



Fire safety guideline

Fire safety in waste facilities



Version 02
Issued 20 August 2019

Fire Safety Branch
Community Safety Directorate

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Published by

Fire and Rescue NSW
Community Safety Directorate
Fire Safety Branch

Document control

File Reference: FRN14/3255
Document ID: D17/81582
Version: 02
Release Date: 20 August 2019

Document history

Version	Date	Reviewed by:	Authorised by:
01	19 Nov 2018	EPA, DPIE, CSFS, JV, SN, KB	Approved (CSFS)
02 Draft A	15 May 2019	CSFS, JV, SN, KB	For review
02 Draft B	21 May 2019	EPA, DPIE, NSW Rural Fire Service (RFS)	For review
02 Draft C	04 Jul 2019	JV, RFS	For review
02 Draft D	30 Jul 2019	CSFS, RFS, EPA, DPIE, Industry reps	For review
02 Draft E	09 Aug 2019	CSFS, ACCS	For review
02	20 Aug 2019	CSFS, ACCS	Approved (CSFS)

Contents

1	Purpose	4
2	Scope	4
3	Application	4
4	Definitions	5
5	Background	7
6	Legislated requirements	8
6.1	Protection of the Environment Operations Act 1997	8
6.2	Environmental Planning and Assessment Act 1979	8
6.3	Work Health and Safety Act 2011	9
6.4	National Construction Code	9
7	Development and planning	9
7.1	General	9
7.2	Designing for special hazard	11
7.3	Development of existing waste facilities	12
7.4	Firefighting intervention	12
7.5	Fire hydrant system	13
7.6	Automatic fire sprinkler systems	14
7.7	Fire detection and alarm systems	14
7.8	Smoke hazard management	15
7.9	Fire water run-off containment	15
7.10	Bush fire prone land	16
8	Facility operation and management	16
8.1	General	16
8.2	Storage and stockpiles	16
8.3	Stockpile movement	17
8.4	External stockpiles	18
8.5	Internal stockpiles	21
8.6	Operations plan	22
9	Workplace fire safety	22
9.1	General	22
9.2	Risk assessment and mitigation	23
9.3	Emergency plan	24
9.4	Emergency services information package (ESIP)	24
9.5	Fire safety statements	25
10	References	25

1 Purpose

The purpose of this document is to provide guidance on fire safety in waste facilities that receive combustible waste material, including adequate provision for fire safety and facilitate safe fire brigade intervention to protect life, property and the environment.

2 Scope

This guideline details the requirements of Fire and Rescue NSW (FRNSW) for:

- a) consideration of fire safety during all stages of a waste facility including site selection, planning, design, assessment and operation
- b) fire safety systems to be adequate to the special hazards identified within a waste facility and which also meet the operational needs of firefighters
- c) safe storage and stockpiling of combustible waste material based on expected combustibility and maximum pile size, and
- d) workplace fire safety and fire safety planning, including procedures for the event of fire or emergency incident.

When this guideline is followed the likelihood and severity of fire should be reduced, assisting with firefighting intervention and protecting life, property and environment from fire.

3 Application

This guideline applies to any waste facility within NSW involved in the storage, processing or resource recovery of combustible waste material.

This guideline applies to any proposed development of a waste facility that involves a change of building use or building work that intends to meet the National Construction Code (NCC).

This guideline does not apply to any waste facility, or areas of, that are being used for:

- a) landfill (but, may apply to a waste facility on the landfill site)
- b) composting, including in-vessel, green waste and anaerobic digestion
- c) liquid waste treatment
- d) hazardous chemicals or special waste treatment (e.g. waste tyres), or
- e) less than 50 m³ of combustible waste material.

Note: Fire safety requirements still apply to waste facilities not covered by this guideline.

This guideline does not overrule any other requirement that specifically relates to the business or undertaking (e.g. guidelines for rubber tyre storage, dangerous goods code), nor does this guideline overrule any other specific condition that has been imposed on the waste facility.

This guideline is intended to be used by any person conducting a business or undertaking (PCBU), owner, development proponent (e.g. builder, fire engineer), planning/environmental consultant, regulatory authority, consent or certifying authority.

This guideline is not a statutory document and should be given due consideration by each stakeholder as it relates to their role and responsibility in operating, managing, planning, designing, consulting, assessing or determining the case of any applicable waste facility.

This guideline is developed in the public interest and should be taken into consideration by any consent authority when determining a development application for a waste facility (refer to [Section 4.15\(1\)\(e\)](#) of the *Environmental Planning and Assessment Act 1979 (EP&A Act)*).

Note: Under [Section 4.17](#) of the *EP&A Act*, the consent authority may impose requirements from this guideline (in part or full) as a condition on the development consent.

Where appropriate, it is recommended that an external consultant be engaged to provide specialist advice and services on the application of this guideline to any given waste facility.

4 Definitions

The following definitions apply in this guideline:

acceptable solution – means a prescriptive solution as defined in Appendix A.

alternative solution – means a method of complying with the performance requirements of the *NCC* other than by a ‘deemed-to-satisfy’ solution (i.e. performance solution).

certifying authority – means a person who is authorised to issue a Part 4A certificate under the *Environmental Planning and Assessment Regulation 2000 (EP&A Reg.)*.

consent authority – means the same as in [Section 4.5](#) of the *EP&A Act*.

combustible waste material – means any solid waste material that can readily ignite and burn under normal conditions, which includes:

- paper and cardboard
- wood and wood-based products
- plastic
- rubber
- textiles
- waste derived fuels such as refuse derived fuels (RDF), solid recovered fuels (SRF) and processed engineered fuels (PEF)
- metal with combustible contaminants, and
- any other waste material which may pose a notable fire risk like above.

Department Planning, Industry and Environment (DPIE) – means the consent authority responsible for State Significant Development under [Division 4.7](#) of the *EP&A Act*.

emergency plan – means a written plan which details the actions required to be undertaken by occupants of a premises during a fire or other emergency incident.

emergency response procedures – means written procedures outlining the response to an emergency, such as evacuation and/or activation of the emergency response team etc.

emergency services information package (ESIP) – means a folder containing concise information necessary to allow emergency services to commence operations and develop effective strategies and tactics to manage a fire or other emergency incident.

emergency vehicle – means any vehicle that forms part of the equipment of a fire brigade and that is equipped with an audible warning device and flashing lights.

fire brigade – means a statutory authority constituted under an Act of Parliament having as one of its functions, protect life and property from fire and other emergencies.

fire brigade station – means a state government operated premises which is a station for a *fire brigade* (i.e. a FRNSW or NSW Rural Fire Service fire brigade station).

fire brigade booster assembly – means a connecting device enabling the fire brigade to pressurise or pump water into a fire hydrant or fire sprinkler system.

fire compartment – means the same as in the *NCC*.

fire hydrant – means an assembly installed on a mains water or private water pipeline, which provides a valved outlet to permit a supply of water to be taken for firefighting.

fire safety system – means an active and/or passive system which warns people of an emergency, provides safe evacuation, restricts or extinguishes fire.

fire-source feature – means:

- a) the far boundary of a road, river, lake or the like adjoining the premises; or
- b) a side or rear boundary of the premises; or
- c) an external wall of another building which is not a Class 10 building.

fire water run-off – means residual water used in fighting the fire, which is contaminated with the products of combustion and unburnt materials washed off fire debris.

hazardous materials – means anything that, when produced, stored, moved, used or otherwise dealt with without adequate safeguards to prevent it from escaping, may cause injury or death or damage to property.

Note: Hazardous materials include hazardous chemicals under the *Globally Harmonised System (GHS)* and dangerous goods under *Australian Dangerous Goods Code*.

National Construction Code (NCC) – means the *National Construction Code (NCC) 2019, Building Code of Australia Volume One*, as amended.

NSW Environment Protection Authority (EPA) – means the regulatory authority responsible for protecting the environment within NSW.

person conducting a business or undertaking (PCBU) – means the person or company who owns and manages the waste facility business.

premises – means any applicable building, facility or site (land) comprising a waste facility.

owner – means the person or company who owns the premises being used as a waste facility.

regulatory authority – means an authority having the statutory responsibility to administer and enforce related legislative provisions as prescribed.

SafeWork NSW – means the regulatory authority of workplace health and safety in NSW.

stockpile – means any piled storage of waste material or processed waste product, whether loose, baled, sorted, and irrespective of storage duration (e.g. temporary or long-term).

waste – means the same as in the *Protection of the Environment Operations Act 1997*.

waste facility – means any premises used for the storage, treatment, processing, sorting or disposal of waste material, and includes both waste facilities that hold an environment protection licence and waste facilities that are unlicensed sites.

5 Background

Historically, fire brigades have attended numerous fires at waste facilities in NSW. These fires are often quite large and have a detrimental impact on firefighting intervention, the environment, local community and the waste industry itself. The potential fire size correlates with the nature of the combustible waste material being processed, stockpile arrangements, on-site fire safety systems and emergency procedures specific to each facility.

Examples of a waste facility include:

- recycling centres
- resource recovery
- materials recovery facility
- energy recovery centre, and
- transfer stations.

Processes undertaken at waste facilities have higher risks than for other industries and can result in greater frequency and severity of fires. A fire involving bulk storage of mixed, loose combustible waste material presents a high and volatile fire load and causes significant challenges for firefighting intervention.

Waste fires in NSW have demanded significant fire brigade resources and intervention over multiple days to extinguish the fire. The largest and longest-lasting fires often involve large stockpiles of unsorted waste with inadequate separation, where physical removal, separation and extinguishment is required. These fires also result in major pollution impact on the community, especially from smoke, which is unable to be contained.

Combustible waste therefore generally presents 'special problems of firefighting' that warrant classification and consideration of 'special hazards' provisions under Clause E1.10 and E2.3 of the *NCC*. Fires in waste facilities present specific issues for firefighting, including:

- a) the physical nature of combustible waste and waste by-products, including fire properties and ignition potential of both unsorted and sorted materials
- b) unsuitable storage method, stockpile size, separation distances and accessibility
- c) mechanised waste handling, sorting and processing systems, including vehicles
- d) poor emergency vehicle and/or firefighter access for firefighting intervention
- e) facilities having an inadequate or no fire hydrant system, including water capacity
- f) facilities having an inadequate automatic fire suppression system installed
- g) buildings having an inadequate smoke hazard management system installed, and
- h) facilities having inadequate provision to contain fire water run-off.

Guidance on fire safety for waste facilities is generally limited due to the case-by-case considerations of the special hazards unique to each facility. It is the intention of this guideline to assist the responsible person to plan, manage, advise, assess or determine the risks and measures applicable to any given facility in the absence of any other requirements.

Specific requirements may be imposed on the waste facility, or any processes undertaken (e.g. storage, processing, transportation), by the relevant regulatory authority, such as local council, DPIE, NSW EPA or SafeWork NSW.

Note: A regulatory authority may impose requirements from this guideline on the waste facility as either a condition of consent, licensing or Development Control Order.

6 Legislated requirements

6.1 Protection of the Environment Operations Act 1997

A waste facility operator must hold an environment protection licence issued by NSW EPA when storing, processing or recovering waste above the licensing thresholds specified in *Schedule 1* of the *Protection of the Environment Operations Act 1997* (POEO Act).

NSW EPA have published a *Guide to licensing - Under the Protection of the Environment Operations Act 1997*, which outlines the requirements for an Environment Protection Licence for the PCBU of a waste facility.

Waste is classified using *Schedule 1* of the POEO Act. NSW EPA have published a *Waste Classification Guidelines - Part 1: Classifying waste* to assist the PCBU to classify waste.

Note: Waste is classified as either liquid, restricted solid, general solid (putrescible or non-putrescible), special or hazardous. These classifications only consider groups which pose similar environmental and health risks, and do not consider fire risks.

Any fire involving a waste facility can produce a pollution incident which may cause injury or death or result in damage to property or the environment. FRNSW will enact a hazardous materials response to any waste fire (e.g. to contain fire water run-off) and will notify NSW EPA as per agreement of the joint memorandum of understanding.

Note: A licenced waste facility must prepare a pollution incident response management plan that complies with *Part 5.7A* of the POEO Act.

6.2 Environmental Planning and Assessment Act 1979

Any development of a waste facility, new or existing, must be carried out in accordance with the legislated framework of the *EP&A Act* and corresponding regulations.

Environmental planning instruments (EPIs) are made under *Part 3* of the *EP&A Act*, and determine whether consent for the activity is required or not, the appropriate consent authority, and the assessment and approval process to be followed.

Note: An EPI can include either State environmental planning policy (SEPP) or Local environmental plans (LEPs).

The regulations and EPI will assist the planning authority determine if an Environmental Assessment, Environmental Impact Statement or a Statement of Environmental Effects is required, and whether development will be Designated Development, Integrated Development, State Significant Development or State Significant Infrastructure.

When assessing development, whether during the planning or approval stage, the relevant approval authority may require consultation with the fire brigade.

Note: The relevant approval authority, including the consent authority such as DPIE, may seek advice from the fire brigade and consider any recommendations provided when making their determination.

When reviewing any proposed development, the fire brigade will assess the 'special hazards' that impact on life, property and the environment during fire and may recommend additional provisions under Clause E1.10 and E2.3 of the NCC.

6.3 Work Health and Safety Act 2011

Any place of work has the legislated responsibility to ensure health and safety is maintained at the workplace at all times under the *Work Health and Safety Act 2011* (WHS Act) and corresponding *Work Health and Safety Regulation 2017* (WHS Reg.).

The *WHS Reg.* requires the PCBU to identify hazards and manage risks to health and safety by implementing a hierarchy of control measures at their facility. The PCBU must provide information, instruction and training to employees and other persons as necessary to ensure their health and safety.

Note: Refer to *Managing the work environment and facilities* by SafeWork NSW.

The PCBU should assess the nature of combustible waste material, and processes used, to determine the fire risks and potential fire load. Unprocessed mixed waste or processed renewable material and by-product may present risks similar to dangerous goods, and require consideration of specific controls as per *Part 7.1 Division 5* of the *WHS Reg.*

Clause 43 of the *WHS Reg.* requires the PCBU to provide an emergency plan for their workplace, detailing emergency procedures for staff and occupants of the premises.

Note: Refer to *AS 3745–2010 Planning for emergencies in facilities* for guidance on developing emergency plans and procedures.

6.4 National Construction Code

The *Environmental Planning and Assessment Regulation 2000* requires development to comply with the *Building Code of Australia* (i.e. *NCC*) in force at the time of application.

Deemed-to-Satisfy (DtS) provisions of the *NCC* are often applied to the waste facility. A waste facility is to be designed, constructed or adapted for use as a class 8 building. A warehouse (i.e. class 7 building) with standard fire safety systems may be ineffective and overwhelmed from fire involving stockpiles of combustible waste material.

Due to waste facilities presenting ‘special problems of firefighting’, *Clause E1.10* and *E2.3* of the *NCC* should be considered and additional provision for special hazards made for the development. Consent and certifying authorities are often reluctant to impose *Clause E1.10* and *E2.3* due to lack of familiarity or expertise with such special hazards.

Note: The *NCC* does not specify any prescriptive DtS provisions for special hazards.

The lack of prescriptive requirements means development should be assessed holistically on a case-by-case basis, ensuring performance requirements are met. The provisions should be based on an assessment of fire risks, fire safety systems, intended operations, and made in consultation with the fire brigade to identify potential problems for fire brigade intervention.

7 Development and planning

7.1 General

7.1.1 This whole section, being ‘*Development and planning*’, applies to new development of any waste facility that is being determined by the relevant consent or certifying authority, such as DPIE or the local Council.

Note: Development includes any application for land use or building works involving demolition, erection, rebuilding, alteration, enlargement or extension.

- 7.1.2 This whole section may apply to an existing waste facility that is subject to a development control order issued by the relevant regulatory authority (e.g. Council fire safety order if the facility does not have adequate provision for fire safety).
- 7.1.3 This whole section takes guidance from the documents *Reducing fire risk at waste management sites* and *Waste fire burn trials summary non-technical report*, both published by the Waste Industry Safety and Health Forum.
- 7.1.4 This whole section addresses the NCC and its performance requirements to be determined by the relevant certifying authority, including Clause E1.10 and E2.3.
- 7.1.5 This whole section may be addressed by a performance solution under the NCC; the proposed 'alternative solution' may need to be referred to FRNSW under [Clause 144](#) of the *Environmental Planning and Assessment Regulation 2000 (EP&A Reg.)*.

Note: FRNSW will provide comments to the certifying authority for consideration when determining development. The proponent is encouraged to consult with FRNSW when the performance-based design brief is developed.

- 7.1.6 The owner and/or PCBU should attain development and planning approval through the most appropriate pathway for their given circumstance (see Figure 1).

Note: Any leased premises must be fit for the intended use and have provision for fire safety appropriate to the business or undertaking.

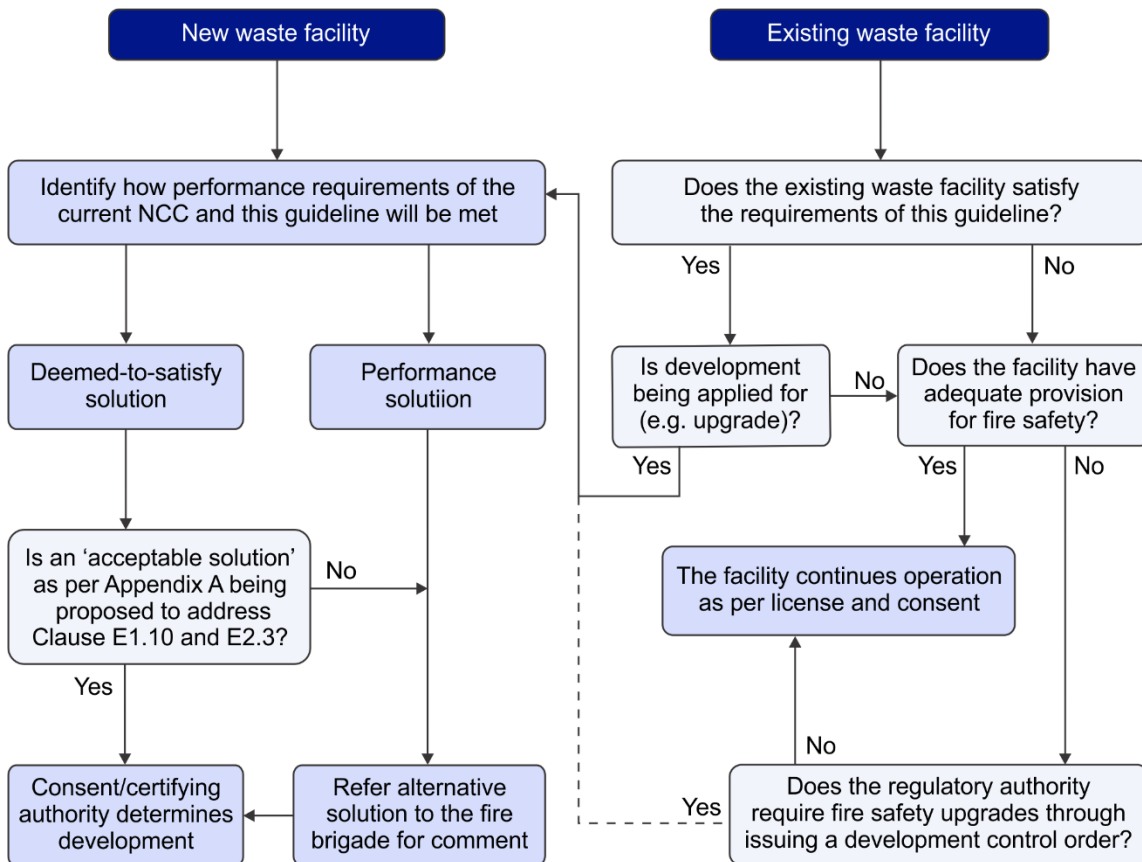


Figure 1 Development and planning pathways for waste facilities

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7.2 Designing for special hazard

- 7.2.1 Combustible waste should be considered a special hazard and consent authorities should impose the condition on development that Clause E1.10 and E2.3 of the *NCC* be complied with to the satisfaction of the fire brigade.
- 7.2.2 Development should make adequate provision for fire safety as prescribed by this guideline and either meet the 'acceptable solution' defined in Appendix A or provide an 'alternative solution' that complies with *NCC* performance requirements and the requirements of this guideline (refer to clause 7.1.5).

Note: The fire brigade should be consulted on any alternative solution.

- 7.2.3 All fire risks and hazards of the waste facility should be identified. A fire safety study is to be done in accordance with *Hazardous Industry Planning Advisory Paper No 2 Fire Safety Study Guidelines* if deemed appropriate by the relevant consent authority.
- 7.2.4 The development proponent is encouraged to engage a fire safety engineer or other suitably qualified consultant to develop an alternative solution specific to the waste facility and its proposed operations.

Note: The design should consider all reasonable and foreseeable fire scenarios.

- 7.2.5 All reasonable and foreseeable combustible waste materials should be identified and considered in any alternative solution (i.e. the fire engineered design should consider burn temperature, heat release rate and heat flux, total fire load and burn duration, ease of ignition and flame spread that would be expected from each stockpile).

Note: The maximum sizes and minimum separations of all stockpiles should be detailed in an operations plan for the waste facility (refer to section 8.6).

- 7.2.6 For simplification in designing for special hazards, the following surface burning temperatures and fire risk rating should be applied to stockpiles of common combustible waste materials, as given in Table 1¹.

Type of waste material	Burn temperature	Fire risk
Paper and cardboard	850°C	Ordinary
Wood products	860°C	Ordinary
Plastic	1,200°C	High
Rubber	1,130°C	High
Refuse derived fuels	900°C	Ordinary
Solid recovered fuels	950°C	Ordinary

Table 1 Typical burn temperature and fire risk of combustible waste material

- 7.2.7 Where a stockpile contains a mixture of combustible waste materials, the burn temperature and fire risk of the most predominant waste material should be used for the whole stockpile, and in the case of no clear majority then the worst-case material should be used.

¹ Waste Industry Safety and Health Forum, *WISH INFO 05 Waste fire burn trials summary non-technical report version 2*

7.3 Development of existing waste facilities

7.3.1 When development is being applied for, the owner or PCBU should undertake an assessment of the design and performance of their existing waste facility against the requirements specified within this guideline and provide this to the relevant consent or regulatory authority for determination.

7.3.2 If the assessment determines that an upgrade is required to address a deficiency in the design or performance, the relevant authority should impose an appropriate condition (e.g. licensing) or direction (e.g. issue an Order) on the owner.

Note: Under [Section 9.35\(d\)](#) of the *EP&A Act*, FRNSW authorised fire officers are empowered to issue a fire safety Order.

7.3.3 When an existing waste facility undergoes demolition, erection, rebuilding, alteration, enlargement or extension (i.e. development), the relevant consent authority should consider imposing this guideline (in part or full) as a condition on the development.

7.3.4 When an existing waste facility has restrictions on stockpile sizes and separations, control measures should be implemented to maintain such limits and ensure the fire load remains appropriate to the building and installed fire safety systems.

Note: Restrictions may be imposed by an authority including condition of consent, an order, or a licence condition. Installing or upgrading fire safety systems may remove or reduce any restrictions on operations (e.g. larger stockpiles).

7.4 Firefighting intervention

7.4.1 The waste facility is to provide safe, efficient and effective access for emergency vehicles as detailed in FRNSW guideline [Access for emergency vehicles and emergency service personnel](#).

7.4.2 Performance requirement CP9 of the *NCC* requires access to be appropriate to the building function/use, fire load, potential fire intensity, fire hazard, active fire safety systems and fire compartment size.

7.4.3 Enhanced emergency vehicle access should be provided for firefighting intervention, including a perimeter ring road around any large non-sprinklered building and access roads between external stockpiles.

7.4.4 The facility should cater for a large emergency service response (e.g. multiple alarm and multiple agency) if the potential hazard may result in a large emergency.

Note: This includes from any pollution event requiring a protracted hazardous materials response (e.g. contain and remove fire water run-off).

7.4.5 A building not fitted with an automatic fire sprinkler system should have a dedicated external quarantine area not less than four times the floor area of the largest internal stockpile to receive, breakdown and extinguish that stockpile (refer to clause 8.5.3).

7.4.6 Any development application should be accompanied by a flow rate and pressure test of the water main connected to the fire hydrant system.

7.4.7 Firefighter access should be provided to buildings, structures and storage areas, including to any fire safety system or equipment provided for firefighting intervention.

7.5 Fire hydrant system

7.5.1 The waste facility is to have a fire hydrant system installed appropriate to the risks and hazards for the waste facility.

Note: A fire hydrant system is only required when a fire brigade station is within 50 km and equipped to utilise the system.

7.5.2 The fire hydrant system should consider facility layout and operations, with fire hydrants being located to provide compliant coverage and safe firefighter access during a fire, including having external fire hydrants to protect any open yard storage (i.e. external stockpiles).

7.5.3 The design of the fire hydrant system is to have enhanced standard of performance when combustible waste material is not protected by a fire sprinkler system, including having an additional fire hydrant outlet required to flow simultaneously for any open yard storage and for any non-sprinklered internal stockpiles, as given in Table 2.

Fire compartment floor area of non-sprinklered building	Area of open yard (used for stockpiles)	No. of fire hydrants required to flow
≤ 500 m ²	≤ 3,000 m ²	2
> 500 m ² ≤ 5,000 m ²	> 3,000 m ² ≤ 9,000 m ²	3
> 5,000 m ² ≤ 10,000 m ²	> 9,000 m ² ≤ 27,000 m ²	4
> 10,000 m ²	> 27,000 m ²	5 (or more)

Table 2 Minimum fire hydrants for non-sprinklered buildings and external storage

Note: Refer to *Australian Standard AS 2419.1-2005* for fire hydrant system design requirements of buildings that are protected by a fire sprinkler system.

7.5.4 Fire hydrants are not to be located within 10 m of stockpiled storage and must be accessible to firefighters entering from the site and/or building entry points.

7.5.5 Where appropriate to protect against high risks and hazards, suitable on-site fixed external fire monitors may be provided as part of the fire hydrant system.

7.5.6 The fire brigade booster assembly is to be located within sight of the designated site entry point, or other location approved by the fire brigade, and be protected from radiant heat from any nearby stockpile (e.g. by a masonry wall).

7.5.7 The fire hydrant system is to have a minimum water supply and capacity providing the maximum hydraulic demand (i.e. flow rate) for not less than four hours.

7.5.8 The fire hydrant system should incorporate fire hose reels installed in accordance with Clause E1.4 of the *NCC* and externally to cover open yard storage areas to enable effective first attack of fires by appropriately trained staff.

Note: First attack firefighting is often critical to extinguishing minor fire ignitions.

7.6 Automatic fire sprinkler systems

- 7.6.1 The waste facility is to have an automatic fire sprinkler system installed in any fire compartment that has a floor area greater than 1000 m² and contains combustible waste material.

Note: Unsorted mixed combustible waste material generally presents a greater ignition hazard than most other combustibles.

- 7.6.2 The fire sprinkler system should be demonstrated as being appropriate to the risks and hazards identified for buildings, including externally as necessary (e.g. drenchers to protect plant/equipment, exposures, high-risk external storage).

- 7.6.3 The fire sprinkler system design should be appropriate to the hazard class (e.g. 'high hazard class') and have enhanced standard of performance as appropriate to the special hazard.

Note: Any system design limitation set by specifying content and percentages are to be maintained for the building's operating life unless the system is upgraded.

- 7.6.4 To protect vital systems, storages or equipment or protect against high risk hazards, a deluge, drencher, fast response, mist or foam system should be provided.

Note: A localised system may be installed to protect specific areas or equipment if the whole building is not sprinkler protected.

- 7.6.5 The fire brigade booster assembly for the fire sprinkler system should be co-located with the fire hydrant system booster within sight of the designated site entry point, or in a location approved by the fire brigade.

- 7.6.6 The fire sprinkler system is to have a minimum water supply and capacity providing the maximum hydraulic demand (i.e. flow rate) for not less than two hours.

Note: The fire sprinkler system should contain fire spread and allow firefighters to enter the building, remove burning waste material and extinguish the fire.

7.7 Fire detection and alarm systems

- 7.7.1 The waste facility is to have a fire detection and alarm system installed appropriate to the risks and hazards identified for each area of a building.

- 7.7.2 The fire detection and alarm system should warn all occupants of fire and to evacuate the facility, with each component being appropriate to the environment (e.g. flame detector or infrared detector in sorting area, visual alarms around noisy machinery).

- 7.7.3 Upon positive detection of fire, the system is to activate any required alarm, fire suppression system, passive measure (e.g. fire door, fire shutter) or plant/machinery override (e.g. shutdown of conveyor, shredder) as appropriate to the detector.

Note: The system may incorporate multiple levels of detection (e.g. fast acting IR detector to shutdown machinery and activate a local deluge system, and medium acting aspirating system to provide broad area detection).

- 7.7.4 Manual alarm points should be provided in clearly visible locations as appropriate to the environment so that staff can initiate early alarm of fire.

7.8 Smoke hazard management

7.8.1 Buildings containing combustible waste material are to have an automatic smoke hazard management system appropriate to the potential fire load and smoke production rate installed within the building.

7.8.2 Under Clause E2.3 of the *NCC*, additional smoke hazard management measures should be provided to vent or exhaust smoke so that in at least 90% of the compartment, the smoke layer does not descend below 4 m above floor level.

Note: To undertake firefighting intervention, visibility is needed so that piled waste can be safely removed using machinery.

7.8.3 Natural low-level openings, either permanent or openable such as roller doors, should be provided on two or more walls to assist with venting de-stratified (i.e. cooled) smoke and ensure minimum visibility is maintained during a fire.

Note: Roller doors should have manual override so that the door can be opened in the event of electrical isolation or failure during fire.

7.8.4 Any smoke exhaust system installed should be capable of continuous operation of not less than two hours in a sprinkler-controlled fire scenario, or four hours in any non-sprinkler-controlled fire scenario.

7.8.5 Automatic operation of the smoke hazard management system from smoke detection should not cause undue delay to the activation of any automatic fire sprinkler system.

7.9 Fire water run-off containment

7.9.1 The waste facility should have effective and automatic means of containing fire water run-off, with primary containment having a net capacity not less than the total hydraulic demand of installed fire safety systems.

Note: The total hydraulic demand is the net discharge of water from both the fire hydrant system and fire sprinkler system.

7.9.2 An alternative means of fire water run-off containment may be proposed, particularly for development of an existing waste facility, including being validated by hydrological engineering assessment where appropriate.

Note: Bunding of the processing areas may be a containment option.

7.9.3 The containment system is to wholly incorporate any dedicated external quarantine area required to extinguish any internal stockpile from a building (refer to clause 7.4.5).

7.9.4 The containment system, which includes the base of any storage area, should be impermeable (i.e. sealed) and prevent fire water run-off from entering the ground or any surface water course (e.g. river, stream, lake, estuary, open sea).

7.9.5 The containment system should include secondary/tertiary facilities such as impermeable bunds, storage lagoons, isolation tanks or modified site design (e.g. recessed catchment pit, drainage basin) as appropriate to the facility.

Note: Any external pit/basin used to breakdown and extinguish burning waste from within a building must form part of the containment system.

- 7.9.6 Pollution control equipment such as stormwater isolation valves, water diversion booms, drain mats, should be provided as necessary for the facility's emergency response procedures, and be kept readily accessible for the event of fire.

Note: Failure to contain fire water run-off can result in significant pollution of the environment, which may incur substantial remediation costs and/or fines.

7.10 Bush fire prone land

- 7.10.1 The NSW RFS *Planning for Bush Fire Protection – A guide for councils, planners, fire authorities and developers* (PBP) applies to all development on 'bush fire prone land'.
- 7.10.2 Bush fire prone land is mapped by each respective council under *section 146* of the *Environmental Planning and Assessment Act 1979*.
- 7.10.3 Suitable emergency vehicle access is to be provided to within 4 m of any static water supply if no reticulated water supply is otherwise available (e.g. bulk water tank, dam).

8 Facility operation and management

8.1 General

- 8.1.1 This whole section, being '*Facility operation and management*', applies to new and existing waste facilities as determined by the relevant regulatory authority, such as NSW EPA as a condition of licence or the local Council as a condition of consent.

Note: NSW EPA regulate waste facilities through an environment protection licence issued under the *POEO Act*.

- 8.1.2 This whole section takes guidance from the documents *Reducing fire risk at waste management sites* and *Waste fire burn trials summary non-technical report*, both published by the Waste Industry Safety and Health Forum.
- 8.1.3 This whole section addresses the operation and management of a waste facility to ensure the fire hazard from combustible waste material fire is controlled.
- 8.1.4 This whole section should not override any existing licence or consent in-force if the conditions are being met.
- 8.1.5 This whole section may be addressed by performance outcomes identified through risk management, including identification of fire hazards, assessment of risks, implementation of controls, and documented review/audit process.

8.2 Storage and stockpiles

- 8.2.1 Storage and stockpiling of combustible waste material should be limited in size and volume appropriate to the given combustible waste material, fire risks, building design and installed fire safety systems.

Note: The size, volume and type of waste of all stockpiles should be identified on a site/floor plan and submitted with any development application.

- 8.2.2 Variations to storage and stockpile requirements, including maximum size and volume, movement, separation distances etc., will be considered through an appropriate pathway such as an alternative solution.

- 8.2.3 The maximum height of any stockpile, loose piled or baled, should not exceed 4 m (see Figure 2).
- 8.2.4 The uncontained vertical face of any stockpile (i.e. any face not being retained by a masonry wall) should recede on a slope no greater than 45° to minimise the risk of collapse and fire spread (see Figure 2).

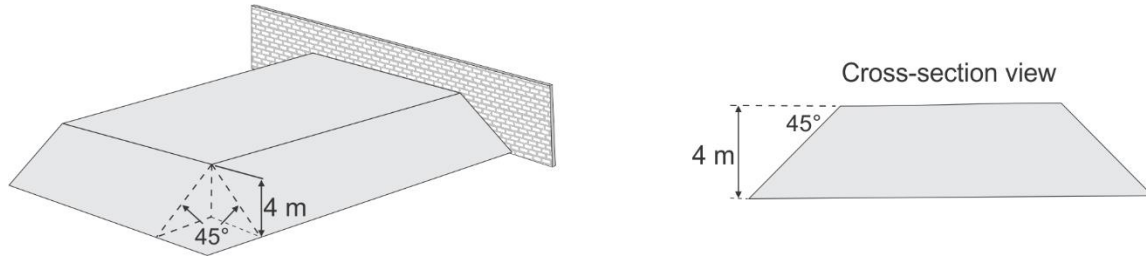


Figure 2 Maximum stockpile height and face angle

- 8.2.5 The storage method and arrangement of stockpiles is to minimise the likelihood of fire spread and provide separation which permits access for firefighting intervention.

Note: Fire separating masonry walls (e.g. bunkers) and automatic fire sprinkler systems may allow larger stockpile sizes and/or shorter separation distances.

- 8.2.6 A separating masonry wall, revetment or pen should extend at least 1 m above the stockpile height and at least 2 m beyond the outermost stockpile edge (see Figure 3).

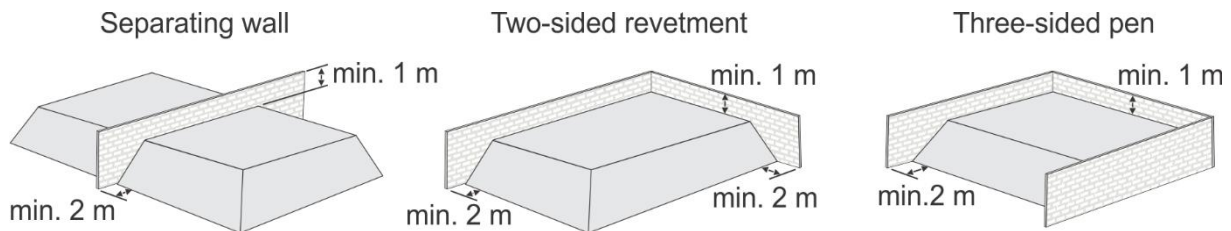


Figure 3 Example separating masonry wall, revetment or pen

- 8.2.7 Stockpile boundary limits should be permanently marked to clearly identify limits that maintain maximum stockpile sizes and/or minimum separations.

8.3 Stockpile movement

- 8.3.1 Stockpiles of combustible waste material should be rotated to dissipate any generated heat and minimise risk of auto-ignition as required.
- 8.3.2 Any stockpile of combustible waste material prone to self-heating should have appropriate temperature monitoring to identify localised hotspots; procedures outlined in the operations plan should be implemented to reduce identified hotspots.

Note: Temperature should ideally be measured at the core of the stockpile where thermal confinement will be highest.

- 8.3.3 Any processed or treated waste material, such as chipping, shredding, baling or producing crumb should be cooled before being stockpiled.
- 8.3.4 Procedures for stockpile rotation and monitoring of temperature during hot weather are to be included in the operations plan (refer to section 8.6).

8.4 External stockpiles

8.4.1 The maximum width of an external stockpile should be 20 m if emergency vehicle access is provided down both sides of the stockpile, and 10 m if access is provided down one side of the stockpile only (see Figure 4).

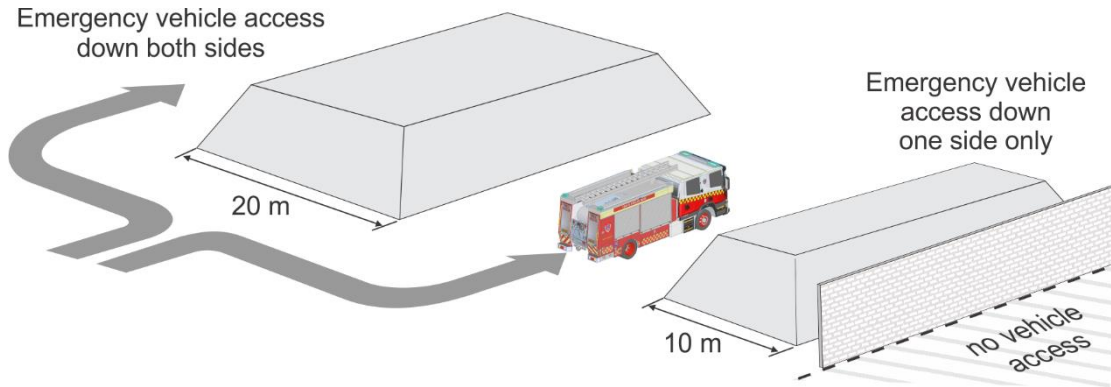


Figure 4 Maximum external stockpile widths

8.4.2 The maximum length of an external stockpile should be 50 m, or as determined from required minimum separation distances (refer to clauses 8.4.3 and 8.4.5).

8.4.3 Minimum separation should be maintained between external stockpiles, depending on storage method and fire risk of materials, as given in Table 3 (see also Figure 5).

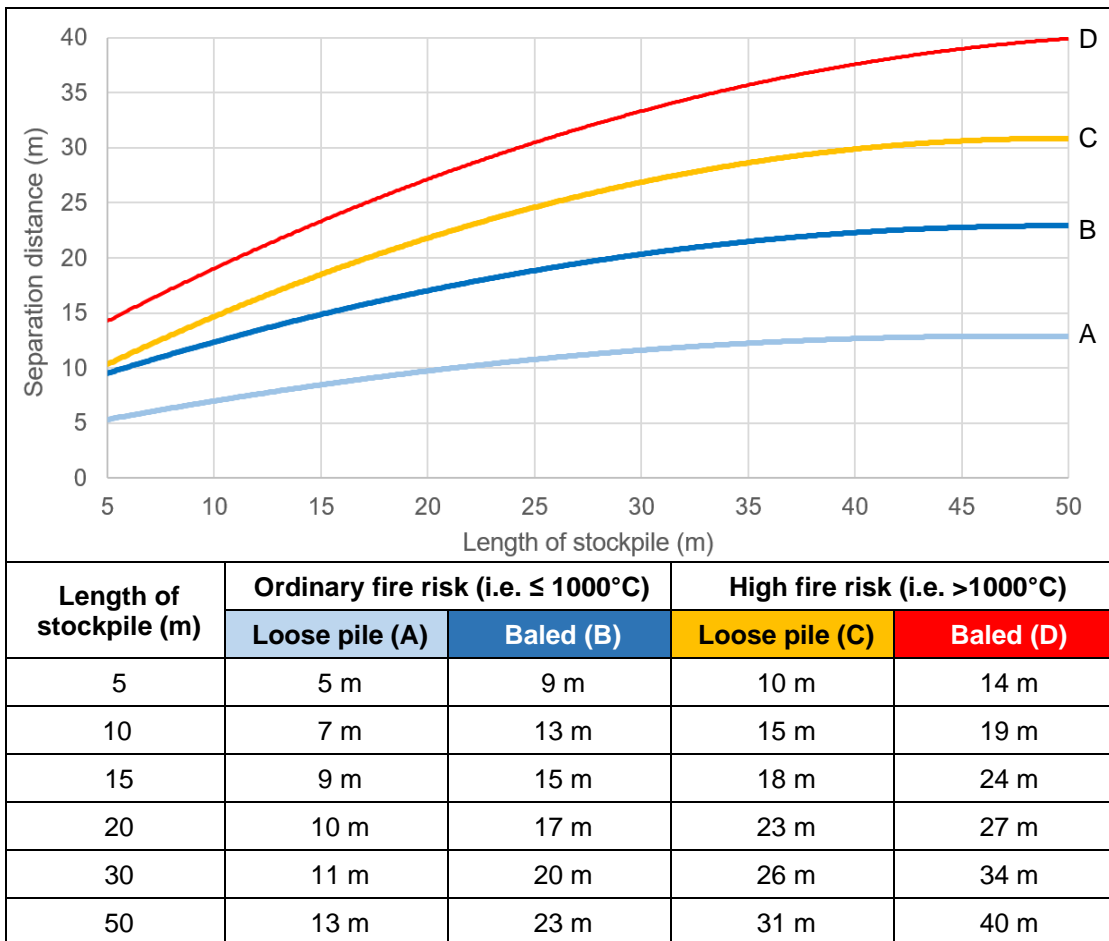


Table 3 Minimum separation distances between external stockpiles

8.4.4 If two separation distances apply between different stockpiles (i.e. due to different lengths of each stockpile), the greatest distance is to be used (see Figure 5).

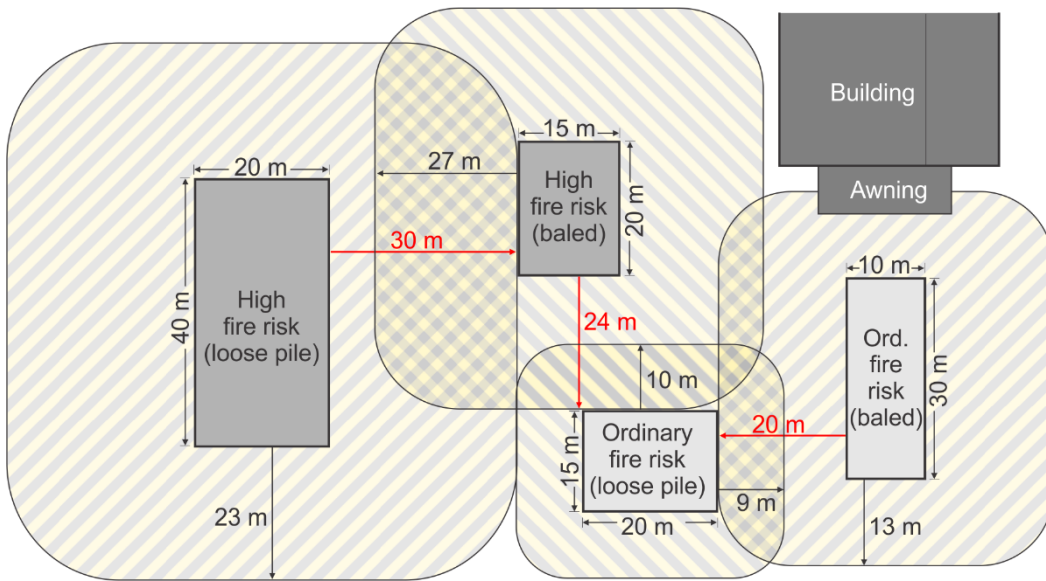


Figure 5 Examples of minimum separation between external stockpiles

8.4.5 Minimum separation should be maintained between external stockpiles and any fire-source feature, depending on storage method and fire risk of materials, as given in Table 4 (see also Figure 6):

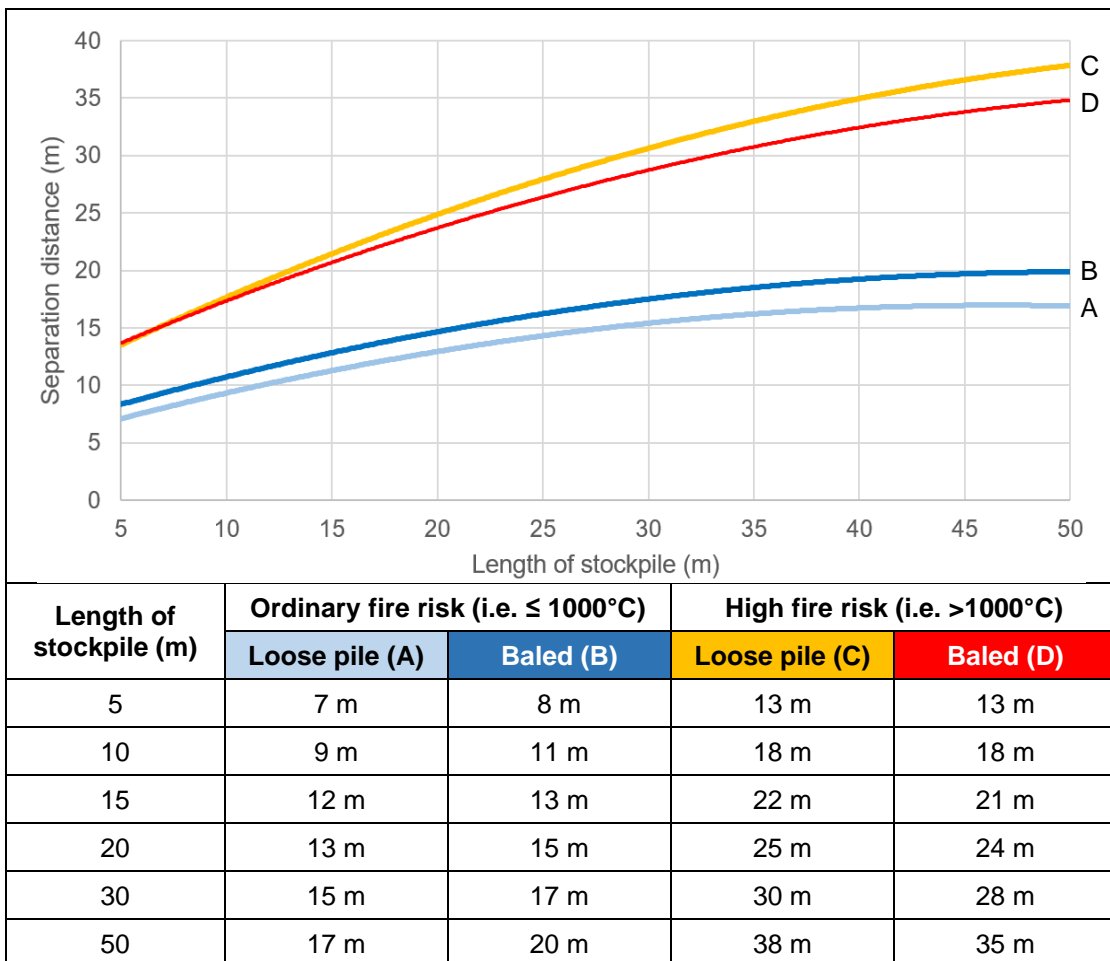


Table 4 Minimum separation between external stockpile and any fire-source feature

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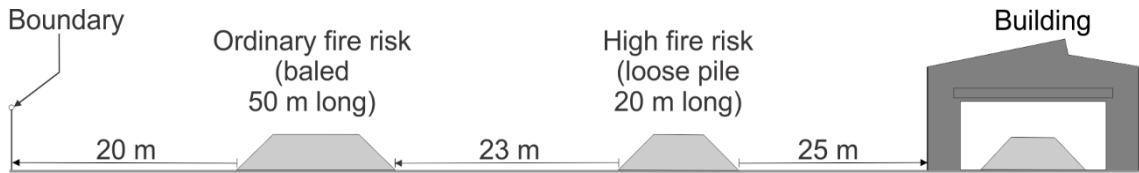


Figure 6 Examples of separation between stockpile and fire-source features

8.4.6 Covered areas attached to buildings or structures, such as areas under awnings and undercrofts, should not encroach into the minimum separation distance unless protected by an automatic fire sprinkler system (see Figure 7).



Figure 7 Example of separation from any covered building part or structure

8.4.7 The minimum separation between external stockpiles or an external stockpile and any fire-source feature may be reduced when the stockpile is separated by masonry wall or protected by an automatic fire sprinkler system (i.e. drenchers) (see Figure 8).

Note: The masonry wall should intersect the direct line between the fire source feature (e.g. building) and top of the stockpile, and be located to provide fire appliance access as necessary.

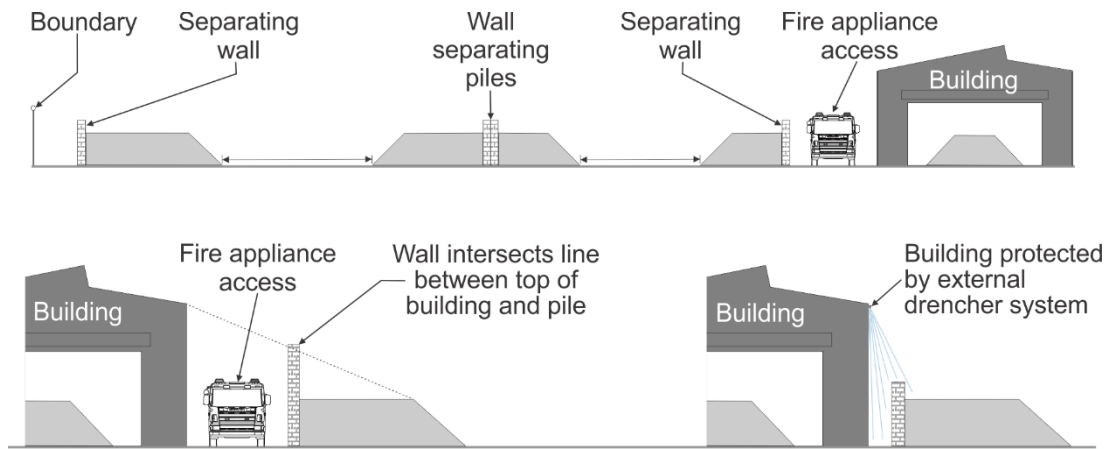


Figure 8 Examples of reduced separation using masonry wall or sprinkler system

- 8.4.8 External stockpile limits should be maintained and not exceeded as per the operations plan, and as appropriate to the facility, boundaries, exposures, buildings, terrain, drainage, vegetation, prevailing winds, vehicular access etc.
- 8.4.9 External stockpiles should be protected from high or unnecessary external risks (e.g. bushfire, adjacent property fire, arson, self-combustion in hot weather).
- 8.4.10 External stockpiles should be maintained so that all buildings access and egress points are always kept clear and unobstructed.
- 8.4.11 External stockpiles should be maintained so that all required emergency vehicle access (e.g. around buildings, between stockpiles and to hardstand areas) is always kept clear and unobstructed.

8.5 Internal stockpiles

- 8.5.1 Internal stockpiles of combustible waste material should be maintained as determined by the operations plan, and appropriate to the building size/layout, compartmentation, installed safety systems, process equipment and plant etc.
- 8.5.2 The maximum internal stockpile size in a building fitted with an automatic fire sprinkler system should be 1,000 m³.
- 8.5.3 Internal stockpiles should have a minimum of 6 m unobstructed access on each accessible side in a building fitted with an automatic fire sprinkler system, or a 10 m in a building not fitted with an automatic fire sprinkler system (see Figure 9).

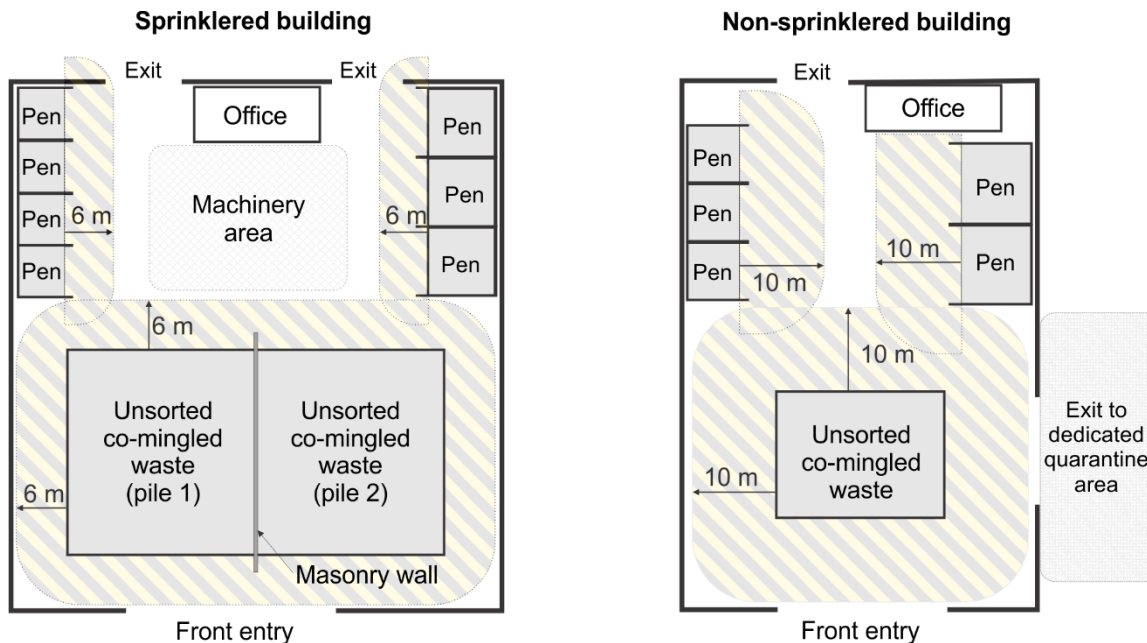


Figure 9 Example of unobstructed access around internal stockpiles

- 8.5.4 Internal stockpiles may be located side by side when separated by a masonry wall (refer to clause 8.2.6).
- 8.5.5 The internal stockpile of a building not fitted with an automatic fire sprinkler system should be limited in size to be able to be moved to the dedicated external quarantine area using on-site resources only within one hour or less (refer to clause 7.4.5).
- Note:** By example, two waste handlers with 5 m³ bucket capacity taking two minutes per return trip can move a 300 m³ stockpile in an hour (i.e. 2 x 5 m³ x 30 trips).
- 8.5.6 Internal stockpiles should be protected from high or unnecessary ignition risks (e.g. friction/heating from conveyors, waste movers, heaters, chippers, shredders, balers, sorters, other machinery etc.).
- 8.5.7 Internal stockpiles should be maintained so that all building egress points and required paths of travel are not blocked or impeded at any time.
- 8.5.8 Internal stockpiles should be maintained so that access to the dedicated external quarantine area is always kept clear and unobstructed (i.e. by waste handlers).

Note: Any door opening (e.g. roller door) providing access to the quarantine area must be able to be readily opened at any time, including when power is lost.

8.6 Operations plan

- 8.6.1 The waste facility should develop and implement a written operations plan outlining the daily operations of the waste facility, including describing the combustible waste materials likely and the method of storage, handling or processing at the facility.
- 8.6.2 The operations plan should include a site plan drawing that identifies the layout of the waste facility and all locations of storage, handling and processing of combustible waste material.
- 8.6.3 The operations plan should identify the expected daily and holding inventory of combustible waste material including daily capacities and maximum stockpile limits.
- 8.6.4 The operations plan should define procedures that ensure maximum stockpile limits are not exceeded by operations at the waste facility.
- 8.6.5 The operations plan site plan should identify separate and clearly designated areas for materials drop-off, transfer and storage method of combustible waste materials (e.g. internal or external, sorted or unsorted, loose stockpile, bailed stockpile, binned, bundled, bunkered, container etc.).
- 8.6.6 The operations plan should identify all primary and secondary methods of combustible waste material transfer and stockpile movement (e.g. operational and reserve plant and equipment available at the waste facility).
- 8.6.7 The operations plan should include procedures for turnover of stockpiles to dissipate internal heat confinement, with the frequency determined by the combustible waste material, storage environment and ambient conditions.
- Note:** Turnover may relate to temperature monitoring where provided. Consideration should be given to periods of hot weather and high ambient temperature, where heat generation and self-combustion is more likely.
- 8.6.8 The operations plan should be regularly reviewed and updated (i.e. annually from the date of implementation) upon any change in combustible waste materials, storage, handling, processes or other conditions affecting daily operations.
- 8.6.9 The operations plan should be stored on site at the waste facility and kept in a readily accessible location (e.g. with the emergency plan).
- 8.6.10 A copy of the operations plan should be placed within the ESIP (refer to section 9.4).

Note: If the operations plan is prescribed and daily inventory constant, such details can be directly added to the ESIP rather than a copy of the operations plan.

9 Workplace fire safety

9.1 General

- 9.1.1 This whole section, being '*Workplace fire safety*', applies to any person who conducts the business or undertaking of owning, operating or managing a waste facility.

Note: SafeWork NSW regulate workplace safety under the *WHS Act*.

- 9.1.2 This whole section addresses the requirements on the PCBU to operate the waste facility as a safe workplace, especially regarding provision of fire safety.
- 9.1.3 This whole section does not override any other existing statutory requirement, code of practice or guideline that directly applies to the PCBU.

Note: SafeWork NSW publish a range of documents applicable to all PCBUs.

- 9.1.4 This whole section is to be addressed by thorough risk management, including identification of hazards, assessment of risks, implementation of controls, and documented review/audit process.

9.2 Risk assessment and mitigation

- 9.2.1 The PCBU should implement a hierarchy of control measures for the waste facility including providing information, instruction and training to employees and other persons as necessary to ensure health and safety (e.g. an emergency plan).
- 9.2.2 The PCBU should implement management procedures for general safety including staff induction, safe plant/equipment use, maintenance checks, safety inspections, clear reporting and communication, emergency drills etc.
- 9.2.3 The PCBU should implement housekeeping procedures to ensure all emergency access, equipment and exits are kept clear, including regular cleaning undertaken to prevent stockpile creep or litter build-up.
- 9.2.4 The PCBU should implement procedures to control potential ignition sources (e.g. friction, sparks, heating) including 'no open fire' policy, smoking restricted to designated areas or banned, 'hot-works permit' procedures in place.
- Note:** Plant and equipment such as conveyors, waste movers, heaters, chippers, shredders, balers, sorters etc. should be regularly inspected and maintained.
- 9.2.5 Vehicles and other machinery (e.g. waste movers) are to have appropriate heat shrouds and spark arrestors fitted and be kept, maintained and refuelled in designated areas away from combustible waste materials.
- 9.2.6 The PCBU should implement procedures to ensure hazardous materials and highly combustible materials (e.g. gas cylinders, fuels, paints, solvents) are stored in accordance with any relevant statutory requirement, code or standard and away from combustible waste material.
- 9.2.7 The PCBU should implement appropriate signage and markings, including facility layout plan at main site entry, warning signs (e.g. 'no smoking'), stockpile and clear space markings, emergency and evacuation area signs, fire safety system signs etc.
- 9.2.8 The PCBU should implement security arrangements (e.g. fencing with locked gate, lighting, alarm system, video surveillance, 24/7 security) to restrict unauthorised access and deter arson, including after-hours when staff have left the facility.

Note: Firefighter access must not be prevented (e.g. non-hardened metal chain and lock with key deposited at two nearest fire brigade stations or 24/7 security).

9.3 Emergency plan

9.3.1 The PCBU is required to develop an emergency plan for the waste facility, which is done in accordance with *AS 3745–2010 Planning for emergencies in facilities*.

Note: The emergency plan is developed for staff and occupants in the workplace. An external consultant should be engaged to provide specialist advice and services in relation to fire safety planning and developing an emergency plan.

9.3.2 The emergency plan is to assess fire safety risks and identify appropriate responses and controls (i.e. a fire safety management plan) and include emergency response procedures for staff and other persons at the waste facility in the event of fire.

9.3.3 The emergency plan is to identify an emergency control organisation for the facility including staff nominated as fire wardens in the emergency response procedures.

9.3.4 The emergency plan is to identify safe evacuation routes and assembly area (and alternates), shutdown processes, firefighting team activation, removal of uninvolved vehicles, activation of pollution control measure etc.

9.3.5 The PCBU is to ensure all staff receive appropriate training in fire safety including emergency response procedures, use of first attack firefighting equipment (e.g. fire hose reels, fire extinguishers), evacuation drills etc.

Note: Training in the use of first attack firefighting equipment must include education of fire awareness, including when to cease firefighting and to evacuate.

9.3.6 The emergency plan is to identify a process of regular fire safety audits to ensure fire safety requirements are being met, including reviewing stockpile limits, safe work practices, clear access, firefighting and emergency equipment.

Note: The PCBU should nominate a responsible person to conduct the fire safety audit, including check first attack firefighting equipment, stockpiles, access are kept clear and free of obstructions.

9.4 Emergency services information package (ESIP)

9.4.1 An ESIP, as detailed in FRNSW guideline [Emergency services information package and tactical fire plans](#), should be developed and provided by the PCBU.

Note: The ESIP is intended for use by emergency service personnel only and supplements the emergency plan.

9.4.2 The ESIP should provide firefighters with specific information that can be used to develop strategies and tactics for firefighting intervention, including:

- the operations plan (refer to section 8.6)
- facility processes and systems including emergency shutdown procedures
- facility evacuation plan including ward areas and safe assembly area/s
- fire safety systems including on-site fixed fire monitors, deluge or drenchers static water supplies, special extinguishing agents or systems
- firewater containment system including secondary/tertiary facilities
- pollution control equipment including location and procedures, and
- machinery available for waste removal (e.g. waste movers) and location of designated quarantine area/s.

9.5 Fire safety statements

9.5.1 Under *clause 177* and *clause 180* of the *EP&A Reg.* the premises owner is to have fire safety systems inspected and maintained by a competent fire safety practitioner, then issue a fire safety statement to the local Council and provide a copy to FRNSW.

Note: The fire safety statement is a record of maintenance of the fire safety system. Information on this process including the *Fire Safety Statement* form to be used is available on the DPIE website at www.planning.nsw.gov.au.

9.5.2 An annual fire safety statement must be completed once every year for all essential fire safety measures installed, and where applicable, a supplementary fire safety statement completed for all critical fire safety measures installed (e.g. every six months).

9.5.3 The premises owner is responsible for choosing the competent fire safety practitioner to undertake the inspection and maintenance and must provide a written opinion that the person or persons chosen are competent to perform the fire safety inspection.

9.5.4 The PCBU is to make allowance for the premises owner to arrange the inspection and maintenance of fire safety systems for the purpose of a fire safety statement.

10 References

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Waste Industry Safety and Health Forum, *WISH INFO 05 Waste fire burn trials summary non-technical report version 2*, October 2018, United Kingdom.

Appendix A – Acceptable solution

This acceptable solution intends to assist the consent authority make determination on a proposed waste facility without specific referral to the fire brigade.

The adoption and compliance with the prescriptive requirements outlined by this acceptable solution will ensure that the provisions of Clause E1.10 and E2.3 of the NCC are adequately addressed to the satisfaction of the fire brigade in this given case.

This acceptable solution applies to the case of a typical waste facility that handles unprocessed co-mingled recyclable waste material which includes plastics. For any other case, an alternative solution should be undertaken and referred to the fire brigade.

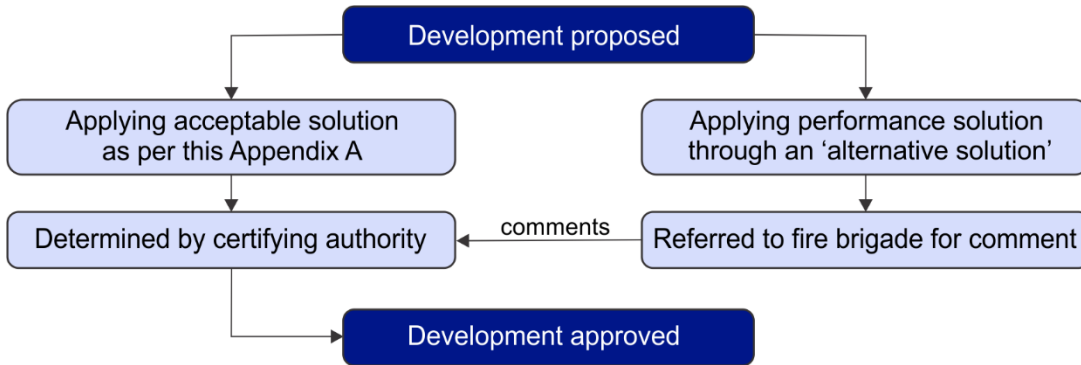


Figure 10 Pathways involving acceptable solution or alternative solution

The following provisions specifically address special hazards for this typical waste facility:

Performance requirement	Description of provision	Guideline reference
CP9	'Specialist fire appliance' access is provided to satisfy performance requirement CP9 of the NCC and FRNSW guideline Access for emergency vehicles and emergency service personnel .	Clause 7.4.1
CP9	Adequate firefighter access is provided to the building, fire safety systems and equipment.	Clause 7.4.7
EP1.3	A fire hydrant system is installed to Australian Standard AS 2419.1 and provides coverage for both internal and external stockpiles.	Clause 7.5.1
EP1.3	The fire hydrant system incorporates enhanced standard of performance for external stockpiles (i.e. one additional hydrant to flow).	Clause 7.5.3
EP1.3	Fire hydrants are not located within 10 m of any stockpiled storage (or vice versa), whether being internal or external.	Clause 7.5.4
EP1.3	The fire hydrant system delivers the required number of fire hydrants to flow simultaneously for a minimum of four hours duration.	Clause 7.5.7
EP1.3	A fire brigade booster connection is installed within sight of the designated site entry point.	Clause 7.5.6
EP1.1	A fire hose reel system is installed to Australian Standard AS 2441 and provides coverage for both internal and external stockpiles.	Clause 7.5.8
EP1.4	An automatic fire sprinkler system is installed to Australian Standard AS 2118.1 and designed for special hazard (e.g. 'high hazard' class).	Clause 7.6.1

EP1.4	A fire brigade booster connection is installed for the automatic fire sprinkler system and is co-located with the hydrant system booster.	Clause 7.6.5
EP1.4	The fire sprinkler system delivers not less than the total hydraulic demand for a minimum of two hours duration.	Clause 7.6.6
EP2.2	A fire detection and alarm system is installed to Australian Standard AS 1670.1 and designed for the fire scenarios and environment (e.g. visual flame detectors, infrared detectors, heat detectors/probes).	Clause 7.7.1
EP2.2	Manual alarm points are installed for staff to initiate alarm of fire.	Clause 7.7.4
EP2.2	An automatic smoke hazard management system is installed and designed so the smoke layer does not descend below 4 m above floor level.	Clause 7.8.1
EP2.2	Low level openings (e.g. roller doors) on two or more walls to assist with venting de-stratified smoke.	Clause 7.8.3
EP2.2	The automatic smoke hazard management system is capable of continuous operation for a minimum of two hours duration.	Clause 7.8.4
N/A	An automatic fire water run-off containment system is provided and designed to contain the total hydraulic demand of the fire hydrant and fire sprinkler systems.	Clause 7.9.1
N/A	Pollution control equipment is provided to divert fire water run-off and isolate stormwater drainage in the event of fire.	Clause 7.9.6
NSW PBP	The waste facility complies with NSW RFS <i>Planning for Bush Fire Protection</i> when located on bush fire prone land.	7.10.1
CP2	Any separating masonry wall, revetment or pen is to extend at least 1 m above and at least 2 m beyond the stockpile.	Clause 8.2.6
N/A	Any stockpile prone to self-heating is to be monitored and rotated as necessary to dissipate any hotspots.	Section 8.3
CP2	Any external stockpile is to be limited in size and maintain minimum separations to prevent fire spread, including reduced separation when protected by a masonry wall or an automatic fire sprinkler system.	Section 8.4
CP9	Emergency vehicle access is provided between external stockpiles.	Clause 8.4.11
CP2	Each internal stockpile is to be limited in size to 1,000 m ² .	Clause 8.5.2
CP9	Internal stockpiles are to be maintain a minimum of 6 m unobstructed access on each accessible side.	Clause 8.5.3
N/A	An operations plan is to be documented and implemented for stockpile management and a copy is to be included within the Emergency Services Information Package (ESIP).	Section 8.6
WHS Reg.	An emergency plan is to be provided for staff and other persons at the waste facility in the event of fire.	Section 9.3
N/A	An Emergency Services Information Package (ESIP) is provided for firefighters in accordance with FRNSW guideline <i>Emergency services information package and tactical fire plans</i> .	Section 9.4
EP&A Reg.	Fire safety systems are to be inspected and maintained with corresponding fire safety statements being issued; The provision of maintenance should be covered in any leasehold contract.	Section 9.5

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Fire and Rescue NSW

Fire Safety Branch
Locked Mail Bag 12
Greenacre NSW 2190

1 Amarina Avenue
Greenacre NSW 2190

T (02) 9742 7434

F (02) 9742 7483

E firesafety@fire.nsw.gov.au

W firesafety.fire.nsw.gov.au

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