BUILDING FOR BUSHFIRE

Building Siting and Design

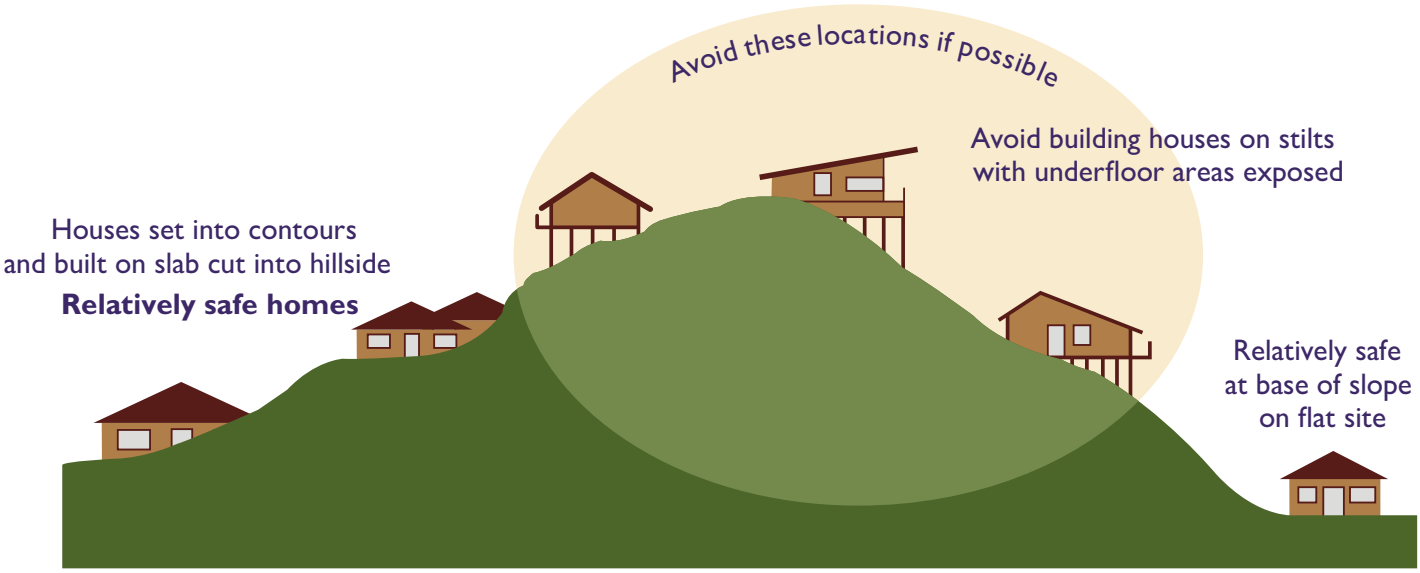

Diagram showing preferred and higher risk building locations

Building siting and design can significantly affect building resistance to bushfires and should be considered when designing or modifying buildings in bushfire-prone areas.

The way in which a building is designed and positioned on a site can significantly affect the potential for debris and ember accumulation on or around the structure as well as its exposure to radiant heat, flame and wind. The building design considerations outlined in this document should be considered in tandem with construction standards and landscaping measures and in the context of specific site conditions.

BUILDING SITING

Building sites on top of ridgelines and saddles are often popular for the views they offer occupants. These sites are often also at higher risk during a bushfire as an approaching fire will typically move faster and become more intense as it moves upslope. Building sites on top of ridgelines and saddles should accordingly be avoided in high-risk areas. A location below the ridgeline or at the base of the hill is a safer option.

Northern aspects are also popular for the solar access they provide. From a bushfire protection perspective, northern aspects typically mean drier vegetation and therefore more available fuel for a bushfire to consume. This can increase a fire's rate of spread and intensity, thereby increasing risk to buildings in its path.

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Dwellings located in rural or environmental living areas are often sited in locations that rely on relatively lengthy private accesses, often passing through bushfire-prone vegetation. Locating new buildings near the property access and where occupants can easily egress away from the likely hazard source is advisable where possible.

BUILDING SHAPE

Complicated building shapes can trap flammable debris and embers against structures. A common example is the use of re-entrant corners in external facades.

Simple building shapes are preferable as they limit the opportunity for embers and debris to become trapped against the building.

ROOF DESIGN

Complicated roof designs and flat roofs can also trap flammable debris and embers on buildings and against facades.

Simple roof shapes with a pitch of 18° or greater will aid the flushing of debris.

Guttering systems can accumulate flammable leaf litter that can facilitate a fire within the roof system. Use of non-combustible gutter guards can help avoid this problem. In some situations it may be preferable to avoid installing gutters altogether (i.e. in areas that are not easily accessible for routine maintenance).

BUILDING HEIGHT AND BULK

Large, expansive walls present greater surface area to receive radiant heat and high-velocity winds.

Reducing building height and bulk will reduce exposure and is therefore recommended. It is noted that the effect of height and bulk on vulnerability is relative to the construction materials used and the separation available from the bushfire hazard.

Slab-on-ground construction is considered more resilient than suspended floor construction as it generally avoids creating sub-floor spaces and can reduce a building's height and bulk. When developing on sloping land, use of cut-in-benches is preferable.

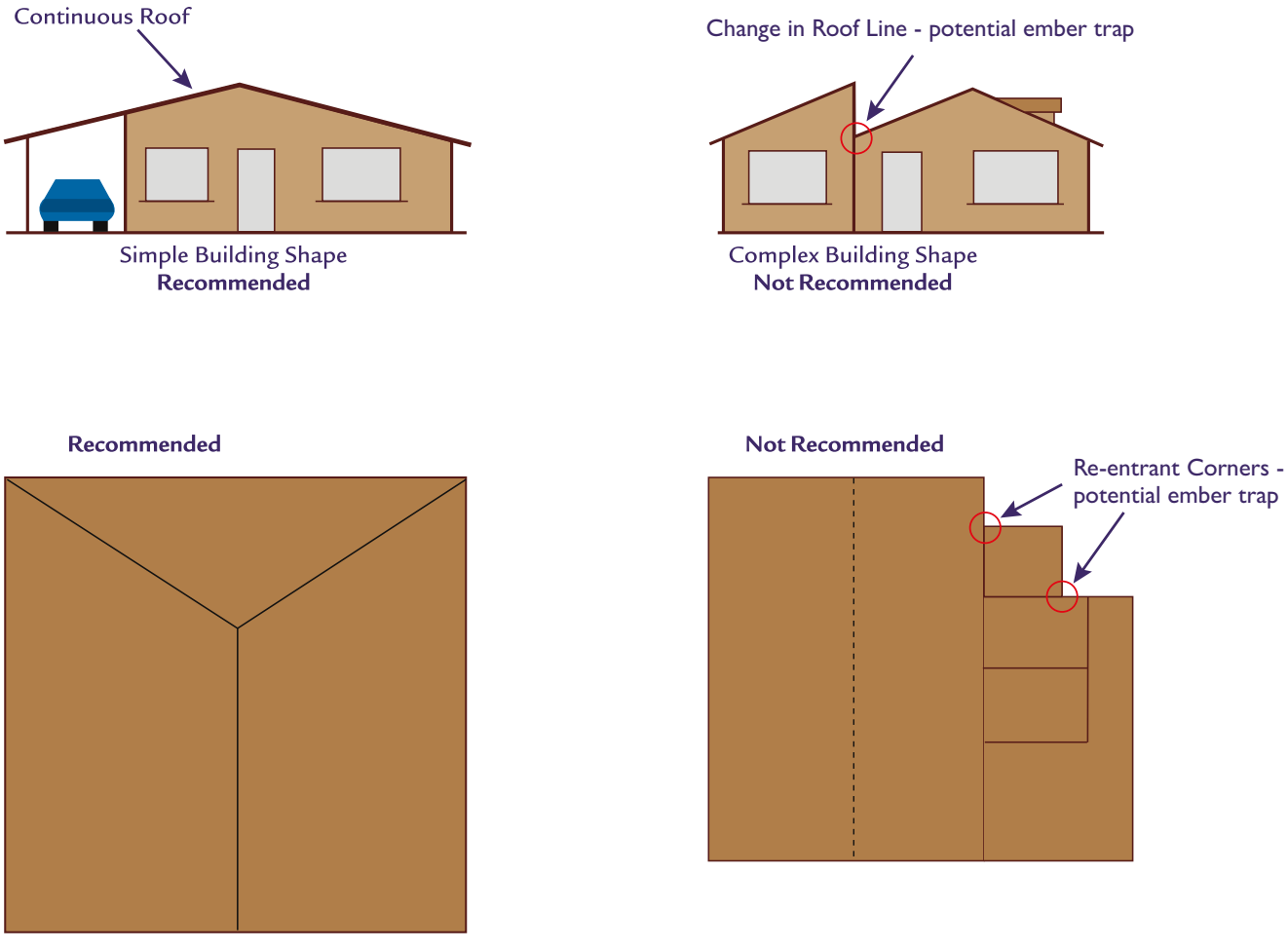

Diagram showing comparison of building and roof shapes

SUB-FLOOR SPACES

Sub-floor spaces can increase the vulnerability of a building by enabling flammable material to accumulate underneath structures that may be ignited during a bushfire.

Where the creation of sub-floor spaces cannot be avoided, risk can be minimised by enclosing the sub-floor space to prevent entry of debris. Another strategy is to line the underside of timber framing with non-combustible fibre-cement sheeting.

WINDOW PLACEMENT AND DESIGN

Windows are particularly vulnerable to failure when exposed to wind-blown debris and radiant heat during extreme events. When windows fail, openings are created that can enable the entry of embers into buildings.

The larger the piece of glass, the greater its vulnerability to heat and wind stresses. Breaking a large window design into smaller portions with framing members can provide better performance.

The construction requirements of AS 3959-2009 Construction of buildings in bushfire-prone areas include specifications for glazing that will improve resistance to radiant heat. The standard does not specify requirements to protect buildings from extreme wind.

Particular care should be taken to avoid locating combustible landscaping materials and plants in direct proximity to glazed elements.

ADJACENT AND ADJOINING OUTBUILDINGS

Certain types of outbuildings, structures and appurtenances can be constructed without a permit yet can majorly compromise the main building's resistance to bushfire attack. Examples include garden sheds, garages, boundary fencing and shade sails.

Structures such as garden sheds are often particularly susceptible to ember-based ignition as a result of gaps and openings in their construction and the storage of flammable materials within them.

Adjacent structures can ignite and burn for several hours, thereby exposing the main building to flame and prolonged radiant heat.

Where an adjacent structure is made from – or contains – combustible material, it should be located at least 6m from the main building or designed and built to withstand exposure to bushfire (for example – by utilising a colorbond fence instead of a timber paling one).

Attached shade-sails can potentially accumulate flammable debris and embers directly adjacent to buildings. For this purpose, they should be angled at 18° in order to avoid this accumulation.

Examples of a simple building shape, simple roof design and an enclosed subfloor space on a deck

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