



**ABCBC**

# **Bushfire protection for certain Class 9 buildings**

Decision Regulation Impact Statement

---

2022

---

The Australian Building Codes Board has developed this Final Regulation Impact Statement, which accords with the requirements of Best Practice Regulation: *A Guide for Ministerial Councils and National Standard Setting Bodies*, as endorsed by the Council of Australian Governments in 2007. Its purpose is to inform interested parties and to assist the Australian Building Codes Board in its decision making on proposed amendments to the National Construction Code.

---

## The Australian Building Codes Board

The Australian Building Codes Board (ABCB) is a joint initiative of all levels of government in Australia, together with the building industry. Its mission is to oversee issues relating to health, safety, amenity and sustainability in building. The ABCB promotes efficiency in the design, construction and performance of buildings through the National Construction Code, and the development of effective regulatory and non-regulatory approaches. The Board aims to establish effective and proportional codes, standards and regulatory systems that are consistent between States and Territories. For more information see [the ABCB website](#).

### Copyright

© Commonwealth of Australia and States and Territories of Australia 2020, published by the Australian Building Codes Board.



The material in this publication is licensed under a Creative Commons Attribution-NonCommercial-4.0 International licence, with the exception of

- Any third-party material
- Any trademarks, and
- Any images or photographs.

More information on this CC BY licence is set out at the Creative Commons website ([creativecommons.org/licenses/by/4.0](https://creativecommons.org/licenses/by/4.0)).

Enquiries about this publication can be sent to:

Australian Building Codes Board  
GPO Box 2013  
CANBERRA ACT 2601  
Phone: 1300 134 631  
Email: [ncc@abcb.gov.au](mailto:ncc@abcb.gov.au)  
Web: [abcb.gov.au](http://abcb.gov.au)

### Attribution

Use of all or part of this publication must include the following attribution:

© Commonwealth of Australia and States and Territories 2020, published by the Australian Building Codes Board.

## Disclaimer

By accessing or using this publication, you agree to the following:

While care has been taken in the preparation of this publication, it may not be complete or up-to-date. You can ensure that you are using a complete and up-to-date version by checking the Australian Building Codes Board website ([abcb.gov.au](http://abcb.gov.au)).

The Australian Building Codes Board, the Commonwealth of Australia and States and Territories of Australia do not accept any liability, including liability for negligence, for any loss (howsoever caused), damage, injury, expense or cost incurred by any person as a result of accessing, using or relying upon this publication, to the maximum extent permitted by law. No representation or warranty is made or given as to the currency, accuracy, reliability, merchantability, fitness for any purpose or completeness of this publication or any information which may appear on any linked websites, or in other linked information sources, and all such representations and warranties are excluded to the extent permitted by law.

This publication is not legal or professional advice. Persons rely upon this publication entirely at their own risk and must take responsibility for assessing the relevance and accuracy of the information in relation to their particular circumstances.

## Version history

Original

Publish date: March 2022

Print version: 1.

# Contents

Purpose and Scope .....	7
Problem .....	7
Population at risk of the problem .....	7
Challenges evacuating people at risk .....	8
The risk of bushfires occurring is increasing over time.....	10
Objective.....	20
Options .....	20
Option 1: Retain the status quo .....	20
Option 2: Include changes to the Performance Requirements and DTS provisions of Part G of NCC Volume One .....	20
Option 3: Publish a non-mandatory Handbook. ....	21
Impact Analysis.....	21
Option 1: Retain the status quo .....	21
Option 2: Include changes to the Performance Requirements and DTS provisions of Part G of NCC Volume One .....	22
Option 3: Publish a non-mandatory Handbook. ....	27
Unintended Consequences.....	28
Business compliance costs.....	29
Regulatory Burden .....	30
Consultation.....	31
COAG Planning Officials Group – 2010.....	31
Victorian Building Commission – 2012.....	31
State and Territory administrations – 2016 .....	31
Stakeholder working group consultations – 2017.....	32
Building Code Committee consultations – 2017.....	32
Cross industry-administration working group – 2018 .....	32
Building Codes Committee meeting – 2021.....	33
Conclusion .....	34
Implementation and Review .....	36

## Glossary

Term	Meaning
Bushfire Attack Level	A means of measuring a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per metre squared.
Deemed-to-Satisfy Provisions	Provisions which are Deemed-to-Satisfy the Performance Requirements.
Health-care building	A building who's occupants are undergoing medical treatment generally need physical assistance to evacuate the building during an emergency
Performance Requirement	A requirement which states the level of performance which a Performance Solution or Deemed-to-Satisfy Solution must meet.
Performance Solution	A method of complying with the Performance Requirements other than by a Deemed-to-Satisfy Solution.
Residential care building	A Class 3, 9a or 9c building, which is a place of residence where 10% or more of residents who reside there need physical assistance conducting their daily activities and to evacuate the building during an emergency (including any aged care building or residential aged care building) but does not include a hospital.

## Abbreviations

Abbreviation	Full Name
ABCB	Australian Building Codes Board
AIA	Australian Institute of Architects
AS	Australian Standard
BCC	Building Codes Committee
BAL	Bushfire Attack Level
BPA	Bushfire Prone Area
DTS	Deemed-to-Satisfy
FFDI	Forest Fire Danger Index
PCD	Public Comment Draft
PV	Present Value
NCC	National Construction Code
NPV	Net Present Value

Abbreviation	Full Name
SEMC	State Emergency Management Committee (Tasmania)
SoC	State of Climate Report (2020)
VoSL	Value of Statistical Life

## Purpose and Scope

The purpose of this Decision Regulation Impact Statement (RIS) is to provide an assessment of the need to provide additional bushfire protection measures for certain Class 9 buildings. This follows several recent severe bushfire events and research showing that bushfires will increase in both frequency and severity in the future. It is also a result of an increase in the number of vulnerable people occupying certain Class 9 buildings in bushfire prone areas.

The focus of this analysis is on the cost of proposed Deemed-to-Satisfy (DTS) Provisions for certain Class 9 buildings, where vulnerable occupants reside or occupy for long periods of time, namely:

- Class 9a health-care buildings
- Class 9b early childhood centres, primary and secondary school buildings
- Class 9c residential care buildings

Other Class 9 buildings and all other building classifications are excluded from the scope of this analysis.

## Problem

The nature of the problem relates to users of certain Class 9 buildings being more vulnerable than the general population in the event of a bushfire. Over time, the risk of bushfire occurring is increasing due to climate change. Population growth also means that more communities are living in bushfire prone areas.

## Population at risk of the problem

Vulnerable people can be defined as individuals who may be unable to take care of themselves or are unable to protect themselves against harm. Vulnerable people can include individuals in one or more of the following categories:

- Minors under the age of 18;
- Senior citizens with some physical or cognitive impairment;
- People with impaired intellectual or physical functioning;
- People with low levels of English comprehension, literacy and/or education; and
- People suffering acute or chronic illness.

# Challenges evacuating people at risk

## Children

The Tasmanian State Emergency Management Committee (SEMC) *“Policy Statement - Emergency Management Framework for Vulnerable People”* acknowledges that children can behave unpredictably in response to stressful situations or may be overwhelmed because of their level of physical, cognitive and emotional development.

Typical vulnerabilities include: lack of ability to independently access transportation assistance and services; suffering greater harm from exposure to smoke or chemical agents because of their size, metabolisms, respiratory rates and other factors; more likely to develop dehydration, malnutrition and exhaustion quicker than adults; and more susceptibility to infectious diseases and severe forms of illness.

A study undertaken into the prevalence and fire safety implications of early childhood centres by Page and Norman summarised the findings of Taciuc and Dederichs based on surveys with 87 responses (62 teachers and 25 fire experts) from USA, Germany, Denmark, Romania, and Canada as follows<sup>1</sup>:

- Between 30 and 36 months, children are generally capable of understanding and following simple fire evacuation instructions;
- Between 24 and 30 months, they can generally walk down stairs.
- Younger than 24 months, they can evacuate horizontally without assistance (unless they are toddlers or babies);
- Teachers say that between 24 and 30 months, children will not become upset by unusual events (e.g. fire and emergency evacuation).
  - Learning is very age-specific, and pre-schoolers remember images (e.g. of a cigarette lighter) but not the accompanying safety message.
  - Depending on the age of students, the occupant characteristics correlate to Ambulant Type 3 or Non-ambulant Type 4 and the applicable evacuation capability type would be “Walker” or “Walker Assist” (i.e. with a need for supervision and assistance).

---

<sup>1</sup> Taken from ETF Consulting, Risk to Vulnerable Occupants in Class 9 Buildings Associated with Bushfire Attack, 2019, Page 26.

- The ratio of children to supervisors necessary for orderly evacuation would tend to increase as the age of the children increases.

## Elderly

Aged-care facilities can be classified as Class 3, Class 9a or Class 9c buildings depending on the capability of the occupants. The potential exists for clients of varying care needs to be accommodated in the same building. A Class 9c was developed to address this mix of low and high care occupants to facilitate aging in place, amongst other things. It therefore follows that the occupants of a Class 9c building may comprise a mix of evacuation capabilities varying from Type 1 to 5. The mix of occupants may vary between facilities, but there are likely to be cases where full evacuation and relocation of Class 9c residential care buildings is impractical. The vulnerability of aged occupants to exposure to smoke and heat is greater than the general population and any firefighting activities will need to be undertaken by staff and/or external resources (e.g. fire brigade).

Ambulances or similar specialised transport would be required for significant numbers of occupants and there could be significant risk to life from the evacuation process for the most vulnerable occupants. This was demonstrated during the Black Saturday fires, where two residential care facilities in the Bunyip area were evacuated. The evacuations were not undertaken prior to bushfires approaching the surrounding area and appropriate vehicles were not available for all the occupants. There were 82 occupied beds in the facilities at the time of the fire, most of which could be considered to be highly vulnerable. Four occupants of the facility died in the ensuing days and it was stated in evidence<sup>2</sup> to the 2009 Victorian Bushfires Royal Commission that the deaths could be attributed to the disruption and shock of evacuation.

It is worth remembering that total evacuation of hospitals and evacuation of high dependency occupants of residential care facilities cannot be undertaken without exposing some occupants to significant risks due to the disruption to the care, increased stress and potential exposure to high temperatures and smoke during the relocation process. Whilst early evacuation of some occupants of these buildings could be achieved safely, there will, in many instances, be a need for a 'defend-in-place' strategy for the more vulnerable occupants. Therefore, some Class 9a and Class 9c buildings will need to maintain a tenable environment within the structure during and after exposure to bushfire and maintain essential services such

---

<sup>2</sup> Bunyip fire submissions: Submissions of counsel assisting the Victorian bushfires Royal Commission issued 16 February 2009 <http://royalcommission.vic.gov.au/getdoc/063443b4-b222-455c-8445-56947726eb08/SUBM.202.002.0001.pdf> accessed 14 February 2022.

as air conditioning, medical gas supplies, etc. For schools and early childhood centres, evacuation is more practical since a school can be simply closed on high-risk days. This approach is applied on Code Red days in Victoria and consideration could be given to extending this to Forest Fire Danger Index (FFDI) below 100 as an alternative to providing highly protected buildings. However, this should be balanced against sending children home to residences, which may be more vulnerable to bushfire attack.

## **People with disabilities**

The challenge is even more difficult with certain Class 9 buildings, such as hospitals and residential care, where the occupants, due to their delicate physical and mental state, cannot be easily evacuated and/or that the evacuation process will be a major traumatic experience for those individuals.

So, the benefits accruing from higher building standards are both in terms of protecting the physical lives of those considered vulnerable individuals, and also reducing the considerable stress and trauma that would be inflicted on those same individuals should they need evacuation.

The evidence that certain community members, due to age, cognitive, mental or physical impairment, are more vulnerable than the general public during a bushfire event is well established.

## **The risk of bushfires occurring is increasing over time**

Bushfire risks are expected to increase in geographic spread and intensity, and are expected to become more frequent<sup>3</sup>.

This is supported by CSIRO climate scientists, findings from the National Natural Disaster Arrangements Royal Commission and research arising from the Bushfire and Natural Hazards Cooperative Research Centre.

There is growing and extensive scientific evidence that long-term warming is leading to higher probabilities of extreme weather events, including bushfires.

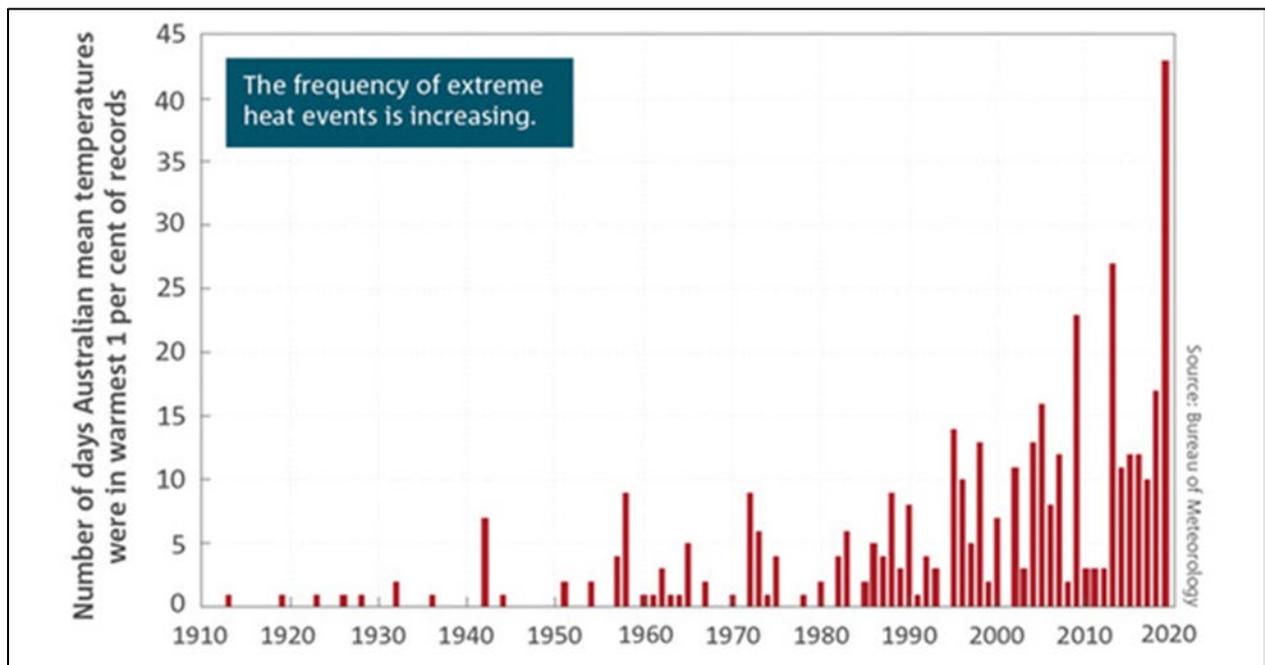
As with previous reports, CSIRO's State of the Climate (SoC) 2020 report has a primary focus on the increasing frequency and severity of extreme weather events and natural disasters. This is of particular relevance to insurance and emergency management as most natural disasters affecting Australia are weather or climate related.

---

<sup>3</sup> Royal Commission into National Natural Disaster Arrangements, Report, 2020, Page 55.

The report concludes that the science has been broadly consistent and largely accurate in the way that it has described and projected the climate system for the last several decades. Australia is experiencing climate change now, and the warming trend is continuing. This trend is reflected in Figure 1.

**Figure 1.** The number of days each year in which the Australian averaged daily mean temperature each month is extreme (warmest 1% of days for each month).



Source: BOM/CSIRO (2020)

In the three years since the SoC 2018 report, Australia has experienced its hottest and driest year on record: 2019/2020. These extremes, combined with anomalously windy conditions, played a pivotal role in the disastrous Black Summer fires of 2019/2020.

SoC 2020 explains that these conditions would not be considered extreme in a 1.5-degree warmer world (best case scenario), let alone the 6 degree warmer world projected by some simulations under a 'business as usual' scenario.

Climate extremes experienced in Australia, and globally during 2019/20, are part of a continuing trend where each decade is hotter than the previous one. This warming is entirely consistent with global climate model projections produced more than 20 years ago (Hausfather et al 2020).

While swings from drought to flood are a natural and defining characteristic of Australian climate, SoC 2020 describes how long-term warming trends amplify this natural variability and will continue to do so in coming decades.

Long-term warming increases the likelihood of extreme events beyond our historical experience, calling into question the applicability of historical records to accurately project the risk environment of the future. For this reason, 'climate-enabled' catastrophe loss models using the latest simulations, estimate financial losses due to extreme weather events for a range of future climate scenarios and time horizons by blending and downscaling historical and future climate model data.

Despite bushfire risk increasing geographically, there are a number of other measures in place intended to reduce risk to life in a bushfire event. These measures include: land use planning interventions, community education, emergency management and early warning systems.

## Population growth is resulting in more development in bushfire prone areas

Australian States and Territories have experienced considerable population growth, demographic change, and urban development on the periphery of cities and regional centres. Construction continues to push further outward from current urban boundaries<sup>4</sup>. This peri-urban development has the potential to place non-residential buildings and their occupants, into bushfire prone areas and exacerbate risk.

Understandably, given population growth, demographic change, and regional migration/lifestyle influencing factors, the number of Class 9 buildings constructed around the country in potential bushfire prone areas is increasing. However, it would appear that the overall scale of Class 9 building development in bushfire prone areas is not significant.

## Evidence of loss of buildings or life is lacking despite the increased risk

From a life safety perspective, there is an increased threat, although unquantifiable, that early childhood centres, schools, residential care facilities and hospitals face from a changing climate. This is particularly the case in those circumstances where facilities are needed by communities given their physical location, community demand and that alternative options are limited.

What remains poorly understood is the actual scale of damage caused to Class 9 buildings from bushfires over the past decade and/or the extent of social, economic and environmental disruption caused by impacts of bushfires on the operations of these structures.

This proposal has been in development for a long time. It originates from the 2009 Victorian Bushfires Royal Commission. Since that time there have been other significant fire events,

---

<sup>4</sup> Final Report of the NSW Bushfire Inquiry, 2020, Page 191.

and post-event reviews. Most recently, a review was undertaken in response to the Black Summer bushfires of 2019/20, which was separately reviewed by the Commonwealth, Victorian, NSW and Queensland Governments. None of these reviews identified a Class 9 building that was lost, despite the widespread nature of the fires.

As previously discussed, there were four deaths linked to the evacuation of an aged care facility in the 2009 Victorian bushfires when two aged-care facilities in the Bunyip area were evacuated. The evacuations were not undertaken prior to bushfires approaching the surrounding area and appropriate vehicles were not available for all the occupants. There were 82 occupied beds in the facilities at the time of the fire, most of which could be considered to be highly vulnerable.

Fortunately, a Report prepared by EFT Consulting in 2019, found that losses of Class 9 buildings as a result of bushfire is rare<sup>5</sup>. In fact, the methodology adopted for the study used residential house loss in bushfire prone areas as a proxy for the lack of detailed information on Class 9 structures.

## Planning controls are in place to reduce bushfire risk to vulnerable buildings

Local, state and territory government planning requirements seek to reduce the risk to buildings and their occupants, by placing spatial and design limits on where development can occur and what land uses are appropriate given strategic and planning policy contexts. There is also wide-spread acceptance by all States and Territories that appropriate risk assessments be incorporated into land use planning decisions.

Planning regulations at the local, regional and state levels, are designed to prevent inappropriate land use development, especially those subject to a range of natural hazards be they flood, land slip or bushfires. This is not something new. Increasingly, coastal development and areas of significant environmental, ecological or cultural values are uniformly protected from inappropriate development activity.

In consultations following the recommendations of the 2009 Victorian bushfires Royal Commission, the ABCB Office sought evidence in particular, from the then Victorian Building Commission (now VBA), the then Australasian Fire and Emergency Services Authorities Council (now Australian and New Zealand National Council for fire and emergency services) (AFAC) and the CSIRO that demonstrated an existing deficiency in the NCC and the true extent of the problem. No supporting evidence was provided at the time.

The ABCB Office also sought advice from the then COAG national Planning Officials Group (POG). The POG subsequently sought advice from all State and Territory planning authorities

---

<sup>5</sup> ETF Consulting, Risk to Vulnerable Occupants in Class 9 Buildings Associated with Bushfire Attack, 2019, Page 27.

regarding the current planning approval requirements for 'vulnerable occupancy' buildings in designated bushfire prone areas.

The POG were of the collective opinion that respective jurisdictional planning systems are largely effective at the point at which development is assessed. Given the right circumstances and context, development that is deemed appropriate is usually approved with conditions that relate to required infrastructure, hours of use, scale of undertaking, physical design and site layout.

Subsequent feedback indicated there were several consistent requirements being applied via planning assessment procedures, including:

- mandating compliance with the technical requirements of the Building Code of Australia (BCA);
- referral of development applications to designated fire authorities for consideration or approval; and
- active consideration of bushfire safety measures such as: -

**Asset Protection Zones** - to provide space for fire-fighters and other emergency services personnel and ensure that their activities can be safely conducted under critical conditions of radiant heat, smoke and embers;

**Vehicular access** – via internal roads that provide safe access for emergency services personnel in suppressing a bushfire, while residents are accessing or egressing an area;

**Managing utility services** – water, gas and electricity - to provide adequate water services for the protection of buildings during and after the passage of a bushfire and to locate gas and electricity services so they do not contribute to the risk of fire spreading to associated buildings; and

**Emergency and evacuation planning** - to provide suitable emergency and evacuation/relocation arrangements and protocols for existing residents/occupants.

However, while governments have a significant number of ways to reduce bushfire risk, including restricting development approvals and/or conditioning development consent, none are 100 per cent effective at preserving life or the structural integrity of the buildings they occupy<sup>6</sup>.

---

<sup>6</sup> This is highlighted by the Report of the Royal Commission into National Natural Disaster Arrangements. The Report contains a significant number of recommendations to reduce the risk of negative impacts from bushfires, including better provision of information and educating the community, changing planning regulations, improving emergency response capabilities, improving evacuation procedures, improved land management, and others. None of these recommendations are proposed to solve the issue on their own, but each reduces the risk to a certain extent.

## Planning controls do not stop all development of vulnerable use buildings in bushfire prone areas

It is worth noting that in certain circumstances the construction of certain Class 9 buildings in bushfire prone areas may still occur regardless of existing planning controls and conditions of consent. This may be the case where existing communities, especially in regional and rural localities have a demonstrated need for these educational, health or community based facilities, and locating them at a further distance from the community in a lower risk location is deemed inappropriate for a variety of reasons<sup>7</sup>.

Where those approving, developing or managing such facilities lack an understanding or adequate information at the physical building design stage of construction increased risk to building occupants may occur.

In these circumstances, strengthening the requirements of the NCC will provide an important safety net to manage the life safety outcomes within these buildings while satisfying local and regional needs.

Whilst the increasing bushfire risk in many parts of Australia is undisputed, the scale of the actual problem when it comes to Class 9 buildings and the people that reside or attend them is not well understood in a quantitative sense.

## Early evacuation of buildings significantly reduces risks to life

Total and early evacuation of a building is recognised as the best way to mitigate the risk to life in a bushfire scenario, and there are various initiatives to advise operators of Class 9 facilities of appropriate actions to consider in a fire emergency<sup>8</sup>. Early evacuation means that the benefit of having more resilient buildings is significantly reduced, as there is no risk to life in an empty building.

Of course, the effectiveness of early evacuation is limited where a fire behaves in an unpredictable manner due to extreme circumstances.

It should also be noted that the complete evacuation of hospitals and residential care facilities cannot be undertaken without exposing some occupants to significant risks due to the disruption to the care, increased stress and potential exposure to high temperatures and

---

<sup>7</sup> ETF Consulting, Risk to Vulnerable Occupants in Class 9 Buildings Associated with Bushfire Attack, 2019, page 3

<sup>8</sup> ETF Consulting, Risk to Vulnerable Occupants in Class 9 Buildings Associated with Bushfire Attack, 2019, Page 50.

smoke during the relocation process<sup>9</sup>. Whilst early evacuation of some occupants of these buildings is possible, this won't be true in every situation.

## Building construction methods can also reduce risk to life in the event of a bushfire

The way buildings are designed and constructed can help to reduce the risk<sup>10</sup> from bushfires. This is done by adopting a design for the external building envelope that is resistant to the various bushfire attack mechanisms (e.g. embers, radiant heat, flame contact and impact resistance)<sup>11</sup>.

Proposed changes to the NCC to reduce the risk from fire include:

- ensuring separation distance between structures, and other potential hazards
- ensuring non-combustible paths around buildings
- appropriate HVAC systems
- informative signage; and
- vehicular access.

## Bushfire threats also result in dislocation and disruption to the community

Non-residential buildings, especially residential care buildings, hospitals and schools, can be critical community assets which cannot be replaced quickly, risking significant disruption to services provided to vulnerable groups and the community generally when damaged by bushfire or other hazards.

This disruption can be at a significant economic and social cost. Particularly for smaller regional centres and rural/remote communities where facilities are limited in number and physical location.

Hospitals and schools, comprise an important part of the public infrastructure of a local community. Communities rely on these buildings to provide essential facilities that must be accessed to support a thriving community. Given bushfires are inherently disruptive to the community, if vulnerable use buildings are destroyed by a bushfire, it could further disrupt the community and its ability to adjust and re-establish itself after a bushfire event.

---

<sup>9</sup> ETF Consulting, Risk to Vulnerable Occupants in Class 9 Buildings Associated with Bushfire Attack, 2019, Page 38.

<sup>10</sup> Royal Commission into National Natural Disaster Arrangements, Report, 2020, Page 411.

<sup>11</sup> ETF Consulting, Risk to Vulnerable Occupants in Class 9 Buildings Associated with Bushfire Attack, 2019, Page 45.

Loss of schooling and other community services are factors that can lead to feelings of isolation by local communities. Given the level of social disruption and potential feelings of isolation, individuals may also decide not to return and this may have adverse impacts on the prosperity of towns affected by bushfire. Some individuals may leave a bushfire affected area due to a loss of support services or infrastructure.

Hospitals are also a crucial part of a bushfire response for individuals injured by bushfire. In the Black Saturday bushfires, Victorian public hospitals provided care to more than 800 people and admitted 130 patients with a fire-related injury or illness. To cope with the high demand for health services, Victorian Medical Assistance Teams were deployed from metropolitan hospitals to various regional and rural hospitals to assist in treating those requiring medical care. If regional and rural hospitals were destroyed or severely damaged during a bushfire, the pressure on the health system to cope with the increased demand for medical services would be even greater. There can also be broader impacts associated with loss or damage of buildings, over and above lost property value.

Though not an objective of the NCC, current bushfire standards for residential (Class 1a, 2 and 3) buildings deliver a degree of property protection. Class 9 buildings may or may not address occupant safety, and may or may not provide additional property protection that would allow vulnerable people additional time to relocate to safety or evacuate if deemed necessary.

## There are a number of market failures reducing uptake of improved construction methods for bushfire prone buildings

An important means of reducing bushfire risk, to both the occupants and structure of Class 9 buildings, is through building design and construction measures. There are a number of market failures that may prevent building owners and operators from identifying and assessing bushfire risk, and adequately addressing this risk at the time of building design, construction or redevelopment.

### Insufficient information

To determine the appropriate building construction standards to adopt, the building owner or person with control over the construction of the building would need to understand bushfire risk and the factors that influence it. The information required to understand this risk requires a certain level of technical expertise without which it may be difficult to make a proper evaluation of bushfire risk. It may be unrealistic to expect building owners to have the capacity

to generate a fully informed view of their building's bushfire risk and the associated bushfire risk reduction measures required.

The National Resilience Taskforce found that there may be a lack of information or understanding of the risks, for both those designing and constructing the building, and the building owner<sup>12</sup>. Understanding these risks requires either technical knowledge of fire, or an awareness of the possibility of fire in the location a building will be built, resulting in technical advice being acquired through a third party<sup>13</sup>. Determining appropriate mitigation measures for these risks, once identified, may also be challenging<sup>14</sup>.

While an expert could be commissioned to advise building owners on bushfire risk, studies have revealed that there are numerous factors influencing a person's perception of risk and people generally consider themselves or their property to be less at risk than their locality.

## Bounded rationality

One theme that emerged from the evidence before the 2009 Victorian Bushfire Royal Commission was that people underestimated the threat posed by the bushfires, and that 'community memory' of ferocious fires is difficult to maintain. As such, people may be less likely to commission technical advice when building a Class 9 building.

## Split incentives

Another market failure is that the benefits of protecting a Class 9 building through stricter construction standards do not accrue to the party that designs or constructs the building. Designers and builders have incentives to minimise their building costs to remain competitive in the building industry. Given owners decisions are likely to be price driven, they may be unable to verify the benefits arising from an increase in building costs. Hence, the industry may have little incentive to offer to build to stricter requirements.

## Information asymmetry

By the same token, evidence before the 2009 Royal Commission indicated that potential users of facilities, like residential care facilities and schools, do not generally seek or take into account information about the building's ability to withstand bushfire. That is, people may not place a strong focus on the level of fire resistance when choosing a facility, whether it is public or private. This is especially the case if there is a lack of choice or that alternatives are

---

<sup>12</sup> National Resilience Taskforce, *Profiling Australia's Vulnerability: The interconnected causes and cascading effects of systemic disaster risk*, 2018, Page 18.

<sup>13</sup> Department of Planning and Community Development, *Bushfire protection for vulnerable use buildings*, 2012

<sup>14</sup> CSIRO, *Report on Climate and Disaster Resilience*, 2020, Page 239.

inaccessible due to distance or lack of alternative modes of transport to other facilities and services.

## The NCC sets a higher standard for Class 2 and Class 3 buildings in bushfire prone areas

The NCC does not have a Performance Requirement relating to the construction of Class 9 buildings in bushfire prone areas. However, there is a Performance Requirement (GP5.1) for Class 2 and 3 buildings (and Class 10a buildings associated with a Class 2 or 3 building).

GP 5.1 requires:

*A building that is constructed in a designated bushfire prone area must, to the degree necessary, be designed and constructed to reduce the risk of ignition from a bushfire, appropriate to the—*

*(a) potential for ignition caused by burning embers, radiant heat or flame generated by a bushfire; and*

*(b) intensity of the bushfire attack on the building.*

The final design and construction of a building is also the result of a large number of trade-offs, the most significant being trading the standard the building is built to and the cost to construct and use the building<sup>15</sup>. Where risks aren't known due to a lack of information and/or changing circumstances, and in the absence of a regulatory trigger, the building designer and other technical professionals may not design to reduce or manage the potential risks, e.g. through a larger investment in building construction and/ or relocating to another part of the site/location.

## Regulations in some states mandate a higher standard for Class 9 buildings in bushfire prone areas

NCC variations, setting a higher bushfire standard for Class 9 buildings, exist in NSW, Victoria and WA, with Tasmania applying similar provisions within their building regulations rather than as an appendix to the NCC. Therefore, the extent of the problem is not necessarily uniform across Australia<sup>16</sup>.

---

<sup>15</sup> National Resilience Taskforce, *Profiling Australia's Vulnerability: The interconnected causes and cascading effects of systemic disaster risk*, 2018, Page 18.

<sup>16</sup> The EFT report's consideration of State/Territory variations was only based only on the NCC appendices and for Tasmania and no consideration was given to other jurisdictional variations.

## Objective

A core goal of the NCC is to address safety and health in the design, construction and performance and liveability of buildings.

Hence, the Objective of this proposal is to reduce the risk of building ignition leading to fatality, injury and evacuation trauma to vulnerable occupants of Class 9 buildings in the event of a bushfire.

## Options

The Principles of Best Practice Regulations require that regulations are effective and proportional to the problem and there is no regulatory or non-regulatory option that would generate higher net benefits. This is also reflected in the ABCB's Intergovernmental Agreement (IGA).<sup>17</sup>

Having regard for these principles, there are three options presented for consideration:

### Option 1: Retain the status quo

The status quo is the default choice for decision-makers in considering alternatives to achieve the objectives. Where the incremental impacts of other options would result in more costs than benefits, or would be ineffective in addressing the problem or achieving the objectives, the RIS will conclude in favour of the status quo.

### Option 2: Amend the Performance Requirements and DTS provisions of Part G of NCC Volume One

This option would mandate a higher level of performance for Class 9 buildings constructed in bushfire prone areas.

The proposed changes to the NCC include:

- Development of new Performance Requirement;
- Modification of the existing Bushfire Verification Method;
- Appropriate DTS Provisions.

---

<sup>17</sup> ABCB Intergovernmental agreement (2017). >  
[https://www.abcb.gov.au/sites/default/files/resources/2020//2020\\_ABCB\\_IGA.pdf](https://www.abcb.gov.au/sites/default/files/resources/2020//2020_ABCB_IGA.pdf) < Accessed 7 December 2020.

The changes would require that Class 9 buildings in bushfire prone areas facilitate temporary shelter for building occupants who may be unable to readily evacuate the building prior to a bushfire.

These changes are intended to reflect the additional protection to these buildings when used by the occupants as a place of last resort during a bushfire when early evacuation is unsafe or impractical (sometimes referred to as a 'defend-in-place' strategy).

This option would also reduce the risk of loss of the building, thereby reducing the risk of disruption to the current or future users of the building.

Building classifications affected by these proposed changes include:

- Class 9a buildings which are health-care buildings;
- Class 9b buildings which are used as either an early childhood centre or primary or secondary school;
- Class 9c buildings which are residential care buildings.

This option is designed as a safety net, where local and state government planning controls are not effective at preventing high-risk developments from occurring.

### Option 3: Publish a non-mandatory Handbook.

As regulation is considered to be a last resort mechanism for implementing government policy, the ABCB could develop and publish an informative Handbook for use by building designers, architects and engineers.

The Handbook could include specific technical guidance on methods of minimising the potential impact of ember attack on a range of common forms of construction for the classifications of buildings addressed by the proposal and reinforce the need for emergency management evacuation procedures in case of emergencies.

## Impact Analysis

This section provides an assessment of the incremental costs and benefits associated with Option 2 and Option 3 when compared with Option 1, i.e. the status quo baseline.

### Option 1: Retain the status quo

The impacts of the status quo are those reflected in the problem section of this RIS.

The status quo will be regarded as the baseline. Where the incremental impacts of each option result in a net cost, the status quo will be recommended.

## Option 2: Amend the Performance Requirements and DTS provisions of Part G of NCC Volume One

The costs and benefits of mandating a bushfire Performance Requirement for Class 9 buildings is estimated below.

### Costs

#### Additional costs per building

The ABCB commissioned the quantity surveying firm Plan Cost to estimate the cost impact of complying with the proposed requirements for designated ‘example’ buildings chosen to be ‘typical examples’ of the following building uses found under the building classifications captured. It should be noted the costs were based on designs representative of the average in the experience of the firm. Actual cost implications will vary considerably depending upon a building’s particular design, size and location<sup>18</sup>.

The results of Plan Cost’s analysis is shown in the below table.

**Table 1:** Costs of Option 2 for example buildings

Building type	Typical construction cost, status quo	Additional costs, as a result of the proposal	Percentage increase
School	\$8,820,000	\$1,315,913	15.0%
Child care	\$1,890,000	\$333,349	17.6%
Aged care	\$22,050,000	\$347,533	1.6%
Hospitals	\$23,630,000	\$393,525	1.7%

Source: Plan Cost, 2021

#### Estimated number of affected buildings constructed per annum

There is no national data source for the number of these buildings built per annum in bushfire prone areas. Therefore, the estimate of the number of buildings affected by this proposal is

<sup>18</sup> Cost Study: The cost impact of complying with proposed 2022 changes to section G of NCC Volume One in Non-residential Class 9 Buildings 31 May 2021, Plan Cost.

based on a significant number of different building specific data sources, growth projections and rates of development where published<sup>19</sup>.

It is estimated that, nationally the following number of these buildings are built per year in bushfire prone areas

**Table 2:** Number of buildings constructed per annum and aggregate cost of Option 2

Building type	Number constructed per annum, BPA nationally	Estimated total additional costs, per year, national
School	5	\$6,206,735
Child care	49	\$19,411,422
Aged care	20	\$6,804,775
Hospitals	7	\$2,687,930

Sources:

Hospital numbers and growth:

<https://www.aihw.gov.au/reports/hospitals/hospital-resources-2017-18-ahs/data>,  
<https://www.abs.gov.au/statistics/health/health-services/private-hospitals-australia/latest-release>  
<https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/latest-release#states-and-territories>

Aged care (excluding home care) services number and growth:

<https://gen-agedcaredata.gov.au/Resources/Reports-and-publications/2020/November/2019-20-Report-on-the-Operation-of-the-Aged-Care-A>  
<https://www.gen-agedcaredata.gov.au/Topics/People-using-aged-care>

Early childhood centres (excluding family day care and out-of-school hours) numbers and growth:

<https://my.ibisworld.com/au/en/industry/q8710/key-statistics#annual-change>  
<https://www.acecqa.gov.au/nqf/snapshots>

School numbers and growth:

<https://www.abs.gov.au/statistics/people/education/schools>  
 NSW: NSW government school enrolments by head count (2004-2018)  
<https://data.cese.nsw.gov.au/data/dataset/nsw-government-school-enrolments-by-head-count>  
 Queensland: Department of Education (Queensland) Change Register: School Openings, Closures & Name Changes  
<https://education.qld.gov.au/parents/school-information/Documents/change-register.xls>

The estimated cost increase was applied to the estimated number of buildings forecast to be built to arrive at the total cost. The cost of this proposal, in Net Present Value (NPV) terms is

<sup>19</sup> For schools and childcare centres a national average based on Victoria: Department of Education (Victoria) Bushfire At-Risk Register (BARR)

<https://www.education.vic.gov.au/about/programs/health/Pages/bushfirerisk.aspx>

NSW: NSW government schools by bushfire category (2017)

<https://data.cese.nsw.gov.au/data/dataset/nsw-government-schools-by-bushfire-category>

SA: Department of Education (SA) <https://www.education.sa.gov.au/parents-and-families/safety-and-wellbeing/bushfires/list-high-bushfire-risk-schools-preschools-and-kindergartens>

For Hospitals one third were assumed to be built in BPA to reflect population growth  
 For aged care, weighted by the estimated share of the state which is bushfire prone.

\$35 million per annum, or \$264 million in Present Value terms, estimated using a 7% p.a. discount rate.

**Table 3:** Present Value cost of Option 2 (by building type)

Building type	Total PV cost of Option 2
Hospitals	\$20,200,421
Aged care	\$51,139,463
Schools	\$46,645,057
Child care	\$145,881,342
<b>Total</b>	<b>\$263,866,283</b>

## Benefits

Benefits in commercial buildings are difficult to identify for the following reasons.

- The effectiveness of technical solutions addressing the risk is not known with certainty. Both the proposal and the risk assessment suggest compliance with the proposed NCC provisions does not guarantee the safety of building occupants or the maintenance of tenable conditions within a building during a bushfire event.
- The likelihood of a building being occupied depends heavily on the nature and use of the building, early childhood centres and schools have different usage profiles to those of residential care facilities and hospitals.
- It is not known where bushfire will occur and there is difficulty predicting the likelihood of an event.

Further, the case for the generalisation of benefits is diminished by the following factors:

- Advice from consultation suggests other referrals and planning requirements of state or local authorities require the application of different measures to those proposed in order to limit the exposure of residents to bushfire risk, e.g. the bushfire requirements introduced following the Black Saturday bushfires in Victoria.
- Buildings on sites which are assessed as being higher than Bushfire Attack Level or BAL 12.5 will be required to use a Performance Solution. The costs and benefits of those solutions are not known and are difficult to quantify.

The assessment of vulnerable use buildings in Victoria considered a reduction in the need to permanently relocate residents of an aged care home<sup>20</sup>. This assessment provides an indication of the scale of avoidable financial loss benefits available in these buildings.

<sup>20</sup> Bushfire protection for vulnerable use buildings, Department of Planning and Community Development Regulatory Impact Statement, May 2012.

Assuming the Option avoided the trauma associated with the sudden and permanent closure of one aged care building annually, a net benefit may be possible in aged care buildings as shown in the table below:

**Table 4:** Potential financial benefits of avoiding permanent closure in aged care buildings

Costs	Benefits	Net Present Value
\$51,139,463	\$52,231,055	<b>\$1,091,592</b>

Assumptions and sources:

1. One aged care home per year is assumed to avoid the need for permanent relocation of residents over the regulatory period.
2. Costs and benefits are Net Present Values calculated using a discount rate of 7%.
3. Costs assume:
  - a. An average increase in risk of mortality of 2.875 based on Robinson, 2002.
  - b. Proportion of people using aged care.
  - c. Adjusted life expectancy based on aged care and ABS life tables 2017-19
  - d. Death rates based on Australian population and age specific death rates 2019 per 1000 population as of 2020 (25,687,041).

## Break-Even Analysis

While bushfires are expected to increase in frequency and severity in the future, there is continued uncertainty regarding the consequences of these events in terms of the number of fatalities.

In these circumstances a break-even analysis can be helpful to indicate the required benefits, so reasonableness can be assessed. A break-even analysis calculates the benefits needed to equal the costs using a key assumption. In this case the key assumption is the number of avoidable fatalities over the life of the building.

The below table shows the results of a breakeven analysis using the Value of Statistical Life (VoSL) to derive the number of avoided multi-fatality events in order for the benefits to at least equal the costs.

**Table 5: Breakeven analysis of Option 2**

Building type	PV Cost	Frequency of multi-fatality events required to breakeven with the PV Cost.	Annualised average avoided fatality rate required to breakeven with PV Cost
Aged care	\$51,139,463	10 fatalities every 9 years	1.1
Hospital	\$20,200,421	10 fatalities every 16 years	0.6
School	\$46,645,057	10 fatalities every 10 years	1.0
Early childhood centres	\$145,881,342	8.3 fatalities every 3 years	2.8

Notes:

1. The monetary benefit of avoiding fatalities has been calculated using the VoSL discounted at a rate of 7% p.a.
2. The VoSL used in Year 1 is \$4.9 million.

From the above table, it can be seen that the total avoided fatalities required to offset the Present Value cost is low and ranges from an average annualised rate of 0.6 fatalities to 2.8 fatalities per year.

In aged care there was one recorded multi-fatality event as a result of evacuation, which resulted in four fatalities. The quantified benefits recognise the unique vulnerability of these occupants to the stress and trauma of bushfire events.

While the rate in other buildings is considered low, it should be noted that the current rate of fatality within Class 9 schools, health-care and early childhood centres is historically very low. No bushfire-related fatalities are recorded to have occurred within these building types. In evaluating the reasonableness of the breakeven results, it should also be noted that there are important differences in the uses of Class 9 buildings which impact the likelihood of fatality. For example, not all Class 9 buildings are occupied overnight or on weekends and, in the case of schools, these buildings may be evacuated voluntarily ahead of the fire front passing the building, minimising the risk to occupants.<sup>21</sup> Whereas hospitals, like residential care facilities, are occupied continuously and at night.

The breakeven results allow a direct comparison between the number fatalities that would need to be avoided in different Class 9 buildings. Based on historical fatalities in residential

<sup>21</sup> For example, in Victoria all schools and early childhood services on the Department's Bushfire At-Risk Register (BARR), and schools and early childhood services listed at risk of grassfire (Category 4), must close on all days declared Code Red for their fire weather district. <https://www2.education.vic.gov.au/pal/bushfire-and-grassfire-preparedness/policy>

aged, quantified benefits present a stronger case for their reasonableness. As hospital buildings have both a lower breakeven and share similar occupant characteristics and evacuation challenges, benefits are considered more likely to be achieved relative to schools and early childhood centres when holding all other assumptions equal.

### Option 3: Publish a non-mandatory Handbook.

This option may provide a viable cost-effective means of addressing problems, primarily related to information asymmetry of builders, designers, planning authorities, developers or owners of non-residential buildings. It would achieve this by highlighting the critical importance of preventing ember attack, and responsibilities of dealing with vulnerable people under bushfire and related natural hazard threats. This is a legitimate response option that can be applied by jurisdictions with a particular need is identified pending discovery of contemporary evidence of the true extent of the problem.

In the event that future monitoring and evaluation demonstrates a change in the risk profile different to that determined, the introduction of new regulations could then be revisited in the future.

#### Costs

There are low costs to produce non-mandatory guidance for practitioners to assist in the development of buildings that are more resilient to bushfire attack. Costs will be borne by the ABCB and governments to develop and consult on guidance, and potentially produce printed and electronic materials for distribution to industry.

Developing non-mandatory guidance allows industry to implement required changes in the most effective manner for individual buildings. Costs borne by industry due to the time and effort needed to understand the guidance and ensure it is implemented in the design of new buildings under this option would be voluntarily incurred, as would costs associated with following the advice.

#### Benefits

The main benefit of guidance material will be national consistency. The Productivity Commission's 2004 research report on reform of building regulation suggests that a nationally consistent approach to bushfire provisions would be beneficial.

Guidance material also provides flexibility to apply the requirements. Local governments and approval authorities will be able to rely on the guidance material, and refer to it in approving buildings, rather than developing their own codes, rules, etc.

The quantum of benefits is extremely difficult to calculate, and depends on the take-up rate.

## Effectiveness of non-regulatory option

Achieving a national approach by attempting to harmonise existing state/territory variations may, in this case, be difficult. Each of the existing variations includes technical provisions and reference to planning legislation rather than the NCC.

For a national approach to be feasible, these legislative measures would need to be harmonised, or removed.

## Unintended Consequences

Any unintended consequences of regulatory options need to be considered by the Decision RIS.

The proposed changes to the NCC under this option are based on an ABCB Handbook about Community Bushfire Refuges and AS 3959 *Construction of building in bushfire prone areas*. The EFT Consulting report notes that Class 9 buildings could also provide a refuge for people other than the building's normal occupants.

Logically, it can be argued that if the occupants of a building are unable to evacuate the building during a bushfire, then that building would need to act as a refuge. However, it was not within the scope of the project to suggest a role beyond providing refuge for people other than the normal occupants of the building.

Concerns were also raised by Victoria that, unless the proposed changes recommended by the report provide assurance that the building can act as a refuge during a bushfire event, the term 'refuge' should not be used. The basis of those concerns is the concern that calling the building a 'refuge' is likely to provide a false sense of security about the building's ability to withstand a bushfire. For example, it could influence a decision by occupants to stay rather than leave early (assuming this is possible), which could result in loss of life.

Justifying this concern is the uncertainty that even if a Class 9 building was constructed to comply with the requirements proposed by the report, this would still not necessarily guarantee the safety of the occupants.

## Business compliance costs

Business compliance costs are assessed under the following checklist:

- Notification – businesses will not be required to report certain events.
- Education – businesses will be required to keep abreast of regulatory requirements.
- Permission – businesses will not need to seek new permission to conduct an activity.
- Purchase cost – businesses will be required to purchase items, namely additional bushfire protection features. This impact is covered under the impacts of Option 2.
- Record keeping – businesses will not be required to update their records.
- Enforcement – businesses will not incur additional costs when cooperating with audits or inspections.
- Publication and documentation – businesses will not incur costs of producing documents for third parties.
- Procedural – businesses will not incur cost of a non-administrative nature.
- Other – businesses will not incur any other costs other than those identified by the analysis.

## Regulatory Burden

The Australian Government has introduced the 'Guide to Regulation', which discusses the importance of cutting red tape.

A key principle for Australian Government policy makers in the Guide to Regulation is that:

*The cost burden of new regulation must be fully offset by reductions in existing regulatory burden.*

All regulatory costs, whether arising from new regulations or changes to existing regulation, must be quantified using the Regulatory Burden Measurement (RBM) framework. The framework must also be used for quantifying offsetting regulatory savings, where applicable.

As measured in accordance with the framework, the regulatory offset required to implement Option 2 would be a total of \$26.4 million annually. The Commonwealth's share of this is \$2.9 million annually.<sup>22</sup>

Governments of the States and Territories are not required under the policy to identify regulatory offsets. Some jurisdictions may have their own mechanisms regarding regulatory offsets, which would be a matter for those jurisdictions to consider.

---

<sup>22</sup> Regulatory burden has been calculated in accordance with the RBM framework. Annual burden calculated by dividing the Present Value costs by 10 and then dividing the total annual burden by 9 to reflect the Commonwealth's contribution to the decision making.

## Consultation

Consultation is the cornerstone of the ABCB's commitment to create a contemporary and relevant NCC that delivers good societal outcomes for health, safety, amenity and sustainability in the built environment. This must be achieved in the context of good regulatory practice that evaluates the costs and benefits to society, as per the objective of the ABCB's Intergovernmental Agreement. The ABCB recognises the value of engaging constructively with the community and industry in order to achieve this.

This proposal has been considered several times by the ABCB's Building Codes Committee and the Board and on each occasion there has been meaningful consultation with key stakeholders. Each iteration of consultation has revealed the difficulty in obtaining sufficient evidence to justify a regulatory change to the NCC, as well as documenting the benefits that would be accrued from introducing new regulations into the NCC.

Below is a summary of some of the consultation undertaken, and the outcomes of this consultation.

### COAG Planning Officials Group – 2010

In 2010, the ABCB reviewed all relevant state/territory planning policies, in consultation with the then COAG Planning Officials Group (POG). Feedback was inconclusive that there was a major issue with Class 9 buildings being approved in potential bushfire prone areas.

In 2011 the ABCB requested further information from jurisdictions regarding the risk to safety of Class 9 buildings before the ABCB Board further consider whether there needs to be stronger building regulations.

### Victorian Building Commission – 2012

In 2012 ABCB officers met with the then Victorian Building Commission (VBC) to gather information on characteristics of 'non-residential' buildings destroyed in bushfires and to identify potential deficiencies in current NCC (2012) provisions. The VBC was unable to provide specific information or assist in identifying specific deficiencies. The ABCB subsequently contacted CSIRO and AFAC seeking their advice on the availability of information.

### State and Territory administrations – 2016

In late 2016, further correspondence was sent to State and Territory administrations requesting further information on the jurisdictional approaches of dealing with non-residential

buildings in bushfire prone areas. The findings were shared with the State and Territory building administrations.

## Stakeholder working group consultations – 2017

In late 2017 a working group was formed to progress the work on bushfire protection measures for Class 9 buildings.

The working group consulted with jurisdictions and selected stakeholders, such as the Australian Institute of Architects (AIA), Fire and Emergency services agencies and planning departments. This revealed that many jurisdictions had developed their own mechanisms to deal with development of Class 9 buildings in potential bushfire prone areas, and that planning systems generally ensure that development is only permitted where the risk to life and property from bushfire can be reduced to acceptable levels.

The AIA supported the expansion of stronger bushfire provisions to other building classifications to improve life safety, but also believed that a non-mandatory handbook would be useful, given the fact that most buildings housing vulnerable people normally have evacuation procedures in place.

## Building Code Committee consultations – 2017

The Building Codes Committee (BCC) were consulted in October 2017 and requested to assist in determining whether sufficient evidence was available to support the project proceeding.

A total of seven responses were received. Four from Fire Authorities and three from State or Territory building administrations. The feedback to introduce regulatory change was mixed. Some jurisdictions supported changes to the NCC (SA), others had enhanced systems in place (Victoria and NSW), and others argued that more work is required to define stricter criteria for development and building approvals of Class 9 buildings in bushfire prone areas (ACT). The NT did not have any evidence to provide as there were no declared bushfire prone areas in the Territory at that time.

## Cross industry-administration working group – 2018

In 2018, the ABCB Board established a working group to determine whether the bushfire construction requirements of the NCC should be extended to capture non-residential Class 9 buildings. This working group consisted of two representatives of industry and two from State and Territory building administrations.

The working group undertook a gap analysis and agreed on the need to engage an expert consultant to inform the life safety risk of occupants of Class 9 buildings located in a bushfire

prone area, and the need to undertake a survey of buildings (age, numbers, classifications and location) to inform the evidence base.

## Building Codes Committee meeting – 2021

Proposed changes to the bushfire provisions were reflected in the NCC 2022 Public Comment Draft (PCD) and attracted a high number of public comments, which were mostly supportive of the proposed provisions for Class 9 buildings. In November 2021, the BCC met to consider endorsing the proposed changes for NCC 2022. While comments at the meeting were supportive of the amendments, some BCC members suggested further analysis was required before the DTS Provisions were included in NCC 2022.

The agreed BCC position was that the proposed DTS provisions be relocated to the Guide to Volume One and Performance Solutions be required for these building types.

This recommendation was given on the basis that some BCC members felt the provisions were not suitable for Type A and Type B construction (the most fire resistant) and should be limited to Type C construction (i.e. low-rise construction). While this was the agreed position of the BCC, it should be noted that support for this position came from non-government BCC representatives.

The ABCB Office developed the proposed DTS Provisions through a comprehensive risk assessment, informed by a specific BCC working group and public consultation. Given the dynamic and complex nature of the bushfire hazard and the scope of buildings covered, it is inevitable that the provisions may be conservative in some scenarios. For such scenarios, on sites exceeding BAL 12.5 or where the DTS is considered too conservative, the NCC provides more flexibility through the use of Performance Solutions. However, in either case the DTS or guidance will set the basis for comparison and as such, it is the proposed DTS Provisions for NCC 2022 which are the subject of this assessment.

## Conclusion

Due to increasing population, expansion of urban boundaries, and climate change, vulnerable occupants within some new Class 9 buildings will be exposed to higher risk of fatality during future bushfire events relative to historical incidences of fatality.

The objective of this analysis is to evaluate whether the current NCC Provisions relating to construction in bushfire prone areas need to be revised to reduce the risk of building ignition leading to fatality, injury or evacuation trauma to vulnerable occupants of new Class 9 buildings.

Option 2 has been developed to reduce the risk to vulnerable occupants of Class 9 buildings by requiring specific consideration to bushfire protection via a new mandatory Performance Requirement and optional Deemed-to-Satisfy Provisions as a compliance pathway. The cost of Option 2 is estimated to be \$264 million in Present Value terms, using a discount rate of 7% over 10 years. This aggregate cost is considered small in effort to improve the life safety outcomes for vulnerable occupants of Class 9 buildings in bushfire prone areas.

It was also noted through consultation that there are a number of other mitigations in place that have reduced the risk to vulnerable occupants, namely planning and land controls. The risk reduction of Option 2 in absolute terms is therefore relatively small, with the risk perceived as highest in aged care where historical fatalities have been associated with permanent evacuation. For costs to breakeven, the proposal would need to avoid the sudden and permanent closure of one new residential aged care building each year.

No data or evidence was provided at consultation which could inform the benefits. Given the continued uncertainty regarding the frequency and severity of future bushfire events, a breakeven analysis was conducted to provide a means to gauge the reasonableness of the costs being offset by the benefits of Option 2.

The breakeven analysis shows a required annual avoided fatality rate to offset the PV costs, ranging from 0.6 fatalities for Class 9 health-care buildings, 1 fatality for schools and 2.8 fatalities in Class 9 early childhood centres.

In the case of aged care, one evacuation in response to a bushfire caused a multi-fatality event, which supports the reasonableness of the estimate. Similarly, for Class 9 health-care, which shares usage characteristics with aged care (both around the nature and hours of occupation and challenges with evacuation), the breakeven rate is lower. In other Class 9 buildings, there are important differences in the uses of Class 9 schools and early childcare

centres including not being continually occupied by incapacitated occupants, overnight or after business hours. While the breakeven rate is low in absolute terms, it should be noted that the current rate of fatality within these building types is also very low, with no recorded historic fatalities occurring within these building types.

Based on the breakeven results, and having regard to the breakeven analysis, it is considered unlikely that the benefits of Option 2 will be greater than the cost in all cases. There is a stronger case for new requirements for Class 9 residential care facilities and health-care; relative to Class 9 schools and childcare buildings. This is also emphasised when considering other benefits which may result from higher building standards, such as avoiding the need for long-term or permanent closure of these buildings.

The non-regulatory option (Option 3) would assist in instances where planning decisions allow certain Class 9 buildings to be constructed in bushfire prone areas (to meet community needs), and where those approving, developing or managing such facilities possess a lack of understanding or information at the physical building design stage of construction.

However, Option 3 inherently involves voluntary uptake of higher standards, which may not be achieved due to several plausible market failures. As such, the increased effectiveness of this option relative to the status quo is likely to be immaterial.

Based on the findings of this analysis, it is recommended that decision makers consider the likelihood of higher future risk relative to current risk for vulnerable occupants of Class 9 buildings in bushfire prone areas and determine whether the breakeven results are plausible for all building types considered by this analysis.

On the basis of belief that the future risk of bushfire is increasing and the consequences of this increased risk to vulnerable occupants of Class 9 buildings is not sufficiently mitigated by other interventions, it would be desirable that decision makers adopt a consistent, albeit precautionary, approach to the problem and implement Option 2.

## Implementation and Review

If decision makers support the proposed changes to the NCC, the provisions will be included in NCC 2022. As a matter of policy, proposed changes to the NCC are released in advance of implementation to allow time for familiarisation and education and for industry to modify its practices to accommodate the changes. It is also anticipated that the ABCB, in association with State and Territory building administrations and industry organisations, would conduct information and awareness raising activities.

A specific review of the preferred option is not planned following its implementation. The NCC is amended on a three yearly cycle and the ABCB maintains regular and extensive consultative relationships with a wide range of stakeholders. It relies on this process to identify emerging concerns, and through these relationships can evaluate the uptake of the alternative provisions proposed, which would serve as an indicator of acceptance and cost-effectiveness.