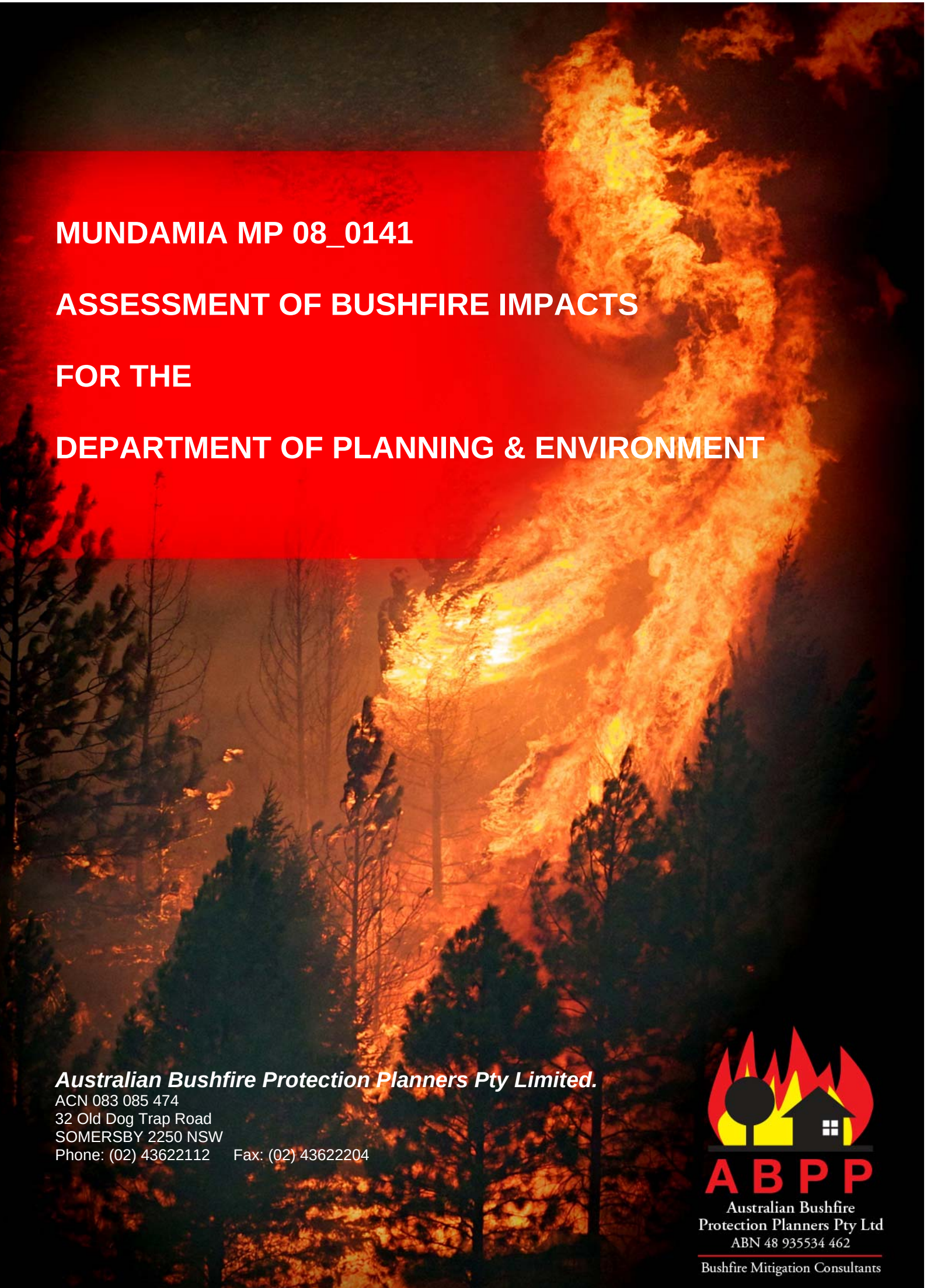


MUNDAMIA MP 08_0141

ASSESSMENT OF BUSHFIRE IMPACTS

FOR THE

DEPARTMENT OF PLANNING & ENVIRONMENT

Australian Bushfire Protection Planners Pty Limited.
ACN 083 085 474
32 Old Dog Trap Road
SOMERSBY 2250 NSW
Phone: (02) 43622112 Fax: (02) 43622204

ABPP
Australian Bushfire
Protection Planners Pty Ltd
ABN 48 935534 462
Bushfire Mitigation Consultants

MUNDAMIA MP 08_0141

ASSESSMENT OF BUSHFIRE IMPACTS

FOR THE

NSW DEPARTMENT OF PLANNING & ENVIRONMENT

Assessment Number	Document	Preparation Date	Issue Date	Directors Approval
B183282 - 2	Final	29.01.2019	01.02.2019	*G.L.Swain*

Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

EXECUTIVE SUMMARY

Australian Bushfire Protection Planners Pty Limited has been commissioned by the Department of Planning & Environment to assess the bushfire impacts associated with the Mundamia MP 08_0141, Lot 3 in DP 568613 and Lot 384 in DP 755952 George Evans Road Mundamia, particularly consideration of the acceptability of the evacuation timeframes, risks to the community, compliance with *Planning for Bushfire Protection,* access and any other relevant matter.

The proposal consists of a staged development creating a total of 319 residential lots, 1 commercial lot and 4 public reserves.

Figure 1 – Location of the Proposal

Source – Eco Logical Australia Pty Ltd – Bushfire Protection Assessment 25 May 2012

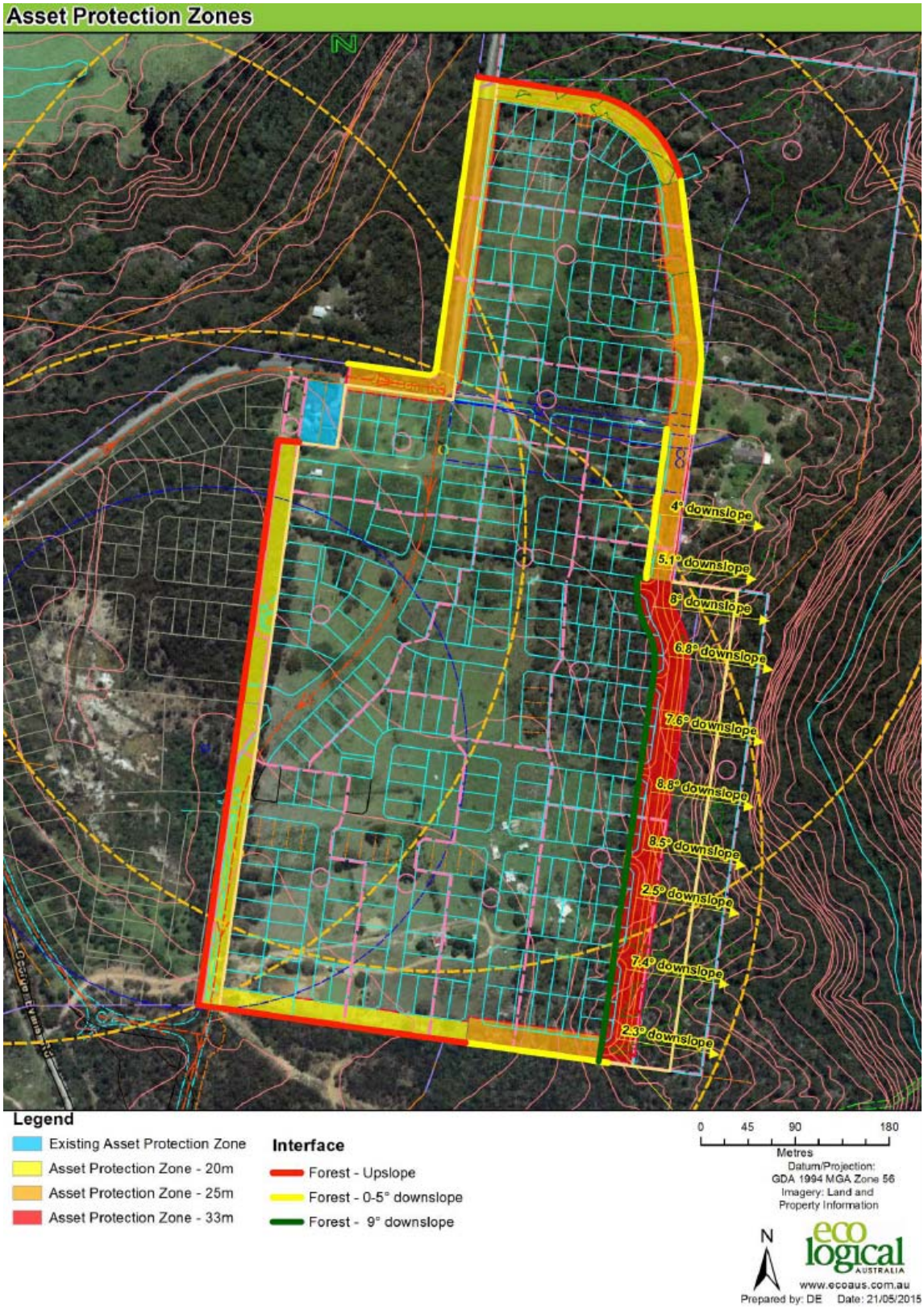
Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

Figure 2 – Plan of proposed Subdivision

Source – Eco Logical Australia Pty Ltd – Bushfire Protection Assessment 22 May 2015

Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

Figure 3 – Plan of Vegetation, Slope and APZs



Source – Eco Logical Australia Pty Ltd – Bushfire Protection Assessment 22 May 2015

The subdivision proposal also includes the re-alignment of George Evan Road.

Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

The Department has looked into the background of the rezoning of the site to see how bushfire issues were addressed at that time and identified that in Council's report, which considered submissions on the exhibition of the draft Shoalhaven LEP 2013, Council deferred consideration of detailed bushfire issues to future Development Applications.

Section 8 – Access and Egress of the Bushfire Protection Assessment Report prepared by Eco Logical Australia states:

8.1 Public roads

Egress/ingress routes for the proposed subdivision are available from the south-west corner (via the realigned George Evans Road) and western side (via existing Jonsson Road) and north-western corner (Jonsson Road). A separate subdivision is proposed to the west, and road design within each of the two subdivisions has adopted a configuration compatible with each other (i.e. roads within each individual subdivision align). This is a note only; access for the proposed subdivision on the subject land does not rely on any access provisions within the neighbouring proposal.

The proposed public roads within the subdivision can comply with all of the PBP design requirements as outlined **Table 1**.

8.2 Access and egress

Future dwellings within the proposed subdivision will be accessed via standard residential driveways. As outlined in **Table 1**, these residential driveways do not need to comply with any specific bushfire access design requirements because the following applies to the proposed subdivision:

(i) The proposed subdivision will be serviced by reticulated water

(ii) The furthest point of any future dwellings within the proposed subdivision from the nearest hydrant will be no greater than 70 m; and

(iii) The speed limit within the proposed subdivision will be less than 70 kph.

The 2012 ELA report notes that the re-alignment of George Evan Road to provide direct access to the proposed subdivision in the south-west corner has been approved [in DA091519] and has commenced.

The 2012 and 2015 reports do not examine the bushfire risk to this road and only examines the road network within the subdivision precinct.

This report examines the bushfire risk to the access roads to the subdivision precinct.

Graham Swain,
Managing Director
Australian Bushfire Protection Planners Pty Limited.

Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

TABLE OF CONTENTS

EXECUTIVE SUMMARY..... 3

TABLE OF CONTENTS 7

SECTION 1 – INTRODUCTION
1.1 Aim of this Report 8
1.2 Objectives of this Report..... 8
1.3 Scope of Work..... 8

SECTION 2 – DESCRIPTION OF STUDY AREA
2.1 Study Area 9
2.2 Site Assessment 9
2.3 Existing Land Use..... 10
2.4 Land Use Zoning..... 10
2.5 Topography 11
2.6 Vegetation on the vacant land within the Study Area..... 11

SECTION 3 – BUSHFIRE RISK ASSESSMENT
3.1 Introduction..... 12
3.2 Risk Assessment..... 12
3.3 Risk Statement 16
3.4 Summary of Bushfire Risk 17

SECTION 4 – CONCLUSION..... 18

REFERENCES 20

Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

SECTION 1

INTRODUCTION

1.1 Aim of this Report.

The aim of this report is to prepare an independent assessment of the bushfire impacts associated with proposal, particularly consideration of the acceptability of the evacuation timeframes, risks to the community, compliance with *Planning for Bushfire Protection*, access and any other relevant matter.

1.2 Objectives of the Report.

The objectives of the report are to obtain advice on the bushfire impacts, particularly in relation to evacuation timeframes and the risks to the community.

1.3 Scope of Work.

The assessment is to be undertaken with reference to the following methodology:

(a) Identify the fire scenarios including an assessment of:

- The exposure to possible ignition/fire sources;
- Vegetation type and likely fuel loads and fire hazards arising;
- The likely fire runs during severe fire danger periods.

(b) Identify and describe the surrounding natural environment:

- The steepness, slope/terrain; and

(c) Identify and describe the proposed development and consequences of a bushfire:

- Assumed fire impacts / consequence if exposed to fire events; including during severe/catastrophic fire danger periods; and
- Define each level of consequence stating level of impacts.

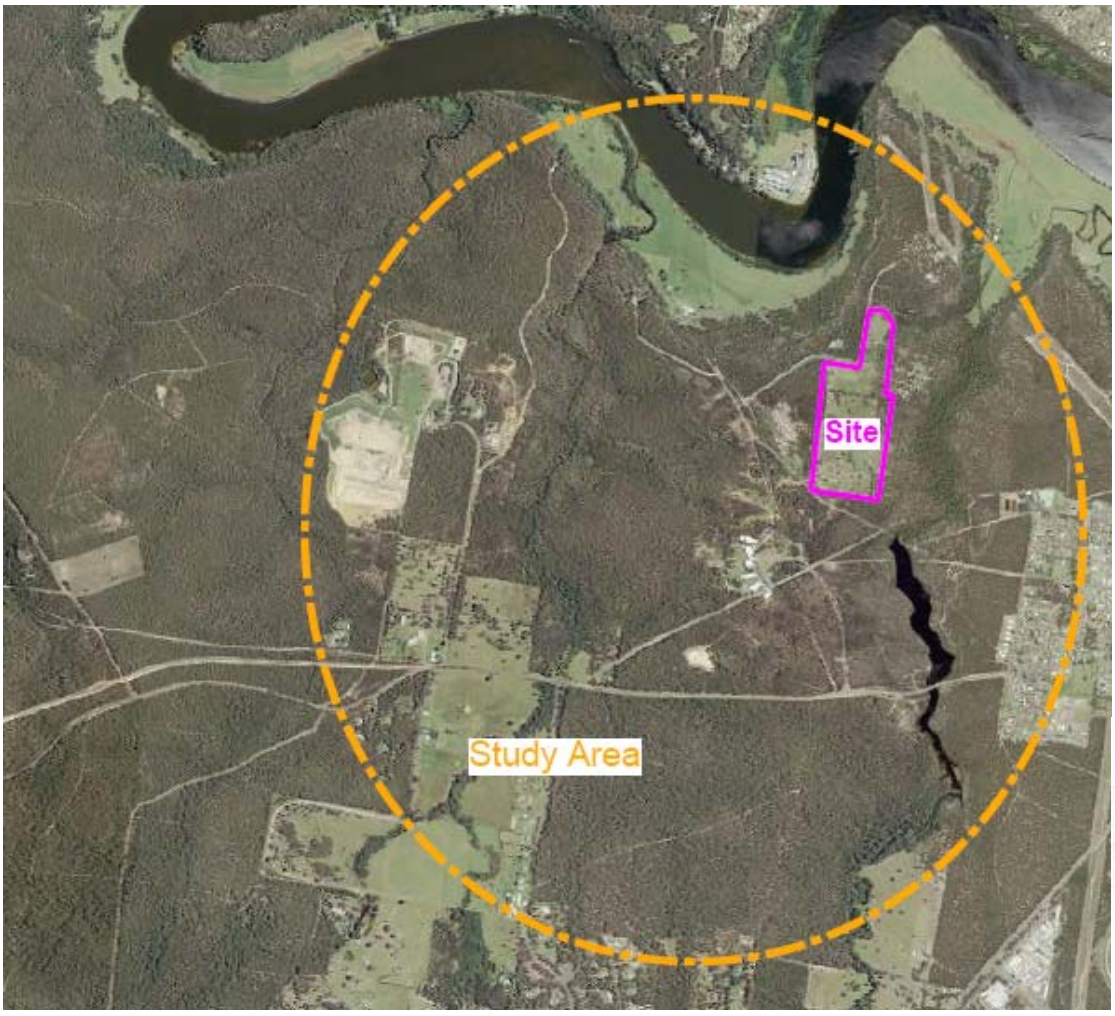
Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

SECTION 2
DESCRIPTION OF THE BUSHFIRE STUDY AREA

2.1 The Study Area.

For the purpose of examining the potential bushfire risk to the site and access roads a study area has been established which includes the land surrounding the site for a distance of 300 metres. Figure 4 below provides a graphical representation of the 'Study Area'.

Figure 4 – Bushfire Risk Assessment Study Area.



2.2 Site Assessment.

Graham Swain undertook an inspection of the site and surrounding land on the 16th January 2019. The inspection reviewed the general topography and gradients of the land and vegetation classification within the site and study area. A desk-top review of the site and surrounding development was completed for the preparation of this report.

Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

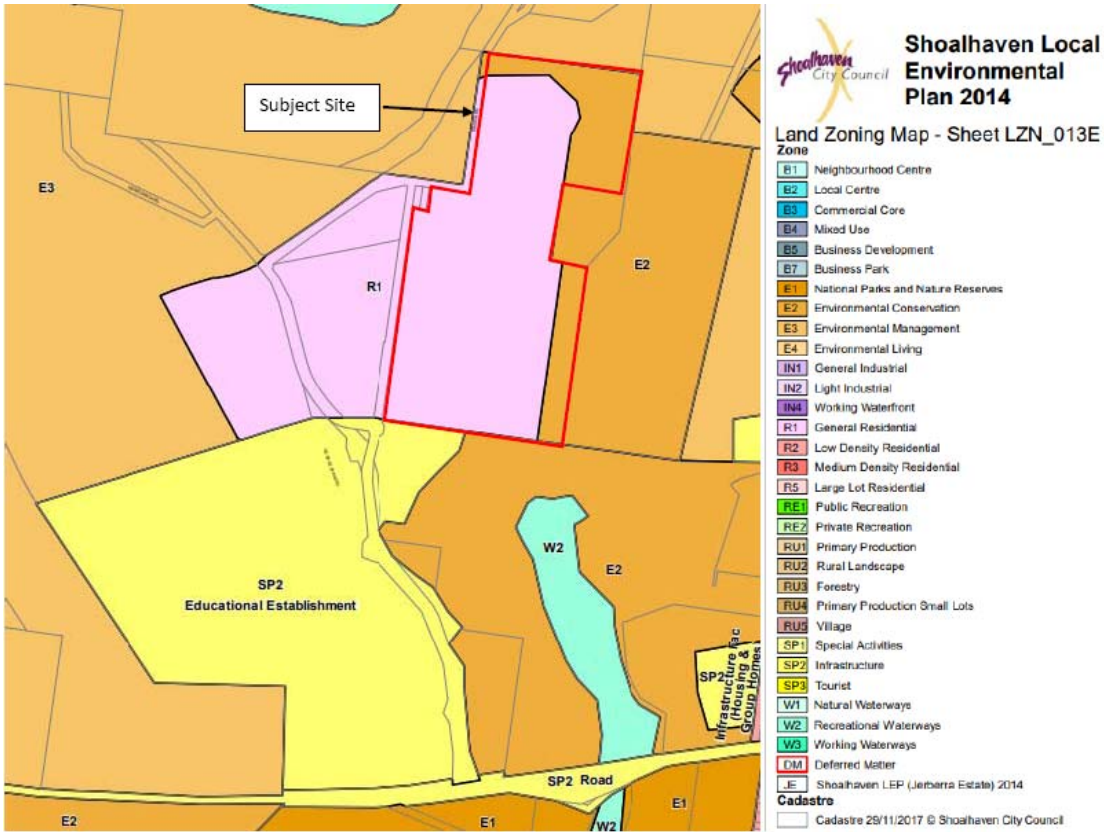
2.3 Existing Land Use.

The site is currently vacant land.

2.4 Landuse Zoning.

The development site is zoned R1 General Residential. Refer to Zoning Plan below.

Figure 5 – Landuse Zoning Plan.



The land to the east of the site and George Evans Road is vacant E2 – Environmental Conservation zoned land.

The land to the northwest and west, beyond the adjoining R1 zoned land is vacant E3 – Environmental Management zoned land. The land to the west of George Evans Road is zoned SP2 – Educational Establishment and contains a small area occupied by the University of Wollongong Shoalhaven Campus.

The land to the south of the intersection of George Evans Road and Yalwal Road is zoned E1 and contains the Triplarina Nature Reserve. State Forest extends to the west of this reserve.

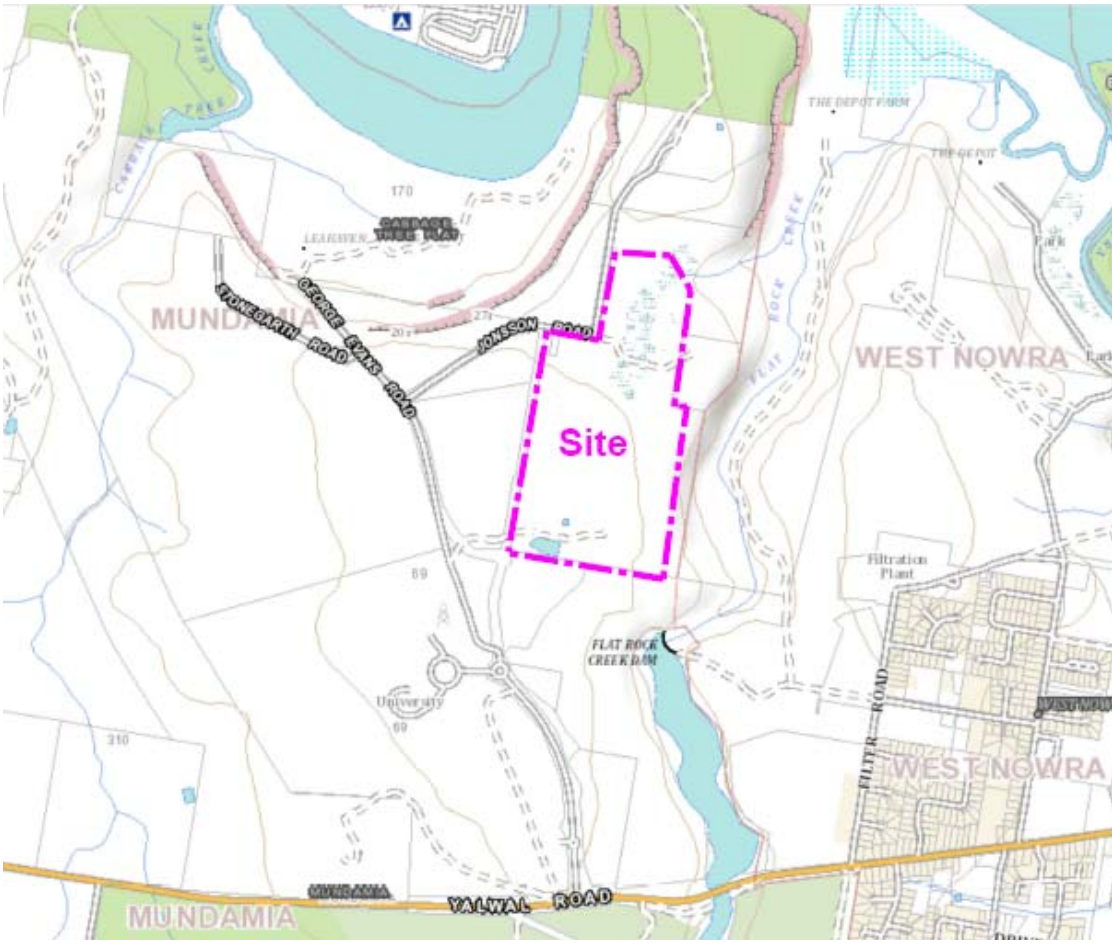
Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

2.5 Topography.

The land within the study area forms a broad ridge line that extends north to the cliff line that runs along the southern side of the Shoalhaven River.

The gradient of the land falls to the north and northwest from Jonsson Road and to the west and east from George Evans Road.

Figure 6 – Topographic Map



Contour Interval: 10m

2.5 Vegetation on the vacant land within the Study Area.

The vegetation on the vacant land within the Study Area is classified as 'forest'.

The University Campus contains a limited area of managed gardens within the immediate curtilage to the buildings.

Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

SECTION 3

BUSHFIRE RISK ASSESSMENT

3.1 Introduction.

The Australian Standard AS/NZS ISO 31000:2009 and the Emergency Management Australia (EMA) emergency risk management process provide the framework for establishing the context, analysis, evaluation, treatment, monitoring and communication of risk.

Risk has two elements: likelihood, the chances of a bushfire occurring and consequence, the impact of a bushfire when it occurs.

Bushfire risk is defined as the chance of a bushfire occurring that will have harmful consequences to human communities and the environment.

Bushfire risk is usually assessed through consideration of the likelihood of ignition and consequences of a bushfire occurring. Risk reduction can be achieved by reducing the likelihood of a bushfire, the opportunity for a bushfire to spread or the consequence of a bushfire (on natural and built assets).

A range of factors influence bushfire risk – these include:

- The likelihood of human and natural fire ignitions, as influenced by time, space and demographics;
- The potential spread and severity of a bushfire, as determined by fuel, topography and weather conditions;
- The proximity of assets vulnerable to bushfire fuels, and likely bushfire paths; and
- The vulnerability of assets including natural assets, or their capacity to cope with, and recover from bushfire.

3.2 Risk Assessment.

An assessment of bushfire risk must firstly define the problem. This involves the identification of the nature and scope of issues to be addressed and defining the possible boundaries for the assessment *(Emergency Risk Management – Applications Guide. (EMA Echo Press, 2000),* and AS/NZS ISO 31000:2009*).*

For the purpose of analysing fire risks to the subdivision and the primary access road [George Evans Road], a dangerous and damaging fire has the potential to occur when the following conditions prevail:

Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

- Continuous available fuel – fuel at moisture content sufficiently low to enable rapid combustion, arising from drought effects or the maturing and drying of surface and near surface fuels;

- Exposure of vulnerable assets. The 'catchment' for such fires may be within several hundred metres or many (60-70) kilometres from the asset/s;

- A combination of weather conditions that generate a high to catastrophic forest fire danger index. Prevailing adverse fire weather will have a strong north-westerly, through to south-westerly wind influence;

- A fire in the landscape which is not effectively suppressed [beyond the control of fire authorities].

The assessment of the risk to the development site, George Evans Road and Yalwal Road was undertaken during the site assessment and identified that the subdivision and access roads will be exposed to the risk of:

- A north-westerly fire path, burning upslope through the forest vegetation to the northwest of Jonsson Road and to the west of George Evans Road. The fire path to the northwest of Jonsson Road is approximately 350 metres whilst the northwest fire path to the west of the subdivision precinct and George Evans Road exceeds 2.5 kilometres.

  Ignition of the vegetation ahead of the main fire front by embers will increase the spread of fire across the landscape towards the subdivision and George Evans Road.

  A north-westerly fire path has the potential to pass 'over' George Evans Road and impact the western edge of the residential development in West Nowra and also impact Yalwal Road. Refer to Figure 7.

- A westerly fire path, burning upslope through the forest vegetation to the west of the subdivision precinct and George Evans Road. This fire path exceeds 4 kilometres.

  Ignition of the vegetation ahead of the main fire front by embers will increase the spread of fire across the landscape towards the subdivision and George Evans Road.

  A westerly fire path has the potential to pass over George Evans Road and impact the western edge of the residential development in West Nowra.

Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

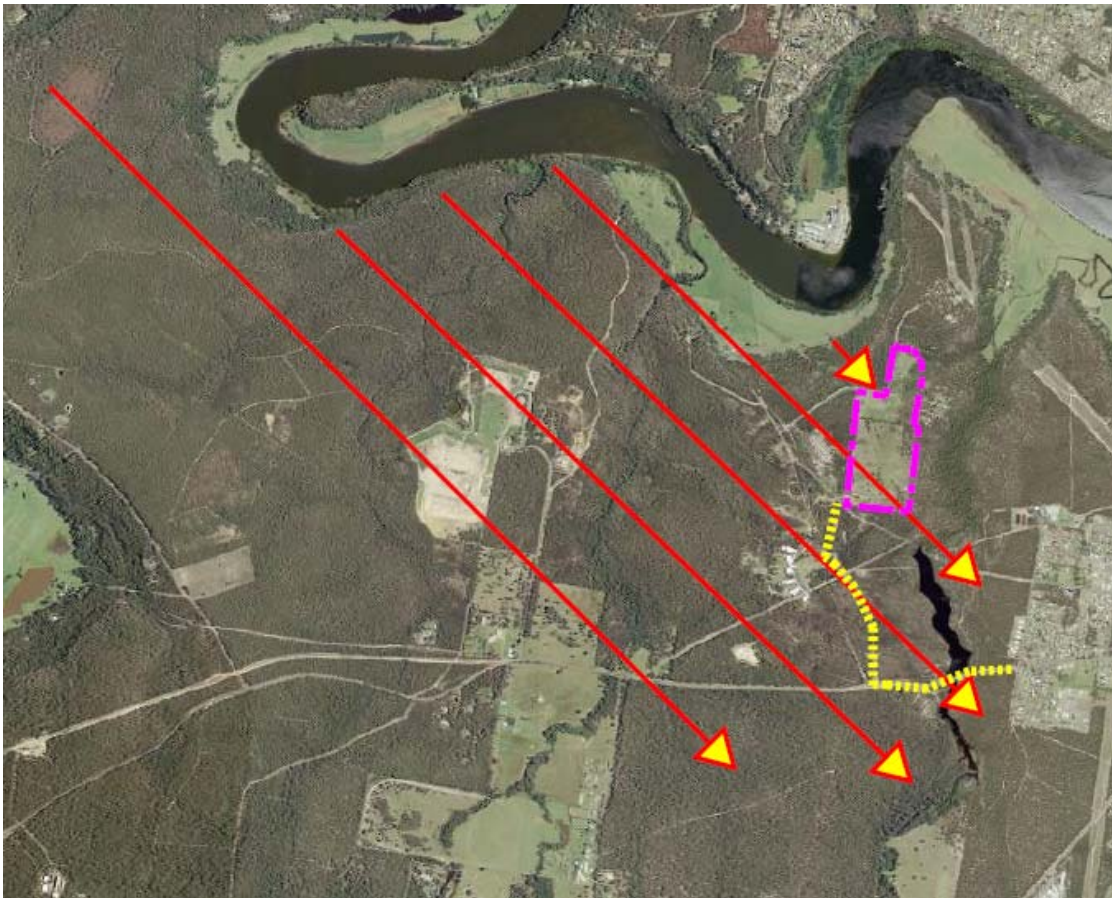
- A south-westerly fire path burning upslope through forest vegetation within the vacant land/University Campus and State Forest land to the southwest of the subdivision precinct and George Evans Road. This fire path varies between 2 – in excess of 5 kilometres.

  A south-westerly fire path has the potential to pass over Yalwal Road and George Evans Road.

  Ignition of the vegetation ahead of the main fire front by embers will increase the spread of fire across the landscape towards the subdivision and George Evans Road/Yalwal Road.

Refer to Figures 7 – 9 Fire Path Diagrams below and on Page 15.

Figure 7 – North West Fire Path Diagram.



Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

Figure 8 – West Fire Path Diagram.

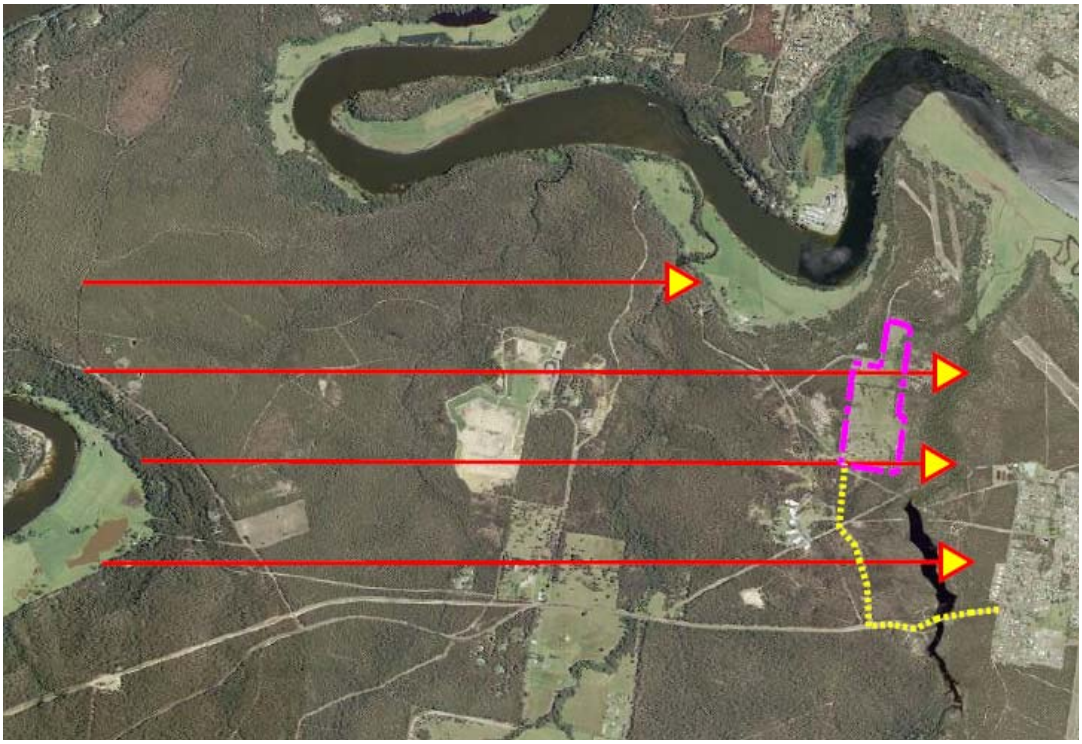
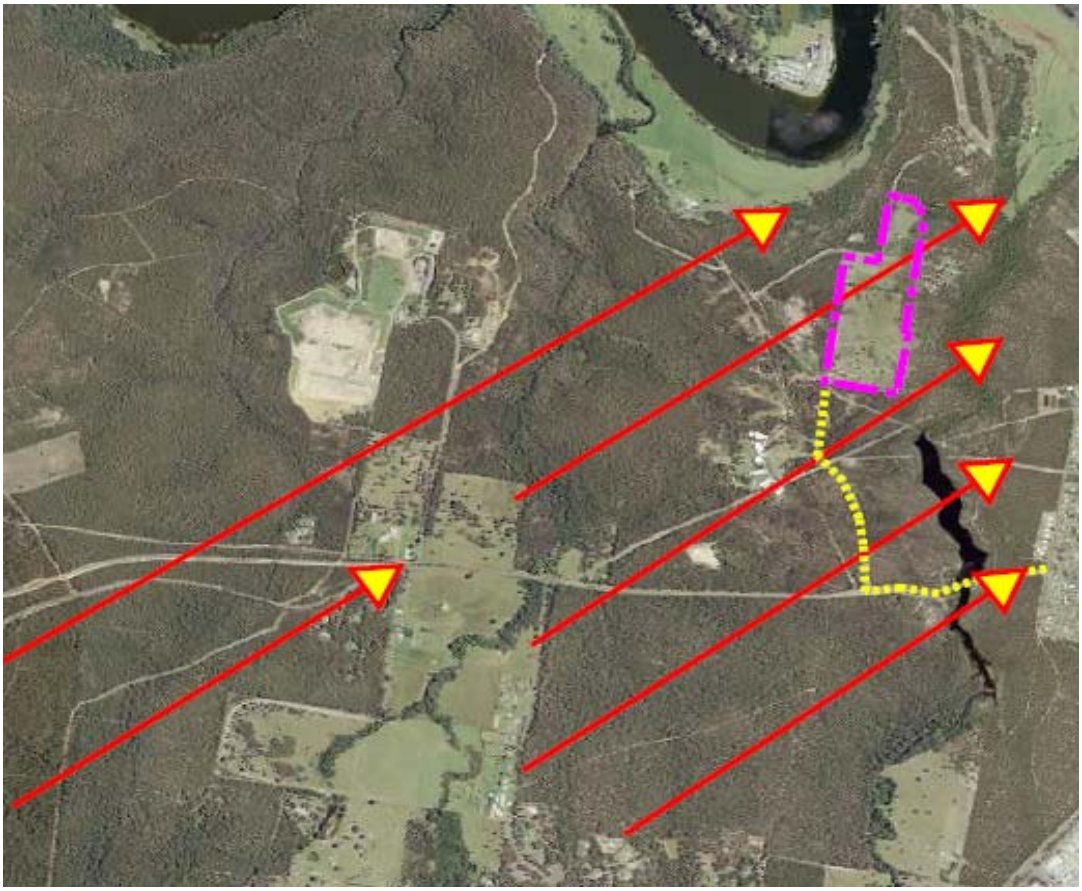


Figure 9 – Southwest Fire Path Diagram.



Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

3.3 Risk Statement.

Table 4 provides a statement of risk for the identified fire scenarios that can occur in the forest vegetation during high, extreme and catastrophic fire weather conditions and assigns risk levels reflecting identified levels of likelihood and consequences.

Table 1 provides a list of qualitative measures of consequence [or impact] whilst Table 2 provides a list of qualitative measures of likelihood and Table 3 provides a qualitative risk analysis matrix – used to determine the level of risk in Table 4.

Table 1 – Qualitative Measures of Consequence [or Impact]

Level	Descriptor	Detail Description
1	Insignificant	No public safety injuries or impact to buildings
2	Minor	No public safety injuries – minor impact to buildings
3	Moderate	Burns and Respiratory problems – moderate damage to buildings
4	Major	Death of people exposed to radiant heat & major property damage
5	Catastrophic	Death of people exposed to radiant heat and total destruction of buildings

Table 2 – Qualitative Measures of Likelihood

Level	Descriptor	Detail Description
A	Almost Certain	Is expected to occur during severe fire danger periods
B	Likely	Will probably occur during severe fire danger periods
C	Possible	May occur during severe fire danger periods
D	Unlikely	Unlikely to occur during severe fire danger periods
E	Rare	Will rarely occur during severe fire danger periods

Table 3 – Qualitative risk analysis matrix – used to determine the level of risk in Table 4

Likelihood	Risk Rating				
	Consequences				
	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
A – almost certain	High	High	Extreme	Extreme	Extreme
B – likely	Moderate	High	High	Extreme	Extreme
C – possible	Low	Moderate	High	Extreme	Extreme
D – unlikely	Low	Low	Moderate	High	Extreme
E – rare	Low	Low	Moderate	High	High

Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

Table 4 – Bushfire Risk Register – Severe Bushfire Event – if high levels of combustible fuels/unmanaged vegetation exist in the landscape.

The Risk What can happen?	The consequences of an event happening Consequences	Likelihood	Consequence Rating	Likelihood Rating	Level of Risk
Fire Scenario 1: A fire burning through the forest vegetation under north-westerly winds	Catastrophic	Likely when ignition occurs during high, extreme and catastrophic fire weather conditions	5 [Catastrophic]	B [Likely]	Extreme risk rating
Fire Scenario 2: A fire burning through the forest vegetation under westerly winds	Catastrophic	Likely when ignition occurs during high, extreme and catastrophic fire weather conditions	5 [Catastrophic]	B [Likely]	Extreme risk rating
Fire Scenario 3: A fire burning through the forest vegetation under south-westerly winds	Major	Possible when ignition occurs during high, extreme and catastrophic fire weather conditions	4 [Major]	C [Possible]	Extreme risk rating

3.4 Summary of Bushfire Risk.

The risk assessment undertaken in Table 4 identifies that there is an extreme level of bushfire risk to the subdivision precinct, George Evans Road and Yalwal Road with the potential for fire to over-run these access roads during major fire events which occur during high, extreme and catastrophic bushfire events.

Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

SECTION 4

CONCLUSION

The subdivision of the land relies on the use of George Evans Road and Yalwal Road as the sole access/egress road connection to the safety within the existing residential development in West Nowra.

This report has examined the likely fire paths which will impact both of these roads and found that both roads will be impacted by fire over-run which will pose an extreme level of risk to the public and emergency service personnel.

The Bushfire Protection Assessment Report prepared by Eco Logical is silent on this matter with no examination undertaken of the life safety protection of the residents.

The subdivision layout also does not address the provision of a safe alternate access/egress to the subdivision precinct. The Eco Logical Bushfire Protection Assessment Report identifies Jonsson Road and the northern portion of George Evans Road as an alternate road network. The site inspection confirmed that these roads are not through roads, will be impacted by fire over-run and do not provide a safe alternate means of egress and therefore create an extreme risk to the public and fire-fighting personnel.

The Acceptable Solution for public roads [Chapter 4.1.3 – Access (1) – Public Roads] of *Planning for Bushfire Protection 2006* states:

"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".

The subdivision layout does not comply with the acceptable solution for public roads and does not provide a safe alternate means of egress for the residents and emergency service personnel.

The Stantec Memo dated 5th November 2018 reviews the road capacity and evacuation times in the event of a bushfire emergency at Mundamia.

What the Memo does not assess in the findings is the operational difficulties experienced by Police and Emergency Services during extreme emergencies such as bushfires.

In the case of bushfire emergencies this can involve smoke hazards, extreme levels of radiant heat and ember attack which often result in the fleeing public panicking, running off roads, crashing into other cars or trees.

Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

This has a knock-on effect with roads being blocked and not trafficable as experienced in the Kinglake/Marysville bushfires in Victoria where people in isolated villages succumbed to death and injury due to roads being blocked and/or over-run by fire, as is the likely situation with the development proposal.

It is my professional opinion that the resolution of the safe access/egress for the subdivision of the land into multi-lot residential development should have been addressed as part of the rezoning of the land and not left, as Council recommended, to the Development Application Stage.

The proposition of developing a residential subdivision on an isolated parcel of land, which has a capacity to accommodate 319 dwellings and commercial development in the Jemalong Subdivision [SSD 7169] with the potential for a further 237 residential dwellings, Childcare Centre, retail centre in the remainder of Mundamia URA plus an existing University Campus, all having access/egress via one road which will be subject to fire attack and fire over-run does not address best practice bushfire safety planning.

Graham Swain
Managing Director
Australian Bushfire Protection Planners Pty Limited.

Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au

REFERENCES:

- *Australian Standard for Risk Management* A.S./N.Z.S. ISO 31000:2009 and A.S. 3959 - 2009;
- Emergency Risk Management – Applications Guide. (EMA) 2000);
- Bushfire Protection Assessment report prepared by Eco Logical Australia – 25th May 2012;
- Bushfire Protection Assessment report prepared by Eco Logical Australia – 22nd May 2015;
- Email correspondence from the NSW Rural Fire Service;
- Letter from NSW Rural Fire Service – Comments on Evacuation Memorandum – 12th November 2018;
- Letter from NSW Rural Fire Service – Ref D15/2555 C – 4th November 2016;
- Letter from NSW Rural Fire Service – Ref S08/0042 – 12th June 2013;
- Traffic Report – Department of Planning & Environment – Mundamia Residential Subdivision Review – TDG – October 2017;
- Transport Report prepared by Colston Budd Hunt & Kafes Pty Ltd – May 2012.

Tel. 612 43622112 / 612 43621184
Email. abpp@bigpond.net.au