



CLARKE DOWDLE & ASSOCIATES

DEVELOPMENT CONSULTANTS

SURVEYORS • PLANNERS • ECOLOGISTS • BUSHFIRE CONSULTANTS

BUSH FIRE ASSESSMENT REPORT



For the Proposed Development
at

**LOT 313 HAWKESBURY RIVER,
PATONGA, NSW**
(LOT 313 IN DP 755251)

November 2021

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DOCUMENT TRACKING

Project Location	Lot 313 Hawkesbury River, Patonga
Date	08/11/21
Prepared by	Ashley Dowdle
Reviewed by	Anthony Clarke
Approved by	Anthony Clarke
Status	FINAL
Version	2

1.0 INTRODUCTION

We have attended the above-described property for the purpose of undertaking a Bush Fire Assessment Report (BFAR) in accordance with the guidelines outlined in Planning for Bushfire Protection, 2019 (PBP), to determine the level of bushfire threat to the site. Central Coast Council has provided mapping of Bushfire Prone Areas that identifies areas of bushfire threat. This mapping identifies properties that are in the buffer zone of 100m metres from Category 1 mapped vegetation or 30m from Category 2 & 3 mapped vegetation. All developments occurring on land mapped as bushfire prone are subject to the conditions detailed in the planning document PBP.

The subject site has been mapped as bushfire prone land (See Figure 1); therefore, the purpose of this BFAR is to provide information to Central Coast Council to ascertain compliance or otherwise with AS3959-2018 'Construction of Buildings in Bush Fire Prone Areas' and PBP.

This report will provide an independent assessment of the bushfire risk to the proposal, based upon the surrounding site conditions with reference to Section 4.14 of the Environmental Planning and Assessment Act 1979, PBP and AS3959-2018.



Figure 1: Bushfire Mapping (site boundary in yellow)
Source: ePlanning Spatial Viewer, 2021

1.1 Proposed Development

The site is a residential parcel of land that contains an existing dwelling and the proposed development will involve the construction of additions and alterations to the dwelling. Figure 2 provides a site plan of the proposal.

The final building plans outlining the size and dimension of the proposed development will accompany the Development Application.

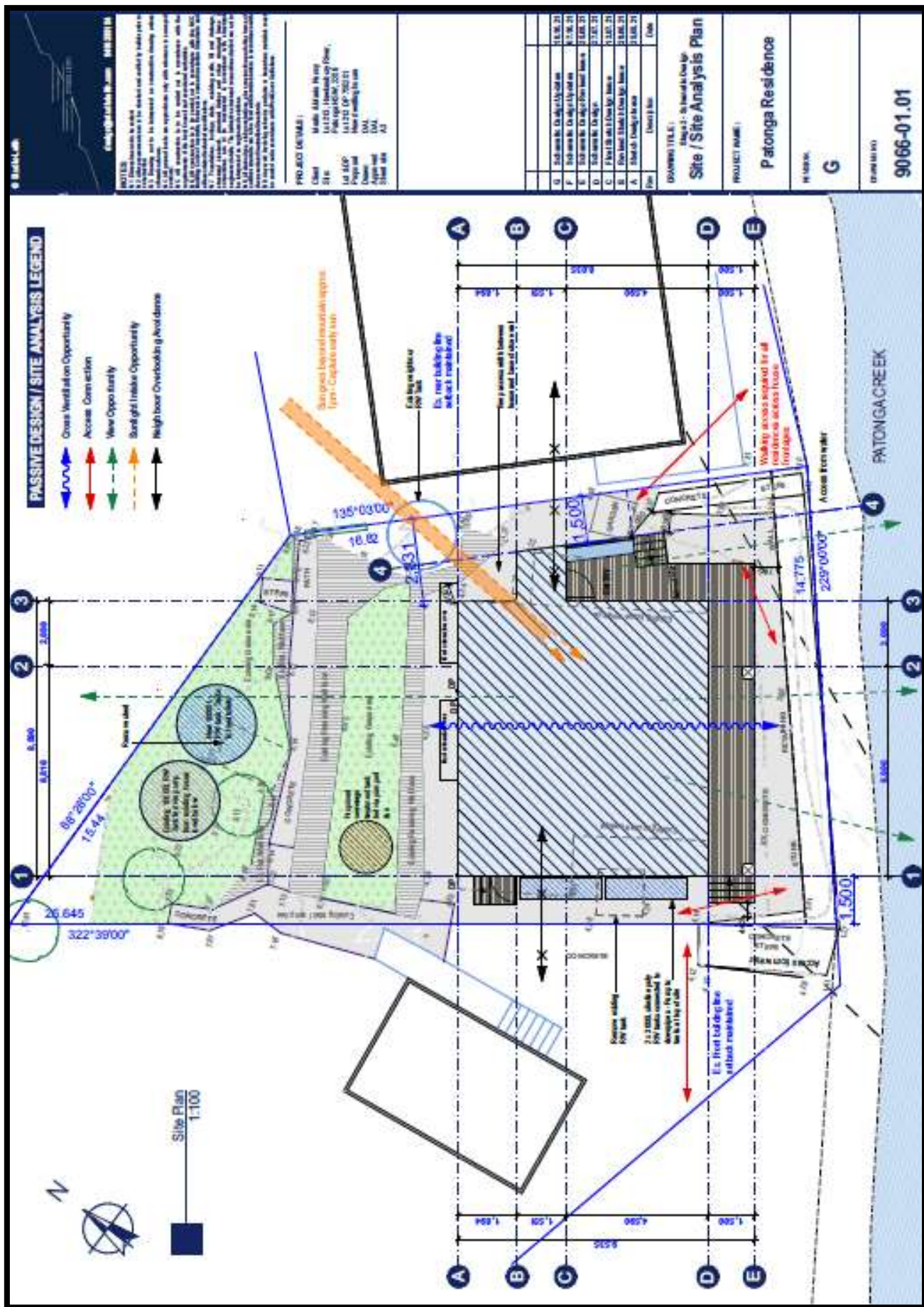


Figure 2: Proposed Development Site Plan

2.0 SITE IDENTIFICATION

The site is located at Lot 313 Hawkesbury River, Patonga (Lot 328 DP 755251). The site is in the Local Government Area (LGA) of Central Coast Council (Fire Danger Index-100). The site is only accessible by boat and via Patonga Creek to the east.

The site is a residential parcel of land that contains an existing dwelling on the southern portions of the site. Land conditions within the site consist of managed lands immediately surrounding the dwelling with areas of vegetation on the northern portions.

The site is not connected to the town-reticulated supply of water but is connected to the mains electrical grid.



Figure 3: Aerial Photograph of the site (approx. site boundary bordered in blue)
Source: Nearmap, 2021

3.0 BUSH FIRE HAZARD ASSESSMENT

3.1 Surrounding Vegetation

The surrounding land and vegetation found within 140m of the site are detailed below.

East

The surrounding land on this aspect is Hawkesbury River and therefore this aspect is deemed not to contain a bushfire hazard.

North, South & West

To the north and west and directly adjoining the site and to the south beyond developed residential allotments is vegetation that has been mapped as containing a mixture of *Sheltered Blue Gum Forest*, *Dharug Foothills Apple Redgum Forest*, *Hawkesbury Peppermint Apple Forest* and *Exposed Hawkesbury Woodland*. This vegetation meets with the Keith (2004) description of a 'wet and dry sclerophyll forest'. In accordance with Appendix 1 in PBP, this vegetation will be assessed as **Forest** as per PBP.

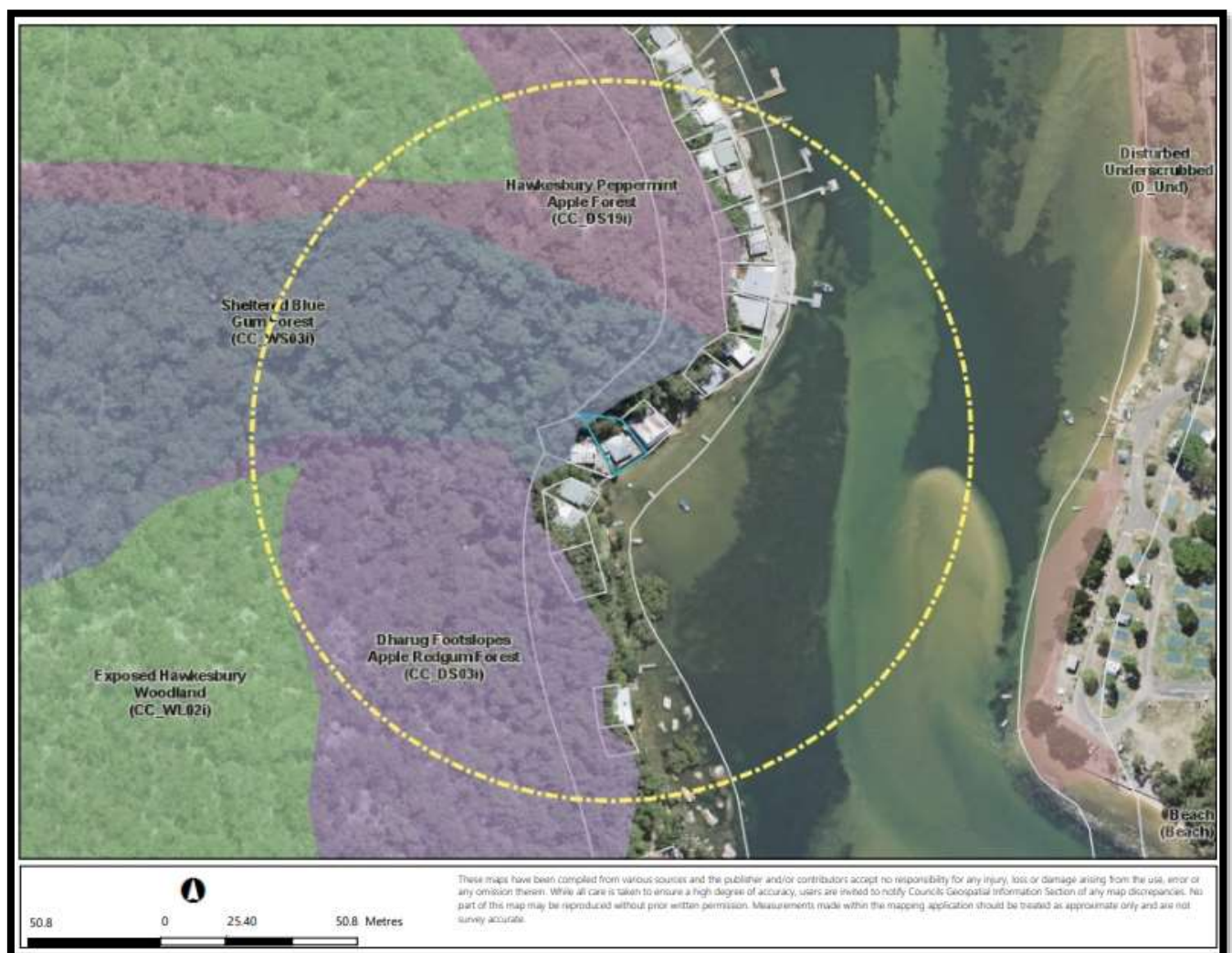


Figure 4: Vegetation Assessment (yellow circle is 140m from the site)
Source: Central Coast Council, 2021



1.



2.



3.



4.



5.



6.

Note: See figure 5 for photograph location and direction.

3.2 Effective Slope

PBP states in A1.5 that the effective slope is;

‘The slope of the land under the classified vegetation has a direct influence on the rate of fire spread, the intensity of the fire and the ultimate level of radiant heat flux. The effective slope is the slope of the ground under the hazard (vegetation). It is not the slope between the vegetation and the building (slope located between the asset and vegetation is the site slope).’

Figure 5 provides the topographic and vegetation mapping surrounding the proposal as sourced by NSW Spatial Services (2m contours).

The effective slope measured 100m from the proposed development for the hazard facing aspects are (See Figure 5);

North, South & West: >10° Up Slope

4.0 BUSHFIRE ATTACK LEVEL (BAL) ASSESSMENT

The bushfire risk to property depends on the vegetation type, slope and proximity of vegetation to the proposed development, and can be classified as BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL FZ as outlined in AS3959-2018 and PBP. The categories of bushfire attack were determined for the vegetation conditions currently existing on the site and adjacent areas. Following the identification of the bushfire attack category for each aspect, the site will be assessed according to vegetation that presents the highest level of bushfire attack risk. AS3959-2018 provides two methods to determine complying Bushfire Attack Levels, these are; the **Simplified Procedure-Method 1** (deemed-to-satisfy) and **Detailed Method for Determining the Bushfire Attack Level-Method 2** (alternate solution).

Table 1 provides an assessment through the Detailed Assessment Method 2 in AS3959-2018 for the northern and aspects. The following land and vegetation conditions were used in the calculations and assessment;

- A setback/APZ of 5m to the north and west
- Forest Vegetation (PBP 2019 fuel loads 22/36.1 t/ha);
- The effective slope of 10° Up Slope (*NSW RFS state that slopes greater than 10 degrees is beyond the known reliable output of available models*)
- An APZ/ site slope of 10° Up Slope
- A Flame Width of 100m

Table 1: Bushfire Attack Assessment (Method 2 - AS3959-2018)

	ASPECT			
	Northern	Western	Southern	Eastern
Vegetation¹ within 100m of development	Forest		Forest	Managed Lands
Effective Slope of Land	>10° Up Slope		Flat/Up Slope	-
APZ Existing/Setback Provided²	5m	6m	~31m	>100m
Slope of Site	>10° Up Slope		-	-
Flame Length³	12.94		-	
Bushfire Attack Level (BAL)⁴	BAL FZ		BAL FZ	BAL 40 ⁵

Notes for Table 1:

- (1) Refer to Keith (2004), AS 3959-2018 and PBP
- (2) Distance to vegetation
- (3) AS3959-2018 Method 2 calculator (see calculations below)
- (4) BAL's are in accordance with Table A1.12.5 in PBP
- (5) PBP states where an elevation is shielded from direct radiant heat arising from bush fire attack, then the construction requirements for that elevation can be reduced to the next lower BAL except when BAL 12.5 where all aspects shall comply with BAL 12.5. The shielding of an elevation shall apply to all the elements of the wall but shall not apply to subfloors or roofs.
- Table 1 **does not display applicable BAL Ratings** for each aspect (**See recommendations of this report**)

Proposed Dwelling

As detailed in Table 1 and Table A1.12.5 in PBP, based upon the current and surrounding conditions the proposed development will be subject to BAL FZ as per AS3959-2018 from the northern and western aspects.

It is noted that developments located within BAL FZ are outside the scope of the NSW variation of the

National Construction Code (NCC) deemed-to-satisfy provisions of AS3959-2018. Furthermore, Section A1.8 of PBP states *'Reduced construction requirements do not apply where any elevation is BAL-FZ unless justified with an appropriate performance-based demonstration of the shielding'*

The distance from the hazard to the east of the proposal (>13m) and the shielding provided would inhibit direct flame contact on the easternmost facade of the proposed development. In recognition of this, a reduction to BAL 40 on the eastern aspects of the proposal is justified and sort to be agreed with by the RFS.



5.0 RECOMMENDATIONS

This Bush Fire Assessment Report concluded that the proposed development may comply with the performance criteria for PBP if the proposed acceptable solutions and recommendations are implemented. These items are outlined below.

5.1 Asset Protection Zones

- The entire site shall be maintained as an APZ for the lifetime of the development.
- The APZ shall be maintained to meet with the requirements of an Inner Protection Area (IPA) as outlined in Appendix 4 in PBP.

5.1.1 Environmental Considerations

Tree clearing will be required for bushfire protection purposes.

5.2 Construction Standards

- The northern, southern and western aspects of the proposed development shall be constructed to comply with Sections 3 & 9 (BAL FZ) as per AS3959- 2018 and Section 7.5 in PBP 2019.
- The eastern aspects of the proposed development shall be constructed to comply with Sections 3 & 8 (BAL 40) as per AS3959-2018 and Section 7.5 in PBP 2019.

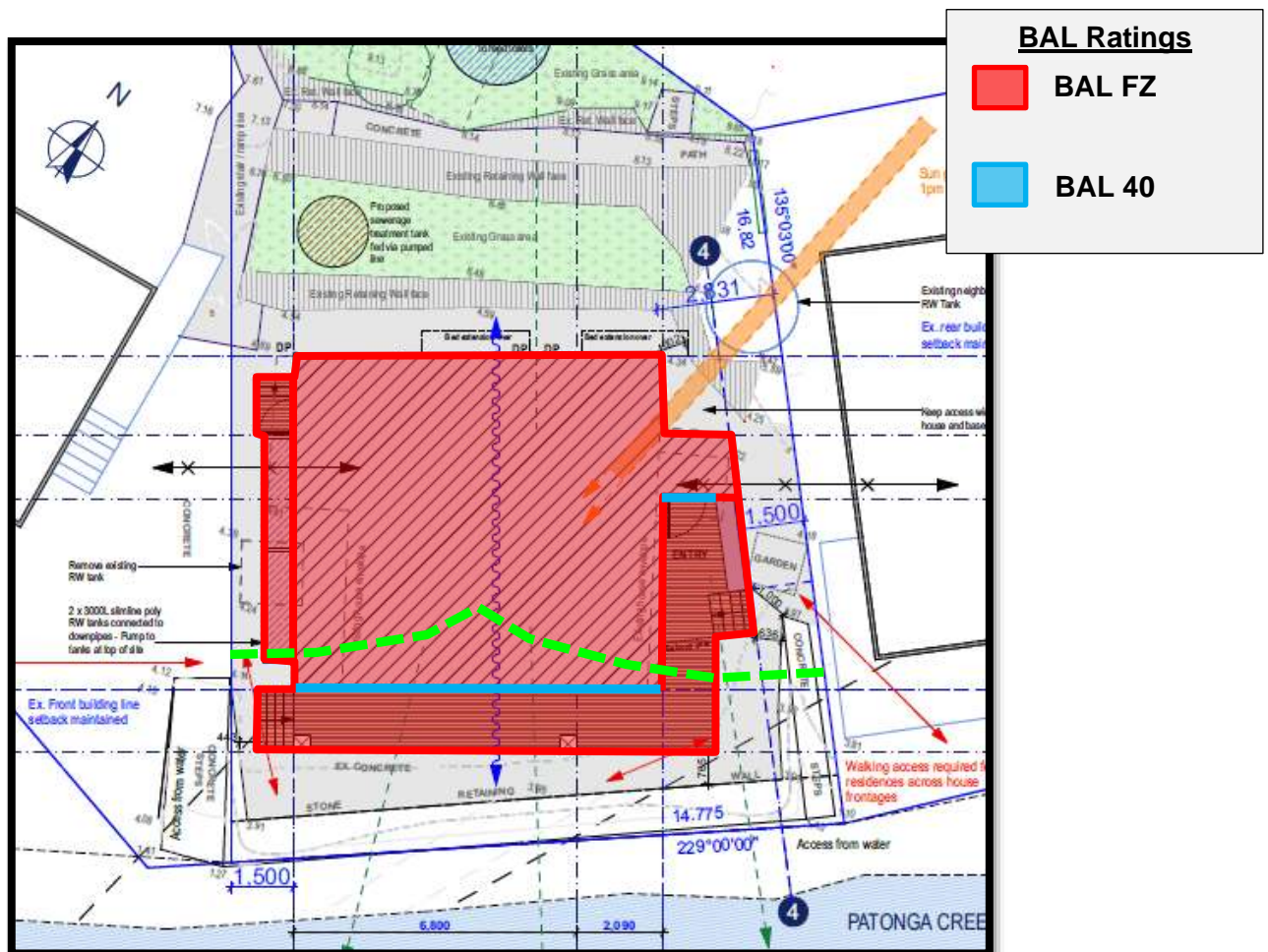


Figure 6: Applicable BAL Ratings (13m offset shown)



*Areas highlighted in Blue indicate BAL 40. All other areas not shaded in figure 7 are subject to BAL FZ

Figure 7: Applicable BAL Ratings (Elevations)

Service Pipes

- All exposed piping should be of metal. Pipes of other materials should be buried to a depth of at least 300mm below the finished ground level.

Fencing (if applicable)

- All new fencing shall be constructed in accordance with section 7.6 in PBP.

Existing Dwelling(not forming part of the application)

- All openable windows on the existing dwelling be screened with aluminium, steel or bronze metal mesh having an aperture size of ≤ 2.0 mm in such a way that the entire opening remains screened when in the opened position
- All vents and weepholes on the existing dwelling be screened with aluminium, steel or bronze metal mesh having an aperture size of ≤ 2.0 mm in such a way that the entire opening is screened
- All external hinged doors on the existing dwelling have a draught excluders or draught seals at the base having a flammability index of not more than 5

5.3 Property Access and Evacuation Safety

- The property is provided access via Patonga Creek to the east.
- It is recommended that the building occupants prepare a bushfire survival plan which addresses the option to leave early before bushfire impacting the site. Details on how to prepare this plan are provided by the NSW RFS website (http://www.rfs.nsw.gov.au/file_system/attachments/Attachment_BushFireSurvivalPlan.pdf)

5.4 Water and Utility Services Supply

5.4.1 Water

The site is not connected to the town reticulated supply of water however the site does contain water tanks supplying water to the existing dwelling of which provides water supplies exceeding 5,000 litres (PBP requirement for properties <1,000m²). Therefore, the following recommendations are made;

- 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;
- all new above-ground water service pipes external to the building are metal, including and up to any taps;
- Hoses should be provided great enough in length and number to provide adequate protection to all structures;

5.4.2 Gas (if applicable)

- Any gas cylinders or gas connections should be installed and maintained in accordance with
- Australian Standard AS1596 - *The Storage and Handling of LP Gas* and the requirements of relevant authorities.
- If gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion.

5.4.3 Electricity

- The site is connected via overhead lines

6.0 SPECIFIC OBJECTIVES FOR INFILL IN PBP

With a combination of bushfire protection measures, the proposal is seen to comply with the aim and objectives of PBP for infill development. The Specific Objectives for infill development and a comment as to how they are achieved by the proposed development is provided below:

Objective 1: “provide a defensible space to enable unimpeded access for firefighting around the building”.

A defensible space is provided. The proposal provides compliance with the objective.

Objective 2: “provide better bush fire outcomes on a redevelopment site than currently exists, commensurate with the scale of works proposed;”.

The proposed development is recommended to be constructed to BAL FZ and BAL 40. Therefore, the proposal provides compliance with the objective.

Objective 3 “design and construct buildings commensurate with the bush fire risk”.

The proposed development will be constructed to BAL FZ and BAL 40 under AS3959. This level of construction will involve the usage of non-combustible external materials. The proposal provides compliance with the objective.

Objective 4” provide access, services and landscaping to aid firefighting operations;”.

The site is provided access via boat only. Services and landscaping have been recommended that complies with PBP. The proposal provides compliance with the objective.

Objective 5 “not impose an increased bush fire management and maintenance responsibility on adjoining landowners; and

The maintenance of the APZ’s within the site will not result in increased bushfire management and maintenance responsibility on adjoining landowners. The proposal provides compliance with the objective.

Objective 6 ‘increase the level of bush fire protection to existing dwellings based on the scale of the proposed work and level of bush fire risk’;

The proposed development will be constructed to BAL FZ and BAL 40 under AS3959. This level of construction will involve the usage of non-combustible external materials and significantly increase the bushfire resilience of the dwelling. Also, upgrading of the existing dwelling not forming part of the application has been recommended to increase the bushfire resilience of the building and **provide a better bushfire outcome to the existing dwelling**. The proposal provides compliance with the objective.

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7.0 CONCLUSION

Clarke Dowdle & Associates have been engaged to conduct a Bush Fire Assessment Report upon the property located at Lot 313 Hawkesbury River, Patonga, NSW. This original assessment was performed in October 2021 and was conducted in accordance with the procedures and methods recommended in the NSW Rural Fire Service published document '*Planning for Bushfire Protection, 2019*' (PBP).

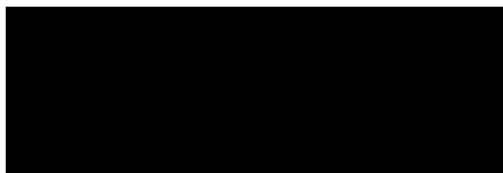
This report has detailed that the proposed works are subject to BAL FZ and therefore requires referral to the RFS in accordance with section 4.14 of the *Environmental Planning and Assessment Act, 1979*.

The determining authorities and Rural Fire Service may suggest additional measures to be implemented with any planning and construction upon the subject site.

We would be pleased to provide further information on any aspects of this report.

For and on behalf of

Clarke Dowdle and Associates



Ashley Dowdle
Bushfire Consultant
Planning for Bushfire Prone Areas - UTS Short Course

Disclaimer

PBP States;

Due to a range of limitations, the measures contained in this document do not guarantee that loss of life, injury and/or property damage will not occur during a bush fire event

AS 3959-2018 states;

It should be borne in mind that the measures contained in this standard cannot guarantee that the building will survive a bushfire event on every occasion. This is substantially due to the unpredictable nature and behaviour of fire and extreme weather conditions.

This report provides the required information to assist Local Council and the Rural Fire Service in determining compliance in accordance with PBP and AS 3959-2018 and as stated above, this report does not guarantee that the proposal will withstand bushfire attack on every occasion.

REFERENCES

- Keith, D. (2004), *Ocean Shores to Desert Dunes*. Department of Environment and Conservation, Sydney
- National Construction Code (2019), Building Codes Australia, *Class 1 and Class 10 Building Housing Provisions Volume 2*
- NSW Rural Fire Service and Department of Planning (2019), *Planning for Bushfire Protection, A guide for Councils, Planners, Fire Authorities and Developers*. NSW Rural Fire Service.
- Schauble, J. (2004). *The Australian Bushfire Safety Guide*. Harper Collins Publishers, Sydney, Australia.
- Standards Australia, (2018), *AS3959 Construction of Buildings in Bushfire-prone Areas*. Standards Australia International

APPENDIX A

RADIANT HEAT CALCULATIONS



NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 10/25/2021

Assessment Date: 10/25/2021

Site Street Address: Lot 313 Hawkesbury River, Patonga Creek

Assessor: Kristan Dowdle; Clarke Dowdle & Associates

Local Government Area: Central Coast

Alpine Area: No

Equations Used

Transmissivity: Fuss and Hammins, 2002

Flame Length: RFS PBP, 2001/Vesta/Catchpole

Rate of Fire Spread: Noble et al., 1980

Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005

Peak Elevation of Receiver: Tan et al., 2005

Peak Flame Angle: Tan et al., 2005

Run Description: North

Vegetation Information

Vegetation Type: Forest (including Coastal Swamp Forest)

Vegetation Group: Forest and Woodland

Vegetation Slope: 10 Degrees

Vegetation Slope Type: Upslope

Surface Fuel Load(t/ha): 22

Overall Fuel Load(t/ha): 36.1

Vegetation Height(m): 2

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 10 Degrees

Site Slope Type: Upslope

Elevation of Receiver(m): Default

APZ/Separation(m): 5

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1090

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg) 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL FZ

Peak Elevation of Receiver(m): 0

Radiant Heat(kW/m2): 76.03

Flame Angle (degrees): -10

Flame Length(m): 12.94

Maximum View Factor: 1

Rate Of Spread (km/h): 1.32

Inner Protection Area(m): 5

Transmissivity: 1

Outer Protection Area(m): 0

Fire Intensity(kW/m): 24698

