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ABN 47 857 816 658

Building Construction in Bush Fire Prone Areas

Proposed Alterations and Additions

Ref No. 17.10.412

Address Lot 11 DP 1209742 401 – 435 Hoxton Park Road, Hinchinbrook NSW 2168

For Good Samaritan Catholic College

The site was inspected on 8th November, 2017

Report Preparation

Craig Burley

Grad Dip Design for Bushfire Prone Areas FPAA Certified BPAD – Level 3 Practitioner

Executive Summary

The Proposal is for the construction of alterations and additions to the existing college buildings on the grounds of the subject allotment.

The proposed development **will fully conform** to the requirements of *Planning for Bush Fire Protection* 2006 (PBP2006) based on the scope of works submitted for this bushfire assessment and the recommendations included within this report.

Asset Protection Zones for the proposed development are required to satisfy section 4.2.7 Asset Protection Zones of PBP2006 for a Special Fire Protection Purpose.

Compliance with the relevant requirements and is achieved by the existing management practices for maintaining the grounds within the subject allotment and existing conditions of adjoining lands.

Access and Egress to the site is provided directly from a two lane public road with an all-weather surface. Compliance with relevant requirements is achieved by existing road conditions.

Levels of Construction shall be undertaken to satisfy the provisions of the National Construction Code. **Compliance** for construction required by PBP2006 will be **achieved** by the incorporation of the recommendations included within this report.

Water, Gas and Electricity Supplies - Compliance for service supplies as required by PBP2006 will be achieved by the incorporation of the recommendations included within this report.

Emergency Management will be undertaken to satisfy the acceptable solutions contained within section 4.2.7 of PBP2006. This report recommends that an emergency/evacuation plan is prepared in accordance with the NSW RFS *Guide to Develop a: Bushfire Evacuation Plan*. Compliance for emergency management required by PBP2006 will be achieved by the incorporation of the recommendations included within this report

1.0 Introduction

We have been engaged by Sydney Catholic Schools being the owners of the Good Samaritan Catholic College to prepare a Bushfire Hazard Assessment Report with respect of compliance to regulatory bushfire protection measures for the construction of proposed alterations and additions to existing buildings within the grounds of the subject allotment.

The site has been identified as being bushfire prone land and therefore the legislative requirements for the proposed development are applicable.

This style of development for the purposes of being a school facility is referred to as being a Special Fire Protection Purpose (SFPP) and, according to the provisions of *Planning for Bush Fire Protection* 2006 (PBP 2006), the requirements for bushfire protection measures are greater than for a normal residential development.

This Bushfire Hazard Assessment Report is intended to be submitted to the Liverpool City Council as a supplement within a development application for the establishment of the alterations and additions to the College within the subject site.

1.1 Purpose of Report

- To determine the vegetation type, the expected fire behaviour and the threat to the proposal
- To assess the proposal with reference to *Planning for Bushfire Protection* 2006
- To assess the proposed construction with reference to the National Construction Code
- To determine the level of construction with reference to AS 3959-2009
 Construction of buildings in bushfire prone areas
- To identify any other such measures as to improve the chances of building and occupant survival during a bushfire event
- To provide information with respect to bushfire related matters for the development that would assist the Commissioner of the NSW Rural Fire Service for the issuance of a Bushfire Safety Authority
- To provide information with respect to bushfire related matters for the development that would assist the consent authority Liverpool City Council in the determination of the development application subject to this proposal.

1.2 Scope of Report

The scope of this report is limited to the bushfire hazard assessment for the proposed development and only contains comments for the subject property. Where reference is made to adjacent or adjoining lands, this report does not purport to assess those lands; rather it may discuss bushfire progression on and through those lands with the possible bushfire impact to the subject property and the proposed development.

1.3 Methodology

An initial site inspection for the purpose of assessing bushfire related matters affecting this site was conducted on the 8th November, 2017 and a review of the proposed concept construction plans and ancillary works as prepared by JDH Architects has taken place.

An assessment of slope was conducted out to a distance of 100 metres and assessment of vegetation to a distance of 140 metres from the proposed development.

The findings were related and assessed with reference to *Planning for Bushfire Protection* 2006, Appendix 2, the Addendum to Appendix 3 of *Planning for Bush Fire Protection* 2006 and AS3959-2009 *Construction of buildings in bushfire prone areas* for the formulation of the Bushfire Hazard Assessment.

This report has also been prepared having consideration to the requirements of Clause 44 of the *Rural Fire Service Regulation* 2008 for the purpose of satisfying the requirements of section 100b of the *Rural Fires Act* 1997.

1.4 The Proposal

The proposal as indicated by consultation with the engaged architects being JDH Architects and the perusal of plans supplied is for the construction of the following;

- Extension of existing buildings with in total 21 additional General Learning Areas (GLA), 18 GLAs on top of the TAS building and three additional GLAs on the first floor of Block C
- Changes and alterations to existing buildings
- Construction of a covered walkway connecting the Trade Training Centre and the Good Samaritan Catholic College

Whilst the external finishes have not been detailed upon the plans supplied it is my understanding that these shall be all non-combustible. An extract of the site plan showing the proposed scope of works location is shown over.



Figure 1; Extract of Site plan ex JDH Architects

1.5 Regulatory Controls

The preparation of this Bushfire Hazard Assessment Report has given consideration to the various legislative and regulatory requirements including the *Environmental Planning and Assessment Act 1979*, the *Rural Fires Act 1997*, the National Construction Code, *Planning for Bush Fire Protection* 2006, AS 3959-2009 *Construction of buildings in bushfire prone areas*.

The proposal being an integrated development will require the issuance of a Bushfire Safety Authority by the Commissioner of the NSW Rural Fire Service under the provisions of section 100b Rural Fire Act 1997.

Development applications on bushfire prone land must be accompanied by a Bushfire Hazard Assessment within the Statement of Environmental Effects demonstrating compliance with the aims and objectives of "Planning for Bushfire Protection" and the specific objectives and performance criteria for the land use proposed.

2.0 Site and Adjacent Developments

The following seeks to describe the site, the adjoining lands and land uses effective upon the development proposal.

2.1 Site Description

The site is identified as being within the grounds of Good Samaritan Catholic College

Lot 11 DP 1209742 401-435 Hoxton Park Road, Hinchinbrook NSW 2168 LGA Liverpool City Council

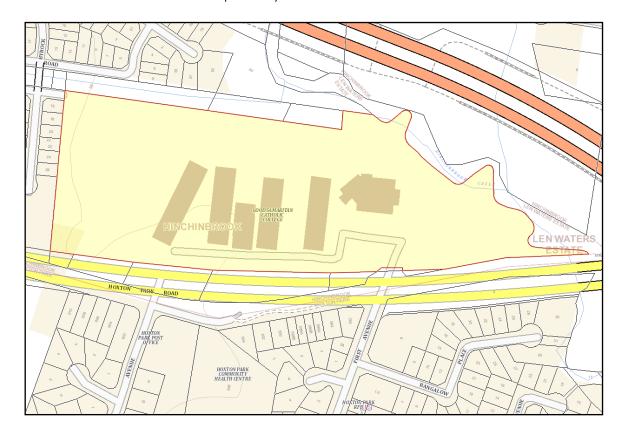


Figure 2; Locality Map (north to top of page) (Source; Dept of Lands)

The subject allotment is a parcel of land currently used for educational purposes being the Good Samaritan Catholic College and is located on the northern side of Hoxton Park Road.

The total area of the subject allotment is approximately 7.4 hectares which within itself contains no significant areas of bushfire hazardous vegetation.

The site is currently dominated by the existing buildings which support the college and an adjoining complex identified as being the Trade Training Centre.

An extract of the Liverpool Bushfire Prone Land map shows the site is only partially impacted by bushfire prone land being a small section of category 1 vegetation (shown red) and category 1 vegetation buffer zone (shown yellow) across the northern and eastern sections of the overall site.

The site inspection and interpretation of aerial photography for the subject allotment confirms that this parcel is reasonably depicted upon this map.

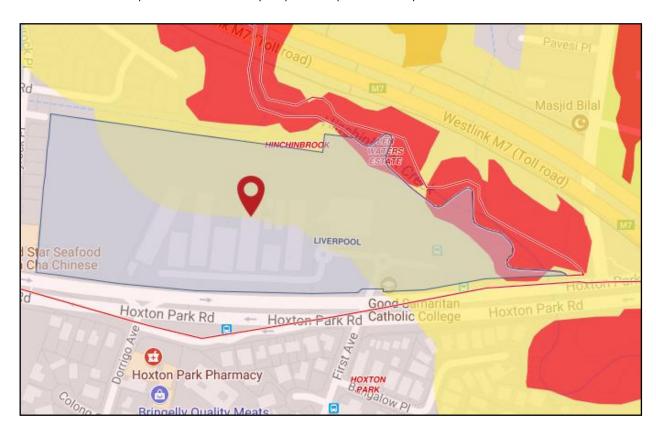


Figure 3; Extract of Bushfire Prone Land Map (source; I Planing)

The provision of water, electricity and phone is available to the proposal by existing infrastructure within the adjoining carriageways.

2.2 Any significant environmental features

The entire site is a combination of the existing building structure, existing playing fields, paved driveway surfaces with very limited areas of landscaping.

2.3 Threatened species

Given the site conditions it would be reasonable to assume that there are no threatened species of flora or fauna present.

2.4 Indigenous relics

Whilst there have been no details of any archaeological assessments provided by the client to assist in the preparation of this assessment. It would be reasonable to assume that there are no known or apparent items/relics of Indigenous heritage significance known to exist on the site.

2.5 Description of Adjoining Lands

To the north and east of the subject allotment are the areas of vegetation hazard effective upon the proposed development. This is initially a narrow section of grassland within a drainage corridor which leads into Hinchinbrook Creek.

Beyond this is again a relatively narrow section of forest vegetation that is bounded to the north and east by the M7 Motorway.

To the south and west is a large and expansive area of existing residential development that contains no significant sections of bushfire hazardous vegetation effective upon the proposed development.



Figure 4; Aerial indicating subject allotment and adjoining lands ex Nearmap

2.6 Classification of Vegetation and Slope

The vegetation was assessed for a distance of 140 metres from the proposed development building footprint in each of the following directions. To the north, east, south and west being the general direction adjacent and away from the proposed building elevations within such building footprint.



Figure 5: Vegetation study area 140 metre radius approx. Image ex Dept Lands

Proposed works Forest Grassland

To the north of the subject allotment are the areas of fire hazardous vegetation and these areas should be classified as being a vegetation formation of Forest and Grassland as illustrated above in figure 5.

The closest section of consistent forest vegetation is located approximately 85.0 metres to the northeast of the proposed construction with the grassland approximately 58.0 metres to the north.

There is no bushfire hazardous vegetation effective in any other direction and to each other direction from the subject allotment is well established residential development.

The effective slope of the land, out to a distance of 100 metres within the area of hazard (that is, the slope of the land most likely to influence bushfire behaviour for the purposes of calculating Asset Protection Zones), has been assessed (using a clinometer) and desktop analysis as being a level slope (transect A) in a northerly direction and upslope (transect B) in a north easterly direction. (see figure 6).

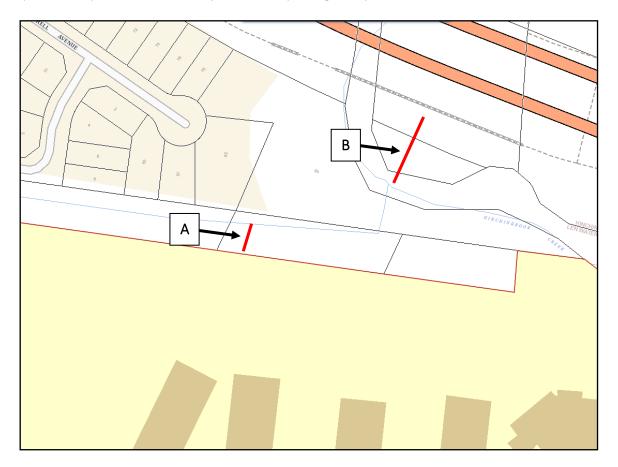


Figure 6; Slope analysis study area

3.0 Bushfire Assessment

The effects of a bushfire event can have devastating consequences for personal safety and structures in the paths of such events. This has been recognised by the planning and fire authorities for many years and as a part of bushfire protection measures the NSW government in conjunction with the NSW Rural Fire Service instigated controls to better prepare our communities.

The recent severe bushfire events such as those in Canberra in 2003 and Victoria in 2009 are but a few examples of the consequences of such events and amplify the needs for creating developments that may try and better protect our community.

The document *Planing for Bush Fire Protection* 2006 sets out the required bushfire protection measures for all developments in bushfire prone areas and the following seeks to identify any requirements for the proposed scope of works.

3.1 The extent to which the development is to provide setbacks, including Asset Protection Zones

The site is located within the Liverpool local government area, in the Greater Sydney Fire Weather area, and is subject to an FDI rating of 100 according to Table A2.3 of PBP2006.

Based upon the provisions of PBP2006, the asset protection zone required to be provided between the Forest vegetation hazard and the proposed new works is 30 metres and 10 metres from the area of Grassland.

Based upon the plans referenced for the purposes of this assessment (see Appendix 1), the separation distance from the closest section of the proposed development to the areas of vegetation located to the north will be not less than 58.0 metres.

Under the current landscaping management practices and existing ground conditions the area between the proposed works and the area of identified vegetation hazard satisfies the provisions for an asset protection zone.

This report will only recommend that the ongoing management of any vegetation within the subject site should be in accordance with the requirements of the NSW Rural Fire Service document entitled *Standards for Asset Protection Zones* (2005). This will satisfy the relevant performance criteria of *Planning for Bush Fire Protection* 2006.

The following are the requirements for asset protection zone inner protection areas as described within the documents *Planning for Bush Fire Protection* 2006 and NSW RFS Standards for Asset Protection Zones.

Inner Protection Area

An IPA should provide a tree canopy cover of less than 15% and should be located greater than 2.0 metres from any part of the roof line of a dwelling. Garden beds of

flammable shrubs should not be located under trees and should be located not closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2.0 metres above the ground.

Ground fuels such as fallen leaves, twigs (less than 6mm in diameter) and branches should be removed on a regular basis, and grass needs to be kept closely mown and where possible green.

The creation and continued maintenance of the full asset protection zone is one of the primary factors in bushfire protection measures for developments in bushfire prone areas.

3.2 Fire fighting water supply

The subject site is serviced by mains reticulated water supply.

A search of the Sydney Water Plans shows that there are a series of existing roadside hydrants located within road verge area of Hoxton Park Road.

It is assumed by this report that the existing building, location of hydrants and onsite hydrant boosters currently would satisfy the requirements for the National Construction Code and it is not envisaged that a bushfire fighting tanker will need to be replenished within the general area of the College.

3.3 Public road capacity to handle increased traffic volume during a bushfire event

Vehicular access to the site is from Hoxton Park Road which is one of the main thoroughfares through the suburb of Hinchinbrook.

Whilst this road may be effected by a bushfire event to the southeast it is not envisaged that direct access to the site from any other direction would be severely affected by the mechanisms of bushfire attack although some smoke limited inundation may occur.

3.4 Public road links to fire trail network and two way access

The objective for provision of a dedicated fire trail system is to assist fire fighters in either offensive or defensive fire fighting. In addition a fire trail may be incorporated into a development to define the asset protection zone and to provide access for maintenance.

While there is no existing fire trail in the proximity of the subject allotment, the clear existing access along the site boundaries is considered adequate for fire fighting access purposes.

Therefore access to all areas of the new centre is achieved without the need for a fire trail system and the above noted objective is satisfied by existing site conditions.

3.5 Adequacy of access and egress from the development site for emergency response

The system of public roads to the site appears to be adequate under most conditions to allow for access and egress for the site for emergency service vehicles.

3.6 Adequacy of bushfire maintenance plans and fire emergency procedures for the development site

It is assumed that at present that there are no bushfire management plans and/or bushfire emergency procedures developed as yet for the College.

Whilst it is not envisaged that the centre would be subjected to all mechanisms of bushfire attack it is likely that large amounts of smoke and some ember attack could still occur which may be quite upsetting and disturbing for children or staff at the centre.

Bushfire evacuation procedures should be should be prepared in accordance with the current NSW RFS document *Guide to Develop a: Bushfire Evacuation Plan*.

Management of any vegetation within the subject site should be in accordance with the requirements of the NSW Rural Fire Service document entitled *Standards for Asset Protection Zones* (2005). This will satisfy the relevant performance criteria of PBP2006.

3.7 Construction standards for building elements in the development

The requirements of AS 3959-2009 *Construction of buildings in bushfire prone areas* is only required where a structure is located within 100 metres of a fire source feature (vegetation hazard).

Given that the category of bushfire attack that could be anticipated for such development is Low from vegetative fuels to the north and northeast, this proposed developments roof and eaves section, and external elevations should therefore be designed and constructed to the requirements of AS 3959-2009 and must be constructed to comply with section 3 Construction General and section 5 BAL 12.5 of such standard apart from as varied to comply with the Addendum to Appendix 3 of *Planning for Bushfire Protection* 2006.

3.8 Adequacy of sprinkler systems and other fire protection measures to be incorporated No additional bushfire protection measures or external bushfire sprinkler systems are recommended for this development apart from those measures nominated in this report and listed within the recommendations section of this report.

The proposed scope of works are to be constructed in accordance with the *National Construction Code* and services and equipment are to be provided to the development in accordance with Part E of the code. The precise details of the fire protection measures to be incorporated in the development as per the code are outside the scope of this bushfire assessment.

4.0 Assessment of the extent to which the development conforms or deviates from Chapter 4 of *Planning for Bush Fire Protection* 2006

The details provided in Section 4 of this Assessment outline the relationship between the proposed works and the specifications set out in Chapter 4 (Performance Based Controls) of PBP2006.

4.1 Asset protection zones

In relation to the provision of Asset Protection Zones, Table 4.1 assesses the proposed works against the relevant performance criteria.

Table 4.1- Asset Protection Zones

Performance Criteria	Relationship of proposed works to Performance Criteria		Meets performance criteria?
Radiant heat levels of greater than 10kW/m² will not be experienced by occupants or emergency services workers entering or exiting a building.	4.1.1	APZs to the standard of an inner protection area are existing in accordance with Table A2.6 of PBP2006.	Yes
Applicants demonstrate that issues relating to slope are addressed: Maintenance is practical, soil stability is not compromised and the potential for crown fires is negated.	4.1.2	The APZ is located on lands with a slope <18°.	Yes
APZs are managed and maintained to prevent the spread of a fire towards the building	4.1.3	APZs to be maintained in accordance with the requirements of the NSW Rural Fire Service document entitled Standards for Asset Protection Zones (2005).	Yes
Vegetation is managed to prevent flame contact and reduce radiant heat to buildings, minimise the potential for wind driven embers to cause ignition and reduce the effect of smoke on residents and fire-fighters.	4.1.4	All above.	Yes

4.2 Access

In relation to access, Tables 4.2.1 and 4.2.2 assess the proposed new works against the relevant performance criteria.

Table 4.2.1 – Access: Public Roads

Performance Criteria	Relationship of proposed works to Performance Criteria	Meets performance criteria?
Firefighters are provided with safe all weather access to structures (thus allowing more efficient use of fire fighting resources)	4.2.1.1 Public roads are two-wheel drive, sealed, all-weather roads.	Yes
Public road widths and design that allow safe access for firefighters while residents are evacuating an area.	4.2.1.2 The adjacent public roads are two-way and allow traffic to pass in opposite directions.	Yes
The capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles. Roads that are clearly sign-posted (with easily distinguishable names) and buildings/properties that are clearly numbered.	4.2.1.3 The capacity of the existing public roads that serve the site is sufficient to carry fully loaded fire fighting vehicles	Yes
There is clear access to reticulated water supply	4.2.1.4 Reticulated water is available to the site.	Yes
Parking does not obstruct the minimum paved width	4.2.1.5 Car parking should be restricted to the main car parking areas.	Yes

Table 4.2.2 – Access: Internal Roads

Performance Criteria	Relationship of proposed works to Performance Criteria	Meets performance criteria?
Internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle	4.2.2.1 Access to the site is from existing internal driveway and car parking proposed appear to be adequate	Yes

4.3 Water supply, electricity and gas

Table 4.3 assesses the proposed works against the relevant performance criteria for water supply, electricity and gas.

Table 4.3

Performance Criteria	Relation	nship of proposed works to Performance Criteria	Meets performance criteria?
Water Supply Water supplies are easily accessible and located at regular intervals	4.3.1	Reticulated water is available to the site.	Yes
Electricity Services Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings	4.3.2	No external electrical works are proposed and existing cabling into building is to be under ground	Yes
	4.3.3	Any bottled gas is to be installed and maintained in accordance with AS1596 and the requirements of relevant authorities. Metal piping is to be used.	
Gas services Location of gas services will not lead to ignition of surrounding bush land or the fabric of buildings	4.3.4	Any fixed gas cylinders are to be kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation.	Yes
	4.3.5	If any gas cylinders need to be kept close to the building, the release valves are to be directed away from the building and at least 2 metres away from any combustible material.	
	4.3.6	Connections to and from any gas cylinders are to be metal.	

4.4 Emergency and Evacuation Planning

Table 4.4 assesses the proposed works against the relevant performance criteria for emergency and evacuation planning.

Table 4.4

Performance Criteria	Relationship of proposed works to Performance Criteria	Meets performance criteria?
An Emergency and Evacuation Plan is approved by the relevant fire authority for the area.	4.4.1 A bushfire emergency and evacuation plan shall be developed in accordance with the NSW RFS document "Guide to Develop a Bushfire Evacuation Plan	Yes
Suitable management arrangements are established for consultation and implementation of the emergency and evacuation plan	4.4.2 Management and implementation arrangements for the plan must be incorporated into the formulated Emergency / Evacuation Plan	Yes

5.0 Recommendations

The following recommendations are made in relation to the bushfire protection measures for the proposed alterations and additions, and are based on the relevant provisions of the NSW Rural Fire Service guideline entitled *Planning for Bush Fire Protection* 2006:

- 1. That the entire area of the subject allotment where not built upon shall continue to have the vegetation reduced where or if necessary to satisfy the requirements of *Planning for Bushfire Protection* 2006 and NSW Rural Fire Service document entitled *Standards for Asset Protection Zones* (2005) for an inner protection area of an asset protection zone.
- 2. That no future landscaping features, planting of shrubs, trees or other vegetation shall occur in such a manner as to compromise the integrity of the asset protection zone.
- 3. Construction of the proposed scope of works are to comply with the standard provisions of the *National Construction Code* and in this instance AS 3959-2009 *Construction of buildings in bushfire prone areas* section 3 Construction General and section 5 BAL 12.5 of such standard apart from as varied to comply with the Addendum to Appendix 3 of *Planning for Bushfire Protection* 2006.
- 4. (Services and equipment (fire protection measures) are to be provided to and within the proposed buildings in accordance with Part E of the *Building Code of Australia*.
- 5. Bushfire emergency/evacuation procedures for the proposed buildings should be prepared in accordance with the NSW RFS *Guide to Develop a: Bushfire Evacuation Plan*.

6.0 Conclusion

Based upon the bushfire hazard assessment and recommendations arising for the proposed development being the establishment of the proposed scope of works as shown on plans prepared by JDH Architects this development will fully comply with the requirements of *Planning for Bush Fire Protection* 2006 as required under section100B of the *Rural Fires Act* 1997.



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Caveat

Quote from Planning for Bushfire Protection 2001, 'not withstanding the precautions adopted, it should always be remembered that bushfire burn under a wide range of conditions and an element of risk, no matter how small always remains.'

Quote from Standards Australia, 'Although the standard is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.'

References

<u>Planning for Bush Fire Protection 2006</u> Planning NSW in conjunction with NSW Rural Fire Service

Building Code of Australia Volume 2 2005 Australian Building Codes Board

AS 3959 –2009 Construction of buildings in bushfire prone areas Standards Australia & Australian Building Codes Board

Landscape and building Design for Bushfire Areas Ramsay C. & Rudolph L. CSIRO 2003

<u>Quantifying bushfire penetration into urban areas in Australia</u> Keping Chan & McAneny J. Geophysical Research Letters, Volume 31, L12212, doi:10.1029/2004GL020244,2004

Bushfires in Australia Luke R.H. & McArthur CSIRO 1978

<u>Performance of Building Elements in Bushfire Prone Areas</u> Poon S.L. & England J.P. Warrington Fire Research Australia

Address Validation Search Department of Lands www.maps.nsw.gov.au

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Appendix 1 – Development Plans ex JDH Architects

