

Bushfire Hazard Assessment Report

Proposed:
Residential Subdivision

At:
**Lakes Estate -
North Boambee Road,
North Boambee Valley NSW**

Reference Number: 130580

Prepared For:
NOUBIA

11th March 2013



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List of Abbreviations:

APZ	Asset Protection Zone
AS3959	Australian Standard 3959 – 2009 as amended.
BAL	Bushfire Attack Level
BCA	Building Code of Australia
BPMs	Bushfire Protection Measures
BPLM	Bushfire Prone Land Map
Council	Coffs Harbour Council
DA	Development Application
EP&A Act	<i>Environmental Planning and Assessment Act - 1979</i>
ESD	Ecologically Sustainable Development
FR NSW	Fire and Rescue NSW
IPA	Inner Protection Area
OPA	Outer Protection Area
PBP	<i>Planning for Bush Fire Protection – 2006</i>
ROW	Right of Way
RF Act	<i>Rural Fires Act - 1997</i>
RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose
SWS	Static Water Supply

1.0 Introduction

The development proposal relates to the subdivision of five (5) existing allotments located North Boambee Road, North Boambee Valley into one hundred and forty (140) new residential allotments, one (1) future residential subdivision lot (not to be developed at this point) and various Open Space and Bushland areas. The proposed development will also include all associated infrastructure, including roadways, footpaths, and services.

This type of development is considered integrated under section 100B of the Rural Fires Act 1997. As the matter is a Part 3a application the NSW Department of Planning will seek comment from NSW Rural Fire Service during their assessment process. It is understood that this particular application has been referred to the NSW Rural Fire Service on two (2) previous occasions.

It is acknowledged that the proposed subdivision is within North Boambee Valley and subject to the '*North Boambee Valley (east)*' *Development Control Plan 2008* and the Coffs Harbour City Local Environmental Plan 2000. In this regard the proposed development forms part of the North Boambee Valley (east) Precinct with an approved residential subdivision to the east and southwest of the subject site.

The subject development provides a central connection point between two existing residential subdivisions within the North Boambee Valley (east) Precinct. In this regard the proposed development includes the extension of existing dead-end internal roads within neighbouring residential development and provides connection points for future proposed residential development.

The subject site has frontage to the North Boambee Road to the south and abuts private rural residential allotments to the north, a mix of private residential allotments and retained large vegetated allotments to the east and southwest and large rural allotments to the west.

The vegetation identified as being a potential bushfire hazard is located to the northeast, south and west of the subject site within neighbouring allotments.

The subject site is identified as having various constraints including Koala Habitat (primary and secondary), Endangered Ecological Communities (EEC), riparian zones and flood prone land. These aforementioned constraints require the retention of native vegetation within the subject site, which have subsequently been assessed as a bushfire threat as part of this assessment.

Coffs Harbour Council's Bushfire Prone Land Map identifies that the subject site contains designated Category 1 and Category 2 Vegetation and their associated buffer zones. The application of *Planning for Bush Fire Protection 2006* (PBP) is therefore required.

2.0 Purpose of Report

The purpose of this Bushfire Assessment Report is to provide the owners, the Rural Fire Service and the NSW Department of Planning and Infrastructure with an independent bushfire hazard assessment together with appropriate recommendations for new building construction and bushfire mitigation measures considered necessary having regard to construction within a designated 'bushfire prone' area.

The recommendations contained within this report may assist in forming the basis of any specific construction conditions and/or bushfire mitigation measures that the NSW Department of Planning and Infrastructure and/or the NSW Rural Fire Service may elect to place within any consent conditions issued for the subject application.

3.0 Scope of this Report

The scope of this report is limited to providing a bushfire hazard assessment and recommendations for the subject site. Where reference has been made to the surrounding lands, this report does not purport to directly assess those lands; rather it may discuss bushfire impact and/or progression through those lands and possible bushfire impact to the subject site.

4.0 Referenced Documents and Persons

Comments provided are based on the requirements of the NSW *Environmental Planning and Assessment Act* 1979 (EP&A Act), the *Rural Fires Act* 1997, the Rural Fires Regulation 2008, the RFS document known as '*Planning for Bush Fire Protection 2006*' for the purposes of bushfire hazard determination and Australian Standard 3959 2009 titled 'Construction of buildings in bushfire-prone areas' as amended for building/structural provisions.

A company representative has made a site inspection of the subject site and the surrounding area.

The 'Subdivision Stage 1 Plan' dwg no A012, rev C, 'Subdivision Stage 2 Plan' dwg no A013, rev D and 'Subdivision Stage 3 Plan' dwg no A014, rev D (all prepared by Astoria Group Pty Ltd) have been relied upon for this assessment.

I have also reviewed the full plan set as submitted to the NSW Department of Planning and Infrastructure as part of the Preferred Project Report, comprising of:

- LOCATION PLAN, issue D, dwg no A001
- SURROUNDING PLANS, issue D, dwg no A002
- Zoning PLAN, issue F, dwg no A003
- KOALA HABITAT PLAN, issue F, dwg no A004
- PREVIOUS BANANA PLANTATION AREAS PLAN, issue F, dwg no A005
- COMBINED CONSTRAINTS PLAN, issue F, dwg no A006
- OPEN SPACES PLAN, issue G, dwg no A007
- ROADS AND MOVEMENT ACCESS PLAN, issue G, dwg no A008
- SERVICES PLAN, issue F, dwg no A009
- SUBDIVISION LAYOUT PLAN, issue D, dwg no A010
- SUBDIVISION STAGING PLAN, issue D, dwg no A011

The Bushfire Design Response Plan prepared by Astoria Group Pty Ltd (titled 'Subdivision Staging Plan Response to RFS', project no 912, dwg no A015-A017, issue A, dated 11/03/13) was also reviewed.

The '*North Boambee Valley (east)*' *Development Control Plan 2008* under Coffs Harbour City Local Environmental Plan 2000 has also been reviewed.

A teleconference was also held between the author of this assessment (Stuart McMonnies – Building Code and Bushfire Hazard Solutions P/L) and Mr Paul Creenaune – Development Assessment & Planning Officer, NSW Rural Fire Service on Tuesday 26th February 2013.

5.0 Aerial view of the subject allotment

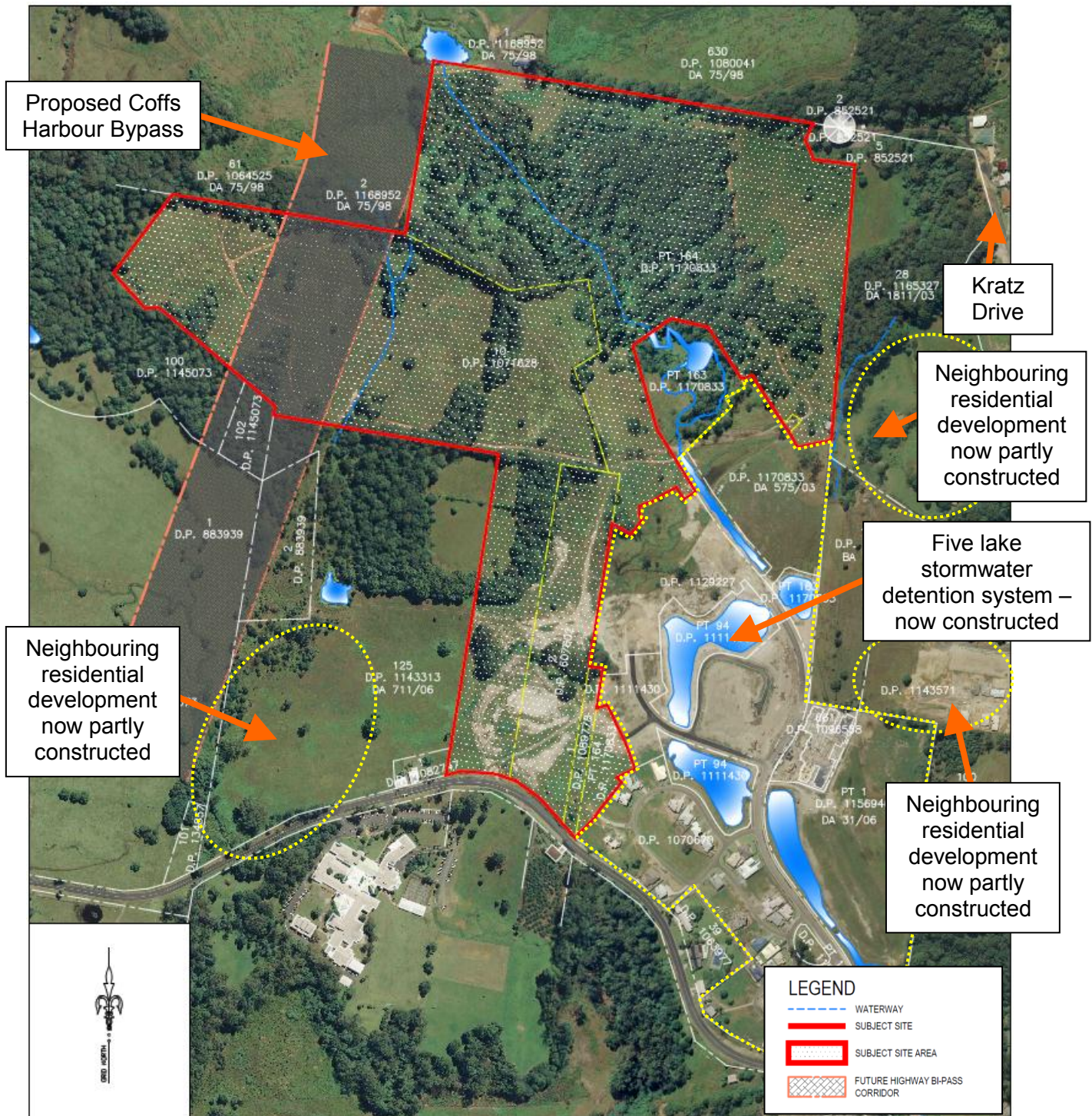


Image 01: Aerial view of the subject area

6.0 Bushfire Hazard Assessment

6.01 Preface

Properties considered to be affected by possible bushfire impact are determined from the local Bushfire Prone Land Map as prepared by Council and or the Rural Fire Service. All property development within affected areas is subject to the conditions detailed in the document '*Planning for Bush Fire Protection 2006*' (PBP). Set back distances for the purpose of creating Asset Protection Zones (APZ's) must be applied and any buildings must then conform to corresponding regulations detailed in Australian Standard 3959 'Construction of buildings in bushfire prone areas' 2009.

Planning for Bush Fire Protection 2006, (PBP) formally adopted on the 1st March 2007 and amended May 2010 (Appendix 3) provides for the protection of property and life (including fire-fighters and emergency service personnel) from bushfire impact.

The purpose of the document is to ensure that developers of new properties or sub-divisions include the constraints associated with the construction of buildings in bushfire prone areas within their proposed development sites. PBP is applicable to proposed development inside determined Category 1 or 2 areas and also inside a buffer zone radius of 100m from a Category 1 bushfire area or 30m from a Category 2 bushfire area.

The document also acknowledges 'infill' developments associated with re-development of existing properties and allows some higher levels of building safety where the increased 'set backs' (APZ's) may not be achievable.

The subject development relates to the subdivision of five (5) existing allotments into one hundred and forty (140) new residential allotments, one (1) residual allotment (not to be developed at this point) and various Open Space and Bushland areas. To accord with PBP the subdivision is classified as integrated development and assessed under section 100B of the *Rural Fires Act 1997*.

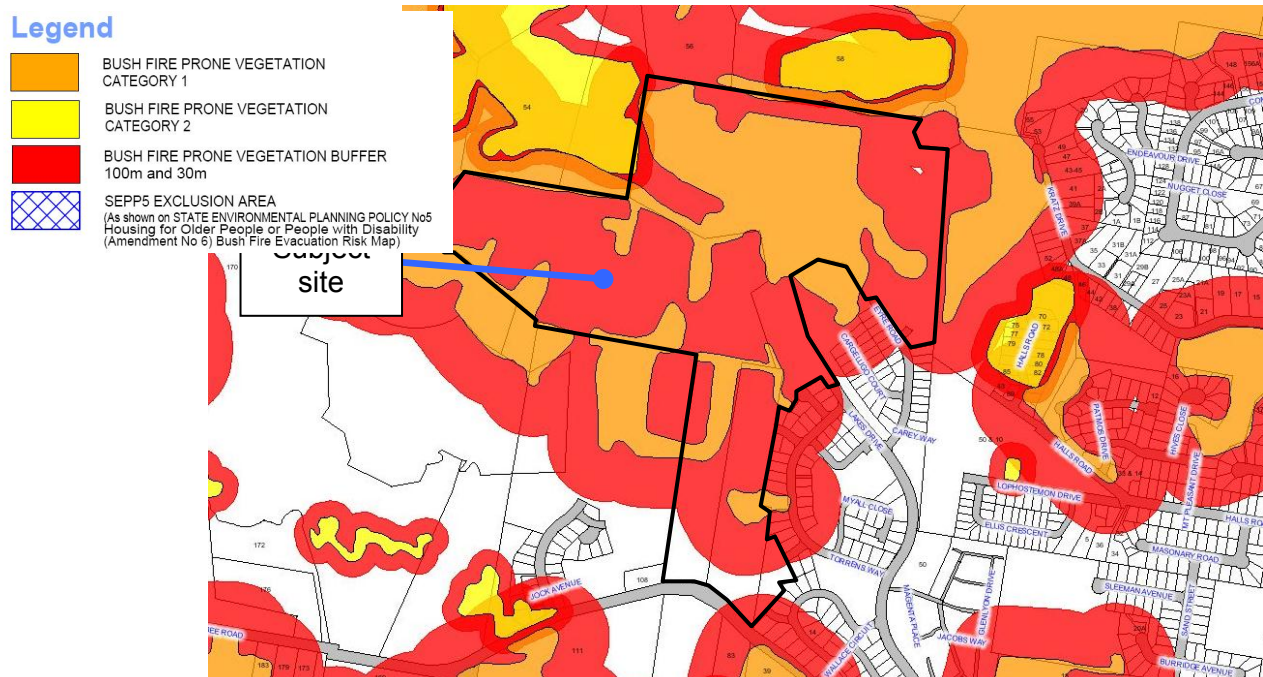


Image 02: Extract from Coffs Harbour Council's Bushfire Prone Land Map

6.02 Location

The subject site comprises of five (5) existing allotments known as Lot 2 in DP 607602, Lot 10 in DP 1071628, Lot 1 in DP 1089778 and two lots under PT 164 DP 1170833. The site has street frontage to North Boambee Road to the south and abuts private rural residential allotments to the north, a mix of private residential allotments and retained large vegetated allotments to the east and southwest and large rural allotments to the west.

The subject site is within Coffs Harbour Councils Local Government Area and falls within the '*North Boambee Valley (east)*' *Development Control Plan 2008* under Coffs Harbour City Local Environmental Plan 2000.

The subject development is an extension of Lakes Drive within the already developed portion of the Lakes Estate and future vehicle access to the west from within the partially developed Highlands Estate.

The subject development connects these two existing residential subdivisions within the North Boambee Valley (east) Precinct. In this regard the proposed development includes the extension of existing internal roads connecting to the developments previous stages and provides connection points for future proposed residential development of adjoining Highlands Estate.

The vegetation identified as being a potential bushfire hazard is located to the northeast, south and west of the subject site within neighbouring allotments and also throughout the subject site where areas of native bushland are proposed to be retained.

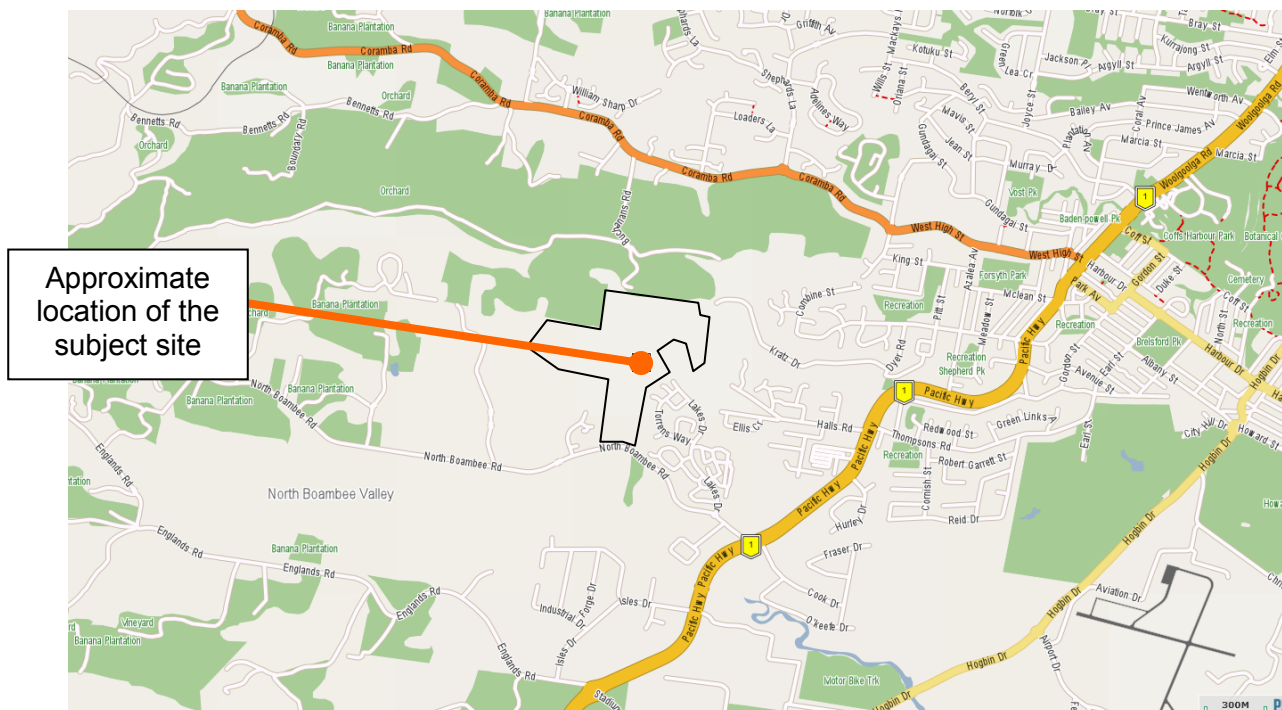


Image 03: Extract from street-directory.com.au

6.03 Vegetation

The subject site was found to be currently rural use, comprising of two (2) distinct areas. The first being grazed pastures and the second being native bushland. The subject site is identified as having various constraints including Koala Habitat (primary and secondary), Endangered Ecological Communities (EEC), riparian zones and flood prone land. These aforementioned constraints require the retention of native vegetation within the subject site, which has subsequently been assessed as a bushfire threat to the proposed residential allotments.

Eco Logical Australia Pty Ltd has undertaken a detailed Flora and Fauna Assessment for the subject site (project no 192-001, dated October 2007). This assessment concluded the presence of various vegetation communities within the subject site, including disturbed or regenerating, Lowland Rainforest, Pastoral – Swamp Mahogany, Tall Open Forest (type 1 and 2) and Wet Area. See image 04 for a depiction of the location of these communities (being Figure 2 from the Flora and Fauna Assessment Report prepared by Eco Logical Australia Pty Ltd).

The vegetation identified as being a potential bushfire hazard to the proposed residential allotments is located to the northeast, south and west within neighbouring allotments and also throughout the subject site where areas of native bushland are proposed to be retained.

For the purpose of assessment against Planning for Bush Fire Protection 2006 the following vegetation communities were used.

	North	East	South	West
Stage 1	Remnant (Koala Corridor)	Maintained curtilages (Lakes Estate)	Forest	Grassland (staged setback)
Stage 2a	Maintained curtilages (within proposal)	Remnant (Koala Corridor)	Remnant (Koala Corridor)	Grassland (staged setback)
Stage 2b-c	Maintained curtilages (managed open space)	Maintained curtilages (managed open space)	Maintained curtilages (within proposal & Lakes Estate)	Remnant (Koala Corridor)
Stage 2d-e	Rainforest	Rainforest	Remnant (Koala Corridor)	Remnant (Koala Corridor)
Stage 2f-g	Rainforest	Remnant (Koala Corridor)	Forest	Maintained grounds (within residual lot and open space)
Stage 3a	Forest	Forest	Maintained curtilages (Lakes Estate)	Forest (northwest)
Stage 3b	Forest / Remnant	Grassland / Forest	Forest	Forest

The vegetation posing a hazard to the north of Stages 2f-g was found to consist of Forest transitioning into disturbed vegetation and Rainforest further north. The topography through the Forest was determined to be 10 degrees up slope, with the geographical feature encouraging fire behaviour away from the site. The slope within the Rainforest vegetation was determined to be 10 degrees down. The highest hazard was determined from Bushfire Design Modelling consistent with Appendix 2 of Planning for Bush Fire Protection 2006 to be the Rainforest hazard to this aspect.

The proposed retained Koala corridors between Stages 2a & 2b and Stages 2d-e & 2f-g were determined to be remnant hazards in accordance with Appendix 2.3 of Planning for Bush Fire Protection 2006 as they were discontinued pockets of vegetation less than one hectare in size. These corridors were also found to be bisected by proposed roads.

While neighbouring residential development is proposed to the west of Stages 1b & d, Stage 2a & Stage 3b it is acknowledge that this development may not occur at the time that future dwellings within the subject development are constructed. In this regard a Grassland hazard has been applied to these areas and the relevant Asset Protection Zone applied. It should be noted that any restriction to user (APZ) created within the effected lots can be lifted at the time that the neighbouring developments have reached substantial commencement.

The subject development contains large areas of 'Open Space'. It is proposed that these areas will comprise of mown lawns, walkways, park benches, play equipment, picnic tables and other maintained recreational land.

Coffs Harbour City Council has requested as part of its submission to this application that "the application should quantify the primary function of all proposed open space i.e. conservation area, asset protection zones, play, visual amenity, drainage, buffer etc". In this regard the applicant is preparing a Management Plan to clearly specify the intended uses and management responsibilities of the Open Space. This plan will state that all Open Space and Nature Strips within the subject development are to be maintained in accordance with an Asset Protection Zone (Inner Protection Area).

The ongoing management of the Open Space area will be the immediate responsibility of the applicant (a.k.a. NOUBIA). It is understood that it is intended that Coffs Harbour City Council will acquire the Open Space land in due course. Prior to Coffs Harbour City Council acquiring any Open Space they must acknowledge and agree to these ongoing management responsibilities.

The presence of the proposed Coffs Harbour Bypass precludes further development within the proposed residual allotment (a.k.a. Lot 142) which is zoned residential. It is proposed as part of this application to continue management, including grazing and fence maintenance, of this allotment, excluding that area identified as being Endangered Ecological Community or Primary Koala Habitat. Note, the area adjacent Stages 2f-h is currently grazed.



Photograph 01: View northwest from within the western hazard of Stage 3b

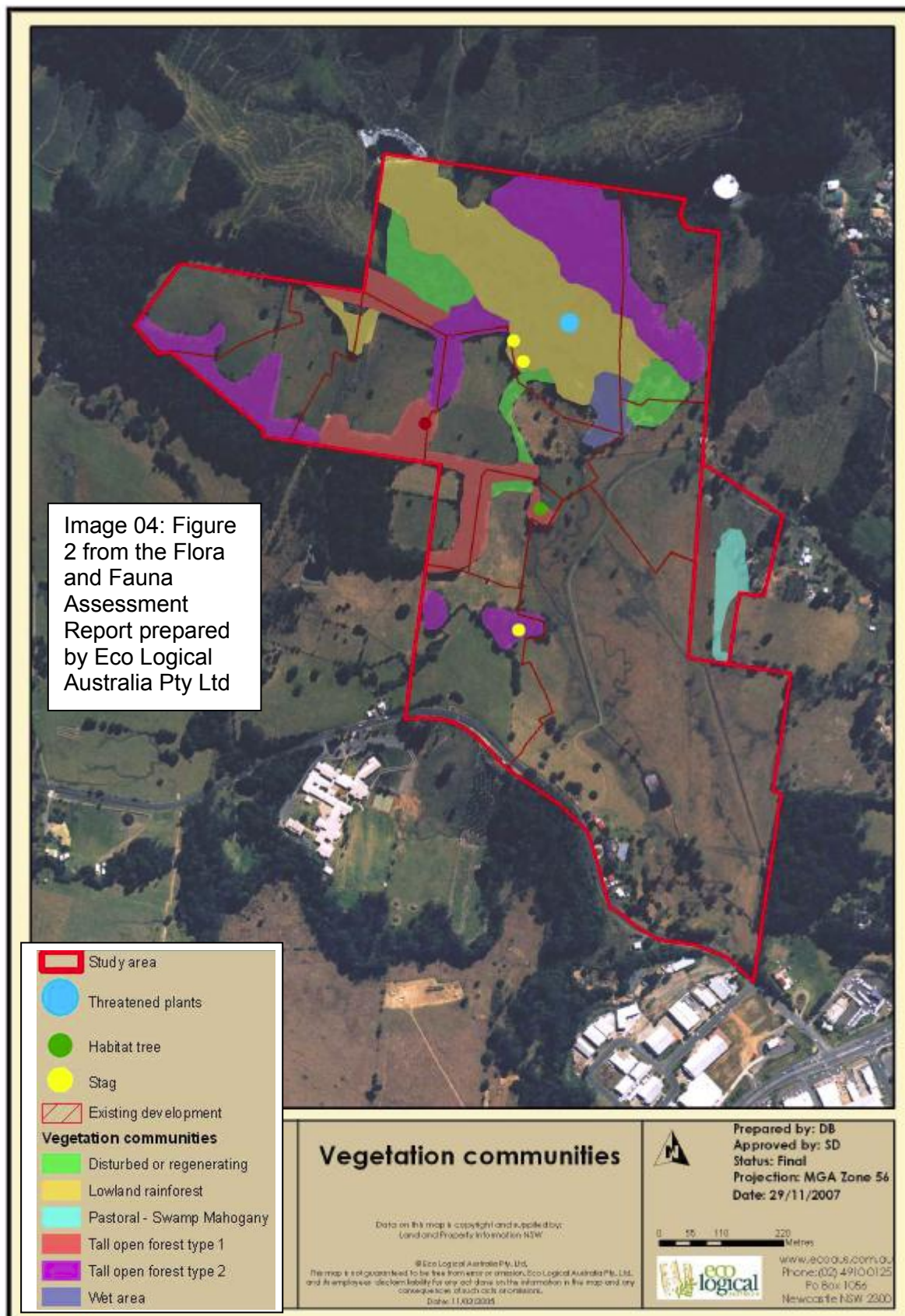


Figure 2

6.04 Slope and Topography

The slope that would most significantly affect bushfire behaviour within the hazard must be assessed for at least 100 metres from the closest available building footprint.

The slope that would most significantly influence bushfire behaviour was determined onsite and verified from topographic mapping to be:

	North	East	South	West
Stage 1	0° across	n/a	10 - 15° down	0 - 5° down
Stage 2a	n/a	5 - 10° down	0° across	0 - 5° down
Stage 2b-c	n/a	n/a	n/a	0 degrees & up
Stage 2d-e	5 - 10° down	0° & up	0° & up	0° & up
Stage 2f-g	10° down	0° & up	0 - 5° down	n/a
Stage 3a	10° up	15° up	n/a	0° across
Stage 3b	>15° up	0 - 5° down	5 - 10° down	10 - 15° down

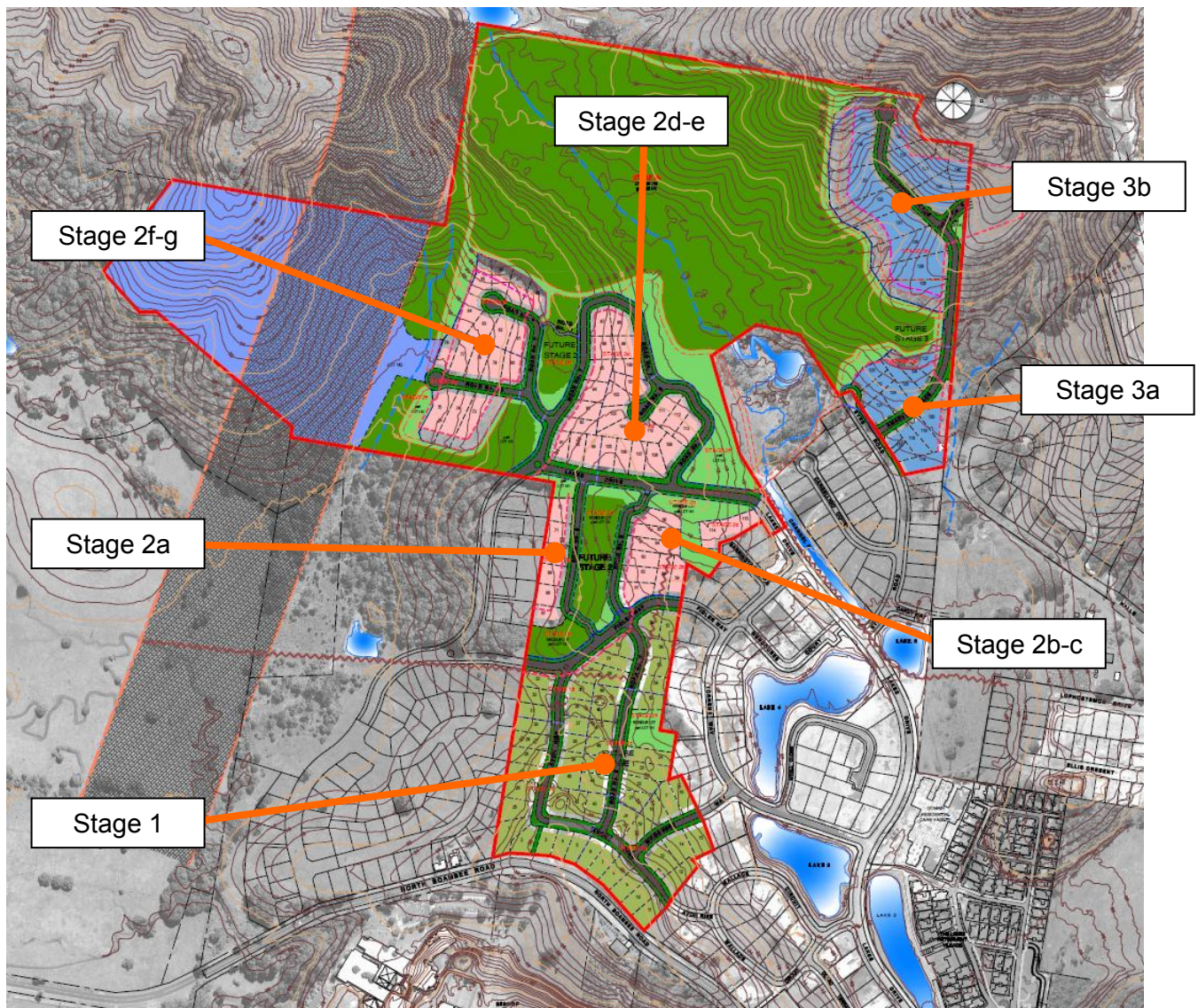


Image 05: Extract from the subdivision staging plan

6.05 Asset Protection Zones

The minimum required Asset Protection Zones (APZ) were determined from Table A2.5 of *Planning for Bush Fire Protection* 2006 and radiant heat design modelling consistent with Appendix 2 of *Planning for Bush Fire Protection* 2006.

Where multiple hazard were present to one aspect, both scenarios were assessed and the highest hazard applied.

The minimum required Asset Protection Zones (APZ) were determined to be:

	North	East	South	West
Stage 1	10 metres	n/a	40 metres	8.05 metres*
Stage 2a	n/a	15 metres	7 metres	8.05 metres*
Stage 2b-c	n/a	n/a	n/a	10 metres
Stage 2d-e	15 metres	10 metres	10 metres	10 metres
Stage 2f-g	15 metres	10 metres	20 metres	n/a
Stage 3a	12.03 metres	8 metres	n/a	20 metres
Stage 3b	20 metres	8.05 metres* / 20 metres	30 metres	40 metres

* Specific bushfire design modelling was undertaken to allow for the provision of a 1.8 metre high radiant heat shield (i.e. colorbond fence) and its effect on the minimum required Asset Protection Zone to the west of Stage 1 and Stage 2a & east of Stage 3b – being grassland hazards.

To undertake this modelling the reduced view factor was determined using a method described at the University of Western Sydney. This reduced view factor method includes the following process, firstly to determine the base view factor (as determined without any regard to shielding) (view factor - 0.499), then determined the view factor of the shield itself – this is achieved by modifying the fuel loads under the previous model until the flame length is the same height as the radiant heat shield (view factor – 0.112). The shield view factor is then subtracted from the base calculation and this modified view factor (modified view factor – 0.387) is then used in a final calculation.

The conclusion of this modelling (attached) is that the minimum required Asset Protection Zone is reduced from 10 metres (generic under *Planning for Bush Fire Protection* 2006) to 8.05 metres. This setback will still ensure any future dwelling is outside the designated Flame Zone under Australian Standard 3959 'Construction of buildings in bushfire-prone areas' 2009 (AS3959 – 2009).

It is acknowledged that the NSW Rural Fire Service has indicated that where possible they would require setbacks consistent with BAL 29 under AS3959 – 2009 to be provided. It is noted that in most instances this (or a greater) setback is achieved.

Furthermore as requested by the NSW Rural Fire Service we have verified that proposed Lots 67, 127 & 128 can accommodate building footprints outside the designated Flame Zone under AS3959 – 2009. These determinations were achieved by using both Table 2.4.2 of AS3959 – 2009 and bushfire design modelling consistent with Method 2, Appendix B of AS3959 – 2009. In this regard it should be noted that the northern APZ to Stage 3a was increased from 11 metres to 12.03 metres to ensure any future dwelling is not within the Flame Zone.

All proposed residential allotments can accommodate a building footprint achieving (and in most instances exceeding) the minimum required Asset Protection Zones for Residential Subdivisions under *Planning for Bush Fire Protection* 2006.

The proposed Asset Protection Zones will consist of the proposed roads, fire trails, maintained Open Space and grounds within the proposed residential allotments.

The ongoing management of the Open Space area will be the immediate responsibility of the applicant (a.k.a. developer). It is understood that it is intended that Coffs Harbour City Council will acquire the Open Space land in due course. Prior to Coffs Harbour City Council acquiring any Open Space they must acknowledge and agree to their ongoing management responsibilities.

Furthermore it will be recommended that during the construction phase of any area within the subject development that a minimum 10 metre wide (or minimum required APZ as specified above) staging Asset Protection Zone be provided, until such time that the adjacent stage is developed.

It is understood that the NSW Department of Planning and Infrastructure has raised concern as to the viability of proposed lots 67, 76, 127, 136 and 128 due to the minimum required Asset Protection Zones.

Through the assessment process the minimum required Asset Protection Zones were determined (as described above) and a plan (attachment 01) developed to clearly demonstrate the impact of these setbacks on the proposed design. This plan demonstrates the concerned lots can achieve compliance within the minimum required Asset Protection Zones and accommodate a viable building footprint outside the designated Flame Zone under AS3959 – 2009. The APZs to the aforementioned allotments will be located within proposed public roads, maintained Open Space and within the new allotments themselves.

It is therefore of our opinion that the concerns of the NSW Department of Planning and Infrastructure in relation to the aforementioned allotments has been addressed.

6.06 Fire Fighting Water Supply

The proposed development will include the installation of the hydrant network along the proposed new internal road network. Hydrant sizing, spacing and pressures must comply with Australian Standard 2419.1 – 2005.

6.07 Property Access

The subject development will have vehicle access from Lakes Drive within the already developed portion of the Lakes Estate and future vehicle access to the west from within the partially developed Highlands Estate.

The subject development provides a link between these two existing residential subdivisions within the North Boambee Valley (east) Precinct. In this regard the proposed development includes the extension of existing roads within neighbouring residential development and provides connection points for future proposed residential development.

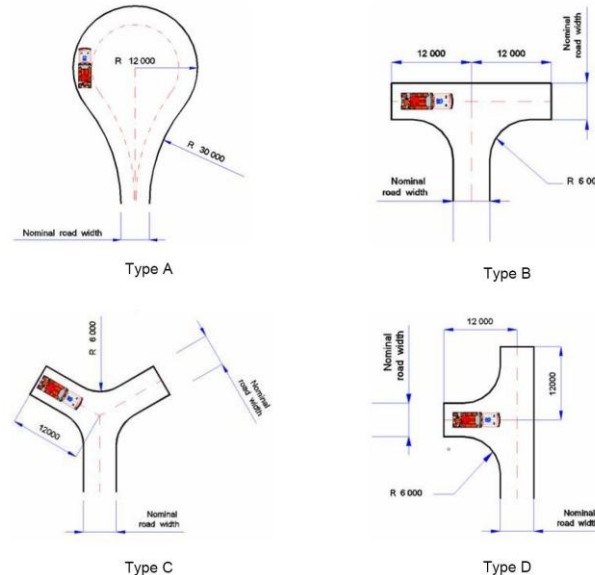
The proposed development includes the construction of an internal road network. This internal road network must satisfy the requirements for Public Roads under section 4.1.3(1) of *Planning for Bush Fire Protection* 2006.

A review of the proposed subdivision design has found that some road specifications do not achieve the minimum carriageway widths for Public Roads as detailed in section 4.1.3(1) of *Planning for Bush Fire Protection* 2006, specifically:

- Road 7 requires a minimum 8 metre carriageway, currently 7 metres; and
- Roads 5 (adjacent lots 61-66) & 6 require a minimum 6.5 metre carriageway, currently 6 metres;

The carriageway of the aforementioned roads shall be increased to demonstrate compliance with section 4.1.3(1) of *Planning for Bush Fire Protection* 2006.

Furthermore the proposed turning circles at the end of Roads 8-10 and Amadeus Place were not found to achieve the 12 metre outer turning radius. The outer turning area of these turning circles must be increased to 12 metres to achieve compliance with section 4.1.3(1) of Planning for Bush Fire Protection 2006. Alternatively these turning areas can be modified to any of the below:



It is understood that Road 11, the northern end of road 5 and the southern end of Road 6 will provide a minimum 3.5 metre carriageway and be one-way, which can achieve compliance with PBP. It is acknowledged that Road 11 and the southern end of Road 6 traverse ecologically sensitive areas and therefore expanding the carriageway widths is difficult. A minimum 4 metre vertical clearance should be provided above these roads.

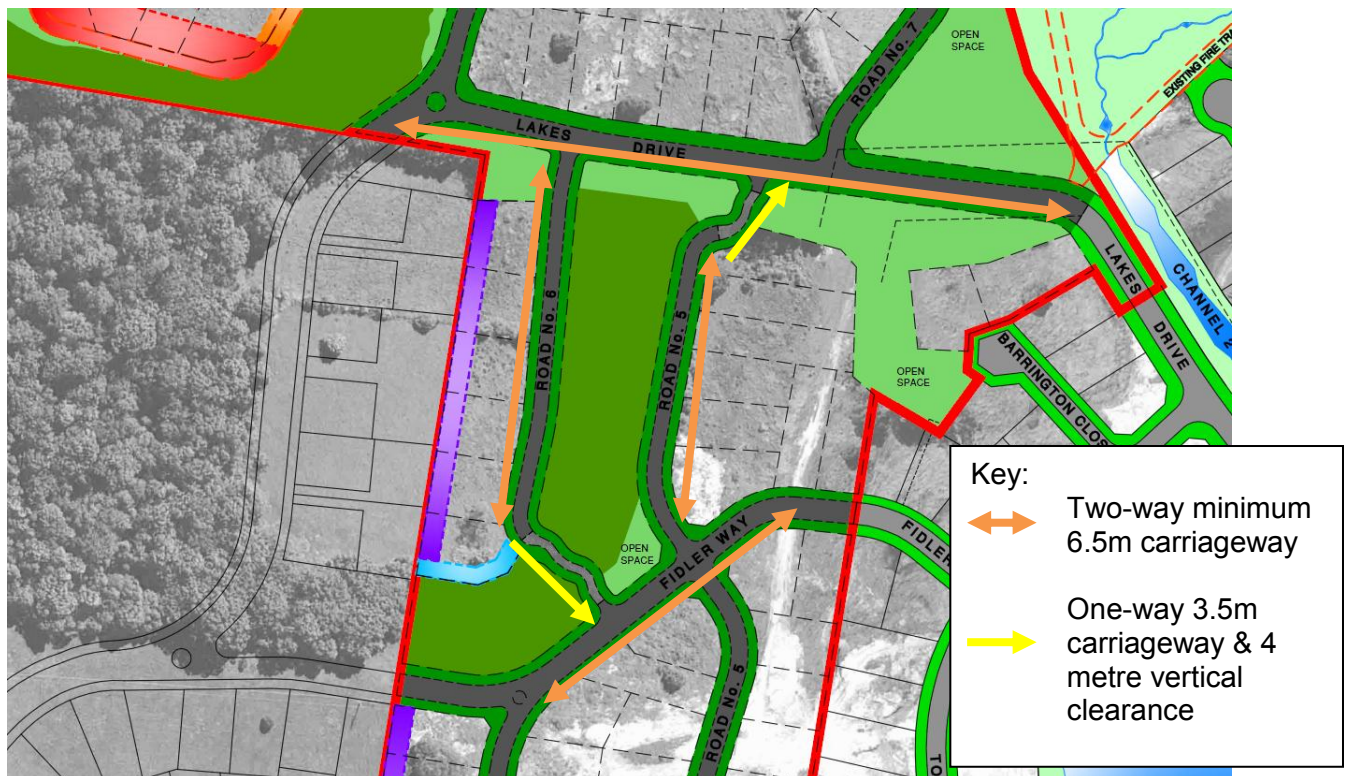


Image 06: Access arrangements for Stages 2a-b

The current proposal includes the construction of an extensive fire trail network. These fire trails will provide a strategic benefit to attending fire services undertaking fire suppression or hazard reduction activities. The fire trail around stages 2f, 2g and 2h will also provide interface access for attending fire services while providing occupants egress along the public roads.

It has been acknowledged that the Rural Fire Service has raised concern that adequate justification has not been demonstrated with the use of fire trails over perimeter roads. The following images depict the proposed access provisions inclusive of the use of two-way roads (perimeter and internal), one-way roads and fire trails.

In considering the application of perimeter roads consideration must be given to the overall bushfire risk, presence of hazard and residential evacuation. The NSW Rural Fire Service have identified two areas where the application does not demonstrate a clear benefit for the use of fire trails instead of perimeter roads, these areas being within Stage 2f-g and Stage 3a-b.

In relation to Stage 2f-g further clarification has been provided for the proposed management strategy of the residual lot (a.k.a. Lot 142). This being it is the intent of the applicant to continue vegetation management of this allotment, excluding that area identified as being Endangered Ecological Community or Primary Koala Habitat. Note, the area adjacent Stages 2f-h is currently grazed. The ongoing management of this area will subsequently be included within the recommendations of this report.

This management effectively removes the western hazard to Stage 2f-g, therefore alleviating the need for perimeter access to this aspect. Of further benefit is the presence of the proposed Coffs Harbour Bypass. Should this bypass be constructed it will provide a significant fire break (as well as access) from any bushfire impacting from the west/ northwest – being the fire paths typically associated with more significant fire behaviour, due to the hot dry winds brought from further inland.

The proposed access arrangements for Stage 2f-g (shown on Image 07) will provide a central loop road (with the use of Road 11) with two dead-ends being less than 200 metres in length. These arrangements in conjunction with the proposed perimeter fire trail will allow attending fire services to access the hazard interfaces while occupants are evacuated via the road system.

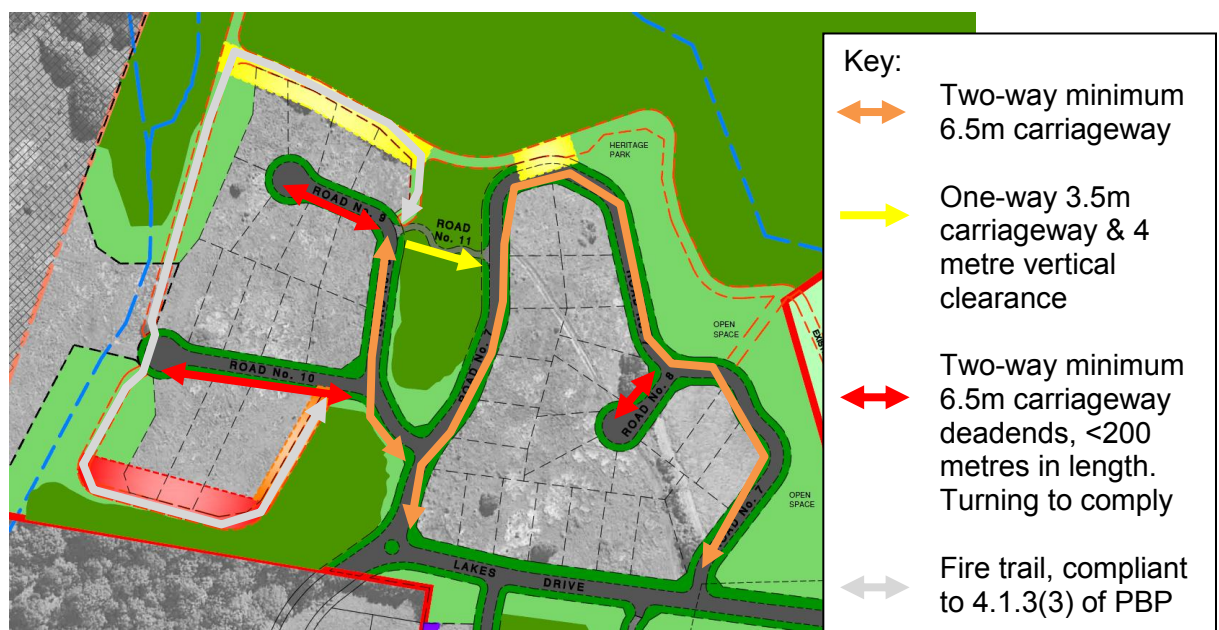


Image 07: Access arrangements for Stages 2d-g

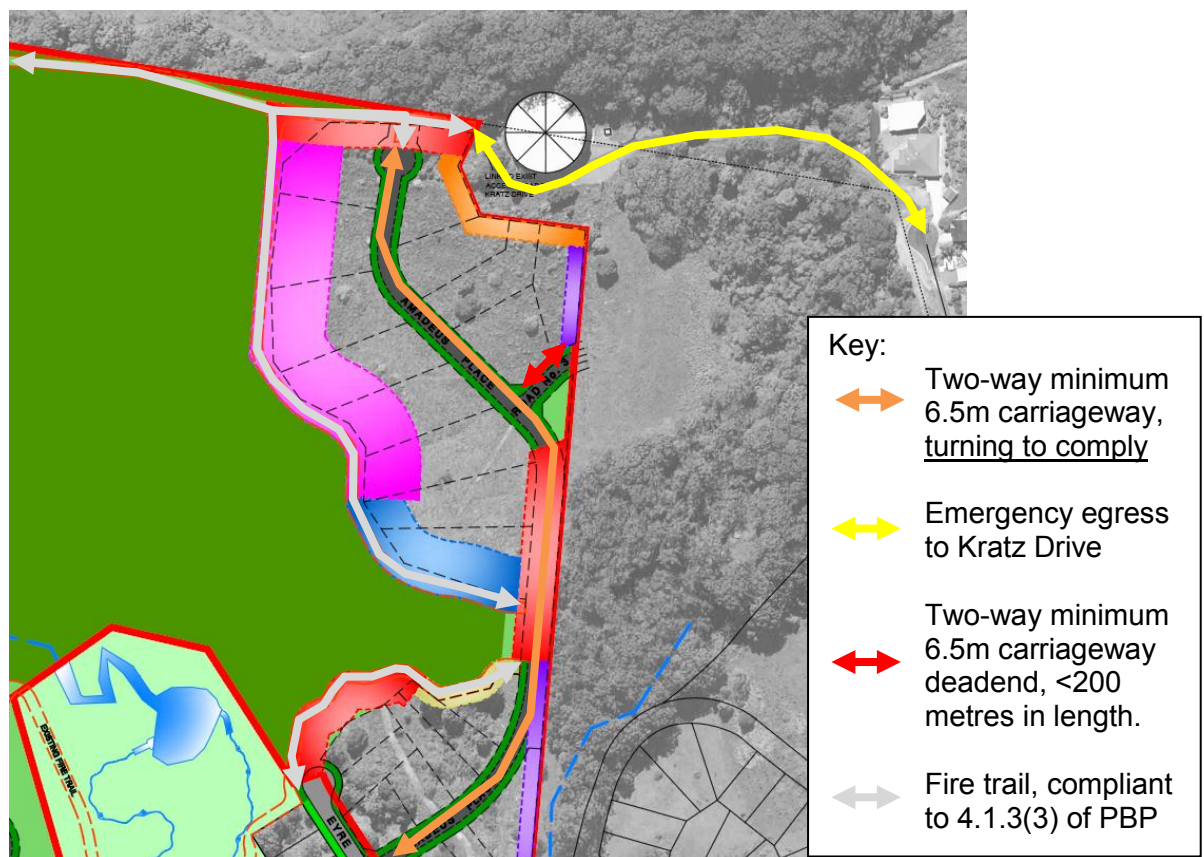


Image 08: Access arrangements for Stages 3b

It is also proposed to link the fire trail off Amadeus Place in Stage 3 into the road servicing Roberts Hill Reservoir. This would be intended to provide additional access for attending fire services. Coffs Harbour Council has made the same suggestion in their response and therefore this will be a recommendation of this assessment.

The proposed fire trail network will also provide perimeter access along the northern and north-western boundary of the subject site and will link Stage 2f to Stage 3. The location of this fire trail will provide strategic benefit to attending fire services undertaking fire suppression or hazard reduction activities and also help satisfy the property owners (developer or Council) duty of care under the *Rural Fires Act 1997*.

The ongoing management of the fire trail system similar to that of the Open Space area will be the immediate responsibility of the applicant (a.k.a. Astoria Group). It is understood that it is intended that Coffs Harbour City Council will acquire the Open Space and Bushland in due course. Prior to Coffs Harbour City Council acquiring any Open Space or Bushland they must acknowledge and agree to these ongoing management responsibilities of the fire trail network.

Attending fire crews can access the hazards directly via the proposed internal road network, perimeter roads and fire trail network for hazard reduction or fire suppression activities.

It should be noted that the proposed development will improve the current access provisions to the neighbouring development to the east (Lakes Estate) and west (Highlands Estate) of the subject site.

The proposed subdivision lot layout has been reviewed and compliance with the Performance Criteria for Public Roads as detailed in section 4.1.3(1) of Planning for Bush Fire Protection 2006 can be achieved with the recommendations herein.

7.0 Compliance Tables & Notes

The following tables sets out the projects compliance with *Planning for Bush Fire Protection – 2006* for residential subdivision as dictated by Appendix 2 *Planning for Bush Fire Protection 2006*.

Stage 1:

	North	East	South	West
Vegetation Structure	Remnant	Maintained curtilages	Forest	Grassland
Slope	0 degrees across	n/a	10 – 15 degrees down	0 – 5 degrees down
Required Asset Protection Zone	10 metres	n/a	40 metres	8.05 metres
Proposed Asset Protection Zone	>15 metres	n/a	≥40 metres	≥8.05 metres

Stage 2a:

	North	East	South	West
Vegetation Structure	Maintained curtilages	Remnant	Remnant	Grassland
Slope	n/a	5 – 10 degrees down	0 degrees across	0 – 5 degrees down
Required Asset Protection Zone	n/a	15 metres	7 metres	8.05 metres
Proposed Asset Protection Zone	n/a	≥15 metres	≥7 metres	≥8.05 metres

Stage 2b-c:

	North	East	South	West
Vegetation Structure	Managed Open Space	Managed Open Space	Maintained curtilages	Remnant
Slope	n/a	n/a	n/a	0 degrees & up
Required Asset Protection Zone	n/a	n/a	n/a	10 metres
Proposed Asset Protection Zone	n/a	n/a	n/a	>15 metres

Stage 2d-e:

	North	East	South	West
Vegetation Structure	Rainforest	Rainforest & Managed Open Space	Remnant	Remnant
Slope	5 – 10 degrees down	0 degrees & up	0 degrees & up	0 degrees & up
Required Asset Protection Zone	15 metres	10 metres	10 metres	10 metres
Proposed Asset Protection Zone	>20 metres	>40 metres	>30 metres	>20 metres

Stage 2f-g:

	North	East	South	West
Vegetation Structure	Rainforest	Remnant	Forest	Maintained grounds
Slope	10 degrees down	0 degrees & up	0 – 5 degrees down	n/a
Required Asset Protection Zone	15 metres	10 metres	20 metres	n/a
Proposed Asset Protection Zone	≥15 metres	≥10 metres	≥20 metres	n/a

Stage 3a:

	North	East	South	Northwest
Vegetation Structure	Forest	Forest	Maintained curtilages	Forest
Slope	10 degrees up	15 degrees up	n/a	0 degrees across
Required Asset Protection Zone	11 metres	8 metres	n/a	20 metres
Proposed Asset Protection Zone	≥12.03 metres	≥8.05 metres	n/a	≥20 metres

Stage 3b:

	North	East	South	West
Vegetation Structure	Forest	Grassland / Forest	Forest	Forest
Slope	0 degrees & up	0 - 5 degrees down	5 – 10 degrees down	10 - 15 degrees down
Required Asset Protection Zone	20 metres	8.05 metres / 20 metres	30 metres	40 metres
Proposed Asset Protection Zone	≥20 metres	≥8.05 metres / ≥20 metres	≥30 metres	≥40 metres

* The minimum required Asset Protection Zones (APZ) were determined from Table A2.5 of *Planning for Bush Fire Protection* 2006 and radiant heat design modelling consistent with Appendix 2 of *Planning for Bush Fire Protection* 2006.

Where multiple hazards were present to one aspect, both scenarios were assessed and the highest hazard applied.

Asset Protection Zones Compliance

All proposed new allotments can accommodate building footprints achieving (and in most instances exceeding) the minimum requirements under PBP 2006. This includes concerned lots 67, 76, 127, 136 and 128 as identified by the NSW Department of Planning and Infrastructure.

The available APZs consist of land entirely within the subject property including land within the proposed residential allotments, Open Space, fire trails and perimeter roads.

Construction Level Compliance

No new dwellings are proposed as part of this application. The proposed new allotments can accommodate a building footprint meeting or exceeding the minimum required Asset Protection Zones as required under section 4.1.3 of PBP. An independent assessment will be required under s79BA of the *Environmental Planning and Assessment Act* 1997 at the time of any future application for the construction of a new dwelling within the proposed new allotments.

As requested by the NSW Rural Fire Service we have verified that proposed Lots 67, 127 & 128 can accommodate building footprints outside the designated Flame Zone under AS3959 – 2009. These determinations were achieved by using both Table 2.4.2 of AS3959 – 2009 and bushfire design modelling consistent with Method 2, Appendix B of AS3959 – 2009. In this regard it should be noted that the northern APZ to Stage 3a was increased from 11 metres to 12.03 metres to ensure any future dwelling is not within the Flame Zone.

Access and Services

Guideline Ref.	Proposed Development Determinations
Property Access	The proposed development will involve the construction of an internal road network. This road network must comply with the requirements for Public Roads as detailed in section 4.1.3(1) of Planning for Bush Fire Protection 2006. The proposed subdivision lot layout has been reviewed and in consideration of the bushfire threat posed to the subject site in our opinion can achieve compliance with the Performance Criteria for Public Roads.
Water Supply	Hydrants will be extended along the proposed new internal road network as part of this development. Hydrant sizing, spacing and pressures must comply with AS2419.1 – 2005.
Evacuation	Evacuation will be possible by utilising proposed road infrastructure. We recommend that the occupants of the future dwellings complete a Bush Fire Safety Plan addressing “Prepare, Act, Survive” as advocated by the NSW RFS http://www.rfs.nsw.gov.au/ under publications / bushfire safety

8.0 Site & Bushfire Hazard Assessment

8.01 Planning for Bush Fire Protection - 2006

'Planning for Bush Fire Protection – 2006' (PBP) is applicable to those lands determined as being within a 'bushfire prone area' in accordance with a local Bushfire Prone Land Map as provided by the Rural Fire Service and Council.

The most appropriate method of determining site bushfire hazard under the terms of PBP is to consider the site in a singular form.

Bushfire prone areas are defined as those areas;

- *within or within 100m of high or medium bushfire hazards; or*
- *within or within 30m of low bushfire hazards.*

In this instance the subject site has been identified as being bushfire prone land therefore it is appropriate to apply PBP.

8.02 Australian Standard AS 3959 – 2009 'Construction of buildings in bushfire –prone areas'

Australian Standard 3959 – 2009 'Construction of buildings in bushfire-prone areas' provides for six (6) levels of building construction these being BAL - Low, BAL - 12.5, BAL - 19, BAL - 29, BAL - 40 and BAL - FZ. The Australian Standard 3959 specifies construction standards for buildings within various Bushfire Attack Levels as determined by the *Planning for Bush Fire Protection – 2006* document. The NSW Rural Fire Service will not accept deemed to satisfy provisions for BAL Flame Zone and therefore have a NSW variation to the listed standard provisions of BAL FZ under AS3959 - 2009.

8.03 Correlation between bushfire impact and AS3959

Bushfire Attack Level	Maximum radiant heat impact (kW/m ²)	Level of construction under AS3959-2009
Low		No special construction requirements
12.5	≤12.5	BAL - 12.5
19	12.6 to 19.0	BAL - 19
29	19.1 to 29.0	BAL - 29
40	29.1 to 40.0	BAL - 40
Flame Zone	>40.0	BAL FZ No deemed to satisfy provisions

8.04 Site Specific Bushfire Hazard Determination

All property development must be assessed on an individual basis as broad-brush approaches of documents such as PBP may not be applicable in every instance. The proposed development located at Lakes Estate – North Boambee Road, North Boambee Valley was assessed against the requirements of *Planning for Bush Fire Protection* 2006 noting the following:

- a) The hydrant system will be installed along the proposed internal road network in accordance with AS2419.1 – 2005.
- b) The proposed internal road network, inclusive of fire trials, in our opinion will satisfy the Performance Criteria for Public Roads under section 4.1.3(1) of *Planning for Bush Fire Protection* 2006.
- c) The available building footprints achieve (and in most instances exceed) the minimum required Asset Protection Zones.
- d) The proposed residential allotments can accommodate a building footprint outside the designated Flame Zone under Australian Standard 3959 'Construction of buildings in bushfire-prone areas' 2009.

8.05 Viable Construction Method

The objectives of *Planning for Bush Fire Protection* – 2006 are for the protection of life including fire fighters. Provided these objectives can be met the construction of buildings is feasible and both the Rural Fire Service and Council should be in a position to consider such applications.

No new dwellings are proposed as part of this application.

An independent assessment will be required under s79BA of the *Environmental Planning and Assessment Act* 1997 at the time of any future application for the construction of a dwelling within the proposed allotments.

It should be noted that the proposed residential allotments can accommodate a building footprint outside the designated Flame Zone under Australian Standard 3959 'Construction of buildings in bushfire-prone areas' 2009.

8.06 Bushfire Risk

In assessing the bushfire threat to the site and its proposed residential allotments it is important to have a holistic approach and assess the risk of a bushfire occurring and impacting the subject site.

To assess the overall bushfire threat posed to the subject site consideration was given to the likely / possible fire paths to the site from large bushfire hazards. Boambee State Forest (Boambee SF) is located to the west of the subject site and at its closest point is approximately 1.5 kilometres from the subject site.

The closest point of Boambee SF narrows to a band of vegetation which has direct link through neighbouring vegetated / private allotments with an approximate 260 metre width. This potential fire run is depicted on the following image with 'yellow' arrows. This band of vegetation appears to be intermixed with wet sclerophyll forest and rainforest communities (which would be consistent with the southerly aspect) and is separated from the vegetation surrounding the subject site by an area of grassland >60 metres wide. This area also contains a number of watercourses which would be expected to interrupt fire progression.

A bushfire impacting the site from this narrow band of vegetation would be under extreme bushfire weather conditions (i.e. high temperatures, prolonged period of drought, low humidity etc) to sufficiently cure the wet fuels, with strong westerly / north-westerly winds to direct fire behaviour across the steep slope. It should be noted that even with strong winds fire behaviour along this band is expected to be heavily influenced up slope away from the site due to the steep terrain.

Where a bushfire reaches the closest point of this band it is broken from the forest vegetation surrounding the subject site by >60 metres of grassland and future bypass. The fire once in the forest surrounding the subject site would then have to regenerate into a full quasi-steady state to replicate the bushfire impact designed for under Planning for Bush Fire Protection 2006.

It should also be noted that there is a vehicle trail along the northern perimeter of this band which would provide direct access for attending fire services.

The main interface of Boambee SF (which widens to a >3km interface) was found to be located >2.8 kilometres from the subject site. Impact from this larger section of Boambee SF would be limited to potential smoke and ember attack, although this would have to be under extreme / catastrophic fire conditions given the separation to the subject site.

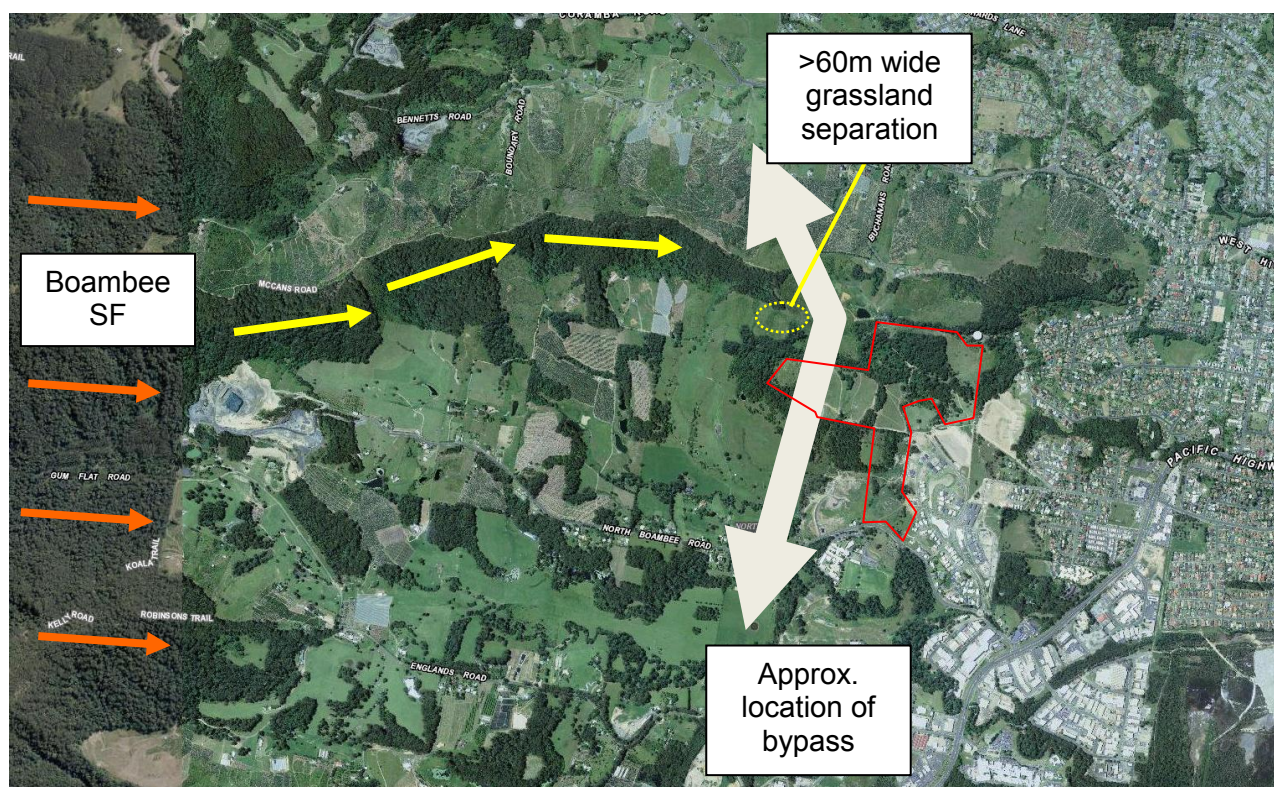


Image 09: Scenario 1 – Impacts from larger external hazards

The highest potential threat posed to the subject development was considered to be a bushfire starting by ember ignition or other sources within the subject site or immediately adjacent the subject site, particularly where an up slope run is available.

The two (2) areas which were assessed as posing the greatest potential threat the subject development were determined to be within the vegetation within a neighbouring property to the south of Stage 2g (depicted as 'orange' arrows on Image 10) and within the subject site to the west / southwest of Stage 3b (depicted as 'red' arrows on Image 10).

A significant bushfire impacting from these scenarios would be under extreme bushfire weather conditions (i.e. high temperatures, prolonged period of drought, low humidity etc) to sufficiently cure the wet fuels.

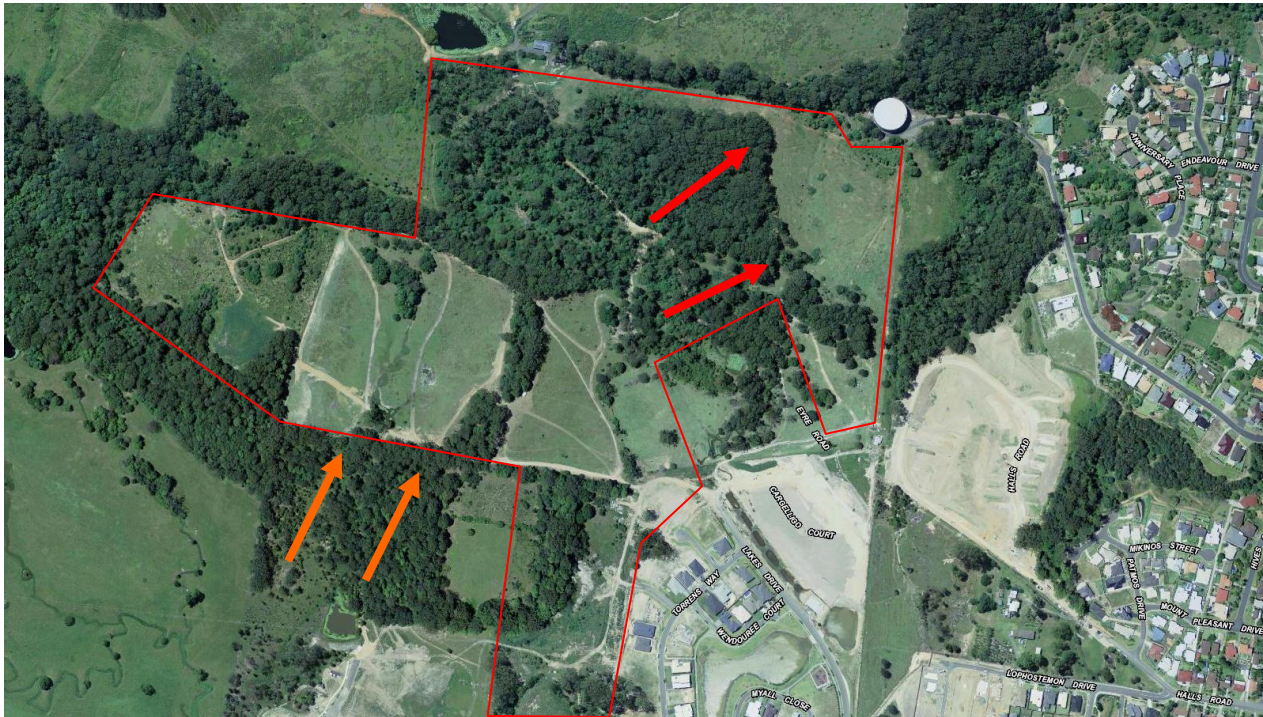


Image 10: Scenario 2 – Impacts from adjacent and internal hazards

In considerations of the site specific circumstances and the bushfire scenarios discussed above the subject development is not considered to be at a high or extreme risk of significant bushfire impact.

9.0 Recommendations

The following recommendations are provided as the minimum necessary for compliance with *Planning for Bush Fire Protection* – 2006 and Australian Standard 3959 'Construction of buildings in bushfire-prone areas' - 2009. Additional recommendations are provided to supplement these minimum requirements where considered necessary.

General

1. That the proposed development complies with the Bushfire Design Response Plan prepared by Astoria Group Pty Ltd (titled 'Subdivision Staging Plan Response to RFS', project no 912, dwg no A015-A017, issue A, dated 11/03/13) (attachment 01).

Asset Protection Zones

2. That all Asset Protection Zones detailed on the Bushfire Design Response Plan prepared by Astoria Group Pty Ltd (titled 'Subdivision Staging Plan Response to RFS', project no 912, dwg no A015-A017, issue A, dated 11/03/13) (attachment 01) be applied and where they burden residential allotments shall be formalised by way of a restriction to user under s88b of the Conveyancing Act 1919.
3. That all Open Space shall be maintained in accordance with an Asset Protection Zone as detailed in Appendix 2 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service document 'Standards for Asset Protection Zones'.
4. That all grounds within the proposed future residential subdivision lot (Lot 142), excluding areas identified as being Endangered Ecological Community or Primary Koala Habitat, shall be maintained in accordance with an Asset Protection Zone as detailed in Appendix 2 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service document 'Standards for Asset Protection Zones'.
5. That during the construction phase of any stage within the subject development a minimum 10 metre wide (or minimum required APZ as specified above) staging Asset Protection Zone shall be provided, until such time that the adjacent stage is developed
6. That any new landscaping within the residential allotments is to comply with Appendix 5 'Landscaping and Property Maintenance' under Planning for Bushfire Protection 2006.
7. That a 1.8 metre high radiant heat shield (i.e. colorbond or masonry fence) shall be installed along the western boundary of all Lots within Stage 1 and Stage 2a and the eastern boundary of Stage 3b prior to the construction of any dwelling within these allotments.
8. That a Fuel Management Plan shall be prepared to ensure the ongoing management of the Open Space, Nature Strips and Asset Protection Zones within the future residential subdivision lot (Lot 142).

Construction

N/A

Access

9. That proposed Road 7 shall be widened from a 7 metre carriageway to an 8 metres carriageway.
10. That proposed Roads 5 & 6 shall be widened from a 6 metre carriageway to a 6.5 metre carriageway.
11. That the proposed turning circles at the end of Roads 8-10 and Amadeus Place shall be amended to be consistent with one of the 'complying' turning provisions described in section 6.07 of this report.
12. That proposed Road 11, the northern end of Road 5 and the southern end of Road 6 provide a minimum 3.5 metre carriageway, minimum 4 metre vertical clearance and be one-way.
13. That all new internal roads shall comply with the requirements for Public Roads as detailed within section 4.1.3(1) of *Planning for Bush Fire Protection* 2006.
14. That all proposed fire trails shall comply with the requirements for Fire Trails as detailed within section 4.1.3(3) of *Planning for Bush Fire Protection* 2006.
15. That the proposed fire trail north of Amadeus Place provides a suitable vehicle connection to the existing access road around Roberts Hill Reservoir.

Water Supply

16. That the new hydrant sizing, spacing and pressures must comply with AS2419.1 – 2005.

Ongoing Management

17. Prior to Coffs Harbour City Council acquiring any Open Space / Nature Strips they shall acknowledge and agree to their ongoing management responsibilities of the Asset Protection Zones and Fire Trails.

10.0 Conclusion

Given that the property is deemed bushfire prone under Coffs Harbour Council's Bushfire Prone Land Map any development would need to meet the requirements of *Planning for Bush Fire Protection* 2006 and of the construction requirements of Australian Standard 3959 'Construction of buildings in bushfire-prone areas' 2009 if any are applicable. The determination of any bushfire hazard must be made on a site-specific basis that includes an assessment of the local bushland area and its possible impact to the subject site.

The development proposal relates to the subdivision of five (5) existing allotment located at North Boambee Road, North Boambee into one hundred and forty (140) new residential allotments, one (1) residual allotment (not to be developed at this point) and various Open Space and Bushland areas. The proposed development will also include all associated infrastructure, including roadways, footpaths, and services.

This type of development is considered integrated under section 100B of the Rural Fires Act 1997. As the matter is a Part 3a application the NSW Department of Planning will refer the application to the NSW Rural Fire Service during their assessment process.

The vegetation identified as being a potential bushfire hazard to the proposed residential allotments is located to the northeast, south and west within neighbouring allotments and also throughout the subject site where areas of native bushland are proposed to be retained.

The minimum required Asset Protection Zones (APZ) were determined from Table A2.5 of *Planning for Bush Fire Protection* 2006 and radiant heat design modelling consistent with Appendix 2 of *Planning for Bush Fire Protection* 2006. All proposed residential allotments can accommodate a building footprint achieving (and in most instances exceeding) the minimum required Asset Protection Zones for Residential Subdivisions.

No new dwellings are proposed as part of this application. Individual lot assessments will be required under s79BA of the *Environmental Planning and Assessment Act* 1997 at the time of any future application for the construction of a dwelling within the proposed allotments. It should be noted that all proposed residential allotments can accommodate a building footprint outside the designated Flame Zone under Australian Standard 3959 'Construction of buildings in bushfire-prone areas' 2009.

The proposed access provisions and water supply must satisfy the requirements of section 4.1.3 under *Planning for Bush Fire Protection* 2006. The proposed subdivision lot layout has been reviewed and in our opinion compliance can be achieved by way of satisfying the Acceptable Solutions and/or Performance Criteria. Specific recommendations have been included herein where considered necessary.

In accordance with the bushfire safety measures contained in this report, and consideration of the site specific bushfire risk assessment it is our opinion that when combined, they will provide a reasonable and satisfactory level of bushfire protection to the subject development and also satisfy both the Rural Fire Service's concerns and those of the NSW Department of Planning.

We are therefore in support of the application.

Should you have any enquiries regarding this project please contact me at our office.

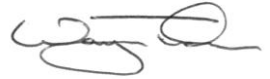
Prepared by
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Disclaimer:

Quote from *Planning for Bush Fire Protection* 2006, 'Any representation, statement opinion, or advice expressed or implied in this publication is made in good faith on the basis that the State of New South Wales, the NSW Rural Fire Service, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice referred to above..'

Similarly the interpretations and opinions provided by Building Code and Bushfire Hazard Solutions in regard to bushfire protection are also given in the same good faith.

11.0 Annexure 01

List of Referenced Documents

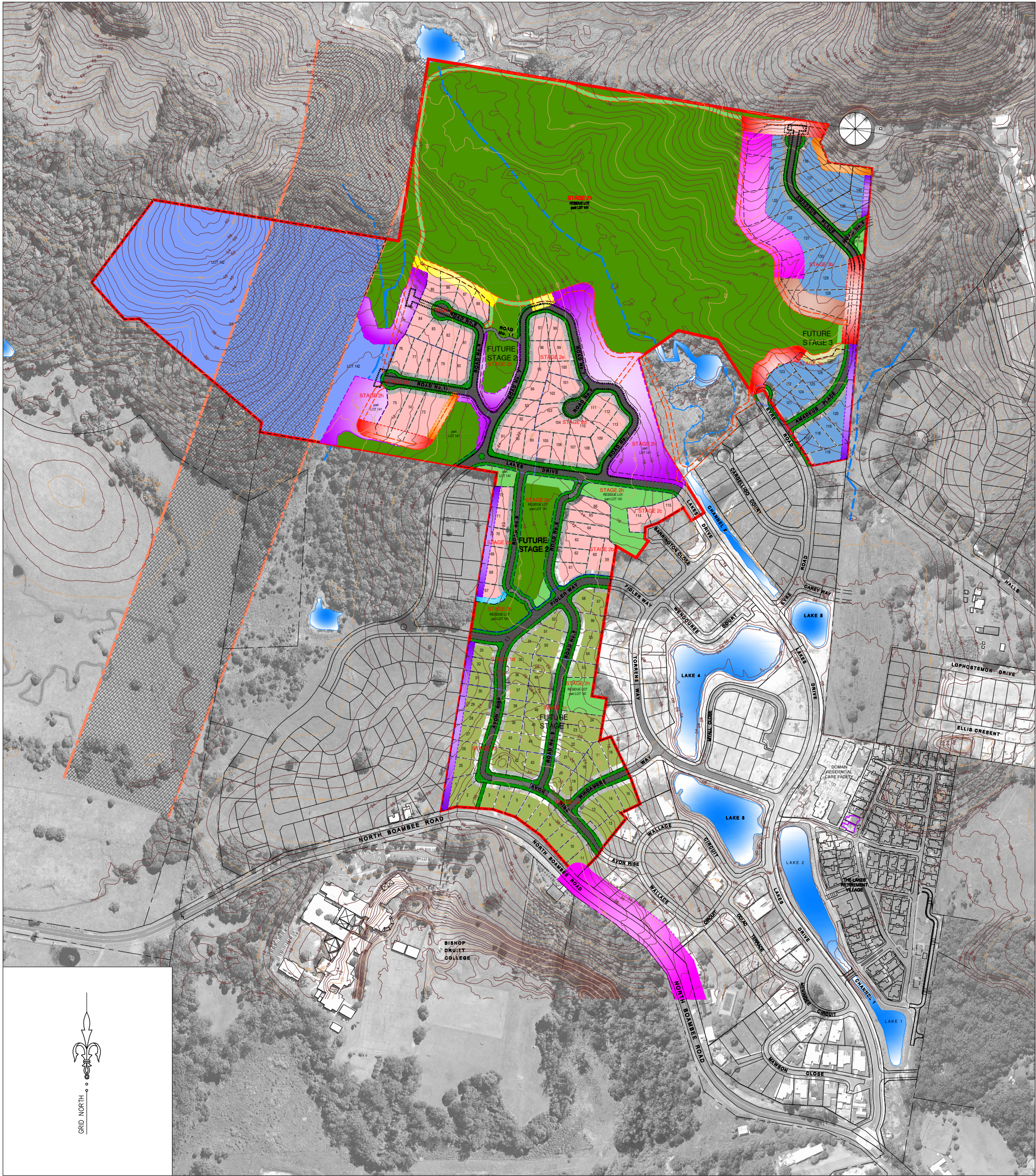
- a) *Environmental Planning and Assessment Act* 1979
- b) *Rural Fires Act* 1997 as amended
- c) '*Planning for Bush Fire Protection*' 2006 - NSW Rural Fire Services & Planning NSW
- d) 'Construction of buildings in bushfire prone areas' - AS 3959 – 2009 (as - amended) – Standards Australia
- e) 'Coffs Harbour Council's Bushfire Prone Land Map'
- f) '*North Boambee Valley (east)*' Development Control Plan 2008
- g) 'Subdivision Stage 1 Plan' dwg no A012, rev C, 'Subdivision Stage 2 Plan' dwg no A013, rev D and 'Subdivision Stage 3 Plan' dwg no A014, rev D (all prepared by Astoria Group Pty Ltd)
- h) Acknowledgements to:
 - UBD Directories
 - NSW Department of Lands – SixViewer
 - Street-directory.com.au

Attachments

Attachment 01:	Bushfire Response Plan
Attachment 02:	Comment on Bushfire Response Plan
Attachment 03:	Bushfire Attack Assessment Reports

Attachment 01

Bushfire Response Plan



LEGEND

WATERWAY

FIRE TRAIL

FUTURE HIGHWAY
BI-PASS CORRIDOR

RESERVED MANAGED
AS APZ

ASSET PROTECTION
ZONE (7m APZ)

ASSET PROTECTION
ZONE (8.05m APZ)

ASSET PROTECTION
ZONE (10m APZ)

ASSET PROTECTION
ZONE (12.03m APZ)

ASSET PROTECTION
ZONE (15m APZ)

ASSET PROTECTION
ZONE (20m APZ)

ASSET PROTECTION
ZONE (30m APZ)

ASSET PROTECTION
ZONE (40m APZ)

THESE LINES REPRESENT AMENDED ROAD DESIGN AND WIDTHS
TO ADDRESS BUSHFIRE SAFETY ISSUES.
(REFER TO REPORT BY BC & BHS DATED 11 MARCH 2013)

4m WIDE ONE WAY ROADS WITH
4M VERTICAL CLEARANCE

5.5m WIDE SPEED REDUCING
ROADWAY

STAGE 1 BUILDING AREA

STAGE 2 BUILDING AREA

STAGE 3 BUILDING AREA

AMENDMENTS			
ISSUE	DRAWN	DESCRIPTION	DATE
A	DD	ISSUED FOR RFS APPROVAL	11/03/13
NOTES: Lengths shown are in metres. Distances & Areas are subject to further Survey. Building setbacks according to DCP are as follows: 6 metre setback from Primary Street Frontage. 3 metre setback from secondary Street (Corner Lots) 20 metre setback from Creek & Major water Courses. 900mm setback from side or rear boundaries and This drawing is the copyright of ASTORIA GROUP Pty Ltd and may not be altered, reproduced or transmitted in any form or by any means, in part or in whole without the written permission of ASTORIA GROUP Pty Ltd			

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PROJECT TITLE

LAKES DRIVE, NORTH BOAMBEE,
COFFS HARBOUR FUTURE SUB-DIVISION

DRAWING TITLE

SUBDIVISION STAGING PLAN_Response TO RFS

CHECKED

MS

SCALE

0 25 50 100 150m

SCALE 1 : 5000 @ A3

DRAWN

DD

PROJECT No.

912

LOT No.

-

DWG No.

A015

REV. No.

A



LEGEND

- WATERWAY

FIRE TRAIL

FUTURE HIGHWAY BI-PASS CORRIDOR

RESERVED MANAGED AS APZ

ASSET PROTECTION ZONE (7m APZ)

ASSET PROTECTION ZONE (8.05m APZ)
- ASSET PROTECTION ZONE (10m APZ)

ASSET PROTECTION ZONE (12.03m APZ)

ASSET PROTECTION ZONE (15m APZ)

ASSET PROTECTION ZONE (20m APZ)

ASSET PROTECTION ZONE (30m APZ)

ASSET PROTECTION ZONE (40m APZ)
- THESE LINES REPRESENT AMENDED ROAD DESIGN AND WIDTHS TO ADDRESS BUSHFIRE SAFETY ISSUES. (REFER TO REPORT BY BC & BHS DATED 11 MARCH 2013)

4m WIDE ONE WAY ROADS WITH 4M VERTICAL CLEARANCE

5.5m WIDE SPEED REDUCING ROADWAY
- STAGE 1 BUILDING AREA

STAGE 2 BUILDING AREA

STAGE 3 BUILDING AREA

AMENDMENTS			
ISSUE	DRAWN	DESCRIPTION	DATE
A	DD	ISSUED FOR RFS APPROVAL	11/03/13
NOTES: Lengths shown are in metres. Distances & Areas are subject to further Survey. Building setbacks according to DCP are as follows: 6 metre setback from Primary Street Frontage. 3 metre setback from secondary Street (Corner Lots) 20 metre setback from Creek & Major water Courses. 900mm setback from side or rear boundaries and This drawing is the copyright of ASTORIA GROUP Pty Ltd and may not be altered, reproduced or transmitted in any form or by any means, in part or in whole without the written permission of ASTORIA GROUP Pty Ltd			

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PROJECT TITLE

LAKES DRIVE, NORTH BOAMBEE,
COFFS HARBOUR FUTURE SUB-DIVISION

DRAWING TITLE

SUBDIVISION STAGE 1 PLAN_Response TO RFS
LOTS 1-58 AND PART LOT 141 (RESIDUAL)

CHECKED

MS

PROJECT NO.

912

DRAWN

DD

LOT No.

-

SCALE

0 10 20 40 60m

SCALE 1 : 2000 @ A3

DWG No.

A016

REV. No.

A



LEGEND

WATERWAY

FIRE TRAIL

FUTURE HIGHWAY BI-PASS CORRIDOR

RESERVED MANAGED AS APZ

ASSET PROTECTION ZONE (7m APZ)

ASSET PROTECTION ZONE (8.05m APZ)

ASSET PROTECTION ZONE (10m APZ)

ASSET PROTECTION ZONE (12.03m APZ)

ASSET PROTECTION ZONE (15m APZ)

ASSET PROTECTION ZONE (20m APZ)

ASSET PROTECTION ZONE (30m APZ)

ASSET PROTECTION ZONE (40m APZ)

THESE LINES REPRESENT AMENDED ROAD DESIGN AND WIDTHS TO ADDRESS BUSHFIRE SAFETY ISSUES. (REFER TO REPORT BY BC & BHS DATED 11 MARCH 2013)

4m WIDE ONE WAY ROADS WITH 4M VERTICAL CLEARANCE

5.5m WIDE SPEED REDUCING ROADWAY

BUILDING AREA

STAGE 2 BUILDING AREA

BUILDING AREA

AMENDMENTS			
ISSUE	DRAWN	DESCRIPTION	DATE
A	DD	ISSUED FOR RFS APPROVAL	11/03/13
NOTES: Lengths shown are in metres. Distances & Areas are subject to further Survey. Building setbacks according to DCP are as follows: 6 metre setback from Primary Street Frontage. 3 metre setback from secondary Street (Corner Lots) 20 metre setback from Creek & Major water Courses. 900mm setback from side or rear boundaries and This drawing is the copyright of ASTORIA GROUP Pty Ltd and may not be altered, reproduced or transmitted in any form or by any means, in part or in whole without the written permission of ASTORIA GROUP Pty Ltd			

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PROJECT TITLE

LAKES DRIVE, NORTH BOAMBEE,
COFFS HARBOUR FUTURE SUB-DIVISION

DRAWING TITLE

SUBDIVISION STAGE 2 PLAN Response TO RFS
LOTS 58-115, LOT 142 AND PART LOT 141 (RESIDUAL)

CHECKED

MS

PROJECT No.

912

DRAWN

DD

LOT No.

-

SCALE

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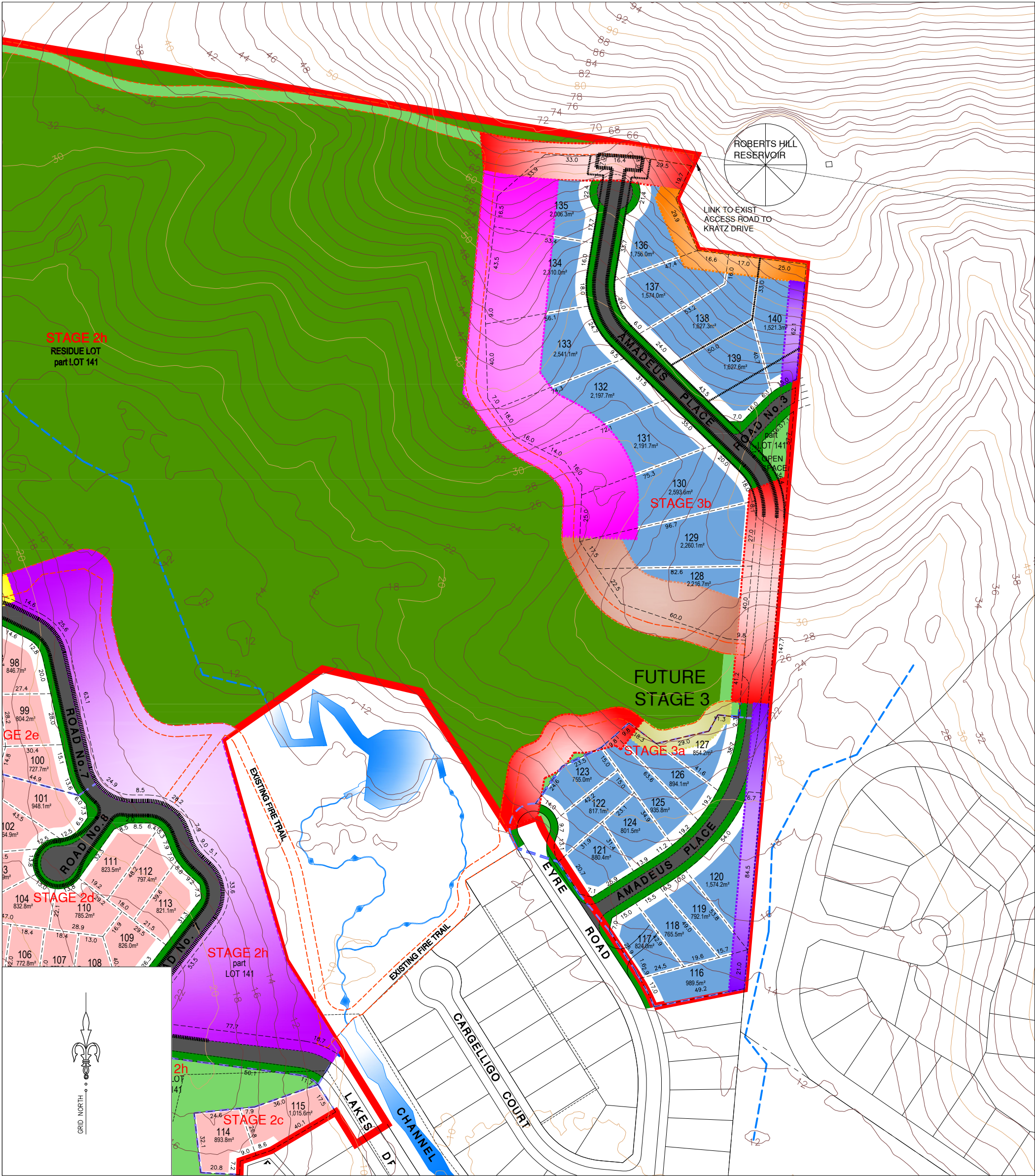
SCALE 1 : 2000 @ A3

DWG No.

A017

REV. No.

A



LEGEND

- WATERWAY
 - FIRE TRAIL
 - FUTURE HIGHWAY BI-PASS CORRIDOR
 - RESERVED MANAGED AS APZ
 - ASSET PROTECTION ZONE (7m APZ)
 - ASSET PROTECTION ZONE (8.05m APZ)
 - ASSET PROTECTION ZONE (10m APZ)
 - ASSET PROTECTION ZONE (12.03m APZ)
 - ASSET PROTECTION ZONE (15m APZ)
 - ASSET PROTECTION ZONE (20m APZ)
 - ASSET PROTECTION ZONE (30m APZ)
 - ASSET PROTECTION ZONE (40m APZ)
 - STAGE 1 BUILDING AREA
 - STAGE 2 BUILDING AREA
 - STAGE 3 BUILDING AREA
- THESE LINES REPRESENT AMENDED ROAD DESIGN AND WIDTHS TO ADDRESS BUSHFIRE SAFETY ISSUES. (REFER TO REPORT BY BC & BHS DATED 11 MARCH 2013)
- 4m WIDE ONE WAY ROADS WITH 4M VERTICAL CLEARANCE
- 5.5m WIDE SPEED REDUCING ROADWAY

AMENDMENTS			
ISSUE	DRAWN	DESCRIPTION	DATE
A	DD	ISSUED FOR RFS APPROVAL	11/03/13
B	DD	CORRECTED DRAWING NUMBER	19/03/13
NOTES: Lengths shown are in metres. Distances & Areas are subject to further Survey. Building setbacks according to DCP are as follows: 6 metre setback from Primary Street Frontage. 3 metre setback from secondary Street (Corner Lots) 20 metre setback from Creek & Major water Courses. 900mm setback from side or rear boundaries and			
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	ASTORIA GROUP PTY LTD 55 Grandview Street, Pymble NSW 2073 TEL: 9488 6800 FAX: 9144 6864	CLIENT NOUBIA PTY LTD 55 Grandview Street, Pymble NSW 2073 TEL: 9488 6800 FAX: 9144 6864	PROJECT TITLE LAKES DRIVE, NORTH BOAMBEE, COFFS HARBOUR FUTURE SUB-DIVISION	CHECKED MS	DRAWN DD	SCALE 0 10 20 40 60m SCALE 1 : 2000 © A3	
				PROJECT NO. 912	LOT No. -	DWG No. A018	REV. No. B

Attachment 02

Comment on Bushfire Response Plan



Building Code & Bushfire Hazard Solutions

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PO Box 124, Berowra NSW 2081
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Certified Business
Bushfire Planning & Design
BPD-BA-02354

Astoria Group
PO Box 6215
PYMBLE NSW 2073

11th March 2013
Our Ref. 130580

Attn: Mr George Khouri

**Re: PROPOSED RESIDENTIAL SUBDIVISION
LAKES ESTATE - NORTH BOAMBEE ROAD, NORTH BOAMBEE VALLEY
BUSHFIRE RESPONSE PLAN**

Dear George,

The purpose of this statement is to provide a direct comment on the Bushfire Design Response Plan prepared by Astoria Group Pty Ltd (titled 'Subdivision Staging Plan Response to RFS', project no 912, dwg no A015-A017, issue A, dated 11/03/13) in relation to its ability to address the recommendations of the Bushfire Hazard Assessment Report prepared by Building Code and Bushfire Hazard Solutions P/L (ref 130580, dated 11th March 2013).

I have reviewed the Bushfire Design Response Plan prepared by Astoria Group Pty Ltd and am of the opinion that it satisfactorily addresses the specific access recommendations (being recommendations 9-12 and 15) and satisfactorily depicts the minimum required Asset Protection Zones as detailed in the Bushfire Hazard Assessment Report.

Should you require any further information or clarification please do not hesitate to contact the under signed.

Prepared by
Building Code & Bushfire Hazard Solutions

Stuart McMonnies

G. D. Design in Bushfire Prone Areas.
Certificate IV Fire Technology
Fire Protection Association of Australia BPAD – A Certified Practitioner
Certification number – BPD – PA-09400

Attachment 03

Bushfire Attack Assessment Report

Grassland Shielding – Stages 2 & 3



Bushfire Attack Assessment Report

AS3959 (2009) Version 1.4.2

Print Date: 18/02/2013

Assessment Date: 18/02/2013

Site Street Address: Lakes Estate, North Boambee

Assessor: admin; admin

Fire Danger Index: 80 (Fire Weather Area: North Coast)

Local Government Area: Coffs Harbour

Alpine Area: No

Equations Used

Transmissivity: Fuss and Hammins, 2002

Flame Length: RFS PBP, 2001

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: West - Stage 2 - Base

Vegetation Information

Vegetation Type: Grassland

Vegetation Group: Grassland

Vegetation Slope: 5 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 6

Overall Fuel Load(t/ha): 6

Site Information

Site Slope: 0 Degrees

Site Slope Type: Level

Elevation of Receiver(m): Default

APZ/Separation(m): 8.05

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

Program Outputs

Category of Attack: VERY HIGH

Peak Elevation of Receiver(m): 3.48

Level of Construction: BAL 40

Fire Intensity(kW/m): 45523

Radiant Heat(kW/m2): 33.36

Flame Angle (degrees): 60

Flame Length(m): 8.04

Maximum View Factor: 0.499

Rate Of Spread (km/h): 14.68

Inner Protection Area(m): 8

Transmissivity: 0.879

Outer Protection Area(m): 0

Run Description: West - Stage 2 - Final			
<u>Vegetation Information</u>			
Vegetation Type:	Grassland	Vegetation Group:	Grassland
Vegetation Slope:	5 Degrees	Vegetation Slope Type:	Downslope
Surface Fuel Load(t/ha):	6	Overall Fuel Load(t/ha):	6
<u>Site Information</u>			
Site Slope	0 Degrees	Site Slope Type:	Level
Elevation of Receiver(m)	Default	APZ/Separation(m):	8.05
<u>Fire Inputs</u>			
Veg./Flame Width(m):	100	Flame Temp(K)	1090
<u>Calculation Parameters</u>			
Flame Emissivity:	95	Relative Humidity(%):	25
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308
Moisture Factor:	5		
<u>Program Outputs</u>			
Category of Attack:	HIGH	Peak Elevation of Receiver(m):	3.48
Level of Construction:	BAL 29	Fire Intensity(kW/m):	45523
Radiant Heat(kW/m2):	25.87	Flame Angle (degrees):	60
Flame Length(m):	8.04	Maximum View Factor:	0.387
Rate Of Spread (km/h):	14.68	Inner Protection Area(m):	8
Transmissivity:	0.879	Outer Protection Area(m):	0
Run Description: West - Stage 2 - Shield			
<u>Vegetation Information</u>			
Vegetation Type:	Grassland	Vegetation Group:	Grassland
Vegetation Slope:	5 Degrees	Vegetation Slope Type:	Downslope
Surface Fuel Load(t/ha):	0.3	Overall Fuel Load(t/ha):	0.3
<u>Site Information</u>			
Site Slope	0 Degrees	Site Slope Type:	Level
Elevation of Receiver(m)	Default	APZ/Separation(m):	8.05
<u>Fire Inputs</u>			
Veg./Flame Width(m):	100	Flame Temp(K)	1090
<u>Calculation Parameters</u>			
Flame Emissivity:	95	Relative Humidity(%):	25
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308
Moisture Factor:	5		
<u>Program Outputs</u>			
Category of Attack:	LOW	Peak Elevation of Receiver(m):	0.89
Level of Construction:	BAL 12.5	Fire Intensity(kW/m):	2276
Radiant Heat(kW/m2):	7.39	Flame Angle (degrees):	84
Flame Length(m):	1.8	Maximum View Factor:	0.112
Rate Of Spread (km/h):	14.68	Inner Protection Area(m):	8
Transmissivity:	0.872	Outer Protection Area(m):	0

APZ - Stage 3a



Bushfire Attack Assessment Report

AS3959 (2009) Version 1.4.2

Print Date: 1/03/2013

Assessment Date: 26/02/2013

Site Street Address: Lakes Estate - Stage 3a, North Boambee Valley

Assessor: admin; admin

Fire Danger Index: 80 (Fire Weather Area: North Coast)

Local Government Area: Coffs Harbour

Alpine Area: No

Equations Used

Transmissivity: Fuss and Hammins, 2002

Flame Length: RFS PBP, 2001

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: East

Vegetation Information

Vegetation Type: Forest

Vegetation Group: Forest and Woodland

Vegetation Slope: 15 Degrees

Vegetation Slope Type: Upslope

Surface Fuel Load(t/ha): 20

Overall Fuel Load(t/ha): 25

Site Information

Site Slope 0 Degrees

Site Slope Type: Level

Elevation of Receiver(m) Default

APZ/Separation(m): 8

Fire Inputs

Veg./Flame Width(m): 40

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

Program Outputs

Category of Attack: HIGH

Peak Elevation of Receiver(m): 3.31

Level of Construction: BAL 29

Fire Intensity(kW/m): 8810

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 63

Flame Length(m): 7.43

Maximum View Factor: 0.435

Rate Of Spread (km/h): 0.68

Inner Protection Area(m): 8

Transmissivity: 0.876

Outer Protection Area(m): 0

Run Description: North			
<u>Vegetation Information</u>			
Vegetation Type:	Forest	Vegetation Group:	Forest and Woodland
Vegetation Slope:	10 Degrees	Vegetation Slope Type:	Upslope
Surface Fuel Load(t/ha):	20	Overall Fuel Load(t/ha):	25
<u>Site Information</u>			
Site Slope	10 Degrees	Site Slope Type:	Upslope
Elevation of Receiver(m)	Default	APZ/Separation(m):	11
<u>Fire Inputs</u>			
Veg./Flame Width(m):	100	Flame Temp(K)	1090
<u>Calculation Parameters</u>			
Flame Emissivity:	95	Relative Humidity(%):	25
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308
Moisture Factor:	5		
<u>Program Outputs</u>			
Category of Attack:	HIGH	Peak Elevation of Receiver(m):	5.84
Level of Construction:	BAL 29	Fire Intensity(kW/m):	12439
Radiant Heat(kW/m2):	29	Flame Angle (degrees):	56
Flame Length(m):	9.26	Maximum View Factor:	0.439
Rate Of Spread (km/h):	0.96	Inner Protection Area(m):	11
Transmissivity:	0.869	Outer Protection Area(m):	0
Run Description: North - Construction			
<u>Vegetation Information</u>			
Vegetation Type:	Forest	Vegetation Group:	Forest and Woodland
Vegetation Slope:	10 Degrees	Vegetation Slope Type:	Upslope
Surface Fuel Load(t/ha):	25	Overall Fuel Load(t/ha):	35
<u>Site Information</u>			
Site Slope	10 Degrees	Site Slope Type:	Upslope
Elevation of Receiver(m)	Default	APZ/Separation(m):	12.03
<u>Fire Inputs</u>			
Veg./Flame Width(m):	100	Flame Temp(K)	1090
<u>Calculation Parameters</u>			
Flame Emissivity:	95	Relative Humidity(%):	25
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308
Moisture Factor:	5		
<u>Program Outputs</u>			
Category of Attack:	VERY HIGH	Peak Elevation of Receiver(m):	6.73
Level of Construction:	BAL 40	Fire Intensity(kW/m):	21768
Radiant Heat(kW/m2):	35.91	Flame Angle (degrees):	50
Flame Length(m):	12.02	Maximum View Factor:	0.542
Rate Of Spread (km/h):	1.2	Inner Protection Area(m):	8
Transmissivity:	0.871	Outer Protection Area(m):	4