BUSHFIRE THREAT ASSESSMENT
FOR A PROPOSED REZONING AT 25 CASTAWAY CLOSE, BOAT HARBOUR

Prepared by:

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Site Details:	25 Castaway Road, Boat Harbour
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Disclaimer

Not withstanding the precautions adopted within this report, it should always be remembered that bushfires burn under a wide range of conditions. An element of risk, no matter how small always remains, and although the standard is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.

Executive Summary

A Bushfire Threat Assessment Report (BTA) has been prepared by Firebird ecoSultants Pty Ltd at the request of Perception Planning Pty Ltd in support for a planning proposal to rezone 25 Castaway Road, Boat Harbour.

This assessment aims to consider and assess the bushfire hazard and associated potential threats relevant to the proposal. Recommendations are provided with regard to fuel management, access, provision of emergency services, building protection and construction standards to facilitate an acceptable level of bushfire protection.

In summary, the following is recommended to enable the proposal to meet the relevant legislative requirements:

- APZs of 20m are required between any future dwelling within the site and the Open Forest vegetation to the north and west of the site.
- An APZ of 10m is required between any future dwelling within the site and the remnant vegetation to the east of the site.

Provided the recommendations stated within this report are implemented in full then Firebird ecoSultants Pty Ltd is of the opinion that the proposed rezoning is able to meet the aims and objectives of PBP (RFS, 2006).

Yours faithfully
Firebird ecoSultants

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Terms & Abbreviations

Abbreviation	Meaning
APZ	Asset Protection Zone
AS2419 -2005	Australian Standard – Fire Hydrant Installations
AS3959-2009	Australian Standard – Construction of Buildings in Bush Fire Prone Areas
BAL	Bushfire Attack Level
BCA	Building Code of Australia
BPA	Bush Fire Prone Area (Also Bushfire Prone Land)
BPL Map	Bush Fire Prone Land Map
BPMs	Bush Fire Protection Measures
EPA Act	*NSW Environmental Planning and Assessment Act 1979*
FDI	Fire Danger Index
FMP	Fuel Management Plan
ha	hectare
IPA	Inner Protection Area
LGA	Local Government Area
OPA	Outer Protection Area
PBP	Planning for Bushfire Protection 2006
PSC	Port Stephens Council
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation

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TABLES

FIGURES

1 INTRODUCTION

Firebird ecoSultants Pty Ltd has been engaged by Perception Planning Pty Ltd to undertake a Bushfire assessment to support a planning proposal to rezone 25 Castaway Road, Boat Harbour hereafter referred to as the "site" (Figure 1-1).

The planning proposal is for rezoning of the land from R5 – Large Lot Residential to part E2 – Environmental Conservation. If a proposed amendment to land use zoning or land use affects a designated Bushfire Prone Area, then the section 117(2) Direction No 19 must be applied (section 117 of the EP&A Act provides for the Minister for Planning to direct a council, in relation to the preparation of a draft LEP, to apply the planning principles specified in that direction).

The section 117 Direction No 19 requires councils to:

- Consult with the Commissioner of the RFS under section 62 of the EP&A Act, and to take into account any comments by the Commissioner; and
- have regard to the planning principles of PBP being

    a. Provision of a perimeter road with two way access which delineates the extent of the intended development;
    b. Provision, at the urban bushland interface, for the establishment of adequate asset protection zones for future housing;
    c. Specifying minimum residential lot depths to accommodate asset protection zones for lots on perimeter roads;
    d. Minimising the perimeter of the area of land, interfacing the hazard, which may be developed;
    e. Introduction of controls which avoid placing inappropriate developments in hazardous areas; and
    f. Introduction of controls on the placement of combustible materials in asset protection zones

This assessment aims to consider and assess the bushfire hazard and associated potential threats relevant to such a proposal, and to outline the minimum mitigative measures which would be required in accordance with the above Planning Principles for Rezoning and Residential development.

1.1 Site Particulars

Locality: 25 Castaway Road, Boat Harbour

LGA: Port Stephens

Forest Danger Index: 100 FDI

Current Land Use: Land zoned as R5 - Large Lot Residential with an existing dwelling

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Climate / Fire History: The site lies within a geographical area with a Fire Danger Index (FDI) rating of 100. Extreme bushfire weather is therefore associated with long periods of drought, high temperatures, low humidity and gusty often north-westerly winds.

1.2 Legislative Requirements

This BTA has been prepared using current legislative requirements and associated guidelines for assessment of bushfire protection, this being:

- PBP (RFS, 2006).

Figure 1-1: Site Location

FIGURE 1-1:SITE LOCALITY MAP

CLIENT	Client
SITE DETAILS	No.25 Castaway Close Boat Harbour
DATE	18 January 2018

Legend
Subject Site

NORTH
0 50 100 150
SCALE 2500 @ A3

Ref No 2254

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1.3 Description of the Proposal

This assessment has been undertaken to support a planning proposal to rezone 25 Castaway Road, Boat Harbour from R5 – Large Lot Residential to part E2 – Environmental Conservation. The proposed rezoning of 25 Castaway Close into a part E2 zoning will support anticipated population growth in the area and respond to housing demand as well as ensuring future protection of the high ecological values identified at the rear of the lot. Refer to Appendix A for proposed plans.

1.4 Objectives of Assessment

This assessment has been undertaken in regards to the Planning Principles for rezoning to Residential in BPA in accordance with PBP. The planning provision being:

a. Provision of a perimeter road with two way access which delineates the extent of the intended development;
b. Provision, at the urban bushland interface, for the establishment of adequate asset protection zones for future housing;
c. Specifying minimum residential lot depths to accommodate asset protection zones for lots on perimeter roads;
d. Minimising the perimeter of the area of land, interfacing the hazard, which may be developed;
e. Introduction of controls which avoid placing inappropriate developments in hazardous areas; and
f. Introduction of controls on the placement of combustible materials in asset protection zones

2 METHODOLOGY

2.1 Vegetation Assessment

Vegetation surveys and vegetation mapping carried out on the site has been undertaken as follows:

- Aerial Photograph Interpretation to map vegetation cover and extent.
- Site Inspection

2.2 Slope Assessment

Slope assessment has been undertaken as follows:

- Aerial Photograph Interpretation in conjunction with analysis of electronic contour maps with a contour interval of 10m.
- Site Inspection

3 SITE ASSESSMENT

The following assessment has been undertaken in accordance with the requirements of PBP (RFS, 2006).

3.1 Vegetation Assessment

In accordance with PBP (RFS 2006), an assessment of the vegetation over a distance of 140m in all directions from the site was undertaken.

Vegetation that may be considered a bushfire hazard was identified in all directions from the site and are presented and depicted in Table 3-1.

Table 3-1: Vegetation Classification

Direction	Vegetation Type	Distance from Site Boundary
North	Open Forest	Adjacent
East	Vegetation classified as remnant vegetation due to its restricted width.	Adjacent
South	Residential development	Adjacent
West	Open Forest	Adjacent

3.2 Effective Slope Assessment

In accordance with PBP (RFS 2006), an assessment of the slope affecting the bushfire behaviour was undertaken for a distance of 100m from the edge of the lot boundaries in the direction of the bushfire hazard.

The slopes leading away from the site have been evaluated to identify both the average slope and by identifying the maximum slope present. These values help determine the level of gradient which will most significantly influence the fire behaviour of the site. Refer to Table 3-2 for Vegetation and Slope Assessment for the site.

Table 3-2: Vegetation & Slope Assessment

Direction from Site	Vegetation	Slope Vegetation occurs on
North	Open Forest	Flat
East	Vegetation classified as remnant vegetation due to its restricted width.	Cross-slope/flat
South	Residential development	Upslope/flat
West	Open Forest	Cross-slope/flat

4 BUSHFIRE ATTACK ASSESSMENT

4.1 Bushfire Assessment

The site lies within Port Stephens Local Government Area and therefore is assessed under a FDI rating of 100. Using the methodology outlined in Appendix 2 of PBP, and the results from the Site Assessment (section 3 of this report) the deemed to satisfy APZ requirements for future dwellings within the proposed lots and any bushfire hazard is detailed in Table 4-1 and Figure 4-1, Figure 4-2 and Figure 4-3.

Table 4-1: Bushfire Attack Assessment for the Site

Direction from Development	Vegetation classification within 140m	Effective Slope (within 100m)	APZ to be provided in accordance with PBP 2006
North	Open Forest	Flat	20m
East	Vegetation classified as remnant vegetation due to its restricted width.	Cross-slope/flat	10m
South	Residential development	Upslope/flat	N/A
West	Open Forest	Cross-slope/flat	20m

Figure 4-1 APZ Map

FIGURE 4-1:APZ MAP - OPTION 1

CLIENT Client
SITE DETAILS No.25 Castaway Close Boat Harbour
DATE 15 March 2018

Legend
Subject Site
100m Buffer
20m APZ
10m APZ
Remnant Vegetation
Open Forest

NORTH
0 25 50 75
SCALE 1500 @ A3

Ref No 2254

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5 DWELLING DESIGN & CONSTRUCTION

On 6 March 2009, Council of Standards approved the revised Australian Standard AS3959-2009 *Construction of buildings in bushfire prone areas* (AS3959-2009). This standard was published by Standards of Australia on 10 March 2009 and replaces the 1999 version of the document.

AS3959-2009 was formally adopted by the BCA as the national standard on 1 May 2010. The BCA 2010 references AS3959-2009 as the deemed-to-satisfy (DTS) solution for construction requirements in bush fire prone areas for NSW. In order to clarify the NSW development approval process, the RFS has prepared an addendum to *Planning for Bush Fire Protection* 2006 (PBP) which replaces the existing Appendix 3. The addendum aligns PBP Appendix 3 with the BCA DTS separation distance requirements for the Bushfire Attack Levels (BAL) of AS3959-2009. It also maintains ember protection consistent with current requirements.

Building design and the materials used for construction of future dwellings should be chosen based on the information contained within AS3959-2009, and accordingly the designer / architect should be made aware of this recommendation. It may be necessary to have dwelling plans checked by the architect involved to ensure that the proposed dwellings meet the relevant Bushfire Attack Level (BAL) as detailed in AS3959-2009.

The determinations of the appropriate BAL are based upon parameters such as weather modelling, fire-line intensity, flame length calculations, as well as vegetation and fuel load analysis. The determination of the construction level is derived by assessing the:

- Relevant FDI = 100
- Flame temperature
- Slope
- Vegetation classification; and
- Building location.

The following BAL, based on heat flux exposure thresholds, are used in the standard:

(a) **BAL – LOW** The risk is considered to be **VERY LOW**

There is insufficient risk to warrant any specific construction requirements but there are still some risks.

(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 k/m^2.

(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/m^2.

(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 no greater than 29 kW/m^2.

(e) **BAL-40** The risk is considered to be **VERY HIGH**

There is 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 no greater than 40 kW/m^2.

(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, 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 40 kW/m^2.

5.1 Determination of Bushfire Attack Levels

Using a FDI of 100, the information relating to vegetation, slope and according to Table 2.4.2 of AS3959-2009 Table 5-1 and Figure 5-1 illustrates the required BALs for future dwellings within the lots.

Table 5-1: Determination of BALs for Future Dwellings within the Site

Vegetation Type and Direction	Separation Distance	Bushfire Attack Level (BAL)	Construction Section
Open Forest occurs over flat/cross-slope/upslope to the north and west of the site	19-<25m	BAL-40	Sect 3 & 7 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
	25-<35m	BAL-29	Sect 3 & 7 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
	35-<48m	BAL- 19	Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
	48-<100m	BAL-12.5	Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
	>100m	BAL-LOW	No Requirements
Remnant Vegetation occurs over flat/cross-slope/upslope to the east of the site	8-<11m	BAL-40	Sect 3 & 7 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
	11-<16m	BAL-29	Sect 3 & 7 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
	16-<23m	BAL- 19	Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
	23-<100m	BAL-12.5	Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
	>100m	BAL-LOW	No Requirements

Any future dwellings within the site will need to be assessed under Section 79BA of the EP&A Act which requires assessment in accordance with AS3959-2009.

6 ACCESS

6.1 Property Access

Property access roads should be designed in accordance with section 4.1.3; Access (2) – Property Access of PBP (RFS, 2006). This will be assessed under Section 79BA of EP&A Act for any future dwellings.

7 SERVICES

7.1 Water Supply & Pressure

The subject land will be serviced by reticulated water and will extend into the development area. The proposed internal fire hydrant spacing, sizing and pressures are to comply with AS 2419.1-2005 Fire Hydrant Installations – System design, installation and commissioning (2005).

7.2 Gas & Electricity Supply

Any gas services are to be installed and maintained in accordance with AS 1586. The relief valves of any gas cylinder located near the dwelling will be directed away from the buildings and away from combustible materials.

8 CONCLUSION & RECOMMENDATIONS

If the recommendations contained within this report are duly considered and incorporated, it is considered that the fire hazard present is containable to a level necessary to provide an adequate level of protection to life and property on the site.

In summary, the following is recommended to enable the proposal to meet the relevant legislative requirements:

- APZs of 20m are required between any future dwelling within the site and the Open Forest vegetation to the north, east and west of the site.
- An APZ of 10m is required between any future dwelling within the site and the remnant vegetation to the east of the site
- Any proposed development be linked to the existing mains pressure water supply and that suitable hydrants be clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure should comply with AS2419.1, 2005.

Provided the recommendations stated within this report are implemented in full then Firebird ecoSultants Pty Ltd is of the opinion that the proposed planning proposal for rezoning is able to meet the aims and objectives of PBP (RFS, 2006).

Yours faithfully
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APPENDIX A PROPOSED REZONING PLANS

The Site

E2 - Environmental Conservation and W - 4,000sqm

Potential Building Envelope

R5 - Large Lot Residential and V - 2,000sqm

Recently House Constructed

Recently House Constructed

CASTAWAY CLOSE

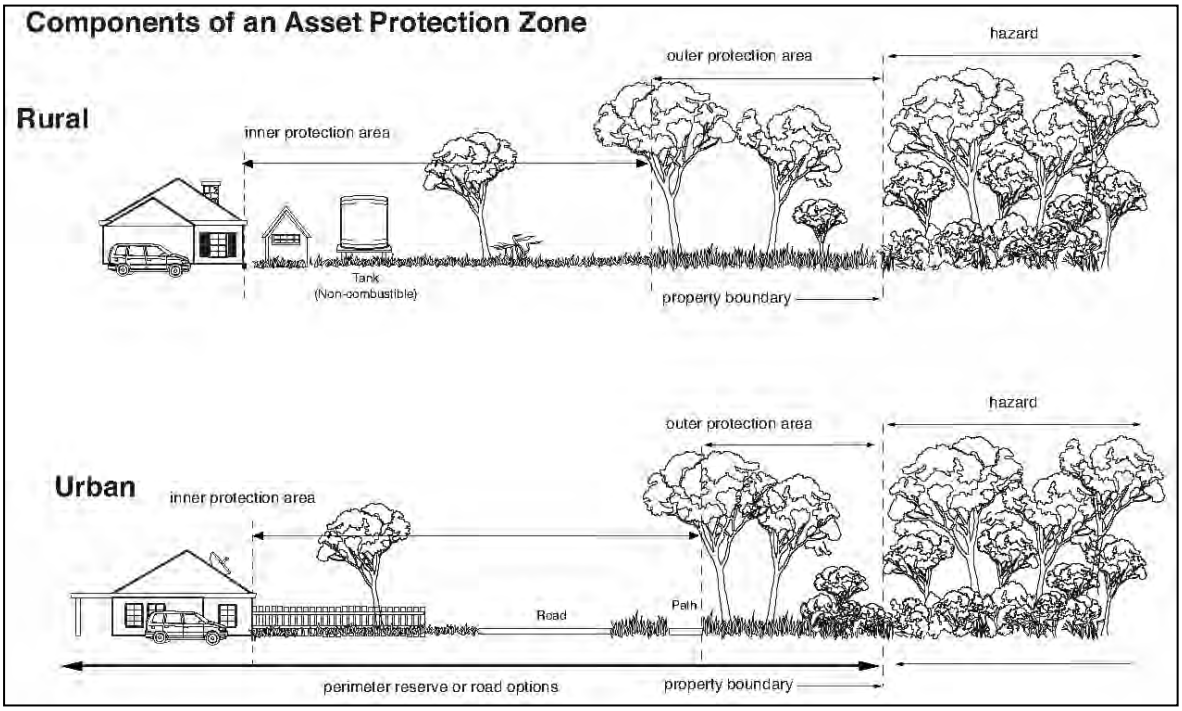
APPENDIX B ASSET PROTECTION ZONES

ASSET PROTECTION ZONES

An Asset Protection Zone (APZ) is an area surrounding a development that is managed to reduce the bushfire hazard to an acceptable level to mitigate the risk to life and property (refer to Figure B-1 below). The required width of the APZ varies with slope and the type of hazard. An APZ can consist of both an Inner Protection Area (IPA) and an Outer Protection Area (OPA). The respective IPA and OPA widths for the required APZs are as detailed in Table 5-1. An APZ can include the following:

- Lawns;
- Discontinuous gardens;
- Swimming pools;
- Driveways;
- Unattached non-combustible garages with suitable separation from the dwelling;
- Open space / parkland; and
- Car parking.

Figure 1: Components of an APZ (PBO 2006)



Inner Protection Area

The Inner Protection Area (IPA) extends from the edge of the OPA to the development. The IPA aims to ensure that the presence of fuels which could contribute to a fire event / intensity, are minimised close to the development. The performance of the IPA must be such that:

- There is minimal fine fuel at ground level which could be set alight by a bushfire; and
- Any vegetation in the IPA does not provide a path for the transfer of fire to the development – that is, the fuels are discontinuous.

The presence of a few shrubs or trees in the IPA is acceptable provided that they:

- Do not touch or overhang any buildings;
- Are well spread out and do not form a continuous canopy;
- Are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and
- Are located far enough away from any dwelling so that they will not ignite the dwelling by direct flame contact or radiant heat emission.

Woodpiles, wooden sheds, combustible material storage areas, large areas / quantities of garden mulch, stacked flammable building materials etc are not permitted in the IPA

Outer Protection Area

The Outer Protection Area (OPA) is located adjacent to the hazard. Within the OPA any trees and shrubs should be maintained in a manner such that the vegetation is not continuous. Fine fuel loadings should be kept to a level where the fire intensity expected will not impact on adjacent developments.