RESIDENTIAL SUBDIVISION DEVELOPMENT

LOT 4 DP834254

510 BEACH ROAD

BERRY. NSW. 2535

BUSH FIRE HAZARD ASSESSMENT

Prepared by SOWDES
4 March 2020

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List of Abbreviations that may be used throughout this report

APZ	Asset Protection Zone
AS 3959	AS3959 - 2018 Construction of Buildings in Bush Fire Prone Area
BAL	Bush Fire Attack Level
BCA	Building Code of Australia
BFSA	Bush Fire Safety Authority
BPMs	Bush Fire Protection Measures
CC	Construction Certificate
DA	Development Application
DCP	Development Control Plan
EP&A ACT	Environmental Planning & Assessment Act (1979)
FDI	Fire Danger Index
IPA	Inner Protection Area
LEP	Local Environmental Plan
OPA	Outer Protection Area
PBP	Planning for Bush Fire Protection (2019)
RF Act	NSW Rural Fires Act (1997)
RF Reg	NSW Rural Fires Regulation (2008)
RFS	NSW Rural Fire Service
RHF	Radiant Heat Flux
ROS	Rate of Spread
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose

It is acknowledged that certain parts of this report contain images and directly quoted information from a range of sources including but not limited to; Planning for Bush Fire Protection (2019), Planning for Bush Fire Protection (2006), AS3959 (2018) Construction of Buildings in Bushfire Prone Areas, and a range of other NSW Rural Fire Service resources and publications.

Executive Summary.

SOWDES has been commissioned by the owners of a portion of land identified as Lot 4 DP834254 - 510 Beach Road, Berry. NSW. 2535 to undertake a 'Bush Fire Hazard Assessment' to support a development application to the Shoalhaven City Council for the subdivision of the land to create 31 new residential allotments. The subject development property contains portions of land that are designated as bush fire prone and therefore this Bushfire Hazard Assessment has been undertaken in accordance with the criteria of both the Shoalhaven City Council and the New South Wales Rural Fire Service's (NSW RFS) 'Submission Information' requirements for a proposed development of land within a bush fire prone mapped area.

This report provides an independent assessment of the proposed development with regard to protection of life and property, the general construction standards within bush fire prone areas and follows the relevant guidelines and information requirements of the NSW RFS's publication "Planning for Bush Fire Protection" (2019) (PBP 2019), Clause 44 of the Rural Fires Regulation (2008) (RF Reg), Section 4.46 of the Environmental Planning and Assessment Act (1979) (EP&A Act), Section 100B of the Rural Fires Act (1997) (RF Act), and 'AS 3959-2018 Construction of Buildings in Bush Fire Prone Areas'.

The preparation of this Bush Fire Hazard Assessment follows on from the recent rezoning approval over the subject property that allows for large portions of land within the northern third of the site to be zoned as a blend of 'R5 - Large Lot Residential' and 'E3 – Environmental Management' with a minimum Lot size for residential dwelling entitlements of 1 hectare. The subdivision proposal will create 31 separate residential allotments and a road reserve, and a residue portion in the southern half that will be dedicated as 'E1 – National Parks and National Reserves' that forms part of the existing Coomonderry Swamp.

The bush fire assessment and any recommended bush fire protection measures are based on the plan of subdivision prepared by Allen Price & Scarratts Pty Ltd, Ref: N27074 dated February 2020. It is noted that 'potential' dwelling envelopes of 600m² have been identified within each of the proposed residential allotments which are based on a combination of considerations such as setback distances from boundaries, the need to provide onsite effluent management areas, geophysical constraints, and bush fire protection measures. The placement of building envelopes within the individual allotments is not intended to be absolute or tied to the title of the individual allotments thereby allowing flexibility in the site layouts, building orientation and landscaping options. Some of the proposed Lots will however have limited development opportunity if compliance with the provisions of Planning for Bush Fire Protection (2019) and 'AS3959 (2018) Construction of Buildings in Bushfire Prone Areas' are to be met, but all Lots can achieve a residential dwelling envelope that have a Bush Fire Attack Level (BAL) rating of BAL-29 or less.

With reference to the bush fire mapping instrument relevant at the time of preparing this assessment the site is particularly burdened by a stand of wooded vegetation that covers an area of approximately 2.8 hectares within the eastern portion of the site. The current maps list the vegetation group as 'Category 2 – low risk' with a 30-metre buffer zone. The mapped vegetation category is inconsistent with the Flora and Fauna assessment prepared for the site by Biosis (Ref: 25603, dated 27th October 2017) which identifies the stand as forested vegetation, and therefore should be considered and assessed as a 'Category 1 – high risk' vegetation group. Accordingly, the buffer distance from the margins of this stand of forested vegetation has been assessed as 100 metres in all directions which therefore effectively designates proposed Lots 10 to 16 and Lot 18 as being bush fire prone.

A further consideration of the current bush fire maps relevant to the property is the fact that the open paddocks of grasslands that occupy the greater portion of the property whilst not mapped as bush fire prone vegetation can contribute to the rapid spread of fire. It is therefore a recommendation of this assessment that all new Lots comprising either R5 and/ or E3 zoned lands maintain vegetation within those zones in accordance with the requirements for asset protection zones as prescribed by the NSW Rural Fire Service for the benefit of all neighbouring allotments.

The development property is located outside the area serviced by Council's utilities, in particular the provision of a reticulated water supply. Each Lot will be equal to or greater than 1 hectare in size and will therefore be required to provide a dedicated water supply of at least 20,000 litres for the purposes of firefighting.

It is considered that the proposed development for the subdivision of land to create 31 separate residential allotments and a new road formation will be able to satisfy the requirements of Planning for Bush Fire protection (2019), in particular the 'acceptable solutions', 'performance requirements' and 'specific objectives' contained in Chapter 5 of the publication, and that all newly created Lots will be able to support a 'complying development' for developments undertaken in bushfire prone land. A site plan has been prepared to accompany this Bush Fire Hazard Assessment which is based on the proposed plan of subdivision and includes the existing mapped bush fire prone vegetation for the subject development property, Ref: 0110220-01A.

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4 March 2020

The following key summaries apply to the development and are detailed in the following pages:

- The development property is burdened by two parcels of land that are mapped as bush fire prone vegetation groups; Coomonderry Swamp wetland in the southern third of the site, and Jim's Forest located midway along the length of the eastern boundary within the residential zone of the site. The current bush fire mapping instruments have both stands of vegetation identified as Category 2 'Low Risk' formations with a 30 metre buffer zone.
- Jim's Forest is more accurately assessed as a forest formation and therefore all proposed Lots within 100 metres of the margins of the stand should be included in any bush fire hazard assessment
- The margins of the Coomonderry Swamp wetland in the southern third of the site will be approximately 100 metres from the southern boundaries of Lots 4 to 11 and greater than 400 metres from any of the proposed new dwelling envelopes within those Lots and will therefore not pose a development risk.
- An Aboriginal heritage study of the development property was undertaken by *AMBS Ecology & Heritage* in 2018 which identified a scarred tree within the eastern portion of the site. Originally the tree was to be retained in its natural state and protected within the subdivision development, however subsequent storms and a lightning strike in early 2019 have adversely affected the tree and rendered it dangerous, and the tree will now be cut and trimmed back to make is safe.
- During the 2018 Aboriginal Cultural Heritage Assessment of the property a small number of stone artefacts were discovered along an east – west aligned ridge and on the lower southern aspect of the ridge. The area bound by the discoveries has been identified a 'Potential Archaeological Deposit (PAD) which has been identified on the plans of subdivision with all building envelopes to be located outside the mapped area.
- The proposed internal road network servicing the subdivision is a simple looped formation with two junctions that provide access to Beach Road along the northern boundary. The road formation is 18 metres wide with an 8 metre wide sealed section.
- A separate 6 metre wide access easement will be formed between Lots 9 and 10 in the southern portion of the development which will facilitate direct access from the new internal road to the Coomonderry Swamp wetland to the south for management and firefighting protection purposes.
- The northern and eastern outer boundaries will have a 10 metre wide easement for the planting of suitable tree and plants to provide an element of screening to the development from the Beach Road traffic corridor.
- The Council's reticulated water supply does not extend to the development property therefore each Lot designated as bush fire prone will be required to provide a dedicated water supply for firefighting purposes. All Lots will be at least 1 hectare in size and therefore will be required to provide a dedicated water storage of at least 20,000 litres in accordance with the provisions of Table 5.3d of Planning for Bush Fire Protection (2019).

A. Legislation.

The proposed development includes the subdivision of residential land and is therefore designated as 'integrated development' in accordance with Section 4.46 of the EP&A Act. As integrated development, a formal application must be submitted to the NSW Rural Fire Service under Section 100B of the RF Act seeking a 'Bush Fire Safety Authority' for the proposed development which will assess the proposal for compliance with PBP and the combined bush fire protection measures aimed at the protection of life and property. A 'Bush Fire Safety Authority' (BFSA) requires assessment of the development against set criteria as set out in Clause 44 of the Rural Fires Regulation (2008) which forms the basis of the assessment process adopted within this report. The relevant policies and guidelines that have been considered in the development assessment include:

- "Planning for Bush Fire Protection (2019)" (NSW Rural Fire Service)
- "AS3959 - 2018 Construction of Buildings in Bush Fire Prone Areas"
- Environmental Planning and Assessment Act (1979) - Sections 4.46 and 4.14
- NSW Rural Fires Act (1997) - Section 100B
- NSW Rural Fires Regulation (2008) - Clause 44
- Shoalhaven City Council Local Environmental Plan (2014)
- Shoalhaven City Council Development Control Plan (2014)

B. Assessment Methodology.

The methodology employed to undertake a site assessment of the proposed development is consistent with that required for integrated development applications as defined in Section 4.46 of the EP&A Act and Section 100B of the RF Act, and contains the following detailed information as set out in Clause 44 of the RF Reg (as applicable):

1. **A description of the property**

- provide Lot No., DP of subject land
- street address with locality map
- zoning of subject land and any adjoining lands
- staging issues, if relevant, and description of the whole proposal
- aerial or ground photographs of subject land including contours and existing and proposed cadastre

2. **Identification of any significant environmental features - these could include the presence of:**

- riparian corridors
- SEPP 14 – Coastal Wetlands, SEPP 26 Littoral rainforests, SEPP 44 – Koala Habitat
- areas of geological interest
- environmental protection zones or steep lands (>18°)
- land slip or flood prone areas
- national parks estate or various other reserves.

3. **Details of threatened species, populations, endangered ecological communities and critical habitat known to the applicant**

- details of some threatened species can be found on the web (www.environment.nsw. gov.au)
- past and/or present studies or surveys for the area (eg local environment studies)
- documentation supplied to council in relation to flora and fauna

4. **Details of Aboriginal heritage known to the applicant**

- past surveys and information held by the DEC.

5. **A bush fire assessment for the individual Lots that addresses –**

- the classification of vegetation out to 140 metres from the development
    - provide a structural description consistent with the identification key in Keith D (2004) and PBP.
    - identify any past disturbance factors and any future intended land uses that could alter the vegetation classification in the future.
- an assessment of the effective slope to a distance of 100 metres
    - usually 5m contours will suffice for subdivisions, 10 metres should be used only if there has not been a survey undertaken by a registered land surveyor.
    - the effective slope is the slope under the vegetation assessed as being a hazard in relation to the development and not the slope within the asset protection zone.
- asset protection zones (including any management arrangements, any easements including those contained on adjoining lands)
- siting and adequacy of water (in relation to reticulation rates or where dedicated water storage will be required)
- capacity of public roads (especially perimeter roads and traffic management treatments)
- whether public roads link to fire trails and have two way access
- adequacy of access and egress
- adequacy of maintenance plans (eg; landscaping) and emergency procedures (especially SFPP developments)
- construction standards to be used (where non-conformity to the deemed-to-satisfy arrangement is envisaged, which aspects are not intended to conform)
- adequacy of sprinkler systems (only as an adjunct to other passive controls).

6. **An assessment of how the development complies with the acceptable solutions, performance requirements and relevant specific objectives within Chapter 4 of PBP.**

Detailed responses to each of the above listed assessment criteria, and where deemed appropriate, an individual assessment of each Lot may be included:

B1. A description of the proposed development and property

The development property is identified as Lot 4 DP834254 - 510 Beach Road, Berry. NSW. 2535 comprises approximately 75 hectares of mixed-use land that is located approximately 5.3 kilometres to the east of the village of Berry, and 2.2 kilometres west of the popular 'Seven Mile Beach'.

The subject property has historically been used as a dairy operation, and more recently as a viable rural enterprise concentrating on the grazing cattle and beef production. The current land holders have owned and operated the property since the mid-1960's with small portions of land on the eastern aspect of the property separated-off over the years and now set to neighbouring residential developments.

There is an existing residential dwelling, supporting sheds and several outbuildings within a defined curtilage in the northwest quarter of the property which is accessed via an unsealed carriageway formed off the Beach Road traffic corridor in the northwest corner of the block. The existing dwelling will be contained with the proposed Lot 2 of the subdivision development which will not be burdened by bush fire prone lands and therefore an assessment of the dwelling with the provisions of Planning for Bush Fire Protection (2019) has not been included within this assessment.

The development property has recently gone through a land rezoning process to divide the site into discrete areas of environmental protection and management, and large Lot residential development. The minimum Lot sizes associated with each of the land zone precinct has ensured that future subdivision of the proposed residential blocks cannot be undertaken. The site is separated into four land zoning areas: 'E1 – National Parks and National Reserves', 'E2 – Environmental Conservation', 'E3 – Environmental Management', and 'R5 – Large Lot Residential'. The 'E2 – Environmental Conservation' zone is located through the southern half of the property between the Coomonderry Swamp wetlands and the rear of the nominated development precincts within proposed Lots 4 to 13. The minimum Lot size in the E2 zone is predominantly 2 hectares, however there is a small area along the southeastern boundary where the minimum Lot size is 4 hectares to protect a stand of forested vegetation and support a residential dwelling. The section of the property that has been identified for residential development purposes essentially sits to the northern of a ridge line that runs in an east-west alignment across the holding. This area has been zoned into a mix of 'E3 – Environmental Management' along existing drainage lines and springs and other general low-lying areas along the northern boundary, and 'R5 – Large Lot Residential'.

The property comprises a blend of vegetation types which are dominated by several distinct formations;

- Coomonderry Swamp that occupies the southern portion of the property covering an area of approximately 20.9 hectares and listed as 'High Biodiversity Value' ('SEPP 14 Wetland),
- Jim's Forest (also referred to as Jim's Bush within the site Flora and Fauna Assessment prepared by Biosis in 2017) covering an area of approximately 2.8 hectares centrally along the eastern boundary, and
- improved pastures with a mix of exotic and native grass species occupying the majority of the property north of the Coomonderry Swamp.
- A blend of *Forest Red Gum open forest*, *Blackbutt Bangalay open forest*, and *Swamp oak forest* along the northern boundary and scattered patches surrounding an existing dwelling and curtilage. In the northwest corner of the site

The first two vegetation formations listed above are identified as not being disturbed by the proposed development as both will be located within the newly zoned 'E1 – National Parks and National Reserves' and 'E2 – Environmental Conservation' areas of the site which will prohibit any development. The last two vegetation formations are assumed to be impacted by the proposed subdivision development with the exception of the strips of intact formations that lie parallel to the northern roadside boundary ("Biodiversity Development Assessment Report" prepared by *Niche Environment and Heritage* - Ref:5595, dated 5th February 2020). These strips of forested vegetation along the northern roadside boundary will be protected by the creation of a 'restriction on title' of the burdened Lots for their retention and preservation.

The property is essentially divided into two drainage regimes that are separated by an east Ÿ west aligned ridge that runs through the centre of the property. The northern side of the ridge falls toward the Beach Road aspect and has an average grade of 10°, whilst the southern side of the ridge slopes toward the catchment of the Coomonderry Swamp and has an average grade of 10° to 15° in the higher elevations before transitioning into a plateau of less than 5° slope nearing the margins of the swamp. The terrain on the northern side of the ridge has a slight cross-fall toward the northwest in the lower elevations of the site and is highlighted by a series of small dams that are utilise by the grazing stock for drinking water. There is a small exception to the aforementioned drainage regimes with the land area under the Jim's Forest precinct falling away from the main portion of the property toward the east at variable grades that average 10°.

With reference to the bush fire mapping instrument relevant at the time of preparing this assessment the site is particularly burdened by a stand of wooded vegetation formally identified as Jim's Forest that covers an area of approximately 2.8 hectares within the eastern portion of the site. The current maps list the vegetation group as 'Category 2 – low risk' (*Rainforests and lower risk vegetation parcels such as remnant vegetation and parcels of land with ongoing land management practices)* with a 30-metre buffer zone. The mapped vegetation category is inconsistent with the Flora and Fauna assessment prepared for the site by *Biosis* (Ref: 25603, dated 27th October 2017) which identifies two separate plant community types within the same stand; "Illawarra Escarpment Blackbutt Forest" and "Illawarra Gully Wet Forest".

The density of canopy cover within the stand is greater than 30% of the area when projected vertically to the ground, and therefore should be considered and assessed as a 'Category 1 – high risk' (*areas of forest, woodlands, heaths [tall and short], forested wetlands and timber plantations*) vegetation group. Accordingly, the buffer distance from the margins of the stand of Jim's forest have been assessed as 100 metres in all directions which therefore effectively designates proposed Lots 10 to 16 and Lot 18 as being bush fire prone.

It is noted that at the time of preparing this assessment an enquiry was made with the Shoalhaven City Council (18th February 2020) to determine if any upgrades or amendments to the existing bush fire vegetation mapping was being undertaken. The Duty Building Surveyor that handled the enquiry advised that there was no such process occurring or scheduled to be undertaken at this time.

The proposed plan of subdivision creates 31 residential allotments of varying sizes, an internal road corridor, and a residual portion of land comprising 26.86 hectares adjacent to the Coomonderry Swamp wetland that will be gifted back to the environment as 'E1 – National Parks and National Reserves'. Proposed Lots 4 to 11 are formed as 'finger' allotments of varying size on the southern end of the site that will adjoin the 'E1' zoned land. It is proposed that a 100 metre buffer zone will be created between the edge of the wetland and the southern boundary of Lots 4 to 11, and there will be an additional 30 metre vegetation regeneration zone inside the boundaries of the respective Lots. The separation distance of 100 metres from the edge of the mapped Bush Fire Prone Lands that includes the Coomonderry Swamp wetland and the southern boundary of the proposed Lots 4 to 11 results in the proposed Lots being outside the mapped buffer zone and therefore not subject to a bush fire hazard assessment under the provision of Planning for Bush Fire Protection (2019).

The proposed Lots that surround the Jim's Forest stand of vegetation in the eastern portion of the site have potential dwelling envelopes identified around the margins of the formation that meet the requirements of a BAL-29 rating. The slope under the vegetation falls from the west toward the east at an average grade of 10.5% or 6° with a slight crossfall from the outer northeastern and southwestern margins toward the centre of the plot. Outside the forested stand the vegetation formations revert to an open grassland environment in all directions with variable slopes. The existing stand of Jim's Forest covers an area of 2.8 hectares and has been assessed as a 'forest' formation for the purposes of the bush fire hazard assessment with a 100 metre buffer zone that burdens proposed Lots 10 to 16 and Lot 18. It is noted however that if the current Bush Fire Prone Lands maps are not altered and the existing 'Category 2' vegetation group status with 30 metre buffer zone is applied it will only remove Lots 10, 16 and 18 from needing to be assessed as bush fire prone lands in any future development.

In assessing the bush fire hazard related to Lots 10 to 16 and Lot 18 it is noted that several of the proposed Lots will be relatively constrained in relation to the possible location for a future dwelling when also considering other site design matters such as boundary setbacks, onsite effluent management systems, and bush fire protection measures.

Whilst a generously sized potential dwelling envelope of 600m² has been identified in all Lots, the final size of a dwelling footprint in Lots 12 to 15 may need to be reduced and/or modified to build within the provisions of "Section 7 BAL-29" of *AS3959 (2018) Construction of Buildings in Bushfire Prone Areas*. It is acknowledged however that construction of a dwelling within each of these Lots to a higher BAL rating may be possible upon submission and approval of a design to the NSW Rural Fire Service at the time of individual Lot development.

The proposed road design within the subdivision plan has a 'looped' formation with entrance and exit provisions that junction with the Beach Road traffic corridor located parallel to the northern boundary. The internal road formations will be new and can therefore be readily designed and constructed to meet the requirements of Council's engineering standards, and the design considerations of the NSW Rural Fire Service. The internal road reserve will be 18 metres wide with a sealed carriageway width of at least 8 metres, and there will be clearances in the vertical plane of at least 4 metres along all carriageways without the need to remove any significant trees. The proposed Lot configuration throughout the site and the identified dwelling envelopes within close proximity of the front boundary for Lots 4 to 11 in the south end of the development should ensure that all building envelopes will be within 200 metres of the internal 'through road' network – although the dwelling envelopes in the proposed Lots 15 and 18 may be slightly beyond 200 metres which will be determined at the time of individual Lot development.

Proposed Lots 15 and 18 of the subdivision are proposed to be accessed via a long access handle that is 10 metres wide, whilst the access handle within Lot 18 will also be an easement for access to Lots 19 and 20. Lot 31 of the development will be accessed via a Right of Carriageway easement that will burden Lot 22. The nominated dwelling envelopes within Lots 15 and 18 may be close to or slightly further than 200 metres from the roadside entrances and therefore it is proposed for all access handle provisions that the carriageway formation be sealed and 6 metres wide which will allow for two vehicles travelling in opposite directions to pass each other, and will also meet the provisions for Chapter 5, *Table 5.3b - Property Access* of 'Planning for Bush Fire Protection (2019). As there are no Council services to be extended into the individual allotments the 6 metre carriageway width within the 10 metre wide access handles will allow adequate space either side of the formation for other utilities such as power and communications to be installed below ground without concerns for damage.

The proposed Lot configuration has allowed for an access carriageway of 6 metres to be created between Lots 9 and 10 in the southern portion of the site for access to maintain and manage the vegetation regeneration within the Coomonderry Swamp wetlands. The access carriageway is similar to another arrangement within the neighbouring large Lot residential subdivision to the immediate west of the development property. The access carriageway is not specifically designated as a fire trail; however, the access could be utilised by the NSW Rural Fire Service in an emergency situation to combat a fire advancing from the southern aspect if required. The access handle forms part of the land to be rezoned 'E1 – National Parks and National Reserves' that is being dedicated back to the environment and it is understood that National Parks & Wildlife Service will be responsible for the maintenance and management of the carriageway in a similar manner to other existing access provisions within the neighbouring development precincts.

The development property is not serviced by a Council maintained reticulated water supply and therefore each Lot within a future subdivision if deemed to be in a designated bushfire prone area will be required to provide a dedicated water supply for firefighting purposes in accordance with Chapter 5, Table 5.3d - '*Water supply requirements for non-reticulated developments or where the reticulated water supply cannot be guaranteed'*, Planning for Bush Fire Protection (2019), (page 48). With reference to the subdivision plan for the site it is noted that each of the proposed Lots will be equal to or greater than 10,000m² in area and therefore in accordance with Table 5.3d of PBP (2019) will require a minimum dedicated water storage provision of 20,000 litres.

Whilst the majority of the Lots will not be within designated bushfire prone areas and therefore not obligated under existing provisions to comply with the provisions of PBP, there may be a development consideration due to the isolated nature of the site from a Council maintained water supply that all Lots do provide a static water supply of at least 20,000 litres as part of a community based approach to bushfire protection measures. If adopted, the requirements for dedicated firefighting water supply would be in excess of any storage provisions required for potable purposes.

Figure 1. Portion of the Shoalhaven City Council 'Bushfire Mapping' showing Category 2 vegetation formations and associated 30 metre buffer zones within and surrounding the development property.

B2. Identification of any significant environmental features

The Coomonderry Swamp wetland located in the southern portion of the development property is identified as of 'High Biodiversity Value' (*Biosis* – 27th October 2017) and is deemed a Coastal Wetland under the provisions of SEPP 14. The report prepared by *Biosis* states that the Coomonderry Swamp will be isolated from any potential future subdivision development and therefore '…. this area will not be directly impacted by the project', (page 23).

Other areas of significant vegetation values such as Jim's Forest in the central eastern portion of the development site will not be modified or changed in association with any future subdivision development and therefore the potential for adverse impacts on any significant environmental features will be mitigated by way of the project design.

For details of the flora and any associated significant environmental considerations refer to the Flora and Fauna Assessment prepared by *Biosis* (dated 27th October 2017) and a separate "Biodiversity Development Assessment Report" prepared by *Niche Environment and Heritage* - Ref:5595, dated 5th February 2020.

B3. Details of threatened species, populations, endangered ecological communities and critical habitat known to the applicant

For details of the fauna any associated significant environmental considerations refer to the Flora and Fauna Assessment prepared by *Biosis* (dated 27th October 2017) and the "Biodiversity Development Assessment Report" prepared by *Niche Environment and Heritage* - Ref:5595, dated 5th February 2020.

B4. Details of Aboriginal heritage known to the applicant

A detailed Aboriginal Heritage Assessment was undertaken by AMBS Ecology & Heritage in 2018 which identified a scarred tree within the central eastern portion of the site, around the vicinity of the proposed Lot 14. The original report recommended listing the scarred tree within the Shoalhaven City Council Local Environmental Plan as a significant heritage item with the Local Environmental Plan. However, a lightning strike in early 2019 has significantly damaged the tree and a subsequent recommendation that the tree be trimmed and lowered for safety reasons has been prepared. It is no longer considered that the tree be registered as a significant heritage item within the Local Environmental Plan.

Additional Aboriginal Heritage items in the form of stone artefacts were found in soil test pits across the east – west ridge line and in the terrain just below the ridge to the south. The AMBS report recommended that a 'Potential Archaeological Deposit' (PAD) area be defined on the plan of subdivision and that any future residential dwelling development be undertaken outside of this defined area. Accordingly, the 'PAD' area has been included within the zoned 'E2 – Environmental Conservation' portion of the site with all potential dwelling envelopes being identified to the north of the zoning boundary.

Further details of the Aboriginal Cultural Heritage Assessment can be found in the report prepared for the Shoalhaven City Council by AMBS Ecology & Heritage, Ref: 17334, dated 22nd October 2018.

B5. Bush Fire Hazard Assessment for the Proposed Individual Lots

Each of the proposed Lots 10 to 16 and Lot 18 to be burdened by Bush Fire Prone Land vegetation have been assessed using a Bush Fire Attack Level (BAL) certificate as the other assessment components of how the individual Lots 'as a whole' can satisfy the objectives of Planning for Bush Fire Protection (2019) are addressed in Item 6 of this report.

The selected images following the BAL certificates represent a typical assessment of the vegetation formations and terrain evident throughout the development property.

Bush Fire Attack Level (BAL) Certificate – Lot 10

Site Address Details	510 Beach Road, Berry. NSW. 2535		
Property Details	Lot 4 DP834254		
Local Council Area	Shoalhaven City Council	FFDI	100

Type of Proposal		Land Zoning & Use	
✓	Subdivision		Urban residential / Village
		✓	Rural / other

Mapped Vegetation Category	Category 2 - Rainforests and lower risk vegetation parcels such as remnant vegetation and parcels of land with ongoing land management practices

Proximity, Aspect and Vegetative Formation in Relation to the Proposed Development

Category	North Arc NWŸ NŸ NE		South Arc SEŸ SŸ SW		East Arc NEŸ EŸ SE		West Arc NWŸ WŸ SW	
Distance	metres	**25**	metres	**25**	metres	**80**	metres	**25**
BAL rating	BAL	**12.5**	BAL	**12.5**	BAL	**12.5**	BAL	**12.5**
Vegetation formation within 140 metres		Forest		Forest	✓	Forest		Forest
		Woodland		Woodland		Woodland		Woodland
		Tall heaths		Tall heaths		Tall heaths		Tall heaths
		Short heaths		Short heaths		Short heaths		Short heaths
		Rainforest		Rainforest		Rainforest		Rainforest
	✓	Grasslands	✓	Grasslands		Grasslands	✓	Grasslands
		Managed land		Managed land		Managed land		Managed land
Slope under the hazard	Downslope >5 to 10		Downslope >10 to 15		Downslope >0 to 5		Downslope >0 to 5	

Overall Bush Fire Attack Level (BAL) and AS3959 – 2018 Building Construction Requirements

The highest BAL Rating that this development must achieve is:	BAL-12.5	AS3959 – 2018 Requirement	Sections 5 & 7

*** Specific variations exist in NSW in the application of Sections 5 and 6 of AS3959-2018 Construction of Buildings in Bush Fire Prone Areas. Refer to Chapter 7.5.2 of Planning for Bush Fire Protection [2019] (page 70)**

Dedicated Water Supply - Table 5.3d of Planning for Bush Fire Protection [2019]

Development Type	Water Supply Requirement	Planned	Existing
Large rural / lifestyle Lots (>10,000m²)	20,000L / Lot	☑	☐

APZ Requirements – Table A1.12.2 of Planning for Bush Fire Protection [2019]

			Asset Protection Area			
			Inner	Outer		
Direction	Vegetation	Slope	(metres)		Planned	Existing
North	Grasslands	Downslope >5 to 10	25	0	☑	☐
South	Grasslands	Downslope >10 to 15	25	0	☑	☐
East	Forest	Downslope >0 to 5	15	10	☑	☐
West	Grasslands	Downslope >0 to 5	25	0	☑	☐

Bush Fire Attack Level (BAL) Certificate – Lot 11

Site Address Details	510 Beach Road, Berry. NSW. 2535		
Property Details	Lot 4 DP834254		
Local Council Area	Shoalhaven City Council	FFDI	100

Type of Proposal		Land Zoning & Use	
✓	Subdivision		Urban residential / Village
		✓	Rural / other

Mapped Vegetation Category	Category 2 - Rainforests and lower risk vegetation parcels such as remnant vegetation and parcels of land with ongoing land management practices

Proximity, Aspect and Vegetative Formation in Relation to the Proposed Development

Category	North Arc NWŸ NŸ NE		South Arc SEŸ SŸ SW		East Arc NEŸ EŸ SE		West Arc NWŸ WŸ SW	
Distance	metres	**25**	metres	**45**	metres	**40**	metres	**30**
BAL rating	BAL	**12.5**	BAL	**29**	BAL	**29**	BAL	**12.5**
Vegetation formation within 140 metres		Forest		Forest	✓	Forest		Forest
		Woodland		Woodland		Woodland		Woodland
		Tall heaths		Tall heaths		Tall heaths		Tall heaths
		Short heaths		Short heaths		Short heaths		Short heaths
		Rainforest		Rainforest		Rainforest		Rainforest
	✓	Grasslands	✓	Grasslands		Grasslands	✓	Grasslands
		Managed land		Managed land		Managed land		Managed land
Slope under the hazard	Downslope >5 to 10		Downslope >10 to 15		Downslope >5 to 10		Downslope >0 to 5	

Overall Bush Fire Attack Level (BAL) and AS3959 – 2018 Building Construction Requirements

The highest BAL Rating that this development must achieve is:	BAL-29	AS3959 – 2018 Requirement	Section 7

*** Specific variations exist in NSW in the application of Sections 5 and 6 of AS3959-2018 Construction of Buildings in Bush Fire Prone Areas. Refer to Chapter 7.5.2 of Planning for Bush Fire Protection [2019] (page 70)**

Dedicated Water Supply - Table 5.3d of Planning for Bush Fire Protection [2019]

Development Type	Water Supply Requirement	Planned	Existing
Large rural / lifestyle Lots (>10,000m²)	20,000L / Lot	☑	☐

APZ Requirements – Table A1.12.2 of Planning for Bush Fire Protection [2019]

			Asset Protection Area			
			Inner	Outer		
Direction	Vegetation	Slope	(metres)		Planned	Existing
North	Grasslands	Downslope >5 to 10	25	0	☑	☐
South	Grasslands	Downslope >10 to 15	25	0	☑	☐
East	Forest	Downslope >5 to 10	20	15	☑	☐
West	Grasslands	Downslope >5 to 10	25	0	☑	☐

Bush Fire Attack Level (BAL) Certificate – Lot 12

Site Address Details	510 Beach Road, Berry. NSW. 2535		
Property Details	Lot 4 DP834254		
Local Council Area	Shoalhaven City Council	FFDI	100

Type of Proposal		Land Zoning & Use	
✓	Subdivision		Urban residential / Village
		✓	Rural / other

Mapped Vegetation Category	Category 2 - Rainforests and lower risk vegetation parcels such as remnant vegetation and parcels of land with ongoing land management practices

Proximity, Aspect and Vegetative Formation in Relation to the Proposed Development

Category	North Arc NWŸ NŸ NE		South Arc SEŸ SŸ SW		East Arc NEŸ EŸ SE		West Arc NWŸ WŸ SW	
Distance	metres	**25**	metres	**39**	metres	**70**	metres	**30**
BAL rating	BAL	**12.5**	BAL	**29**	BAL	**12.5**	BAL	**12.5**
Vegetation formation within 140 metres		Forest	✓	Forest	✓	Forest		Forest
		Woodland		Woodland		Woodland		Woodland
		Tall heaths		Tall heaths		Tall heaths		Tall heaths
		Short heaths		Short heaths		Short heaths		Short heaths
		Rainforest		Rainforest		Rainforest		Rainforest
	✓	Grasslands		Grasslands		Grasslands	✓	Grasslands
		Managed land		Managed land		Managed land		Managed land
Slope under the hazard	Downslope >5 to 10		Downslope >5 to 10		Downslope >0 to 5		Downslope >0 to 5	

Overall Bush Fire Attack Level (BAL) and AS3959 – 2018 Building Construction Requirements

The highest BAL Rating that this development must achieve is:	BAL-29	AS3959 – 2018 Requirement	Section 7

*** Specific variations exist in NSW in the application of Sections 5 and 6 of AS3959-2018 Construction of Buildings in Bush Fire Prone Areas. Refer to Chapter 7.5.2 of Planning for Bush Fire Protection [2019] (page 70)**

Dedicated Water Supply - Table 5.3d of Planning for Bush Fire Protection [2019]

Development Type	Water Supply Requirement	Planned	Existing
Large rural / lifestyle Lots (>10,000m²)	20,000L / Lot	☑	☐

APZ Requirements – Table A1.12.2 of Planning for Bush Fire Protection [2019]

			Asset Protection Area			
			Inner	Outer		
Direction	Vegetation	Slope	(metres)		Planned	Existing
North	Grasslands	Downslope >5 to 10	25	0	☑	☐
South	Forest	Downslope >5 to 10	20	15	☑	☐
East	Forest	Downslope >0 to 5	15	10	☑	☐
West	Grasslands	Downslope >0 to 5	25	0	☑	☐

Bush Fire Attack Level (BAL) Certificate – Lot 13

Site Address Details	510 Beach Road, Berry. NSW. 2535		
Property Details	Lot 4 DP834254		
Local Council Area	Shoalhaven City Council	FFDI	100

Type of Proposal		Land Zoning & Use	
✓	Subdivision		Urban residential / Village
		✓	Rural / other

Mapped Vegetation Category	Category 2 - Rainforests and lower risk vegetation parcels such as remnant vegetation and parcels of land with ongoing land management practices

Proximity, Aspect and Vegetative Formation in Relation to the Proposed Development

Category	North Arc NWŸ NŸ NE		South Arc SEŸ SŸ SW		East Arc NEŸ EŸ SE		West Arc NWŸ WŸ SW	
Distance	metres	**25**	metres	**40**	metres	**25**	metres	**25**
BAL rating	BAL	**12.5**	BAL	**29**	BAL	**12.5**	BAL	**12.5**
Vegetation formation within 140 metres		Forest	✓	Forest		Forest		Forest
		Woodland		Woodland		Woodland		Woodland
		Tall heaths		Tall heaths		Tall heaths		Tall heaths
		Short heaths		Short heaths		Short heaths		Short heaths
		Rainforest		Rainforest		Rainforest		Rainforest
	✓	Grasslands		Grasslands	✓	Grasslands	✓	Grasslands
		Managed land		Managed land		Managed land		Managed land
Slope under the hazard	Downslope >5 to 10		Downslope >5 to 10		Downslope >5 to 10		Downslope >5 to 10	

Overall Bush Fire Attack Level (BAL) and AS3959 – 2018 Building Construction Requirements

The highest BAL Rating that this development must achieve is:	BAL-29	AS3959 – 2018 Requirement	Section 7

*** Specific variations exist in NSW in the application of Sections 5 and 6 of AS3959-2018 Construction of Buildings in Bush Fire Prone Areas. Refer to Chapter 7.5.2 of Planning for Bush Fire Protection [2019] (page 70)**

Dedicated Water Supply - Table 5.3d of Planning for Bush Fire Protection [2019]

Development Type	Water Supply Requirement	Planned	Existing
Large rural / lifestyle Lots (>10,000m²)	20,000L / Lot	☑	☐

APZ Requirements – Table A1.12.2 of Planning for Bush Fire Protection [2019]

			Asset Protection Area			
			Inner	Outer		
Direction	Vegetation	Slope	(metres)		Planned	Existing
North	Grasslands	Downslope >5 to 10	25	0	☑	☐
South	Forest	Downslope >5 to 10	20	15	☑	☐
East	Grasslands	Downslope >5 to 10	25	0	☑	☐
West	Grasslands	Downslope >5 to 10	25	0	☑	☐

Bush Fire Attack Level (BAL) Certificate – Lot 14

Site Address Details	510 Beach Road, Berry. NSW. 2535		
Property Details	Lot 4 DP834254		
Local Council Area	Shoalhaven City Council	FFDI	100

Type of Proposal		Land Zoning & Use	
✓	Subdivision		Urban residential / Village

Mapped Vegetation Category	Category 2 - Rainforests and lower risk vegetation parcels such as remnant vegetation and parcels of land with ongoing land management practices

Proximity, Aspect and Vegetative Formation in Relation to the Proposed Development

Category	North Arc NWŸ NŸ NE		South Arc SEŸ SŸ SW		East Arc NEŸ EŸ SE		West Arc NWŸ WŸ SW	
Distance	metres	**25**	metres	**95**	metres	**25**	metres	**30**
BAL rating	BAL	**12.5**	BAL	**12.5**	BAL	**12.5**	BAL	**12.5**
Vegetation formation within 140 metres		Forest	✓	Forest		Forest		Forest
		Woodland		Woodland		Woodland		Woodland
		Tall heaths		Tall heaths		Tall heaths		Tall heaths
		Short heaths		Short heaths		Short heaths		Short heaths
		Rainforest		Rainforest		Rainforest		Rainforest
	✓	Grasslands		Grasslands	✓	Grasslands	✓	Grasslands
		Managed land		Managed land		Managed land		Managed land
Slope under the hazard	Downslope >5 to 10		Downslope >5 to 10		Downslope >5 to 10		Downslope >5 to 10	

Overall Bush Fire Attack Level (BAL) and AS3959 – 2018 Building Construction Requirements

The highest BAL Rating that this development must achieve is:	BAL-12.5	AS3959 – 2018 Requirement	Sections 5 & 7

*** Specific variations exist in NSW in the application of Sections 5 and 6 of AS3959-2018 Construction of Buildings in Bush Fire Prone Areas. Refer to Chapter 7.5.2 of Planning for Bush Fire Protection [2019] (page 70)**

Dedicated Water Supply - Table 5.3d of Planning for Bush Fire Protection [2019]

Development Type	Water Supply Requirement	Planned	Existing
Large rural / lifestyle Lots (>10,000m²)	20,000L / Lot	☑	☐

APZ Requirements – Table A1.12.2 of Planning for Bush Fire Protection [2019]

			Asset Protection Area			
			Inner	Outer		
Direction	Vegetation	Slope	(metres)		Planned	Existing
North	Grasslands	Downslope >5 to 10	25	0	☑	☐
South	Forest	Downslope >5 to 10	20	15	☑	☐
East	Grasslands	Downslope >5 to 10	25	0	☑	☐
West	Grasslands	Downslope >5 to 10	25	0	☑	☐

Bush Fire Attack Level (BAL) Certificate – Lot 15

Site Address Details	510 Beach Road, Berry. NSW. 2535		
Property Details	Lot 4 DP834254		
Local Council Area	Shoalhaven City Council	FFDI	100

Type of Proposal		Land Zoning & Use	
✓	Subdivision		Urban residential / Village
		✓	Rural / other

Mapped Vegetation Category	Category 2 - Rainforests and lower risk vegetation parcels such as remnant vegetation and parcels of land with ongoing land management practices

Proximity, Aspect and Vegetative Formation in Relation to the Proposed Development

Category	North Arc NWŸ NŸ NE		South Arc SEŸ SŸ SW		East Arc NEŸ EŸ SE		West Arc NWŸ WŸ SW	
Distance	metres	**25**	metres	**39**	metres	**25**	metres	**25**
BAL rating	BAL	**12.5**	BAL	**29**	BAL	**12.5**	BAL	**12.5**
Vegetation formation within 140 metres		Forest	✓	Forest		Forest		Forest
		Woodland		Woodland		Woodland		Woodland
		Tall heaths		Tall heaths		Tall heaths		Tall heaths
		Short heaths		Short heaths		Short heaths		Short heaths
		Rainforest		Rainforest		Rainforest		Rainforest
	✓	Grasslands		Grasslands	✓	Grasslands	✓	Grasslands
		Managed land		Managed land		Managed land		Managed land
Slope under the hazard	Downslope >5 to 10		Downslope >5 to 10		Downslope >5 to 10		Upslope / flat	

Overall Bush Fire Attack Level (BAL) and AS3959 – 2018 Building Construction Requirements

The highest BAL Rating that this development must achieve is:	BAL-29	AS3959 – 2018 Requirement	Section 7

*** Specific variations exist in NSW in the application of Sections 5 and 6 of AS3959-2018 Construction of Buildings in Bush Fire Prone Areas. Refer to Chapter 7.5.2 of Planning for Bush Fire Protection [2019] (page 70)**

Dedicated Water Supply - Table 5.3d of Planning for Bush Fire Protection [2019]

Development Type	Water Supply Requirement	Planned	Existing
Large rural / lifestyle Lots (>10,000m²)	20,000L / Lot	☑	☐

APZ Requirements – Table A1.12.2 of Planning for Bush Fire Protection [2019]

			Asset Protection Area			
			Inner	Outer		
Direction	Vegetation	Slope	(metres)		Planned	Existing
North	Grasslands	Downslope >5 to 10	25	0	☑	☐
South	Forest	Downslope >5 to 10	15	10	☑	☐
East	Grasslands	Downslope >5 to 10	25	15	☑	☐
West	Grasslands	Upslope / flat	25	0	☑	☐

Bush Fire Attack Level (BAL) Certificate – Lot 16

Site Address Details	510 Beach Road, Berry. NSW. 2535		
Property Details	Lot 4 DP834254		
Local Council Area	Shoalhaven City Council	FFDI	100

Type of Proposal		Land Zoning & Use	
✓	Subdivision		Urban residential / Village
		✓	Rural / other

Mapped Vegetation Category	Category 2 - Rainforests and lower risk vegetation parcels such as remnant vegetation and parcels of land with ongoing land management practices

Proximity, Aspect and Vegetative Formation in Relation to the Proposed Development

Category	North Arc NWŸ NŸ NE		South Arc SEŸ SŸ SW		East Arc NEŸ EŸ SE		West Arc NWŸ WŸ SW	
Distance	metres	**25**	metres	**25**	metres	**25**	metres	**25**
BAL rating	BAL	**12.5**	BAL	**12.5**	BAL	**12.5**	BAL	**1.5**
Vegetation formation within 140 metres		Forest		Forest		Forest		Forest
		Woodland		Woodland		Woodland		Woodland
		Tall heaths		Tall heaths		Tall heaths		Tall heaths
		Short heaths		Short heaths		Short heaths		Short heaths
		Rainforest		Rainforest		Rainforest		Rainforest
	✓	Grasslands	✓	Grasslands	✓	Grasslands	✓	Grasslands
		Managed land		Managed land		Managed land		Managed land
Slope under the hazard	Downslope >5 to 10		Upslope / flat		Downslope >5 to 10		Downslope >0 to 5	

Overall Bush Fire Attack Level (BAL) and AS3959 – 2018 Building Construction Requirements

The highest BAL Rating that this development must achieve is:	BAL-12.5	AS3959 – 2018 Requirement	Sections 5 & 7

*** Specific variations exist in NSW in the application of Sections 5 and 6 of AS3959-2018 Construction of Buildings in Bush Fire Prone Areas. Refer to Chapter 7.5.2 of Planning for Bush Fire Protection [2019] (page 70)**

Dedicated Water Supply - Table 5.3d of Planning for Bush Fire Protection [2019]

Development Type	Water Supply Requirement	Planned	Existing
Large rural / lifestyle Lots (>10,000m²)	20,000L / Lot	☑	☐

APZ Requirements – Table A1.12.2 of Planning for Bush Fire Protection [2019]

			Asset Protection Area			
			Inner	Outer		
Direction	Vegetation	Slope	(metres)		Planned	Existing
North	Grasslands	Downslope >5 to 10	25	0	☑	☐
South	Grasslands	Upslope / flat	25	0	☑	☐
East	Grasslands	Downslope >5 to 10	25	0	☑	☐
West	Grasslands	Downslope >0 to 5	25	0	☑	☐

Bush Fire Attack Level (BAL) Certificate – Lot 18

Site Address Details	510 Beach Road, Berry. NSW. 2535		
Property Details	Lot 4 DP834254		
Local Council Area	Shoalhaven City Council	FFDI	100

Type of Proposal		Land Zoning & Use	
✓	Subdivision		Urban residential / Village
		✓	Rural / other

Mapped Vegetation Category	Category 2 - Rainforests and lower risk vegetation parcels such as remnant vegetation and parcels of land with ongoing land management practices

Proximity, Aspect and Vegetative Formation in Relation to the Proposed Development

Category	North Arc NWŸ NŸ NE		South Arc SEŸ SŸ SW		East Arc NEŸ EŸ SE		West Arc NWŸ WŸ SW	
Distance	metres	**25**	metres	**25**	metres	**25**	metres	**25**
BAL rating	BAL	**12.5**	BAL	**12.5**	BAL	**12.5**	BAL	**12.5**
Vegetation formation within 140 metres		Forest		Forest		Forest		Forest
		Woodland		Woodland		Woodland		Woodland
		Tall heaths		Tall heaths		Tall heaths		Tall heaths
		Short heaths		Short heaths		Short heaths		Short heaths
		Rainforest		Rainforest		Rainforest		Rainforest
	✓	Grasslands	✓	Grasslands	✓	Grasslands	✓	Grasslands
		Managed land		Managed land		Managed land		Managed land
Slope under the hazard	Downslope >5 to 10		Upslope / flat		Downslope >0 to 5		Downslope >0 to 5	

Overall Bush Fire Attack Level (BAL) and AS3959 – 2018 Building Construction Requirements

The highest BAL Rating that this development must achieve is:	BAL-12.5	AS3959 – 2018 Requirement	Sections 5 & 7

*** Specific variations exist in NSW in the application of Sections 5 and 6 of AS3959-2018 Construction of Buildings in Bush Fire Prone Areas. Refer to Chapter 7.5.2 of Planning for Bush Fire Protection [2019] (page 70)**

Dedicated Water Supply - Table 5.3d of Planning for Bush Fire Protection [2019]

Development Type	Water Supply Requirement	Planned	Existing
Large rural / lifestyle Lots (>10,000m²)	20,000L / Lot	☑	☐

APZ Requirements – Table A1.12.2 of Planning for Bush Fire Protection [2019]

			Asset Protection Area			
			Inner	Outer		
Direction	Vegetation	Slope	(metres)		Planned	Existing
North	Grasslands	Downslope >5 to 10	25	0	☑	☐
South	Grasslands	Upslope / flat	25	0	☑	☐
East	Grasslands	Downslope >0 to 5	25	0	☑	☐
West	Grasslands	Downslope >0 to 5	25	0	☑	☐

Partial view of Jim's Forest from the western aspect looking toward the east.

View from the bottom of proposed Lot 11 looking toward the north and showing part of the stand of Jim's Forest.

View looking from the east-west ridge line toward the Coomonderry Swamp wetlands to the south.

View from the location of proposed Lot 12 toward the northeast with the existing dwelling in the centre left of the image and the boundary with Beach Road along the tree line to the right-hand side.

B6. An assessment of how the development complies with the acceptable solutions, performance requirements and relevant specific objectives within Chapter 5 of PBP (2019)

ASSET PROTECTION ZONES		
Performance Criteria	**Acceptable Solutions**	**How Does the Development Comply**
The intent may be achieved where:		
Potential building footprints must not be exposed to radiant heat levels exceeding 29 kW/m² on each proposed lot.	APZ's are provided in accordance with Tables A1.12.2 and A1.12.3 of PBP2019 based on the FFDI.	Proposed Lots 10 to 16 and Lot 18 will be burdened by bush fire prone lands. The nominated dwelling envelopes within each of the Lots will be able to achieve a separation distance from the margins of Jim's Forest of at least 40 metres to ensure that the Bush Fire Attack Level rating does not exceed BAL-29. Some consideration will need to be given to the shape of any future dwelling within Lots 11, 12, 13 and 15 to ensure that the footprint of the building does not encroach on the minimum separation distance of 36 metres. With reference to the existing Bush Fire Prone Lands mapping instruments all other proposed Lots will be outside the burdened bush fire prone areas.
APZ's are managed and maintained to prevent the spread of a fire towards the building	APZ's are managed in accordance with the requirements of Appendix 4, and in particular in accordance with the requirements of 'Standards for Asset Protection Zones (RFS 2006). ***	All proposed Lots have a potential dwelling envelope that will be surrounded by grassland vegetation formations. There is an exception with Lots 11, 12, 13 and 15 where the southeastern aspects will front the Jim's Forest aspect, however the space between the building footprint and the margins of the forested formation is essentially grasslands. Once new dwelling envelopes and associated curtilages are established on each allotment there will be an ongoing requirement for the management and maintenance of vegetation as an asset protection zone to benefit all allotments.

The APZ's are provided in perpetuity	APZ's are wholly within the boundaries of the development site	The Shoalhaven Council DCP, Chapter G12: *Dwelling houses, Additions and Ancillary Structures*, requires that all proposed allotments will have a 20 to 30 metre setback from the front boundary, 7.5 to 10 metres from the side boundaries, and a minimum of 7.5 metres from the rear boundary. It is considered that all Lots burdened by bush fire prone lands can comply with this condition. The required asset protection zones around each the proposed dwellings within Lots 10 to 16 and Lot 18 however may extend beyond the boundaries of the individual allotments and therefore it is recommended that all Lots maintain any portions of 'R5' and/or 'E3' zoned lands as an asset protection zone for the benefit of all neighbouring allotments. It is further recommended that ALL residential Lots created by the subdivision irrespective of the coverage of the existing Bush Fire Prone Lands maps maintain any portions of 'R5' and/or 'E3' zoned lands as an asset protection zone for the benefit of all neighbouring allotments.
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised	The APZ's are located on lands with a slope less than 18°	All proposed allotments will have development envelopes that are located on lands where the slope does not exceed 5° to 10° and therefore can comply.

LANDSCAPING		
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	To be undertaken by all Lots burdened by bush fire prone lands at the time of individual Lot development. The use of fencing materials that are commensurate with the rural nature of the develooment precinct will be encouraged.
	Fencing is constructed in accordance with section 7.6.	

*** http://www.rfs.nsw.gov.au/__data/assets/pdf_file/0010/13321/Standards-for-Asset-Protection-Zones.pdf

PUBLIC ROADS		
Performance Criteria	**Acceptable Solutions**	**How Does the Development Comply**
The intent may be achieved where:		
Firefighting vehicles are provided with safe, all-weather access to structures.	Property access roads are two-wheel drive, all-weather roads	All proposed internal roads will comply with Council's engineering requirements which will include formation widths and sealed road construction standards
	Perimeter roads are provided for residential subdivisions of three or more allotments	The proposed road will be a looped formation that will provide direct access to each of the proposed Lots
	Subdivisions of three or more allotments have more than one access in and out of the development	The internal road is designed as a through or 'looped' road formation with two junction locations to allow traffic movements back to the Beach Road traffic corridor.
	Traffic management devices are constructed to not prohibit access by emergency services vehicles	As the internal road network will be new, it can ensure that construction complies with the relevant Acceptable Solutions requirements.
	Maximum grades for sealed roads do not exceed 15° and an average grade of not more than 10° or other gradient specified by road design standards, whichever is the lesser gradient	As the internal road network will be new, it can ensure that construction complies with the relevant Acceptable Solutions requirements including grade limitations and Council's engineering standards.
	All roads are through roads	The internal road is designed as a through or 'looped' road formation and therefore complies
	Dead end roads are not recommended, but if unavoidable, 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	There are no dead-end roads.
	Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road	The proposed new internal road formation does not include kerb and guttering, instead the roads are drained to roadside swales.

	Where access/egress can only be achieved through forest, woodland and heath vegetation, secondary access shall be provided to an alternate point on the existing public road system	Not applicable
	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.	Not applicable
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	There are no bridges proposed within the design of the new road network, however there may be several drainage crossings utilising piped culverts. Any drainage crossing will be constructed to comply with Council's relevant engineering standards including load capacity.
There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression	Not applicable
	Hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005 - *Fire hydrant installations System design, installation and commissioning*	Not applicable
	There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available	Not applicable

PERIMETER ROADS		
Access roads are designed to allow safe access and egress for firefighting vehicles while residents	Are two way sealed roads	The proposed internal road will be a new formation that will be suitable for two-way traffic and will be sealed

are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	Minimum 8 metre carriageway width kerb to kerb	The proposed internal road will have a formed and sealed width of 8 metres.
	Parking is provided outside of the carriageway width	There will not be any designated roadside parking within the new road formation.
	Hydrants are located clear of parking areas	Not applicable
	Are through roads, and these are linked to the internal road system at an interval of no greater than 500 metres	Complies, refer to the set of drawings prepared by Allen Price & Scarratts Pty Ltd, Ref: N27074
	Curves of roads have a minimum inner radius of 6 metres	Complies, refer to the set of drawings prepared by Allen Price & Scarratts Pty Ltd, Ref: N27074
	The maximum grade road is 15° and average grade of not more than 10°	Complies, refer to the set of drawings prepared by Allen Price & Scarratts Pty Ltd, Ref: N27074
	The road crossfall does not exceed 3°	Complies, refer to the set of drawings prepared by Allen Price & Scarratts Pty Ltd, Ref: N27074
	Minimum vertical clearance of 4 metres to any overhanging obstructions, including tree branches, is provided	Complies, refer to the set of drawings prepared by Allen Price & Scarratts Pty Ltd, Ref: N27074

NON-PERIMETER ROADS		
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	Minimum 5.5 metre carriageway width kerb to kerb	Complies, refer to the set of drawings prepared by Allen Price & Scarratts Pty Ltd, Ref: N27074
	Parking is provided outside of the carriageway width	Complies, refer to the set of drawings prepared by Allen Price & Scarratts Pty Ltd, Ref: N27074
	Hydrants are located clear of parking areas	Complies, refer to the set of drawings prepared by Allen Price & Scarratts Pty Ltd, Ref: N27074
	Roads are through roads, and these are linked to the internal road system at an interval of no greater than 500 metres;	Complies, refer to the set of drawings prepared by Allen Price & Scarratts Pty Ltd, Ref: N27074
	Curves of roads have a minimum inner radius of 6 metres	Complies, refer to the set of drawings prepared by Allen Price & Scarratts Pty Ltd, Ref: N27074

	The road crossfall does not exceed 3°	Complies, refer to the set of drawings prepared by Allen Price & Scarratts Pty Ltd, Ref: N27074
	A minimum vertical clearance of 4 metres to any overhanging obstructions, including tree branches, is provided.	All internal access provisions can comply with this condition as most if not all Lots are not adversely affected by existing tree canopies.

PROPERTY ACCESS		
Performance Criteria	**Acceptable Solutions**	**How Does the Development Comply**
The intent may be achieved where:		
Firefighting vehicles can access the dwelling and exit the property safely	*Note: There are no specific access requirements in a urban area where an unobstructed path (no greater than 70 metres) 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 (i.e. a hydrant or water supply).*	
	In circumstances where this cannot occur, the following requirements apply	
	Minimum 4 metre carriageway width	All Lots benefited or accessed by an access handle will have a formed carriageway width of at least 6 metres
	In forest, woodland and heath situations, rural property access roads have passing bays every 200 metres that are 20 metres long by 2 metres wide, making a minimum trafficable width of 6 metres at the passing bay;	Not applicable
	A minimum vertical clearance of 4 metres to any overhanging obstructions, including tree branches	All access driveways and handle will be able to meet this condition without the need to remove significant vegetation
	Provide a suitable turning area in accordance with Appendix 3 of PBP2019	All Lots are a minimum of 1 hectare in size and therefore can provide adequate space for emergency services vehicles to turn
	Curves have a minimum inner radius of 6 metres and are minimal in number to allow for rapid access and egress	Not applicable
	The minimum distance between inner and outer curves is 6 metres	Not applicable
	The crossfall is not more than 10°	Not applicable

	Maximum grades for sealed roads do not exceed 15° and not more than 10° for unsealed roads	Not applicable
	A development comprising more than three dwellings has access by dedication of a road and not by right of way	Not applicable
	Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.	

SERVICES – WATER, GAS & ELECTRICITY		
Performance Criteria	**Acceptable Solutions**	**How Does the Development Comply**
The intent may be achieved where:		
WATER SUPPLIES		
Adequate water supplies is provided for firefighting purposes.	Reticulated water is to be provided to the development where available	Not applicable
	A static water and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed	Of the proposed allotments to be created within the subdivision development only Lots 10 to 16 and Lot 18 will be directly burdened by mapped bushfire prone land. All other allotments will not be within mapped bushfire prone area and therefore not obligated to comply with these provisions, however consideration should be given to all individual allotments providing static water supply in accordance with Table 5.3d as a 'community' approach to bushfire protection measures.
	Static water supplies shall comply with Table 5.3d.	In accordance with Table 5.3d Lots 10 to 16 and 18 will be at least 1 hectare in size and will therefore be required to provide a dedicated water supply of at least 20,000 litres for firefighting purposes.
Water supplies are located at regular intervals; and the water supply is accessible and reliable for firefighting operations	Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2005	Not applicable
	Hydrants are not located within any road carriageway	Not applicable
	Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads	Not applicable
Flows and pressure are appropriate.	Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005	Not applicable
The integrity of the water supply is maintained	All above-ground water service pipes are metal, including and up to any taps	All new residential dwellings to comply with this condition if applicable

	Above-ground water storage tanks shall be of concrete or metal	All new residential dwellings to comply with this condition if applicable

ELECTRICITY		
Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings	Where practicable, electrical transmission lines are underground.	All new electrical cabling installations throughout the development will be undertaken in accordance with the supply authority's standards for developments undertaken within bushfire prone areas. As much as possible and practical underground services will be installed as a preference to overhead installations.
	Where overhead electrical transmission lines are proposed: - lines are installed with short pole spacing (30 metres), 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 accordance with the specifications in ISSC3 *Guideline for Managing Vegetation Near Power Lines*.	To be undertaken in accordance with the supply authority's standards for developments undertaken within bushfire prone areas.

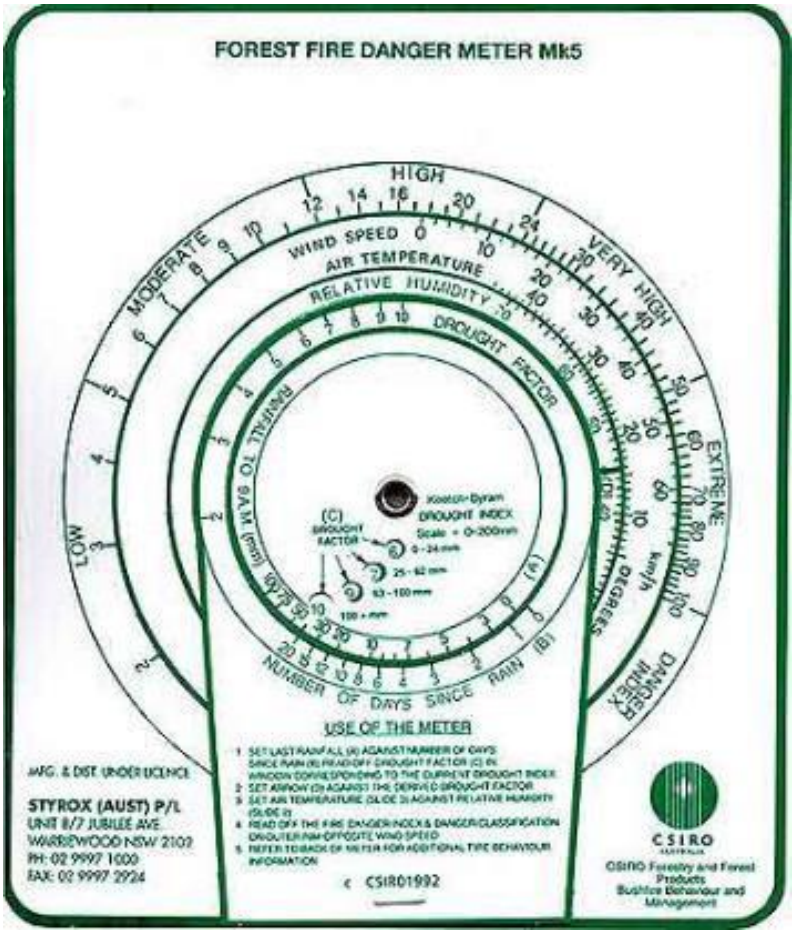
GAS		
Location of gas services will not lead to ignition of surrounding bush land or the fabric of buildings.	Reticulated or bottled gas is installed and maintained in accordance with *'AS 1596 – 2014 – The Storage and Handling of LP Gas'* and the requirements of relevant authorities. Metal piping is to be used.	The development site is not serviced by a reticulated gas supply therefore any future dwelling will be required to provide bottled gas – if required. Any gas services undertaken within the individual allotments will need be undertaken by a licenced plumber to ensure that these conditions are met. All appliances and/or gas bottle connection points such as regulators should have a certificate of compliance attached.
	All fixed gas cylinders are kept clear of all flammable materials to a distance of 10	All new residential dwellings to comply with this condition if applicable

	metres and shielded on the hazard side of the installation.	
	Connections to and from gas cylinders are metal.	All new residential dwellings to comply with this condition if applicable
	Polymer sheathed flexible gas supply lines are not to be used.	All new residential dwellings to comply with this condition if applicable
	Above-ground gas service pipes are metal, including and up to any outlets.	All new residential dwellings to comply with this condition if applicable

C. Fire Weather.

The FDI (Fire Danger Index) rating system was developed by McArthur (CSIRO) in the 1960's to help predict the chance of a fire starting, its rate of spread, its intensity and the difficulty of its suppression according to the various combinations of air temperature, relative humidity, wind speed and both the long and short term drought effects. An FDI of 100 was considered to be the maximum danger rating given the worst possible combination of fire conditions when the Forest Fire Danger Index was initially introduced, and still stands as the fire weather indicator for all NSW local government areas despite the fact that the maximum potential FDI ratings have been calculated well in excess of 100 in some weather districts. The warning classifications have been updated recently in line with improved knowledge of weather and fire behaviour to the extent that the classification system introduced a new level of danger being "Catastrophic" which reflects conditions in excess of an FDI of 100.

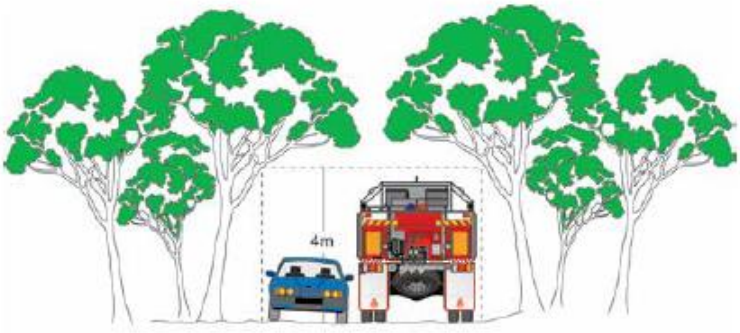
The Shoalhaven City Council is located within the Illawarra / Shoalhaven fire area of NSW and therefore has an FDI rating of 100 assumed as a 1:50 year event.



D. General design and construction considerations for each Lot as 'infill' developments under Section 4.14 of the Environmental Planning and Assessment Act 1979.

1. Access and Egress.

Table 7.4a 'Access' of "Planning for Bush Fire Protection" (2019) requires that an alternate escape route be made available if the distance from the nearest arterial road to the dwelling site is greater than 200 metres, and that the minimum width for internal access roads be four metres plus one metre either side which is maintained to provide a clear opening of four metres between ground level and any overhanging vegetation in accordance with the below Figure. There must also be a turning provision of not less than 12 metres near to the dwelling site which will allow emergency services vehicles clear access to the dwelling.



General construction requirements for internal property access roads in rural areas as prescribed by the NSW Rural Fire Service

2. Water Supply.

In rural areas where the development block is not located within a service area that has access to reticulated water supply, the provision of a dedicated and static water supply is considered essential. The provision of a dedicated waters supply in rural areas provides opportunities for fire fighters to replenish their tanker supplies and also aims to ensure that there is adequate water provisions for the property owners to undertake their own protection activities. As a general rule the capacity of the static water requirement is based on the Lot size and the type of development, with the typical requirements summarised in Table 1.

It should be emphasised that the water requirements listed in Table 1 are a minimum requirement, and where site specific firefighting systems have been installed such as fire hose reels, drencher systems and other fire suppression measures, additional water storage will be required - and the overall capacity of this additional requirement should be based on a site specific design. The minimum water storage requirements applicable for all Lots in this particular development without any site-specific fire protection detail is highlighted in Table 1.

Table 1. Water supply requirements - adopted from Table 5.3d of "Planning for Bush Fire Protection (2019).

Development Type	Residential Lots <1000m²)	Residential Lots (1000 - 10,000m²)	Large Rural / Lifestyle Lots (>10,000m²)	Multi-housing dwellings and Dual Occupancy
Water Requirement	5,000 litres / Lot	10,000 litres / Lot	20,000 litres / Lot	5,000 litres / Unit

The following items are adopted from Table 7.4a of "Planning for Bush Fire Protection (2019)" and are considered mandatory installation conditions where they are applicable to the development:

- where no reticulated water supply is available, water for firefighting purposes is provided in accordance with Table 5.3d;
- a connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure; 65mm Storz outlet with a ball valve is fitted to the outlet;
- ball valve and pipes are adequate for water flow and are metal;
- supply pipes from tank to ball valve have the same bore size to ensure flow volume;
- underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank;
- a hardened ground surface for truck access is supplied within 4m;
- above-ground tanks are manufactured from concrete or metal;
- raised tanks have their stands constructed from non combustible material or bush fire resisting timber (see Appendix F of AS 3959);
- unobstructed access can be provided at all times;
- underground tanks are clearly marked;
- tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters;
- all exposed water pipes external to the building are metal, including any fittings;
- where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bush fire attack;
- any hose and reel for firefighting connected to the pump shall be 19mm internal diameter; and fire hose reels are constructed in accordance with AS/NZS 1221:1997, and installed in accordance with the relevant clauses of AS 2441:2005.
- Where a Static Water Supply (SWS) is provided, an "SWS" sign should be installed in a visible location on the street front.

From a firefighting point of view, any source of available water may be used during a bush fire event and tanks are not always the most practical option. In light of the above, and the increasing demand for sustainable and efficient use of our water resources, the NSW RFS prefers that water is solely dedicated for firefighting purposes. As such, water holding structures such as tanks, swimming pools and dams can be considered as long as they are accessible, reliable and adequate. Nevertheless, where a water supply is provided it must be available for the lifetime of the development.
Water capacities, access for firefighters (tanker or pedestrian) and the provision of appropriate connections must also be considered when determining if a proposed water source is suitable. Where a Static Water Supply (SWS) is provided, a SWS sign should be installed in a visible location on the street front. Regular testing of firefighting equipment should also occur to ensure that it is maintained in working order.

Source: (Section 3.5, page 30 of Planning for Bush Fire Protection (2019).

It is also important to remember that whilst the protection and defensive measures addressed in this report are principally focused on the requirements for bush fire events, other fires including general household fires can occur at any time and therefore the provisions of this report are intended to extend to all probable fire events. It is for this reason that firefighting measures, such as firefighting pumps being connected to the water supply, should be in place at all times and not simply in the recognised bush fire season.

Example of a storz connection associated with a dedicated water storage tank used for dedicated firefighting purposes and a standard "Static Water Supply" sign to be placed at the front of the property.

3. Gas Supply.

Gas and other combustible materials should not be stored within the inner protection area of the dwelling or close to significant stands of vegetation formations. In particular, Table 7.4a of "Planning for Bush Fire Protection (2019)" states the following:

- reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used;
- all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side;
- connections to and from gas cylinders are metal
- polymer sheathed flexible gas supply lines are not used
- above-ground gas service pipes are metal, including and up to any outlets.

4. Vegetation Assessment.

The vegetation around the dwelling site should be classified using recommended references including "Ocean Shores to Desert Dunes" (Keith, 2004), "AS3959 - 2018 Construction of Buildings in Bushfire Prone Areas", and "Planning for Bushfire Protection" (2019). Where applicable, the dominant vegetation types and formations should be identified for each aspect or elevation of the proposed dwelling to a distance of 140 metres, or the nearest distance if the assessable vegetation formation is less than 140 metres from the development site.

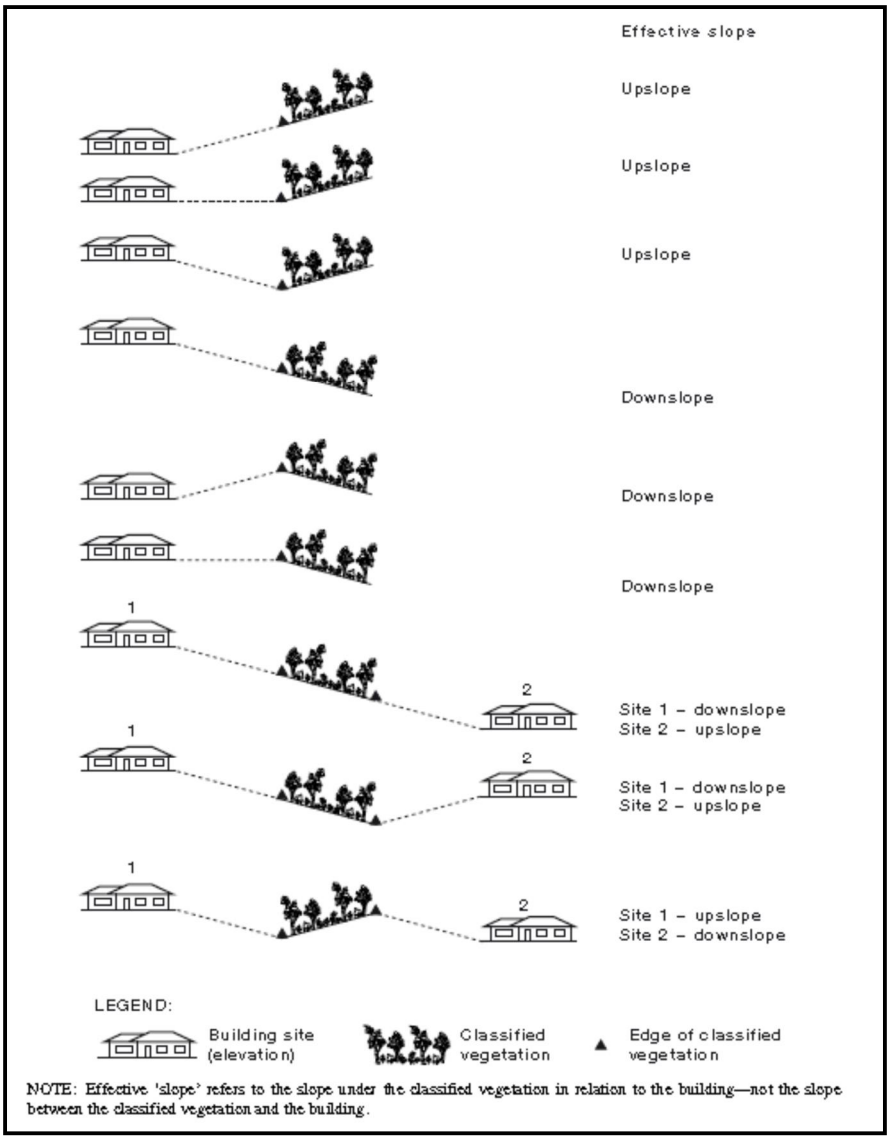
As a general rule of the assessment process, the vegetation assessment that is deemed manageable by the property owners shall only be conducted to the extents of the boundaries of the subject property if the distance to the property boundary is less than 140 metres as the property owners normally do not have any direct control on the vegetation that lies in adjacent properties.

Where the distance from the development site to the property boundary is less than 140 metres and the assessable vegetation formation is immediately on the neighbouring side of that boundary, it is presumed that for the lifetime of the development that this vegetation will be a 'constant' within the assessment process irrespective of any agreement between the two property owners to undertake any clearing or maintenance within the area. An exception applies if the area is to be maintained by a supply authority as part of a service easement - such as overhead power lines.

5. Asset Protection Zone.

Asset protection zones are areas of reduced fuel accumulation between the assessable vegetation classification and the dwelling site. This separation area provides a defendable space whereby persons attempting to combat the fire will have some protection from the radiant heat that the burning fuel might generate in an intense fire event. The establishment and maintenance of the asset protection zone is required to achieve specific bushfire attack level ratings (BAL) which in turn is used to determine the relevant construction requirements. There are two protection areas within an asset protection zone: the inner protection area and the outer protection area, and the following details should be applied as appropriate to the particular development.

The inner protection area is that area immediately around the building envelope that aims to reduce the combustible fuel levels and thereby reduce the possible impacts of direct flame contact and radiant heat to the building elements. The inner protection area should have a tree canopy of less than 15% with no part of any tree within 2 metres of the roofline of the dwelling. Gardens with shrubs and other woody plant materials should not be located under trees such that they could provide a ladder for fire to reach the tree canopy, and they should also not be planted within 10 metres of any exposed window or door of the defendable structure. All trees should be maintained such that there are no limbs below 2 metres from the ground surface.



Example of the methods used for determining the effective slope under the vegetation formation.

The outer protection area should have a tree canopy of less than 30% and should have the lower strata vegetation mowed and managed to reduce the rate of fire spread. The aim of reducing the density of the tree canopy is to reduce the rate of crown fire spread, and to help filter some of the flying embers by the remaining trees.

The asset protection zones should be calculated with reference to Table A1.12.2 "Minimum Distances for APZ's – Residential Development (m) FFDI 100 Areas (≤29kW/m², 1090K)" and 'Table A1.12.4 "Allowable Outer Protection Area Distances (m) within an APZ for Forest Vegetation", page 90 of "Planning for Bush Fire Protection" (2019).

6. Bushfire Attack Level (BAL)

The Bushfire Attack Level (BAL) is defined as "a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per metre squared, and the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire. There are several 'levels' within the range of BAL assessments, each with differing construction standards - and these are explained at the end of this report for reference purposes.

7. Construction Standards (for Buildings of Classes 1, 2, 3, 4 and Certain Class 9 Buildings that are Deemed Special Fire Protection Purpose (SFPP)).

"AS3959 - 2018 Construction in Bushfire Prone Areas" sets out the construction requirements for building elements in order to reduce the likelihood of ignition of the building during a bushfire event. The level of building construction is defined as Bushfire Attack Level (BAL) and is equivalent to the BAL rating derived from the above-mentioned processes and assessments.

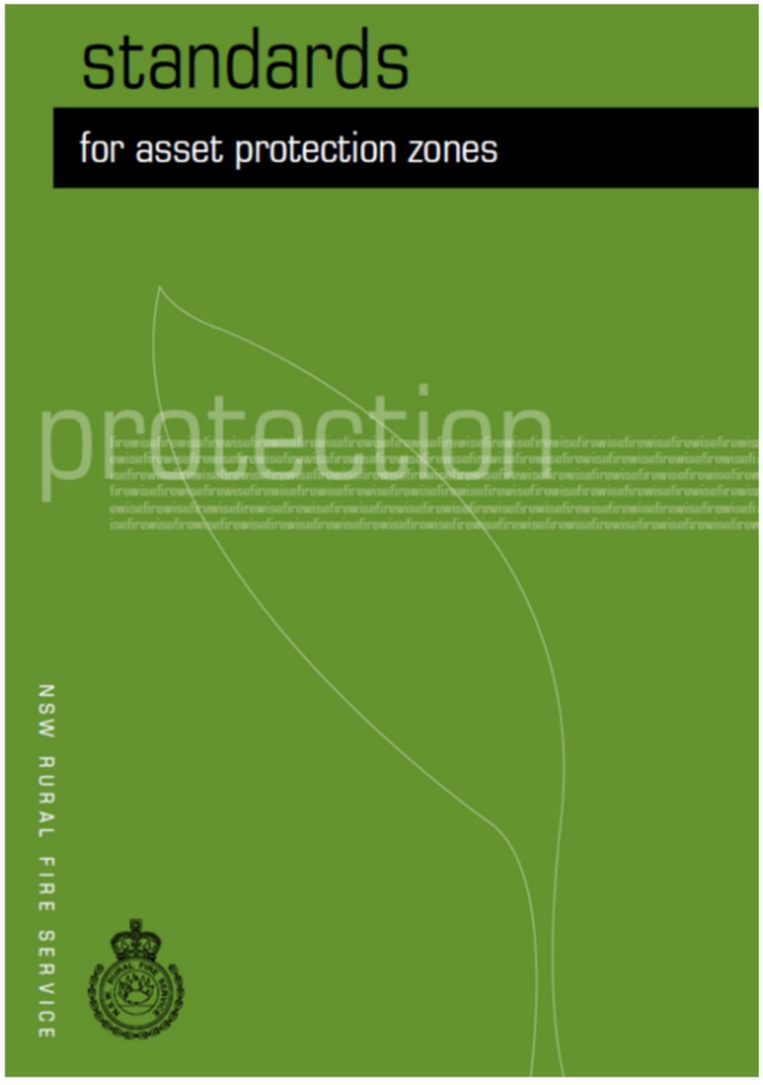
In addition to the construction standards set out in the relevant Sections of "AS3959 - 2018 Construction in Bushfire Prone Areas", the requirements previously discussed in this summary pertaining to access and egress, water supply, gas supply and the asset protection zones must also be undertaken as each of the bush fire protection measures must be considered as a 'whole of system' approach to bush fire protection rather than undertaking individual components in isolation.

**** It is noted that there are several requirements in New South Wales where the construction standards of Section 5 (BAL 12.5) and Section 6 (BAL 19) of "AS3959 - 2018 Construction of Buildings in Bush Fire Prone Areas" have been superseded and replaced with additional construction standards equal to the construction standards as set out in Section 7 (BAL 29) of "AS3959 - 2018 Construction of Buildings in Bush Fire Prone Areas". For further details refer to Chapter 7.5.2 of Planning for Bush Fire Protection (2019) [page 70]. These variations are to be applied to the individual dwelling constructions as applicable based on specific siting and design details at the time of lodging a formal development application to Council.**

8. General Maintenance and Landscaping.

The establishment of gardens and lawns are often a dominant part of the rural lifestyle choice as they help to provide seclusion, shelter and a general beautification of the landscape, however consideration needs to be given to the type and structure of the landscaping components to ensure that they do not form a continuum between the classified vegetation formations and the building elements. Selection of appropriate vegetation types and form for landscaping purposes are important considerations, as is the location and positioning of various plantings. It is important that critical asset protection areas are not compromised by the establishment of landscaping features, and that the longer term maintenance requirements of established gardens do not in fact add to the potential fire fuel loads around the property.

The publication "Standards for Asset Protection Zones" (2006) from the NSW Rural Fire Service provides good advice and guidelines for the establishment of asset protection areas, landscaping and longer term maintenance requirements and should be referenced prior to the design and installation of landscaping features.



E. Conclusion.

It is the formal assessment of this report that the proposed subdivision of land to create 31 rural-residential allotments and associated road network within a parcel of land identified as Lot 4 DP834254 – 510 Beach Road at Tarlo will satisfy the requirements of 'Planning of Bush Fire Protection (2019)'.

It is further considered that any potential future residential development undertaken within any of the proposed Lots will be able to comply with the acceptable solutions, performance requirements and specific objectives provisions of "Planning for Bush Fire Protection" (2019) and "AS3959 - 2018 Construction of Buildings in Bush Fire Prone Areas" if applicable.

Following creation of the individual Lots and registration of the subdivision any subsequent developments within the new Lots may be required to provide an independent bushfire hazard assessment that addresses the requirements of the appropriate standards and legislation applicable at the time a formal development application is submitted to Council if it is deemed that the Lots are within mapped Bush Fire Prone Lands.

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4 March 2020

Appendix A

BUSH FIRE ATTACK LEVELS (BAL's) EXPLAINED

The 2018 edition of AS 3959 "Construction of Buildings in Bush Fire Prone Areas" explains Bush Fire Attack Levels (BAL's) as follows:

(a) **BAL—LOW** The risk is considered to be **VERY LOW**.
There is insufficient risk to warrant any specific construction requirements but there is still some risk.

(b) **BAL—12.5** The risk is considered to be **LOW**.
There is a risk of ember attack. The construction elements are expected to be exposed to a heat flux not greater than 12.5 kW/m2.

(c) **BAL—19** The risk is considered to be **MODERATE**.
There is a risk of ember attack and burning debris ignited by wind borne embers and a likelihood of exposure to radiant heat. The construction elements are expected to be exposed to a heat flux not greater than 19 kW/m2.

(d) **BAL—29** The risk is considered to be **HIGH**.
There is an increased risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to an increased level of radiant heat. The construction elements are expected to be exposed to a heat flux not greater than 29 kW/m2.

(e) **BAL—40** The risk is considered to be **VERY HIGH**.
There is a much increased risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front. The construction elements are expected to be exposed to a heat flux not greater than 40 kW/m2.

(f) **BAL—FZ** The risk is considered to be **EXTREME**.
There is an extremely high risk of ember attack and burning debris ignited by windborne embers, and a likelihood of exposure to an extreme level of radiant heat and direct exposure to flames from the fire front. The construction elements are expected to be exposed to a heat flux greater than 40kW/m².