



Bushfire construction details for housing

This bulletin is to provide general guidance on typical bushfire construction details that should be included within plans and specifications that are listed in a certificate of design compliance.

The building legislation of Western Australia requires new buildings to comply with the Building Code of Australia (BCA), being Volumes One and Two of the National Construction Code (NCC). The BCA also applies to new building work in existing buildings. The BCA contains specific bushfire construction requirements for certain residential buildings in designated bushfire prone areas that aim to reduce the risk of ignition from a bushfire.

Please note references in this bulletin relate to NCC 2016 Volume Two for housing. NCC 2019 will be adopted on 1 May 2019, which may contain changes relating to bushfire construction requirements.

BCA compliance

Compliance with BCA Performance Requirements P2.3.4 (in NCC Volume Two) relating to bushfire construction for Class 1 buildings in designated bushfire prone areas can be demonstrated by following a Deemed-to-Satisfy Solution or developing a Performance Solution.

For Class 1 buildings and associated Class 10a buildings or decks, Deemed-to-Satisfy solutions include compliance with the following referenced standards:

- **AS 3959:** Australian Standard AS 3959 – Construction of buildings in bushfire-prone areas (2009, incorporating Amendment Nos 1, 2, and 3);

Or

- **NASH standard:** National Association of Steel Housing (NASH) Standard - Steel Framed Construction in Bushfire Areas.

It should be noted that these Deemed-to-Satisfy Solutions are two separate acceptable construction manuals. The BCA allows the use of the AS3959 or NASH standard as separate options but not in combination. Plans and specifications should clearly identify which standard has been used and make reference to another standard for particular construction details only when that standard allows.

Plans and specifications should clearly document how the building complies with the entirety of the standard being used.

The design must also consider all other relevant BCA requirements for the building. Other BCA requirements may exceed the requirements for bushfire construction for example increased thickness for glazing for certain locations and glass panel areas to meet human impact safety requirements.

Where a Performance Solution is proposed to a bushfire Performance Requirement, information should be fully documented. A statement about each Performance Solution including details of the assessment method used must be provided in the certificate of design compliance issued by the building surveyor.

Building Surveyors and designers should ensure Performance Solutions follow the guidance document published by the Australian Building Codes Board for the Development of Performance Solutions.

Plans and specifications

Plans and specifications must contain sufficient details and information for the building surveyor signing the relevant certificate of design compliance to determine that the building when built in accordance with the plans and specifications will comply with applicable building standards, namely the BCA.

Nominating compliance with a referenced standard without adequate construction details, assumes the person carrying out the building work knows all the requirements contained within the standard. There are many elements and options for compliance provided in AS 3959 or NASH. It would not be expected that the persons carrying out the building work on site would be aware of all the specifics of the relevant standard or the compliance options selected for the particular building. As such this information must be fully documented on the plans and specifications.

In addition to demonstrating compliance with the BCA, the necessary details and information for bushfire construction on the plans and specifications also allows for:

- clarity for the client on design inclusions.
- building work to be more accurately costed.
- clear details to be made available for construction in order to meet compliance on completion and reduce the chance of costly rectification work.
- records for the owner on the construction of the building for maintenance purposes and for any future alterations or improvements.

The construction requirements detailed should be site specific for the proposal. Generic details providing various options for compliance should be avoided.

For example, if using Australian Standard AS 3959 for meeting bushfire construction requirements, different options are provided in BAL-29 for a side hung external main entry door such as:

- any type protected by a compliant bushfire shutter or external screen; or
- non-combustible (e.g. metal door); or
- solid timber of at least 35mm thick; or
- a hollow core door protected externally by a compliant screen; or
- a fully framed compliant glazed door (including type of glass and a compliant screen where relevant)

Each door also needs to be fitted with a door frame in compliance with AS 3959. The actual door and its frame should be identified at design and selection stage and the specific chosen compliant door and frame details documented and checked and certified by the building surveyor accordingly.

Bushfire construction details

As a guide the following information should be included in the documentation relating to bushfire construction requirements on plans and specifications for a house when considering a Deemed to Satisfy solution using AS 3959 (similar principles apply when using the NASH standard):

- A Bushfire Attack Level (BAL) assessment– this is generally separate work carried out by a competent person, such as an accredited BAL assessor at the appropriate level, to identify the correct BAL rating for the site where the proposed building is to be located in accordance with AS 3959 along with a report to provide details of the assessment. It is important that the assessment correctly documents the actual and not indicative site conditions including vegetation, slopes and setbacks. The construction requirements can then be established from AS3959 or NASH based on the BAL rating derived from AS 3959 for the building site.
- Where shielding is proposed to enable a reduction in the BAL to an elevation this should be clearly detailed within the plans and specifications i.e. show which walls on the plans are shielded and what the applicable BAL is to those shielded elevations.
- Site plans showing any adjacent structure's distance from building and how they are demonstrating compliance.
- A window and door schedule, while may not be necessary in every circumstance, will assist in identifying relevant details such as the type and thickness of each glazed assembly and which portions of glazing require screening, particularly where different glazing is being used throughout the house.
- Construction details should also be identified on any relevant sections and elevations being provided.
- Sections and details showing the connections between the veranda and main roof.
- Where the proposal includes the use of a tested product or system. Technical details that demonstrate how the product or system complies should accompany, or be included in, the plans and specifications for the building.
- A Performance Solution is required for the proposed use of any materials or methods of construction that do not follow Deemed to Satisfy provisions. The requirements of the Performance Solution should be clearly identified and must be detailed on the plans and specification. Furthermore, the building surveyor must also ensure that the certificate of design compliance contains:
 - a statement about each Performance Solution to the bushfire Performance Requirement (if proposed); and
 - details of the Assessment Method used to establish compliance with that requirement.
- A specification, drawing notes and details should be provided specific to the site identifying the general bushfire construction requirements in accordance AS 3959 pertinent to the BAL for the relevant parts of construction. Typical information that should be included is tabulated below for various building elements:

Building element	Typical information required on plans and specifications
Floor	details about type, material, height above the ground and protection where relevant
Vents, weepholes and gaps	details on ensuring minimum gaps and any protection screens
External walls	details about type, material including any cladding
External glazed elements and assemblies and external doors	details on glass type, type of protection (e.g. screens) and frame material for windows and sliding doors. Also details on external side hung doors and garage doors and any protection
Roofs (including veranda and attached car port roofs, penetrations, eaves, fascias, gables, gutters and downpipes)	details on type and material including details on roof/wall junction, any sarking requirements, any proposed roof mounted evaporative cooling units, roof flumes, roof vents, downpipes, gutters and leaf guards
Veranda decks, steps, ramps and landings	details on material (for veranda decks, steps, ramps, landings, balustrades and handrails), whether enclosed or unenclosed and distance from glazed elements
Above ground, exposed water and gas supply pipes	details on location and material

This information may be provided on the plans and/or detailed in a building materials specification linked to the plans (not just a generic one).

Sample plan

A sample plan (drawing titled “Bushfire Construction Plan BAL – 19”) is attached to assist in identifying the level of bushfire construction detail that may be required in a plan in addition to other general design documentation.

Further related information

The Department of Mines, Industry Regulation and Safety has published other information regarding bushfire construction. This includes:

- [Designated bushfire prone areas – Frequently asked questions](#)
- [Construction in bushfire prone areas – presentation slides](#)
- [The role of the building surveyor in checking BAL reports – presentation slides](#)
- [Roof-mounted evaporative coolers – fact sheet](#)
- [Transition for alterations and extensions in bushfire prone areas – fact sheet](#)
- [Indicative BAL ratings in bushfire risk assessments – Industry Bulletin 103](#)

Disclaimer

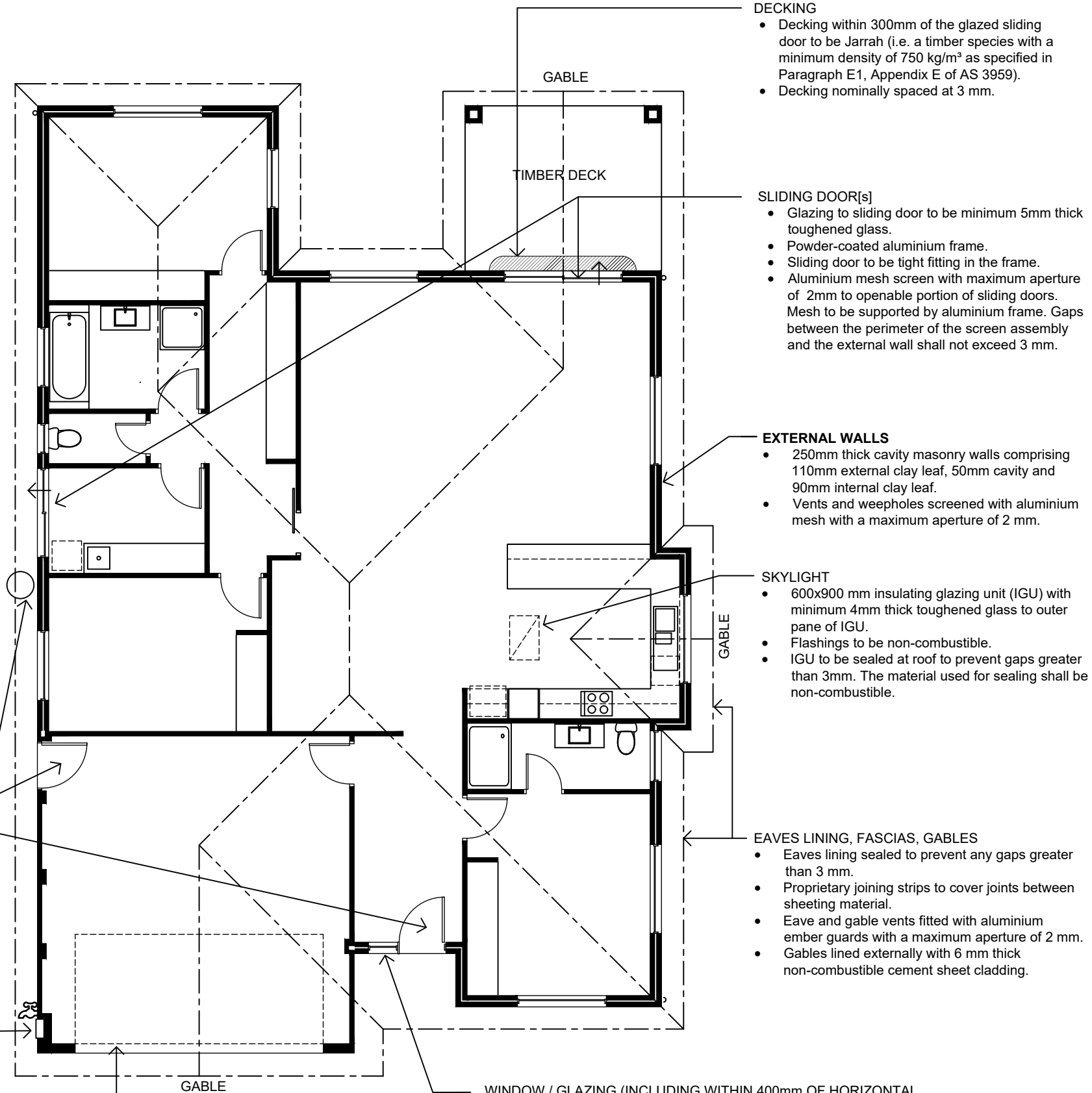
The information contained in this bulletin is provided as general information only and should not be relied upon as legal advice or as an accurate statement of the relevant legislation provisions. If you are uncertain as to your legal obligations you should obtain independent legal advice.

September 2018



FOR REFERENCE USE ONLY

- This drawing is provided as an example of how to present the Building Code of Australia (BCA) deemed-to-satisfy construction requirements of **AS 3959-2009** for a new Class 1a building with a rating of **BAL-19**.
- This drawing is to be read in conjunction with the Industry Bulletin on bushfire construction details for housing and AS 3959-2009.
- When detailing an actual building for deemed-to-satisfy compliance, you must refer to the referenced standard to identify and detail the construction requirements that applies to the building.
- Additional documentation is required to support how the building achieves compliance with the bushfire requirements of the BCA. For example, a report from a competent person detailing the BAL rating in accordance with AS 3959-2009.
- Where shielding is used, details of the elevation(s) that has been shielded and the requirements that apply to building elements in that wall must be clearly shown on the plans.
- The design must also consider all other relevant BCA requirements for the building.



- EXTERNAL DOOR [s]**
- Door frame of solid jarrah timber (i.e. timber species with a minimum density of 650 kg/m³ as specified in Paragraph E2, Appendix E of AS 3959).
 - Solid timber door, a minimum 35 mm thick.
 - Any glazing in door to be a minimum 5 mm thick toughened glass.
 - Door shall be tight fitting to the frame.
 - Weather strip to base of door.

- ALL WATER AND GAS SUPPLY**
- Above ground, exposed water and gas supply pipes shall be metal.

- VEHICLE ACCESS DOOR**
- Non-combustible panel lift door with bottom weather seal and guide tracks, with a maximum gap no greater than 3 mm to all four edges of door.
 - Ventilation slots are not permitted.

- WINDOW / GLAZING (INCLUDING WITHIN 400mm OF HORIZONTAL SURFACE)**
- Window frame of solid jarrah timber (i.e. timber species with a minimum density of 650 kg/m³ as specified in Paragraph E2, Appendix E of AS 3959).
 - Glazing, including glazing within 400mm of horizontal surface, a minimum 5 mm thick toughened glass.

- DECKING**
- Decking within 300mm of the glazed sliding door to be Jarrah (i.e. a timber species with a minimum density of 750 kg/m³ as specified in Paragraph E1, Appendix E of AS 3959).
 - Decking nominally spaced at 3 mm.

- SLIDING DOOR[s]**
- Glazing to sliding door to be minimum 5mm thick toughened glass.
 - Powder-coated aluminium frame.
 - Sliding door to be tight fitting in the frame.
 - Aluminium mesh screen with maximum aperture of 2mm to openable portion of sliding doors. Mesh to be supported by aluminium frame. Gaps between the perimeter of the screen assembly and the external wall shall not exceed 3 mm.

- EXTERNAL WALLS**
- 250mm thick cavity masonry walls comprising 110mm external clay leaf, 50mm cavity and 90mm internal clay leaf.
 - Vents and weepholes screened with aluminium mesh with a maximum aperture of 2 mm.

- SKYLIGHT**
- 600x900 mm insulating glazing unit (IGU) with minimum 4mm thick toughened glass to outer pane of IGU.
 - Flashings to be non-combustible.
 - IGU to be sealed at roof to prevent gaps greater than 3mm. The material used for sealing shall be non-combustible.

- EAVES LINING, FASCIAS, GABLES**
- Eaves lining sealed to prevent any gaps greater than 3 mm.
 - Proprietary joining strips to cover joints between sheeting material.
 - Eave and gable vents fitted with aluminium ember guards with a maximum aperture of 2 mm.
 - Gables lined externally with 6 mm thick non-combustible cement sheet cladding.

BAL-19 TO AS 3959-2009 CONSTRUCTION NOTES

To comply with Section 3 and 6 of AS 3959 - 2009 including but not limited to the following:

FLOOR
Concrete slab on ground.

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

EXTERNAL WALLS
250mm thick cavity masonry walls comprising 110mm external clay leaf, 50mm cavity and 90mm internal clay leaf.

VENTS and WEEPHOLES
Vents and weepholes in external walls shall be screened with aluminium mesh with a maximum aperture of 2 mm, except where the vents and weepholes have an aperture less than 3 mm.

WINDOW / GLAZING (unless noted otherwise)
Window shall be metal frame with a minimum 5 mm thick toughened glass. Openable portions of windows to be screened externally with screens as described below.

SCREENS FOR WINDOWS
Aluminium mesh with a maximum aperture of 2 mm. Frame supporting mesh shall be aluminium. Gaps between the perimeter of the screen assembly and the building element to which it is fitted shall not exceed 3 mm.

ROOF
Metal roof sheeting. All roof covering accessories to be non-combustible.

Roof to be fully sarked with sarking that has flammability index of not more than 5 when tested to AS1530.2. Sarking shall:

- Be located on top of the roof framing. Foil backed insulation may be fixed over the roof battens; and
- Cover the entire roof including the ridge and hips; and
- Extend into the gutters and valleys.

Sheet roof / wall junction shall be sealed to prevent openings greater than 3 mm by the use of fascia and eaves lining.

Gaps greater than 3 mm (such as under corrugations or ribs of sheet roofing and between roof components) shall be sealed at the fascia or wall line and at valleys, hips and ridges by -

- Aluminium mesh with maximum aperture of 2 mm; or
- Mineral wool; or
- Other non-combustible materials; or
- a combination of the above items.

Roof ventilation openings such as eave, gable and roof vents shall be fitted with aluminium ember guards with a maximum aperture of 2 mm.

ROOF PENETRATIONS
Roof penetrations including roof ventilators, roof mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors shall adequately sealed at the roof to prevent gaps greater than 3 mm. The material used for sealing shall be non-combustible.

Openings in roof ventilators or vent pipes shall be fitted with aluminium ember guards with a maximum aperture of 2 mm.

Roof mounted evaporative cooling unit to be fitted with non-combustible butterfly closer as close as practicable to the roof level. Evaporative cooling unit to be sealed at roof to prevent gaps greater than 3mm. The material used for sealing shall be non-combustible.



Rev.	Amendment	Date:

Drawing Title
BUSHFIRE CONSTRUCTION PLAN
BAL - 19

Owner/Client:
Building and Energy

Project:
Class 1a [Single Storey] Sample House
1 Example Street, Western Australia

Date: Aug 2018	Drawn by:	Page:
Scale: 1:100 @ A3	Job No.:	A01