

7 Appendix B – Bushfire Assessment Report

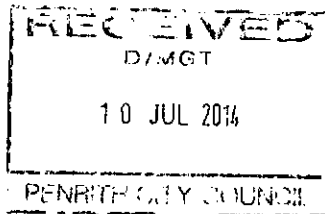
Bushfire Hazard Assessment Report

**Proposed:
Shed Building**

**At:
152 Park River Road,
Mulgoa**

Reference Number: 110440

*Prepared For:
Fairlight Group*



15th September 2011

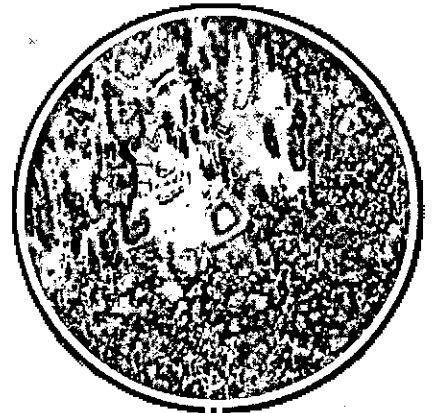


Prepared By:
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List of Abbreviations:

APZ	Asset Protection Zone
AS3959	Australian Standard 3959 – 2009 as amended.
BAL	Bushfire Attack Level
BCA	Building Code of Australia
BPMs	Bushfire Protection Measures
BPLM	Bushfire Prone Land Map
Council	Penrith Council
DA	Development Application
EP&A Act	<i>Environmental Planning and Assessment Act - 1979</i>
ESD	Ecologically Sustainable Development
FRNSW	Fire and Rescue NSW
IPA	Inner Protection Area
OPA	Outer Protection Area
PBP	<i>Planning for Bush Fire Protection – 2006</i>
ROW	Right of Way
RF Act	<i>Rural Fires Act - 1997</i>
RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose
SWS	Static Water Supply

1.0 Introduction

The development proposal relates to the construction of a shed building, inclusive of a caretakers residence, within an existing rural-residential allotment located at 152 Park River Road, Mulgoa. The site currently contains an existing sole occupancy dwelling and as such this application has been assessed as creating a detached dual occupancy dwelling.

The subject property has street frontage to Park River Road to the north and abuts private rural-residential allotments to the north, east and west and Blue Mountains National Park to the south. The vegetation identified as being the potential bushfire hazard is within the subject property, neighbouring private allotments, and Blue Mountains National Park to the east and south of the proposed building.

Penrith Council's Bushfire Prone Land Map identifies the subject property as containing Category 1 vegetation and its associated 100 metre buffer zone and therefore the application of *Planning for Bush Fire Protection - 2006* (PBP) must apply in this instance.

2.0 Purpose of Report

The purpose of this Bushfire Assessment Report is to provide the owners, The Rural Fire Service and Council with an independent bushfire hazard determination together with appropriate recommendations for both new building construction and bushfire mitigation measures considered necessary having regard to construction within a designated 'bushfire prone' area.

The recommendations contained within this report may assist in forming the basis of any specific construction conditions and/or bushfire mitigation measures that Council and/or the NSW Rural Fire Service may elect to place within any consent conditions issued for the subject Development Application.

3.0 Scope of this Report

The scope of this report is limited to providing a bushfire hazard assessment and recommendations for the subject property. Where reference has been made to the surrounding lands, this report does not purport to directly assess those lands; rather it may discuss bushfire impact and/or progression through those lands and possible bushfire impact to the subject property.

4.0 Referenced Documents and Persons

Comments provided are based on the requirements of the *Environmental Planning and Assessment Act 1979* (EP&A Act), the *Rural Fires Act 1997*, the *Rural Fires Regulation 2008*, the RFS document known as '*Planning for Bush Fire Protection 2006*' for the purposes of bushfire hazard determination and Australian Standard 3959 2009 titled 'Construction of buildings in bushfire-prone areas' as amended for building/structural provisions.

A company representative has made a site inspection of the subject property and the surrounding area. The plans relied upon for the assessment includes the Site Plan and Analysis and Floor Plan, Elevations and Section prepared by Fairlight Developments, job no. DODAA1, sheets 1-2, dated 18.07.11.

5.0 Compliance Tables & Notes

The following table sets out the projects compliance with *Planning for Bush Fire Protection – 2006*.

	North	East	South	West
Vegetation Structure	Maintained curtilages	Forest	Forest	Maintained curtilages
Slope	N/A	12 degrees down	12 degrees down	N/A
Required Asset Protection Zone	N/A	50 metres	50 metres	N/A
Proposed Asset Protection Zone	N/A	>100 metres	>64 metres	N/A
Significant Environmental Features	Park River Road / Neighbouring private allotment	Neighbouring private allotment	Neighbouring private allotment	Neighbouring private allotments
Threatened Species	APZ Existing	APZ Existing	APZ Existing	APZ Existing
Aboriginal Relics	APZ Existing	APZ Existing	APZ Existing	APZ Existing
Bushfire Attack Level	N/A	BAL Low	BAL 19	N/A
Required Construction Level	BAL 12.5	BAL 19	BAL 19	BAL 19
Proposed Construction Level	BAL 12.5	BAL 19	BAL 19	BAL 19

Asset Protection Zones Compliance

The proposed shed building was found to be located greater than 100 metres from the hazard interface to the east and >64 metres from the hazard interface to the south. The separation from the hazard interfaces includes maintained land within the subject property and land "equivalent to an Asset Protection Zone" within a neighbouring private rural-residential allotment.

Construction Level Compliance

The highest Bushfire Attack Level to the proposed building was determined to be 'BAL 19' and therefore construction must comply with that of section 3 & 6 of AS3959 – 2009 and the additional construction measures detailed in the addendum to Appendix 3 of PBP.

In applying section 3.5 of AS3959 – 2009 the north western façade of the proposed building has been downgraded to BAL 12.5 due to shielding provided by the building itself.

Access and Services

Guideline Ref.	Proposed Development Determinations	Compliance
Property Access (Driveway)	The most distant external point of the proposed building is greater than 70 metres of a public road supporting the operational use of fire fighting vehicles and therefore the Property Access requirements detailed in section 4.1.3 (2) of PBP are applicable.	Can Comply
Water Supply	The most distant external point of the proposed building is greater than 70 metres of a public road supporting the operational use of fire fighting vehicles and therefore a 20,000 litre Static Water Supply is required. The existing dams within the property satisfy this requirement and will be further supplemented by the installation of the proposed 100,000 litre underground water tank.	Yes
Evacuation	Evacuation is possible by utilising existing road infrastructure. It is encouraged that the occupants of the proposed dwellings complete a Bush Fire Safety Plan addressing "Prepare, Act, Survive" as advocated by the NSW RFS http://www.rfs.nsw.gov.au/ under publications / bushfire safety	Yes

6.0 Aerial view of the subject allotment



Image 01: Aerial view of the subject area from nearmap.com

7.0 Bushfire Hazard Assessment

7.01 Preface

Properties considered to be affected by possible bushfire impact are determined from the local Bushfire Prone Land Map as prepared by Council and or the Rural Fire Service. All property development within affected areas is subject to the conditions detailed in the document 'Planning for Bush Fire Protection 2006' (PBP). Set back distances for the purpose of creating Asset Protection Zones (APZ's) must be applied and any buildings must then conform to corresponding regulations detailed in Australian Standard 3959 'Construction of buildings in bushfire prone areas' 2009.

Planning for Bush Fire Protection 2006, (PBP) formally adopted on the 1st March 2007 and amended 3rd May 2010 (Appendix 3) provides for the protection of property and life (including fire-fighters and emergency service personnel) from bushfire impact.

The thrust of the document is to ensure that developers of new properties or sub-divisions include the constraints associated with the construction of buildings in bushfire prone areas within their proposed development sites. PBP is applicable to proposed development inside a determined Category 1 or 2 areas and also inside a buffer zone radius of 100m from a Category 1 bushfire area or 30m from a Category 2 bushfire area.

The document also acknowledges 'infill' developments associated with re-development of existing properties and allows some higher levels of building safety where the increased 'set backs' (APZ's) may not be achievable.

The subject development relates to the construction of a shed building, inclusive of a caretakers residence, within an existing rural-residential allotment. Although this type of development is considered infill under s79BA of the *Environmental Planning and Assessment Act 1979*, to accord with PBP the development has been assessed as if it were submitted under s100B of the *Rural Fires Act 1997* for a new rural-residential subdivision.

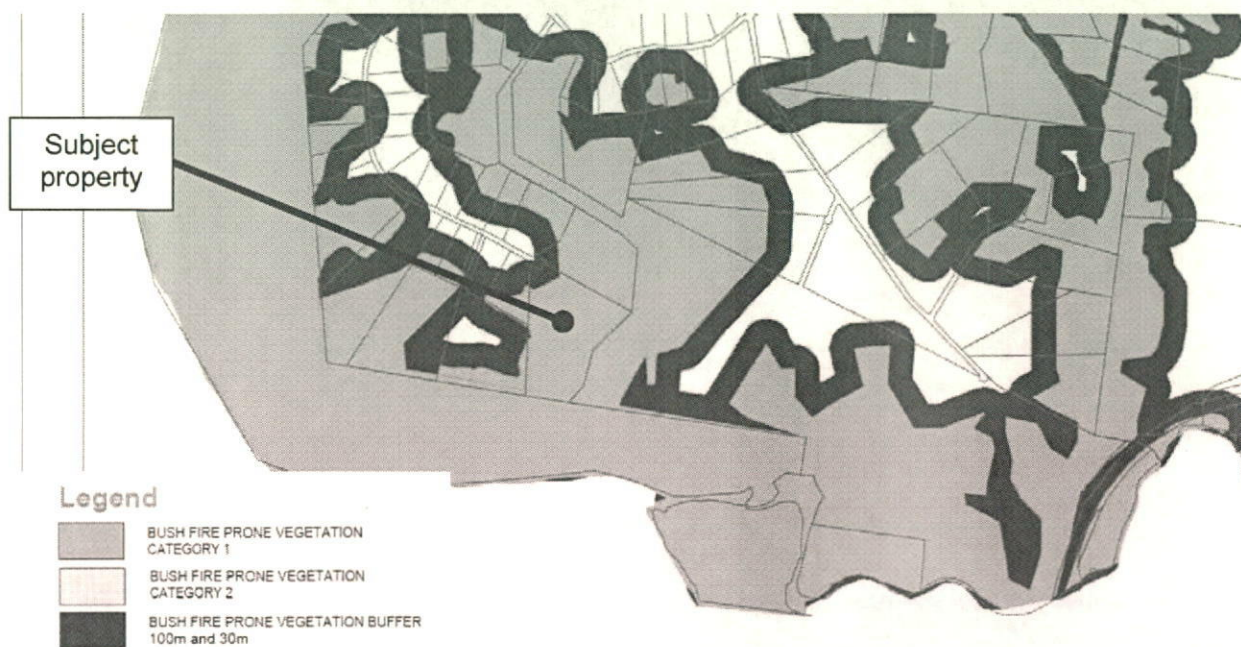
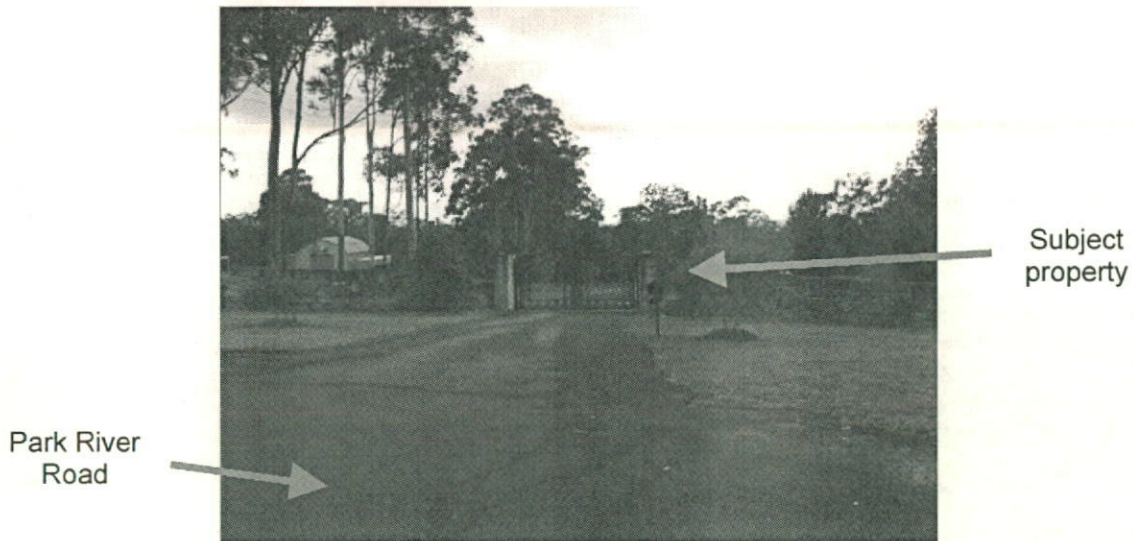


Image 02: Extract from Penrith Council's Bushfire Prone Land Map

7.02 Location

The subject property is known as 152 Park River Road, Mulgoa (Lot 59 in DP 241749) and is a rural-residential allotment located within Penrith Councils Local Government Area. The subject property has street frontage to Park River Road to the north and abuts private rural-residential allotments to the north, east and west and Blue Mountains National Park to the south.

The proposed building is susceptible to possible bushfire impact from vegetation within the subject property, neighbouring private allotments and Blue Mountains National Park to the east and south.



Photograph 01: View southeast from Park River Road toward the subject property

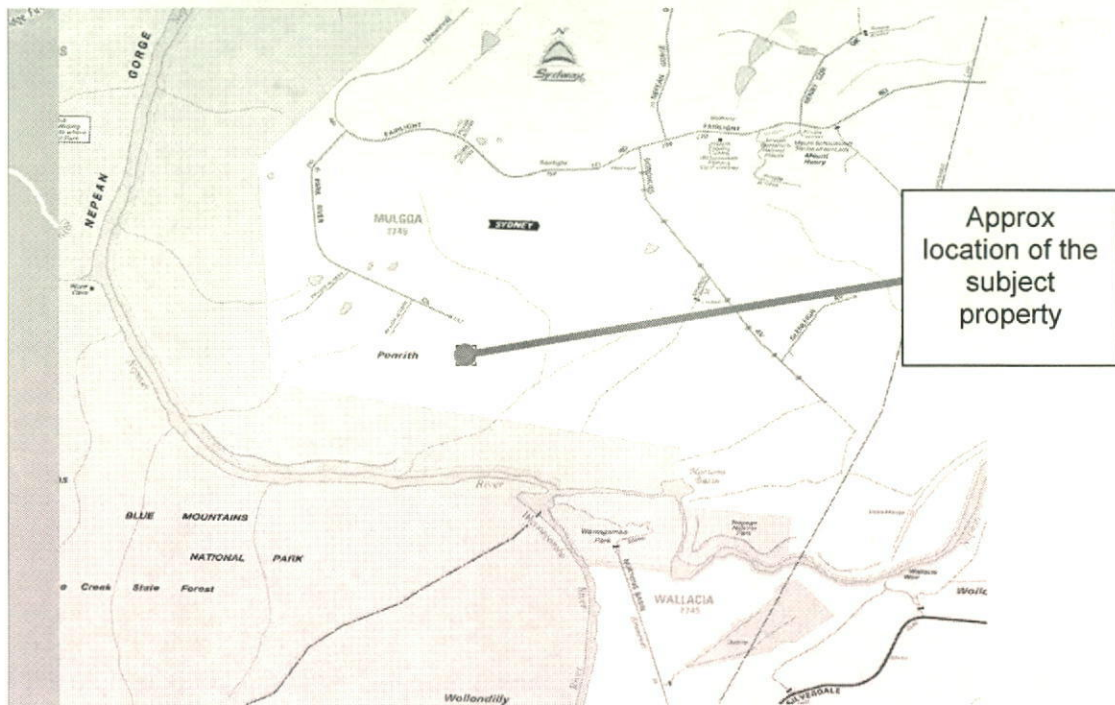


Image 03: Extract from street-directory.com.au

7.03 Vegetation

The predominate vegetation around the existing dwelling and proposed development site within the subject property was found to consist of maintained lawns and gardens.

The vegetation that is posing a threat to the proposed building is located within the subject property, neighbouring private allotments and Blue Mountains National Park to the east and south. The vegetation posing a hazard was found to consist of trees 10-30 metres in height with a 50-70% foliage cover and an understorey of low trees, shrubs and grasses.

For the purpose of assessment under PBP the vegetation posing a hazard to the east and south has been determined to be Forest.



Photograph 02: View southeast from within the subject property



Photograph 03: View south from within the subject property

7.04 Slope and Topography

The slope that would most significantly affect fire behaviour must be assessed for at least 100 metres from the proposed building.

The most significant bushfire impact from the east and south is expected to be a bushfire travelling upslope toward the proposed building. The slope that would most significantly influence bushfire impact was determined from topographic imagery to be:

- 12 degrees down slope within the hazard to the east and south



12 degrees down

Photograph 04: View south from within the subject property

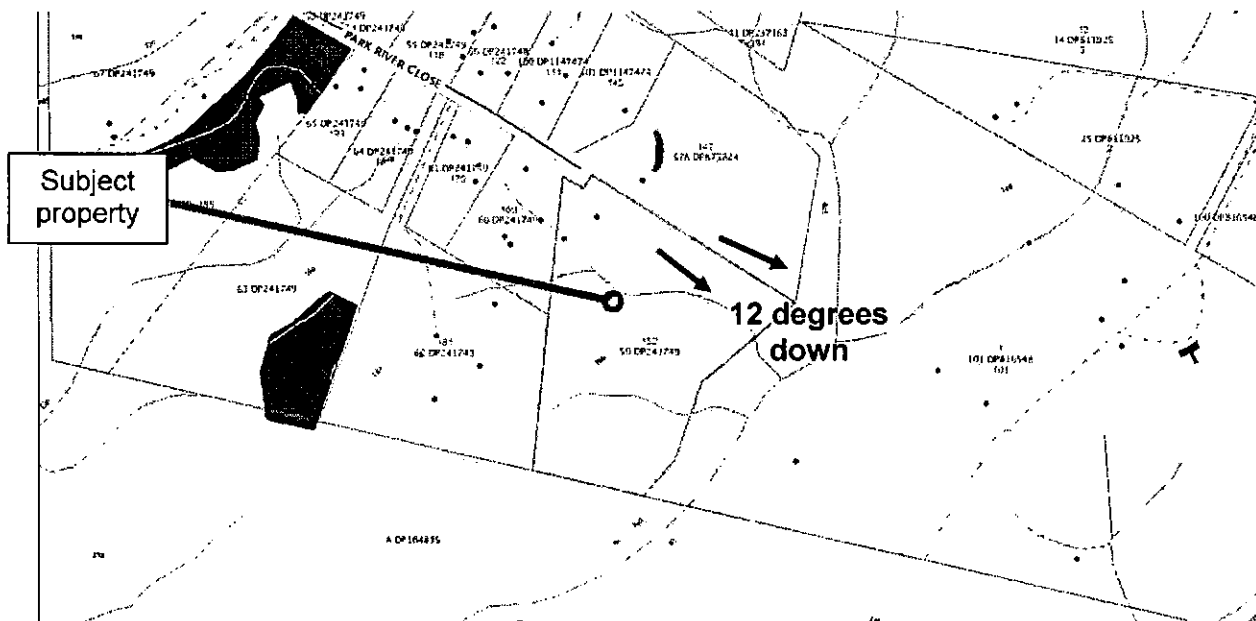


Image 04: Extract from Land and Property Management Authority Spatial Information Exchange

7.05 Asset Protection Zones

The proposed building is within the existing pattern of development. The required Asset Protection Zones (APZ) were determined from Appendix 2 of *Planning for Bush Fire Protection 2006* to be 50 metres, consisting of a 25 metre Inner Protection Area (IPA) and 25 metre Outer Protection Area (OPA).

The proposed building was found to be located >100 metres from the hazard interface to the east and >64 metres from the hazard interface to the south. The existing Asset Protection Zone includes maintained land within the subject property and land "equivalent to an Asset Protection Zone" within a neighbouring private rural-residential allotment.

All Asset Protection Zones within the subject property must be maintained in accordance with the NSW Rural Fire Service's document 'Standards for Asset Protection Zones'. Note: This will allow for gardens (including native trees and shrubs) managed as clumps or islands, covering of no more than 20% of the area.



Photograph 05: View east from within the subject property



Photograph 05: View northwest from within the subject property

7.06 Fire Fighting Water Supply

The most distant external point of the building footprint will be greater than 70 metres from a public road supporting the operational use of fire fighting vehicles and therefore a 20,000 litre Static Water Supply is required. The existing two (2) dams onsite satisfy this required. In addition to the existing water supply it is proposed as part of this application to install a 100,000 litre underground water tank.

The existing water supply is considered adequate for the replenishment of attending fire services.



Photograph 06: View of one of the large dams onsite

7.07 Property Access – Fire Services & Evacuation

The subject property has street frontage to Park River Road to the north. Persons seeking to egress the proposed building will be able to do so via the access drive and Park River Road.

The most distant external point of the building footprint will be greater than 70 metres of a public road supporting the operational use of fire fighting vehicles and therefore the Property Access requirements detailed in section 4.1.3 (2) of PBP are applicable to the access drive.

Fire Services have free vehicle access around the proposed building footprint. Attending fire crews can access the hazard via the subject property or neighbouring private allotments for hazard reduction or fire suppression activities.

Access for Fire Services and opportunities for occupant evacuation are considered adequate for this property.

8.0 Site & Bushfire Hazard Determination

8.01 Planning for Bush Fire Protection - 2006

'Planning for Bush Fire Protection – 2006' (PBP) is applicable to those lands determined as being within a 'bushfire prone area' in accordance with a local Bushfire Prone Land Map as provided by the Rural Fire Service and Council.

The most appropriate method of determining site bushfire hazard under the terms of PBP is to consider the site in a singular form.

Bushfire prone areas are defined as those areas;

- *within or within 100m of high or medium bushfire hazards; or*
- *within or within 30m of low bushfire hazards.*

In this instance the subject property has been identified as being bushfire prone land therefore it is appropriate to apply PBP as follows:

Eastern:

- a) Vegetation Structure Forest
- b) Slope 12 degrees down
- c) A 50 metre APZ is required
- d) A >100 metre APZ is available
- e) The highest Bushfire Attack Level was determined to be 'BAL Low'

Southern:

- a) Vegetation Structure Forest
- b) Slope 12 degrees down
- c) A 50 metre APZ is required
- d) A >64 metre APZ is available
- e) The highest Bushfire Attack Level was determined to be 'BAL 19'

8.02 Australian Standard AS 3959 – 2009 'Construction of buildings in bushfire –prone areas'

Australian Standard 3959 – 2009 'Construction of buildings in bushfire-prone areas' provides for six (6) levels of building construction these being BAL - Low, BAL - 12.5, BAL - 19, BAL - 29, BAL - 40 and BAL - FZ. The Australian Standard 3959 specifies construction standards for buildings within various Bushfire Attack Levels as determined by the *Planning for Bush Fire Protection – 2006* document. The NSW Rural Fire Service will not accept deemed to satisfy provisions for BAL Flame Zone and therefore have a NSW variation to the listed standard provisions of BAL FZ under AS3959 - 2009.

8.03 Correlation between bushfire impact and AS3959

Bushfire Attack Level	Maximum radiant heat impact (kW/m ²)	Level of construction under AS3959-2009
Low		No special construction requirements
12.5	≤12.5	BAL - 12.5
19	12.6 to 19.0	BAL - 19
29	19.1 to 29.0	BAL - 29
40	29.1 to 40.0	BAL - 40
Flame Zone	>40.0	BAL FZ No deemed to satisfy provisions

8.04 Site Specific Bushfire Hazard Determination

All property development must be assessed on an individual basis as broad-brush approaches of documents such as PBP may not be applicable in every instance. The proposed development located at 152 Park River Road, Mulgoa was assessed against the requirements of *Planning for Bush Fire Protection 2006* noting the following:

- a) Existing water supply for fire fighting purposes is adequate and will be supplemented as part of this application.
- b) Access to the subject property is available from Park River Road.
- c) Vehicle access to the hazard is available via the subject site.
- d) The proposed development is within the existing pattern of development.
- e) Recommendations to maintain the Asset Protection Zones within the subject property will be included.
- f) The access drive will need to comply with the requirements for Property Access as detailed in section 4.1.3(2) of PBP.

8.05 Viable Construction Method

The objectives of *Planning for Bush Fire Protection – 2006* are for the protection of life including fire fighters. Provided these objectives can be met the construction of buildings is feasible and both the Rural Fire Service and Council should be in a position to consider such applications.

The highest Bushfire Attack Level to the proposed building was determined to be 'BAL 19' and therefore construction must comply with that of section 3 & 6 of AS3959 – 2009 and the additional construction measures detailed in the addendum to Appendix 3 of PBP.

In applying section 3.5 of AS3959 – 2009 the north western façade of the proposed building has been downgraded to BAL 12.5 due to shielding provided by the building itself.

8.06 Risk Rating

In assessing the bushfire threat to the site and its structures it is important to have a holistic approach and assess the risk of a bushfire occurring and impacting the subject property. It is also important to include the risk the site poses to neighbouring properties.

Image 05 is an overview of risk to the proposed building. This model takes a holistic approach and assesses the risk of a bushfire occurring and impacting the site. This risk level can be reduced by either an increase in preparedness by the owners/occupants of the building (e.g. good house keeping, maintained lawns & bushfire awareness) and/or hazard reduction activities by local fire agencies. Alternatively this risk level can increase if the preparedness level decreases and/or hazard reduction activities are neglected for the area.

The below matrix is for risk only, it does not reflect the Bushfire Attack Level determined within PBP 2006. Note: All new work will comply with the requirements of *Planning for Bush Fire Protection 2006*.

Consequence \ Likelihood	Minor	Moderate	Major	Catastrophic
Almost certain	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	Extreme
Possible	Insignificant	Low	Medium	High
Unlikely	Insignificant	Insignificant	Low	Medium

Image 05: Risk Matrix

9.0 Recommendations

The following recommendations are provided as the minimum necessary for compliance with *Planning for Bush Fire Protection 2006* and Australian Standard 3959 'Construction of buildings in bushfire-prone areas' 2009. Additional recommendations are provided to supplement these minimum requirements where considered necessary.

Asset Protection Zones

1. That the proposed building be constructed within the building footprint indicated on the Site Plan and Analysis prepared by Fairlight Developments, job no. DODAA1, dated 18.07.11.
2. That all grounds from the proposed building to the northern, eastern and western boundaries and for a distance of 64 metres to the south be maintained as an Asset Protection Zone as detailed in the NSW Rural Fire Service's document 'Standards for Asset Protection Zones' and Appendix 2 of *Planning for Bush Fire Protection 2006*.

Construction

3. That the roof and north eastern, south eastern and south western elevations of the proposed building be constructed to that of Section 3 and BAL 19 under Section 6 of AS3959 – 2009.
4. That the north western elevation of the proposed building be constructed to that of Section 3 and BAL 12.5 under Section 5 of AS3959 – 2009.
5. That the proposed building be constructed to the 'Additional Construction Requirements' detailed in A3.7 of the Addendum to Appendix 3 of *Planning for Bush Fire Protection 2006* and NSW Rural Fire Service Fast Facts, Development Control Notes and Practice Notes.

Access

6. That the access drive complies with the requirements for Property Access as detailed in section 4.1.3 (2) of *Planning for Bush Fire Protection 2006*, in particular:
 - A minimum carriageway width of four metres.
 - A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches.
 - Curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.
 - The minimum distance between inner and outer curves is six metres.
 - The crossfall is not more than 10 degrees.
 - Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads.
 - Internal roads for rural properties provide a loop road around any dwelling or incorporate a turning circle with a minimum 12 metre outer radius (or suitable turning provisions for a fire appliance).

Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.

Landscaping

7. That any new landscaping within the subject property is to comply with Appendix 5 'Landscaping and Property Maintenance' of *Planning for Bush Fire Protection 2006*.

Gas (where applicable)

8. That reticulated or bottled gas is installed and maintained in accordance with AS 1596 and the requirements of relevant authorities.
 - Metal piping is to be used.
 - All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation.
 - If gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal.
 - Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used.

10.0 Conclusion

Given that the property is deemed bushfire prone under Penrith Council's Bushfire Prone Land Map any development would need to meet the requirements of *Planning for Bush Fire Protection* 2006 and of the construction requirements of Australian Standard 3959 'Construction of buildings in bushfire-prone areas' 2009. The determination of any bushfire hazard must be made on a site-specific basis that includes an assessment of the local bushland area and its possible impact to the subject property.

The subject property is a large rural-residential allotment within an area of similar properties. The hazard was identified as being located within the subject property, neighbouring private allotments and Blue Mountains National Park to the east and south of the proposed building. The vegetation posing a hazard to the east and south was determined to be Forest.

The required Asset Protection Zone (APZ) was determined from Appendix 2 of *Planning for Bush Fire Protection* 2006 to be 50 metres. The proposed building was found to be located >100 metres from the hazard interface to the east and >64 metres from the hazard interface to the south. The existing Asset Protection Zones include maintained land within the subject property and land "equivalent to an Asset Protection Zone" within a neighbouring private rural-residential allotment.

The highest Bushfire Attack Level to the proposed building was determined to be 'BAL 19' and therefore construction must comply with that of section 3 & 6 of AS3959 – 2009 and the additional construction measures detailed in the addendum to Appendix 3 of PBP. In applying section 3.5 of AS3959 – 2009 the north western façade of the proposed building has been downgraded to BAL 12.5 due to shielding provided by the building itself.

The required access provisions and existing water supply are considered adequate for attending fire services.

In accordance with the bushfire safety measures contained in this report, and consideration of the site specific bushfire risk assessment it is my opinion that when combined, they will provide a reasonable and satisfactory level of bushfire protection to the subject development and also satisfy both the Rural Fire Service's concerns and those of Council in this area.

I am therefore in support of the development application.

Should you have any enquiries regarding this project please contact me at our office.

Prepared by
Building Code & Bushfire Hazard Solutions



Stuart McMonnies

G. D. Design in Bushfire Prone Areas.
Certificate IV Fire Technology
Fire Protection Association of Australia BPAD – A Certified Practitioner
Certification number – BPD – PA-09400

Reviewed by
Building Code & Bushfire Hazard Solutions P/L



Wayne Tucker

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Disclaimer:

Quote from *Planning for Bush Fire Protection* 2006, 'Any representation, statement opinion, or advice expressed or implied in this publication is made in good faith on the basis that the State of New East Wales, the NSW Rural Fire Service, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice referred to above.'

Similarly the interpretations and opinions provided by Building Code and Bushfire Hazard Solutions in regard to bushfire protection are also given in the same good faith.

11.0 Annexure 01

List of Referenced Documents

- a) *Environmental Planning and Assessment Act* 1979
- b) *Rural Fires Act* 1997 as amended
- c) '*Planning for Bush Fire Protection*' 2006 - NSW Rural Fire Services & Planning NSW
- d) 'Construction of buildings in bushfire-prone areas' - AS 3959 – 2009 (as - amended) – Standards Australia
- e) 'Penrith Council's Bushfire Prone Land Map'
- f) Acknowledgements to:
 - UBD Directories
 - NSW Department of Lands – SixViewer
 - Street-directory.com.au

Attachments

Attachment 01: 79BA Compliance Certificate



Building Code & Bushfire Hazard Solutions

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15th September 2011

79BA Certificate

Thank you for engaging us to provide these services for you. The following certificate pertains to the proposed development having regards to bushfire mitigation matters and the requirements and specifications of the NSW Rural Fire Service under section 79BA of the Environmental Planning and Assessment Act 1979.

Property description	152 Park River Road, Mulgoa	Lot 59 in DP 241749
Assessed by	Stuart McMonnies	BPAD PA 09400
Proposed Development	Proposed Shed Building	Our Ref 110440

Site Assessment			
Aspect	Effective hazard slope	Vegetation classification	Asset Protection Zone (Separation from the hazard)
East	12 degrees down	Forest	50 metres
South	12 degrees down	Forest	50 metres

Plans provided for review	Yes – Fairlight Developments Drg No DODAA1, DODAA2 and CLAIR
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BAL ASSESSMENT	BAL 19
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Does the development comply with the acceptable solutions for Planning for Bushfire Protection 2006.	YES
Can the proposed development comply with BAL 12.5 under Australian Standard 3959 'Construction of buildings in bushfire-prone areas' 2009	YES

Additional notes or comments:

N/A

Recommendations:

It is therefore our opinion that the development consent should include the following conditions.

Asset Protection Zones

1. That the proposed building be constructed within the building footprint indicated on the Site Plan and Analysis prepared by Fairlight Developments, job no. DODAA1, dated 18.07.11.
2. That all grounds from the proposed building to the northern, eastern and western boundaries and for a distance of 64 metres to the south be maintained as an Asset Protection Zone as detailed in the NSW Rural Fire Service's document 'Standards for Asset Protection Zones' and Appendix 2 of *Planning for Bush Fire Protection 2006*.

Construction

3. That the roof and north eastern, south eastern and south western elevations of the proposed building be constructed to that of Section 3 and BAL 19 under Section 6 of AS3959 – 2009.
4. That the north western elevation of the proposed building be constructed to that of Section 3 and BAL 12.5 under Section 5 of AS3959 – 2009.
5. That the proposed building be constructed to the 'Additional Construction Requirements' detailed in A3.7 of the Addendum to Appendix 3 of *Planning for Bush Fire Protection 2006* and NSW Rural Fire Service Fast Facts, Development Control Notes and Practice Notes.

Access

6. That the access drive complies with the requirements for Property Access as detailed in section 4.1.3 (2) of *Planning for Bush Fire Protection 2006*, in particular:
 - A minimum carriageway width of four metres.
 - A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches.
 - Curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.
 - The minimum distance between inner and outer curves is six metres.
 - The crossfall is not more than 10 degrees.
 - Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads.
 - Internal roads for rural properties provide a loop road around any dwelling or incorporate a turning circle with a minimum 12 metre outer radius (or suitable turning provisions for a fire appliance).

Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.

Landscaping

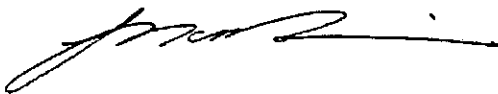
7. That any new landscaping within the subject property is to comply with Appendix 5 'Landscaping and Property Maintenance' of *Planning for Bush Fire Protection 2006*.

Gas (where applicable)

8. That reticulated or bottled gas is installed and maintained in accordance with AS 1596 and the requirements of relevant authorities.
 - Metal piping is to be used.
 - All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation.
 - If gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal.
 - Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used.

Should you have any questions please do not hesitate in contacting me.

Prepared by
Building Code & Bushfire Hazard Solutions P/L



Stuart McMonnies
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