PLANNING AND BUILDING

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Where people live, the standard of the buildings in which they live and how those standards are maintained are crucial factors affecting people's exposure to bushfire risk. The Commission considered the complex and multi-layered planning and building regimes, including how they could be used to prevent or deter people from living in areas of unacceptably high bushfire risk. Protection of human life is the overriding objective in implementing bushfire prevention measures through improved planning and building regulation. The Commission considers there is much scope to substantially restrict development in areas thought to pose an unacceptably high bushfire risk by ensuring that strategic policies and the Victoria Planning Provisions give more emphasis to human safety. Where development is approved, risk-mitigation measures and construction standards should be related to the degree of risk.

Victoria's planning and building provisions are embedded in detailed and comprehensive regulation. By necessity, this chapter extends to a commensurate level of specificity to enable consideration of the development, adoption and implementation of the regulations by all levels of government. To avoid weighting the report with an undue number of detailed recommendations, the Commission puts many of its conclusions and views in tables and the text and adopts recommendations that are broad, as in other chapters. The reader is encouraged to note the Commission's positions in tables and the text, as well as its recommendations.

In all, 2,133 houses were destroyed as a result of the late January–February 2009 bushfires in Victoria. Research conducted by the Bushfire Cooperative Research Centre shows that many of the 173 people who died during that time had been trying to defend their home. A number of these homes had been well prepared, in accordance with Country Fire Authority advice, but the Commission nevertheless heard many accounts of people who tried to defend a well-prepared house and failed (see Chapter 1 in this volume and Part One in Volume I).¹

The unpredictable nature of fire and extreme weather conditions means it is not possible to guarantee that any building will survive a bushfire. Nevertheless, the construction of buildings and their siting relative to surrounding fuel loads are central to their defendability. Maximising a house's ability to withstand bushfire is important, both for people who choose to stay and defend and for those unexpectedly caught in their home during a fire. It can also help minimise the personal, social and economic costs of the widespread destruction of homes.²

Land-use planning and regulation of building standards in bushfire-prone areas are two of several measures available for improving people's chances of surviving a bushfire. Individual planning and response are also essential. As lay witness Mr Rainier Verlaan of Callignee noted, 'Building regulations and bushfire plans need to go hand-in-hand together. There is no point in having these bushfire building regulations without the need for some form of bushfire survival plan as well'. Applying land-use planning and building controls to minimise or reduce bushfire risk does, however, present challenges. In particular, the planning and building systems, which seek to reduce risk to communities in the long term, operate prospectively and have little capacity to deal with past decisions in relation to existing settlements or buildings in bushfire-prone areas.³

Many have argued that planning regulation is crucial; for example, the 2004 report of the National Inquiry on Bushfire Mitigation and Management cited land-use planning as 'the single most important mitigation measure in preventing future disaster losses in areas of new development'. Good planning offers the potential to help people who choose to leave their property in the face of a fire by allowing for the development of evacuation routes. It can also make it easier for firefighters to gain access to and defend a property by imposing entry, exit and water supply requirements. Additionally, planning decisions in relation to settlement matters, land use and development, and the location of individual buildings on a property can potentially reduce bushfire risk by, among other things, restricting development in the areas of highest risk, where people's lives may be gravely endangered in the event of extreme bushfire.⁴

The Commission also studied what can be done to maximise buildings' capacity to provide sanctuary during a bushfire. This is in large part the preserve of building regulation—specifically, the regulation of building in bushfire-prone areas. After reviewing the existing planning and building regimes in Victoria, the Commission explored the following themes:

- There are deficiencies in the mapping of bushfire risk throughout Victoria. Mapping is the starting point for all decisions on planning and building in bushfire-prone areas. It identifies bushfire hazard and provides the information base that gives rise to the requirement for bushfire-specific planning and building controls in areas of high risk. A well-informed, holistic and strategic approach to mapping is essential for planning and building decisions.
- The current approach to planning does not take account of the fact that there are some areas in which the risk to life from bushfire is so high that new settlements should not be established in these locations. People should be prevented or discouraged from building new houses in such areas and those already living there should be helped to move.
- The planning framework and subsequent planning decisions, as currently applied, do not attach sufficient importance to the risk of bushfire and the potential threat to people's lives in bushfire-prone areas. The strategic policy framework should provide more clarity and guidelines for giving greater recognition to bushfire risk in planning decisions without imposing unacceptable biodiversity costs.
- The provisions in the planning framework pertaining to bushfire safety include a number of exemptions that allow clearing of native vegetation for fire protection. The provisions are unduly complex. They need to be consolidated and simplified so as to help planning professionals and the public more effectively reduce bushfire risk.
- Residential development of bush blocks scattered across the landscape has the potential to greatly increase bushfire risk, especially if the blocks are too small to create defendable space around dwellings. Grouping development in areas that can be adequately protected is preferable.
- Clearing and maintaining a defendable space around buildings is crucial to facilitating active defence and can increase the chances of a building surviving a bushfire—particularly by reducing the risk of radiant heat and direct flame contact. The planning system should prevent, or strongly discourage, people from living in areas where it is not possible to have the minimum defendable space without excessive costs for biodiversity.
- The Building Code of Australia and most bushfire-related standards are not readily available at low cost, and this can inhibit compliance.
- The standard for construction in bushfire-prone areas does not adequately cover all the important components of bushfire risk.
- Building regulations do not adequately cover the construction of non-residential buildings used by vulnerable groups—for example, schools, hospitals and aged care facilities.
- It is difficult to ensure that the standards and conditions that apply at the time of planning and building approval are upheld for the life of a development. Specific mechanisms are required to improve compliance and maintenance in order to ensure that bushfire safety continues to be a focus.

The Commission also heard that bushfire risk management was not well integrated into the Victorian planning and building systems. This was emphasised by the panel of experts the Commission brought together to consider planning matters (see Box 6.1); the panel concluded that 'responsibility for the development and implementation of planning policy is fragmented, both horizontally and vertically, which raises the question of who should ultimately be responsible for the integration of bushfire risk management into planning processes'.⁵ This chapter cites examples of such fragmentation, among them the range of participants in the planning and building regimes — including the Department of Planning and Community Development, the Department of Sustainability and Environment, the Country Fire Authority and local councils.

The Commission considers that coordination and integration of bushfire risk-management responses for planning and building could be improved, and the Commission's recommendations better implemented, if the State were to assign to an appropriate government entity responsibility for promoting and overseeing bushfire management—including bushfire hazard mapping, land-use planning, and supporting local government in the implementation of bushfire risk management strategies.

The approach proposed by the Commission recognises the complexity of the planning system and the need to strengthen the consideration of bushfire at different stages of the planning process. The Commission views this as the most effective way of maintaining the capacity to assess each development on its merits, while ensuring that such assessment gives sufficient weight to the risk of bushfire. The independent audit of implementation recommended in Chapter 12 should look at the outcomes of this approach and consider the need for more prescriptive controls if the construction of new houses in high-risk areas continues to occur.

Box 6.1 The expert panel on planning

The Commission engaged six experts from a variety of fields and jurisdictions to provide evidence relating to land-use planning:

- Dr Michael Buxton, Associate Professor, Environment and Planning, School of Global Studies, Social Science and Planning, RMIT University
- Mr Mark Chladil, Fire Management Planning Officer, Tasmania Fire Service
- Professor Roz Hansen, Managing Director, Hansen Partners, and Adjunct Professor, Faculty of Arts and Education, Deakin University
- Mr Brett Lane, Director, Brett Lane & Associates
- Ms Debbie Pinfold, Town Planner, Sutherland Shire Council, New South Wales
- Mr Athol Yates, Executive Director, Australian Security Research Centre.

At the request of the Commission, the experts prepared individual reports on a series of land-use planning questions. The reports were tendered in evidence. The experts also attended a private facilitated conference on 5 February 2010 to discuss the matters raised in their reports and identify areas of agreement and disagreement. The conference was conducted in accordance with Practice Note No. 5. No third parties—including media, external parties and parties with leave to appear—attended the conference. Nor were the Commissioners present. Counsel assisting and solicitors instructing attended as observers. At the conclusion of the conference the experts prepared a written statement of the discussion and that, too, was tendered in evidence.

On 15 and 16 February 2010 the experts appeared together as a panel before the Commission. They responded to a range of questions asked by counsel assisting, counsel for the parties with leave to appear and the Commissioners.

Use of a panel proved effective and efficient, allowing a range of views to be explored within a short period and facilitating a method of instantaneous peer review.

6.1 BUILDING SURVIVAL IN THE 2009 VICTORIAN BUSHFIRES

In considering how planning and building regulation could improve people's safety in the event of a bushfire, it is important to understand what fire does to buildings and what causes the greatest risk. In the report he prepared for the Commission Mr Justin Leonard, a research scientist with CSIRO Sustainable Ecosystems, described the current understanding of building performance in bushfires; his description is based on research involving post-bushfire surveys, experimental work and risk modelling and is detailed in Section 6.9. In brief, the report indicates that most houses are damaged or destroyed by embers, rather than by direct flame contact or radiant heat; that a house is more likely to survive if people actively defend it; and in the absence of human intervention a house is likely to burn to the ground once ignited, rather than just be damaged.⁶

216 In the weeks after 7 February the Bushfire Cooperative Research Centre surveyed 1,065 houses in the areas affected by the Bunyip, Churchill, Kilmore East, Bendigo and Murrindindi fires. The survey results were supplemented by remote-sensing data for a number of fire-affected regions. A further survey was later conducted, incorporating houses in areas affected by the Beechworth–Mudgegonga, Horsham and Narre Warren fires. The Bushfire CRC found that, in comparison with other recent major fires, a much lower proportion of houses were damaged by embers only and a higher proportion of houses were damaged by direct flame contact—20 per cent destroyed by embers only and 13 per cent by flame contact. It also found that wind was an important factor: 13 per cent of houses damaged were damaged by both fire and wind.⁷

Among the findings relating to house design and materials were the following:

- Brick structures performed significantly better than cellulose cement, timber or mud-brick structures.
- There was a strong correlation between overhanging trees and house destruction and between house destruction and lack of active water defence.
- There was a higher rate of house survival where water was available on the property and was gravity fed because both mains water and water pumps often fail.
- Concrete water tanks performed best, followed by steel tanks. Polyethylene and fibreglass tanks performed poorly.
- The raw data revealed that a much lower proportion of houses fitted with sprinkler systems were destroyed. The data do not, however, show whether the sprinklers were activated.⁸

The following are findings of particular importance for the Commission's consideration of planning:

- Of all damaged or destroyed structures that were surveyed, 59 per cent were not in an area that had been identified as an area of high bushfire risk for the purposes of planning regulation; that is, they were not covered by the planning regime's primary tool for managing bushfire risk, the Wildfire Management Overlay. This raises serious questions about the effectiveness of this planning instrument—see Section 6.4.3.
- The distance between a structure and a forested area is a good indicator of the likelihood of damage by fire although not of the extent of damage.
- In the largest sample region, houses were destroyed up to 150 metres away from forest, and over 20 per cent of houses more than 100 metres from forest were destroyed, suggesting a need to review the currently accepted 100-metre buffer between houses and vegetation. This finding was supported by research recently conducted for the Commission by the Bushfire CRC—see Section 6.2.4.9

The Building Commission analysed data on 2,131 buildings destroyed by the fires that burned in late January and February 2009. Its interim analysis of the data shows that only 177 of those buildings had been required to be built in accordance with the Australian Standard for Construction of Buildings in Bushfire-prone Areas. In the absence of other pertinent data—such as data on the houses that survived and on whether houses had adequate defendable space and were actively defended—the Building Commission was unable to draw any conclusions about the effectiveness of construction standards in preventing house destruction.¹⁰

6.2 MAPPING BUSHFIRE RISK

Bushfire-specific planning and building controls are applied only in areas that have been identified as being at high bushfire risk through bushfire hazard mapping. Building controls apply in areas designated 'Bushfire-prone Areas', or BPAs, in accordance with the Building Regulations 2006. Planning measures apply only in areas where the Wildfire Management Overlay has been used through a local planning scheme. Bushfire risk assessment is then carried out on individual sites, so that specific risk treatments can be developed. The mapping and designation processes differ between the building and planning systems. The Commission heard evidence that both systems are flawed and in need of review, that mapping for both systems should be integrated and centralised, and that there is scope to strengthen the mapping criteria used to determine bushfire hazard.

In 2002 Victorian government agencies embarked on a statewide project to align WMO mapping with mapping of designated BPAs. Progress was very slow, as demonstrated by Figure 6.1, which shows the status of the project at February 2009. The map also reveals that the 2009 fires burned across large areas that were not designated BPAs and where the WMO had not been applied.¹¹



Figure 6.1 Areas burnt within the Wildfire Management Overlay or Bushfire-prone Areas

6.2.1 BUSHFIRE-PRONE AREAS

The bushfire safety provisions of the Building Code of Australia, which are detailed in Appendix B, apply only to new buildings in designated BPAs. Until 11 March 2009 mapping and designation of BPAs was a matter for municipal councils. This system had a number of shortcomings, primarily the lack of clear criteria for designating BPAs. Additionally, the Building Commission and the CFA had limited power to advocate for and monitor the designation of BPAs, which hindered statewide coordination of bushfire risk assessment.¹³

The result was inconsistency. For example, some councils included public land in designated BPAs, while others did not. Other instances resulted in land on one side of a municipal boundary being designated bushfire prone, while land on the other side was not. It is telling that councils' designation of BPAs was a poor predictor of where bushfires burned on 7 February; most starkly, neither Kinglake nor Marysville was in a BPA.¹⁴

Since 11 March 2009 all of Victoria has been designated a BPA, an interim arrangement that will terminate on 9 September 2011. Victoria's Building Commissioner, Mr Tony Arnel, put the view that requiring a site assessment for all sites would require a more consistent, ofer outcome for Victoria. He did not consider it imposed on

218 for all sites would result in a more consistent, safer outcome for Victoria. He did not consider it imposed an unnecessary regulatory burden since up to 80 per cent of the 40,000 new houses built every year in Victoria would not require any bushfire-specific construction standards.¹⁵ No witness who appeared before the Commission called for responsibility for designating BPAs to revert to councils after the interim arrangement expires, but a number of witnesses were critical of the interim measure and did not want it to continue. Mr Stuart McLennan, a registered building surveyor, suggested the interim arrangement is simplistic, expensive and counter-productive because it misrepresents actual risk, potentially undermines the effectiveness of the designation process and adds to the cost of building works. Mr Mike Harding of the Housing Industry Association and Mr Geoff Woolcock of MBA Building Services criticised the additional regulatory burden imposed by the interim arrangement.¹⁶

6.2.2 THE WILDFIRE MANAGEMENT OVERLAY

The WMO is applied to 'areas where the intensity of wildfire is significant and likely to pose a threat to life and property'. Mapping of the WMO has, however, changed with time, leading to inconsistent application across Victoria:

- For areas mapped before 2002 the WMO was applied more restrictively than BPAs and was applied only to areas where controlling a high-intensity fire would be difficult, rather than to all areas where bushfire was likely to pose a threat to life and property.
- Since July 2002 the criteria for mapping the WMO have been the same as those used for BPAs, but there has been no systematic re-examination of the WMO mapping completed before that time.
- DSE initially opposed applying the WMO to public land—a matter that was not resolved for some time. In December 2005 the Minister for Planning approved application of the WMO to public land, but DSE notified only councils that were in the process of amending their planning schemes at the time, so this criterion was not applied to all planning schemes.¹⁷

The practical consequences of the tardy development of and unevenness in the criteria for mapping the WMO and its application to public land can be seen in the case of Murrindindi (see Box 6.2), which shows how lack of clarity about mapping criteria has led to inconsistent, and in some cases sparse, application of the WMO across Victoria.

Box 6.2 Mapping the Wildfire Management Overlay: Murrindindi

The WMO did not apply to some areas of Murrindindi Shire that were devastated by fire on 7 February 2009—notably Marysville, Kinglake and Kinglake West. It is obvious from aerial photographs taken before the fire that these were 'areas where the intensity of wildfire is significant and likely to pose a threat to life and property'.

Several factors – for which the CFA, DSE, the Minister for Planning and Murrindindi Shire Council share responsibility – contributed to the failure to apply the WMO to these areas:

- The CFA prepared the WMO maps for Murrindindi in 2001, when public land was not included. The maps did not identify private land adjacent to vegetated public land for inclusion in the WMO, although there were in fact areas of private land within 100 metres of public land that should have been included.
- The Murrindindi Municipal Fire Prevention Committee reviewed the maps prepared by the CFA and did not query their accuracy.
- When the mapping criteria were expanded in 2002, the CFA did not re-examine the WMO mapping it had already completed for Murrindindi Shire.
- DSE did not advise Murrindindi Shire of the Minister's December 2005 decision to include public land in the WMO.
- Murrindindi Shire Council has not reviewed the application of the WMO since it was introduced in July 2004.

The Commission heard that 24 houses that were destroyed by fire on 7 February had been built in Marysville, Pine Ridge Road and Grandview Crescent after the introduction of the WMO in 2004. The evidence before the Commission does not permit the drawing of a conclusion about whether a more thorough and extensive application of the WMO and the resultant planning and construction–related bushfire protection measures would have affected the survival rate for these houses. The evidence does, however, demonstrate the need for a serious look at the current mapping criteria and a more systematic and cohesive approach to mapping.¹⁸

Figure 6.2 Marysville before the fire



Source: Exhibit 678 – Marysville – Pre-fire Aerial Photography.¹⁹ (Showing property boundaries.)

Figure 6.3 Marysville after the fire



Source: Exhibit 678 – Marysville – Post-fire Aerial Photography.²⁰ (Showing property boundaries.)

6.2.3 INTEGRATED, CENTRALISED MAPPING

There is widespread agreement that there needs to be a more strategic, holistic approach to mapping the state's bushfire risk and designating levels of risk for planning and building purposes.²¹ Such an approach requires the following:

- that mapping be assigned higher priority
- that the approach to mapping be applied consistently by skilled officers
- that the criteria used be justifiable on the basis of the best available science and cover all aspects of bushfire risk
- adoption of a tiered approach that better identifies risk and more effectively targets responses.

One of the best means of achieving this would be to have a single agency responsible for bushfire mapping. Mr Jeffrey Gilmore, Executive Director, Planning Policy and Reform, Department of Planning and Community Development, agreed with such an approach:

... using a single mapping method for hazard identification and a single approach to risk assessment across the state is going to deliver significant benefits, and having that mapping controlled by a single agency is an important part of that so that you do get consistency and timeliness ...²²

The panel of planning experts the Commission convened supported this proposition, concluding, 'There must be a common underlying methodology for the mapping of bushfire-prone areas and the overlay. This methodology must apply a clear and transparent process that can be applied consistently across the state'.²³

In South Australia and New South Wales, both bushfire-prone states, consistency is achieved by designating BPAs centrally:

- In South Australia the State Government designated 'bushfire protection areas' following a two-staged bushfire mapping exercise (a strategic assessment and a more detailed hazard assessment) carried out in consultation with councils, the Country Fire Service and the public. Three levels of bushfire risk—general, medium and high—determine what, if any, planning and construction requirements apply.
- In New South Wales bushfire-prone land is designated by the Commissioner of the Rural Fire Service at the request of a council. This then triggers the application of bushfire-specific building and planning controls. The Rural Fire Service provides strict mapping guidelines and has the legislative power to certify bushfire-prone land maps.²⁴

The Commission considers that centralised mapping and designation of BPAs for the purposes of planning and building controls would achieve more thorough and consistent outcomes, enable risk assessment beyond the individual site, and promote holistic management of bushfire risk. The CFA already has mapping expertise and is one agency that might take up this role. There might be other government agencies that could perform the task.²⁵ As this mapping is done, designation of BPAs under the Building Regulations should be re-introduced. This is preferable to the current situation, in which all of Victoria is effectively designated a BPA, and it will remove the regulatory burden involved in requiring a site assessment for building work where there is obviously no bushfire risk.

The State should identify a central point of responsibility within government, and this entity should do the following:

- immediately start comprehensively mapping Victoria's bushfire risk, beginning with an initial strategic assessment and proceeding to a detailed hazard assessment of each region, giving priority to the regions of highest risk
- progressively designate BPAs for the purpose of applying the bushfire-specific planning and building controls
- identify different levels of bushfire risk
- consider how the various risk levels could best be used to align building and planning 'triggers' and to apply different treatments based on risk
- 222 publish maps and make them widely available, to further community education and other community or business purposes
 - review the mapping and designation of BPAs regularly.

6.2.4 MAPPING CRITERIA

The criteria the CFA currently uses to map the Wildfire Management Overlay for planning purposes are the same as those used for Bushfire-prone Areas that are used for building. Both remain limited in several ways:

- They focus exclusively on forest fire, excluding grassland and scrub fires, even though grass and scrub fires can be of great intensity and can threaten life and property.
- Evidence before the Commission suggests that the criterion requiring a minimum patch size of 5 hectares is too generous.
- The boundary of the WMO is determined by applying a 100-metre buffer around the areas of mapped risk and should be reviewed.²⁶

The distance of 100 metres appears to have been chosen initially as a convenient margin and was retained when a 1999 study by Ahern and Chladil found that 85 per cent of houses were destroyed within 100 metres of vegetation. It is not known whether any agency has ever considered whether 85 per cent is an acceptable level of risk. Analysis of more recent fires, including those on 7 February, shows that 85 per cent of houses are destroyed within 108 metres of bush and 90 per cent within 145 metres. These data, and the CFA's practice in relation to 'neighbourhood safer places' (see Chapter 1), suggest that something beyond 100 metres would be a more conservative choice from the perspective of safety. The Commission supports the view that the 100-metre margin should be reviewed.²⁷

The CFA applies different criteria for designating neighbourhood safer places (or bushfire shelters)—using a methodology based on assessment of radiant heat levels, rather than determining the acceptable risk of loss—and includes either a separation distance of 140 metres between the building and the vegetation or a maximum potential radiant heat impact of no more than 10 kilowatts per square metre. Although there might be good reasons why bushfire shelters should be subject to more stringent criteria than residences, there is scope to review the mapping criteria for planning and building in light of this different approach. Ms Lisa Sturzenegger, the CFA's Director of Community Safety, agreed with this proposition.²⁸

Finally, consideration should be given to the increasing risk exposure arising from climate change projections of more frequent occurrence of catastrophic fire weather.²⁹

There is a clear need for a wholesale review of the criteria used for mapping bushfire-prone areas for the purposes of applying planning and building controls. The criteria should specify that bushfire risk is to be mapped regardless of land tenure and the review should consider the following:

- the inclusion of all vegetation types that carry a risk of bushfire that could pose a risk to life and property—in particular, grasslands, scrub and heath
- the identification of low, medium and high levels of bushfire risk
- the 100-metre margin applied to vegetation boundaries, with specific reference to the recent work of Risk Frontiers and to the proportion of house destruction that represents an acceptable level of risk
- the 5-hectare minimum patch size
- the methodology used in developing criteria for bushfire shelters (neighbourhood safer places)
- the impact of climate change projections of more frequent occurrence of catastrophic fire weather.

6.2.5 A SINGLE SITE-ASSESSMENT METHODOLOGY

Increased consistency and stronger links between planning and building controls are already state government policy. A project control group was established in September 2009 with representatives of the CFA, the Building Commission and the Department of Planning and Community Development 'to discuss the way building controls and land use planning can interact in order to be able to provide the best possible risk management solutions to building in BPAs'. This group is progressing a number of projects to achieve this.³⁰

One way to achieve greater integration is to enable a single site assessment to be carried out for planning and building permit applications. At present there are some technical differences between the site assessments used for planning and building. The Building Regulations, however, allow a single site assessment to be carried out in order to determine the construction requirements and for the planning permit application.³¹

The Department of Planning and Community Development, the CFA and the Building Commission are working on a joint project to align the site assessment methods for planning and building purposes. This includes liaising with Standards Australia and the Australian Building Codes Board to discuss changes to the site assessment methodology used nationally for building in bushfire-prone areas.

The Commission welcomes the State's commitment to increasing consistency and strengthening links between planning and building controls, including the work being done by the project control group as well as the specific project to align the site-assessment methods. In all of this work the State should explicitly consider the risk of bushfires to human safety as well as property. The Commission encourages the State to bring the work to finalisation as soon as possible.³²

RECOMMENDATION 37

The State identify a central point of responsibility for and expertise in mapping bushfire risk to:

- review urgently the mapping criteria at present used by the Country Fire Authority to map the Wildfire Management Overlay, to ensure that the mapping used to determine building and planning controls is based on the best available science and takes account of all relevant aspects of bushfire risk
- map and designate Bushfire-prone Areas for the purposes of planning and building controls, in consultation with municipal councils and fire agencies
- finalise the alignment of site-assessment methods for planning and building purposes, taking into account bushfire risk to human safety as well as to property.

6.3 REGULATION OF LAND-USE PLANNING

Land-use planning in Victoria is regulated by the *Planning and Environment Act 1987*, which establishes 'a framework for planning the use, development and protection of land in Victoria in the present and long-term interests of all Victorians'. The planning framework established under the Act aims to ensure sound strategic planning and coordinated action at the state, regional and municipal levels and enable easy integration of land-use planning and policy with environmental, social, economic, conservation and resource management policies.³³

The Act is administered by the Minister for Planning, who is advised by the Department of Planning and Community Development. The State sets the strategic planning framework through a set of standard statewide planning provisions called the Victoria Planning Provisions. Councils then use the VPPs to create local planning schemes, which must include standard provisions selected from the VPPs—the State Planning Policy Framework, zones, overlays, and particular and general provisions—and local provisions developed by the council, primarily through its Local Planning Policy Framework and local schedules to zones and overlays and other provisions.³⁴ Appendix B provides further information about the VPPs and planning schemes.



Figure 6.4 Elements of a local planning scheme

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Source: Exhibit 679 – Composition of a Planning Scheme.<sup>35</sup>
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Decisions about specific proposals for the use and development of land are made by responsible authorities (usually councils), in accordance with the permit application process set out in the Act and the strategic policies and planning scheme controls in the local planning scheme. If a planning scheme specifies a person or body to be a 'referral authority' for specific permit applications, those applications must be directed to the referral authority for its consideration. A permit must be refused if the referral authority objects, or it must include any conditions that are required by the referral authority. The two main referral authorities relevant to bushfire provisions are the CFA (for permits in the Wildfire Management Overlay) and DSE (for some permits to remove native vegetation).³⁶

Planning has limited capacity to mitigate bushfire risk for existing developments, including townships, in high-risk areas. The main area in which it can do so is in rationalising controls on the removal of vegetation for bushfire risk (as discussed in Section 6.5) and ensuring that sites subject to existing permits that impose bushfire risk-management conditions are maintained to particular standards.

In many areas, however, planning (as well as building regulation) needs to be accompanied by other measures, so that a 'package' of measures is used to improve people's safety in the face of bushfires.

Planning can lead to increased safety of new buildings and developments in most areas of bushfire risk by setting conditions that substantially improve people's safety. The expert panel put the view that in some areas the bushfire risk is so high that new development, including new subdivision of existing areas, should not be permitted. The panel proposed that the criteria for identifying where new development should not be permitted should include the physical characteristics of the area—the type, the density and extent of vegetation, the topography and the weather patterns for the area—as well as potential effects of climate change on the bushfire hazard in the area. The panel also proposed that a number of social framework criteria—such as the quality and availability of infrastructure, social and demographic considerations in the area, the changing nature of hazards, and the level of confidence that mitigation measures will remain in place over time—should also be taken into account.³⁷

This creates particular difficulties in areas of extremely high risk where people have already established homes. Even a combination of protective measures might not be enough to reduce the risk to an acceptable level. In such areas the government should consider options outside the planning system, as discussed in Section 6.8.

The vast majority of settled land has already been deemed suitable for development, but much of this occurred before the possible impacts of climate change were known and before the devastating impact of deadly fires on particular localities on days such as Black Saturday were investigated. The Commission is of the view that there is considerable scope to substantially restrict development in areas that are known to pose an unacceptably high bushfire risk. Overall, the planning framework and subsequent planning decisions should give more explicit consideration to, and attach greater importance to, the risk of bushfire and the potential risk to people's safety in bushfire-prone areas.

Much of what follows deals with planning policies and controls in detail and how they can be modified to ensure that a more suitable emphasis is given to bushfire risk.

6.3.1 URBAN GROWTH

Bushfire risk management should start at the highest strategic level—when the state and local governments are planning and zoning new settlements in Melbourne's urban growth boundary or around regional centres.

There is a well-defined process for taking into account bushfire risk when new settlements in Melbourne's urban growth boundary are being planned and when expansion of that boundary is being investigated. A proposal for a new development in the Urban Growth Zone must be in accordance with a precinct structure plan that includes a bushfire risk–management plan that has been developed in consultation with the CFA. The investigation of areas for expansion of Melbourne's urban growth boundary, published in June 2009, included a land capability report that considered bushfire risk as one of the possible constraints on development.³⁸

There is currently no equivalent of this process for Victoria's regional cities. Beyond Melbourne's urban growth boundary, individual councils decide whether and how they deal with bushfire risk when planning for urban growth.³⁹

Mr Gilmore from the Department of Planning and Community Development told the Commission that the State Government was developing a regional settlement policy, called the Regional Blueprint.⁴⁰ It is vital that this blueprint deals with bushfire risk management—in particular, in the context of small undeveloped rural lots and the urban growth of Victoria's regional cities.

6.3.2 SETTLEMENT PATTERNS

Professor Hansen told the Commission about the need for good planning and the risks inherent in allowing residential development and population growth in bushfire-prone areas without adequately considering bushfire risk:

In my opinion seeking to protect communities living in dwellings scattered across rural landscapes from the ravages of bushfire, often with one access road in and out, is tantamount to 'death trap' planning. Unfortunately there are areas within Victoria where rural living and rural residential development is characterized by this pattern of settlement and yet, in my opinion, it is this very type of settlement pattern that makes it very difficult for planning and building provisions to avoid and manage bushfire risk.⁴¹

This question of land fragmentation was also nominated by Mr Greg Johnson of Friends of Nillumbik as one of the challenges facing Nillumbik Shire Council in land-use planning to reduce bushfire risk.⁴²

Professor Hansen considered that bushfire risk was best managed by concentrating urban and semi-rural settlements in defined areas with adequate buffers, good road access, emergency services and fire refuges. First and foremost the experts thought this should be dealt with in a regional settlement policy. They concluded:

There are a large number of small lot subdivisions outside urban areas in rural Victoria which present a bushfire risk. Settlement policies which discourage fragmented development on rural lots should be developed and implemented, for example, through alternative and innovative development options such as rural clusters, restructures, buy-backs, consolidated titles, tenement controls and transfer [of] development rights.⁴³

One means of discouraging development in some areas and encouraging it in others is for government to purchase land that it does not want developed, in order that the owner can settle in a more suitable area. Another means is for government to swap land in the former area for land in an area that it does want to see developed. These approaches are fairer to individual landowners than simply restricting use and development of their land through tenement controls or a restructure overlay, but they would involve a considerable amount of public money.

Dr Buxton and Professor Hansen both supported buybacks and the transfer of development rights.⁴⁴ The Commission does not consider this is warranted for broad-scale rural lots. It is, however, a suitable strategy for existing developments in areas where bushfire risk is unacceptably high. This is discussed in Section 6.8.

6.3.3 SMALL RURAL LOTS

A more specific question within the broader subject of fragmented settlements in rural areas is that of small rural lots. The experts, particularly Dr Buxton and Professor Hansen, noted that, because of poor planning and decisions in the past, there are thousands of small, undeveloped lots in rural zones in Victoria that pose particular problems for taking account of bushfire risk in the planning system. Residential development on these lots would increase the number of people living in areas of bushfire risk. Further, acute problems can arise on lots where there is no reticulated water, where road access is poor, and where it is not possible to achieve the minimum recommended defendable space because the lot is too small.

Rural zones have controls on the size of lots that may be created by subdivision.⁴⁵ There are, however, a large number of existing lots that are smaller than the minimum lot size for subdivisions. Dr Buxton cited many examples of this. His research in local government areas in peri-urban parts of Melbourne revealed the following, for example:

- Across those municipalities, more than 60 per cent of housing approvals in the Farming Zone were on properties of less than 20 hectares, despite the majority of planning schemes generally nominating larger minimum lot sizes for subdivision.
- In Murrindindi Shire 27 per cent of lots (2,185 lots) in the Farming Zone are less than 2 hectares.
- Most local government areas in the peri-urban region have a high proportion of lots of less than 2 hectares in the Rural Conservation Zone.
- Seventy-five per cent of housing approvals within rural zones were on properties of less than 20 hectares and almost 60 per cent were on properties less than 8 hectares.⁴⁶

There is in the Victoria Planning Provisions a control that could be used to restrict residential development on existing small lots: a council can apply the Restructure Overlay to an existing subdivision to consolidate the lots as a precondition to their development. Nillumbik Shire Council has used this overlay to good effect to restructure an old mining subdivision where the lots were in common ownership. In contrast, an attempt by Murrindindi Shire Council to use the Restructure Overlay to consolidate small lots with different owners in a subdivision at Flowerdale was an unhappy experience, one the council would not care to repeat. This evidence suggests that the Restructure Overlay can be used effectively to consolidate small rural lots, especially where they are in common ownership, but that community support is otherwise required.⁴⁷

As noted, particular safety risks arise when residential development is permitted on small blocks in areas of high bushfire risk. The Commission supports the expert panel's view that additional measures are needed to deal with the problem of residential development on small rural lots and that this could be achieved by more effective use of some types of zones. Although zones are often used to prescribe minimum lot sizes for subdivisions, they are infrequently used to prescribe minimum lot sizes for new residential developments. Dr Buxton suggested that councils should be able to introduce 'tenement controls' by specifying a minimum lot size for use of land as a dwelling or binding together groups of jointly owned lots. Professor Hansen agreed with this, but emphasised the importance of councils tailoring the use of zones to local circumstances in areas of high bushfire risk.⁴⁸

The Commission considers that councils need to be able to specify a minimum lot size for the use of land for a dwelling, not just for subdivision. Although this can already be done—to a certain extent through application of the schedules to the Rural Living Zone and the Farming Zone on land where no permit is required to construct a dwelling—the ability to specify a minimum lot size must also apply to dwellings that do require a permit in those areas and to other rural zones, both with and without a permit.

The rural zones in the Victoria Planning Provisions should be amended to allow councils to use schedules to the zones to specify minimum lot sizes for the use of land for residential development in areas of high bushfire risk.

RECOMMENDATION 38

The State implement a regional settlement policy that:

- takes account of the management of bushfire risk, including that associated with small, undeveloped rural lots
- includes a process for responding to bushfire risk at the planning stage for new urban developments in regional cities, the process being similar to that used for new developments in Melbourne's Urban Growth Zone.

6.3.4 A BUSHFIRE-PRONE ZONE?

At present there is in the Victoria Planning Provisions no zone that relates to bushfire risk. This is unlike the situation with flood risk, for which there is an Urban Floodway Zone plus three overlay controls. The zone is, however, not widely used since it prohibits most land uses, including dwellings.⁴⁹ Mr Gilmore explained why there is no equivalent zone for bushfire risk:

In floods that's relatively straightforward. The level of water in a 100-year flood is a known, quantifiable and discretely defined area and that can be easily mapped and put into the planning scheme. The challenge of mapping a much more dynamic response to a hazard in a bushfire sense is much harder, and the challenge has always been to not only work out what levels of hazard identification are associated with what levels of risk, but also to map them and to map them in a way that can be useful in the time frame over which the planning system works.⁵⁰

The expert panel recognised the difficulties of defining and applying a bushfire risk zone, particularly in being able to map the risk accurately considering the ubiquitous nature of bushfire risk in the landscape. Professor Hansen urged caution in using a zone of this type because of its potential to limit appropriate and legitimate development. Zoning land so as to prohibit certain uses, including use as a dwelling, 'sterilises' that land for future development, and this has harsh consequences for the landowners concerned. The only concrete step that can be taken to mitigate those harsh consequences is government buying the land.⁵¹

The Commission agrees with the expert panel that there should not be a specific 'bushfire-prone zone' that would prohibit residential and other development in areas of high bushfire risk. A variety of other measures could be taken within the Victorian planning system to better manage bushfire risk.

One such measure is to strengthen existing zones to influence the use and development of land in areas of bushfire risk. For example, uses by vulnerable groups such as a child care centre, school or hospital are prohibited uses in areas at greatest risk of bushfires and require a permit in others. The rural zones also have specific requirements for land used for a dwelling—for example, road access and water supply requirements. These could, however, be strengthened by adding some prescriptions for small rural lots.⁵²

6.4 THE VICTORIA PLANNING PROVISIONS: BUSHFIRE RISK MANAGEMENT

Management of bushfire risk is dealt with in the state planning policy Protection from Wildfire, which constitutes clause 15.07 of the Victoria Planning Provisions and forms part of the State Planning Policy Framework, and in a specific overlay, clause 44.06, Wildfire Management Overlay. The requirements of these clauses are discussed in detail in Sections 6.4.1 and 6.4.3 respectively. Some shire councils complement the state planning policy by including a bushfire policy in their Local Planning Policy Framework, as illustrated by the case studies in Box 6.4.

There is also a general provision that requires responsible authorities to consider for all permit applications 'the degree of flood, erosion or fire hazard associated with the location of the land and the use, development or management of the land so as to minimise any such hazard' (clause 65.01). Additionally, for subdivisions consideration must be given to the 'design and siting of buildings having regard to safety and the risk of spread of fire' (clause 65.02). A number of general controls that are also relevant to bushfire risk management deal with matters such as provision of fire hydrants and fire plugs, water supply, and safe access for emergency vehicles (clauses 56.06 and 56.09).⁵³

6.4.1 CLAUSE 15.07: PROTECTION FROM WILDFIRE

The objective of clause 15.07, Protection from Wildfire, is 'to assist the minimisation of risk to life, property, the natural environment and community infrastructure from wildfire'. The clause requires that risk be identified, that fire hazards be considered in planning decisions to 'avoid intensifying the risk through inappropriately located or designed uses or developments', that authorities have regard to a number of cited documents, and that further advice be sought from fire authorities where necessary.⁵⁴

On the basis of the evidence before it, including the views of the planning expert panel, the Commission considers that the wildfire policy outlined in clause 15.07 of the State Planning Policy Framework inadequately sets the strategic policy foundation for considering bushfire risk in all planning decisions: the clause lacks the detail, clarity and guidance that would help councils discharge their obligation to minimise bushfire risk when making planning decisions; and it compares unfavourably with other, more detailed policies in the SPPF that deal with coastal areas and conservation of native flora and fauna.⁵⁵

The panel of planning experts concluded there was considerable scope for improving the policy and that this might mean amending the policy to include some prescriptive elements.⁵⁶

The Commission agrees that the state planning policy for bushfire risk management does not give clear guidance to decision makers and does not include all the elements that would promote protection of human life as the highest priority. The policy should be rewritten to take into account the shortcomings and solutions highlighted in the evidence before the Commission, as outlined in Table 6.1. The intent is that the proposed amendments to the Victoria Planning Provisions take account of the matters detailed in this table.

Table 6.1 The state planning policy for bushfire: shortcomings and solutions

Shortcoming	Solution
Protection of human life should be the ultimate objective of the policy. The policy's focus needs to be comprehensively recast to achieve this.	The revised policy should assign priority to policy objectives. In particular, it should clearly state that the protection of human life overrides all other policy objectives.
The policy does not give adequate attention to management of native vegetation; nor does it provide guidance about how that element should be balanced with objectives to do with protection from fire. It does not recognise that in areas where the bushfire risk is very high it is not possible to allow people to live safely without clearing land around dwellings and beyond. ⁵⁷ In the Commission's view, if the native vegetation in these areas has high ecological value new development should not be allowed.	The revised policy should do the following:
	 strongly discourage new development of sites in bushfire-prone areas that are also of high biodiversity conservation value
	state that in bushfire-prone areas new developments should proceed only where bushfire risk can be reduced to an acceptable level on a continuing basis—without unacceptable biodiversity costs
	for existing developments in bushfire-prone areas, introduce a policy that explicitly enables landowners to take reasonable steps to reduce bushfire risk to an acceptable level.
Although the policy directs readers to reference documents, it provides no specific guidance on	For existing and new developments, the revised policy should do the following:
how to assess bushfire risk.	 provide guidance on what is an acceptable level of bushfire risk
	 identify policy elements that are necessary in order to achieve development with an acceptable level of risk—such as adequate defendable space and vegetation management.
The policy is not based on up-to-date, relevant documents and policies. Some documents cited are not current, have not been reviewed for many years, or are not readily available to authorities or the public. ⁵⁸	The revised policy should refer to current documentation such as AS 3959-2009, Construction of Buildings in Bushfire-prone Areas, and HB 330-2009, Living in Bushfire-prone Areas.
The policy does not take account of climate change projections of a greater frequency of catastrophic fire weather. ⁵⁹	The revised policy should take account of climate change projections as they relate to bushfire risk and incorporate the precautionary principle by recognising that the absence of absolute certainty about bushfire risk is not a reason for postponing action that might diminish risk.
The policy is not linked to related policies to help the reader understand how the policy was formed and what additional sources of information should be consulted. ⁶⁰	The revised policy should show links with other important state policies—for example, Living with Fire, Melbourne 2030 and the regional settlement policy—and relevant Commonwealth policies.
The evidence before the Commission suggests that councils do not consistently include in their Local Planning Policy Framework local bushfire policies to supplement the high-level strategic policy in the State Framework.	The revised policy should include a requirement that the LPPF of each planning scheme where the Bushfire-prone Overlay is applied include a bushfire policy that broadly outlines how to incorporate risk management in land-use planning, including the policy's links with the council's municipal fire prevention plan and municipal emergency management plan.
	The situation with local policies and the State Framework could be improved if municipal councils received better support to develop local bushfire strategies and if the bushfire provisions of the state and local frameworks were more closely linked.
'Wildfire' is an American term that is not widely used by the Victorian community. Further, its use in the Victoria Planning Provisions is inconsistent with the terminology used in the building regulatory system. ⁶¹	The revised policy should use the term 'bushfire' instead of 'wildfire'.

230 One of the main challenges for Victoria in revising the state planning policy relating to bushfire will be determining the variables for 'acceptable levels of risk' for existing and new developments. The State advised the Commission that this is a complex task that will require consideration of many variables—the location of the land, proximity to vegetation and slope being examples.⁶²

6.4.2 LOCAL PLANNING POLICIES

The requirement for all councils in areas of bushfire risk to have a bushfire policy in their Local Planning Policy Framework will mean substantial work for many councils. The Commission is strongly of the view that the State should provide material assistance by developing a model local bushfire policy that can be adopted or adapted by councils to suit their own circumstances. The model policy should give priority to the protection of human life, clearly reflect the objective of substantially restricting development in the areas of highest bushfire risk, give due consideration to biodiversity conservation, and contain guidance on making decisions at the strategic and statutory planning stages. Although local policy must not be inconsistent with state policy, and should not simply repeat state policy, the model should help councils focus on local application of the elements of a revised state planning policy, as outlined in Table 6.1.

The content and complexity of local bushfire planning policies will vary according to the level of bushfire risk in a municipality and the location of bushfire hazards. For example, in a municipality where the bushfire hazard is primarily on public land on which little or no development is likely to occur, a much less detailed policy would be required than for a municipality in which entire towns are deemed to be at high risk of bushfire. The model local bushfire policy should be flexible enough to accommodate a range of local circumstances.

6.4.3 CLAUSE 44.06: WILDFIRE MANAGEMENT OVERLAY

The Wildfire Management Overlay is the primary tool in the Victoria Planning Provisions for managing bushfire risk. It is an additional layer of control in a planning scheme, and the purpose of having it is to ensure that when a development proceeds fire protection objectives are achieved.⁶³

On land covered by a WMO a permit is required to construct a building or to carry out works associated with the following uses of accommodation (which includes residential land use): child care centre, education centre, hospital, industry, place of assembly, retail premises or timber production. Developments in the WMO must demonstrate that the following fire protection objectives have been considered and incorporated:

- Water supply. Water is available to landholders and emergency services, to enable life and property to be defended against bushfire.
- Access. Safe access is provided for emergency and other vehicles at all times.
- Buildings and works. The design and siting of buildings and works increases the potential to protect life and minimises the level of fire impact.
- Vegetation. Ground fuel and shrubs are managed in such a way as to reduce potential fire intensity in the vicinity of buildings.⁶⁴

A permit is also required to subdivide land in a WMO. An applicant must demonstrate that the following fire protection objectives have been met:

- Protective features. The level of fire risk and potential loss of life is reduced by the design, siting and layout of the subdivision.
- Access. Both public access and private access are designed to be safe for emergency and other vehicles at all times.
- Water requirements. Adequate quantities of water are available to landholders or emergency services to enable life and property to be defended against fire.
- Public open space. A fuel-managed buffer lies between a potential or existing fire hazard and a subdivision.
- Vegetation. The subdivision is designed to take account of the effect of vegetation on the level of fire intensity.⁶⁵

One of the central elements of the WMO requirements concerns the establishment of a building protection zone that is 'landscaped to reduce fuel load, distribution and continuity ... to inhibit the spread of fire and minimise the fire risk to life and property'. The CFA has developed a method for determining appropriate vegetation management zones on a site in order to create around a building defendable space that provides 'an area of protection from radiant heat, direct flame contact and ember attack'.⁶⁶

In discussing defendable space, policy makers need to be aware that, as discussed in Chapter 1, one of the lessons from the late January–February fires is that an assessment of whether a house is defendable should cover more than the immediate property. Defendability is also affected by the surrounding environment, such as proximity to a heavily forested area. These broader factors affect the ferocity of an approaching fire and whether the house could be subject to very heavy ember attack.

Permit applications under the WMO must be referred to the relevant fire authority—invariably the CFA. Because a council must accept the CFA's assessment of a permit, including any conditions it (the CFA) imposes, the CFA's guidelines for assessing permit applications are crucial and provide much detail about the decision-making tools for assessing bushfire risk on a site. These guidelines are discussed in Section 6.4.4.⁶⁷

As well as the CFA's advice, the council must consider the State Planning Policy Framework, the Local Planning Policy Framework and any adopted municipal fire prevention plan before deciding on an application for a site in the WMO. Permit applications under the WMO are exempt from the usual requirement to give notice to third parties.⁶⁸

Application of the Wildfire Management Overlay

The WMO was first introduced into the Victoria Planning Provisions in October 1997. It was progressively applied by councils and, by 7 February 2009, 35 of Victoria's 82 planning schemes applied it. Of the 20 municipalities affected by the fires the Commission investigated, 13 had applied the WMO and the remaining seven—Southern Grampians, Horsham, Alpine, Indigo, Casey, South Gippsland and Wellington—had not.⁶⁹

A council wanting to apply the WMO in its planning scheme must do so through the standard planning scheme amendment process, as outlined in Appendix B. This can be time consuming: it generally involves mapping, ground truthing, public consultation, a panel hearing to respond to any objections, approval to proceed, a council decision and ministerial approval. It has taken an average of 4.8 years for councils to implement the WMO in their planning schemes.⁷⁰

The Commission agrees with the submission of the Municipal Association of Victoria (and the 77 councils it represented) that the process for councils to introduce or amend the WMO is 'slow, costly, labour-intensive and unpredictable'. Although some measures—such as alternative notice procedures and exemptions or waivers for some costs—have been introduced to alleviate this problem, the WMO amendment process still takes an unreasonably long time.⁷¹

The Commission is of the view that councils have implemented the WMO slowly and inconsistently, at least partly, for several reasons:

- The planning scheme amendment process has been costly and complex.
- Before the late January–February 2009 fires, the Department of Planning and Community Development had not systematically monitored the application of the WMO, despite the CFA's attempts to apprise the department of concerns through its regional managers.
- No government agency was responsible for the process. The CFA, in its role as advocate, could do nothing more than monitor, encourage and advise. Councils have limited resources for dealing with a large number of competing priorities, one of which is the management of bushfire risk, including applying the WMO. The person who could, and should, have led the process was the Minister for Planning, acting on the advice of the Department of Planning and Community Development.⁷²

Since February 2009 the department, with the CFA's assistance, has identified areas in 26 municipalities where the WMO should be applied and has begun fast-tracking their applications through a process whereby the minister prepares and approves amendments without advance public notice. By February 2010 a number of planning schemes had been amended to apply the WMO through this process of ministerial amendment.⁷³

Although the Commission welcomes this development, it considers that the standard process for amending the scheme is not suitable for mapping bushfire risk and applying the WMO. The State should replace this process with a simplified system that allows the Bushfire-prone Overlay to be automatically applied without delay once the mapping has been done, as proposed in recommendation 37.

The centralised, comprehensive mapping process the Commission recommends will result in more accurate, consistent and robust identification of bushfire risk, obviating the need for the lengthy process of amending the planning scheme to introduce a Bushfire-prone Overlay. Automatic application of this overlay would, however, eliminate the opportunities for community consultation and education that exist as part of the standard planning scheme amendment process. The State should consider how such opportunities could otherwise be provided.⁷⁴

The effectiveness of the Wildfire Management Overlay on 7 February 2009

Because adoption of the WMO has been slow and because it applies only to new developments, there has been little opportunity to assess its effectiveness. CFA internal research into houses destroyed in the Kilmore East, Murrindindi, Churchill, Delburn, Beechworth–Mudgegonga and Bunyip fires looked at the number of dwellings destroyed in the fire areas and the proportion of those dwellings that had been formally referred to the CFA to assess their compliance with WMO requirements. The draft results provided to the Commission constituted a preliminary analysis only, using a very small sample of houses, and did not take account of important factors such as whether a house was actively defended. Nevertheless, the data did suggest that houses that had been referred to the CFA were less likely to be destroyed.⁷⁵

Box 6.3 Rebuilding in Wildfire Management Overlay areas

In March 2009 an amendment to the Victoria Planning Provisions was introduced to enable rebuilding without a permit in areas affected by the February 2009 fires if a dwelling was in a WMO and was to be rebuilt in the same location and provided construction began before 31 March 2011. The amendment allowed dwellings in a WMO that had been destroyed in the 2009 bushfires to be rebuilt in the same place, without any attention to the fire protection objectives set out in the WMO—namely, water supply, access, design and siting of buildings, and management of vegetation to achieve defendable space.⁷⁶

The rationale was 'to streamline the planning process so that bushfire survivors can commence rebuilding their homes as soon as practicable'. It was thought that early rebuilding would offer important environmental, social and economic benefits and reduce the time, cost and administrative burden for bushfire survivors and councils.⁷⁷ Mr Gilmore explained:

The government was clearly aware of its role in providing leadership for the community in a very difficult time and didn't want to be seen to make the rebuilding for the community any more difficult than it already was. There was a requirement to provide the sort of leadership to the community and respond to those people whose lives had been so badly affected by the fires.⁷⁶

The evidence before the Commission suggests that this amendment did not streamline the rebuilding process and that further amendments were needed to achieve this. The Commission considers it was an ill-conceived and ineffective gesture that allowed homes that had just been destroyed by fire to be rebuilt without any requirement to manage vegetation so as to create or maintain defendable space around the new homes. The standard WMO requirements for water supply and access were subsequently imposed by means of an amendment to the Building Regulations, but this did not come into effect until 1 September 2009.⁷⁹

Figure 6.5 Bald Spur Road before the fire



Source: Exhibit 678 – Bald Spur Road – Pre-fire Aerial Photography.⁸⁰ (Showing property boundaries.)

Figure 6.6 Bald Spur Road after the fire



Source: Exhibit 678 – Bald Spur Road – Post-fire Aerial Photography.81 (Showing property boundaries.)

Revision of the Wildfire Management Overlay

Members of the expert panel agreed on the need for some revision of the WMO, noting that it 'is generally a useful risk management tool, but it has shortcomings which need to be addressed in terms of how it works from a top down approach'. They also said the WMO cannot work effectively alone as a risk management tool and cannot treat existing risk.

In the Commission's view the WMO has serious limitations and should be revised and strengthened. Like the bushfire policy in the State Planning Policy Framework, the WMO does not provide strong and unequivocal guidance about the relative weight that should be given to bushfire risk when balancing complex and competing objectives, including native vegetation management. More comprehensive mapping of bushfire risk would enable better directed application of risk treatments through the WMO. Changes to the permit requirements and giving councils the opportunity to include local content would also help meet the overlay's fire protection objectives.

The Commission urges that the Wildfire Management Overlay be renamed the Bushfire-prone Overlay and that it be comprehensively reviewed in order to redress the shortcomings detailed in Table 6.2. The intent is that the proposed amendments to the WMO take account of the matters detailed in this table, and the revised CFA guidelines for permit applications take account of these matters.

Table 6.2 The Wildfire Management Overlay: shortcomings and solutions

Shortcomings	Solution	
The WMO does not provide strong, clear direction for decision makers about the relative priority that should be given to bushfire objectives vis-a-vis other priorities, particularly the management of native vegetation. Like the state planning policy for bushfire, the WMO fails to explicitly acknowledge that in some areas where the bushfire risk is very high it is not possible for people to live safely without clearing land around dwellings.	The revised overlay should do the following:	
	 provide that new developments in the areas of highest risk in the Bushfire-prone Overlay are strongly discouraged 	
	provide that new developments be approved only if minimum defendable space can be created and continually maintained on the property, without unacceptable biodiversity costs, unless the permit applicant can demonstrate that exceptional circumstances justify approving the development with less than minimum defendable space	
Contrary to community expectations, there is no connection between application of the WMO and the ability to clear vegetation, without a permit, for fire-protection purposes. ⁸²	 for existing developments, provide that minimum defendable space may be created on the lot without a requirement for a permit to remove vegetation 	
	 allow councils to use a schedule to the overlay to identify areas of particular environmental or landscape importance and for which a permit is required to remove vegetation to create defendable space around existing developments. 	
The WMO does not provide enough flexibility to allow for tailored risk treatments. Further, it does not recognise that different levels of bushfire risk can exist in an area and does not provide any means for councils to include local content in a schedule to the overlay or to adapt it to local circumstances. ⁸³	The revised overlay should do the following:	
	 recognise the different levels of bushfire risk identified in the mapping of bushfire-prone areas 	
	allow councils to use schedules to adapt the application of the overlay to different risk levels and to local conditions—including to identify areas of particular environmental or landscape importance for which a permit is needed to remove vegetation to create defendable space around existing developments.	

Shortcomings	Solution	
The WMO specifies water supply requirements for subdivisions in reticulated and non-reticulated areas. The CFA takes reticulated and static water supply into account when assessing applications for a permit to develop dwellings in the WMO. Evidence before the Commission showing that reticulated water supplies failed on 7 February 2009 – particularly in Marysville – suggests these requirements should be reviewed. People in areas at risk of bushfire should have a static water supply because they cannot rely solely on a reticulated water supply in the event of bushfire. ⁸⁴	The CFA should review the requirements for the supply of water for firefighting purposes in areas with reticulated water, and any amendments deemed necessary should be included in the revised overlay.	
Professor Hansen and Ms Pinfold suggested that there is a need to review the permit 'triggers' and exemptions in the WMO, specifically in relation to whether the current uses that require a permit (accommodation, child care centre, education centre, hospital, industry, place of assembly, retail premises and timber production) are appropriate and whether small-scale alterations (less than 50 per cent of the floor area) to existing buildings should require a permit. ⁸⁵	The State should review the uses for which a permit is required under the WMO and the exemption from the permit requirement for small-scale alterations, to ensure that they adequately take account of developments with increased bushfire risk exposure.	
A planning permit is not at present required for constructing or carrying out works associated with a 'private bushfire shelter' (bushfire bunker). There are, however, several very important planning considerations for bunkers—among them siting, access and egress, and defendable space.	A planning permit should be required for constructing or carrying out works associated with a bushfire bunker.	
The WMO-referenced documents are dated, in	The revised overlay should refer to the following:	
need of revision and, in the case of one, have not been readily available. ⁸⁶	 the revised CFA guidelines for assessing permit applications for dwellings, non-dwellings and subdivisions 	
	 AS 3959-2009, Construction of Buildings in Bushfire-prone Areas, and HB 330-2009, Living in Bushfire-prone Areas. 	

6.4.4 THE CFA AS A REFERRAL AUTHORITY

Mr James Fox, the CFA's Manager Community Safety for the Outer Metro Norwest Area, told the Commission that the CFA did not consider the WMO was aimed at preventing development but that it was instead about 'addressing the issues to do with fire risk so that development can happen, development that meets the objectives of the WMO'. The CFA rarely objects to a permit application referred to it under the WMO: in the past three years 2,866 permit applications were referred to the CFA; it objected to 24, required permit conditions for 2,754, and did not object to 88.⁸⁷

The CFA's view that development can usually be accommodated is puzzling. It should be recognised that some places are too dangerous for people to live there, and development should be strongly discouraged in these areas in the first instance. In high-risk areas safety needs to be paramount, and minimum defendable space considerations should therefore not be compromised.

The Victorian Civil and Administrative Tribunal dealt with the approach taken by the CFA in assessing permit applications in a decision it handed down in May 2010 in relation to an application for the subdivision and development of land at St Andrews. The decision was delivered after the Commission had concluded its hearings and receipt of submissions. The parties have not therefore had the opportunity to comment on the decision. The Commission notes that VCAT found the CFA's assessment in that matter as 'somewhat surprising' and concluded that the proposal was unacceptable. This may give some indication of the approach to be taken in such matters in the future.⁸⁸

In the WMO Applicant's Kit the CFA sets out the way it assesses permit applications for dwellings in the Wildfire Management Overlay. It also has guidelines for assessing applications for developments other than dwellings and for subdivisions, which are not as widely available. These documents are very important because councils must take the CFA's advice, as informed by these documents, when determining whether to approve a planning permit.

Dwellings

The WMO Applicant's Kit does not have any formal status in the Victoria Planning Provisions, but councils may refer to it in their planning schemes, as Nillumbik has done. The kit describes a method for assessing the wildfire, or bushfire, risk on a site, as well as three permit options, each with standard permit conditions—for water supply, access and vegetation management.

- Option One applies to a site with low-risk vegetation within 100 metres. The site must have either reticulated water or a static water supply of at least 10,000 litres maintained solely for firefighting, and it must meet minimum design requirements for emergency vehicle access. Vegetation must be managed within 30 metres of the dwelling.
- Option Two applies to a site with higher risk vegetation within 100 metres. The 10,000-litre static water supply requirement is a standard condition, as are minimum design requirements for emergency vehicle access. The vegetation management requirements are more extensive and include management in an area of up to 85 metres around a dwelling.
- Option Three is available where the standard permit conditions for Option One or Option Two are not achievable or are not accepted by the applicant—for example, if the block is too small to achieve the minimum defendable space requirements or if there are major environmental concerns. The applicant must propose an alternative solution (detailing it in a Wildfire Management Statement) that satisfies the fire protection objectives and outcomes of the WMO. Applicants are encouraged to seek expert advice for difficult sites.⁸⁹

Three specific concerns arise from the Commission's examination of the assessment guidelines for dwellings: the need for a stronger stance on defendable space; the need for a review of how defendable space is determined; and inclusion of assessment guidelines for bunkers.

Because of its focus on defendable space as an integral part of preserving human life, the Commission considers that the CFA should not approve a development in the absence of being assured that defendable space exists or can be created and maintained on the site without excessive damage to conservation values. The Applicant's Kit should be revised to eliminate Option Three. Instead, the kit should state that the CFA will approve new developments only if minimum defendable space exists or can be created and maintained on a continuing basis. The sole exception to this is if the permit applicant can demonstrate to the CFA's satisfaction that exceptional circumstances justify approving the development with less than the minimum defendable space. In providing guidance about what could constitute exceptional circumstances, the CFA might wish to consider the role of alternative safety measures such as bunkers.

Expert panel member Mr Chladil expressed some reservations about the WMO Applicant's Kit parameters for defendable space, which are also used in the Household Bushfire Self-Assessment Tool and in the fire protection exemption in clause 52.17, Native Vegetation. In particular, he suggested that these parameters be reviewed in order to incorporate the modelling used in AS 3959-2009. The Commission encourages the CFA to include this modelling as part of its current revision of the Applicant's Kit to take account of the major changes resulting from the adoption of AS 3959-2009.⁹⁰

The Applicant's Kit does not provide guidance on bunkers, or 'private bushfire shelters', since these are a relatively new addition to Victoria's building regime. In addition to the construction requirements for bunkers that have recently been developed nationally and adopted by Victoria, there are several very important planning considerations for bunkers, among them siting, access and egress, the availability of water for firefighting, and defendable space. The revised Applicant's Kit should also set out the CFA's guidelines for assessing planning permit applications for bunkers.

Use by vulnerable groups

The CFA also assesses applications for non-dwellings in a WMO, including buildings used by 'vulnerable' groups such as schools, child care centres, hospitals and places of assembly. It assesses the applications against the following 'critical variables' to ensure that appropriate treatments and mechanisms are considered:

- the capacity of the occupants to be involved in active defence
- whether the building will always be occupied and the capacity of occupants to evacuate early
- the likelihood of fire service attendance
- the suitability of AS 3959 for defining construction levels
- whether the development is made up of multiple occupied structures and the practicality of making all of the occupied structures defendable
- the expected population.⁹¹

Emergency management planning is considered at the planning approval stage. Specifically, consideration is given to two factors:

- including high-risk new developments on the local risk register or wildfire risk plan and the municipal emergency management plan
- including a permit condition that requires an emergency management plan or fire risk management plan that covers, among other things, communication with occupants, equipment, occupant and firefighter safety, and 'triggers' for activating the plan.⁹²

Unlike the WMO Applicant's Kit, the CFA practice note for assessing non-dwellings does not appear to be publicly available. It also makes reference to a site assessment tool developed by a private company that is available only through a restricted-access website.⁹³

The CFA should review its guidelines for non-dwellings but should continue to give particular attention to emergency management planning and the fire protection measures required for vulnerable uses such as schools, child care centres, hospitals and aged care facilities. The Commission encourages the CFA to take into account the New South Wales provisions for special fire protection–purpose buildings as part of this review.⁹⁴

Subdivisions

In assessing applications for subdivisions in the WMO, the CFA relies on two documents: its 1991 document *Planning Conditions and Guidelines for Subdivisions* and a more recent internal practice note.⁹⁵

The 1991 subdivision guidelines set out requirements for emergency vehicle access and water supply and include specific requirements relating to building protection zones, buffer zones and the setback of buildings within the building envelope that do not appear in the practice note. But the guidelines are not readily available, even within the CFA.⁹⁶

The practice note contains very little beyond the general fire protection objectives and outcomes set out in the WMO. It refers to the 1991 subdivision guidelines but does not otherwise draw on their contents. In particular, it does not set out the specific minimum distances required for building protection zones and fuel-modified buffer zones. It does, however, spell out the importance of ensuring that defendable space is achievable on each lot in the subdivision and that future development of the subdivision should be possible, consistent with the WMO. The note specifically cautions against subdivisions that might create 'Option 3' permit applications in the future, citing the cost and complexity of designing responses that meet the required level of fire protection.⁹⁷

Again, this practice note is not publicly available and, like the practice note for assessing non-dwelling applications, refers to an online site assessment tool access to which is restricted to 'wildfire practitioners'.⁹⁸

The focus on defendable space in the CFA documents for assessing subdivisions is welcome, but it should be made explicit that a subdivision without defined building envelopes around which minimum defendable space can be created will be approved only if exceptional circumstances can be demonstrated. The two main documents the CFA uses to assess permit applications also need to be updated, made consistent and made widely available.

RECOMMENDATION 39

The State amend the Victoria Planning Provisions relating to bushfire to ensure that the provisions give priority to the protection of human life, adopt a clear objective of substantially restricting development in the areas of highest bushfire risk—giving due consideration to biodiversity conservation—and provide clear guidance for decision makers. The amendments should take account of the conclusions reached by the Commission and do the following:

- outline the State's objectives for managing bushfire risk through land-use planning in an amended state planning policy for bushfire, as set out in clause 15.07 of the Victoria Planning Provisions
- allow municipal councils to include a minimum lot size for use of land for a dwelling, both with and without a permit, in a schedule to each of the Rural Living Zone, Green Wedge Zone, Green Wedge A Zone, Rural Conservation Zone, Farming Zone and Rural Activity Zone
- amend clause 44.06 of the Victoria Planning Provisions to provide a comprehensive Bushfire-prone Overlay provision.

RECOMMENDATION 40

The Country Fire Authority amend its guidelines for assessing permit applications for dwellings, nondwellings and subdivisions in the Bushfire-prone Overlay in order to accommodate the amendments to the Wildfire Management Overlay that are implemented as a result of recommendation 39 and make the guidelines available to municipal councils and the public. The revised guidelines should do the following:

- substantially restrict new developments and subdivisions in those areas of highest risk in the Bushfireprone Overlay
- set out the CFA's guidelines for assessing permit applications for dwellings, non-dwellings and subdivisions—including the minimum defendable space requirements for different risk levels
- clarify that the CFA will approve new developments and subdivisions only if the recommended bushfire protection measures—including the minimum defendable space—can be created and maintained on a continuing basis
- emphasise the need for enduring permit conditions—in particular, conditions for the creation and maintenance of minimum defendable space to be maintained for the life of the development.

6.5 VEGETATION CONSERVATION

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Management of native vegetation is relevant to the Commission's consideration of planning because much of Victoria's native vegetation is highly flammable and managing bushfire risk often involves the removal or modification of native vegetation around dwellings.⁹⁹

The conservation of native vegetation is subject to planning controls—primarily clauses 15.09 and 52.17 of the Victoria Planning Provisions, which are discussed in detail in the following sections. A council can also apply additional vegetation protection controls through one or more of the three environmental and landscape overlays in its planning scheme.

As a consequence of these two objectives—modifying native vegetation around dwellings and conserving native vegetation—the bushfire risk-management measures often intersect and conflict with the Victorian Native Vegetation Management Framework.

The Commission was told by a number of witnesses—among them lay witness Mr Ray Maino—that native vegetation controls were unduly complex, leading to confusion and frustration when trying to interpret and follow the various provisions and exemptions. During the Commission's community consultations in fire-affected areas many residents also expressed concern about regulations governing the removal and retention of vegetation.¹⁰⁰

6.5.1 CLAUSE 15.09: CONSERVATION OF NATIVE FLORA AND FAUNA

The objective of clause 15.09 of the Victoria Planning Provisions, Conservation of Native Flora and Fauna, is 'To assist the protection and conservation of biodiversity, including native vegetation retention and provision of habitats for native plants and animals and control of pest plants and animals'.¹⁰¹

In implementing that objective, councils must have regard to Victoria's Native Vegetation Management Framework. It reflects the National Framework for the Management and Monitoring of Australia's Native Vegetation, in which all Australian governments commit to reversing the long-term decline in the quality and extent of Australia's native vegetation cover. The Department of Sustainability and Environment implements the Victorian framework.¹⁰²

By 2002, when the framework was adopted in Victoria, an estimated 66 per cent of Victoria's 22.7 million hectares of native vegetation had been cleared. Of the remainder, about 7.4 million hectares was on public land and about 1.1 million on private land. At that time an estimated 2,500 hectares of native vegetation was being permanently lost each year.¹⁰³ The framework identified two major legacies of this widespread clearing of native vegetation:

Ecosystems upon which our presence and productivity depend are now beyond the point of sustainability. Evidence of this is in the continuing problems of salinity, soil structure decline, reduced water quality and quantity and increased rates of severe flooding. The biodiversity that built and maintains these ecosystems is also in decline.¹⁰⁴

To redress the situation, the framework seeks 'reversal across the entire landscape of the long-term decline in the extent and quality of native vegetation, leading to a Net Gain', to maintain biodiversity, increase the viability of threatened species and ecological communities, improve land and water quality, and increase carbon sinks in Victoria.¹⁰⁵

A net gain is achieved by reducing losses of existing native vegetation and the quality of that vegetation and achieving gains in the extent and quality of native vegetation through rehabilitation and revegetation. The framework establishes a three-step approach for this:

- Avoid adverse impacts, particularly through vegetation clearance.
- If impacts cannot be avoided, minimise them through planning processes and project design or management.
- Identify suitable offset options—that is, actions taken to achieve commensurate gains.¹⁰⁶

Any clearance of native vegetation must be offset by like-for-like gains that are commensurate with the loss. The conservation significance of the cleared vegetation will determine the stringency of the offset required, there being more emphasis on protecting and improving vegetation of high conservation significance and a more flexible approach to offsetting the clearance of vegetation of lower conservation significance. In practice, native vegetation offsets can result in existing vegetation being protected and managed, an area being revegetated and protected, or an area being set aside for regeneration or restoration. For those who cannot achieve offsets on their own land, DSE runs a service called BushBroker, which accredits providers of offsets available in Victoria. A similar scheme is run by the Trust for Nature, established under the *Victorian Conservation Trust Act 1972.*¹⁰⁷

6.5.2 CLAUSE 52.17: NATIVE VEGETATION

Clause 52.17 of the Victoria Planning Provisions, Native Vegetation, applies across planning schemes and is instrumental in implementing the framework through the planning system. The purpose of the clause is 'to protect and conserve native vegetation to reduce the impact of land and water degradation and provide habitat for plants and animals' by taking the following action:

- avoiding the removal of native vegetation
- minimising native vegetation removal through planning and design
- offsetting the loss of native vegetation if removal cannot be avoided
- removing native vegetation in accordance with a property vegetation plan
- managing vegetation near buildings to reduce the threat to life and property from wildfire.¹⁰⁸

Central to the operation of clause 52.17 is the requirement for a permit to 'remove, destroy or lop native vegetation, including dead native vegetation'. 'Native vegetation' is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'.¹⁰⁹

A council must refer an application for a permit to remove native vegetation to DSE if particular referral 'triggers' exist. The triggers include removing more than 15 immature trees or more than five mature trees and removing more than 0.5 hectares of endangered, vulnerable or rare vegetation or more than 1 hectare of depleted or 'least-concern' vegetation.¹¹⁰

Clause 65 of the Victoria Planning Provisions requires a council to have regard to the degree of fire hazard associated with the land, but there is apparently no requirement for DSE to have regard to fire hazard, and fire risk is not included in DSE's guide to assessing permit applications.¹¹¹

A number of exemptions enable clearing of vegetation without a permit for a range of purposes, among them to remove native vegetation for a fire protection purpose. The parts of the exemption that are most relevant to creating and maintaining defendable space around a home allow for removal or modification of the following for fire protection:

- a tree overhanging the roof of a building used for accommodation
- native vegetation within 30 metres of a building used for accommodation—except for trees and provided that at least 50 per cent of native shrubs are retained and native grasses are kept to at least a height of 100 millimetres
- native vegetation within up to 100 metres of a building used for accommodation, provided the conditions just noted are met and a plan is submitted to DSE.¹¹²

The exemption allowing creation of defendable space within 30 metres of a home is relatively straightforward and has been simplified with the introduction of clause 52.43, Interim Measures for Bushfire Protection, which is discussed in the next section.

Compliance with the exemption that allows clearing up to 100 metres from a house is more onerous because a person wanting to apply the exemption must calculate the exact distances that apply on the basis of the vegetation category, the slope, and whether the vegetation is in the north-western or eastern zone of the property. The method for calculating defendable space is consistent with the WMO Applicant's Kit and the CFA's Household Bushfire Self-Assessment Tool. The exemption also requires that the applicant submit a plan to DSE. DSE's approval of the plan is not required, but the department can take action if the plan does not comply with clause 52.17. Although this exemption has been in operation since September 2006, DSE has not received any plans under it. The State should reconsider whether the exemption is still required in the light of the Commission's recommendation that people be able to create defendable space around existing properties in the Bushfire-prone Overlay without a permit.¹¹³

6.5.3 CLAUSE 52.43: THE 10/30 RULE

Clause 52.43—widely known as the '10/30 right' or the '10/30 rule'—is in effect from 10 September 2009 until 31 August 2010. It allows the removal without a permit of some vegetation for bushfire protection purposes. This includes the following:

- any vegetation within 10 metres of a building used for accommodation
- any vegetation, except for trees, within 30 metres of a building used for accommodation
- any vegetation for a combined maximum width of 4 metres either side of a fence on a boundary between properties in different ownership
- fuel-reduction burning on the roadside of an existing public road
- removing fallen wood for personal use from the roadside of an existing public road.¹¹⁴

The clause applies only to the planning schemes of non-metropolitan councils and only to existing developments constructed or approved before 10 September 2009. It applies in addition to any other exemption in a planning scheme and overrides any requirement in an overlay for a permit to remove vegetation. The main differences between this new clause and the existing exemptions to clause 52.17 are that there is no requirement to retain 50 per cent of shrubs within the area between 10 and 30 metres from the building and there is no requirement to maintain native grasses at a height of 100 millimetres. The main virtue of the new provision is that it simplifies and clarifies what was already permitted.¹¹⁵

There is, however, concern that, in an effort to achieve simplicity, clause 52.43 might permit the destruction of vegetation to the overall detriment of the community and the environment because it overrides any environmental and landscape overlay that has been applied in a planning scheme.¹¹⁶ This is discussed in Section 6.6.1.

6.5.4 ENVIRONMENTAL AND LANDSCAPE OVERLAYS

The Victoria Planning Provisions contain three environmental and landscape overlays that can be applied in a planning scheme:

- The Environmental Significance Overlay identifies areas where the development of land can be affected by environmental constraints and ensures that development is compatible with identified environmental values.
- The Vegetation Protection Overlay protects areas of significant vegetation, including ensuring that development minimises loss of vegetation.
- The Significant Landscape Overlay identifies significant landscapes and conserves and improves the character of significant landscapes.¹¹⁷

Where any of these overlays applies, the requirements of the overlay are in addition to clause 52.17, Native Vegetation. A permit is required to remove, destroy or lop vegetation that is protected by an overlay. There are fire protection exemptions to the requirement for a permit in the overlays, but they are more restrictive than the conditions contained in clause 52.17. As with clause 52.17, there appears to be no requirement for DSE to consider fire hazard or fire protection when assessing a referred application.¹¹⁸

6.6 BALANCING THE CONSERVATION OF NATIVE VEGETATION AND THE MANAGEMENT OF BUSHFIRE RISK

Many of the witnesses before the Commission raised the question of balancing measures designed to mitigate bushfire risk with the conservation of native vegetation. Striking such a balance is a challenge at all levels, but the Commission was especially concerned to hear about the difficulties it causes councils when they are deciding on permit applications because there is a lack of strategic direction about how to balance competing objectives. Individuals also encounter problems when they want to clear land for fire protection purposes around their existing homes.

The expert panel accepted that considerable weight should be given to biodiversity conservation—not only for native vegetation but for all flora and fauna and particularly threatened species—in planning. They thought the balance between biodiversity conservation and protection against bushfire was best struck at the strategic level, using high-quality information, so that development could be concentrated in areas of lower biodiversity value. Panel members also stressed that this high-level policy should be reflected in decision making at the permit application stage, to enable an assessment of the biodiversity costs of an application by, for example, considering the amount of vegetation clearing required to create the defendable space necessary for new developments and subdivisions.¹¹⁹

In his report Mr Chladil noted that native vegetation measures were technically complex and were highly weighted in the planning system. He observed, 'To me (an outsider) it appears that the Native Vegetation Management policy in Victoria is positioned to be a "must have" while relegating bushfire safety to a "nice to have"'.¹²⁰

There was widespread agreement with this observation among panel members, although Dr Buxton did not accept the characterisation of the framework as 'must have'. He suggested that, despite the complex regulatory arrangements, the first two elements of the framework—avoiding and minimising removal of native vegetation—were not widely adopted and that there is 'still extensive, continuing clearing' in Victoria.¹²¹

The Commission proposes in recommendations 39 and 40, that the State provide strategic leadership by amending key clauses of the Victoria Planning Provisions to clarify how bushfire risk management and biodiversity conservation should be balanced. The Commission also considered the following related matters:

- biodiversity concerns arising from the 10/30 rule
- DSE's consideration of bushfire risk in its role as a referral agency for permits to clear land around existing properties
- the difficulty of securing offsets where removal of native vegetation has been allowed
- biodiversity mapping
- fire-resistant vegetation.

6.6.1 THE 10/30 RULE: BIODIVERSITY CONCERNS

The 10/30 rule was introduced as an interim measure for simplifying vegetation controls for fire protection purposes around existing buildings. It is a welcome measure, but there are some difficulties associated with it:

- It does not permit clearing beyond 30 metres from a house or other building used for accommodation, and a permit might still be required to create the minimum defendable space recommended by the CFA if an exemption under clause 52.17 does not apply.
- There is no link between the 10/30 rule and the Wildfire Management Overlay. This is understandable considering the imperfect application of the WMO to date.
- It is a one-size-fits-all solution, and there is concern about whether the rule could be used to permit widespread clearing to the detriment of important environmental or landscape values.¹²²

244 Implementation of recommendation 39 should alleviate these problems because it would include a general provision that no permit will be necessary for removing vegetation to create minimum defendable space on existing developments in the Bushfire-prone Overlay, but that councils will be able to identify areas where this provision should not apply and a permit is required. Exceptions to the general provision should be included in a schedule

to the Bushfire-prone Overlay so that the rules applying to vegetation clearing for defendable space remain in just one place in a planning scheme.

Implementation of recommendation 39 would also allow the extent of clearing permitted for fire protection to be linked to an applicable risk level, based on more accurate bushfire hazard mapping and application of the Bushfire-prone Overlay, rather than the arbitrary measures in the 10/30 rule. This might not be as simple as the 10/30 rule, but it would be a more evidence-based and robust approach, and the CFA could provide detailed guidelines to help people understand the rationale and approach to assessing permit applications for dwellings, non-dwellings and subdivisions.

Although the Commission considers the 10/30 rule has been a useful interim measure, the rule should not continue to be used once clause 44.06 and the CFA's assessment guidelines are revised and comprehensive bushfire-prone area mapping is completed. The State agreed with this proposition in its submissions.¹²³

6.6.2 CONSIDERATION OF BUSHFIRE HAZARD BY THE DEPARTMENT OF SUSTAINABILITY AND ENVIRONMENT

The intent of the changes proposed in recommendation 41 is to make it easier for people to create and maintain defendable space around homes located in the Bushfire-prone Overlay, but a permit will still be required for removing native vegetation in some circumstances and the permit application might be referred to DSE for advice if the relevant triggers, discussed in Section 6.5.2, exist. At present there is no requirement for DSE to consider bushfire hazard or fire protection purposes when assessing a referred application for a permit to remove native vegetation around an existing development. There is no evidence before the Commission that this has led to DSE rejecting such an application, but minimising fire hazard should be an explicit consideration both for DSE, as the referral authority, and for responsible authorities, such as councils. DSE should also consult with the CFA in the development and publishing of guidelines for assessing an acceptable level of native vegetation removal for bushfire risk mitigation, to ensure that the approaches taken by the two agencies are not in conflict.¹²⁴

RECOMMENDATION 41

The State:

- amend the Victoria Planning Provisions to require that, when assessing a permit to remove native vegetation around an existing dwelling, the responsible authority and the Department of Sustainability and Environment, as referral authority, take into account fire hazard and give weight to fire protection purposes
- develop guidelines for determining the maximum level of native vegetation removal for bushfire risk mitigation, beyond which level the application would be rejected.

6.6.3 NATIVE VEGETATION OFFSETS

Allowing people in the Bushfire-prone Overlay to clear defendable space around their homes without a permit should reduce the requirement for native vegetation around homes to be offset. Offsets might still be required for clearing in those areas of particular environmental or landscape importance where councils already require a permit to remove vegetation around existing properties. For new developments, the Native Vegetation Management Framework's net gain requirements will apply, so offsets will be required where a permit is granted to remove vegetation.

Expert panel member Mr Brett Lane, a specialist ecological consultant, outlined the difficulties individual landholders face in finding offsets for the removal of small amounts of vegetation and the questionable benefit of the offsets achieved:¹²⁵

It is my view that in a situation where you have multiple individual separate landholders wanting to remove small bits of vegetation in order to protect their property from fire ... it is not practical to expect each of them to go out and find an offset. Even if they did, you would end up with a series of random tiny little offset sites spread across the countryside with absolutely no strategic view as to how they work together to actually achieve a biodiversity conservation outcome.¹²⁶

The time and effort required for individual landholders to achieve offsets was illustrated by the evidence of Ms Eva Matthews of Steels Creek, who told the Commission of long and costly delays in obtaining permission to clear native vegetation to build a home at that location.¹²⁷

The Commission also heard evidence that at present the demand for offset sites exceeds the number of sites registered with schemes such as BushBroker and the offset scheme run by the Trust for Nature and that it is difficult to arrange an off-site offset relatively quickly. The State informed the Commission that DSE operates a limited program whereby landholders can buy offsets for trees over the counter and is working with a number of councils to establish local offset schemes that allow councils to accept payment in exchange for obtaining offsets on behalf of landowners. The Commission encourages this work and urges the State to expand the BushBroker scheme so as to increase the number of sites registered.¹²⁸

The Commission agrees, however, with Mr Lane's suggestion that DSE develop a collective offset solution. Such a scheme would differ from the BushBroker scheme, which brokers individual offsets, in that it would pool funds contributed by individual landholders seeking to offset small removals in order to create a larger scale offset with greater biodiversity value.

RECOMMENDATION 42

The Department of Sustainability and Environment develop and administer a collective offset solution for individual landholders who are permitted to remove native vegetation for the purpose of fire protection.

6.6.4 BIODIVERSITY MAPPING

A recurrent theme in the panel of experts' written statement and in their panel discussion concerned the need for thorough biodiversity mapping that identified flora, fauna and any protected, vulnerable or threatened species. As noted in Chapter 7, this subject was also raised by the expert panel for land and fuel management. Such mapping would greatly help councils and the wider community in their efforts to accommodate biodiversity considerations when aiming to manage bushfire risk. DSE is already doing high-resolution biodiversity mapping as part of the process of precinct structure planning for Melbourne's growth areas. This mapping should be done across the state. It would be useful in more areas than planning and would be of particular value in relation to fuel-reduction burning on public land and roadside management.¹²⁹

RECOMMENDATION 43

The Department of Sustainability and Environment conduct biodiversity mapping identifying flora, fauna and any threatened species throughout Victoria and make the results publicly available. The format used should be compatible with that used for Bushfire-prone Area mapping.

6.6.5 FIRE-RESISTANT VEGETATION

A final consideration in connection with balancing native vegetation conservation and the management of bushfire risk is the use of fire-resistant vegetation as a risk-mitigation measure. Much of Victoria's native vegetation is fire dependent and highly flammable. In the 1980s and 1990s the CFA advised the community about the use of fire-resistant vegetation in landscaping and, among other things, provided a list of species that burn less readily than others. Its current advice, however, is that 'There is no such thing as a "fire retardant" or "hard to burn" plant' since 'all plants will burn given the right fire conditions'. The advice notes that different plants burn differently, according to factors such as age, environment, season and water availability. This advice is so general as to be quite unhelpful.

Of course, all plants will burn in the right conditions, but it is equally the case that some plants burn far more readily than others. The Tasmania Fire Service, the South Australian Country Fire Service, the ACT Planning and Land Authority and CSIRO all provide more specific advice about choosing and planting less flammable plants. Ms Sturzenegger had no difficulty with the idea of the CFA providing this kind of information to the community.¹³⁰

RECOMMENDATION 44

The Country Fire Authority produce for community guidance material on fire-resistant landscape and garden design, including a list of fire-resistant species.

In the light of the information other states and the ACT provide about fire-resistant vegetation as a bushfire riskmitigation measure, the Commission was concerned to hear from lay witness Ms Eva Matthews of Steels Creek that a condition on her planning permit required that 85 per cent of new plantings in the 10-acre (4-hectare) development zone where her house was to be built be native vegetation. This condition was imposed at the same time as a WMO permit condition requiring the creation and maintenance of defendable space around the home was imposed.¹³¹

Although there is no evidence before the Commission that administration of the framework has required landowners to plant flammable native vegetation in preference to fire-resistant vegetation within their defendable space, it is conceivable that this could occur under the current arrangements.¹³² The Commission strongly discourages DSE and councils from implementing clause 52.17 of the Victoria Planning Provisions or 'Native Vegetation Management—a framework for action' so as to limit the ability of landowners to plant fire-resistant vegetation within that space.

6.7 LOCAL PLANNING SCHEMES

The Commission looked at how the planning schemes of Nillumbik, Murrindindi and Latrobe Councils deal with bushfire risk management and vegetation conservation. All three schemes make use of some of the main provisions of the Victoria Planning Provisions, such as clause 52.17, and apply the Wildfire Management Overlay to some extent. Their case studies demonstrate that balancing the objectives of bushfire protection and maintaining biodiversity at the local level varies considerably.

Box 6.4 Bushfire risk management and vegetation conservation: Nillumbik, Murrindindi and Latrobe Councils

Nillumbik

The Shire of Nillumbik, north-east of metropolitan Melbourne, covers 430 square kilometres and has a population of about 62,000. About 90 per cent of the shire's population lives in urban areas, the main townships being Eltham, Diamond Creek, Hurstbridge and Greensborough.

Nillumbik's planning scheme allows for a comprehensive approach to both bushfire risk and native vegetation management. It identifies high fire risk as an important environmental concern, gives prominence to conservation of native flora and fauna, and highlights the possible tension between managing bushfire risk and biodiversity conservation. The shire's Local Planning Policy Framework specifically deals with bushfire hazard and includes a comprehensive, well-constructed wildfire management policy. The Wildfire Management Overlay has applied in Nillumbik since December 2005 and applies to 64 per cent of the municipality.

The Local Planning Policy Framework has a strong emphasis on biodiversity conservation, which is implemented in part by use of the Environmental Significance Overlay and the Significant Landscape Overlay, but the overlays also recognise bushfire risk. Although the ESO restricts the removal of vegetation on significant sites, it does include a fire protection exemption. The SLO implements Nillumbik's neighbourhood character policy, which involves retaining and planting native vegetation but also requires that buildings and landscaping be designed and sited to minimise bushfire risk and stipulates that defendable space should be maintained around dwellings.

Nillumbik Shire Council has adopted its own native vegetation offsets management policy, which provides that where on-site offsets are not practical the council considers making public land available for this purpose or accepting a payment to fund planting and maintenance on private or council land in lieu of an offset.¹³³

Murrindindi

Murrindindi Shire, north-east of Nillumbik, covers 3,889 square kilometres and has a population of about 14,000 people. The main population centres are Alexandra, Yea and the Kinglake Ranges. The shire is very hilly, and about 46 per cent of the land area is forest and public land.

There is no clear planning response to bushfire risk in the Murrindindi planning scheme. The Local Planning Policy Framework does not specifically address bushfire risk management and, although it mentions bushfire risk—most notably in relation to the lack of reticulated water in some townships—no coherent approach to managing the risk is described. Application of the Vegetation Protection Overlay means a permit is required to remove any vegetation in Marysville. This is subject to exemptions in the VPO and in VPO Schedule 1, but the exemptions are more restrictive than those in clause 52.17 of the Victoria Planning Provisions.

The Wildfire Management Overlay has applied in Murrindindi since July 2004, but many areas in the shire that were burnt in February 2009 were not covered by the WMO, among them Marysville, Kinglake and Pine Ridge Road in Kinglake West.¹³⁴

In January 2010 the council amended its Local Planning Policy Framework to include a policy and strategies for rebuilding Marysville and policies for the Marysville business and residential areas. One aspect of the rebuilding policy involves the intention to ensure that 'Marysville is rebuilt as a scenic mountain village located in an attractive setting in the Steavenson River valley enclosed by vegetated forest and hills'. There is no mention of the known bushfire risk or how it is to be taken into account in rebuilding the town.

Latrobe

The City of Latrobe is based in the Latrobe Valley, about 140 kilometres east of Melbourne. It covers an area of 1,400 square kilometres and has a population of about 73,500. The four main urban areas are Traralgon, Morwell, Moe–Newborough and Churchill.

In January 2010 Latrobe City Council adopted a new Municipal Strategic Statement (see Appendix C), which now constitutes the Latrobe Local Planning Policy Framework. The MSS contains high-level objectives and strategies for identifying bushfire risk and ensuring that new developments do not increase risk and do include adequate fire protection measures. The main way these objectives and strategies are implemented is through application of the Wildfire Management Overlay, which has applied since April 2007. The MSS also covers native vegetation and biodiversity objectives and strategies. Latrobe makes limited use of the Environmental Significance Overlay to provide a buffer between urban areas and coal-mining and electricity-generating areas and to protect water catchments. It does not apply either the Vegetation Protection Overlay or the Significant Landscape Overlay.¹³⁵

Nillumbik, Murrindindi and Latrobe Shires exemplify the fact that, despite high levels of bushfire risk, councils do not always pay sufficient attention to mitigation measures by adopting planning controls in their planning schemes. The Commission's proposed changes to the Victoria Planning Provisions, requiring a specific bushfire policy in the Local Planning Policy Framework of every council where the Bushfire-prone Overlay is applied, would ensure that bushfire risk management is given more appropriate consideration in future. The model policy recommended by the Commission would also ensure a higher level of consistency among councils.

The Commission is alarmed, however, that Murrindindi Shire Council recently amended its Local Planning Policy Framework to include policies for rebuilding Marysville without reference to the mitigation of bushfire risk. The council should urgently incorporate bushfire risk management in its planning activities, starting with adopting a bushfire policy in its Local Planning Policy Framework. This should not wait for changes to the Victoria Planning Provisions.

RECOMMENDATION 45

The State press municipal councils—in particular, Murrindindi Shire Council—to urgently adopt a bushfire policy in their Local Planning Policy Framework and incorporate bushfire risk management in their planning policies and strategies for rebuilding communities such as Marysville, Kinglake and others affected by the January–February 2009 fires.

6.8 HIGH-RISK AREAS

Planning policies and controls such as the Wildfire Management Overlay are designed to apply to decision making about whether new development should proceed and, if so, what bushfire measures should be applied. They are not designed to mitigate bushfire risk for existing developments, including townships, in high-risk areas.

Planning's limited capacity to treat existing risk highlights the need for a rethinking and redesign of settlements and towns that were destroyed by fire on 7 February 2009, but the opportunity was lost with the early commitment to rebuilding these communities 'brick by brick'.

The Commission understands the imperative to rebuild, but to rebuild without any real thought being given to the future management of bushfire risk is to fail to learn from experience. The Commission notes the State's efforts to quickly rebuild homes and communities in order to help people heal and to deal with practical problems such as homelessness. It considers, however, that this has put short-term social welfare considerations above the longer term safety of the community.¹³⁶ Murrindindi Shire Council's Local Planning Policy Framework illustrates this wish to rebuild without considering how to accommodate future bushfire risk.

The new Bushfire-prone Overlay the Commission proposes would allow for vegetation clearing for fire protection purposes around existing dwellings, but there could be circumstances when this would not be enough. In these cases communities might need to rely on other mechanisms for dealing with bushfire risk. Many of the alternatives—for example, fuel management on public land, the construction of refuges and shelters, and options such as evacuation planning—are discussed elsewhere in this report. They will be most effective when they are taken as part of an integrated fire management plan.¹³⁷

In its hearings dealing with the fire-related deaths the Commission examined particular localities, all of them close to bush and posing an unacceptably high threat to human safety. For example, Pine Ridge Road in Kinglake West remains an extraordinarily high risk location: it consists of a number of small lots on top of a ridge surrounded by national park. Every house in the street was destroyed by fire on Black Saturday. Landowners there have little option but to rebuild if they cannot sell and move on.¹³⁸ But if they rebuild the risk to life and property returns; if they sell their land to someone else who then rebuilds the risk is merely transferred to someone else. Were they able to sell their land to the State, that land could be used to create a buffer for Kinglake West, they could resettle elsewhere, and the problem of the risk would be redressed. The Commission notes the State's concern about this proposal, including in connection with the short- to medium-term risk for those who choose to remain in such a high-risk location. The Commission has, however, set its sights on long-term solutions.

Figure 6.7 Pine Ridge Road before the fire





Source: Exhibit 681 - Pine Ridge Road - Pre-fire Aerial Photography.¹³⁹ (Showing property boundaries.)

Figure 6.8 Pine Ridge Road after the fire



Source: Exhibit 681 – Pine Ridge Road – Post-fire Aerial Photography.¹⁴⁰ (Showing property boundaries.)

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In view of the extent of existing development in rural areas, the commitment to rebuild following 7 February, and the slow progress in establishing shelters and refuges, it might be necessary to help people move out of areas where the bushfire risk is greatest. One option for existing developments in areas of unacceptably high risk is a retreat-and-resettlement strategy that encourages people living in those areas to move somewhere safer. An aspect of such a strategy should be the non-compulsory acquisition by the State of land from people who want to sell and resettle. If they cannot sell their land many landowners in areas of extreme risk will be financially unable to move to a safer location. This proposal is not without precedent. The Commission heard evidence from Dr Buxton that over 30 years successive Victorian governments created a fire buffer zone in the Dandenong Ranges through extensive compulsory acquisition and restructuring of often inappropriately subdivided residential lots, with the objective of separating residential development from areas of high fire risk. Dr Buxton estimated that this policy prevented tens of thousands of people from building properties in what was historically identified as an area of extremely high bushfire risk.¹⁴¹

In developing the retreat and resettlement strategy the State should consider a number of factors:

- focusing on land that is near to or adjoining public land
- giving priority to acquiring land that is in an area of unacceptably high bushfire risk and on which dwellings were damaged or destroyed by the 2009 bushfires
- determining criteria for 'unacceptably high risk', with particular reference to the availability of other risk-mitigation measures such as shelters and refuges
- using non-compulsory land acquisition as a last resort only, when other options—such as creating defendable space around a dwelling and installing a bunker—are not feasible
- allowing an application for acquisition to be initiated by a landowner or recommended by the State
- the duration of the strategy and the available funds.

RECOMMENDATION 46

The State develop and implement a retreat and resettlement strategy for existing developments in areas of unacceptably high bushfire risk, including a scheme for non-compulsory acquisition by the State of land in these areas.

6.9 BUILDING REGULATION

Building in bushfire-prone areas of Victoria is regulated in three ways:

- by Victorian legislation—the Building Act 1993 and the Building Regulations 2006
- by a national building code—the Building Code of Australia, which includes specific bushfire provisions and is adopted in the State's Building Regulations
- by an Australian standard adopted in the Building Code of Australia—AS 3959, Construction of Buildings in Bushfire-prone Areas.

The Building Act and Regulations, which are administered by the Building Commission, regulate building standards and building work in Victoria. The Regulations establish building standards, primarily by adopting the Building Code of Australia and the standards referred to in it. Operation of the BCA and the relevant standards is detailed in Appendix B. Bushfire construction provisions contained in the BCA are one element of the building standards. The provisions apply only to building work in designated Bushfire-prone Areas, which are determined by each state and territory. Building work must be carried out in accordance with the Building Act and Regulations, including the building standards. Municipal and private building surveyors are responsible for issuing building and occupancy permits and ensuring that a building meets all the relevant requirements.¹⁴²

National standards for building in bushfire-prone areas are based on research about how houses burn in bushfires. Post-bushfire surveys—including those conducted in Beaumaris after the 1944 fires, in Macedon and the Otway Range after the 1983 Ash Wednesday fires, around Sydney after the January 1994 fires, and in Duffy after the 2003 Canberra fires—have highlighted two major themes:

- Most houses damaged or destroyed were ignited by wind-borne embers, rather than by direct flame contact or radiant heat.
- The presence of people able to put out spot fires greatly increased the likelihood of a building surviving.¹⁴³

There is a clear relationship between the severity of weather conditions and building losses from bushfires. A recent study found that most building losses occurred under very intense weather conditions, when the Forest Fire Danger Index exceeded 100. The FFDI is calculated using data on wind speed, temperature, humidity and drought conditions. Each of these factors influences the severity of a bushfire, as well as buildings' vulnerability to ignition.¹⁴⁴

The insights provided by post-bushfire surveys have been added to by experimental studies, which typically focus on the performance of specific building components—for example, timber, windows and window shutters, and water tanks. The results of these two forms of empirical research have been used to develop risk and vulnerability models, including the Wilson House Survival Meter, the House Ignition Likelihood Index and the CFA's Household Self-Assessment Preparedness Tool.¹⁴⁵

Mr Leonard from CSIRO outlined the ways buildings are damaged or destroyed during bushfires. All of them have implications for the standards of building construction:

- Ember attack. Ember attack can occur before, during and after a firefront has passed and is more intense in hot, dry and windy conditions. It persists for the longest time and affects areas that are not reached by the main firefront. Recent studies show that houses were destroyed at around 700 metres from continuous vegetation in the 2003 Canberra bushfires and in Kinglake during the 7 February fires. Embers can ignite a building through direct contact, igniting combustible gases, entering through a small gap in the building structure (for example, a vent), or igniting something near the building.¹⁴⁶
- Radiant heat. This can come from the firefront or from combustible elements on or near a building. Such heat can cause structural failure (melting or cracking), heat a building component to the point that gases ignite (either from embers or spontaneously) or dry the surface of the material, increasing its flammability.¹⁴⁷
- Flame contact. Flame contact occurs across shorter distances than ember attack and radiant heat and can come from the firefront or other sources. Risk of direct flame contact is influenced by the siting of the building and the amount of fine fuels close to the building or heavier fuel sources such as fences and decks close by. The combustibility of external building elements is crucial to a building's vulnerability to ignition from direct flame contact.¹⁴⁸
- Convective heat. This is the effect hot gases, such as hot air from a bushfire, have on a building's predisposition to ignition by another source. Hot winds that heat and dry a building and surrounding structures before a firefront arrives increase the risk of ignition and can also shrink timber, creating gaps in the building's facade.¹⁴⁹
- Strong winds. These are a defining feature of extreme fire weather. Wind can dislodge building components and thus expose areas inside the building to fire, create an air pressure difference between the inside and outside of the building that drives flames through small gaps in the building, and increase the rate of moisture loss from building components. The effects of wind can be reduced by designing and constructing a building to withstand high wind loads and through siting and surrounding vegetation.¹⁵⁰

Of course, a building will often be subjected to more than one attack mechanism, and the combination can be what causes ignition and burning. For example, high winds can lift roof tiles, allowing embers to enter the roof cavity, or radiant heat can cause windows to break, allowing embers and flames to enter the building and ignite its contents.¹⁵¹

In bushfires, and in the absence of human intervention, once a building catches fire it is most likely that it will burn to the ground. Buildings that are only partially damaged by bushfire are rare and this usually occurs only where part of the building is saved by occupants or fire brigades fighting the fire. For this reason research into building performance in bushfires and building standards in bushfire-prone areas has focused on factors that contribute to the initial ignition of the building.¹⁵²

The Commission notes that building standards do not and cannot guarantee a home will not burn down. They are, at present, designed to reduce the risk of ignition during the passage of the firefront. In the case of ferocious fires, such as those experienced on 7 February, this passage took much longer than under more usual fire conditions. Under such extreme conditions the protection offered by even well-constructed buildings is diminished.¹⁵³

Box 6.5 Explosion

A number of witnesses reported seeing buildings explode during the fires of 7 February. These observations do not accord with the accepted scientific understanding of how buildings ignite and burn in a bushfire. Mr Leonard noted that the explosion of things such as gas bottles, paint tins and aerosol cans is sometimes mistaken for a building explosion once a building is on fire. He added, 'It may be technically possible for a building to explode, however it must first be filled with combustible gases and later detonated, meaning that the building or an isolated region of the building would be untenable prior to the explosion'. He concluded:

Apart from the possibility of the building filling with combustible gas from an unusual failure of gas supply infrastructure, CSIRO is not aware of any plausible theory being discussed by scientists that would explain how a building may explode during the passage of a firefront due to the fire effects that the main firefront imposes.

Researchers have investigated a number of instances in which houses were reported to have 'just exploded' and in each case have found that the house ignited some time before the actual explosion and subsequently detonated a substance such as fuel, gas or paint that was inside the burning house. No studies have confirmed a case of a house exploding as a result of external exposure to a bushfire.

Mr Leonard also confirmed that researchers had found evidence of 'catastrophic rupture' of gas bottles when dislocation of the bottles had prevented the venting valve from working effectively. It seems probable that a number of observations of houses exploding are associated with the venting of gas bottles in or near those houses.¹⁵⁴

6.9.1 AS 3959: CONSTRUCTION OF BUILDINGS IN BUSHFIRE-PRONE AREAS

AS 3959 was first published in 1991 and has evolved over three editions—AS 3959-1991, AS 3959-1999 and AS 3959-2009. It provides rules and guidelines for the construction of elements of buildings, such as floors, walls, windows, doors, roofs, verandas and decks, and water and gas supply pipes. Despite this standard being crucial to providing effective guidance on construction of buildings in bushfire-prone areas, the process for revising, producing and publishing this guidance has been fraught with difficulty. It has not delivered timely regulation.¹⁵⁵

6.9.2 REVISION OF AS 3959-1999

The full revision of AS 3959-1999 began in late 2001. Following the Canberra bushfires in January 2003, the Australian Building Codes Board stressed the importance of revising the standard in a timely manner to the committee undertaking the review. Even though it was expected that the new edition would be published in September 2003, the revised standard was not put to a final ballot of the committee until 27 February 2009, despite requests from the ABCB and a recommendation by COAG's 2004 National Inquiry on Bushfire Mitigation and Management that it be finalised as a matter of priority. There were several reasons for the long delay:

- The committee responsible for the standard—the FP-020 Committee—had to review over 490 comments received on the original public consultation draft and more than 1,100 comments on a further draft issued in February 2005.
- Four subcommittees were established to consider specific matters in depth.
- Standards Australia was concurrently developing and publishing two important standards for testing the performance of building materials subjected to simulated bushfire attack (AS 1530.8.1 and AS 1530.8.2) that were to be extensively cited in the revised edition of AS 3959.
- Committee members disagreed about the flame temperature for the site assessment methodology and whether to include deemed-to-satisfy provisions for the Extreme and Flame Zone categories.¹⁵⁶

The question of flame temperature was finally resolved in April 2007, when the ABCB agreed that regulators would make the decision on the basis of policy considerations and the level of stringency required. The ABCB also determined that if a category of Flame Zone was to be included in the new edition of AS 3959, a deemed-to-satisfy construction solution for that category would be necessary.¹⁵⁷

6.9.3 PUBLICATION AND ADOPTION OF AS 3959-2009

In the aftermath of the 7 February 2009 fires considerable pressure was brought to bear on Standards Australia to publish the revised standard quickly, and the ABCB and Standards Australia moved to finalise the standard with much more urgency than had previously been evident. Standards Australia initially proposed to publish an interim standard that could be adopted in Victoria but ultimately, at the request of the Victorian Government, proceeded to finalise the fully revised edition for publication.¹⁵⁸

A special meeting of the FP-020 Committee was held on 25 February 2009 to finalise the pre-ballot draft. Some, but not all, of the points of disagreement were resolved at the meeting. The main questions that remained unresolved concerned the inclusion of the Bushfire Attack Level for the Flame Zone, or BAL-FZ, and prescription of deemed-to-satisfy construction solutions for that level.¹⁵⁹

At the close of the ballot, on 4 March, five of the 20 votes received were negative. The representatives of the Australasian Fire and Emergency Service Authorities Council, CSIRO and the Fire Protection Association Australia voted against publication; they were concerned about the inclusion of deemed-to-satisfy solutions for BAL-FZ (see Section 6.9.5). The ballot had not achieved consensus. Although the FPAA subsequently agreed to publication of the standard on the condition that it include comments noting the association's reservations, the continued opposition of CSIRO and AFAC had to be considered by the Standards Development Committee. It met on 5 March 2009 and resolved to publish the standard, notwithstanding the opposition of these two major interests. It was, however, agreed to include the following notation in the preface to AS 3959-2009:

Construction in Flame Zone

Whilst the majority of the Committee support the full Standard, unanimity was not reached on aspects related to BAL-FZ Flame Zone. The Committee will be asked to review this Standard, including Flame Zone construction, in light of relevant outcomes of the Victorian Royal Commission into the February 2009 bushfires.¹⁶⁰

AS 3959-2009 was finally published on 10 March 2009. It was adopted in Victoria the following day with the making of the Interim Building Regulations, and was cited in the 2010 edition of the Building Code of Australia.¹⁶¹

The lengthy history of the revision of AS 3959-1999 and the eventual publication of AS 3959-2009 reflect poorly on both Standards Australia and building regulators, in particular the ABCB. It is unfortunate that regulation of a matter of public safety should have been allowed to drift for nearly eight years—and for five years after the 2004 COAG Inquiry recommended that it be completed as a matter of priority. Resolution of difficult and important policy matters such as the level of stringency required of the standard and whether deemed-to-satisfy solutions should be prescribed for the Flame Zone should not be left to a technical committee consisting of volunteers who must try to reach consensus and are not accountable for the timeliness of their decision making. While there has been some recognition of these problems, there is currently no clear commitment to adopting a more efficient process.

Box 6.6 Standards Australia's development pathways

Although consensus-based standards development offers advantages for the legitimacy and implementation of the resulting standards, an outcome within a given time frame cannot be guaranteed.

The Standards Australia business model offers a choice of development pathways, including development led by committees, development in collaboration with interested parties, and development led and resourced by Standards Australia.

To date AS 3959 has been developed under the Standards Australia–led pathway. The Chief Executive Officer of Standards Australia, Mr John Tucker, told the Commission that future development and revision of the standard were likely to occur under the collaborative pathway. This would involve interested parties (such as the Australian Building Codes Board) and Standards Australia jointly leading and resourcing the project through a negotiated sharing of responsibility.

On 4 November 2009 Standards Australia announced it would introduce revised governance and budgeting arrangements for the Standards Australia–led pathway to ensure that it can make progress with priority projects that deliver safety, community or economic benefits and cannot be financially resourced by stakeholders.

The Commonwealth prefers that AS 3959 continue to be developed using the Standards Australia–led pathway. The Commission considers, however, that a different approach, with agreed resource allocation and greater flexibility to achieve more timely outcomes, is required. It sees the collaborative pathway as a better option for future work on AS 3959 because the pathway is designed to maintain collaboration while ensuring timely progress. The State and Standards Australia support this.¹⁶²

Responsibility for this failure of regulation is broadly spread. In part, it rests with Standards Australia for its failure to actively manage the revision of the standard. On the basis of Mr Tucker's evidence, the Commission is satisfied that this failing has been redressed by Standards Australia's adoption of its new business model.

Responsibility also rests in part with Australia's building regulators, who come together as the ABCB. It left the technical content of the Building Code of Australia's performance requirements for bushfire-prone areas entirely up to a non-government body without contributing substantial resources to the revision of the standard or defining the scope of the standard. When, belatedly in April 2007, the ABCB advised the FP-020 Committee that the final decision on flame temperature was a policy matter that would be decided by the regulators, the committee was able to produce a near-to-final draft of the standard relatively quickly. It is regrettable that the regulators did not also take responsibility earlier for resolving the question of deemed-to-satisfy solutions for the Flame Zone.¹⁶³

Some responsibility also rests with the allocation of modest resources to the ABCB by its government members. Mr Ivan Donaldson, General Manager, Australian Building Codes Board, acknowledged that a greater commitment of resources and people earlier in the process would have been helpful. He did not say the ABCB did not have the necessary resources, but the evidence suggests that this has been a problem for the ABCB and, if the current funding model continues, will continue to be so in the future.¹⁶⁴

The Commission is of the view that a greater commitment of public resources to the continuing review and development of AS 3959 and other bushfire-related standards is required, and that future project proposals for revision and development of bushfire-related standards by Standards Australia should specify the scope of the project—including matters of regulatory policy that are beyond the project's scope—and provide clear project management specifications.

6.9.4 ACCESS TO THE BUILDING CODE OF AUSTRALIA AND AUSTRALIAN STANDARDS

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With the exception of municipal councils and public libraries, which receive free copies, the Australian Building Codes Board charges for online and hard copies of the Building Code of Australia. About two-thirds of the ABCB's operating budget is funded by sales of the code. Although successive reviews of the ABCB have recommended

that it be funded to enable a minimum level of free access to the code, including free online access, Australian governments have not revised the ABCB's funding model.¹⁶⁵

As with the Building Code of Australia, standards developed by Standards Australia are available at a cost. In the report of its 2006 Review of Standard Setting and Laboratory Accreditation, the Productivity Commission recommended that the Australian Government and other governments fund free or low-cost access to standards made mandatory by regulation. The Commission agrees.¹⁶⁶

Standards Australia owns the copyright in the standards it develops. It receives royalties under an agreement with its publisher, SAI Global Ltd, but otherwise has no involvement in the pricing or sale of standards by SAI Global. The cost of access to AS 3959 is of concern: evidence before the Commission shows that the cost of access reduces compliance.¹⁶⁷

The Commission considers that bushfire-related standards mandated by legislation should be freely available and that any cost associated with this should be borne by the Commonwealth and state and territory government members of the Australian Building Codes Board. The Commission notes that the performance standard for private bushfire shelters, released by the ABCB on 30 April 2010, is available free of charge on the ABCB website. It welcomes this development.¹⁶⁸

6.9.5 AS 3959-2009

The 2009 edition of AS 3959 contained many important improvements on the 1999 edition. Among other things, the 2009 edition does the following:

- specifies six Bushfire Attack Levels, or BALs, as opposed to the previous four levels
- contains five levels of construction corresponding to the highest BALs, as opposed to the previous three levels
- contains two scientifically based methodologies for assessing bushfire attack—a simplified method and a detailed method—in contrast with the observation-based approach in the 1999 edition
- recognises the variations in bushfire risk across Australia, specifying different Fire Danger Index values for each state and territory and for distinct regions in Victoria and New South Wales
- refers to two new testing standards—AS 1530.8.1 and AS 1530.8.2—designed to test the ability of materials to withstand specified levels of radiant heat over time in simulated bushfire conditions
- has a structure that is easier to follow compared with that of the earlier edition.¹⁶⁹

A central element of AS 3959-2009 is the requirement that each site in a bushfire-prone area undergo a site assessment to determine its BAL. The six BAL levels—BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 AND BAL-FZ—are named according to radiant heat flux thresholds but are based on the predicted bushfire attack for ember attack, heat flux and flame exposure. Ember attack is predicted for all BALs other than BAL-LOW.¹⁷⁰

By far the most controversial aspect of AS 3959-2009 was the inclusion of deemed-to-satisfy construction solutions for BAL-FZ (the Flame Zone).¹⁷¹ Two elements of the deemed-to-satisfy solutions are particularly significant:

- The deemed-to-satisfy solutions rely heavily on testing standard AS 1530.8.2.¹⁷² Several witnesses before the Commission expressed concern about the testing standards referenced in AS 3959-2009.
- AS 3959-2009 specifies a minimum setback distance of 10 metres from the classified vegetation, but it also allows that 'in circumstances where the 10 m setback distance cannot be achieved, those elements of the building that are less than 10 m from the classified vegetation shall comply with AS 1530.8.2'.¹⁷³ This effectively prescribes a construction solution for a building surrounded by vegetation that is very close or even adjacent to the building.

Overall, the Commission is satisfied that the 2009 edition of AS 3959 improves the protection of buildings in bushfire-prone areas compared with AS 3959-1999.¹⁷⁴ There is, however, evidence before the Commission of some serious reservations about the following aspects of AS 3959-2009 and its application through the Building Code of Australia:

- the deemed-to-satisfy solutions for the Flame Zone
- lack of application to buildings used by vulnerable groups
- the importance of ember attack
- reliance on the testing standards AS 1530.8.1 and AS 1530.8.2.

Deemed-to-satisfy solutions for the flame zone

There was a sharp divergence of views about whether building regulations for bushfire-prone areas should prescribe deemed-to-satisfy construction solutions for the Flame Zone. A site assessed as BAL-FZ is predicted to be exposed to direct flame contact from a bushfire, as well as radiant heat flux greater than 40 kilowatts per square metre and ember attack. It is the highest risk category of bushfire attack. At present, the deemed-to-satisfy solutions set out in AS 3959-2009 are prescribed for BAL-FZ in Victoria.

Citing AS 3959 as the deemed-to-satisfy solution is highly significant because most domestic construction (not just in bushfire-prone areas) is done in accordance with a deemed-to-satisfy solution rather than an alternative solution. Alternative solutions that comply with the performance requirement for bushfire-prone areas are always possible, but they are not the norm in domestic construction.¹⁷⁵

Mr Ivan Donaldson, General Manager, Australian Building Codes Board, Mr Tony Arnel, Building Commissioner, Victoria, witnesses from the Housing Industry Association and the Master Builders Association of Victoria, and two experienced building surveyors, Mr Stuart McLennan and Mr Geoff Woolcock, supported the inclusion of deemed-to-satisfy solutions for the Flame Zone. They told the Commission that prescribing deemed-to-satisfy solutions establishes a greater level of certainty for designers, builders and property owners—they can be quantified and costed and result in more consistent, certain and timely outcomes for clients. The absence of any guidance potentially creates uncertainty and higher compliance and construction costs. As noted by Mr Mike Harding, the HIA's National Manager Codes and Standards, there is a concern that 'the potential construction requirements provided by a fire authority on an ad hoc basis would not provide a level of consistency in application across jurisdictions nor be subject to regulatory scrutiny, and it could be argued would not pass the test of delivering a net cost benefit, as building regulations are required to do'. The State also noted that provision of deemed-to-satisfy solutions drives investment in product research and development, which in turn increases the safety of houses built in the Flame Zone.¹⁷⁶

In summary, the arguments for prescription of deemed-to-satisfy provisions for the Flame Zone are certainty, consistency, reduced compliance and construction costs, and provision of a clear indication of acceptable minimum levels of construction as well as a benchmark for alternative solutions. It should be noted, however, that certainty and consistency are not possible at present since there are very few deemed-to-satisfy construction solutions that have met the requirements of testing standard AS 1530.8.2 available for some parts of a building, such as roofing and window systems. This appears to pose difficulties for people who are rebuilding in fire-affected areas, as highlighted by lay witness Mr Andrew Berry of Kinglake, who said, 'Many people are uncertain what to do regarding [the] roof structure of homes in the fire zone because there is no roofing material that has been tested to withstand a fire in that scenario'.¹⁷⁷

Fire agencies and the Fire Protection Association Australia oppose the prescription of deemed-to-satisfy solutions for the Flame Zone. Two of their concerns are as follows:

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Deemed-to-satisfy solutions, and indeed building homes in the Flame Zone at all, normalise the placement of people in extreme hazard.

Deemed-to-satisfy solutions are useful as a benchmark only in situations in which it is possible to set a benchmark, which is not the case in the Flame Zone. The Flame Zone is an inherently dangerous area where adequate defendable space is not possible. Any home built in such an area should be individually designed to the specific fire risks of the site. Providing deemed-to-satisfy solutions implies the resultant safety level is equivalent to that of lower hazard areas.¹⁷⁸

Mr Chladil, one of AFAC's representatives on the FP-020 Committee, characterised the Australian Building Codes Board's position that there should be deemed-to-satisfy solutions for any place where a built solution was possible as 'more ideological than practical or safe'.¹⁷⁹

The Commission considered the competing perspectives of building regulators, industry bodies and fire agencies and fire safety interests. It considers that the policy imperatives of certainty, consistency, reduced costs of compliance and construction, and benchmarking alternative solutions are important and are consistent with the national approach under the Building Code of Australia. But they do not outweigh the compelling safety arguments against prescribing deemed-to-satisfy building solutions in the Flame Zone. The Commission is particularly concerned that the aims of certainty, consistency, and reduced costs are unlikely to be achieved in the short-term because of the limited availability of tested roofing and window products in the marketplace. Benchmarking alternative solutions is not appropriate or even readily achievable in the circumstances of high risk that apply when building in the Flame Zone.

The nature of the risk, and the appropriate ways of mitigating that risk, differ according to site-specific characteristics. If building is to be permitted on a site assessed to have the highest level of bushfire risk, then the building should be designed specifically for the particular risks on the site. This is the approach taken in New South Wales, and it should also be the approach in Victoria. Consistent with the commitment to national building standards, consideration should be given to adopting this position in all jurisdictions through the Building Code of Australia.¹⁸⁰

The Commission notes that requiring an alternative solution for building in the Flame Zone is likely to cost more than a deemed-to-satisfy solution and could take longer to achieve. It will require specialist technical advice and possibly testing of specific building components and a higher construction cost. Since alternative solutions are not the norm for domestic building, consideration also needs to be given to ensuring that suitably qualified people are available to provide the necessary design services. But reducing the potential loss of life is the most important consideration, and in the Flame Zone this requires the development of performance-based building solutions for each particular site.¹⁸¹

Non-residential buildings

The Building Code of Australia currently applies AS 3959-2009 only to Class 1, 2, 3 and associated class 10a buildings—in essence, dwellings and nearby outbuildings—except where jurisdictions have modified their application of the BCA. In Victoria there are no bushfire-related construction requirements for buildings in Classes 4 to 9 (such as schools, early childhood centres, hospitals, aged care facilities, shops, restaurants and offices) constructed in bushfire-prone areas. Many buildings of this kind were destroyed in the 7 February fires.¹⁸²

Mr Arnel told the Commission that extending the bushfire safety provisions of the Building Code of Australia to all non-residential buildings should be considered and that the Building Commission was looking at the way the New South Wales Rural Fire Service does this. In New South Wales application of the Building Code of Australia is varied to apply the bushfire safety provisions to specific Class 4 and 9 buildings, known as 'special fire protection purpose buildings', whose occupants might be more vulnerable to bushfire attack for reasons of age, illness or limited mobility and who present organisational difficulties for evacuation and management. This includes schools, child care centres, hospitals and retirement villages.¹⁸³

As noted in Section 6.4.3, the Victoria Planning Provisions already require additional bushfire safety measures for 'vulnerable use' developments such as schools, child care centres, hospitals and places of assembly. The Commission is of the view that extending the application of bushfire safety construction provisions to non-residential buildings, particularly those for vulnerable use, warrants further consideration by both the Australian Building Codes Board and the State.

Ember attack

In its second interim report the Commission recommended immediate revision of AS 3959-2009 to deal with the following:

- inclusion of unmanaged grassland in the vegetation types and classifications
- use of sarking as a secondary ember protection measure
- increased ember protection measures at lower bushfire attack levels—in particular, in relation to sub-floor requirements and materials prescribed for doors, windows and wall barriers.¹⁸⁴

Standards Australia advised the Commission that a revised edition of AS 3959–2009 is due for public comment and committee ballot consideration from June to August 2010. Assuming that consensus is reached, the amendment is expected to be published in October 2010. The amendment will incorporate unmanaged grassland in its vegetation types and classifications and take account of the use of sarking as a secondary ember protection measure. Amending AS 3959–2009 to increase ember protection measures at lower Bushfire Attack Levels will, however, not be considered by Standards Australia until further information supporting an amendment becomes available. These developments are welcomed, but the Commission urges that ember protection measures at lower Bushfire Attack Levels also need to be pursued as a priority.¹⁸⁵

As discussed, ember attack is the predominant bushfire attack mechanism, and measures to protect buildings from the risk of ignition by embers are essential. The significance of protecting a building against ignition by embers is not, however, specifically reflected in the objective of AS 3959-2009. Similarly, the performance requirement in the bushfire safety provisions of the Building Code of Australia is that a building constructed in a designated Bushfire-prone Area must be 'designed and constructed to reduce the risk of ignition from a bushfire while the fire front passes'. As noted, the evidence before the Commission suggests that most houses that are burnt in bushfires are burnt because of ember attack. Although buildings' resistance to radiant heat and direct flame contact is important in the areas of highest risk, resistance to ignition by embers is crucial to the survival of all buildings in bushfire-prone areas.¹⁸⁶

The relevant performance requirements in the Building Code of Australia and the objective of AS 3959-2009 should be amended to incorporate resistance to ember attack. This will assist in ensuring that ember protection measures remain a focus of future work on development of appropriate standards and regulatory measures.

The Commission is also of the view that new houses and extensions in bushfire-prone areas should have some level of ember protection. It proposes that all new buildings and extensions in bushfire-prone areas have a minimum AS 3959-2009 construction level of BAL-12.5. This would ensure that new developments and extensions of existing developments in areas of bushfire risk incorporate basic ember-protection measures. This requirement could be waived in exceptional circumstances. Higher construction levels would be required as determined by the site assessment.¹⁸⁷

Testing standards AS 1530.8.1 and AS 1530.8.2

Another area of concern in relation to AS 3959-2009 is its reliance on the testing standards AS 1530.8.1 (in the Flame Zone) and AS 1530.8.2 (for construction on sites assessed as BAL-29 or BAL-40). CSIRO, AFAC and the Fire Protection Association Australia are all concerned about using AS 1530.8.1 or AS1530.8.2, or both, to determine the performance of building components under bushfire conditions. They argue that the testing standards do not effectively simulate bushfire conditions because they do not sufficiently consider wind effects, moisture content relevant to bushfire conditions, and effective requirements for gaps to hamper ember entry.¹⁸⁸

The limitations of AS 1530.8.1 and AS 1530.8.2 are acknowledged in the standards themselves. Witnesses before the Commission confirmed that the conditions specified in AS 1530.8.1 and AS 1530.8.2 do not simulate bushfire conditions and are not designed to do so. Rather, the tests are designed to be repeatable and to provide a reliable mechanism for comparing the performance of building elements at a very high level of fire intensity. Because the test methods are designed to achieve consistent ranking of the performance of building systems subjected to heat and flame, it has been necessary to make some simplifications and to balance these with other criteria.¹⁸⁹

On the evidence before the Commission, testing standards AS 1530.8.1 and AS 1530.8.2 do allow for repeatable tests for comparing and ranking the performance of building components subjected to radiant heat and direct flame contact in a bushfire. This is necessary. But, because AS 3959-2009 prescribes compliance with these tests as deemed-to-satisfy solutions for construction at higher bushfire attack levels, it is vital that the testing standards also be reliable predictors of the performance of building components under bushfire conditions. The Commission therefore considers that a review of both testing standards is warranted.

RECOMMENDATION 47

Standards Australia do the following:

- amend the objective of AS 3959-2009, Construction of Buildings in Bushfire-prone Areas, to ensure that it incorporates reducing the risk of ignition from ember attack
- review, and amend as appropriate, the testing methods prescribed in its standards for Tests on Elements of Construction for Buildings Exposed to Simulated Bushfire Attack (AS 1530.8.1 and AS 1530.8.2) to ensure that, so far as is possible, the methods provide a reliable predictor of the performance of construction elements under bushfire conditions.

RECOMMENDATION 48

The Australian Building Codes Board do the following:

- amend the performance requirements in the Building Code of Australia to ensure that they incorporate reducing the risk of ignition from ember attack
- work with Standards Australia to effect expeditious continuing review and development of AS 3959, Construction of Buildings in Bushfire-prone Areas, and other bushfire-related standards referred to in the Building Code of Australia
- negotiate with Standards Australia and SAI Global Ltd an arrangement for free online access to AS 3959-2009, Construction of Buildings in Bushfire-prone Areas, the other Australian standards referred to in AS 3959-2009, and any other bushfire-related Australian standards referred to in the Building Code of Australia
- amend the Building Code of Australia to remove deemed-to-satisfy provisions for the construction of buildings in BAL-FZ (the Flame Zone)
- include in the Building Code of Australia bushfire construction provisions for non-residential buildings that will be occupied by people who are particularly vulnerable to bushfire attack, such as schools, child care centres, hospitals and aged care facilities.

RECOMMENDATION 49

The State modify its adoption of the Building Code of Australia for the following purposes:

- to remove deemed-to-satisfy provisions for the construction of buildings in BAL-FZ (the Flame Zone)
- to apply bushfire construction provisions to non-residential buildings that will be occupied by people who are particularly vulnerable to bushfire attack, such as schools, child care centres, hospitals and aged care facilities
- other than in exceptional circumstances, to apply a minimum AS 3959-2009 construction level of BAL-12.5 to all new buildings and extensions in bushfire-prone areas.

6.10 BUSHFIRE BUNKERS

In its second interim report the Commission expressed its concern about the lack of regulation for bunkers, the risks of misplaced reliance on bunkers, the demand for bunkers, and the widespread availability of bunker products. It tackled the clear and pressing need for a minimum standard to regulate the design, siting and construction of bunkers by recommending that the Australian Building Codes Board develop a standard as a matter of priority.

The Commission also made recommendations designed to ensure that, in Victoria and nationally, bunkers are regulated under building legislation and the standard developed by the ABCB is referenced as the minimum standard for construction of bunkers.

On 30 April 2010 the ABCB released a performance standard for private bushfire shelters; the standard is available free on the ABCB website. The ABCB advised the Commission that the 2011 edition of the Building Code of Australia will include bunkers and will reference the standard. In the meantime, the Commonwealth and the ABCB will continue to encourage all jurisdictions to adopt the bunker standard by means of interim regulations. On 28 May 2010 the Victorian Government adopted the standard through an amendment to the Building Regulations. The Commission commends this swift action to finalise and adopt the standard.¹⁹⁰

6.11 BUSHFIRE SPRINKLERS

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An important finding in the Bushfire Cooperative Research Centre's research after Black Saturday concerned the strong influence of the presence of sprinkler systems for house survival. The Commission heard a number of lay witnesses' accounts of the role sprinklers played in successfully defending a house. Mr Andrew Berry of Kinglake told the Commission, 'If we didn't have the sprinkler system, I believe we would have been incinerated in the house in less than two minutes. The sprinkler system bought us time and absorbed the "hit" of the firefront'.¹⁹¹

The CFA advised the Commission that sprinkler systems might help to protect a house. But sprinkler systems can fail during a fire, as several lay witnesses attested, and the presence of such a system is no guarantee that a house or its occupants will survive a fire. For example, the Commission was told about sprinkler systems that ceased to work once the power failed. It also heard of instances of people using regular garden sprinklers that were not designed to withstand extreme fire conditions.¹⁹²

There is no standard to guide people in designing and installing a workable sprinkler system. Some lay witnesses told the Commission about sprinkler systems they had designed and built, sometimes at great expense. For example, Ms Judy Frazer-Jans of Marysville described the 'water curtain' she designed:

I devised a unique solution involving 132 linear metres of copper piping installed on the fascia boards under all of the guttering around the house. Approximately 130 fine copper tubes were inserted into this copper piping, each about 1 metre apart and facing downwards. Very small brass sprinkler heads were inserted into the ends of each tube, and aligned so that the water jets intersected to create a water curtain around the house. I designed this myself from scratch. Copper was selected because it is a more fire resistant material.¹⁹³

Mr Barry Eadie, chair of the FP-020 Committee, told the Commission that bushfire sprinklers and sprayers were not within the scope of AS 3959 and were most likely to be dealt with by technical sub-committee FP-004-02 as a separate and specific standard-development project. He estimated that it would take two years to develop the standard.¹⁹⁴

Standards Australia advised the Commission that it received a proposal for this project on 1 October 2009 and, following stakeholder consultation, broad but not unanimous support was received for a bushfire sprinkler standard. It also noted that a net benefit analysis for the project would be essential given the potentially high cost of such systems. Standards Australia has not been approached by any party willing to fund the development of a standard, although a proposal to have the standard treated as a Standards Australia–resourced standards-development project is currently being assessed, with an outcome expected in August 2010.¹⁹⁵

The Commission welcomes this. Although it does not envisage that sprinklers would be mandated in bushfireprone areas, the standard would add to the options available to people in high-risk areas. It is highly desirable that this standard be developed and ready for publication as soon as possible—ideally, within 12 months. Effective project management under Standards Australia's new business model will be needed to bring the project to a prompt conclusion.

The Commission also notes that there were examples of people who had installed sprinklers who died while sheltering in their homes during the 2009 fires. It therefore cautions that sprinklers should be seen as a supplement to other measures and, in particular, are not a substitute for active external defence of a property. Reliance on a mechanical system alone does not appear to be sufficient to provide a satisfactory level of protection.

RECOMMENDATION 50

Standards Australia move expeditiously to develop a standard for bushfire sprinklers and sprayers.

6.12 RETROFITTING OF BUILDINGS

The requirement to build homes that comply with AS 3959 applies only to new buildings and extensions. Compliance with AS 3959 has been a requirement in Victoria only since 2004, and many existing buildings in areas of high bushfire risk do not comply. The Building Commission's analysis of 2,131 homes destroyed by the fires on 7 February 2009 found that 87 per cent of those homes had not been required to be built to any bushfire standard.

AFAC's tentative position on this subject, set out in its draft discussion paper *Habitable Buildings in Bushfire-prone Areas*, is that fire agencies should work with other interested parties to raise awareness and encourage the owners of properties to upgrade and improve the bushfire preparedness of existing buildings.¹⁹⁶

The CFA publication *Preparing Your Property: make your home bushfire ready* suggests modifications that can be made to roofs, windows, doors and decks in existing homes to make them better able to withstand ember attack and the passage of a bushfire. Each suggested modification is accompanied by a brief explanation of why it will make the building more bushfire resistant. The useful work done by the CFA in this regard would be reinforced if similar information were also published by the Building Commission, targeted at both the community and the building industry.¹⁹⁷

The pace and extent of voluntary retrofitting are likely to be inhibited by the shortage of Victorian building practitioners qualified in bushfire planning and design who could assess existing houses for the purposes of recommending modifications consistent with AS 3959-2009.¹⁹⁸

The Commission considered whether there should be a legal requirement to modify existing houses and other buildings in bushfire-prone areas to make them compliant with AS 3959-2009. Mr Arnel acknowledged that there is some precedent for applying new regulations to existing buildings in relation to pool and spa fencing and some smoke alarms and fire sprinklers. In light of the substantial cost involved in modifying existing houses to meet AS 3959-2009, however, he expressed caution about making such retrofitting mandatory in the absence of a cost–benefit analysis.¹⁹⁹ The Commission agrees with this assessment. It does not recommend mandatory retrofitting of houses in bushfire-prone areas. It does, however, encourage individuals to consider voluntary modifications to their homes as part of their bushfire planning. This should be aided by wide access to publicly available information on options. The Commission takes this view in light of its other recommendations aimed at improving individual and community safety.

RECOMMENDATION 51

The Victorian Building Commission, in conjunction with the Country Fire Authority, develop, publish and provide to the community and industry information about ways in which existing buildings in bushfireprone areas can be modified to incorporate bushfire safety measures.

6.13 ENFORCEMENT AND MAINTENANCE OF PLANNING AND BUILDING CONDITIONS

It is imperative that the conditions that exist at the time of a planning or building approval, such as the required defendable space or the bushfire attack level of the site, are maintained to provide for continued bushfire risk management. Ensuring that this occurs is, however, a challenge in both the planning and the building regimes. The Commission considered a number of ways to achieve this over the life of a building, even after the building changes hands. It also looked at how municipal fire prevention arrangements could better complement enforcement and maintenance of planning and building measures.

6.13.1 PLANNING PERMIT CONDITIONS

A planning permit for a development in a Wildfire Management Overlay will generally contain detailed conditions for water supply, access and vegetation management for achieving and maintaining defendable space. Compliance with these permit conditions is the responsibility of the owner and the occupier of the land. The WMO Applicant's Kit reminds applicants of this responsibility and that the obligation to comply with permit conditions is ongoing.²⁰⁰

The responsible authority—the local council—is responsible for enforcement of permit conditions. There is, however, no requirement in the *Planning and Environment Act 1987* for a council to check whether permit conditions have been fulfilled at any stage of a development. This contrasts with the position under the *Building Act 1995*, which requires an occupancy permit before the building may be occupied.²⁰¹

It is an offence to use or develop land in contravention of a planning scheme or a permit or to fail to comply with a planning scheme or permit. Councils have several mechanisms under the Act for enforcing permit conditions and planning schemes more broadly:

- An authorised officer of a council may serve a planning infringement notice on any person the officer believes has committed an offence.
- A council (or any other person) may apply to the Victorian Civil and Administrative Tribunal for an enforcement order against an owner or occupier of land if a use or development of land contravenes a planning scheme or a permit condition.
- A council may prosecute for the offence and the penalty must be paid to it.²⁰²

There are, of course, measures short of formal enforcement that may be taken by a council to ensure compliance with a planning permit—for example, a letter inquiring as to whether the permit conditions have been fulfilled, a telephone call from a council officer or a site visit.

Murrindindi Shire Council has a proactive system for checking compliance with permit conditions. Three months before each permit expires the computer system flags that a letter should be sent to the permit applicant asking about the progress of compliance with the permit conditions. Generally applicants respond with information about how they are achieving compliance or with a request for further time. Applicants who do not respond to the letter are contacted by council staff.²⁰³

Enforcement action is a last resort for Nillumbik, Murrindindi and Latrobe councils. On the rare occasion when enforcement action is taken, it is prompted by a complaint to the council rather than the result of the council's monitoring of compliance. None of the council witnesses was aware of enforcement action ever having been taken in relation to WMO permit conditions. Enforcement action had, however, been taken by Nillumbik and Murrindindi for removal of vegetation without a permit. In both instances the action was prompted by complaints to the council.²⁰⁴

The Commission acknowledges that councils are constrained by the resources available to them and that this necessarily focuses attention on resource-efficient means of achieving compliance with permit conditions.²⁰⁵ It is, however, of the view that councils should do more to enforce the bushfire protection measures in their planning schemes, including permits issued by them. The obligation of a permit holder to comply with permit conditions is not the same as, and does not discharge, a council's responsibility to enforce permit conditions imposed by it in the administration of its planning scheme. Requirements for a minimum supply of water for firefighting purposes and

for vegetation management for defendable space are ongoing and need attention every fire season. It cannot be assumed that this will occur without active enforcement.

One way of improving continued compliance with conditions is to apply only those conditions that are likely to be complied with during the term of the development.²⁰⁶ As proposed in recommendation 40, the CFA's guidelines for assessing permit applications should emphasise that permits will be issued subject to conditions only if the assessing officer considers the conditions can be maintained in the long term. This is not to dilute the requirements imposed through permit conditions; rather, if the officer's opinion is that it is unlikely that minimum defendable space can be readily created or maintained on the site, the development should not be approved in the first place.

Councils should also be required to check that Bushfire-prone Overlay permit conditions for new developments have been complied with before the development may be occupied—in the same way that compliance with building permit conditions is checked through the requirement for certificates of occupancy under the Building Act. More regular assessment of compliance with Bushfire-prone Overlay permit conditions over the full term of the development is also essential. A mechanism to follow up non-compliance and escalate responses, including any additional enforcement powers, would be necessary.

RECOMMENDATION 52

The State develop and implement, in consultation with local government, a mechanism for sign-off by municipal councils of any permit conditions imposed under the Bushfire-prone Overlay and the regular assessment of landowners' compliance with conditions.

6.13.2 BUILDING MAINTENANCE

AFAC is concerned that AS 3959-2009 does not cover the continued maintenance of a building's bushfire safety features.²⁰⁷ The benefit of constructing a house in a bushfire-prone area to a specified standard may be eroded or lost in the following circumstances:

- The house is poorly maintained—for example, holes in window screens or loose roof tiles.
- The house is modified in a way that is inconsistent with the standard—for example, through the addition of a non-compliant deck or pergola.
- Vegetation around the house increases the bushfire attack level for the site.

The subject of maintenance has been raised in previous inquiries, most recently by COAG in its 2004 National Inquiry on Bushfire Mitigation and Management. COAG noted that a shortcoming of AS 3959-1999 was 'the absence of any requirement or mechanism for ensuring continuing building maintenance'. It supported AFAC's work to develop a national position that included incorporating building maintenance in AS 3959.²⁰⁸

Before this, in October 2003 the House of Representatives Select Committee into the Recent Australian Bushfires delivered its report, *A Nation Charred: report on the inquiry into bushfires,* which looked at, among other things, building maintenance measures to protect a building from bushfire and other measures to maintain a defendable space around the home, such as removing vegetation and hazardous material. The committee concluded that often buildings are not adequately maintained and this could be attributed to regulations that focus specifically on construction. It recommended that Standards Australia incorporate building maintenance in AS 3959.²⁰⁹

The committee's recommendation was never implemented. The Australian Building Codes Board did not respond to the recommendation because the recommendation was directed to Standards Australia. Standards Australia did not act on or respond to the recommendation, perhaps because it regarded maintenance as outside the scope of a construction standard referred to in the Building Code of Australia.²¹⁰

The evidence before the Commission suggests that expanding AS 3959 to incorporate maintenance of buildings is impractical. The Commission agrees with Mr Eadie's view that maintenance is beyond the scope of a construction standard referred to in the BCA.²¹¹

There is considerable difficulty associated with regulating the ongoing maintenance of a house and its surrounds. Mr Chladil suggested a maintenance regime such as that found in the BCA for fire protection features in commercial buildings, where there is a requirement for an annual statement of compliance. Another possibility would be if the building surveyor were to attach maintenance conditions to occupancy permits for houses constructed in bushfireprone areas and for these to be enforced by an inspection regime. These suggestions were rejected as impractical by two of the building surveyors who gave evidence, largely because of problems with enforcement.²¹²

Although maintenance of a house's bushfire safety features, or the bushfire attack level for the site, might be the subject of a note on the occupancy permit, it would appear that making these matters conditions of the permit is not supported by the Act or the Regulations in their current form. The Building Commission advised this Royal Commission that vegetation management cannot be enforced as a condition of an occupancy permit issued under the Act because it is not 'building work' and is therefore beyond the scope of the Act. Even if the legislation were to be amended, the difficulty of enforcing conditions of this nature would potentially render the amendments ineffective.²¹³

Both Mr Chladil and Mr Arnel spoke of the important role of community information and education. The CFA already provides community information about maintaining houses and defendable space, as exemplified by its publication *Preparing Your Property—make your home bushfire ready.* In addition, maintenance is covered in Standards Australia Handbook 330, *Living in Bushfire-prone Areas,* which was released on 31 December 2009 following a recommendation by the Commission in its second interim report.²¹⁴ The Commission considers that information could be complemented by information about maintaining the bushfire safety measures and bushfire attack level assessments of buildings in bushfire-prone areas published by the Building Commission, with accompanying community education.

The Commission is also of the view that measures beyond community information and education are required to ensure the effectiveness of building controls in bushfire-prone areas throughout the life of a building.

6.13.3 CHECKS AT THE POINT OF SALE

Because a house often changes hands a number of times during its life, the point of sale is a logical time to provide prospective purchasers with information about the bushfire safety of the site and building they propose to purchase.

The Commission proposes that s. 32 of Victoria's *Sale of Land Act 1962* be amended to require that, for land in a designated Bushfire-prone Area, a vendor's statement under that section must contain a statement about the standard (if any) to which the dwelling was constructed and the assessment (if any) of the bushfire attack level at the time of construction. This would tell potential purchasers whether the house is in a Bushfire-prone Area and the risk level and standard for which the house was constructed (if these were a requirement at the time the house was built).

It is also proposed that the vendor be required to provide a current BAL assessment of the site and that that BAL rating be included on the vendor's statement. If the house was built after AS 3959-2009 was introduced, a prospective buyer will be able to determine whether the expected level of bushfire attack had changed over time, for example, as a result of lack of maintenance. Any increase in risk is likely to have an adverse impact on price, thus providing an incentive for owners to maintain the original BAL for the site or to take steps to improve that level before selling. If the house was built after AS 3959-2009 was introduced, the current BAL assessment will provide an indication of the level of risk of the site and might encourage prospective buyers to undertake additional checks to determine how the property could be made safer.

RECOMMENDATION 53

The State amend s. 32 of the *Sale of Land Act 1962* to require that a vendor's statement include whether the land is in a designated Bushfire-prone Area, a statement about the standard (if any) to which the dwelling was constructed, the bushfire attack level assessment at the time of construction (where relevant) and a current bushfire attack level assessment of the site of the dwelling.

6.14 MUNICIPAL FIRE PREVENTION

Although limited resources constrain councils in their enforcement of WMO permit conditions, every council has some resources dedicated to fire prevention activities under the *Country Fire Authority Act 1958*, which requires every council to appoint a municipal fire prevention officer. Councils may also appoint any number of assistant MFPOs, to whom the MFPO may delegate powers.²¹⁵

One of the main responsibilities of the MFPO is to serve fire prevention notices on the owner or occupier of land where there is deemed to be 'a danger to life or property from the threat of fire'. A fire prevention notice may require the owner or occupier to take the steps specified in the notice to remove or minimise the threat of fire, within the time specified in the notice. Fire prevention notices are generally aimed at removing fine fuels, particularly around dwellings, but also on other parts of a property where they pose a risk. The Commission heard evidence of a great deal of work done by MFPOs to issue and follow up fire prevention notices each fire season. A large number of notices are issued each year, and compliance is generally high.²¹⁶

Fire prevention notices are not specific to areas in the WMO and are not specifically directed to achieving defendable space around dwellings; nor are they a replacement for proper enforcement of WMO planning conditions. There may be, however, scope for better integration of the fire prevention and planning permit enforcement roles of councils. For example, the State told the Commission that some of the matters dealt with by a fire prevention notice might overlap with certain planning permit conditions, such as a requirement to manage vegetation around a dwelling. In implementing recommendation 39, the State should consider whether MFPOs could play a role in complementing the enforcement of planning permit conditions.²¹⁷

The Chief Officer of the CFA may also issue and enforce a fire prevention notice if the relevant MFPO refuses or fails to issue one. This is, in effect, a fallback measure available where an MFPO has failed to act. Curiously, the Chief Officer is precluded from delegating the power to issue fire prevention notices. This would be a much more workable fallback measure if the power to issue fire prevention notices could be delegated by the Chief Officer to other CFA personnel.²¹⁸

RECOMMENDATION 54

The State amend the *Country Fire Authority Act 1958* to enable the Chief Officer to delegate the power to issue fire prevention notices.

6.15 EDUCATION AND TRAINING

The Commission heard evidence that education and training for planning and building professionals could be improved by provision of better practical training and materials and more formal education in bushfire planning and design.

There is a demonstrated need for council planners to have access to CFA training about bushfire risk management through planning. The CFA does run a WMO site assessment training course, but this is a five-day intensive course. The Commission considers that such a course is probably more detailed than most council planners need and probably takes more time than their employers can afford. It sees benefit in the CFA regularly offering shorter training sessions to council planners, as it has done in the past, when the sessions were well attended.²¹⁹

There is evidence before the Commission that building practitioners have had difficulty interpreting and applying the bushfire attack level site-assessment methodology in AS 3959-2009. Since such an assessment must be conducted in order to obtain a permit to build a dwelling in a designated Bushfire-prone Area, this results in inconsistent BAL assessments and poor-quality supporting information. At present training in the site-assessment methodology provided for in AS 3959-2009, which is offered by the Building Commission and professional associations, is occasional and informal. The Building Commission previously held 22 technical seminars for the building industry about AS 3959-2009 and the CFA also developed a one-day course to train the Building Commission's BAL assessment volunteers. Mr Arnel foreshadowed developing the CFA's one-day course into

an accredited TAFE short course. The Building Commission should continue to provide education opportunities on AS 3959-2009, including the site-assessment process, at regular intervals. The Commission expects that, at least initially, this would occur every six months.²²⁰

Other forms of information and guidance are also important for building and planning practitioners. For example, in August 2009 the Building Commission issued an interim practice note on the interpretation and application of the site-assessment methodology for AS 3959-2009. The practice note should be further developed and refined, using worked examples and case studies, and provide information about the interaction between bushfire planning and building controls that was included in earlier versions of the practice note.²²¹

The take-up of more general bushfire training in the building industry is, however, still limited. Mr McLennan of the Australian Institute of Building Surveyors surveyed people who attended the Building Commission seminars on AS 3959-2009 and estimated that less than 1 per cent had done any bushfire-specific training. A reason for this might be the absence of any training course in bushfire design in Victoria.²²²

Victoria University offers a graduate certificate and a graduate diploma in fire safety through its Centre for Fire Safety, but these courses focus on fire safety in buildings rather than bushfire safety. The University of Western Sydney offers the only graduate diploma course in bushfire planning and design in Australia. Mr Christopher Orr, National President, Fire Protection Association Australia, who has completed this course, informed the Commission that it covers fire behaviour, bushfire fighting and emergency management, planning, defendable space and construction. A practitioner who has completed the course would be well placed to take a holistic approach to planning and building in a bushfire-prone area. The course focuses, however, on legislation and practice in New South Wales, particularly in relation to planning.²²³

The expert panel also highlighted the need for education and training on bushfire risk management in planning:

It is acknowledged that due to the level of technical detail in the CFA Permit Applicant's Kit, the involvement of qualified fire experts should be strongly encouraged in undertaking site assessments for building and planning applications.

State government should help relevant educational institutions to develop courses with relevant institutions to provide training and retraining for bushfire and planning professionals. Training should include technical bushfire risk assessment training, and also communication and negotiation skills training.²²⁴

There is obvious potential to develop a course in bushfire planning and design specific to Victorian conditions, legislation and practice at a Victorian university or TAFE institute. The evidence before the Commission suggests a need for such a course. The Commission expects that such a course would make provision for recognition of prior learning, recognition of current competency and access for rural students.

AFAC advised the Commission that it had begun discussions with the Fire Protection Association Australia and the University of Western Sydney with a view to developing a national graduate diploma in bushfire planning and design. The Commission also heard evidence about the Fire Protection Association Australia's bushfire planning and design certification scheme, which is currently the only scheme in Australia that benchmarks practitioners and businesses providing bushfire planning and design services. Completion of the University of Western Sydney course is a criterion for accreditation, with the result that the scheme operates mainly in New South Wales. Establishment of an equivalent course in Victoria would enable the association, or another suitable industry organisation, to operate such a scheme in Victoria.²²⁵

RECOMMENDATION 55

The State initiate the development of education and training options to improve understanding of bushfire risk management in the building and planning regimes by:

- providing regular training and guidance material to planning and building practitioners
- helping a suitable tertiary institution design and implement a course on bushfire planning and design in Victoria.

- Exhibit 980 Victorian Bushfires Royal Commission 2009 Houses Destroyed in Bushfires (CORR.1002.0330_R); Exhibit 980 Victorian Bushfires Royal Commission 2009 Houses Destroyed in the Bushfires Breakdown of Houses Destroyed by Fire Areas (CORR.1003.0048_R); Exhibit 894 Review of Fatalities in the February 7, 2009, Bushfires Final Report (Amended version without mark up) (EXP.029.003.0001) at 0020, 0026–0027; Exhibit 108 Statement of Brown (WIT.053.001.0001_R) [6]–[7], [11], [14], [25]–[32], [43]–[44]; Exhibit 173 Statement of Witshire (WIT.075.001.0001_R) [9]–[13], [18]–[22], [28]; Exhibit 181 Statement of Wasley (WIT.073.001.0001_R) [4]–[18], [21], [26], [33]–[45], [51]–[56]; Exhibit 49 Statement of O'Halloran, Attachment 1 (WIT.3010.001.0007_R); Brown T3501:7–T3501:22, T3504:1–T3504:28, T3506:9–T3507:16, T3513:16–T3519:19; Wiltshire T5406:6–T5407:25, T5408:13–T5413:11; Wasley T5707:6–T5707:20, T5709:2–T5715:11, T5717:20–T5721:18, T5722:29–T5724:1
- 2 Exhibit 9 Building in a Fire-Prone Environment: Research on Building Survival in Two Major Bushfires (TEN.001.001.0102) at 0106, 0108; Exhibit 9 – Living in the Bush (TEN.001.001.0004) at 0035–0038; Exhibit 172 – Statement of Eadie, Attachment 6 (WIT.7502.001.0098) at 0107; Pinfold T14437:1–T14437:7
- 3 Exhibit 416 Statement of Verlaan (WIT.095.001.0001_R) [62]; Exhibit 706 Yates Report (EXP.020.001.0001) at 0001–0002; Further Submissions of the State of Victoria Land Use Planning (RESP.3000.006.0110) [5]
- 4 Exhibit 45 2002 COAG Report (TEN.004.002.0037) at 0067; Exhibit 142 2004 COAG Report (TEN.049.001.0001) at 0126–0128; Submissions of Counsel Assisting – Land Use Planning (SUBM.600.001.0001) [1.3]–[1.4]; Exhibit 710 – Buxton Report (EXP.023.001.0001) at 0007; Yates T14430:20–T14431:9
- 5 Exhibit 711 Planning Topic Facilitated Expert Conference, Written Statement (EXP.027.001.0001) at 0001; Hansen T14428:4–T14428:12
- 6 Exhibit 175 Leonard Report (TEN.066.001.0001) at 0011
- 7 Exhibit 672 Building and Land-use Planning Research After the 7th February 2009 Victorian Bushfires Preliminary Findings (CRC.300.007.0135) at 0185–0189; Exhibit 602 – Bushfire CRC Supplementary Report (CRC.301.001.0001) at 0004, 0039, 0040, 0077
- 8 Exhibit 672 Building and Land-use Planning Research After the 7th February 2009 Victorian Bushfires Preliminary Findings (CRC.300.007.0135) at 0197–0215; Exhibit 602 – Bushfire CRC Supplementary Report (CRC.301.001.0001) at 0041–0044, 0078–0081
- 9 Exhibit 672 Building and Land-use Planning Research After the 7th February 2009 Victorian Bushfires Preliminary Findings (CRC.300.007.0135) at 0218–0231
- 10 Exhibit 169 Supplementary Statement of Arnel (WIT.3000.002.0220_R) [264]–[279]; Exhibit 980 Victorian Bushfires Royal Commission 2009 Houses Destroyed in Bushfires (CORR.1002.0330_R); Exhibit 980 Victorian Bushfires Royal Commission 2009 Houses Destroyed in the Bushfires Breakdown of Houses Destroyed by Fire Areas (CORR.1003.0048_R); Arnel T5220:28–T5221:23, T5223:20–T5224:16
- 11 Exhibit 679 Statement of Gilmore (WIT.3018.001.0001) [6.14]–[6.15], [7.5], Attachment 63 (WIT.3018.001.0758); Exhibit 684 Statement of Fox, Annexure 3 (WIT.3004.028.0235), Annexure 4 (WIT.3004.028.0246); Submissions of Counsel Assisting – Building in Bushfire Prone Areas (SUBM.201.001.0001) [4.3]–[4.7]
- 12 Exhibit 679 Statement of Gilmore, Attachment 63 (WIT.3018.001.0758)
- 13 Exhibit 168 Statement of Arnel (WIT.3000.002.0001) [95], [104]–[110], Annexure G (WIT.3000.002.0072) at 0101; Exhibit 190 Statement of Spring (WIT.3004.011.0228) [28]–[31]; Exhibit 207 – Statement of Andreou (WIT.3004.012.0065) [34], [36]–[39]; Exhibit 291 – CFA, Land Use Planning – Wildfire Management Overlay Mapping Process (CFA.001.026.0007); Andreou T6427:4–T6429:3
- 14 Exhibit 484 Map of the City of Greater Bendigo Showing Bushfire-prone Areas, Wildfire Management Overlay Areas and Fire Affected Areas (MAV.001.001.0022); Exhibit 484 – Map of Nillumbik Shire Showing Bushfire-prone Areas, Wildfire Management Overlay Areas and Fire Affected Areas (MAV.001.001.0039); Exhibit 484 – Map of Murrindindi Shire Showing Bushfire-prone Areas, Wildfire Management Overlay Areas and Fire Affected Areas (MAV.001.001.0039); Exhibit 484 – Map of Murrindindi Shire Showing Bushfire-prone Areas, Wildfire Management Overlay Areas and Fire Affected Areas (MAV.001.001.0037)
- 15 Building Amendment (Bushfire Construction Short-term Requirements) Regulations 2010; Exhibit 169 Supplementary Statement of Arnel (WIT.3000.002.0220_R) [222]–[223]; Arnel T5187:19–T5188:30
- 16 Exhibit 180 Statement of McLennan (WIT.068.001.0001_R) [47]–[51]; Exhibit 179 Statement of Harding (WIT.7503.001.0001_R) [98]; Exhibit 185 – Statement of Woolcock (WIT.7505.001.0001_R) [52]–[55]; McLennan T5678:27–T5679:29; Woolcock T5790:16–T5791:23
- 17 Exhibit 693 Statement of Parsons (WIT.4021.001.0001) [91]; Exhibit 678 VPP Practice Note Planning for Wildfire Protection (SUMM.020.019.0172) at 0175; Exhibit 678 – Nillumbik Planning Scheme Amendment C11 Panel Report (DOC.NMC.001.0658) at 0684–0688; Exhibit 679 – Statement of Gilmore (WIT.3018.001.0001) [9.2], [9.5], Attachment 63 (WIT.3018.001.0760) at 0761, Attachment 65 (WIT.3018.001.0763); Exhibit 689 – Statement of Abbey (WIT.4016.001.0001) [169]; Sturzenegger T13988:23–T13989:8; Abbey T14168:28–T14169:8, T14172:1–T14172:18; Gilmore T13881:5–T13881:23
- 18 Exhibit 678 Murrindindi Shire Bushfire Extent and WMO (TEN.196.001.0001); Exhibit 678 Marysville Pre Fire Aerial Photography (EXH.678.0005); Exhibit 678 – Bald Spur Road – Pre Fire Aerial Photography (TEN.196.001.0004); Exhibit 678 – Pine Ridge Road – Pre Fire Aerial Photography (TEN.196.001.0007); Exhibit 678 – Marysville – Parcels with Destroyed Buildings (EXH.678.0003); Exhibit 678 – Pine Ridge Road – Destroyed Buildings (TEN.196.001.0006); Exhibit 678 – Bald Spur Road Area – Destroyed Buildings (TEN.196.001.0003); Exhibit 678 – Marysville Township – Building Permit Analysis (EXH.678.0002); Exhibit 679 – Statement of Gilmore, Attachment 64 (WIT.3018.001.0763); Exhibit 693 – Statement of Parsons (WIT.4021.001.0001) [92]–[95], [112]; Sturzenegger T13987:11–T13988:19; Parsons T14257:18–T14258:12, T14261:9–T14261:25, T14262:20, T14262:24, T14266:10–T14266:18, T14292:23–T14296:5
- 19 Exhibit 678 Marysville Pre Fire Aerial Photography (EXH.678.0005)
- 20 Exhibit 678 Marysville Post Fire Aerial Photography (EXH.678.0004)
- 21 Exhibit 185 Statement of Woolcock (WIT.7505.001.0001_R) [52]–[56]; Exhibit 711 Planning Topic Facilitated Expert Conference, Written Statement (EXP.027.001.0001) at 0004; Exhibit 709 – Lane Report (EXP.022.001.0001) [38], [40]; Exhibit 705 – Pinfold Report (EXP.019.001.0001) at 0035, 0038–0040; Exhibit 708 – Hansen Report (EXP.021.001.0001) [7.23]–[7.36]; Hansen T14671:19–T14671:21; Woolcock T5790:16–T5792:16
- 22 Gilmore T13878:21-T13879:8
- 23 Exhibit 711 Planning Topic Facilitated Expert Conference, Written Statement (EXP.027.001.0001) at 0004; Hansen T14671:16–T14674:13

- Exhibit 167 BRC Research Building and Planning in Bushfire-prone Areas, Appendix 4 (TEN.065.001.0080) at 0081–0088; Exhibit 167 A 24 Fresh Approach to Development Assessment in Bushfire Protection Areas (TEN.063.001.0018): Exhibit 167 – BRC Research – Building and Planning in Bushfire-prone Areas - Regulation and Policy in Other States and Territories, Appendix 1 (TEN.065.001.0038) at 0038-0042; Exhibit 167 - Bush Fire Prone Land Mapping (TEN.063.001.0024)
- 25 Exhibit 183 - Statement of Watson (WIT.4001.001.0001_R) [22]; Exhibit 207 - Statement of Andreou (WIT.3004.012.0065) [35]; Andreou T6420:19-T6421:8; Watson T5832:8-T5834:2
- Exhibit 684 Statement of Fox, Annexure 2 (WIT.3004.028.0227) at 0227, 0230; Exhibit 687 Bushfire Penetration Into Urban Areas in Australia: A Spatial Analysis (CRC.304.001.0001) at 0024, 0028; Exhibit 711 Planning Topic Facilitated Expert Conference, Written 26 Statement (EXP.027.001.0001) at 0004: Chladil T14602:27-T14603:28, T14674:30-T14675:20, T14676:24-T14676:30
- Exhibit 684 Statement of Fox, Annexure 2 (WIT.3004.028.0227) at 0230; Exhibit 687 Bushfire Penetration Into Urban Areas in 27 Australia: A Spatial Analysis (CRC.304.001.0001) at 0024; Exhibit 711 – Planning Topic – Facilitated Expert Conference, Written Statement (EXP.027.001.0001) at 0004; Sturzenegger T13978:1-T13978:4, T13990:11-T13991:17; McAneney T14111:18-T14111:27; Chladil T14601:2-T14601:27, T14602:27-T14603:28
- Exhibit 614 Statement of Hayes (WIT.3004.032.0147) [16]-[23]; Sturzenegger T13994:11-T13994:28 28
- Exhibit 222 Hennessy Report (EXP.006.001.0001) at 0034; Hennessy T6771:9-T6773:22; Chladil T14532:6-T14534:5; 29 Pinfold T14534:6-T14536:3
- Exhibit 207 Statement of Andreou (WIT.3004.012.0065) [32]–[33]; Exhibit 679 Statement of Gilmore (WIT.3018.001.0001) [13.28], 30 Attachment 89 (WIT.3018.001.1559) at 1589; Andreou T6418:27-T6420:10
- 31 Building Amendment (Bushfire Construction – Short-term Requirements) Regulations 2010 (Vic), r. 6
- 32 Submissions of the State of Victoria - Land Use Planning (RESP.3000.006.0001) [199]; Gilmore T13872:17-T13874:3
- 33 Planning and Environment Act 1987, ss. 1, 4(2)(a), 4(2)(c)
- 34 Planning and Environment Act 1987, s. 7
- 35 Exhibit 679 – Composition of a Planning Scheme (WIT.3018.001.0106)
- 36 Planning and Environment Act 1987, ss. 55-56, 61(2), 62(1)(a)
- Exhibit 711 Planning Topic Facilitated Expert Conference, Written Statement (EXP.027.001.0001) at 0002; Exhibit 706 Yates Report 37 (EXP.020.001.0001) at 0002–0003; Exhibit 708 – Hansen Report (EXP.021.001.0001) [3.18]–[3.24]; Chladil T14455:20–T14457:28
- Exhibit 678 Precinct Structure Planning Guidelines Preparing the Precinct Structure Plan (TEN.173.002.0001) at 0009, 0042; Exhibit 678 38 Delivering Melbourne's Newest Sustainable Communities - Background Technical Report 1: Land Capability (PCD.001.101.0001) at 0019–0020, 0044; Gilmore T13892:21-T13894:4, T13894:14-T13894:26; Fox T14037:15-T14038:29
- 39 Gilmore T13894:27-T13895:26
- 40 Gilmore T13895:27-T13895:30
- Exhibit 708 Hansen Report (EXP.021.001.0001) [2.15] 41
- 42 Exhibit 696 – Statement of Johnson (WIT.136.001.0001_R) [41]; Johnson T14340:17-T14341:4
- Exhibit 708 Hansen Report (EXP.021.001.0001) [2.16], [3.9]; Exhibit 711 Planning Topic Facilitated Expert Conference, Written 43 Statement (EXP.027.001.0001) at 0003; Hansen T14561:27-T14562:8, T14565:23-T14569:6; Lane T14562:9-T14562:22; Buxton T14562:23-T14565:23; Yates T14569:14-T14570:1
- Buxton T14573:11-T14574:6, T14574:26-T14575:4; Hansen T14574:9-T14574:25 44
- Exhibit 678 VPP Clause 35.04 Green Wedge Zone (TEN.114.001.0047) at 0051-0052; Exhibit 678 VPP Clause 35.06 Rural Conservation 45 Zone (TEN.114.001.0055) at 0058-0059; Exhibit 678 - VPP Clause 35.07 - Farming Zone (TEN.114.001.0062) at 0065-0066; Exhibit 678 -VPP Clause 35.03 - Rural Living Zone (TEN.114.001.0041) at 0044; Exhibit 679 - Statement of Gilmore, Attachment 16 (WIT.3018.001.0273), (WIT.3018.001.0303) at 0307. (WIT.3018.001.0281) at 0285
- 46 Exhibit 710 - Buxton Report (EXP.023.001.0001) at 0018
- 47 Exhibit 678 - Murrindindi Shire Council Restructure Overlay (TEN.203.001.0001); Exhibit 696 - Statement of Johnson (WIT.136.001.0001_R) [13]-[20]; Gilmore T13846:29-T13847:28; Abbey T14183:16-T14184:14; Johnson T14333:22-T14337:17; Parsons T14250:3-T14252:20
- 48 Buxton T14570:20-T14571:21; Hansen T14571:22-T14572:28
- 49 Exhibit 678 - Clause 37.03 - Urban Floodway Zone (TEN.114.001.0069); Exhibit 679 - Statement of Gilmore (WIT.3018.001.0001) [12.8]-[12.16]; Gilmore T13883:24-T13884:21, T13890:26-T13891:7
- 50 Gilmore T13884:24-T13885:4
- Hansen T14460:26-T14461:9, T14472:3-T14472:23, T14480:6-T14480:17; Buxton T14463:22-T14463:26, T14469:25-T14472:2; 51 Chladil T14456:5-T14456:12, T14464:2-T14465:29, T14472:24-T14473:4; Pinfold T14478:5-T14478:13
- Exhibit 679 Statement of Gilmore (WIT.3018.001.0001) [11.7]; Gilmore T13882:16-T13883:9; Buxton T14462:20-T14463:22, 52 T14479:6-T14479:22; Pinfold T14467:11-T14468:8; Chladil T14481:8-T14481:21
- Exhibit 678 VPP Clause 65 Decision Guidelines (TEN.111.001.0062) at 0062-0063; Exhibit 679 Statement of Gilmore (WIT.3018.001.0001) 53 [3.1(4)], Attachment 14 (WIT.3018.001.0262), Attachment 16 (WIT.3018.001.0267), (WIT.3018.001.0273), (WIT.3018.001.0281), (WIT.3018.001.0289), (WIT.3018.001.0296), (WIT.3018.001.0303), Attachment 22 (WIT.3018.001.0335), Attachment 23 (WIT.3018.001.0337)
- Exhibit 678 VPP Clause 15 Environment (TEN.115.001.0001) at 0005 54
- Exhibit 678 VPP Clause 15 Environment (TEN.115.001.0001) at 0006-0010; Exhibit 708 Hansen Report (EXP.021.001.0001) [2.7]; 55 Exhibit 711 - Planning Topic - Facilitated Expert Conference, Written Statement (EXP.027.001.0001) at 0004; Hansen T14419:22-T14420:3; Buxton T14441:29-T14442:14

- 56 Exhibit 708 Hansen Report (EXP.021.001.0001) [2.7], [8.22]–[8.24]; Exhibit 710 Buxton Report (EXP.023.001.0001) at 0038; Exhibit 711 Planning Topic Facilitated Expert Conference, Written Statement (EXP.027.001.0001) at 0004; Buxton T14692:31–T14695:24; Lane T14695:25–T14696:22; Hansen T14696:23–T14697:25; Chladil T14697:26–T14698:21; Yates T14698:24–T14699:4; Pinfold T14699:5–T14702:5
- 57 Exhibit 708 Hansen Report (EXP.021.001.0001) [2.7], [8.22]–[8.24]; Exhibit 710 Buxton Report (EXP.023.001.0001) at 0038;
 Exhibit 711 Planning Topic Facilitated Expert Conference, Written Statement (EXP.027.001.0001) at 0004; Buxton T14692:31–T14695:24;
 Lane T14695:25–T14696:22; Hansen T14696:23–T14697:25; Chladil T14697:26–T14698:21; Yates T14698:24–T14699:4; Pinfold T14699:5–T14702:5
- 58 Exhibit 678 Building in Bushfire-prone Areas Information and Advice, CSIRO & Standards Australia (SAA HB36–1993) (SUMM.045.002.0003); Exhibit 678 – Planning Conditions and Guidelines for Subdivisions (CFA.001.026.0232); Exhibit 678 – Standards Australia HB 330–2009 Living in Bushfire-prone Areas (TEN.174.001.0001); Gilmore T13856:4–T13856:19, T13858:28–T13859:14; Sturzenegger T13999:3–T13999:31
- 59 Exhibit 222 Hennessy Report (EXP.006.001.0001) at 0034; Hennessy T6771:9–T6773:22; Planning Expert Panel Discussion T14532:6–T14536:3
- Exhibit 708 Hansen Report (EXP.021.001.0001) [2.7], [8.22]–[8.24]; Exhibit 710 Buxton Report (EXP.023.001.0001) at 0038;
 Exhibit 711 Planning Topic Facilitated Expert Conference, Written Statement (EXP.027.001.0001) at 0004; Buxton T14695:31–T14695:24;
 Lane T14695:25–T14696:22; Hansen T14696:23–T14697:25; Chladil T14697:26–T14698:21; Yates T14698:24–T14699:4; Pinfold T14699:5–T14702:5
- 61 Sturzenegger T13983:13–T13984:4; Rogers T14368:5–T14368:13
- 62 Submissions of the State of Victoria Land Use Planning (RESP.3000.006.0001) [54]
- 63 Exhibit 679 Statement of Gilmore (WIT.3018.001.0001) [3.9], [3.32]; Gilmore T13860:6–T13860:26
- Exhibit 678 VPP Clause 44.06 Wildfire Management Overlay (TEN.111.001.0036) at 0036–0038
- 65 Exhibit 678 VPP Clause 44.06 Wildfire Management Overlay (TEN.111.001.0036) at 0038-0040
- 66 Exhibit 678 VPP Clause 44.06 Wildfire Management Overlay (TEN.111.001.0036) at 0038; Exhibit 678 Building in a Wildfire Management Overlay: Applicant's Kit 2007 (TEN.008.001.0007) at 0022, 0029
- 67 Exhibit 678 VPP Clause 44.06 Wildfire Management Overlay (TEN.111.001.0036) at 0040; Planning and Environment Act 1987, ss. 55–56
- 68 Exhibit 678 VPP Clause 44.06 Wildfire Management Overlay (TEN.111.001.0036) at 0040
- 69 Exhibit 679 Statement of Gilmore (WIT.3018.001.0001) [3.20], [7.9]–[7.10], [7.12], [7.16]; Gilmore T13874:27–T13875:20
- 70 Sturzenegger T13984:24–T13984:31, T13989:12–T13989:14
- 71 Exhibit 679 Statement of Gilmore (WIT.3018.001.0001) [7.8]; Exhibit 688 Key Introductory Propositions of MAV and 77 Councils (EXH.688.0001) [5]
- 72 Exhibit 682 Statement of Sturzenegger (WIT.3004.028.0166) [18.b]; Gilmore T13877:26–T13878:11; Sturzenegger T13981:31–T13982:8, T13984:15–T13984:31, T13985:29–T13986:22; Fox T14026:18–T14027:8
- 73 Exhibit 679 Statement of Gilmore (WIT.3018.001.0001) [7.11], [7.13], Attachment 61 (WIT.3018.001.0753) at 0754; Gilmore T13875:21–T13875:30, T13878:13–T13878:20; Sturzenegger T13985:17–T13985:28
- 74 Fox T14024:26-T14025:30
- 75 Exhibit 678 Land Use Planning and Bushfire Risk: CFA Referrals and the February 2009 Victorian Fire Area (CFA.600.003.0001)
- 76 Exhibit 678 Amendment VC54 and Explanatory Report (TEN.061.001.0010), (TEN.061.001.0012), (TEN.061.001.0013)
- 77 Exhibit 678 Amendment VC54 and Explanatory Report (TEN.061.001.0010) at 0010
- 78 Gilmore T13865:15-T13865:21
- 79 Exhibit 678 Amendment VC57, Explanatory Report and Advisory Note Dated May 2009 (TEN.061.001.0018), (TEN.061.001.0020), (TEN.061.001.0021), (TEN.061.001.0024); Exhibit 679 – Statement of Gilmore (WIT.3018.001.0001) [5.13]–[5.25]; Submissions of Counsel Assisting – Building in Bushfire-prone Areas (SUBM.201.001.0001) [3.12]; Gilmore T13864:30–T13865:13, T13867:22–T13868:4
- 80 Exhibit 678 Bald Spur Road Post Fire Aerial Photography (TEN.196.001.0005)
- 81 Exhibit 678 Pine Ridge Road Post Fire Aerial Photography (TEN.196.001.0008)
- 82 Exhibit 689 Statement of Abbey (WIT.4016.001.0001) [190]–[191]; Abbey T14174:23–T14175:19; Murray T14330:21–T14331:11
- 83 Exhibit 708 Hansen Report (EXP.021.001.0001) [3.25]–[3.32]; Exhibit 711 Planning Topic Facilitated Expert Conference, Written Statement (EXP.027.001.0001) at 0004–0005; Abbey T14175:25–T14176:2
- Exhibit 678 VPP Clause 44.06 Wildfire Management Overlay (TEN.111.001.0036) at 0039; Exhibit 678 Building in a Wildfire Management Overlay: Applicant's Kit 2007 (TEN.008.001.0007) at 0018; Submissions of Counsel Assisting Murrindindi Fire (SUBM.202.009.0001)
 [10.1]–[10.15], [13.19]; Submissions of the State for the Murrindindi Mill Fire (RESP.3000.005.0112) [230]
- Exhibit 705 Pinfold Report (EXP.019.001.0001) at 0038–0045; Exhibit 708 Hansen Report (EXP.021.001.0001) [8.2]–[8.21];
 Exhibit 678 VPP Clause 44.06 Wildfire Management Overlay (TEN.111.001.0036) at 0036
- 86 Exhibit 678 Design and Siting Guidelines, Bushfire Protection for Rural Houses (CFA.001.026.0208)
- 87 Exhibit 684 Statement of Fox (WIT.3004.028.0202) [38]-[39]; Fox T14027:26-T14028:5, T14030:1-T14030:11
- 88 Masten Bennett & Associates v Nillumbik Shire Council [2010] VCAT 21 May 2010

- Exhibit 678 Building in a Wildfire Management Overlay: Applicant's Kit 2007 (TEN.008.001.0007) at 0012–0021, 0026–0027; Exhibit 684 Statement of Fox (WIT.3004.028.0202) [30], [32(c)]; Exhibit 684 Statement of Fox (WIT.3004.028.0202) [30], [32(c)]; Exhibit 684 Statement of Rox (WIT.3004.028.0202) [30], [32(c)]; Exhibit 684 Statement of Paramet (DOC.CFA.003.0056_R); Exhibit 684 Planning Permit (DOC.CFA.003.0056_R); Exhibit 684 Conditional Consent to the Grant of a Permit (DOC.CFA.003.0051_R); Exhibit 689 Statement of Abbey (WIT.4016.001.0001) [172]–[176]; Exhibit 693 Statement of Parsons (WIT.4021.001.0001) [107]–[108]; Exhibit 694 Statement of Morland (WIT.4023.001.0001) [33], [74]–[76]; Fox T14029:5–T14029:22, T14030:12–T14035:31
- 90 Exhibit 707 Chladil Report (EXP.024.001.0001) [7.2]-[7.9]; Sturzenegger T13999:18-T13999:29
- 91 Exhibit 678 PN LUP 0004 Land Use Planning Assessing Applications for Non Dwellings Within a Wildfire Management Overlay (CFA.600.003.0225) at 0228
- 92 Exhibit 678 PN LUP 0004 Land Use Planning Assessing Applications for Non Dwellings Within a Wildfire Management Overlay (CFA.600.003.0225) at 0232
- 93 Exhibit 678 PN LUP 0004 Land Use Planning Assessing Applications for Non Dwellings Within a Wildfire Management Overlay (CFA.600.003.0225) at 0238; Fox T14037:5–T14037:14
- 94 Exhibit 167 Planning for Bushfire Protection (TEN.063.001.0048) at 0085–0092; Pinfold T14709:28–T14712:13
- 95 Exhibit 678 Planning Conditions and Guidelines for Subdivisions (CFA.001.026.0232); Exhibit 678 PN LUP 0002 Land Use Planning Assessing Subdivision Referrals Within a Wildfire Management Overlay (CFA.600.003.0217)
- 96 Exhibit 678 Planning Conditions and Guidelines for Subdivisions (CFA.001.026.0232) at 0239, 0241, 0243-0249
- 97 Exhibit 678 PN LUP 0002 Land Use Planning Assessing Subdivision Referrals Within a Wildfire Management Overlay (CFA.600.003.0217) at 0219–0220; Fox T14036:17–T14036:26
- 98 Exhibit 678 PN LUP 0002 Land Use Planning Assessing Subdivision Referrals Within a Wildfire Management Overlay (CFA.600.003.0217) at 0224; Fox T14036:6–T14036:14
- 99 Exhibit 684 Statement of Fox, Annexure 2 (WIT.3004.028.0227) at 0227, 0230; Exhibit 697 Statement of Francis (WIT.133.001.0001_R) [28]–[34]; Exhibit 709 – Lane Report (EXP.022.001.0001) at 0009–0010; Dripps T14073:2–T14073:12; Lane T14560:20–T14561:24
- 100 B Teague, R McLeod, S Pascoe, 2009 Victorian Bushfires Royal Commission: Interim Report, Parliament of Victoria, Melbourne, August 2009 at 92, 94; Exhibit 724 – Statement of Maino (WIT.138.001.0001_R) [3]–[6], [10]–[12]; Maino T14956:1–T14957:8, T14958:1–T14958:29, T14959:9–T14960:31
- 101 Exhibit 678 VPP Clause 15 Environment (TEN.115.001.0001) at 0009
- 102 Exhibit 678 VPP Clause 15 Environment (TEN.115.001.0001) at 0009–0010; Exhibit 678 Victoria's Native Vegetation Management A Framework for Action (SUMM.020.038.4204) at 4214; Exhibit 685 – Statement of Dripps (WIT.3024.005.0081) [12]; Exhibit 744 – National Framework for the Management and Monitoring of Australia's Native Vegetation (DEWH.001.001.0246). A revised draft National Framework was released in February 2010 for public comment which, once finalised, is intended to replace the existing National Framework: Exhibit 744 – Australia's Native Vegetation Framework – Consultation Draft (DEWH.001.001.0320); Dripps T14041:17–T14041:20, T14090:21–T14091:24
- 103 Exhibit 931 Statement of Armytage (WIT.3003.002.0001) [26]; Exhibit 678 Victoria's Native Vegetation Management A Framework for Action (SUMM.020.038.4204) at 4211
- 104 Exhibit 678 Victoria's Native Vegetation Management A Framework for Action (SUMM.020.038.4204) at 4211
- 105 Exhibit 678 Victoria's Native Vegetation Management A Framework for Action (SUMM.020.038.4204) at 4218–4219
- 106 Exhibit 678 Victoria's Native Vegetation Management A Framework for Action (SUMM.020.038.4204) at 4222, 4227
- 107 Exhibit 678 Victoria's Native Vegetation Management A Framework for Action (SUMM.020.038.4204) at 4227–4229, 4258–4259;
 Exhibit 685 Statement of Dripps (WIT.3024.005.0081) [97]–[98], Attachment 5 (DSE.HDD.0052.1822) at 1836; Dripps T14049:18–T14050:15
- 108 Exhibit 678 VPP Clause 52.17 Native Vegetation (TEN.111.001.0041) at 0041
- 109 Exhibit 678 VPP Clause 52.17 Native Vegetation (TEN.111.001.0041) at 0041; Exhibit 678 VPP Clause 72 General Terms (TEN.114.001.0085) at 0087
- 110 Exhibit 678 VPP Clause 66 Referral and Notice Provisions (TEN.111.001.0064) at 0066; Exhibit 685 Statement of Dripps (WIT.3024.005.0081) [20]; Dripps T14053:16–T14054:16
- 111 Exhibit 678 VPP Clause 65 Decision Guidelines (TEN.111.001.0062) at 0062; Exhibit 685 Statement of Dripps (WIT.3024.005.0081) [26], Annexure 5 (DSE.HDD.0052.1822); Dripps T14056:12–T14058:25
- 112 Exhibit 678 VPP Clause 52.17 Native Vegetation (TEN.111.001.0041) at 0043–0050
- 113 Exhibit 678 Building in a Wildfire Management Overlay: Applicant's Kit 2007 (TEN.008.001.0007) at 0022–0025; Exhibit 678 VPP Clause 52.17 Native Vegetation (TEN.111.001.0041) at 0046; Sturzenegger T13977:22–T13978:14; Dripps T14076:12–T14077:5
- 114 Exhibit 678 Amendment VC61 Explanatory Report (TEN.077.001.0001); Exhibit 679 Statement of Gilmore (WIT.3018.001.0001) [5.26]–[5.36]; Exhibit 695 – Statement of Murray (WIT.134.001.0001_R) [34]; Gilmore T13868:5–T13869:31
- 115 Dripps T14083:8–T14083:27, T14083:30–T14084:17; Gilmore T13868:14–T13869:10, T13869:20–T13869:31, T13871:7–T13871:16
- 116 Exhibit 696 Statement of Johnson (WIT.136.001.0001_R) [35]; Johnson T14339:20–T14340:16; Buxton T14655:2–T14658:14
- 117 Exhibit 678 VPP Clause 42.01 Environmental Significance Overlay (TEN.111.001.0002); Exhibit 678 VPP Clause 42.02 Vegetation Protection Overlay (TEN.111.001.0006); Exhibit 678 – VPP Clause 42.03 – Significant Landscape Overlay (TEN.111.001.0011)
- 118 Exhibit 678 VPP Clause 42.01 Environmental Significance Overlay (TEN.111.001.0002) at 0002–0004; Exhibit 678 VPP Clause 42.02 Vegetation Protection Overlay (TEN.111.001.0006) at 0006-0008; Exhibit 678 Clause 42.03 Significant Landscape Overlay (TEN.111.001.0011) at 0011–0013; Exhibit 678 VPP Clause 65 Decision Guidelines (TEN.111.001.0062); Dripps T14077:6–T14077:26
- 119 Exhibit 711 Planning Topic Facilitated Expert Conference, Written Statement (EXP.027.001.0001) at 0003; Lane T14621:14–T14629:6
- 120 Exhibit 707 Chladil Report (EXP.024.001.0001) [5.10]-[5.11]

- 121 Planning Expert Panel Discussion T14629:7–T14635:10
- 122 Hansen T14637:7-T14637:17, T14659:3-T14659:12; Pinfold T14638:8-T14639:5, T14661:22-T14662:4; Buxton T14655:12-T14656:29
- 123 Submissions of the State of Victoria Land Use Planning (RESP.3000.006.0001) [171]
- 124 Submissions of the State of Victoria Land Use Planning (RESP.3000.006.0001) [178(c)]
- 125 Lane T14649:27-T14654:27
- 126 Lane T14652:28-T14653:5
- 127 Exhibit 731 Statement of Matthews (WIT.137.001.0001_R) [5]-[6], [28]-[45]; Matthews T15115:10-T15121:10
- 128 Submissions of the State of Victoria Land Use Planning (RESP.3000.006.0001) [188]–[189]; Lane T14653:16–T14653:28
- 129 Exhibit 711 Planning Topic Facilitated Expert Conference, Written Statement (EXP.027.001.0001) at 0003; Planning Expert Panel Discussion T14680:16–T14681:16; Dripps T14080:5–T14081:13, T14093:13–T14093:23
- 130 Exhibit 831 Preparing Your Property Make Your Home Bushfire Ready (RESP.3001.001.0047) at 0056; Exhibit 831 Design and Siting Guidelines, Bushfire Protection for Rural Houses (CFA.001.026.0208) at 0224–0226; Exhibit 831 Tasmania Fire Service, Fire Retardant Garden Plants for the Urban Fringe and Rural Areas (TEN.180.001.0007); Exhibit 831 South Australian Country Fire Service Wildfire Fact Sheet No 15 (TEN.180.001.0003); Exhibit 831 South Australian Country Fire Service Wildfire Fact Sheet No 16 (TEN.180.001.0003); Exhibit 831 South Australian Country Fire Service Wildfire Fact Sheet No 16 (TEN.180.001.0003); Exhibit 831 South Australian Country Fire Service Wildfire Fact Sheet No 16 (TEN.180.001.0005); Exhibit 831 ACT Planning and Land Authority, FireWise Home Gardens (TEN.180.001.0001); Exhibit 831 CSIRO, Landscape and Building Design for Bushfire Areas (extracts) (TEN.182.001.0001); Exhibit 697 Statement of Francis, Attachment 3 (SUBM.002.017.0407_R) at 0437_R-0441_R; Sturzenegger T14001:5–T14002:1
- 131 Exhibit 731 Statement of Matthews (WIT.137.001.0001_R) [30], [34]; Matthews T15119:21–T15120:22
- 132 Submissions of the State of Victoria Land Use Planning (RESP.3000.006.0001) [196]
- 133 Exhibit 689 Statement of Abbey (WIT.4016.001.0001) [7]–[10], [22]–[69], [87], [91], [103]–[144], [154]–[165], Attachment 2 (WIT.4016.001.0064) at 0092, 0120, 0170–0182, 0186–0187, Attachment 5 (WIT.4016.001.0409) at 0417–0421, Attachment 8 (WIT.4016.001.0456), Attachment 9 (WIT.4016.001.0466), Attachment 10 (WIT.4016.001.0468) at 0469, Attachment 11 (WIT.4016.001.0470); Exhibit 166 Wildfire Map Management Overlay Map Nillumbik (SUMM.020.035.0014); Abbey T14129:19–T14130:11, T14140:1–T14140:16, T14138:22–T14139:9, T14171:30–T14172:3, T14194:21
- 134 Exhibit 678 Murrindindi Shire Council LPPF (TEN.202.001.0001) at 0009, 0016–0018, 0021–0022, 0029–0033, 0053–0055, 0057–0059;
 Exhibit 678 Planning Map WMO Marysville Region (TEN.191.001.0004); Exhibit 678 Planning Map WMO in Kinglake Region (TEN.191.001.0001); Exhibit 678 Planning Map WMO Bald Spur Road, Kinglake (TEN.191.001.0002); Exhibit 678 Planning Map WMO Pine Ridge Road, Kinglake West (TEN.191.001.0003); Exhibit 677 Statement of Ellett (WIT.4006.001.0001) [29]; Exhibit 166 Wildfire Map Management Overlay Map Murrindindi (SUMM.020.035.0013); Exhibit 679 Statement of Gilmore, Attachment 60 (WIT.3018.001.0748) at 0750; Exhibit 693 Statement of Parsons (WIT.4021.001.0001) [11]–[14], [38]–[41], [43]–[60], [92]–[97]; Parsons T14244:25–T14248:16–T14249:8, T14249:22–T14249:29, T14259:2–T14266:19–T14266:19–T14266:19–T14267:24
- 135 Exhibit 166 Wildfire Map Management Overlay Map Latrobe (SUMM.020.035.0009); Exhibit 678 Latrobe City Council LPFF Current (TEN.194.001.0001) at 0005, 0010–0011, 0014; Exhibit 678 Latrobe City Council LPPF Superseded (TEN.195.001.0001); Exhibit 679 Statement of Gilmore, Attachment 60 (WIT.3018.001.0748) at 0749; Exhibit 694 Statement of Morland (WIT.4023.001.0001) [7]–[31], [41]–[50], [61]–[67]; Morland T14302:12–T14302:30, T14303:11–T14303:21, T14304:24–T14304:25, T14306:11–T14307:8
- 136 Exhibit 708 Hansen Report (EXP.021.001.0001) [2.19]; Planning Expert Panel Discussion T14451:23-T14455:4
- 137 Planning Expert Panel Discussion T14579:2–T14588:18; Parsons T14289:22–T14289:26
- 138 Exhibit 678 Pine Ridge Road Post Fire Aerial Photography (TEN.196.001.0008); Exhibit 680 Statement of Cook (WIT.131.001.0001_R) [27], [32]–[34]; Hainsworth T4545:6–T4545:13; Cook T13902:25–T13902:27, T13920:5–T13921:13
- 139 Exhibit 678 Pine Ridge Road Pre Fire Aerial Photography (TEN.196.001.0007)
- 140 Exhibit 678 Pine Ridge Road Post Fire Aerial Photography (TEN.196.001.0008)
- 141 Exhibit 706 Yates Report (EXP.020.001.0001) at 0003; Exhibit 710 Buxton Report (EXP.023.001.0001) at 0017; Planning Expert Panel Discussion T14431:24–T14453:31, T14573:11–T14575:4; Hansen T14581:16–T14582:3; Buxton T14470:2–T14470:22
- 142 Exhibit 177 Statement of Donaldson (WIT.6001.002.0001) [25], Annexure 4 (WIT.6001.002.0229) at 0233–0234; Exhibit 168 Statement of Arnel (WIT.3000.002.0001) [96], [99], [269]; Building Regulations 2006, rr. 109, 807; *Building Act 1993*, ss. 1, 3, 7, 9, 196, Parts 3 and 5; Exhibit 168 – Statement of Arnel (WIT.3000.002.0001) [11]–[16]
- 143 Exhibit 175 Leonard Report (TEN.066.001.0001) at 0011-0015
- 144 Exhibit 175 Leonard Report (TEN.066.001.0001) at 0038–0040, and in particular Figure 6, citing Blanchi R, Lucas C, Leonard J & Finkele K (forthcoming), Meteorological Conditions and Wildfire Related House Loss in Australia (review International Journal of Wildland Fire); Exhibit 3 – Statement of Rees (WIT.004.001.0001) [237]
- 145 Exhibit 135 Tolhurst Report (EXP.003.005.0001); Exhibit 175 Leonard Report (TEN.066.001.0001) at 0015-0018
- 146 Exhibit 175 Leonard Report (TEN.066.001.0001) at 0020, 0029; Exhibit 687 Bushfire Penetration into Urban Areas in Australia: A Spatial Analysis (CRC.304.001.0001) at 0020
- 147 Exhibit 175 Leonard Report (TEN.066.001.0001) at 0022
- 148 Exhibit 175 Leonard Report (TEN.066.001.0001) at 0025, 0035-0036
- 149 Exhibit 175 Leonard Report (TEN.066.001.0001) at 0026-0027
- 150 Exhibit 175 Leonard Report (TEN.066.001.0001) at 0025, 0036-0037
- 151 Exhibit 175 Leonard Report (TEN.066.001.0001) at 0019–0020, 0027
- 152 Exhibit 175 Leonard Report (TEN.066.001.0001) at 0019

- 153 Exhibit 165 Building Commission & Standards Australia Seminars Series Delegates Information Pack AS 3959–2009 (TEN.064.001.0001) at 0005, 0011
- Exhibit 17 Statement of Spooner (WIT.011.001.0001_R) [26]; Exhibit 224 Statement of Cowdery (WIT.081.001.0001_R) [33]; Exhibit 357 Statement of Malcolm (WIT.3004.017.0251) [44], [50]; Exhibit 175 Leonard Report (TEN.066.001.0001) at 0027; Spooner T485:1–T485:21; Cowdery T6865:20–T6865:24; Barber T3351:20–T3351:29; Malcolm T8707:3–T8707:5; Leonard T5520:25–T5522:30; Tolhurst T1076:3–T1076:23
- 155 Exhibit 172 Statement of Eadie (WIT.7502.001.0001_R) [20]–[38], Attachment 2 (WIT.7502.001.0038), Attachment 3 (WIT.7502.001.0053), Attachment 6 (WIT.7502.001.0097), Attachment 7 (WIT.7502.001.0211) at 0211–0216, Attachment 13 (WIT.7502.001.0261); Eadie T5379:7–T5379:18
- Exhibit 142 2004 COAG Report (TEN.049.001.0001) at 0025; Exhibit 172 Statement of Eadie (WIT.7502.001.0001_R) [45]–[46],
 [54]–[55], [60], [64], [66], [81], [85], [90]–[92], [94], [97], [100], [106]–[107], [144]–[146], Attachment 18 (WIT.7502.001.0304), Attachment 23 (WIT.7502.002.0169) at 0177–0178, Attachment 37 (WIT.7502.003.0062), Attachment 62 (WIT.7502.004.0155), Attachment 63 (WIT.7502.004.0166), Attachment 87 (WIT.7502.006.0151); Exhibit 177 Statement of Donaldson (WIT.6001.002.0001) [55(a)], [55](f)], [55(n)], Annexure 22 (WIT.6001.002.0515), Annexure 24 (WIT.6001.002.0550), Annexure 36 (WIT.6001.002.0813), Annexure 37 (WIT.6001.002.0863); Eadie T5383:31–T5384:9, T5385:2–T5386:11
- 157 Exhibit 172 Statement of Eadie (WIT.7502.001.0001_R) [110], [112], Attachment 66 (WIT.7502.004.0174), Attachment 67 (WIT.7502.004.0182); Exhibit 177 Statement of Donaldson (WIT.6001.002.0001) [55(t)], Annexure 25 (WIT.6001.002.0553); Eadie T5386:20–T5386:26
- 158 Exhibit 177 Statement of Donaldson (WIT.6001.002.0001) [55(cc)], Annexure 31 (WIT.6001.002.0697); Exhibit 171 Statement of Tucker (WIT.7501.001.0001) [101]–[106]; Tucker T5309:10–T5311:12
- 159 Exhibit 171 Statement of Tucker (WIT.7501.001.0001) [107], Attachment 87 (WIT.7501.005.0121)
- 160 Exhibit 171 Statement of Tucker (WIT.7501.001.0001) [111]–[119], Attachment 88 (WIT.7501.005.0131), Attachment 89 (WIT.7501.005.0134), Attachment 90 (WIT.7501.005.0139), Attachment 91 (WIT.7501.005.0142), Attachment 92 (WIT.7501.005.0145); Exhibit 188 – Statement of Orr (WIT.060.001.0001_R) [30]–[32], Attachment 2 (WIT.060.001.0019); Tucker T5314:26–T5317:10; Donaldson T5624:20–T5626:24
- 161 Exhibit 171 Statement of Tucker (WIT.7501.001.0001) [123]; Exhibit 177 Statement of Donaldson (WIT.6001.002.0001) [79], Annexure 33 (WIT.6001.002.0802), Annexure 34 (WIT.6001.002.0809); Exhibit 481 Minutes of ABCB Meeting Held 5 March 2009 (TEN.126.001.0008)
- 162 Exhibit 171 Statement of Tucker (WIT.7501.001.0001) [31]–[35], Attachment 27 (WIT.7501.002.0078), Attachment 28 (WIT.7501.002.0082); Submissions of the Commonwealth – Building in Bushfire-prone Areas (RESP.6003.001.0001) [20]–[23]; Submissions of the State of Victoria – Building in Bushfire-prone Areas (RESP.3001.011.0062) [7]; Submissions of Standards Australia – Building in Bushfire-prone Areas (RESP.7501.002.0001) [5]; Tucker T5272:30–T5273:27, T5358:13–T5358:27
- 163 Donaldson T5610:23–T5612:2, T5618:12–T5619:15; Chladil T5437:24–T5437:30
- 164 Exhibit 177 Statement of Donaldson (WIT.6001.002.0001) [14]; Donaldson T5586:14–T5587:17, T5617:31–T5618:4
- 165 Exhibit 161 Reform of Building Regulation, Productivity Commission Research Report (TEN.062.001.0001); Exhibit 177 Statement of Donaldson (WIT.6001.002.0001) [14], Annexure 5 (WIT.6001.002.0250), Annexure 6 (WIT.6001.002.0353); Donaldson T5586:14–T5594:4–T5594:31, T5594:4–T5594:31, T5596:14
- 166 Exhibit 171 Statement of Tucker, Attachment 26 (WIT.7501.002.0038) at 0071
- 167 Exhibit 180 Statement of McLennan (WIT.068.001.0001_R) [59]–[67]; Tucker T5289:16–T5290:25
- 168 Exhibit 930 National Standard for Private Bushfire Shelters (TEN.285.001.0001)
- 169 Exhibit 168 Statement of Arnel (WIT.3000.002.0001) [137]–[140]; Exhibit 172 Statement of Eadie (WIT.7502.001.0001_R) [135]–[139], Attachment 84 (WIT.7502.006.0076); Eadie T5371:15–T5373:21
- 170 Exhibit 172 Statement of Eadie, Attachment 6 (WIT.7502.001.0098) at 0132
- 171 Exhibit 172 Statement of Eadie, Attachment 6 (WIT.7502.001.0098) at 0173-0179
- 172 Exhibit 177 Statement of Donaldson, Annexure 37 (WIT.6001.002.0863)
- 173 Exhibit 172 Statement of Eadie, Attachment 6 (WIT.7502.001.0098) at 0173
- 174 Exhibit 169 Supplementary Statement of Arnel, Annexure Q (WIT.3000.002.0375); Exhibit 175 Leonard Report (TEN.066.001.0001) at 0051–0053; Exhibit 177 Statement of Donaldson, Annexure 39 (WIT.6001.002.0900)
- 175 Exhibit 177 Statement of Donaldson (WIT.6001.002.0001) [27]; McLennan T5697:30-T5698:14
- 176 Exhibit 169 Supplementary Statement of Arnel, Annexure Q (WIT.3000.002.0375) at 0385–0390; Exhibit 179 Statement of Harding (WIT.7503.001.0001_R) [91]–[95]; Exhibit 180 Statement of McLennan (WIT.068.001.0001_R) [69]–[71]; Submissions of the State of Victoria Building in Bushfire-prone Areas (RESP.3001.011.0062) [14c], [19]; Arnel T5198:27–T5199:1, T5199:23–T5200:2; Harding T5658:11–T5659:1; McLennan T5683:1–T5685:26; Donaldson T5628:22–T5628:28, T5629:3–T5629:11; Welch T5772:23–T5773:4; Woolcock T5782:7–T5782:20
- 177 Exhibit 169 Supplementary Statement of Arnel (WIT.3000.002.0220_R) [212]–[216]; Exhibit 180 Statement of McLennan (WIT.068.001.0001_R) [85]–[90]; Exhibit 185 Statement of Woolcock (WIT.7505.001.0001_R) [20]; Exhibit 195 Statement of Berry (WIT.071.001.0001_R) [111]; Arnel T5194:23–T5195:27, T5197:20–T5198:8; McLennan T5684:15–T5684:22, T5699:2–T5699:18; Woolcock T5777:20–T5779:9
- 178 Exhibit 171 Statement of Tucker, Attachment 89 (WIT.7501.005.0134) at 0135; Exhibit 174 Statement of Chladil (WIT.7506.001.0001_R)
 [30]–[34]; Exhibit 188 Statement of Orr (WIT.060.001.0001_R) [57]; Exhibit 190 Statement of Spring (WIT.3004.011.0228) [17]–[18], [25]–[26];
 Exhibit 207 Statement of Andreou (WIT.3004.012.0065) [28]; Exhibit 207 Letter from CFA and MFB to T Arnel (CFA.001.023.0229); Chladil T5443:4–T5445:22; Orr T5892:4–T5893:26; Spring T6002:6–T6002:9, T6003:9–T6003:19; Andreou T6412:7–T6413:25
- 274 179 Exhibit 174 Statement of Chladil (WIT.7506.001.0001_R) [30]–[34]; Chladil T5443:4–T5445:22
 - 180 Exhibit 167 BRC Research Building and Planning in Bushfire-prone Areas, Appendix 1 (TEN.065.001.0038) at 0056–0058; Orr T5914:27–T5915:27

- 181 B Teague, R McLeod, S Pascoe, 2009 Victorian Bushfires Royal Commission: Interim Report, Parliament of Victoria, Melbourne, August 2009 [7.104]
- 182 Exhibit 169 Supplementary Statement of Arnel (WIT.3000.002.0220_R) [241]
- 183 Exhibit 169 Supplementary Statement of Arnel (WIT.3000.002.0220_R) [246], [250]–[252]; Exhibit 167 BRC Research Building and Planning in Bushfire-prone Areas (TEN.065.001.0001) at 0030–0031, Appendix 1 (TEN.065.001.0038) at 0050–0060, Appendix 3 (TEN.063.001.0112) at 0114; Exhibit 177 – Statement of Donaldson (WIT.6001.002.0001) [43]–[47]; *Rural Fires Act 1997* (NSW), s. 100B; Orr T5914:10–T5916:27
- 184 B Teague, R McLeod, S Pascoe, 2009 Victorian Bushfires Royal Commission: Interim Report 2, Parliament of Victoria, Melbourne, November 2009 [42]–[54]
- 185 Exhibit 997 Letter to Fiona Bustos-McNeil of Standards Australia from Gary Morgan of Bushfire CRC (CORR.1006.0017_R)
- 186 B Teague, R McLeod, S Pascoe, 2009 Victorian Bushfires Royal Commission: Interim Report 2, Parliament of Victoria, Melbourne, November 2009 [51]–[54]
- 187 Chladil T14686:31–T14687:7; Pinfold T14687:8–T14687:25
- 188 Exhibit 171 Statement of Tucker, Attachment 88 (WIT.7501.005.0131), Attachment 89 (WIT.7501.005.0134) at 0135; Exhibit 174 Statement of Chladii (WIT.7506.001.0001_R) [44]–[46]; Exhibit 175 – Leonard Report (TEN.066.001.0001) at 0052–0053; Exhibit 177 – Statement of Donaldson, Annexure 36 (WIT.6001.002.0813), Annexure 37 (WIT.6001.002.0863); Exhibit 188 – Statement of Orr, Attachment 2 (WIT.060.001.0019); Chladii T5449:21–T5451:5
- 189 Exhibit 169 Supplementary Statement of Arnel, Annexure Q (WIT.3000.002.0375) at 0390–0392; Exhibit 177 Statement of Donaldson, Annexure 36 (WIT.6001.002.0813) at 0821–0822, Annexure 37 (WIT.6001.002.0863) at 0870; Eadie T5380:10–T5381:27
- 190 Building Amendment (Private Bushfire Shelter Construction) Interim Regulations 2010, rr. 3(1), 6; Building Amendment (Bushfire Construction Short Term Requirements) Regulations 2010 (Vic), rr. 3(1), 6
- Exhibit 13 Statement of Newman (WIT.009.001.0001_R) [6], [11], [16], [22]; Exhibit 170 Statement of Frazer-Jans (WIT.074.001.0001_R) [13]–[15], [19]–[20], [42]–[44], [72]; Exhibit 182 Statement of Moore (WIT.076.001.0001_R) [5], [9]–[10], [25]–[26], [43]–[44]; Exhibit 195 Statement of Berry (WIT.071.001.0001_R) [9]–[18], [53], [58]–[68], [83]–[84]; Exhibit 672 Building and Land-use Planning Research After the 7th February 2009 Victorian Bushfires Preliminary Findings (CRC.300.007.0135) at 0215; Newman T334:20–T334:30, T338:17–T338:28, T347:22–T347:24; Frazer-Jans T5239:28–T5242:6, T5242:30–T5243:10; Moore T5727:22–T5727:27, T5731:1–T5731:4, T5731:19–T5731:30, T5735:23–T5735:28; Berry T6112:22–T6113:25, T6118:18–T6120:14, T6123:23–T6123:29; Leonard T5956:28–T5957:16
- 192 Exhibit 831 Preparing Your Property Make Your Home Bushfire Ready (RESP.3001.001.0047) at 0058–0059; Exhibit 108 Statement of Brown (WIT.053.001.0001_R) [6], [25]–[26]; Exhibit 416 – Statement of Verlaan (WIT.095.001.0001_R) [8], [13], [30]–[31]; Brown T3515:16–T3515:23, T3516:6–T3516:15, T3539:1–T3539:7; Easterbrook T7163:25–T7164:10, T7171:5–T7171:13; Verlaan T9640:1–T9640:12, T9646:15–T9646:25; Davey T776:19–T776:28; Hollowood T10649:25–T10650:25, T15986:16–T15986:18, T15993:15–T15993:21, T15994:3–T15994:7, T15995:14–T15995:16, T16014:23–T16014:28, T16015:22–T16015:29, T16016:30–T16017:6
- 193 Exhibit 170 Statement of Frazer-Jans (WIT.074.001.0001_R) [13]–[14]
- 194 Exhibit 172 Statement of Eadie (WIT.7502.001.0001_R) [8], [21], [138]; Eadie T5391:23–T5392:12
- 195 Submissions of Standards Australia Building in Bushfire-prone Areas (RESP.7501.002.0001) [19]–[20]; Exhibit 981 Letter from Fiona Bustos-McNeil of Standards Australia Ltd (CORR.1003.0288_R) at 0291_R; Exhibit 997 – Letter to Fiona Bustos-McNeil of Standards Australia Ltd from Gary Morgan of Bushfire CRC (CORR.1006.0017_R)
- 196 Exhibit 174 Statement of Chladil, Attachment 2 (WIT.7506.001.0024) at 0034
- 197 Exhibit 831 Preparing Your Property Make Your Home Bushfire Ready (RESP.3001.001.0047) at 0057–0059
- 198 Exhibit 169 Supplementary Statement of Arnel (WIT.3000.002.0220_R) [261]
- 199 Exhibit 169 Supplementary Statement of Arnel (WIT.3000.002.0220_R) [256], [259]–[260]
- 200 Exhibit 678 Building in a Wildfire Management Overlay: Applicant's Kit 2007 (TEN.008.001.0007) at 0018-0021
- 201 Planning and Environment Act 1987, s. 14(a); Building Act 1993, ss. 9, 16
- 202 Planning and Environment Act 1987, ss. 114, 126, 129, 130(1)
- 203 Exhibit 693 Statement of Parsons (WIT.4021.001.0001) [120]-[121]; Parsons T14272:30-T14273:21
- 204 Exhibit 689 Statement of Abbey (WIT.4016.001.0001) [208]; Exhibit 693 Statement of Parsons (WIT.4021.001.0001) [119]; Exhibit 694 Statement of Morland (WIT.4023.001.0001) [89]; Abbey T14177:8–T14179:30; Parsons T14272:24–T14272:29, T14273:30–T14274:15
- 205 Abbey T14179:31-T14180:9, T14181:2-T14181:6; Hansen T14518:17-T14518:23
- 206 Exhibit 705 Pinfold Report, Appendix 3 (EXP.019.001.0092); Pinfold T14480:27-T14481:7, T14490:4-T14491:19
- 207 Exhibit 174 Statement of Chladil (WIT.7506.001.0001_R) [47]
- 208 Exhibit 142 2004 COAG Report (TEN.049.001.0001) at 0130–0131
- 209 Exhibit 160 A Nation Charred (EXH.160.0001) at 0294, 0305–0306
- 210 Exhibit 171 Statement of Tucker (WIT.7501.001.0001) [129]–[130], Attachment 100 (WIT.7501.005.0277); Exhibit 172 Statement of Eadie (WIT.7502.001.0001_R) [21], [142]; Exhibit 177 Statement of Donaldson (WIT.6001.002.0001) [56]–[58]; Eadie T5392:23–T5392:30
- 211 Exhibit 172 Statement of Eadie (WIT.7502.001.0001_R) [21]; Eadie T5392:23-T5392:30
- 212 Building Regulations 2006, Part 12; Chladil T5451:18–T5452:17; Woolcock T5792:17–T5793:5; Watson T5839:1–T5845:2
- 213 Exhibit 206 Memorandum of Advice (TEN.074.001.0002)
- 214 B Teague, R McLeod, S Pascoe, 2009 Victorian Bushfires Royal Commission: Interim Report 2, Parliament of Victoria, Melbourne, November 2009 at 13; Exhibit 831 – Preparing Your Property – Make Your Home Bushfire Ready (RESP.3001.001.0047); Exhibit 678 – Standards Australia HB 330-2009 Living in Bushfire-prone Areas (TEN.174.001.0001) at 0055–0057; Arnel T5208:17–T5208:23; Chladil T5452:18–T5452:25

- 215 Country Fire Authority Act 1958, ss. 96A(1)(b), 96(A)(2)
- 216 Exhibit 692 Statement of Creedon (WIT.4017.001.0001) [19], [21]–[24]; Exhibit 692 Municipal Fire Prevention Officer Learning Manual (EXH.692.0001) at 0003–0004; Exhibit 693 Statement of Parsons (WIT.4021.001.0001) [145], [150]; Exhibit 694 Statement of Morland (WIT.4023.001.0001) [99]–[101]; Country Fire Authority Act 1958, ss. 41(2), 41(3); Creedon T14231:24–T14232:6, T14234:28–T14235:11; Parsons T14280:24–T14282:22; Morland T14310:21–T14311:29
- 217 Further Submissions of the State of Victoria Land Use Planning (RESP.3000.006.0110) [6]–[8]; Creedon T14234:24–T14236:3; Parsons T14282:29–T14283:10
- 218 Country Fire Authority Act 1958, ss. 28(1), 41F; Sturzenegger T14002:27–T14003:10
- 219 Exhibit 684 Statement of Fox (WIT.3004.028.0202) [42], Annexure 6 (WIT.3004.028.0262); Exhibit 689 Statement of Abbey (WIT.4016.001.0001) [170]–[171]; Exhibit 693 Statement of Parsons (WIT.4021.001.0001) [105]–[106]; Exhibit 694 Statement of Morland (WIT.4023.001.0001) [70]–[73]
- Exhibit 165 Building Commission & Standards Australia Seminars Series Delegates Information Pack AS 3959–2009 (TEN.064.001.0001);
 Exhibit 168 Statement of Arnel (WIT.3000.002.0001) [153]; Exhibit 169 Supplementary Statement of Arnel (WIT.3000.002.0220_R) [204]–
 [209]; Exhibit 180 Statement of McLennan (WIT.068.001.0001_R) [11], [55]–[58]; Exhibit 183 Statement of Watson (WIT.4001.001.0001_R)
 [33]; Exhibit 185 Statement of Woolcock (WIT.7505.001.0001_R) [54]–[66]; Arnel T5192:20–T5192:26, T5193:14–T5193:19, T5194:8–T5194:18; McLennan T5668:13–T5668:23, T5677:27–T5678:16
- 221 Exhibit 169 Supplementary Statement of Arnel (WIT.3000.002.0220_R) [210], Annexure M (WIT.3000.002.0361), Annexure O (WIT.3000.002.0368), Annexure R (WIT.3000.002.0396); Exhibit 185 Statement of Woolcock (WIT.7505.001.0001_R) [59]; Woolcock T5788:22–T5788:31
- 222 Exhibit 180 Statement of McLennan (WIT.068.001.0001_R) [55], [109]–[112]; McLennan T5677:4–T5677:19, T5677:27–T5678:16
- 223 Exhibit 188 Statement of Orr (WIT.060.001.0001_R) [62]; Orr T5898:22–T5899:30
- 224 Exhibit 711 Planning Topic Facilitated Expert Conference, Written Statement (EXP.027.001.0001) at 0004
- 225 Exhibit 188 Statement of Orr (WIT.060.001.0001_R) [59]–[66]; Submissions of AFAC Building in Bushfire-prone Areas (RESP.7500.004.0001) [15]; Orr T5896:16–T5903:1