

AustralianBushfireSolutions

BUSHFIRE ASSESSMENT REPORT

FOR PROPOSED SUBDIVISION OF

Lot 8 & 9 DP 249821

55-65 Bronzewing St

TAHMOOR NSW 2573

Site Visit: 17 August 2018

Report Date: 26 Sept 2018



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Executive Summary

This report has been prepared for Bronzewing Properties Pty Ltd by Australian Bushfire Solutions, PO Box 498, Bowral NSW 2576. It has been prepared as a bushfire assessment for a subdivision of two into forty one allotments in the Local Government Area of Wollondilly, NSW.

The land has been identified as being bushfire prone land vegetation category 2 and buffer, and hence as the development application is for subdivision, is subject to consideration under Section 4.46 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) in combination with 100B of the *Rural Fires Act*, and must be submitted to the NSW RFS for a Bushfire Safety Authority.

Located on the western periphery of the urban area of Tahmoor, the subject land is zoned R2 – Low Density Residential, as are the nearby lots towards the east, and RU4 zoned lots to the west, and one lot to the north. Tahmoor Showground is located nearby to the north west and is vegetated with a portion of Sydney Hinterland Transition Woodland, which is equivalent to dry sclerophyll forest as per Keith (2004). The adjacent lots to the north and west are currently paddocks. To the west and north are large lots containing paddocks to varying extents. As per recent FPA Australia guidance re grassland hazards, “having a reasonable expectation of ongoing management does not include stock grazing...”. Thus these paddocks are also considered a grassland hazard. To the north east and east are recent developed urban subdivisions.

Approximately 4.046Ha in size, the subject land is currently predominantly clear with maintained grass. It has a minimally southerly and north westerly aspect at an altitude of approximately 288-291m.

Access is from Bronzewing St to the south, with three new roads proposed through the centre of the development.

The required APZ's can be met on the subject land, and a dwelling to BAL 29 or lower would be possible on all of the proposed lots.

For any infill development on the proposed new lots a separate bushfire report assessed under Section 4.14 of the *Environmental Planning and Assessment Act 1979* may be required.

Performance criteria required as per PBP 2006 have been assessed and the performance criteria to be satisfied have been outlined in Section 4 of this report.

Pending acceptance and compliance with the recommendations following (also in Section 4.4 this report does not find sufficient justification for the proposal to be rejected due to any bushfire considerations.

Pending compliance with the below conditions, the performance criteria and deemed to satisfy provisions outlined in Section 4.1 of PBP 2006 are found to be satisfied.

BAL, APZ and Landscaping Recommendations

- BAL 29 or lower has been established as possible for all proposed lots
- An APZ is required of 10m from the north, west and south west (met on Bronzewing St to the south west), and 32m from the north west.
- APZ's can be met on subject land

- It is advised that the site be maintained as per Standards for Asset Protection Zones (RFS) which outline in detail management of APZ's – see Appendix 7

Public Roads

- Public roads are two-wheel drive, all weather roads.
- Traffic management devices are constructed to facilitate access by emergency services vehicles.
- Public roads have a cross fall not exceeding 3 degrees.
- Dead ends are not more than 200 metres in length, incorporate a minimum 12m radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard.
- Curves of roads (other than perimeter roads) are a minimum inner radius of six metres and minimal in number, to allow for rapid access and egress.
- The minimum distance between inner and outer curves is six metres.
- Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient.
- There is a minimum vertical clearance to a height of four metres above the road at all times.
- The capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicate load rating.
- Public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression.
- Public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.
- Public roads up to 6.5 metres wide provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.
- One way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.
- Parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement. No services or hydrants are located within the parking bays.
- Public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road.

Services Recommendations

Water:

- Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.
- Fire hydrant spacing, sizing and pressures comply with AS 2419.1-2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases the location, number and sizing of hydrants shall be determined using fire engineering principles.
- Hydrants are not located within any road carriageway
- All above ground water and gas service pipes external to the building are metal, including and up to any taps.
- The provisions of parking on public roads are met

Electricity:

- Where practicable, electrical transmission lines are underground.
- 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 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).

Gas:

- Gas installation and maintenance to be in accordance with Australian Standard AS/NZS 1596:2002. Metal piping to be used.
- Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used
- All above ground water and gas service pipes external to the building are metal, including and up to any taps.



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1 Introduction

This Bush Fire Assessment Report has been compiled regarding the proposed subdivision of Lots 8 & 9 DP 249821, known as 55-65 Bronzewing St Tahmoor NSW, as part of a Development Application to be submitted to Wollondilly Shire Council, and referred to the NSW RFS for a Bushfire Safety Authority for the purpose of a two into forty one lot subdivision and assessment under Section 4.46 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Section 100B of the *Rural Fires Act*.

The report has been prepared in accordance with the submission requirements of Appendix 4 of *Planning for Bush Fire Protection* (NSW RFS 2006), and identifies if the proposal can meet the appropriate objectives and performance criteria of Section 4.1 *Planning for Bush Fire Protection* (NSW RFS 2006).

2 Site Description

2.1 Location

The subject land is located on Bronzewing Street on the periphery of the urban area of Tahmoor in the Wollondilly Shire of NSW. The subject land is also located near the Tahmoor Sportsground.



Figure 2-1 Street Map of subject land © Google Maps

2.2 Description

Cadastre of the subject land can be found in Appendix 1 and proposed cadastre Appendix 2

The subject land proposal is to subdivide the land into forty one lots.

The subject land is currently predominantly clear with maintained grass.

Size:	2.023Ha in size for each existing lot
Aspect:	Minimally southerly and north westerly
Altitude:	Approximately 288-291m
Slope:	Very gently 0-5° slope down to the south and road, and to the north west corner.
Existing:	Single storey brick dwelling and three outbuildings and a circular driveway
Water:	Reticulated – three hydrants are mapped as located at the front corners of the two lots (not identified at time of site visit)
Electricity:	Above ground as is common in the Shire
Gas:	Unknown whether to be installed
Access:	Directly from Bronzewing Street, a formed road
FDI:	100



Figure 2-2 Aerial photo of subject land © Nearmap



Figure 2-3 Aerial photo of subject land and part of Tahmoor © Nearmap

2.3 Zoning

The subject land is zoned R2 – Low Density Residential, as are the nearby and adjacent lots to the east. Nearby is zoned RU4, and the Tahmoor Sports field is nearby to the north east.



Figure 2-4 - Zoning of subject land – WSC LEP 2010

2.4 Proposal

The proposal is for a two into forty one-lot subdivision. As such in regards to bushfire it must comply the performance criteria and acceptable solutions as outlined in *Planning for Bushfire Protection* (PBP 2006) Chapter 4, section 4.1 (NSW RFS 2006).

Table 1 – Proposed Lot Sizes (sqm)

LOT #	SIZE	LOT #	SIZE	LOT #	SIZE
1	1160	15	966	29	922
2	703	16	920	30	702
3	703	17	703	31	800
4	712	18	700	32	735
5	709	19	984	33	800
6	707	20	700	34	703
7	704	21	801	35	801
8	803	22	801	36	703.2
9	801	23	701	37	801
10	700	24	838	38	703
11	700	25	1089	39	802
12	700	26	1068	40	703
13	700	27	932	41	801
14	893	28	1069		

3 Bushfire Hazard and Risk Assessment

3.1 Bushfire Prone Land

The current land is identified as bushfire prone land vegetation category 2 and buffer, as per the below.

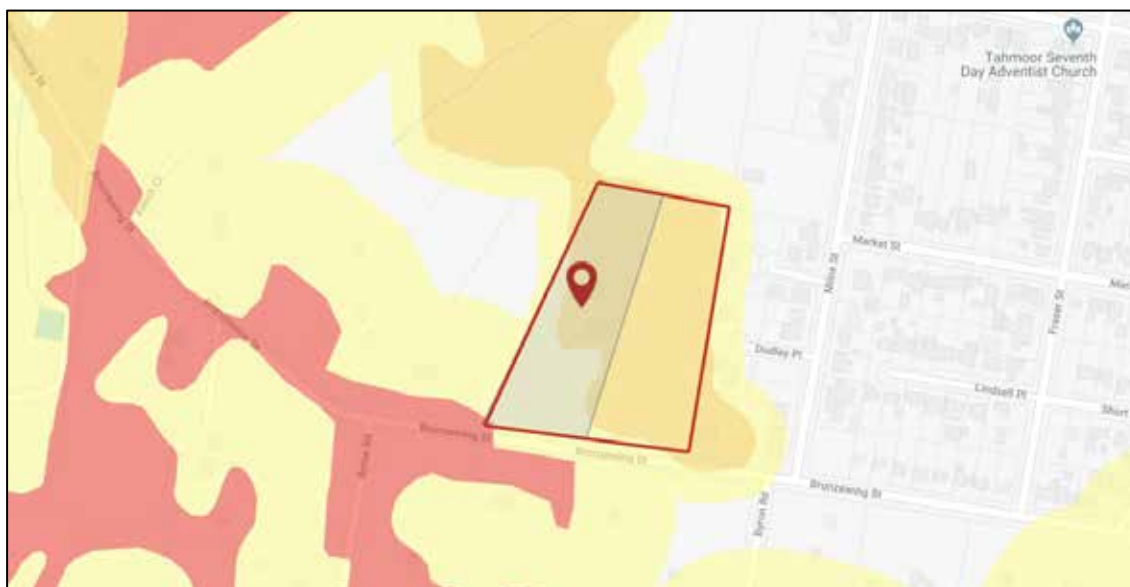


Figure 3-1 Bushfire Prone Land Map © Wollondilly Shire Council

3.2 Vegetation

The images that can be found in 0show the vegetation present on the subject and surrounding lots during a site inspection.

Mapping of the vegetation communities affecting the lot can be found in Appendix 3

3.2.1 Vegetation on subject lot

A Flora and Fauna study has been undertaken by Enviro Ecology, who have identified two vegetation communities as per the below: Cleared Land with Scattered Trees and DSF P146: Sydney Hinterland Transition Woodland (Underscrubbed/remnant canopy).

Targeted surveys and significance tests concluded that “...the project is unlikely to have a significant impact on the ecological features of the local area.”

Figure 3-1 Field verified vegetation communities from the study area



As required by *PBP*, this vegetation is required to be aligned with classifications by Keith who identifies this to be **forest** as per AS3959-2009. Any trees remaining as part of the development will be as part of managed gardens.

The land is currently maintained.

3.2.2 Vegetation on nearby land

Adjacent land to the east and north east is urban development with managed gardens.

To the west and north are large lots containing paddocks to varying extents. As per recent FPA Australia guidance re grassland hazards, “having a reasonable expectation of ongoing management does not include stock grazing...”. Thus these paddocks are also considered a grassland hazard.

To the north west and south west are more pockets of Sydney Hinterland Transition Woodland, that as per above translates to dry sclerophyll forest as per Keith and forest as per AS3959-2009.

Directly to the south and south west across Bronzewing St are properties mapped as hazard type 1. The property directly south does have hazard on the southern end of the property, >140m from the subject land, however the vegetation at the northern/front of the property is actually managed gardens. The property across the road to the south west is cleared paddock with occasional trees, but it not hazard type 1. The paddock can be considered to present as a grassland hazard.

3.2.3 Vegetation to 140m & Effective slope under hazard to 100m

The vegetation affecting the proposed development site can be outlined as per the tables following.

Notes re table 2 following:

- As any trees remaining as part of the development will be as part of managed gardens, thus *distances are from the subject land boundaries to vegetation on nearby properties.*
- Distance to achieve BAL 29 as per AS3959-2009

Table 2 - Proposed subdivision - Predominant vegetation; Effective slope and APZ

Aspect	Distance to Hazard	Vegetation up to 140m	Effective Slope under hazard to 100m	Min APZ Required for BAL 29
North	On boundary	Grassland / Developed residential lots	0-5° Downslope	10m*
North West	14m	Forest	0-5° Downslope	32m
South	>140m	Managed land then woodland	n/a	n/a
South West	20m	Grassland	Level/Upslope	10m*
East	>140m	Developed residential lots	n/a	n/a
West	On Boundary	Grassland	Level	10m*

* Min APZ required for grassland to satisfy PBP 2006

Table 3 – Maximum BAL calculated as possible for the lot

- A plan showing the BAL affecting the proposed lots as per the below table can be found in 0
- If the grassland lots to the north and west of the subject land are similarly developed, then lots 27, 28 and 29 would be the only lots bushfire affected.

LOT	BAL	LOT	BAL	LOT	BAL
1	BAL FZ→ BAL 29 is possible	15	BAL FZ→ BAL 29 is possible	29	BAL FZ→ BAL 29 is possible
2	BAL 12.5	16	BAL FZ→ BAL 29 is possible	30	BAL 19
3	BAL 12.5	17	BAL 12.5	31	BAL 12.5
4	BAL LOW	18	BAL 12.5	32	BAL FZ→ BAL 29 is possible
5	BAL LOW	19	BAL LOW	33	BAL 12.5
6	BAL LOW	20	BAL LOW	34	BAL LOW
7	BAL LOW	21	BAL LOW	35	BAL LOW
8	BAL LOW	22	BAL LOW	36	BAL LOW
9	BAL LOW	23	BAL 12.5	37	BAL LOW
10	BAL LOW	24	BAL 12.5	38	BAL LOW

11	BAL LOW	25	BAL FZ→ BAL 29 is possible	39	BAL LOW
12	BAL LOW	26	BAL FZ→ BAL 29 is possible	40	BAL LOW
13	BAL 12.5	27	BAL FZ→ BAL 29 is possible	41	BAL LOW
14	BAL 12.5	28	BAL FZ→ BAL 29 is possible		

3.2.4 Predominant Vegetation and Closest threat of Bushfire

The closest threat is the portion of forest vegetation present to the north west, and the grassland hazard directly to the north, west and south west of the subject land.

3.3 Hazard Assessment

3.3.1 Fire and Ember Attack

Fire and ember attack would be possible from hazardous vegetation near the subject land.

3.3.2 Fire History

MyRFS does not indicate fire on the subject land or nearby lots, however the Burragorang Complex fire of 2002, did come within approximately 780m to the south of the subject land as per the below images. Embers in such wild fires can be carried large distances and be a threat.

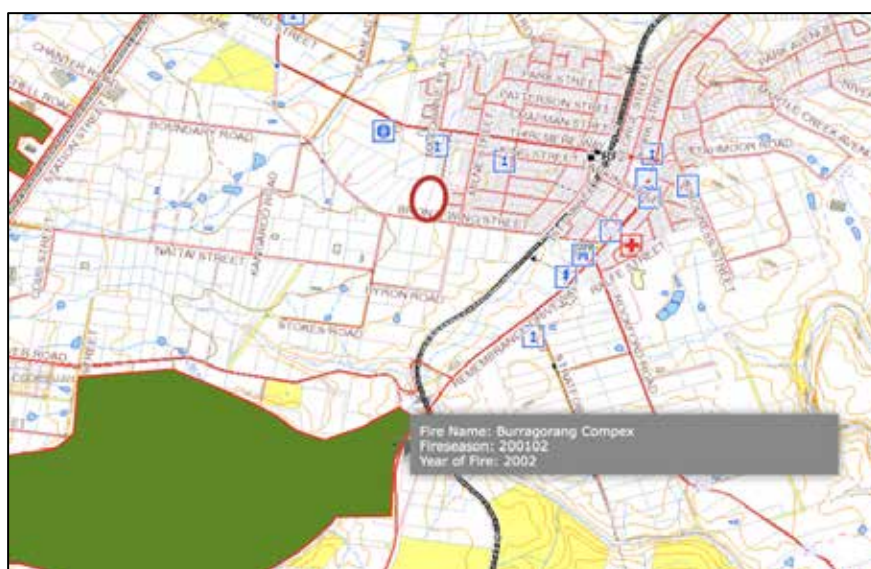


Figure 3-2 Wildfire Map © NSW RFS

3.3.3 Bushfire Attack Level

The BAL's as established in the tables above indicate that as required by PBP 2006, each new proposed lot would be able to have a dwelling built to BAL 29 or lower. For any infill development on the proposed lots a separate bushfire report assessed under Section 4.14 of the *Environmental Planning and Assessment Act 1979* may be required.

3.3.4 Asset Protection Zone - APZ

Table A2.4 outlines the minimum APZ distances for residential subdivision in an FDI 100 area to achieve <29kW/m². These distances do not currently align with the distances for BAL 29 as per AS3959-2009, with the BAL 29 distances being slightly greater. As the intent of PBP 2006 is to meet BAL 29, the minimum distances applied here are as per AS3959-2009 for BAL 29 rather than Table A2.4 PBP 2006, and thus automatically also meet the requirements of Table A2.4 PBP 2006.

As per Table 2 above, the minimum APZ required is 10m to the north, west and south west, and 32m from the north west and can be met on the subject land.

3.4 Significant Environmental Features

3.4.1 Heritage

In accordance with the Wollondilly Shire Council Heritage map, there are no heritage considerations on the subject land.

3.4.2 Aboriginal Heritage

A search of the AHIMS database, maintained by DECC reveals no objects of interest in the vicinity.

3.4.3 Flora and Fauna

A Flora and Fauna Assessment conducted by Enviro Encology noted that targeted surveys and significance tests concluded that "...the project is unlikely to have a significant impact on the ecological features of the local area."

Hence, there are no known significant environmental constraints or considerations on the subject land that would preclude the approval of this proposal.

3.5 Overall Assessment

Pending the satisfaction of section 4.2 below, the level of bushfire hazard risk identified in relation to the subject land and the proposed development is not considered to be such that the proposal should be denied due to bushfire considerations.

4 Bushfire Protection Measures

Section 4.1 of The NSW Rural Fire Services' *Planning for Bushfire Protection* (PBP 2006) provides the standards, performance criteria and acceptable solutions for subdivision in bushfire prone areas.

The tables below outline the performance criteria specified in PBP 2006 that must be satisfied for this subdivision to be approved.

4.1 Asset Protection Zone – APZ

Intent of measures: to provide sufficient space and maintain reduced fuel loads, so as to ensure radiant heat levels at buildings are below critical limits and to prevent direct flame contact with a building. (PBP 2006)

4.1.1 How PBP 2006 APZ requirements satisfied

Performance Criteria The intent may be achieved where:	Acceptable Solutions and how satisfied for this subdivision
<ul style="list-style-type: none"> • radiant heat levels at any point on a proposed building will not exceed 29 kW/m² 	<ul style="list-style-type: none"> • Any future buildings would be subject to their own bushfire assessments, <i>but all lots can have a dwelling built to BAL 29 or lower</i>
<ul style="list-style-type: none"> • APZs are managed and maintained to prevent the spread of a fire towards the building. 	<ul style="list-style-type: none"> • <i>Subject land should be managed in accordance with the requirements of Standards for Asset Protection Zones (RFS 2005) and Appendix 5 PBP (see Appendix 7)</i>
<ul style="list-style-type: none"> • APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is negated 	<ul style="list-style-type: none"> • Slope is <18°

4.2 Access (1&2) – Public Roads & Property Access

Public Roads - Intent of measures: to provide safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area.

4.2.1 Public Roads and Property Access

There are no new proposed roads as part of this proposal. All proposed lots accessible from Bronzewing Street.

4.2.2 Public Roads

New roads are to be created as part of the development, and are recommended to satisfy the requirements of *PBP* as outlined below.

4.2.3 PBP 2006 (1) – Public Roads - requirements

Performance Criteria The intent may be achieved where:	Acceptable solutions
<ul style="list-style-type: none"> • fire fighters are provided with safe all weather access to structures (thus allowing more efficient use of fire fighting resources) 	<ul style="list-style-type: none"> • <i>public roads are two-wheel drive, all weather roads.</i>
<ul style="list-style-type: none"> • public road widths and design that allow safe access for fire fighters while residents are evacuating an area. 	<ul style="list-style-type: none"> • <i>urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply</i>

Performance Criteria The intent may be achieved where:	Acceptable solutions
	<p>with PBP Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle – see table in recommendations below).</p> <ul style="list-style-type: none"> the perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas. traffic management devices are constructed to facilitate access by emergency services vehicles. public roads have a cross fall not exceeding 3 degrees. all roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard. curves of roads (other than perimeter roads) are a minimum inner radius of six metres and minimal in number, to allow for rapid access and egress. the minimum distance between inner and outer curves is six metres. maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient. there is a minimum vertical clearance to a height of four metres above the road at all times.
<ul style="list-style-type: none"> the capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles. 	<ul style="list-style-type: none"> the capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicate load rating.
<ul style="list-style-type: none"> roads that are clearly sign- posted (with easily distinguishable names) and buildings/properties that are clearly numbered. 	<ul style="list-style-type: none"> public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression. public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.
<ul style="list-style-type: none"> there is clear access to reticulated water supply 	<ul style="list-style-type: none"> public roads up to 6.5 metres wide provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression. one way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.
<p>parking does not obstruct the minimum paved width</p>	<ul style="list-style-type: none"> parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement. No services or hydrants are located within the parking bays. public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road.

4.3 Services – Water, electricity and gas

Intent of measures: to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building

4.3.1 Existing water, electricity and gas

The subject land is on reticulated water. Three hydrants are located at the front corners of the subject land (these were not sited at the time of the site inspection, however myRFS identifies this as the closest hydrant)

Electrical lines servicing the subject land are above ground to the lot (as is normal in the Shire).

Any future buildings that could include a residence will have to comply with performance criteria, as specified in PBP 2006 Section 4.2 or 4.3 as part of any future infill development.

4.3.2 Services – Water, electricity and gas

Performance Criteria The intent may be achieved where:	Satisfied	Acceptable Solutions and how satisfied for this subdivision
Reticulated water supplies <ul style="list-style-type: none"> Water supplies are easily accessible and located at regular intervals 	<ul style="list-style-type: none"> YES 	<ul style="list-style-type: none"> reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads. Fire hydrant spacing, sizing and pressures comply with AS 2419.1-2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases the location, number and sizing of hydrants shall be determined using fire engineering principles. Hydrants are not located within any road carriageway All above ground water and gas service pipes external to the building are metal, including and up to any taps. The provisions of parking on public roads are met
Electricity Services <ul style="list-style-type: none"> location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings regular inspection of lines is undertaken to ensure they are not fouled by branches. 	<ul style="list-style-type: none"> YES 	<ul style="list-style-type: none"> Where practicable, electrical transmission lines are underground where overhead electrical transmission lines are proposed: <ul style="list-style-type: none"> 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 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).
Gas services <ul style="list-style-type: none"> location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings 	<ul style="list-style-type: none"> YES 	<ul style="list-style-type: none"> Reticulated gas is to be installed and maintained in accordance with AS 1596 and the requirements of relevant authorities. Metal piping is to be used. polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used.

4.4 Recommendations

4.4.1 BAL, APZ and Landscaping Recommendations

- All lots are able to have a dwelling to Bal 29 or lower - See 0
- An APZ is required of 10m from the north, west and south west (met on Bronzewing St to the south west), and 32m from the north west.
- APZ's can be met on subject land

- It is advised that the site continue to be maintained as per Standards for Asset Protection Zones (RFS) which outline in detail management of APZ's—see Appendix 7

4.4.2 Public Roads

- Public roads are two-wheel drive, all weather roads.
- Traffic management devices are constructed to facilitate access by emergency services vehicles.
- Public roads have a cross fall not exceeding 3 degrees.
- Dead ends are not more than 200 metres in length, incorporate a minimum 12m radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard.
- Curves of roads (other than perimeter roads) are a minimum inner radius of six metres and minimal in number, to allow for rapid access and egress.
- The minimum distance between inner and outer curves is six metres.
- Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient.
- There is a minimum vertical clearance to a height of four metres above the road at all times.
- The capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicate load rating.
- Public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression.
- Public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.
- Public roads up to 6.5 metres wide provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.
- One way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.
- Parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement. No services or hydrants are located within the parking bays.
- Public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road.

4.4.3 Services Recommendations

Water:

- Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.
- Fire hydrant spacing, sizing and pressures comply with AS 2419.1-2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases the location, number and sizing of hydrants shall be determined using fire engineering principles.

- Hydrants are not located within any road carriageway
- All above ground water and gas service pipes external to the building are metal, including and up to any taps.
- The provisions of parking on public roads are met

Electricity:

- Where practicable, electrical transmission lines are underground.
- 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 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).

Gas:

- Gas installation and maintenance to be in accordance with Australian Standard AS/NZS 1596:2002. Metal piping to be used.
- Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used
- All above ground water and gas service pipes external to the building are metal, including and up to any taps.

5 Summary of Findings and Recommendations

This report finds that the proposed subdivision would allow buildings to be located on each of the proposed new lots satisfying the requirement of being able to be built to a level of construction of BAL 29 or lower.

If the proposal incorporates the recommendations in 4.4 above, then the proposed subdivision design is considered acceptable in satisfying the performance criteria outlined in Section 4.1 of PBP 2006 (detailed in section 4 above).

Hence this report does not believe that the proposal should be rejected due to bushfire considerations.

[illegible]

Appendix 3 Vegetation Mapping

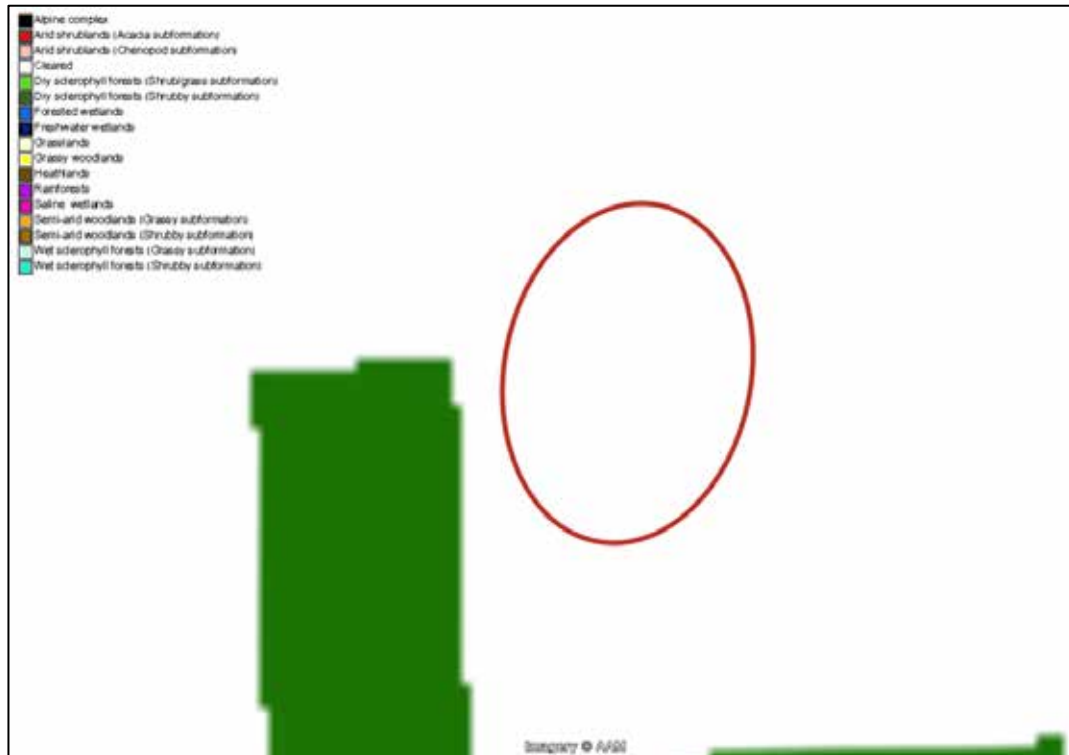


'Tozer,M.(2003). - The Native Vegetation of the Cumberland Plain, western Sydney: systematic classification and field identification of communities. Cunninghamia, vol 8(1):1-75.

Figure 3-1 Field verified vegetation communities from the study area



Enviro Ecology Flora and Fauna Assessment 2018



Keith, D. A. and Simpson, C. C. (2010) Vegetation Formations of NSW (version 3.0): A seamless map for modelling fire spread and behaviour. Report to the Rural Fire Service. NSW Department of Environment & Climate Change. October 2010

OPTION 1 **Rev B**

Managed Land
>140m to hazard

Legend

- Edge of Vegetation
- BAL 40/FZ
- BAL 29
- BAL 19
- BAL 12.5

D. P. 2 4 9 8 2 1

Until developed -
Grassland - level

ROAD SET-UP FOR CONNECTION
RESIDUALS AND DEVELOPMENT

STREET

Forest
1-2° Downslope

Building Envelope as per Victorian DCP
Indicative vehicle crossing as per VSC-D13 Engineering Standard

ROAD 2 15 WIDE

ROAD 3 15 WIDE

ROAD 1 15 WIDE

BRONZEWING

DP737056
Until developed - Grassland -
1-2° downslope

MANORINA PLACE

193
DP8982

18
DP793070

161
DP83609DP793070

1
DP261564

13
DP261564

12
DP261564

11
DP261564

A1
PROJECT

NOTE: This subdivision design was prepared as a plan to accompany a development application for a subdivision of land. It is not a final design and is subject to change without notice. The design is based on the information provided to the designer and is not a guarantee of accuracy. The designer is not responsible for the design of the development or the construction of the development. The design is for informational purposes only and is not to be used for any other purpose without the written consent of the designer.

COVENANTS: The developer must ensure that the design is in accordance with the relevant planning and building regulations. The developer must also ensure that the design is in accordance with the relevant planning and building regulations. The developer must also ensure that the design is in accordance with the relevant planning and building regulations.

DATE	REVISION	DESCRIPTION
10/10/2023	1	INITIAL DESIGN
10/10/2023	2	ALLOW FOR THE ACCESS TO LOT 1020 8821

Australian Bushfire Solutions

CLIENT	Birrell Investments Pty. Ltd.
LOCAL GOVERNMENT	LOCAL GOVERNMENT OF VICTORIA
PROPOSED SUBDIVISION PLAN	OPTION 1
LOTS & C.D.P.	240821
55-66 BRONZEWING STREET	TAMBOOR 2873
SCALE	1:500
DATE	24/01/2024
PROJECT NO.	180321-BF

Appendix 5 Site photos



Figure A-1 - Existing driveway to subject land



Figure A-2 - Looking west along Bronzewing St from subject land



Figure A-3 - Looking east along Bronzewing St from subject land



Figure A-4 - Looking NW across adjacent lot to the west from near Bronzewing St



Figure A-5 - Looking east along southern portion of subject land



Figure A-6 - Looking north from right had portion of subject land



Figure A-7 - Looking south across right hand portion of subject land



Figure A-8 - Looking north west to forest between subject land and Tahmoor Showground



Figure A-9 - Looking east from near existing dwelling



Figure A-10 - North West corner of subject land



Figure A-11 - North east corner of adjacent lot to the west of subject land looking to forest



Figure A-12 - Looking west across adjacent lot



Figure A-13 - Looking to forest hazard to the north west



Figure A-14 - Looking north across adjacent lot



Figure A-15 - Looking north east across adjacent lot to the north



Figure A-16 - Looking south across left hand portion of subject land and adjacent lot to the west



Figure A-17 - Existing dwelling to be demolished



Figure A-18 - Trees lining southern border of adjacent lot to the west



Figure A-19 - BMX track between showground oval and forest vegetation



Figure A-20 - BMX track between showground oval and forest vegetation

Appendix 6 AHIMS Report



AHIMS Web Services (AWS) Search Result

Purchase Order/Reference : 180321

Client Service ID : 372972

Australian Solutions Pty Ltd
PO Box 498
BOWRAL New South Wales 2576
Attention: Jane Brandon
Email: jane@ausbushfire.com.au

Date: 26 September 2018

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 8, DP:DP249821 with a Buffer of 200 meters, conducted by Jane Brandon on 26 September 2018.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

Appendix 7 Hydrant



Appendix 8 Appendix 5 of PBP – Bush Fire Provisions – Landscaping and Property Maintenance

Appendix 5

Bush Fire Provisions - Landscaping and Property Maintenance

A5.1 Introduction

Bush fires are a natural and periodic event in the Australian landscape. Many Australian plants and animals have adapted to fire over thousands of years and require fire as part of their life cycle.

However, development adjacent to bushland areas has increased the risk of fire impacting on people and their assets. Fire management needs to strike a balance between the protection of life and property and the maintenance of ecological processes and systems.

In Australia, bush fires are inevitable and an essential aspect of the landscape.

However, the impact on property and life can be reduced with responsible preparation and management of bush fire hazards. This is the responsibility of all land managers, as well as communities and individuals taking responsibility for their own fire safety.

The level of protection for life or whether or not a house or other assets survive a bush fire ultimately depends on the landowner and their level of preparedness against bush fire attack.

The planning system can be used to better effect in protecting human life, property and environmental values from the impacts of bush fire events.

In some cases this will involve land use planning and development controls, construction standards, APZs and subdivision layout, siting, design and provision of services. It also involves careful and deliberate consideration of the environmental impacts of these and how we can recognise the need to protect our wetlands, rainforests, koala habitat and other biodiversity and cultural values.

However, the best planning can be undone by poor maintenance and lack of forethought when landscaping a development. Therefore house survival ultimately depends on the householder.

Some maintenance also depends upon adjoining neighbours and upon fuel management in adjacent bush land areas by the owners, occupiers or managers of that land. General housekeeping and maintenance of the grounds by the householder is equally important and, in some cases, may even be more so.

Experience from the Canberra 2003 fires suggests that house losses are greatest in the area up to 250 metres from the bush interface. Distances of

less than 100 metres are particularly vulnerable to flame contact, radiant heat and ember attack.

Hence it is within this distance that efforts should be made to prepare for the onslaught of major bush fire events.

While other legislation provides the impetus for planning objectives, the RF Act provides the legislative vehicle to achieve bush fire management objectives.

In this appendix consideration will be given to the principles for landscaping and management, and the role of property maintenance during the fire event.

A5.2 Principles of Protection

Bush fire attack takes essentially five forms;

- wind,
- smoke,
- ember,
- radiant heat and
- flame.

Evidence indicates ember attack is responsible for most bush fire related house fires. Strong winds resulting from severe bush fires will drive embers into vulnerable areas of a building, preheat and dry fuel ahead of a fire, lift roofing and extend flames along a more horizontal plane closer to building elements. Embers can also cause spotting in advance of the bush fire and provide piloted ignition to building elements. To effectively protect a building, strategies must be implemented that separate it from the hazard and reduce the intensity of bush fires to minimise the combined impact of ember, wind, flame and heat attack.

While smoke will cause minimal damage to property, it can severely affect the health of residents. Smoke is a significant factor in areas in which aged or disabled persons reside – hospitals and nursing homes – and more so where residents are susceptible to respiratory disorders.

Radiant heat (measured in kW/m²) can severely impair firefighting operations, the health of residents and the integrity of building elements. Radiant heat in excess of 10kW/m² can prevent emergency services personnel assisting residents of SFPP developments.

Flame attack will severely restrict firefighting operations, provide piloted ignition to building elements and threaten the health of residents and their capacity to evacuate the area.

Appendices

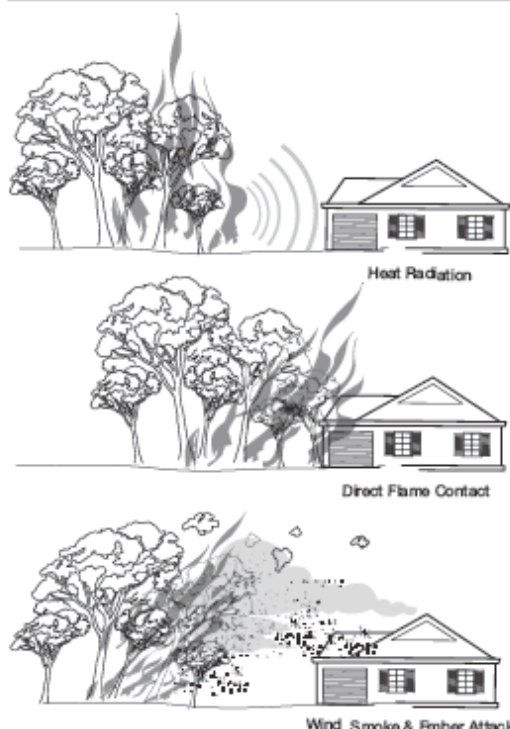


Figure A 5.1 Bush Fire Attack Mechanisms

Overall the intention of bush fire protection measures should be to prevent flame contact to a structure, reduce radiant heat to below the ignition thresholds for various elements of a building, to minimise the potential for wind driven embers to cause ignition and reduce the effects of smoke on residents and firefighters.

A5.3 Principles of Landscaping Properties for Bush Fire Protection

The principles of landscaping for bush fire protection aim to:

- Prevent flame impingement on the dwelling;
- Provide a defensible space for property protection;
- Reduce fire spread;
- Deflect and filter embers;
- Provide shelter from radiant heat; and
- Reduce wind speed.

(a) Vegetation choices

All vegetative material can burn under the influence of bush fire.

With this in mind, careful attention must be paid to species selection, their location relative to their flammability, avoidance of continuity of vegetation (horizontally and vertically), and ongoing maintenance to readily remove flammable fuels (leaf litter, twigs and debris).

In the paper *"Landscape and Building Design for Bushfire Areas"* G.C. Ramsay and L. Rudolph have provided 14 attributes of vegetation which affect bush fire attack. In summary these attributes are:

- Moisture content of leaves;
- Volatile oil content of leaves;
- Mineral content of leaves;
- Leaf fineness;
- Density of foliage;
- Continuity of plant form;
- Height of lowest foliage above ground;
- Size of plant;
- Dead foliage on the plant;
- Bark texture;
- Quantity of ground fuels;
- Fineness of ground fuels;
- Compaction ability of ground fuels; and
- Mineral content of ground fuel.

What is clear is that the higher moisture content of leaves (mesic), the less bark that will be available and the lower the leaf drop, all of which will assist with maintenance of the understorey and will also assist in reducing bush fire attack.

Work in the USA and elsewhere has also suggested that in addition to removal of understorey species, the trimming of lower limbs of trees also assists in reducing fire penetration into the canopy. Trees such as 'pencil pines' and African olive have been attributed with high fire propagation due to the high fine fuel and/or oil content captured within the canopy. This leads to significant flame height. Avoid such species in favour of rainforest species such as Figs and Syzygium.

When choosing plants, be sure not to introduce weed species into an area. Fire events may provide the opportunity for weed species to spread and may contribute fuel to an area of otherwise lower fuel loads.

Contact local councils, plant nurseries and plant societies to determine suitable species for your area.

(b) Trees as Windbreaks

The use of trees as windbreaks is a common practice but trees also provide a useful function, trapping embers and flying debris, which would otherwise reach the house. The tree crown will rarely carry fire unless there is a significant fuel loading on the ground.

By reducing the wind speed, a row of trees also slows the rate of spread of a bush fire and a dense foliage traps radiant heat, lowering bush fire radiant heat.

Because of the effect of turbulence, a balance has to be struck between a high density of trees (that

maximises the trapping of embers and radiant heat but also maximises turbulence) and a lower density (that allows more embers and radiant heat to pass through but minimises turbulence). A windbreak that allows 30-60% of the wind to pass through is ideal as less than this becomes too solid with ember laden winds being carried over the top of the break.

To be effective a windbreak must:

- be located on the side of the lot from which fire weather normally approaches;
- be of sufficient length (generally 100 metres minimum length);
- be located at a distance of one to three times the height of fully grown trees but not within the IPA;
- use smooth barked eucalypts, rainforest trees or deciduous trees;
- make sure there are no breaks of sufficient size to allow winds to funnel through; and
- be separated by sufficient distance from the hazard so as not to be consumed and become a hazard itself.

A5.4 Vegetation Management

Where APZs have been incorporated as part of the development approval for subdivision or for dwelling construction, the environmental aspects of the development should have already been taken into account.

In general, it is expected that APZs will be maintained by the owner of the land including maintenance of any fire trail constructed as part of the development.

It is accepted practice that after construction of a dwelling, gardens will be established and landscaping of the grounds will be undertaken. It is essential that efforts to reduce fuels on adjoining properties are therefore not negated by actions within the immediate curtilage of the building.

In terms of priorities of addressing bush fire attack, priority should be given to preventing flame impingement by not allowing fine debris to accumulate close to the building. Secondly, removal of understorey fuels aids in the reduction of flame heights and likely canopy fire, thereby reducing overall radiant heat. Removal of loose bark and fine fuels reduces both heat output and ember generation, while the retention of taller trees with canopies will also assist in filtering out embers.

To maintain a garden that does not contribute to the spread of bush fires, it is necessary to plan the layout of the garden beds and take an active decision to minimise certain features in favour of other features. These should include:

- maintaining a clear area of low cut lawn or pavement adjacent to the house;
- keeping areas under fences, fence posts and

- gates and trees raked and cleared of fuel;
- utilising non-combustible fencing and retaining walls
- breaking up the canopy of trees and shrubs with defined garden beds;
- organic mulch should not be used in bush fire prone areas and non flammable material should be used as ground cover, eg Scoria, pebbles, recycled crushed bricks.
- planting trees and shrubs such that:
 - the branches will not overhang the roof;
 - the tree canopy is not continuous; and
 - there is a windbreak in the direction from which fires are likely to approach.

The RFS has developed its document "Standards for Asset Protection Zones" which should be consulted for APZ specifications. This is also available on the RFS web page at www.rfs.nsw.gov.au.

A5.5 Maintenance of Property

Sensible arrangements for landscaping and maintenance of the property are critical in the prevention of losses.

In considering property maintenance the following items should therefore be implemented in advance of the bush fire season:

- removal of material such as litter from the roof and gutters;
- ensure painted surfaces are in good condition with decaying timbers being given particular attention to prevent the lodging of embers within gaps;
- check pumps and water supplies are available and in working order;
- driveways are in good condition with trees not being too close and forming an obstacle during smoky conditions;
- check tiles and roof lines for broken tiles or dislodged roofing materials;
- screens on windows and doors are in good condition without breaks or holes in flyscreen material and frames are well fitting into sills and window frames;
- drenching or spray systems are regularly tested before the commencement of the fire season;
- hoses and hose reels are not perished and fittings are tight and in good order;
- doors are fitted with draught seals and well maintained;
- mats are of non combustible material or in areas of low potential exposure; and
- woodpiles, garden sheds and other combustible materials are located downslope and well away from the house.

Trees and other vegetation in the vicinity of power lines and tower lines should be managed and trimmed in accordance with the specifications in "Vegetation Safety Clearances" issued by Energy Australia (NS179, April 2002).

7 References

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