



Bushfire Threat Assessment

Lot 12 DP729973 and Lot 3 DP 1211767 Huntlee Residential Development – Stage 10

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Approval for Issue

Name	Signature	Date
Stuart Greville		11 March 2016

BPD-PD Certification


Stuart Greville
Accredited Bushfire Practitioner
BPD-PD-26202



Summary

RPS Australia East Pty Ltd (RPS) has been commissioned by Huntlee Pty Ltd to undertake a Bushfire Threat Assessment (BTA) over a portion of land at the proposed Huntlee Residential Development at North Rothbury NSW.

The BTA supports the development of the Stage 10 Eastern Precinct within the Huntlee Residential Development and associated access roads.

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 Grasslands 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 21m wide Asset Protection Zone (APZ) is recommended from the northern boundary of the site between the hazard and proposed development;
- All lots located greater than 21m and wholly contained within 100m of the northern boundary are to be managed as an Inner Protection Area (IPA);
- A 100m Temporary APZ is recommended to west of the development; measured from the boundary of the western most residential allotment;
- A 100m Temporary APZ shall be provided within the development footprint to the east and south of the development unless the adjoining development stages have been completed
- Future dwellings within the site must satisfy the performance requirements of the NCC BCA, which makes specific reference to the Australian Standard *AS3959 – 2009 Construction of buildings in bushfire prone areas*, and the NASH Standard 'Steel Framed Construction in Bushfire 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 with the balance of all lots to be managed as an Outer Protection Area (OPA); 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 (March 2016).

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.

Terms and Abbreviations

Abbreviation	Meaning
APZ	Asset Protection Zone
AS2419 -2005	Australian Standard – Fire Hydrant Installations
AS3959-2009	Australian Standard – Construction of Buildings in Bush Fire Prone Areas
BCA	Building Code of Australia
BRMC	Bushfire Risk Management Committee
BFRMP	Bush Fire Risk Management Plan
BPA	Bush Fire Prone Area (Also Bushfire Prone Land)
BPL	Bush Fire Prone Land
BPL Map	Bush Fire Prone Land Map
BPMs	Bush Fire Protection Measures
BTA	Bushfire Threat Assessment
<i>EPA Act</i>	<i>NSW Environmental Planning and Assessment Act 1979</i>
FDI	Fire Danger Index
FMP	Fuel Management Plan
ha	hectare
IPA	Inner Protection Area
LEP	Local Environment Plan
LGA	Local Government Area
OPA	Outer Protection Area
PBP	Planning for Bushfire Protection 2006
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation
RPS	RPS Australia East Pty Ltd

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Appendix 1	Site Plan
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1.0 Introduction

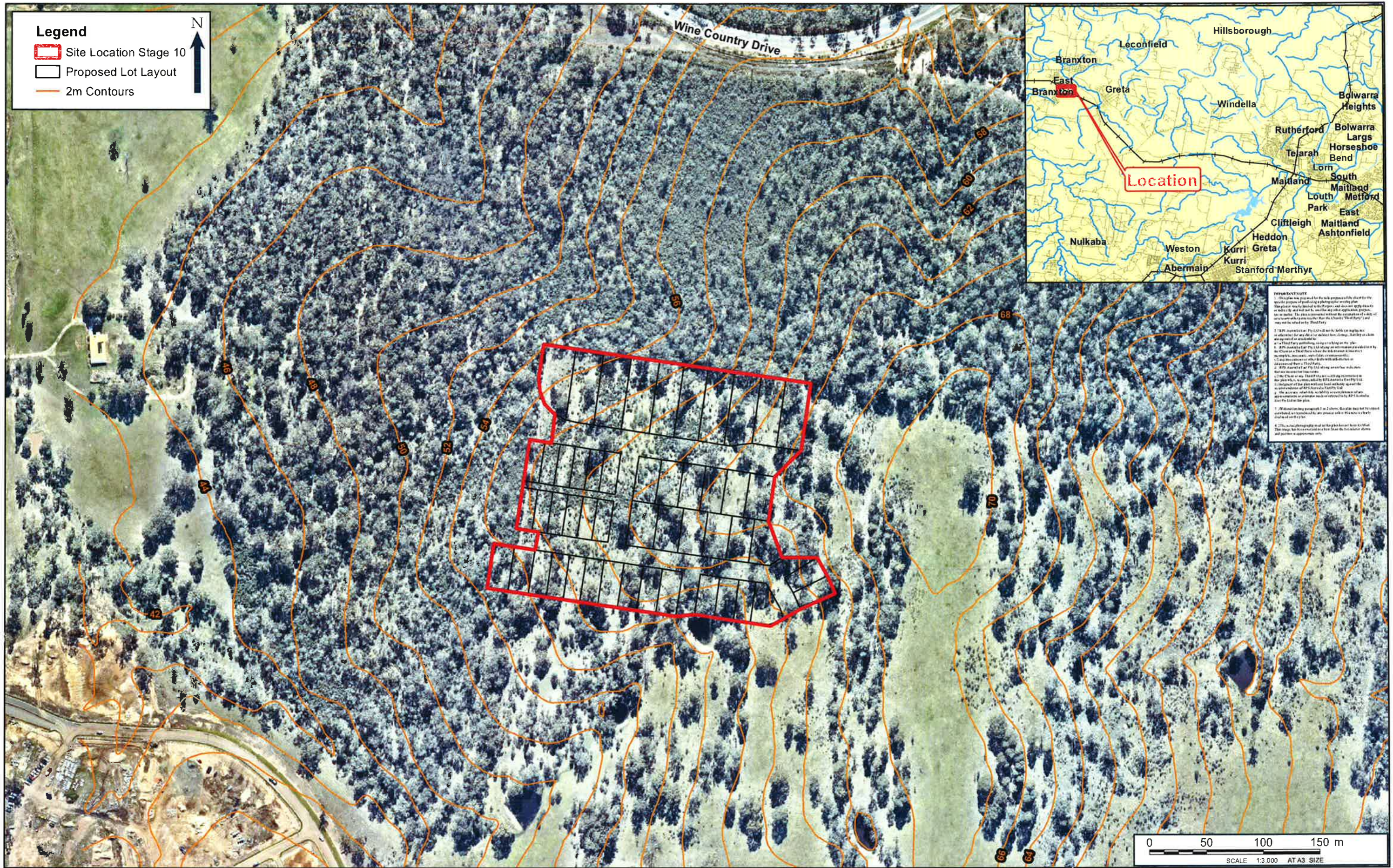
RPS has been engaged by Huntlee Pty Ltd, to undertake a Bushfire Threat Assessment (BTA) for Stage 10 within the Eastern Precinct of the Huntlee New Town Residential Development; specifically within Lot 12 DP 729973 and Lot 3 DP 1211767 North Rothbury, NSW, hereafter referred to as the 'site' (**Figure 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*.

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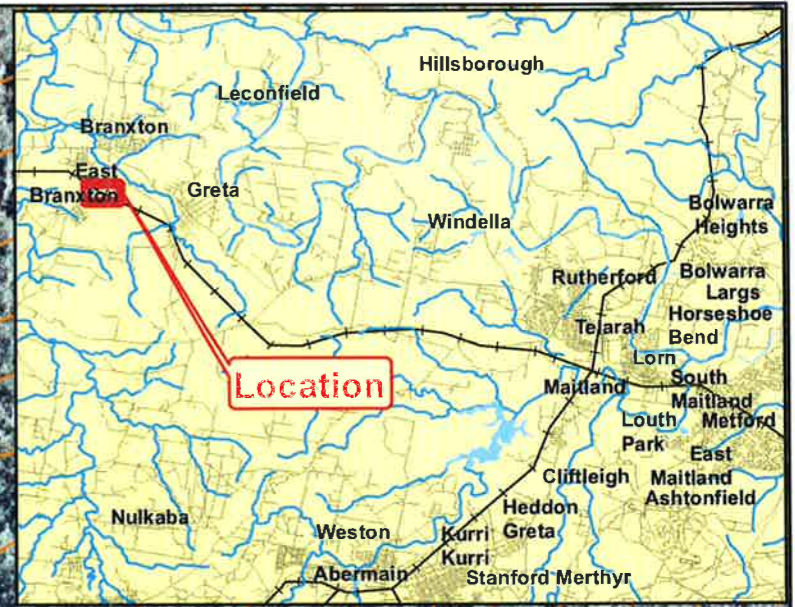
1.1 Site Particulars

Locality	Lot 12 729973 and Lot 3 DP 1211767 Huntlee New Town.
LGA	Cessnock City Council.
Area	Stage 10 occupies an area of approximately 6 hectares.
Zoning	The land is currently zoned R1 General Residential and B4 Mixed Use under the SEPP (Major Development) 2005.
Boundaries	The site is bordered by a combination of managed rural and farming lands and unmanaged vegetated lands.
Current Land Use	The land is currently cleared and vacant farming land.
Topography	The site gently undulates from east to west with the highest point occurring in the centre of the site.
Climate / Fire History	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 Cessnock City Council as Vegetation Category 1, Vegetation Category 2 and Vegetation Buffer on the Bushfire Prone Land Map (2011b) Figure 2 .



Legend

- Site Location Stage 10
- Proposed Lot Layout
- 2m Contours



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TITLE : **FIGURE 1: SITE LOCATION** | LOCATION : **NORTH ROTHBURY** | DATUM:GDA 1994 | DATE : **11/03/2016** | VERSION (PLAN BY): **A A3 (amy.obrien)**

PROJECTION: GDA 1994 MGA Zone 56 | PURPOSE: **BTA** | PATH: J:\JOBS\105216\North Rothbury (Huntlee)\10- Drafting\ArcGIS Map Documents\105216 Stage 10 Figure 1 A3 20160216.mxd

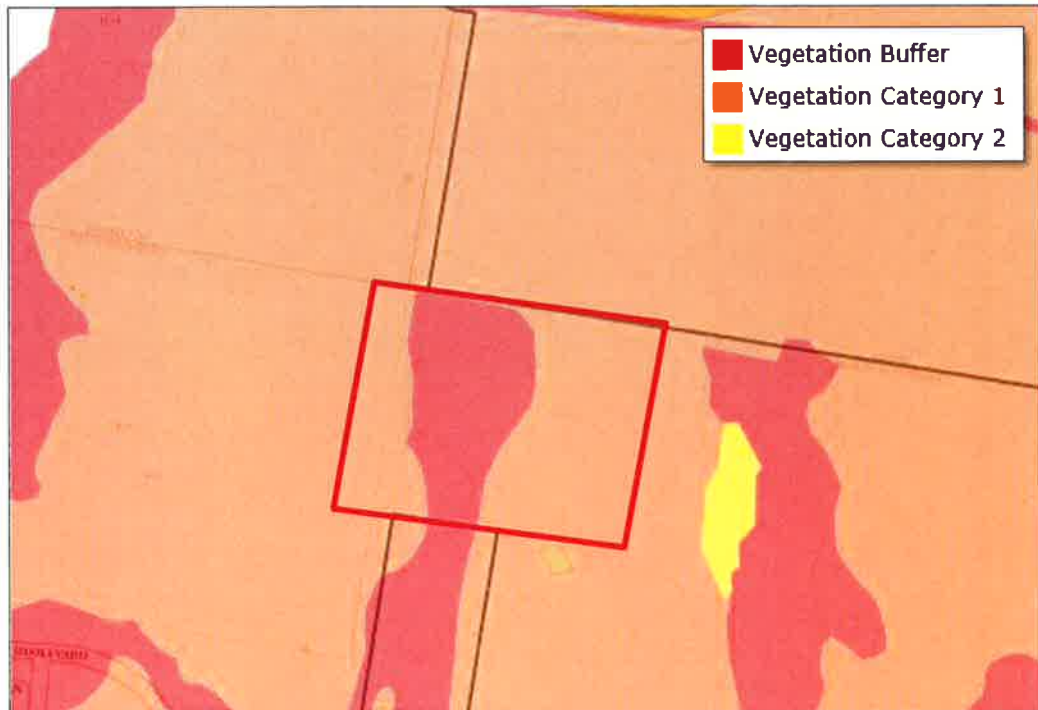


Figure 2 Bushfire Prone Land Map of the Site

1.2 Description of Proposal

The proposed modifications to the Stage 1 Project Approval include an extension of the Stage 1 approval boundary located in sub stage 3 and the addition of 33 residential allotments and associated streets. The modification will result in the implementation of an APZ that is outside of the Stage 1 boundary however this is a temporary APZ on land that will be subject to future development.

A site plan for development of the proposal is contained in **Appendix 1**.

1.3 Objectives of Assessment

This assessment has been undertaken in accordance with clause 44 of the RF Regulation 2008. 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;
- On-site vegetation assessment; 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 the revised Appendix 3 of PBP 2006.

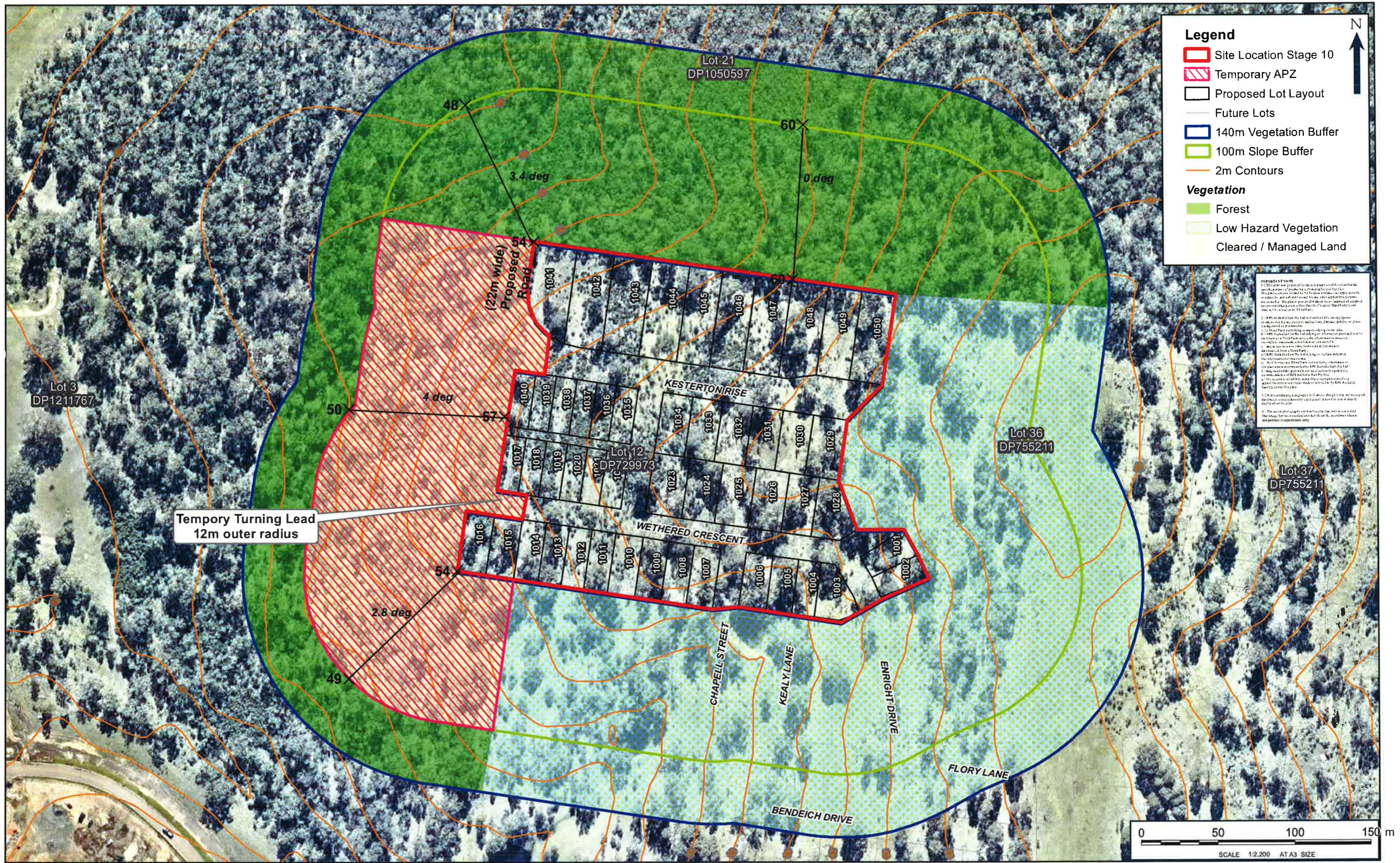
2.1.2 Predominant Vegetation Formation

Refer to **Table 1** and **Figure 3** for vegetation classifications.

Table 1 Vegetation Classification

Direction	Vegetation Description	Classification of Vegetation Formations (PBP 2006)
North	Vegetation	Forest
North West	Vegetation	Forest
West	Open Forest (Huntlee owned)	Managed Lands/ Temporary APZ
East	Approved residential development (Huntlee)	Managed Lands (residential development)
South	Vegetation within lot 351 surrounding by residential development (Huntlee)	Low Hazard

*The hazard applies to vegetation within Lot 351 and not the unformed crown road. Regular vehicular use of the crown road occurs for access to multiple properties in the area, thus prohibiting the growth of most vegetation along the crown road. A low number of scattered trees exist along the border of the crown road but they do not constitute a hazard.



TITLE : **FIGURE 3: VEGETATION CLASSIFICATION** | LOCATION : **NORTH ROTHBURY** | DATUM:GDA 1994 | DATE : **8/03/2016** | VERSION (PLAN BY): **C A3 (Natalie.Wood)**

PROJECTION: **GDA 1994 MGA Zone 56** | PURPOSE: **BTA** | PATH: **J:\JOBS\1051\105216 North Rothbury (Hunlee)\10 - Drafting\ArcGIS Map Documents\105216 Stage 10 Figure 3 C A3 20160308.mxd**

2.2 Effective Slope Assessment

2.2.1 Methodology

Slope assessment has been undertaken as follows:

- Aerial Photograph Interpretation in conjunction with analysis of electronic contour maps with a contour interval of 2m.

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	Cross Slope
North West	Forest	3.4° Down-slope
West	Managed Lands/ Temporary APZ	4° Down-slope
East	Managed Lands (residential development)	Up-slope
South	Low Hazard	Down-slope/ Cross-slope

2.3 Significant Environmental Features

The majority of the site is currently cleared land, however remnant scattered vegetation occurs across the site along with multiple small water bodies. No other significant environmental features such as riparian corridors, SEPP 26 Littoral Rainforest, Koala Habitat, steep lands, land slide or flood prone areas or national parks were recorded on site.

2.4 Significant Threatened Species

A search of the Atlas of NSW Wildlife Database and a Protected Matters Search of the Department of the Environment's online Protected Matters Search tool were conducted on 15th January 2015. These searches include records of threatened species listed under both the NSW *Threatened Species Act 1995* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Although a number of threatened flora and fauna have been recorded within a 10km radius of the site, no threatened flora and fauna records were located within the site boundaries.

2.5 Cultural Significance

A search of The Aboriginal Heritage Information Management System (AHIMS) confirmed that there are no records of culturally significant artefacts on the site or within the surrounding area.

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 Hunter Bushfire Management Committee developed the Hunter Bush Fire Risk Management Plan (BFRMP) which was endorsed in April 2009 and finally approved in September 2009. The BFRMP investigated the community assets in the Cessnock Local Government Area and ranked them according to the assessed bushfire risk and the likely consequence of a bushfire attack.

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

Hunter Bush Fire Risk Management Plan

Part of the Huntlee development is located within an area identified as Human Settlement Type in the Hunter BFRMP (No.69). This asset is recognised by the Hunter Bush Fire Management Plan Committee as a High priority. It is recommended that the Hunter BFRMP be updated to include the entire Huntlee residential development to increase protection and maintenance relating to bushfire hazards.

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: Parallel Attack suppression strategies with the zone. and/or Indirect Attack (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: Topography; Aspect; Spotting propensity; Location of adjacent firebreaks; Mosaic pattern of treatment; 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.

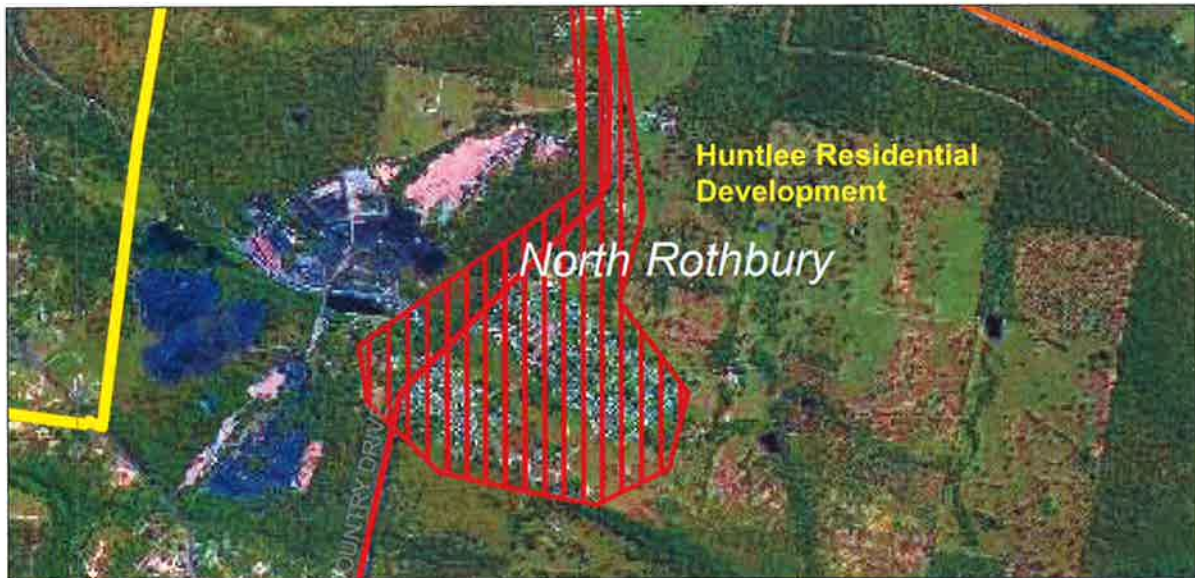


Figure 4 Hunter Bushfire Risk Management Plan

Figure 4 displays the context of the site in relation to other assets included in the BFRMP. The red hatching represents human residential.

The Hunter BFMC 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 Hunter BFMC area

Strategy	Targeted treatments used in the BFMC
Ignition Management	<ul style="list-style-type: none"> Implement arson prevention campaign
Hazard Reduction	<ul style="list-style-type: none"> Inspect APZ and maintain as required Survey new APZ, implement if required and maintain Inspect SFAZ and treat as required Implement mosaic burn regime in LMZ Plan and implement LMZ mosaic burns Inspect LMZ and treat as required Inspect SMR corridor and maintain as required
Community Education	<ul style="list-style-type: none"> Plan and implement community education program
Property Planning	<ul style="list-style-type: none"> Investigate need and implement PIP as required Develop and implement fire relocation plan
Preparedness	<ul style="list-style-type: none"> Inspect Fire Trails and maintain as required Inspect access roads and maintain as required Develop management guidelines for s52 Operations Plan
Other	<ul style="list-style-type: none"> Inspect bridges after fire events

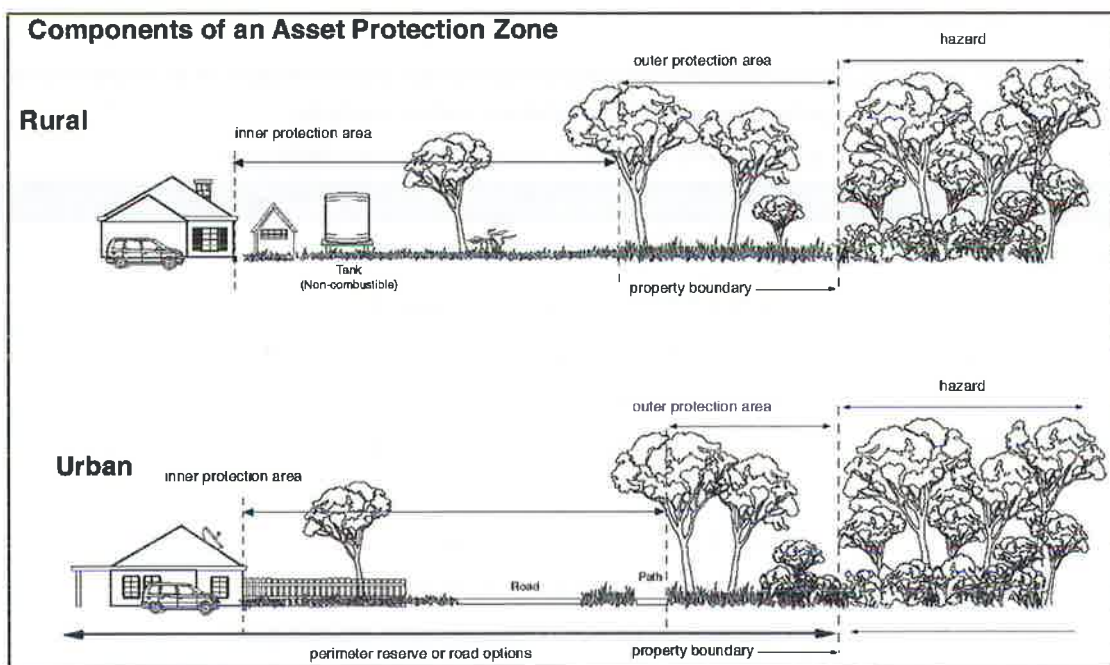
3.0 Bushfire Protection Measures

1.2 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 5**). The required width of the APZ varies with slope and the type of hazard. An APZ can consist of both an Inner Protection Area (IPA) and an Outer Protection Area (OPA). 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 5 Components of an APZ (PBP 2006)



1.2.1 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.

1.2.2 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.

1.2.3 Determining the Appropriate Setbacks

The site lies within the Cessnock 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 6** for required APZs.

Table 5 Required APZ

Direction of Hazard	Vegetation Classification	Slope	Required APZ (PBP 2006)	BAL-29 (AS3959-2009 – Method 2)	APZ Provided
North	Forest	Cross Slope	20m	21m	21m
North-west	Forest	3.4° Down-slope	25m	25m	25m (provided by road)
West	Managed Lands/ Temporary APZ	4° Down-slope	25m	26m	Temporary 100m APZ
East	Managed Lands (residential development)	Up-slope	20m	18m	Temporary 100m APZ (active construction site)
South	Low Hazard	Down-slope/ Cross-slope	20m-25m	25m	>100m managed land

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

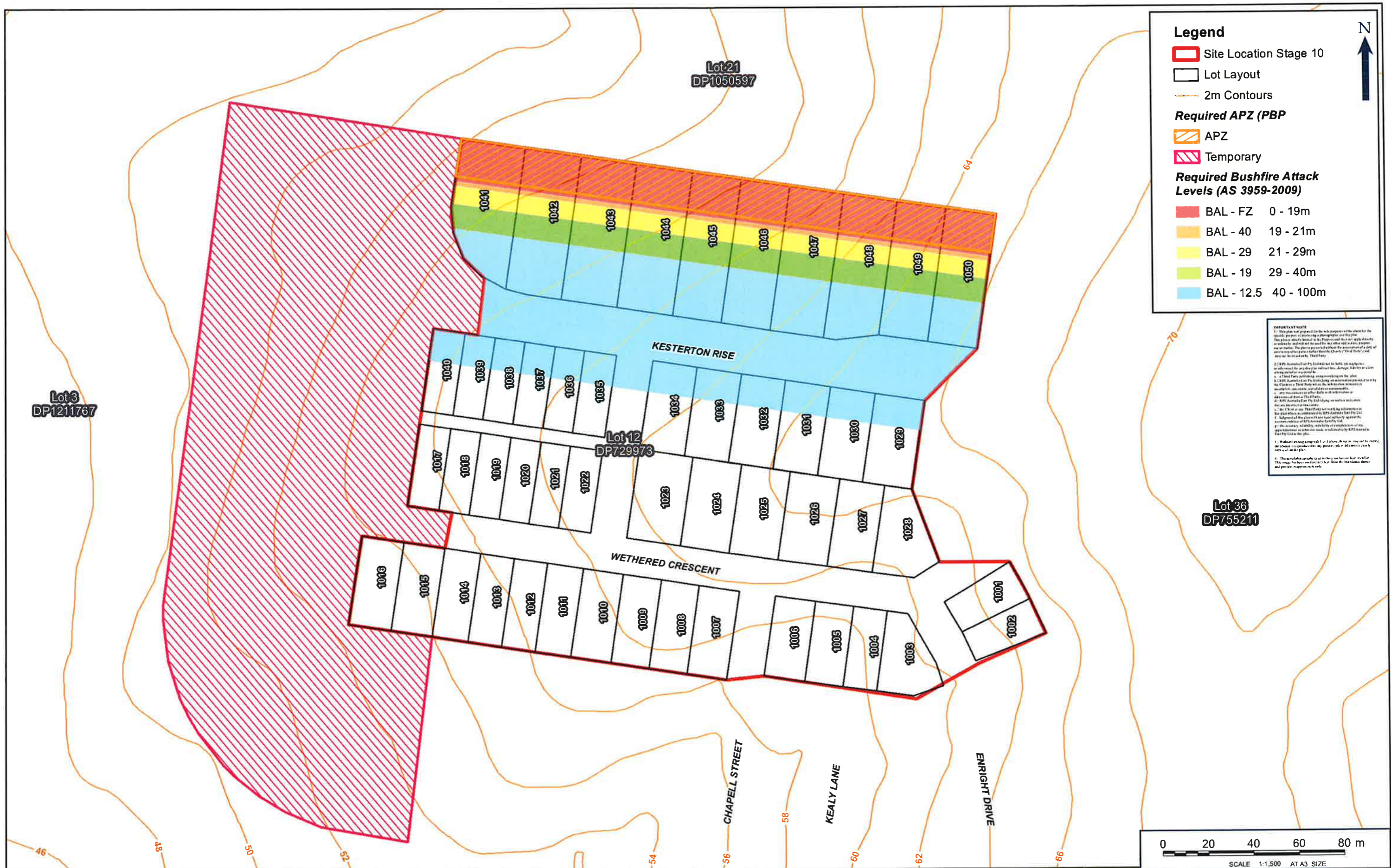
The Detailed Assessment (Method 2) outlined in Australian Standard AS3959-2009 *Construction of buildings in bushfire prone areas* was used to calculate the Bushfire Attack Level for the development. The NBC Bushfire Attack Assessor V2.1 was used to model the bushfire radiant heat exposure which determined the applicable bushfire attack level.

Refer to **Table 6** and **Figure 7** for the BALs calculated for the site.

Table 6 Required BAL (AS 3959-2009)

Direction of Hazard	Vegetation Classification	Slope	APZ	Separation Distance from threat	AS3959-2009 (Detailed Method)	Construction Section
	AS3959-2009					
North	Forest	Cross-slope	21m	0m-19m	BAL – FZ	Sect 5, 6, 7, 8 & 9 of AS3959-2009 and Sect A3.7 of PBP Addendum Appendix 2 or NASH
				19m-21m	BAL – 40	
				21m-29m	BAL – 29	
				29m- 40m	BAL – 19	
				40m-100m	BAL – 12.5	
East	Managed Lands	Up-slope	>100m	0m – 100m	BAL – LOW	
South	Low Hazard	Cross-slope/ down-slope	>100m	0m – 100m	BAL – LOW	
West	Managed Lands	Down-slope	Min. 100m	0m – 100m	BAL – LOW	

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.



TITLE : FIGURE 6: REQUIRED BUSHFIRE ATTACK LEVELS (AS3959-2009) |
 LOCATION : NORTH ROTHBURY |
 DATUM: GDA 1994 |
 DATE : 11/03/2016 |
 VERSION (PLAN BY): AA3 (amy.obrien) |
 PROJECTION: GDA 1994 MGA Zone 56 |
 PURPOSE: BTA |
 PATH: J:\JOBS\105k\105216 North Rothbury (Huntlee)\10- Drafting\ArcGIS Map Documents\105216 Stage 10 Figure 7 C A3 20160311.mxd