



TRAVERS BUSHFIRE & ECOLOGY

A TBE ENVIRONMENTAL COMPANY



BUSHFIRE PROTECTION ASSESSMENT

Rezoning Application

Lot 273, DP 755266

15 Malloway Road

Chain Valley Bay

Under Section 9.1(2) of the *EP&A Act* (1979)

20 October 2021

(REF: 18OD02)

BUSHFIRE PROTECTION ASSESSMENT

Rezoning Application

Lot 273, DP 755266 15 Mulloway Road, Chain Valley Bay

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The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

EXECUTIVE SUMMARY

A bushfire protection assessment report was prepared for the proposed rezoning of 15 Mulloway Road, Chain Valley Bay in June 2016 with the NSW Rural Fire Service (RFS) issuing their advice via a letter on 13 December 2018 (RFS ref: R16/1673).

This updated report has been prepared for the revised planning proposal which now includes;

- Proposed change in zoning of the bushland corridor adjacent to the western and northern property boundary in support of a habitat corridor is E2. This corridor has been increased slightly from 43-50m width to 54-60m. A proposed pedestrian/ cycleway/ fire trail will separate this corridor from the existing residential properties to the west and is proposed to be zoned RE1.
- Retention of the proposed R2 zoned land within the central portion of the site
- Retention of the existing E2 zoned land within the southern portion of the site and an extension of this zone to identify and protect the known boundaries of the EEC. The proposed has been amended to now include a small rural residential parcel, retaining the current E3 Environmental Management zone to separate the proposed R2 Low Density Residential zoned land from the E2 southern conservation zoned lands.

This report identifies matters for consideration for the planning proposal and highlights the required bushfire protection measures, including asset protection zones (APZs), for future development under *Direction 4.4 'Planning for Bush Fire Protection (PBP)'*.

Section 9.1(2) Direction of the *EP&A Act* requires Council to consult with the Commissioner of the RFS and to take into account any comments by the Commissioner and to have regard to the planning principles of *PBP* (detailed within Section 1.5.3).

The key principle for the proposal is to ensure that future development is capable of complying with *PBP*. Planning principles for the proposal include the provision of adequate access including perimeter roads, establishment of adequate APZs for future housing, specifying minimum lot depths to accommodate APZs and the introduction of controls which avoid placing inappropriate developments in hazardous areas and the placement of combustible material in APZs.

Our assessment found that bushfire can potentially affect the site from the retained narrow strip of forest vegetation located within the proposed E2 zoned land to the west and north and the forested wetland vegetation located to the south and south-east of the site resulting in possible ember attack, radiant heat and potentially flame attack.

The bushfire risk posed to the rezoning proposal can be mitigated if appropriate bushfire protection measures (including APZs) are put in place and managed in perpetuity.

The assessment has concluded that future development on site will provide compliance with the planning principles of *PBP* and is subject to the following alternative solutions;

- Use of Appendix B Method 2 of *AS3959 Construction of buildings in bushfire prone areas (2009)* to determine minimum setbacks to the south; and

- Use of the short fire run (SFR) methodology for the proposed RE1 portion of land to the west and north. This area is identified as low risk vegetation due to its consistent linear width which is at right angles to the development.

It is noted that the RFS letter (dated December 2018) did not raise any objection to the proposal at the time (RFS ref: R16/1673) and stated that the modelling and recommended APZ's are generally accepted by the NSW RFS with the following exception:

'Along the south of the site an APZ of 10–25m is indicated. However, the RFS requires an APZ of 25m for the entirety of the southern perimeter. By way of explanation the bushfire consultant has recommended a 10m APZ in part because of the presence of a freshwater wetland. However, this wetland is contiguous with the vegetation identified as Coastal Swamp Forest. In cases where there are a mix of vegetation types, it is the higher hazard that is said to predominate, and the greater APZ must be provided'

The APZ adjacent to the southern boundary has been increased to 25m along the entire length to comply with the RFS requirement.

GLOSSARY OF TERMS

AHIMS	Aboriginal Heritage Information System
APZ	asset protection zone
AS1596	<i>Australian Standard – The storage and handling of LP Gas</i>
AS2419	<i>Australian Standard – Fire hydrant installations</i>
AS3745	<i>Australian Standard – Planning for emergencies in facilities</i>
AS3959	<i>Australian Standard – Construction of buildings in bushfire-prone areas 2018</i>
BAL	<i>bushfire attack level</i>
BCA	<i>Building Code of Australia</i>
BSA	bushfire safety authority
DA	development application
DLUP	Development Land Use Plan
EEC	Endangered ecological community
<i>EP&A Act</i>	<i>Environmental Planning & Assessment Act 1979</i>
<i>EP&A Regulation</i>	<i>Environmental Planning and Assessment Regulation 2000</i>
FFDI	forest fire danger index
IPA	inner protection area
LEP	Local Environmental Plan
LGA	local government area
m	metres
NCC	<i>National Construction Code</i>
OPA	outer protection area
<i>PBP 2019</i>	<i>Planning for Bush Fire Protection 2019</i>
<i>RF Act</i>	<i>Rural Fires Act 1997</i>
RFS	NSW Rural Fire Service
SFR	short fire run
SFPP	special fire protection purpose
TBE	<i>Travers bushfire & ecology</i>

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1. INTRODUCTION

Travers bushfire & ecology has been engaged to undertake a bushfire protection assessment for the proposed rezoning located at Lot 273, DP 755266, Chain Valley Bay.

The proposal is located on land identified as bushfire prone on the *Central Coast* bushfire prone land map (refer Figure 1-1). *Direction 4.4, Planning for Bush Fire Protection 2019 (PBP)* identifies matters for consideration for planning proposals that will affect, or are in proximity to land mapped as bushfire prone.

As such, the proposal is subject to the requirements of Section 9.1(2) of *the Environmental Planning and Assessment Act 1979 (EP&A Act)* which requires Council to consult with the Commissioner of the NSW Rural Fire Service (RFS) and to take into account any comments provided by the Commissioner.



Figure 1-1 – Bushfire Prone Land Map
(source: Planning Portal, 2020)

1.1 Aims of the assessment

Planning applications are required to address Section 9.2(2) Direction 4.4 of Planning for Bushfire Protection. The objectives of this direction are to;

- a) to protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas, and
- b) to encourage sound management of bush fire prone areas.

The potential for future rezoning of the property, from a bushfire context, needs to ensure that future land uses are in a suitable location to minimise the risk and impact of bush fire attack. In addition, services and infrastructure to facilitate effective suppression of a bush fire also needs to be provided.

The broad principles which should be applied to strategic level development are as follows:

- a) not all land is suitable for development in the context of bush fire risk
- b) any new development on bush fire prone land must comply with PBP
- c) infrastructure associated with emergency evacuation and firefighting operations must be provided
- d) appropriate ongoing land management practices must be facilitated.

Strategic planning should provide for the exclusion of inappropriate development in bush fire prone areas as follows:

- a) when the bush fire risk makes it inappropriate for new development to occur
- b) for development that is likely to be difficult to evacuate during a bush fire
- c) for development that will adversely affect other bush fire protection strategies or place existing development at increased risk
- d) for development that is within an area of high bush fire risk where density of existing development may cause evacuation issues for both existing and new occupants.
- e) where environmental constraints to the site cannot be overcome.

1.2 Proposed development

The site has an area of approximately 16.6ha and is currently zoned under the Wyong Local Environmental Plan (WLEP) 2013 as E3 Environmental Management for the northern 80% of the study area, and E2 Environmental Conservation in the southern 20% of the study area.

This revised planning proposal (refer Figure 1-2) includes the retention of a habitat corridor in the proposed E2 zone along with an increase in the E2 southern conservation lands.

A small rural residential parcel, retaining the current E3 Environmental Management zone is now included to separate the proposed R2 Low Density Residential zoned land from the E2 southern conservation zoned lands.

A proposed pedestrian/cycleway/fire trail separates the existing residential properties to the west and will be zoned RE1 and dedicated to Central Coast Council.

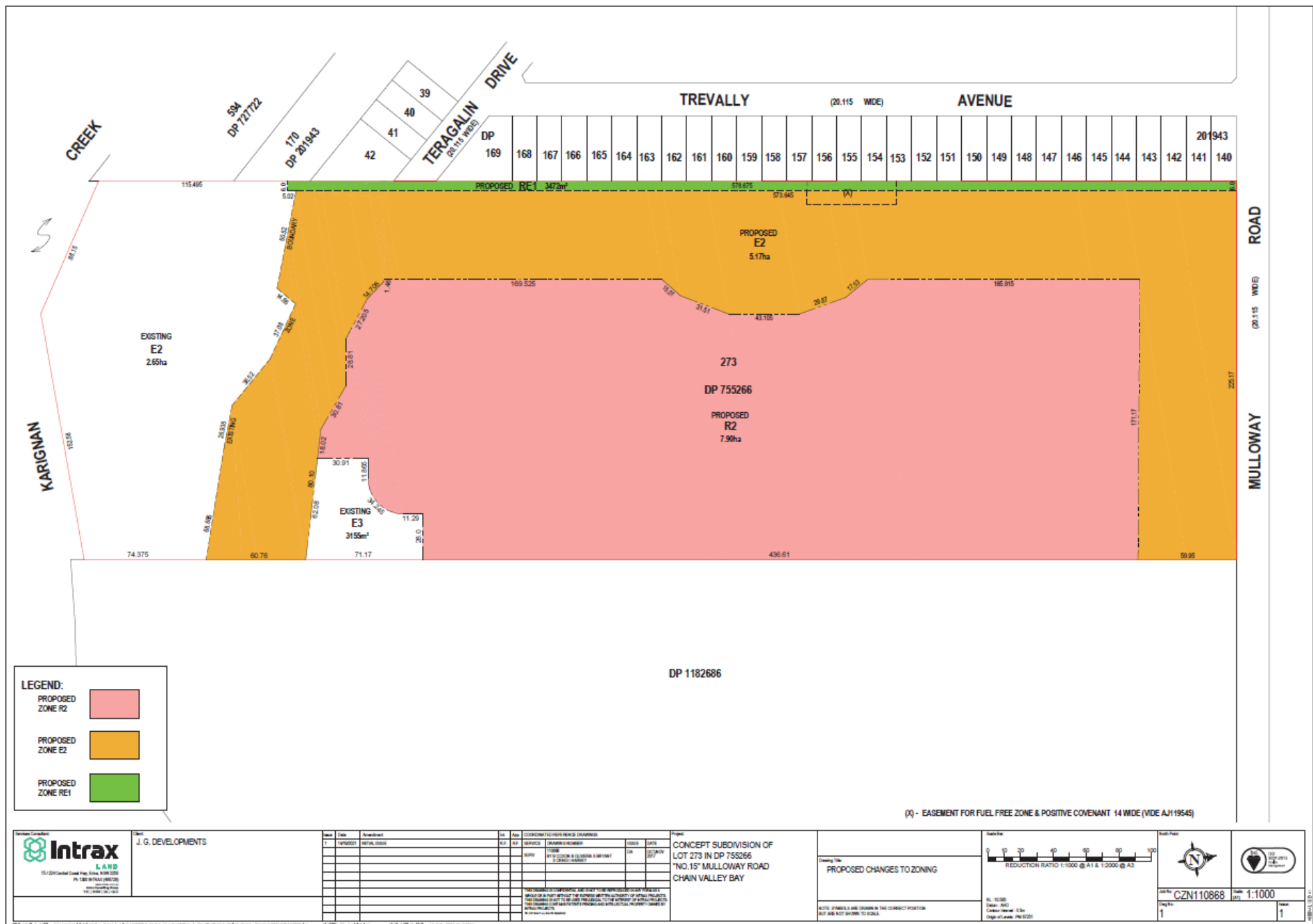


Figure 1-2 – Proposed Zoning Plan
 (source: Intrax. Drawing. no. – CZN110868 – Dwg 1 – issue 1, dated 14/10/2021)

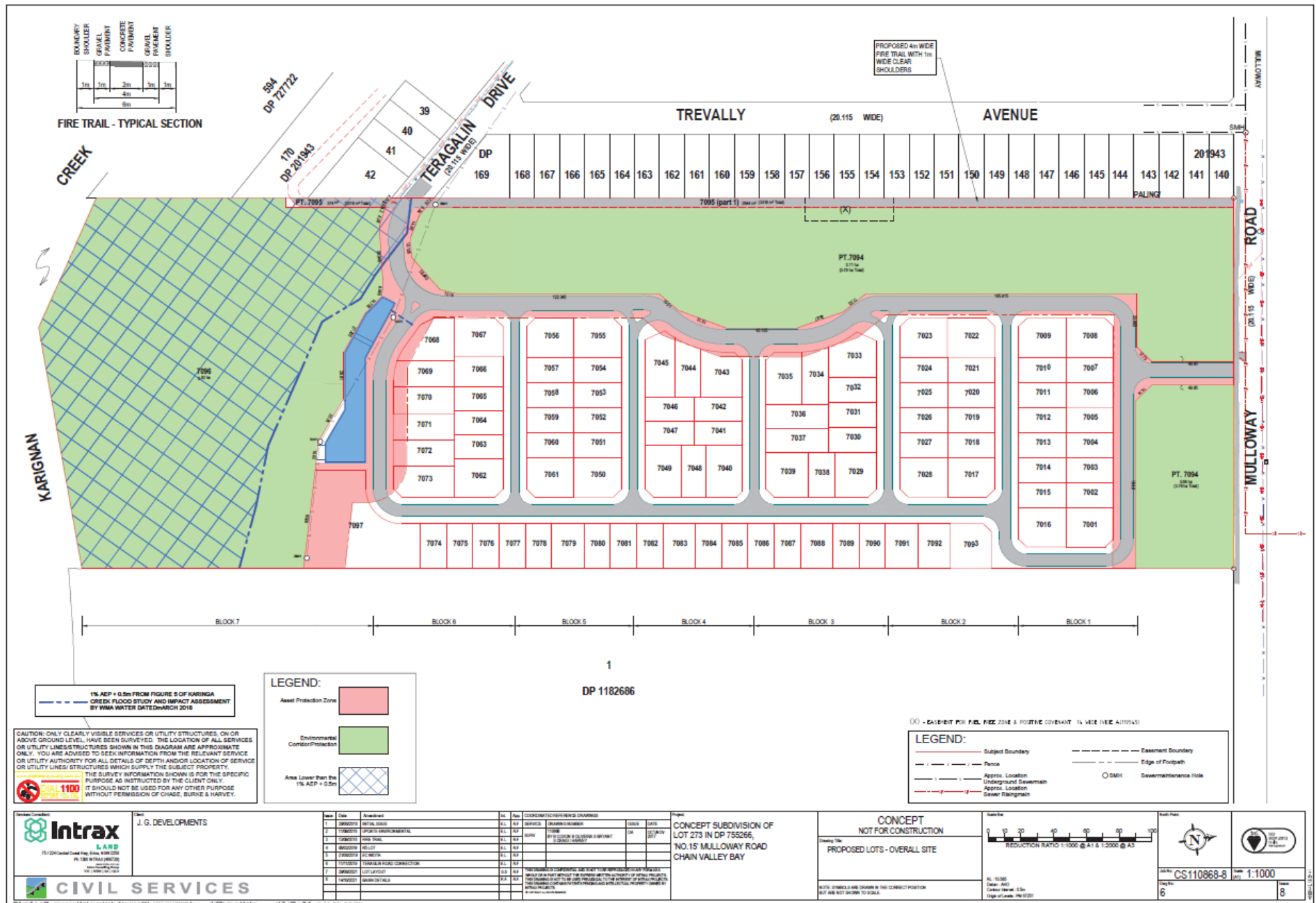


Figure 1-3 – Proposed Lot Layout
 (source: Intrax Drawing no. CS110868-8 DWG no. 6- Issue 8 Dated 14/10/2021)

1.3 Information collation

To achieve the aims of this report, a review of the information relevant to the property was undertaken prior to the initiation of field surveys. Information sources reviewed include the following:

- Wyong Local Environmental Plan 2013
- Biodiversity Certification Assessment Report, 2021 prepared by *Travers bushfire & ecology*
- *Nearmap* aerial photography
- Topographical maps *DLPI of NSW 1:25,000*
- *Australian Standard 3959 Construction of buildings in bushfire-prone areas*
- *Planning for Bush Fire Protection 2006 (PBP)*
- *Community Resilience Practice Notes 2/12 Planning Instruments and Policies.*

An inspection of the proposed development site and surrounds was undertaken by Nicole van Dorst to assess the topography, slopes, aspect, drainage, vegetation and adjoining land use. The identification of existing bushfire measures and a visual appraisal of bushfire hazard and risk were also undertaken.

1.4 Site description

The site is located at Lot 273 DP 755266 15 Mulloway Road, Chain Valley Bay. It is situated to the south of Mulloway Road and to the east of Trevally Avenue.

The site is bound to the east by a Manufactured Housing Estate (MHE) and to the west by low-density residential development and by Lake Macquarie State Recreation Area to the north-east. The southern portion of the site supports Estuarine Swamp Oak Forest vegetation, an endangered ecological community (EEC) within E2 zoned land. Karignan Creek defines the sites southern boundary.



Figure 1-4 – Aerial appraisal
 (source: IntraX- Drawing no. CS110868-8- Dwg No. 2 - Issue 8 Dated 14/10/2021)

1.5 Legislation and planning instruments

1.5.1 Environmental Planning and Assessment Act (1979) and bush fire prone land

The *EP&A Act* governs environmental and land use planning and assessment within New South Wales. It provides for the establishment of environmental planning instruments, development controls and the operation of construction controls through the *Building Code of Australia (BCA)*. The identification of bushfire prone land is required under Section 10.3 of the *EP&A Act*.

PBP (pg 4) stipulates that if a proposed amendment to land use zoning or land use affects a designated bushfire prone area then the Section 9.1(2) Direction No 4.4 of the *EP&A Act* must be applied. This requires Council to consult with the Commissioner of the RFS and to take into account any comments by the Commissioner and to have regard to the planning principles of *PBP* (detailed within Section 1.5.3).

1.5.2 Local Environmental Plan (LEP)

A LEP provides for a range of zonings which list development that is permissible or not permissible, as well as the objectives for development within a zone.

The site is currently zoned under the Wyong LEP 2013 as part E3 and part E2 – Environmental Management and E2 – Environmental Conservation (refer Figure 1-5). The proposal seeks to amend the LEP to rezone the majority of the E3 Environmental Management land to R2 Low Density Residential to accommodate 93 Low Density Residential lots and retain a small E3 Environmental zoned section and extend the existing E2 Environmental Conservation zoned land by additional lands to the north of this zone by way of an addition of a habitat corridor along the west and northern boundaries. A strip of

land for a pedestrian/cycleway/fire trail separates the corridor lands from the existing residential zoned land beyond the western boundary and this strip is to be zoned RE1 Public Recreation. (Refer Figure 1-2).

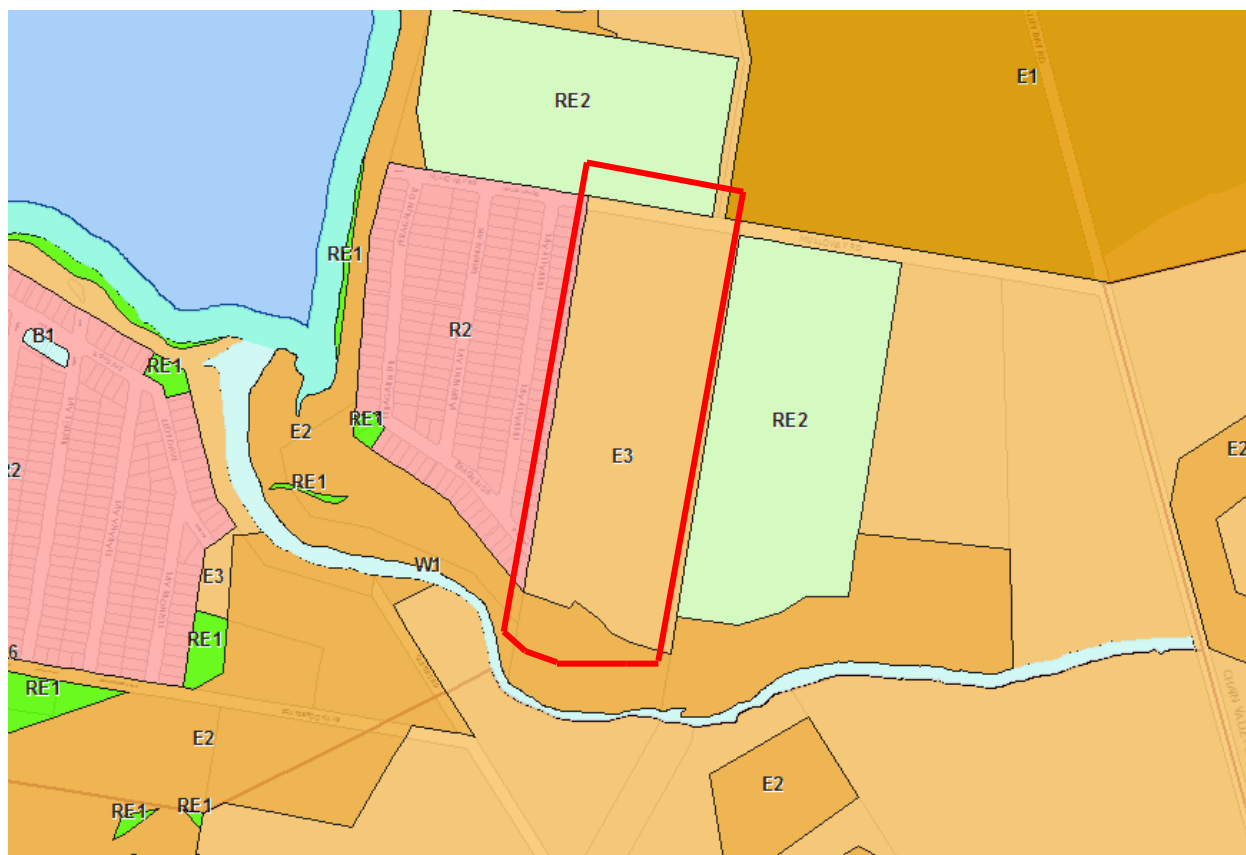


Figure 1-5 – Wyong LEP 2013

The proposal, including the provision of APZs, would seek to comply with the objectives of the proposed rezoning.

1.5.3 Planning for Bush Fire Protection 2019 (PBP)

Bushfire protection planning requires the consideration of the RFS planning document entitled *PBP 2019*. *PBP 2019* provides planning principles for rezoning to residential land as well as guidance on effective bushfire protection measures.

For strategic development proposals in bush fire prone areas *PBP 2019* requires, as a minimum, assessment of the components in Table 1-1 below. These issues are addressed in Section 3 of this report.

Table 1-1 Requirements for a Bush Fire Strategic Study

Issue	Detail	Assessment Considerations
Bush fire landscape assessment	A bush fire landscape assessment considers the likelihood of a bush fire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.	<p>The bush fire hazard in the surrounding area, including:</p> <ul style="list-style-type: none"> • Vegetation • Topography • Weather <p>The potential fire behaviour that might be</p>

Issue	Detail	Assessment Considerations
		<p>generated based on the above;</p> <p>Any history of bush fire in the area; Potential fire runs into the site and the intensity of such fire runs; and</p> <p>The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.</p>
Land use assessment	The land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses.	<p>The risk profile of different areas of the development layout based on the above landscape study;</p> <p>The proposed land use zones and permitted uses of the zone;</p> <p>The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site); and</p> <p>The impact of the siting of these uses on APZ provision.</p>
Access and egress	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	<p>The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile;</p> <p>The location of key access routes and direction of travel; and</p> <p>The potential for development to be isolated in the event of a bush fire.</p>
Emergency services	An assessment of the future impact of new development on emergency services.	<p>Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/ brigades; and</p> <p>Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency.</p>
Infrastructure	An assessment of the issues associated with infrastructure and utilities.	<p>The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants; and</p> <p>Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.</p>
Adjoining land	The impact of new development on adjoining landowners and their ability to undertake bush fire management.	Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans.

1.5.4 Building Code of Australia (BCA) and the Australian Standard AS3959 Construction in bushfire-prone areas 2009 (AS3959)

The *BCA* is given effect through the *EP&A Act* and forms part of the regulatory environment of construction standards and building controls. The *BCA* outlines objectives, functional statements, performance requirements and deemed to satisfy provisions. For residential dwellings these include Classes 1, 2 and 3 buildings. The construction manual for the deemed to satisfy requirements is *AS3959*.

1.6 Environmental and cultural constraints

1.6.1 Environmental constraints

The Biodiversity Certification Assessment Report (BCAR) prepared by this firm has identified no threatened flora species, ten (10) threatened fauna species and one (1) threatened ecological community within the study area.

The proposed development does exceed the nominated threshold triggers as outlined in the BCAR. The study area is located on lands mapped as Biodiversity Values Land, and the proposal will also exceed the area clearing threshold of 1 ha. Therefore, biodiversity offsets are required under the Biodiversity Offsets Scheme (BOS).

The conservation area is proposed to be managed through a vegetation management plan (VMP) with the conservation protection mechanism to be resolved at the DA stage.

1.6.2 Cultural constraints

A basic search was conducted on the Aboriginal Heritage Information System (AHIMS). The results show that there are no identified Aboriginal sites of significance within Lot 273 DP 755266 or within 50m of the site. An ACHA has been completed by MDCA (May 2018) and no Aboriginal archaeological remains or areas of archaeological potential were identified.

2. BUSHFIRE THREAT ASSESSMENT

To assess the bushfire threat and to determine the required width of an APZ for a development, an assessment of the potential hazardous vegetation and the effective slope within the vegetation is required. These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation.

2.1 Hazardous fuels

PBP guidelines require the identification of the predominant vegetation formation in accordance with David Keith (2004) if using the simplified acceptable solutions in PBP 2019, or alternatively the vegetation class if adopting the comprehensive vegetation fuel loads (as allowable when undertaking an assessment under Method 2 of AS3959). The hazardous vegetation is calculated for a distance of at least 140m from a proposed building envelope.

The vegetation posing a bushfire threat to the proposed development includes:

Table 2-1 - Vegetation

Aspect	Vegetation community	Vegetation formation	Vegetation classification	Comprehensive fuel loads (t/ha)
North West	PCT 1619 Narrabeen Doyalson Coastal Woodland	Dry Sclerophyll Forest (shrubby)	Sydney Coastal Dry Sclerophyll Forest	21.3 / 27.3
South	PCT 1718 Swamp Mahogany-Flaxleaved Paperbark Swamp Forest	Forested Wetland	Coastal Swamp Forest	22.6 / 34.1
	Wetland Basin	Freshwater Wetlands	N/A	15.0 / 15.0

The following assessment has adopted the comprehensive fuel loads (column five) identified above.

2.1.1 Short Fire Run

The vegetation corridor to the north and west is proposed to be retained as part of a habitat corridor. This corridor is between 54 and 60m in width and is adjoined by a proposed fire trail which will run along the sites western boundary. As outlined in Section 2.3 and depicted in Schedule 1 attached this area is subject to three (3) fire run scenarios based on the flame length and effective slope. These 'short fire runs' are entitled SFR A, SFR B & SFR C.

This vegetation has been identified as low risk vegetation due to its consistent linear width which is at right angles to the property. The proximity of this low risk vegetation in relation to the development site does not present the capacity for a fire run to progress into a bushfire that will achieve a head width exceeding 100 metres. In addition, a crown fire is unlikely to develop.

These assumptions are based on the linear nature of the vegetation parcel which is limited to less than 60m. In addition, the reserve complies with the limitations outlined in the 'Short Fire Run' paper produced by the NSW RFS as follows:

- Vegetation slope is less than the 30 degrees downslope and 15 degree upslope limit.
- Site slope is less than the '20 degrees downslope limit' for fuel management
- The maximum fire run is less than 150 metre.
- Limited to maximum input of 1.4 metres in height for elevated fuel (Project Vesta) for Sydney Coastal Dry Sclerophyll Forest.

It is also noted that the RFS letter (ref: R16/1673, dated December 2018) stated that the modelling and recommended APZ's are generally accepted by the NSW RFS.

The remaining land to the east and within 140m of the property is considered managed. This includes the landscaped area to the east of the site. As depicted in the figure below this area (circled red) is subject to a Property Vegetation Plan. This area is identified as APZ Area C. The management actions for this area are provided in Appendix 2.

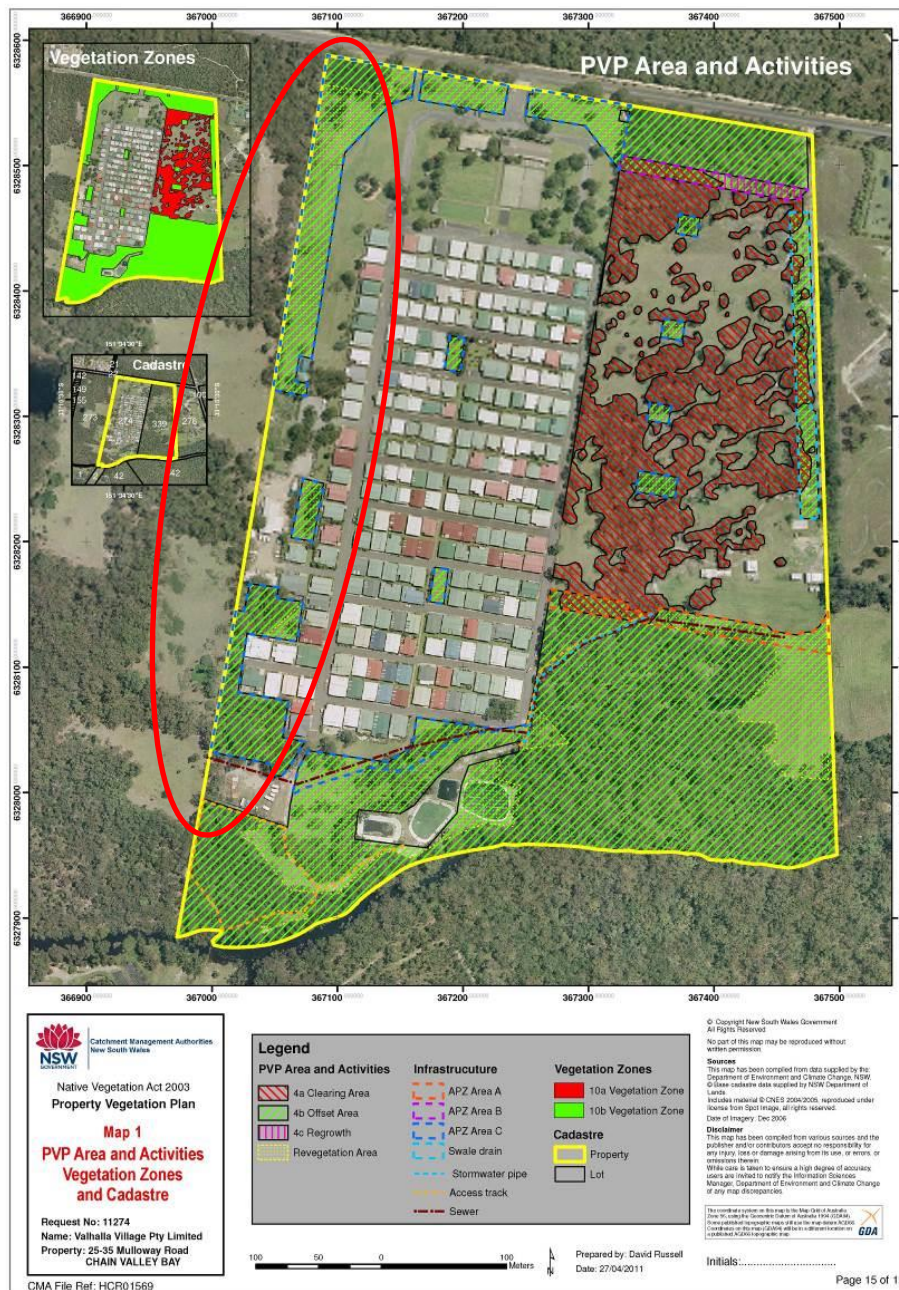


Figure 2-1 Property Vegetation Management Plan for adjoining lot

2.2 Effective slope

The effective slope (post earthworks) has been assessed for up to 100m from the development site. Effective slope refers to that slope which provides the most effect upon likely fire behaviour. A mean average slope may not in all cases provide sufficient information such that an appropriate assessment can be determined.

The effective slope within the hazardous areas is provided in detail within Section 2.3 however can be summarised as follows;

- 1-4 degrees downslope within the proposed E2 zoned habitat corridor to the west and north
- Level within the wetland detention basin to the south and within the retained dam to the west
- 1 degree downslope within the forested wetland to the south

The effective slope within the hazardous vegetation is described in detail within Table 2-2 below.

2.3 Bushfire attack assessment

The following assessment has determined the APZ and BAL levels via the following approaches;

- Appendix B Method 2 (alternative solution) of *AS3959 Construction of buildings in bushfire prone areas* (2009); and
- Short fire run methodology as detailed in the NSW RFS document entitled *Short Fire Run Methodology for Assessing Bush Fire Risk for Low Risk Vegetation*.

A fire danger index (FDI) of 100 has been used to calculate bushfire behaviour on the site based on its location within the Greater Hunter region. Table 2-2 provides a summary of the bushfire attack assessment based on residential development and the methodologies identified above.

Table 2-2 - Bushfire Attack Assessment Summary

Aspect	Predominant* Vegetation Class	Effective Slope	Minimum APZ Required	BAL Rating / Radiant heat exposure
North	Sydney Coastal Dry Sclerophyll Forest	1-4°	Refer Table 2-3	
West				
East	Low Threat Vegetation (managed land)	N/A	N/A	N/A
South	Coastal Swamp Forest*	1°	25m **	25 - <34.4m (BAL-29) 34.4 - <46.5m (BAL-19) 46.5m - <100m (BAL_12.5)

* The freshwater wetland associated with the proposed stormwater management basin will be contiguous with the Coastal Swamp Forest to the south. In cases where there are a mix of vegetation types, it is the higher hazard that is said to predominate (as per *PBP 2019*).

** A performance-based assessment using Appendix B of AS3959 was undertaken to determine the required APZ and BAL levels based on the comprehensive fuel loads associated with Coastal Swamp Forest on a 1 degree downslope. The results of the *Flamesol* assessment are provided within Appendix 2.

Table 2-3 - Short Fire Run Assessment Summary

<i>Design Fire</i>	<i>Vegetation</i>	<i>Fire run length (metres)</i>	<i>Effective slope</i>	<i>Site slope</i>	<i>Calculated head width (metres)</i>	<i>APZ provided (metres)</i>	<i>Calculated radiant heat impact</i>
Fire Run A	Sydney Coastal Dry Sclerophyll Forest (21.3 / 27.3 t/ha)	60	3 ⁰	Level	18.284	14	28.52 kW/m ²
Fire Run B		54	1 ⁰	Level	16.087	13	27.86 kW/m ²
Fire Run C		54	4 ⁰	Level	16.087	14.5	27.73 kW/m ²

3. SPECIFIC PROTECTION ISSUES

3.1 Asset protection zones (APZs)

Table 3.1 outlines the proposal’s compliance with the performance criteria for APZs.

Table 3-1 – Performance criteria for asset protection zones (PBP 2019 guidelines pg. 43)

<i>Performance criteria</i>	<i>Acceptable solutions</i>	<i>Acceptable solution</i>	<i>Performance solution</i>	<i>Comment</i>
Potential building footprints will not be exposed to radiant heat levels exceeding 29kW/m ² on each proposed lot	APZs are provided in accordance with Tables A1.12.2 and A1.12.4 of PBP based on the FFDI of 100	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	The subdivision design complies with the performance criteria. Table 2.1 & 2.2 outlines the methodology for determining minimum APZ setbacks.
APZs are managed and maintained to prevent the spread of a fire towards the building	APZs are managed in accordance with the requirements of Appendix 4 of PBP	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
The APZ is provided in perpetuity	APZs are wholly within the boundaries of the development site	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies.
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised	The APZ is located on lands with a slope of less than 18°	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies. All slopes are less than 18 degrees.
Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions	Landscaping is in accordance with Appendix 4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent
	Fencing is constructed in accordance with section 7.6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent (see Note 1 below).

Note 1: Section 7.6 of PBP states that all fences in bush fire prone areas should be made of either hardwood or non-combustible material. However, in circumstances where the fence is within 6m of a building or in areas of BAL 29 or greater, they should be made of non-combustible material only.

3.2 Building protection

Building construction standards for the proposed future dwellings located within 100m of bushfire prone land are to be applied in accordance with *AS3959 Construction of buildings in bushfire prone areas (2018)* or *NASH Standard - Steel Framed Construction in Bushfire Areas* and Section 7.5 of *Planning for Bush Fire Protection 2019*.

3.3 Hazard management

APZs are required to be managed as an inner protection area (IPA) in accordance with RFS guidelines *Standards for Asset Protection Zones (RFS, 2005)*, with landscaping design to comply with Appendix 4 of *PBP*. Appendix 2 of this report provides additional maintenance advice for vegetation within the APZ.

In addition to the APZs depicted in Schedule 1, the developer will be required following subdivision to maintain each residential allotment as an IPA throughout the development and until such time as the lot is sold, at which time the responsibility is passed to the new owner.

3.4 Access for firefighting operations

Based on the acceptable solutions the subdivision design should include perimeter roads each with a minimum 8m wide carriageway. They will be located adjacent to the southern, western and northern boundaries of the residential development adjacent to bushland vegetation. All other internal public roads are to have a minimum width public road carriageway of 5.5m. Roadside parking and water hydrants should be provided outside of this minimum carriageway width.

Note: The proposed pedestrian/cycleway/fire trail which runs adjacent to the sites western boundary, is not a substitute for a road, nor is it considered an appropriate trade-off for the provision of perimeter, non-perimeter or property road access requirements. The trail must be designed, constructed and maintained in accordance with the *NSW RFS Fire Trail Standards* and the *NSW RFS Fire Trail Design, Construction and Maintenance Manual*.

The proposal's compliance with the acceptable solutions outlined in *PBP 2019* is detailed within Table 3-2 below.

Table 3-2 – Performance criteria for access within Residential Subdivisions (PBP 2019) Guidelines pg. 44)

<i>Performance criteria</i>	<i>Acceptable solution</i>	<i>Acceptable solution</i>	<i>Performance solution</i>	<i>Comment</i>
ACCESS (GENERAL REQUIREMENTS) Firefighting vehicles are provided with safe, all weather access to structures.	Property access roads are two-wheel drive, all-weather roads	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies. To be a condition of consent.
	Perimeter roads are provided for residential subdivisions of three or more allotments.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies. To be a condition of consent.
	Subdivisions of three or more allotments have more than one access in and out of the development.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Future residential development within the site will access Malloway Road in the north and Teragalin Drive in the west.
	Traffic management devices are constructed to not prohibit access by emergency services vehicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be a condition of consent.
	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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies. All roads will be sealed.
	All roads are through roads	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies. To be a condition of consent.

<i>Performance criteria</i>	<i>Acceptable solution</i>	<i>Acceptable solution</i>	<i>Performance solution</i>	<i>Comment</i>
	Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200m in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies. There are no dead end roads proposed.
	Where kerb and guttering are provided on perimeter roads, roll top kerbing should be used to the hazard side of the road.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be a condition of consent.
	Where access / egress can only be achieved through forest, woodland or heath vegetation, secondary access shall be provided to an alternate point on the existing public road system.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The two access routes traverse the narrow E2 zoned bushland corridor.
	One way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	All roads are two (2) way.
The capacity of access roads is adequate for firefighting vehicles.	The capacity of perimeter and non-perimeter road surfaces and any bridges / causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges / causeways are to clearly indicate load rating.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be a condition of consent.
There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be a condition of consent.

	<i>Performance criteria</i>	<i>Acceptable solution</i>	<i>Acceptable solution</i>	<i>Performance solution</i>	<i>Comment</i>
		accessibility to reticulated water for fire suppression.			
		Hydrants are provided in accordance with AS 2419.1:2005.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be a condition of consent.
		There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Reticulated water is provided.
PERIMETER ROADS	Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	Are two-way sealed roads.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies. To be a condition of consent.
		Minimum 8m carriageway width kerb to kerb.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		Parking is provided outside of the carriageway width.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		Hydrants are located clear of parking areas.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		Curves of roads have a minimum inner radius of 6m.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		The maximum grade road is 15° and average grade is 10°.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		The road crossfall does not exceed 3°.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
PERIMETER	Access roads are designed to allow safe	Minimum 5.5m carriageway width kerb to kerb.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies. To be a condition of consent.

	<i>Performance criteria</i>	<i>Acceptable solution</i>	<i>Acceptable solution</i>	<i>Performance solution</i>	<i>Comment</i>
	access and egress for medium rigid firefighting vehicles while residents are evacuating.	Parking is provided outside of the carriageway width.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		Hydrants are located clear of parking areas.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		Roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		Curves of roads have a minimum inner radius of 6m.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		The road crossfall does not exceed 3°.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
PROPERTY ACCESS	Firefighting vehicles can access the dwelling and exit the property safely.	There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	All allotments are provided with direct frontage to the public road system. No further requirements are necessary.

3.5 Water supplies

The intent of measures is to provide adequate services of water for the protection of buildings during and after the passage of bushfire.

for reticulated water supply.

Table 3-3 outlines the proposal's compliance with the acceptable solutions for reticulated water supply.

Table 3-3 – Performance criteria for reticulated water supplies (PBP guidelines pg. 47)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Adequate water supplies is provided for firefighting purposes.	Reticulated water is to be provided to the development, where available.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Reticulated water is available to the development.
	A static water supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not applicable
	Static water supplies shall comply with Table 5.3d.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not applicable
Water supplies are located at regular intervals.	Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2005.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.
The water supply is accessible and reliable for firefighting operations.	Hydrants are not located within any road carriageway.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.
	Reticulated water supply to urban subdivisions uses a ring main system for areas for areas with perimeter roads.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.
Flows and pressure are appropriate.	Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.
The integrity of the water supply is maintained.	All above-ground water service pipes are metal, including and up to any taps.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.
	Above ground water storage tank shall be of concrete or metal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.

3.6 Gas

The intent of measures is to locate gas so as not to contribute to the risk of fire to a building. Table 3-4 outlines the required acceptable solutions for gas supply.

Table 3-4 – Performance criteria for gas supplies (PBP Guidelines pg. 47)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Location of gas services will not lead to the ignition of surrounding bushland or the fabric of buildings.	Reticulated or bottled gas bottles are to be installed and maintained in accordance with AS/NZS 1596 (2014), the requirements of relevant authorities and metal piping is to be used.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.
	All fixed gas cylinders are to be kept clear of flammable materials to a distance of 10m and shielded on the hazard side.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.
	Connections to and from gas cylinders are metal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.
	Polymer sheathed flexible gas supply lines are not used.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.
	Above ground gas service pipes are metal, including and up to any outlets.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.

3.7 Electricity

The intent of measures is to locate electricity so as not to contribute to the risk of fire to a building. Table 3-5 outlines the required acceptable solutions for the subdivision's electricity supply.

Table 3-5 – performance criteria for electricity services (pbp guidelines pg. 47)

<i>Performance criteria</i>	<i>Acceptable Solutions</i>	<i>Acceptable solution</i>	<i>Performance solution</i>	<i>Comment</i>
Location of electricity services limit the possibility of ignition of surrounding bushland or the fabric of buildings.	Where practicable, electrical transmission lines are underground.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The majority of electrical lines will be underground
	Where overhead electrical transmission lines are proposed: lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and no part of a tree is closer to a power line than the distance set out in ISSC3 Guideline for Managing Vegetation Near Power Lines.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The 11kv overhead power lines will be relocated to comply with the acceptable solutions.

4. CONCLUSION & RECOMMENDATIONS

4.1 Conclusion

Our assessment found that bushfire can potentially affect the site from the retained narrow strip of forest vegetation located within the proposed E2 zoned land to the west and north and the forested wetland vegetation located to the south and south-east of the site (within the E2 zoned land) resulting in possible ember attack, radiant heat and potentially flame attack.

The bushfire risk posed to the rezoning proposal can be mitigated if appropriate bushfire protection measures (including APZs) are put in place and managed in perpetuity.

The assessment has concluded that future development on site will provide compliance with the planning principles of *PBP* and in recognition of the bushfire risk posed to the site *Travers bushfire & ecology* propose the following combination of bushfire measures;

- APZs to the south in accordance with minimum setbacks determined via Appendix B Method 2 of *AS3959 Construction of buildings in bushfire prone areas (2009)*
- APZs to the west and north in accordance with minimum setbacks determined via the short fire run (SFR) methodology to the north. This narrow riparian corridor is identified as low risk vegetation due to its consistent linear width which is at right angles to the development.
- Provision of access in accordance with the acceptable solutions outlined in *PBP 2019*;
- Water, electricity and gas supply in compliance with the acceptable solutions outlined in *PBP 2019*;
- Future dwelling construction in compliance with the appropriate construction sections of *AS3959-2009*, and *PBP 2019*.

The following recommendations are provided to ensure that the development is in accordance with, or greater than, the requirements of *PBP*.

4.2 Recommendations

Recommendation 1 - APZs are to be provided to the future residential development. APZs are to be measured from the exposed wall of any dwelling toward the hazardous vegetation. The minimum APZ must be achievable within all lots fronting the bushfire hazard as nominated in Table 2.1 & 2.2 and also as generally depicted in Schedule 1.

Recommendation 2 - Fuel management within the APZs is to be maintained by regular maintenance of the landscaped areas, mowing of lawns in accordance with the guidelines provided in Appendix 1, and as advised by the RFS in their publications.

Recommendation 3 - Building construction standards for the proposed future dwellings are to be applied in accordance with *AS3959 Construction of buildings in bushfire prone areas*

(2009) or NASH Standard 'National Standard Steel Framed Construction in Bushfire Areas as modified by *PBP 2019*.

Recommendation 4 – Public access roads are to comply with the acceptable solutions provided within Section 4.1.3 of *PBP* (refer Section 3.4 of this report). The requirement for a perimeter road (8m width) along the southern, western and northern boundaries is recommended with all other roads having a minimum width of 5.5m. Parking is to be provided outside of these minimum widths.

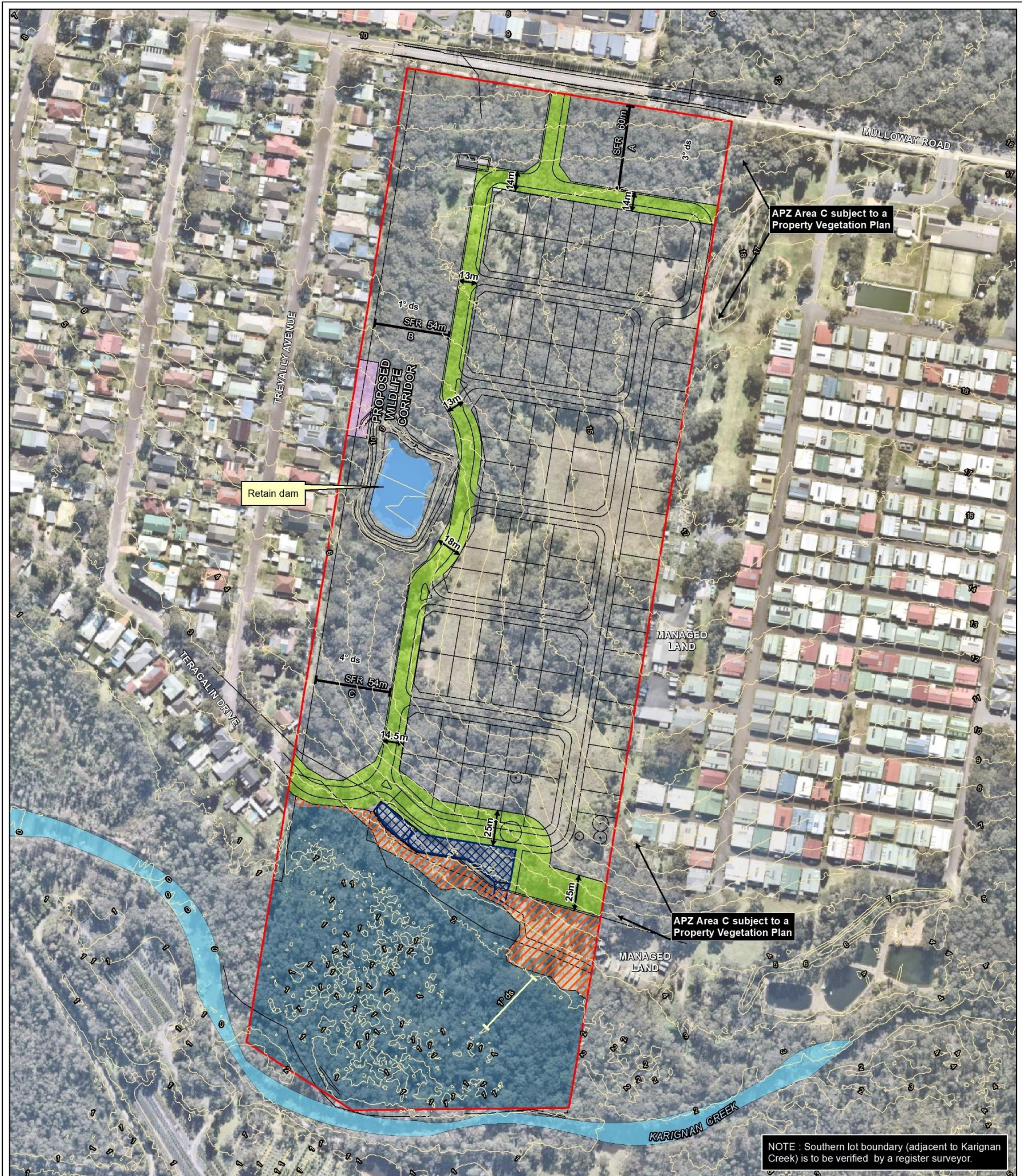
Recommendation 5 – The proposed fire trail adjacent to the western property boundary will be constructed in accordance with the *NSW RFS Fire Trail Standards* and the *NSW RFS Fire Trail Design, Construction and Maintenance Manual*, and then handed over to Council for ongoing maintenance and management.

Recommendation 6 – Water, electricity and gas supply is to comply with the acceptable solutions as provided within Section 5.3.3 of *PBP 2019* (refer Sections 3.5, 3.6 and 3.7 of this report).

5. REFERENCES

- Australian Building Codes Board (2010) – *Building Code of Australia, Class 1 and Class 10 Buildings Housing Provisions Volume 2*.
- Chan, K.W. (2001) – *The suitability of the use of various treated timbers for building constructions in bushfire prone areas*. Warrington Fire Research.
- Councils of Standards Australia AS3959 (2009) – *Australian Standard Construction of buildings in bush fire-prone areas*.
- Keith, David (2004) – *Ocean Shores to Desert Dunes – The Native Vegetation of New South Wales and the ACT*. The Department of Environment and Climate Change.
- Rural Fire Service (2019) - *Planning for bushfire protection – a guide for councils, planners, fire authorities and developers*. NSW Rural Fire Service.
- Tan, B., Midgley, S., Douglas, G. and Short (2004) - *A methodology for assessing bushfire attack*. RFS Development Control Service.

SCHEDULE 1. PLAN OF BUSHFIRE PROTECTION MEASURES



Legend

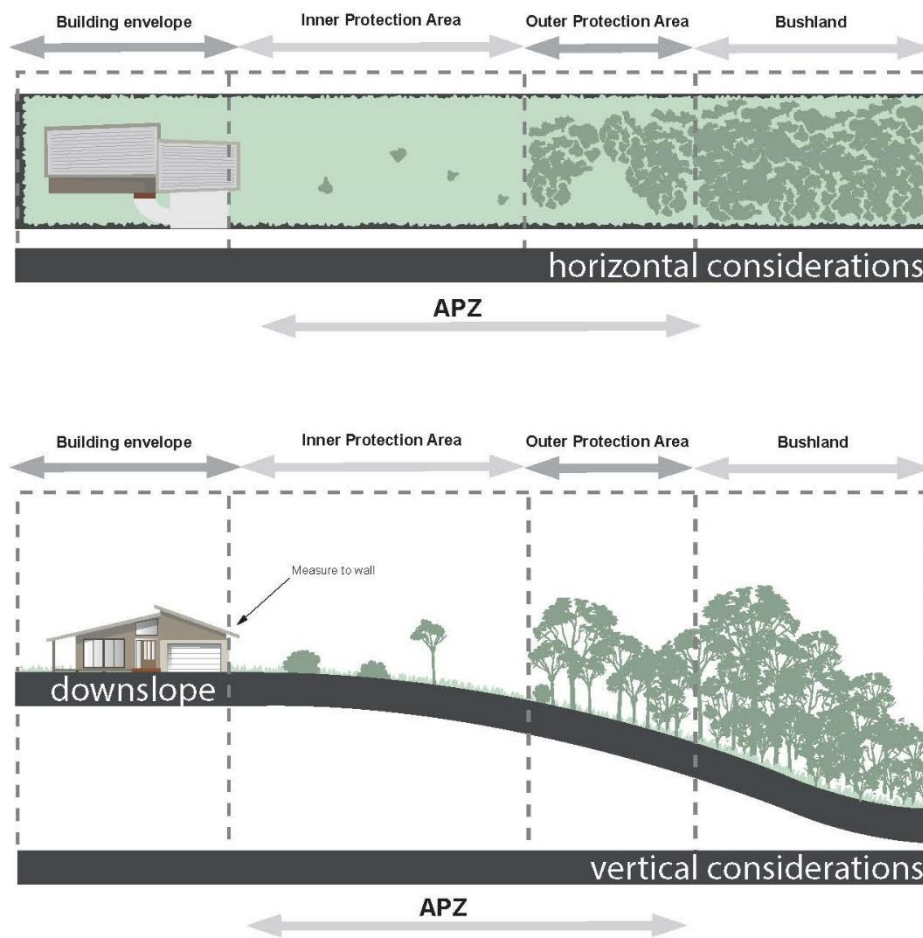
- | | |
|--------------------------------------|--|
| Lot boundary (source: CAD - 16.52ha) | Easement |
| Contour 1m (source: LiDAR) | TEC Buffer |
| Creek line (source - LPI) | Vegetation Communities |
| Retain dam | PCT 1718 - Swamp Mahogany - Flax-leaved Paperbark swamp forest on coastal lowlands of the Central Coast - (EEC - Swamp Sclerophyll Forest on Coastal Floodplains) (3.49ha) (Impacted 0.12ha) |
| Short fire run (SFR) | Retain Dam (0.19ha) |
| Stormwater basin | |
| Asset Protection Zone | |

APPENDIX 1. MANAGEMENT OF ASSET PROTECTION ZONES

The RFS provides basic advice in respect of managing APZs through documents such as, *Standards for Asset Protection Zones* (RFS, 2005), with landscaping to comply with Appendix 4 of *PBP*.

In forest vegetation an APZ may consist of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The IPA is the area immediately surrounding the building and the OPA (up to 30% of the total APZ width) is between the IPA and the hazard.

A typical APZ is graphically represented below.



APZs and progressive reduction in fuel loads

(Source: PBP, 2019)

Note: Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought regarding vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

The following table adapted from *PBP 2019* provides maintenance advice for vegetation within the IPA and OPA. The APZ is to be maintained in perpetuity and maintenance should be undertaken regularly, particularly in advance of the bushfire season.

	Inner Protection Area	Outer Protection Area
Trees	<ul style="list-style-type: none"> ➤ Tree 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 the ground; ➤ Tree canopies should be separated by 2 to 5m; and ➤ Preference should be given to retaining smooth barked and evergreen trees. 	<ul style="list-style-type: none"> ➤ Tree canopy cover should be less than 30%; and ➤ Canopies should be separated by 2 to 5m.
Shrubs	<ul style="list-style-type: none"> ➤ Large discontinuities or gaps in the vegetation should be provided to slow down or break the progress of fire towards buildings; ➤ Shrubs should not be located under trees; ➤ Shrubs should form less than 10% ground cover; and ➤ Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation. 	<ul style="list-style-type: none"> ➤ Shrubs should not form a continuous canopy; and ➤ Shrubs should form less than 20% of ground cover.
Grass and Leaf Litter	<ul style="list-style-type: none"> ➤ Grass should be kept mown to a height of less than 100mm; and ➤ Leaves and other debris should be removed 	<ul style="list-style-type: none"> ➤ Grass should be kept mown to a height of less than 100mm; and ➤ Leaf and other debris should be removed.

All Management Zones	
Weeds	<ul style="list-style-type: none"> ➤ All weeds should be removed in accordance with best practice guidelines, and measures taken to prevent their further spread
Landscaping	<ul style="list-style-type: none"> ➤ Suitable impervious areas being provided immediately surrounding the building such as courtyards, paths and driveways; ➤ Restrict planting in the immediate vicinity of the building which may over time and if not properly maintained come into contact with the building; ➤ When considering landscape species consideration needs to be given to estimated size of the plant at maturity; ➤ Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies; ➤ Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown; ➤ Avoid planting of deciduous species that may increase fuel at surface / ground level (i.e. leaf litter); ➤ Avoid climbing species to walls and pergolas; ➤ Locate combustible materials such as woodchips / mulch, flammable fuel stores away from the building; ➤ Locate combustible structures such as garden sheds, pergolas and materials such timber garden furniture way from the building; and ➤ Use of low flammability vegetation species.

APPENDIX 2. PERFORMANCE BASED ASSESSMENT

Southern aspect – Method 2 AS3959



Calculated May 24, 2021, 3:09 pm (MDC v.4.9)

18OD02 - South aspect - Coastal Swamp Forests

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	2.9 km/h
Vegetation classification	Forest	Flame length	22.97 m
Understorey fuel load	22.6 t/ha	Flame angle	52 °, 61 °, 68 °, 72 °, 74 ° & 81 °
Total fuel load	34.1 t/ha	Elevation of receiver	8.73 m, 9.619999999999999 m, 10.05 m, 10.11 m, 10.1 m & 9.25 m
Vegetation height	n/a	Fire intensity	51,194 kW/m
Effective slope	1 °	Transmissivity	0.858, 0.834, 0.804, 0.778, 0.766 & 0.711
Site slope	1 °	Viewfactor	0.6121, 0.4551, 0.3095, 0.2109, 0.1712 & 0.0462
Flame width	100 m	Minimum distance to < 40 kW/m ²	18.4 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	24.5 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	34.4 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	46.5 m
		Minimum distance to < 10 kW/m ²	54 m

Rate of Spread - McArthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Short Fire Run results



FOREST & WOODLAND - Bushfire Attack Level (BAL) Calculator

performance based assessment for a developing fire run in Forest & Woodland vegetation formations.

Developing (SFR) fire run in low risk vegetation

Version 1.10 - 10/01/2019

Site Particular

Date: 10/06/2021 15:06

Site Address: 15 Mulloway Road, Chain Valley Bay

Lot/DP: 273/-/DP755266

LGA: Central Coast (100)

Job No.: 18OD02 - Fire Run A

Assessment prepared by: Heath Fitzsimmons

Common and bushfire behaviour contributor INPUTS:

Predominant vegetation	Key Coastal Dry Sclerophyll Forests - 21.3 & 27.3 - Medium - > 0.9m - < 1.4m				
Surface & Elevated Fuel Load	21.3	tph	Overall fuel load	27.3	tph
Average Canopy Height	20	Metres	Fire weather district	100	FDI
Average elevated fuel height	1.4	Metres	Flame temperature	1090	Kelvin
Distance to vegetation	1.4	Metres	Target elevation of receiver	2	Metres
Effective slope	3	Degrees	Ambient temperature	308	Kelvin
Site slope	0	Degrees	SFR fire run length	60	Metres
FDI nominal head width	100	Metres			

OUTPUTS - Fully Developed Fire (FDF)

Wind Speed	45	kph
Default elevation of receiver	11.855	Metres
FDF Flame Angle	18	Degrees
FDF Flame Length	23.71	Metres
FDF Intensity	44344	kW/m
FDF FROS	3.1438	kph
FDF Flame transmissivity	0.8929	kW/m
FDF View Factor	0.7409	

OUTPUTS - Developing Fire Run (DFR)

Wind speed	30	kph
Default elevation of receiver	7.986	Metres
SFR Flame Angle	38	Degrees
SFR Flame Height	15.972	Metres
SFR Intensity	34598	kW/m
SFR FROS	3.1438	kph
SFR Flame transmissivity	0.8726	kW/m
SFR View Factor	0.4298	
Calculated SFR Head Width	21.962	Metres
SFR fire run length	60	Metres
Approx. SFR travel time	19:05	min/sec

FDF Radiant Heat: 50.30 kW/m²

SFR Radiant Heat: 28.52 kW/m²

Glossary of abbreviations/terms:

tph = tonnes per hectare
 kW/m = Kilowatts per metre
 kW/m² = Kilowatts per metre squared
 HFD = Horizontal Flame Depth
 LRV - Low Risk Vegetation

m/h = metres per hour
 FROS = Forward rate of Spread
 kph = kilometres an hour
 FF = Flank Fire
 SFR = Short Fire Run

K = Kelvin
 min = minutes
 sec = seconds
 min/sec = minutes and seconds



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FOREST & WOODLAND - Bushfire Attack Level (BAL) Calculator

performance based assessment for a developing fire run in Forest & Woodland vegetation formations.

Developing (SFR) fire run in low risk vegetation

Version 1.10 - 10/01/2019

Site Particular

Date: 10/06/2021 15:15

Site Address: 15 Mulloway Road, Chain Valley Bay

Lot/DP: 273/-/DP755266

LGA: Central Coast (100)

Job No. 18OD02 - Fire Run B

Assessment prepared by: Heath Fitzsimmons

Common and bushfire behaviour contributor INPUTS:

Predominant vegetation: Key Coastal Dry Sclerophyll Forests - 21.3 & 27.3 - Medium - > 0.9m - < 1.4m

Surface & Elevated Fuel Load	21.3	tph	Overall fuel load	27.3	tph
Average Canopy Height	20	Metres	Fire weather district	100	FDI
Average elevated fuel height	1.4	Metres	Flame temperature	1090	Kelvin
Distance to vegetation	13	Metres	Target elevation of receiver	2	Metres
Effective slope	1	Degrees	Ambient temperature	308	Kelvin
Site slope	0	Degrees	SFR fire run length	54	Metres
FDI nominal head width	100	Metres			

OUTPUTS - Fully Developed Fire (FDF)

Wind Speed	45	kph
Default elevation of receiver	10.538	Metres
FDF Flame Angle	21	Degrees
FDF Flame Length	21.08	Metres
FDF Intensity	38628	kW/m
FDF FROS	2.7386	kph
FDF Flame transmissivity	0.8910	kW/m
FDF View Factor	0.7017	

OUTPUTS - Developing Fire Run (DFR)

Wind speed	30	kph
Default elevation of receiver	7.227	Metres
SFR Flame Angle	39	Degrees
SFR Flame Height	14.455	Metres
SFR Intensity	30138	kW/m
SFR FROS	2.7386	kph
SFR Flame transmissivity	0.8738	kW/m
SFR View Factor	0.4193	
Calculated SFR Head Width	19.766	Metres
SFR fire run length	54	Metres
Approx. SFR travel time	19:43	min/sec

FDF Radiant Heat: 47.54 kW/m²

SFR Radiant Heat: 27.86 kW/m²

Glossary of abbreviations/terms:

tph = tonnes per hectare
kW/m = KiloWatts per metre
kW/m² = KiloWatts per metre squared
HFD = Horizontal Flame Depth
LRV - Low Risk Vegetation

m/h = metres per hour
FROS = Forward rate of Spread
kph = kilometres an hour
FF = Flank Fire
SFR = Short Fire Run

K = Kelvin
min = minutes
sec = seconds
min/sec = minutes and seconds



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FOREST & WOODLAND - Bushfire Attack Level (BAL) Calculator

performance based assessment for a developing fire run in Forest & Woodland vegetation formations.

Developing (SFR) fire run in low risk vegetation

Version 1.10 - 10/01/2019

Site Particular

Date: 10/06/2021 15:17

Site Address 15 Mulloway Road, Chain Valley Bay

Lot/DP: 273/-/DP755266

LGA Central Coast (100)

Job No. 18OD02 - Fire Run C

Assessment prepared by: Heath Fitzsimmons

Common and bushfire behaviour contributor INPUTS:

Predominant vegetation Key Coastal Dry Sclerophyll Forests - 21.3 & 27.3 - Medium - > 0.9m - < 1.4m

Surface & Elevated Fuel Load	21.3	tph	Overall fuel load	27.3	tph
Average Canopy Height	20	Metres	Fire weather district	100	FDI
Average elevated fuel height	1.4	Metres	Flame temperature	1090	Kelvin
Distance to vegetation	14.5	Metres	Target elevation of receiver	2	Metres
Effective slope	4	Degrees	Ambient temperature	308	Kelvin
Site slope	0	Degrees	SFR fire run length	54	Metres
DFD nominal head width	100	Metres			

OUTPUTS - Fully Developed Fire (FDF)

Wind Speed	45	kph
Default elevation of receiver	12.585	Metres
FDF Flame Angle	16	Degrees
FDF Flame Length	25.17	Metres
FDF Intensity	47512	kW/m
FDF FROS	3.3684	kph
FDF Flame transmissivity	0.8943	kW/m
FDF View Factor	0.7695	

OUTPUTS - Developing Fire Run (DFR)

Wind speed	30	kph
Default elevation of receiver	8.394	Metres
SFR Flame Angle	36	Degrees
SFR Flame Height	16.789	Metres
SFR Intensity	37069	kW/m
SFR FROS	3.3684	kph
SFR Flame transmissivity	0.8726	kW/m
SFR View Factor	0.4180	
Calculated SFR Head Width	19.766	Metres
SFR fire run length	54	Metres
Approx. SFR travel time	16.01	min/sec

FDF Radiant Heat 52.32 kW/m²

SFR Radiant Heat 27.73 kW/m²

Glossary of abbreviations/terms:

tph = tonnes per hectare
kW/m = Kilowatts per metre
kW/m² = Kilowatts per metre squared
HFD = Horizontal Flame Depth
LRV - Low Risk Vegetation

m/h = metres per hour
FROS = Forward rate of Spread
kph = kilometres an hour
FF = Flank Fire
SFR = Short Fire Run

K = Kelvin
min = minutes
sec = seconds
min/sec = minutes and seconds

APPENDIX 3. PROPERTY VEGETATION PLAN FOR ADJACENT LOT



Catchment Management Authorities
New South Wales

Hunter-Central Rivers Catchment Management Authority Clearing PROPERTY VEGETATION PLAN *Native Vegetation Act 2003*

“Valhalla Village” 25-35 Mulloway Road
CHAIN VALLEY BAY NSW 2259

This Property Vegetation Plan applies to the land described in Schedule 1, as shown on Map 1 in Schedule 4 of this agreement.

The Landholder is authorised to undertake the activities set out in Schedule 2 and agrees to carry out the management actions and management action details set out in Schedule 2. The Landholder agrees to comply with the requirements of Schedule 3.

Notes:

1. The Director-General of DECCW (or delegate) will notify the Registrar-General once all landholders and parties with a prescribed interest have consented to the registration of this PVP. Once notified by the Director-General, the Registrar-General is required to register this PVP. This PVP will then be binding on all current and future landholders.
2. This Plan does not exempt the landholder from any Council clearing consent requirements.
3. In order to carry out the works under this PVP, the Landholder may be required to obtain other approvals from other government agencies.

Delegate name and position: Valhalla Village Pty Limited		
Print name of landholder (and name of delegate, delegate's position, and corporate landholder name if applicable)	Signature	Date
Delegate name and position: Valhalla Village Pty Limited		
Print name of landholder (and name of delegate, delegate's position, and corporate landholder name if applicable)	Signature	Date
Fiona Marshall		
General Manager of the Hunter-Central Rivers Catchment Management Authority Delegate of the Minister for Climate Change and the Environment	Signature	Date

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SCHEDULE ONE — DESCRIPTION OF LAND TO WHICH THIS PVP APPLIES

Lot	DP	LGA	Parish	County
274	755266	WYONG	WALLARAH	BLAND
339	755266	WYONG	WALLARAH	BLAND

.....
Initials

**SCHEDULE TWO — AUTHORISED ACTIVITIES AND MANAGEMENT ACTIONS
AUTHORISED CLEARING (NOT INVOLVING INVASIVE NATIVE SCRUB AND/OR THINNING)**

Map Number (as per Schedule 4)	Map Unit	Clearing Type Authorised on Map Unit	Details of Authorised Clearing Type
Map 1	4a	Clearing Area	<p>1. Broadscale Clearing.</p> <p>(a) The landholder may clear vegetation as schematically represented as Map Unit 4a on Map 1 of Schedule 4, comprising an area of 3.18 hectares of the vegetation type <i>Smooth-barked Apple - Red Bloodwood open forest on coastal plains on the Central Coast, Sydney Basin</i> (schematically represented as Map Unit Vegetation zone 10a of Map 1 of Schedule 4).</p> <p>(b) In the area schematically represented as "APZ Area A" and coinciding with Map Unit 4a on Map 1 of Schedule 4, the landholder may clear to the minimum extent necessary that meets bushfire protection requirements. This is considered to result in a minimum retention of twenty (20) percent tree canopy crown cover and, where existing, native groundcover to a minimum height of five (5) centimetres.</p> <p>(c) In the area schematically represented as "APZ Area B" and coinciding with Map Unit 4a on Map 1 of Schedule 4, the landholder may clear mid-storey and groundcover vegetation only; canopy trees must not be cleared.</p> <p>(d) The landholder may clear regrowth as schematically represented as Map Unit 4c on Map 1 of Schedule 4 and defined in the table titled "Management actions for continuing use" in Schedule 2.</p> <p>2. Duration of clearing.</p> <p>(a) Clearing of native vegetation authorised under this PVP must be commenced within one (1) year of the commencement of this PVP.</p> <p>(b) Clearing of native vegetation authorised under this PVP must be completed within one (1) year of the commencement of clearing.</p> <p>3. Notification. The landholder must notify the Hunter-Central Rivers Catchment Management Authority (CMA) at least two weeks prior to commencement of, and at least two weeks prior to cessation of, clearing operations authorised in this Schedule.</p> <p>4. Compliance assurance.</p> <p>(a) Vegetation Management Plan. The landholder must prepare and submit to the CMA at least two weeks prior to commencing clearing authorised in this PVP, a Vegetation Management Plan (VMP) which details specific actions that ensure compliance with the authorised activities and agreed management action outcomes set out in this Schedule. The VMP must identify resource requirements and timeframes for meeting the management action outcomes.</p> <p>(b) Erosion and Sediment Control Plan. The landholder must prepare and submit to the HCRCA at least two weeks prior to commencing clearing authorised in this PVP an Erosion and Sediment Control Plan (ESCP) which details specific actions that ensure compliance with the authorised activities and agreed Management Actions titled "Control soil erosion and sedimentation" in this Schedule.</p>

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MANAGEMENT ACTIONS FOR AUTHORISED CLEARING (NOT INVOLVING INVASIVE NATIVE SCRUB AND/OR THINNING)

- If clearing occurs in the Map Units, as identified in Authorised Clearing table, then the management actions and management action details described below must be undertaken in the specified Map Unit, as identified in Schedule 4.
- The management actions and management action details are to be continued for, or completed within, the duration specified in the column "Duration of Management Action".

Map Number (as per Schedule 4)	Map Unit	Management Action	Duration of Management Action	Management Action Details
Map 1	4a	Method of clearing	Prior, during and subsequent to clearing.	<ol style="list-style-type: none"> The landholder must, by erecting effective barriers, ensure that machinery used for clearing does not enter the adjacent offset area (Map Unit 4b schematically represented on Map 1 of Schedule 4.) In the areas schematically represented as "APZ Area A", "APZ Area B" and coinciding with Map Units 4a and 4c on Map 1 of Schedule 4, the landholder may only clear by methods that do not: damage retained canopy trees; cause soil disturbance; or result in deep mulch. To enhance habitat values, large woody debris resulting from clearing may be relocated to the Offset Area schematically represented as Map Unit 4b on Map 1 of Schedule 4 by methods that do not: damage canopy trees; damage mid-storey vegetation; or cause soil disturbance.
Map 1	4a	Control soil erosion and sedimentation	Prior, during and subsequent to clearing.	<ol style="list-style-type: none"> The landholder must plan appropriate measures to prevent soil erosion and control sedimentation prior to carrying out any clearing. The landowner must implement appropriate measures to prevent soil erosion and control sedimentation during and subsequent to clearing.

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REQUIRED OFFSETS FOR AUTHORISED CLEARING (NOT INVOLVING INVASIVE NATIVE SCRUB AND/OR THINNING)

Map Number (as per Schedule 4)	Map Unit	Offset on Map Unit	Details of Authorised Offset Type
Map 1	4b	Offset Area	Biodiversity offsets in perpetuity required for authorised clearing are schematically represented as Map Unit 4b in Map 1 of Schedule 4 and comprise an area of 10.42 hectares of the vegetation type <i>Smooth-barked Apple - Red Bloodwood open forest on coastal plains on the Central Coast, Sydney Basin</i> (schematically represented as Map Unit Vegetation zone 10b of Map 1 of Schedule 4).

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Management actions for offsets

1. If clearing occurs in the Map Units, as identified in Authorised Clearing table, then the management actions and management action details described below must be undertaken in the specified Map Unit, as identified in Schedule 4.
2. The management action and management action details are to be continued for, or completed within, the duration specified in the column "Duration of Management Action".

Map Number (as per Schedule 4)	Map Unit	Management Action	Duration of Management Action	Management Action Details
Map 1	4b	Clearing Not Allowed	In Perpetuity	<p>The clearing of native vegetation, whether remnant or regrowth, is not permitted in this zone at any time. Routine Agricultural Management Activities are not permitted in this zone at any time, except for minimal disturbance required in the undertaking of the following activities that are listed under Section 11, Part 2 of the Native Vegetation Act 2003 or in Part 4 of the Native Vegetation Regulation 2005:</p> <ul style="list-style-type: none"> ▪ Pt2 s11b and s11c, Pt4 c13 and c17 - control of noxious & feral weeds and noxious & pest animals; ▪ Pt2 s11h, Pt4 c21 - maintenance of public utilities; ▪ Pt2 s11i - removal of imminent risk of personal injury or damage to property; and ▪ Pt 4 s11g - traditional Aboriginal cultural activities; and ▪ Pt 2 s11a, Pt4 c20 – construction, operation and maintenance of rural infrastructure limited to: <ul style="list-style-type: none"> - Construction, operation and maintenance of boundary fences for the contiguous landholding described in Schedule 1 and schematically represented as "Property" on Map 1 of Schedule 4, to a maximum of three (3) metres width of clearing that does not involve the clearing of any trees or soil disturbance, and using materials which do not impact on native fauna on site. - Operation and maintenance of the existing tracks schematically represented in Map 1 of Schedule 4, to a maximum of four (4) metres width of clearing that does not involve the clearing of any trees or soil disturbance. - Operation and maintenance of the existing sewer schematically represented in Map 1 of Schedule 4, to a maximum of four (4) metres width of clearing that does not involve the clearing of any trees. - Construction, operation and maintenance of the stormwater pipe schematically represented in Map 1 of Schedule 4, to a maximum clearing of four (4) trees less than twenty (20) centimetres diameter at breast height over bark. - Construction, operation and maintenance of drainage works within the area schematically represented as "Swale drain" in Map 1 of Schedule 4.

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Management actions for offsets (continued)

Map Number (as per Schedule 4)	Map Unit	Management Action	Duration of Management Action	Management Action Details
Map 1	4b	Maintain native vegetation and retain regrowth	In perpetuity	The landholder must retain all native vegetation (whether remnant or regrowth) in the offset area with the exception of permitted activities as specified by the Management Action titled "Clearing Not Allowed" in this Schedule.
Map 1	4b	Regeneration of native vegetation and/or supplementary planting	In perpetuity	<ol style="list-style-type: none"> The landholder must regenerate and maintain in perpetuity native vegetation cover to benchmark condition in the areas not schematically represented as "APZ Area A", "APZ Area B" and "APZ Area C" in Map 1 of Schedule 4. In the areas schematically represented as "APZ Area A", "APZ Area B" and "APZ Area C" in Map 1 of Schedule 4, the landholder must regenerate and maintain in perpetuity native vegetation cover to the maximum extent that meets bushfire protection standards. This is considered to be a minimum of twenty (20) percent tree canopy crown cover and, where existing, native groundcover to a minimum height of five (5) centimetres. In the areas schematically represented on Map 1 of Schedule 1 as the "Revegetation Area", and not coinciding with the areas schematically represented as "APZ Area A", "APZ Area B" and "APZ Area C" in Map 1 of Schedule 4, the landholder must achieve and maintain in perpetuity the following native vegetation regeneration targets within six (6) months of the completion of clearing, or within twelve (12) months of the commencement of any clearing, whichever occurs first: <ol style="list-style-type: none"> regenerate tree canopy species to an average minimum stem density of one (1) stem per one hundred (100) square metres; and regenerate mid storey species to an average minimum stem density of one (1) stem per one hundred (100) square metres. The regeneration must include only plant species suitable for the site conditions and which occur in the vegetation types on site. The regeneration must include (but not be exclusively limited to) the preferred forage species for threatened fauna species: <ul style="list-style-type: none"> Swamp Mahogany (<i>Eucalyptus robusta</i>); Broad-leaved paperbark (<i>Melaleuca quinquinervia</i>) and Snow in Summer (<i>Melaleuca linariifolia</i>) on lower slope and poorly drained soils; and Red Bloodwood (<i>Corymbia gummifera</i>); Scribbly Gum (<i>Eucalyptus heamastoma</i>); Old man Banksia (<i>Banksia serrata</i>); Fern-leaved Banksia (<i>Banksia oblongifolia</i>); and Sydney Golden Wattle (<i>Acacia longifolia</i> subsp. <i>longifolia</i>) on upper slope and well drained soils.

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Management actions for offsets (continued)

Map Number (as per Schedule 4)	Map Unit	Management Action	Duration of Management Action	Management Action Details
Map 1	4b	Regeneration of native vegetation and/or supplementary planting	In perpetuity	<ol style="list-style-type: none"> In the areas schematically represented on Map 1 of Schedule 1 as the "Revegetation Area", and coinciding with the areas schematically represented as "APZ Area A", "APZ Area B" and "APZ Area C" in Map 1 of Schedule 4, the landholder must achieve and maintain in perpetuity the following native vegetation regeneration targets within six (6) months of the completion of clearing, or within twelve (12) months of the commencement of any clearing, whichever occurs first: <ol style="list-style-type: none"> Regenerate tree canopy species to an average minimum stem density of one (1) stem per one hundred (100) square metres. The regeneration must include only plant species suitable for the site conditions and which occur in the vegetation types on site. The regeneration may be limited to the gum barked species: <ul style="list-style-type: none"> Scribbly Gum (<i>Eucalyptus heamastoma</i>) and Smooth-barked Apple (<i>Angophora costata</i>). In the event that established trees canopy exceeds the minimum standards for bushfire protection requirements, the established trees may be lopped or thinned to the minimum extent necessary to meet the bushfire protection requirements. This is considered to be a minimum tree canopy crown cover of twenty (20) percent.
Map 1	4b	Weed control	In perpetuity	<ol style="list-style-type: none"> The landholder must identify weed infestations and existing and potential nutrient and sediment plumes, and take all reasonable measures to control weeds and to prevent and remediate nutrient and sediment sources. The landholder must commence weed control within one (1) month of the commencement of clearing. The total crown cover of weeds must be: <ol style="list-style-type: none"> reduced to less than five percent (5%) within six (6) months of the commencement of any clearing; and maintained at less than five percent (5%) thereafter.* Weed control methods must minimise disturbance and damage to retained vegetation, groundcover and soil. Earth moving machinery must not be used. Native groundcover vegetation must not be buried by weed debris or mulch. <p><small>*Note: In those areas of the "Revegetation Area" schematically represented on Map 1 of Schedule 1 dominated by non-native groundcover, the weed cover target of 5% does not apply to groundcover vegetation.</small></p>

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Management actions for offsets (continued)

Map Number (as per Schedule 4)	Map Unit	Management Action	Duration of Management Action	Management Action Details
Map 1	4b	Management of human activities	In perpetuity	<p>(a) The landholder must take all reasonable measures to exclude dumping; fire wood collection; and unauthorised human activities. These measures must include the erection of fences (where not fenced) on the boundary of all offset areas, and the maintenance of existing and new fences.</p> <p>(b) The landholder must install signage clearly stating the land use of offset area as biodiversity conservation at each separate offset area, and at a minimum spacing of 100 metres inclusive of signage erected at access points.</p> <p>(c) The landholder must exclude the following recreational activities:</p> <ul style="list-style-type: none"> (i) any activity involving use of a motorised vehicle; (ii) horse riding; and (iii) exercising of domestic pets. <p>(d) The erection of fences and signage described in the Management Action titled "Management of human activities" under Management Action Details (a) and (b) in this Schedule must be commenced within one (1) month of the commencement of clearing, and completed within three (3) months of the completion of, or within six (6) months of the commencement of any clearing, whichever occurs first.</p>
Map 1	4b	Erosion control	In perpetuity	The landholder must identify existing erosion and take all reasonable steps to control erosion and sedimentation within one (1) month of the completion of, or within three (3) months of the commencement of any clearing, whichever occurs first.
Map 1	4b	Fire exclusion	In perpetuity	The landholder must not light fires and must take all reasonable steps to ensure wild fire is excluded. <i>Note: Any direction under the Rural Fires Act 1997 takes precedence over this management action.</i>
Map 1	4b	Exclude commercial apiary	In perpetuity	The landholder must exclude commercial apiaries at all times.
Map 1	4b	Retain rocks	In perpetuity	The landholder must not remove, authorise the removal of, or allow the removal of any rocks.

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Management actions for offsets (continued)

Map Number (as per Schedule 4)	Map Unit	Management Action	Duration of Management Action	Management Action Details
Map 1	4b	Maintain hydrological regime	In perpetuity	The landholder must take all reasonable measures to maintain natural hydrological regimes in riparian areas.
Map 1	4b	Domestic stock grazing exclusion	In perpetuity	The landholder must exclude domestic grazing stock at all times.
Map 1	4b	Control feral and pest animals	In perpetuity	The landholder must take all reasonable measures to control feral and pest animals.
Map 1	4b	Retention of all dead (and alive) timber	In perpetuity	The landholder must not remove, authorise the removal of, or allow the removal of any standing or fallen timber.

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MANAGEMENT ACTIONS FOR CONTINUING USE

1. The management actions and management action details are to be continued for, or completed within, the duration specified in the column "Duration of Management Action".
2. The management actions and management action details set out below must be undertaken in the specified map unit as identified in Schedule 4.

Map Number (as per Schedule 4)	Map Unit	Management Action	Duration of Management Action	Management Action Details
Map 1	4c	Clearing of Regrowth	In perpetuity	All native vegetation less than three (3) metres in height is certified as regrowth and/or groundcover vegetation that may be cleared under sections 19 and 20 of the Native Vegetation Act 2003.

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SCHEDULE THREE - STANDARD CONDITIONS

Commencement

1. This PVP will commence from the date at which it is signed by the Minister for Climate Change and the Environment (or delegate).

Words and phrases used

2. In this Schedule:

"CMA" means the Catchment Management Authority that is a party to this property vegetation plan ("PVP");

"Landholder" means the landholder who is a party to this PVP and once this PVP is registered all future landholders;

"the works under this PVP" means the clearing, the management actions, the mitigating actions and all other works that the Landholder is authorised or required to take under this PVP;

"the Land" means the land to which this PVP applies; and

"DECCW" means the Department of Environment, Climate Change and Water and includes its successor departments or agencies.

Monitoring and auditing

3. The carrying out of any works under this PVP may be subject to auditing by officers of the CMA or DECCW who are authorised officers under the *Native Vegetation Act 2003*, as set out in sections 34 and 35.
4. Subject to reasonable notice, the Landholder will allow authorised officers of the CMA or DECCW access to the Land and allow those officers to do all things reasonably necessary for the purpose of monitoring or auditing compliance with this PVP.
5. Clauses 3 and 4 do not affect the powers of authorised officers of the CMA, DECCW or other government agencies to carry out investigations under the *Native Vegetation Act 2003*.

Registration of PVP on Title

6. For the purpose of sections 31(1) and 31(2) of the *Native Vegetation Act 2003*, the Landholder consents to the registration of this PVP in accordance with section 31 of the *Native Vegetation Act 2003*.

Dispute resolution

7. The parties agree to attempt to resolve any dispute in relation to this PVP by negotiation in the first instance. Such negotiation may involve agreeing on a variation to the PVP. However, this clause does not apply to a dispute relating to a possible breach of the *Native Vegetation Act 2003*.
8. Where appropriate, if negotiations are not successful, the CMA agrees to provide a written notice to the Landholder setting out the nature of any contravention and requesting the Landholder to take the steps specified in that notice, in the time specified in that notice, to rectify that contravention. This clause does not apply to a possible breach of the *Native Vegetation Act 2003*.
9. The Landholder agrees to comply with that notice in the time specified in the notice. Failure to comply with that notice is a breach of this plan. If the Landholder does not comply with the notice, the Minister (or delegate) may consider terminating this plan, in accordance with the procedure set out in section 30 of the *Native Vegetation Act 2003*. The CMA or DECCW may also take other action under that Act.
10. The landholder also agrees to provide access to the property to officers of the CMA and DECCW.

Note: The procedure for varying or terminating a PVP is set out in section 30 of the *Native Vegetation Act 2003* and clause 11 of the *Native Vegetation Regulation 2005*.

Subdivision

11. The Landholder agrees to notify the CMA of any proposal to subdivide the Land.

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12. The Landholder agrees to submit to the CMA an application to vary this PVP to divide it into separate PVPs relating to the Land as subdivided in the same or similar terms to this PVP, if so requested by the CMA.


Apportionment of risk/indemnity

13. The parties agree to apportion risk as follows:
- (i) The CMA accepts the risk for the actions of CMA staff in entering the Land and carrying out functions associated with this PVP and for the actions of other visitors to the Land as organised by the CMA.
 - (ii) All other risks associated with this PVP and the works under this PVP rest with the Landholder.
















Disclosure of Information

14. Subject to clause 15, personal information contained in this PVP will be treated in accordance with the *Privacy and Personal Information Protection Act 1998*, under which you have rights of access and correction.
15. Information contained in this PVP may be disclosed:
- (i) In the case of a PVP that allows broadscale clearing or that specifies a date for the definition of "regrowth", certain information from the PVP will be included on the register of PVPs and development consents, which will be publicly available on the Internet and available for inspection at the office of the CMA.
 - (ii) to DECCW for compliance and statistical purposes.
 - (iii) in circumstances where disclosure is otherwise required or authorised by law, including the Government Information (Public Access) Act 2009.




 Catchment Management Authorities
 New South Wales
 Native Vegetation Act 2003
Property Vegetation Plan
Map 1
PVP Area and Activities
Vegetation Zones
and Cadastre
 Request No: 11274
 Name: Valhalla Village Pty Limited
 Property: 25-35 Mulloway Road
 CHAIN VALLEY BAY
 CMA File Ref: HCR01569

Legend

PVP Area and Activities  4a Clearing Area  4b Offset Area  4c Regrowth  Revegetation Area	Infrastructure  APZ Area A  APZ Area B  APZ Area C  Swale drain  Stormwater pipe  Access track  Sewer	Vegetation Zones  10a Vegetation Zone  10b Vegetation Zone Cadastre  Property  Lot
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Prepared by: David Russell
Date: 27/04/2011

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 Zone 56, using the Geocentric Datum of Australia 1984 (GDA84).
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 Coordinates on this map (GDA84) will be in a different location to
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Initials:.....

