Bushfire Assessment

Picton High School Redevelopment

480 Argyle Street, Picton

Billard Leece Partnership

4 April 2018

(Ref: 17152)

report by
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1 Introduction

Street or property name:	480 Argyle Street		
Suburb, town or locality:	Picton	**Postcode:**	2571
Lot/DP no:	Lot 2 DP 520158		
Local Government Area:	Wollondilly Shire Council		
Development type:	Infill Special Fire Protection Purpose (SFPP)		

1.1 Background

Billard Leece Partnership commissioned Peterson Bushfire to prepare a bushfire assessment of the proposed redevelopment of Picton High School. This report presents the assessment and recommendations to achieve compliance with the relevant bushfire protection legislation.

This bushfire assessment has been prepared by a consultant accredited by the Fire Protection Association of Australia's BPAD scheme (Accreditation No. BPD-L3-18882).

1.2 Location and description of school

The school site is situated at the southern edge of the township of Picton as shown in Figure 1. Predominantly surrounded by cleared and managed lands, the 'bushfire prone vegetation' closest to the school site consists of forest on the steep slopes of Stonequarry Creek over 140 m to the east of the school boundary.

1.3 Proposed development

The proposal consists of the replacement of most of the school buildings with a contemporary, purpose-built design to allow for the capacity of 1,500 students with core facilities for 2,000 students and future expansion zones for an additional 500 students. Seven buildings will be retained and integrated into the new works as shown on the development site plan included as Figure 2.

1.4 Secretary's Environmental Assessment Requirements (SEARs)

This assessment has been prepared to inform the preparation of an EIS for the proposed redevelopment. Secretary's Environmental Assessment Requirements (SEARs) have been issued under Section 78A(8A) of the *Environmental Planning and Assessment Act 1979* and Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*, listing 'bushfire' as a Key Issue at item No. 19. This technical report addresses Item No. 19 of the SEARs:

SEAR Application Number SSD 8640 (Issued 17 August 2017):

Key Issue No. 19: Bushfire: Address bushfire hazard and if required, prepare a report that addresses the requirements for Special Fire Protection Purpose Development as detailed in Planning for Bushfire Protection 2006 guidelines.

The NSW Rural Fire Service (RFS) document *Planning for Bushfire Protection 2006* (referred to as PBP throughout this report) prescribes bushfire protection measures for development proposals on bushfire prone land. Section 4.2 of PBP addresses Special Fire Protection Purpose (SFPP) development and outlines the assessment methodology and protection measures, such as asset protection zones building setbacks from hazards, building construction standards to withstand bushfire attack (i.e. Bushfire Attack Levels – 'BALs'), adequate road access for emergency response and evacuation, the provision of water supply for fire-fighting, and vegetation management.



Legend

Subject Land

N

DKGIS

Date: 19/12/2017

0 250 500 1,000

Metres

Figure 1: The Location of the Subject Land

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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Legend

- Subject Land
- Argyle Street
- RMS Land
- Wonga Road

Figure 2: Proposal

N

DKGIS

Date: 4/04/2018

0 25 50 100

Metres

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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2 Bushfire hazard assessment

An assessment of the bushfire hazard is necessary to determine the application of bushfire protection measures such as Asset Protection Zone location and dimension and Bushfire Attack Level. The following sub-sections provide a detailed account of the vegetation communities (bushfire fuels) and the topography (effective slope) that combine to create the bushfire hazard that may affect bushfire behaviour approaching the development site.

An inspection of the site and adjacent bushfire hazard occurred on 29th November 2017. Photographs are included in Appendix 1.

2.1 Assessment of bushfire prone land mapping

The Wollondilly Bushfire Prone Land Map as it relates to the school site is shown in Figure 3. The '100 m Vegetation Buffer' extends marginally across the eastern boundary of the school. The mapped 'bushfire prone vegetation' consists of the forest further to the east of the school site as discussed below.

2.2 Predominant vegetation

The vegetation within 140 m of the school site has been assessed in accordance with the methodology specified within PBP. The 140 m assessment area and predominant vegetation is mapped on Figure 4, which shows that the bushfire hazard lies to the east of the school site only. The remaining sides of the school (north, west and south) consist of cleared and developed lands for a considerable distance. The school grounds are managed and consist of buildings, playing fields and scattered trees in the north-eastern corner with a cleared and mown understorey.

There are three hazard types within the 140 m assessment area to the east of the school site as described below.

Forest

Western Sandstone Gully Forest is located on the steep slopes leading down to Stonequarry Creek. Classified as 'forest', the vegetation is beyond the 140 m assessment area and is therefore not the predominant vegetation. However, the presence of vast tracts of forest within the steeply incised gullies to the east is the primary influencing factor underpinning the bushfire risk at the school, and therefore the forest has been considered in determining the appropriate bushfire protection measures.

Grassland

Between the forest and the school boundary is an unmaintained cleared area that has been colonised by predominantly Kikuyu grass. Regeneration of native shrubs and trees has been minimal due to the past use of the area as a tip, which has since been covered in fill creating an uneven, hummocky surface covered in Kikuyu grass. Even though not predominantly

consisting of native grasses, it is classified as ‘grassland’ due to the unmaintained nature of the land by grazing or other means.

Low hazard corridor

Along the eastern boundary within the adjacent properties is a narrow corridor of forest that is classified as ‘low hazard’. The corridor is highly disturbed with an open understorey colonised by Kikuyu Grass and other exotics such as Bamboo. It also contains the unsealed extension on Wonga Road and access trails within its limits.

2.3 Effective slope

The ‘effective slope’ influencing fire behaviour has been assessed in accordance with the methodology specified within PBP. This is conducted by measuring the slope that would most influence fire behaviour where the hazard occurs within 100 m of the development proposal. The slope was determined using a 2 m contour layer as shown on Figure 4.

Forest

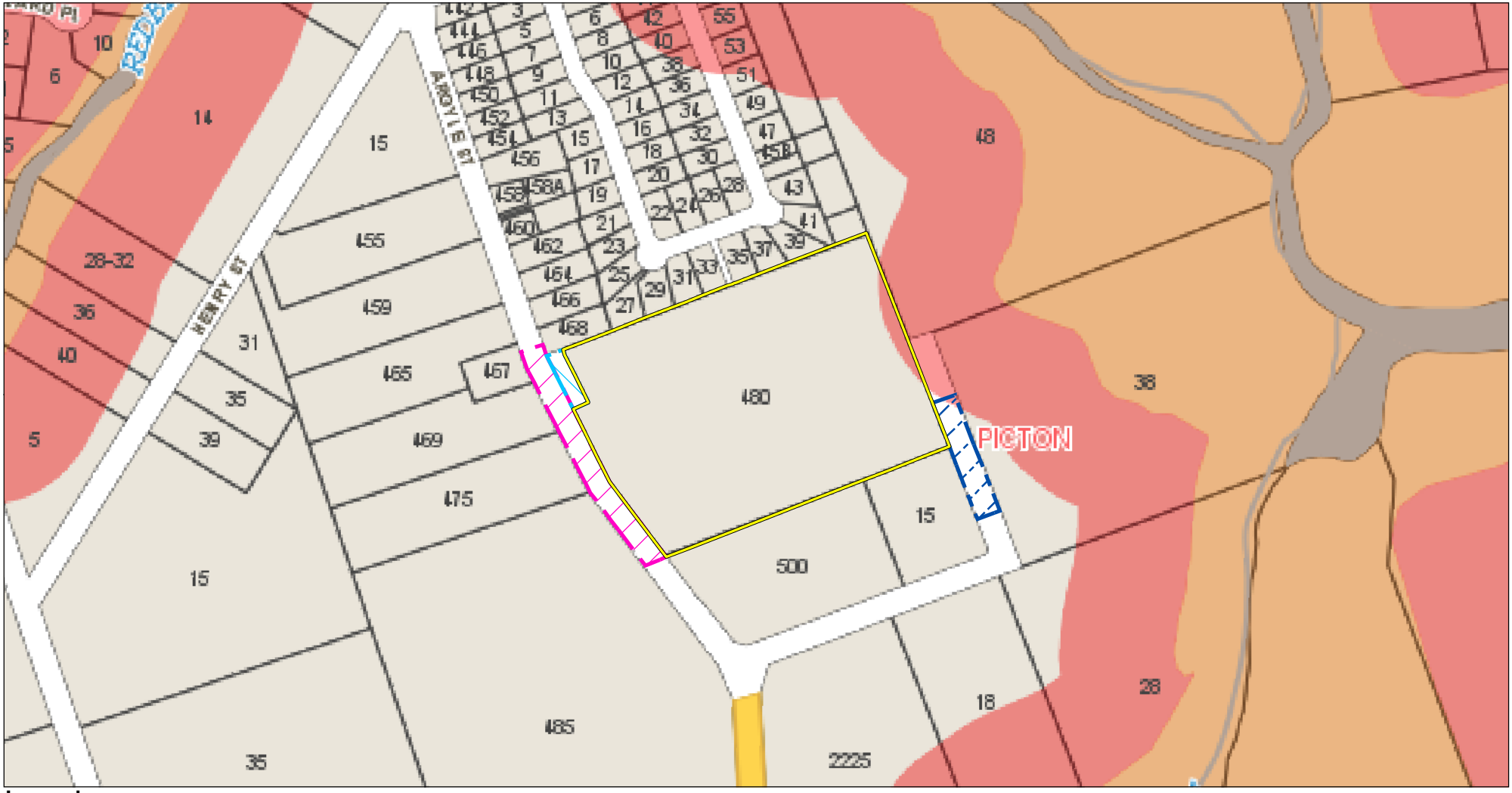
The forest is located greater than 100 m from the school boundary therefore does not technically fall into the assessment area. The forest is located on the steeply incised gully walls of Stonequarry Creek, on a gradient exceeding the PBP slope class of ‘Downslope >15-18 degrees’.

Grassland

Between the school boundary and the steep downslopes is land that is relatively flat or gently sloping uphill. Therefore, the grassland is located on a gradient within the PBP slope class of ‘upslope/flat’.

Low hazard corridor

Like that of the grassland, the low hazard is also on land within the PBP slope class of ‘upslope/flat’.



Legend

Subject Land	**Bushfire Prone Land**
RMS Land	Vegetation Buffer
Argyle Street	Vegetation Category 1
Wonga Road	Vegetation Category 2

Figure 3: Bushfire Prone Land

N

DKGIS

Date: 4/04/2018

0 50 100 200

Metres

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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Legend

- Subject Land
- Argyle Street
- RMS Land
- Wonga Road
- Contour - 2m
- Assessment Area - 140m

Vegetation Formations

- Forest
- Grassland

Figure 4: Bushfire Hazard Analysis

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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3 Bushfire protection measures

PBP requires the assessment of a suite of bushfire protection measures that in total provide an adequate level of protection for SFPP development. The measures required to be assessed are listed in Table 1 below and are discussed in detail in the remainder of this section.

Table 1: PBP bushfire protection measures

Bushfire protection measures	Considerations
Asset Protection Zones (APZ)	Location and dimension of APZ setbacks from identified hazards.
Construction standards (BALs)	Application of BALs to new building works.
Access	Assessment to include access and egress, perimeter access and design standards of internal roads.
Water supply and other utilities	List requirements for reticulated water supply and hydrant provisions, and any static water supplies for fire-fighting.

3.1 Asset protection zones (APZ)

Using the vegetation and slope data discussed in Section 2 and mapped on Figure 4, APZs suitable for the development of a school have been calculated. The available APZ is indicated on Figure 4 and listed in Table 2 below. The APZ will consist of the managed school grounds and will exceed the minimum requirements. Additional APZ establishment is not required.

Table 2: APZ determination

Location[1]	Vegetation[2]	Slope[3]	Required APZ[4]	Proposed APZ[5]	APZ provided by:
East	Forest	Downslope >15-18˚	100 m	77 m + 140 m	77 m within school plus 140 m of low hazard and grassland
	Grassland	Upslope/ Flat	32 m	77 m	77 m within school
	Low Hazard	Upslope/ Flat	30 m	77 m	77 m within school
Remaining directions	Managed	Not required	Not required	>100 m	Managed lands

[1] Direction of assessment from boundary of school site. Refer to Figure 4.

[2] Predominant vegetation classification over 140 m from the boundary of school site.

[3] Effective slope assessed over 100 m from the boundary of school site where the bushfire hazard occurs.

[4] Asset Protection Zone (APZ) required by Table A2.6 of Planning for Bushfire Protection 2006. Determined by the NBC Bushfire Attack Assessor v2.1 for the grassland hazard.

[5] Asset Protection Zone (APZ) provided by proposed and/or existing management arrangements.

3.2 Vegetation management and landscaping

The school site currently complies with the performance requirement of an Inner Protection Area (IPA) as described by PBP. Additional vegetation management or tree removal is not required.

Any proposed landscaping across the school site should comply with the principles listed within Appendix 5 of PBP.

3.3 Bushfire Attack Level (BAL)

The Bushfire Attack Level (BAL) for the proposed school development has been determined in accordance with a Method 1 assessment under Australian Standard *AS 3959-2009 Construction of buildings in bushfire-prone areas* (AS 3959). The BAL extends outwards 100 m from the forest and low hazard, and 50 m from the grassland. As the school development is within 100 m of the eastern boundary and the commencement of the low hazard, it is impacted by a BAL-12.5 rating.

Although only the eastern tip (23 m) of the proposed school building is within 100 m of a hazard and affected by BAL-12.5, it is recommended that the entire build is designed to comply with BAL-12.5 to address the risk of ember attack from fire approaching uphill through the forests to the east. It is also a requirement of PBP to apply a BAL-12.5 rating to an entire building when only partially affected.

It is therefore recommended that the proposed school buildings be designed and constructed to comply with BAL-12.5. The NSW variation to AS 3959 is to be applied to BAL specifications. The variation can be found in the *Planning for Bushfire Protection Addendum Appendix 3 May 2010*.

3.4 Access

Argyle Street and Wonga Road provides the public road access to the school site. Both roads and connecting roads comply with the PBP Acceptable Solutions for the design and construction of public roads.

The primary access to the school will remain unchanged and consists of the drive-through access road off Argyle Street forming the western boundary of the school site. The access is designed to cater for bus movements and therefore suitable for fire and emergency authorities. Secondary and perimeter access is provided by Wonga Road forming the eastern boundary and providing additional separation from the identified hazards to the east. The existing access achieves the aim and objectives of PBP. Additional access provisions for bushfire protection are not required.

3.5 Water supply and utilities

Water supply

Hydrants are available along Argyle Street and Wonga Road as well as through the school grounds. The new build will require a hydrant design that complies with *AS 2419.1 – 2005 Fire Hydrant Installations - System Design, Installation and Commissioning* (AS 2419). The development will require the installation of hydrants on site to ensure a compliant coverage.

Electricity supply

Where overhead electrical transmission lines are installed no part of a tree should be closer to a powerline than the distance specified in *ISSC 3 Guideline for Managing Vegetation Near Power Lines* (Industry Safety Steering Committee 2005).

Gas supply

Any gas services are to be installed and maintained in accordance with *AS/NZS 1596-2008 The storage and handling of LP gas*.

4 Conclusion and recommendations

4.1 Conclusive summary

The proposal consists of the redevelopment of Picton High School which will see most of the school buildings replaced with a new build designed to cater for an additional 1,500 students. The bushfire hazard within 140 m of the school site is a low hazard corridor and grassland, which will be separated from the new build by 78 m consisting of the managed school grounds. Additional APZ establishment or vegetation management is not required.

It is recommended to apply a BAL-12.5 (AS 3959) construction standard to the new build to address potential ember attack from the low hazard and forests located further to the east.

This assessment concludes that, with the adoption of the recommendations (see Section 4.2 below), the proposal complies with the provisions of *Planning for Bushfire Protection 2006*. As such, this assessment demonstrates compliance with the Secretary's Environmental Assessment Requirements (SEARs) Item No. 19 "*Bushfire: Address bushfire hazard and if required, prepare a report that addresses the requirements for Special Fire Protection Purpose Development as detailed in Planning for Bushfire Protection 2006 guidelines."*

4.2 Recommendations

The recommendations made within this assessment are repeated below:

1. Any landscaping is to comply with the principles listed within Appendix 5 of PBP.
2. It is recommended that new buildings are designed and constructed to comply with BAL-12.5 of *AS 3959-2009 Construction of buildings in bushfire-prone areas*. The NSW variation to AS 3959 is to be applied in addition to the BAL specifications. The variation is listed within *Planning for Bushfire Protection Addendum Appendix 3 May 2010*.
3. Hydrants are to be installed to achieve compliance with *AS 2419.1 – 2005 Fire Hydrant Installations - System Design, Installation and Commissioning* (AS 2419).
4. Where overhead electrical transmission lines are installed no part of a tree should be closer to a powerline than the distance specified in *ISSC 3 Guideline for Managing Vegetation Near Power Lines* (Industry Safety Steering Committee 2005).
5. Any gas services are to be installed and maintained in accordance with *AS/NZS 1596-2008 The storage and handling of LP gas* (Standards Australia, 2008).



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References

Industry Safety Steering Committee. 2005. *ISSC 3 Guideline for Managing Vegetation Near Power Lines*. (updated from Energy Australia. 2002. *Network Standard NS 179 (Vegetation Safety Clearances)).*

NSW Rural Fire Service (RFS). 2006. *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners*. Australian Government Publishing Service, Canberra.

Standards Australia. 2005. *Fire hydrant installations - System design, installation and commissioning,* AS2419.1, Fourth edition 2005, Standards Australia International Ltd, Sydney.

Standards Australia. 2008. *The storage and handling of LP Gas*, AS/NZS 1596-2008, Fourth edition 2005, Standards Australia International Ltd, Sydney.

Standards Australia. 2009 (Amendment 3). *Construction of buildings in bushfire-prone areas*, AS 3959, Third edition 2009, Standards Australia International Ltd, Sydney.

Appendix 1 - Photographs



Photograph 1: Forest outside of the 140 m assessment area to the east of the school site



Photograph 2: Grassland over old tip to the east between forest and school site



Photograph 3: Low hazard corridor to the east between school site and grassland



Photograph 4: Managed north-eastern corner of the school site



Photograph 5: Argyle Street providing primary access point on western boundary



Photograph 6: Through access drive off Argyle Street on western boundary



Photograph 7: Wonga Road providing secondary access point on eastern boundary



Photograph 8: Unsealed extension of Wonga Road providing perimeter access to east

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