



Bushfire Assessment

Planning Proposal

**Lot 39 Major Roberts
Avenue, Tahmoor**

ABAX Contracting Pty Ltd

4 November 2019

(Ref: 18057)

report by
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Executive summary

Objective and assessment requirements

This Bushfire Assessment Report was commissioned by ABAX Contracting Pty Ltd to inform a Planning Proposal application seeking approval to rezone land identified as bushfire prone to allow future development. The purpose was to assess the bushfire hazard and risk and recommend bushfire protection measures commensurate with the risk to achieve compliance with the relevant specifications and requirements for protection against bushfires.

A Planning Proposal on bushfire prone land must have regard to the *Environmental Planning and Assessment Act 1979* Section 9.1 Ministerial Direction No. 4.4 – ‘Planning for Bush Fire Protection’, referring to the document *Planning for Bush Fire Protection 2006*.

Bushfire hazard, threat and risk

The hazard consists of grass woodland vegetation along Myrtle Creek riparian corridor and beyond to the north and west. The bushfire threat is assessed to be ‘low’ to ‘moderate’ influenced by the predominance of the surrounding cleared grazing land.

The Wollondilly/Wingecarribee Bushfire Risk Management Plan (Wollondilly/Wingecarribee Bushfire Risk Management Committee 2017) ranks the existing adjacent residential community as ‘medium’ risk. The low risk ranking reflects the patchy nature of the hazards in the area. A risk rating of future residential development at the subject land would be medium or lower as there will be compliant bushfire protection measures.

Measures to achieve compliance

Bushfire protection measures for future development recommended within this report to achieve the requirements are listed below:

- Provision of compliant APZs between future building envelopes and bushfire hazards. A 30 m APZ is required from the proposed E2 zone (riparian corridor) to the north, and a 15 m APZ is required to the western boundary.
- Management of vegetation and fuels within the designated APZs to achieve the standard of an Inner Protection Area (IPA) as described by PBP.
- Provision of a perimeter fire trail within the APZ to allow fire-fighting appliances to gain access along the hazard interface between future dwellings and the hazard. The trail is to link back to Major Roberts Avenue at the western and eastern ends of the subject land. The design and construction of the perimeter fire trail is to comply with PBP Section 4.1.3(3) ensuring the trail is under single ownership and sealed.

Conclusion

The report concludes that the Planning Proposal together with the recommended bushfire protection measures satisfies the specifications and requirements of Ministerial Direction No. 4.4 and ‘*Planning for Bush Fire Protection 2006*’.

1 Introduction

1.1 Background

ABAX Contracting Pty Ltd commissioned Peterson Bushfire to prepare a Bushfire Assessment Report to accompany a Planning Proposal to rezone land in Tahmoor to promote riparian conservation and seek a reduced lot size for residential subdivision. This report addresses the requirements for assessment of rezoning proposals involving bushfire prone land, namely the *Environmental Planning and Assessment Act 1979* Section 9.1 Ministerial Direction 4.4 – 'Planning for Bush Fire Protection'.

1.2 Location of subject land


The subject land is located on the western edge of the village of Tahmoor as shown on Figure 1. The subject land is bounded by the Macquarie Grove Retirement Village to the east, recent residential subdivision to the south, Council property to the west (Tahmoor Pony Club) and Myrtle Creek and large-lot residential properties to the north. It is the bushland along Myrtle Creek and adjoining properties to the north and west that act as the bushfire prone vegetation affecting the proposal.

1.3 Description of proposal

The proposal seeks to rezone the subject land zoned 'R2 – Low Density Residential' to allow a riparian corridor along the northern boundary (Myrtle Creek) to be zoned 'E2 – Environmental Conservation' with the remainder of the lot zoned 'R2 – Low Density Residential' to have a minimum lot size of 700 m² for future residential subdivision and the construction of dwellings.



Legend

 Subject Land

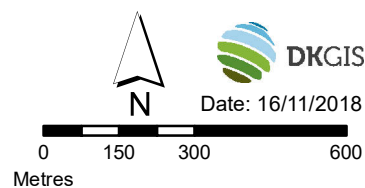


Figure 1: The Location of the Subject Land

2 Assessment requirements

The subject land is identified as 'bushfire prone land' on the Wollondilly Bushfire Prone Land Map as shown on Figure 2. When investigating the capability of bushfire prone land to be rezoned, submissions must have regard to Section 9.1 Direction 4.4 – 'Planning for Bush Fire Protection' of the *Environmental Planning and Assessment Act 1979*. The objectives of Direction 4.4 are:

- *To protect life, property and the environment from bushfire hazards, by discouraging the establishment of incompatible land uses in bushfire prone areas; and*
- *To encourage sound management of bushfire prone areas.*

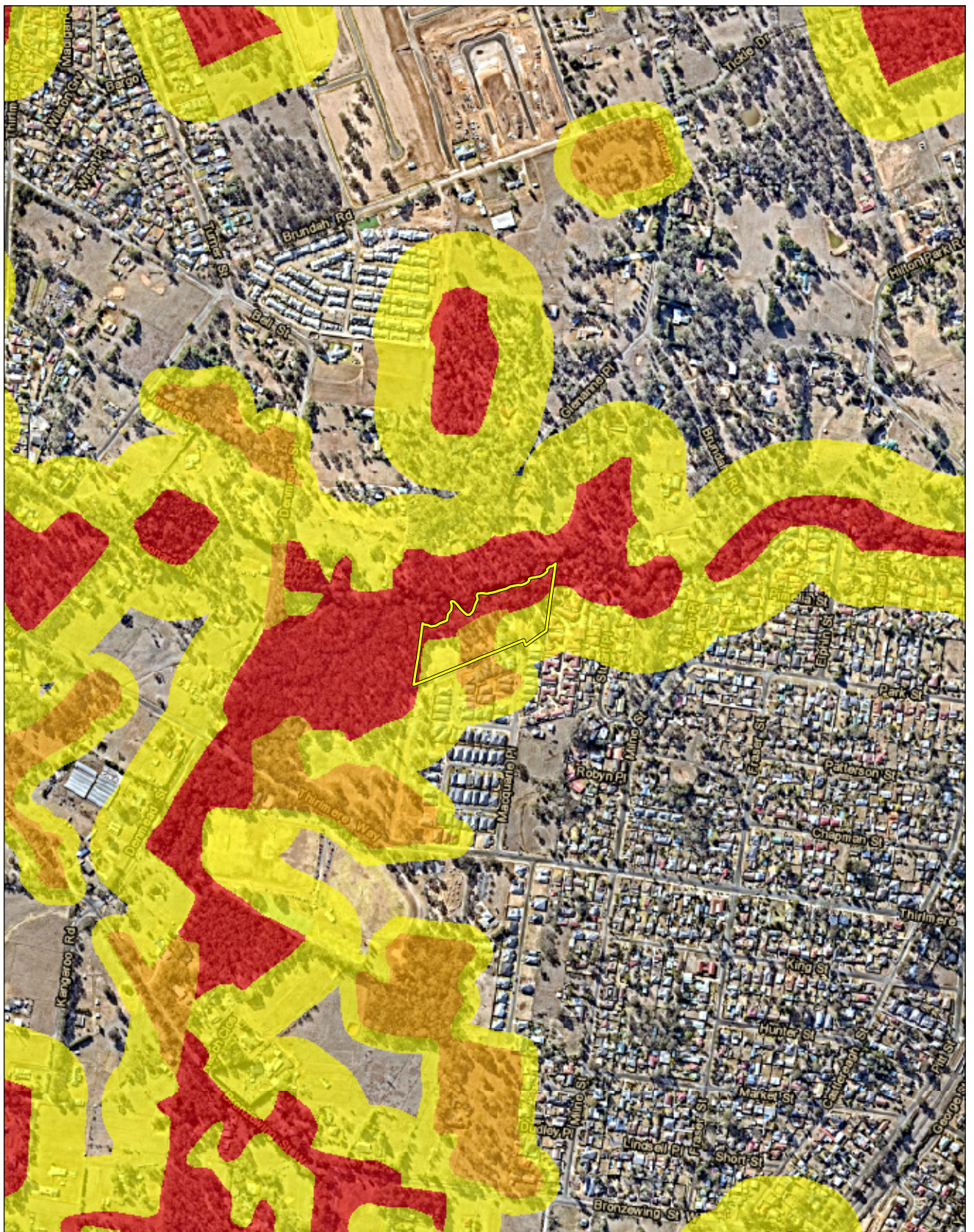
Direction 4.4 instructs councils on the bushfire matters which need to be addressed when drafting and amending Local Environmental Plans (LEP). They are as follows:

- *A draft LEP shall:*
 - *have regard to the document Planning for Bush Fire Protection 2006;*
 - *introduce controls that avoid placing inappropriate developments in hazardous areas; and*
 - *ensure that bushfire hazard reduction is not prohibited within the asset protection zone.*
- *A draft LEP shall, where development is proposed, comply with the following provisions, as appropriate:*
 - *provide an asset protection zone incorporating at a minimum:*
 - *an Inner Protection Area 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 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. If the provisions of the draft LEP permit Special Fire Protection Purposes (as defined under Section 100B of the Rural Fires Act 1997), 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,*
- *introduce controls on the placement of combustible materials in the Inner Protection Area.*

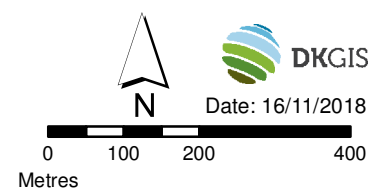
The need for Planning Proposals to comply with '*Planning for Bush Fire Protection 2006*' (referred to as PBP throughout this report) is called up by Direction 4.4. The Direction 4.4 provisions are specified within PBP as well. The relevant sections of PBP as they apply to the proposal are summarised below:

- PBP Section 2.1 – describes the submission requirements for rezoning proposals. The requirements do not differ from Direction 4.4.
- PBP Section 4.1 – outlines the specific objectives (Section 4.1.2) and assessment requirements (Section 4.1.3) for residential subdivision.



Legend

	Subject Land		Bush Fire Prone Land		Vegetation Category 3
			Vegetation Category 1		Vegetation Buffer
			Vegetation Category 2		



Date: 16/11/2018

Figure 2: Bushfire Prone Land

3 Bushfire hazard and risk

3.1 Bushfire hazard

An assessment of the bushfire hazard surrounding or within the subject land is necessary to determine the suitability of the proposed future land use and the required bushfire protection measures that may be required, such as Asset Protection Zones (APZ). The bushfire hazard is a combination of vegetation and slope determined in accordance with methodology specified by PBP. Site assessment took place during April 2018. Photographs of the subject land and surrounding hazards are provided in Appendix 1.

3.1.1 Predominant vegetation (fuels)

The bushfire hazard consists of the bushland along the riparian corridor of Myrtle Creek and adjoining properties to the north, and the Council property to the west. Figure 3 displays the current distribution of the hazard.

The vegetation community has been identified (Ecoplanning 2018) as 'Narrow-leaved Ironbark – Broad-leaved Ironbark – Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Region'. The community is Plant Community Type (PCT) 1395 in accordance with OEH's BioNet Vegetation Classification which is based on Keith (2004) vegetation classification. As quoted by OEH, the vegetation formation of PCT 1395 is 'Grassy Woodland' and the vegetation class is 'Coastal Valley Grassy Woodland'.

The woodland structure of the surrounding vegetation is evident from site inspection (refer to photographs in Appendix 1). The projected canopy cover and the understorey closely resembles the Cumberland Plain woodland assemblages common to the western fringes of the Sydney Basin. Typically, the shrub layer becomes denser along the channel of Myrtle Creek, however the understorey quickly becomes open and grassy with elevation up the banks and throughout the majority of the surrounding lands to the north and west.

Based on the findings of the site inspection, and ecological identification and associated OEH classification, the predominant vegetation is classified as 'woodland' in accordance with PBP. The woodland classification is used to determine APZ dimension.

The vegetation community is also known as 'Shale Sandstone Transition Forest' (SSTF) and listed as a Critically Endangered Ecological Community (CEEC) under the NSW *Biodiversity Conservation Act 2016* and Critically Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

SSTF is described by OEH (2014) as occupying the edges of the Cumberland Plain, where clay soils from the shale rock mix with sandy soils from a sandstone substrate. The species composition varies depending on the soil influences (i.e. shale vs sandstone). Areas of low sandstone influence (such as Myrtle Creek and surrounding lands) have an understorey that is closer to Cumberland Plain Woodland. It is noted that *Eucalyptus moluccana* (Grey Box) and *E. tereticornis* (Grey Box) are common along Myrtle Creek (Ecoplanning 2018) and that they

have also been recorded on surrounding lands. These species are more common elements of the Cumberland Plain Woodland vegetation community, which is associated with shale soils.

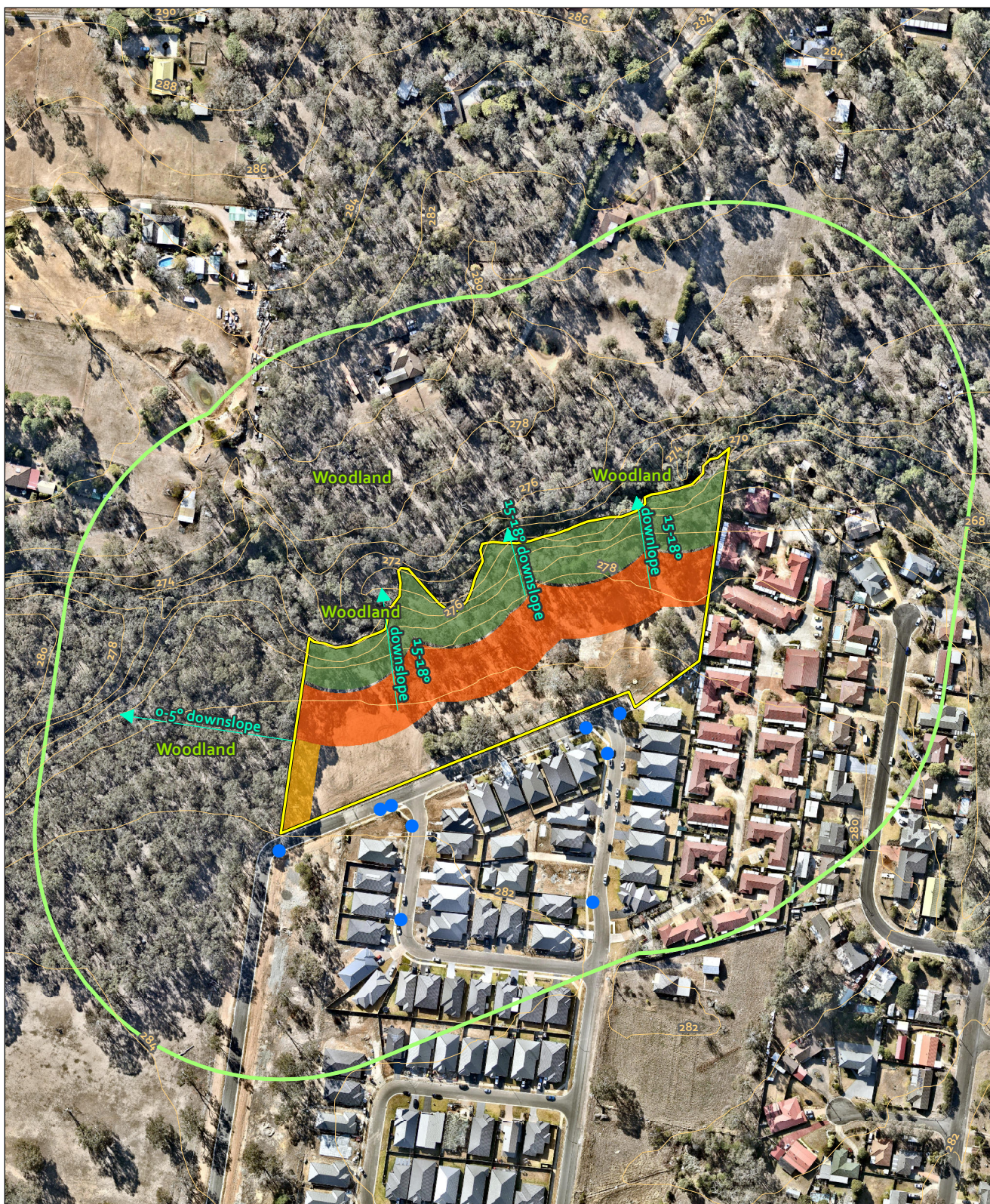
The adjoining lands in the remaining directions to the east and south are classified 'managed' as they are cleared and developed.

3.1.2 Slopes influencing fire behaviour

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. The slope was determined using a hand-held inclinometer on site and verified using a 2 m contour layer as shown on Figure 3.

The downslope leading down into Myrtle Creek varies from a gentle slope at the outer edge of the riparian zone, to a moderate slope and almost sheer (eroded) embankments in some areas. Slope transects along the riparian zone that were not affected by eroded scarps resulted in a consistent reading of 16 degrees. The eroded scarps exceed 16 degrees, however were excluded from the slope assessment as they would not significantly influence fire behaviour. The effective slope for the Myrtle Creek riparian zone is therefore within the PBP slope class of 'Downslope >15-18 degrees'.

The slope underneath the woodland within the road reserve and Council property to the west is on a gentle downslope in the PBP slope class 'Downslope 0-5 degrees'.



Legend

- | | | |
|--|--|--|
| ● Hydrant | Subject Land | Asset Protection Zone |
| — Contour - 2m | Proposed E2 Riparian Buffer | |
| | Subject Land Buffer - 140m | Asset Protection Zone - 15m |
| | | Asset Protection Zone - 30m |



Date: 5/11/2019

0 25 50 100
Metres

Coordinate System:
GDA 1994 MGA Zone 56

Imagery: © Nearmap

Figure 3: Bushfire Hazard Analysis and Asset Protection Zone

3.2 Bushfire risk

Assessing the bushfire hazard or threat is often better addressed by measuring risk. Bushfire risk is defined (Wollondilly/Wingecarribee Bushfire Risk Management Committee 2017) as the chance of a bushfire igniting, spreading and causing damage to assets of value. Therefore, risk is analysed not only in terms of the existence of an adjacent hazard, but also the potential for ignition, fire spread, factors contributing to fire control and response, and the vulnerability or resilience of the asset to fire.

The Wollondilly/Wingecarribee Bushfire Risk Management Plan (Wollondilly/Wingecarribee Bushfire Risk Management Committee 2017) ranks the existing adjacent residential community as 'medium' risk (out of a scale of low, medium, high, very high and extreme) with a management priority ranking of '4' (out of 1 to 5 with 1 being the highest priority). The low risk ranking reflects the patchy nature of the hazards in the area, being the riparian area of Myrtle Creek, which is somewhat disconnected from other remnants. The level terrain, lower fuel loads within woodland assemblages, and high degree of operational access (e.g. road network) and responsiveness (e.g. proximity to Tahmoor village and emergency authorities) would also be contributing factors.

A risk rating of future residential development with minimum 1,000 m² lot size at the subject land would be medium or lower. Although the risk profile may increase with the introduction of life and property into the area, there will be compliant bushfire protection measures in accordance with PBP (e.g. houses constructed to comply with AS 3959). Required measures to achieve compliance are discussed in the following Section 4 – 'Addressing Compliance'.

4 Addressing compliance

This section details how compliance with the assessment requirements listed in Section 2 is addressed. The response to requirements is set out following the structure of Direction 4.4, followed by PBP. There is reiteration of requirements between Direction 4.4 and PBP; in these cases, the relevant report subsection is referred to for the appropriate response.

4.1 Direction 4.4

The objectives of Direction 4.4 can only be satisfied once the provisions are achieved. Demonstration of achieving the provisions is provided below. A statement of how the objectives are achieved is listed below also:

“To protect life, property and the environment from bushfire hazards, by discouraging the establishment of incompatible land uses in bushfire prone areas”

The intention of the objective is to avoid a development outcome that is faced by or poses a risk that cannot be managed to an acceptable level. The assessment of ‘incompatible’, ‘inappropriate’ and ‘acceptable’ is a subjective one, and one that is not defined within the legislation or related policy.

To guide an assessment, reference should be made to the measures specified by ‘Planning for Bush Fire Protection 2006’ (see Section 4.1), such as the ability to establish and maintain an adequate APZ, and the assurance of acceptable access and evacuation.

The hazard and risk analysis within this report (Section 3) demonstrates that future development at the site will be faced by a risk that can be managed to an acceptable level by implementing the recommendations, therefore making it compatible with the surrounding environment.

It is concluded that the proposed land use is not considered incompatible with the adjacent bushfire prone area. Compliant APZs coupled with adequate access designed to address the bushfire risk produces a use not incompatible with the surrounding environment.

“To encourage sound management of bushfire prone areas”

The recommended bushfire protection measures demonstrate sound management of the use of the subject land for the intended use.

The provisions and how they are to be addressed are as follows:

“have regard to Planning for Bush Fire Protection 2006”

Addressing this provision is detailed in the following Section 4.2.

“introduce controls that avoid placing inappropriate developments in hazardous areas”

The proposed land use is not considered inappropriate nor is the area determined to be hazardous (refer to Section 3). Controls (bushfire protection measures) will be set in place commensurate with the level of risk for any future development. These controls would comply with PBP as set out in Section 4.2.

“ensure that bushfire hazard reduction is not prohibited within the asset protection zone”

The APZ will be contained within the R2 land within the lots. The APZ will not fall within the adjacent E2 zone (Myrtle Creek riparian area). This will ensure APZ maintenance can occur without conflicting with ecological objectives.

“provide an asset protection zone incorporating at a minimum:

an Inner Protection Area 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 managed for hazard reduction and located on the bushland side of the perimeter road”

APZs suitable for residential subdivision are shown on Figure 4 and detailed in Section 4.2. Compliant APZ dimension can be achieved within the subject land.

“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. If the provisions of the draft LEP permit Special Fire Protection Purposes (as defined under Section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with”

The proposal is not ‘infill development’.

“contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks”

The existing Major Roberts Avenue provides the public road access to the subject land. Additional public roads are not required. Addressing this provision is detailed in the following Section 4.2.

“contain provisions for adequate water supply for fire-fighting purposes”

Major Roberts Avenue has existing hydrants that will provide a compliant water supply to the subject land and future lots. Addressing this provision is detailed in the following Section 4.2.

“minimise the perimeter of the area of land interfacing the hazard which may be developed”

The developable area is defined by the proposed E2 zone riparian area along the northern portion of the subject land (refer to Figure 3). The perimeter is essentially a straight line from east to west.

“introduce controls on the placement of combustible materials in the Inner Protection Area”

Section 4.2 details the how future lots and APZs are to be maintained.

4.2 Planning for Bush Fire Protection 2006 (PBP)

Compliance with PBP is achieved by addressing the standards for bushfire protection. The standards consist of ‘Acceptable Solutions’ and corresponding ‘Performance Criteria’ for the provision of APZs, access and services (water supply).

Discussion on the standards and statements on how each protection measure can be complied with are listed in the subsections below.

4.2.1 Asset Protection Zones (APZ)

Using the hazard parameters of vegetation and slope discussed in Section 3, APZ distances have been determined and are shown on Figure 3. The recommended APZ dimensions range from 15 m to 30 m, depending on the effective slope class as listed in Table 1 below.

The 30 m APZ is measured from the proposed E2 zone and the 15 m APZ will be accommodated within the proposed western lot.

Table 1: Determination of APZ

Location ¹	Vegetation ²	Slope ³	PBP 2006 APZ ⁴
North	Woodland	Downslope >15-18°	30 m
West	Woodland	Downslope 0-5°	15 m
South and East	Managed	Not required	Not required

¹ Location with respect to subject land – refer to Figure 3.

² Predominant vegetation classification over 140 m from development boundary.

³ Effective slope assessed over 100 m from development boundary where the bushfire hazard occurs.

⁴ Minimum APZ required by PBP 2006 acceptable solution for residential development.

The APZs and future lots (not including land zoned E2) will need to be maintained to achieve the performance requirements of an Inner Protection Area (IPA) as specified by PBP. The following guide can be used:

- Canopy treatment: The tree canopy is to be discontinuous with gaps between crowns of at least 2 to 5 m. Small clumps of trees can remain forming one larger crown providing larger gaps to the next adjacent crown of minimum 5 m is achieved.
- Understorey treatment: Shrubs, saplings and understorey vegetation should not be within the APZ.
- Groundcover treatment: Groundcovers such as grasses are to be regularly mowed or slashed to minimal height (i.e. 100 mm), and ground fuels are to be maintained in a minimal state by removing all dead vegetative material by raking and removing leaf litter and other fine fuels such as sticks and fallen dead-wood.

4.2.2 Access

Alternate access and egress

PBP requires an access design that enables safe evacuation whilst facilitating adequate emergency and operational response. All bushfire prone areas should have an alternate access or egress option depending on the bushfire risk, the density of the development, and the chances of the road being cut by fire for a prolonged period.

Major Roberts Avenue provides alternate access from the east and west directions, leading south away from the bushfire hazard and towards Thirlmere Way. The existing public road access is compliant with PBP.

Perimeter access

Future lots are proposed to have a fire trail that provides perimeter access to the rear of all lots. The trail is to be located between the E2 zone and building envelopes, linking to Major Roberts Avenue at either end of the subject land. The trail is to be placed under the ownership of a single lot to prevent the erection of boundary fences and gates that could potentially sever the trail. Enforcing trail maintenance will also be more direct under single ownership. To ensure trail maintenance is not a burden on the single owner, and trafficable conditions persist, it is proposed to apply a two-coat bitumen seal for its entire length. Applying a pavement will ensure those typical trail maintenance issues, such as erosion, wash-outs and overgrowth, don't occur.

Design and construction standards

The perimeter fire trail is to be constructed to comply with PBP Section 4.1.3(3). Public subdivision roads are not proposed, and there will be no requirement for property access roads as dwellings would be within the required distance of hydrants along Major Roberts Avenue.

4.2.3 Water supply for fire-fighting

Existing hydrants along Major Roberts Avenue provide coverage compliant with *AS 2419.1 – 2005 Fire Hydrant Installations - System Design, Installation and Commissioning* (AS 2419) so that future dwellings would be within 70 m of a hydrant by lay of the hose (or 90 m with a tanker parked in-line maximum 20 m from the hydrant). The hydrant locations are mapped on Figure 3.

5 Conclusion and recommendations

The information presented in this Bushfire Assessment Report demonstrates that the proposal to rezone the subject land and reduce the minimum lot size can satisfy the Ministerial Direction No. 4.4 – ‘Planning for Bush Fire Protection’ and the requirements of ‘*Planning for Bush Fire Protection 2006*’. This is achieved by providing compliant bushfire protection measures such as hazard separation and adequate access.

The proposal is not considered incompatible with the surrounding environment and bushfire risk. With compliant bushfire management as listed within this report, future development can occur adjacent the existing hazards.

Bushfire protection measures for future development recommended within this report to achieve the requirements are listed below:

- Provision of compliant APZs between future building envelopes and bushfire hazards. A 30 m APZ is required from the proposed E2 zone (riparian corridor) to the north, and a 15 m APZ is required to the western boundary.
- Management of vegetation and fuels within the designated APZs to achieve the standard of an Inner Protection Area (IPA) as described by PBP.
- Provision of a perimeter fire trail within the APZ to allow fire-fighting appliances to gain access along the hazard interface between future dwellings and the hazard. The trail is to link back to Major Roberts Avenue at the western and eastern ends of the subject land.
- The design and construction of the perimeter fire trail is to comply with PBP Section 4.1.3(3) ensuring the trail is under single ownership and sealed.



David Peterson



References

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<http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10755>

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

Wollondilly/Wingecarribee Bushfire Management Committee (WWBMC) 2017. *Bushfire Risk Management Plan*. Prepared by the IBMC pursuant to section 52 of the Rural Fires Act 1997.

Appendix 1 – Photographs



Photograph 1: Outside edge of riparian zone followed by slope down to Myrtle Creek.



Photograph 2: Slope transect from channel towards development site



Photograph 3: Slope transect from channel towards development site



Photograph 4: Steep embankment down into Myrtle Creek



Photograph 5: Creek bank on northern side of Myrtle Creek



Photograph 6: Woodland in large rural lots to the north of Myrtle Creek



Photograph 7: Woodland in road reserve and Council property to the west

