



Planning Proposal

Bushfire Management Strategy

Jacaranda Ponds

November 2018



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Executive Summary

The report provides a bushfire risk assessment of the proposed re-zoning for the Jacaranda Ponds Planning proposal, at Glossodia in the Hawkesbury Council Local Government Area. This report provides bushfire protection measures that meet the statutory and policy requirements for bushfire protection in NSW.

The proposed development subdivision development for residential purposes. The perimeter of this development, including its various stages abuts bushfire prone land and is vulnerable to bushfire attack. The assessment assumes a worst likely bushfire attack scenario on a day of catastrophic bushfire danger (i.e. Fire Danger Rating of 100).

A number of strategies have been provided in the form of planning controls such that the risk from bushfire is reduced to an appropriate level and a level that meets or exceeds the deemed to satisfy bushfire protection requirements for NSW. The bushfire protection measures applied represent at least national best practice bushfire risk reduction, and take into consideration developing bushfire research, including dynamic fire propagation.

The strategies used to reduce the bushfire risk associated with the re-zoning, include:

- Setbacks from bushfire prone vegetation (APZs)
- Integration of non-combustible infrastructure within APZs such as roads, easements and parking areas
- Access and egress from the site through a well-designed road system
- Landscaping and garden design principles and guidance to minimise bushfire risk
- Underground electricity and gas services
- Compliant water supplies
- Emergency response planning.

More detailed bushfire assessment to accurately prescribe setbacks, access roads and landscaping is required for each stage of subdivision, however the re-zoning application has provisions that allow this more detailed designed to occur smoothly and achieve the deemed to satisfy standards for subdivisions within NSW.

1 Introduction

1.1 Purpose of assessment

The report provides a bushfire risk assessment of the proposed re-zoning for the Jacaranda Ponds Planning proposal (hereafter referred to as the subject land). It specifically addresses:

- Whether the statutory and policy requirements for bushfire protection NSW are met by the structure plan
- The extent to which best practice approaches to bushfire planning are achieved.

The existing and potential bushfire hazard and associated risk (post development) is assessed using Planning for Bushfire Protection 2006 (PBP) Guidelines (NSW RFS, 2006).

1.2 Location

Figure 1 shows the location and extent of the subject land.

1.3 Description of re-zoning proposal and process

The Jacaranda Ponds planning proposal is for the development in NSW for residential and related purposes. This proposal is located at Glossodia in the Hawkesbury Council Local Government Area. **Figure 2** shows the proposed masterplan.

The proposed development involves subdivision of the existing land to create smaller residential lots, conservation areas and associated roads and infrastructure.

The proposed rezoning of the subject land will involve changes to the planning controls that currently apply over the site. This means a change to the types of development permissible.

Hawkesbury Council will oversight, and ultimately determine, the environmental approvals and rezoning for the subject land

The planning proposal to rezone the land at Jacaranda Ponds has undergone extensive community consultation. Celestino have been conducting monthly meetings with the community at Glossodia since 2015.

Celestino and Hawkesbury Council have been discussing the proposal for a number of months.

- Celestino met with Council on 10 December 2015, 14 July 2016 and 16 May
- Celestino, Council and ELA met with OEH on 18 March 2016 to discuss the project.

The planning proposal would be placed on public exhibition.



Figure 1: Location of subject land



Figure 2: Proposed Master Plan

1.4 Legislative and policy requirements

1.4.1 Environmental Planning and Assessment Act 1979

The NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal planning legislation for the state, providing a framework for the overall environmental planning and assessment of development proposals. Various legislation and instruments, such as the NSW *Threatened Species Conservation Act 1995* (TSC Act) and *Rural Fires Act 1997* (RF Act) are integrated with the EP&A Act.

Section 117(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) issues directions to be followed when considering rezoning. 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. The relevant planning authority, in the preparation of a planning proposal, must:

'...consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 56 of the Act, and prior to undertaking community consultation in satisfaction of section 57 of the Act, and take into account any comments so made'.

1.4.2 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (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 (Part 4 of the EP&A Act 1974) is likely to significantly affect threatened species, populations and ecological communities or their habitat.

In relation to bushfire, the TSC Act also identifies high frequency fire regimes as a key threatening process.

1.4.3 Rural Fires Act, 1997

A large proportion of the bushfire issues in NSW are regulated by the *Rural Fires Act 1997* (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 (NSW RFS, 2006b). Key requirements of the RF Act 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 Asset Protection Zones (APZ), landscaping and any retained vegetation when developing land (NSW RFS, 2006b).

1.4.4 Planning for Bush Fire Protection 2006 (PBP)

Planning for Bush Fire Protection 2006 (PBP) was developed by the NSW Rural Fire Service (NSW RFS) to provide development standards for building in bush fire prone areas in NSW. It provides for the protection of human life and helps to minimise the impacts on property from the threat of bush fire.

Development on bushfire prone land must satisfy the requirements of *PBP* which includes having regard to the following planning principles:

- Provision of a perimeter road with 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
- Introduction of controls on the placement of combustible materials in asset protection zones.

PBP also provides performance and acceptable solutions for a range of bushfire protection measures required to minimise the risk associated with bushfire attack.

Planning for Bush Fire Protection 2006 has been reviewed by the NSW RFS to incorporate lessons learnt from major bush fire events such as the 2009 Victorian Black Saturday fires, along with changes to building code and construction standards. The Pre-Release version of Planning for Bush Fire Protection 2018 (PBP 2018) was released in early September 2018 however, the legislation enacting PBP 2018 will not be changed until mid-2019 to coincide with the release of the 2019 National Construction Code and updated version of Australian Standard (AS) 3959-2009 'Construction of buildings in bushfire-prone areas'. Until this legislation change occurs, the 2006 version of PBP will remain the legislated version of PBP and the basis for compliance. Pre-Release PBP 2018 will be considered in performance solutions only.

The advice below includes information relating to the potential changes to PBP, including a potential increase in minimum APZ distances based on BAL-29.

1.5 Building Code of Australia

The Building Code of Australia (BCA) is adopted in NSW through the EP&A Act. It contains provisions, which can be used for construction to resist bushfires in order to reduce the risk to life and minimise the risk of property loss in designated bushfire prone areas.

The BCA specific 'deemed to comply' measure is the *Australian Standard AS3959 Construction of buildings in bushfire-prone areas*.

1.6 Australian Standard AS3959-2009 Construction of buildings in bushfire-prone areas

The standard is applied throughout Australia to the construction of buildings on bushfire prone lands. Its objectives are to prescribe particular construction details for buildings to reduce the risk of ignition from a bushfire while the fire front passes. NSW has a number of alternate provisions to AS3959-2009 for BAL FZ but these are unlikely to be applicable to this proposal.

1.7 Bushfire prone lands

The subject land is mapped as bushfire prone land on the Hawksbury Shire Council Bushfire Prone Land map.

1.8 Assessment framework

The following section outlines how the development will be assessed in accordance with PBP.

1.8.1 NSW Residential

Future residential subdivision will be assessed under Section 100B of the RF Act and a Bush Fire Safety Authority (BFSA) must be obtained from the NSW RFS. Section 100B of the RF Act specifies conformance with the intent and performance criteria of the Bushfire Protection Measures outlined in PBP. The bushfire protection measures relevant to 100B of the RF Act within PBP 2006 are:

- *The provision of clear separation of buildings and bushfire hazards, in the form of fuel-reduced APZ (and their subsets, inner and outer protection areas and defensible space)*
- *Construction standards and design*
- *Appropriate access standards for residents, fire fighters, emergency service workers and those involved in evacuation*
- *Adequate water supply and pressure*
- *Emergency management arrangements for fire protection and/or evacuation; and*
- *Suitable landscaping, to limit fire spreading to a building.*

2 Bushfire Hazard Assessment

The bushfire hazard was assessed using the method prescribed in PBP and is described in the following sections.

2.1 Vegetation

Error! Reference source not found. shows the vegetation of the subject land. The majority of the subject land is considered exotic pasture land and does not form part of any native vegetation community. This area is largely cleared and managed for cattle grazing with a number of scattered trees.

The creek on the southern boundary of the subject land, Currency Creek, is vegetated to a width of 100 m or more in most areas south of pasture land. This vegetation is mapped by OEH (2013) as Alluvial Woodland and confirmed by site inspection as Forest Red Gum. This vegetation is therefore considered River-flat Eucalypt Forest and classified as PBP as 'Forest'.

The vegetation on the north, east and west of the subject land is mapped by OEH (2013) as Shale Sandstone Transition Forest and Shale Plains Woodland and confirmed by site inspection as Grey Box Forest (ELA, 2016). The vegetation is therefore considered Cumberland Plain Woodland and classified by PBP as 'Woodland'. This vegetation is located within sections of the urban area to the north and west. The vegetation is separated by grazed land across the subject land and is to be retained in larger sections where regeneration is expected.

The land on the eastern boundary is considered managed large lot and agricultural land.

2.2 Slope

Figure 4 shows the slope on the subject land using the slope classes of PBP. The subject land is located on a gentle slope that falls south. The vegetation on the southern boundary is considered as flat land and falls in the PBP slope category 'all upslopes and flat land'. On the north, east and west, the vegetation is located on ridge lines of varying slopes and falls within slope categories 'all upslopes and flat land', 'downslope >0-5 degrees', 'downslope >5-10 degrees'.

2.3 Interpretation of the vegetation and slope assessment

Subsequent stages in the development planning process will include APZ appropriate to each stage of implementation based upon the vegetation likely to affect each stage up until it is removed under subsequent development. The re-zoning proposal can provide a compliant APZ at its final extent and at each stage of development.

The current distributions of separated Woodland vegetation throughout the subject land are expected to revegetate into larger continuous areas of vegetation at the development stage. The vegetation along the creek line to the south is expected to remain over the same area with development. The pasture land throughout the subject land is located within the development area and will not be retained.

Indicative vegetation types mapped by OEH 2013

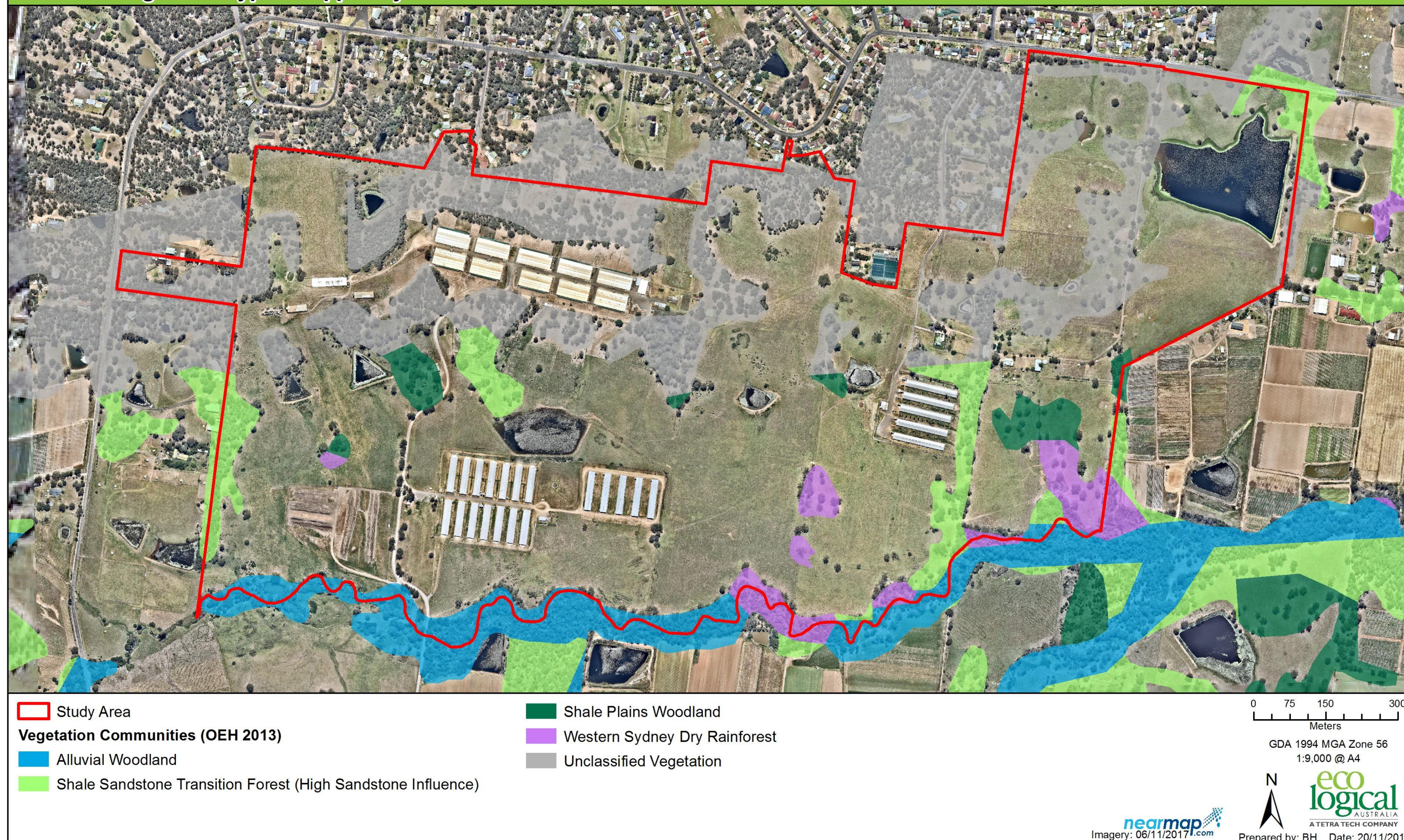


Figure 3: Vegetation Formations

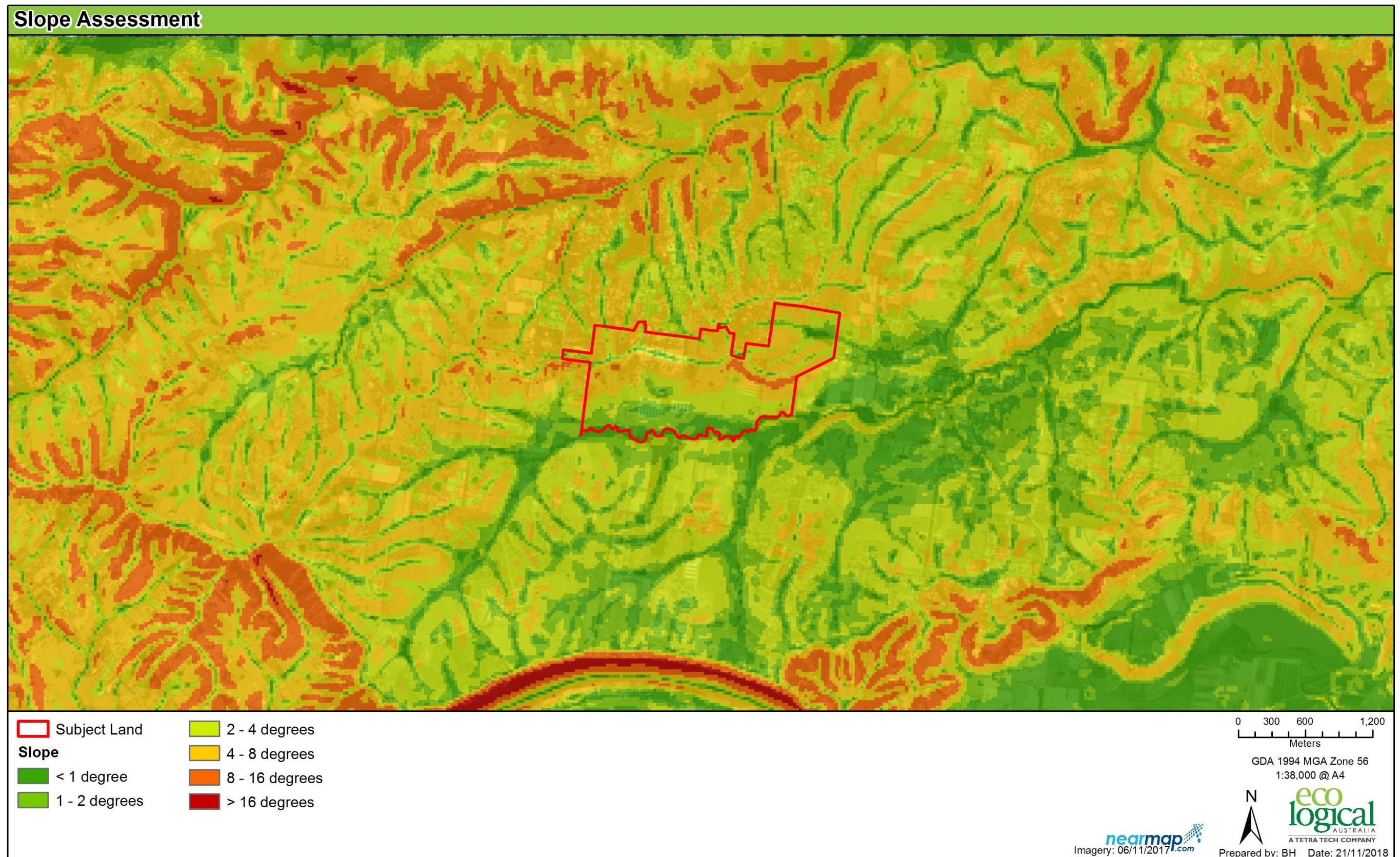


Figure 4: Slope assessment

3 Bush Fire Protection Measures

Application of the bushfire protection measures described in PBP minimise the risks from bushfire and ensure that the aims and objectives of PBP are met. This PBP approach has been applied for the subject site.

The following key bushfire protection measures are addressed in this assessment:

- Asset Protection Zones (APZs)
- Water supplies
- Infrastructure (including access road provisions and other services)
- Evacuation and emergency management (including emergency access/egress arrangements)
- Landscape management and garden design principles.

3.1 Asset Protection Zones (APZs)

APZs are areas located between bushfire hazards and development to provide a defensible space in which to undertake emergency operations and to provide a buffer from direct flame contact, and the impacts of radiant heat, smoke and embers.

The width of APZs is based on a combination of:

- Predominant vegetation (using structural classification)
- Effective slope (i.e. slope most affecting fire behaviour adjacent to the interface)
- Fire Danger Index (FDI) of 100 (a catastrophic fire weather day).

In NSW, PBP and the APZ dimension for residential development is currently undergoing review by the RFS as previously indicated (Section 1.4.1.4). The revised APZ requirements will therefore be applied in the future and are provided in **Table 1**.

APZ are typically refined during subdivision stages with the Structure Plan at re-zoning stage ensuring the APZ dimensions required at subdivision stage can be achieved. The APZ dimensions cited in this assessment are based on current APZ requirements in AS3959 (2009) and will be refined for future subdivision as a more detailed assessment of slope, vegetation and bushfire attack is required for each individual allotment, and the revised requirements of PBP 2018 will be applied.

APZs should be wholly contained within the proposed lot or subject land for which they are benefitting or protecting. However, in some circumstances APZs may consist of managed areas outside an allotment e.g. managed open space, managed service easements and roads. Perimeter roads form part of the APZ's throughout the site except within the powerline corridors which are low hazard and are separated by a road or trail where it abuts higher hazard areas.

Figure 5 and **Figure 6** shows the proposed APZ for the subject land. Error! Reference source not found. identifies the slope and vegetation type used to determine the APZ.

3.1.1 Fuel management within the APZ

The APZs are to be maintained by the owner of each future lot; where the APZ is part of a road reserve or public place it will be maintained by the agency responsible e.g. Hawkesbury Council. It is proposed

that the total APZ will be managed to an Inner Protection Area standard, except where it adjoins forest, where an Outer Protection Area of a size permissible under Table A2.7 of PBP will be applied.

Table 1: Threat assessment, APZ and category of bushfire attack

Transect #	Slope ¹	Vegetation ²	BAL-29 required APZ (AS3959-2009) ³	Residential APZ (PBP 2018) ⁴	Recommended APZ	Comments
1	All upslopes and flat land	Woodland	16 m	12 m	16 m	The APZ can be provided by perimeter roads, maintained public reserves and parks, maintained roadside reserves and managed gardens.
2	All upslopes and flat land	Woodland	16 m	12 m	16 m	As above
3	All upslopes and flat land	Woodland	16 m	12 m	16 m	As above
4	Downslope >5 to 10 degrees	Woodland	26 m	20 m	26 m	As above
5	Downslope >0 to 5 degrees	Woodland	21 m	16 m	21 m	As above
6	All upslopes and flat land	Woodland	16 m	12 m	16 m	As above
7	All upslopes and flat land	Woodland	16 m	12 m	16 m	As above
8	Downslope >0 to 5 degrees	Woodland	21 m	16 m	21 m	As above
9	Downslope >0 to 5 degrees	Woodland	21 m	16 m	21 m	As above
10	Downslope >0 to 5 degrees	Woodland	21 m	16 m	21 m	As above
11	All upslopes	Woodland	16 m	12 m	16 m	As above

	and flat land					
12	Downslope >0 to 5 degrees	Woodland	21 m	16 m	21 m	As above
13	All upslopes and flat land	Woodland	16 m	12 m	16 m	As above
14	Downslope >0 to 5 degrees	Woodland	21 m	16 m	21 m	As above
15	All upslopes and flat land	Woodland	16 m	12 m	16 m	As above
16	All upslopes and flat land	Woodland	16 m	12 m	16 m	As above
17	All upslopes and flat land	Forest	25 m	24 m	25 m	As above
18	All upslopes and flat land	Forest	25 m	24 m	25 m	As above
19	All upslopes and flat land	Forest	25 m	24 m	25 m	As above

¹ Slope most significantly influencing the fire behaviour of the site having regard to vegetation found as per PBP.

² Predominant vegetation is identified, according to PBP.

³ Assessment according to Table 2.4.2 AS3959 2009

⁴ Assessment according to Table A1.12.2 of PBP 2018

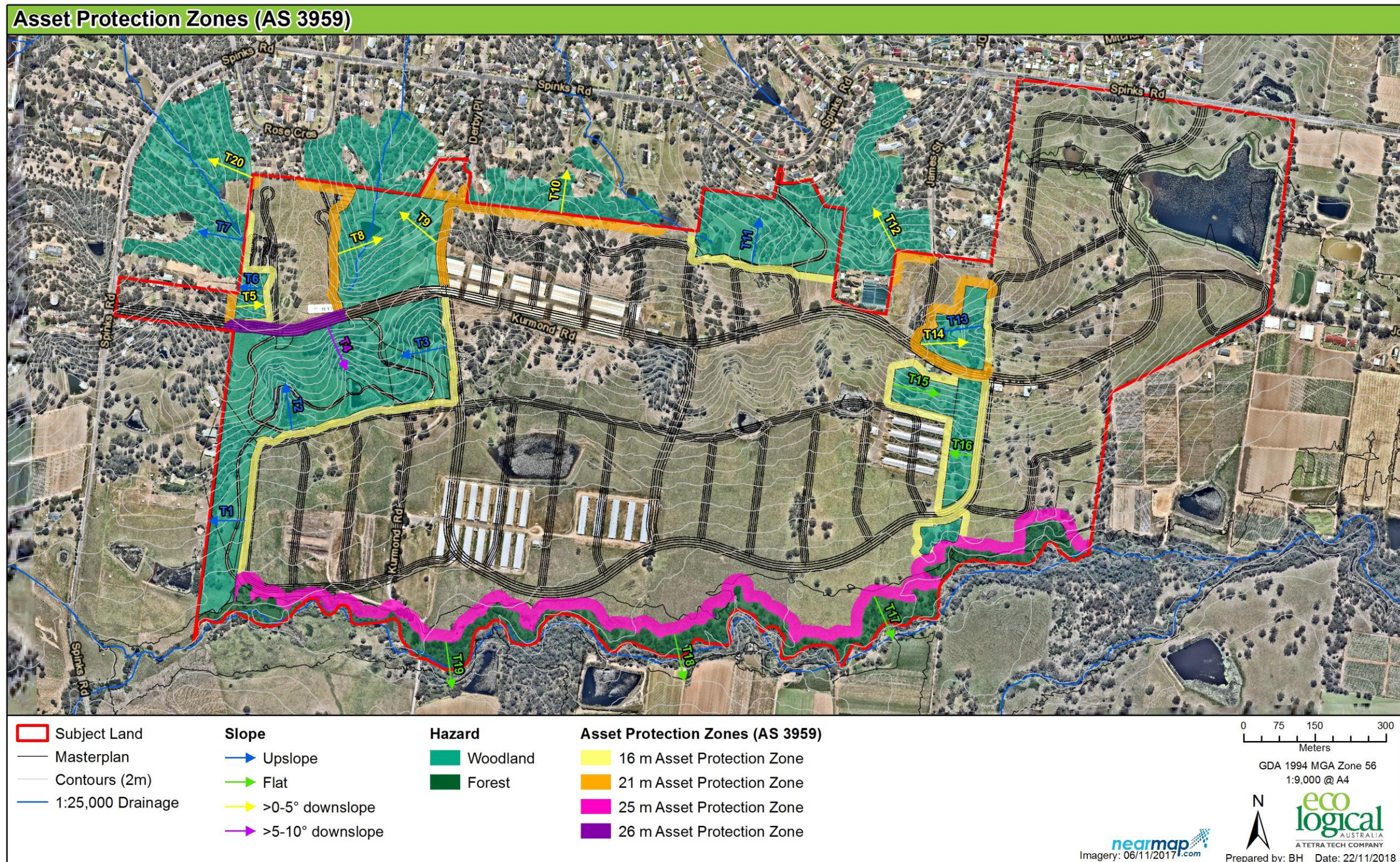


Figure 5: Asset Protection Zone (APZ) AS3959 2009

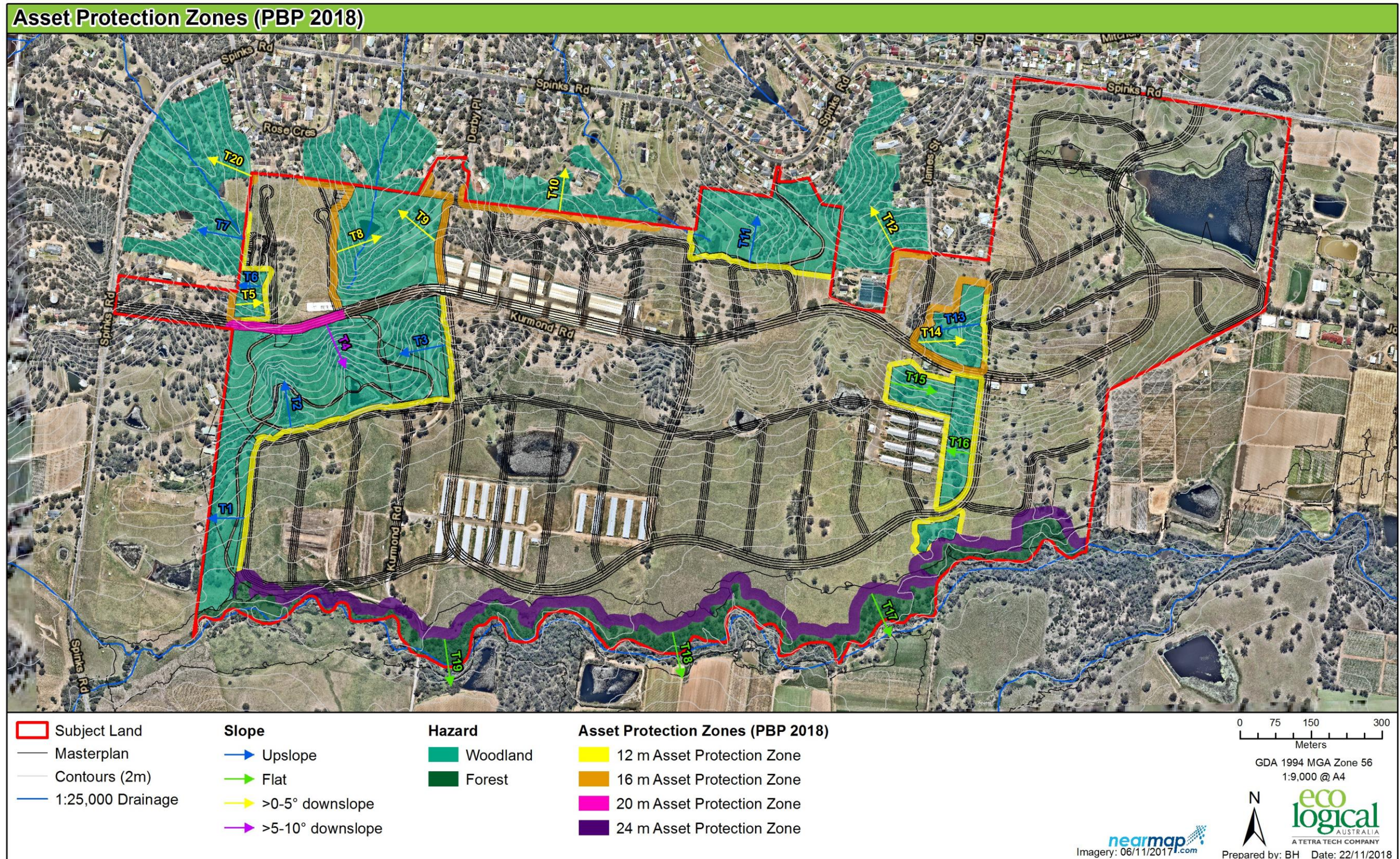


Figure 6: Asset Protection Zone (APZ) PBP 2018

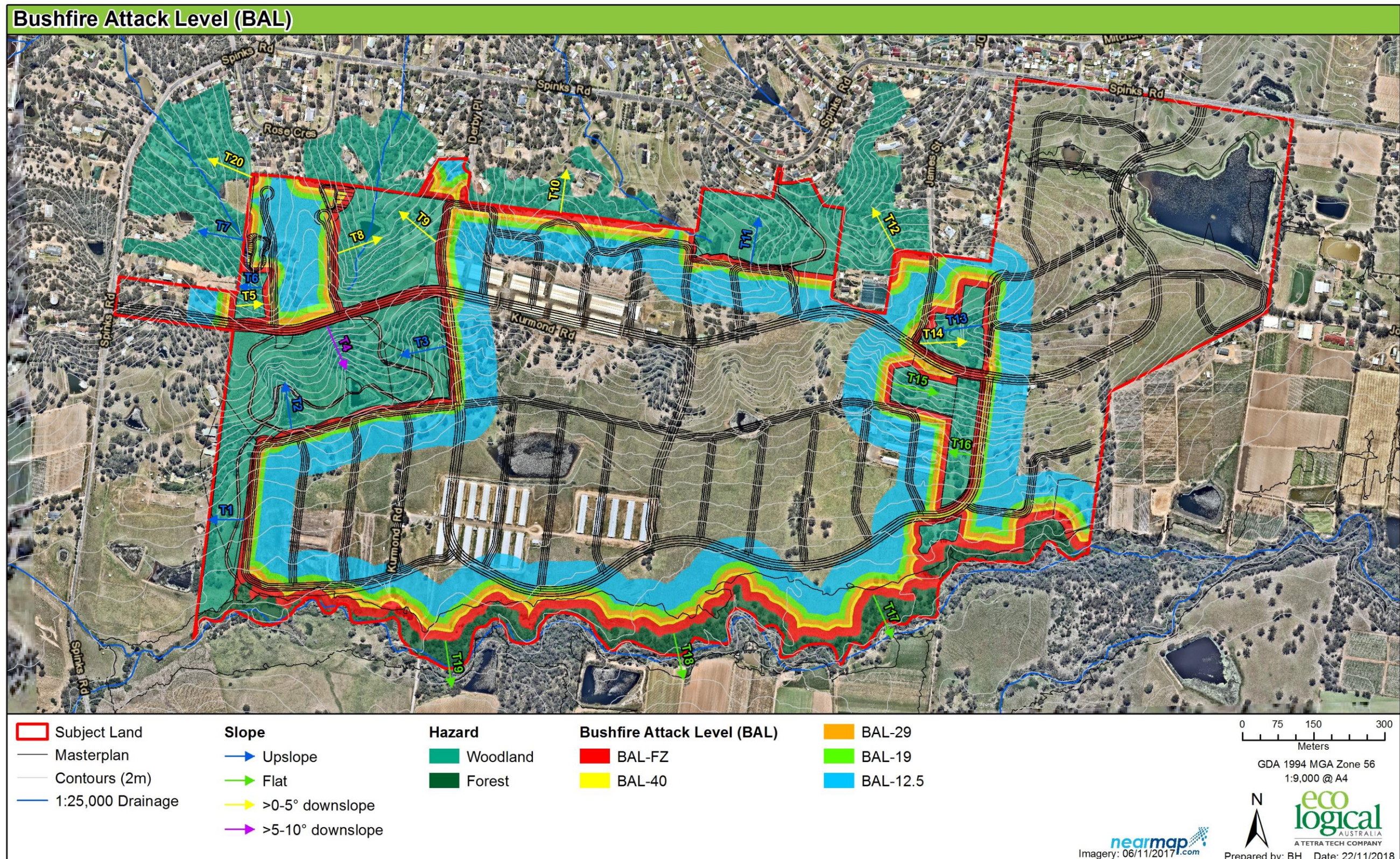


Figure 7: Bushfire Attack Level (BAL) AS3959 2009

3.1.2 Vegetation Management Requirements

The measures described in Appendix 5 of PBP (RFS 2006b) for landscaping of APZ and gardens etc will be applied in the subject site. These measures will assist in mitigating burning debris attack on gardens and subsequently buildings. It will be applied to residential, industrial and public zoned lots. A summary of these measures is below.

3.1.3 APZ maintenance

When establishing and maintaining an APZ the following requirements should apply as applicable:

- canopy cover should be less than 15% (at maturity);
- trees (at maturity) should not touch or overhang the building;
- lower limbs should be removed up to a height of 2m above ground;
- preference should be given to smooth barked and evergreen trees;
- avoid connective pathways across the ground toward a building;
- small isolated clumps needs to be site specific in design;
- avoid creating fuel ladders (shrubs, bark, dropped branches, leaves etc);
- select suitable plants (low flammability, avoid dense and elevated fine fuels);
- no plants near vulnerable building components (windows, decks); and
- leaves and vegetation debris should be removed.

3.1.4 APZ on adjoining lands

The calculated APZs are located wholly within the subject land and not on adjoining lands. The land adjoining the eastern boundary of the subject land is managed agricultural land and is expected to remain as managed or developed in future. On this basis, an APZ has not been provided on the eastern boundary. Where unmanaged vegetation is located on the adjoining land, an APZ is provided at the boundary between this hazard and the developable area.

3.2 Construction Standards and Design

The Bushfire Attack Level (BAL) for future developments within Jacaranda Ponds will need to be determined at the Development Application (DA) stage. A maximum Bushfire Attack Level (BAL) of BAL-29 will need to be provided by the development design for residential development. Development Applications will need to demonstrate a construction standard and building design appropriate to the BAL and in compliance with PBP (relevant version at the time, currently PBP 2006) and AS 3959-2009 (SA 2009). **Figure 7** shows the BAL locations across the subject land.

3.3 Access

Safe access, egress and defensible spaces are required for emergency services. Emergency management arrangements are also required such as procedures and routines for evacuation and consideration of safer places.

Bushfire and other related emergency services for the development will be provided from the NSW RFS brigade. Given the importance of rapid first attack on bushfires the travel times for the nearest NSW RFS brigade and Fire and Rescue Service units is important. The Richmond station is the nearest NSW Fire and Rescue station and the nearest RFS brigade located at Kurrajong. These stations will provide good response times on completion of roads for the subject development

A key to emergency access is a perimeter road with frequent direct access to the internal road system for easy and rapid access/egress. Feeder roads off the perimeter road should where possible radiate away from the bushfire hazard. Specifications for public roads and property access roads are provided below.

Figure 2 shows the indicative roading as part of the masterplan.

3.3.1 Public roads

Public roads include both the perimeter road and the internal road system. A safe operational access to structures and water supply for emergency services personnel, while residents are seeking to

evacuate from an area is required. Key requirements include road size (safe/efficient access/egress) and suitable location of water supply points (readily accessible during bushfire).

The proposed dead end roads on the north west of the subject land are more than 200m in length. For acceptable solutions for public roads in PBP (2006) requires dead ends to be not more than 200 metres in length. It is recommended that these roads meet the acceptable solutions outlined in **Appendix 2** which provides additional details for NSW.

3.3.2 Perimeter roads

The requirements for perimeter roads are as follows:

- Located between (or within) the APZ and the boundary of the allotments.
- Providing fire fighters with easier access to structures, allowing more efficient use of fire fighting resources
- Providing a safe retreat for fire fighters
- Providing a clear control line from which to conduct hazard reduction or back burning operations
- Providing two-way access (carriageway 8 metres kerb to kerb) and compliance with the design specifications identified in PBP 2006 (see **Appendix 2**).

3.4 Services – Water, electricity and gas

3.4.1 Water

The proposal will be serviced by a reticulated water supply. **Table 2** identifies the acceptable solution requirements of Section 4.1.3 of PBP for which the proposal is compliant with, subject to the following specifications:

Table 2: Performance criteria for reticulated water supplies (PBP page 27)

Performance Criteria	Acceptable Solutions	Complies
The intent may be achieved where:		
<ul style="list-style-type: none"> • water supplies are easily accessible and located at regular intervals 	<ul style="list-style-type: none"> • reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads. 	complies
	<ul style="list-style-type: none"> • fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles. 	complies
	<ul style="list-style-type: none"> • hydrants are not located within any road carriageway 	complies
	<ul style="list-style-type: none"> • all above ground water and gas service pipes external to the building are metal, including and up to any taps. 	complies
	<ul style="list-style-type: none"> • the provisions of parking on public roads are met. 	complies

3.4.2 Electricity services

Electricity supply to / within the subject land is located underground and therefore complies with Section 4.1.3 of PBP.

3.4.3 Gas services

Gas services (reticulated or bottle gas) are compliant with Section 4.1.3 of PBP, subject to the following specifications:

- Any gas services are to be installed and maintained in accordance with Australian Standard AS/NZS 1596 *The storage and handling of LP Gas* (SA 2014). Metal piping is to be used;
- All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation;
- If gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal; and
- Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used.

3.5 Emergency management

The proximity of emergency services to the precinct are considered adequate, subject to the timing of completion of all access roads (see discussion in Section 3.3).

Consultation with the NSW RFS and Fire and Rescue services will occur during subdivision design to ensure adequate emergency response during all phases of construction and occupation of development on the subject land.

4 Development Staging

The APZ required for each stage of subdivision is required to be wide enough to provide the building construction standard envisaged under AS3959-2009 at the completion of development for the whole site. Temporary APZ may be required if the vegetated land within another stage is considered a bushfire hazard at subdivision stage.

Perimeter roads or trails are also to be provided for each stage of subdivision to separate development from the hazard.

5 Conclusions

A number of strategies have been provided in the form of planning controls such that the risk from bushfire is reduced to an appropriate level and a level that meets the deemed to satisfy bushfire protection requirements for NSW.

The strategies used to reduce the bushfire risk associated with the re-zoning, include:

- Setbacks from bushfire prone vegetation (APZs)
- Integration of non-combustible infrastructure within APZs such as roads, easements and parking areas
- Access and egress from the site through a well-designed road system
- Underground electricity and gas services
- Compliant water supplies
- Emergency response planning
- Interim APZs and perimeter roads provided for each stage of development
- A maximum of BAL 29 under AS3959-2009 applied to the entire development site

More detailed bushfire assessment to accurately prescribe setbacks, roading and landscaping is required for each stage of subdivision, however the re-zoning application has provisions that allow this more detailed designed to occur smoothly and achieve the deemed to satisfy standards for subdivisions within NSW.

6 Recommendation

It is recommended that the re-zoning application be approved based upon the bushfire protection measures identified in this report.

References

Industry Safety Steering Committee 3 (ISSC3). 2016. *ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Supply Infrastructure*. November 2016. NSW.

Keith, D. 2004. *Ocean Shores to Desert Dunes*. Department of Environment and Conservation, Sydney.

NSW Rural Fire Service (RFS). 2006. *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners* including the 2010 Appendix 3 Addendum. Australian Government Publishing Service, Canberra.

NSW RFS, 2006a. *Guideline for Bush Fire Prone Land Mapping*. Version 3. NSW Rural Fire Service.

NSW RFS (2006c). *The Bush Fire Environmental Assessment Code for New South Wales*.

Standards Australia (SA). 2005. *Fire hydrant installations - System design, installation and commissioning*, AS 2419.1, Fourth edition 2005, SAI Global, Sydney.

Standards Australia (SA). 2009. *Construction of buildings in bushfire-prone areas (including Amendments 1 – 3)*, AS 3959-2009. SAI Global, Sydney.

Standards Australia (SA). 2014. *The storage and handling of LP Gas*, AS/NZS 1596:2014. SAI Global, Sydney.

Appendix 1: Road standards public roads (PBP 2006)

Performance Criteria	Acceptable solutions
The intent may be achieved where:	
<ul style="list-style-type: none"> • firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources) 	<ul style="list-style-type: none"> • public roads are two-wheel drive, all weather roads.
<ul style="list-style-type: none"> • public road widths and design that allow safe access for firefighters while residents are evacuating an area 	<ul style="list-style-type: none"> • 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. • all 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 and minimal in number, to allow for rapid access and egress. • the minimum distance between inner and outer curves is 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.
<ul style="list-style-type: none"> • the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles. 	<ul style="list-style-type: none"> • 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 indicate load rating.
<ul style="list-style-type: none"> • roads that are clearly sign- posted (with easily distinguishable names) and buildings/properties 	<ul style="list-style-type: none"> • public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure

Performance Criteria	Acceptable solutions
that are clearly numbered.	<p>accessibility to reticulated water for fire suppression.</p> <ul style="list-style-type: none"> • 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.
<ul style="list-style-type: none"> • there is clear access to reticulated water supply 	<ul style="list-style-type: none"> • public roads up to 6.5 metres wide provide parking within parking bays and locate 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 locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.
<ul style="list-style-type: none"> • parking does not obstruct the minimum paved width 	<ul style="list-style-type: none"> • parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement. No services or hydrants are located within the parking bays. • public roads directly interfacing the bushfire hazard vegetation provide roll top kerbing to the hazard side of the road.



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