

APPENDIX E TIMBER SPECIES AND DENSITIES

E1 GENERAL CONSTRUCTION

Timber with a density of 750 kg/m³ or greater at a 12 percent moisture content is suitable for construction where specified in Sections 5 and 6. Examples of suitable timber species are listed in Table E1.

Densities of timber species not listed in Table E1 may be found in AS 1720.2.

Many of the timber species listed in Table E1 from various regions of Australia may not be available in all areas.

TABLE E1
TIMBER SPECIES WITH A DENSITY OF 750 kg/m³ OR GREATER

Standard trade name	Botanical name
Ash, Crow's	Flindersia australis
Ash, silvertop	Eucalyptus sieberi
Balau (selangan batu)	Shorea spp.
Bangkirai	Shorea laevifolia
Belian	Eusideroxylon zwageri
Blackbutt	Eucalyptus pilularis
Blackbutt, New England	Eucalyptus andrewsii
	Eucalyptus campanulata
Box, brush	Lophostemon confertus
Box, grey	Eucalyptus microcarpa
Box, grey, coast	Eucalyptus bosistoana
Box, white-topped	Eucalyptus quadrangulata
Box, yellow	Eucalyptus melliodora
Brownbarrel	Eucalyptus fastigata
Candlebark	Eucalyptus rubida
Gum, blue, southern	Eucalyptus globulus
Gum, blue, Sydney	Eucalyptus saligna
Gum, grey	Eucalyptus propinqua
Gum, grey, mountain	Eucalyptus cypellocarpa
Gum, Maiden's	Eucalyptus maidenii
Gum, manna	Eucalyptus viminalis
Gum, red, forest	Eucalyptus tereticornis
Gum, red, river	Eucalyptus camaldulensis
Gum, rose	Eucalyptus grandis
Gum, spotted	Corymbia maculata
	Corymbia henryi
	Corymbia citriodora
Gum, sugar	Eucalyptus cladocalyx
Hardwood, Johnstone River	Backhousia bancroftii
Ironbark, grey	Eucalyptus paniculata
Ironbark, red	Eucalyptus sideroxylon
Jarra	Eucalyptus marginata
Kapur	Dryobalanops spp.
Karri	Eucalyptus diversicolor



TABLE E1 (Cont.)

Standard trade name	Botanical name
Kempas	Koompassia malaccensis
Keruing	Dipterocarpus spp.
Kwila (Merbau)	Intsia bijuga
Mahogany red	Eucalyptus resinifera
Mahogany, southern	Eucalyptus botryoides
Mahogany, white	Eucalyptus acmenoides
Messmate	Eucalyptus obliqua
Messmate, Gympie	Eucalyptus cloeziana
Northern Box (Pelawan)	Tristaniopsis spp.
Oak, American	Quercus spp.
Peppermint, narrow-leaved	Eucalyptus australiana
Satinay	Syncarpia hillii
Stringybark, Blackdown	Eucalyptus sphaerocarpa
Stringybark, blue-leaved	Eucalyptus agglomerata
Stringybark, brown	Eucalyptus baxteri
Stringybark, silvertop	Eucalyptus laevopinea
Stringybark, white	Eucalyptus eugenioides
Stringybark, yellow	Eucalyptus muelleriana
Tallowwood	Eucalyptus microcorys
Turpentine	Syncarpia glomulifera
Woollybutt	Eucalyptus longifolia



APPENDIX E TIMBER SPECIES AND DENSITIES

E2 WINDOWS AND DOORS

Timber species with a density of 650 kg/m³ or greater at a 12 percent moisture content is suitable for window joinery, door frames and the framing surrounding any glazing where specified in Sections 5 and 6. Examples of suitable timber species are listed in Table E2.

Densities of timber species not listed in Table E2 may be found in AS 1720.2.

Many of the timber species listed in Table E2 from various regions of Australia may not be available in all areas.

TABLE E2

SOME TIMBER SPECIES WITH A DENSITY OF 650 kg/m³ OR GREATER

Standard trade name	Botanical name
Ash, alpine	<i>Eucalyptus delegatensis</i>
Ash, Crow's	<i>Flindersia australis</i>
Ash, mountain	<i>Eucalyptus regnans</i>
Ash, silvertop	<i>Eucalyptus sieberi</i>
Balau (selangan batu)	<i>Shorea</i> spp.
Bangkirai	<i>Shorea laevifolia</i>
Beech, myrtle	<i>Nothofagus cunninghamii</i>
Belian	<i>Eusideroxylon zwageri</i>
Blackbutt	<i>Eucalyptus pilularis</i>
Blackbutt, New England	<i>Eucalyptus andrewsii</i>
	<i>Eucalyptus campanulata</i>
Blackwood	<i>Acacia melanoxylon</i>
Box, brush	<i>Lophostemon confertus</i>
Box, grey	<i>Eucalyptus microcarpa</i>
Box, grey, coast	<i>Eucalyptus bosistoana</i>
Box, white-topped	<i>Eucalyptus quadrangulata</i>
Box, yellow	<i>Eucalyptus melliodora</i>
Brownbarrel	<i>Eucalyptus fastigata</i>
Candlebark	<i>Eucalyptus rubida</i>
Cypress	<i>Callitris glaucophylla</i>
Gum, blue, southern	<i>Eucalyptus globulus</i>
Gum, blue, Sydney	<i>Eucalyptus saligna</i>
Gum, grey	<i>Eucalyptus propinqua</i>
Gum, grey, mountain	<i>Eucalyptus cypellocarpa</i>
Gum, Maiden's	<i>Eucalyptus maidenii</i>
Gum, manna	<i>Eucalyptus viminalis</i>
Gum, mountain	<i>Eucalyptus dalrympleana</i>
Gum, red, forest	<i>Eucalyptus tereticornis</i>
Gum, red, river	<i>Eucalyptus camaldulensis</i>
Gum, rose	<i>Eucalyptus grandis</i>



TABLE E2 (Cont.)

Standard trade name	Botanical name
Gum, shinning	Eucalyptus nitens
Gum, spotted	Corymbia maculata
	Corymbia henryi
	Corymbia citriodora
Gum, sugar	Eucalyptus cladocalyx
Hardwood, Johnstone River	Backhousia bancroftii
Ironbark, grey	Eucalyptus paniculata
Ironbark, red	Eucalyptus sideroxylon
Jarra	Eucalyptus marginata
Kapur	Dryobalanops spp.
Karri	Eucalyptus diversicolor
Kempas	Koompassia malaccensis
Keruing	Dipterocarpus spp.
Kwila (Merbau)	Intsia bijuga
Mahogany, Philippine red, dark	Shorea spp.
Mahogany red	Eucalyptus resinifera
Mahogany, southern	Eucalyptus botryoides
Mahogany, white	Eucalyptus acmenoides
Messmate	Eucalyptus obliqua
Messmate, Gympie	Eucalyptus cloeziana
Northern Box (Pelawan)	Tristaniopsis spp.
Oak , American	Quercus spp.
Peppermint, narrow-leaved	Eucalyptus australiana
Pine, celery-top	Phyllocladus asplenifolius
Pine, slash	Pinus elliotii
Ramin	Gonystylus spp.
Rosewood, New Guinea	Pterocarpus indicus
Satinay	Syncarpia hillii
Stringybark, Blackdown	Eucalyptus sphaerocarpa
Stringybark, blue-leaved	Eucalyptus agglomerata
Stringybark, brown	Eucalyptus baxteri
Stringybark, silvertop	Eucalyptus laevopinea
Stringybark, white	Eucalyptus eugenioides
Stringybark, yellow	Eucalyptus muelleriana
Tallowwood	Eucalyptus microcorys
Taun	Pometia pinnata
Turpentine	Syncarpia glomulifera
Vitex, New Guinea	Vitex cofassus
Woollybutt	Eucalyptus longifolia
Ash, Crow's	Flindersia australis
Ash, silvertop	Eucalyptus sieberi
Balau (selangan batu)	Shorea spp.
Bangkirai	Shorea laevifolia
Belian	Eusideroxylon zwageri
Blackbutt	Eucalyptus pilularis
Blackbutt, New England	Eucalyptus andrewsii
	Eucalyptus campanulata
Box, brush	Lophostemon confertus



TABLE E2 (Cont.)

Standard trade name	Botanical name
Box, grey	<i>Eucalyptus microcarpa</i>
Box, grey, coast	<i>Eucalyptus bosistoana</i>
Box, white-topped	<i>Eucalyptus quadrangulata</i>
Box, yellow	<i>Eucalyptus melliodora</i>
Brownbarrel	<i>Eucalyptus fastigata</i>
Candlebark	<i>Eucalyptus rubida</i>
Gum, blue, southern	<i>Eucalyptus globulus</i>
Gum, blue, Sydney	<i>Eucalyptus saligna</i>
Gum, grey	<i>Eucalyptus propinqua</i>
Gum, grey, mountain	<i>Eucalyptus cypellocarpa</i>
Gum, Maiden's	<i>Eucalyptus maidenii</i>
Gum, manna	<i>Eucalyptus viminalis</i>
Gum, red, forest	<i>Eucalyptus tereticornis</i>
Gum, red, river	<i>Eucalyptus camaldulensis</i>
Gum, rose	<i>Eucalyptus grandis</i>
Gum, spotted	<i>Corymbia maculata</i>
	<i>Corymbia henryi</i>
	<i>Corymbia citriodora</i>
Gum, sugar	<i>Eucalyptus cladocalyx</i>
Hardwood, Johnstone River	<i>Backhousia bancroftii</i>
Ironbark, grey	<i>Eucalyptus paniculata</i>
Ironbark, red	<i>Eucalyptus sideroxylon</i>
Jarra	<i>Eucalyptus marginata</i>
Kapur	<i>Dryobalanops</i> spp.
Karri	<i>Eucalyptus diversicolor</i>
Kempas	<i>Koompassia malaccensis</i>
Keruing	<i>Dipterocarpus</i> spp.
Kwila (Merbau)	<i>Intsia bijuga</i>
Mahogany red	<i>Eucalyptus resinifera</i>
Mahogany, southern	<i>Eucalyptus botryoides</i>
Mahogany, white	<i>Eucalyptus acmenoides</i>
Messmate	<i>Eucalyptus obliqua</i>
Messmate, Gympie	<i>Eucalyptus cloeziana</i>
Northern Box (Pelawan)	<i>Tristaniopsis</i> spp.
Oak, American	<i>Quercus</i> spp.
Peppermint, narrow-leaved	<i>Eucalyptus australiana</i>
Satinay	<i>Syncarpia hillii</i>
Stringybark, Blackdown	<i>Eucalyptus sphaerocarpa</i>
Stringybark, blue-leaved	<i>Eucalyptus agglomerata</i>
Stringybark, brown	<i>Eucalyptus baxteri</i>
Stringybark, silvertop	<i>Eucalyptus laevopinea</i>
Stringybark, white	<i>Eucalyptus eugenioides</i>
Stringybark, yellow	<i>Eucalyptus muelleriana</i>
Tallowwood	<i>Eucalyptus microcorys</i>
Turpentine	<i>Syncarpia glomulifera</i>
Woollybutt	<i>Eucalyptus longifolia</i>



APPENDIX F BUSHFIRE-RESISTING TIMBER

The following species have been tested and have met the requirements of Paragraph F2 within Appendix F for Bushfire Resisting Timber:

Standard trade name	Botanical name
Ash, silvertop	Eucalyptus sieberi
Blackbutt	Eucalyptus pilularis
Gum, red, river	Eucalyptus camaldulensis
Gum, spotted	Corymbia maculata
	Corymbia henryi
	Corymbia citriodora
Ironbark, red	Eucalyptus sideroxylon
Kwila (Merbau)	Intsia bijuga
Turpentine	Syncarpia glomulifera



Bushfire Hazard Assessment Report

Proposed:
**New Sole Occupancy
Dwelling**

At:
**10 Paruna Place
Cromer**

Reference Number: 170984

Prepared For:
Michael Hanning

30th March 2017



Prepared By:
**Building Code & Bushfire
Hazard Solutions Pty Limited**

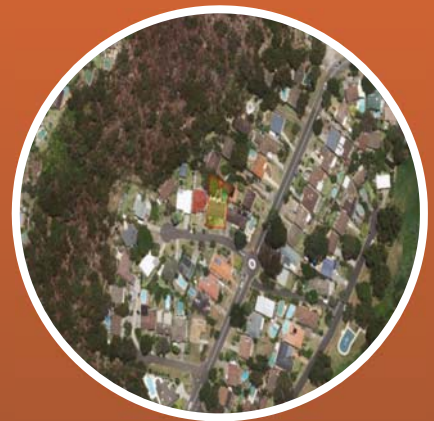
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List of Abbreviations:

APZ	Asset Protection Zone
AS3959	Australian Standard 3959 – 2009 as amended.
BAL	Bushfire Attack Level
BPMs	Bushfire Protection Measures
BPLM	Bushfire Prone Land Map
Council	Northern Beaches Council
DA	Development Application
EP&A Act	Environmental Planning and Assessment Act - 1979
ESD	Ecologically Sustainable Development
FRNSW	Fire & Rescue NSW
IPA	Inner Protection Area
NCC	National Construction Code
OPA	Outer Protection Area
PBP	Planning for Bush Fire Protection – 2006
ROW	Right of Way
RF Act	Rural Fires Act - 1997
RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose
SWS	Static Water Supply

1.0 Introduction

The development proposal relates to the demolition of the existing dwelling and the construction of a new sole occupancy dwelling within an existing residential allotment located at 10 Paruna Place, Cromer (Lot 49 DP 239139).

The subject property is a residential allotment within an area of similar properties. The site has street frontage to Paruna Place to the south and abuts private residential allotments to all other aspects. The vegetation identified as being the hazard is located to the northwest within a vegetated allotment.

Northern Beaches Council's Bushfire Prone Land Map identifies the subject property as being within the 100 metre buffer zone of Category 1 vegetation therefore the application of Planning for Bush Fire Protection - 2006 (PBP) must apply in this instance.

2.0 Purpose of Report

The purpose of this Bushfire Assessment Report is to provide the owners and Council with an independent bushfire hazard determination together with appropriate recommendations for both new building construction and bushfire mitigation measures considered necessary having regard to construction within a designated 'bushfire prone' area.

The recommendations contained within this report may assist in forming the basis of any specific construction conditions and/or bushfire mitigation measures that Council and/or the NSW Rural Fire Service may elect to place within any consent conditions issued for the subject Development Application.

3.0 Scope of this Report

The scope of this report is limited to providing a bushfire hazard assessment and recommendations for the subject property. Where reference has been made to the surrounding lands, this report does not purport to directly assess those lands; rather it may discuss bushfire impact and/or progression through those lands and possible bushfire impact to the subject property.

Where Council considers a bushfire risk is associated with surrounding private lands or lands owned by an authority, Council could seek to issue notice under Section 66 of the Rural Fires Act on any or all surrounding properties for the purposes of reducing and maintaining safe levels of vegetation and thus reducing the possibility of bushfire impact to the subject property and any adjoining properties.

4.0 Referenced Documents and Persons

Comments provided are based on the requirements of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act), the RFS document known as 'Planning for Bush Fire Protection - 2006' for the purposes of bushfire hazard determination and Australian Standard 3959 - 2009 titled 'Construction of buildings in bushfire-prone areas' as amended for building/structural provisions.

A company representative has made a site inspection of the subject site and surrounding area. Plans by Hartdesign, Job No. 16.16, Issue A, Dated 11/03/2017 has also been relied upon.

5.0 Compliance Tables & Notes

The following table sets out the projects compliance with *Planning for Bush Fire Protection – 2006*.

	Northwest	East	South	North
Vegetation Structure	Forest	Maintained curtilages	Maintained curtilages	Maintained curtilages
Slope	>15 degrees upslope	N/A	N/A	N/A
Proposed Asset Protection Zone	39 metres	N/A	N/A	N/A
Significant Environmental Features	Maintained private allotments	Maintained private allotments	Paruna Place	Maintained private allotments
Threatened Species	APZ Existing	APZ Existing	APZ Existing	APZ Existing
Aboriginal Relics	APZ Existing	APZ Existing	APZ Existing	APZ Existing
Bushfire Attack Level	BAL 19	N/A	N/A	N/A
Required Construction Level	BAL 19	BAL 12.5	BAL 12.5	BAL 19

Asset Protection Zones Compliance

The proposed dwelling within the subject property was found to be located 39 metres from the hazard interface to the northwest. The separation from the hazard interfaces includes maintained land within the subject property and land “*equivalent to an Asset Protection Zone*” within neighbouring private allotments.

Construction Level Compliance

The highest Bushfire Attack Level to the proposed dwelling was determined from Table 2.4.2 of AS3959 – 2009 to be ‘BAL 19’. The proposed dwelling is required to comply with section 3 and BAL 19 section 6 under AS 3959 – 2009 and Appendix 3 under PBP 2006.

All works facing east & south can be downgraded to BAL 12.5 due to shielding provided by the dwelling itself.

A copy of these requirements has been provided to the client.

Access and Services

Guideline Ref.	Proposed Development Determinations	Compliance
Property Access (Driveway)	The most distant external point of the proposed dwelling is within 70 metres of a road supporting the operational use of fire fighting vehicles and therefore the Property Access requirements detailed in section 4.1.3 (2) of PBP are not applicable.	Yes
Water Supply	The most distant external point of the building footprint will be within 70 metres from a road supporting the operational use of fire fighting vehicles and therefore a Static Water Supply is not required.	Yes
Evacuation	Evacuation is possible by utilising existing road infrastructure. It is encouraged that the occupants complete a Bush Fire Safety Plan addressing "Prepare, Act, Survive" as advocated by the NSW RFS http://www.rfs.nsw.gov.au/publications / bushfire safety	Yes
Electrical Supply	Supply provided.	N/A

6.0 Aerial view of the subject allotment



Image 01: Aerial view of the subject area from the Land and Property Management Authority 2017

7.01 Preface

Planning for Bush Fire Protection – 2006, (PBP) formally adopted on the 1st March 2007 and amended 3rd May 2010 (Appendix 3) provides for the protection of property and life (including fire-fighters and emergency service personnel) from bushfire impact.

The document also acknowledges 'infill' developments associated with re-development of existing properties and allows some higher levels of building safety where the increased 'set backs' (APZ's) may not be achievable.

[illegible]

Image 02: Extract from Northern Beaches Council's Bushfire Prone Land Map

7.02 Location

The subject property is known as 10 Paruna Place, Cromer (Lot 49 DP 239139) and is a residential allotment located within Northern Beaches Councils Local Government Area. The subject property is a residential allotment within an area of similar properties. The site has street frontage to Paruna Place to the south and abuts private residential allotments to all other aspects.

The vegetation identified as being the hazard is located to the northwest within a vegetated allotment.

Subject dwelling



Photograph 01: View north from Paruna Place toward the subject property

Approximate location of the subject property



Image 03: Extract from streetdirectory.com.au

7.03 Vegetation

The subject site and neighbouring private residential allotments were found to be developed and consist of built upon areas surrounded by maintained gardens and urban landscaping.

The vegetation identified as being the hazard is located to the northwest within a vegetated allotment. The vegetation posing a hazard was found to consist of trees 10 - 30 metres in height with an understory consisted of low trees and tall shrubs. Rock Outcrops within the hazard would assist to lessen the fire intensity as it approaches the subject site.

For the purpose of assessment under 'Planning for Bush Fire Protection' the vegetation posing a hazard to the northwest of the proposed dwelling has been determined to be Forest.



Photograph 02: View north from within the northwestern hazard

7.04 Slope and Topography

The slope that would most significantly affect bushfire behaviour must be assessed for at least 100 metres from the proposed dwelling. The most significant bushfire impact from the northwest is expected to be a bushfire travelling down slope toward the subject property.

The slope that would **most significantly** influence bushfire impact was determined from topographic imagery to be:

- > 15 degrees upslope within the hazard to the northwest

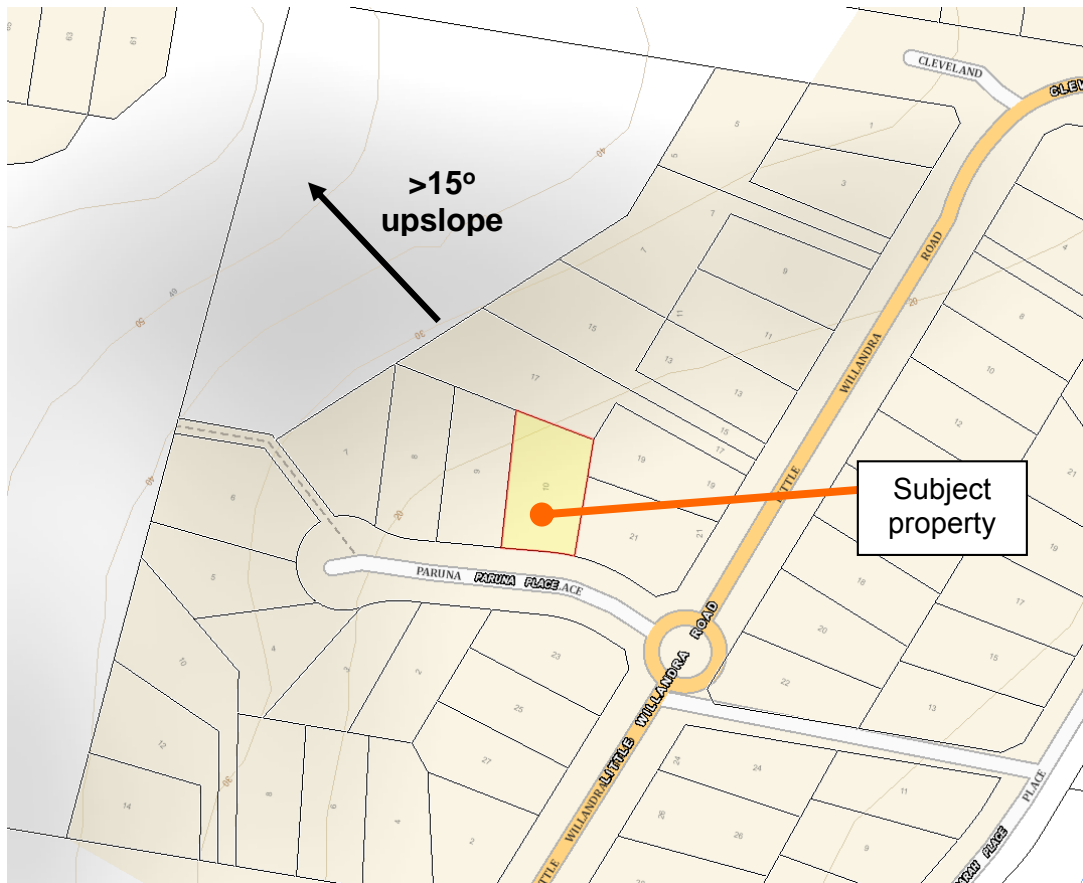


Image 04: Extract from Land and Property Management Authority Spatial Information Exchange

7.05 Asset Protection Zones

The proposed dwelling was found to be located 39 metres from the hazard interface to the northwest. The Asset Protection Zones include maintained land within the subject property and land “*equivalent to an Asset Protection Zone*” being maintained land within neighbouring private allotments.

All grounds within the subject allotment not built upon will be maintained as an Asset Protection Zone as detailed in the NSW Rural Fire Service’s document ‘Standards for Asset Protection Zones’. Note: This will allow for gardens (including native trees and shrubs) in the APZ managed as clumps or islands, covering no more than 20% of the area.



Photograph 03: View west from Paruna Place towards the hazard interface

7.06 Fire Fighting Water Supply

The proposed dwelling will be connected to the reticulated town's water main in Paruna Place for its domestic needs. Existing in ground hydrants are available along Paruna Place and surrounding streets for the replenishment of attending fire services.

The most distant external point of the building footprint will be less than 70 metres from a hydrant and therefore a Static Water Supply is not required.

The existing water supply is considered adequate for the replenishment of attending fire services.



Photograph 04: View from an existing hydrant towards the subject property

7.07 Property Access – Fire Services & Evacuation

The subject property has street frontage to Paruna Place to the south. Persons seeking to egress the proposed dwelling are able to do so via the existing access drive and existing road infrastructure.

The most distant external point of the building footprint will be within 70 metres of a public road that supports the operational use of fire fighting vehicles and therefore the Property Access requirements detailed in section 4.1.3 (2) of PBP are not applicable.

Fire services will have free pedestrian access around the proposed building footprint. Attending fire crews can access the hazard via Paruna Place and neighbouring private allotments for hazard reduction or fire suppression activities without the need to enter the subject property.

Access for fire services and opportunities for occupant evacuation are considered adequate for this property.

8.0 Site & Bushfire Hazard Determination

8.01 Planning for Bush Fire Protection – 2006

‘Planning for Bush Fire Protection – 2006’ (PBP) is applicable to those lands determined as being within a ‘bushfire prone area’ in accordance with a local Bushfire Prone Land Map as provided by the Rural Fire Service and Council.

The most appropriate method of determining site bushfire hazard under the terms of PBP is to consider the site in a singular form.

Bushfire prone areas are defined as those areas;

- *within or within 100m of high or medium bushfire hazards; or*
- *within or within 30m of low bushfire hazards.*

In this instance the subject property has been identified as being bushfire prone land therefore it is appropriate to apply PBP as follows:

Northwestern Aspect:

- a) Vegetation Structure Forest
- b) Slope >15 degrees upslope
- c) A 39 metre APZ is available
- d) The Bushfire Attack Level was determined to be ‘BAL 19’

8.02 Australian Standard AS 3959 – 2009 ‘Construction of buildings in bushfire –prone areas’

Australian Standard 3959 – 2009 ‘Construction of buildings in bushfire-prone areas’ provides for six (6) levels of building construction these being BAL - Low, BAL - 12.5, BAL - 19, BAL - 29, BAL - 40 and BAL - FZ. The Australian Standard 3959 specifies construction standards for buildings within various Bushfire Attack Levels as determined by the Planning for Bush Fire Protection – 2006 document. The NSW Rural Fire Service will not accept deemed to satisfy provisions for BAL Flame Zone and therefore have a NSW variation to the listed standard provisions of BAL FZ under AS3959 - 2009.

8.03 Correlation between bushfire impact and AS3959

Bushfire Attack Level	Maximum radiant heat impact (kW/m ²)	Level of construction under AS3959-2009
Low		No special construction requirements
12.5	≤12.5	BAL - 12.5
19	12.6 to 19.0	BAL - 19
29	19.1 to 29.0	BAL - 29
40	29.1 to 40.0	BAL - 40
Flame Zone	>40.0	BAL FZ No deemed to satisfy provisions

8.04 Site Specific Bushfire Hazard Determination

All property development must be assessed on an individual basis as broad-brush approaches of documents such as PBP may not be applicable in every instance. The proposed development located at 10 Paruna Place, Cromer was assessed against the requirements of 'Planning for Bush Fire Protection 2006' noting the following:

- Existing water supplies for firefighting purposes are adequate.
- Access to the subject property is available from Paruna Place.
- Access to the hazard is available without the need to enter the subject site.
- Recommendations to maintain the Asset Protection Zones within the subject property will be included.

8.05 Viable Construction Method

The objectives of Planning for Bush Fire Protection – 2006 are for the protection of life including fire fighters. Provided these objectives can be met the construction of buildings is feasible and both the Rural Fire Service and Council should be in a position to consider such applications.

The highest Bushfire Attack Level to the proposed dwelling was determined from Table 2.4.2 of AS3959 – 2009 to be 'BAL 19'. The proposed dwelling is required to comply with section 3 and BAL 19 section 6 under AS 3959 – 2009 and Appendix 3 under PBP 2006.

All works facing east & south can be downgraded to BAL 12.5 due to shielding provided by the dwelling itself.

8.06 Risk Rating

In assessing the bushfire threat to the site and its structures it is important to have a holistic approach and assess the risk of a bushfire occurring and impacting the subject property. It is also important to include the risk the site poses to neighbouring properties.

Table 01 is an overview of risk to the proposed dwelling. This model takes a holistic approach and assesses the risk of a bushfire occurring and impacting the site. This risk level can be reduced by either an increase in preparedness by the owners/occupants of the dwelling (e.g. good house-keeping, maintained lawns & bushfire awareness) and/or hazard reduction activities by local fire agencies. Alternatively this risk level can increase if the preparedness level decreases and/or hazard reduction activities are neglected for the area.

The below matrix is for risk only, it does not reflect the Bushfire Attack Level determined within PBP 2006. Note: All new work will comply with the requirements of Planning for Bush Fire Protection 2006.

		CONSEQUENCE			
		Minor	Moderate	Major	Catastrophic
L I K E L I H O O D	Almost Certain	High	Very High	Extreme	Extreme
	Likely	Medium	High	Very High	Extreme
	Possible	Low	Medium	High	Very High
	Unlikely	Low	Low	Medium	High

Table 1: Risk Ranking Matrix

9.0 Recommendations

The following recommendations are provided as the minimum necessary for compliance with Planning for Bush Fire Protection – 2006 and Australian Standard 3959 'Construction of Buildings in bushfire-prone areas' - 2009. Additional recommendations are provided to supplement these minimum requirements where considered necessary.

Asset Protection Zones

1. That all grounds not built upon within the subject property be maintained as an Asset Protection Zone as detailed in the NSW Rural Fire Service's document 'Standards for Asset Protection Zones' and Appendix 2 of 'Planning for Bush Fire Protection 2006'.

Construction

2. That the roof and all new construction facing north & west be constructed to that of section 3 and BAL 19 under section 6 of AS3959 – 2009.
3. That all new construction facing east & south shall comply with section 5 (BAL 12.5) of AS3959 – 2009
4. That the proposed dwelling be constructed to that of the 'Additional Construction Requirements' detailed in A3.7 of the Addendum to Appendix 3 of Planning for Bush Fire Protection 2006 and NSW Rural Fire Service Fast Facts, Development Control Notes and Practice Notes.

Landscaping

5. That all landscaping is to comply with Appendix 5 'Landscaping and Property Maintenance' under Planning for Bush Fire Protection 2006.

Gas (where applicable)

6. That reticulated or bottled gas is installed and maintained in accordance with AS 1596 and the requirements of relevant authorities.
 - ❖ Metal piping is to be used.
 - ❖ All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation.
 - ❖ If gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal.
 - ❖ Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used.

Fencing

7. That to comply with NSW Rural Fire Service Practice Note 2/06 'Fences or Gates in Bush Fire Prone Areas' any new fencing is to be either hardwood or non-combustible.

10.0 Conclusion

Given that the property is deemed bushfire prone under Northern Beaches Council's Bushfire Prone Land Map any development would need to meet the requirements of 'Planning for Bush Fire Protection' – 2006 and of the construction requirements of Australian Standard 3959 'Construction of buildings in bushfire-prone areas' – 2009. The determination of any bushfire hazard must be made on a site-specific basis that includes an assessment of the local bushland area and its possible impact to the subject property.

The subject property is a residential allotment within an area of similar properties. The vegetation identified as being the hazard is located to the northwest within a vegetated allotment. The vegetation posing a hazard was determined to be Forest.

The proposed dwelling was found to be located 39 metres from the hazard interface to the northwest. The Asset Protection Zones include maintained land within the subject property and land "*equivalent to an Asset Protection Zone*" within neighbouring private allotments.

The highest Bushfire Attack Level to the proposed dwelling was determined from Table 2.4.2 of AS3959 – 2009 to be 'BAL 19'. The proposed dwelling is required to comply with section 3 and BAL 19 section 6 under AS 3959 – 2009 and Appendix 3 under PBP 2006. All works facing east & south can be downgraded to BAL 12.5 due to shielding provided by the proposed dwelling.

The existing access provisions and water supply are considered adequate.

In accordance with the bushfire safety measures contained in this report, and consideration of the site specific bushfire risk assessment it is our opinion that when combined, they will provide a reasonable and satisfactory level of bushfire protection to the subject development.

We are therefore in support of the development application.

Should you have any enquiries regarding this project please contact me at our office.

Prepared by
Building Code & Bushfire Hazard Solutions



Glyn Bickford

Reviewed by
Building Code & Bushfire Hazard Solutions P/L



Stuart McMonnies

G. D. Design in Bushfire Prone Areas.
Certificate IV Fire Technology
FPA Australia BPAD Level 3 Accredited Practitioner
Certification number – BPAD9400



Disclaimer:

Quote from Planning for Bush Fire Protection 2006, 'Any representation, statement opinion, or advice expressed or implied in this publication is made in good faith on the basis that the State of New South Wales, the NSW Rural Fire Service, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice referred to above..'

Similarly the interpretations and opinions provided by Building Code and Bushfire Hazard Solutions in regard to bushfire protection are also given in the same good faith.

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11.0 Annexure 01

List of Referenced Documents

- a) Environmental Planning and Assessment Act - 1979
- b) 'Planning for Bush Fire Protection' - 2006 - NSW Rural Fire Services & Planning NSW
- c) 'Construction of buildings in bushfire prone areas' - AS 3959 – 2009 (as amended) – Standards Australia
- d) 'Northern Beaches Council's Bushfire Prone Land Map'
- e) Acknowledgements to:
NSW Department of Lands – SIXMaps
Street-directory.com.au
- f) Plans by Hartdesign, Job No. 16.16, Issue A, Dated 11/03/2017

Attachments

Attachment 01: 79BA Compliance Certificate



Building Code & Bushfire Hazard Solutions

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BUSHFIRE RISK ASSESSMENT CERTIFICATE UNDER s79BA OF THE EP&A Act 1979

PROPERTY ADDRESS:	10 Paruna Place, Cromer
DESCRIPTION OF PROPOSAL:	New Sole Occupancy Dwelling
PLAN REFERENCE: (relied upon in report preparation)	Plans by Hartdesign, Job No. 16.16, Issue A, Dated 11.03.2017
BAL RATING:	BAL 19 <small>(If the BAL rating is FZ the application is to be referred to NSW RFS for assessment)</small>
DOES THE PROPOSAL RELY ON ALTERNATE SOLUTIONS:	YES <input type="radio"/> NO <input checked="" type="radio"/> <small>(Circle the relevant response)</small> <small>(If YES the application is to be referred to NSW RFS for assessment)</small>
BUSHFIRE ASSESSMENT REPORT REFERENCE:	170984
REPORT DATE:	30th March 2017
CERTIFICATION NO/ACCREDITED SCHEME	BPAD9400

I Stuart McMonnies of Building Code and Bushfire Hazard Solutions Pty Ltd hereby certify, in accordance with Section 79BA of the *Environmental Planning and Assessment Act 1979 No 203*:

1. That I am a person recognised by the *NSW Rural Fire Service* as a qualified consultant in bushfire risk assessment; and
2. That subject to the recommendations contained in the Bushfire Risk Assessment Report the proposed development conforms specifications and requirements of the documents entitled *Planning for Bush Fire Protection* prepared by the NSW Rural Fire Service in co-operation with the Department of Planning and any other documents as prescribed by Section 79BA 1 (a) of the *Environmental Planning and Assessment Act 1979 No 203*.

I am aware that the Bushfire Assessment Report, prepared for the above mentioned site is to be submitted in support of a development application for this site and will be relied upon by Council as the basis for ensuring that the bushfire risk management aspects of the proposed development have been addressed in accordance with *Planning for Bushfire Protection 2006*.

Signature:  Date: 30th March 2017



SECTION 3: CONSTRUCTION GENERAL

3.3 EXTERNAL MOULDINGS

Unless otherwise required in Sections 4 to 9, combustible external mouldings, jointing strips, trims and sealants may be used for decorative purposes or to cover joints between sheeting material.

3.6 VENTS, WEEPHOLES AND GAPS

Where a circular probe of 3 mm diameter is capable of being passed through external vents, weepholes or gaps, the vents, weepholes and gaps shall be screened as specified in Sections 3, 5, 6, 7, 8 and 9, except for weepholes from the frames of windows and glazed doors.

To determine the maximum aperture size of screening material, it shall not be possible to pass a circular probe of 2 mm diameter through the aperture.

Gaps between doors and the door jambs, heads or sills (thresholds) shall be as shown in Figure 3.2. Alternatively, gaps shall be protected by draught excluders.

C3.6 Weepholes from the frames of windows and glazed doors and those gaps between doors and door jambs, heads or sills (thresholds) that may exceed 3 mm (see Figure 3.2) are exempt from screening because they do not provide a direct passage for embers to the interior of the building or building cavity.

3.7 BUSHFIRE SHUTTERS

Bushfire shutters shall—

- (a) be fixed to the building and be non-removable;
- (b) when in the closed position, have no gap greater than 3 mm between the shutter and the wall, the sill or the head;
- (c) be readily manually operable from either inside or outside;
- (d) protect the entire window assembly or door assembly;
- (e) consist of materials specified in Clauses 5.5.1, 6.5.1, 7.5.1, 8.5.1 and 9.5.1 for the relevant BAL; and
- (f) where perforated, have—
 - (i) uniformly distributed perforations with a maximum aperture of 3 mm when the shutter is providing radiant heat protection or 2 mm when the shutter is also providing ember protection (such as where the openable portion of the window is not screened in accordance with the requirements of the respective BAL); and
 - (ii) a perforated area no greater than 20% of the shutter.

If bushfire shutters are fitted to all external doors then at least one of those shutters shall be operable from the inside to facilitate safe egress from the building.



SECTION 5: CONSTRUCTION FOR BUSHFIRE ATTACK LEVEL 12.5 (BAL — 12.5)

5.1 GENERAL

A building assessed in Section 2 as being BAL—12.5 shall comply with Section 3 and Clauses 5.2 to 5.8. There are a number of Standards that specify requirements for construction; however, where this Standard does not provide construction requirements for a particular element, the other Standards apply.

Any element of construction or system that satisfies the test criteria of AS 1530.8.1 may be used in lieu of the applicable requirements contained in Clauses 5.2 to 5.8 (see Clause 3.8).

NOTE: BAL—12.5 is primarily concerned with protection from ember attack and radiant heat up to and including 12.5 kW/m² where the site is less than 100 m from the source of bushfire attack.

5.2 SUBFLOOR SUPPORTS

NSW RURAL FIRE SERVICE VARIATION

This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with—

- (a) wall that complies with **(Clause 5.4 as appropriate)**; or
- (b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion resistant steel, bronze or aluminium; or
- (c) a combination of Items (a) and (b) above.

Where the subfloor space is unenclosed, the support posts, columns, stumps, piers and poles shall be—

- (i) of non-combustible material; or
- (ii) of bushfire-resisting timber (see Appendix (ii) F); or
- (iii) a combination of Items (i) and (ii) above. (iii)

NOTE: This requirement applies to the principal building only and not to verandas, decks, steps, ramps and landings.

5.3 FLOORS

5.3.1 Concrete slabs on ground

This Standard does not provide construction requirements for concrete slabs on the ground.

5.3.2 Elevated floors

This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring.

See NSW Variation Following Page



NSW RURAL FIRE SERVICE VARIATION

Enclosed Subfloor Space

This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring, where the subfloor space is enclosed with—

- (a) a wall that complies with **(Clause 5.4 appropriate)**; *or*
- (b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion resistant steel, bronze or aluminium; *or*
- (c) a combination of Items (a) and (b) above.

Unenclosed subfloor space

Where the subfloor space is unenclosed, the bearers, joists and flooring, less than 400 mm above finished ground level, shall be one of the following:

- (a) Materials that comply with the following:
 - (i) Bearers and joists shall be—
 - A. non-combustible; *or*
 - B. bushfire-resisting timber (see Appendix F); *or*
 - C. a combination of Items (A) and (B) above
 - (ii) Flooring shall be—
 - A. non-combustible; *or*
 - B. bushfire-resisting timber (see Appendix F); *or*
 - C. timber (other than bushfire-resisting timber), particleboard or plywood flooring where the underside is lined with sarking-type material or mineral wool insulation; *or*
 - D. a combination of any of Items (A), (B) or (C) above *or*
- (b) A system complying with AS 1530.8.1

This Standard does not provide construction requirements for elements of elevated floors, including bearers, joists and flooring, if the underside of the element is 400 mm or more above finished ground level.

5.4 EXTERNAL WALLS

5.4.1 Walls

The exposed components of an external wall that are less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the wall (see Figure D3, Appendix D) shall be:

- (a) Non-combustible material.
NOTE: Examples include, but are not limited to, the following (with a minimum of 90 mm in thickness):
 - (a) Full masonry or masonry veneer walls with an outer leaf of clay, concrete, calcium silicate or natural stone.
 - (b) Precast or in situ walls of concrete or aerated concrete.
 - (c) Earth wall including mud brick.
- or*
- (b) Timber logs of a species with a density of 680 kg/m³ or greater at a 12 percent moisture content; of a minimum nominal overall thickness of 90 mm and a minimum thickness of 70 mm (see Clause 3.11); and gauge planed.

or



- (c) Cladding that is fixed externally to a timber-framed or a steel-framed wall and is—
- (i) non-combustible material; or
 - (ii) fibre-cement a minimum of 6 mm in thickness; or
 - (iii) bushfire-resisting timber (see Appendix F); or
 - (iv) a timber species as specified in Paragraph E1, Appendix E; or
 - (v) a combination of any of Items (i), (ii), (iii) or (iv) above.
- or
- (d) A combination of any of Items (a), (b) or (c) above.

This Standard does not provide construction requirements for the exposed components of an external wall that are 400 mm or more from the ground or 400 mm or more above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the wall (see Figure D3, Appendix D).'

5.4.2 Joints

All joints in the external surface material of walls shall be covered, sealed, overlapped, backed or butt-jointed to prevent gaps greater than 3 mm.

5.4.3 Vents and weepholes

Vents and weepholes in external walls shall be screened with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium, except where the vents and weepholes have an aperture less than 3 mm (see Clause 3.6), or are located in an external wall of a subfloor space.

5.5 EXTERNAL GLAZED ELEMENTS AND ASSEMBLIES AND EXTERNAL DOORS

5.5.1 Bushfire shutters

Where fitted, bushfire shutters shall comply with Clause 3.7 and be made from—

- (a) non-combustible material; *or*
- (b) a timber species as specified in Paragraph E1, Appendix E; *or*
- (b) bushfire-resisting timber (see Appendix F); *or*
- (d) a combination of any of Items (a), (b) or (c) above.

5.5.1A Screens for windows and doors

Where fitted, screens for windows and doors shall have a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium. Gaps between the perimeter of the screen assembly and the building element to which it is fitted shall not exceed 3 mm.

The frame supporting the mesh or perforated sheet shall be made from—

- (a) metal; *or*
- (b) bushfire-resisting timber (see Appendix F); *or*
- (c) a timber species as specified in Paragraph E2, Appendix E.

5.5.2 Windows

Window assemblies shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with Clause 5.5.1.
or
- (b) They shall be completely protected externally by screens that comply with Clause 5.5.1A.
or
- (c) They shall comply with the following:
 - (i) For window assemblies less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), window frames and window joinery shall be made from:



- (A) Bushfire-resisting timber (see Appendix F). *or*
 - (B) A timber species as specified in Paragraph E2, Appendix E. *or*
 - (C) Metal. *Or*
 - (D) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel and the frame and sash shall satisfy the design load, performance and structural strength of the member.
- (ii) Externally fitted hardware that supports the sash in its functions of opening and closing shall be metal.
 - (iii) Where glazing is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), the glazing shall be Grade A safety glass minimum 4 mm thickness, or glass blocks with no restriction on glazing methods.

NOTE: Where double glazed units are used the above requirements apply to the external face of the window assembly only.

- (iv) Where glazing is other than that specified in Item (iii) above, annealed glass may be used.
- (v) The openable portions of windows shall be screened internally or externally with screens that comply with Clause 5.5.1A.

5.5.3 Doors—Side-hung external doors (including French doors, panel fold and bi-fold doors)

Side-hung external doors, including French doors, panel fold and bi-fold doors, shall comply with one of the following:

- (a) Doors and door frames shall be protected by bushfire shutters that comply with Clause 5.5.1.
or
- (b) Doors and door frames shall be protected externally by screens that comply with Clause 5.5.1A.
or
- (c) Doors and door frames shall comply with the following:
 - (i) Doors shall be—
 - (A) non-combustible; *or*
 - (B) a solid timber, laminated timber or reconstituted timber door, having a minimum thickness of 35 mm for the first 400 mm above the threshold; *or*
 - (C) a door, including a hollow core door, with a non-combustible kickplate on the outside for the first 400 mm above the threshold; *or*
 - (D) a door, including a hollow core door, protected externally by a screen that complies with Clause 5.5.1A; *or*
 - (E) a fully framed glazed door, where the framing is made from materials specified for bushfire shutters (see Clause 5.5.1), or from a timber species as specified in Paragraph E2, Appendix E.
 - (ii) Where doors incorporate glazing, the glazing shall comply with the glazing requirements for windows.
 - (iii) Doors shall be tight-fitting to the door frame and to an abutting door, if applicable.
 - (iv) Where any part of the door frame is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the door (see Figure D3, Appendix D), that part of the door frame shall be made from:
 - (A) Bushfire-resisting timber (see Appendix F). *or*
 - (B) A timber species as specified in Paragraph E2, Appendix E. *or*
 - (C) Metal. *Or*



- (D) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel and the door assembly shall satisfy the design load, performance and structural strength of the member.
- (v) Weather strips, draught excluders or draught seals shall be installed at the base of side-hung external doors.

5.5.4 Doors—Sliding doors

Sliding doors shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with Clause 5.5.1.
or
- (b) They shall be completely protected externally by screens that comply with Clause 5.5.1A.
or
- (c) They shall comply with the following:
 - (i) Any glazing incorporated in sliding doors shall be Grade A safety glass complying with AS 1288.
 - (ii) Both the door frame supporting the sliding door and the framing surrounding any glazing shall be made from:
 - (A) Bushfire-resisting timber (see Appendix F). *or*
 - (B) A timber species as specified in Paragraph E2, Appendix E. *or*
 - (C) Metal. *or*
 - (D) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel and the frame and the sash shall satisfy the design load, performance and structural strength of the member.
 - (iii) There is no requirement to screen the openable part of the sliding door. However, if screened, the screens shall comply with Clause 5.5.1A.

NOTE: The construction of manufactured sliding doors should prevent the entry of embers when the door is closed. There is no requirement to provide screens to the openable part of these doors as it is assumed that a sliding door will be closed if occupants are not present during a bushfire event. Screens of materials other than those specified may not resist ember attack.

- (iv) Sliding doors shall be tight-fitting in the frames.

5.5.5 Doors—Vehicle access doors (garage doors)

The following apply to vehicle access doors:

- (a) The lower portion of a vehicle access door that is within 400 mm of the ground when the door is closed (see Figure D4, Appendix D) shall be made from—
 - (i) non-combustible material; *or*
 - (ii) bushfire-resisting timber (see Appendix F); *or*
 - (iii) fibre-cement sheet, a minimum of 6 mm in thickness; *or*
 - (iv) a timber species as specified in Paragraph E1, Appendix E; *or*
 - (v) a combination of any of Items (i), (ii), (iii) or (iv) above.
- (b) Panel lift, tilt doors or side-hung doors shall be fitted with suitable weather strips, draught excluders, draught seals or guide tracks, as appropriate to the door type, with a maximum gap no greater than 3 mm.
- (c) Roller doors shall have guide tracks with a maximum gap no greater than 3 mm and shall be fitted with a nylon brush that is in contact with the door (see Figure D4, Appendix D).
- (d) Vehicle access doors shall not include ventilation slots.



5.6 ROOFS (INCLUDING VERANDA AND ATTACHED CARPORT ROOFS, PENETRATIONS, EAVES, FASCIAS, GABLES, GUTTERS AND DOWNPIPES)

5.6.1 General

The following apply to all types of roofs and roofing systems:

- (a) Roof tiles, roof sheets and roof-covering accessories shall be non-combustible.
- (b) The roof/wall junction shall be sealed, to prevent openings greater than 3 mm, either by the use of fascia and eaves linings or by sealing between the top of the wall and the underside of the roof and between the rafters at the line of the wall.
- (c) Roof ventilation openings, such as gable and roof vents, shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

NSW RURAL FIRE SERVICE VARIATION

Any sarking used shall be:

- (a) Non-combustible; or
- (b) Breather-type sarking complying with AS/NZS 4200.1 and with a flammability index of not more than 5 (see AS1530.2) and sarked on the outside of the frame; or
- (c) An insulation material conforming to the appropriate Australian Standard for that material.

5.6.2 Tiled roofs

Tiled roofs shall be fully sarked. The sarking shall—

- (a) be located on top of the roof framing, except that the roof battens may be fixed above the sarking;
- (b) cover the entire roof area including ridges and hips; and
- (c) extend into gutters and valleys.

5.6.3 Sheet roofs

Sheet roofs shall—

- (a) be fully sarked in accordance with Clause 5.6.2, except that foil-backed insulation blankets may be installed over the battens; and
- (b) have any gaps greater than 3 mm (such as under corrugations or ribs of sheet roofing and between roof components) sealed at the fascia or wall line and at valleys, hips and ridges by—
 - (i) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or
 - (ii) mineral wool; or
 - (iii) other non-combustible material; or
 - (iv) a combination of any of Items (i), (ii) or (iii) above.

5.6.4 Veranda, carport and awning roofs

The following apply to veranda, carport and awning roofs:

- (a) A veranda, carport or awning roof forming part of the main roof space [see Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in Clauses 5.6.1, 5.6.2, 5.6.3, 5.6.5 and 5.6.6.
- (b) A veranda, carport or awning roof separated from the main roof space by an external wall [see Figures D1(b) and D1(c), Appendix D] complying with Clause 5.4 shall have a non-combustible roof covering.

NOTE: There is no requirement to line the underside of a veranda, carport or awning roof that is separated from the main roof space.



5.6.5 Roof penetrations

The following apply to roof penetrations:

- (a) Roof penetrations, including roof lights, roof ventilators, roof-mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors, shall be adequately sealed at the roof to prevent gaps greater than 3 mm. The material used to seal the penetration shall be non-combustible.
- (b) Openings in vented roof lights, roof ventilators or vent pipes shall be fitted with ember guards made from a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium. This requirement does not apply to the exhaust flues of heating or cooking devices with closed combustion chambers. In the case of gas appliance flues, ember guards shall not be fitted.
NOTE: Gasfitters are required to provide a metal flue pipe above the roof and terminate with a certified gas flue cowl complying with AS 4566. Advice may be obtained from State gas technical regulators.
- (c) All overhead glazing shall be Grade A safety glass complying with AS 1288.
- (d) Glazed elements in roof lights and skylights may be of polymer provided a Grade A safety glass diffuser, complying with AS 1288, is installed under the glazing. Where glazing is an insulating glazing unit (IGU), Grade A toughened safety glass minimum 4 mm thickness, shall be used in the outer pane of the IGU.
- (e) Flashing elements of tubular skylights may be of a fire-retardant material, provided the roof integrity is maintained by an under-flashing of a material having a flammability index no greater than 5.
- (f) Evaporative cooling units shall be fitted with non-combustible butterfly closers as close as practicable to the roof level or the unit shall be fitted with non-combustible covers with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.
- (g) Vent pipes made from PVC are permitted.

5.6.6 Eaves linings, fascias and gables

The following apply to eaves linings, fascias and gables:

- (a) Gables shall comply with Clause 5.4.
- (b) Eaves penetrations shall be protected the same as for roof penetrations, as specified in Clause 5.6.5.
- (c) Eaves ventilation openings greater than 3 mm shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.

This Standard does not provide construction requirements for fascias, bargeboards and eaves linings.

5.6.7 Gutters and downpipes

This Standard does not provide requirements for—

- (a) gutters, with the exception of box gutters; and
- (b) downpipes.

If installed, gutter and valley leaf guards shall be non-combustible. Box gutters shall be non-combustible and flashed at the junction with the roof with non-combustible material.



5.7 VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS

5.7.1 General

Decking may be spaced.

There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.

C5.7.1 Spaced decking is nominally spaced at 3 mm (in accordance with standard industry practice); however, due to the nature of timber decking with seasonal changes in moisture content, that spacing may range from 0–5 mm during service. The preferred dimension for gaps is 3 mm (which is in line with other 'permissible gaps') in other parts of this Standard.

It should be noted that recent research studies have shown that gaps at 5 mm spacing afford opportunity for embers to become lodged in between timbers, which may contribute to a fire. Larger gap spacings of 10 mm may preclude this from happening but such a spacing regime may not be practical for a timber deck.

5.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings

5.7.2.1 Materials to enclose a subfloor space

NSW RURAL FIRE SERVICE VARIATION

The subfloor spaces of verandas, decks, steps, ramps and landings are considered to be 'enclosed' when —

- (a) the material used to enclose the subfloor space complies with **(Clause 5.4 as appropriate)**; and
- (b) all openings greater than 3 mm are screened with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

5.7.2.2 Supports

This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.

5.7.2.3 Framing

This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).

5.7.2.4 Decking, stair treads and the trafficable surfaces of ramps and landings

NSW RURAL FIRE SERVICE VARIATION

Decking, stair treads and the trafficable surfaces of ramps and landings shall be—

- (a) of non-combustible material; or
- (b) of bushfire-resisting timber (see Appendix F); or
- (c) a combination of Items (a) and (b) above.



5.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings

5.7.3.1 Supports

NSW RURAL FIRE SERVICE VARIATION

Support posts, columns, stumps, stringers, piers and poles shall be—

- (a) of non-combustible material; *or*
- (b) of bushfire-resisting timber (see Appendix F); *or*
- (c) a combination of Items (a) and (b) above.

5.7.3.2 Framing

NSW RURAL FIRE SERVICE VARIATION

Framing of verandas, decks, ramps or landings (i.e., bearers and joists) shall be—

- (a) of non-combustible material; *or*
- (b) of bushfire-resisting timber (see Appendix F); *or*
- (c) a combination of Items (a) and (b) above.

5.7.3.3 Decking, stair treads and the trafficable surfaces of ramps and landings

NSW RURAL FIRE SERVICE VARIATION

Decking, stair treads and the trafficable surfaces of ramps and landings shall be—

- (a) of non-combustible material; *or*
- (b) of bushfire-resisting timber (see Appendix F); *or*
- (c) a combination of Items (a) and (b) above.

5.7.4 Balustrades, handrails or other barriers

NSW RURAL FIRE SERVICE VARIATION

Those parts of the handrails and balustrades less than 125 mm from any glazing or any combustible wall shall be—

- (a) of non-combustible material; *or*
- (b) bushfire-resisting timber (see Appendix F); *or*
- (c) a combination of Items (i) and (ii) above.

Those parts of the handrails and balustrades that are 125 mm or more from the building have no requirements.

5.8 WATER AND GAS SUPPLY PIPES

Above-ground, exposed water and gas supply pipes shall be metal.



SECTION 3: CONSTRUCTION GENERAL

3.3 EXTERNAL MOULDINGS

Unless otherwise required in Sections 4 to 9, combustible external mouldings, jointing strips, trims and sealants may be used for decorative purposes or to cover joints between sheeting material.

3.6 VENTS, WEEPHOLES AND GAPS

Where a circular probe of 3 mm diameter is capable of being passed through external vents, weepholes or gaps, the vents, weepholes and gaps shall be screened as specified in Sections 3, 5, 6, 7, 8 and 9, except for weepholes from the frames of windows and glazed doors.

To determine the maximum aperture size of screening material, it shall not be possible to pass a circular probe of 2 mm diameter through the aperture.

Gaps between doors and the door jambs, heads or sills (thresholds) shall be as shown in Figure 3.2. Alternatively, gaps shall be protected by draught excluders.

C3.6 Weepholes from the frames of windows and glazed doors and those gaps between doors and door jambs, heads or sills (thresholds) that may exceed 3 mm (see Figure 3.2) are exempt from screening because they do not provide a direct passage for embers to the interior of the building or building cavity.

3.7 BUSHFIRE SHUTTERS

Bushfire shutters shall—

- (a) be fixed to the building and be non-removable;
- (b) when in the closed position, have no gap greater than 3 mm between the shutter and the wall, the sill or the head;
- (c) be readily manually operable from either inside or outside;
- (d) protect the entire window assembly or door assembly;
- (e) consist of materials specified in Clauses 5.5.1, 6.5.1, 7.5.1, 8.5.1 and 9.5.1 for the relevant BAL; and
- (f) where perforated, have—
 - (i) uniformly distributed perforations with a maximum aperture of 3 mm when the shutter is providing radiant heat protection or 2 mm when the shutter is also providing ember protection (such as where the openable portion of the window is not screened in accordance with the requirements of the respective BAL); and
 - (ii) a perforated area no greater than 20% of the shutter.

If bushfire shutters are fitted to all external doors then at least one of those shutters shall be operable from the inside to facilitate safe egress from the building.



SECTION 6 CONSTRUCTION FOR BUSHFIRE ATTACK LEVEL 19 (BAL — 19)

6.1 GENERAL

A building assessed in Section 2 as being BAL—19 shall comply with Section 3 and Clauses 6.2 to 6.8.

There are a number of Standards that specify requirements for construction; however, where this Standard does not provide construction requirements for a particular element, the other Standards apply.

Any element of construction or system that satisfies the test criteria of AS 1530.8.1 may be used in lieu of the applicable requirements contained in Clauses 6.2 to 6.8 (see Clause 3.8).

NOTE: BAL—19 is primarily concerned with protection from ember attack and radiant heat greater than 12.5 kW/m² up to and including 19 kW/m².

6.2 SUBFLOOR SUPPORTS

NSW RURAL FIRE SERVICE VARIATION

This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with—

- (a) wall that complies with **(Clause 6.4 as appropriate)**; or
- (b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion resistant steel, bronze or aluminium; or
- (c) a combination of Items (a) and (b) above.

Where the subfloor space is unenclosed, the support posts, columns, stumps, piers and poles shall be—

- (i) of non-combustible material; or
- (ii) of bushfire-resisting timber (see Appendix (ii) F); or
- (iii) a combination of Items (i) and (ii) above. (iii)

NOTE: This requirement applies to the principal building only and not to verandas, decks, steps, ramps and landings.

6.3 FLOORS

6.3.1 Concrete slabs on the ground

This Standard does not provide construction requirements for concrete slabs on ground.



6.3.2 Elevated floors

NSW RURAL FIRE SERVICE VARIATION

Enclosed Subfloor Space

This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring, where the subfloor space is enclosed with—

- (a) a wall that complies with **(Clause 6.4 appropriate)**; *or*
- (b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion resistant steel, bronze or aluminium; *or*
- (c) a combination of Items (a) and (b) above.

Unenclosed subfloor space

Where the subfloor space is unenclosed, the bearers, joists and flooring, less than 400 mm above finished ground level, shall be one of the following:

- (a) Materials that comply with the following:
 - (i) Bearers and joists shall be—
 - A. non-combustible; *or*
 - B. bushfire-resisting timber (see Appendix F); *or*
 - C. a combination of Items (A) and (B) above
 - (ii) Flooring shall be—
 - A. non-combustible; *or*
 - B. bushfire-resisting timber (see Appendix F); *or*
 - C. timber (other than bushfire-resisting timber), particleboard or plywood flooring where the underside is lined with sarking-type material or mineral wool insulation; *or*
 - D. a combination of any of Items (A), (B) or (C) above *or*
- (b) A system complying with AS 1530.8.1

This Standard does not provide construction requirements for elements of elevated floors, including bearers, joists and flooring, if the underside of the element is 400 mm or more above finished ground level.

6.4 EXTERNAL WALLS

6.4.1 Walls

The exposed components of an external wall that are less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the wall (see Figure D3, Appendix D) shall be:

- (a) Non-combustible material.
NOTE: Examples include, but are not limited to, the following (with a minimum of 90 mm in thickness):
 - (a) Full masonry or masonry veneer walls with an outer leaf of clay, concrete, calcium silicate or natural stone.
 - (b) Precast or in situ walls of concrete or aerated concrete.
 - (c) Earth wall including mud brick.
- or*
- (b) Timber logs of a species with a density of 680 kg/m³ or greater at a 12 percent moisture content; of a minimum nominal overall thickness of 90 mm and a minimum thickness of 70 mm (see Clause 3.11); and gauge planed.
- or*



- (c) Cladding that is fixed externally to a timber-framed or a steel-framed wall and is—
 - (i) non-combustible material; or
 - (ii) fibre-cement a minimum of 6 mm in thickness; or
 - (iii) bushfire-resisting timber (see Appendix F); or
 - (iv) a timber species as specified in Paragraph E1, Appendix E; or
 - (v) a combination of any of Items (i), (ii), (iii) or (iv) above.
- or
- (d) a combination of any of Items (a), (b) or (c) above.

This Standard does not provide construction requirements for the exposed components of an external wall that are 400 mm or more from the ground or 400 mm or more above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the wall (see Figure D3, Appendix D).

6.4.2 Joints

All joints in the external surface material of walls shall be covered, sealed, overlapped, backed or butt-jointed to prevent gaps greater than 3 mm.

6.4.3 Vents and weepholes

Vents and weepholes in external walls shall be screened with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium, except where the vents and weepholes have an aperture less than 3 mm (see Clause 3.6), or are located in an external wall of a subfloor space.

6.5 EXTERNAL GLAZED ELEMENTS AND ASSEMBLIES AND EXTERNAL DOORS

6.5.1 Bushfire shutters

Where fitted, bushfire shutters shall comply with Clause 3.7 and be made from—

- (a) non-combustible material; *or*
- (b) a timber species as specified in Paragraph E1, Appendix E; *or*
- (c) bushfire-resisting timber (see Appendix F); *or*
- (d) a combination of any of Items (a), (b), or (c) above.

6.5.1A Screens for windows and doors

Where fitted, screens for windows and doors shall have a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium. Gaps between the perimeter of the screen assembly and the building element to which it is fitted shall not exceed 3 mm.

The frame supporting the mesh or perforated sheet shall be made from—

- (a) metal; *or*
- (b) bushfire-resisting timber (see Appendix F); *or*
- (c) a timber species as specified in Paragraph E2, Appendix E.

6.5.2 Windows

Window assemblies shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with Clause 6.5.1.
or
- (b) They shall be completely protected externally by screens that comply with Clause 6.5.1A.
or
- (c) They shall comply with the following:



- (i) For window assemblies less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings (such as masonry sills) having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), window frames and window joinery, shall be made from:
 - (A) Bushfire-resisting timber (see Appendix F).
 - or
 - (B) A timber species as specified in Paragraph E2, Appendix E.
 - or
 - (C) Metal.
 - or
 - (D) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel and the frame and the sash shall satisfy the design load, performance and structural strength of the member.
- (ii) Externally fitted hardware that supports the sash in its functions of opening and closing, shall be metal.
- (iii) Where glazing is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings, having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), the glazing shall be toughened glass minimum 5 mm in thickness, or glass blocks with no restriction on glazing methods.
NOTE: Where double-glazed units are used, the above requirements apply to the external face of the window assembly only.
- (iv) Where glazing is other than that specified in Item (iii) above, annealed glass may be used. Where annealed glass is used, both the fixed and openable portions of windows shall be screened externally with screens that comply with Clause 6.5.1A.
- (v) Where toughened glass is used, it shall be toughened glass minimum 5 mm and the openable portions of windows shall be screened internally or externally with screens that comply with Clause 6.5.1A.
- (vi) Glazed elements that are designed to take internal screens shall use toughened glass minimum 5 mm and the openable portion shall be screened with screens that comply with Clause 6.5.1A.

6.5.3 Doors—Side-hung external doors (including French doors, panel fold and bi-fold doors)

Side-hung external doors, including French doors, panel fold and bi-fold doors, shall comply with one of the following:

- (a) Doors and door frames shall be protected by bushfire shutters that comply with Clause 6.5.1.
- or
- (b) Doors and door frames shall be protected externally by screens that comply with Clause 6.5.1A.
- or
- (c) Doors and door frames shall comply with the following:
 - (i) Doors shall be—
 - (A) non-combustible; or
 - (B) a solid timber, laminated timber or reconstituted timber door, having a minimum thickness of 35 mm for the first 400 mm above the threshold; or
 - (C) a door, including a hollow core door, with a non-combustible kickplate on the outside for the first 400 mm above the threshold; or
 - (D) a door, including a hollow core door, protected externally by a screen that complies with Clause 6.5.1A; or
 - (E) a fully framed glazed door, where the framing is made from materials specified for bushfire shutters (see Clause 6.5.1), or from a timber species as specified in Paragraph E2, Appendix E.



- (ii) Where doors incorporate glazing, the glazing shall be toughened glass minimum 5 mm thickness.
- (iii) Doors shall be tight-fitting to the door frame and to an abutting door, if applicable.
- (iv) Where the door frame is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the door (see Figure D3, Appendix D), that part of the door frame shall be made from one of the following:
 - (A) Bushfire-resisting timber (see Appendix F).
 - or
 - (B) A timber species as specified in Paragraph E2, Appendix E.
 - or
 - (C) Metal.
 - or
 - (D) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel and the door assembly shall satisfy the design load, performance and structural strength of the member.
- (v) Weather strips, draught excluders or draught seals shall be installed at the base of side-hung external doors.

6.5.4 Doors—Sliding doors

Sliding doors shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with Clause 6.5.1.
- or
- (b) They shall be completely protected externally by screens that comply with Clause 6.5.1A.
- or
- (c) They shall comply with the following:
 - (i) Any glazing incorporated in sliding doors shall be toughened glass minimum 5 mm.
 - (ii) Both the door frame supporting the sliding door and the framing surrounding any glazing shall be made from:
 - (A) Bushfire-resisting timber (see Appendix F).
 - or
 - (B) A timber species as specified in Paragraph E2, Appendix E.
 - or
 - (C) Metal.
 - or
 - (D) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel and the frame and the sash shall satisfy the design load, performance and structural strength of the member.
 - (iii) There is no requirement to screen the openable part of the sliding door. However, if screened, the screens shall comply with Clause 6.5.1A.

NOTE: The construction of manufactured sliding doors should prevent the entry of embers when the door is closed. There is no requirement to provide screens to the openable part of these doors as it is assumed that a sliding door will be closed if occupants are not present or during a bushfire event. Screens of materials other than those specified may not resist ember attack.

- (iv) Sliding doors shall be tight-fitting in the frames.



6.5.5 Doors—Vehicle access doors (garage doors)

The following apply to vehicle access doors:

- (a) The lower portion of a vehicle access door that is within 400 mm of the ground when the door is closed (see Figure D4, Appendix D) shall be made from—
 - (i) non-combustible material; *or*
 - (ii) bushfire-resisting timber (see Appendix F); *or*
 - (iii) fibre-cement sheet a minimum of 6 mm in thickness; *or*
 - (iv) a timber species as specified in Paragraph E1, Appendix E; *or*
 - (v) a combination of any of Items (i), (ii), (iii) or (iv) above.
- (b) Panel lift, tilt doors or side-hung doors shall be fitted with suitable weather strips, draught excluders, draught seals or guide tracks, as appropriate to the door type, with a maximum gap no greater than 3 mm.
- (c) Roller doors shall have guide tracks with a maximum gap no greater than 3 mm and shall be fitted with a nylon brush that is in contact with the door (see Figure D4, Appendix D).
- (d) Vehicle access doors shall not include ventilation slots.

6.6 ROOFS (INCLUDING VERANDA AND ATTACHED CARPORT ROOFS, PENETRATIONS, EAVES, FASCIAS, GABLES, GUTTERS AND DOWNPIPES)

6.6.1 General

The following apply to all types of roofs and roofing systems:

- (a) Roof tiles, roof sheets and roof-covering accessories shall be non-combustible.
- (b) The roof/wall junction shall be sealed, to prevent openings greater than 3 mm, either by the use of fascia and eaves linings or by sealing between the top of the wall and the underside of the roof and between the rafters at the line of the wall.
- (c) Roof ventilation openings, such as gable and roof vents, shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

NSW RURAL FIRE SERVICE VARIATION

SARKING

Any sarking used shall be:

- (a) Non-combustible; *or*
- (b) Breather-type sarking complying with AS/NZS 4200.1 and with a flammability index of not more than 5 (see AS1530.2) and sarked on the outside of the frame; *or*
- (c) An insulation material conforming to the appropriate Australian Standard for that material.

6.6.2 Tiled roofs

Tiled roofs shall be fully sarked. The sarking shall—

- (a) be located on top of the roof framing, except that the roof battens may be fixed above the sarking;
- (b) cover the entire roof area including ridges and hips; and
- (c) extend into gutters and valleys.

6.6.3 Sheet roofs

Sheet roofs shall—

- (a) be fully sarked in accordance with Clause 6.6.2, except that foil-backed insulation blankets may be installed over the battens; and
- (b) have any gaps greater than 3 mm (such as under corrugations or ribs of sheet roofing and between roof components) sealed at the fascia or wall line and at valleys, hips and ridges by—



- (i) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or
- (ii) mineral wool; or
- (iii) other non-combustible material; or
- (iv) a combination of any of Items (i), (ii) or (iii) above.

6.6.4 Veranda, carport and awning roofs

The following apply to veranda, carport and awning roofs:

- (a) A veranda, carport or awning roof forming part of the main roof space [see Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in Clauses 6.6.1, 6.6.2, 6.6.3, 6.6.5 and 6.6.6.
- (b) A veranda, carport or awning roof separated from the main roof space by an external wall [see Figures D1(b) and D1(c), Appendix D] complying with Clause 6.4 shall have a non-combustible roof covering.

NOTE: There is no requirement to line the underside of a veranda, carport or awning roof that is separated from the main roof space.

6.6.5 Roof penetrations

The following apply to roof penetrations:

- (a) Roof penetrations, including roof lights, roof ventilators, roof-mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors shall be adequately sealed at the roof to prevent gaps greater than 3 mm. The material used to seal the penetration shall be non-combustible.
- (b) Openings in vented roof lights, roof ventilators or vent pipes shall be fitted with ember guards made from a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium. This requirement does not apply to the exhaust flues of heating or cooking devices with closed combustion chambers. In the case of gas appliance flues, ember guards shall not be fitted.
NOTE: Gasfitters are required to provide a metal flue pipe above the roof and terminate with a certified gas flue cowl complying with AS 4566. Advice may be obtained from State gas technical regulators.
- (c) All overhead glazing shall be Grade A safety glass complying with AS 1288.
- (d) Glazed elements in roof lights and skylights may be of polymer, provided a Grade A safety glass diffuser, complying with AS 1288, is installed under the glazing. Where glazing is an insulating glazing unit (IGU), Grade A toughened safety glass of minimum 4 mm in thickness shall be used in the outer pane of the IGU.
- (e) Flashing elements of tubular skylights may be of a fire-retardant material, provided the roof integrity is maintained by an under-flashing of a material having a flammability index no greater than 5.
- (f) Evaporative cooling units shall be fitted with non-combustible butterfly closers as close as practicable to the roof level, or the unit shall be fitted with non-combustible covers with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

6.6.6 Eaves linings, fascias and gables

The following apply to eaves linings, fascias and gables:

- (a) Gables shall comply with Clause 6.4.
- (b) Eaves penetrations shall be protected the same as for roof penetrations, as specified in Clause 6.6.5.



- (c) Eaves ventilation openings greater than 3 mm shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.

This Standard does not provide construction requirements for fascias, bargeboards and eaves linings.

6.6.7 Gutters and downpipes

This Standard does not provide material requirements for—

- (a) gutters, with the exception of box gutters; and
- (b) downpipes.

If installed, gutter and valley leaf guards shall be non-combustible.

Box gutters shall be non-combustible and flashed at the junction with the roof with non-combustible material.

6.7 VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS

6.7.1 General

Decking may be spaced.

There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.

C6.7.1 Spaced decking is nominally spaced at 3 mm (in accordance with standard industry practice); however, due to the nature of timber decking with seasonal changes in moisture content, that spacing may range from 0–5 mm during service. The preferred dimension for gaps is 3 mm (which is in line with other 'permissible gaps') in other parts of this Standard.

It should be noted that recent research studies have shown that gaps at 5 mm spacing afford opportunity for embers to become lodged in between timbers, which may contribute to a fire. Larger gap spacings of 10 mm may preclude this from happening but such a spacing regime may not be practical for a timber deck.

6.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings

6.7.2.1 Materials to enclose a subfloor space

NSW RURAL FIRE SERVICE VARIATION

The subfloor spaces of verandas, decks, steps, ramps and landings are considered to be 'enclosed' when —

- (a) the material used to enclose the subfloor space complies with **(Clause 6.4 as appropriate)**; and
- (b) all openings greater than 3 mm are screened with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

6.7.2.2 Subfloor supports

This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.



6.7.2.3 Framing

This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).

6.7.2.4 Decking, stair treads and the trafficable surfaces of ramps and landings

NSW RURAL FIRE SERVICE VARIATION

Decking, stair treads and the trafficable surfaces of ramps and landings shall be—

- (a) of non-combustible material; *or*
- (b) of bushfire-resisting timber (see Appendix F); *or*
- (c) a combination of Items (a) and (b) above.

6.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings

6.7.3.1 Supports

NSW RURAL FIRE SERVICE VARIATION

Support posts, columns, stumps, stringers, piers and poles shall be—

- (a) of non-combustible material; *or*
- (b) of bushfire-resisting timber (see Appendix F); *or*
- (c) a combination of Items (a) and (b) above.

6.7.3.2 Framing

NSW RURAL FIRE SERVICE VARIATION

Framing of verandas, decks, ramps or landings (i.e., bearers and joists) shall be—

- (a) of non-combustible material; *or*
- (b) of bushfire-resisting timber (see Appendix F); *or*
- (c) a combination of Items (a) and (b) above.

6.7.3.3 Decking, stair treads and the trafficable surfaces of ramps and landings

NSW RURAL FIRE SERVICE VARIATION

Decking, stair treads and the trafficable surfaces of ramps and landings shall be—

- (a) of non-combustible material; *or*
- (b) of bushfire-resisting timber (see Appendix F); *or*
- (c) a combination of Items (a) and (b) above.



6.7.4 Balustrades, handrails or other barriers

NSW RURAL FIRE SERVICE VARIATION

Those parts of the handrails and balustrades less than 125 mm from any glazing or any combustible wall shall be—

- (a) of non-combustible material; *or*
- (b) bushfire-resisting timber (see Appendix F); *or*
- (c) a combination of Items (i) and (ii) above.

Those parts of the handrails and balustrades that are 125 mm or more from the building have no requirements.

6.8 WATER AND GAS SUPPLY PIPES

Above-ground, exposed water and gas supply pipes shall be metal.

