporting, and monitoring requirements. KPIs and tools should be used to support effective contract performance management.

Disposal and resource recovery gate fees should be defined and separately paid for in the program. This will disincentivise illegal disposal of the waste. On-property assessments can provide data for cross-checking between reported volumes of waste generated and volumes reported as received at facilities for disposal/recycling.

Tier 1 contractor

Alternatively, the functional lead for DWM can engage a single external contractor to deliver operational support. Tier 1 contractors have resources and capabilities to plan, coordinate and undertake large-scale operations.

Table B7.2 below provides guidance on the potential division of roles and responsibilities for this arrangement.

Contracts with Tier 1 contractors should be set up to drive desired outcomes. This may include specifying:

- that a portion of the clean-up be sub-contracted to local providers
- resource recovery targets
- minimum data collection and reporting requirements
- acceptable timelines for reporting issues
- how they should communicate with the owners of properties that they are visiting and cleaning-up.

Roles and responsibilities of the Tier 1 contactor and how they interact with the functional lead throughout the recovery phase should be clearly defined in the contract and throughout the engagement.

The complexity of such arrangements typically deems that a Standard Goods and Services Agreement is not appropriate for engaging a Tier 1 contractor and further legal advice should be sought to assist with development of a bespoke agreement.

Table B7.2: Potential of roles and responsibilities for functional lead for DWM vs Tier 1 contactor

Role	Functional Lead for DWM	Tier 1 contractor
Project management	• State reporting • Liaison with external agencies and organisations • Set policy and principles for clean-up • Monitor performance of Tier 1 contractor against project timeline, budget and KPIs • Field queries and provide support to Tier 1 contractor	• Develop and execute project plan for clean-up • Develop schedule for clean-up in line with agreed principles • Budgeting • Progress tracking and reporting
Procurement and contract management	• Develop specification for Tier 1 contractor • Appoint Tier 1 contractor • Set procurement policy for Tier 1 contractor to follow when appointing civil and other sub-contractors	• Appoint sub-contractors as required, in line with agreed policy • Review claims from sub-contractors

Role	Functional Lead for DWM	Tier 1 contractor
	◆ Manage contract including key milestones, targets/KPI's, costs, and completion of contract	◆ Manage timely payment to sub-contractors
Operations	◆ Auditing and confirming requirements are being met in-field	◆ Undertake on-property waste assessments ◆ Operations planning and coordination ◆ Property owner liaison ◆ Sub-contractor management and/or direct delivery of site clean-up, waste management, transport, and disposal ◆ Compliance with WHS regulations
Communications	◆ Provide a policy/guidance to Tier 1 contractor on communicating with residents/landowners ◆ Liaise with DPC ◆ Coordinate media releases ◆ Assign resources as required to support communications ◆ Develop and update communications collateral and digital assets as needed ◆ Provide support at local recovery centre (e.g. taking registrations, issuing vouchers, providing information) ◆ Attend community meetings	◆ Receive and respond to queries from the affected residents/landowners relating to clean-up scheduling and delivery in line with communications policy/guidance
Data management	◆ Work with Tier 1 contractor to communicate data reporting needs and assist with flow of information	◆ Design data collection system ◆ Manage data collected through registration forms for affected landowners/residents to receive assistance, data collection sheet/program for on-property waste assessments and program dashboard ◆ Data collection and cleansing ◆ Data reporting ◆ Fielding enquiries from on-property data collection team ◆ Record keeping

B7.3 ON-PROPERTY ASSESSMENTS

On-property assessments may be needed to:

- confirm the extent of damage to a property
- identify acute waste issues (such as the presence of hazardous waste streams)
- identify and quantify waste types and volumes
- meet the property owner and agree on the materials that will be removed from the site during the clean-up (depending on DWM Program)
- identify any other issues relevant to the clean-up, such as site access issues and traffic management needs.

Depending on the type of disaster and the scope of the clean-up program, additional specialist assessments may be required from:

- **qualified hygienists,** to assess hazards such as black mould, asbestos and silica products
- **structural engineers,** to assess building damage and structural integrity.

An all-hazards approach may be beneficial to reduce the number of visits to a property, as multiple assessments can retraumatise landowners and tenants. See Toolbox 6.

TOOLTIP 2: ALL HAZARDS ASSESSMENT – SA FLOOD CLEANUP PROGRAM

Collecting data on waste volumes and types is key to developing a DWM program. However, multiple assessments can retraumatise landowners and tenants.

To minimise visits and stress for landowners and tenants, the Government of South Australia implemented an "all-hazards" assessment approach after the 2022–23 River Murray flood. Inspections were conducted by a single team of 3 specialists, comprised of:

- an electrician, who checked electrical safety and performed Make Safe
- a qualified hygienist, who identified hazards such as black mould, silica, and asbestos
- a structural engineer, who assessed building damage and structural integrity.

Findings were shared with owners, detailing hazards, recommended actions, and property damage to guide decisions on repair or demolition. Owners could then choose to proceed with hazard reduction or demolition support.

Step 1: Planning

The following planning steps should be undertaken before starting on-property assessments:

1. Defining scope and objectives

- Identify the scope of data collection relevant to the event type and clean-up program
- Consult with local traditional owners and AAR SA to check for known or potential cultural heritage in the affected area
- Consider the need for environmental assessments

2. Coordination and logistics

- Check property status with SA Power Networks to confirm disconnection from the electricity supply
- Consider training and qualification requirements for assessment personnel
- Consider the involvement of multiple disciplines for assessments, such as electricians, hygienists, and engineers (see Tooltip 2 for more information)
- Establish a point of contact for armed forces if they are in the area and explore how they can assist
- Coordinate with PIRSA to address any biosecurity needs for on-property assessments
- Plan road access routes, considering potential access issues

3. Resource planning and scheduling

- Set a timeline for assessments and allocate resources accordingly
- Develop a data collection template
- Recruit and train assessors, ensuring their locations minimise travel time to the affected region
- Develop a property assessment schedule, grouping properties geographically for efficiency

STEP 2: UNDERTAKE ON-PROPERTY ASSESSMENTS

The following information should be collected where possible and practical:

- Location of waste (street address and GPS coordinates)
- Waste 'owners' (name and contact information)
- Level of insurance to cover waste management costs
- Heritage listed properties (even though the building may be destroyed there is still a process to be implemented)
- Presence of hazards and hazardous waste (such as black mould, asbestos, CCA posts, and silica products)
- Waste data, including:
- waste sources, such as destroyed or damaged dwellings, roads, or fences)
- waste stream types, such as vegetative waste)
- problematic waste streams, such as fencing wire
- waste stream nature, such as water damaged, mixed, or clean)
- estimated volumes (cubic metres and tonnes) or, if deceased animals, the number and species
- site access
- Additional data not listed here, to be collected by other specialist contractors such as structural engineers

Table B7.3 describes information to be collected and potential sources for this information.

Data may be collected by a specialist team engaged by the functional lead for DWM. Alternatively, waste data may be gathered by contractors appointed by the functional lead to inform quotes and assist with pre-work planning.

Some of this data will have been collected during the response phase to complete the high-level initial waste assessment and/or via State Emergency, Recovery and Management. The team should be given this data, so they can build on it to complete the detailed waste assessment. This

will avoid duplicating data collection/provision efforts by the government and affected landowners.

Where site assessments are needed, specialists should coordinate to conduct combined site assessments (such as hazardous materials, environmental, and WHS) wherever feasible, to minimise duplication, cost, and logistical complexity.

Section C.2 provides practical guidelines for completing on-property assessments, which may be required to collect data.

Table B7.3: Data collected to complete detailed waste assessment during recovery phase

Data	Potential information sources	Description and considerations
Location	Initial waste assessments/follow-up on-property assessments (where data gaps exist)	Information on the location of waste (including street addresses and GPS coordinates) is needed to identify where the waste needs to be collected from and nearby facilities where the waste can be stored, recycled, or disposed.
Waste owner	Initial waste assessments/follow-up on-property assessments (where data gaps exist)	Unless otherwise determined, managing the waste generated by an event is the responsibility of the landowner (e.g. private property owner, local government, state government or animal owner). Where private waste is displaced from private property (e.g. waste moved by a flood or vehicles damaged on public road) special processes may be needed for public authorities to manage this.
Heritage listed properties	Local government, Heritage SA	It is important to identify any damaged or destroyed buildings that are heritage listed. Heritage SA can assess these sites and give approvals to demolish, partly demolish or remove waste. This process is undertaken with the assistance of the relevant local government. A report is produced, including pictures of the damage and the reasons for the waste removal. Care needs to be taken for sites where there is only partial damage, to prevent further damage to the buildings and to potentially listed buildings nearby.
Insurance status	Insurance Council of Australia	Information on the level of insurance (fully insured, partially insured, uninsured) can be used to identify what level of support the community may need to assist with recovery.
Building age	Land Services, SA NEXIS, Geoscience Australia	Information on the age of damaged building/structures can be used to identify the likelihood of asbestos being present. In Australia, buildings constructed before the mid-1980s are highly likely to have asbestos-containing materials. This represents more than 61% of residential and 48% of commercial buildings in South Australia. Buildings constructed after this date may still contain asbestos, but those constructed post-1990 are generally unlikely to have asbestos-containing materials.
Presence of	Initial waste assessments/follow-	Information on likely locations of hazardous wastes, particularly in industrial building areas, should be collected

Data	Potential information sources	Description and considerations
hazardous waste	up on-property assessments (where data gaps exist)	to enable risk assessments, appropriate skilled management, and monitoring. Hazardous wastes include oils, pesticides, refrigerants, radioactive waste, etc.
Presence of Battery Energy Storage Systems (BESS)	Australian Energy Market Operator	Incorrect disposal of batteries can result in major fires and community safety issues, including the generation of toxic smoke plumes. Information should be gathered on the locations of BESS to identify potential volumes of batteries.
Waste source	Initial waste assessments/follow-up site assessments (where data gaps exist)	Information on waste sources can be used to identify waste owners, types and volumes (see below). Waste sources may include destroyed or damaged: • dwellings • sheds • powerlines • roads • fences • trees • livestock. Where possible, more detailed descriptions about the waste source are useful to identify waste streams and estimate volumes. For example, describing the type of damaged building (e.g. 3-bedroom double brick home) and the extent of the damage (e.g. partially damaged).
Waste types	Initial waste assessments/follow-up on-property assessments (where data gaps exist)	Information on waste types is needed to identify appropriate methods for transport, storage, reprocessing and disposal. Waste types include: • asbestos and asbestos-containing materials • materials containing crystalline silica • construction and demolition inert waste • mixed waste • hard waste • green (vegetative) waste • metal waste • vehicle waste • chemical waste drums • food waste • CCA post waste • agricultural waste. See Part C for a list of key waste streams. Waste types can be assessed by waste experts using information collected through damage assessments, the SA Disaster Debris Estimation Tool and/or other methods (e.g. visual observations of the waste).

Data	Potential information sources	Description and considerations
Waste nature	Initial waste assessments/on-property assessments (where data gaps exist)	Information on the nature of the waste stream is needed to assess the viability of recycling and/or disposal options. For example, waste that is clean, dry, and easy to separate has a higher likelihood of recyclability than waste that is highly mixed or water damaged.
Estimated waste volume	Initial waste assessments/on-property assessments (where data gaps exist)	Information on the volume of waste (both in tonnes and in cubic metres or, in the case of deceased animals, number by species) is needed to identify the level of resources required to manage the waste, such as the number of bins and truck movements to transport the waste from source to waste facilities. This information can also be used to estimate associated costs for waste transport, reprocessing, and disposal. Waste volumes can be estimated by waste experts using information collected through damage assessments, the SA Disaster Debris Estimation Tool (currently in beta form) and/or other methods (e.g. visual observations of the waste).
Site access	On-property assessments	Events can cause significant damage to infrastructure, including roads, bridges/culverts and private access driveways. These may need to be repaired prior to the recovery activity. Other items to note are damaged or overhanging trees on the access, egress, and the road network. It is also important to identify whether existing driveways are suitable for large vehicles and the potential for blockages to arterial roads during the disaster waste management recovery phase.

B8: OVERSEE IMPLEMENTATION OF PROGRAM UNTIL COMPLETION

B8.1 REPORTING

The functional lead for DWM should attend the State Recovery Coordination and Planning Group (SRCPG) and report to the Chair of the SRCPG. The functional lead for DWM should assist in preparation of any detailed Cabinet submissions or contribute to Cabinet submissions, if required.

B8.2 COMMUNICATIONS

The functional lead for DWM should help develop information related to waste management to be disseminated to DWM stakeholders via DPC.

This may include messages to the public on:

- human health and safety issues, in particular information on appropriate management of hazardous waste streams and risks associated with these waste streams
- any waste management issues that may affect insurance eligibility (if applicable) (such as requirements to take photos of all damage before clean-up)
- debris handling and disposal (for both individuals and contractors) including location of handling facilities and costs
- any relevant rules and regulations.

Messages to the public on managing key waste streams are provided in Part C. In addition, communications are needed to support the rollout of a successful DWM Program. Potential communication needs are identified in *Table B8.1*, along with high-level guidance on target audiences, scope of communications activities/messages, channels, and supporting collateral, digital assets and/or equipment.

Table B8.1: Potential communication needs to support a DWM Program

Situation requiring communications support	Target audiences	Scope of communications activities/messages	Channels	Collateral/digital assets/equipment
Issuing a warning to the community about hazards arising from waste (e.g. asbestos, black mould, etc.)	Affected community/residents	• Notify public of hazards present, and where to seek clean-up and health and safety advice	• Roadside signage • Newsletters • Website • SMS • Social and other media	• Roadside signage (corflute or digital) • Website and newsletter content
Community seeking information on what level of government support is available for waste management	Affected community/residents	• What services the government is providing • Eligibility • Where to get more help	• SAFECOM Call Centre • Recovery centres upon opening • Presentations at community recovery meetings • Website/s that amplify consistent messaging • Recovery newsletter • Social and other media • SMS	• Call scripts using plain language • FAQs • Brochures with information about different waste streams and options • Website content
Community members wanting to register their interest to receive government assistance	Affected community/residents	• Contact details • Damage • Waste streams • Hazardous waste/issues	• SAFECOM Call Centre • Online forms (via relevant government website) • Registration on Emergency Client Information System and/or paper forms (at a relief/recovery centre)	• Registration form

Situation requiring communications support	Target audiences	Scope of communications activities/messages	Channels	Collateral/digital assets/equipment
Property owners/tenants enquiring about vouchers for dropping off materials at a transfer station	Residents Transfer station operator Local government Recovery centre Centralising comms	◆ Eligibility ◆ How to get a voucher ◆ Opening hours ◆ What items the transfer station will and won't accept ◆ Other facilities/options	◆ SAFECOM Call Centre ◆ Recovery centres ◆ Face-to-face ◆ Community meetings ◆ Website/s ◆ Recovery newsletter ◆ Social and other media ◆ SMS	◆ Website content ◆ Brochures ◆ Q&A
Community seeking updates on clean-up progress	Media Property owners Other government departments	◆ Status of clean-up progress ◆ Next steps and estimated timeframes	◆ SAFECOM Call Centre ◆ Recovery centre ◆ Presentations at community recovery meetings ◆ Website ◆ Recovery newsletter ◆ Media releases	◆ Web portal for community to login (using unique ID) and track process of their clean-up including current stage vs future steps ◆ Schedule map ◆ Digital dashboard showing progress at each stage of the clean-up
Managing traffic impacts associated with clean-up	Local community and external visitors	◆ Road closures ◆ Notifications on the use of heavy equipment in the area	◆ Roadside signage	◆ Roadside signage (developed in consultation with relevant road owner)

Situation requiring communications support	Target audiences	Scope of communications activities/messages	Channels	Collateral/digital assets/equipment
Property owners/tenants wanting to discuss matters relating to the clean-up of their property (for events arranged by state government)	Residents that are part of a clean-up program	◆ Eligibility for program ◆ Scope of clean-up (what's covered, what's not) ◆ Scheduled date(s) for demolition and clean-up	◆ SAFECOM Call Centre In person discussion (via onsite assessors) ◆ Phone and email direct to resident	◆ Q&A ◆ Forms to 'sign off' on agreed clean-up ◆ Scripts for customer service staff ◆ Complaints escalation system
Waste assessors and other state government representatives needing guidance on how to communicate with the affected community and property owners/tenants	Waste assessors and other state government representatives	◆ Scope of the DWM support ◆ Progress of the clean-up (where applicable) ◆ Where the property owners/tenants can get support	◆ In person and written communications	◆ Q&A sheets ◆ Verbal communication ◆ Communication principles (*Table B8.2*)
Waste assessors needing guidance on hazards to consider when undertaking detailed site assessments	Waste assessors	◆ What hazards may be present ◆ What to do if you come across a hazard ◆ Which agency to contact for more information	◆ In person and written communications	◆ Fact sheets for waste assessors on DWM hazards for different events (e.g. floods, fires, earthquakes, etc.)
GISA contractors/staff in the field needing to prove they are representing state government and have a legitimate reason to access areas and properties	Other government departments SAPOL Public			◆ Travel letters (cross borders, access) ◆ ID tags ◆ Uniforms (colour branding), field wear – Disaster Response

When 2 disaster clean-up programs run simultaneously, using colour-coded materials (for example, yellow for program 1 and blue for program 2) can help prevent confusion and ensure clear, distinct messaging.

Effective communication is essential in disaster waste management to ensure communities receive accurate, timely, and actionable information. The principles in *Table B8.2* provide a framework for delivering clear consistent, and effective messaging that supports public safety, manages expectations, and fosters trust throughout the recovery process.

Table B8.2: Communication principles for disaster waste management

Principles for communication	Description
1. Use plain language	Clear, accessible messaging ensures the community understands vital information. Avoiding technical jargon and using simple, direct language prevents confusion and helps people follow instructions on waste management, safety precautions, recovery efforts, and seeking support.
2. Say what you know as soon as you know it	Timely updates reduce uncertainty and help communities make informed decisions. Even if all details are not confirmed, sharing available information – along with a commitment to providing further updates – builds trust and prevents misinformation.
3. Stay consistent, build trust	Consistent messaging is key to managing expectations, particularly regarding the scope and timing of government clean-up programs. Sticking to a clear, agreed-upon script prevents misunderstandings, unrealistic expectations, and frustration. While updates should reflect new information, shifting key messages or terminology can erode trust and confidence in the recovery process.
4. Allow residents to track the progress of their property's clean-up	Communities should have clear, reliable ways to check their property's clean-up status. Well-publicised hotlines, online portals, or local recovery centres allow individuals to track progress, understand next steps, and access estimated timelines. Responsive communication channels help manage expectations, relieve anxiety, and build trust.
5. Stay connected to community needs	Ongoing community feedback ensures communication and clean-up efforts remain relevant and responsive. Having staff, contractors, or local representatives on the ground helps capture real-time concerns and shifting priorities. Regularly relaying this information to leadership ensures messaging, support, and operations can be adjusted as needed.
6. Match messaging to evolving risks	Communication must adapt as community needs and behaviours change. Early messaging focuses on safety warnings, such as staying away from hazardous areas. As people begin returning home, guidance should shift to managing risks like asbestos, black mould, and hazardous materials. Sharing this information too early may encourage premature clean-up, while delaying it can lead to unsafe practices. Staying connected to the community ensures messaging remains timely and relevant.
7. Don't overcommunicate	Too many updates can lead to fatigue and disengagement. Messaging should be clear, concise, and focused on what the community needs to know, when they need to know it. Prioritising key updates keeps communication impactful. At the same time, providing channels for residents to track their property's clean-up progress (see principle 4) gives them the agency to seek additional insights if they choose.

B8.3 PROCESS FOR CLEANING UP AND REMOVING WASTE

The following provides high-level guidance on the process for cleaning up and removing waste debris from properties.

Stage 1: Planning

- Communicate with the property owner and/or or tenant to identify any hazards (including asbestos, utilities, and so on) that may be present at the site, and consider how these can be managed before and during clean-up works.
- Agree and document with the property owner on which materials and/or structures are to be removed from the site, and which will remain on site.
- Photograph and document property damage and site conditions before work commences. This will help to prevent potential disputes over site and property conditions after completion of clean-up works.
- Advise the property owner of the scheduled clean-up date and time

Stage 2: Clean-up

- Contractor(s) undertake clean-up of the property, as per the agreed scope.
  Note: Consider assigning contractors with geographically grouped 'work packages' to enhance efficiency and cost-effectiveness in clean-up effort.

Stage 3: Post clean-up

- Assess the property to ensure the contractor has completed clean-up works as per the agreed scope and has not caused any additional damage.
- Advise the owner and hand the property back.
- Approve the contractor's payment.

B8.4 POTENTIAL WASTE ISSUES AND CHALLENGES RELATED TO PROGRAM DELIVERY

Table B8.4 outlines potential waste issues and challenges related to program delivery, along with methods for managing them. These should be considered alongside:

- challenges detailed in Section B5 (*Table B5.4*) regarding waste issues during the recovery phase.
- challenges resulting from not following guidance on DWM Program delivery (outlined in Section B8), including factors like resourcing, communication, and other key considerations.

Table B8.4: Potential issues and challenges related to program delivery

Issue/challenge	Responsibility (landowner/other)	Potential DWM method(s)
Property owners/tenants placing hazardous waste on the kerbside for collection	Owners of the waste	For kerbside collections, inform the public about acceptable and prohibited items. Make residents aware of disposal options for hazardous waste
In tourist areas with disaster-affected holiday homes, owners may be unable to return in time for the scheduled kerbside collection.	Owners of the waste	Plan for multiple collection runs and provide drop-off options (such as drop-off vouchers)
Waste receiving facility underquoting, making it unsustainable for them to continue accepting waste at the agreed rate	Waste receiving facility	Check that the waste receiving facility has considered any capacity limitations and the full scope of work before settling on the agreed rates
Properties have not been disconnected from power, posing safety risks	SAPN, property owners, and functional lead for DWM	Work closely with SAPN to ensure properties have been disconnected prior to undertaking on-property assessments and clean-up activities. Include an electrician in on-property assessments to review electrical safety and perform Make Safe
Long lead time to set up and undertake on-property assessments, creating a bottleneck for subsequent clean-up activities	Functional lead for DWM	Prepare templates for assessments during preparedness phase. Send out multiple teams to carry out assessments and geographically group assessments where practical
Specialist contractors (e.g. environmental, cultural heritage, traffic management) are unable to attend during site works, causing delays and stand-down costs	Functional lead for DWM	Establish contingency plans, such as remote consultations or alternative on-call specialists to minimise delays
Builders or residents attempting to dispose of their construction or rebuilding waste through the disaster waste provisions	Builders/property owners	Clearly communicate the scope of the clean-up, including exclusions
Dispute between property owners and contractors on the condition of, and	Contractors	Photograph the condition of the property before and after the works are completed to reduce the potential for disputes

Issue/challenge	Responsibility (landowner/other)	Potential DWM method(s)
Property owners/tenants placing hazardous waste on the kerbside for collection	Owners of the waste	For kerbside collections, inform the public about acceptable and prohibited items. Make residents aware of disposal options for hazardous waste
In tourist areas with disaster-affected holiday homes, owners may be unable to return in time for the scheduled kerbside collection.	Owners of the waste	Plan for multiple collection runs and provide drop-off options (such as drop-off vouchers)
damage to, property following site works		

B8.5 RECORD KEEPING

The functional lead for DWM should ensure appropriate record keeping is maintained during all phases of work, and provide effective control and oversight of DWM to support a cost-effective, speedy recovery. Where operational support is resourced by the state government, record keeping should include monitoring contractor performance against contract requirements.

If large volumes of waste are being managed privately (for example, demolition of private premises by contractors/insurers/individuals) additional monitoring measures may be necessary to track waste and ensure responsible waste management practices are being followed.

Where vouchers for transfer stations/other services are provided to residents, they should:

- be issued at local council offices or the recovery centre
- only be for disposal of disaster waste at either government or privately operated facilities.

These steps will reduce the risk of the vouchers being used inappropriately (for non-disaster related materials).

B9: REVIEW DISASTER WASTE MANAGEMENT OUTCOMES

DWM outcomes should be reviewed to evaluate outcomes and key lessons for future events. This review should be undertaken in line with the Monitoring and Evaluation Framework for Disaster Recovery Programs.[3]

The evaluation scope will depend on the event and the details of the DWM program but may include assessing the following outcomes:

- The community is aware of the clean-up program, including what support is available, how to register for the program, timelines, and program updates.

[3] The Australia and New Zealand School of Government (2018).

- The community has access to waste services for managing disaster waste and spoilable waste.
- Hazards arising from damage to property are identified and reduced, enabling populations to safely return to their property and commence repairing or rebuilding their property.
- Property owners have information on the damage sustained by their property to help them decide whether to repair or demolish.
- Vulnerable groups are provided with the support they need to manage debris and disaster-affected waste.
- The community can express its changing needs for managing debris and disaster-affected waste.
- The community's exposure to environmental health and public health risks from debris and disaster-affected material is minimised.
- The natural environment operates to maintain healthy biodiversity and ecosystems.
- Local waste management business activity fosters growth.
- Culturally significant sites and artefacts are identified and protected.

The review may also include evaluating:

- volumes and types of waste generated by the event
- adequacy of tools and resources (including these guidelines)
- clarity of DWM roles and responsibilities
- acute waste issues that arose and assessment of adequacy of the management approaches
- the total cost of waste management (where possible to identify, or at least for parts funded by the state government)
- long-term environmental monitoring of any sites or facilities used to manage waste, which needed emergency authorisations or exemptions, or any sites where onsite burial of large volumes of carcasses or biosecurity waste was carried out.

This review will need to be conducted in collaboration with stakeholders that were involved with DWM, such as control agencies (where applicable), local councils, the affected communities, insurance companies, and contractors.

Key lessons from this review should be incorporated into updates of the DWM Capability Plan and guidelines.

Part C – Technical guidelines

Overview

DWM involves handling waste from its point of generation to destination for recycling or disposal. Part C provides technical guidance, including for:

- on-property waste assessments
- on-property handling of waste
- collection and transport of waste
- establishing an interim waste storage facility
- options for recycling/disposal of waste generated by an event
- further technical guidance, by waste stream.

Guidelines

Operational processes
C1: Introduction
C2: On-property waste assessments
C3: On-property handling of waste
C4: Collection and transport
C5: Establishing an interim storage facility
C6: Recycling and disposal options

Hazardous waste streams
C7: Animal carcass waste
C8: Asbestos and asbestos-contaminated waste
C9: Chemical (hazardous) waste
C10: Copper chrome arsenate (CCA) solid and ash waste
C11: E-waste and whitegoods
C12: Household hazardous waste
C13: Lithium-ion batteries
C14: Medical and pharmaceutical waste
C15: Respirable Crystalline Silica

High-volume and other disaster waste streams:
C16: Agriculture (including greenhouse)
C17: Construction and demolition inert waste (concrete, brick, and rubble)
C18: Empty chemical drums
C19: Food waste
C20: Green (vegetative) waste
C21: Hard waste
C22: Metal waste
C23: Mixed waste
C24: Sandbag waste
C25: Soil and sediment waste

C26: Unwanted donated goods
C27: Vehicle waste
Throughout the waste stream guidelines of Part C, icons are used to indicate whether a waste stream is likely to require management during the recovery of various disaster events. A coloured icon signifies that the waste stream is relevant to the event type, while a greyed-out icon indicates that the waste stream is unlikely to arise, or arises in insignificant quantities.

Relevant to event type:

Applicable to fire events	Applicable to flood events	Applicable to earthquake events	Applicable to storm events

Waste stream is unlikely to arise, or arises in insignificant quantities:

N/A to fire events	N/A to flood events	N/A to earthquake events	N/A to storm events

OPERATIONAL PROCESSES

C1: INTRODUCTION

Managing waste includes several stages, from on-property handling through to final reprocessing and/or disposal (see *Figure C1.1*). The following guidelines provide technical advice on managing waste throughout each of these stages.

Figure C1.1: Stages for managing waste volumes

C2: ON-PROPERTY WASTE ASSESSMENTS

On-property waste assessments provide an opportunity to:

- confirm the extent of damage to property
- identify acute waste issues (such as the presence of hazardous waste streams)
- identify and quantify waste types and volumes
- meet the property owner and agree on the materials that will be removed from the site during the clean-up (depending on the scope of the clean-up)
- identify any other issues relevant to the clean-up, such as site access issues and traffic management needs.

This section provides guidance on gathering data on the above items. Depending on the type of disaster and the scope of the clean-up program, additional specialist assessments may be required, which are not covered in this section. These may include:

- **a qualified hygienist**, to assess hazards such as black mould, asbestos and silica products
- a **structural engineer**, to assess building damage and structural integrity.

As noted in Section B7.3, an all-hazards approach may be beneficial to reduce the number of visits to a property, as multiple assessments can re-traumatise landowners and tenants.

Before conducting any on-property waste assessments, it is essential to ensure the property is safe to enter. This includes verifying that the electricity supply has been disconnected. An electrician may be needed to assess electrical safety and carry out a Make Safe.

C2.1 SKILLS, KNOWLEDGE, AND EQUIPMENT

Skills and knowledge

Local knowledge and geographical awareness can provide valuable context for planning site visits, helping identify access constraints, infrastructure conditions, and potential risks in advance.

Assessors need a range of skills and knowledge to successfully complete waste assessments. This includes:

- a working knowledge of the waste management industry, including:
- skip bins

- roll-on-roll-off (RORO) trucks
- rear loaders
- liquid tankers
- vacuum trucks
- a working knowledge of plant and equipment, including:
- earth working equipment (such as bobcats, wheel loaders, excavators, and so on)
- tandem tippers, semi tippers, super dogs, and so on
- a working knowledge of the demolition/building industry, including being able to identify:
- asbestos types and condition
- products containing crystalline silica
- unsafe structures (including walls, roofing, chemicals, metals and cellars)
- building materials/structures (such as double brick vs. brick veneer vs lightweight structures)
- sludges and slurries (flooding event)
- a working knowledge of relevant legislation and associated policies
- a basic understanding of the recycling/landfill industry
- basic understanding of maths, density, and volumes
- experience identifying different waste streams.

Equipment

Typical equipment needed for assessments includes:

- PPE: safety boots, high visibility vests, shirts, P3 masks, hard hats, sunscreen
- vehicles for transport between sites
- a daily/weekly schedule with property addresses and contact details
- IDs and contact cards
- data collection sheets (or smart devices with electronic forms)
- mobile phones for communication
- cameras (can use in-built phone/smart device cameras)
- measuring wheels
- asbestos sampling bags and latex gloves.

Additional equipment may be needed depending on hazards.

C2.2 PROCESS TO FOLLOW

High-level guidance undertaking an on-property assessment is provided below.

Stage 1: Schedule assessments

- Ensure planning steps have been completed (see stage 1 in section B5)
- Contact the owner to explain the purpose of the assessment
- Arrange a time to undertake the assessment and request permission to enter the site

Note: Scheduling assessments may be undertaken by case officers depending on the program communications strategy and resourcing.

Stage 2: Site assessment

- Meet the owner if they are onsite
- Confirm property details, including:
- site address
- GPS coordinates for property entry
- confirm owner (the owner may not be living there, rather it could be rental property)
- property age
- known asbestos products
- Assess access and egress points, including evaluating ease of access:
- Is there access for a semi-trailer?
- Are access roads or bridges washed away or burnt?
- Are trees blocking the access (need to consider the road network as well as the private property)?
- Are there septic tanks impacting access?
- Identify, photograph, and record GPS coordinates of damaged buildings, sheds, and waste
- Identify any dangerous materials (such as asbestos and chemicals)
- For each damaged structure, identify and estimate volumes of materials including:
- concrete, bricks, rubble or other silica-containing product
- metals
- asbestos type and conditions, and any assumed asbestos
- batteries
- combustibles
- CCA posts/ash, including creosote
- chemicals waste including containers
- cars, trucks, tractors
- other items
- Check all data has been collected and correctly entered
- Explain to the property owner what will happen next, and provide contact details should they have any other queries after the assessment
- If applicable (depending on scope of state government support):
- go through the check list to ensure property owner understands what is being removed
- seek and document agreement from owner of agreed total clean-up/materials removed
- advise the owner to shift materials they would like to keep to one location, where practical to do so

Stage 3: Post-site assessment

- Provide feedback and any issues, queries, or other relevant information to the region operations manager (or other direct report).

TOOL TIP 3: PRACTICAL TIPS FOR UNDERTAKING ON-PROPERTY ASSESSMENTS

- Follow WHS protocols
- Pause to consider the area you are entering and look for danger
- Evaluate the total loss/damaged area and break it down into smaller areas

- Create a system, for example:
- Area 1 – house
- Area 2 – main shed
- Area 3 – smaller shed
- Try to build a picture in your mind of how you think the clean-up will be undertaken
- Measure the building perimeter, and estimate the height of standing walls
- Define construction materials, such as brick veneer or double brick
- Define roofing materials, such as metal or tiles
- Consider any cladding, for example timber/CCA, cement fibre board or asbestos
- Try to count bedrooms, wet areas, family rooms, games areas, lounge rooms, storeys, cellars, and so on.

C3: ON-PROPERTY HANDLING OF WASTE

Property owners may sometimes handle volumes of waste on their property prior to waste collection and recycling/disposal. For example, this could include:

- salvaging personal belongings from damaged buildings
- sorting waste into different piles
- moving waste to the boundary of their property (such as for kerbside collection)
- moving waste to a waste depot.

It is important to inform the public and other stakeholders in a timely manner about potential risks to human health and the environment when handling waste on their property, and make them aware of responsible methods for managing waste, including council or state government assistance. Some waste streams pose high risks to human health and the environment, such as asbestos, animal carcasses, agricultural (green) waste, lithium-ion batteries, household chemicals, mould, and CCA products including posts and ash. Guidelines C7 to C27 provide advice on handling each waste stream and responsible management methods. In addition, the following general guidance should be provided to the public:

- Do not enter a damaged building or structure, unless deemed safe to do so by a qualified building inspector or engineer.
- Check for danger, such as loose beams and sheet metal, trip hazards, and pits or holes dug by vermin and snakes.
- Remind residents to contact their insurance company directly and advise taking photos of any damage before removing and disposing of items.
- Follow the appropriate WHS requirements as recorded in sections C7 to C27.

TOOLTIP 4: MUCKS OUTS

A muck out is the process of clearing and cleaning a property after an event such as a flood, typically carried out by residents or volunteers. Muck outs can be provided to assist vulnerable individuals and groups who may not be able to remove hazardous materials themselves.

Muck outs typically involve:

- removal of contaminated items, such as furniture and carpets that have been damaged by the disaster event

- cleaning of silt, mud and other contaminants (by sweeping/mopping)
- sorting of waste for collection.

Potential hazards that may be encountered during a muck out include:

- contact with contaminants such as chemicals and bacteria
- physical hazards, such as sharp or heavy objects
- fatigue and emotional exhaustion.

It is advised that when undertaking a muck out, PPE is worn, and regular breaks are taken.

The scale and timing of muck outs should align with community needs, which will determine the number of volunteers required and timeframes for clean-up efforts.

Clear and consistent communication to volunteers performing muck outs from those facilitating the recovery effort is essential throughout. Community members may sometimes self-activate and initiate muck outs without guidance from response coordinators, however uncoordinated efforts can lead to improper procedures, increased safety risks, and other unintended negative consequences. For guidance on managing volunteers effectively, refer to the Guidelines for Managing Spontaneous Volunteers in South Australia.

C4: COLLECTION AND TRANSPORT

Numerous different vehicles may be used to collect waste generated by an event, including:

- front lift vehicles
- rear loader vehicles
- ROROs (rigid and articulated)
- skip trucks
- side lift vehicles
- tankers (rigid and articulated)
- tandem tipper/bobcat and dog trailer
- semi-tipper (steel and aluminium body)
- flat bed/gates
- Pantech/tailgate trucks
- vacuum trucks.

Several factors should be considered when selecting a vehicle(s) to transport waste, including:

- waste type (for example, liquid waste needs to be transported in a tanker)
- availability of collection vehicles (which depends on the stock of vehicles available by the council, waste, and civil contractors in the region)
- method of waste loading (for example, if the waste is presented in a pile, then a bobcat may be used to load the waste into a tipper)
- travel distance and vehicle loading capacity (for example, if the waste is being moved long distances, then bulk loading vehicles such as ROROs are likely to be more time and cost-effective)
- other practical considerations, such as accessibility to site where waste is being collected.

Tables C4.1 and C4.2 provide a quick guide of vehicles for loading and transporting waste. *Table C4.1* identifies vehicle type, suitability for waste streams, typical vehicle capacity. *Table C4.2* provides practical considerations for the use of each vehicle type. These guides may be used by the functional lead for DWM and/or other stakeholders to identify the types of waste vehicles and number of waste collections needed to transport waste.

When selecting a waste transporter, it is important to check they are suitably licensed to transport the waste stream. An authorisation from the SA EPA for additional vehicles for transporting waste may be required if suitable waste licensed vehicles are not readily available (such as civil contractor vehicles for C&D waste).

Further guidance and considerations for collection and transport of specific waste streams is provided in the waste stream guidelines (C7 to C25).

TOOLTIP 5: RIVER CLEAN-UP

During a flooding event, household materials and other waste may be displaced and end up in rivers and waterways, creating potential hazards. All items considered for debris collection should be flagged in advance, with details recorded on coordinates, weight, and safety risks.

Collection can be carried out by the clean-up team by:

- using a barge with an excavator for larger items
- individuals on boats handpicking smaller items from the river or waterway.

Large items that cannot be collected due their size are to be assessed on a case-by-case basis. Trees may be left in place if they are not considered a navigational obstruction and are still suitable habitats.

Table C4.1: Waste vehicles and equipment for transporting waste streams

		Vehicle type													
		Front lift vehicles	Rear loader vehicles	ROROs (rigid)	ROROs (articulated)	Skip trucks	Side lift vehicles	Tanker rigid	Tanker articulated	Tandem tipper/bobcat & dog	Semi-tipper steel body	Semi-tipper aluminium body	Flat bed/gates	Pantech/tailgate	Vacuum Trucks
Suitability for waste streams	Inert C&D			✓	✓	✓				✓	✓				
	Mixed			✓	✓	✓				✓	✓				
	Vegetative, organics	✓	✓	✓	✓	✓	✓			✓	✓	✓			
	Metal			✓	✓	✓				✓	✓				
	Liquid							✓	✓						✓
	Asbestos			✓	✓	✓				✓	✓				
	Municipal solid waste	✓	✓	✓	✓	✓	✓			✓	✓				
	Chemical and hazardous waste							✓		✓[3]	✓[3]	✓[3]	✓	✓	
	Medical													✓	
	Agricultural (incl. greenhouse)			✓[2]	✓[2]	✓[2]				✓[2]	✓[2]	✓[2]		✓[2]	

	E-waste & whitegoods	✓	✓	✓	✓	✓				✓	✓			✓	
	Hard waste	✓	✓	✓	✓	✓				✓		✓		✓	
	Solid CCA & Creosote			✓	✓	✓				✓	✓	✓			
	CCA Ash Waste			✓	✓	✓				✓	✓	✓			✓
	Animal carcasses		✓[2]	✓[2]	✓[2]	✓[2]				✓[2]	✓[2]	✓[2]			
Typical vehicle capacity	**Cubic metres**	27–30	18–22	11–30	11–30	4–10	27	8,000–11,000L	Up to 30,000L						
	Tonnes	9–11	9–11	9–11	16–18	Up to 8T with bin	9			11 in tipper, up to 14–15 in trailer	22–25	25–28	1–16	6-8	8-10

1. Ensure that open-topped containers are appropriately tarped and do not have holes in them to avoid spillage. Vehicles need to be appropriately scrubbed and disinfected once the load has been tipped.
2. These vehicle types may be needed on occasions when chemicals have burst from containers and impregnated the surrounding soils sheds, concrete green waste. These clean-ups require soil assessment and a safe bulk removal process developed in conjunction with the SA EPA and soil analysts, and a plan and process safely and efficiently implemented

Table C4.2: Practical considerations for the use of waste vehicles and equipment for transporting waste streams

Vehicle type	Considerations
Front lift vehicles	A front lift vehicle requires delivery and collection of waste containers.
Rear loader vehicles	Rear loader vehicles can be loaded by hand, bobcat, or small excavator. The bobcat or excavator would need to be transported on a separate vehicle.
ROROs (rigid and articulated)	RORO bins can be delivered and left onsite for filling and the vehicle can return at a later date or time for collection. The waste container can be filled by bobcat, excavator, wheel loader, or by hand.
Skip trucks	Skip bins can be delivered and left onsite for filling and the vehicle can return at a later date or time for collection. The waste container can be filled by bobcat, excavator, wheel loader, or by hand.
Side lift vehicles	In a disaster event, side lift vehicles would potentially have little or no role to play due to the small loading area which needs the use of mobile garbage bins, except for collection of municipal solid waste.
Tanker – rigid (Vacuum Truck)	Tankers can vary in size depending on their use and required access. For instance, in a metro area they may be quite small and on long country runs they may be larger to minimise trips to the disposal point.
Tanker – articulated (Vacuum Truck)	Articulated tankers are more likely to be used on long distance country runs and would generally carry liquid fuels, gases, and so on.
Tandem tipper/bobcat and dog trailers	Tandem tippers with bobcats are quite useful for clean-up following a disaster. They can carry relatively large volumes of material and can be independently moved from site to site. Tippers with bobcats are generally steel body and therefore can carry large concrete and metal objects, as well as softer materials such as hard waste and municipal solid waste. Vehicle operators may not be licensed to collect the waste and could require an emergency authorisation.
Semi-tipper steel body	Steel body tippers can carry large volumes, but need the additional transport of unloading equipment if moving from site to site. Steel body tippers are extremely useful in the event of a large volume of inert or heavy metal waste material being loaded from one central point, reducing the need for transporting excavators or loaders. Vehicle operators may not be licensed to collect the waste and could require an emergency authorisation.
Semi-tipper aluminium body	Aluminium body tippers can carry large volumes but much more care is needed when loading as the types of materials loaded, such as large concrete and metal objects, can damage the softer aluminium body. Vehicle operators may not be licensed to collect the waste and could require an emergency authorisation.
Flat bed/gates	Flat bed trucks are quite useful in many applications, but care needs to be taken to ensure stability and to tie down freight correctly. Pallets can be used for ease of loading if materials are wrapped with clear plastic film. Using gates is also recommended. Vehicle operators may not be licensed to collect the waste and could require an emergency authorisation.
Pantech/tailgate truck	Pantech/tailgate trucks cannot be used for medical waste – this must be transported in a fully enclosed vehicle.

C5: ESTABLISHING AN INTERIM STORAGE FACILITY

Interim debris storage sites can be established following a disaster to manage waste volumes. These sites provide an area where the waste can be aggregated and possibly segregated before a decision is made about where the material will be sent for disposal or recycling. Waste can be sorted into piles of different materials at these sites.

Establishing an interim storage facility may be warranted when one or more of the following conditions exist:

- The volume of waste generated is greater than the capacity of local facilities to process the waste within a reasonable timeframe.
- Waste reprocessing and disposal facilities cannot be accessed due to damaged roads and/or other transport infrastructure.
- Establishing an interim storage facility is necessary to centrally control the flow of disaster debris and other waste, prior to recycling or final disposal.
- More time is needed to examine the waste to determine the appropriate reuse, recycling, or disposal method. For example, to identify the presence of heritage materials in a pile of rubble that would need to be removed for reuse before sending the remaining rubble for recycling or disposal.

Establishing an interim storage facility requires an authorisation (for example, an emergency authorisation or exemption) from the SA EPA, who will liaise with the relevant local planning authority. The authorisation includes an agreed timeframe for operating the site to prevent long-term operation of the site for unauthorised uses. This timeframe could be extended via an agreement with the SA EPA should extra time be needed to process the waste generated by the disaster or event.

C5.1 SELECTING AN APPROPRIATE SITE TO LOCATE THE STORAGE FACILITY

Table C5.1 summarises criteria to assess the suitability of a site for temporary storage of disaster waste. Considerations include:

- planning approvals (including considerations related to zoning, land ownership and buffer distances)
- environment impacts
- proximity to disaster-affected area and transport networks
- storage capacity
- business model
- site security
- site facilities (such as electricity and water).

Closed landfills and quarries in South Australia may be suitable sites for temporary storage of disaster waste, given that many are generally located in industrial zones, and have suitable environmental controls and storage capacity. Some potential sites for assessment include closed landfills, currently operating landfills or resource recovery facilities, large vacant land, council depots/transfer stations in the region or vacant industrial sites.

Table C5.1: Site selection criteria for establishing a temporary debris storage site

Consideration	Site selection criteria
Planning approval	◆ If possible, locate in an industrial zoned area or away from sensitive uses such as residential or mixed-use zones, and/or areas of high conservation value (e.g. watershed zones, areas of significant natural and cultural heritage) to minimise potential impacts and loss of amenity (increased noise, dust, odour, and traffic volumes, etc.) ◆ Consider ownership of the land. If possible, locate on public rather than private land to expedite any required planning approvals (such approvals may be for temporary operations or be granted retrospectively) ◆ Consider applicable separation distances, as per SA EPA guidelines, between the site and adjacent/nearby sensitive land uses (e.g. residential) ◆ Depending on the debris materials (e.g. hazardous chemicals), consider possible longer-term impacts, in particular, site and groundwater contamination, that may unduly affect future use of the land and surrounding established land uses and operations
Environment impacts	◆ Sites need to be assessed in terms of their potential impacts and key mitigation measures identified. Attention should be paid to surface and groundwater contamination, soil contamination, odour, dust and impacts to vegetation ◆ To reduce the risk of water contamination: ▪ locate at a suitable distance from groundwater, potable water wells and rivers, lakes, and streams ▪ do not locate in a floodplain or wetland ◆ Have controls in place to mitigate stormwater run-off, erosion, fires and dust
Heritage/cultural	◆ Consider heritage and cultural issues when selecting a site, for example, the site's significance to Aboriginal and Torres Strait Islander peoples
Proximity to disaster-affected area, and transport networks	◆ Locate close to disaster-affected area to minimise travel distances for transporting waste ◆ Ensure suitable transport networks between temporary storage site, disaster-affected area and end disposal and recycling facilities
Storage capacity	◆ Ensure adequate room for storing expected waste volumes, and keep in mind maximum stockpile heights
Business model	◆ Determine how the facility will be operated and funded, including: ▪ who can use the facility ▪ who will pay for facility operation (e.g. fully government funded or private disposal fees) ▪ how disposal rate will be determined ◆ Ideally use publicly owned land to avoid costly leases and other potential legal complications
Site security	◆ Fence site, and limit site access to permitted personnel ◆ If possible, install cameras and other security provisions
Site facilities and design	◆ Large open sites are needed for any type of debris staging activity. Paved sites are best. Semi-paved or large parking lots paved in stone dust or gravel is the next best option. Meadows are least desirable because they may be inaccessible because of saturated soils after extended and heavy rainfall ◆ Provide an undercover area for storing potentially hazardous materials ◆ DWM sites should be designed to handle different waste streams ◆ Make sure site has access to water and electricity (for lighting, administration, and staff amenities)

C5.2 OPERATING AN INTERIM STORAGE FACILITY

Table C5.2 summarises considerations for best practice operation of an interim storage facility. Considerations include:

- Work health and safety (WHS)
- environmental controls
- record keeping
- traffic management
- site security.

Table C5.2: Operating an interim waste storage facility

Consideration	Criteria for operating an interim storage facility
WHS	• Induct all staff and visitors on WHS at the site • Ensure staff and contractors have adequate training to operate equipment and fulfil their responsibilities • Ensure workers and visitors wear suitable personal protection equipment.
Environmental controls	• Develop an Environmental Management System that identifies environmental hazards and how risks will be monitored and controlled at the site • Monitor groundwater, temperature of stockpiles, dust levels and litter • Implement environmental controls, such as stockpile height management, dust suppression, litter management, fire prevention and management equipment and procedures
Record keeping	• Record incoming waste volumes, streams, and sources (via weighbridge and/or volume estimations and visual inspections of loads) • Monitor stockpile heights and volumes • Record outgoing waste volumes, types, and destinations • Ensure proper accounting procedures are followed for managing fees, income, and expenses • Document and report any WHS or environmental incidents that occur
Traffic management	• Maximise one-way traffic flow about the site • Have separate access points and roads for small and large vehicles where possible • Use signage to direct traffic onsite
Site security	• Provide 24/7 supervision of the site, in addition to fencing, video surveillance and other controls

C5.3 DECOMMISSIONING AN INTERIM STORAGE FACILITY

The owner/operators of interim storage sites are responsible for closing the site in accordance with state and federal requirements. *Table C5.3* identifies key considerations for decommissioning an interim storage facility, including removing any disaster debris, decommissioning of plant and equipment, completing environmental sampling, site rehabilitation, notification to authorities and post-closure monitoring.

Table C5.3: Operating an interim storage facility

Consideration	Criteria for decommissioning an interim storage facility
Removing disaster debris	◆ Remove all disaster-related debris by the expiration of the emergency authorisation and/or licence, unless otherwise authorised by SA EPA ◆ Mulch and wood chips produced from processing uncontaminated green waste may be left onsite if prior approval is obtained from SA EPA
Decommission of plant and equipment	◆ Decommission and/or remove infrastructure, utilities, and services
Environmental sampling	◆ Carry out environmental sampling in line with SA EPA requirements
Site rehabilitation	◆ If applicable, landscape the site to make it safe and protect the surrounding environment
Notifying authorities	◆ Inform the functional lead for DWM and SA EPA in writing when all closure activities at the DWM site area are complete. If environmental sampling was conducted as part of the closure activities, the closure notice should include the results of this sampling. A surrender of licence may also be required
Post-closure monitoring	◆ Implement an appropriate post-closure monitoring program

C6: RECYCLING AND DISPOSAL OPTIONS

The appropriate method for recycling or disposing of waste depends on the individual stream. For some streams, there are multiple options for recycling or disposal. For example, green waste can be chipped, composted, spread on-property, or sent for disposal at a suitably licensed landfill. *Table C6.1* lists factors that influence choosing the most appropriate method with some examples.

Table C6.1: Choosing recycling and disposal methods

Consideration	Examples
Volume of waste generated	Small volumes of a waste stream may make it financially unfeasible for recycling.
Event type	Soft furnishings water-damaged by a flood or storm are unlikely to be suitable for recycling.
Location and capacity of local infrastructure	Recycling infrastructure may not be available in regional locations.
Levels of contamination	C&D waste that is contaminated with asbestos or crystalline silica must be sent to a specially licensed landfill.
Potential market demand for product	There is no point recovering waste for recycling if no end market exists for the recycled product.
Other considerations	Some waste streams are banned from landfill disposal, so an exemption would need to be sought from SA EPA.

Advice on recycling and disposal options for each waste stream is provided in the following technical guidelines.

HAZARDOUS STREAMS GUIDELINES

C7: ANIMAL CARCASS WASTE

Natural disasters, such as fire or flood, may lead to many deceased animals, particularly livestock, pets, wildlife, and feral species.

In general terms the responsibility for managing this waste lies with the animal owner. Where the animal is not 'owned' or the owner is affected by the disaster, the landowner or person in charge of the animals at the time of the event may be responsible.

There are numerous methods for disposing of animal carcasses. The ideal disposal method can be determined based on the type of event and the scale and volume of animal carcass waste, with direction from PIRSA, the SA EPA and the Department for Environment and Water (DEW).

Although this guideline is for use for responses other than exotic disease control, many of the same definitions and end uses equally apply for a biosecurity incident that results in animal carcasses.

Sources of animal carcass waste

Potential sources of animal carcass waste are from:

- agricultural farms
- abattoirs
- saleyards and showgrounds
- business premises that hold animals (such as veterinary clinics, pet boarding facilities, research laboratories)
- live export docks/depots
- livestock transport vehicles
- wildlife sanctuaries and zoos
- animals in the wild (such as feral species and wildlife)
- private homes
- fish deaths.

WHAT IS ANIMAL CARCASS WASTE?

Animal carcass waste is the waste arising from the whole or any part of a deceased animal. This may include:

- livestock
- companion animals/pets
- assistance animals
- animals used for work, sport, recreation, research, and display
- animals from the wild
- aquatic species (farmed or wild).

Animal carcass waste does not include animals disposed of in the course of veterinary or medical practice or research – this waste falls under medical and pharmaceutical waste (see Guidelines C25: Medical and pharmaceutical waste for more information).

POTENTIAL END USES FOR THE RECOVERED WASTE

Table C7.1 lists potential end uses for recovered animal carcass waste and key considerations for each option, which may help with decision-making regarding what can be done with animal carcasses after an event.

PIRSA and the SA EPA are to be consulted on the advice to provide to the community on the best disposal/recycling options applicable for the event. Roles and responsibilities for carcass disposal after emergency incidents in South Australia are defined in the Carcass Disposal Arrangements for Emergencies in South Australia. The AUSVETPLAN Disposal Manual 2015 is a good reference for carcass disposal requirements in a large event or where animal or zoonotic diseases risks are present. Both documents are available in *Further information and resources*.

Table C7.1: Typical end uses for recovered animal carcass waste materials

Potential uses	Key considerations
Composting (recycling option)	According to the SA EPA, the successful composting of animal carcasses by licensed commercial composting companies, abattoirs and saleyards in SA is well established and should therefore be considered as the primary method for recycling this waste, subject to available quantities of carbon-based inputs. See *Further information and resources* for more information.
Burial (disposal option)	Livestock burial can be onsite (shallow burial or a trench), disposal to landfill, burial at a nominated location for high volumes of carcasses, or mounding (a temporary solution where carcasses on top of the ground are covered with soil or woodchips). Burial is generally regarded as the most economical option and, if nearby, can reduce transportation requirements. The volume of carcasses, proximity to the water table and available sites will determine the viability of this option. A mass burial site requires SA EPA approval. This option is suitable for carcasses from all types of events. Disposal of deceased companion animals/pets may be via onsite burial, depending on the number and size of the deceased animals and site suitability.
Incineration (disposal option)	Incineration may be used to significantly reduce the volume of animal carcass waste. SA has only a few small, fixed incineration facilities, which generally only take medical and veterinary waste. Interstate, there are some mobile 'air curtain incinerators' which burn at high temperatures and produce very little smoke. This option is suitable for carcasses resulting from most types of events but is unlikely to be the most practical option and is not a recommended approach. Cremating deceased companion animals/pets through a veterinary clinic or the Animal Welfare League is an option.
Leave in situ (disposal option)	Isolated carcasses located throughout a property in the order of one per hectare (1/ha) can be left to decompose naturally onsite. Shallow burial or a soil cover will help reduce flies, odour and scavenging. This option is suitable for carcasses caused by natural disasters.
Rendering (recycling option)	Commercial rendering businesses may NOT be able to render animal carcass not deemed fit for human consumption. Although there will still be some waste after the material has been rendered to extract valuable materials such as fertiliser additives and tallow, it will be of significantly lower volume than burning. There may be a lack of potential capacity in the rendering market to take the goods.

RECYCLING AND DISPOSAL OPTIONS

Table C7.2 provides a quick guide to recycling and disposal options for managing this waste stream.

Table C7.2: Quick guide to disposal and recycling options

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
Onsite burial	Lower volumes	All events	Will be on a case-by-case basis	Ensure no hazardous waste is buried with the animal carcass (e.g. CCA posts)	NA	Refer to SA EPA information sheet, On-farm disposal of animal carcasses
Leave in situ	< 1 carcass per hectare	Not suitable for an exotic biosecurity event	NA		NA	
Compost (at licensed commercial facilities)	All volumes up to what composters can accept	Not suitable for an exotic biosecurity event	Sites north and south of Adelaide potentially available	< 0.5% non-organic material, 0% listed or hazardous waste	May vary	Regional: potential to use large-scale compost facility in the state's south-east Composting onsite may be considered where there is a suitable mix of organic input streams and expertise on composting animal carcasses available. If > 200 tonnes of material is being processed annually, an SA EPA licence will be required.
Rendering	All volumes up to what renderers can accept	May not accept animal carcasses deemed unfit	May be limited rendering sites available to take	No other wastes accepted	May vary	

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
		for human consumption	animal carcasses			
Mass carcass burial or mounding	High volumes	Likely to be restricted to a biosecurity incident	Confirmation would need to be sought with SA EPA	Only waste approved by PIRSA	NA	As above. Large volumes may require a joint/coordinated effort to manage (landowner, SA EPA, Council, PIRSA etc.)
Landfill	All volumes	All events	Significant space in landfills servicing metro Adelaide. May be more limited in regional areas	No listed, hazardous or radioactive wastes	NA	Licensing, transport costs

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

The process for managing the waste onsite and moving to an appropriate facility is covered in *Table C7.3*.

Table C7.3: Managing the waste

Process	Key considerations
Onsite handling	◆ Estimate the number and type of animal carcasses at the site ◆ Contact PIRSA and the SA EPA to determine the appropriate recycling/disposal method for the animal carcass waste ◆ Determine the risk of animal or zoonotic disease spread
Collection and transport	◆ If sending the waste offsite, stockpile the waste ready for collection or removal using appropriate machinery and equipment – decontamination of vehicles may be required to minimise spread of endemic biosecurity diseases ◆ Alternatively, move the waste to the appropriate location onsite for disposal
Interim storage	◆ If interim storage is required, cover the waste and do not store for extended periods. The waste may need to be sealed to prevent leachate escaping
Processing/disposal	◆ Options for recycling include composting and rendering ◆ Options for disposal include burial, burning, leaving in situ or landfill

	◆ All disposal options should be completed as quickly as possible (ideally within 1 to 3 days) to avoid possible human and animal health impacts

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C7.4 lists potential hazards and WHS requirements and control measures.

Table C7.4: Potential hazards and control measures

Hazard type	Description	Control measure
Environmental and WHS	The potential for disease to spread through unsanitary disposal of animal carcass waste	PIRSA can provide details on sanitary disposal of animal carcass waste to prevent the spread of disease.
Environmental	Various environmental risks are associated with each of the described recycling/disposal methods	Consider any environmental impacts before selecting a recycling or disposal method. Mass or onsite burial locations for animal carcasses need to be rigorously assessed to quantify access of leachate to the water table. It may require a plastic liner to reduce the risk of leachate leaking into waterways. Burning will release emissions into the atmosphere. PIRSA and the SA EPA will consider these aspects before providing advice or deciding on a disposal method.
WHS	Cuts or manual handling injury from moving waste	Wear appropriate PPE while handling animal carcass waste. Use appropriate equipment to reduce handling risks.
Other	Humane killing of animals that are alive but require euthanasia	Any animals that survive but require euthanasia must be treated humanely (see *Animal Welfare Act 1985*). For companion animals, a private veterinarian can provide advice or undertake the process.
Mental health, WHS	Emotional/psychological trauma from dealing with deceased animals	Ensure public messages advise on where to access support.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is important to provide information to the community on the appropriate disposal method(s), their responsibilities and support or advice options. Messages may include the following:

- Animal owners are responsible for:
- managing the disposal of deceased animals that they own
- promptly disposing of deceased animals in an environmentally responsible manner
- keeping details for insurance purposes (such as livestock number and type, including photos)
- seeking advice if overwhelmed or unable to carry out disposal themselves (see below).[4]

[4] See the Department of Primary Industries and Regions (PIRSA) under *Further information and resources*.

- If animal owners are unsure of the best disposal option or are overwhelmed with the volume of deceased animals, PIRSA can provide advice and links to service providers that may be able to help (such as local council, contractors, stock agents and waste disposal facilities). The SA EPA can also provide advice in relation to disposal methods (including dead wildlife) and locations.
- Physical support for disposing of deceased animals includes:
- hiring contractors (livestock and large animals)
- local veterinary clinics or Animal Welfare League (household pets)
- local councils, who might also provide physical support for disposing of deceased animals (primarily stock disposal), depending on individual council policies and availability of suitable resources.
- Animals that survive but require euthanasia must be treated humanely. Seek advice from a veterinary medical centre, the PIRSA and the RSPCA.

RECORD KEEPING

The animal owner is responsible for keeping information on livestock and animals they own for insurance purposes, such as livestock number and type, and photos.

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage or final disposal.

LEGISLATION AND REGULATIONS TO CONSIDER (WHS AND ENVIRONMENTAL)

Animal Welfare Act 1985

Part 3 lists the penalties for ill treatment of animals.

Livestock Act 1997

Defines notifiable conditions (disease) and requirements to control or eradicate disease, which may affect the disposal option used.

FURTHER INFORMATION AND RESOURCES

Animal Health Australia

- AUSVETPLAN (Australian Veterinary Emergency Plan) Operational Manual – Disposal (2015)
- AUSVETPLAN – methods for animal carcass disposal

PIRSA

- *Managing Animals in Emergencies: A framework for South Australia* (2018)
- Animal safety in emergencies

SA EPA

- *On-farm disposal of animal carcasses* (2016)

C8: ASBESTOS AND ASBESTOS-CONTAMINATED WASTE

Asbestos and asbestos-contaminated waste may be in buildings (particularly if built prior to 1990) that are displaced or damaged due to an event. It could include roofing, cement, steel beam coating and other building materials. Asbestos testing must be undertaken. Negative results must come from a NATA-approved laboratory. If asbestos is suspected in any materials, it is best to assume asbestos is present until proven otherwise. Asbestos materials must be sent to an appropriately licensed landfill.

SOURCES OF ASBESTOS AND ASBESTOS-CONTAMINATED WASTE

Potential sources of asbestos and asbestos-contaminated waste are from damaged buildings, factories, stores, dwelling, apartment and office blocks and supermarkets.

WHAT IS ASBESTOS AND ASBESTOS-CONTAMINATED WASTE?

According to *Work health and Safety 2012* (SA), asbestos means the asbestiform varieties of mineral silicates belonging to the serpentine or amphibole groups of rock forming minerals including:

a. actinolite asbestos
b. grunerite (or amosite) asbestos (brown)
c. anthophyllite asbestos
d. chrysotile asbestos (white)
e. crocidolite asbestos (blue)
f. tremolite asbestos
g. a mixture that contains 1 or more of the minerals referred to in paragraphs (a) to (f).

Friable asbestos means material that:

a. is in a powder form or that can be crumbled, pulverised, or reduced to a powder by hand pressure when dry and
b. contains asbestos.

Non-friable asbestos is material containing asbestos that is not friable asbestos, including material containing asbestos fibres reinforced with a bonding compound. Non-friable asbestos may become friable asbestos through deterioration.

Asbestos waste means asbestos or asbestos-containing material removed, and disposable items used, during asbestos removal work, including plastic sheeting and disposable tools.

POTENTIAL END USES FOR THE RECOVERED WASTE

Asbestos waste cannot be recycled. If the material is tested and proven to contain asbestos, the only use for the material is disposal to a landfill licensed to accept asbestos waste. It will be buried, clearly labelled and its location recorded. If asbestos-containing material is mixed with general building waste, the entire load is deemed to be asbestos waste and must be disposed of at an SA EPA authorised facility able to receive asbestos waste.

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

The process for managing asbestos waste onsite and moving to an appropriate facility is covered in *Table C8.1*.

Table C8.1: Managing the waste

Process	Key considerations
Onsite handling	◆ A suitably qualified, licensed and competent person should assess the waste and confirm whether it is asbestos waste ◆ Samples should be collected and secured in an appropriately marked, zip sealed plastic bag ◆ Details of the site area (e.g. back porch, side eaves, garage etc.), materials, assessor and date should be written on the bag ◆ A fresh bag should be used at each point where a sample is collected, and all samples placed into a larger sample bag and zip sealed for each site, with these items available from the laboratory ◆ Appropriate PPE should be worn during the collection process ◆ Samples should be collected or delivered to a laboratory that is NATA-accredited for the relevant test method ◆ Results should be provided to the functional lead for DWM or their representative and the on-ground management team, who will determine and implement appropriate site management and waste removal ◆ Engage the services of a suitably licensed asbestos removalist company to spray the affected site with a water-based dust polymer to contain the asbestos particles. Care should be taken to ensure that the surrounding area is also assessed and sprayed so all materials are contained ◆ Where time critical, or if the site is located near sensitive receptors, commence spraying asbestos waste before the assessment ◆ Once sprayed the site should be marked ◆ Consider hazards and WHS requirements in Table C8.2 and information below this table ◆ If greater than 10m2 bonded asbestos waste or any volume of friable asbestos waste, have an appropriately licensed asbestos removalist company manage the asbestos waste onsite and ensure that barriers are erected around the asbestos waste to prevent access by the public
Collection and transport	◆ Have an appropriately SA EPA-licensed asbestos removalist transport the asbestos waste ◆ An Asbestos Removal Control Plan will be required for each site and contractors will be required to notify SafeWork SA at least 5 days prior to commencing the work. Where the assessment indicates that the work must commence immediately because it could expose persons to respirable asbestos fibres, the contractor must contact SafeWork SA via phone prior to commencing the work ◆ Ensure transport vehicles and containers can fully contain the waste ◆ The asbestos must be dampened and wrapped in minimum of 200-micron thick plastic and clearly labelled when transported
Interim storage	◆ If interim storage is required, ensure it is secure and appropriately signed. Any interim storage needs to be in a fully enclosed facility either a shed or a temporary sea container or similar
Processing/disposal	◆ Asbestos is not recyclable and should be taken to an appropriately licensed landfill

A sign indicating the danger of asbestos (photo by Mark Haviland).

OTHER IMPORTANT CONSIDERATIONS WHEN REMOVING OR SPRAYING ASBESTOS AND ASBESTOS-CONTAMINATED WASTE

It is important to ensure that:

- the person spraying the affected site with dust polymer should be a SafeWork SA licensed asbestos removalist.
- spraying of the major threat areas (such as schools, kindergartens hospitals, and so on) is prioritised, and then consider the remaining sites
- the person conducting the removal is a SafeWork SA licensed asbestos removalist:
- Class A: friable asbestos material and greater than 10m2 of non-friable asbestos, or
- Class B: greater than 10m2 of non-friable
- the work is under the licensable quantities and is performed under safe conditions
- appropriate PPE is worn at all times, which at a minimum includes:
- disposable coveralls rated type 5, category 3 (prEN ISO 13982–1)
- fully enclosed shoes, preferably steel capped and not lace up
- gloves
- respirators that comply with the AS/NZ S1716 respiratory protective devices
- after removal, all PPE is treated as asbestos-contaminated waste and should be removed and placed in 200-micron plastic bags that are appropriately labelled for disposal
- recovery and handling of asbestos can be separated into non-friable/bonded asbestos, friable asbestos, and asbestos-contaminated soil (that is, asbestos-containing material buried in the soil).

When moving **non-friable/bonded asbestos waste**, the asbestos and asbestos-containing material must be:

- removed from site as soon as practical
- kept damp (while preventing run-off water) until it is securely wrapped using minimum 200-micron plastic and labelled ‘asbestos’ or contained in plastic lined bins
- placed in trucks or bins that are large enough to contain full sheets without breaking them or the plastic wrapping

- transported by a licensed transporter and stored in a secure and appropriately signed area.

When moving **friable asbestos waste**, it must be:

- removed from site as soon as practical
- kept damp
- placed in drums or crates
- securely wrapped using minimum 200 micron thick appropriately labelled plastic bags, with labelling stating:

  CAUTION – ASBESTOS
  DO NOT DAMAGE OR OPEN BAG
  DO NOT INHALE DUST
  CANCER AND LUNG DISEASE HAZARD

- decontaminated through the site decontamination procedure (this should be installed and used by the licensed asbestos removalists)
- wrapped in a second layer of 200-micron thick plastic bags outside the work area. These bags must:
- weigh less than 25 kg
- be less than half full
- be stored in a secure and appropriately signed area until removal.

When moving asbestos-contaminated soil, it must be:

- dug up using an excavator and placed in a bulk truck lined with the required plastic to contain the asbestos waste
- kept damp, including the soil
- securely locked and covered with 200-micron plastic when transported, and the asbestos removalists should ensure that the truck is decontaminated before it leaves the site.

SafeWork SA has information on asbestos in the workplace. See *Further information and resources* for links.

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C8.2 lists potential hazards and WHS requirements and control measures.

Table C8.2: Potential hazards and control measures

Hazard type	Description	Control measure
WHS	Inhaling asbestos fibres has a serious long-term health risk. Exposure can cause: • mesothelioma • lung cancer • asbestosis	• Asbestos removalists should be a fully trained and licensed for the type of asbestos being removed. • SafeWork SA must be notified of sites requiring licensed asbestos removal via the online asbestos removal notification portal. • An asbestos removal control plan must be prepared before licensed asbestos removal work commences.

Hazard type	Description	Control measure
	◆ pleural plaques ◆ pleural thickening.	◆ Removalists should place appropriate signage and bunting prior to undertaking any work. ◆ Air monitoring is required for friable and non-friable removal. An approved air monitoring company independent from the removalist should be engaged. ◆ Brushes, power tools and similar instruments must not be used unless controlled to ensure exposure to asbestos fibres is below half the exposure standard. High-pressure water jets are prohibited. ◆ Appropriate PPE should be worn at all times, which at a minimum includes: ▪ disposable coveralls rated type 5, category 3 (prEN ISO 13982–1) ▪ fully enclosed shoes, preferably steel capped and not lace up ▪ gloves ▪ respirators that comply with the AS/NZ S1716 respiratory protective devices. ◆ After removal, all PPE is treated as asbestos-contaminated waste and should be removed and placed in 200-micron plastic bags that are appropriately labelled for disposal. ◆ The asbestos removal site should be clearly defined to ensure that non-essential people do not enter the area and to clearly delineate the removal site and warn persons that asbestos removal work is being carried out (e.g. using barriers and signs or other warning devices). ◆ All barriers and warning signs should remain in place until a clearance certificate to re-occupy has been granted. ◆ Potential entry points to the asbestos work area should be signposted or labelled in accordance with AS1319-1994 Safety Signs for the Occupational Environment. These signs should be weatherproof, constructed of lightweight material, and adequately secured. ◆ Tape can be used as a barrier to define an asbestos work area for some types of asbestos removal work of short duration and, if a sign is not feasible, tape with the words 'asbestos hazard' along its length. ◆ Those affected by asbestos removal, such as neighbours, need to be notified 24 to 48 hours in advance. They should be advised to close all windows and doors for the duration of the work.

Hazard type	Description	Control measure
		• Washing should not be hung outside to dry during the removal. Air conditioners which introduce external air to the home should also not be operated during nearby asbestos removal.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- Asbestos and asbestos-containing materials may be present in buildings that have been destroyed or damaged in the disaster, and this is more likely if the building was built prior to 1990.
- If you suspect the presence of asbestos in any damaged buildings or equipment at your property, leave the materials alone and let a licensed person test and remove the products.
- Visit asbestos.sa.gov.au or call 1300 365 255 for further information.
- While asbestos or asbestos-contaminated materials are being removed, stay out of the demarcated zone that waste removalists have set up for safety purposes.

RECORD KEEPING

Quantities of asbestos can only be transported by an approved asbestos waste transporter in an appropriately signed and licensed to carry asbestos vehicle/s. All waste material must be accompanied by an appropriately completed Transport Certificate (asbestos is Code N220). Transporting asbestos must be logged into the SA EPA's online tracking system. Note that in certain circumstances, tracking waste is exempt in an emergency to protect human health, the environment or property.

SafeWork SA licensed asbestos removalists must upload a clearance certificate to the online asbestos notification portal within 5 days of job completion and the waste transport certificate within 14 days of job completion.

FURTHER INFORMATION AND RESOURCES

Asbestos.sa.gov.au

- Information on managing asbestos

SafeWork SA

- How to safely remove asbestos
- How to manage and control asbestos in the workplace
- Register of asbestos assessors
- Register of asbestos removal licence holders - Class A
- Register of asbestos removal licence holders - Class B

SA EPA

- Online waste tracking system

- What waste must be tracked
- Wastes containing asbestos – removal, transport and disposal
- For a list of sites that are licensed to receive asbestos, contact EPA Waste on 8204 2004, 1800 623 445 (free call), or at epainfo@sa.gov.au

Waste containing asbestos *Peg identifying that the site has been sprayed*
Photos taken following 2019–20 bushfires by Mike Haywood

C9: CHEMICAL (HAZARDOUS) WASTE

Damaged buildings, vehicles or other infrastructure may contain chemical (hazardous) waste that needs to be appropriately managed after an event, or the event may be caused by chemical (hazardous) waste. There are strict processes to follow when faced with this waste to ensure safe and sound disposal.

SOURCES OF CHEMICAL (HAZARDOUS) WASTE

Potential sources of chemical (hazardous) waste are from dangerous substances found in damaged:

- factories and stores
- agriculture sites such as farms and greenhouses
- transport vehicles
- food processing facilities
- service stations.

WHAT IS CHEMICAL (HAZARDOUS) WASTE?

The SA EPA defines chemical (hazardous) waste as listed waste having a characteristic described in Schedule A list 2 of the *National Environment Protection (Movement of Controlled Waste between States and Territories) Measure 1998*. Listed wastes are also included in Part B of Schedule 1 of the Environment Protection Act 1993 (see Further information and resources at the end of this guideline for the entire list).

Listed wastes can be categorised as:

- explosive substances
- flammable liquids and solids
- substances or wastes liable to spontaneous combustion
- substances or wastes which, in contact with water, emit flammable gases
- oxidising substances
- organic peroxides
- poisons
- infectious substances
- corrosives
- liberation of toxic gases in contact with air or water
- toxic substances
- ecotoxic substances
- substances capable of yielding a material with any of these substances.

POTENTIAL END USES FOR THE RECOVERED WASTE

Safety is the priority – when the chemical waste is no longer a threat to human health or the environment, there are limited recycling options for this waste, especially if it is mixed or not

correctly labelled. As such, safe treatment and disposal at a hazardous waste treatment/disposal facility, based on advice from SafeWork SA and the SA EPA, is the only option for this waste.

KEY CONSIDERATIONS FOR MANAGING CHEMICAL (HAZARDOUS) WASTE

The process for managing this waste onsite and moving to an appropriate facility is covered in *Table C9.1*.

Table C9.1: Managing chemical (hazardous) waste

Process	Key considerations
Onsite handling	◆ Ensure the site is safe from a health and environmental perspective (this should be done by the emergency responders). ◆ When safe, arrange removal of the chemical waste, based on advice from SafeWork SA and the SA EPA.
Collection and transport	◆ Follow the advice of the waste removalists and cordon off the area from the public. ◆ Follow requirements for transporting chemical waste when transporting the waste.
Interim storage	◆ Interim storage facilities may be set up if they can safely store and contain the waste, and appropriate monitoring and recording of waste in the facility is undertaken.
Processing/disposal	◆ This waste will be treated or potentially recycled into other chemical products.

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Due to physical, chemical, or infectious characteristics, chemical (hazardous) waste can be a significant hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. *Table C9.2* lists potential hazards and WHS requirements and control measures.

Table C9.2: Potential hazards and control measures

Hazard type	Description	Control measure
Injury from chemical (hazardous) waste, WHS	Chemical (hazardous) waste includes dangerous substances that may cause injury or illness if inhaled or touched	It is the responsibility of all Emergency Services workers to identify any hazards and ensure they are reported to supervisors or management, so that effective controls and or assistance can be implemented. SafeWork SA can provide specific advice on materials and the best way to manage these materials. The use of appropriate PPE is required when handling any form of chemical (hazardous) waste spills. Key considerations for PPE include: ◆ implementing higher levels controls (e.g. engineering controls) in preference of reliance upon PPE, noting PPE is the lowest level of control measure and is to be used

		where higher-level controls have not been able to sufficiently minimise risks associated with handling, storage and/or use of hazardous waste ◆ ensuring PPE is suited to the task, clean, and in good condition before and after use ◆ reading the label or Safety Data Sheet which specifies which PPE to use where possible when using or handling chemical (hazardous) waste ◆ noting that for persons who operate, service or maintain machinery, the individual and their employers are responsible for having the correct type of PPE in good working order, with regular inspections ◆ discouraging the shared use of PPE, particularly for items such as gloves and footwear.
Chemical leakage, environmental	Chemical (hazardous) waste may leak to water streams, soil and the atmosphere causing environmental damage	SA EPA can provide specific advice on materials and the best means of managing these materials to minimise the environmental impact. Local chemical waste companies may also be able to provide advice and support.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- If you encounter chemical or hazardous waste materials check (where possible) for appropriate warnings and labelling such as:

Label element	Examples
Signal words – these provide an immediate warning to the reader	Danger or Warning
Hazard statements – these describe the nature and severity of the chemical hazard based on a chemical's classification	May cause cancer Fatal if inhaled Flammable liquid and vapour Causes severe skin burns and eye damage May cause respiratory irritation
Pictograms – these provide a pictorial representation of the type of hazard that can be easily recognised at a glance	 Flammable Acute toxicity Warning

	Corrosive Human health

- Seek advice from SafeWork SA or a specialist hazardous waste disposal contractor before attempting recovery or removal.
- Wear appropriate protective gear/equipment including chemical resistant clothes and safety goggles. As a minimum, wear clothes to fully cover you – long sleeves, trousers, and closed in shoes.
- Do not breathe in vapours/gases and keep your back to the wind so it does not blow into your face.
- Do not get materials onto your skin.
- Dispose of gloves appropriately, or if safe to do so, wash gloves with water to remove all traces of the chemical.

RECORD KEEPING

For chemical (hazardous) wastes which are dangerous goods, transport documents must be readily available and located in the cabin of the vehicle in an emergency information holder, and must include:

- the consignor's name and telephone number
- the number of a 'telephone advisory service', if the dangerous goods are in a tank vehicle, portable tank, or bulk container with a capacity of more than 500 kg or 500 L
- the United Nations number of the goods
- the proper shipping name of the goods
- the Class or Division of the goods
- each Subsidiary Hazard (if any) of the goods
- the packing Group (if any) of the goods
- a description of each type of package or other receptacle to be transported (such as drum, intermediate bulk container, and so on)
- the quantity of each type of package or receptacle in the consignment
- the aggregate quantity of the dangerous goods.

LEGISLATION AND REGULATIONS TO CONSIDER (WHS AND ENVIRONMENTAL)

Dangerous Substance Act 1979 (SA)* and *Dangerous Substances (Dangerous Goods Transport) Regulations 2023

This legislation provides the regulatory requirements for the keeping, handling, transporting, conveyance, use and disposal, and the quality of dangerous substances. Visit the SafeWork SA website for more information.

FURTHER INFORMATION AND RESOURCES

National Transport Commission

The *Australian Code for the Transport of Dangerous Goods by Road & Rail* (ADG Code) sets out the operational and technical requirements for the management of dangerous goods transportation.

United Nations

The *Globally Harmonized System of Classification and Labelling of Chemicals* (GHS) is a United Nations initiative to internationally standardise chemical classification, labelling and Safety Data Sheets in the workplace.

Environment Protection Act 1993

Listed wastes from the *Environment Protection Act 1993* include:

- Acids and acidic solutions
- Adhesives (excluding solid inert polymeric materials)
- Alkali metals and alkaline earth metals
- Alkalis and alkaline solutions
- Antimony and antimony compounds and solutions
- Arsenic and arsenic compounds and solutions
- Asbestos
- Barium compounds and solutions
- Beryllium and beryllium compounds
- Boron and boron compounds
- Cadmium and cadmium compounds and solutions
- Calcium carbide
- Carbon disulphide
- Carcinogens teratogens and mutagens
- Chlorates
- Chromium compounds and solutions
- Copper compounds and solutions
- Cyanides or cyanide solutions and cyanide complexes
- Cytotoxic wastes
- Dangerous substances within the meaning of the Dangerous Substances Act 1979
- Distillation residues
- Fluoride compounds
- Halogens
- Heterocyclic organic compounds containing oxygen, nitrogen or sulphur
- Hydrocarbons and their oxygen, nitrogen and sulphur compounds (including oils)
- Isocyanate compounds (excluding solid inert polymeric materials)
- Laboratory chemicals
- Lead compounds and solutions
- Lime sludges or slurries
- Manganese compounds
- Medical waste
- Mercaptans
- Mercury compounds and equipment containing mercury
- Nickel compounds and solutions
- Nitrates
- Organic halogen compounds (excluding solid inert polymeric materials)
- Organic phosphates
- Organic solvents
- Organometallic residues
- Oxidising agents
- Paint sludges and residues
- Perchlorates
- Peroxides
- Pesticides (including herbicides and fungicides)
- Pharmaceutical wastes and residues Phenolic compounds (excluding solid inert polymeric materials)
- Phosphorus and its compounds
- Polychlorinated biphenyls

- Poisons within the meaning of the Drugs Act 1908
- Reactive chemicals Reducing agents
- Selenium and selenium compounds and solutions
- Silver compounds and solutions
- Solvent recovery residues
- Sulphides and sulphide solutions
- Surfactants
- Thallium and thallium compounds and solutions
- Vanadium compounds
- Zinc compounds and solutions.
- For details on asbestos waste, see Guideline C6: Asbestos and asbestos-contaminated waste

C10: COPPER CHROME ARSENATE (CCA) SOLID AND ASH WASTE

Soft woods used in building or agricultural products are often treated with copper chrome arsenate (CCA) to extend their life. This material is commonly used in agriculture as fencing posts, in viticulture as vine supports, and in buildings and homes. Due to the chemicals used in their production damaged CCA materials require special treatment and disposal to a suitably engineered licensed landfill.

Sources of CCA waste

Potential sources of CCA waste are from damaged:

- agricultural farms and orchards
- wineries (posts used in vineyards)
- houses/buildings (pergolas, verandas, facias and cladding).

WHAT IS CCA WASTE?

The SA EPA defines CCA as 'timber treated with copper chrome arsenate (or CCA; commonly known as 'permapine')'.

Softwood timber materials that are treated with CCA are recognisable by a greenish tinge on the raw timber, and are commonly used in:

- viticulture as posts to support the trellis wire
- agricultural fence posts and structures
- pergolas and decking
- pallets and skids.

CREOSOTE TREATED TIMBERS

Some softwood posts used for fencing and as vine supports are treated with creosote. The differences are reasonably easy to recognise, as creosote posts are generally quite black rather than green and have an oily texture and hydrocarbon odour. They are typically disposed of using the same process as CCA posts.

CCA TREATED TIMBER WASTE

POTENTIAL END USES FOR THE RECOVERED WASTE

CCA timber waste cannot be recycled, burnt or chipped, and the only disposal option is sending it to a suitably engineered and licensed SA EPA approved landfill.

The process for managing solid CCA timber waste onsite and moving to an appropriate facility is covered in *Table C10.1*.

Table C10.1: Managing the solid CCA timber waste materials

Process	Key considerations
Onsite handling	◆ Pack the CCA waste onto non-CCA pallets, into dedicated waste bins or in readily accessible stockpiles. ◆ A shovel and large crowbar may be sufficient to move the waste, although it may be necessary to use a tractor with appropriate post removal equipment.
Collection and transport	◆ Items can be transported by smaller vehicles (e.g. a ute or car with trailer) or larger trucks.
Interim storage	◆ If CCA timber waste needs to be temporarily stored, it needs to be managed on a site-specific basis. ◆ The SA EPA recommends that sites develop their own waste management plans (see below). ◆ See the SA EPA's waste management guideline on CCA timber waste (listed under Further information and resources).
Processing/disposal	◆ This waste cannot be recycled and must be taken to a suitably engineered and licensed landfill.

OTHER CONSIDERATIONS FOR MANAGING THIS WASTE

Temporary stockpiling of CCA timber waste should be done on non-CCA pallets or dedicated waste bins. Cover the CCA timber waste (above and below) with strong plastic or tarpaulins to reduce the potential for contaminated leachate production.

For interim storage of this waste, complete a site waste management plan for CCA waste that addresses the following:

- Ensure that CCA timber waste is sorted and stored separately from other material.
- Keep the CCA timber waste as dry as possible and store at appropriate distances from any water courses.
- Store larger quantities of CCA timber waste in appropriately constructed roofed and bunded structures (see SA EPA's *Bunding and spill management guideline* under *Further information and resources*).
- Elevate stockpiles above the ground surface, noting that storing small quantities on high ground may be an acceptable interim measure in some environments.
- Refer to SA EPA's guide to CCA timber waste listed under *Further information and resources*.

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Potential hazards and WHS requirements and control measures are highlighted in *Table C10.2*.

Table C10.2: Potential hazards and control measures

Hazard type	Description	Control measure
WHS, environmental	Large quantities of CCA timber waste in stockpiles have the potential to release toxic quantities of	See the 'other considerations for managing this waste' above as well as SA EPA's waste management guideline on CCA timber waste

Hazard type	Description	Control measure
	contaminated leachate into the ground.	(listed under *Further information and resources*).
WHS, environmental	During combustion, CCA post waste releases toxic gases and the residual ash would be toxic containing heavy metals. See section on CCA ash treatment below.	Never burn CCA timber waste. If CCA timber waste is on fire due to an uncontrolled event, do not breathe in the emissions. Stay upwind from the fire and, if required, douse the CCA post waste in water until flames and smoke are extinguished. If available, wear breathing apparatus.
WHS	Manual handling of product leads to injury.	Use supportive equipment and machinery to remove and transport the material, such as a shovel, large crowbar or a tractor with post removal equipment attached.

CCA TIMBER ASH WASTE

The process for managing CCA timber ash waste onsite and moving to an appropriate facility is covered in *Table C10.3*.

Table C10.3: Managing the ash waste materials

Process	Key considerations
Onsite handling	◆ Large volumes of CCA ash require special on-site removal with a super vac unit or similar and must be undertaken under the supervision of a suitably qualified Soil Auditor. ◆ Care must be taken to not allow the ash to become disturbed, airborne or mobile. ◆ Once removal is completed, the area should be sampled and tested to ensure all residuals have been removed and signed off by the soil auditor. ◆ Smaller volumes can be collected and removed with a CCA ash clean-up kit
Collection and transport	◆ Ash must be contained in sealed plastic-lined 205 litre drums or similar and transported in a suitably EPA licensed vehicle displaying the appropriate hazardous good signage. ◆ CCA ash clean-up kits should be transported to centralised transfer stations stored and collected in a fully enclosed container for disposal by a suitably licensed hazardous waste contractor.
Interim on-site management	◆ Ensure ash is contained within a small bund and covered with plastic especially if a rain event is anticipated. ◆ Engage a soil auditor to develop a site-specific waste management plan. ◆ See the SA EPA's waste management guideline on CCA timber waste (listed under Further information and resources).

Processing/disposal	◆ This waste cannot be recycled and must be taken to a suitably engineered and licensed landfill.

OTHER CONSIDERATIONS FOR MANAGING THIS WASTE

From time to time, there may be incidents where the CCA ash is contaminated with other dangerous goods. For example, the ash may contain asbestos. In this case the SA EPA should be advised, a removal plan should be prepared and approved and the whole volume of waste should be treated as asbestos.

In these situations:

- ensure that CCA ash waste is stored separately from other material
- keep the CCA ash waste as dry as possible
- keep the CCA ash under tarps or strong plastic until safe removal and disposal
- refer to SA EPA's guide to CCA timber waste listed under *Further information and resources.*

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Potential hazards and WHS requirements and control measures are highlighted in *Table C10.4*.

Table C10.4: Potential hazards and control measures

Hazard type	Description	Control measure
WHS, environmental	During combustion, CCA post waste releases toxic gases and the residual ash would be toxic containing heavy metals.	Never burn CCA post waste. If CCA post waste is on fire due to an uncontrolled event, do not breathe in the emissions. Stay upwind from the fire, and if required, douse the CCA post waste in water until flames and smoke are extinguished. If available, wear breathing apparatus.
WHS, environmental	Large quantities of CCA ash waste have the potential to release toxic quantities of contaminated leachate into the ground.	See the 'other considerations for managing this waste' above as well as SA EPA's waste management guideline on CCA timber waste (listed under *Further information and resources*).
WHS	Manual handling of product leads to injury.	Use supportive equipment and machinery to remove and transport the material, such as a shovel, large crowbar or a tractor with post removal equipment attached.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- Your property may contain ash from CCA treated timber products damaged in the event. This waste needs to be disposed of appropriately.
- These materials are ash that has a green tinge and a chrome glint in certain sunlight.
- Do not under any circumstances try to remove the ash without appropriate support and advice, as it might contain toxic chemicals.

- If you need to contain the ash or partly burnt posts, cover it with either strong plastic or tarpaulins to reduce the potential for the ash migrating to water courses.
- Contact the EPA for further information.

LEGISLATION AND REGULATIONS TO CONSIDER (WHS AND ENVIRONMENTAL)

Environment Protection (Air Quality) Policy 2016

Under this policy, a person must not cause or permit the burning of copper chromium arsenate or other timber preservation substances by fire.

RECORD KEEPING

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage or final disposal.

FURTHER INFORMATION AND RESOURCES

SA EPA

- Copper chromated arsenate (CCA) timber waste—storage and management (2016)
- Liquid storage guideline, Bunding and spill management (2016)

CCA Posts at the Tiers Road Transfer Station Bulk Bins delivered to wineries for loading and transport.

Stockpiles of damaged posts, which become CCA waste ash in a bushfire event

L to R: 20L ash kits, ash pump and containers, and vacuuming the ash into drums
Photos by Mike Haywood

ADF Assistance at the temporary Woodside transfer Station

Task

The ADF has agreed to be tasked with the day to day operation and management of the transfer station.

The site has primarily been established to accept fire damaged Perma Pine posts (CCA) from the local community and local fire affected wine industry.

Materials Accepted

Perma Pine will be presented to the site in the following forms:

- fence posts
- retaining logs
- pergolas & general agricultural material.

Acceptance Criteria

This is a trailer/ute operation; vouchers will be required to present waste and are available at the Lobethal Recovery Centre prior to presenting for unloading at the transfer station. The bin has a walk-in door and ADF are asked to ensure materials are placed in reasonable order to maximise the utilisation of airspace in the bin.

ADF Personnel Role

ADF are to ensure the following:

- that the person(s) presenting the load have the voucher collected from the recovery centre.
- recover the voucher.
- ensure that only CCA is predominantly present in the load
- direct the person(s) unloading to the correct bin for disposal. Small amounts of wire and vines to be placed into smaller waste bin
- a smaller bin will be provided for any hard waste in the load however the acceptance and disposal will not be encouraged and should be a small portion of the load not the predominant material in the load.
- lose or litter blown materials will not be accepted
- contact Mike Haywood 0407 400 071 when containers are full and require an exchange.

Rejected loads of mixed waste should be diverted to council transfer stations at:

- Windmill Lane Transfer Station, Windmill ln Totness
- Heathfield Resource Recovery Centre, 32 Scott Creek Rd, Scott Creek

Sample of Australian Defence Force Tiers Road Site management procedure for CCA solid waste used in 2019–20 Bushfire clean up. This example is unique to this event. Management decisions will vary on an event-by-event basis.

C11: E-WASTE AND WHITEGOODS

Computers, televisions, fridges, washing machines and other electrical and electronic equipment in dwellings can be damaged during an event. This waste is banned from landfill and should (where possible) be separated out, recovered, and recycled. This can be done at numerous locations registered to accept and recycle e-waste and whitegoods waste.

E-waste

SOURCES OF E-WASTE AND WHITEGOODS WASTE

Potential sources of e-waste and whitegoods waste are from electronic equipment in damaged:

- factories and stores
- single or multistorey dwellings
- high-rise apartments and office blocks
- supermarkets and shopping centres/precincts.

WHAT IS E-WASTE AND WHITEGOODS WASTE?

The SA EPA defines e-waste and whitegoods waste as electrical and electronic equipment that is dependent on electric currents or electromagnetic fields to function (including all components, subassemblies and consumables which are part of the original equipment at the time of discarding). E-waste includes:

- consumer/entertainment electronics (such as televisions, DVD players and tuners)
- devices of office, information and communications technology (such as computers, telephones and mobile phones)
- lights and lighting devices (such as desk lamps)
- power tools (such as power drills) with the exclusion of stationary industrial devices
- devices used for sport and leisure including toys (such as fitness machines and remote-control cars).

Whitegoods include household appliances such as fridges, washing machines and microwaves.

POTENTIAL END USES FOR THE RECOVERED WASTE

Ideally, these items will be recovered, and each component separated out and recycled. *Table C11.1* lists typical end uses for recovered e-waste and whitegoods.

Table C11.1: Typical end uses for recovered e-waste and whitegoods

Materials recovered	Potential uses
Brown goods (e.g. televisions, audio equipment)	Disassembled at an e-waste recycler for metals and plastics recovery as well as heavy metals and rare earth recovery.
Other e-waste	Shredding and/or disassembly at an e-waste recycler to plastic, metal, and other components for reprocessing. These separate waste streams are sold as a commodity on the market and used to make new products.
Whitegoods (e.g. refrigerators, washing machines)	Transported to a metal scrapyard, degassed and the metals recovered and recycled into new metal, automotive parts, cables, and so on.

RECYCLING AND DISPOSAL OPTIONS

Table C11.2 provides a quick guide to recycling and disposal options for this waste stream.

Table C11.2: Quick guide to disposal and recycling options

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product
E-waste: disassemble/ shredding at e-waste recycler	All volumes	All events	Numerous e-waste recyclers across the state	Should be e-waste only (no other wastes)	May vary. If market demand is low, safely store until demand increases
Whitegoods: de-gas and recover metal	All volumes	All events	Numerous scrap metal recyclers across the state	Should be whitegoods and metal waste only (no other wastes)	May vary. If market demand is low, safely store until demand increases
Landfill	If e-waste or whitegoods waste is mixed with other wastes and cannot be separated, an exemption of the landfill ban may be needed.				

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

The process for managing the waste onsite and moving to an appropriate facility is covered in *Table C11.3*.

Table C11.3: Managing the waste

Process	Key considerations
Onsite handling	◆ Consider hazards and WHS requirements in Table C11.4. ◆ Separate the e-waste and whitegoods from other waste streams.
Collection and transport	◆ If required, stockpile e-waste and whitegoods in a dry, undercover area. ◆ Transport e-waste to an e-waste recycler or e-waste collection point and whitegoods to a scrap metal recycler.
Interim storage	◆ Interim storage may be needed. If so, ensure it is in a dry, undercover area and potentially caged in or fenced to prevent items falling.
Processing/disposal	◆ Do not landfill these items. ◆ The recycling facility will dissemble and recycle the components while treating the hazardous materials.

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C11.4 lists potential hazards and WHS requirements and control measures.

Table C11.4: Potential hazards and control measures

Hazard type	Description	Control measure
Gas release, environmental	Refrigerant and air-conditioning gases can potentially be released into the atmosphere	Refrigerant and air-conditioning gases are not to be discarded into the atmosphere. These items require a suitably qualified licensed disposal facility with the approved gas capture and recovery equipment to decant the units.
Potential release of dangerous heavy metals, environmental	E-waste can potentially contain heavy metals that can be dangerous to the environment	E-waste and whitegoods should be collected and disposed of at approved e-waste recycling facilities.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- E-waste should be collected and disposed of at approved e-waste recycling facilities. Learn more.
- Whitegoods should be collected and disposed of at approved metal recycling facilities.
- Store damaged e-waste and whitegoods in a dry place until ready to move to a recycling facility or e-waste scheme collection point.

LEGISLATION AND REGULATIONS TO CONSIDER (WHS AND ENVIRONMENTAL)

National Television and Computer Recycling Scheme

Established in 2011 to provide Australian householders and small business with access to industry-funded collection and recycling services for televisions and computers. Learn more.

Environment Protection (Waste to Resources) Policy 2010 (EPP)

The recycling scheme and the EPP state that e-waste and whitegoods are prohibited from landfill in South Australia. Learn more.

Ozone Protection and Synthetic Greenhouse Gas Management Legislation

Refrigerant and air conditioner gases are classified under this legislation. Learn more.

RECORD KEEPING

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage or final disposal.

FURTHER INFORMATION AND RESOURCES

National Television and Computer Recycling Scheme

Find your nearest e-waste recycling drop off point.

C12: HOUSEHOLD HAZARDOUS WASTE

Households may have stored hazardous materials, such as household chemicals, that become displaced or damaged after an event.

Sources of household hazardous waste

Potential sources of household hazardous waste are from damage to garden sheds, garages, houses, or other buildings that contain hazardous materials.

WHAT IS HOUSEHOLD HAZARDOUS WASTE?

Household hazardous waste includes materials such as:

- acids and alkalis
- brake fluids and coolants
- car care products
- cleaning products
- other household chemicals
- paint (liquid only)
- pesticides and other garden chemicals
- photographic chemicals
- polishes
- pool chemicals
- solvents (including paint thinners, turpentine)
- varnishes and stains.

POTENTIAL END USES FOR THE RECOVERED WASTE

Where practical, these items can be recovered and sent for recycling. *Table C12.1* lists typical end uses for recovered household hazardous waste.

Table C12.1: Potential end uses for recovered household hazardous waste

Materials recovered	Potential uses
Mercury	Mercury can be recovered from fluorescent lighting and used in new mercury-containing products such as lamps, thermometers and medical equipment.
Lead	Lead from lead-acid batteries can be recovered and used in new products containing lead such as new lead-acid batteries, building construction material and cable sheathing.
Paint	Paint can be recovered and recycled. Recovered paint tins can be recycled into new metal packaging and products.
Oil	Oil can be recovered and recycled.
Chemicals (various)	Acids, alkalis and other chemicals can be treated and disposed through a treatment process.

RECYCLING AND DISPOSAL OPTIONS

Table C12.2 provides a quick guide to recycling and disposal options for managing this waste stream.

Table C12.2: Quick guide to disposal and recycling options

<table>
<tr><th>Recycling or disposal option(s)</th><th>Suitable volumes</th><th>Event type considerations</th><th>Location & capacity of infrastructure</th><th>Waste stream contamination</th><th>Likely demand for recycled product</th><th>Other considerations</th></tr>
<tr><td>Fluorescent tube recycler</td><td>All fluorescent tubes</td><td rowspan="5">All events</td><td rowspan="5">Local network of collectors/ aggregators, which would transport to recyclers</td><td>Likely to be mixed with C&D waste stream</td><td rowspan="5">N/A</td><td rowspan="5">Likely to be small volumes and may not be practical to source separate for recycling</td></tr>
<tr><td>Paint recycler</td><td>All paints</td><td rowspan="4">N/A</td></tr>
<tr><td>Lead-acid battery recycler</td><td>All lead-acid batteries</td></tr>
<tr><td>Oil recycler</td><td>Oil</td></tr>
<tr><td>Chemicals (various)</td><td>Chemicals (various)</td></tr>
<tr><td>Landfill</td><td colspan="6">Many household hazardous waste items (e.g. fluorescent tubes, oil and batteries) are banned from landfills and as such, an exemption would need to be sought to dispose of this waste at landfill.</td></tr>
</table>

The process for managing the waste onsite and moving to an appropriate facility is covered in *Table C12.3*.

Table C12.3: Managing the waste

Process	Key considerations
Assessing the site	◆ Consult with property owner to create a list and volume of chemicals stored at the premises.
Onsite handling	◆ Advise the public to take precautions when handling household hazardous waste.
Collection and transport	◆ Set up drop-off points at transfer stations or council depots operated by suitably qualified contractors where residents/contractors can bring this material. ◆ Advise residents on precautions to take when transporting the waste, including ensuring lids are tightly fitted and hazardous wastes are securely packed in a non-returnable crate or box, and placing leaking containers into a sealed container prior to transportation. ◆ If possible, request that labels are retained or label chemicals clearly where known. ◆ Where large risks exist for transport of material, establish a dangerous goods run.

Interim storage	◆ Long-term storage is not recommended. In most instances, the contractor would transport to final processing/disposal location within a few days. ◆ Store materials in a secure, undercover area. ◆ Special handling and storage requirements are required for hazardous waste streams. See Guideline C9: Chemical (hazardous) waste for more information.
Processing/disposal	◆ Where practical, send recovered materials to recyclers.

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C12.4 lists potential hazards and WHS requirements and control measures.

Table C12.4: Potential hazards and control measures

Hazard/hazard type	Description	Control measure
WHS and environmental	Fluorescent lights contain many materials that can pose risks to workers, the community, public health and the environment. These include broken glass (from bulbs and tubes) and toxic chemicals, such as mercury, which is a potent neurotoxin that contaminates water supplies through leakage from landfill.	◆ Take caution and wear suitable personal protection equipment (PPE) (respiratory protection, gloves, glasses, and disposable overalls) when handling fluorescent lights. ◆ Sort fluorescent lighting into types, and store in purpose-built stillages or sealed cardboard boxes in a secure, suitably labelled, undercover area. ◆ Send fluorescent tubes to recyclers where possible and practical for recycling, rather than landfill disposal.
WHS	Chemicals from leaking batteries can be toxic and cause burns or skin irritation.	◆ Always treat batteries as though they are fully charged. ◆ Use equipment to aid handling (e.g. forklifts) ◆ Wear PPE, particularly gloves and eye protection ◆ Have a minimum of one person per work area trained in spill response. ◆ Follow correct and safe manual handling and management procedures.
WHS	Electrocution from larger batteries still containing significant energy.	
WHS and environmental	If not stored correctly, batteries can leak toxic chemicals and potentially explode or be an ignition source.	◆ Keep batteries away from flammable and combustible materials and ignition sources. ◆ For lead-acid car batteries, best practice is to store batteries undercover, on pallets, up to 2 batteries high, and then shrink wrap ready for transport. It is recommended that no more than 2 pallets of lead-acid batteries

		(approximately 56 batteries) are stored before collection for recycling.
WHS and environmental	Motor oil contains materials and properties that can pose hazards to workers	◆ Keep heat and potential ignition sources away from waste oils storage and handling areas. ◆ Ensure containers and drums containing waste oil are not cut with any heat-producing equipment. ◆ Follow correct safe manual handling and management procedures when handling large/heavy drums or containers. ◆ Ensure both operators and others who carry out decanting wear appropriate PPE, including gloves and eye protection. ◆ Employ waste oil spill management plans and spill kits at sites to ensure spills are contained and cleaned up correctly. ◆ Ensure each facility has onsite staff trained in the use of suitable firefighting equipment.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- It is important to take the following precautions when transporting household hazardous wastes to a collection point:
- Always handle hazardous wastes carefully and avoid direct contact. Wear protective gear/equipment where possible.
- Prior to transporting, ensure lids are tightly fitted and hazardous wastes are securely packed in a non-returnable crate or box. Place leaking containers into a sealed container prior to transportation.
- If possible, retain all labels or label chemicals clearly where known.
- When transporting, put the crate or box on a tarpaulin in the boot of the car.
- It is suggested that passengers are excluded from vehicles when transporting hazardous household waste to drop-off point.

RECORD KEEPING

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage or final disposal.

RELATED GUIDELINES

If household hazardous waste is present after a disaster, refer to *Guideline C9: Chemical (hazardous) waste* for more information and guidance.

C13: LITHIUM-ION BATTERIES

Lithium-ion batteries (LIBs) can pose significant hazards for disaster waste management. Use of LIBs is increasing and they are present in most homes and businesses.

SOURCES OF LITHIUM-ION BATTERIES

Potential sources of LIBs include:

- Electric Vehicles (EV) and Light Electric Vehicles (LEV) (cars, e-scooters, e-bikes, micromobility devices)
- small household appliances (vacuums, baby monitors)
- electrical appliances (computers, Bluetooth speakers, phones, tablets, gaming controllers)
- energy storage systems (solar panels)
- other rechargeable devices (vapes, cameras, power tools, toys).

WHAT ARE LITHIUM-ION BATTERIES?

Lithium-ion batteries are rechargeable batteries that store and release energy using lithium-ions. They are characterised by their high density and long life span. They are considered hazardous e-waste and are classified as a Class 9 Dangerous Good. LIBs can present as either removable/loose or embedded (not removable) in a device.

POTENTIAL END USES FOR THE RECOVERED WASTE

There is currently no widespread collection/drop off solution for LIBs. Refer to resources from local council, state governments or industry bodies such as B-cycle to determine best disposal option.

LIBs are not suitable for landfill and need to be disposed of correctly. They pose as a significant fire risk when placed in kerbside bins and in waste and recycling facilities. Recycling of LIBs in Australia is emerging. There are some (but limited) facilities currently accepting loose and embedded LIBs in South Australia.

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

The process for managing LIBs impacted or damaged by an event onsite and moving to an appropriate facility is covered in *Table C13.1*.

Table C13.1: Managing waste

Process	Key considerations
Assessment	◆ An understanding of what products contain LIBs should be developed before the assessment phase. ◆ To assess whether a product contains a LIB, look for product markings: ◆ “Li” or “Lithium” ◆ Chasing arrow with “Li-ion”

	◆ Do not remove embedded LIBs from their devices. ◆ Inspect all products for damage, including: ◆ swelling or deformation of the battery case ◆ leaks, dents, damage, or visual distortion ◆ smoke emission or usual heat ◆ strange noises ◆ chemical odours If LIBs are presenting any of these signs, they should be treated as unsafe. ◆ In the case that the LIB is deemed unsafe, store it in a cool, dry area that is well ventilated. Contact your local council or waste service provider for next steps. ◆ EVs store large LIBs with higher capacity, potentially increasing the hazard. ◆ It may not be immediately obvious whether a product contains a LIB if it has sustained damage. Caution should be taken throughout the assessment phase.
Onsite handling	◆ Do not place LIBs in household bins or on the kerbside. ◆ Handle with care (avoid dropping, crushing, or piercing batteries). ◆ Wear PPE such as gloves and protective clothing.
Collection and transport	◆ Identify appropriate drop-off location for transport of LIBs. ◆ Use signage to inform of LIB presence. ◆ Follow requirements of the Australian Dangerous Goods Code (ADG Code). ◆ Transport documents must be readily available and located in the cabin of the vehicle in an emergency information holder.
Interim storage	◆ Store LIBs away from other e-waste and away from sunlight in a cool, dry area. ◆ Follow the manufacturer's guidelines for correct storage (when available). ◆ Store in appropriate containers with ventilation and non-conductive and non-combustible cushioning. An example of this is metal containers that can be flooded by emergency services during a fire. ◆ Store containers on a non-permeable surface to prevent run-off and contamination. ◆ Use signage. ◆ Conduct routine inspections.
Processing/disposal	◆ Send LIBs to approved facilities to receive and recycle/process. ◆ Suitable measures must be in place to manage risks.

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C13.2 lists potential hazards and WHS requirements and control measures.

Table C13.2 Potential hazards and control measures

Hazard type	Description	Control measure
Combustion and fires, WHS, environmental	Fires and explosions due to highly flammable material present in LIBs, particularly if damaged (crushed/wet/burnt)	◆ Do not crush battery or device containing LIB ◆ If safe, remove device containing the LIB from area prior to any demolition works ◆ Avoid modification ◆ Use PPE such as gloves and protective clothing when handling
Combustion and fires, WHS, environmental	Incorrect disposal of LIBs can lead to fires at kerbside, during transport or at waste and recycling facilities	◆ LIBs have a higher fire risk than any other battery type, so correct disposal is crucial ◆ Never place LIBs in household or kerbside bins ◆ Follow ADG Code requirements during transport
Combustion and fires, WHS, environmental	LIBs are highly volatile when exposed to water. They can produce excessive heat which can lead to explosions and formation of dangerous gases including hydrogen and chlorine.	◆ Keep batteries dry, store in a cool dry place ◆ If LIBs have been exposed to water and no longer work, follow appropriate disposal procedures ◆ Wear PPE, such as masks, when handling
WHS, environmental	Water based fire extinguishers can cause toxic runoff when used to put out an LIB fire. This runoff can contain harmful components including metals, oxides and solvents. Poses as a threat to environmental and human health.	◆ Use appropriate extinguishers that are designed for metal fires ◆ Where water-based extinguishers have been used, monitor runoff
Combustion and fires, WHS, environmental	Thermal runaway: a chain reaction of exothermic chemicals that results in a major increase of temperature. May release toxic chemicals in the form of gas (flammable). Thermal runway is more likely to occur in larger LIBs such as those found in EV's.	◆ Never touch ruptured batteries as the heat may cause severe burns ◆ Act immediately if change in odour, visible change, battery is damaged or leaking ◆ Call fire emergency services for attendance ◆ Do not overcharge LIB and be cautious when temperature is increasing ◆ Use PPE such as gloves, masks and protective clothing ◆

WHS	LIBs contain toxic chemicals that, if exposed to skin and eyes or inhaled, may have harmful effects.	◆ If LIB has been visibly damaged or is leaking, do not touch, or wear PPE such as gloves, protective clothing, and a mask

CRITICAL INFORMATION TO PROVIDE THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- Lithium-ion batteries (LIBs) are a common battery type, present in majority of households and businesses. They are present as either removable/loose or embedded.
- They contain heavy metals that can have negative impacts on the environment and human health.
- LIBs have the highest fire risk out of all battery types.
- If an LIB has been impacted by an event (particularly a fire or water event) extra precaution should be taken when handling and disposing.
- LIBs are considered dangerous if they are damaged, leaking, hot to the touch, emitting smoke, visually distorted, have come into contact with water, or have an odour.
- LIBs must NOT be placed in kerbside bins due to fire risk. Fires can occur in bins, transport vehicles, and waste/recycling facilities.
- If you are handling LIBs, it is recommended that:
- they are stored away from sunlight in a cool, dry area away from other e-waste
- non-combustible, ventilated materials and containers are used (such as metal), and containers are stored on non-permeable surfaces to avoid run-off/contamination
- they are handled with extra care, avoiding physical abuse such as dropping or crushing
- PPE is worn (such as gloves and protective clothing).

RECORD KEEPING

Where possible, keep records of volumes/amounts of LIBs that may be present in households and establishments, track LIB disposal, and establish emerging end of life destinations as LIB recycling develops.

FURTHER INFORMATION AND RESOURCES

SA EPA

- *Don't bin your batteries* (2024)

SafeWork NSW

- *Lithium-ion batteries*

GISA

- *Capitalising on the lithium-ion waste resource challenge in South Australia* (2021)

ACCC

- *Lithium-ion batteries guide*

C14: MEDICAL AND PHARMACEUTICAL WASTE

Waste in hospitals, medical centres, and veterinary clinics, such as needles, surgical instruments, human tissue, medical specimens and so forth, require safe and effective removal processes to minimise any risk of injury.

SOURCES OF MEDICAL AND PHARMACEUTICAL WASTE

Potential sources of medical and pharmaceutical waste are from damaged:

- hospitals
- medical centres/clinics
- veterinary clinics.

WHAT IS MEDICAL AND PHARMACEUTICAL WASTE?

The SA EPA defines medical and pharmaceutical waste as the wastes listed in Part B of Schedule 1 (Page 14) of the *Environment Protection Act 1993,* which includes:

- a needle, syringe with needle, surgical instrument or other article that is discarded in the course of medical*, dental or veterinary practice or research, and has a sharp edge or point capable of inflicting a penetrating injury on a person who comes into contact with it
- human tissue, bone, organ, body part or foetus
- a vessel, bag or tube containing a liquid body substance
- an animal carcass discarded in the course of veterinary or medical* practice or research
- a specimen or culture discarded in the course of medical*, dental or veterinary practice, or research, and any material that has come into contact with such a specimen or culture
- any other article or matter that is discarded in the course of medical*, dental or veterinary practice or research and that poses a significant risk to the health of a person who comes into contact with it.

* Medical practice includes the practice of pathology and the operation of an immunisation clinic.

POTENTIAL END USES FOR THE RECOVERED WASTE

Treatment and incineration or autoclaving are the most appropriate end uses for this waste. A waste autoclave is a form of solid waste treatment that uses heat, steam, and pressure of an industrial autoclave in the processing of waste.

However, the *Environment Protection (Waste to Resources) Policy 2010* now enables the SA EPA to approve alternative methods of treatment or disposal for medical waste in addition to incineration.

RECYCLING AND DISPOSAL OPTIONS

Table C14.1 provides a quick guide to recycling and disposal options for managing this waste stream.

Table C14.1: Quick guide to disposal and recycling options

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other consider ations
Treatment and disposal/in cineration	All volumes	All events	Two major facilities servicing metro Adelaide. Regional areas may have autoclaves at hospitals, or may need to temporarily store and transport to other facilities	N/A	N/A	N/A
Autoclavin g	Small volumes		Large commercial autoclave in metro Adelaide			
Landfill	Medical and pharmaceutical waste is banned from landfill and as such, a waiver would be required to dispose of this waste to landfill.					

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

The process for managing the waste onsite and moving to an appropriate facility is covered in *Table C14.2*.

Table C14.2: Managing the waste

Process	Key considerations
Onsite handling	◆ If sharps (needles, syringes) are identified in the area that you are trying to remediate/recover, stop all further activity while the sharps are contained. ◆ Store the sharps and waste in safe yellow marked boxes (see *Potential hazards and WHS requirements*).
Collection and transport	◆ Once stored in the sharps disposal unit, contact the SA EPA to determine the most appropriate location to transport sharps and other medical and pharmaceutical waste.
Interim storage	◆ Sharps disposal units can be stored at an interim storage facility until they are incinerated.
Processing/disposal	◆ Incineration or autoclaving at an SA EPA licensed site is the most appropriate disposal method for medical waste.

	◆ Contact the SA EPA to determine the most appropriate disposal location and method.

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C14.3 lists potential hazards and WHS requirements and control measures.

Table C14.3: Potential hazards and control measures

Hazard type	Description	Control measure
WHS	All sharps, such as needles, syringes with needles and surgical instruments, have the potential to transmit diseases through accidental skin penetration such as, but not limited to: ◆ AIDS ◆ Hepatitis, including type C ◆ tetanus.	If sharps are found, contact the local council immediately for advice or support for removal of this waste. It is important to watch for needles and use equipment such as tongs to move the waste into sharps disposal units where possible. Wear appropriate PPE for handling sharps, specifically medical sharps, such as safety gloves and eyewear. Eyewear is particularly important for soiled or blood-soaked materials. If an item cuts or penetrates the skin during the removal process, ensure appropriate testing is undertaken. Note that it can take several months after an injury of this nature to have health cleared of any long-term ramifications/injuries. To safely place items in the sharps disposal unit: ◆ place the unit on the floor or a stable surface ◆ pick up one syringe at a time using tongs or other available safety tool to collect and place in the unit ◆ do not hold the unit while disposing of the sharps and do not place a plastic cap or cover over the sharp, as this increases the risk of injury ◆ once all visible sharps have been removed, put the sharps disposal unit back in the area it belongs ◆ continue to remediate/recover other items in the area with caution as some sharps may have been missed.

CRITICAL INFORMATION TO PROVIDE THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- If you see a syringe or needle or other sharp medical objects, contact your local council immediately.
- If you are responsible for removing sharps (such as needles and syringes), make sure you:
- wear appropriate protective gear/equipment, such as needle-proof gloves and goggles
- avoid touching the sharps where possible (even with gloves) by using tongs and other similar items to pick them up
- discard sharps into a yellow sharps disposal unit, available from the local council or hospital/medical centre, or some stores (such as Officeworks). Place the yellow sharps disposal

units on a sturdy surface and discard the sharps into the unit using tongs, taking care not to hold the unit while disposing of the items
- contact the SA EPA after disposing of the sharps in the sharps disposal unit, to determine the most appropriate location to send these items.

LEGISLATION AND REGULATIONS TO CONSIDER (WHS AND ENVIRONMENTAL)

Environment Protection Act 1993

Part B of Schedule 1 (Page 14) defines medical and pharmaceutical waste.

Environment Protection (Waste to Resources) Policy 2010

This policy outlines the duties of councils, hospitals, and pharmacies in relation to medical waste.

Work Health and Safety Regulations 2012

Under the Work Health and Safety Act 2012.

RECORD KEEPING

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage, or final disposal.

FURTHER INFORMATION AND RESOURCES

SA EPA

For more information on medical waste disposal methods, refer to:

- the SA EPA website
- the SA EPA guideline on medical waste procedures, *Medical waste – storage, transport and disposal* (EPA 044/03) (2003).

C15: RESPIRABLE CRYSTALLINE SILICA

Managing waste that contains crystalline silica (CSS) products may occur during or after an event during clean up, demolition and recovery processes.

WHAT IS CRYSTALLINE SILICA?

Crystalline silica (CSS), or the crystalline form of silica dioxide (SiO2), is a naturally occurring mineral present in construction materials, particularly engineered stone. When these materials are altered, with processes such as drilling, grinding, cutting, and sanding, they can release respirable-sized dust into the air. This is known respirable crystalline silica (RCS), which is 100 times smaller than a grain of sand (10 µm).

SOURCES OF CSS

As per SafeWork SA, the WHS regulations define CSS substances as anything containing more than 1% CSS by weight. These products, generally building materials, include:

- engineered stone
- tiles, grout, cement and concrete
- sandstone, clay, rocks and sand
- bricks and pavers
- quartz, marble and porcelain/ceramics
- asphalt.

Exposure to RCS is caused by both the processing of crystalline silica substances which can include:

- the use of power tools or mechanical plant to carry out an activity involving the crushing, cutting, grinding, trimming, sanding, abrasive polishing or drilling
- the use of road headers to excavate silica containing material
- the quarrying of a silica containing material
- mechanical screening involving silica containing material
- tunnelling through a silica containing material
- manufacture, handling or disturbance of silica containing material (such as cleaning and maintenance processes like sweeping).

POTENTIAL END USES FOR THE RECOVERED WASTE

Refer to your local waste service provider and resources to determine best disposal options for materials with crystalline silica present. This waste must be sent to a licensed EPA approved site. Dust generating materials should be contained, bagged and labelled (such as 'Silica dust hazard') before disposal. Bags should be durable to avoid tears and breaks. This waste is hazardous and should be handled with care.

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

A national ban on the use of engineered stone was introduced in 2024, following advice from Safe Work Australia to combat the fatal effects of RCS amongst workers. Engineered stone is not a risk once its installed and left undisturbed. Fresh cut, active crystalline silica particles are more harmful and generate exposure to RCS. There is no requirement to remove engineered stone that is already installed. During an event, exposure to silica containing materials may occur and appropriate measures should be taken to mitigate risk.

The process for managing products containing crystalline silica for removal after an event is covered in *Table C15.1*.

Table C15.1: Managing waste

Process	Key considerations
Assessment	◆ All materials that contain at least 1% crystalline silica in weight, per weight concentration, must be managed as per the Work Health and Safety Regulations (South Australia), Chapter 8A – Crystalline Silica. ◆ Processes involving CSS must undergo a risk assessment to determine whether it is high risk before any work begins. If a process is likely to pose a health risk, it is considered high risk. ◆ In assessing whether the processing is high risk, the following factors must be regarded: ◆ Weight per weight concentration ▪ The specific processing to be undertaken ▪ The form/s of CSS present ▪ Hazards associated with the work, including likely frequency and duration of exposure to RCS. ◆ When assessing whether processing is high risk, you must <u>not</u> regard: ▪ the use of PPE and administrative controls used to control the risks associated with RCS. ◆ If you are unable to determine the risk level, the process must be considered high risk until it is determined otherwise. ◆ All high-risk processes require a silica risk control plan.
Silica risk control plan	◆ A silica risk control plan must be completed for high-risk process before the processing commences. ◆ A control plan is not required to be prepared if the processing is also high-risk construction work, and a safe work method statement is prepared prior to commencement that aligns with Silica Risk Control Plan requirements. ◆ Arrangements must be put into place to ensure that the control plan is followed, such as: ◆ providing the control plan to all workers prior to commencement ◆ stopping processes that do not align with the control plan.

	◆ Ensure that a silica risk control plan is reviewed and revised as necessary if relevant control measures are changed.
Training	◆ You must ensure that a person receives CSS training if they are involved in high-risk processing. Records of this training must be available for inspection under the WHS Act.
Health monitoring	◆ You must provide health monitoring to those carrying out high risk processing.
Air monitoring	◆ Undertake air monitoring for the processing that is high risk. ◆ The regulator must be notified of air monitoring results that exceed the exposure standards as soon as reasonably practicable, and no more than 14 days from the monitoring date.
Engineered stone	◆ Before the processing of engineered stone is carried out, the regulator must be provided written notice. This includes: ◆ removal, repair, or modification to installed engineered stone ◆ disposal of engineered stone whether it is installed or not.
Onsite handling	◆ Best practice is removal of engineered stone before demolition. ◆ Breaking of engineered stone should be avoided where possible. ◆ Demolition contractors must manage processing of silica materials that is high risk as per the silica risk control plan. ◆ Dust piles containing CSS should be identified and separated from frequented pathways to limit the risk of 'kicking up' and making the dust airborne. ◆ Handling must not occur unless the processing is controlled, that is, at least one of the following measures are undertaken: ◆ Isolation from dust exposure ◆ Wet dust suppression method ◆ On-tool extraction system ◆ Local exhaust ventilation system ◆ If there is still a risk of exposure to RCS after following at least 1 of these methods, respiratory equipment must be provided and worn until work is complete. ◆ All onsite handling must align with the silica risk control plan.
Collection and transport	◆ Transport vehicles should be completely contained to prevent air pollution.
Interim storage	◆ If interim storage is needed it should be ventilated, and appropriate housekeeping methods should be followed. An outdoor area away from people is preferable. ◆ Suitable signage should be used as a precaution.
Processing/disposal	◆ Materials must be disposed at an SA EPA licensed facilities that can receive the material.

	◆ Containment measures must be used as per the silica risk control plan. ◆ PPE and respiratory protective equipment (RPE) must we worn when handling RCS-containing products.

Table C15.2 lists potential hazards and WHS requirements and control measures.

Table C15.2 Potential hazards and control measures

Hazard type	Description	Control measure
WHS	Inhaling RCS can lead to serious long-term health effects. Exposure can cause: ◆ lung scarring (silicosis) ◆ lung cancer ◆ progressive massive fibrosis ◆ chronic obstructive pulmonary disease ◆ chronic bronchitis ◆ increased risk of kidney disease, autoimmune disorders, and eye irritation/damage.	◆ Air monitoring to determine airborne concentration of RCS should be conducted in event affected areas where CSS is identified or suspected. ◆ Workers that come into contact with RCS should undertake appropriate training prior to contact with CSS products. ◆ PPE and RPE should be worn at all times. ◆ Exposure times should be limited. The WHS limit, which is a time weighted average, is 0.05mg/m3 over an 8-hour period. Note: ◆ duty holders are required to ensure exposure levels of workers do not exceed this limit ◆ if levels exceed this amount, WHS must be contacted within 2 weeks ◆ SafeWork SA recommends a lower exposure level at 0.025 mg/m3 ◆ the risk of lung cancer is increased at exposure levels of 0.065 mg/m3 ◆ lifetime average exposure of 0.065 mg/m3 creates a 7% chance of silicosis. ◆ Health monitoring, conducted by a professional familiar with silica, of workers exposed to RCS is required. Clear communication between workers and the person conducting a business or undertaking about health concerns is advised.
WHS	Air pollution: dust containing CSS/RCS released into the atmosphere.	◆ Engineering controls such as dust suppression using water systems (spraying the materials and dust with water during modification process), ventilation/exhaust for dust extraction.

		◆ Where engineering controls are not viable, a tight-fitting respirator may be used for a short period of time (no more than 15 minutes). ◆ Appropriate housekeeping to avoid CSS dust build up. Dust should never be dry swept. ◆ Isolation techniques such as physical barriers and it is advised that processes are conducted outdoors.

CRITICAL INFORMATION TO PROVIDE THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- Crystalline silica (CSS) is present in many construction materials, such as engineered stone. CSS dust is generated by the removal, repair, modification or disposal of these materials.
- Respirable Crystalline Silica (RCS) is 100 times smaller than a grain of sand, is a recognised carcinogen and will cause adverse health effects when inhaled.
- There is a ban on the manufacturing, supply and installation (includes re-installation) of engineered stone slabs and benchtops. Engineered stone that is already installed does not pose as a risk if left undisturbed and unmodified.
- Some products, such as garden ornaments and prefabricated sinks, are not subject to the ban, but safety precautions still should be taken when handling these products.
- Do not undertake DIY work with engineered stone – contact a qualified tradesman.
- Preventative measures include identifying risks and creating a plan, engineering controls (such as dust suppression), and administration controls (such as appropriate housekeeping).
- Individual safety measures include use of Personal Protective Equipment (PPE) and Respiratory Protective Equipment (RPE).
- If you currently work with silica-containing products, it is your employer's responsibility to protect you:
- You required to undergo health monitoring with a medical practitioner provided by the person conducting a business or undertaking.
- If you are worried about your health and safety, talk to you employer or contact SafeWork SA.
- It is your individual responsibility as a worker to protect those around you by following the appropriate safety procedures as listed above.

RECORD KEEPING

It is recommended that records of the following are kept:

- RCS air monitoring results
- Related work permits
- Maintenance records of engineering controls

Health monitoring records must be kept for 30 years and are to be undertaken by a medical practitioner familiar with silica.

FURTHER INFORMATION AND RESOURCES

EPA SA

- *Respirable Crystalline Silica (RCS) monitoring and analysis* (2022)
- *Engineered stone ban*

SafeWorkSA

- Crystalline silica substances regulations

SafeWork Australia

- *Crystalline silica and silicosis*
- *Working with crystalline silica substances: Guidance for PCBUs (2024)*

C16: AGRICULTURAL (INCLUDING GREENHOUSE) WASTE

Events can impact agricultural businesses and land, leading to destroyed greenhouses, crops, and other items. It can be difficult to separate these materials and work out the risk of disease. Where waste is highly mixed or contaminated, the most practical option is sending waste to landfill. Some aspects of this guideline may also apply to disposing of waste generated as a result of an exotic pest or disease incident affecting plants.

Agricultural waste

SOURCES OF AGRICULTURE ORGANICS WASTE AND GREENHOUSE WASTE

Potential sources of agriculture organics waste and greenhouse waste are from damaged:

- broadacre farms, which may include:
- vegetable and fruit crops (predominately from flood damage)
- forestry (predominately from bushfires)
- viticulture (predominately from bushfires and floods)
- greenhouses, which may include:
- plastic sheeting
- glass
- irrigation pipes
- immature plants and fruit/vegetables
- growing media (hydroponics)
- chemical drums.

WHAT IS AGRICULTURE (INCLUDING GREENHOUSE) WASTE?

This waste stream is defined as the destroyed or semi-destroyed organic fraction (such as broadacre crops) from a disaster event, and the waste generated from or within greenhouses.

Agriculture waste does not include treated timbers, copper chrome arsenic (CCA) posts or animal carcasses. This guideline should be read in conjunction with Guidelines C20: Green (vegetative) waste, C19: Food waste and C7: Animal carcass waste.

POTENTIAL END USES FOR THE RECOVERED WASTE

Table C16.1 lists typical end uses for agricultural waste. Separating these materials may be difficult and determining disease risk challenging, resulting in most of this waste requiring landfill disposal.

Table C16.1: Typical end uses for agricultural (including greenhouse) waste materials

Materials recovered	Potential uses
Vegetative waste	◆ Refer to Guideline C20: Green (vegetative) waste
Vegetable waste in greenhouses (including vines)	◆ Compost (free of twine) ◆ Mulch ◆ Onsite spreading of waste material (small volumes) ◆ Energy from waste
Horticulture waste (including greenhouse) where a biosecurity risk exists	◆ Where technology exists and if appropriate or accessible, incineration or autoclaving is also an option ◆ Deep burial on or offsite
Trees and shrubs	◆ Leaf mulch ◆ Wood chip ◆ Compost ◆ Onsite spreading of waste material (small volumes)
Crops and food waste (free of plastics)	◆ Compost offsite or onsite (if landowner has appropriate level of expertise) ◆ Crops may be spread onsite (small volumes)
Plastics from greenhouses	◆ Plastic granulating – if single source plastic
Irrigation tubing	◆ Plastic granulating – if single source plastic
Greenhouse metal frames	◆ Salvaged and sold to the metal scrap industry
Broadacre plants (partially destroyed and no endemic biosecurity risk)	◆ Depending on the issue, broadacre plant destruction can occur, which involves ploughing the plants back into the soil

RECYCLING AND DISPOSAL OPTIONS

Table C16.2 provides a quick guide to recycling and disposal options for managing this waste stream.

Table C16.2: Quick guide to disposal and recycling options

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
Compost (onsite or at a licensed commercial compost facility)	Food and vegetative waste	Flood or biosecurity affected waste not accepted as may carry disease	Sites north and south of Adelaide potentially available	<0.5% non-organic material, 0% listed or hazardous waste	May vary	Regional: Potential to use large-scale compost facility in the state's south-east and/or other smaller regional facilities (Whyalla, Riverland)
Chipped or mulched	Vegetative waste, all volumes if offsite, onsite must be less than 200 tonnes	As above	Sufficient facilities and mobile equipment across South Australia to use local options	Cannot accept other waste	May vary	
Spread on property	Green waste, low volumes	As above	Dependent on property	No contamination	N/A	Be careful of potential to create fire hazard
Plastic granulation	Greenhouse plastic, all volumes	If left in floodwater and mixed with other waste, do not recycle	May need to be exported interstate or overseas due to limited plastic recyclers in	No contamination	May vary	

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
			South Australia			
Metal recycling, aggregated as scrap metal and sold to make other metal products	Metal waste, all volumes	All events	Numerous scrap metal recyclers/receivers in metro Adelaide, or operators may come to the site	0% hazardous or listed waste, no oils	May vary	Regional: Mobile equipment may be used to shred metals and bulk transport to metro processors
Landfill	If the waste is mixed and cannot be easily separated, or the waste has been through a flood and is wet, dirty or potentially carrying disease, the practical disposal option for this waste is to landfill.					

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

The process for managing this waste onsite and moving to an appropriate facility is covered in *Table C16.3*.

Table C16.3: Managing the waste

Process	Key considerations
Onsite handling	◆ Where possible, separate items into different waste streams (e.g. food, plastic, metal etc.), and place these in separate piles (see *Figure C16.1* for potential equipment and machinery to use). ◆ Be particularly careful to avoid cross contamination of green organics with twine and irrigation equipment, and where possible, keep irrigation equipment separate and waste stockpiled for collection and recycling.
Collection and transport	◆ Ensure clear access pathways to waste on the property. ◆ Stockpile these wastes as close as possible to a boundary access point for collection, while not blocking access and egress to and from public roads – this will reduce the possibility of cross contamination of sites, which is a biosecurity issue. ◆ Clearly mark stockpiles and access areas with a flag or marker hammered into the ground that is easily recognisable for collection. ◆ Where possible, take GPS coordinates and give this information to the waste collection company or companies. Waste trucks will then arrive onsite and collect the waste using their equipment.

Process	Key considerations
	◆ Waste should be fully enclosed to prevent any leakage or items blowing off piles during transport. ◆ It may be beneficial to speak to the waste removalist to outline the requirements to remove the waste, including plant and equipment that may be needed to move waste to a stockpile, accessibility requirements to accommodate the various waste vehicles used to collect the waste (e.g. semitrailers or tandem trucks) and decontamination requirements to prevent spread of disease between properties.
Interim storage	◆ Interim storage of the organics component is not an option for this waste. ◆ It may be appropriate to stockpile the non-organic fraction of the waste at an interim storage location.
Processing/disposal	◆ Seek advice from a composting expert on the requirements for composting the organic fraction of the waste (must also take into consideration efficacy of this process if a biosecurity pest/disease is present), and advice from waste collection contractors is recommended. ◆ In most cases, this waste will be sent to landfill as it will be highly mixed.

Figure C16.1: Potential supporting equipment to help move agriculture organics waste and greenhouse waste

Bobcat

Tipper

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C16.4 lists potential hazards and WHS requirements and control measures.

Table C16.4: Potential hazards and control measures

Hazard/hazard type	Description	Control measure
Attraction of vermin, WHS	Waste can become home to vermin, snakes and other wildlife. These insects and animals have the potential to bite, scratch or sting.	Care must be taken when handling the waste to minimise risk. Ensure that hands and feet are not placed in holes or other areas that cannot be seen. Use gloves when moving the waste as well as a P3 dust mask. If necessary, the waste can be moved by bobcats and tippers (see *Figure C16.1*). Using machinery will minimise the risk of being bitten, scratched or stung.
Biosecurity risk, WHS	There is a risk of biosecurity issues such as diseased plants. See *Further information and resources* in this guideline for biosecurity contact details.	This waste is assumed not to have a biosecurity issue. If this is suspected, contact the SA EPA or PIRSA. For extra precaution, clean all boots and shoes that touch the ground in or near agricultural waste. Decontaminate any other equipment that touches the agricultural waste. Speak to PIRSA for further information. Where possible, leave vehicles at the boundary or in designated parking areas.
Spread of disease or pathogens from poor management of stockpiles and compost, WHS	Poorly managed stockpiles or composted organics waste can lead to the potential for further disease outbreak.	PIRSA is responsible for responding to exotic pest or disease outbreak. They have measures in place to minimise risk and check waste over time to ensure known biosecurity risks have been controlled. It is important to follow the advice of PIRSA and work with them to help reduce the risk.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- Personal protective equipment and equipment used to move agricultural waste should be decontaminated before being used on another property. Advice on decontamination can be sourced from the Department of Primary Industries and Regions.
- Rotting food and compost piles can harbour bugs and diseases unless they have been composted properly. As such, onsite composting should be done by someone with the appropriate level of expertise and experience in composting.
- Consider seeking advice from a professional composter or sending this waste to a licensed commercial composting facility rather than managing it onsite.
- Do not place hands or feet into waste piles as animals such as snakes may be lying underneath or within the waste.

- Wash your hands after handling rotting vegetation.
- If you develop a severe cough or infection of the skin (especially if there is an open sore or puncture wound), seek medical attention as soon as possible.
- When moving or touching vegetative waste, wear strong rubber gloves to reduce the chance of cuts, as well as closed shoes to avoid direct contact with rotting vegetation and compost.
- Ensure that shoes and clothing that come into contact with the waste are washed thoroughly and not brought inside.

Legislation and regulations to consider (WHS and environmental)

Composting

If composting less than 200 tonnes of organic waste annually, use the SA EPA's *Compost Guideline* (updated June 2019) for composting guidance. Available from https://www.epa.sa.gov.au/files/7687_guide_compost.pdf.

If more than 200 tonnes, alternative licensing and processing is required.

Plant Health Act 2009

Provides for the protection of plants from pests, the regulation of the movement of plants into, within and out of the State, and the control, destruction and suppression of pests.

RECORD KEEPING

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage or final disposal.

FURTHER INFORMATION AND RESOURCES

Australian Interstate Quarantine

If cross-border activity is a part of the clean-up, the Australian Interstate Quarantine website details what items can and cannot be moved from state to state.

Biosecurity legislation

A full list of the primary legislation, associated Acts and supporting delegated legislation is available from the Department of Agriculture, Fisheries and Forestry website.

Biosecurity SA, PIRSA

PIRSA's Biosecurity SA division manages the risks to South Australia posed by animal and plant pests and diseases, food borne illnesses and misuse of rural chemicals.

RELATED GUIDELINES

Review relevant waste guidelines in this document, which may include:

- C7: Animal carcass waste
- C9: Chemical (hazardous) waste
- C10: CCA post waste
- C18: Empty chemical drums
- C19: Food waste

- C20: Green (vegetative) waste
- C25: Soil and sediment waste

C17: CONSTRUCTION AND DEMOLITION INERT WASTE (CONCRETE, BRICK, AND RUBBLE)

During an event, damage to infrastructure and buildings can generate significant quantities of construction and demolition (C&D) inert waste such as concrete, bricks and rubble. Post-event, more waste may be generated as buildings are damaged or demolished during the recovery phase. Most C&D inert waste can be transported to C&D reprocessing facilities for recycling, provided that no asbestos is present in the building materials and contamination is sufficiently low.

C&D inert waste (photos by Mike Haywood)

SOURCES OF C&D INERT WASTE

Potential sources of C&D inert waste are from damaged:

- roads and bridges
- factories and stores
- single or multistorey dwellings
- commercial premises and office blocks
- supermarkets and shopping centres/precincts
- public and community infrastructure.

WHAT IS C&D INERT WASTE?

The SA EPA defines C&D inert waste as 'the solid inert component of the waste stream arising from the construction, demolition or refurbishment of buildings or infrastructure but which does not contain municipal solid waste, commercial and industrial waste (general), listed waste, hazardous waste or radioactive waste'.

C&D inert waste includes bricks, concrete, tiles and ceramics, steel, and inert soils. C&D inert waste should ideally contain no foreign materials although it may be contaminated with negligible components of foreign material (as a guide, 0 to 5% maximum by volume per load). Foreign material includes green waste, plastics, electrical wiring, timber, paper, insulation, tins, and packaging.

POTENTIAL END USES FOR THE RECOVERED WASTE

Table C17.1 lists typical end uses for recovered C&D inert waste. Recovering and recycling these materials is likely to be useful following a disaster, with source products being recycled into items such as road base.

Table C17.1: Typical end uses for recovered C&D inert waste

Materials recovered	Potential uses
Inert materials (concrete/bricks/rubble/soils*)	◆ Can be crushed and blended to make road bases (such as for reconstruction efforts after the event) ◆ Construction fill ◆ Directly reused ◆ Quarry rehabilitation material
Hazardous waste (asbestos and crystalline silica)	◆ C&D inert waste that contains either asbestos or crystalline silica must be landfilled. There are no end uses for these materials.

**Note that some soil may be picked up when collecting and recycling C&D inert waste. This is also called waste derived fill and can be sold as a product after being separated from other C&D inert waste. For a definition of this product and recovery guidance, see C25: Soil and sediment waste.*

RECYCLING AND DISPOSAL OPTIONS

Table C17.2 provides a quick guide to recycling and disposal options for managing this waste stream.

Table C17.2: Quick guide to disposal and recycling options

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
Send to C&D recycler (e.g. for road base)	All volumes	All events	Significant C&D processing capacity north and south of Adelaide, and in the Adelaide Hills	< 5% foreign materials (plastics, organics etc.) and 0% asbestos or other hazardous waste	Likely to remain high	Regional: Mobile crushers can be used to process the waste onsite
Landfill	While C&D inert waste is not banned from landfill and there is significant landfill space in metro Adelaide, the waste is non-compostable, non-combustible, very stable, and easy to store and stockpile for extended periods. It should therefore not need to be landfilled unless there are extenuating circumstances.					

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

Ideally, C&D inert waste will be taken to an SA EPA licensed C&D reprocessing facility for recycling. Professional demolition contractors will likely undertake this process and provide advice. The process for managing the waste onsite and moving to an appropriate facility is covered in *Table C17.3*.

Table C17.3: Managing the waste

Process	Key considerations
Onsite handling	◆ Assessments should be conducted prior to handling to identify the presence of asbestos (C8), crystalline silica (C15), or other hazardous materials. Relevant WHS precautions are detailed in their respective sections of these guidelines. ◆ Demolition contractors should manage C&D inert waste onsite and use excavators with a grapple, hammer, pulveriser or similar to separate or break up the waste for easier transportation (see *Figure C17.1*). ◆ Wheel loaders can be used to pick up waste and place in transport vehicle (see *Figure C17.1*).
Collection and transport	◆ Transport vehicles should be fully enclosed steel-bodied trucks (either tandem or semi-tipper). ◆ In regional areas, mobile crushers could be used along with contracted labour to process the material (*Figure C17.2*).
Interim storage	◆ If interim storage is needed, the material is low risk and can be stockpiled for extended periods before moving to a recycling facility.
Processing/disposal	◆ C&D inert waste can be processed into a wide range of products by SA EPA licensed facilities (see *Table C17.1*). ◆ It is generally more economical and environmentally friendly to recycle this product. Given that it can also be stockpiled for extended periods, it should not go to landfill. ◆ However, there is a risk that C&D waste is contaminated with asbestos or crystalline silica. It is crucial to establish measures for identifying contamination and, if present, ensure safe handling and proper disposal as outlined in sections C8 and C15 respectively.

Figure C17.1: Recovery and transportation equipment for C&D inert waste

Grapple excavator

Pulveriser (photo by Mike Haywood)

Wheel loader

Hammer attachment (photo by Ildar Sagdejev)

RORO truck (photo by Rawtec)

Skip truck (photo by Eco Waste Solutions)

Figure C17.2: Mobile crusher

(Photo by Mike Haywood)

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C17.4 lists potential hazards and WHS requirements and control measures.

Table C17.4: Potential hazards and control measures

Hazard/hazard type	Description	Control measure
General hazards, WHS	There are various hazards at sites containing C&D inert waste.	Before removing C&D inert waste, a structural engineer should complete a risk assessment and the area or building should be deemed safe to enter. Utilities (such as gas, electricity, and water) must be properly disconnected.
Asbestos, WHS	Inhalation of asbestos fibres can have serious long-term (latency) health risks and exposure can cause: ◆ mesothelioma ◆ lung cancer ◆ asbestosis ◆ pleural plaques and thickening, and so on.	Buildings constructed in Adelaide's metropolitan area prior to 1990 are known to potentially have materials that contain asbestos. If asbestos is suspected, treat the waste as containing asbestos until proven otherwise. See *Guideline C7: Asbestos and asbestos-contaminated waste* for more information.
Dust and silica particles, WHS	C&D inert waste can cause dust and silica particles to be released into the air. Dust can impede vision and potential breathing difficulty. Repeated exposure to high levels of these fine crystalline silica particles can cause a variety of diseases that mostly affect the respiratory system.	All processing of C&D Waste material(s) that contain at least 1% crystalline silica, determined as a weight/weight (w/w) concentration, must be managed as per the Work Health and Safety Regulations (South Australia) Chapter 8A – Crystalline Silica. Refer to section C15 of this guideline for more information.

Weight of material, WHS	C&D inert waste is generally very dense and heavy and can cause manual handling injuries.	Waste removalists should use appropriate equipment to move this waste such as those in *Figure C17.1*.
Unstable stockpiles and structures, WHS	Damaged buildings and structures may fall after the event is completed.	Do not stand or work underneath structures or next to walls or stockpiles that may topple. Note: a structure that contain asbestos and needs to be demolished because it is unstable has a regulatory requirement to notify SafeWork SA – see regulations 454 and 455.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- If you have large volumes of concrete, bricks, and rubble at or nearby your property, waste removalists should conduct the handling and removal of this material.
- If hazardous materials such as asbestos are suspected, you should avoid handling this material and contact SafeWork SA for information and guidance.
- If you are near the handling and removal of concrete, bricks, and rubble, consider wearing a P3 dust mask and closing your doors and windows.
- If you are handling and removing this waste yourself, the following measures are recommended to ensure safety:
- Prior to commencing removal of material from a damaged structure, have a structural engineer conduct a risk assessment to check the building is safe to enter.
- Wear appropriate PPE, such as high visibility clothing, a hard hat, steel cap shoes and a P3 dust mask.
- Take the material to a C&D recycler or waste and recycling centre to be recycled.

RECORD KEEPING

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage, or final disposal.

FURTHER INFORMATION AND RESOURCES

SA EPA

- *Guideline for stockpile management (2020)*
- Standard for the production and use of Waste Derived Fill *(2013)*
  Waste derived fill may be separated out when C&D inert waste is recycled

C18: EMPTY CHEMICAL DRUMS

Farms and other properties may have empty chemical drums affected by the disaster.

Sources of empty chemical drums

Potential sources of empty chemical drums are from:

- factories and stores
- agricultural farms
- orchards
- wineries.

WHAT ARE EMPTY CHEMICAL DRUMS?

Empty chemical drums are drums or containers that contained hazardous liquids or other materials (such as disinfectants, liquid fertilisers, and herbicides) prior to appropriate decontamination. These drums may be made of plastic or metal.

If a chemical waste drum still contains a hazardous liquid, see Guideline C9: Chemical (hazardous) waste for guidance.

POTENTIAL END USES FOR THE RECOVERED WASTE

Table C18.1 lists typical end uses for recovered chemical drum waste.

Table C18.1: Typical end uses for recovered empty chemical waste drums

Materials recovered	Potential uses
Plastic drums	Plastic drums are either shredded, granulated or heat-extruded back to a resin suitable for plastics component production.
Metal drums	Metal drums are recycled through the standard metal recycling process.

RECYCLING AND DISPOSAL OPTIONS

Table C18.2 provides a quick guide to recycling and disposal options for managing this waste stream.

Recycling of some drums may be covered under the *drumMUSTER* program. *DrumMUSTER* is a voluntary product stewardship scheme of AgStewardship Australia Limited and provides a way of disposing of empty farming chemical containers across rural Australia.

Where this is the case, the empty chemical drums may be taken to a *drumMUSTER* collection point for inspection, before being taken to an approved processor. Please note it is possible that *drumMUSTER* and other drum collection points/recycling facilities may not be available or practical to use after the disaster event.

Table C18.2: Quick guide to disposal and recycling options

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
Drum recyclers	All volumes	Floodwater may carry disease and prevent this option		0% listed or hazardous waste (drums must be empty)	May vary	For non-empty drums, refer to Guideline C9: Chemical (hazardous) waste
Recycling via ***drum**MUSTER* program	Only eligible containers under program*	As above	Over 800 disposal sites across Australia†	As above	As above	As above
Landfill	Significant space in landfills servicing metro Adelaide, although these may be more limited in regional areas. Landfill may be required if the waste is mixed with other wastes that are not listed, hazardous or radioactive, or if the ***drum**MUSTER* program is not in operation and the waste cannot be stockpiled or stored appropriately until recycling sites become available					

* See drummuster.org.au/container-recycling/eligible-containers

† See drummuster.org.au/find-a-collection-site

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

The process for managing the waste onsite and moving to an appropriate facility is covered in *Table C18.3*.

Table C18.3: Managing the waste

Process	Key considerations
Onsite handling	◆ Separate empty chemical waste drums from other waste streams and ensure they are empty. ◆ Appropriately rinse the empty chemical drums (capturing rinse water for appropriate disposal). ◆ If chemical waste drums are not empty, or if rinsing/washing them is not practical, the drums must be treated as per Guideline C9: Chemical (hazardous) waste.
Collection and transport	◆ Once appropriately decontaminated, transport to or organise collection by a drum recycler, or bring to a drumMUSTER collection point (if covered by the scheme).
Interim storage	◆ If needed, interim storage can be set up onsite or at a central location.
Processing/disposal	◆ Plastic or metal drums collected via drumMUSTER or those sent directly to a drum recycler will be recycled.

	◆ If a drum recycling option is not practical, disposal to landfill may be required.

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C18.4 lists potential hazards and WHS requirements and control measures.

Table C18.4: Potential hazards and control measures

Hazard/hazard type	Description	Control measure
Hazardous chemicals, WHS	Chemical drums may contain traces of hazardous chemicals	Unless appropriately decontaminated, chemical containers are not considered empty. When handling and transporting chemical drums, appropriate PPE must be worn, including: ◆ safety glasses, preferably goggles ◆ chemically resistant safety gloves ◆ long trousers and long-sleeved shirt ◆ protective footwear.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- The public should be advised about the requirements for appropriate rinsing/washing if they are going transport any drums, collecting the rinse water for appropriate disposal (see the drumMUSTER website for more information).
- Drums that are not rinsed need to be managed via a hazardous waste disposal route.
- When managing empty chemical drums, wear appropriate protective equipment, including:
- safety glasses, preferably goggles
- chemical resistant safety gloves
- long trousers and long-sleeved shirt
- protective footwear.

LEGISLATION AND REGULATIONS TO CONSIDER (WHS AND ENVIRONMENTAL)

SA Work Health and Safety Regulations 2012

All chemicals in Australia need to be labelled with appropriate warnings and minimum safety and handling data. Safety Data Sheets are available from the manufacturer's website.

These regulations established a new system of chemical classification and hazard communication on labels and Safety Data Sheets, based on the GHS.

From January 2017, all workplace chemicals must be classified according to the GHS, and labels and Safety Data Sheets updated. Some hazardous chemicals are excluded from the labelling provisions in these regulations and the code does not apply to those chemicals.

RECORD KEEPING

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage or final disposal.

FURTHER INFORMATION AND RESOURCES

Australian Pesticides and Veterinary Medicines Authority

- Labelling Codes – agricultural products

SafeWork SA

- Chemical labelling

United Nations

- Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

C19: FOOD WASTE

Spoiled or damaged food may result from an event due to power outages or damage to equipment or transport vehicles. The ideal way to manage this waste stream is by composting at a licensed commercial composting facility.

SOURCES OF FOOD WASTE

Potential sources of food waste are from:

- damaged packing sheds or cold stores
- refrigerators and freezers at residential and commercial properties used to store food, where loss of power has resulted in spoiled food
- food transport vehicles
- packaged or containerised food in supermarkets, shops, markets and so on, that is no longer edible as it has been left too long.

WHAT IS FOOD WASTE?

Food waste fits under putrescible waste in the SA EPA definition, which is the component of the waste stream liable to become putrid. Food waste may be any food item that is now inedible.

POTENTIAL END USES FOR THE RECOVERED WASTE

Table C19.1 lists typical end uses for recovered food waste. If composting onsite, it is recommended that expert advice is provided by an experienced composter.

Table C19.1: Typical end uses for recovered food waste materials

Materials recovered	Potential uses
Food waste (free of plastics and other contaminants)	Compost (offsite or onsite if appropriate level of expertise)

RECYCLING AND DISPOSAL OPTIONS

Table C19.2 provides a quick guide to recycling and disposal options for managing this waste stream.

Table C19.2: Quick guide to disposal and recycling options

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
Compost (onsite or commerci	All volumes if	A fire may have blended or melted	Sites north and south of Adelaide	< 0.5% non-organic material, 0%	May vary	Regional: Potential to use large-

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
al composting facility)	offsite, onsite must be less than 200 tonnes.	packaged materials to food which would make it unsuitable for composting. Food that has sat in floodwater should also not be recycled.	potentially available	listed or hazardous waste		scale compost facility in the state's south-east or smaller regional facilities (Whyalla, Riverland). Food that is packaged may be unsuitable for composting due to risk of contamination from plastic and other packaging.
Landfill	If access to composting facilities is limited or if the food is packaged or contaminated, or cannot be safely handled, landfill may be the best option for this waste stream, particularly given unmonitored stockpiling for extended periods can be dangerous					

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

The process for managing the waste onsite and moving to an appropriate facility is covered in *Table C19.3*. Managing food waste correctly includes proper cleaning and sanitisation of fridges, freezers and cool rooms. There may be resources to manage the appropriate and professional clean-out of commercial and some residential fridges and freezers, but in some cases these items will need to be disposed of together with the food inside.

Food waste, once rotten, is generally not safe for the public to handle, so it needs to be collected/handled by professionals. In Hurricane Katrina (United States, 2005) for example, duct-taped fridges were placed on the kerbside for collection.

Table C19.3: Managing the waste

Process	Key considerations
Onsite handling	◆ Consider hazards and WHS requirements in Table C19.4. ◆ To manage the material onsite, wear appropriate PPE. ◆ Place food waste into appropriate disposal containers, separating it from packaging and other contaminants where possible.

Collection and transport	◆ As soon as practical, move the waste offsite or to an appropriate onsite/nearby composting location and consider using vehicle shown in *Figure C19.1*. ◆ Fully enclose the waste when transporting to prevent any leakage or items blowing off during transport.
Interim storage	◆ Interim storage is not an option for this waste unless a composting process is commenced at the interim site. Seek advice from a composting expert on the requirements for composting, including vegetative streams to combine with the food waste. ◆ Consider using an on-site enclosed, aerated system to reduce food waste volume and begin composting before sending the material to a commercial composter to finish the process. ◆ Seek advice from a composting expert on the requirements for composting.
Processing/disposal	◆ Take the waste to a composting facility. ◆ South Australian large-scale commercial composting facilities are located within 50 km north and south of Adelaide, and in the south-east, and some smaller facilities are located regionally in Whyalla and the Riverland. ◆ Discard food waste mixed with other materials such as packaging and plastics to landfill.

Figure C19.1: Potential supporting equipment to help move food waste

Rear loader vehicle

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C19.4 lists potential hazards and WHS requirements and control measures.

Table C19.4: Potential hazards and control measures

Hazard type	Description	Control measure
WHS	Damage to the eyes or skin from handling rotten food waste	When handling rotten food waste, wear appropriate PPE such as: ◆ gloves ◆ glasses ◆ waterproof apron or similar.
Spread of disease or pathogens, WHS	Poorly managed stockpiles of food and other organic waste can lead to rotting and the spread of dangerous pathogens (see *Table C19.5*)	Follow the following general safety precautions to avoid transmission of dangerous fungi, bacteria and other pathogens found in rotting food: ◆ Always wear dry, breathable gloves to avoid direct contact with the skin. ◆ Wear protective footwear that covers your skin adequately to avoid direct contact with food waste and other vegetative matter, and do not wear them anywhere except outdoors. ◆ When collecting and removing rotting food waste and other vegetative matter, always wear a nose and mouth guard or dust mask (e.g. a P3 mask) to avoid inhaling the various spores that can become airborne. ◆ Wash your hands after dealing with rotting food (while this may sound obvious, many forget the potential dangers from poisoning). ◆ If you develop a severe cough or infection of the skin (especially if there is an open sore or puncture wound), seek medical attention immediately, as you may require antibiotics or a tetanus shot.

Additionally, unprotected contact with resultant compost is also associated with a range of potential physical ailments and appropriate PPE should always be worn.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- If individuals choose to compost food waste, it is important to ensure that composting is done correctly, with an appropriate mix of materials, including vegetation or other carbon inputs. It is important to note that materials can harbour pathogens and diseases and must be composted properly. Consider seeking advice from a professional composter or ideally, send this waste to a composting facility as soon as possible. If a composter cannot be accessed, discard the food waste with other general waste or have it managed by a professional.
- It is advised that commercial cleaners are used to clean out commercial fridges.
- Rotten food is generally not safe to handle, so it needs to be collected/handled by professionals. This may include taping up the fridge containing rotten food and having the entire fridge collected.

- When moving or touching food waste, wear strong rubber gloves to reduce the chance of cuts, as well as closed shoes to avoid direct contact with rotting food.
- Wash your hands after dealing with rotting food.
- If you develop a severe cough or infection of the skin (especially if there is an open sore or puncture wound), seek medical attention as soon as possible.
- Keep pets and animals away from food waste.
- Do not consume the food waste.
- Contact PIRSA to find out how to treat and dispose of green waste from a biosecurity quarantine zone or properties.

LEGISLATION AND REGULATIONS TO CONSIDER (WHS AND ENVIRONMENTAL)

Composting

If composting less than 200 tonnes of organic waste annually, use the SA EPA's *Compost Guideline* (updated June 2019) for composting guidance. Available from https://www.epa.sa.gov.au/files/7687_guide_compost.pdf.

If more than 200 tonnes of organic material is being composted annually, alternative licensing and processing is required.

Record keeping

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage or final disposal.

C20: GREEN (VEGETATIVE) WASTE

A disaster can lead to large volumes of green waste, which is the vegetative portion of the waste stream such as trees (including ornamental and fruit) and shrubs damaged in the event. It does not include food (see *Guideline C19: Food waste* for information on this stream) and may be found on private, commercial, or municipal properties or in transport vehicles. If possible, green (vegetative) waste will be composted, chipped or mulched, as it is a valuable recycled product.

Green waste (photo by Rawtec)

SOURCES OF GREEN (VEGETATIVE) WASTE

Potential sources of green (vegetative) waste include:

- trees, shrubs, garden waste at factories, stores, municipal facilities, residential and commercial premises, forestry plantations, roadside and public land
- plant or wood transport vehicles.

WHAT IS GREEN (VEGETATIVE) WASTE?

The SA EPA defines green waste as 'the vegetative portion of the waste stream arising from various sources including waste from domestic and commercial premises and municipal operations'.

It does not contain listed waste, radioactive waste, hazardous waste, inorganic waste (such as plastics and metal), CCA/treated timber, or food waste. Examples of green (vegetative) waste include plants, shrubs, wood, clippings and branches that are free of plastic and other contaminants. Aspects of green (vegetative) waste is also covered in *Guideline C16: Agricultural (including greenhouse) waste*.

POTENTIAL END USES FOR THE RECOVERED WASTE

Table C20.1 lists typical end uses for recovered green (vegetative) waste.

Table C20.1: Typical end uses for recovered green (vegetative) waste materials

Materials recovered	Potential uses
Green waste (trees, shrubs, untreated timber, and so on)	◆ Chipped or mulched ◆ Composted (with other materials such as food waste)* ◆ Reuse of timber ◆ Energy to waste (for example, timber used for processed engineered fuel that is burnt for energy, or as an energy source in paddle steamers)

**A licensed composting facility will have a range of control measures to effectively handle, compost, mulch or chip and then re-sell the green (vegetative) waste. The composting process should be controlled, and the treatment should significantly reduce plant and animal pathogens. If composting onsite, it is recommended that an experienced composter provides advice.*

RECYCLING AND DISPOSAL OPTIONS

Table C20.2 provides a quick guide to recycling and disposal options for managing this waste stream.

Table C20.2: Quick guide to disposal and recycling options

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
Chipped or mulched	All volumes	Flood affected waste or green waste from a plant pest/disease quarantine zone (e.g. fruit fly) may not be suitable for chipping or mulching as may carry disease	Sufficient facilities and mobile equipment across South Australia to use local options	Cannot accept other waste	May vary	
Compost (onsite or at a licensed	All volumes if offsite, onsite must be	As above	Sites north and south of Adelaide	< 0.5% non-organic material,	May vary	Regional: Potential to use large-scale

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
compost facility)	less than 200 tonnes		potentially available	0% listed or hazardous waste		compost facility in the state's south-east or other facilities in Whyalla and Riverland
Spread on property	Low volumes	As above	Dependent on property	No contamination	N/A	Be careful of potential to create fire hazard
Send to energy from waste plant or use as another energy means (e.g. paddle steamers)	All volumes	All events	One alternative fuels plant north of Adelaide, other options for energy recovery will depend on what is available in the region	Preference for dry material (e.g. logs)	Demand will remain high if energy from waste plant is in operation and other energy source demands may vary	
Landfill	While green (vegetative) waste is not banned from landfill and there is significant space in landfills servicing metro Adelaide, appropriate quantities of clean vegetative waste streams can be stockpiled for extended periods (provided it contains no food) and landfill should be avoided if possible.					

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

The process for managing the waste onsite and moving to an appropriate facility is covered in *Table C20.3*.

Table C20.3: Managing the waste

Process	Key considerations
Scoping	◆ Before including tree or vegetation removal in the work scope, consider: ◆ What is the reason for its removal? (for example, safety risk or preference from owner) ◆ Is it classified as a significant tree? ◆ Does it have cultural or heritage value?

	◆ What is its habitat value?
Onsite handling	◆ When managing the material onsite, wear appropriate PPE and consider using vehicles as shown in *Figure C20.1*. ◆ Aggregate the waste onsite, separating out contaminants where safe and practical.
Collection and transport	◆ Waste should be fully enclosed when transporting to prevent leakage or items blowing off during transport.
Interim storage	◆ Interim storage facilities may be used for this waste, provided stockpiles are well-managed and they contain no food waste or come from a plant pest/disease quarantine zone (e.g. fruit fly).
Processing/disposal	◆ Ideally, waste will be taken to a local chipping/mulching facility, or a licensed composting facility where it will be turned into a compost or mulch that can be sold. ◆ If impractical to compost or mulch, consider spreading it on-property, using it for energy or sending to landfill.

Figure C20.1: Potential supporting equipment to help move green (vegetative) waste

Bobcat

Tipper

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C20.4 lists potential hazards and WHS requirements and control measures.

Table C20.4: Potential hazards and control measures

Hazard/hazard type	Description	Control measure
Attracting vermin, WHS	Green (vegetative) waste can become a home for vermin, snakes, and other wildlife. These insects and animals have the potential to bite, scratch or sting. There is also a risk of a manual handling injury.	Care must be taken when handling the waste to minimise risk. Don't place hands and feet in holes or other areas that cannot be seen. Use gloves when moving the waste and if necessary, the waste can be moved by bobcats and tippers (see *Figure C20.1*). Using machinery will minimise the chance of a manual handling injury, and of being bitten, scratched or stung.

Asbestos contamination	In certain events such as a large bushfire or earthquake there is the potential for contamination of green waste with asbestos. This is especially of concern with grasses and garden beds in proximity to damaged structures.	The site should be assessed for the presence of asbestos prior to the removal of any green waste, especially ground covers that can easily be contaminated with asbestos fragments.
Combustion and fires, WHS	The decomposition of green waste triggers chemical reactions that generate heat, which can lead to spontaneous combustion.	Maintain storage temperatures below 70°C and keep the moisture content between 20% and 45%. Ensure adequate airflow, to allow oxygen to reach the waste.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- When moving tree branches, leaves, and plants, wear eye protection, closed shoes, and strong rubber gloves to reduce the chance of cuts.
- Contact PIRSA to find out how to treat and dispose of green waste from a biosecurity quarantine zone or properties.

LEGISLATION AND REGULATIONS TO CONSIDER (WHS AND ENVIRONMENTAL)

Composting

If composting less than 200 tonnes of organic waste annually, use the SA EPA's *Compost Guideline* (updated June 2019) for composting guidance. Available from https://www.epa.sa.gov.au/files/7687_guide_compost.pdf.

If more than 200 tonnes annually, alternative licensing and processing is required.

RECORD KEEPING

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage or final disposal.

FURTHER INFORMATION AND RESOURCES

SA EPA

- *Standard for the production and use of Waste Derived Soil Enhancer* (2010)
- *Compost Guideline (2019)*

C21: HARD WASTE

Hard waste includes items inside dwellings and buildings such as cupboards and bedding but does not include electronic or toxic items. Depending on the state of these items and the disaster, these items may be recovered and recycled, burned to produce energy, or sent to landfill.

Hard waste following Hurricane Katrina (photos by User:Infrogmation / Wikimedia Commons)

SOURCES OF HARD WASTE

Potential sources of hard waste are from damaged:

- single or multistorey dwellings
- high-rise apartments and office blocks.

WHAT IS HARD WASTE?

The SA EPA defines hard waste as the solid component of the waste stream arising from domestic premises which is not suitable for collection using a kerbside bin system but does not contain commercial and industrial waste (general), listed waste, hazardous waste, radioactive waste, or waste that is not deemed suitable for collection by local councils.

This waste stream includes:

- furniture, bedding, cabinets, tables, sofas lounges and chairs
- mattresses, carpet and textiles
- toys, bikes, old tins, empty clean paint tins (with lids removed), scrap iron and car rims (not tyres).

POTENTIAL END USES FOR THE RECOVERED WASTE

Typical end uses for recovered hard waste are listed in *Table C21.1*.

Table C21.1: Typical end uses for recovered hard waste materials

Materials recovered	Potential uses
Hard waste	Depending on the nature of the waste and the event, it may be: ◆ reused as a product (couches, table, toys etc.), if safe to do so ◆ separated into each material stream and recycled ◆ used as a feedstock for processed engineered fuel production, or ◆ disposed to landfill.

RECYCLING AND DISPOSAL OPTIONS

Table C21.2 provides a quick guide to recycling and disposal options for managing this waste stream.

Table C21.2: Quick guide to disposal and recycling options

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
Send all waste to recycling facility to be separated and recycled	All volumes	Waste that is burnt or water damaged from flood or storm may not be recyclable	Metro can manage significant volumes of this material		May vary	
Send to energy from waste plant	All dry volumes (excluding green waste)	Water damaged items may not be suitable for energy from waste	One plant north of Adelaide will process to Processed Engineered Fuel (PEF) to power a cement kiln	Preference for plastics, timbers and textiles	May vary	
Landfill	Landfill may be the best option for this waste stream given the potentially mixed nature and the practicality of this method of disposal. There is significant space in landfills servicing metro Adelaide. Space may be more limited in regional areas.					

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

Table C21.3 lists the process for managing the waste onsite and moving to an appropriate facility.

Table C21.3: Managing the waste

Process	Key considerations
Onsite handling	◆ Some items may be salvageable and can be used again onsite. ◆ For the remaining items, pile the waste onsite and separate out contaminants where possible.
Collection and transport	◆ If the waste is being collected, considering marking the waste with a signpost for waste collectors. ◆ In tourist areas where many affected properties are holiday homes and owners may not live locally, consider allowing extra time for waste collection. Since some owners may be unable to return in time to place items at the kerb during the initial collection, planning for multiple collection runs or alternative drop-off options can help manage waste presented intermittently. ◆ If transporting to a waste and recycling facility, vehicle options depend on the volume and state of the waste, but may include a car, van, utilities vehicle, trailer or truck such as those shown in *Figure C21.1*.
Interim storage	◆ Interim storage facilities may be set up for this waste as it can be stockpiled for extended periods if not contaminated.
Processing/disposal	◆ This waste may be turned into PEF for use in a cement kiln or disposed to landfill.

Figure C21.1: Vehicles to transport metal waste

RORO truck (photo by Rawtec) *Rear loader vehicle*

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C21.4 lists potential hazards and WHS requirements and control measures.

Table C21.4: Potential hazards and control measures

Hazard type	Description	Control measure(s)
Needle stick injury, WHS	There is a risk of needle stick injuries due to needles in waste piles.	Care must be taken when handling the material to minimise risk. Stay vigilant and ensure that hands and feet are not placed in holes or other areas that cannot be seen. Use machines or equipment where possible to move the waste. This will minimise the chance of needle injury. See *Guideline C14: Medical and pharmaceutical waste* for more information
Inhalation of asbestos fibres, WHS	Inhaling asbestos fibres has a serious long-term health risk. Exposure can cause: ◆ mesothelioma ◆ lung cancer ◆ asbestosis ◆ pleural plaques ◆ pleural thickening.	Inform the public about risks of hazardous waste. Prohibit the public from presenting hazardous items in waste loads/piles. Ensure waste collectors and facility managers have proper PPE and training to identify and manage hazardous materials as per relevant guidelines.
Inhalation of RCS dust, WHS	Inhalation of RCS may lead to serious health risks such as: ◆ silicosis ◆ lung cancer ◆ fibrosis ◆ pulmonary disease ◆ bronchitis.	
Exposure to chemicals in hazardous waste, WHS	Exposure to chemicals in hazardous waste can have serious health risks, including: ◆ poisoning ◆ chemical burns ◆ skin irritation ◆ respiratory issues ◆ neurological damage ◆ carcinogenic affects.	
Fire or explosion, WHS	Risk of fire or explosion due to damage to or mishandling of batteries.	

RECORD KEEPING

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage, or final disposal.

C22: METAL WASTE

A disaster event can generate large volumes of metal waste, for example from steel beams from damaged buildings, that need to be appropriately and safely managed. If metal waste can be separated, collected, and recycled as scrap metal, it can become a valuable product.

Metal waste

SOURCES OF METAL WASTE

Potential sources of metal waste are from damaged:

- buildings, factories and stores
- singles or multistorey dwellings (including high rise)
- commercial premises and office blocks
- supermarkets and shopping centres/precincts
- bridges and other public infrastructure.

WHAT IS METAL WASTE?

For the purpose of these guidelines, metal waste is the component of the waste stream after an event that is predominantly metals, either ferrous (that is, contains iron) or non-ferrous (does not contain iron, such as aluminium), and that requires shearing, baling or fragmenting (onsite or at a scrap metal recycler) prior to sale.

Metal waste may include:

- machinery
- metal fences
- metal roofs
- wire fencing
- from vehicles such as cars, trucks, ships and aeroplanes (note that these are covered in *Guideline C27: Vehicle waste*).

POTENTIAL END USES FOR THE RECOVERED WASTE

Table C21.1 lists typical end uses for recovered metal waste.

Table C21.1: Typical end uses for recovered metal waste

Material	End products
Metals such as non-ferrous metals (e.g. aluminium) and ferrous metals (e.g. steel)	Scrap metal can be traded as a commodity on the world market, and can be turned into: ◆ steel beams ◆ valves and extrusions ◆ automotive parts ◆ building industry materials ◆ aluminium cans ◆ batteries ◆ cables.

RECYCLING AND DISPOSAL OPTIONS

Table C21.2 provides a quick guide to recycling and disposal options for this waste stream.

Table C21.2: Quick guide to disposal and recycling options

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
Aggregated as scrap metal and sold to make other metal products	All volumes	All events	Numerous scrap metal recyclers/receivers in metro Adelaide, or operators may come to the site	0% hazardous or listed waste, no oils	May vary	Regional: Mobile equipment may be used to shred metals and bulk transport to metro processors
Landfill	Although there is significant space in landfills servicing metro Adelaide (noting these may be more limited in regional areas), an exemption of the landfill ban may need to be sought for aluminium, copper, steel or iron or a blend or alloy of any such metals, if it has been aggregated for resource recovery (whether alone or with other recyclables)*. As metal can be stockpiled for extended periods, it should not need to be landfilled unless there are extenuating circumstances.					

* See list of wastes banned from landfill in South Australia.

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

The process for managing the waste onsite and moving to an appropriate facility is covered in *Table C21.3.*

Table C21.3: Managing the waste

Process	Key considerations
Onsite handling	◆ Separate metal waste from other waste and contamination such as oils. ◆ Use machinery shown in *Figure C21.1* to manage the waste onsite. ◆ Wire fencing can be difficult to handle and compress. Bundle or cut into smaller lengths for improved ease of handling prior to aggregation and transport.
Collection and transport	◆ Metal processing and receival facilities may come to the site to collect the metal. ◆ Transport vehicles should be fully enclosed steel-bodied trucks such as those shown in *Figure C21.2*.
Interim storage	◆ Interim storage facilities may be set up for metal waste if it is not contaminated.
Processing/disposal	◆ Metal should be aggregated and recycled. ◆ Aggregated metals are banned from landfill and as such, an exemption is necessary if landfill disposal is required.

Figure C21.1: Machinery required to manage metal waste onsite

Grapple

Figure C21.2: Vehicles to transport metal waste

RORO truck (photo by Rawtec) *Steel-bodied truck*

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C21.4 lists potential hazards and WHS requirements and control measures.

Table C21.4: Potential hazards and control measures

Hazard type	Description	Control measure
Manual handling, WHS	Metal waste can be heavy or sharp.	Caution should be taken when handling this waste to avoid being cut or lifting items that are too heavy, as well as metal waste falling from piles. It may be necessary to use machinery to lift the metal waste.
Contamination with other materials, environmental	If metal waste is contaminated with oil or mixed with other waste, this may create hazards related to transportation or storage. For example, oil or any other liquid attached to metal waste, when exposed to rain, may contaminate its surrounding environment or in stockpile may lead to stockpile fires. Metal waste may additionally be mixed with or in the vicinity of asbestos waste.	A risk assessment of other hazardous contaminants of scrap such as asbestos or gas bottles should be undertaken prior to removal and transport (for example, measuring airborne emissions of asbestos fibres, or the potential for gas bottle explosion). Regarding environmental hazards when there is no contamination, metal waste does not usually pose any risk to the environment, as issues usually result from other materials. Therefore, there are no environmental risks in the transportation and storage of metal. If metal is found to have contact with asbestos, the asbestos should first be appropriately removed, and the site signed off as asbestos free. This should include decontaminating the steel prior to its removal.
Presence of LIBs	Some machinery or vehicles may contain LIBs that are a fire risk.	Refer to section Guideline C13: Lithium-ion batteries.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- If you have metal waste at your site, demolition experts and scrap metal recyclers can provide help and advice on managing metal waste.
- If handling metal waste, this waste can be sharp – use gloves, protective footwear and safety glasses, or equipment such as a bobcat to move the waste.
- Metal waste can be recycled – take the metal waste (if safe to do so) to a scrap metal recycler. If unsafe to transport, arrange for a scrap metal recycler to pick up the metal waste.

RECORD KEEPING

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage, or final disposal.

C23: MIXED WASTE

Damage to infrastructure and buildings after an event can generate significant quantities of waste streams mixing. If this mixed waste has more than 5% non-C&D inert waste (plastics, food, timber, and so on), this waste is considered as mixed waste. Ideally, mixed waste will be separated into different waste streams, transported to a recycling facility and recycled, with the remaining materials (residual component) either sent to landfill or used for energy from waste, provided that no asbestos or CCA is present in the materials.

SOURCES OF MIXED WASTE

Potential sources of mixed waste are from damaged:

- factories and stores
- single or multistorey dwellings (including high rise)
- commercial premises and office blocks
- supermarkets and shopping centres/precincts.

WHAT IS MIXED WASTE?

Mixed waste is the waste produced from buildings and their contents that cannot be effectively separated from C&D inert waste (rubble, bricks, and concrete). For the purposes of these guidelines, mixed waste incorporates:

- C&D mixed waste (combustible fraction), defined by the SA EPA as the solid component of a waste stream arising from the construction, demolition or refurbishment of buildings or infrastructure which contains some foreign material (as set out below)
- commercial and industrial waste (general), defined by the SA EPA as the solid component of the waste stream arising from commercial, industrial, government, public or domestic premises (not collected as municipal solid waste).

Mixed waste will include more than 5% non-C&D inert materials (called 'foreign materials') such as green waste, plastics, electrical wiring, timber, paper, insulation, tins and packaging, but no listed waste, hazardous waste or radioactive waste.

POTENTIAL END USES FOR THE RECOVERED WASTE

Ideally, C&D mixed waste (combustible fraction) will be separated into different waste streams to enable each stream to be recycled and the non-recyclable residual fraction sent to landfill or used as a processed engineered fuel for energy. Separation can occur onsite, or the waste can be sent to a recycling facility to be separated and recycled where possible. *Table C23.1* lists typical wastes and potential end uses for recovered mixed waste.

Table C23.1: Typical waste streams and uses for recovered mixed waste

Materials recovered	Potential uses
Inert materials (concrete/bricks/rubble/soils)	◆ Crushed and blended to make road bases (such as for reconstruction efforts after the event) ◆ Construction fill ◆ Direct reuse ◆ Quarry rehabilitation material
Timber (excluding CCA/treated timber)	◆ Salvaged and reused if not damaged ◆ Shredded for use as mulch if damaged (see *Guideline C20: Green (vegetative)* waste for more information)
Green waste	◆ Sent to a licensed composting facility or mulched (see *Guideline C20: Green (vegetative)* waste for more information)
Metals	◆ Salvaged and sold to the metal scrap industry (see *Guideline C22: Metal waste* for more information)
Cardboard and paper	◆ Sold to the paper pulp industries if clean and dry
Plastics	◆ Granulated (depending on the ability to recover this to a level accepted by the plastic granulator)
Mixed waste materials (if recyclable materials cannot be easily separated)	◆ Turned into a PEF for use in cement kiln(s) ◆ Alternatively, these may need to be sent to landfill
E-waste	◆ Sent to e-waste recyclers for shredding/dismantling into parts

RECYCLING AND DISPOSAL OPTIONS

Table C23.2 provides a quick guide to recycling and disposal options for this waste stream.

Table C23.2: Quick guide to disposal and recycling options

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
Send all waste to recycling facility to be separated and recycled	All volumes	Waste that is burnt or water damaged from flood or storm may not be recyclable	Metro can manage significant volumes of this material	0% listed, hazardous or radioactive waste. If >95% concrete, bricks and rubble, it is classed as	May vary	Regional: Consider hauling interstate or to interim storage facilities

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
				C&D inert waste		
Separate waste onsite and collect as separate streams	All volumes	As above	As above	As above	As above	As above
Send to energy from waste plant	All dry volumes (excluding vegetative waste)	As above	One plant north-west of Adelaide will process to PEF for use in a cement kiln	Preference for plastics, timbers, and textiles	May vary	As above
Landfill	Significant space in landfills servicing metropolitan Adelaide. These may be more limited in regional areas. An exemption of the landfill ban is required for wastes such as metals, glass, plastics and cardboard and paper that is already separated and aggregated. However, if the waste is mixed and cannot be easily separated, disposal to landfill may be the practical option for this waste. Note that mixed waste can be stockpiled for extended periods while it is progressively moved offsite, provided the stockpiles are well constructed and are properly monitored and as such, landfill should be avoided if possible.					

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

Professional demolition contractors would likely manage and remove this waste. The process for managing the waste onsite and moving to an appropriate facility is discussed in *Table C23.3*.

Table C23.3: Managing the waste

Process	Key considerations
Onsite handling	◆ Demolition contractors should manage mixed waste and use excavators with a grapple, hammer, or pulveriser or similar to separate or break up the waste for easier transportation (see *Figure C23.1*). ◆ Bobcats and wheel loaders can be used to pick up waste from the ground or building and place in a vehicle.
Collection and transport	◆ Materials should be placed into a transport vehicle using the equipment mentioned above.

	◆ Transport vehicles should be fully enclosed steel-bodied trucks (either tandem or semi tipper). ◆ Tarps are required for C&D mixed waste to eliminate litter during transport.
Interim storage	◆ Interim storage may be required if access to recyclers is difficult, and storage should be undercover. ◆ The material is low risk and can be stockpiled for extended periods before moving to a recycling facility, provided the stockpiles are managed properly.
Processing/disposal	◆ This waste can be processed into a wide range of products or sent to an energy from waste facility (see *Table C23.2*). ◆ Some waste may need to go to landfill if not able to be recycled or used for energy recovery. ◆ There is a risk that mixed waste is contaminated with asbestos, so it is crucial to establish measures for identifying contamination and, if present, ensure safe handling and proper disposal as outlined in C8.

Figure C23.1: Potential recovery and transportation equipment for mixed waste

Grapple excavator

Steel-bodied semi-tipper

Wheel loader

Bobcat/Skid steer

RORO truck (photo by Rawtec)

Skip truck (photo by Eco Waste Solutions)

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C23.4 lists potential hazards and WHS requirements and control measures.

Table C23.4: Potential hazards and control measures

Hazard/hazard type	Description	Control measure
General hazards, WHS	There are various other hazards at sites containing mixed waste.	Before removing mixed waste, a structural engineer should complete a risk assessment and the area or building should be deemed safe to enter. Utilities (such as gas, electricity, and water) must be properly disconnected. Waste removalists should consider using PPE such as: ◆ high visibility clothing ◆ hard hats ◆ steel cap shoes ◆ dust masks (a P3 dust mask is recommended).
Asbestos, WHS	Inhalation of asbestos fibres can have serious long-term (latency) health risk and exposure can cause: ◆ mesothelioma ◆ lung cancer ◆ asbestosis ◆ pleural plaques, and so on.	Buildings constructed prior to 1990 are known to potentially have materials that contain asbestos. If asbestos is suspected, treat the waste as containing asbestos until proven otherwise. See *Guideline C6: Asbestos and asbestos-contaminated waste* for more information.
Injury from dense waste, WHS	The waste may be very dense and heavy.	Waste removalists should use appropriate equipment to move this waste (see *Figure C23.1*).
Combustion and fires,	As this material is mixed, it may have combustible	Where possible, separate out the waste by material stream for stockpiling, particularly

Hazard/hazard type	Description	Control measure
WHS and environmental	materials contained in the waste piles. This can spontaneously combust or catch alight from equipment that causes sparks used for cutting, welding or electrical works.	vegetative/green organics as this material can potentially be the main source of ignition. When constructing the stockpile, ensure plenty of room between stockpiles for emergency vehicle access, as well as spreading the waste in the event of a fire, as this will make it easier to extinguish. Stockpiles should be less than 3 metres high and 4 to 5 metres wide, with at least 4 metres between each row. If the stockpile is to remain in place for an extended period, ensure it is under cover. It is also important not to use equipment that will create sparks near stockpiles.
Unstable stockpiles and structures, WHS	Damaged buildings and structures may fall after the event is completed.	Do not stand or work underneath structures or next to walls or stockpiles that may topple.
Needle stick injury, WHS	There is a risk of needle stick injuries due to needles being in the waste piles.	Care must be taken when handling the material to minimise risk. Stay vigilant and ensure that hands and feet are not placed in holes or other areas that cannot be seen. Use machines where possible to move the waste, such as excavators and grapples (see *Figure C9.1*), and wear PPE as suggested above. This will minimise the chance of needle injury or being bitten, scratched or stung.
Bites and stings, WHS	This waste stream also has the potential to harbour vermin, snakes and other wildlife due to the nature of the materials and potential for voids which readily act as a living space. These vermin may bite or sting.	

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- If your house or buildings on or nearby your property have fallen or are damaged, it is safer for waste removalists to manage and remove this material.
- If hazardous materials such as asbestos are suspected, you should avoid handling this material and contact SafeWork SA for information and guidance.
- If you are near the removal of houses or building rubble and other materials, or if dust is visible, consider wearing a P3 dust mask and closing your doors and windows.
- Keep some distance when walking or driving by piles of mixed waste, as it may topple.
- If you are handling and removing this waste, it is recommended that:
- prior to removing waste from a damaged structure, you have a structural engineer conduct a risk assessment to check that the building is safe to enter
- you wear appropriate PPE, such as high visibility clothing, a hard hat, steel cap shoes and a P3 dust mask, glasses and gloves when in the work area

- waste is taken to a waste and recycling centre to be recycled, if practical.

RECORD KEEPING

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage, or final disposal.

FURTHER INFORMATION AND RESOURCES

SA EPA

- *Environmental Guidelines Resource Recovery and Waste Transfer Depots (2001)*
- *Guideline for stockpile management (2020)*
- *Guidelines on the handling of waste banned from landfills (2012)*

C24: SANDBAG WASTE

Sandbags may be used to mitigate the impact of a flood or storm by providing a temporary wall to protect infrastructure and equipment from water damage. After sandbags have been used, they become a waste that needs to be managed. This may be disposed to landfill or, if it has not come in contact with water, the sandbag can potentially be reused.

Sandbags used in the 2022–23 River Murray flood event clean-up

SOURCES OF SANDBAG WASTE

Potential sources of sandbag waste are from sandbags used to mitigate flood or storm damage that are left over after the storm or flood is no longer a threat.

WHAT IS SANDBAG WASTE?

Sandbag waste refers to used bags deployed for flood or storm protection. Bags are usually made of plastic or hessian. They may be filled with sand or other materials, depending on their intended water-blocking function. These other materials may include soil or clay, gravel or crushed rock, water-absorbing polymers (gel bags), recycled rubber granules, and/or other materials.

POTENTIAL END USES FOR THE RECOVERED WASTE

Table C24.1 lists typical end uses for recovered sandbag waste. The appropriate end use depends on both the material composition of the sandbag (bag and contents) as well as whether the bag has been potentially contaminated.

Table C24.1: Typical end uses for recovered sandbag waste

Material	End products
Sandbags that have not come in contact with water	◆ Reuse as a sandbag ◆ If filled with clean sand from a known source, empty material onto ground and reuse the bags.
Sandbags that have come in contact with water, and/or if the fill material is unknown	◆ Disposal to landfill.

RECYCLING AND DISPOSAL OPTIONS

Table C24.2 provides a quick guide to recycling and disposal options for managing this waste stream.

Table C24.2: Quick guide to disposal and recycling options

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
Reuse entire sandbag or the sand and bag	All volumes	Contact with floodwater would prevent this option	N/A	0% listed or hazardous waste	If further events possible, may be high	Non-contaminated sandbags can be stockpiled for some time
Spread clean sand on property	Lower volumes	As above	Dependent on property	As above	N/A	Provenance of sand or fill material must be known.
Compost hessian bag	All volume	Contact with floodwater would prevent this option		0% listed or hazardous waste		
Landfill	If sandbags are mixed with other wastes and cannot be separated, or the sandbags have touched floodwater, or the fill material is unknown, they should be sent to landfill. If bags are not being reused, these should be sent to landfill.					

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

The process for managing the waste onsite and moving to an appropriate facility is covered in *Table C24.3*.

Table C24.3: Managing the waste

Process	Key considerations
Onsite handling	◆ Consider the source: What material is the sandbag filled with, and where was it sourced from? ◆ If sandbags have not come into contact with floodwater but may be required again at the site due to a potential follow-up event, stockpile at the site until needed (following the WHS requirements below). ◆ If the event is unlikely to occur in the near future, sandbags can be stockpiled.
Collection and transport	◆ A waste contractor may collect the sandbags and dispose to landfill if they have come into contact with water or if the contents are unknown.
Interim storage	◆ Clean dry sand and hessian/plastic bags should be safe to stockpile for extended periods until an appropriate long-term storage solution arises. ◆ Interim storage of contaminated sandbag waste (that is, those that have come into contact with floodwater) is not recommended and it should be taken directly to a landfill.
Processing/disposal	◆ Ideally, the sandbag waste will be reused as sandbags if they have not come into contact with floodwater. ◆ If there are minimal uncontaminated sandbags, it may be more logical to simply empty the contents onsite (if provenance is known and clean) and dispose of the bag in the general waste bin. ◆ If the sandbags have come into contact with floodwater, this waste will need to be disposed of to landfill.

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C24.4 lists potential hazards and WHS requirements and control measures.

Table C24.4: Potential hazards and control measures

Hazard type	Description	Control measure
Manual handling injury, WHS	Sandbag waste can be very wet and heavy to lift. The sandbags could also contain chemicals, other waste materials and diseases from floodwater	Wear thick gloves when handling wet sandbags and ensure that the weight of the sandbag is not too heavy – it may be beneficial to pick up the waste using 2 people (if the sandbag is over 15 kg). When lifting, bend at the knees, not with your back.

Silica, WHS	Some sand may contain the presence of crystalline silica.	If more than 1% concentration of crystalline silica is found, refer to *Guideline C15:Respirable Crystalline Silica*.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- The property owner is responsible for safely removing and discarding sandbags on the property.
- Wear thick gloves when handling wet sandbags as they may contain chemicals, waste, and diseases.
- When lifting sandbags, bend at the knees, not with your back.
- If the sandbag is over 15 kg, use 2 people to pick it up.
- Sandbags that have been in contact with floodwater should be disposed of to landfill.
- If the sandbag has not come into contact with water, store it for reuse – either as an entire sandbag if clean and provenance is known or as a sand pile and separate bag pile.

RECORD KEEPING

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage, or final disposal.

C25: SOIL AND SEDIMENT WASTE

Disasters may result in significant volumes of soil and sediment waste being displaced or unearthed. This waste stream is ideally used on the land or as a road base.

SOURCES OF SOIL AND SEDIMENT WASTE

Potential sources of soil and sediment waste are from damaged:

- roads and bridges
- paddocks and rural properties
- embankment erosion
- liquefaction (earthquake).

WHAT IS SOIL AND SEDIMENT WASTE?

There are different classifications of soil and sediment waste according to the level of contamination, including:

- waste derived fill
- intermediate waste soil
- soil that is more contaminated than intermediate waste soil
- soil that is considered low-level contaminated (LLCW)
- highly reactive soils (HLCW)

See *Standard for the Production and Use of Waste Derived Fill* (2013) for SA EPA definitions.

POTENTIAL END USES FOR THE RECOVERED WASTE

Table C25.1 lists typical end uses for recovered soil and sediment waste. Recovering and recycling these materials is likely to be useful following a disaster, with source products being recycled into items such as road base. Determining whether the waste contains contamination (which includes biosecurity hazards that may affect commercial horticulture production) requires an independent environmental auditor.

For further guidance on the potential uses listed in *Table C25.1*, refer to SA EPA's *Standard for the production and use of Waste Derived Fill* (see *Further information and resources* at the end of this guideline).

Table C25.1: Typical end uses for recovered soil and sediment waste materials

Materials recovered	Potential uses
Waste derived fill (no contamination)	Use onsite for land reclamation or export to approved land reclamation fill sites: ◆ Road base ◆ Batters/bunds ◆ Compost (bulking agent) ◆ Quarry rehabilitation material
Intermediate (i.e. a proportion with contamination) waste soils	Remediation or use onsite for land reclamation or export to approved land reclamation fill sites. Note that classification of soil needs approval from SA EPA via an EPA-approved auditor for use of the materials within approved site reclamation projects.

RECYCLING AND DISPOSAL OPTIONS

Table C25.2 provides a quick guide to recycling and disposal options for managing this waste.

Table C25.2: Quick guide to disposal and recycling options

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
Reuse (e.g. clean fill and intermediate fill used for road base)	Higher volumes	Floodwater or soil/sediment from biosecurity quarantine areas/properties may carry disease and prevent this option		Site auditor to determine contamination level and best approach to manage	Likely to be high after an event	Determined by SA EPA conditions of licence, waste derived fill standards and PIRSA
Spread back onsite (clean fill only)	Lower volumes	As above	Dependent onsite	As above	Dependent onsite	As above
Land reclamation (clean fill and potentially intermediate waste soil)		As above	Many land reclamation sites in outer metro Adelaide areas	As above	May vary	As above
Landfill (contaminated soil)	The site auditor would need to determine if landfill disposal is most appropriate given the potential opportunities for beneficial reuse. Contaminated soil requires disposal to an appropriately lined landfill. Hazardous fill may require remediation or taking to an appropriate landfill interstate (for contaminated soil).					

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

The process for managing the waste onsite and moving to an appropriate facility is covered in Table *C25.3*.

Table C25.3: Managing the waste

Process	Key considerations
Soil assessment	◆ Look for discoloration and odor in the soil ◆ Assess the area for telltale identifiers of the potential presence of chemicals in the soil, such as nearby signage, empty or damaged chemical containers, discussion with the premises owner. ◆ If more than 1% concentration of crystalline silica is determined during assessment, follow the appropriate protocols as outlined in *Guideline C15:Respirable Crystalline Silica*.
Onsite handling	◆ Push the material to the side while cleaning a site but take care as the soil may be contaminated. ◆ Have the stockpile tested by an EPA-approved auditor. ◆ Consult PIRSA to confirm quarantine zone/property location.
Collection and transport	◆ Audit results will indicate where the waste can be transported. ◆ Allow sufficient room for the waste collector to pick up the waste.
Interim storage	◆ Waste may be temporarily stored, subject to not having contaminants and aligning with the stockpiling requirements in *Table C25.4*.
Processing/disposal	◆ Several potential destinations exist for this waste depending on the audit results, level of contamination and available recycling options.

Note: Irrespective of whether the soil/sediment has come from a biosecurity quarantine zone/property or not, contractors used to collect and transport this product from agricultural properties/regions need to be conscious of the risk of spreading endemic diseases and weeds between properties. For this reason, vehicles may need to be decontaminated. Advice on this can be accessed from PIRSA.

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C25.4 lists potential hazards and WHS requirements and control measures.

Table C25.4: Potential hazards and control measures

Hazard type	Description	Control measure
WHS	This waste may contain contaminants including heavy metals, carcinogens, asbestos and silica.	Have the soil appropriately sampled, tested, and analysed by an approved independent SA EPA auditor. For presence of asbestos, refer to *Guideline C8: Asbestos and asbestos-contaminated waste*. For presence of silica, refer to *Guideline C15:Respirable Crystalline Silica*.
WHS	Stockpiling can present hazards such as dust and injury from the stockpile collapsing	Stockpiles should, where possible, be kept covered or damp to avoid dust emanating from the stockpile. The SA EPA generally requires a maximum stockpile height in the range of 3 to 5 metres for material management or resource recovery activities. These stockpile height limits are largely based on stockpile manageability, dust impacts,

		stability, potential impact on underlying infrastructure and fire risk. The height of stockpiles should generally be lower than surrounding structures.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- If this event has led to large piles of soil or dirt, contact the SA EPA to have it tested prior to trying to move or manage this yourself.
- The SA EPA will advise on the best approach to take after the soil has been sampled.
- Contact the PIRSA on how to decontaminate vehicles entering multiple properties in agricultural areas to reduce the risk of endemic disease and to confirm if any soil/sediment may have come from a biosecurity quarantine zone/property.

RECORD KEEPING

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic metres) and destinations for recycling, storage, or final disposal.

A remediation management plan is required if volumes are significant (usually >100 tonnes). Advice should be sought from the SA EPA and all relevant sampling and reporting documentation should be logged and managed in accordance with the relevant legislation.

LEGISLATION AND REGULATIONS TO CONSIDER (WHS AND ENVIRONMENTAL)

Environment Protection (Water Quality) Policy 2015

This policy is relevant to this guideline and should be considered when assessing the suitability of using soil and sediment waste (waste fill) as it relates to protection of waters.

Guideline on the Investigation Levels for Soil and Groundwater (Schedule B1) (April 2011)

This guideline provides guidance on appropriate human and ecological exposure levels. This schedule is part of the National Environmental Protection (Assessment of Site Contamination) Measure.

FURTHER INFORMATION AND RESOURCES

SA EPA

- For the current criteria for classifying intermediate and low-level contaminated soils as they appear on SA EPA licences, see *Current criteria for the classification of waste—including Industrial and Commercial Waste (Listed) and Waste Soil* (2010)
- For advice on the environmental management of onsite (site contamination) remediation activities to minimise any actual or potential adverse impacts and to provide adequate protection to the community, see *EPA Guidelines for environmental management of onsite remediation* (2008)
- *Standard for the production and use of Waste Derived Fill (2013)*

C26: UNWANTED DONATED GOODS

After an event, there may be an influx of donated goods from other areas or states into the affected area. Many of these goods may become unwanted or unused and eventually turn into a waste stream. This needs to be managed appropriately.

SOURCES OF UNWANTED DONATED GOODS

Potential sources of unwanted donated goods waste are:

- donated goods such as tables, chairs, toys, mattresses, clothing, pet food and other animal supplies
- unused emergency supplies, such as food and water bottles.

WASTE PREVENTION

To help reduce the donations of unwanted goods, refer to the *National guidelines for managing donated goods* and strengthen public messaging. For example, promoting messages around monetary donations, which supports dignity, offers choice and contributes to rebuilding the local economy.

RELATED GUIDELINES

Unwanted donated goods should preferably be used or reused before disposal. Unwanted donated goods include multiple alternative waste streams, and the relevant waste stream guideline should be referred to for further information. This may include:

- Guideline C19: Food waste
- Guideline C21: Hard waste
- Further information on managing unwanted donated goods can be found in the National guidelines for managing donated goods.

C27: VEHICLE WASTE

Vehicles may be damaged or destroyed during an event. Managing this waste properly can maximise reuse of this resource, reduce environmental impacts and improve amenity. South Australia has a well-established vehicle waste recycling industry for vehicles that are written off or destroyed in disasters.

SOURCES OF VEHICLE WASTE

Potential sources of vehicle waste are from damaged:

- roads, bridges, or carparks or anywhere else where vehicles may be stored or in use at the time of the event
- water infrastructure and areas with water vessels.

WHAT IS VEHICLE WASTE?

Vehicle waste includes damaged or destroyed vehicles that are unsafe to operate as a result of a disaster event. Vehicle waste cannot be repaired onsite and/or safely driven to a location to be repaired. These vehicles will often not start due to water, fire or crush damage. Examples of vehicle waste include damaged cars, motorbikes, trucks and water vessels.

POTENTIAL END USES FOR THE RECOVERED WASTE

The priority is to repair and reuse the vehicle, if possible. However, if the vehicle is written off and cannot be repaired, *Table C27.1* refers to the recycling options.

Table C27.1: Potential end uses for recovered vehicle waste

Materials recovered	Potential uses
Vehicle that is written off and can be used for spare parts	• Wrecking yard may salvage the parts and re-sell as spare vehicle parts.
Vehicle that is written off and cannot be used for spare parts (scrap metal waste)	• Metal waste from vehicles can be traded as a commodity on the world market, which may be turned into: ▪ valves and extrusions ▪ automotive parts ▪ building industry materials ▪ batteries ▪ cables.
Batteries, oils, petrol	• Likely to be disposed safely and not recycled.

RECYCLING AND DISPOSAL OPTIONS

Table C27.2 provides a quick guide to recycling and disposal options for managing this waste stream.

Table C27.2: Quick guide to disposal and recycling options

Recycling or disposal option(s)	Suitable volumes	Event type considerations	Location & capacity of infrastructure	Waste stream contamination	Likely demand for recycled product	Other considerations
Repair and reuse	All volumes	All events	Numerous repair shops in metro Adelaide	N/A	Will likely remain high	This is the priority if practical
Vehicle disassembled at wrecking yard	As above	As above	Numerous wrecking yards in metro Adelaide, or vehicle transporters can be used	May be required to remove contaminants and vehicle components such as batteries, oils and petrol	Demand for spare parts may be high after an event	
Scrap metal waste extracted from vehicle and recycled	As above	As above	Numerous scrap metal and vehicle recyclers/receivers in metro Adelaide, or operators may come to the site	As above	May vary	Regional: Mobile operators may come to the site to crush and haul the waste
Landfill	Vehicles and contents in vehicles (petrol, oil and batteries) are banned from landfills and as such, an exemption would need to be sought to dispose of this waste at landfill.					

KEY CONSIDERATIONS FOR MANAGING THIS WASTE

Ideally, the vehicle will be repairable for reuse. Professional vehicle repairers will likely undertake this process and provide advice. Vehicle wrecking yard operators and scrap metal recyclers will advise on re-using parts or recycling the vehicle if it cannot be repaired. The process for managing the waste onsite and moving to an appropriate facility is covered in *Table C27.3*.

Table C27.3: Managing the waste

Process	Key considerations
Onsite handling	◆ First identify (if possible) the owner of the vehicle/vessel, who is responsible for the waste. ◆ If the vehicle is not safe to drive, leave it onsite and seek professional advice as to the reparability of the vehicle. ◆ A mobile metal crusher and baler may be required at the site. ◆ If vehicle waste is on private property but is impeding recovery, authorities have the right to seize/manage this waste.
Collection and transport	◆ If the vehicle can be repaired and is safe to drive, take it to a repair shop from the site. ◆ For vehicles that are not safe to drive, seek advice from an expert. If it is written off and parts cannot be salvaged, have the vehicle collected (see *Figure C27.1*) from the site when safe to do so.
Interim storage	◆ It may be necessary to establish interim storage for damaged vehicles. ◆ Follow the WHS requirements in this guideline if interim storage is required.
Processing/disposal	◆ Vehicle waste has 3 end-use options: ▪ Repair and reuse/sell ▪ Send to a wrecker to salvage parts and re-sell ▪ Remove parts, crush the remaining vehicle, and sell the metal ◆ This waste is banned from landfill and exemptions would be required if needing to dispose to landfill.

Figure C27.1: Vehicles used to collect damaged vehicles from site

POTENTIAL HAZARDS AND WHS REQUIREMENTS

Table C27.4 lists potential hazards and WHS requirements and control measures.

Table C27.4: Potential hazards and control measures

Hazard/hazard type	Description	Control measure
WHS and environmental	Vehicle waste can produce liquid or gas fuel leakage, which can explode or cause a fire. The risk is higher after or during a fire.	◆ Handling by a professional is required to ensure the vehicle is safe to move. If the event is a fire, care should be taken to ensure the vehicle has cooled before attempting to recover the metal and other waste materials.
WHS and environmental	Electric vehicles containing LIBs are a fire risk.	◆ Identify vehicles containing LIBs prior to removal. Follow the safety protocols as outlined in *Guideline C13:Lithium-ion batteries*.
Injury, WHS	Driving damaged vehicles could increase the risk of a car accident.	◆ Ensure the vehicle is roadworthy and drivable before driving to a repair shop. If in doubt, have a repair person inspect the car first.

CRITICAL INFORMATION TO PROVIDE TO THE PUBLIC

It is recommended that information circulated to the public includes or incorporates the following:

- Your vehicle may have been damaged in the event.
- Contact your insurer to discuss your options for reimbursement and appropriate course of action.
- If your vehicle is not a write-off, ensure it is safe and can be legally driven before driving from the area.
- If you are unsure whether the vehicle can be driven or repaired, the car needs to be inspected in its current location or towed to an automotive shop for evaluation.
- If driving the vehicle, ensure there are safe travel routes from the event area to your destination.
- If the vehicle is a write-off, it is recommended that:
- you do not drive the vehicle
- you contact a towing service to take it to a car yard/wrecker for individual parts to be re-sold, or a scrap metal recycling facility. If this is not possible, have it crushed and baled onsite by car recyclers who are appropriately trained and have the necessary equipment.

RECORD KEEPING

Where possible and practical, keep records of waste sources, volumes (tonnes or cubic meters) and destinations for recycling, storage, or final disposal.

In addition, it is important to follow the vehicle insurance requirements as well as statutory requirements for writing off the vehicle.

LEGISLATION AND REGULATIONS TO CONSIDER (WHS AND ENVIRONMENTAL)

Motor Vehicles Standards Act 1989

The Act requires all road vehicles, whether newly manufactured in Australia or imported as new or second-hand vehicles, to comply with the relevant Australian Design Rules. These rules are national standards for vehicle safety, anti-theft and emissions at the time of manufacture and supply to the Australian market.

Motor Vehicles Regulations 2025

The regulations require certain entities to provide information about written-off vehicles to the Registrar. The entities include:

- insurers
- vehicle dealers (including auction houses)
- vehicle wreckers
- any other person responsible for a notifiable vehicle (for example, the owner of a vehicle).

FURTHER INFORMATION AND RESOURCES

SA Government

- *Guidelines for the South Australian Written-Off Vehicle Register*
  These guidelines explain when a vehicle is a write-off, and what type of write-off it is.

Government
of South Australia