



# Bushfire Threat Assessment

## Edmund Street, Riverstone

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**Approval for Issue**

Name	Signature	Date
Stuart Greville		13 October 2015

**BPD-PD Certification**


Stuart Greville  
BPD-PD-26202



## Summary

RPS Australia East Pty Ltd (RPS) has been commissioned by GMR Riverstone to undertake a Bushfire Threat Assessment (BTA) for the subdivision of land at 141 Crown Street, 22 and 32 William Street and 43-63 Edmund Street, Riverstone, NSW.

The assessment aims to consider and assess the bushfire hazard and associated potential threats relevant to such a proposal, and to outline the minimum mitigative measures which would be required in accordance with the provisions of the *Planning for Bush Fire Protection, 2006* that has been released and adopted through the *Environmental Planning & Assessment Amendment* (Planning for Bush Fire Protection) *Regulation 2007* & the *Rural Fires Amendment Regulation 2007*.

In order to determine whether the proposed development is bushfire-prone, and if so, which setbacks and other relevant Bush Fire Protection Measures (BFPM) will be appropriate, this assessment adheres to the methodology and procedures outlined in “Planning for Bushfire Protection” (NSW Rural Fire Service, 2006) (hereafter referred to as ‘PBP 2006’).

This BTA found the land surrounding the site to support vegetation consistent with *Forest* and *Rainforest* vegetation formation as described by PBP (2006).

In summary, the following key recommendations have been generated to enable the proposed development to comply with PBP (2006):

- A minimum 25m wide Asset Protection Zones (APZ) is recommended to the south of the building envelopes identified on proposed Lot 357. The APZ is to be made of 15m Inner Protection Area (IPA) and 10m Outer Protection Area (OPA);
- A 10m APZ is recommended to the east and south of the rainforest vegetation to the west of proposed lots 125 to 404 and to the north of proposed lots 413 to 406;
- Future dwellings within the site should have due regard to the specific considerations given in the BCA, which makes specific reference to the Australian Standard (AS3959 – 2009) construction of buildings in bushfire prone areas;
- Roads are to be constructed in accordance with PBP (2006) as outlined in section 3.3 of this report;
- Consideration should be given to landscaping and fuel loads on site to decrease potential fire hazards on site; and
- Any proposed development are to be linked to the existing mains pressure water supply and that suitable hydrants be clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure should comply with AS2419.1 - 2005.

This assessment has been made based on the bushfire hazards in and around the site at the time of inspection and production (October 2015).

In conclusion, should the recommendations above be duly considered and incorporated, the bushfire hazard present should be reduced to a level considered necessary to provide an adequate level of protection to life and property of the site, however will not prevent a bushfire from occurring offsite or radiating from the site.

***Finally, the implementation of the adopted measures and recommendations forwarded within this report comply with PBP (2006) and will contribute to the amelioration of the potential impact of any bushfire upon the development estate, but they do not and cannot guarantee that the area will not be affected by bushfire at some time.***

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## I.0 Introduction

RPS has been engaged by GMR Riverstone to undertake a Bushfire Threat Assessment (BTA) for the subdivision of land at 141 Crown Street, 22 and 32 William Street and 43-63 Edmund Street, Riverstone; described as:

- Lot 9 DP1459
- Lot 10 DP1459
- Lot 12 DP1459
- Lot 16 DP1459
- Lot 17 DP1459
- Lot 18 DP1459

hereafter referred to as the 'site' (**Figure 1**).

The assessment aims to consider and assess the bushfire hazard and associated potential threats relevant to such a proposal, and to outline the minimum mitigative measures which would be required in accordance with the provisions of the *Planning for Bush Fire Protection, 2006* that has been released and adopted through the *Environmental Planning & Assessment Amendment* (Planning for Bush Fire Protection) *Regulation 2007* & the *Rural Fires Amendment Regulation 2007*.

In order to determine whether the proposed development is bushfire-prone, and if so, which setbacks and other relevant Bush Fire Protection Measures (BFPM) will be appropriate, this assessment adheres to the methodology and procedures outlined in "Planning for Bushfire Protection" (NSW Rural Fire Service, 2006) (hereafter referred to as 'PBP 2006') and Clause 44 of the Rural Fires Regulation 2013.

### I.1 Site Particulars

<b>Locality</b>	Edmund Street, Crown Street and William Street, Riverstone.
<b>LGA</b>	Blacktown City Council
<b>Area</b>	Approximately 11.3 ha.
<b>Zoning</b>	The land is currently zoned as R2 Low Density Residential.
<b>Boundaries</b>	The site is surrounded by rural residential properties in all directions. Edmund Street abuts the east of the site, Crown Street abuts the north and William Street abuts the west. Scattered lots of vegetation occur to the south, south west and north.
<b>Current Land Use</b>	The land is currently occupied by rural residential properties, cleared/managed lands and remnant vegetation.
<b>Topography</b>	The land rises from the east to a slight ridge in the centre of the site, before declining gently towards the west eventually into a drainage gully line.
<b>Climate / Fire History</b>	The site lies within a geographical area with a Fire Danger Index (FDI) rating of 100. Extreme bushfire weather is therefore associated with long periods of drought, high temperatures, low humidity and gusty often north-westerly winds. The site is classified by Blacktown City Council as Bushfire Zone Buffer 1 on the Bushfire Prone Land Map (2015) ( <b>Figure 2</b> ).

The site is located in a low density rural residential area. Most lots within the vicinity of the site are partially used for residential purposes, with much of the site left well-grassed and with significant vegetation or for agricultural purposes.



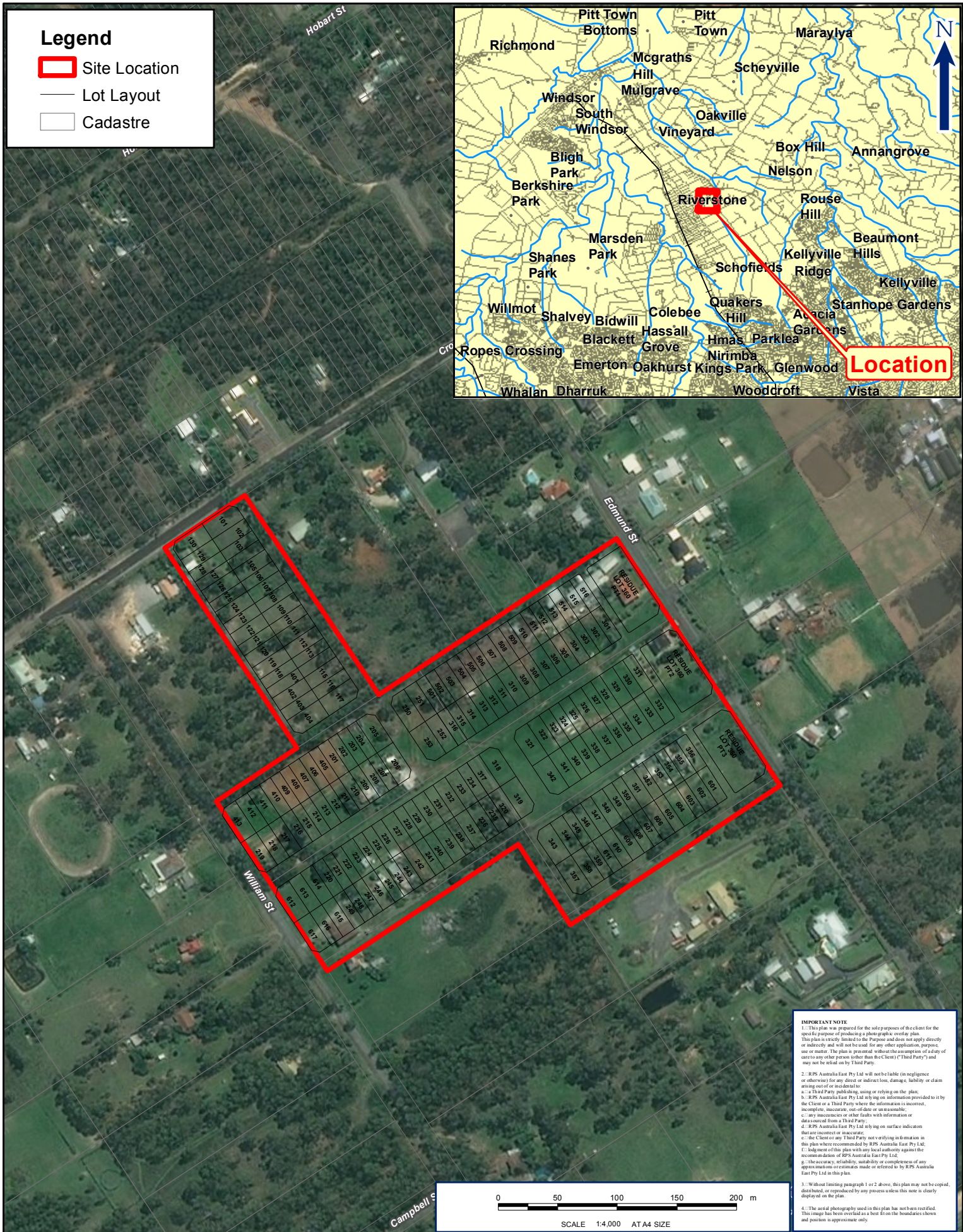






Figure 2 Bushfire Prone Land Map of the Site (Blacktown City Council)

## 1.2 Description of Proposal

The development application seeks consent for demolition of existing structures on the site, the subdivision of seven lots, into 150 residential lots and associated subdivision works such as earthworks, roads, draining construction and installation of utility services as detailed within this section.

The proposed development is consistent with the Riverstone Indicative Layout that has been prepared to support the delivery of the Blacktown City Council Growth Centre Precincts Development Control plan – Schedule 2 Riverstone Precinct.

The proposed plan of subdivision for development of the proposal is contained in **Appendix 1**.

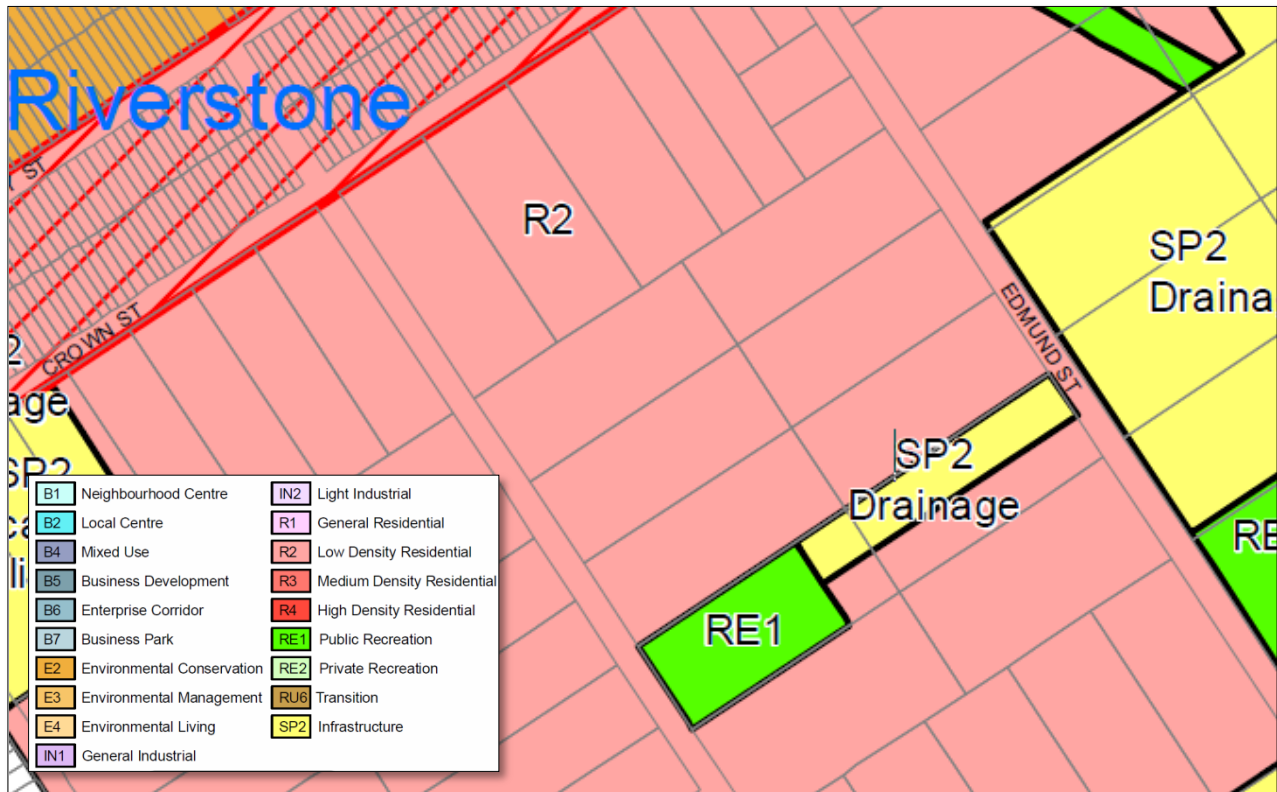


Figure 3 North West Growth Centre Land Zoning Map (NSW Gov 2006)

### 1.3 Objectives of Assessment

This assessment has been undertaken in accordance with Clause 44 of the RF Regulation 2013. This BTA also addresses the six key Bush Fire Protection Measures (BFPMs) in a development assessment context being:

- (1) The provision of clear separation of buildings and bush fire hazards, in the form of fuel-reduced Asset Protection Zones (and their components being Inner Protection Areas and Outer Protection Areas);
- (2) Construction standards and design (Bushfire Attack Levels);
- (3) Appropriate access standards for residents, fire-fighters, emergency workers and those involved in evacuation;
- (4) Adequate water supply and pressure;
- (5) Emergency management arrangements for fire protection and / or evacuation; and
- (6) Suitable landscaping, to limit fire spreading to a building.

## 2.0 Bushfire Hazard Assessment

### 2.1 Vegetation Assessment

#### 2.1.1 Methodology

Vegetation classification over the site has been carried out as follows:

- Aerial Photograph Interpretation to map the vegetation classification and extent;
- LiDAR Vegetation Density analysis;
- On site vegetation assessment (9<sup>th</sup> July 2015); and
- Reference to regional vegetation community mapping.

In accordance with PBP (2006), an assessment of the vegetation over a distance of 140m in all directions from the site was undertaken. Vegetation that may be considered a bushfire hazard was identified in all directions from the site. The vegetation classification is based on Appendix 2 of PBP (2006).

Refer to **Table 1** and **Figure 4** for vegetation classifications. **Plates 1 to 3** display the vegetation surrounding the site.

#### 2.1.2 Predominant Vegetation Formation

**Table 1 Vegetation Classification (PBP 2006)**

Direction of Vegetation	Vegetation Description	Classification of Vegetation Formations
North	Existing rural residential, Crown Street and vegetation	No hazard / Forest
East	Existing rural residential and Edmund Street	No hazard
South	Existing rural residential and vegetation	Forest
West	Existing rural residential, William Street and vegetation	No hazard / Rainforest*

\*An assessment of the vegetation to the west of the site determined that the condition of the vegetation was a young stand of regenerating trees, with little to no understorey and regular canopy disconnection. It exists as an isolated patch of vegetation with no connectivity to the surrounding areas of forest vegetation and is less than 1 hectare in overall size. As per Appendix 2 of PBP 2006, areas of vegetation that are less than 1 hectare in size are considered low hazard vegetation and can therefore be assessed the same as for rainforests.





**Plate 1 'Rainforest' vegetation to the west of the site**



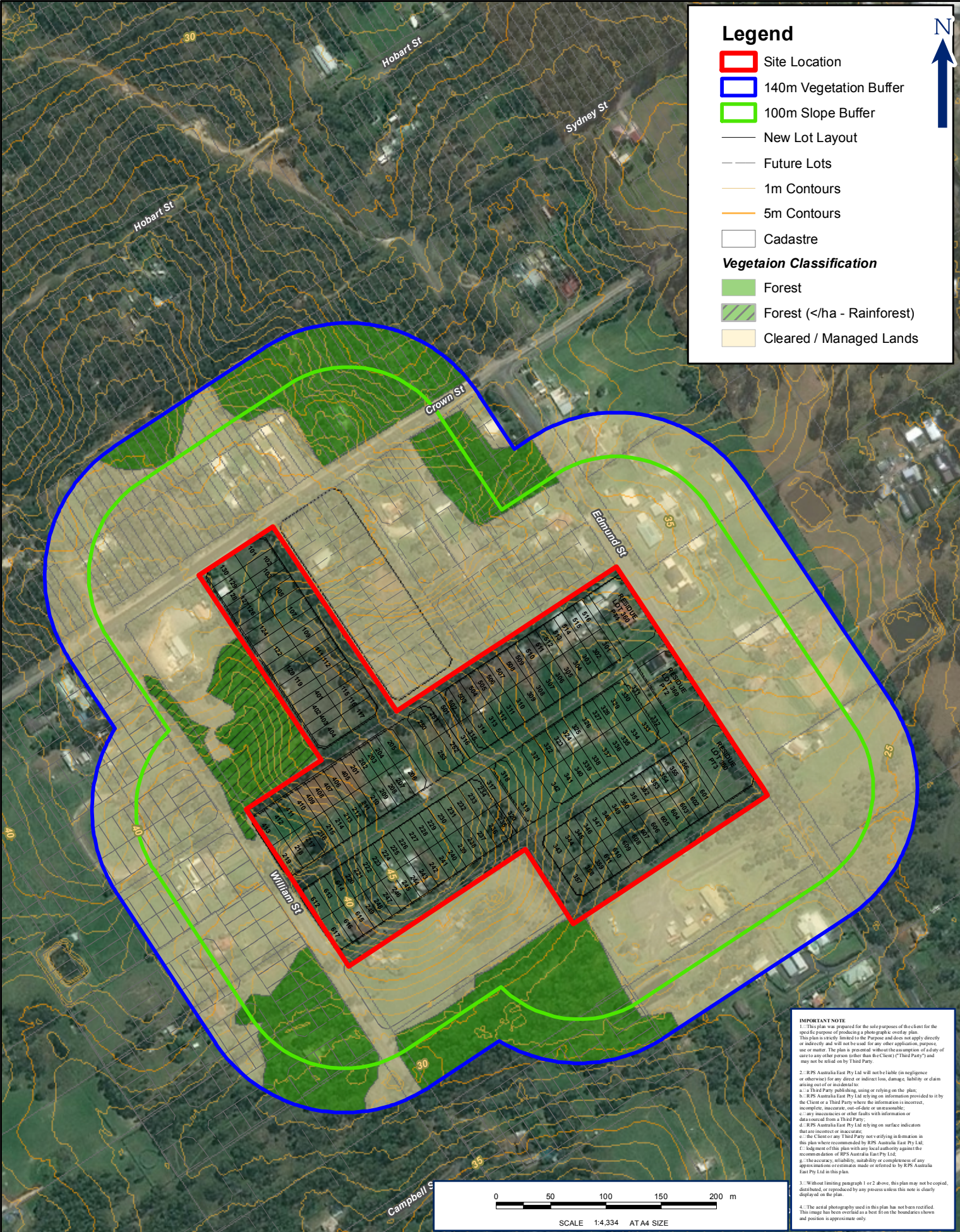
**Plate 2 Forest vegetation Downslope from site facing north**





**Plate 3 Forest vegetation to the south of the site**





**Figure 4: Vegetation Classification**

CLIENT: GMR Developments P/L

LOCATION: Riverstone

JOB NO.: PR127331

PURPOSE: BTA

Technician: Natalie Wood

Date: 9/10/2015

DATUM: GDA94

PROJECTION: MGA Zone 56

Data Sources: RPS

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**RPS**

Path: J:\JOBS\127K\127331 Riverstone - Edmund and Crown St\10 - Drafting\Arcgis Map Documents\BTA\127331 Figure Slope Veg B A4 20151009.mxd



## 2.2 Effective Slope Assessment

### 2.2.1 Methodology

Slope assessment has been undertaken as follows:

- 1m contour interval;
- Aerial photography; and
- Site inspection (9<sup>th</sup> July 2015).

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

The slopes leading away from the site in the direction of the identified bushfire threats have been evaluated to identify both the average slope and by identifying the maximum slope present. These values help determine the level of gradient which will most significantly influence the fire behaviour of the site.

### 2.2.2 Effective Slope

The slope of the bushfire hazard is documented in **Table 2** below.

**Table 2 Slope Assessment**

Direction of Vegetation	Vegetation Type	Slope Classes
North	Forest	0-<5° Downslope
South	Forest	0-<5° Downslope
West	Rainforest	0-<5° Downslope

## 2.3 Significant Environmental Features

Due to the current use of the site as agricultural and rural residential land, very few environmental features are present. Remnant vegetation exists sparsely across the site, with the remainder having been cleared to accommodate grazing cattle and residential properties. One dam is present on site.

## 2.4 Significant Threatened Species

A search of the Atlas of NSW Wildlife Database was conducted on 23<sup>rd</sup> July 2015. The Atlas includes records of threatened species listed under both the NSW *Threatened Species Act 1995* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. No threatened species were found to occur within the site.

## 2.5 Cultural Significance

A search of The Aboriginal Heritage Information Management System (AHIMS) (**Appendix 2**) confirmed that there are four Aboriginal artefacts known to occur within or near the site. Further studies by qualified Cultural Heritage specialists will address any Aboriginal or cultural heritage issues on site.

## 2.6 Bushfire Risk Management Plan

The RF Act requires each bushfire management committee to prepare a bushfire risk management plan for a nominated area; commonly defined by local government area boundaries. The Cumberland Zone Bushfire Management Committee developed the Cumberland Zone Bushfire Risk Management Plan (CZBRMP) which was endorsed in June 2010 and approved in September 2010. The CZBRMP investigated the high

risk human settlements in the Blacktown Local Government Area and ranked them according to the assessed bushfire risk and the likely consequence of a bushfire attack.

BRMPs are often not site specific, and individual sites or development do not have a statutory obligation to prepare a BRMP, however it is often recommended as part of preparedness, a BRMP is prepared.

### Cumberland Zone Bush Fire Risk Management Plan

The site is not located within an identified asset type within the CZBRMP, however it is immediately adjacent to the Vineyard Rural Residential Area (a human settlement asset type) in the CZFRMP (No.9). This asset is recognised by the Cumberland Zone Bush Fire Management Plan Committee as a 2A very high priority with a likely possibility of being affected by fire.

A description of the different bushfire management zones are described in **Table 3** below.

**Table 3 Bushfire Management Zones**

Zone	Purpose	Suppression Objectives (s)	Zone characteristics
Asset Protection Zone (APZ)	To protection human life, property and highly valued public assets and values.	To enable the safe use of Direct Attack suppression strategies within the zone.	As per RFS document <i>Standards for Asset Protection Zones</i> .
Strategic Fire Advantage Zone (SFAZ)	To provide strategic areas of fire protection advantage which will reduce the speed and intensity of bushfires and reduce the potential for spot fire development; To aid containment of wildfires to existing management boundaries.	To improve the likelihood and safe use of: <b>Parallel Attack</b> suppression strategies with the zone. and/or <b>Indirect Attack</b> (back burning) in high to very high fire weather conditions within the zone. To reduce the likelihood of: Crown fire development within the zone; and/or Spot fire ignition potential from the zone.	Zone width related to suppression objectives and dependant: <ul style="list-style-type: none"> <li>• Topography;</li> <li>• Aspect;</li> <li>• Spotting propensity;</li> <li>• Location of adjacent firebreaks;</li> <li>• Mosaic pattern of treatment;</li> </ul> Assess Overall Fuel Hazard (OFH) once vegetation communities reach minimum fire thresholds within this plan. Management practises should aim to achieve mosaic fuel reduction patterns so that the majority of the SFAZ has an OFH of less than high.
Land Management Zone (LMZ)	To meet relevant land management objectives in areas where APZ's or SFAZ's are not appropriate.	As per the land management and fire objectives of the responsible land management agency. To reduce the likelihood of spread of fires. To undertake mosaic burning.	As appropriate to achieve land management eg. heritage and/or fire protection eg. broad scale mosaic burning objectives.
Fire Exclusion Zone (FEZ)	To exclude bushfires	N/A	Variable dependant on size of fire sensitive area requiring protection.



**Figure 5 Cumberland Zone Bushfire Risk Management Plan**

**Figure 5** displays the context of the site in relation to other assets included in the BFRMP. The red hatching represents Human Residential and the orange hatching represents Economic assets.

The CZBFMC includes a series of treatment actions available for implementation at any particular site exposed to a bushfire threat. **Table 4** describes the available treatment actions.

**Table 4 Asset specific treatments used in the CZBRMP area**

Strategy	Targeted treatments used in the BFMC
Hazard Reduction	<ul style="list-style-type: none"> <li>APZ – Inspect &amp; maintain as required</li> <li>SFAZ – Inspect &amp; treat as required</li> <li>LMZ – Inspect &amp; treat as required</li> <li>Undertake strategic mosaic burning</li> <li>Inspect SFAZ and maintain when required</li> <li>Electricity Easement – Inspect and treat as required</li> </ul>
Strategy	<ul style="list-style-type: none"> <li>Targeted treatments used in the Cumberland Zone BFMC area</li> </ul>
Community Engagement	<ul style="list-style-type: none"> <li>Conduct Community Engagement Activity in area</li> <li>Distribute PCC approval to Burn information</li> </ul>
Property Planning	<ul style="list-style-type: none"> <li>Develop Fire Management Plan</li> </ul>

Strategy	Targeted treatments used in the BFMC
	<ul style="list-style-type: none"><li>▪ Develop a Bush Fire Emergency Evacuation Plan</li></ul>
Preparedness	<ul style="list-style-type: none"><li>▪ Undertake Property Preparedness Assessments</li><li>▪ Static Water Supply</li></ul>



## 3.0 Bushfire Protection Measures

### 3.1 Asset Protection Zones

An APZ is an area surrounding a development that is managed to reduce the bushfire hazard to an acceptable level to mitigate the risk to life and property (refer to **Figure 6**). The required width of the APZ varies with slope and the type of hazard. An APZ may consist of both an Inner Protection Area (IPA) and an Outer Protection Area (OPA). The respective IPA and OPA widths for the required APZs are as detailed in **Table 5**. An APZ can include the following:

- lawns;
- discontinuous gardens;
- swimming pools;
- driveways;
- unattached non-combustible garages with suitable separation from the dwelling;
- open space / parkland; and
- car parking.

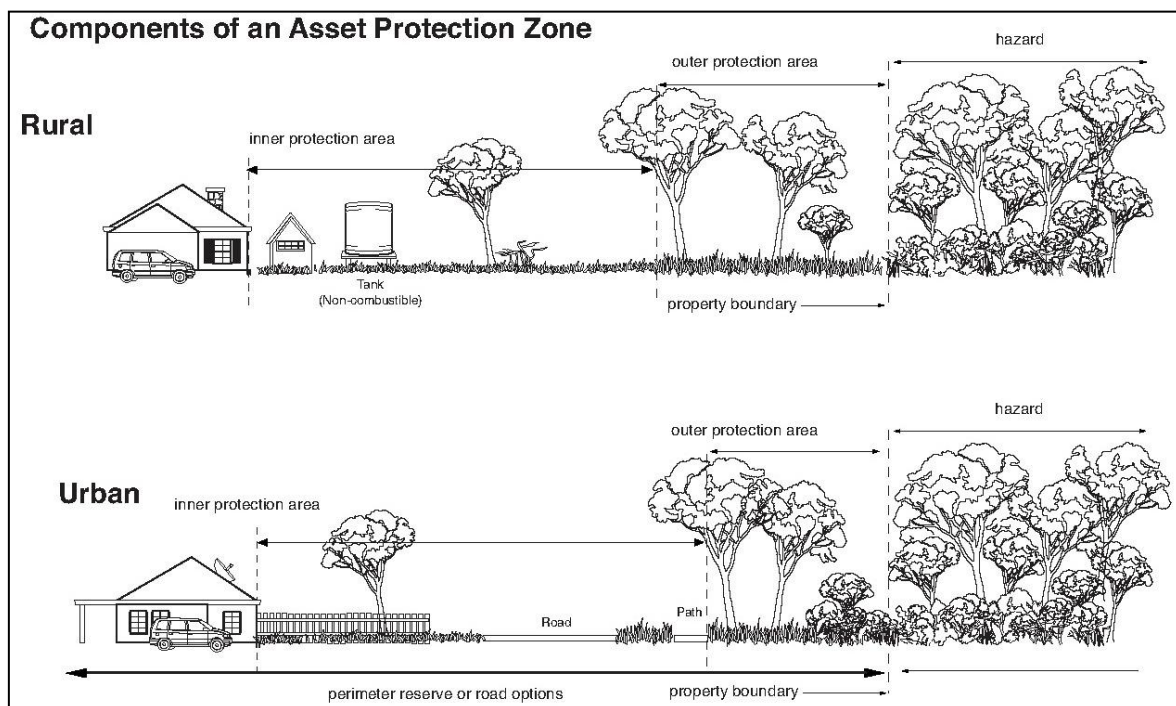


Figure 6 Components of an APZ (PBP 2006)

#### 3.1.2 IPA (Inner Protection Area)

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

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

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

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

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

### 3.1.3 OPA (Outer Protection Area)

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

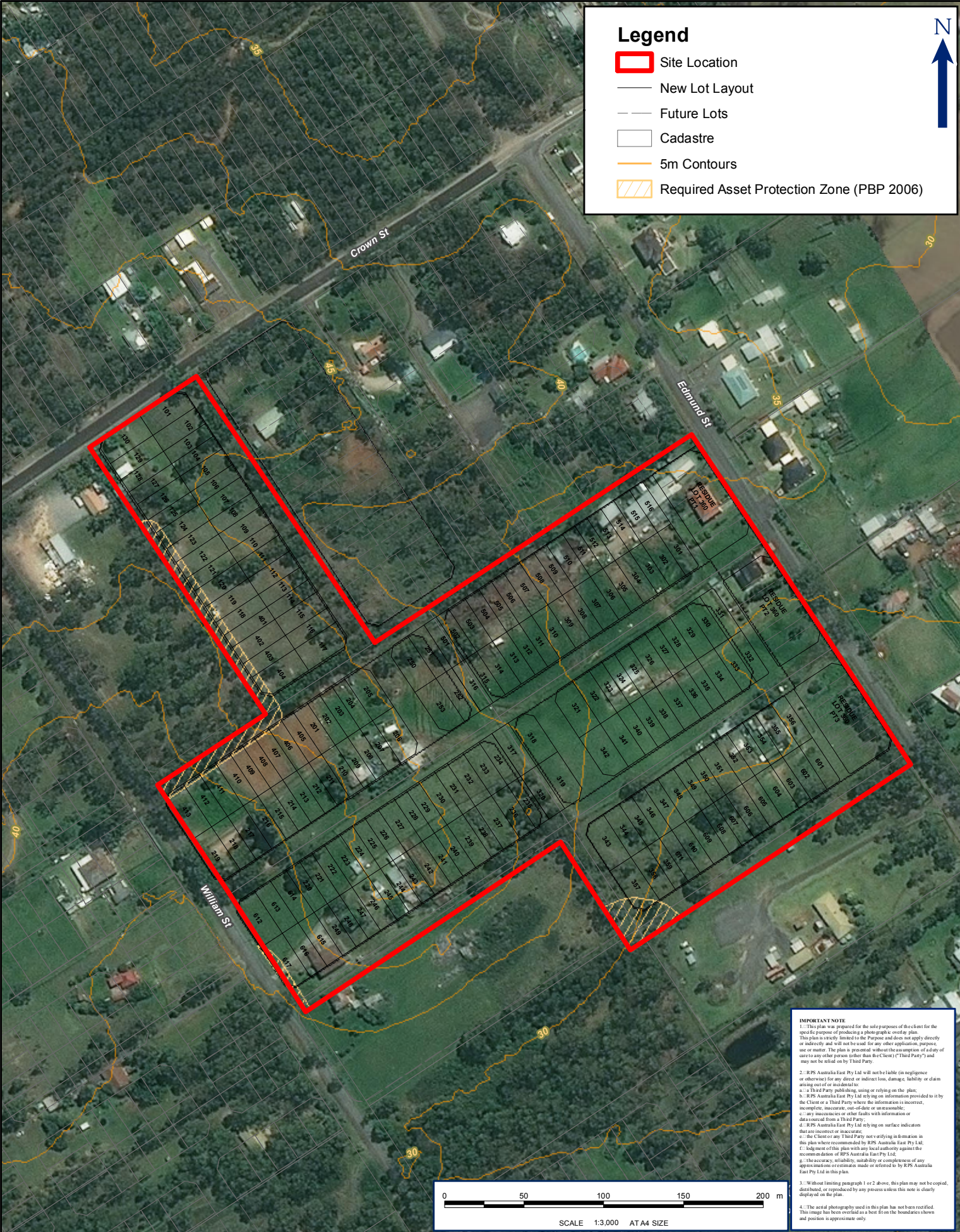
### 3.1.4 Determining the Appropriate Setbacks

The site lies within the Blacktown LGA and therefore is assessed under a FDI rating of 100. In accordance with Table A2.4 and Table A2.7 within PBP (2006), the appropriate width setbacks have been calculated based on the topography and the vegetation on and around the site. Refer to **Table 5** and **Figure 7** for required APZs.

**Table 5 Required APZ**

Direction of Hazard	Vegetation Classification	Slope	Required APZ (PBP 2006)	APZ Components	APZ Provided
North	Forest	0-<5° Downslope	25m	10m IPA + 15m OPA	25m
South	Forest	0-<5° Downslope	25m	10m IPA + 15m OPA	25m
West	Rainforest	0-<5° Downslope	10m	Nil	10m





<b>Figure 9: Required Asset Protection Zone (PBP 2006)</b>		LOCATION: Riverstone	DATUM: GDA94
		JOB NO.: PR127331	PROJECTION: MGA Zone 56
		PURPOSE: BTA	Data Sources: RPS
CLIENT: GMR Developments P/L		Technician: Natalie Wood	Date: 9/10/2015
		RPS AUSTRALIA EAST PTY LTD (ABN 44 140 292 762) 241 DENISON STREET BROADMEADOW PO BOX 428 HAMILTON NSW 2303 T: 02 4940 4200 F: 02 4961 6794 www.rpsgroup.com.au	



### 3.2 Dwelling Design and Construction

Building design and the materials used for construction of future dwellings should be chosen based on the information contained within AS3959-2009, and accordingly the designer/architect has been made aware of this recommendation. The dwelling plans should be checked by the architect to confirm they meet the relevant Bushfire Attack Level (BAL) as detailed in AS3959-2009.

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

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

#### 3.2.1 Bushfire Attack Level for the Proposed Development

Using the Addendum: Appendix 3 (NSW Rural Fire Service, 2010), the information relating to vegetation and slope as presented within this report and according to Table 2.4.2 of AS3959-2009 the BAL for the site was calculated.

Refer to **Table 6** and **Figure 8** for the BALs calculated for the site.

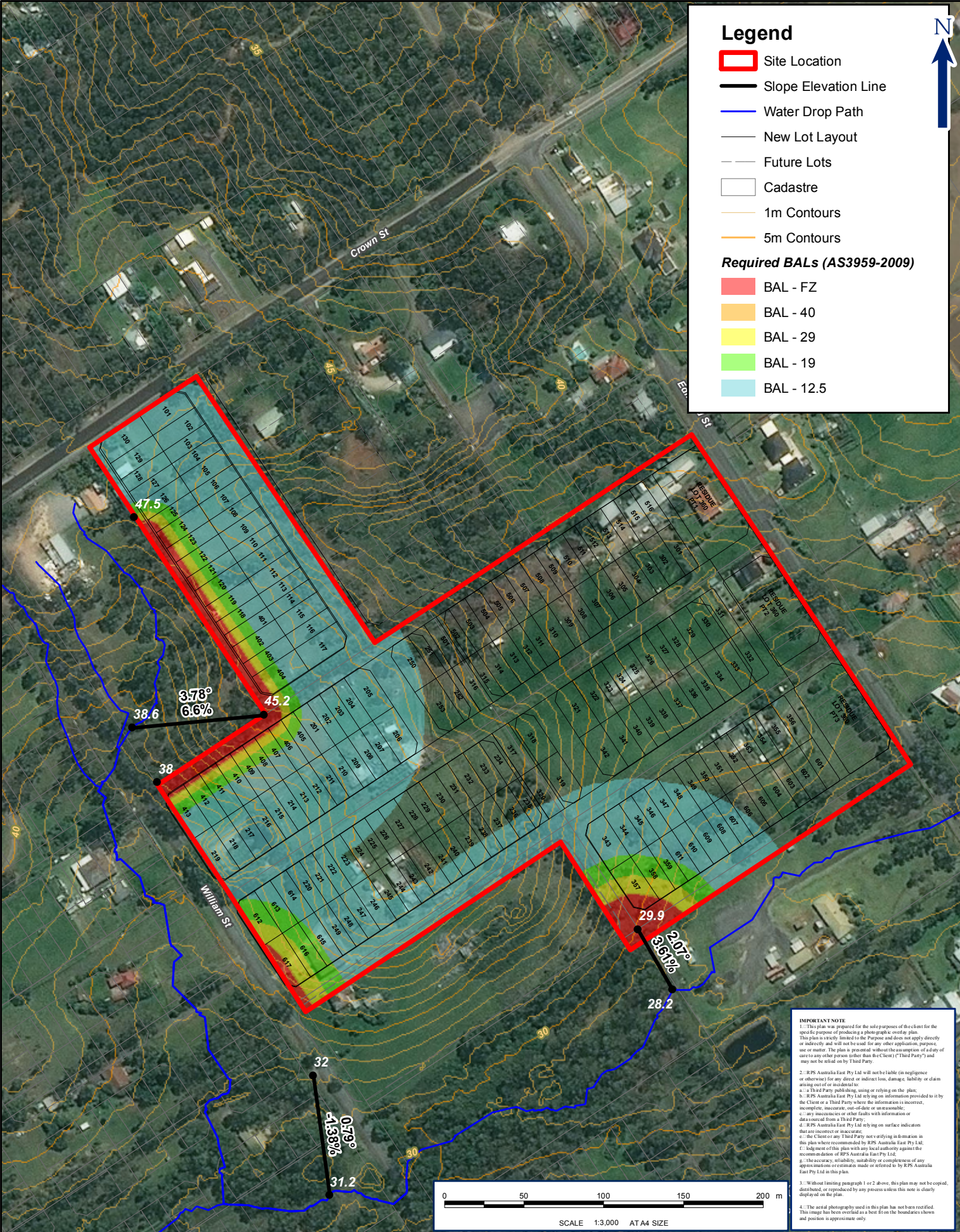
**Table 6 Required BAL (AS 3959-2009)**

Direction of Hazard	Vegetation Classification	Average slope of land in degrees	APZ	Separation Distance from Threat	AS3959-2009 (Method 2)	Bushfire Attack Level (BAL)	Construction Section
North	Forest	0-<5° Downslope	25m	<25m		BAL-FZ	Sect 5, 6, 7, 8 & 9 of AS3959-2009 and Sect A3.7 of PBP Addendum Appendix 3.
				25-<32m		BAL-40	
				32-<43m		BAL-29	
				43-<57m		BAL-19	
				57-<100m		BAL-12.5	
South	Forest	0-<5° Downslope	25m	<25m		BAL-FZ	Sect 5, 6, 7, 8 & 9 of AS3959-2009 and Sect A3.7 of PBP Addendum Appendix 3.
				25-<32m		BAL-40	
				32-<43m		BAL-29	
				43-<57m		BAL-19	
				57-<100m		BAL-12.5	
West	Rainforest	0-<5° Downslope	10m	<10m		BAL-FZ	Sect 5, 6, 7, 8 & 9 of AS3959-2009 and Sect A3.7 of PBP
				10-<14m		BAL-40	
				14-<20m		BAL-29	

Direction of Hazard	Vegetation Classification	Average slope of land in degrees	APZ	Separation Distance from Threat	AS3959-2009 (Method 2)	Bushfire Attack Level (BAL)	Construction Section
				20-<29m		BAL-19	Addendum Appendix 3.
				29-<100m		BAL-12.5	

**To Note:** The construction requirements for the next lower BAL than that determined for the site may be applied to an elevation of the building where the elevation is not exposed to the source of bushfire attack. An elevation is deemed to be not exposed to the source of bushfire attack if all straight lines between that elevation and the source of bushfire attack are obstructed by another part of the building.





<b>Figure 10: Required Bushfire Attack Levels (AS3959-2009)</b>		LOCATION: Riverstone	DATUM: GDA94
		JOB NO.: PR127331	PROJECTION: MGA Zone 56
		PURPOSE: BTA	Data Sources: RPS
		Technician: Natalie Wood	Date: 9/10/2015
CLIENT: GMR Developments P/L		RPS AUSTRALIA EAST PTY LTD (ABN 44 140 292 762) 241 DENISON STREET BROADMEADOW PO BOX 428 HAMILTON NSW 2303 T: 02 4940 4200 F: 02 4961 6794 www.rpsgroup.com.au	



### 3.3 Access

In the event of a serious bushfire threat to the proposed development, it will be essential to ensure that adequate ingress/ egress and the provision of defendable space are afforded in the subdivision design. The following summarises the requirements of PBP (2006).

According to PBP (2006), the design specifications for **internal public road** require that roads:

- be two-wheel drive all weather roads;
- not be hindered by an overuse of traffic calming devices such as speed humps and chicanes;
- be through roads, but if unavoidable then dead ends should be not more than 200 metres in length, incorporate a minimum 12 metres turning circle and should be clearly sign posted as dead ends;
- the capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes for all other areas). Bridges clearly indicate load rating;
- non perimeter roads comply with table – Road widths for Category 1 Tanker;

Curve radius (inside edge metres)	Swept Path (metres width)	Single lane (metres width)	Two way (metres width)
<40	3.5	4.5	8.0
40 – 69	3.0	3.9	7.5
70 – 100	2.7	3.6	6.9
>100	2.5	3.5	6.5

- curves of roads (other than perimeter roads) are a minimum inner radius of 6 metres and minimal in number, to allow for rapid access and egress;
- public roads do not have a cross fall exceeding 3 degrees;
- maximum grade for sealed roads do not exceed 15° and an average grade of not more than 10° or other gradient specified by road design standards, whichever is the lesser gradient;
- have a minimum vertical clearance to a height of four metres at all times;
- public roads between 6.5m and 8m wide are no parking on one side with the services (hydrants) located on the side to ensure accessibility to reticulated water for suppression;
- one way public access roads are no less than 3.5m wide and provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression;
- parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement. No services or hydrants are located within the parking bays; and
- that part of the public road directly interfacing the bush fire hazard vegetation should provide roll top kerbing to the hazard side of the road.

Access to the development will be via multiple ingress/egress routes connecting from Edmund Street, Crown Street and William Street, including internal roads and perimeter roads.

Refer to **Appendix 1** for Proposed Plan of Subdivision showing access.

### 3.4 Water

Associated with any kind of development upon the land, it is expected that water mains will be extended into the site. Provision of access to this supply should be provided for fire-crews in the form of readily accessible and easily located fire hydrants. Fire hydrant spacing, sizing and pressure should comply with AS 2419.1 –

2005. Hydrants are not to be 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.

### 3.5 Gas

Any reticulated or bottled gas should be installed and maintained according to the requirements of the relevant authorities and AS 1596 – 2002. It is expected that the location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.

### 3.6 Fire Fighting Capability

Riverstone Fire station is located approximately 1.5km west of William Street on the corner of Riverstone Parade and Church Street.

To facilitate quick and efficient action by the Fire Brigade / Rural Fire Service upon arrival, it is recommended that all necessary connections / pumps etc on the property be clearly marked and visible, and in good working order.

### 3.7 Landscaping

Landscaping should be designed and managed to minimise flame contact and radiant heat to buildings and the potential for wind driven embers to cause ignitions.

In choosing plants for landscaping consideration should be given to plants that possess properties, which help to protect buildings. If the plants themselves can be prevented from ignition, they can improve the defence of buildings by:

- filtering out wind-driven burning debris and embers;
- acting as a barrier against radiation and flame; and
- reducing wind forces.

Consequently landscaping of the site should consider the following:

- meet the specifications of an Inner Protection Area (IPA) detailed in PBP 2006;
- priority given to retaining or planting species which have a low flammability and high moisture content;
- priority given to retaining or planting species which do not drop much litter in the bushfire season and which do not drop litter that persists as ground fuel in the bush fire season; and
- create discontinuous or gaps in the vegetation to slow down or break the progress of fire towards the dwellings.

Specific landscaping commitments from the project include the following features:

- Setbacks which wrap around three sides of the development for bushfire management;
- A combination of hard and soft landscaping; and
- A selection of plants suitable to the landscape objectives based on native species.

### 3.8 Vegetation Fuel Management

Consideration should be given to vegetation fuel loads present on site with particular attention to APZs.

Careful thought must be given to the type and physical location of any proposed site landscaping. Inappropriately selected and positioned vegetation has the potential to 'replace' any previously removed fuel load.

Bearing in mind the desired aesthetic and environment sought by site landscaping, some basic principles have been recommended to help minimise the chance of such works contributing to the potential hazard on site.

Whilst it is recognised that fire-retardant plant species are not always the most aesthetically pleasing choice for site landscaping, the need for adequate protection of life and property requires that a suitable balance between visual and safety concerns be considered.

It is reiterated again that it is essential that any landscaped areas and surrounds are subject to ongoing fuel management and reduction to ensure that fine fuels do not build up.

## 4.0 Conclusion and Recommendations

It is clear from this investigation and assessment that the site constitutes Bushfire Prone Land. In accordance with the provisions of PBP (2006), the recommendations outlined within this assessment will substitute as appropriate actions to reduce the risk of damage and/or harm in the event of a bushfire event.

This BTA found the land surrounding the site to support vegetation consistent with *Forest* and *Rainforest* as described by PBP (2006).

In summary, the following key recommendations have been generated to enable the proposed development to comply with PBP (2006):

- A minimum 25m wide Asset Protection Zones (APZ) is recommended to the south of the building envelopes identified on proposed Lot 357. The APZ is to be made of 15m Inner Protection Area (IPA) and 10m Outer Protection Area (OPA);
- A 10m APZ is recommended to the east and south of the rainforest vegetation to the west of proposed lots 125 to 404 and to the north of proposed lots 413 to 406;
- Future dwellings within the site should have due regard to the specific considerations given in the BCA, which makes specific reference to the Australian Standard (AS3959 – 2009) construction of buildings in bushfire prone areas;
- Roads are to be constructed in accordance with PBP (2006) as outlined in section 3.3 of this report;
- Consideration should be given to landscaping and fuel loads on site to decrease potential fire hazards on site; and
- Any proposed development are to be linked to the existing mains pressure water supply and that suitable hydrants be clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure should comply with AS2419.1 - 2005.

A review of the site and proposed development layout indicates that compliance with the above recommendations can be achieved or practically implemented without substantial change to the proposed layout or construction methodology.

***Finally, the implementation of the adopted measures and recommendations forwarded within this report comply with PBP (2006) and will contribute to the amelioration of the potential impact of any bushfire upon the development, but they do not and cannot guarantee that the area will not be affected by bushfire at some time.***



## 5.0 Bibliography

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## Appendix I

### Site Plan







## Appendix 2

### AHIMS

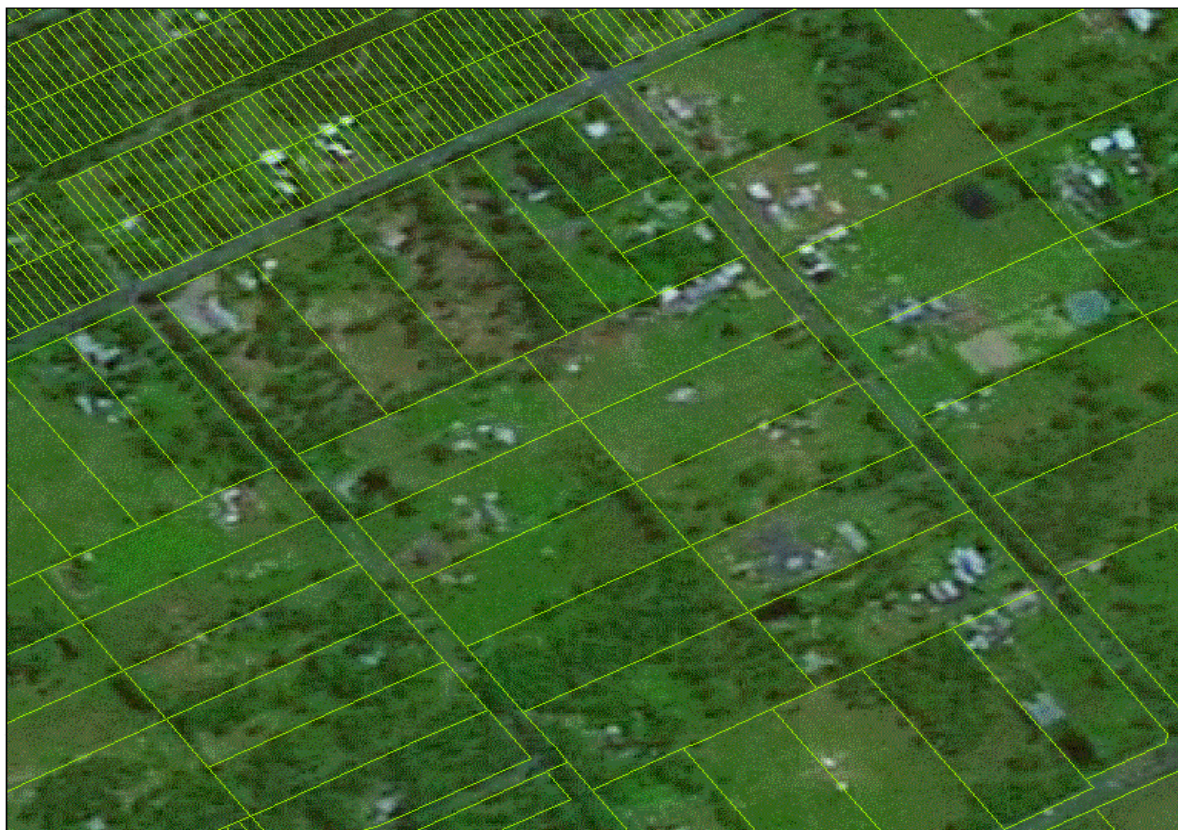
RPS Australia East Pty Ltd -Hamilton  
241 Denison Street  
Broadmeadow New South Wales 2292  
Attention: Lauren Vanderwyk  
Email: lauren.vanderwyk@rpsgroup.com.au

Date: 23 July 2015

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lat, Long From : -33.6699, 150.8694 - Lat, Long To : -33.6645, 150.878 with a Buffer of 50 meters, conducted by Lauren Vanderwyk on 23 July 2015.**

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



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

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

**If your search shows Aboriginal sites or places what should you do?**

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the [NSW Government Gazette \(http://www.nsw.gov.au/gazette\)](http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

**Important information about your AHIMS search**

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.