



Bushfire Assessment

Planning Proposal

'Backsaddle', Kiama

Cardno

29 June 2018

(Ref: 18055)

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Executive summary

Objective and assessment requirements

This Bushfire Assessment Report was commissioned by Cardno 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 117(2) Ministerial Direction No. 4.4 – ‘Planning for Bush Fire Protection’, which calls up the NSW Rural Fire Service guideline document ‘*Planning for Bushfire Protection 2006*’.

Bushfire hazard, threat and risk

The hazard consists of a steep vegetated gullies and slopes supporting Illawarra Subtropical Rainforest and variations such as Acacia Scrub. Classified as ‘rainforest’ for the purposes of the APZ assessment, a minimum 25 m APZ is required along those areas that will be retained due to ecological values.

Beyond the subject land, the bushfire threat is assessed to be ‘low’ due to the hazard being confined to the gully walls and riparian zones, surrounded by cleared farming land and residential development. The Illawarra Bushfire Risk Management Plan (Illawarra Bushfire Risk Management Committee 2017) reports the ‘low risk’ in the area and the absence of landscape-wide fire since recorded history. A risk rating of future residential development at the subject land would also be low as there will be compliant bushfire protection measures.

Measures to achieve compliance

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

- Provision of compliant APZ (25 m minimum) between future building envelopes and bushfire hazards.
- Adequate access for emergency response and evacuation including alternate access linking to existing adjacent development.
- Compliant road widths and design.
- Perimeter subdivision roads between lots and identified hazards.
- Adequate water supply to allow fire-fighting operations by fire authorities.

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 Bushfire Protection 2006*’.

1 Introduction

1.1 Background

Cardno commissioned Peterson Bushfire to prepare a Bushfire Assessment Report to accompany a Planning Proposal to rezone land known as 'Backsaddle' in Kiama to allow future development. This report addresses the requirements for assessment of rezoning proposals involving bushfire prone land, namely the *Environmental Planning and Assessment Act 1979* Section 117(2) Ministerial Direction 4.4 – 'Planning for Bush Fire Protection'.

1.2 Location of subject land and description of proposal

The subject land consists of 13 lots and interconnecting road reserves located on the western interface of the built-up area of Kiama as shown on Figure 1.

The proposal seeks to rezone the land zoned RU2 – Rural Landscape to allow future development as follows:

- Large-lot rural residential subdivision in the northern extremity of the site;
- Local centre and seniors housing along the eastern margin connected to the existing built-up area of Kiama; and
- Low density residential subdivision across the remainder (majority) of the site.



Legend

 Subject Land



Date: 28/06/2018

0 250 500 1,000
Metres

Figure 1: The Location of the Subject Land

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

2 Assessment requirements

Some of the lots comprising the subject land are identified as 'bushfire prone land' on the Kiama 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 117 (2) 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.*

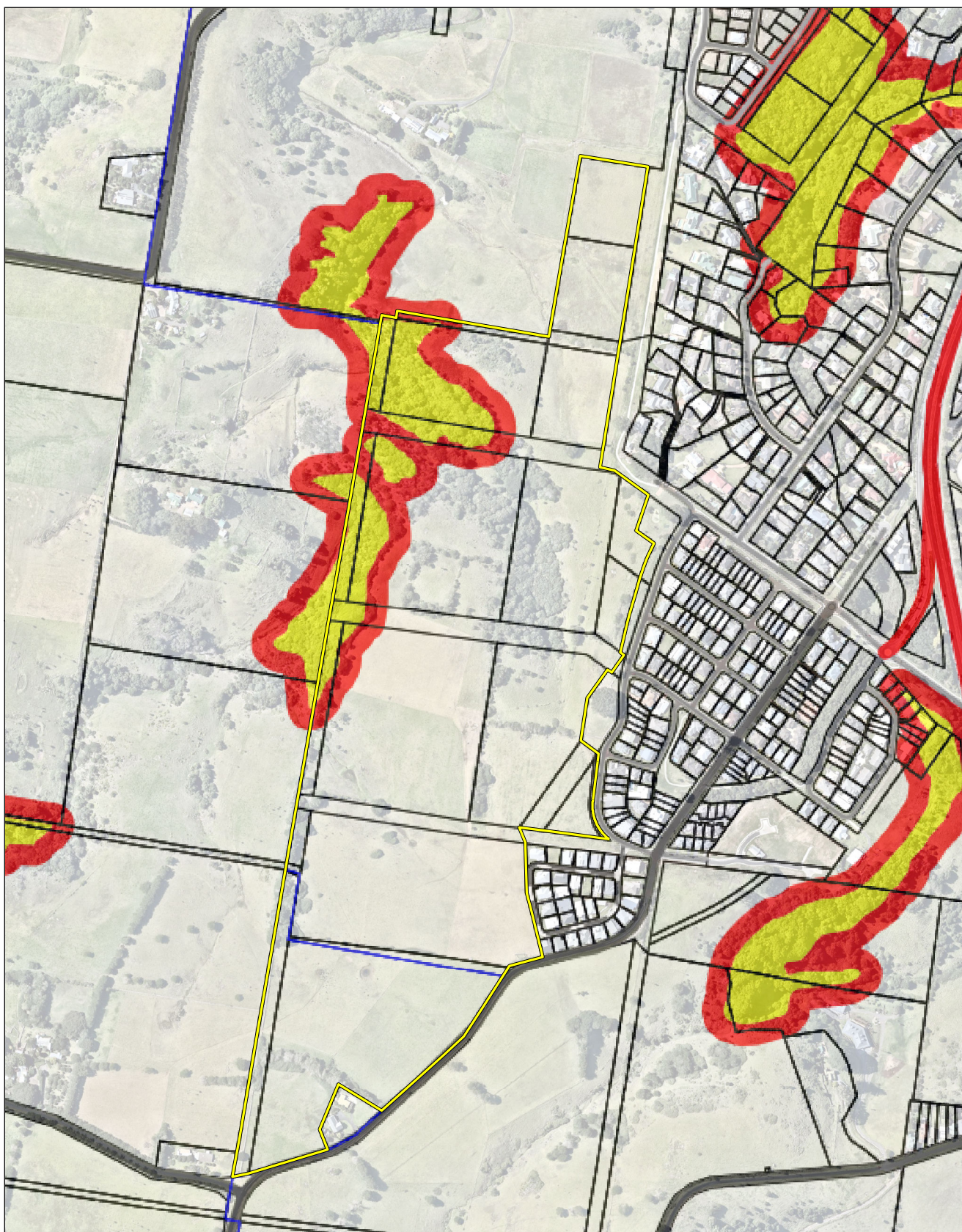
Direction 4.4 instructs councils on the bushfire matters which need to be addressed when drafting and amending Local Environmental Plans (LEP). They are as follows:

- *A draft LEP shall:*
 - o *have regard to the document Planning for Bushfire Protection 2006;*
 - o *introduce controls that avoid placing inappropriate developments in hazardous areas; and*
 - o *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:*
 - o *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.*
 - o *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,*
 - o *contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks,*

- o *contain provisions for adequate water supply for fire-fighting purposes,*
- o *minimise the perimeter of the area of land interfacing the hazard which may be developed,*
- o *introduce controls on the placement of combustible materials in the Inner Protection Area.*

The need for Planning Proposals to comply with '*Planning for Bushfire 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.
- PBP Section 4.2 – outlines the specific objectives (Section 4.2.3) and assessment requirements (Section 4.2.7) for Special Fire Protection Purpose (SFPP) developments such as seniors living.



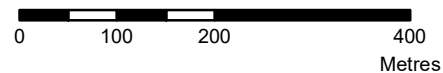
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- Subject Land
- Bushfire Prone Land**
 - Vegetation Buffer
 - Vegetation Category 1
 - Vegetation Category 2

Figure 2: Bushfire Prone Land



Date: 28/06/2018



Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

3 Bushfire hazard and risk

3.1 Bushfire hazard

An assessment of the 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, such as asset protection zones, that may be required. The bushfire hazard is a combination of vegetation and slope determined in accordance with methodology specified by PBP. Site assessment took place on 19th April 2018. Photographs of the subject land and surrounding hazards are provided in Appendix 1.

3.1.1 Predominant vegetation (fuels)

The vegetation within and surrounding the subject land is confined to the steep gullies and slopes where farming has not persisted over time. Most of the vegetation is concentrated in the north-western portion of the site where the steeper lands and riparian zones are found. The vegetation is a mixture of rainforest and a complex of regenerating wattles and exotics where rainforest once stood. The vegetation in the central and southern portions of the subject land consists of windrows, patches of exotics, and stands of Coral Trees, such as along the western boundary.

The vegetation has been surveyed and mapped by EcoPlanning (2018) and the ecological communities are displayed on Figure 3. The climax community for all vegetated areas is Illawarra Subtropical Rainforest (Whalebone Tree – Native Quince dry subtropical rainforest on dry fertile slopes, southern Sydney Basin Bioregion). An exception is the *Melaleuca armillaris* Tall Shrubland (Bracelet Honey-Myrtle – Australian Indigo dry shrubland on volcanics, southern Sydney Basin Bioregion) located amongst the rainforest on the north-western boundary of the subject land.

The Acacia Scrub that is shown (see Figure 3) to cover the upper reaches of the gullies was also once Illawarra Subtropical Rainforest. However, it was once cleared for grazing, and the process of rainforest regeneration begins with thickets of *Acacia melanoxylon* forming a dense scrub which allows the rainforest species to recolonise in a sheltered environment. The rainforest species eventually out compete the Acacia Scrub over a time period defined by the relatively short life-cycle of *A. melanoxylon* and other local wattles (NPWS 2002). The Acacia Scrub across the site displays strong signs of rainforest revival along with severe weed infestations.

The ecological communities as mapped by EcoPlanning have been classified into predominant vegetation classifications in accordance with PBP. The following classifications have been made:

- *Melaleuca armillaris* Tall Shrubland: Tall Heath (Scrub)
- Illawarra Subtropical Rainforest: Rainforest
- Acacia Scrub: Rainforest

The vegetation classifications are mapped on Figure 4. The classification of the shrubland and rainforest is apparent. The classification of Acacia Scrub to rainforest is based on most likely future structural formation and current worst-case hazard scenario. The Acacia Scrub is in varying ages and therefore degrees of recolonisation by the climax rainforest community. Acacia Scrub will remain on site as the potential hazard for some time to come. The classification of rainforest is most fitting in this instance due to the presence of rainforest species and weed invasion. Other possible structural formations considered (e.g. forest and woodland) are not a direct fit in terms of fuel load, height and availability. The other possible classification other than rainforest is Tall Heath (Scrub). The APZ and BAL dimensions for rainforest are wider than Tall Heath (Scrub) on slopes greater than 10 degrees (which is exceeded in all cases at the subject land), therefore the rainforest classification is viewed as the worst-case hazard scenario.

The edge of the hazard used to assess APZ location and dimension has been based on the ecological constraints as mapped on Figure 5. The ecological constraints layer is a combination of the following:

- Existing E2 zone;
- Existing E3 zone;
- High ecological constraint (Ecoplanning 2018) being:
 - o Illawarra Subtropical Rainforest EEC;
 - o *Melaleuca armillaris* Tall Shrubland EEC;
 - o *Zieria granulate* threatened plant locations and 5 m radius buffer.
- Medium ecological constraint (Ecoplanning 2018) being:
 - o Main drainage line 20 m wide riparian zone.

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 2 m contour layer as shown on Figure 5.

The slope underneath the identified hazards within 100 m of the proposed development area is predominantly within and above the PBP slope class of 'downslope >15-18 degrees' for the entire length of the interface with the ecological constraints layer.



Legend

Subject Land

Vegetation Communities (PCT) - © Ecoplanning 2018

Acacia regrowth

Exotic grassland

Bracelet Honey-myrtle - Australian Indigo dry shrubland on volcanics southern Sydney Basin Bioregion

Whalebone Tree - Native Quince dry subtropical rainforest on dry fertile slopes southern Sydney Basin Bioregion



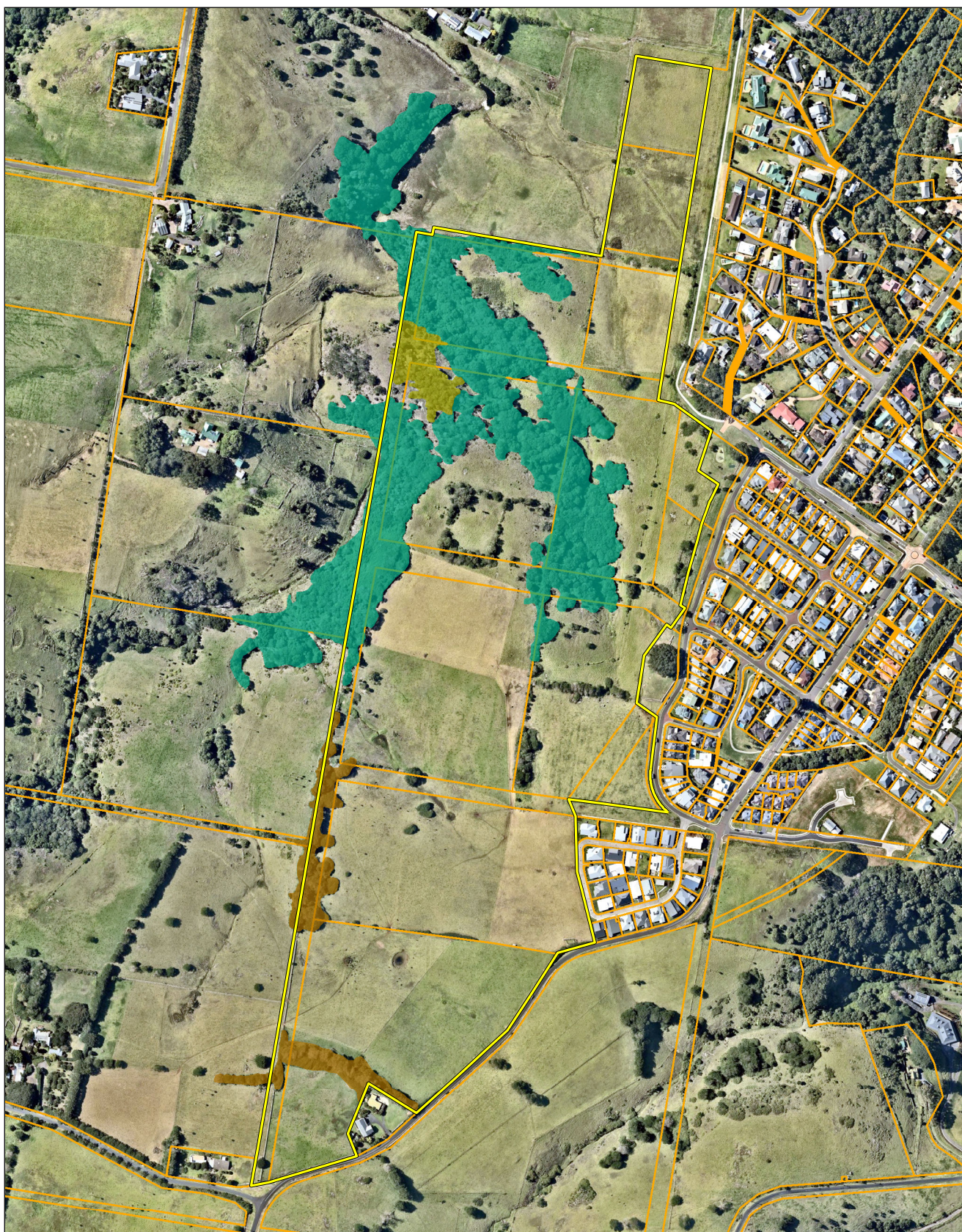
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0 75 150 300
Metres

Figure 3: Ecological Vegetation Communities

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap



Legend

	Subject Land	Vegetation Formations
		Exotics
		Rainforest
		Shrubland



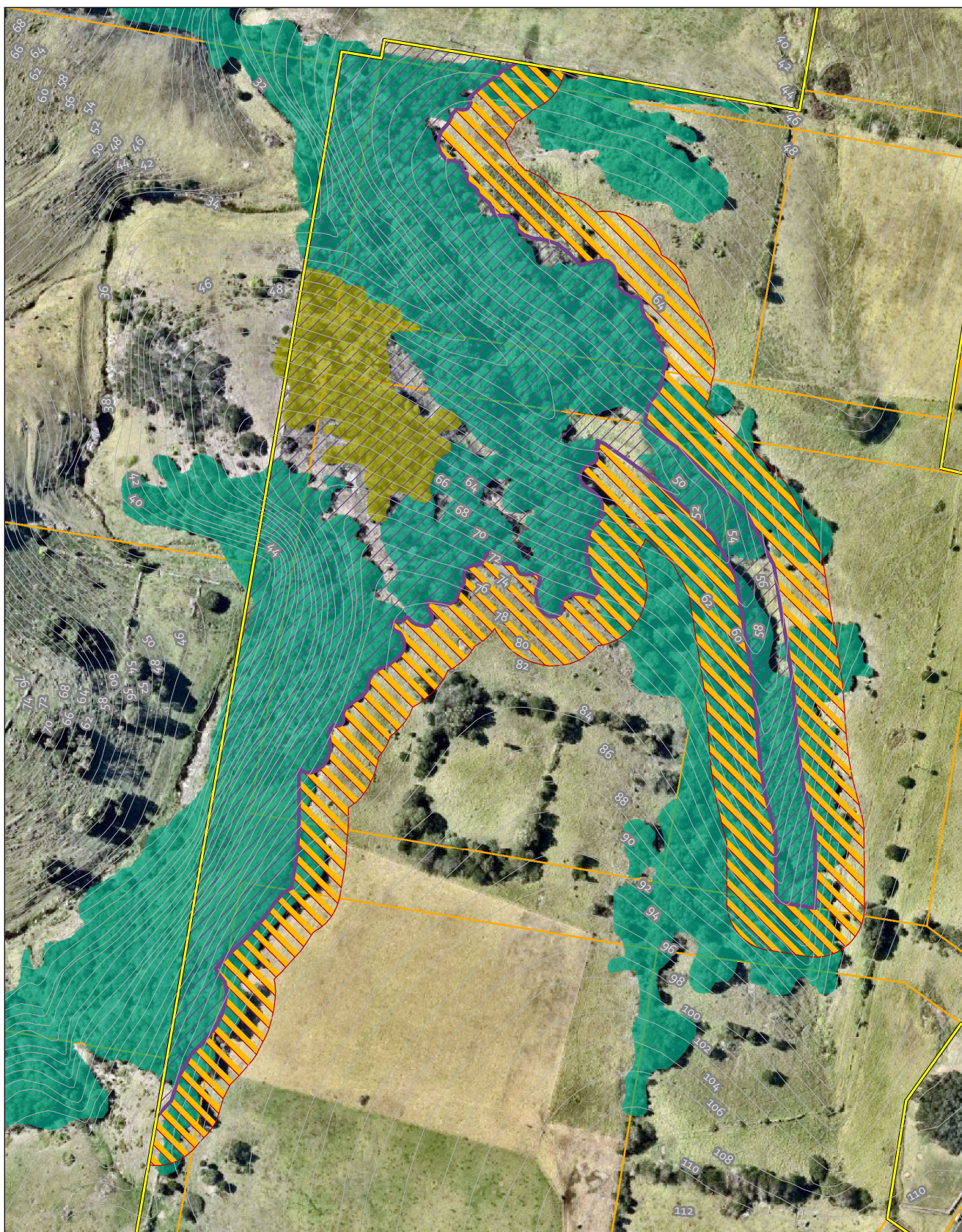
Date: 28/06/2018

0 75 150 300
Metres

Figure 4: Classified Vegetation Formations

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap



Legend

- | | | |
|---|-----------------------------|--|
|  | Subject Land | Vegetation Formations |
|  | Contour - 2m |  Rainforest |
|  | Ecological Constraints |  Shrubland |
|  | Asset Protection Zone - 25m | |

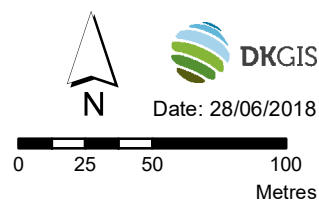


Figure 5: Bushfire Hazard Analysis and Asset Protection Zone

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

3.2 Bushfire threat

Beyond the subject land, the bushfire threat is assessed to be 'low' due to the hazard being confined to the gully walls and rainforested riparian zones and remnants. As can be appreciated from the Kiama Bushfire Prone Land Map (see Figure 2), there is a predominance of cleared farming land in the locale to the north, west and south, and the residential area of Kiama adjoins the subject land to the east.

The surrounding paddocks support exotic pasture grasses on volcanics, resulting in a grass fuel that is not commensurate with the fuel loads, curing rates and fuel availability assumed for native grasslands in PBP. The surrounding paddocks are not classified as 'grasslands'.

3.3 Bushfire risk

Assessing the impact of bushfire is often better addressed by measuring risk. Bushfire risk is defined (Illawarra 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, and factors contributing to fire control and response. The Illawarra Bushfire Risk Management Plan (Illawarra Bushfire Risk Management Committee 2017) ranks the existing western interface of Kiama, which includes the subject land, as 'low risk' with no management priority. This ranking would be due to the lack of significant bushfire hazards as well as the absence of landscape-wide fire in the area since recorded history (Illawarra Bushfire Risk Management Committee 2017). A risk rating of future residential development at the subject land would also be low. 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. 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 Bushfire 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 surrounding 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 Bushfire 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”

It is intended that asset protection zones will be confined to perimeter road reserves and maintained land such as residential lots and designated open space so that they can be maintained 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 and the adjoining hazard are shown on Figure 5 and detailed in Section 4.2.

“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”

Future development will feature a two-way road network to service lots. Addressing this provision is detailed in the following Section 4.2.

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

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 defined by the ecological constraints layer has an interface (refer to Figure 5) that minimises the hazard perimeter. The riparian zone that

protrudes into the developable area however it is very narrow (20 m) and considered an insignificant hazard.

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

Section 4.2 details the how the site and any APZs are to be maintained.

4.2 Planning for Bushfire Protection 2006 (PBP)

Compliance with 'Planning for Bushfire Protection 2006' (PBP) is achieved by addressing the standards for bushfire protection. The standards consist of 'Acceptable Solutions' and corresponding 'Performance Criteria' for the provision of asset protection zones, 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

Using the hazard parameters of vegetation and slope discussed in Section 3, APZ distances have been determined and are shown on Figure 5. The recommended APZ dimension is 25 m, relating to a predominant vegetation classification of 'rainforest' situated on an effective slope class of 'downslope >15-18 degrees'. Areas of Tall Heath (Scrub) would require a 20 m APZ, however the worst-case scenario of rainforest has been selected as the predominant vegetation for the site. A BAL-40 construction standard would result for dwellings with the minimum 25 m APZ. To achieve BAL-29, the APZ would need to be increased to 29 m.

The placement of the APZ may change depending on further detailed technical studies carried out at subdivision stage. The APZ analysis presented within this report is suitable for a Planning Proposal.

The Local Centre and seniors living uses will be located on the eastern side of the subject land furthest from the identified hazards. Therefore, APZs will not be required for these uses.

The APZ and development site (not including riparian zones) 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.

Future subdivision and development will require more than one access point along the eastern side to link back into the existing built-up area. Any access leading north, east or south out of the subject land is considered acceptable for the rezoning proposal as the access leads away from the bushfire threat.

Perimeter access

Future lots are to be separated from the identified hazards by a subdivision perimeter road. The road would accommodate the APZ and provide fire authorities access to defend properties.

Design and construction standards

The subdivision roads are to be designed in accordance with the PBP Acceptable Solutions for the design and construction of public roads in bushfire prone areas (see Table 1 on the following page). Minimum carriageway widths are 6.5 m for non-perimeter roads and 8 m for perimeter roads.

4.2.3 Water supply for fire-fighting

Future development will require fire hydrants to be installed to comply with AS 2419.1 – 2005 *Fire Hydrant Installations - System Design, Installation and Commissioning* (AS 2419) so that all sides of a building envelope are 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).

Table 1: Design and construction for public roads

Performance Criteria	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 PBP Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle), which is a minimum of 6.5 metre carriageway for two-way road with inside edge curve radius >100 and swept path 2.5 metres. • 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 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	• 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
• Roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered	• Public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression • 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
• There is clear access to reticulated water supply	• 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 • 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 does not obstruct the minimum paved width	• 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 • Public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road

5 Conclusion and recommendations

The information presented in this Bushfire Assessment Report demonstrates that the proposal to rezone the subject land for future development 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 sound bushfire management, the proposal can coexist within the rural setting which is assessed to present a low bushfire risk.

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

- Provision of compliant APZ (25 m minimum) between future building envelopes and bushfire hazards.
- Adequate access for emergency response and evacuation including alternate access linking to existing adjacent development.
- Compliant road widths and design.
- Perimeter subdivision roads between lots and identified hazards.
- Adequate water supply to allow fire-fighting operations by fire authorities.



David Peterson



References

Ecoplanning 2018. XXXX Ecological Study for Backsaddle Planning Proposal, Kiama.

NPWS 2002. *Bioregional Assessment Study Part 1: Native Vegetation of the Illawarra Escarpment and Coastal Plain*. ISBN 073136791X

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

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

Appendix 1 - Photographs



Photograph 1: View south across northern tip of the subject land



Photograph 2: View across vegetated gully in north-western corner of the subject land



Photograph 3: View across vegetated gully within central portion of the subject land



Photograph 4: Example of remnant boundary trees

