

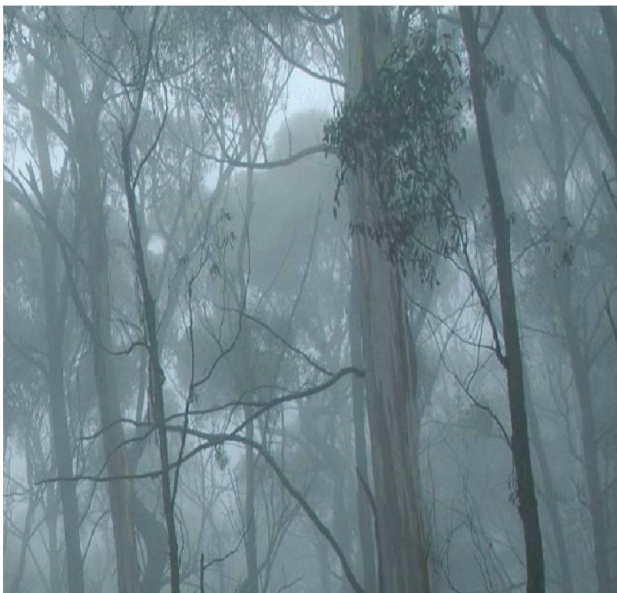


Bushfire Protection Assessment

Proposed Subdivision: Jordan Springs Eastern Precinct Stage 3d

Prepared for
Lendlease Development Pty Limited

31 July 2017



DOCUMENT TRACKING

Item	Detail
Project Name	Bushfire Protection Assessment, Proposed Subdivision, Jordan Springs Eastern Precinct Stage 3d
Project Number	7415
Prepared by	Daniel Copland FPAA BPAD-A Certified Practitioner No. BPAD28853-L3
Review by	Bruce Horkings FPAA BPAD-A Certified Practitioner No. BPAD29962-L3
Approved by	Bruce Horkings
Status	Final
Version Number	2
Last saved on	31 July 2017

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd.

Disclaimer

This document may only be used for the purpose for which it was commissioned and in accordance with the contract between Eco Logical Australia Pty Ltd and Lendlease Development Pty Limited. The scope of services was defined in consultation with Lendlease Development Pty Limited, by time and budgetary constraints imposed by the client, and the availability of reports and other data on the subject area. Changes to available information, legislation and schedules are made on an ongoing basis and readers should obtain up to date information.

Eco Logical Australia Pty Ltd accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report and its supporting material by any third party. Information provided is not intended to be a substitute for site specific assessment or legal advice in relation to any matter. Unauthorised use of this report in any form is prohibited.

Contents

1	Property and proposal	1
1.1	Introduction	1
1.2	Location and description of subject land	1
1.3	Description of proposal	1
2	Bushfire threat assessment	5
2.1	Assessment requirements	5
2.2	Vegetation types and slopes	5
3	Asset Protection Zones (APZ)	6
3.1	APZ Assessment	6
3.2	APZ Management	7
4	Bushfire Attack Levels	9
5	Access and egress	10
6	Utilities	10
6.1	Water supply	10
6.2	Gas and electrical supplies	10
7	Recommendations and conclusion	12
7.1	Recommendations	12
7.2	Conclusion	12
	References	13
	Appendix 1 - Vegetation Mapping	14

List of Figures

Figure 1: Location of Stage 3d	2
Figure 2: Proposed Stage 3d subdivision layout plan	3
Figure 3: Stage 3d subdivision – Bush Fire Prone Land Map (Penrith City Council)	4
Figure 4: Stage 3d bushfire hazard analysis and separation distances	8

List of Tables

Table 1: Asset Protection Zone assessment.....	6
Table 2: Performance criteria for proposed public roads	11

1 Property and proposal

Name:	Lendlease Development Pty Limited		
Street or property Name:	Jordan Springs Eastern Precinct Stage 3d		
Suburb, town or locality:	Jordan Springs	Postcode:	2747
Local Government Area:	Penrith City Council		
Type of development:	Residential subdivision		

1.1 Introduction

Lendlease Development Pty Limited commissioned Eco Logical Australia Pty Ltd (ELA) to prepare a bushfire protection assessment (BPA) for the Stage 3d residential subdivision at the Jordan Springs Eastern Precinct (hereafter referred to as the subject land).

This assessment has been prepared by the ELA Senior Bushfire Consultant Daniel Copland (FPAA BPAD Level 3 Certified Practitioner No. BPAD28853-L3). Daniel is recognised by the NSW Rural Fire Service as a qualified bushfire consultant in bushfire risk assessment.

The bushfire protection requirements for residential subdivision throughout the Central Precinct have been previously determined and approved at the Precinct Plan stage as described within the report '*Bushfire Protection Assessment – St Marys Western and Central Precincts*' prepared by BES (2009).

This assessment relates to the Eastern Precinct but also follows, and builds upon, the findings and principles of the initial bushfire report.

1.2 Location and description of subject land

The subject land is located within the central section of the Eastern Precinct as shown in **Figure 1**. The subject land is bounded by the Wianamatta Regional Park (WRP) and future development areas to the west and managed Regional Open Space to the east. Future stages within the Eastern Precinct lay also to the north.

1.3 Description of proposal

The proposal is for residential subdivision consisting of a large 'super-lot' for future medium or high density residential development and associated public roads, open space, riparian corridor and infrastructure. A subdivision layout plan is shown in **Figure 2**.

Location



Figure 1: Location of Stage 3d



Figure 2: Proposed Stage 3d subdivision layout plan

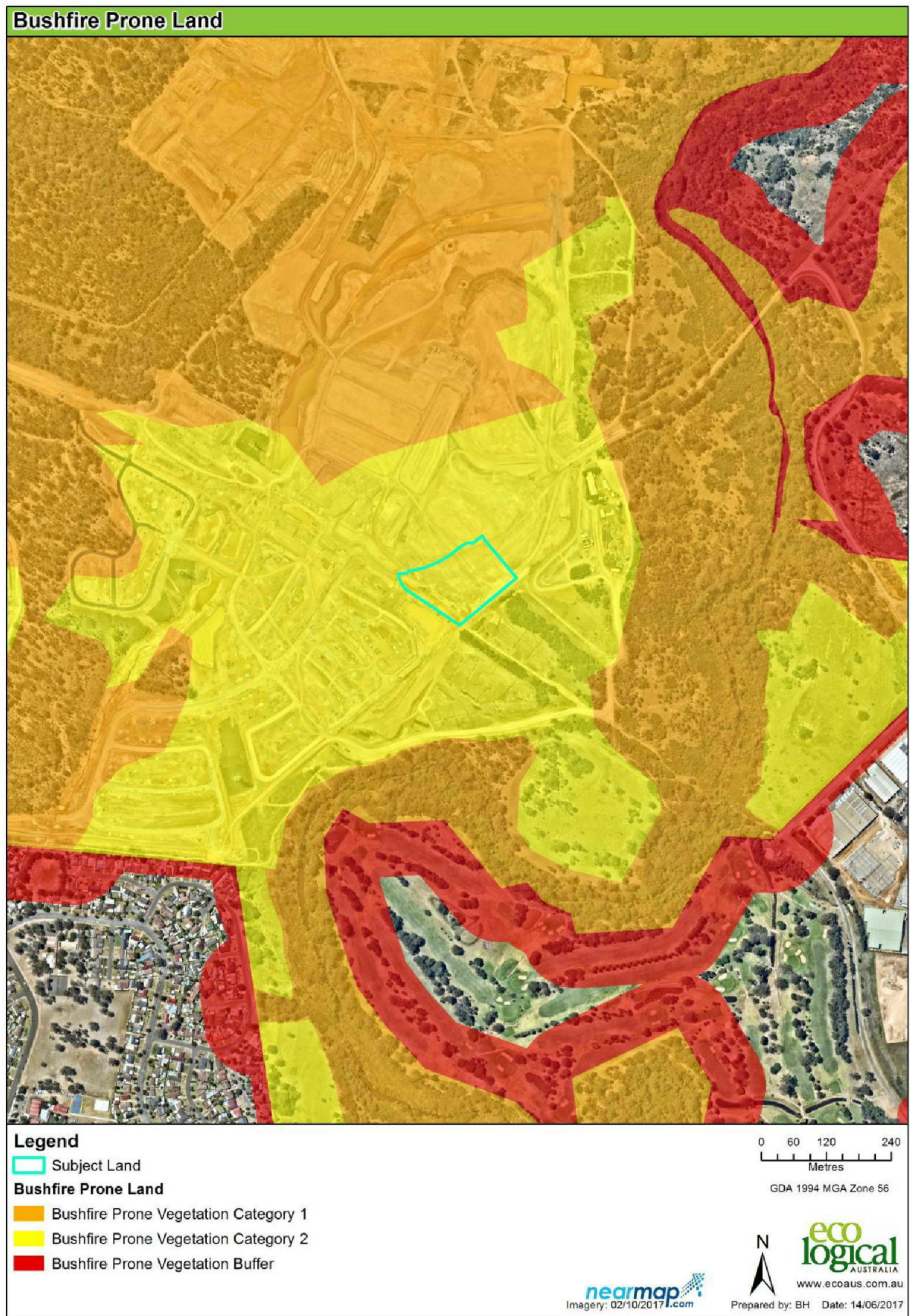


Figure 3: Stage 3d subdivision – Bush Fire Prone Land Map (Penrith City Council)

2 Bushfire threat assessment

2.1 Assessment requirements

The subject land is currently identified as containing Bush Fire Prone Land by Penrith City Council, as per **Figure 3**. The following assessment is therefore prepared in accordance with Section 100B of the *Rural Fires Act 1997*, Clause 44 of the *Rural Fires Regulation 2013*, and 'Planning for Bush Fire Protection 2006' (RFS 2006) herein referred to as PBP.

The assessment also adopts similar recommendations to those approved within the Precinct Plan relating to bushfire protection described within the report '*Bushfire Protection Assessment – St Marys Western and Central Precincts*' prepared by BES (2009).

2.2 Vegetation types and slopes

The vegetation and slope have been assessed outwards from the boundaries of the proposed subdivision in the direction of any bushfire hazards found. In accordance with PBP the predominant vegetation class has been assessed for a distance of at least 140 m out from the boundary of the subject land and the slope class most significantly affecting fire behaviour was determined for a distance of at least 100 m. The predominant vegetation and effective slope assessments are shown in **Figure 4** and summarised in **Table 1** within the following **Section 3**.

There is primarily one type of bushfire hazard found within 140 m of the subdivision perimeter. The hazard type will be created within the proposed riparian zone, positioned to the north and north-west of the subdivision. Due to the width of the vegetated portion of the riparian zone being 50 m or less, and the limited fire run and fire development that is likely to occur directly towards the development, it can be categorised as an area of 'Low Hazard'. These riparian zone areas are separated from the north-western boundary by greater than 100 m of managed land.

Further to the north-west, beyond additional areas of proposed future development, there are areas of bushland conserved within the Wianamatta Regional Park (WRP). These portions of the WRP consist predominantly of Shale Plains Woodland. The bushland is on either a downslope in the PBP class of >0-5 degrees or upslope leading away from the subdivision, however, are separated from the western boundary by greater than 100 m of managed land, including managed powerline easement. The vegetation classifications are consistent with the bushfire assessment (BES 2009) approved as part of the Precinct Plan. **Appendix 1** contains the vegetation mapping from the original assessment.

The bushland within future stages to the north and north east of Stage 3d are to be managed for a distance of at least 100 m from the Stage 3d boundary in order to avoid unnecessary Asset Protection Zones or building construction standards for dwellings within Stage 3d at this interface. Managed lands (including remnant Woodland vegetation) in the form of future Regional Open Space areas, lie to the east and south-east of Stage 3d. The future Regional Open Space in this location is regularly slashed by Lendlease as part of maintenance and fire mitigation across the site. The consistent nature of current management means it is unlikely for a potential grassland / remnant woodland hazard to eventuate. Should currently management be reduced, then 'Temporary' mitigation measures (APZs) are recommended, particularly prior to the formal construction of sporting fields and passive open space areas.

3 Asset Protection Zones (APZ)

3.1 APZ Assessment

Table A2.4 of PBP has been used to determine the width of Asset Protection Zones (APZ) for the proposed subdivision. **Table 1** below shows the assessed hazard and required APZs, with the achieved separation distances for the development shown in **Figure 4**.

The actual separation distances provided within the proposed subdivision exceed both the PBP and AS 3959-2009 minimum requirements.

Table 1: Asset Protection Zone assessment

Location (Refer to Figure 4)	Slope	Vegetation	PBP APZ	Proposed APZ
North-western boundary (Regional Park – beyond powerline easement)	Downslope >0-5°	Woodland	15 m	>100 m
North-western boundary (Riparian Zone)	Downslope >0-5°	Low Hazard	10 m	>100 m
Eastern / South-eastern boundaries	Varies	Managed Land (Future Regional Open Space)	<p>Land managed as part of current site maintenance. Will be developed in future as formal open space / recreation areas.</p> <p>Should current management be reduced, a 'Temporary APZ' (until the formal open space is created) to a distance of at least 100 m may be established within the future open space areas. This would ensure that APZ or construction standards are not required for new dwellings within Stage 3d adjacent to this boundary.</p>	
Northern / North-eastern boundaries	Varies	Managed Precinct Land (Future Subdivision)	<p>The Precinct in this direction is to be managed as a 'Temporary APZ' (until development occurs) to a distance of at least 100 m so that an APZ or construction standards are not required for new dwellings within Stage 3d adjacent to this boundary.</p>	

3.2 APZ Management

The APZs and future landscaping will require vegetation maintenance to achieve the performance objectives of an Inner Protection Area (IPA) as described by PBP. The following fuel management guide should be used to satisfy the performance requirements:

- No tree or tree canopy is to occur within 2 m of future dwelling rooflines;
- The presence of a few trees in the APZ is acceptable provided that they are well spread out and do not form a continuous canopy whereby single trees, or clumps of trees forming one canopy are separated by 2 to 5 m depending on the canopy size;
- Shrubs are to be limited to select and well managed garden beds that are located far enough away from future buildings so that they will not ignite the buildings by direct flame contact or radiant heat emission;
- A minimal ground fuel is to be maintained to include less than 4 tonnes per hectare of fine fuel (*fine fuel* means ANY dead or living vegetation of <6 mm in diameter e.g. twigs less than a pencil in thickness. 4 t/ha is equivalent to a 1 cm thick layer of leaf litter).



Figure 4: Stage 3d bushfire hazard analysis and separation distances

4 Bushfire Attack Levels

Penrith City Council has requested that the Bushfire Attack Levels (BALs) under AS 3959-2009 *Construction of buildings in bushfire-prone areas* (AS 3959-2009) be issued at the time of subdivision application.

Based on the existing management arrangements and separation distances provided from the nearest bushfire hazards, there are no BAL ratings or applicable construction standards for proposed Stage 3d (all classified as **BAL-LOW**).

To prevent the need for unnecessary BALs for dwellings along the various boundaries of Stage 3d, a 100 m 'Temporary APZ' is required within the adjacent future stages. Once the adjoining future stages are developed, maintenance of a temporary APZ would no longer be required. Furthermore, should current site maintenance activities be reduced within the future Regional Open Space areas to the east and south east, the same 'Temporary APZ' approach could be used in order to remove the need for APZ and construction requirements for lots within Stage 3d that are along this interface (until the Open Space areas are formalised).

5 Access and egress

The subdivision will be accessed ultimately from four access points; from the south via Werrington County, the west via Jordan Springs, the east via Ropes Crossing and the north via future stages of the Eastern Precinct. The proposed public road layout within the subdivision and its linkages to existing and future surrounding roads complies with PBP (refer to **Figure 2**).

Table 2 on the following page lists the PBP acceptable solutions and performance criteria for public roads in bushfire prone areas. The design and construction of the roads are to comply with the provisions listed within **Table 2**. The proposed layout shown in **Figure 2** can achieve these.

6 Utilities

6.1 Water supply

The subdivision is to be serviced by reticulated water. The reticulated water supply is to comply with the following acceptable solutions within Section 4.1.3 of PBP:

- 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; and
- The PBP provisions of parking on public roads are met.

6.2 Gas and electrical supplies

In accordance with PBP, electricity should be underground wherever practicable. Where overhead electrical transmission lines are installed:

- Lines are to be installed with short pole spacing, unless crossing gullies, and
- No part of a tree should be closer to a powerline than the distance specified in “*Guideline for managing vegetation near power lines*” issued by Department of Energy, Utilities and Sustainability (ISSC 3, December 2015).

Any gas services are to be installed and maintained in accordance with *AS/NZS 1596:2014 The storage and handling of LP Gas* (Standards Australia 2014).

Table 2: Performance criteria for proposed public roads

Performance Criteria	Acceptable Solutions
The intent may be achieved where:	
<ul style="list-style-type: none"> firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources) 	<ul style="list-style-type: none"> public roads are two-wheel drive, all weather roads
<ul style="list-style-type: none"> public road widths and design that allows safe access for firefighters while residents are evacuating an area 	<ul style="list-style-type: none"> 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 with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle) stating a minimum trafficable width of 6.5 m 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 public 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 firefighting vehicles 	<ul style="list-style-type: none"> the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicated load rating
<ul style="list-style-type: none"> roads that are clearly sign posted (with easy 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 located 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 located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression
<ul style="list-style-type: none"> parking does not obstruct the minimum paved width 	<ul style="list-style-type: none"> parking bays are a minimum of 2.6 metres wide from kerb to 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

7 Recommendations and conclusion

7.1 Recommendations

The following recommendations have been made within this report to ensure the proposed subdivision is compliant with Section 100B of the *Rural Fires Act 1997*, Clause 44 of the *Rural Fires Regulation 2013*, and 'Planning for Bush Fire Protection 2006' (RFS 2006):

Recommendation 1 - The design and construction of public roads is to comply with the acceptable solutions listed in **Table 2 (Section 6)** of this report;

Recommendation 2 - A hydrant water supply is to be installed in accordance with Australian Standard AS 2419.1 and **Section 6.1** of this report;

Recommendation 3 - Electrical services should be underground and if overhead lines are used, overhanging branches should be trimmed according to "Guideline for managing vegetation near power lines" issued by Department of Energy, Utilities and Sustainability (ISSC 3, December 2015); and

Recommendation 4 - Gas services are to be installed and maintained in accordance with AS/NZS 1596:2014 (Standards Australia 2014).

7.2 Conclusion

In the author's professional opinion the bushfire protection requirements listed in this assessment provide an adequate standard of bushfire protection for the proposed development. As such, the proposed subdivision is consistent with the aim and objectives of 'Planning for Bush Fire Protection' (RFS 2006) and appropriate for the issue of a Bush Fire Safety Authority.



Daniel Copland
Senior Bushfire Consultant
Eco Logical Australia Pty Ltd
FPAA BPAD Level 3 Certified Practitioner No. BPAD28853-L3



References

Bushfire and Environmental Services (2009). '*Bushfire Protection Assessment – St Marys Western and Central Precincts*'.

Department of Energy, Utilities and Sustainability (ISSC 3, December 2015) *Guideline for managing vegetation near power line*

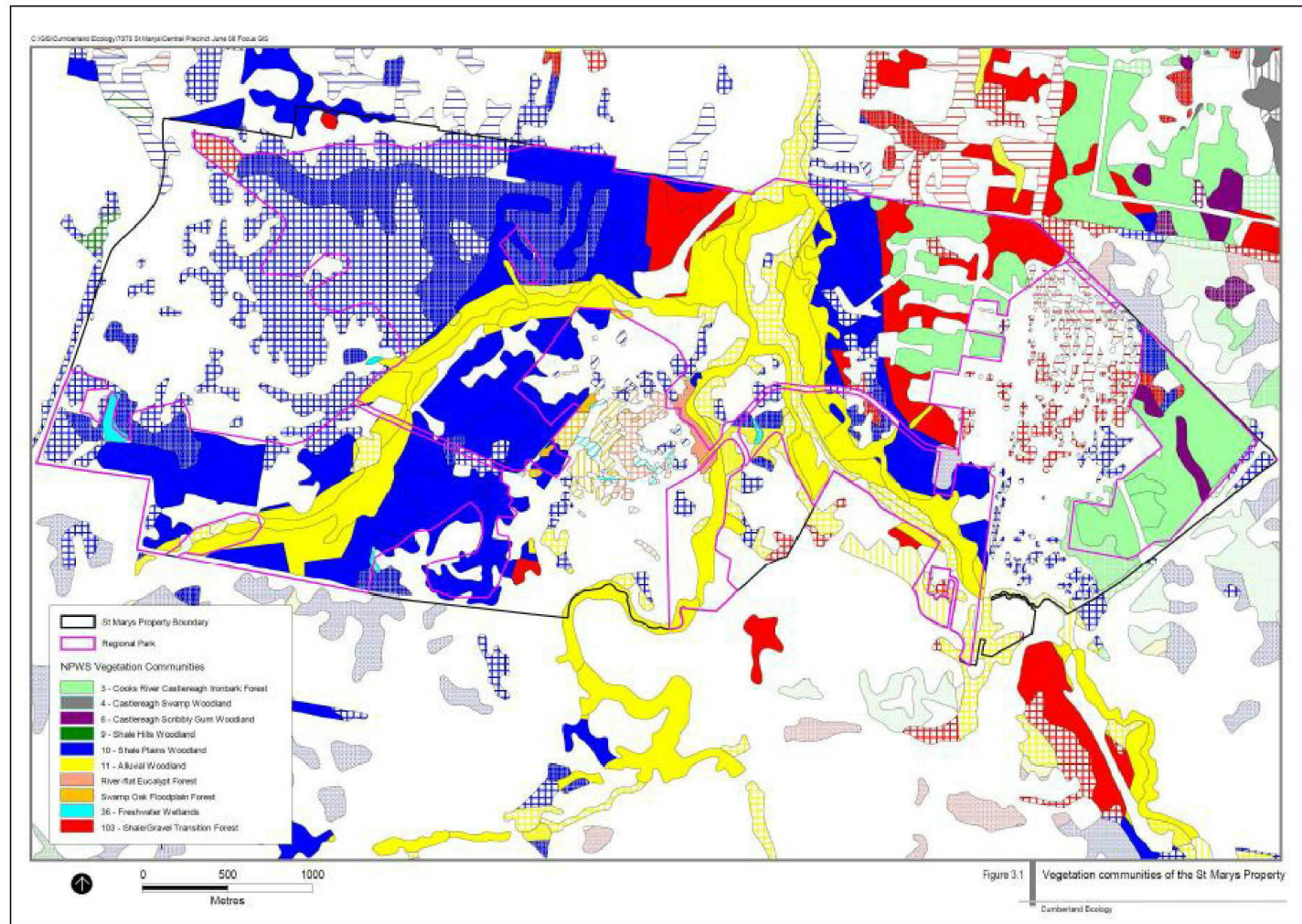
NSW Rural Fire Service (RFS). 2006. *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners*. Australian Government Publishing Service, Canberra.

Standards Australia. 2005. *Fire hydrant installations - System design, installation and commissioning*, AS2419.1, Fourth edition 2005, Standards Australia International Ltd, Sydney.

Standards Australia. 2009. *Construction of buildings in bushfire-prone areas*, AS 3959-2009, Standards Australia International Ltd, Sydney

Standards Australia. 2014. *The storage and handling of LP Gas*, AS/NZS 1596:2014, Eighth edition 2014, Standards Australia International Ltd, Sydney

Appendix 1 - Vegetation Mapping





HEAD OFFICE

Suite 2, Level 3
668-672 Old Princes Highway
Sutherland NSW 2232
T 02 8536 8600
F 02 9542 5622

CANBERRA

Level 2
11 London Circuit
Canberra ACT 2601
T 02 6103 0145
F 02 6103 0148

COFFS HARBOUR

35 Orlando Street
Coffs Harbour Jetty NSW 2450
T 02 6651 5484
F 02 6651 6890

PERTH

Suite 1 & 2
49 Ord Street
West Perth WA 6005
T 08 9227 1070
F 08 9322 1358

DARWIN

16/56 Marina Boulevard
Cullen Bay NT 0820
T 08 8989 5601
F 08 8941 1220

SYDNEY

Level 6
299 Sussex Street
Sydney NSW 2000
T 02 8536 8650
F 02 9264 0717

NEWCASTLE

Suites 28 & 29, Level 7
19 Bolton Street
Newcastle NSW 2300
T 02 4910 0125
F 02 4910 0126

ARMIDALE

92 Taylor Street
Armidale NSW 2350
T 02 8081 2681
F 02 6772 1279

WOLLONGONG

Suite 204, Level 2
62 Moore Street
Austinmer NSW 2515
T 02 4201 2200
F 02 4268 4361

BRISBANE

Suite 1 Level 3
471 Adelaide Street
Brisbane QLD 4000
T 07 3503 7191
F 07 3854 0310

HUSKISSON

Unit 1 51 Owen Street
Huskysson NSW 2540
T 02 4201 2264
F 02 4443 6655

NAROOMA

5/20 Cauty Street
Narooma NSW 2546
T 02 4476 1151
F 02 4476 1161

MUDGEES

Unit 1, Level 1
79 Market Street
Mudgee NSW 2850
T 02 4302 1230
F 02 6372 9230

GOSFORD

Suite 5, Baker One
1-5 Baker Street
Gosford NSW 2250
T 02 4302 1220
F 02 4322 2897

1300 646 131
www.ecoaus.com.au