

STATEMENT



20 September 2017

Seeking comments on early-stage analysis of the impacts associated with draft changes to AS 3959, *Construction of buildings in bushfire-prone areas*

In accordance with the Australian Building Codes Board's (ABCB) *Protocol for NCC Referenced Documents*, Standards Australia's technical committee FP-020 has developed an early-stage analysis of the impacts associated with draft changes to AS 3959, *Construction of buildings in bushfire-prone areas* in the form of a draft Preliminary Impact Analysis (PIA).

The ABCB's PIA process is a requirement to make changes to documents referenced by the National Construction Code (NCC). AS 3959 is a current referenced document in NCC Volumes One and Two. The PIA requires the identification of the nature and extent of the problem, consideration of all feasible options that address the problem, and a cost-benefit analysis of all options considered. Also, it will be used to support the proposal to reference when considered by the ABCB's Building Codes Committee.

Standards Australia is seeking responses from all interested parties on the 'Consultation Questions' contained in the PIA. This will assist in establishing the nature and extent of the problem and the likely impacts of Option 2. See PIA below.

Responses to the questions are invited until 22 November 2017 and can be emailed to Damith Rupasinghe, Project Manager at Damith.Rupasinghe@standards.org.au. All responses will be used to inform the final PIA.

The public comment process remains subject to Standards Australia's public commenting procedures. Access the AS 3959 draft and submit comments through our [Public Comment portal](#). All comments must be received by 22 November 2017.

Contact **Ron Pulido**
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PRELIMINARY IMPACT ANALYSIS (DRAFT)

PROPOSAL:

Briefly describe the nature of the proposal, i.e. 'Revision of Australian Standard AS XXXX' or 'Revise Section X of BCA Volume One to include requirements for XXXX' etc.

Revision of Australian Standard (AS) 3959: Construction in Bushfire Prone Areas.

AS 3959 is a current referenced document in NCC Volumes One and Two.

PROPONENT:

Nominating organisation or individual

Standards Australia

DATE OF PIA:

To differentiate between versions include the document date and/or version number

11 September 2017 – draft version

NATURE AND EXTENT OF THE PROBLEM:

Detail the nature and extent of the problem that is to be addressed by the proposal. Provide information on who is affected and in what way. Explain what evidence exists that shows there is a problem. Attach correspondence or details if necessary. If there is difficulty in articulating the nature of the problem then there is a possibility that the proposal is unwarranted.

Problem

The nature of the problem relates to the need to revise AS 3959 to address:

1. outcomes of the Victorian Royal Commission in relation to the protection of sub-floors for residential buildings at lower Bushfire Attack Levels (BAL) (see p.260 of Volume 2 of the Final Report); and,
2. outstanding issues from previous editions; and,
3. improvements in knowledge on the performance of buildings and building materials in bushfires and recommendations from the recent Standards Australia Bushfire Forum.

In addition, there has been substantial experience in the use of the 2009 edition and related test methods (AS 1530.8.1 & AS 1530.8.2) which has resulted in some issues being identified by users in terms of the Standards application and interpretation.

The primary problems to be addressed as part of this proposal are:

Site assessment

Some vegetation classes (e.g. mangroves, grasslands and rangelands) have been identified as having a lower threat than what is assumed by the 2009 Standard and therefore needs to be clarified. This will result in lower BAL assessments and decrease construction cost in some areas of Australia.

Following a stakeholder workshop on the application of the Standard held by Standards Australia in conjunction with the ABCB, clarification of wording in relation to adjacent and adjoining buildings has also been deemed necessary as a result of confusion amongst building practitioners.

Vents, weepholes and gaps.

Clarification to the treatments of gaps. The Standards Committee considered that it would

be better to rely on current energy efficiency requirements and not specify any requirement for checking of gaps for doors or windows (which are only to be tight fitting) and to simply fill or screen gaps in other cases (e.g. vents).

Removing restrictions on some building materials

Considerable testing work on glazing has occurred since 2009. The results of this testing has led to a greater suite of window configurations now permissible which is reflected in the new Standard. This will allow for a greater choice of windows than currently available through the Standard.

Polycarbonate roof sheeting

Polycarbonate roof sheeting is currently not allowed by AS3959 – 2009. Findings from limited testing has identified that the material is suitable for BAL 12.5 and BAL 19 for awnings and carports, and the like not constructed under the main roof.

Requirements for water and gas supply pipes –

This proposal is consistent with the requirements of the gas standard. Metals pipes for gas and water have been a requirement since 1991 and the revised wording is a clarification for the gas regulators for pipes that might be a composite with metal content. This change is considered cost neutral.

Increases in stringency to the Standard are proposed and are listed below:

1. **Gutter guards** – This proposed change will require the use of metal guards over gutters at a minimum cost of \$2,000 per dwelling in material costs. This is an additional requirement at the request of NSW Regulator (Department of Planning and Environment) and AFAC and has been observed as source of roof fires in past and recent fire events in NSW.
2. **Protection of open subfloor spaces for BAL 12.5 and BAL 19** – This proposed change will require screening or enclosure of the subfloor space which are less than 400mm from the ground. Where the sub-floor is greater than 400mm this is consistent with the termite standard provisions as well as providing for consistency between lower BALs and higher BAL ratings (with the requirement). The cost for this varies between \$125-165 a square metre for the face brick work (variation between Sydney and Adelaide), however, it is expected most buildings will comply with the termite provisions (except Tasmania).
3. **Weather strips with a flammability index of no greater than 5 for vehicle access doors** – This proposed change seeks to prevent embers igniting seals of a garage and will require the use of seals to have a flammability of less than 5, at a cost of between \$100-200 per door, dependent on size. This is now common practice in the industry with 80% of doors in BAL 19 and above currently estimated as using these weather strips.
4. **Prohibiting eave lighting in BAL 40 and BAL - FZ** – This proposed change will prohibit the use of recessed eave lighting so as to prevent fire entering the roof space above the eave. This issue arose from industry concerns at these BALs and does not prevent external lighting affixed onto the eave or wall.

The ABCB office requested information to support the need for each increase in stringency. The Standard's Committee responsible for the development and maintenance of AS 3959 were unable to provide this information, however, recommended that these questions be addressed through consultation with industry and interested parties.

Consultation Questions:

With reference to supporting evidence, what is the need associated with:

1. Requiring gutter guards?
2. Protecting sub-floor spaces in BAL 12.5 and BAL 19 areas?
3. Requiring weather-strips with a flammability index of no greater than 5 for vehicle access doors?
4. Prohibiting eave lighting in BAL 40 and BAL FZ areas?

What extent can these proposals avoid property loss? Can you provide information to support this opinion?

Do you agree that it is current practice to install vehicle access doors with weather strips with a flammability index of no greater than 5?

Are you aware of any property loss that has occurred as a direct result of the installation of eave lighting?

Editorial issues

A number of editorial issues were highlighted as part of the recent bushfire forum. As a direct result of the feedback from the forum, the format of construction requirements has been revised. The Standards useability has been improved and requirements that are duplicated have been removed. These changes do not impact the stringency of the requirements and are designed to assist in the correct interpretation of the requirements.

OBJECTIVES:

Describe the objectives or intended outcomes that will be achieved by addressing the problem, remembering that the objectives should not pre-justify a preferred solution. The objectives need to be broad enough to allow consideration of alternative solutions without being so broad that too many options need to be considered. 'To revise the BCA' or 'To revise a standard' are not suitable objectives.

The objective of this proposal is to ensure that the requirements for construction in bushfire prone areas remain contemporary, address issues raised by users of the Standard and improve clarity for building practitioners and regulators.

OPTIONS:

Consider alternative options that that may address the identified problem. Include the options of 'No change' and the development or introduction of a non-mandatory solution, such as a guide or handbook, or improved education or training.

Three options are presented for consideration:

Option 1: Retain the status quo.

The status quo will be used as a baseline to assess the incremental impacts of the options; if all options would result in a net cost to society then this PIA will recommend the status quo.

Option 2: Reference revised AS 3959

The essential elements of the option relate to the following:

- Improved Vegetation assessment
- Extended glazing options
- Polycarbonate now allowed in BAL-12.5 and BAL-19 for awnings and carports.
- Fire weather classifications – provision for classification for rangelands.
- Introduction of gutter guards for specific locations.

- Protection of open sub-floor spaces – BAL 12.5 and BAL 19.
- Prohibiting recessed eave lighting.
- Weather strips for vehicle access doors.
- Editorial issues and formatting including clarification of wording in some sections

Option 3: Revise AS 3959 to clarify site assessment, provide acceptance of new window configurations and polycarbonate roof sheeting and improve interpretation and formatting.

This option would only amend the Standard to include stringency neutral or lower changes.

These would include:

- Clarification of vegetation assessment and BAL levels.
- Incorporating new allowances for glazed window configurations and polycarbonate roofing.
- Editorial issues and formatting including clarification of wording in some areas.

Note: A non-regulatory approach to address the problem has been considered and deemed not feasible on the basis that the current requirements of AS 3959 which are adopted through the NCC are the cause of the problem. A non-regulatory approach would not solve the problem as described and as such a non-regulatory solution has been discontinued from the analysis.

IMPACT ANALYSIS¹²³ (OF ALL OPTIONS):

All options need to be assessed equally, i.e. the costs and benefits associated with each option, providing an indication of monetary value where possible, whilst also looking at societal and environmental costs and benefits. The benefits of any change need to outweigh these costs for an option to be considered. Forcing an individual or business, through regulation, to carry out their business in a way they wouldn't normally generally has cost implications. Explain in this section who is likely to be affected by the proposal being put forward, and how they will be affected. Will the consumer, building owner or occupant be worse off financially? Will one firm or section of industry benefit to the detriment of another? Identify the sources of any data used and attach any supporting documentation.

The benefits of each option will be considered in both quantitative and qualitative terms. Where the benefits are difficult to quantify, a qualitative analysis is provided.

Option 1 – Retain the status quo:

This option would not address the nature and extent of the problem as described in this PIA and would continue to result in unnecessary costs associated with site assessment and administrative inefficiency. By not amending the Standard it won't be able to take into account the items that have arisen since the publication of the 2009 document in terms of application of the Standard and the adoption of contemporary building practices and testing.

Option 2 – Reference revised AS 3959

Option 2 is primarily intended to support the interpretation and application of AS 3959 as a deemed-to-satisfy solution under the NCC. There are some stringency increases that are being explored through this PIA as well as cost reductions associated with site assessment. All changes will be further scrutinised through public consultation.

The restructure of the document into table format will enhance the readability of the document to enable greater level of compliance.

COSTS

- Gutter guards - Some cost impost will occur for a small number of buildings if trees are to be retained within 5 metres of the roofline (including on adjoining land).The material

¹ A list of possible costs and benefits to consider is at Attachment A

² A Business Compliance Cost Checklist is at Attachment B. If there are significant compliance costs, consider use of the Business Cost Calculator or similar tool

³ A Competition Assessment Checklist is at Attachment C

cost to a representative dwelling is estimated to be a minimum of \$2,000 material cost plus installation. This will not impact buildings assessed as being outside the requirements above and those in BAL-Flame Zone. The extent to which dwellings are impacted by this cost is estimated to be 10% of all new dwellings. This estimation is based on the assumption that the majority of new work is undertaken in Greenfield developments.

- Protection of open sub-floor spaces – There will be an increase in cost to floor systems located less than 400 mm above ground level. Note termite provisions are consistent with this provisions and realigns with the 1999 version of the Standard. The extent to which dwellings are impacted by this cost is estimated to be 5% of all new dwellings in bushfire prone areas. The cost to a representative dwelling (220m²) is estimated to be \$6500. This is for changing to bushfire resistant timbers.
- Requirements for metal fittings for gas and water is a clarification and is also cost neutral.
- Removal of gap requirement with reliance on existing energy efficiency provisions in the NCC.
- Prohibiting eave lighting in BAL 40 and BAL – FZ is a clarification and is also cost neutral.
- New requirements for weather strips to have a flammability index of no greater than 5 for vehicle access doors – The incremental cost of weather strips with a flammability index of no greater than 5 is approximately \$100-200 per vehicle access door. For 20% of dwellings not using current industry practise.

Consultation Questions:

Do you agree with the cost estimates for each of the proposed changes?

Do you agree with the extent to which each change would apply to new buildings?

BENEFITS

Quantitative benefits

The objective of the NCC in relation to construction requirements in bushfire prone areas is to protect a building from the effects of bushfire and reduce the likelihood of fatalities arising from occupants of an affected building not evacuating a property prior to exposure from a bushfire event⁴.

The primary quantitative benefits will be assessed with consideration principally through the avoidance of loss of life through the avoidance of loss of property.

Research that has addressed fires since 1939 indicates a correlation between the loss of houses and the loss of life (Douglas and He, 2017). This risk increases with increased fire weather conditions, with little or no loss of life below a forest fire danger index of 40 or within housing beyond a 100m from bushland.

However the change in policy in some jurisdictions to require early evacuation of residents at the greatest risk following the Black Saturday fires in 2009 is expected to have the effect of reducing the loss of life but will increase property loss due to the evacuation of people who may otherwise defend a property. This was demonstrated during the Wye River fires in 2015 where the proportion of house losses was high but there were no fatalities

The following table shows the cumulative losses of houses and fatalities. This does not account for life loss associated with leaving a refuge early by road.

⁴ National Construction Code Volume 2 Part 2.3 Fire Safety – Explanatory Information. Page 83.

Distance from Bushland or forest	Cumulative % house loss	Cumulative % of fatalities that occurred within houses
10 m	40	76
30 m	60	88
50 m	70	95
100 m	85	100

- The changes proposed in the revised Standard are aimed at providing an incremental reduction in potential property losses
- to a lesser extent in life safety since early evacuation is expected to provide the largest reduction in loss of life
- improve the efficiency and cost effectiveness of the standard

The quantification of impacts associated with Option 2 will be undertaken during the public comment period and resolved at the Public Comment resolution meeting. The impact analysis will be revised following public consultation and include a more robust quantification of benefits including an analysis of the benefits associated with each increase in stringency in monetary terms.

Qualitative benefits

The qualitative benefits of Option 2 include:

- Vegetation assessment – There will be cost saving in some areas which is difficult to quantify. These reduced costs are based on vegetation types being placed into lower hazard categories with resultant lower BAL ratings.
- Rangeland classifications – reduced construction costs associated with rangeland landscapes for QLD, NSW, SA, NT and WA. Under the proposals, dwellings identified as being bushfire prone and greater than 50 metres from vegetation in this region will not be subject to bushfire construction requirements, and houses within 50 metres will have lower BAL levels for all vegetation types except for grasslands.
- Polycarbonate roofing - Allows greater variation in use of materials without further testing and reduces costs for ancillary structures.
- Format of construction requirements in tabular format – No cost implications but ease of use.
- Editorial changes – no specific cost but associated with ease of readability and better compliance.

Option 3: Reference revised AS 3959 without increases in stringency

This option would only amend the Standard to include stringency neutral or lower changes.

These would include:

- Clarification of vegetation assessment and BAL levels.
- Incorporating new allowances for glazed window configurations and polycarbonate roofing.
- Editorial issues and formatting including clarification of wording in some areas.

Costs

The incremental costs of this option when compared to the status quo would be zero as all changes are stringency neutral or lower.

Benefits

Under this option, the quantitative benefits associated with Option 2 associated with reducing life and building losses, which are yet to be demonstrated, will be not be realised by the improved protection of buildings from ember attack, although some savings will be made with improved site assessment (see below).

The following benefits will be achieved and are considered largely cost neutral:

- Requirements for metal fittings for gas and water is a clarification.
- Removal of gap requirement with reliance on existing energy efficiency provisions in the NCC.

The qualitative benefits of this option are associated with improvements set out within Option 2 and are summarised as:

- Vegetation assessment – There will be cost savings based on improved site assessment with resultant lower BAL ratings.
- Rangeland classifications – reduced construction costs associated with rangeland landscapes for QLD, NSW, SA, NT and WA.
- Polycarbonate roofing - Allows greater variation in use of materials without further testing and reduces costs for ancillary structures.
- Format of construction requirements in tabular format – ease of use.
- Editorial changes – ease of readability and better compliance.

CONSULTATION:

Explain what consultation has been undertaken to date. Detail who was consulted and in what manner. Note positive and negative feedback that has been received and whether the proposal has been revised as a result of consultation. If not all affected parties were consulted then explain why. Attach any supporting documentation.

Standards Australia and ABCB have conducted stakeholder forum in Canberra, and current Standard subject to public consultation. ABCB have made preliminary comments on issues raised during this exhibition and noted that some areas not supported for reform. These areas have not been incorporated into the changes proposed. Stakeholders include regulatory authorities, fire authorities, and industry and consumer groups.

It is proposed to consult widely on the revised draft after which further analysis will be required.

CONCLUSION AND RECOMMENDED OPTION:

Provide a concluding summary which details the recommended option and why. Highlight any concerns or gaps in information that may affect a decision, or further research that may be necessary.

Conclusion.

AS 3959-2009 has been in operation for seven years and in that period, there have been three amendments. Further amendment would provide some benefits in relation to site assessment and practical improvements associated with glazing systems. The Standard's Committee responsible for the development and maintenance of AS 3959 also consider some increases in stringency are necessary to assist with ember protection.

The proposed Option 2 is intended to provide an incremental reduction in potential property losses and to a lesser extent in life safety since early evacuation is expected to provide the largest reduction in loss of life, and improve the efficiency and cost effectiveness of the Standard. Option 2 also includes a number of stringency increases which are intended to provide an incremental improvement in housing survivability. However, the merits of these increases have yet to be demonstrated and are not supported by the analysis in its current form.

The ABCB office requested that the Standard's Committee provide information on the nature and extent of the problem associated with each proposed increase in stringency, however, the Committee have been unable to provide the necessary information and have recommended that these questions be further examined through consultation with industry and interested parties.

Option 3 is demonstrated through this PIA as being stringency neutral or lower and produces qualitative benefits that will assist practitioners in applying and interpreting the requirements of the Standard. Until it has been established that the increases in stringency can be justified in terms of producing a net benefit, Option 3 will be recommended.

All comments received through public comment period will be used to inform the final PIA and assist in the quantification of impacts.

IMPLEMENTATION AND REVIEW:

Explain how the preferred option is to be implemented, and the preferred timeline. If implemented, how and when will the changes (if any) be reviewed?

The NCC was last amended in 2016. Changes to the NCC are not anticipated, other than in extreme circumstances, until 2019. It is proposed that Standards Australia adopt the revision of AS3959 (for 2017) and that the revised document form an alternative solution to the BCA in the interim.

References:

Douglas G. and He Y. 2017. Moving Forward on a Verification Method for Bushfire Protection under the National Construction Code. *Fire Australia Conference*. Sydney, NSW.