



Bushfire Protection Assessment

Proposed Rezoning – North Bungendore

Part Lot 1 DP 798111

Prepared for

Queanbeyan-Palerang Regional Council

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1 Introduction

1.1 Description of proposal

Queanbeyan-Palerang Regional Council (QPRC) commissioned Eco Logical Australia Pty Ltd (ELA) to prepare a bushfire protection assessment (BPA) for a proposed rezoning of a Part Lot 1 DP 798111 in North Bungendore.

The land is currently zoned as RU1 Primary Production. Under the proposed rezoning, the planning proposal seeks to rezone the subject land from RU1 Primary Production to a range of land use zones including R2 Low Density Residential, R5 Large Lot Residential and RE1 Public Recreation. The rezoning would enable a subdivision application to be submitted for the creation of approximately 309 residential lots (exclusive of 500 metre radius from the boundary of Lot 1 DP 798111 and Lot 44 DP 754876).

1.2 Study area

The study area is located approximately 1.6 km from Bungendore town centre, within the QPRC area. The total area of the lot is approximately 82 hectares, with the planning proposal relating to approximately 55 hectares of this site. There are currently existing dwellings or structures located within the study area as shown in **Figure 1**.

The study area includes the land relating to the planning proposal (part Lot 1 DP 798111) and the remainder of Lot 1 DP 798111. The western part of Lot 1 DP 798111 and land to the north of Lot 1 DP 798111 may be the subject of future planning proposals.

1.2.1 Assessment report objectives

ELA has been engaged to investigate the current bushfire risk of the study area and the appropriate combination of bushfire protection measures to mitigate this risk in support of the rezoning. Specifically, this investigation responds to the requirements of *Planning for Bush Fire Protection 2006* (PBP), *Australian Standard AS 3959 Construction of buildings in bushfire-prone areas* (AS3959) and the requirements of the *Palerang Local Environment Plan 2014*. This report details the outcomes of these investigations in the context of the proposed land use.

The report identifies potential bushfire constraints to the future urban development of the study area and determines if rezoning may or may not proceed based on the bushfire assessment. The report also provides recommendations to guide the preparation of future planning and infrastructure. As such the objectives of this report are to:

- Ensure the statutory requirements for bushfire protection are identified and can be adequately met;
- Consider the vegetation and ecological constraints of the study area, and the conservation and management of environmental values while providing appropriate bushfire protection; and
- Consider the likely rehabilitation of requirements and the recommendations of the flora and fauna study to preserve and enhance ecological communities.

Future subdivision of land and the construction of buildings will require an assessment against PBP.

1.3 Legislative requirements

1.3.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal planning legislation for NSW, providing a framework for the overall environmental planning and assessment of development proposals, and therefore applying to the study area. A variety of other legislation and environmental planning instruments, such as the *Threatened Species Conservation Act 1995* (TSC Act), *Water Management Act 2000* and *Rural Fires Act 1997* (RF Act), are integrated with the EP&A Act.

1.3.2 Threatened Species Conservation Act 1995

The TSC Act aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. The TSC Act is integrated with the EP&A Act and requires consideration of whether a development (assessed under Part 4 of the EP&A Act) is likely to significantly affect threatened species, populations and ecological communities or their habitat.

A December 2010 flora and fauna assessment for the study area identified several areas of native vegetation that may be classed as the endangered ecological community Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory under the *Environmental Protection and Biodiversity Protection Act 1999* (a Commonwealth Act). No other threatened species likely to be affected and no special habitat for threatened animals was identified.

1.3.3 Rural Fires Act 1997

Bushfire suppression and management is regulated by the RF Act. Both the EP&A Act and the RF Act were modified by the *Rural Fires and Environmental Assessment Legislation Amendment Act 2002* to enhance bushfire protection through the development assessment process. Key requirements of the RF Act that apply to the study area include:

- The need for a bushfire safety authority to be issued by the RFS under section 100B of the RF Act for any development applications for subdivision (therefore considered integrated development);
- All landowners to exercise a duty of care to prevent bushfire from spreading on or from their land under section 63 of the RF Act. This relates to the appropriate provision and maintenance of APZs, landscaping and any retained vegetation when developing land.

1.3.4 Direction 4.4 Planning for Bush Fire Protection

Direction 4.4 Planning for Bushfire Protection identifies matters for consideration for planning proposals that will affect, or are in proximity to land mapped as bush fire prone – therefore applying to the study area. For the study area a planning proposal where development is proposed must:

- have regard to *Planning for Bush Fire Protection 2006* (PBP),
- provide an Asset Protection Zone (APZ) incorporating at a minimum:
 - an Inner Protection Area (IPA) bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and
 - an Outer Protection Area (OPA) managed for hazard reduction and located on the bushland side of the perimeter road;
- for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service (RFS). If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the RF Act), the APZ provisions must be complied with;

- contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks;
- contain provisions for adequate water supply for fire fighting purposes;
- minimise the perimeter of the area of land interfacing the hazard which may be developed; and
- introduce controls on the placement of combustible materials in the Inner Protection Area.

1.3.5 Planning for Bush Fire Protection 2006

Rezoning proposals require consultation with the NSW RFS as the lead agency for managing bushfire. As such the requirements of *Planning for Bush Fire Protection* (NSW RFS, 2006) are to be addressed. This includes having regard to the following planning principles of PBP:

- Provision of a perimeter road with adequate two way access which delineates the extent of the intended development;
- Provision, at the urban bushland interface, for the establishment of adequate asset protection zones for future housing;
- Specifying minimum residential lot depths to accommodate asset protection zones for lots on perimeter roads;
- Minimising the perimeter of the area of land, interfacing the hazard, which may be developed;
- Introduction of controls which avoid placing inappropriate developments in hazardous areas; and
- Introduction of controls on the placement of combustible materials in asset protection zones.



Figure 1: Study area



Figure 2: Vegetation Communities

2 Bushfire threat assessment

An assessment of the bushfire hazard is necessary to determine the feasibility of bushfire protection measures such as asset protection zone location and dimension. This section identifies the vegetation communities (bushfire fuels) and the topography (effective slope) that combine to create the bushfire hazard affecting the study area.

Fire history and current and past bushfire management has little bearing on the bushfire protection measures for rezoning and future development within the study area. This is because PBP requires bushfire protection assessment only using predicted fire intensities (i.e. risk consequence and little consideration of risk likelihood), and it assumes a fire may occur on any bushfire prone land without considering how often this may happen.

The *Lake George Zone Bush Fire Risk Management Plan* (BFRMP) was reviewed to gain understanding of the bushfire environment, hazard and risk issues that affect the study area.

2.1.1 Direction 4.4 Planning for Bush Fire Protection

A response to each of the requirements under Direction 4.4 is provided in **Table 1**.

Table 1: Response to Direction 4.4 PBP

Direction 4.4 requirement	Assessment response
Have regard to PBP	PBP requirements are covered within this assessment
Provide an APZ incorporating at a minimum: - an IPA bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property; and - an OPA managed for hazard reduction and located on the bushland side of the perimeter road	APZ assessment provided in Section 3
For infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW RFS. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the RF Act), the APZ provisions must be complied with	It is not infill or an SFPP proposal
Contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks	Assessment provided in Section 5.3
Contain provisions for adequate water supply for fire fighting purposes	Assessment provided in Section 5.1
Minimise the perimeter of the area of land interfacing the hazard which may be developed	This can be achieved with subdivision design and will potentially provide a better level

Direction 4.4 requirement	Assessment response
	of bushfire safety for Bungendore than the existing urban perimeter
Introduce controls on the placement of combustible materials in IPA	See APZ requirements provided in Section 3
Consideration must also be given to NSW RFS Practice Note 2/12 Planning Instruments and Policies.	See APZ requirements provided in Section 3

2.2 Bushfire protection measures

The bushfire protection measures required by PBP to be assessed for rezoning are listed in **Table 2** and are discussed in detail later in this section.

Table 2: PBP bushfire protection measures

Bushfire Protection Measure	Considerations
APZ	Location and dimension of APZ setbacks from vegetation including prescriptions of vegetation management within the APZ.
Access	Assessment to include access and egress in and out of a developable area such as alternate access, operational response and evacuation options. APZ perimeter access to be considered as is design standards of public roads and any fire trails.
Water supply and other utilities	List requirements for reticulated water supply and hydrant provisions, and any static water supplies for fire fighting.
Building construction standards	Provide a guide on the application of construction standards for future buildings.

2.3 Vegetation types

In accord with PBP, the predominant vegetation class has been assessed for a distance of at least 140 m out from the study area and shown in **Figure 2** and **Table 4**.

The vegetation within the study area consists of grassland, land used for intensive agriculture or land that is cleared and managed. The current bushfire prone land mapping considers grassland (Vegetation Category 3) a hazard unless the following occurs, and the vegetation is then excluded from being mapped as bush fire prone:

- The area is “managed grassland” including grassland on, but not limited to, recreational areas, commercial/industrial land, residential land, airports/airstrips, maintained public reserves and parklands, commercial nurseries and the like; or
- The area is agricultural lands used for annual and/or perennial cropping, orchard, market gardens, nurseries and the likes.

2.4 Effective slope

In accord with PBP, the slope that would most significantly influence fire behaviour was determined over a distance of 100 m from the boundary of the study area where the vegetation was found (measuring the worst-case scenario). This assessment was made with 10 m contours (as shown on Figure 3) and slope classes are listed in **Table 3**.

Slopes vary across the site and within the bushfire hazard and range from flat to 10 degrees upslope and are shown in **Figure 3**.

Table 3: PBP slope classes

Upslope or Downslope	PBP Slope Class
Upslope / Flat Land	Flat land and all upslope land leading away from the development
Downslope	>0-5 degrees downslope leading away from the development
	>5-10 degrees downslope leading away from the development
	>10-15 degrees downslope leading away from the development
	>15-18 degrees downslope leading away from the development

3 Asset protection zones

Table A2.4 of PBP has been used to indicate the required APZ dimensions for future residential development within the study area using the vegetation and slope data identified in **Section 2**. The required APZ are shown in **Figure 3**.

It is best practice to provide an APZ that achieves a building construction standard under *AS 3959-2009 Construction of buildings in bushfire-prone areas* (Standards Australia 2009) of no greater than a Bushfire Attack Level (BAL)-29 for residential development, and to ensure future home owners are not impacted by the additional costs associated with construction of a dwelling at BAL-40. **Table 4** lists the current minimum APZ and best practice APZ related to BAL-29 (refer to **Section 4** for more information on AS 3959-2009).

The APZ in this assessment are indicative only and have been determined at a landscape scale. This level of detail is suitable for a rezoning assessment where the aim is to demonstrate whether a parcel of land can accommodate the bushfire protection measures required by PBP given the bushfire hazard. The ultimate APZ for any future subdivision or development requires a site-specific assessment of each lot. The APZ dimensions quoted in this assessment should not be relied on to approve a future subdivision.

3.1 APZ maintenance plan

The following fuel management specifications will need to be applied to any future APZ:

- No tree or tree canopy is to occur within 2 m of the dwelling roofline.
- The presence of a few shrubs or trees in the APZ is acceptable provided that they:
 - are well spread out and do not form a continuous canopy
 - are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period
 - are located far enough away from the building so that they will not ignite the building by direct flame contact or radiant heat emission.

- Any landscaping or plantings should preferably be local endemic mesic species or other low flammability species.

Application of these measures within the study area is considered feasible.

3.2 Staging of development for APZ

If the study area is developed in stages, each stage should give consideration to the interim bushfire risk. This should include the provision of an APZ to manage any potential bushfire hazard adjoining each stage to ensure that future dwellings are not impacted by unnecessarily high construction standards or exposed to bushfire risks that they are not designed to withstand. This could occur through the provision of temporary APZ for earlier stages which will be extinguished once the land where the APZ operates is developed.

Table 4: Threat assessment, APZ and category of bushfire attack

Direction from envelope	Slope ¹	Vegetation ²	PBP required APZ ³	BAL-29 APZ AS3959	Comments
West	Flat	Grassland	10 m	10 m	Provided within property boundaries
East	Flat	Grassland	10 m	10 m	
North	Upslope	Grassland	10 m	10 m	
All other directions	Managed land				

¹ Slope most significantly influencing the fire behaviour of the site having regard to vegetation found. Slope classes are according to PBP.

² Predominant vegetation is identified, according to PBP and “Where a mix of vegetation types exist the type providing the greater hazard is said to be predominate”.

³ Assessment according to Table A2.4 of PBP

A revised draft version of PBP indicates that larger APZs of 20 m should be provided for development which is located within 50 m of grassland hazard with a height above 100 mm. It must be noted that these APZ requirements are in an early draft on the new PBP only and should not be used for planning purposes, and **are provided for information only**.

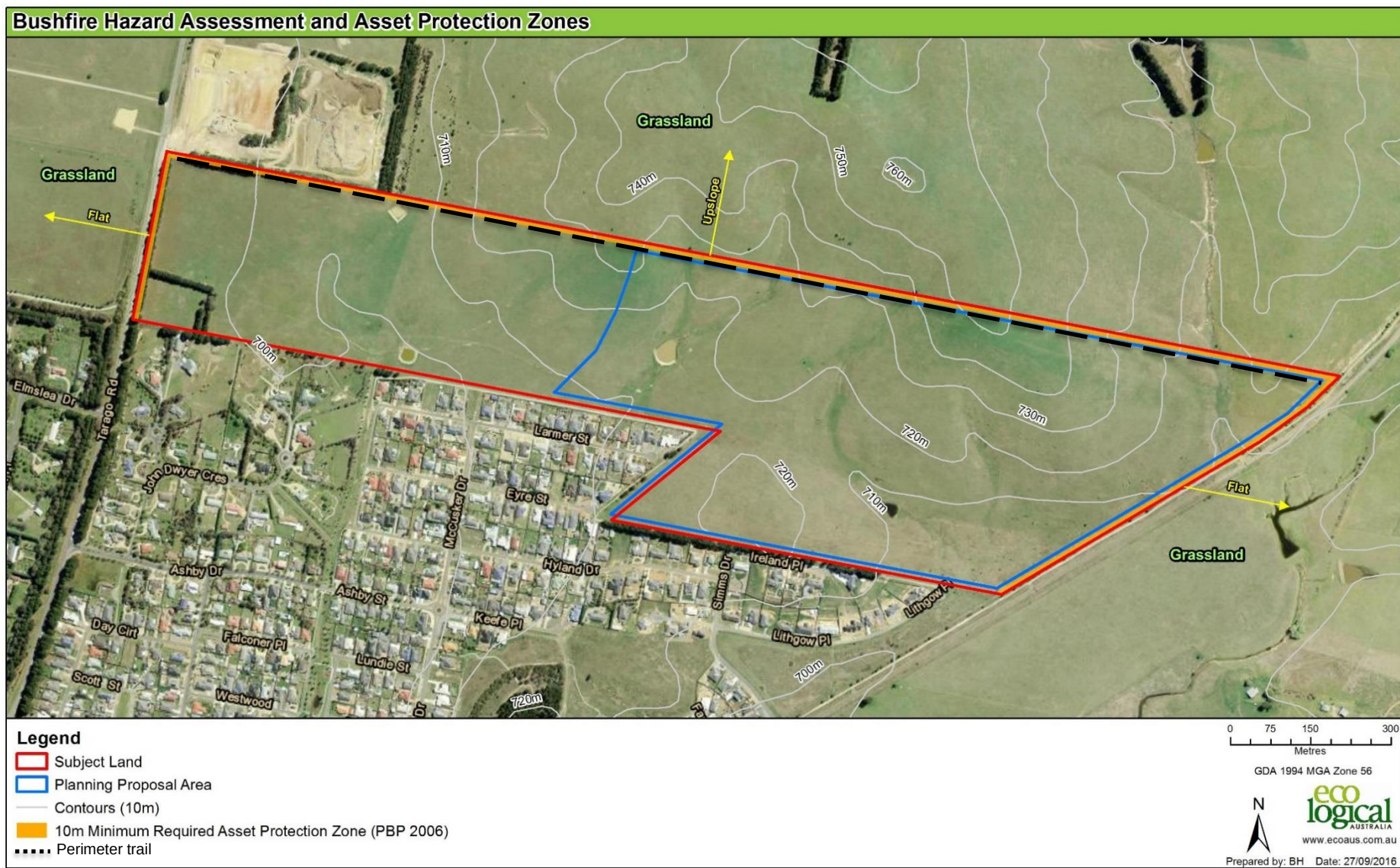


Figure 3: Asset protection zones

4 Construction standard

The application of building construction standards for bushfire protection under AS 3959-2009 *Construction of buildings in bushfire-prone areas* (Standards Australia 2009) is considered at the development application stage for individual dwellings and buildings. An assessment under AS 3959-2009 is not required at the rezoning or subdivision stages. The following is a brief introduction on AS 3959-2009.

AS 3959-2009 contains six Bushfire Attack Levels (BAL), each with a prescribed suite of design and construction specifications aimed at preventing ignition during the passing of a bushfire front. The BALs are outlined below with an indication of the location of each BAL rating provided in **Table 6** and **Figure 4**.

- BAL-Low: The threat does not warrant application of construction standards. Developments with BAL-Low are generally not within bushfire prone land (greater than 100 m from bushland)
- BAL-12.5: Addresses background radiant heat at lower levels and ember attack
- BAL-19: Addresses mid-range radiant heat and ember attack
- BAL-29: Addresses high range radiant heat and ember attack
- BAL-40: Addresses extreme range of radiant heat and potential flame contact and ember attack
- BAL-FZ: Addresses construction within the flame zone. New subdivided lots are not permitted within the flame zone in NSW.

NSW has a minor variation to AS 3959-2009 which requires consideration in future development applications. The variation is contained within the document '*PBP Appendix 3 Addendum*' (RFS 2010).

Table 5: BAL separation distances in relation to the proposed development

Subject land area and Vegetation and Slope	BAL-FZ Distance	BAL-40 Distance	BAL-29 Distance	BAL-19 Distance	BAL-12.5 Distance	BAL-LOW Distance
West, East and North Grassland, Upslope and Flat (0 degrees)	<6 m	6-<9 m	9-<13 m	13-<19m	19-50 m	>50 m
All other Directions Managed lands	BAL Low (separation distance exceeds 100 metres due to existing management or development)					

Information according to AS3959-2009 '*Construction of buildings in bushfire-prone areas*' Table 2.4.2, and PBP revised Appendix 3.

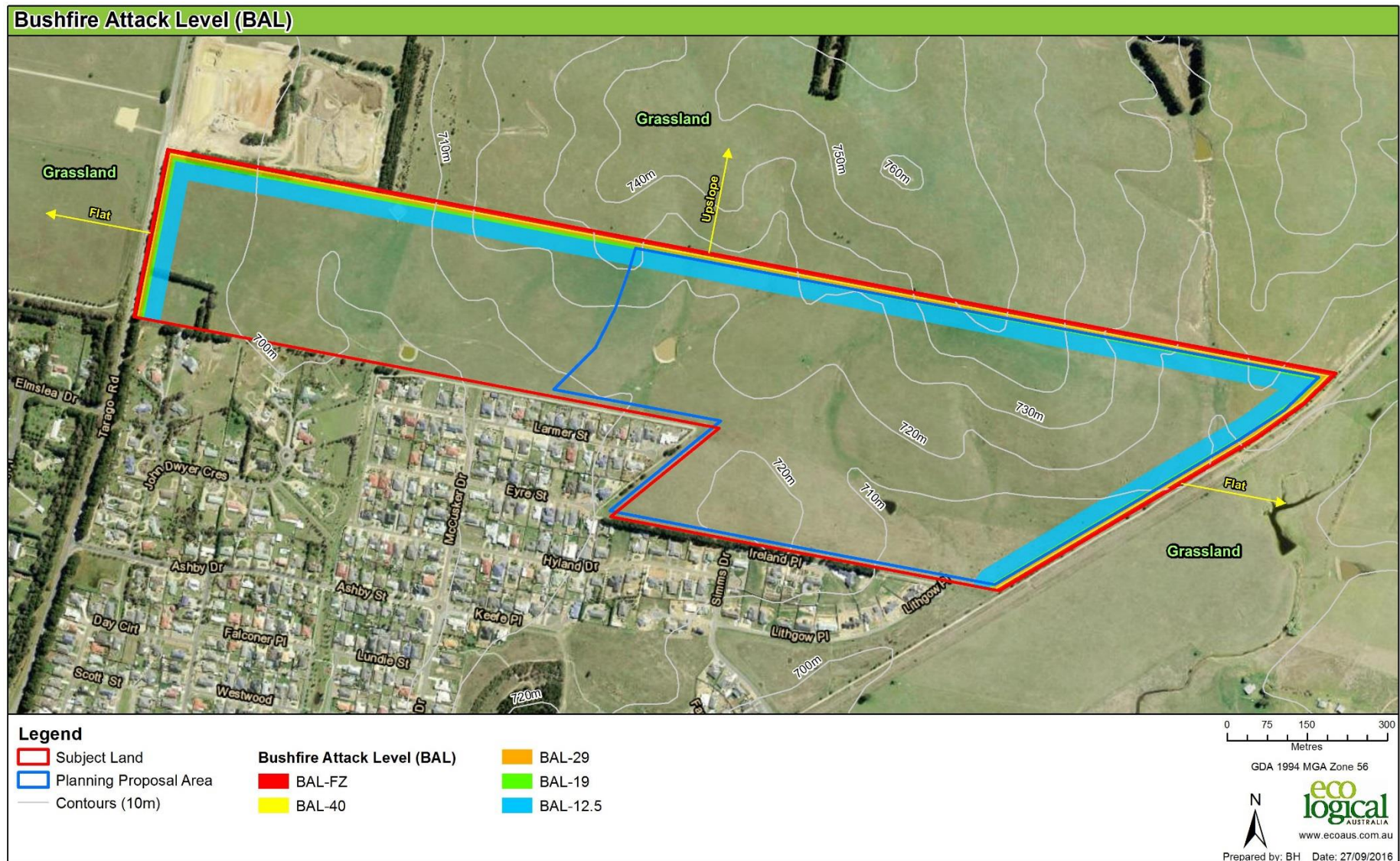


Figure 4: Busfire Attack Level rating

5 Utilities and access

5.1 Water supply

Future lots will likely be serviced by reticulated water infrastructure suitable for fire fighting purposes. With the exception of rural residential subdivision, the furthest point from any future dwellings to a hydrant is to be less than 90 m (with a tanker parked in-line) in accordance with *Australian Standard 2419.1 – 2005 Fire Hydrant Installations - System Design, Installation and Commissioning* (Standards Australia 2005). The reticulated water supply is to comply with the following acceptable solutions within Section 4.1.3 of PBP:

- Reticulated water supply to use a ring main system for areas with perimeter roads;
- Fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005;
- Hydrants are not located within any road carriageway;
- All above ground water and gas service pipes external to the building are metal, including and up to any taps; and
- The PBP provisions of parking on public roads are met.

5.2 Gas and electrical supplies

In accordance with PBP, electricity should be underground wherever practicable. Where overhead electrical transmission lines are installed:

- Lines are to be installed with short pole spacing, unless crossing gullies
- No part of a tree should be closer to a powerline than the distance specified in the *ISSC 3 Guideline for Managing Vegetation Near Power Lines* (Industry Safety Steering Committee, 2005).

Any gas services are to be installed and maintained in accordance with *Australian Standard AS/NZS 1596 'The storage and handling of LP Gas'* (Standards Australia 2008).

5.3 Access

All bushfire prone areas should have an alternate access or egress option. This is usually achieved by providing more than one public road into and out of a precinct. The need for an alternative road and its location depends on the bushfire risk, the density of the development, and the chances of the road being cut by fire. All precincts within the study area should allow for an alternative public access road.

An indicative subdivision layout including access arrangements within the study area detailed in a Planning proposal by DFP Planning (dated 13 October 2014) has the following features:

- A collector road off Tarago Road running generally east-west (major access road)
- A major secondary access road running north-south along the approximate alignment of McCusker Drive
- Minor secondary access roads connecting to Simms Drive and Lithgow Place
- Pedestrian connections to Eyre Street and the eastern and western ends of Larmer Street
- Roads parallel to the east-west collector
- An approximate grid layout.

A perimeter road along the northern boundary of the study area is currently not indicated on the indicative plan. It is noted that the adjacent land to the north may be subject to possible future residential subdivision.

Either a temporary or permanent perimeter road, as indicated on **Figure 3**, is likely to be required under a revised PBP as discussed in Section 3.2. Further detail is provided in Section 5.3.2 below.

With the inclusion of a northern perimeter access road, the access arrangements outlined above are in accordance with the intent and principles of PBP regarding the provision of safe access and egress for both residents and fire fighters.

5.3.1 Safe access and egress

All bushfire prone areas should have an alternate access or egress option. The indicative access arrangements discussed above would provide this through the north-south secondary access road, as well as through the minor secondary access roads connecting Simms Drive and Lithgow Place. An internal road system supporting future development is to comply with Section 4.2.7 of PBP.

5.3.2 Road design and construction

Depending on the bushfire risk, all bushland interface areas should include a perimeter public road within the APZ. In exceptional circumstances an alternative to a perimeter road standard may be acceptable. These include areas of lower bushfire risk (such as grassland as is the case for the study area) or areas where it may not be feasible to provide a continuous road due to the shape of the interface or the terrain. These areas should have some other access strategy such as regular access points and good access to a hydrant network.

Provision of a simple layout with perimeter roads and frequent direct access to the internal road system will provide sufficient access/egress in the case of an emergency. Public roads should provide safe operational access to structures and water supply. Perimeter roads will be required at APZ bushland interface locations where a significant bushfire hazard exists. For the study area exiting roads to the east and west address this requirement. A temporary or permanent perimeter road along the northern boundary of the study area as indicated on **Figure 3** will be required and will need to be considered at the subdivision stage. However, minor drainage corridors and the setbacks provided within larger 'lifestyle lots' present a lower risk scenario and, therefore, may not require implementation of perimeter roads. Property access roads will also need to provide safe access for emergency services and provide protection to properties and occupants during a bushfire.

The design details (PBP acceptable solutions) of public roads are shown in **Table 6** (overleaf).

Table 6: Performance criteria for proposed public roads

Intent may be achieved where:	Acceptable solutions
firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources)	public roads are two-wheel drive, all weather roads
public road widths and design that allows safe access for firefighters while residents are evacuating an area	- urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle) - the perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas - traffic management devices are constructed to facilitate access by emergency services vehicles - public roads have a cross fall not exceeding 3 degrees - public roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard - curves of roads (other than perimeter roads) are a minimum inner radius of six metres - maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient - there is a minimum vertical clearance to a height of four metres above the road at all times - the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicated load rating
the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles	public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression
roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered	- public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression - public roads up to 6.5 metres wide provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression

Intent may be achieved where:	Acceptable solutions
there is clear access to reticulated water supply	- one way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression - parking bays are a minimum of 2.6 metres wide from kerb to kerb edge to road pavement. No services or hydrants are located within the parking bays
parking does not obstruct the minimum paved width	public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road

6 Conclusion

Bushfire hazard has been assessed across the subject study area and if a rezoning were to occur it is feasible for future residential development to comply with Planning for Bushfire Protection and Direction 4.4 rezoning.

The rezoning can potentially proceed based on the bushfire assessment and constraints contained within this report. More detailed assessment and consideration of the relevant bushfire protection strategies will be required at subdivision stage. This report indicates that it is feasible for a subdivision to achieve compliant bushfire protection measures.

6.1 Statement of capability

This bushfire assessment demonstrates that the subject land is capable of accommodating future development and associated land use with the appropriate bushfire protection measures and bushfire planning requirements prescribed by s.117 (2) Direction 4.4 – ‘Planning for Bush Fire Protection’ and PBP.

If further information is required, please contact Mick George on 02 6103 2319.



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References

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