



BUSHFIRE ATTACK LEVEL

FOR FUTURE DWELLINGS

AT STAGE I

BILLY'S LOOKOUT

TERALBA

Prepared by:

Firebird ecoSultants Pty Ltd

ABN – 16 105 985 993

PO Box 354

Newcastle NSW 2300

Mob: 0414 465 990

Ph: 02 4910 3939

Fax: 02 4929 2727

Email: sarah@firebirdeco.com.au



| | |
|------------------------------------|---|
| Site Details: | Stage 1 at Billy's Lookout, Teralba |
| Prepared by: | <i>Sarah Jones B.Env.Sc.,G.Dip.DBPA (Design in Bushfire Prone Areas)</i> <i>Firebird ecoSultants Pty Ltd</i> ABN – 16 105 985 993 PO Box 354, Newcastle NSW 2300 M: 0414 465 990 Email: sarah@firebirdeco.com.au T: 02 4910 3939 Fax: 02 4929 2727 |
| Prepared for: | McCloy Teralba |
| Reference No. | Teralba - McCloy |
| Document Status & Date: | Draft for Client Review 12 February 2015 Final August 2015 |

Disclaimer

Notwithstanding the precautions adopted within this report, it should always be remembered that bushfires burn under a wide range of conditions. An element of risk, no matter how small always remains, and although the standard is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.

Executive Summary

This report provides an assessment of the Bushfire Attack Level (BAL) at Stage 1 within Billy's Lookout, Teralba in accordance with AS3959 (2009) *Construction of Buildings in Bushfire Prone Areas* Appendix B - Detailed Method 2. This report and mapping are not to be used to place wholesale restrictions on lots reflecting the resulting BAL mapping presented within. Future development of surrounding stages may result in lower BALs than detailed in this report.

This BAL report has shown that any future dwellings within the site will be able to meet the requirements of both AS3959-2009 and the addendum to Appendix 3 of Planning PBP 2006 (NSW Rural Fire Service NSW).



Sarah Jones

Ecologist / Bushfire Planner

BPAD-A Certified Practitioner (BPD-PA-26512)

B.Env.Sc., G.Dip.DBPA (Design for Bushfire Prone Areas)

Disclaimer:

The BALs as depicted within this report and mapping have been determined by management of vegetation to the east within the retirement village and to the west. It should be noted that conditions may change over time that may result in different BALs for the lots.

Although every care has been taken in the preparation of this BAL Report, North Lakes Estate and the author accept no responsibility in errors in this report or damaged resulting from the information. It should be noted that upon lodgement of a Development Application (DA) with Council or Rural Fires Service they may recommend additional construction requirements (BALs).



Terms & Abbreviations

| Abbreviation | Meaning |
|----------------|--|
| APZ | Asset Protection Zone |
| AS2419 -2005 | Australian Standard – Fire Hydrant Installations |
| AS3959-2009 | Australian Standard – Construction of Buildings in Bush Fire Prone Areas |
| BAL | Bushfire Attack Level |
| BCA | Building Code of Australia |
| BPA | Bush Fire Prone Area (Also Bushfire Prone Land) |
| BPL Map | Bush Fire Prone Land Map |
| BPMs | Bush Fire Protection Measures |
| <i>EPA Act</i> | <i>NSW Environmental Planning and Assessment Act 1979</i> |
| FDI | Fire Danger Index |
| FMP | Fuel Management Plan |
| ha | hectare |
| IPA | Inner Protection Area |
| LMCC | Lake Macquarie City Council |
| LGA | Local Government Area |
| OPA | Outer Protection Area |
| PBP | Planning for Bushfire Protection 2006 |
| RF Act | Rural Fires Act 1997 |
| RF Regulation | Rural Fires Regulation |



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I INTRODUCTION

Firebird ecoSultants Pty Ltd has been engaged by Teralba McCloys Pty Ltd to undertake a Bushfire Attack Level (BAL) report for Stage 1 at Billy's Lookout, Teralba hereafter referred to as the "site". Refer to Appendix A for Sales Plan.

This BAL report assess the application of Australian Standard AS3959-2009 'Construction of Buildings on Bushfire Prone Land' and Appendix 3 of Planning for Bushfire Protection 2006 (PBP, 2006).

AS3959 (2009) Appendix B - Detailed Method 2 has been used in this assessment. Assessment Method 2 provides for a site specific and accurate determination of the hypothetical radiant heat flux levels a bushfire could be expected to generate under certain environmental conditions. Assessment Method 2 is an approved methodology for bushfire risk assessment as per AS3959 – 2009.

This report has been prepared to provide guidance to prospective purchasers of what Bushfire Attack Levels (BALs) may be required for future dwellings within the site.

I.1 Site Particulars

| | |
|-----------------------------|-------------------------------------|
| Locality: | Stage 1 at Billy's Lookout, Teralba |
| LGA: | Lake Macquarie City Council (LMCC) |
| Forest Danger Index: | 100 |
| Current Land Use: | Approved subdivision |



2 METHODOLOGY

The Australian Standard for assessing the BAL and providing the detailed requirements for construction has been reviewed and amended with the latest version being adopted for use in bushfire prone areas of NSW in May 2010. This version is titled AS 3959-2009 'Construction of Buildings in Bushfire Prone Areas' (standards Australia 2009, incorporating amendment 1 (November 2009) and amendment 2 (February 2011), with amendment 2 being used in this assessment.

In addition, the NSW method of determining the bushfire attack level, found in Appendix 3 of the document 'Planning for Bushfire Protection 2006' (NSW Rural Fire Service 2006) has also been reviewed and amended to come into line with the process within AS 3959. Therefore, in NSW the methodology with AS 3959 is to be used to determine the bushfire attack level.

AS3959 (2009) Appendix B - Detailed Method 2 has been used in this BAL assessment. Assessment Method 2 provides for a site specific and accurate determination of the hypothetical radiant heat flux levels a bushfire could be expected to generate under certain environmental conditions.

2.1 Vegetation Assessment

Vegetation surveys and vegetation mapping carried out on the site has been undertaken as follows:

- Aerial Photograph Interpretation to map vegetation cover and extent.
- Confirmation of the vegetation assemblage typology present via a site inspection.

2.2 Slope Assessment

Slope assessment has been undertaken as follows:

- Aerial Photograph Interpretation in conjunction with analysis of electronic contour maps with a contour interval of 10m.
- On site confirmation of slope measurements.



3 SITE ASSESSMENT

A site inspection was undertaken on the site. The following assessment has been undertaken in accordance with the requirements of PBP (RFS, 2006) and AS3959-2009.

3.1 Vegetation and Slope Assessment

An assessment of the slope affecting the bushfire behaviour was undertaken for a distance of 100m from the edge of the lot boundaries in the direction of the bushfire hazard. The slopes leading away from the site have been evaluated to identify both the average slope and by identifying the maximum slope present. These values help determine the level of gradient which will most significantly influence the fire behaviour of the site. Refer to Table 1 for Vegetation and Slope Assessment.

Table 1 –Vegetation & Slope Assessment

| Direction from Site | Vegetation Classification | Effective Slope |
|---------------------|--|---------------------|
| North | N/A – Residential Development | N/A |
| East | Managed Land as part of the Retirement Village | N/A |
| South | Open Forest | Upslope |
| West | Open Forest | Downslope 6 degrees |



4 BUSHFIRE ATTACK ASSESSMENT

4.1 Bushfire Attack Assessment

To determine the bush fire attack and required Bushfire Attack Level (BAL) for the proposed subdivision the following steps were followed:

1. Determination of the vegetation types within 100m of the site, as assessed in section 3 of this report.
2. Determination of the distance between the vegetation and future dwellings has been assessed in section 4.2 of this report.
3. Determination of the effective slope as assessed in section 3 of this report.
4. A FDI of 100 was determined for LMCC LGA.

4.2 Determination of Bushfire Attack Levels

The results from the above steps were used to calculate the required BAL in accordance with Method 2 of AS 3959 – 2009. Method 2 provides for a site specific and accurate determination of the hypothetical radiant heat flux levels a bushfire could be expected to generate under certain environmental conditions. Assessment Method 2 is an approved methodology for bushfire risk assessment as per AS3959 – 2009.

The results from this bush fire attack assessment are detailed below in Table 4-1– Bushfire Attack Level (BAL) Assessment and Figure 4-1 Bushfire Attack Level Map refer to Appendix B for Bushfire Attack Calculations.

Table 4-1: Bushfire Attack Level Assessment

| Lot Number | Vegetation Type within 100m & Direction from future dwellings | Average Slope of Land (degrees) | Separation Distance from Identified Vegetation | Bushfire Attack Level (BAL) | Construction Section |
|------------|---|---------------------------------|--|-----------------------------|---|
| Lot 101 | Open Forest to the west | Downslope 6 degrees | 35-47m | BAL-29 | Sect 3 & 7 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| | | | 47 – 63m | BAL-19 | Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |

| Lot Number | Vegetation Type within 100m & Direction from future dwellings | Average Slope of Land (degrees) | Separation Distance from Identified Vegetation | Bushfire Attack Level (BAL) | Construction Section |
|------------|---|---------------------------------|--|-----------------------------|--|
| Lot 102 | Open Forest to the west | Downslope 6 degrees | 35-47m | BAL-29 | Sect 3 & 7 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| | | | 47 – 63m | BAL-19 | Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 103 | Open Forest to the west | Downslope 6 degrees | >63-100m | BAL 12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 104 | Open Forest to the west | Downslope 6 degrees | >63-100m | BAL 12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 105 | Open Forest to the west | Downslope 6 degrees | >63-100m | BAL 12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 106 | No hazard within 100m of the lot | N/A | >100m | BAL LOW | BAL-LOW: Minimal attack from radiant heat and flame due to the distance of the site from the vegetation, although some attack by burning debris is possible. There is insufficient threat to warrant specific construction requirements, but residents should still do basic property preparation |
| Lot 107 | No hazard No hazard within 100m of the lot | N/A | >100m | BAL LOW | BAL-LOW: Minimal attack from radiant heat and flame due to the distance of the site from the |

| Lot Number | Vegetation Type within 100m & Direction from future dwellings | Average Slope of Land (degrees) | Separation Distance from Identified Vegetation | Bushfire Attack Level (BAL) | Construction Section |
|------------|---|---------------------------------|--|-----------------------------|--|
| | | | | | vegetation, although some attack by burning debris is possible. There is insufficient threat to warrant specific construction requirements, but residents should still do basic property preparation |
| Lot 108 | No hazard No hazard within 100m of the lot | N/A | >100m | BAL LOW | BAL-LOW: Minimal attack from radiant heat and flame due to the distance of the site from the vegetation, although some attack by burning debris is possible. There is insufficient threat to warrant specific construction requirements, but residents should still do basic property preparation |
| Lot 109 | No hazard No hazard within 100m of the lot | N/A | >100m | BAL LOW | BAL-LOW: Minimal attack from radiant heat and flame due to the distance of the site from the vegetation, although some attack by burning debris is possible. There is insufficient threat to warrant specific construction requirements, but residents should still do basic property preparation |
| Lot 110 | No hazard No hazard within 100m of the lot | N/A | >100m | BAL LOW | BAL-LOW: Minimal attack from radiant heat and flame due to the distance of the site from the vegetation, although some attack by burning debris is |

| Lot Number | Vegetation Type within 100m & Direction from future dwellings | Average Slope of Land (degrees) | Separation Distance from Identified Vegetation | Bushfire Attack Level (BAL) | Construction Section |
|------------|---|----------------------------------|--|-----------------------------|--|
| | | | | | possible. There is insufficient threat to warrant specific construction requirements, but residents should still do basic property preparation |
| Lot 111 | No hazard No hazard within 100m of the lot | N/A | >100m | BAL LOW | BAL-LOW: Minimal attack from radiant heat and flame due to the distance of the site from the vegetation, although some attack by burning debris is possible. There is insufficient threat to warrant specific construction requirements, but residents should still do basic property preparation |
| Lot 112 | No hazard No hazard within 100m of the lot | N/A | >100m | BAL LOW | BAL-LOW: Minimal attack from radiant heat and flame due to the distance of the site from the vegetation, although some attack by burning debris is possible. There is insufficient threat to warrant specific construction requirements, but residents should still do basic property preparation |
| Lot 113 | Open Forest to the south | Upslope on a slope of 11 degrees | >32-100m | BAL 12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 114 | Open Forest to the south | Upslope on a slope of 11 degrees | >32-100m | BAL 12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix |

| Lot Number | Vegetation Type within 100m & Direction from future dwellings | Average Slope of Land (degrees) | Separation Distance from Identified Vegetation | Bushfire Attack Level (BAL) | Construction Section |
|------------|---|----------------------------------|--|-----------------------------|---|
| | | | | | 3 |
| Lot 115 | Open Forest to the south | Upslope on a slope of 11 degrees | 22 >32m | BAL-19 | Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| | | | 32-100m | BAL-12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 116 | Open Forest to the south | Upslope on a slope of 11 degrees | 22 >32m | BAL-19 | Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| | | | 32-100m | BAL-12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 117 | Open Forest to the south | Upslope on a slope of 11 degrees | 22 >32m | BAL-19 | Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| | | | 32-100m | BAL-12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 118 | Open Forest to the south | Upslope on a slope of 11 degrees | 22 >32m | BAL-19 | Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| | | | 32-100m | BAL-12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |

| Lot Number | Vegetation Type within 100m & Direction from future dwellings | Average Slope of Land (degrees) | Separation Distance from Identified Vegetation | Bushfire Attack Level (BAL) | Construction Section |
|------------|---|----------------------------------|--|-----------------------------|--|
| Lot 119 | Open Forest to the south | Upslope on a slope of 11 degrees | 22 >32m | BAL-19 | Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| | | | 32-100m | BAL-12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 120 | Open Forest to the south | Upslope on a slope of 11 degrees | 22 >32m | BAL-19 | Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| | | | 32-100m | BAL-12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 121 | Open Forest to the west | Downslope 6 degrees | 47-63m | BAL-19 | Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| | | | 63-100m | BAL-12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 122 | Open Forest to the west | Downslope 6 degrees | 35-47m | BAL-29 | Sect 3 & 7 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3preparation |
| | | | 47 – 63m | BAL-19 | Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |

| Lot Number | Vegetation Type within 100m & Direction from future dwellings | Average Slope of Land (degrees) | Separation Distance from Identified Vegetation | Bushfire Attack Level (BAL) | Construction Section |
|------------|---|----------------------------------|--|-----------------------------|---|
| Lot 123 | Open Forest to the west | Downslope 6 degrees | 35-47m | BAL-29 | Sect 3 & 7 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| | | | 47 – 63m | BAL-19 | Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 124 | Open Forest to the west | Downslope 6 degrees | 47 – 63m | BAL-19 | Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| | | | 63-100m | BAL-12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 125 | Open Forest to the west | Downslope 6 degrees | 63-100m | BAL-12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 126 | Open Forest to the south | Upslope on a slope of 11 degrees | >32-100m | BAL-12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 127 | Open Forest to the south | Upslope on a slope of 11 degrees | >32-100m | BAL-12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 128 | Open Forest to the south | Upslope on a slope of 11 degrees | >32-100m | BAL-12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |

| Lot Number | Vegetation Type within 100m & Direction from future dwellings | Average Slope of Land (degrees) | Separation Distance from Identified Vegetation | Bushfire Attack Level (BAL) | Construction Section |
|------------|---|----------------------------------|--|-----------------------------|---|
| | | | | | 3 |
| Lot 129 | Open Forest to the south | Upslope on a slope of 11 degrees | >32-100m | BAL-12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |
| Lot 130 | Open Forest to the south | Upslope on a slope of 11 degrees | >32-100m | BAL-12.5 | Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3 |

*To Note: The construction requirements for the next lower BAL than that determined for the site may be applied to an elevation of the building where the elevation is not exposed to the source of the bushfire attack. An elevation is deemed to be not exposed to the source of bushfire attack if all the straight lines between that elevation and the source of bushfire attack are obstructed by another part of the building. However, this does not apply to BAL-12.

No BALs applies to any future dwelling built greater than 100m from the Open Forest.

This report and mapping are not to be used to place wholesale restrictions on lots reflecting the resulting BAL mapping presented within. Building location and design will influence the application of the required BALs. For example, a lot indicated as being affected by BAL-29 may have those facades that are not exposed to the bushfire threat constructed to a lower BAL (i.e. BAL-19), reducing the costs of construction and providing more flexibility in choice of external building materials. Refer to Appendix B for Summary of AS3959-2009 Construction Standards and Appendix C for Additional Building Requirements.

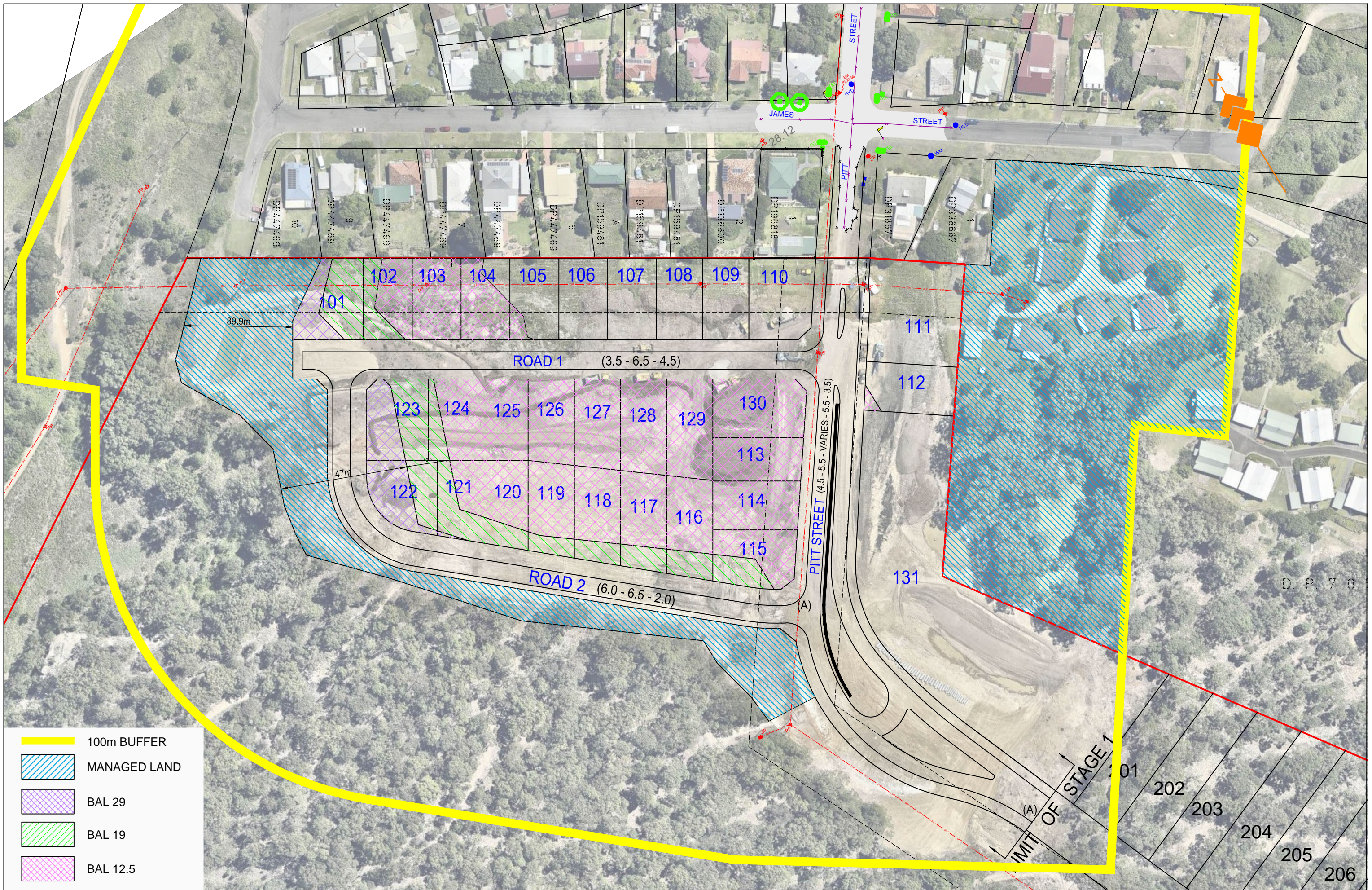


FIGURE 4-1: Bushfire Attach Level Map

Firebird ecoSultants Pty Ltd
level 1 146 Hunter Street
Newcastle NSW 2300
Phone: 0414465990

TITLE:
PROPOSED SUBDIVISION OF LOT
31 AND 32 DP 858667 AND LOT 2
DP628454 STAGE 1
PITT STREET TERALBA

| | | | | | |
|----------------------|------------------|------------------|----------|--------------|--|
| Date: 1.11.14 | | Scale: 1:1000 A3 | | Designed: KU | |
| Cad Ref: TERALBA APZ | | | | | |
| 2 | AMEND BAL LEVELS | KU | 15.02.15 | | |
| 1 | ORIGINAL ISSUE | KU | 1.11.14 | | |
| No | Amendment | Drawn | Date | | |

| | | | |
|------------|----------|---------|--|
| Project No | | TERALBA | |
| Drawing No | Revision | | |
| 4-1 | 2 | | |

5 CONCLUSION

This report provides an assessment of the Bushfire Attack Level (BAL) in accordance with AS3959-2009 Construction of Buildings in Bushfire Prone Areas for Stage 1 at Billy's Lookout, Teralba.

This BAL report assess the application of Australian Standard AS3959-2009 'Construction of Buildings in Bushfire Prone Land' and Appendix 3 of Planning for Bushfire Protection 2006 (PBP, 2006).

AS3959 (2009) Appendix B - Detailed Method 2 has been used in this BAL assessment. Assessment Method 2 provides for a site specific and accurate determination of the hypothetical radiant heat flux levels a bushfire could be expected to generate under certain environmental conditions. Assessment Method 2 is an approved methodology for bushfire risk assessment as per AS3959 – 2009.

This report and mapping are not to be used to place wholesale restrictions on lots reflecting the resulting BAL mapping presented within. Future development of surrounding stages may result in lower BALs than detailed in this report.

This BAL report has shown that any future dwellings within the site will be able to meet the requirements of both AS3959-2009 and the addendum to Appendix 3 of Planning PBP 2006 (NSW Rural Fire Service NSW).



BPAD
Bushfire
Planning & Design
Accredited Practitioner
Level 3

Sarah Jones
Ecologist / Bushfire Planner
FPA BPAD-A Certified Practitioner (BPD-PA-26512)
B.Env.Sc. G.Dip.DBPA (Design for Bushfire Prone Areas)

Disclaimer:

The BALs as depicted within this report and mapping have been determined by vegetation within 100m of Stage 1 at the time of the assessment February 2015. It should be noted that conditions may change over time that may result in different BALs for the lots.



6 BIBLIOGRAPHY

NSW Rural Fire Service (RFS) 2006. Planning for Bushfire Protection: A guide for Councils, Planners, Fire Authorities, Developers and Home Owners. Australian Government Publishing Service, Canberra.

Standards Australia. 2009. Construction of buildings in bushfire-prone Areas, AS3959, Third Edition 2009, Incorporating Amendment 1, Standards Australia International Ltd Sydney



APPENDIX A SALE PLAN



APPENDIX B BUSHFIRE ATTACK CALCULATIONS

NBC Bushfire Attack Assessment Report V2.1

AS3959 (2009) Appendix B - Detailed Method 2

Printed: 11/08/2015 Assessment Date: 9/02/2015



Site Street Address: Billy's Lookout, Stage 1, Teralba
Assessor: Sarah Jones; Firebird Ecosultants Pty Ltd
Local Government Area: Lake Macquarie **Alpine Area:** No

Equations Used

Transmissivity: Fuss and Hammins, 2002
Flame Length: RFS PBP, 2001
Rate of Fire Spread: Noble et al., 1980
Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005
Peak Elevation of Receiver: Tan et al., 2005
Peak Flame Angle: Tan et al., 2005

Run Description: vegetation to the south

Vegetation Information

| | | | |
|---------------------------------|------------|---------------------------------|---------------------|
| Vegetation Type: | Forest | Vegetation Group: | Forest and Woodland |
| Vegetation Slope: | 11 Degrees | Vegetation Slope Type: | Upslope |
| Surface Fuel Load(t/ha): | 25 | Overall Fuel Load(t/ha): | 35 |

Site Information

| | | | |
|---------------------------------|-----------|---------------------------|-----------|
| Site Slope | 0 Degrees | Site Slope Type: | Downslope |
| Elevation of Receiver(m) | Default | APZ/Separation(m): | 31 |

Fire Inputs

| | | | |
|-----------------------------|-----|----------------------|------|
| Veg./Flame Width(m): | 100 | Flame Temp(K) | 1090 |
|-----------------------------|-----|----------------------|------|

Calculation Parameters

| | | | |
|----------------------------------|-------|------------------------------|-----|
| Flame Emissivity: | 95 | Relative Humidity(%): | 25 |
| Heat of Combustion(kJ/kg) | 18600 | Ambient Temp(K): | 308 |
| Moisture Factor: | 5 | FDI: | 100 |

Program Outputs

| | | | |
|-------------------------------|----------|---------------------------------------|-------|
| Category of Attack: | LOW | Peak Elevation of Receiver(m): | 6.47 |
| Level of Construction: | BAL 12.5 | Fire Intensity(kW/m): | 25396 |
| Radiant Heat(kW/m2): | 12.37 | Flame Angle (degrees): | 76 |
| Flame Length(m): | 13.33 | Maximum View Factor: | 0.202 |
| Rate Of Spread (km/h): | 1.4 | Inner Protection Area(m): | 21 |
| Transmissivity: | 0.806 | Outer Protection Area(m): | 10 |

| | |
|---|--|
| Run Description: Vegetation to the south | |
| <u>Vegetation Information</u> | |
| Vegetation Type: Forest | Vegetation Group: Forest and Woodland |
| Vegetation Slope: 11 Degrees | Vegetation Slope Type: Upslope |
| Surface Fuel Load(t/ha): 25 | Overall Fuel Load(t/ha): 35 |
| <u>Site Information</u> | |
| Site Slope 0 Degrees | Site Slope Type: Level |
| Elevation of Receiver(m) Default | APZ/Separation(m): 22 |
| <u>Fire Inputs</u> | |
| Veg./Flame Width(m): 100 | Flame Temp(K) 1090 |
| <u>Calculation Parameters</u> | |
| Flame Emissivity: 95 | Relative Humidity(%): 25 |
| Heat of Combustion(kJ/kg) 18600 | Ambient Temp(K): 308 |
| Moisture Factor: 5 | FDI: 100 |
| <u>Program Outputs</u> | |
| Category of Attack: MODERATE | Peak Elevation of Receiver(m): 6.3 |
| Level of Construction: BAL 19 | Fire Intensity(kW/m): 25396 |
| Radiant Heat(kW/m2): 18.7 | Flame Angle (degrees): 71 |
| Flame Length(m): 13.33 | Maximum View Factor: 0.296 |
| Rate Of Spread (km/h): 1.4 | Inner Protection Area(m): 15 |
| Transmissivity: 0.832 | Outer Protection Area(m): 7 |
| Run Description: vegetation to the west | |
| <u>Vegetation Information</u> | |
| Vegetation Type: Forest | Vegetation Group: Forest and Woodland |
| Vegetation Slope: 6 Degrees | Vegetation Slope Type: Downslope |
| Surface Fuel Load(t/ha): 25 | Overall Fuel Load(t/ha): 35 |
| <u>Site Information</u> | |
| Site Slope 0 Degrees | Site Slope Type: Downslope |
| Elevation of Receiver(m) Default | APZ/Separation(m): 62 |
| <u>Fire Inputs</u> | |
| Veg./Flame Width(m): 100 | Flame Temp(K) 1090 |
| <u>Calculation Parameters</u> | |
| Flame Emissivity: 95 | Relative Humidity(%): 25 |
| Heat of Combustion(kJ/kg) 18600 | Ambient Temp(K): 308 |
| Moisture Factor: 5 | FDI: 100 |
| <u>Program Outputs</u> | |
| Category of Attack: LOW | Peak Elevation of Receiver(m): 15.51 |
| Level of Construction: BAL 12.5 | Fire Intensity(kW/m): 82072 |
| Radiant Heat(kW/m2): 12.48 | Flame Angle (degrees): 67 |
| Flame Length(m): 33.7 | Maximum View Factor: 0.215 |
| Rate Of Spread (km/h): 4.54 | Inner Protection Area(m): 43 |
| Transmissivity: 0.762 | Outer Protection Area(m): 18 |

| | |
|--|--|
| Run Description: vegetation to the west | |
| <u>Vegetation Information</u> | |
| Vegetation Type: Forest | Vegetation Group: Forest and Woodland |
| Vegetation Slope: 6 Degrees | Vegetation Slope Type: Downslope |
| Surface Fuel Load(t/ha): 25 | Overall Fuel Load(t/ha): 35 |
| <u>Site Information</u> | |
| Site Slope 0 Degrees | Site Slope Type: Downslope |
| Elevation of Receiver(m) Default | APZ/Separation(m): 47 |
| <u>Fire Inputs</u> | |
| Veg./Flame Width(m): 100 | Flame Temp(K) 1090 |
| <u>Calculation Parameters</u> | |
| Flame Emissivity: 95 | Relative Humidity(%): 25 |
| Heat of Combustion(kJ/kg) 18600 | Ambient Temp(K): 308 |
| Moisture Factor: 5 | FDI: 100 |
| <u>Program Outputs</u> | |
| Category of Attack: MODERATE | Peak Elevation of Receiver(m): 15.01 |
| Level of Construction: BAL 19 | Fire Intensity(kW/m): 82072 |
| Radiant Heat(kW/m2): 18.72 | Flame Angle (degrees): 63 |
| Flame Length(m): 33.7 | Maximum View Factor: 0.314 |
| Rate Of Spread (km/h): 4.54 | Inner Protection Area(m): 32 |
| Transmissivity: 0.785 | Outer Protection Area(m): 15 |
| Run Description: vegetation to the west | |
| <u>Vegetation Information</u> | |
| Vegetation Type: Forest | Vegetation Group: Forest and Woodland |
| Vegetation Slope: 6 Degrees | Vegetation Slope Type: Downslope |
| Surface Fuel Load(t/ha): 25 | Overall Fuel Load(t/ha): 35 |
| <u>Site Information</u> | |
| Site Slope 0 Degrees | Site Slope Type: Downslope |
| Elevation of Receiver(m) Default | APZ/Separation(m): 35 |
| <u>Fire Inputs</u> | |
| Veg./Flame Width(m): 100 | Flame Temp(K) 1090 |
| <u>Calculation Parameters</u> | |
| Flame Emissivity: 95 | Relative Humidity(%): 25 |
| Heat of Combustion(kJ/kg) 18600 | Ambient Temp(K): 308 |
| Moisture Factor: 5 | FDI: 100 |
| <u>Program Outputs</u> | |
| Category of Attack: HIGH | Peak Elevation of Receiver(m): 14.13 |
| Level of Construction: BAL 29 | Fire Intensity(kW/m): 82072 |
| Radiant Heat(kW/m2): 28.3 | Flame Angle (degrees): 57 |
| Flame Length(m): 33.7 | Maximum View Factor: 0.457 |
| Rate Of Spread (km/h): 4.54 | Inner Protection Area(m): 23 |
| Transmissivity: 0.815 | Outer Protection Area(m): 12 |



APPENDIX C SUMMARY OF AS3959-2009 CONSTRUCTION REQUIREMENTS

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AS 3959- 2010: BUILDING CONSTRUCTION STANDARDS FOR BUSHFIRE PRONE AREAS
Bushfire Attack Levels 12.5, 29 and Flame Zone

Note: This table provides a summary only of AS 3959. For full details and all drawings etc. refer to the Standard. BAL 19 and 40 are not included.

GENERAL REQUIREMENTS (AS 3959 section 3.1)

The following requirements apply to all BAL levels.

3.2 CONSTRUCTION REQUIREMENTS FOR SPECIFIC STRUCTURES

3.2.1 Attached structures

Where any part of a garage, carport, veranda or similar roofed structure is attached to, or shares a common roof space with, a building required to comply with this Standard, the entire garage, carport, veranda or similar roofed structure shall comply with the construction requirements of this Standard, as applicable to the subject building.

Alternatively, the structure shall be separated from the subject building by a wall that extends to the underside of a non-combustible roof covering, and that complies with one of the following:

(a) The wall shall have an FRL of not less than 60/60/60 for loadbearing walls and –/60/60 for non-loadbearing walls when tested from the attached structure side and shall have openings protected as follows:

- (i) Doorways—by FRL –/60/30 self-closing fire doors.
- (ii) Windows—by FRL –/60/– fire windows permanently fixed in the closed position.
- (iii) Other openings—by construction with an FRL not less than –/60/–.

NOTE: Control and construction joints, subfloor vents, weepholes and penetrations for pipes and conduits need not comply with the above [Item (iii)].

or

(b) The wall shall be of masonry, earth wall or masonry-veneer construction with the masonry leaf of not less than 90 mm in thickness and shall have openings protected as follows:

- (i) Doorways—by FRL –/60/30 self-closing fire doors.
- (ii) Windows—by FRL –/60/– fire windows permanently fixed in the closed position.
- (iii) Other openings—by construction with an FRL not less than –/60/–.

NOTE: Control and construction joints, subfloor vents, weepholes and penetrations for pipes and conduits need not comply with the above [Item (iii)].

3.2.2 Garages and carports below the subject building

Where a garage or carport is below a building required to comply with this Standard, it shall comply with the construction requirements of this Standard, as applicable to the subject building.

Alternatively, any construction separating the garage or carport (including walls and flooring systems) from the remainder of the building shall comply with one of the following:

(a) The separating construction shall have an FRL of not less than 60/60/60 for loadbearing construction and –/60/60 for non-loadbearing construction when tested from the garage or carport side and shall have openings protected in accordance with the following:

- (i) Doorways—by –/60/30 self-closing fire doors.
- (ii) Windows—by –/60/– fire windows permanently fixed in the closed position.
- (iii) Other openings—by construction with an FRL not less than –/60/–.

NOTE: Control and construction joints, subfloor vents, weepholes and penetrations for pipes and conduits need not comply with the above [Item (iii)].

or

(b) Where part or all of the separating construction is a wall, the wall need not comply with Item (a) above, provided the wall is of masonry, earth wall or masonry-veneer construction with the masonry leaf of not less than 90 mm in thickness and the wall has openings protected in accordance with the following:

- (i) Doorways—by –/60/30 self-closing fire doors.
- (ii) Windows—by –/60/– fire windows permanently fixed in the closed position.
- (iii) Other openings—by construction with an FRL not less than –/60/–.

NOTE: Control and construction joints, subfloor vents, weepholes and penetrations for pipes and conduits need not comply with the above [Item (iii)].

3.2.3 Adjacent structures

Where any garage, carport, or similar roofed structure is not attached to a building required to comply with this Standard, the entire garage, carport, or similar roofed structure on the subject allotment shall comply with the construction requirements of this Standard. Alternatively, the adjacent structure shall be separated from the subject building by one of the following:

(a) A distance of not less than 6 m from the building required to comply with this Standard.

or

(b) A wall that extends to the underside of a non-combustible roof covering and has an FRL of not less than 60/60/60 for loadbearing walls and –/60/60 for non-loadbearing walls when tested from the attached structure side. Any openings in the wall shall be protected in accordance with the following:

- (i) Doorways—by FRL –/60/30 self-closing fire doors.
- (ii) Windows—by FRL –/60/– fire windows permanently fixed in the closed position.

(iii) Other openings—by construction with an FRL not less than $-/60/-$.

NOTE: Control and construction joints, subfloor vents, weepholes and penetrations for pipes and conduits need not comply with the above [Item (iii)].

or

(c) A wall that extends to the underside of a non-combustible roof covering and is of masonry, earth wall or masonry-veneer construction with the masonry leaf of not less than 90 mm in thickness. Any openings in the wall shall be protected in accordance with the following:

(i) Doorways—by FRL $-/60/30$ self-closing fire doors.

(ii) Windows—by FRL $-/60/-$ fire windows permanently fixed in the closed position.

(iii) Other openings—by construction with an FRL not less than $-/60/-$.

NOTE: Control and construction joints, subfloor vents, weepholes and penetrations for pipes and conduits need not comply with the above [Item (iii)].

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.

3.4 HIGHER LEVELS OF CONSTRUCTION

Construction requirements specified for a particular Bushfire Attack Level (BAL) shall be acceptable for a lower level. For example, if the site has been assessed at BAL—12.5, BAL—12.5 construction is required; however any element or combination of elements contained BAL—19, BAL—29, BAL—40 and BAL—FZ levels of construction may be used to satisfy this Standard.

3.5 REDUCTION IN CONSTRUCTION REQUIREMENTS DUE TO SHIELDING

The construction requirements for the next lower BAL than that determined for the site may be applied to an elevation of the building where the elevation is not exposed to the source of bushfire attack. An elevation is deemed to be not exposed to the source of bushfire attack if all of the straight lines between that elevation and the source of bushfire attack are obstructed by another part of the building (see Figure 3.1).

The construction requirements for a shielded elevation shall be not less than that required for BAL—12.5, except where the exposed elevations have been determined as BAL—LOW.

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.

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.

3.8 TESTING TO AS 1530.8

Where any material, element of construction or system satisfies the test criteria of AS 1530.8.1, for any BAL (BAL—12.5 to BAL—40) and AS 1530.8.2 (BAL—FZ) it satisfies the requirements of that BAL.

If any material, element of construction or system satisfies the test criteria without screening for ember protection, the requirements of this Standard for screening of openable parts of windows or doors shall still apply.

3.9 GLAZING

Glazing requirements shall be in accordance with Sections 5 to 9 of this Standard. See AS 1288 for an explanation of the terminologies used to describe various types of glass in this Standard.

| | BAL 12.5 | BAL 19 | BAL 29 | BAL 40 | Flame Zone [AS 3959:2009] <i>*Note – if 10 m setback (APZ) cannot be achieved, then the building must comply by testing materials according to AS 1530.8.2</i> |
|-------------------|--|--|--|--|---|
| SUBFLOOR SUPPORTS | 5.2 SUBFLOOR SUPPORTS This Standard does not provide construction requirements for subfloor support posts, columns, stumps, piers and poles. <i>NOTE: The exclusion of requirements for subfloor supports applies to the principal building only and not to verandas, decks, steps, ramps and landings (see Clause 5.7).</i> | 6.2 SUBFLOOR SUPPORTS This Standard does not provide construction requirements for subfloor support posts, columns, stumps, piers and poles. NOTE: The exclusion of requirements for subfloor supports applies to the principal building only and not to verandas, decks, steps, ramps and landings (see Clause 6.7). | 7.2 SUBFLOOR SUPPORTS This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with— (a) a wall that complies with Clause 7.4; 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 F); or (iii) a combination of Items (i) and (ii) above. NOTE: This requirement applies to the principal building only and not to verandas, decks, steps, ramps and landings (see Clause 7.7). | 8.2 SUBFLOOR SUPPORTS This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with a wall that complies with Clause 8.4. Where the subfloor space is unenclosed, the support posts, columns, stumps, piers and poles shall be— (a) of non-combustible material; or (b) a system complying with AS 1530.8.1; or (c) a combination of Items (a) and (b) above. NOTE: This requirement applies to the principal building only and not to verandas, decks, steps, ramps and landings (see Clause 8.7). | 9.2 SUB-FLOOR SUPPORTS This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with a wall that complies with Clause 9.4. Where the subfloor space is unenclosed, systems, including support posts, columns, stumps, piers and poles, shall— (a) have an FRL of at least 30/—/— and shall be non-combustible; or (b) be a system complying with AS 1530.8.2; or (c) be a combination of Items (a) and (b) above. NOTE: This requirement applies to the principal building only and not to verandas, decks, steps, ramps and landings (see Clause 9.7). |
| FLOORING SYSTEMS | 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. | 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 This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring. | 7.3 FLOORS 7.3.1 Concrete slabs on ground This Standard does not provide construction requirements for concrete slabs on ground. 7.3.2 Elevated floors 7.3.2.1 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 7.4; 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. 7.3.2.2 Unenclosed subfloor space Where the subfloor space is unenclosed, flooring material, including bearers, joists and flooring less than 400 mm above finished ground level, shall be— (a) non-combustible (e.g., concrete, steel); or (b) of bushfire-resisting timber (see Appendix F); or (c) particleboard or plywood flooring where the underside is lined with sarking-type material or mineral wool insulation; or (d) a system complying with AS 1530.8.1; or (e) a combination of any of Items (a), (b), (c) or (d) above. 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. | 8.3 FLOORS 8.3.1 Concrete slabs on ground This Standard does not provide construction requirements for concrete slabs on ground. 8.3.2 Elevated floors 8.3.2.1 Enclosed subfloor spaces This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring, where the subfloor space is enclosed with a wall that complies with Clause 8.4. 8.3.2.2 Unenclosed subfloor spaces Where the subfloor space is unenclosed, the flooring material, including bearers, joists and flooring, shall— (a) be non-combustible (e.g., concrete, steel); or (b) have the underside of the combustible elements of the floor system protected with a non-combustible material (e.g., fibre-cement sheet or metal sheet); or (c) comply with AS 1530.8.1; or (d) be a combination of any of Items (a), (b) or (c) above. | 9.3 FLOORS 9.3.1 Concrete slabs on ground This Standard does not provide construction requirements for concrete slabs on ground. 9.3.2 Elevated floors 9.3.2.1 Enclosed subfloor spaces This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring, where the subfloor space is enclosed with a wall that complies with Clause 9.4. 9.3.2.2 Unenclosed subfloor spaces Where the subfloor space is unenclosed, the floor system, including bearers, joist and flooring, shall— (a) have an FRL of at least 30/30/30 and the surface material shall be non-combustible (e.g., concrete, steel); or (b) have the underside of the combustible elements of the floor system protected with a 30 min resistance to incipient spread of fire system; or (c) comply with AS 1530.8.2 when tested from the underside; or (d) be a combination of any of Items (a), (b) or (c) above. |
| EXTERNAL WALLS | 5.4 EXTERNAL WALLS 5.4.1 Walls That part of an external wall surface that 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 wall (see Figure D3, Appendix D) shall be of— (a) non-combustible material; or (b) fibre-cement external cladding, a minimum of 6 mm in thickness; or (c) bushfire-resisting timber (see Appendix F); or (d) a timber species as specified in Paragraph E1 and listed in Table E1, Appendix E; or (e) a combination of any of Items (a), (b), (c) or (d) above. There are no requirements for external wall surfaces 400 mm or more from the ground or for external wall surfaces 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 | 6.4 EXTERNAL WALLS 6.4.1 Walls That part of an external wall surface that 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 wall (see Figure D3, Appendix D) shall be made from— (a) non-combustible material; or (b) fibre-cement external cladding, a minimum of 6 mm in thickness; or (c) bushfire-resisting timber (see Appendix F); or (d) a timber species, as specified in Paragraph E1 and listed in Table E1, Appendix E; or (e) a combination of any of Items (a), (b), (c) or (d) above. This Standard does not provide construction requirements for external wall surfaces 400 mm or more from the ground or for external wall surfaces 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 | 7.4 EXTERNAL WALLS 7.4.1 Walls Walls shall be one of the following: (a) Made of non-combustible material (e.g., full masonry, brick veneer, mud brick, concrete, aerated concrete). or (b) Made of timber-framed or steel-framed walls that are sarked on the outside of the frame and clad with— (i) fibre-cement external cladding, a minimum of 6 mm in thickness; or (ii) steel sheet; or (iii) bushfire-resisting timber (see Appendix F); or (iv) a combination of any of Items (i), (ii) or (iii) above. or (c) A combination of Items (a) and (b) above. 7.4.2 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. Alternatively, sarking-type material can be applied over the frame prior to fixing any external cladding. | 8.4 EXTERNAL WALLS 8.4.1 Walls Walls shall be one of the following: (a) Walls made from non-combustible material (e.g., full masonry, brick veneer, mud brick, concrete, aerated concrete). or (b) Timber-framed or steel-framed walls that are sarked on the outside of the frame and clad with— (i) fibre-cement external cladding, a minimum of 9 mm in thickness; or (ii) steel sheeting; or (iii) a combination of Items (i) and (ii) above. or (c) A system complying with AS 1530.8.1. or (d) A combination of any of Items (a), (b) or (c) above. 8.4.2 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. Alternatively, sarking-type material may be applied over the frame prior to fixing any external cladding. | 9.4 EXTERNAL WALLS 9.4.1 Walls Walls shall be one of the following: (a) Walls made of non-combustible material (e.g., masonry, brick veneer, mud brick, aerated concrete, concrete) with a minimum of 90 mm in thickness. or (b) A system complying with AS 1530.8.2 when tested from the outside. or (c) A system with an FRL of 30/30/30 or –/30/30 when tested from the outside. or (d) A combination of any of Items (a), (b) or (c) above. 9.4.2 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. Alternatively, sarking-type material may be applied over the frame prior to fixing any external cladding. |

| | BAL 12.5 | BAL 19 | BAL 29 | BAL 40 | Flame Zone [AS 3959:2009] <i>*Note – if 10 m setback (APZ) cannot be achieved, then the building must comply by testing materials according to AS 1530.8.2</i> |
|------------------------------|--|---|---|---|---|
| | to prevent gaps greater than 3 mm. Alternatively, sarking-type material may be applied over the outer face of the frame prior to fixing any external cladding. | 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. Alternatively, sarking-type material may be applied over the outer face of the frame prior to fixing any external cladding. | | | |
| VENTS & WEEPHOLES | 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 are less than 3 mm (see Clause 3.6), or are located in an external wall of a subfloor space. | 6.4.3 Vents and weepholes Vents and weepholes in external walls shall be screened with mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium, except where they are less than 3 mm (see Clause 3.6), or are located in an external wall of a subfloor space. | 7.4.3 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 they are less than 3 mm (see Clause 3.6). | 8.4.3 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 or bronze except where they are less than 3 mm (see Clause 3.6). | 9.4.3 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 or bronze, except where they are less than 3 mm (see Clause 3.6). |
| BUSHFIRE SHUTTERS | 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 and listed in Table E1, Appendix E; or (c) bushfire-resisting timber (see Appendix F); or (d) a combination of any of Items (a), (b) or (c) above. | 6.5.1 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 and listed in Table E1, Appendix E; or (c) bushfire-resisting timber (see Appendix F); or (d) a combination of any of Items (a), (b), or (c) above. | 7.5.1 Bushfire shutters Where fitted, bushfire shutters shall comply with Clause 3.7 and be made from— (a) non-combustible material; or (b) bushfire-resisting timber (see Appendix F); or (c) a combination of Items (a) and (b) above. | 8.5.1 Bushfire shutters Where fitted, bushfire shutters shall comply with Clause 3.7 and be made from non-combustible material. | 9.5.1 Bushfire shutters Where fitted, bushfire shutters shall comply with— (a) Clause 3.7, except that perforations are not acceptable over the door system; and (b) AS 1530.8.2 when tested from the outside. |
| WINDOWS | 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 with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium. 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 one of the following: (A) Bushfire-resisting timber (see Appendix F). or (B) A timber species specified in Paragraph E2 and listed in Table 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, 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 with mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium. | 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 with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium. 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 one of the following: (A) Bushfire-resisting timber (see Appendix F). or (B) A timber species, as specified in Paragraph E2 and listed in Table 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, 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, the fixed and openable portions of windows shall be screened externally with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium. (v) Where toughened glass is used, the openable portions of windows shall be screened internally or externally with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium. (vi) Glazed elements that are designed to take internal | 7.5.2 Windows Windows shall comply with one of the following: (a) They shall be completely protected by a bushfire shutter that complies with Clause 7.5.1. or (b) They shall comply with the following: (i) Window frames and window joinery and shall be made from one of the following: (A) Bushfire-resisting timber (see Appendix F). or (B) Metal. or (C) 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) Glazing shall be toughened glass minimum 5 mm. (iv) 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) that portion shall be screened with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium. (v) The openable portions of windows shall be screened with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium. | 8.5.2 Windows Window assemblies shall comply with one of the following: (a) They shall be completely protected by a bushfire shutter that complies with Clause 8.5.1. or (b) They shall comply with the following: (i) Window frames and hardware shall be metal. (ii) Glazing shall be toughened glass, minimum 5 mm. (iii) Both the openable and the fixed portions of the window shall be screened with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel or bronze. (iv) Seals to stiles, head and sills or thresholds shall be manufactured from materials having a flammability index no greater than 5. | 9.5.2 Windows Window assemblies shall comply with one of the following: (a) They shall be completely protected by a bushfire shutter that complies with Clause 9.5.1. Or (b) The openable portion of the window shall be screened with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel or bronze; and either— (i) the window system shall have an FRL of at least – /30/–; or (ii) the window system shall comply with AS 1530.8.2 when tested from the outside. |

| | BAL 12.5 | BAL 19 | BAL 29 | BAL 40 | Flame Zone [AS 3959:2009] <i>*Note – if 10 m setback (APZ) cannot be achieved, then the building must comply by testing materials according to AS 1530.8.2</i> |
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| | | screens shall use toughened glass and the openable portion shall be screened in such a way to have no gaps greater than 3 mm in diameter. Screening material shall be a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium. | | | |
| DOORS | <p>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:</p> <p>(a) They shall be protected by a bushfire shutter that complies with Clause 5.5.1.</p> <p>or</p> <p>(b) They shall be completely protected externally by screens with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.</p> <p>or</p> <p>(c) They shall comply with the following:</p> <p>(i) Doors shall be—</p> <p>(A) non-combustible; or</p> <p>(B) a solid timber door, having a minimum thickness of 35 mm for the first 400 mm above the threshold; or</p> <p>(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</p> <p>(D) a fully framed glazed door, where the framing is made from materials required for bushfire shutters (see Clause 5.5.1), or from a timber species specified in Paragraph E2 and listed in Table E2, Appendix E.</p> <p>(ii) Where doors incorporate glazing, the glazing shall comply with the glazing requirements for windows.</p> <p>(iii) Doors shall be tight-fitting to the doorframe and to an abutting door, if applicable.</p> <p>(iv) Where any part of the door assembly 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 assembly shall be made from one of the following:</p> <p>(A) Bushfire-resisting timber (see Appendix F).</p> <p>or</p> <p>(B) A timber species specified in Paragraph E2 and listed in Table E2, Appendix E.</p> <p>or</p> <p>(C) Metal.</p> <p>or</p> <p>(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.</p> <p>(v) Weather strips, draught excluders or draught seals shall be installed at the base of side-hung external doors.</p> <p>5.5.4 Doors—Sliding doors Sliding doors shall comply with one of the following:</p> <p>(a) They shall be protected by a bushfire shutter that complies with Clause 5.5.1.</p> <p>or</p> <p>(b) They shall be completely protected externally by screens with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.</p> <p>or</p> <p>(c) They shall comply with the following:</p> <p>(i) Any glazing incorporated in sliding doors shall be Grade A safety glass complying with AS 1288.</p> <p>(ii) There is no requirement to screen the openable part of the sliding door. However, if screened, the screens shall be a mesh or perforated sheet made of corrosion-resistant steel, bronze or aluminium.</p> <p>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</p> | <p>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:</p> <p>(a) They shall be protected by a bushfire shutter that complies with Clause 6.5.1.</p> <p>or</p> <p>(b) They shall be completely protected externally by screens with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.</p> <p>or</p> <p>(c) They shall comply with the following:</p> <p>(i) Doors shall be—</p> <p>(A) non-combustible; or</p> <p>(B) a solid timber door, having a minimum thickness of 35 mm for the first 400 mm above the threshold; or</p> <p>(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</p> <p>(D) a fully-framed glazed door, where the framing is made from materials specified for bushfire shutters (see Clause 6.5.1).</p> <p>(ii) Where doors incorporate glazing, the glazing shall be toughened glass minimum 5 mm.</p> <p>(iii) Doors shall be tight-fitting to the doorframe and to an abutting door, if applicable.</p> <p>(iv) Where the doorframe 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) the doorframe shall be made from one of the following:</p> <p>(A) Bushfire-resisting timber (see Appendix F).</p> <p>or</p> <p>(B) A timber species, as specified in Paragraph E2 and listed in Table E2, Appendix E.</p> <p>or</p> <p>(C) Metal.</p> <p>or</p> <p>(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.</p> <p>(v) Weather strips, draught excluders or draught seals shall be installed at the base of side-hung external doors.</p> <p>6.5.4 Doors—Sliding doors Sliding doors shall comply with one of the following:</p> <p>(a) They shall be completely protected by a bushfire shutter that complies with Clause 6.5.1.</p> <p>or</p> <p>(b) They shall be completely protected externally by screens with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.</p> <p>or</p> <p>(c) They shall comply with the following:</p> <p>(i) Any glazing incorporated in sliding doors shall be toughened glass, minimum 5 mm.</p> <p>(ii) There is no requirement to screen the openable part of the sliding door. However, if screened, the screens shall be mesh or perforated sheet made of corrosion-resistant steel, bronze or aluminium.</p> <p>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</p> | <p>7.5.3 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:</p> <p>(a) They shall be protected by a bushfire shutter that complies with Clause 7.5.1.</p> <p>or</p> <p>(b) They shall be completely protected externally by screens with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.</p> <p>or</p> <p>(c) They shall comply with the following:</p> <p>(i) Doors shall be—</p> <p>(A) non-combustible; or</p> <p>(B) a solid timber door, having a minimum thickness of 35 mm for the first 400 mm above the threshold; or</p> <p>(C) a door, including a hollow core door, protected on the outside by a screen door or a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or</p> <p>(D) a fully framed glazed door, where the framing is made from non-combustible materials or from bushfire-resisting timber (see Appendix F).</p> <p>(ii) Externally fitted hardware that supports the panel in its functions of opening and closing shall be metal.</p> <p>(iii) Where doors incorporate glazing, the glazing shall be toughened glass, minimum 5 mm.</p> <p>(iv) 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 door (see Figure D3, Appendix D), that portion shall be screened with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.</p> <p>(v) Doorframes shall be made from one of the following:</p> <p>(A) Bushfire-resisting timber (see Appendix F).</p> <p>or</p> <p>(B) Metal.</p> <p>or</p> <p>(C) 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.</p> <p>(vi) Doors shall be tight-fitting to the doorframe and to an abutting door, if applicable.</p> <p>(vii) Weather strips, draught excluders or draught seals shall be installed at the base of side-hung external doors.</p> <p>7.5.4 Doors—Sliding doors Sliding doors shall comply with one of the following:</p> <p>(a) They shall be protected by a bushfire shutter that complies with Clause 7.5.1.</p> <p>or</p> <p>(b) They shall be completely protected externally by screens with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.</p> <p>or</p> <p>(c) They shall comply with the following:</p> <p>(i) Doorframes shall be of bushfire-resisting timber (see Appendix F) or aluminium or steel.</p> <p>(ii) Externally fitted hardware that supports the panel in its functions of opening and closing shall be metal.</p> <p>(iii) Where sliding doors incorporate glazing, the glazed assembly shall be toughened glass minimum 6 mm except where both the fixed and openable portions of doors are screened by a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.</p> | <p>8.5.3 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:</p> <p>(a) They shall be protected by a bushfire shutter that complies with Clause 8.5.1.</p> <p>or</p> <p>(b) They shall comply with the following:</p> <p>(i) Doors shall be—</p> <p>(A) non-combustible; or</p> <p>(B) a solid timber door, having a minimum thickness of 35 mm for the first 400 mm above the threshold and protected on the outside by a metalframed screen door with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel or bronze; or</p> <p>(C) a fully framed glazed door where the framing is made from non-combustible material.</p> <p>(ii) Externally fitted hardware that supports the panel in its functions of opening and closing shall be made of materials that have an FRL of at least –/30/–.</p> <p>(iii) Where doors incorporate glazing, the glazing shall be toughened glass minimum 6 mm.</p> <p>(iv) 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 door (see Figure D3, Appendix D) that portion of the glazing shall be screened with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel or bronze.</p> <p>(v) Seals to stiles, head and sills or thresholds shall be manufactured from silicone.</p> <p>(vi) Doorframes shall be metal.</p> <p>(vii) Doors shall be tight-fitting to the doorframe and to an abutting door, if applicable.</p> <p>(viii) Weather strips, draught excluders or draught seals shall be installed at the base of side-hung external doors.</p> <p>8.5.4 Doors—Sliding doors Sliding doors shall comply with one of the following:</p> <p>(a) They shall be protected by a bushfire shutter that complies with Clause 8.5.1.</p> <p>or</p> <p>(b) They shall comply with the following:</p> <p>(i) Doorframes shall be of metal.</p> <p>(ii) Externally fitted hardware that supports the panel in its functions of opening and closing shall be metal.</p> <p>(iii) Where sliding doors incorporate glazing, the glazing shall have an FRL of at least –/30/– except where both the fixed and openable portions of doors are screened by a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel or bronze.</p> <p>(iv) Seals to stiles, head and sills or thresholds shall be manufactured from silicone.</p> <p>(v) Sliding doors shall be tight-fitting in the frames.</p> | <p>9.5.3 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:</p> <p>(a) They shall be protected by a bushfire shutter that complies with Clause 9.5.1.</p> <p>or</p> <p>(b) They shall comply with the following:</p> <p>(i) All door systems, including doorframes and doors with glazed panels, shall—</p> <p>(A) have an FRL of at least –/30/–; or</p> <p>(B) comply with AS 1530.8.2 when tested from the outside.</p> <p>(ii) Doors shall be tight-fitting to the doorframe and to an abutting door, if applicable.</p> <p>(iii) Weather strips, draught excluders or draught seals shall be installed at the base of side-hung external doors.</p> <p>(iv) Seals shall not compromise the FRL or the performance achieved in AS 1530.4.</p> <p>9.5.4 Doors—Sliding doors Sliding doors shall comply with one of the following:</p> <p>(a) They shall be completely protected by a bushfire shutter that complies with Clause 9.5.1.</p> <p>or</p> <p>(b) They shall comply with the following:</p> <p>(i) All sliding door systems, including those with glazed panels, shall—</p> <p>(A) have an FRL of at least –/30/–; or</p> <p>(B) comply with AS 1530.8.2 when tested from the outside.</p> <p>(ii) Sliding doors shall be tight-fitting in the frames.</p> |

| | BAL 12.5 | BAL 19 | BAL 29 | BAL 40 | Flame Zone [AS 3959:2009] <i>*Note – if 10 m setback (APZ) cannot be achieved, then the building must comply by testing materials according to AS 1530.8.2</i> |
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| | 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. (iii) Sliding doors shall be tight-fitting in the frames. | or during a bushfire event. Screens of materials other than those specified may not resist ember attack. (iii) Sliding doors shall be tight-fitting in the frames. | | | |
| GARAGE/VEHICLE ACCESS DOORS | 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 specified in Paragraph E1 and listed in Table 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 | 6.5.5 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 and listed in Table 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. | 7.5.5 Doors—Vehicle access doors (garage doors) The following apply to vehicle access doors: (a) Vehicle access doors 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 combination of any of Items (i), (ii) or (iii) 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. | 8.5.5 Doors—Vehicle access doors (garage doors) The following apply to vehicle access doors: (a) Vehicle access doors shall be non-combustible. (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. | 9.5.5 Doors—Vehicle access doors (garage doors) The following apply to vehicle access doors: (a) Vehicle access doors shall be non-combustible. (b) Where the garage is attached to the building, the requirements of Clause 3.2.2(b) shall apply. (c) 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. (d) 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). (e) Vehicle access doors shall not include ventilation slots. |
| ROOFS | 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. 5.6.2 Tiled roofs Tiled roofs shall be fully sarked. The sarking shall— (a) have a flammability index of not more than 5; (b) be located directly below the roof battens; (c) cover the entire roof area including the ridge; and (d) be installed so that there are no gaps that would allow the entry of embers where the sarking meets fascias, gutters, valleys and the like. 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; or (b) have any gaps greater than 3 mm, 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 | 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. 6.6.2 Tiled roofs Tiled roofs shall be fully sarked. The sarking shall— (a) have a flammability index of not more than 5, when tested to AS 1530.2; (b) be located directly below the roof battens; (c) cover the entire roof area including the ridge; and (d) be installed so that there are no gaps that would allow the entry of embers where the sarking meets fascias, gutters, valleys and the like. 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; or (b) have any gaps greater than 3 mm 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 | 7.6 ROOFS (INCLUDING VERANDA AND ATTACHED CARPORT ROOFS, PENETRATIONS, EAVES, FASCIAS, GABLES, GUTTERS AND DOWNPIPES) 7.6.1 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. (d) A pipe or conduit that penetrates the roof covering shall be non-combustible. 7.6.2 Tiled roofs Tiled roofs shall be fully sarked. The sarking shall— (a) have a flammability index of not more than 5, when tested to AS 1530.2; (b) be located directly below the roof battens; (c) cover the entire roof area including the ridge; and (d) extend into gutters and valleys. 7.6.3 Sheet roofs Sheet roofs shall— (a) be fully sarked in accordance with Clause 7.6.2, except that foil-backed insulation blankets may be installed over the battens; or (b) have any gaps greater than 3 mm 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. 7.6.4 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 | 8.6 ROOFS (INCLUDING VERANDA AND ATTACHED CARPORT ROOFS, PENETRATIONS, EAVES, FASCIAS, GABLES, GUTTERS AND DOWNPIPES) 8.6.1 General The following provisions 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 or bronze. (d) A pipe or conduit that penetrates the roof covering shall be non-combustible. Roof-mounted evaporative coolers are excluded from this level (i.e., BAL—40). 8.6.2 Tiled roofs Tiled roofs shall be fully sarked. The sarking shall— (a) have a flammability index of not more than 5, when tested to AS 1530.2; (b) be located directly below the roof battens; (c) cover the entire roof area including the ridge; and (d) extend into gutters and valleys. 8.6.3 Sheet roofs Sheet roofs shall— (a) be fully sarked in accordance with Clause 8.6.2, except that foil-backed insulation blankets may be installed over the battens; (b) have any gaps greater than 3 mm 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 or bronze; or (ii) mineral wool; or (iii) other non-combustible material; or (iv) a combination of any of Items (i), (ii) or (iii) above. 8.6.4 Veranda, carport and awning roofs | 9.6 ROOFS (INCLUDING VERANDA AND ATTACHED CARPORT ROOFS, PENETRATIONS, EAVES, FASCIAS, GABLES, GUTTERS AND DOWNPIPES) 9.6.1 General The following apply to all types of roofs and roofing systems: (a) The roof or roofing system shall be one of the following: (i) A system complying with AS 1530.8.2 when tested from the outside. or (ii) A system with an FRL of 30/30/30 or –/30/30 when tested from the outside. or (iii) A combination of Items (i) and (ii) above. (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 or bronze. (d) Pipe or conduit that penetrates the roof covering shall be metal, excluding aluminium. Roof-mounted evaporative coolers are excluded from this level. 9.6.2 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 9.6.1, 9.6.3, and 9.6.4. (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 9.4 shall have a non-combustible roof covering and the support structure shall be— (i) of non-combustible material; or (ii) timber rafters lined on the underside with fibre-cement sheet a minimum of 6 mm in thickness, or with material complying with AS 1530.8.2; or (iii) a system complying with AS 1530.8.2; or |

| | BAL 12.5 | BAL 19 | BAL 29 | BAL 40 | Flame Zone [AS 3959:2009] <i>*Note – if 10 m setback (APZ) cannot be achieved, then the building must comply by testing materials according to AS 1530.8.2</i> |
|--|--|--|--|--|--|
| | <p>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.</p> <p>(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.</p> <p>NOTE: There is no requirement to line the underside of a veranda, carport or awning roof that is separated from the main roof space.</p> <p>5.6.5 Roof penetrations</p> <p>The following apply to roof penetrations:</p> <p>(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.</p> <p>(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.</p> <p>(c) All overhead glazing shall be Grade A laminated safety glass complying with AS 1288.</p> <p>(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, shall be used in the outer pane of the IGU.</p> <p>(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.</p> <p>(f) Evaporative cooling units shall be fitted with butterfly closers at or near the ceiling 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.</p> <p>(g) Vent pipes made from PVC are permitted.</p> | <p>The following apply to veranda, carport and awning roofs:</p> <p>(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.</p> <p>(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.</p> <p>NOTE: There is no requirement to line the underside of a veranda, carport or awning roof that is separate from the main roof space.</p> <p>6.6.5 Roof penetrations</p> <p>The following apply to roof penetrations:</p> <p>(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.</p> <p>(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.</p> <p>(c) All overhead glazing shall be Grade A laminated safety glass complying with AS 1288.</p> <p>(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 shall be used in the outer pane of the IGU.</p> <p>(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.</p> <p>(f) Evaporative cooling units shall be fitted with butterfly closers at or near the ceiling 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.</p> | <p>main roof space [see Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in Clauses 7.6.1, 7.6.2, 7.6.3, 7.6.5 and 7.6.6.</p> <p>(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 7.4 shall have a non-combustible roof covering and the support structure shall be—</p> <p>(i) of non-combustible material; or</p> <p>(ii) bushfire-resisting timber (see Appendix F); or</p> <p>(iii) timber rafters lined on the underside with fibre+cement sheeting a minimum of 6 mm in thickness, or with material complying with AS 1530.8.1; or</p> <p>(iv) a combination of any of Items (i), (ii) or (iii) above.</p> <p>7.6.5 Roof penetrations</p> <p>The following apply to roof penetrations:</p> <p>(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 flash the penetration shall be non-combustible.</p> <p>(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.</p> <p>(c) All overhead glazing shall be Grade A laminated safety glass complying with AS 1288.</p> <p>(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, shall be used in the outer pane of the IGU.</p> <p>(e) Where roof lights are installed in roofs having a pitch of less than 18 degrees to the horizontal, the glazing shall be protected 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.</p> <p>(f) Evaporative cooling units shall be fitted with butterfly closers at or near the ceiling 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.</p> | <p>The following apply to veranda, carport and awning roofs:</p> <p>(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 8.6.1, 8.6.2, 8.6.3, 8.6.5 and 8.6.6.</p> <p>(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 8.4 shall have a non-combustible roof covering and the support structure shall be—</p> <p>(i) of non-combustible material; or</p> <p>(ii) timber rafters lined on the underside with fibre+cement sheeting a minimum of 6 mm in thickness, or with material complying with AS 1530.8.1; or</p> <p>(iii) a system complying with AS 1530.8.1; or</p> <p>(iv) a combination of any of Items (i), (ii) or (iii) above.</p> <p>8.6.5 Roof penetrations</p> <p>The following apply to roof penetrations:</p> <p>(a) Roof penetrations, including roof lights, roof ventilators, 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 flash the penetration shall be noncombustible.</p> <p>(b) Glazed assemblies for roof lights and skylights shall have an FRL of –/30/–.</p> <p>(c) Where roof lights are installed in roofs having a pitch of less than 18 degrees to the horizontal, the glazing shall be protected with ember guards made from a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel or bronze.</p> | <p>(iv) a combination of any of Items (i), (ii) or (iii) above.</p> <p>9.6.3 Roof penetrations</p> <p>The following apply to roof penetrations:</p> <p>(a) Roof penetrations, including roof lights, roof ventilators, aerials, vent pipes and supports for solar collectors, shall be sealed with mineral fibre at the roof to prevent gaps. Where the gap between the roof covering and the roof penetration is greater than 3 mm, the material used to seal the penetration shall be non-combustible.</p> <p>NOTE: As a general principle, the service penetration should not significantly compromise the performance of the element of construction it penetrates nor should it be a means to allow the passage of burning embers or heat transfer such that fire may spread to the interior of a structure.</p> <p>(b) Roof lights and roof ventilators shall be one of the following:</p> <p>(i) A system complying with AS 1530.8.2 when tested from the outside.</p> <p>or</p> <p>(ii) A system with an FRL of 30/30/30 or –/30/30 when tested from the outside.</p> |
| EAVES LININGS, FASCIAS AND GABLES | <p>5.6.6 Eaves linings, fascias and gables</p> <p>The following apply to eaves linings, fascias and gables:</p> <p>(a) Gables shall comply with Clause 5.4.</p> <p>(b) Eaves penetrations shall be protected the same as for roof penetrations, as specified in Clause 5.6.5.</p> <p>(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.</p> <p>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.</p> | <p>6.6.6 Eaves linings, fascias and gables</p> <p>The following apply to eaves linings, fascias and gables:</p> <p>(a) Gables shall comply with Clause 6.4.</p> <p>(b) Eaves penetrations shall be protected the same as for roof penetrations, as specified in Clause 6.6.5.</p> <p>(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.</p> <p>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.</p> | <p>7.6.6 Eaves linings, fascias and gables</p> <p>The following apply to eaves linings, fascias and gables:</p> <p>(a) Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.</p> <p>(b) Gables shall comply with Clause 7.4.</p> <p>(c) Fascias and bargeboards shall—</p> <p>(i) where timber is used, be made from bushfire-resisting timber (see Appendix F); or</p> <p>(ii) where made from metal, be fixed at 450 mm centres; or</p> <p>(iii) be a combination of Items (i) and (ii) above.</p> <p>(d) Eaves linings shall be—</p> <p>(i) fibre+cement sheet, a minimum 4.5 mm in thickness; or</p> <p>(ii) bushfire-resisting timber (see Appendix F); or</p> <p>(iii) a combination of Items (i) and (ii) above.</p> <p>(e) Eaves penetrations shall be protected the same as for roof penetrations (see Clause 7.6.5).</p> <p>(f) 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.</p> | <p>8.6.6 Eaves linings, fascias and gables</p> <p>The following apply to eaves linings, fascias and gables:</p> <p>(a) Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.</p> <p>(b) Gables shall comply with Clause 8.4.</p> <p>(c) Fascias and bargeboards shall comply with AS 1530.8.1.</p> <p>(d) Eaves linings shall be—</p> <p>(i) fibre+cement sheet, a minimum of 6 mm in thickness; or</p> <p>(ii) calcium silicate sheet, a minimum of 6 mm in thickness; or</p> <p>(iii) a combination of Items (i) and (ii) above.</p> <p>(e) Eaves penetrations shall be protected the same as for roof penetrations as specified in Clause 8.6.5.</p> <p>(f) 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 or bronze.</p> | <p>9.6.4 Eaves linings, fascias and gables</p> <p>The following apply to eaves linings, fascias and gables:</p> <p>(a) Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.</p> <p>(b) Gables shall comply with Clause 9.4.</p> <p>(c) Fascias and bargeboards shall comply with AS 1530.8.2.</p> <p>(d) Eaves linings shall be—</p> <p>(i) a system with an FRL of –/30/30; or</p> <p>(ii) a system complying with AS 1530.8.2; or</p> <p>(iii) a combination of Items (i) and (ii) above.</p> <p>(e) Eaves penetrations shall be protected the same as for roof penetrations, as specified in Clause 9.6.3.</p> <p>(f) 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 or bronze.</p> |
| GUTTERS AND DOWNPIPES | <p>5.6.7 Gutters and downpipes</p> <p>This Standard does not provide material requirements for—</p> <p>(a) gutters, with the exception of box gutters; and</p> <p>(b) downpipes.</p> <p>If installed, gutter and valley leaf guards shall be non-combustible.</p> <p>Box gutters shall be non-combustible and flashed at the</p> | <p>6.6.7 Gutters and downpipes</p> <p>This Standard does not provide material requirements for—</p> <p>(a) gutters, with the exception of box gutters; and</p> <p>(b) downpipes.</p> <p>If installed, gutter and valley leaf guards shall be non-combustible.</p> <p>Box gutters shall be non-combustible and flashed at the</p> | <p>7.6.7 Gutters and downpipes</p> <p>This Standard does not provide construction-specific material requirements for downpipes.</p> <p>If installed, gutter and valley leaf guards shall be non-combustible.</p> <p>With the exception of box gutters, gutters shall be metal or PVC-U.</p> <p>Box gutters shall be non-combustible and flashed at the</p> | <p>8.6.7 Gutters and downpipes</p> <p>This Standard does not provide construction-specific material requirements for downpipes.</p> <p>If installed, gutter and valley leaf guards shall be non-combustible.</p> <p>Gutters shall be non-combustible.</p> <p>Box gutters shall be non-combustible and flashed at the junction with the roof with non-combustible materials.</p> | <p>9.6.5 Gutters and downpipes</p> <p>This Standard does not provide construction-specific material requirements for downpipes.</p> <p>If installed, gutter and valley leaf guards shall be non-combustible.</p> <p>Gutters shall be non-combustible.</p> <p>Box gutters shall be non-combustible and flashed at the junction with the roof with non-combustible materials.</p> |

| | BAL 12.5 | BAL 19 | BAL 29 | BAL 40 | Flame Zone [AS 3959:2009] <i>*Note – if 10 m setback (APZ) cannot be achieved, then the building must comply by testing materials according to AS 1530.8.2</i> |
|---|--|--|---|--|---|
| | junction with the roof with non-combustible material. | junction with the roof with non-combustible material. | junction with the roof, with non-combustible materials. | | |
| VERANDAS, DECKS, STEPS, RAMPS & LANDINGS | <p>5.7 VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS</p> <p>5.7.1 General Decking shall be either spaced or continuous (i.e., without spacing). There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.</p> <p>5.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings</p> <p>5.7.2.1 Materials to enclose a subfloor space This Standard does not provide construction requirements for the materials used to enclose a subfloor space except where those materials are less than 400 mm from the ground. Where the materials used to enclose a subfloor space are less than 400 mm from the ground, they shall comply with Clause 5.4.</p> <p>5.7.2.2 Supports This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.</p> <p>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).</p> <p>5.7.2.4 Decking This Standard does not provide construction requirements for decking that is more than 300 mm from a glazed element. Decking less than 300 mm (measured horizontally at deck level) from glazed elements that are less than 400 mm (measured vertically) from the surface of the deck (see Figure D2, Appendix D) shall be made from— (a) non-combustible material; or (b) bushfire-resisting timber (see Appendix F); or (c) a timber species, as specified in Paragraph E1 and listed in Table E1 of Appendix E; (d) PVC-U; or (e) a combination of any of Items (a), (b), (c) or (d) above.</p> <p>5.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings</p> <p>5.7.3.1 Supports This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.</p> <p>5.7.3.2 Framing This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).</p> <p>5.7.3.3 Decking This Standard does not provide construction requirements for decking unless it is less than 300 mm from a glazed element. Decking less than 300 mm (measured horizontally at deck level) from glazed elements that are less than 400 mm (measured vertically) from the surface of the deck (see Figure D2, Appendix D) shall be made from— (a) non-combustible material; or (b) bushfire-resisting timber (see Appendix F); or (c) a timber species, as specified in Paragraph E1 and listed in Table E1, Appendix E; or (d) a combination of any of Items (a), (b) or (c) above.</p> <p>5.7.4 Balustrades, handrails or other barriers This Standard does not provide construction requirements for balustrades, handrails and other barriers.</p> | <p>6.7 VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS</p> <p>6.7.1 General Decking shall be either spaced or continuous (i.e., without spacings). There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.</p> <p>6.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings</p> <p>6.7.2.1 Materials to enclose a subfloor space This Standard does not provide construction requirements for the materials used to enclose a subfloor space except where those materials are less than 400 mm from the ground. Where the materials used to enclose a subfloor space are less than 400 mm from the ground, they shall comply with Clause 6.4.</p> <p>6.7.2.2 Subfloor supports This Standard does not provide construction requirements for subfloor support posts, columns, stumps, stringers, piers and poles.</p> <p>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).</p> <p>6.7.2.4 Decking This Standard does not provide construction requirements for decking that is more than 300 mm from a glazed element. Decking less than 300 mm (measured horizontally at deck level) from glazed elements that are less than 400 mm (measured vertically) from the surface of the deck (see Figure D2, Appendix D) shall be made from— (a) non-combustible material; or (b) bushfire-resisting timber (see Appendix F); or (c) a timber species, as specified in Paragraph E1 and listed in Table E1, Appendix E; or (d) a combination of any of Items (a), (b), or (c) above.</p> <p>6.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings</p> <p>6.7.3.1 Supports This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.</p> <p>6.7.3.2 Framing This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).</p> <p>6.7.3.3 Decking This Standard does not provide construction requirements for decking that is more than 300 mm from a glazed element. Decking less than 300 mm (measured horizontally at deck level) from glazed elements that are less than 400 mm (measured vertically) from the surface of the deck (see Figure D2, Appendix D) shall be made from— (a) non-combustible material; or (b) bushfire-resisting timber (see Appendix F); or (c) a timber species, as specified in Paragraph E1 and listed in Table E1, Appendix E; or (d) a combination of any of Items (a), (b), or (c) above.</p> <p>6.7.4 Balustrades, handrails or other barriers This Standard does not provide construction requirements for balustrades, handrails and other barriers.</p> | <p>7.7 VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS</p> <p>7.7.1 General Decking shall be either spaced or continuous (i.e., without spacing). There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.</p> <p>7.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings</p> <p>7.7.2.1 Materials to enclose a subfloor space 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 is— (i) non-combustible; or (ii) bushfire-resisting timber (see Appendix F); or (iii) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or (iv) a combination of any of Items (i), (ii) or (iii) above; 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.</p> <p>7.7.2.2 Supports This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.</p> <p>7.7.2.3 Framing This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).</p> <p>7.7.2.4 Decking Decking 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.</p> <p>7.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings</p> <p>7.7.3.1 Supports 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.</p> <p>7.7.3.2 Framing 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.</p> <p>7.7.3.3 Decking Decking 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.</p> <p>7.7.4 Balustrades, handrails or other barriers 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.</p> | <p>8.7 VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS</p> <p>8.7.1 General Decking shall be either spaced or continuous (i.e., without spacing). There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.</p> <p>8.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings</p> <p>8.7.2.1 Materials to enclose a subfloor space The subfloor spaces of verandas, decks, steps, ramps and landings are deemed to be ‘enclosed’ when— (a) the material used to enclose the subfloor space complies with Clause 8.4; 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 or bronze.</p> <p>8.7.2.2 Supports This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.</p> <p>8.7.2.3 Framing This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).</p> <p>8.7.2.4 Decking Decking shall be— (a) of non-combustible material; or (b) a system complying with AS 1530.8.1, or (c) a combination of Items (a) and (b) above.</p> <p>8.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings</p> <p>8.7.3.1 Supports Support posts, columns, stumps, stringers, piers and poles shall be— (a) of non-combustible material; or (b) a system complying with AS 1530.8.1; or (c) a combination of Items (a) and (b) above.</p> <p>8.7.3.2 Framing Framing of verandas, decks, ramps or landings (i.e., bearers and joists) shall be— (a) of non-combustible material; or (b) a system complying with AS 1530.8.1; or (c) a combination of Items (a) and (b) above.</p> <p>8.7.3.3 Decking Decking shall be— (a) of non-combustible material; or (b) a system complying with AS 1530.8.1; or (c) a combination of Items (a) and (b) above.</p> <p>8.7.4 Balustrades, handrails or other barriers Those parts of the handrails and balustrades less than 125 mm from any glazing or any combustible wall shall be of non-combustible material. Those parts of the handrails and balustrades that are 125 mm or more from the building have no requirements.</p> | <p>9.7 VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS</p> <p>9.7.1 General Decking shall be either spaced or continuous (i.e., without spacings). There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.</p> <p>9.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings</p> <p>9.7.2.1 Materials to enclose a subfloor space The subfloor spaces of verandas, decks, steps, ramps and landings are deemed to be ‘enclosed’ when— (a) the material used to enclose the subfloor space complies with Clause 9.4; 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 or bronze.</p> <p>9.7.2.2 Supports This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.</p> <p>9.7.2.3 Framing This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).</p> <p>9.7.2.4 Decking Decking shall have no gaps and be— (a) of non-combustible material; or (b) of fibre-cement sheet; or (c) a system complying with AS 1530.8.2; or (d) a combination of any of Items (a), (b) or (c) above.</p> <p>9.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings</p> <p>9.7.3.1 Supports Support posts, columns, stumps, stringers, piers and poles shall be— (a) of non-combustible material; or (b) a system complying with AS 1530.8.2; or (c) a combination of Items (a) and (b) above.</p> <p>9.7.3.2 Framing Framing of verandas, decks, ramps or landings (i.e., bearers and joists) shall be— (a) of non-combustible material; or (b) a system complying with AS 1530.8.2; or (c) a combination of Items (a) and (b) above.</p> <p>9.7.3.3 Decking Decking shall have no gaps and be— (a) of non-combustible material; or (b) fibre-cement sheet; or (c) a system complying with AS 1530.8.2; or (d) a combination of Items (a), (b) or (c) above.</p> <p>9.7.4 Balustrades, handrails or other barriers Those parts of the handrails and balustrades less than 125 mm from any glazing shall be of non-combustible material. Those parts of the handrails and balustrades that are 125 mm or more from the building have no requirements.</p> |
| SERVICE PIPES (WATER AND GAS) | <p>5.8 WATER AND GAS SUPPLY PIPES Above-ground, exposed water and gas supply pipes shall be metal.</p> | <p>6.8 WATER AND GAS SUPPLY PIPES Above-ground, exposed water and gas supply pipes shall be metal.</p> | <p>7.8 WATER AND GAS SUPPLY PIPES Above-ground, exposed water and gas supply pipes shall be metal.</p> | <p>8.8 WATER AND GAS SUPPLY PIPES Above-ground, exposed water and gas supply pipes shall be metal.</p> | <p>9.8 WATER AND GAS SUPPLY PIPES Above-ground, exposed water and gas supply pipes shall be metal.</p> |



APPENDIX D ADDENDUM TO APPENDIX 3 OF PBP 2006 – ADDITIONAL BUILDING REQUIREMENTS

Appendices

Table A3.5.1 – Conversion of vegetation classification from David Keith's *Ocean Shores to Desert Dunes* (used in PBP) to the AUSLIG Pictorial Analysis in AS3959-2009. This conversion is based on what is considered the best representation of similar bush fire behavior potential.

| David Keith's <i>Ocean Shores to Desert Dunes</i> | AUSLIG (1990) Pictorial Analysis (AS3959-2009) |
|---|--|
| Forests (Wet & Dry Sclerophyll) | Forest |
| Pine Plantations | |
| Forested Wetlands | |
| Woodlands (Grassy, Semi-Arid) | Woodland |
| Tall Heath (Scrub) | Scrub |
| Freshwater Wetlands | |
| Short Heath (Open Scrub) | Shrubland |
| Arid Shrubland | Mallee/Mulga |
| Alpine Complex (Sedgeland) | Tussock Moorland |
| Rainforest | Rainforest |
| Grassland | Grassland |

For the purposes of Table A2.6 in Appendix 2, the requirements for Alpine Resorts should be developed using Table 2.4.4 of AS3959-2009. Generally, most development applications within the Alpine Resorts consist of alterations and additions to existing buildings and therefore would be treated as infill development. Developments involving new leases or new alpine resorts must contact the RFS to determine the APZ requirements.

A3.6 Construction Considerations within the Flame Zone

There is potential for flames to ignite the external facade of a building which can continue to burn after the passage of the fire front. Therefore some degree of conservatism in relation to the exposure period is appropriate.

In NSW there are no recognized deemed-to-satisfy arrangements for construction of buildings within the Flame Zone. Where sustained flame contact is likely, the radiant heat and convective heat exposures are considerable and overwhelms most materials.

While AS3959 can be used as a guide to improve building safety, this is subject to additional control measures not included in this document. The design and construction of a building is just one means of mitigating the bush fire risk and will normally require supplementation by a range of other mitigation measures to the satisfaction of the authority having jurisdiction. The extent of additional measures required will be dependent upon the bush fire hazard and its proximity to the buildings. In addition to the construction requirement of AS3959, applicants should also address the Performance Requirements of the BCA and consider the siting and the design principles in Section 4.3.5 of PBP.

Where new testing regimes are developed and deemed appropriate by the NSW Rural Fire Service, these may be incorporated as part of

the process of developing alternative solutions. Alternative solutions will be considered on their merits.

A3.7 Additional Construction Requirements

Planning for Bush Fire Protection is designed to provide for improved bush fire protection outcomes through the planning system, whereas the construction requirements are established through the operation of the BCA. However, based on a review of AS3959-2009 and recent developments through the interim findings from the Victorian Royal Commission, the RFS has concerns over the levels of safety for ember protection at lower BAL levels (BALs 12.5 and 19) provided by AS3959-2009. The RFS is concerned that by adopting the new Standard there would be a reduction in safety created from that afforded by the previous NSW application of AS3959-1999 in relation to ember protection. In this regard, the RFS will aim to maintain the safety levels previously provided by AS3959-1999. In particular, the areas of concern arise from requirements for:

- Sarking
- Sub floor screening
- Floors
- Verandas, Decks, Steps, Ramps And Landings

In addition, in order to provide a suitable combination of bush fire protection measures the NSW Rural Fire Service will, as part of the planning assessment process, recommend / require additional construction requirements beyond those prescribed in AS3959-2009 as deemed appropriate.

Planning requirements for grasslands are contained within the main body of PBP.

As part of the planning requirements, the following will create part of the suite of protection

Appendices

measures required to form compliance with *Planning for Bush Fire Protection*.

SARKING

Any sarking used for BAL-12.5, BAL-19, BAL-29 or BAL-40 shall be:

- Non-combustible; or
- 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
- An insulation material conforming to the appropriate Australian Standard for that material.

SUBFLOOR SUPPORTS

For BAL-12.5 and BAL-19, Clause 5.2 and 6.2 shall be replaced by the provisions of Clause 7.2. In this regard, Clause 7.2 states:

“7.2 SUBFLOOR SUPPORTS

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

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

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

NOTE: *This requirement applies to the principal building only and not to verandas, decks, steps, ramps and landings (see Clause 7.7)."*

ELEVATED FLOORS

For BAL-12.5 and BAL-19, Clause 5.3 and 6.3 shall be replaced by the provisions of clause 7.3. In this regard, clause 7.3.2 states:

“7.3.2 Elevated floors

7.3.2.1 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 wall that complies with **(Clause 5.4 or 6.4 as appropriate)**; or*
- a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion resistant steel, bronze or aluminium; or*
- a combination of Items (a) and (b) above.*

7.3.2.2 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:

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

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VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS

For BAL-12.5 and BAL-19, Clause 5.7 and 6.7 shall be replaced by the provisions of clause 7.7. In this regard, clause 7.7 states:

"7.7 VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS

7.7.1 General

Decking may be spaced.

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

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

7.7.2.1 Materials to enclose a subfloor space

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

- the material used to enclose the subfloor space complies with **(Clause 5.4 or 6.4 as appropriate)**; and*
- 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.*

7.7.2.2 Supports

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

7.7.2.3 Framing

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

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

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

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

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

7.7.3.1 Supports

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

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

7.7.3.2 Framing

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

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

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

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

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

7.7.4 Balustrades, handrails or other barriers

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

- of non-combustible material; or*
- bushfire-resisting timber (see Appendix F); or*
- 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."