

STRATEGIC BUSHFIRE STUDY

Residential Development

39, 39A & 41 Brocklesby Road, Medowie

Prepared for McCloy Project Management Pty Ltd



Bushfire Planning Australia

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BPA Reference: 2239 Medowie V5

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Disclaimer and Limitation

This report is prepared solely for McCloy Project Management Pty Ltd (the 'Client') for the specific purposes of only for which it is supplied (the 'Purpose'). This report is not for the benefit of any other person; either directly or indirectly and is strictly limited to the purpose and the facts and matters stated in it and will not be used for any other application.

This report is based on the site conditions surveyed at the time the document was prepared. The assessment of the bushfire threat made in this report is made in good faith based on the information available to Bushfire Planning Australia at the time.

The recommendations contained in this report are considered to be minimum standards and they do not guarantee that a building or assets will not be damaged in a bushfire. In the making of these comments and recommendations it should be understood that the focus of this document is to minimise the threat and impact of a bushfire.

Finally, the implementation of the adopted measures and recommendations within this report 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.

Document Status: 2239 - Strategic Bushfire Study

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Certification

As the author of this Bushfire Assessment Report (BAR), I certify this BAR provides the detailed information required by the NSW Rural Fire Service under Clause 45 of the Rural Fires Regulation 2022 and Appendix 2 of Planning for Bushfire Protection 2019 for the purposes of an application for a bush fire safety authority under section 100B(4) of the Rural Fires Act 1997.



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Accredited Bushfire Practitioner

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Date: 18 May 2023

In signing the above, I declare the report is true and accurate to the best of my knowledge at the time of issue



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Executive Summary

Bushfire Planning Australia (BPA) has been engaged by the McCloy Project Management Pty Ltd (the 'Client') to undertake a Strategic Bushfire Study (SBS) and Bushfire Assessment Report (BAR) to support a planning proposal to amend the Port Stephens Local Environmental Plan 2013 (PSLEP) to:

- ❑ Rezone site from RU2 - Rural Landscape to R2 – Low Density Residential
- ❑ Reduce the Minimum Lot Size from 2 hectares to 350m²; and
- ❑ Identification as an Urban Release Area to trigger PSLEP 2013.

The proposed amendments to the PSLEP 2013 will affect 39, 39A & 41 Brocklesby Road, Medowie; legally referred to as Lot 301 & 300 DP625002 and Lot 2 DP508780 respectively.

Following the successfully rezoning, the subject site will be subdivided to create approximately 12.5 dwelling lots per hectare. In addition to the Brocklesby Road frontage, the site will have direct access to Macadamia Circuit to the west when the approved residential subdivision (DA16-2018-733-4) is completed in 2023.

Immediately surrounding land uses include Wirreanda Public School to the north, low-density residential to the east, rural-residential to the south and future low-density residential to the west.

The BAR found the site was exposed to medium to high bushfire hazard located to the north-west and a medium bushfire hazard to the south-west of the subject site. The predominant vegetation surrounding the site in unmanaged conditions is consistent with a *forest*, specifically *Sydney Coastal Dry Sclerophyll Forest* vegetation formation as described in PBP 2019. The BAR concludes that the hazard identified can be successfully mitigated by applying the requirements of PBP 2019, including Asset Protection Zones (APZs).

Subject to the following recommendations, the proposed land use can be considered to be appropriate in its bushfire context:

1. The capacity of the road network must be sufficient to deal with occupants of the site in an emergency situation; this should include a minimum of two points of access which provide two different routes of travel away from the site.
2. Details of the proposed community should be provided to the Local Emergency Management Committee to enable awareness in emergency response.

The following key recommendations have been designed to enable the proposed development to maintain an acceptable level of protection from the residual risk of a bushfire that may occur in the existing vegetation, in accordance with *Planning for Bush Fire Protection 2019*:

3. The entire development site; including all residential lots and open space shall be managed as an Inner Protection Area (IPA) as outlined within Section 5.1 of this report;
4. Access/egress will be provided in accordance with Section 5.2 of this report to ensure the safe evacuation of occupants whilst also affording fire fighters safe operational access and a defensible space to work within;
5. Non-perimeter roads shall be 8m wide (including provision for on-street parking);
6. Perimeter roads shall be 10.5m wide (including provision for on-street parking);
7. All temporary turning heads shall be constructed in accordance Appendix A3.3 of PBP 2019;
8. Building envelopes will be setback in accordance with minimum APZs to achieve maximum radiant heat levels of 29kW/m² as indicated in Section 5.4 of this report;
9. All new lots are to be connected to a reliable water supply network in accordance with Section 5.3.1 of this report. The water supply is to have suitable fire hydrants located throughout the development site that are outside of parking reserves and road carriageways, clearly marked and provided for the purposes of bushfire protection;



10. Gas and electricity supplies will be provided in accordance with Section 5.3.2 of this report so as to not contribute to fire ignitions within the development; and
11. Vegetation within road verges (including swales) to be consistent with a grassland vegetation classification with tree canopy less than 10% at maturity (and considered unmanaged);

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection and production (May 2023).

Should the above recommendations be implemented, the existing bushfire risk should be suitably mitigated to offer an acceptable level of protection to life and property for those persons and assets occupying the site but they do not and cannot guarantee that the area will not be affected by bushfire at some time.

1. Introduction

Bushfire Planning Australia (BPA) has been engaged by the McCloy Project Management Pty Ltd (the 'Client') to undertake a Strategic Bushfire Study (SBS) and Bushfire Assessment Report (BAR) to support a planning proposal to amend the Port Stephens Local Environmental Plan 2013 (PSLEP).

The planning proposal will affect 39, 39A & 41 Brocklesby Road, Medowie, legally referred to as Lot 301 & 300 DP625002 and Lot 2 DP508780; hereafter referred to as the 'site' (**Figure 2**).

The assessment aims to consider and assess the bushfire hazard and associated potential bushfire threat relevant to the proposed development, and to outline the minimum mitigative measures which would be required in accordance with the provisions of the New South Wales Rural Fire Service (RFS) publication *Planning for Bushfire Protection 2019* (PBP 2019) that has been released and adopted through the *Environmental Planning and Assessment Amendment* (Planning for Bushfire Protection) *Regulation 2007* and the *Rural Fires Regulation 2022*. This assessment will also demonstrate the planning proposal is consistent with Section 9.1 Ministerial Directions - 4.3 Planning for Bushfire Protection.

2. Site Description

Table 1: Site Details

Address	39, 39A & 41 Brocklesby Road, Medowie
Title	Lot 301 & 300 DP625002 and Lot 2 DP508780
LGA	Port Stephens Council
Site Area	5.1 ha
Land Use Zone	RU2 Rural Landscape
Bushfire Prone Land	Vegetation Category 1, Vegetation Category 3 and Vegetation Buffer
Context	The site is located on the western side of Brocklesby Road and contains multiple dwellings and residential sheds. Surrounding the site to the north and south are vegetated rural residential properties whilst to the west is a current residential subdivision under development.
Topography	The site is relatively flat.
Fire History	The site lies within a local government area with a Fire Danger Index (FDI) rating of 100.

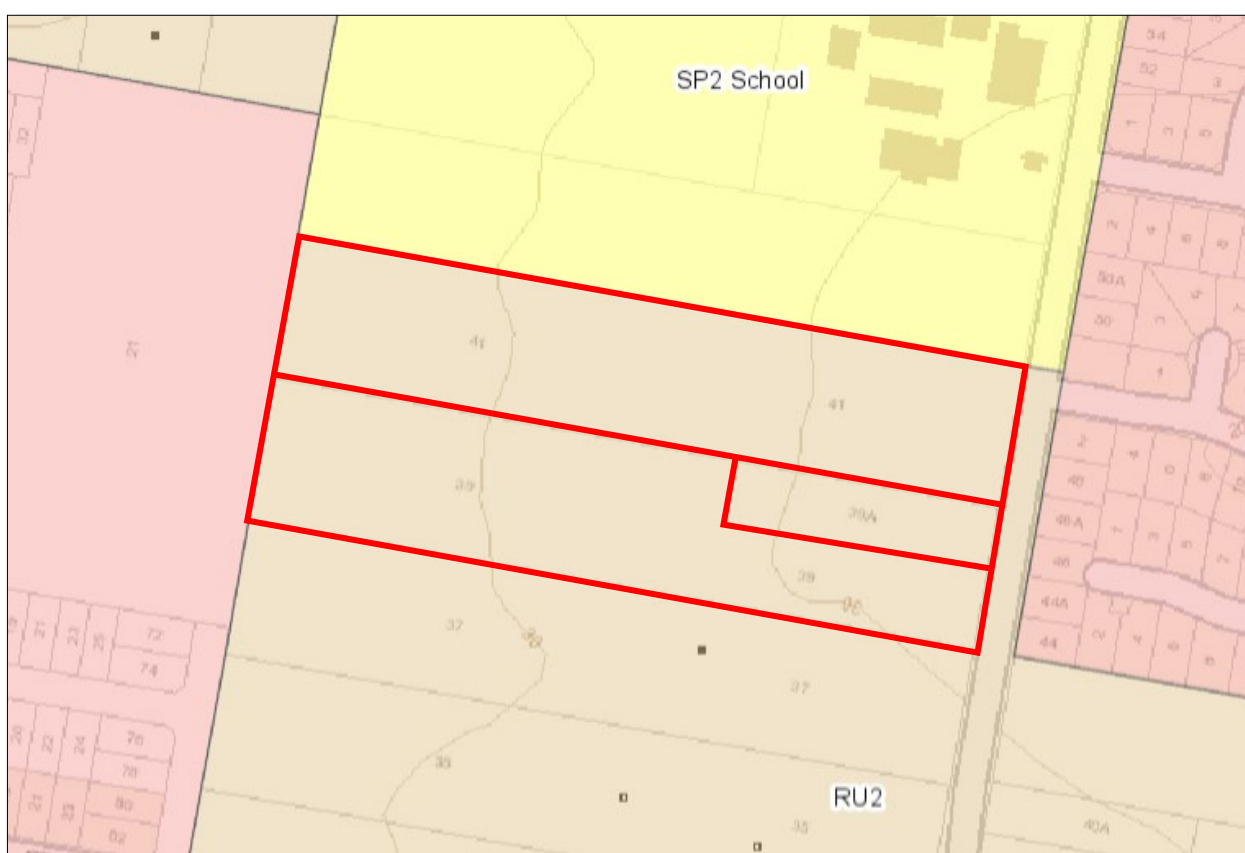


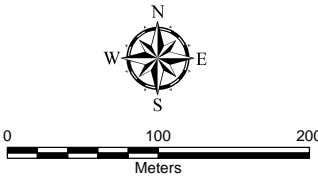
Figure 1: Land Use Zone

Figure 2
Site
Location



- Subject Site
- 100m Buffer
- 140m Buffer

SOURCE:
Base Map © Department of Customer Service
2020

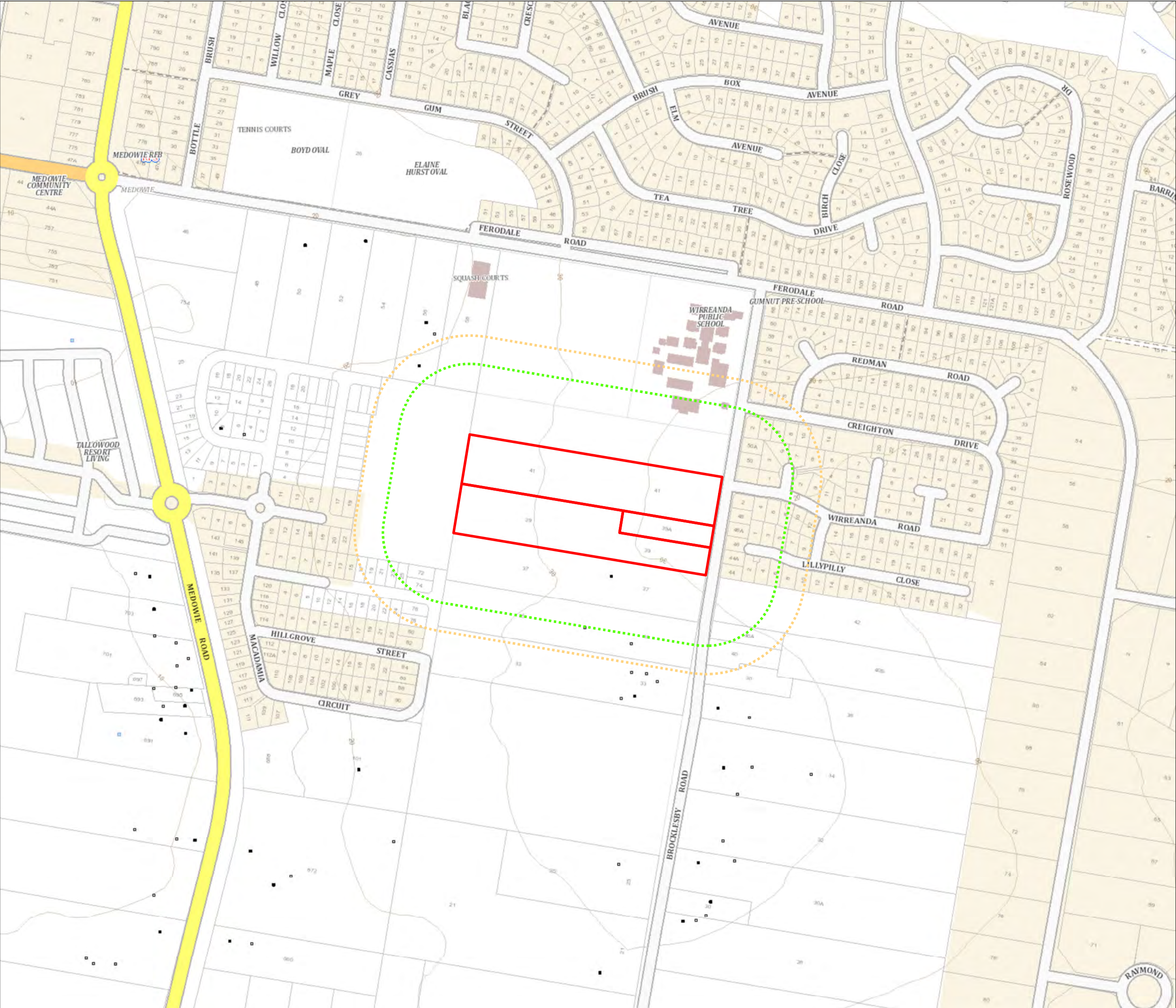


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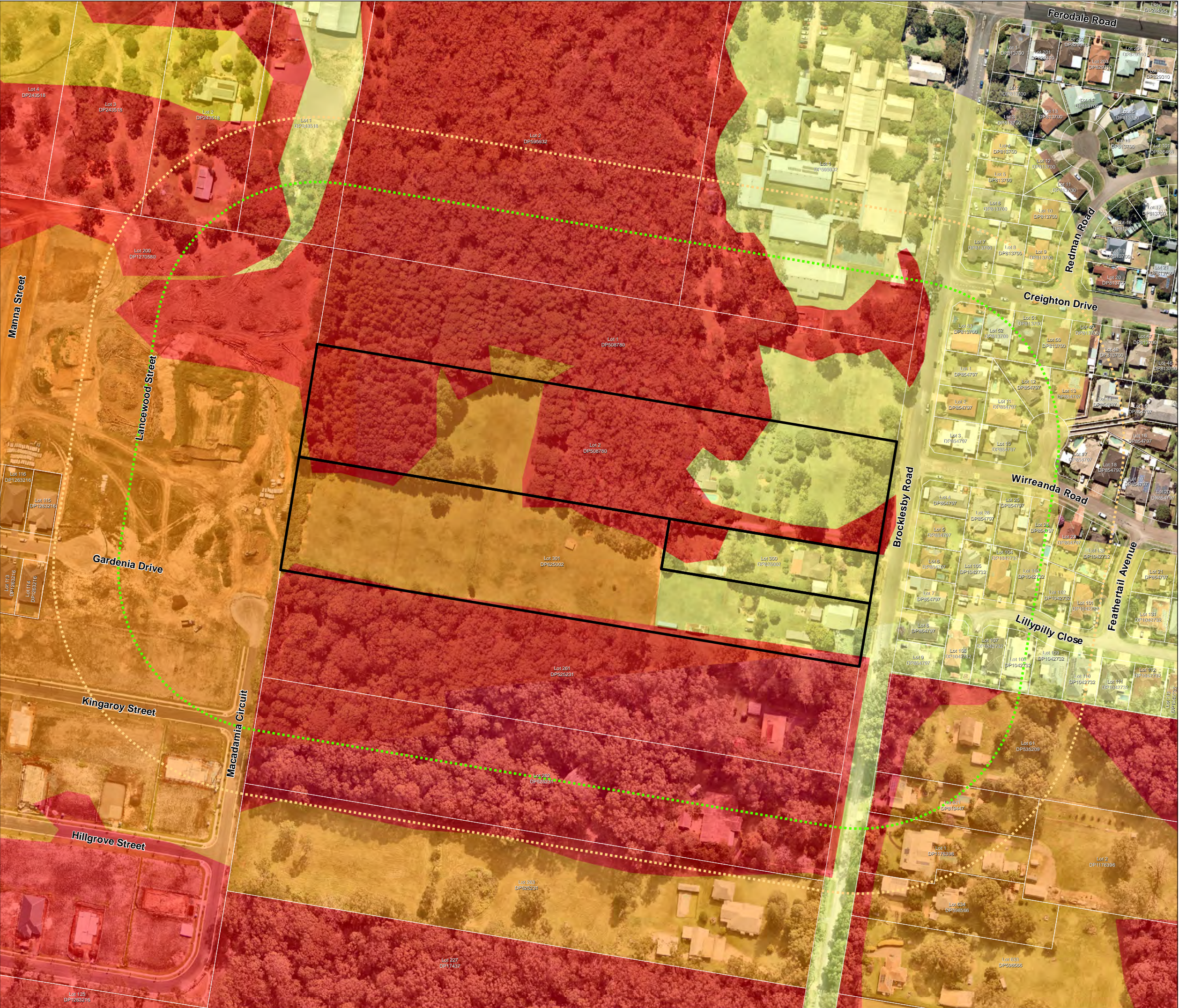


2.2. Bushfire Prone Land

Bushfire activity is prevalent in landscapes that carry fuel and the two predominant bushfire types are grassland and forest fires. Factors such as topographic characteristics and quantity of fuel loads influence the intensity and spread of fire. The scale of a bushfire hazard is tailored to the characteristics of the hazard, the size and characteristics of the affected population, types of land use exposed to bushfire, predicted development growth pressures and other factors affecting bushfire risk.

Figure 3 confirms the site is bushfire prone land. The northern portion of the development site (Lot 2 DP508780) consists of Vegetation Buffer located on the east, Vegetation Category 1 located in the middle and western portions of the site and is separated by Vegetation Category 3 bushfire prone land through the middle of the site. Vegetation Category 3 continues south and covers majority of Lot 301 DP625002 with exception of the Vegetation Buffer to the eastern portion of the site. There is also a narrow corridor along the southern and northern boundaries of Lot 301 DP625002 that are identified as Vegetation Category 1 bushfire prone land.

Surrounding the site to the north and south is mapped as Vegetation Category 1, to the west is mapped as Vegetation Category 3 and to the east is mapped as Vegetation Buffer bushfire prone land.






Project: Strategic Bushfire Study
Job no: 2239





Figure 3
**NSW Bush
Fire Prone
Land**



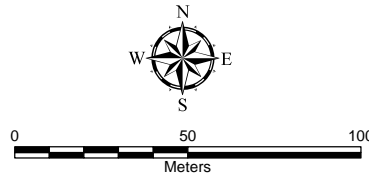
BUSHFIRE
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AUSTRALIA

-  Subject Site
-  100m Buffer
-  140m Buffer

Bushfire Prone Land

-  Vegetation Category 1
-  Vegetation Category 2
-  Vegetation Category 3
-  Buffer

SOURCE:
Cadastral Boundary: NSW Department of Finance,
Services and Innovation 2022
NSW Bush Fire Prone Land: NSW Rural Fire Service
2021
Aerial photo: NearMap 03/04/2022



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2.3. Proposed Development

The SBS is prepared to support a planning proposal to enable residential subdivision and subsequent housing on the site. An estimated 60 residential lots could be created, subject to future development consent.

To deliver the proposed development, the planning proposal seeks to amend the Port Stephens Local Environmental Plan 2013 (PSLEP) to:

- ❑ Rezone site from RU2 – Rural Landscape to R2 – Low Density Residential
- ❑ Reduce the Minimum Lot Size from 2 hectares to 350m²; and
- ❑ Identification as an Urban Release Area to trigger PSLEP 2013.

This residential outcome would be consistent with the Medowie Planning Strategy (2016), which identifies the site for ‘Residential’.

A plan of the proposed subdivision and boundary adjustment is contained shown in **Figure 4** and **Figure 5** and detailed in **Appendix A**.

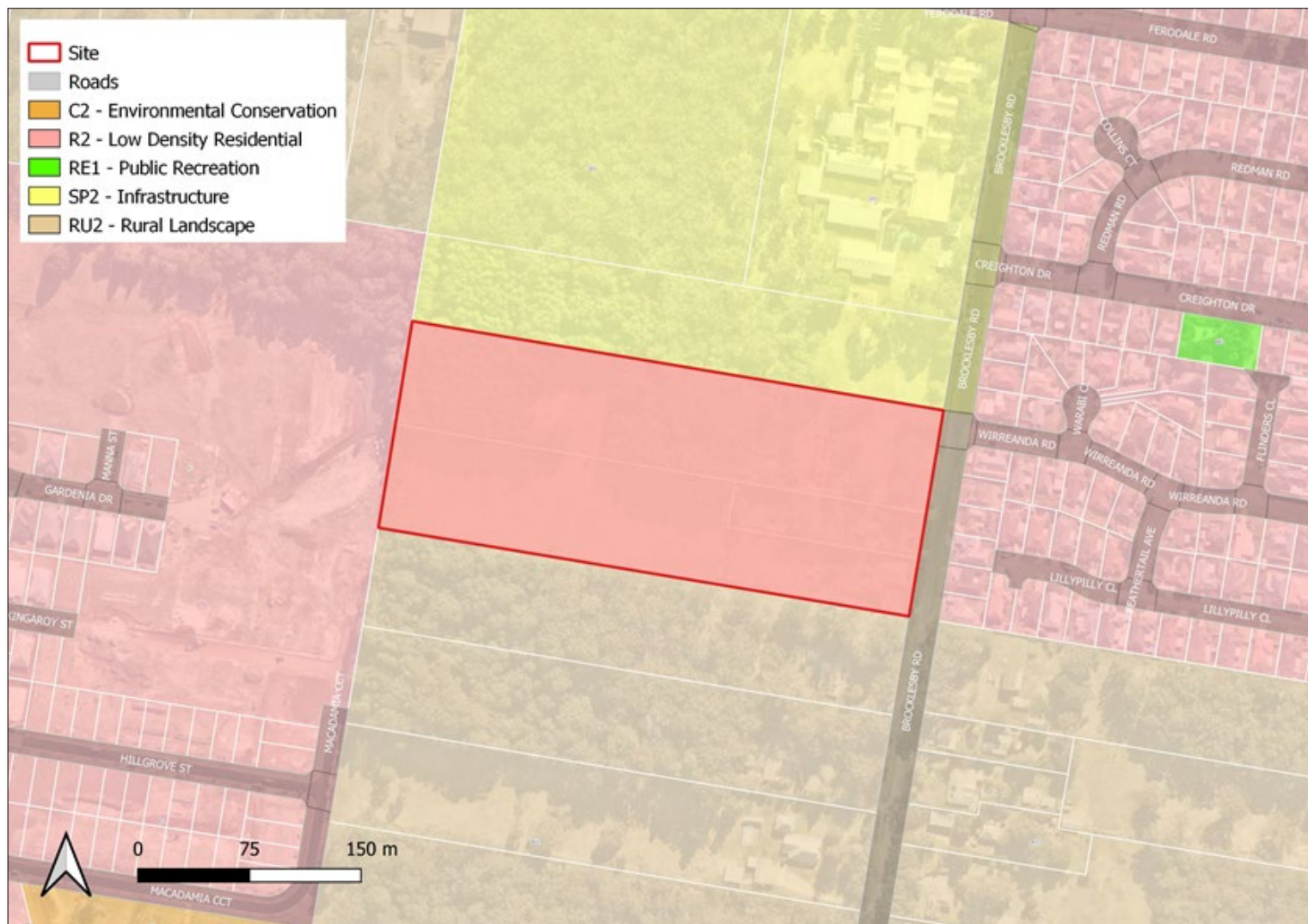


Figure 4: Proposed Land Use Zone Plan

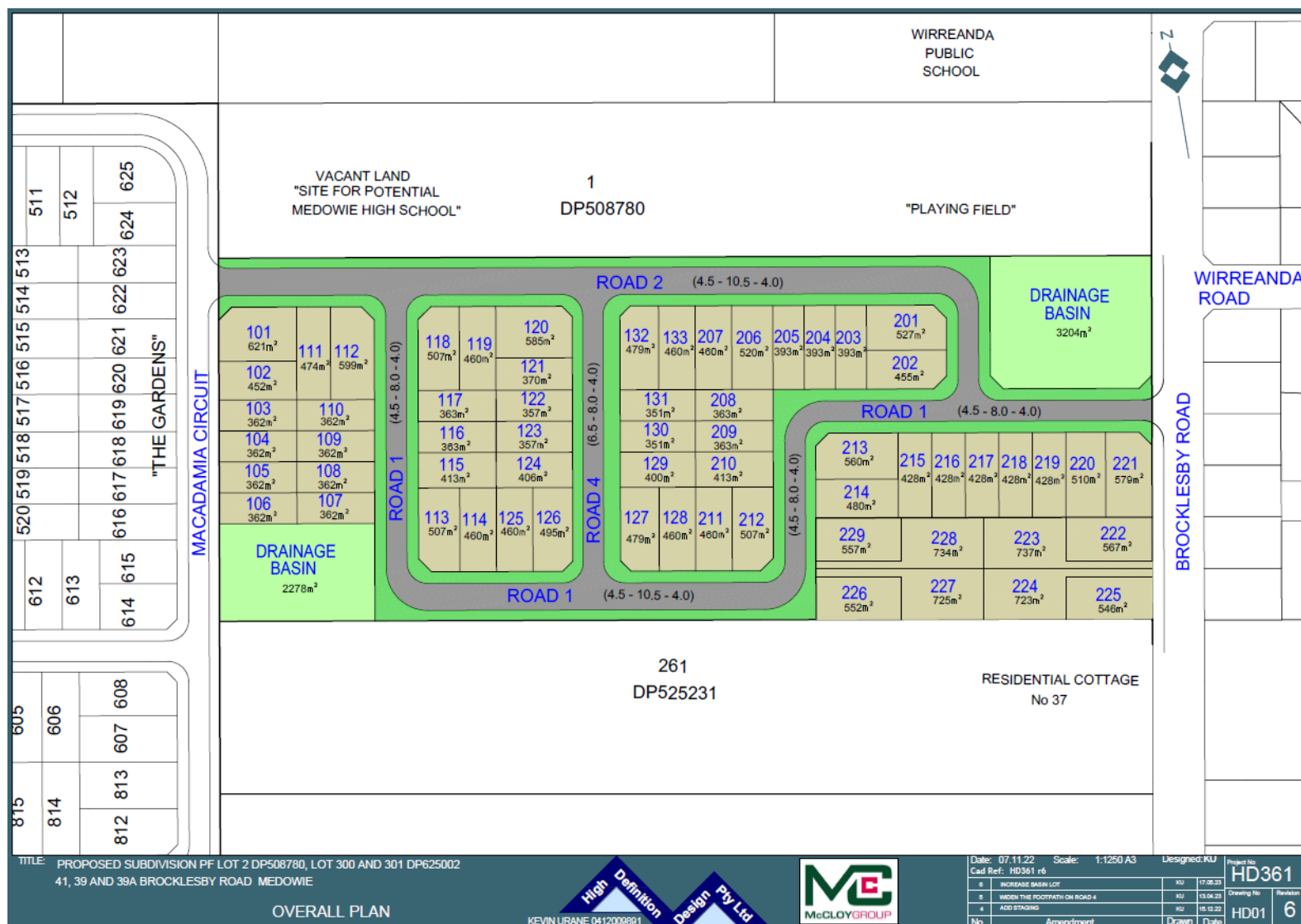


Figure 5: Indicative Subdivision Plan (64 lots)

3. Strategic Bushfire Study

3.1. Establishing Risk and Applying Treatment

The Strategic Bushfire Study (SBS) was introduced in NSW by Planning for Bush Fire Protection 2019 (PBP 2019). The SBS follows the principles of strategic planning generally in taking a long-term approach to land use planning and development expectations. The SBS aims to minimise or avoid the impact of natural hazards by taking a risk-based approach to the assessment of strategic planning policies and proposals. The SBS uses a macro-scale assessment, creates a risk profile and seeks treatment strategies to respond to the risk.

There are a number of national level guidance documents which provide helpful guidance in preparing strategic studies for natural hazard resilience. At a high level, the stage is set for consideration for natural hazards in strategic planning by the *Sendai Framework for Disaster Risk Reduction 2015 - 2030* (UNDRR, 2015), *The National Disaster Risk Reduction Framework* (Australian Government Department of Home Affairs, 2018), *Profiling Australia's Vulnerability: The interconnected causes and cascading effects of systemic disaster risk* (Australian Government Department of Home Affairs, 2018) and the *National Strategy for Disaster Resilience* (COAG 2011).

The *Land Use Planning for Disaster Resilient Communities* (the Handbook) published in 2020 by the Australian Institute for Disaster Resilience (AIDR) focuses on reducing disaster risk by improving strategic planning processes. The handbook aims to reduce both vulnerability and exposure of communities to natural hazard scenarios.

By considering natural hazards early and through its processes, land use planning can evaluate and select land use mechanisms to treat disaster risk.

The actions proposed by the Handbook are to understand disaster risk, make accountable decisions, establish governance, ownership and responsibility and ultimately, attract enhanced investment to reduce the risk. Ultimately, the goal is to make decisions which avoid risk. However, accepting that some level of risk is inevitable, the concept of risk tolerance and acceptable risk is highlighted. The Handbook uses a key principle introduced by the Planning Institute of Australia *National Land Use Planning Guidelines for Disaster Resilient Communities* (2015) which is the ALARP principle (As Low As Reasonably Practicable). This revolves around identifying risks that are broadly acceptable, tolerable, or generally intolerable and requires the identification of risk treatment options to move more towards the tolerable or broadly acceptable categories.

The Handbook also highlights the role that land use planning can play in climate change mitigation and adaptation. Future climate change models should be identified and utilised in the process of data gathering and analysis, whilst also acknowledging the uncertainties associated with those models.

The relationship with emergency management principles is highlighted by the Handbook. The integration of risk management and land use planning is recommended. The National Emergency Risk Assessment Guidelines produced by AIDR sets out the following structure for evaluating risk and applying risk treatment (taken from NERAG):

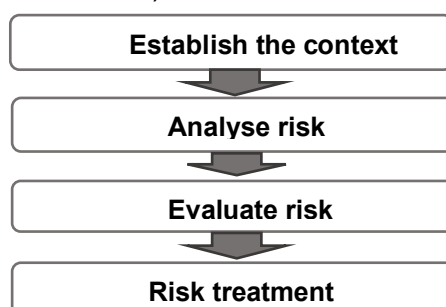


Figure 6: NERAG Risk Assessment Methodology

This process is appropriate for the SBS and will be followed to establish the risk and determine recommended risk treatments.



3.2. Ministerial Directions

Legislatively, planning proposals must follow the Ministerial Directions under Section 9.1(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Direction 4.3 requires a planning proposal, that is in proximity to land mapped as bushfire prone land, to have regard to PBP 2019, introduce controls that avoid placing inappropriate developments in hazardous areas and ensure that bushfire hazard reduction is not prohibited within the APZ.

A planning proposal must, where development is proposed, comply with the following provisions:

3(a) *provide an Asset Protection Zone (APZ) incorporating at a minimum:*

- i. *an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and*
- ii. *an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road,*

3(b) *for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with,*

3(c) *contain provisions for two-way access roads which link to perimeter roads and/or to fire trail networks,*

3(d) *contain provisions for adequate water supply for firefighting purposes,*

3(e) *minimise the perimeter of the area of land interfacing the hazard which may be developed,*

3(f) *introduce controls on the placement of combustible materials in the Inner Protection Area.*

Appendix D demonstrates the planning proposal complies with the above provisions.

3.3. Aim of the Strategic Bushfire Study

In accordance with PBP 2019, the Strategic Bushfire Study (SBS) is a high level assessment that identifies land affected by natural hazards and directs development away from inappropriate and constrained lands. In a bush fire context, strategic planning must ensure that future land uses are in appropriate locations to minimise the risk to life and property from bush fire attack. Services and infrastructure that facilitate effective suppression of bush fires also needs to be provided for at the earliest stages of planning.

The bushfire risk is considered at the macro-scale, looking at fire runs, steep slopes and any areas of isolation. The amount of proposed development interfacing vegetation will also be considered. Firefighting access and evacuation potential must be considered and an assessment of traffic volumes and evacuation routes will be required. The potential for these evacuation routes to be non-trafficable during a bush fire event will be factored into the assessment.

This SBS follows the considerations outlined within Table 4.2.1 of PBP 2019 to identify and analyse the risk profile and apply risk treatment measures.

The aim of the SBS is to meet the following principles:

- ☐ ensure land is suitable for development in the context of bush fire risk;
- ☐ ensure new development on bush fire prone land will comply with PBP 2019;
- ☐ minimise reliance on performance-based solutions;
- ☐ provide adequate infrastructure associated with emergency evacuation and firefighting operations; and
- ☐ facilitate appropriate ongoing land management practices.



3.4. Bushfire Landscape Assessment

A bushfire landscape assessment considers the likelihood of a bushfire approaching an area, its potential severity and intensity, and the resultant impact on life and property in the context of the broader surrounding landscape.

With regard to proposed site, the bushfire hazard, potential fire behaviour, history of bushfires and fire runs, and operational response was assessed with the outcomes addressed in the following sections.

3.4.1. Vegetation

An assessment of vegetation is important in determining risk as different types of vegetation burn differently across the landscape. This is largely due to location and topography, structure and arrangement and available surface, elevated and canopy fuel loads.

Grasses and heath burn more quickly and erratically with fire consuming a large proportion of the plant matter, as they are influenced by finer fuels, open air, exposed drying conditions and variations in wind speed and direction, whilst forests burn with greater intensity due to substantial amounts of taller, dense and woodier fuels. The amount of plant matter consumed by forest fires also varies due to the availability of fine fuel loads, fuel moisture and localised wind conditions.

It is these traits in vegetation that determine potential radiant heat and flame characteristics which in turn define building setback requirements in accordance with PBP 2019.

Vegetation within the proposed site area has been mapped by Department of Planning and Environment 2022, with this work supported by onsite field investigations in accordance with the site assessment methodologies within Appendix 1 of PBP 2019 (carried out by BPA on 24 May 2022 and 13 December 2022).

The vegetation communities within the study area have been characterised into structural formations according to David Keith (2004) *Ocean Shores to Desert Dunes* and PBP 2019 to determine likely maximum fuel loads in accordance with the NSW RFS fact sheet *Comprehensive Vegetation Fuel Loads (2019)*.

Vegetation within a 5km radius of the proposed development site is dominated by various types of Dry Sclerophyll Forests, Heaths, Forested Wetlands and Freshwater Wetlands. Swamps, and Saltmarshes also exist however are defined as low threat vegetation and excluded for the purposes of PBP 2019. **Table 2** and **Figure 7** identifies vegetation and their fuel load within 5km radius of the proposed development site.



Table 2: Vegetation Communities and Corresponding Structural Formations and Fuel Loads

Vegetation Community	Structural formation (Keith 2004)	Structural formation (PBP 2019)	Overall fuel load tonnes/ha (including surface, elevated, bark and canopy)
Coastal Dune Dry Sclerophyll Forest	Dry Sclerophyll Forest (Shrubby)	Forest	31.1
Hunter Macleay Dry Sclerophyll Forest	Dry Sclerophyll Forest (Shrub/Grass)	Forest	24.6
Northern Hinterlands Wet Sclerophyll Forest	Wet Sclerophyll Forest (Grassy)	Forest	33.1
Sydney Coastal Dry Sclerophyll Forest	Dry Sclerophyll Forest (Shrubby)	Forest	27.3
Coastal Swamp Forest	Forested Wetland	Forest	34.1
Coastal Headland Heaths	Heathlands	Short & Tall Heath	Up to 36.9
Wallum Sand Heaths	Heathlands	Short & Tall Heath	Up to 36.9
Coastal Heath Swamps	Heathlands	Short Heath	15.0
Coastal Floodplain Wetlands	Forested Wetland	Forested Wetland	15.1
Coastal Freshwater Lagoon	Freshwater Wetland	Freshwater Wetland	4.4
Mangrove Swamps	Low-threat vegetation	Excluded	N/A
Saltmarshes	Low-threat vegetation	Excluded	N/A

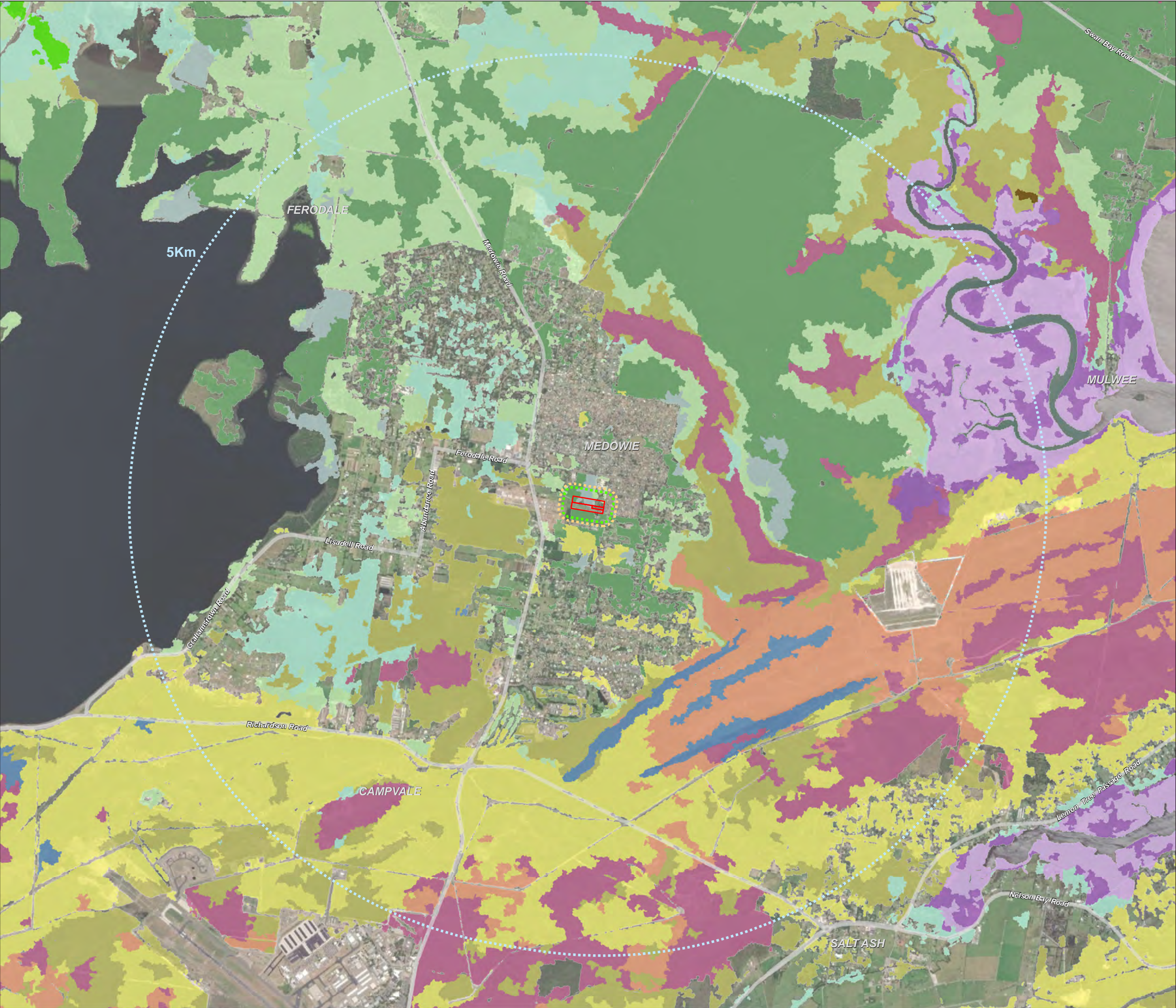


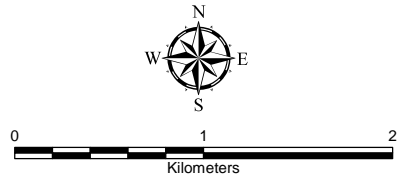
Figure 7
NSW State
Vegetation
Type - 5Km



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	Subject Site		Saltmarshes
	100m Buffer		Coastal Swamp Forests
	140m Buffer		Coastal Dune Dry Sclerophyll Forests
	2Km Buffer		
Vegetation Class			
	Wallum Sand Heaths		Hunter-Macleay Dry Sclerophyll Forests
	Coastal Headland Heaths		Northern Hinterland Wet Sclerophyll Forests
	Coastal Floodplain Wetlands		Sydney Coastal Dry Sclerophyll Forests
	Coastal Freshwater Lagoons		Dry Rainforests
	Coastal Heath Swamps		Not native vegetation
	Mangrove Swamps		

SOURCE:
Imagery: Maxar 2022
Vegetation: © State Government of NSW and Department of Planning and Environment 2022



A3 Scale: 1:40,000

File:2239-MedowieSBS-Fig3b-Vegetation-NSW-SVT-5km-2024-14/11/2022

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3.4.2. Topography

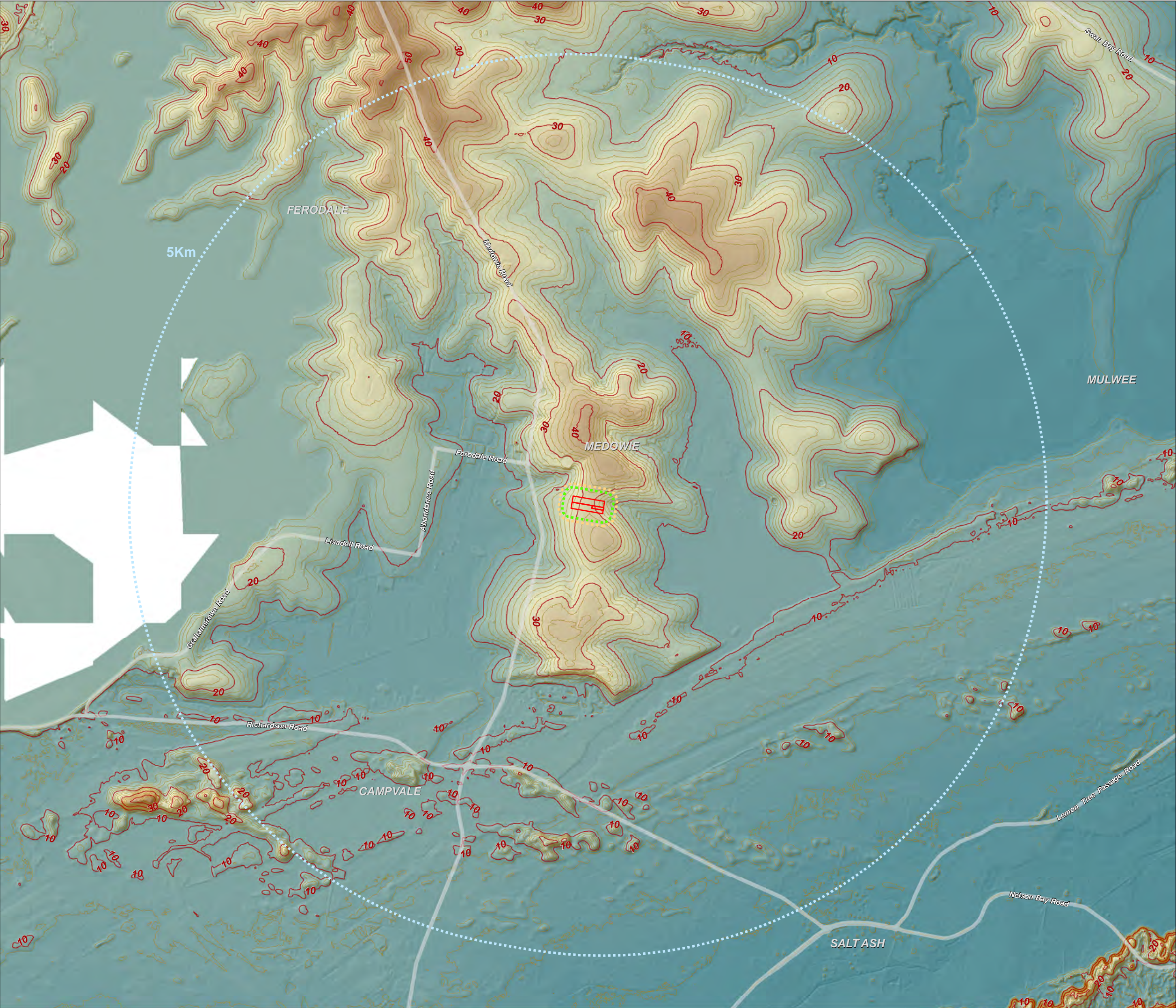
Topography and slope play a significant role in influencing the rate of fire spread and fire behaviour in relation to the potential for canopy involvement.

Research shows that the speed of an advancing bushfire front will double with every 10 degree increase in slope, so that on a 20 degree slope, its speed of advancement is four times greater than on flat ground. This is because the radiation and convection a fire creates preheats the unburned fuel ahead of the fire front causing it to combust at a quicker rate. This is done more effectively upslope than down. Fuel distributed across every layer of the vegetation community, in effect creating a ladder, also contributes to the likelihood of fire transfer to the canopy. This transfer is also more effective on steeper slopes.

Digital Elevation Modelling (DEM) shows us the topography within the locality of Medowie ranges from 0 to <50 metres above sea level. Within the proposed site, the topography peaks at ~31 metres above sea level, similar to the topography surrounding the site (**Figure 8 & 9**).

An assessment of the effective slope (that which sits underneath the bushfire hazardous vegetation) impacting the study area was undertaken using LIDAR point cloud data, DEM (NSW LPI) and results from field investigations carried out on both 24 May and 13 December 2022. An assessment of the slope over a distance of 100m in the hazard direction, as is required within Appendix 1 of PBP 2019, was undertaken. Results revealed slopes within the study area to be mostly flat.

In accordance with PBP 2019, development on steeper slopes, where the bushfire threat is downhill and has the potential to increase the rate of spread and intensity of bushfire, requires larger setbacks. Section 4 of this report addresses Asset Protection Zones and building setbacks commensurate with slope surveyed within the study area to achieve radiant heat levels $\leq 29\text{kW/m}^2$.



Project: Strategic Bushfire Study
Job no: 2239

Figure 8
Digital Elevation Model - 5Km



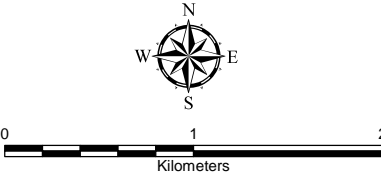
BUSHFIRE
PLANNING
AUSTRALIA

- Subject Site
- 100m Buffer
- 140m Buffer
- 2Km Buffer

- Contour (2m)
- Contour (0.5m)

Elevation (AHD)
High : 127m
Low : 0m

SOURCE:
Imagery: Maxar 2022
Surface analysis based on 1 second SRTM
Derived Hydrological Digital Elevation Model
(DEM-H) version 1.0, GeoScience Australia 2011

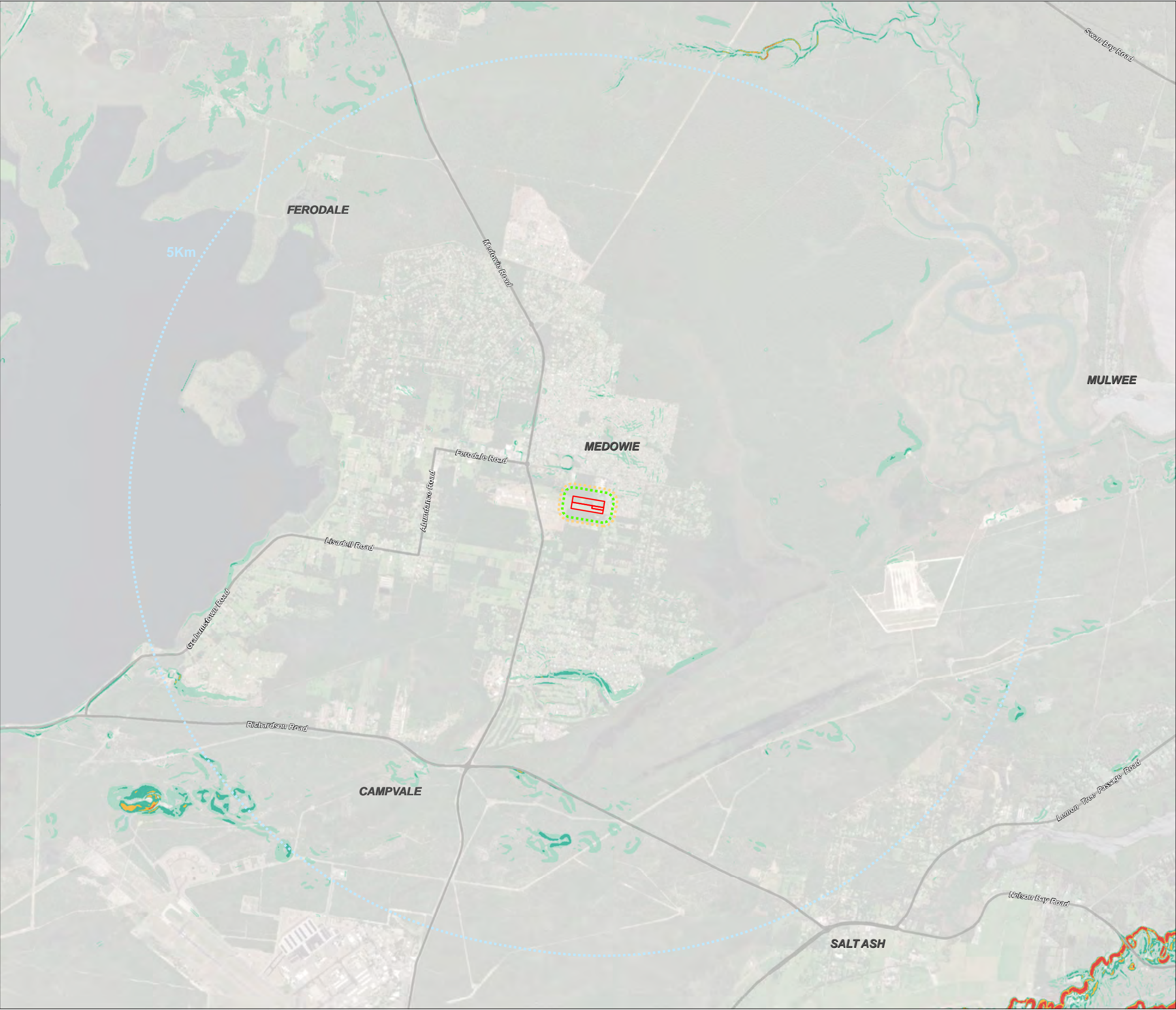


A3 Scale: 1:40,000

File:2239-MedowieSBS-Fig4b-DEM-5Km-221114 Date: 14/11/2022

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Project: Strategic Bushfire Study
Job no: 2239

Figure 9
Slope Analysis:
LiDAR - 5Km

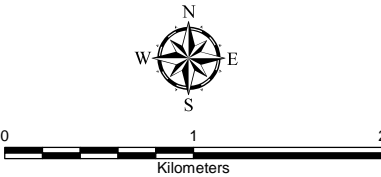


BUSHFIRE
PLANNING
AUSTRALIA

- Subject Site
- 100m Buffer
- 140m Buffer
- 2Km Buffer

- Slope**
- 0° - 5°
 - 5° - 10°
 - 10° - 15°
 - 15° - 20°
 - >20°

SOURCE:
Imagery: Maxar 2022
Surface analysis based on Geoscience Australia
2015 Digital Elevation Model (DEM) of Australia
derived from LiDAR 5 Metre Grid. Geoscience
Australia, Canberra.



A3 Scale: 1:40,000

File:2239-MedowieSBS-Fig5b-SlopeLiDAR-5Km-221114 Date: 14/11/2022

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3.4.3. Weather and Climate

The typical/average climate varies across the Port Stephens LGA from warm subtropical with the high altitude areas tending toward warm temperature. According to the *Lower Hunter Bush Fire Management Committee Bush Fire Risk Management Plan (2009)* (BFRMP), which includes the Port Stephens LGA, the official bushfire danger period ordinarily begins on 1 September and ends on 31 March.

Strong north-west to south-west winds often prevail within this time of year. Longer bush fire seasons occur when summer rainfall is lower than normal, with the bush fire season extending through Summer to early Autumn. Serious fires have occurred late in the season under dry summer conditions.

Prevailing weather conditions associated with the bushfire season in the Lower Hunter BFMC areas are north-westerly winds accompanied by high daytime temperatures and low relative humidity. There are also frequently dry lightning storms in the western areas occurring during the bushfire season.

The Forest Fire Danger Index (FFDI) given to the Port Stephens region is 100. The index is calculated from weather station data and is based on representative values of wind speed, temperature, humidity and fuel conditions.

The index represents a 1:50 year fire weather scenario and is applied to methodologies in calculating anticipated bushfire attack levels. It is possible that due to local variations in elevation, slope, and aspect, FFDI values at any point location may reflect values which are higher or lower than 100 resulting in different rates of fire spread across a landscape. **Table 3** provides a brief overview of point location weather data recorded at Medowie (closest weather station with climate statistics to Williamstown RAAF BOM Site Number: 061078).

Table 3: Climate Statistics Recorded at Williamstown RAAF Weather Station (BOM Climate Statistics for Australian Locations, October 2022)

Weather Station	Williamstown RAAF
Mean maximum temp (degrees)	Highest 28.3 (January), Lowest 6.5 (July)
Highest temp (degrees)	45.5 (4 Jan 2020)
Mean number of days \geq 30 degrees	9.4 (January)
Mean rainfall (mm)	Highest 128.3 (March), Lowest 60.6 (September)
Mean 3pm relative humidity (%)	Highest 62 (February), Lowest 50 (August September)
Mean 3pm windspeed (km/h)	Highest 23.5 (November/ December), Lowest 15.8 (May)
Lowest temp (degrees)	-3.9 (18 July 1970)
Mean minimum temp (degrees)	Highest 18.2 (January), Lowest 6.5 (July)



Climate change is influencing the frequency and severity of dangerous bushfire conditions in Australia. Fire risk is affected by four main factors, fuel load, fuel dryness, weather and ignition. Understanding the impacts of climate change on bushfires in NSW, relies on how climate change might affect these factors.

- ❑ Vegetation (ie fuel) growth will be affected by global increases in greenhouse gas emissions such as carbon dioxide as well as changes to rainfall patterns.
- ❑ Climate models have predicted that NSW will experience warmer drier periods of weather, drying vegetation and increasing bushfire risk. The 2019/2020 Black Summer bushfire season was predeeded by three years of increasing drought conditions.
- ❑ The risk of fire is increased by low rainfall and humidity and high temperature and wind speeds. There have been significant changes observed in recent decades towards more dangerous bushfire weather conditions for various regions of Australia. Observed changes in southern and eastern Australia include an earlier start to the bushfire season with dangerous weather conditions occurring significantly earlier in spring than they ever used to.
- ❑ In relation to fire ignition, there is some indication that climate change could influence the risk of ignitions from dry-lightning storms. Additionally, there has recently been a number of devastating fire events in Australia associated with extreme pyroconvection (including thunderstorm development in a fire plume), with recent research indicating a long-term trend towards increased risk factors associated with pyroconvection in southeast Australia.

According to the BFRMP, temperatures have been increasing in the Lower Hunter Region in recent decades. This warming trend is expected to continue, with anticipated considerable rainfall variability across seasons and from year to year. These projected changes include increasing maximum and minimum temperatures, increasing number of hot days, decreasing number of cold nights together with winter rainfall and increasing Autumn and Spring rainfall. Average fire weather and severe fire weather days are projected to increase in Summer and Spring.

In addition to the changing weather conditions, it is anticipated that the potential for wildfire ignition will increase and fuels may also change. There is increased capacity for lightning strikes within the landscape due to potentially more volatile weather conditions, increased ignition potential could lead to more challenging firefighting conditions. Over the longer term, fuels can become drier, areas of forested wetland or forest could become drier with a higher propensity to burn. The increased risk of hotter fires occurring on a more regular basis can also increase the risk of vegetation communities, such as forest, being impacted more frequently by fire and taking hundreds of years to recover (environment.nsw.gov.au).

In planning for a climate change future, the following mechanisms are recommended:

- ❑ Required setbacks from bushfire hazardous vegetation commensurate with an FFDI 100;
- ❑ Mechanical fuel reduction, where achievable, as opposed to controlled burning;
- ❑ Alternative landscaping initiatives and garden design that relies more on non combustible elements and use of succulent and drought resistant plantings; and
- ❑ Improved emergency management planning and procedures.

3.4.4. Bushfire Behaviour and Fire History

Information on fire history is a useful factor in understanding fire frequency and bushfire risk. Review of available fire history data within and surrounding the Port Stephens LGA indicates there have been an extensive and continuous number of fires within 5kms of the proposed development site recorded over the past 30 years.

The largest and closest fire to the subject site was recorded in 2013, approximately 1km south-west of the site, across multiple rural properties (**Figure 10**).

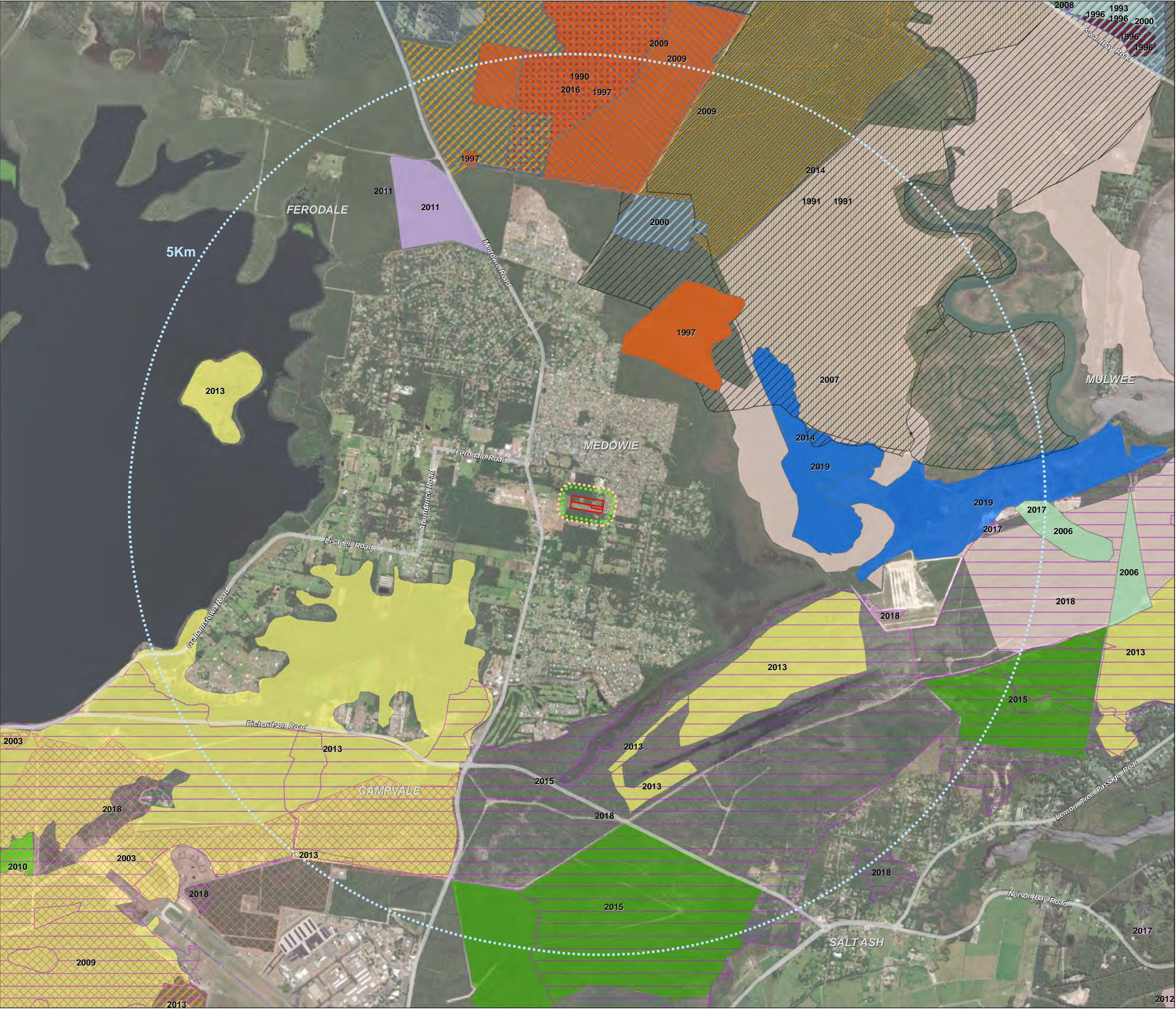


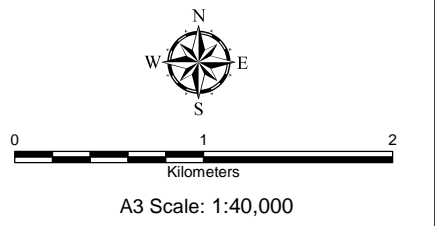
Figure 10

NSW Fire History



	Subject Site		2007
	100m Buffer		2008
	140m Buffer		2009
	2Km Buffer		2010
YearOfFire			2011
	1990		2012
	1991		2013
	1993		2014
	1996		2015
	1997		2016
	2000		2017
	2003		2018
	2006		2019

SOURCE:
Imagery: Maxar 2022
Fire History: NSW Rural Fire Service 2022



File:2239-MedowieSBS-Fig2b-FireHistory-221114 Date: 14/11/2022

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According to the Bush Fire Risk Management Plan (BFRMP) the Port Stephens LGA has on average 200 bushfires per year, of which 3 on average can be considered to be major fires. The main sources of ignition include:

- ❑ Escapes from legal burning off;
- ❑ Incendiarism / arson; and
- ❑ Arcing power lines.

The BFRMP confirms there are a number of assets, including Hunter Water Medowie Pump Station and isolated residences, identified as assets at risk of bushfire impact within the entire Medowie region. **Figure 11** provides a snapshot of the study areas assets at risk (indicated as red and orange hatching and icons) as identified within the Lower Hunter BFRMP and specifically for the Medowie area.

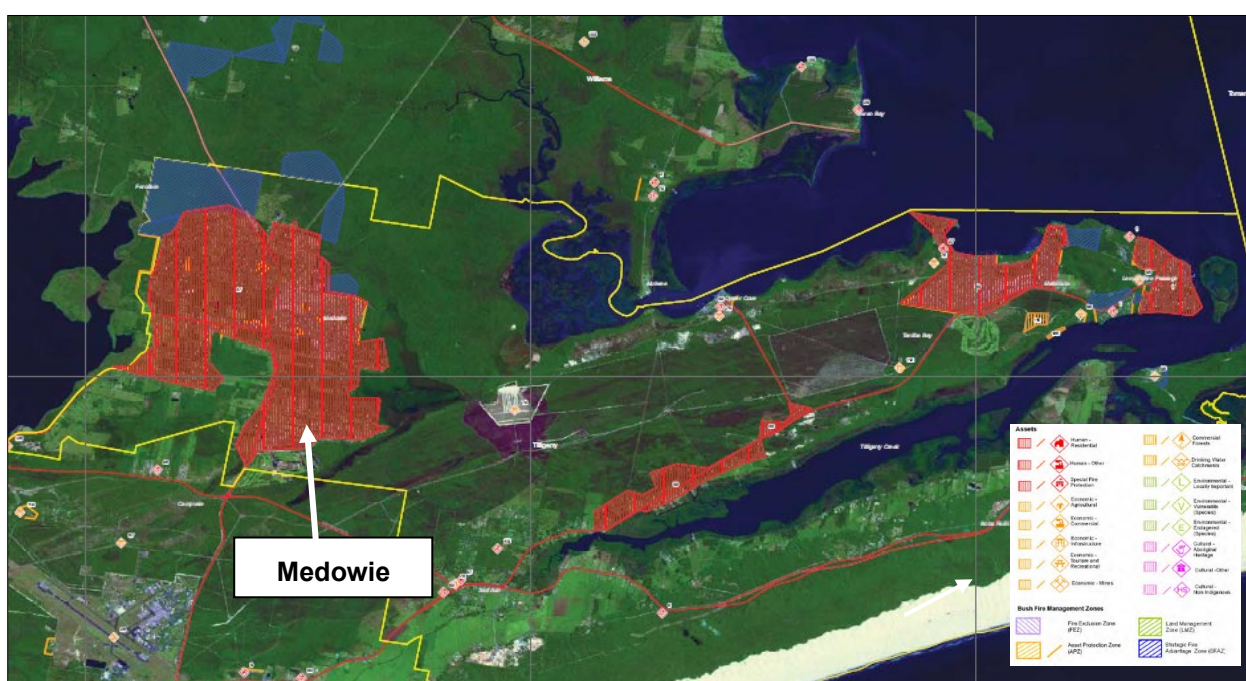


Figure 11: Human Settlement Assets Within Lower Hunter BFRMP



3.5. Land Use Assessment

A land use assessment identifies the appropriateness of siting different land uses in particular locations based on risk profiles. The planning proposal looks to allow for low density residential development opportunities for a site surrounded by an area transitioning from rural residential to low density residential neighbourhoods.

The focus of the SBS is to assess the implications of increased residential densities of the existing lots.

The existing asset (rural landscape) on the subject site has been assessed as having a low risk of bushfire impact. The change of zoning and development for up to 60 low density residences changes the risk profile for the asset in the following ways:

- ❑ The asset would be identified as a “residential” asset.
- ❑ The threat level would be reduced as there would be no change to the vegetation, but mitigation achieved through the planning process, such as the introduction of asset protection zones (APZ) and construction standards would reduce the threat. The threat level will therefore remain ‘low’.
- ❑ The vulnerability of the asset would increase with the addition of residential dwellings, but nevertheless, the vulnerability will remain low, providing the access and egress can be upgraded to an adequate level.
- ❑ The consequence level, derived by plotting threat level against vulnerability, would be minor, again assuming that the access can be upgraded to an adequate level.
- ❑ The likelihood – frequency of ignition and chance of spread (access, suppression capability, fire run, fire paths) would potentially increase slightly over and above the existing use. Additional people on the site may slightly increase the chance of human ignition, there would be greater need for suppression and good access. The likelihood would therefore increase and highlights the need for improved access and suppression capability.

Overall, the bushfire risk to the site will increase slightly with the introduction of low density residential accommodation to the site. Whilst the threat would potentially reduce, the vulnerability, consequence and likelihood would increase slightly. The increase in risk would be offset by the introduction of APZ, construction requirements and other bushfire protection measures. The access is a key mitigation measure in reducing the bushfire risk to the development. Upgrades to the access and a full traffic assessment from an emergency perspective will really embed the low bushfire risk classification.



3.6. Access and Egress

PBP 2019 requires sufficient access with design objectives that enable safe evacuation away from an area whilst facilitating adequate emergency and operational response. All areas affected by bushfire prone land should have an alternate access or egress option dependant on bushfire risk, density of development, population and the chances of roads being cut-off by fire, smoke and accidents for prolonged periods of time.

The proposed development must also ensure there is adequate access/egress. Section 5.3.2 of PBP 2019 requires a development to provide safe operational access to structures and water supply for emergency services while residents are seeking to evacuate.

All new roads would need to comply with the following requirements, in accordance with Table 5.3.2 of PBP 2019:

- ☐ All roads are two-wheel drive, sealed, all-weather roads;
- ☐ A secondary access is provided to the development;
- ☐ Traffic management devices do not prohibit access by emergency services vehicles;
- ☐ Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees;
- ☐ Carriageway width kerb to kerb shall be a minimum of 5.5 metres and have a minimum vertical clearance of 4 metres to overhanging obstructions and tree branches;
- ☐ All parking shall be provided outside of the carriageway width;
- ☐ Curves of roads shall have a minimum inner radius of 6 metres and crossfall shall not exceed 3 degrees;
- ☐ Dead end roads incorporate a minimum 12 metres outer radius turning circle and are clearly sign posted as a dead end;
- ☐ One way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water;
- ☐ The capacity of roads/bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes) with bridges/causeways clearly indicating load rating;
- ☐ Perimeter roads are two-way with a minimum carriageway width of 8 metres kerb to kerb;
- ☐ Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road.

There is no impediment to these standards being achieved. The proposed development is directly accessible from Brocklesby Road. The site will also have a direct access to Macadamia Circuit to the west upon completion of the approved subdivision (DA16-2018-733-4) in 2023.

The increased population on the subject site is unlikely to dramatically affect the capacity of Brocklesby Road.



3.7. Emergency Services

With an increase in population comes a growing demand on emergency services and it is prudent that consideration be given to the future impact on firefighter numbers, appliances, infrastructure, training and response time. Currently within a 20-kilometre radius of the study area there are four (4) Rural Fire Brigades, and 1 (one) Fire and Rescue NSW fire stations (**Table 4**).

Their locations are spaced kilometres apart which may impact quick response to bushfire and building fire emergencies and has in previous times often relied upon attendance from out of area brigades to assist with larger bushfire emergencies.

Table 4: Fire Brigades within 20kms of the Study Area

Rural Fire Brigades	Address	Distance to Subject Site
Medowie Fire Station	47B Ferodale Road, Medowie	1.3km or 2 minutes
Salt Ash Rural Fire Station	2 Michael Drive, Salt Ash	10.3km or 10 minutes
Raymond Terrace	33 Rees Road, Raymond Terrace	16.3km or 16minutes
Tilligerry Rural Fire Brigade	1 Success Street, Tanilba Bay	19.8km or 18 minutes

Fire & Rescue NSW Stations	Address	Distance to Subject Site
Raymond Terrace	5 Leisure Way, Raymond Terrace	12.5km or 12 minutes

Due to the small number of Rural Fire Brigades and FRNSW stations there is a significant requirement for the community to understand their risk and ensure they have a bushfire survival plan that outlines their emergency arrangements and course of action, particularly where there is tourist accommodation. Discussions with NSW RFS confirmed that education of both the existing and proposed community would be a significant benefit in undertaking safe evacuation of the area. It was clear from our discussions that an informed community is easier to evacuate. Providing the community with information regarding potential evacuation routes and timing of evacuation, in line with the BTS, would significantly assist a safe evacuation process.

Potential growth in population should also prompt the Port Stephens Council and RFS District Office to assess the implications on resource capabilities and the need for extra bushfire management and community advisory roles, stations, firefighting volunteers, equipment and/or increased training opportunities (ie Breathing Apparatus and village training) to cater for future development and capacity, particularly in those areas adjacent to substantial areas of bushland.



3.8. Infrastructure

An assessment of the issues associated with infrastructure and utilities considers the life safety issues of fire in proximity to high voltage power lines and natural gas supply lines and the pressures a major bushfire event puts on flow rates of reticulated water systems and telecommunications infrastructure.

Above ground low and high voltage power lines exist in the Medowie region. Generally, the energy authority's vegetation management policies and procedures assist with managing fire risks associated with existing vegetation within close proximity to powerlines to prevent ignitions.

Any new development as a result of rezoning can site electricity, and communication cables underground so as to both reduce the bushfire risk from sparking power lines and protect the infrastructure supply in a bushfire event.

The extent of the existing water supply is such that an increase in demand should not detrimentally impact water pressure and flow to the study area. Additional static water supply systems can be recommended with new development to lessen dependence on reticulated systems.

In accordance with Section 5.3.3 of PBP 2019, any new development shall provide adequate services of water for the protection of buildings during and after the passage of a bushfire and will locate gas and electricity so as not to contribute to the risk of fire to any building.

- ☐ Fire hydrant spacing, sizing, flows and pressure will comply with AS 2419.1 – 2005. Hydrants will be located outside of parking reserves and road carriageways.
- ☐ All sites within proposed developments will be connected to the internal reticulated water supply.
- ☐ All electricity services will be located underground.
- ☐ Any reticulated or bottled gas should be installed and maintained according to the requirements of the relevant authorities and AS 1596-2014.

3.9. Adjoining Land

Consideration of the implications of a change in land use on adjoining land, including increased pressure on bushfire protection measures, should also be undertaken.

The anticipated impact on adjoining land would be:

- ☐ An increase in traffic to the local area and added dependence on reticulated water supply, both of which have been addressed in the sections above; and
- ☐ Pressures on landowners and management agencies to more frequently manage bushfire hazardous vegetation on their properties.

With regards to the latter, although Asset Protection Zones are expected to be provided for wholly within the boundary of developable sites, there may be increased pressures for prescribed burning to complement bushfire protection measures, particularly in the larger tracts of vegetation throughout the Medowie area. Given the biodiversity values of the study area, fire frequencies will need to be directed by already known and established fire regimes and seasonality so as to maintain plant growth cycles, habitat and breeding opportunities of fauna species.

4. Bushfire Hazard Assessment

The appropriateness of the proposed development is established through the Strategic Bushfire Study. Assuming that any issues identified within the SBS can be overcome through the re-zoning process, the Bushfire Assessment Report provides an assessment of the proposed development and subdivision against the requirements of section 100B of the *Rural Fires Act 1997* and *Planning for Bush Fire Protection 2019* (PBP 2019) and can be used in an application for a Bush Fire Safety Authority.

The Bushfire Hazard Assessment is conducted on a more localised scale, assessing vegetation categories out to a distance of 140 metres and slope to a distance of 100m, in accordance with the Site Assessment Methodology within Appendix 2 of PBP 2019. This establishes a more localised risk context for the development and specific bush fire protection measures required for the subdivision of the land to occur.

4.1. Aims and Objectives

The assessment aims to consider and assess the bushfire hazard and associated potential bushfire threat relevant to the proposed development, and to outline the minimum mitigative measures which would be required in accordance with the provisions of PBP 2019 and the *Rural Fires Regulation 2022*.

This assessment has been undertaken in accordance with clause 45 of the Rural Fires Regulation 2022. This BAR also addresses the aims and objectives of PBP 2019, being:

- ☐ Afford buildings and their occupants protection from exposure to a bushfire;
- ☐ Provide for a defensible space to be located around buildings;
- ☐ Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;
- ☐ Ensure that appropriate operational access and egress for emergency service personnel and occupants is available;
- ☐ Provide for ongoing management and maintenance of bushfire protection measures (BPMs); and
- ☐ Ensure that utility services are adequate to meet the needs of firefighters.

A compliance table demonstrating compliance with PBP 2019 is provided in **Appendix C**.

4.2. Vegetation Assessment

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

- ☐ Aerial Photograph Interpretation to map the vegetation classification and extent;
- ☐ Review of LiDAR point cloud data (NSW LPI);
- ☐ Reference to NSW State Vegetation Type Mapping NSW Department of Planning and Environment 2022 (**Figure 12**);
- ☐ Vegetation Communities map, Habitat Environmental Services (**Figure 13**); and
- ☐ Site inspection by Stuart Greville on 24 May and 13 December 2022.

In accordance with PBP 2019, an assessment of the existing vegetation over a distance of 140m in all directions from the site was undertaken. Vegetation that may be considered a bushfire hazard was identified to the north and south of proposed lot 2, and to the south of proposed lot 1. The vegetation classification is based on Appendix 1 of PBP 2019. The findings of the site inspection were compared to the NSW State Vegetation Type mapping (**Figure 12**). The inconsistencies between the mapping sources were quantified during the site inspection. It was confirmed during the site inspection that a *forest*, specifically, *Sydney Coastal Dry Sclerophyll Forest* vegetation formations were present within 140m of the site.

4.2.1. Reliability Assessment

Although the bushfire prone land mapping is intended to be regularly updated, land use and vegetation cover that contribute to bushfire hazards are subject to change. A reliability assessment was undertaken for the subject site and all land within 140m. In this instance the bushfire prone land mapping is mostly consistent with existing vegetation present within the site.

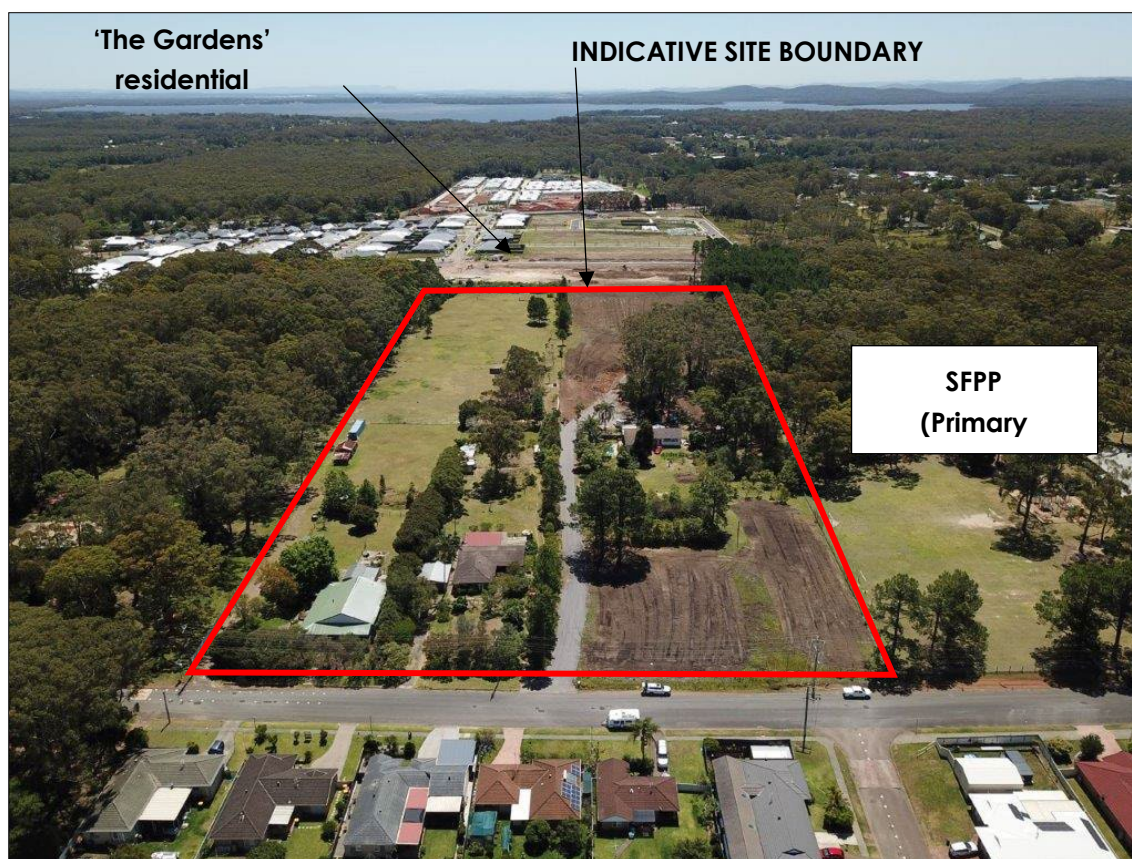


Plate 1: Subject site looking west across Brocklesby Road towards Grahamstown Dam

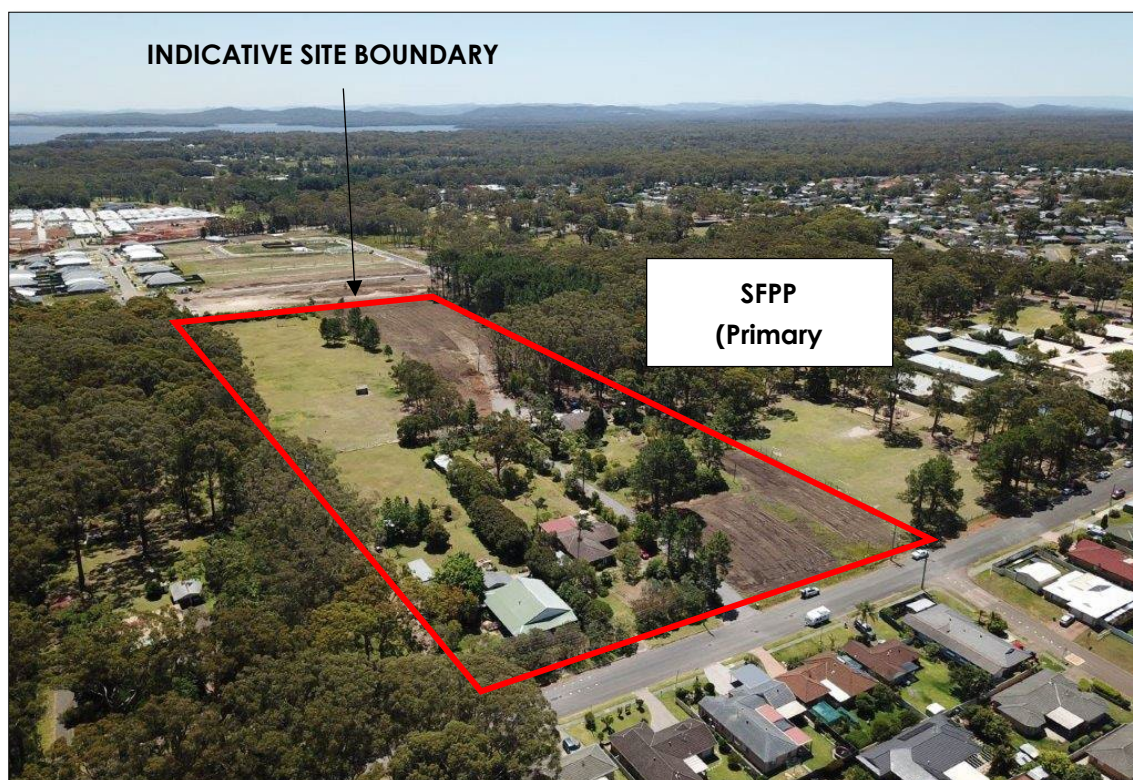


Plate 2: Looking north west towards site and public school. Future subdivision 'The Gardens' to west of site

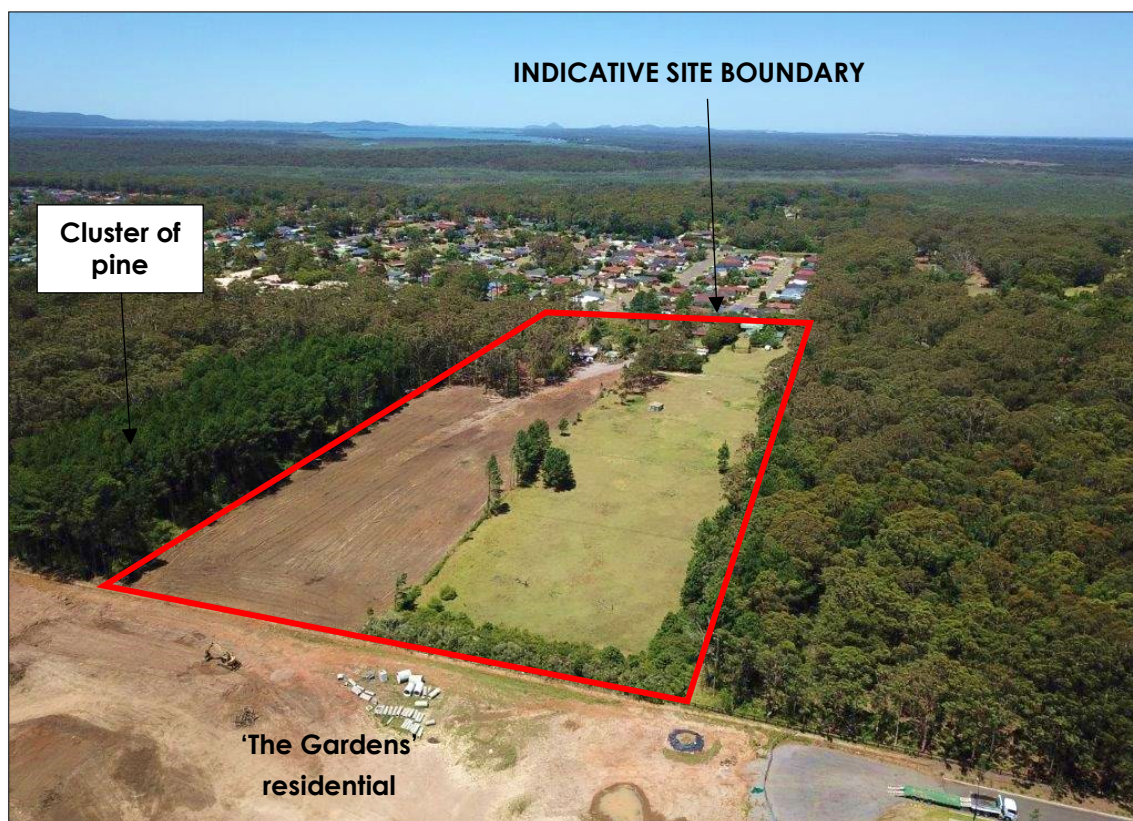


Plate 3: Looking north east over 'The Gardens' over site. Pine plantation within school north of site

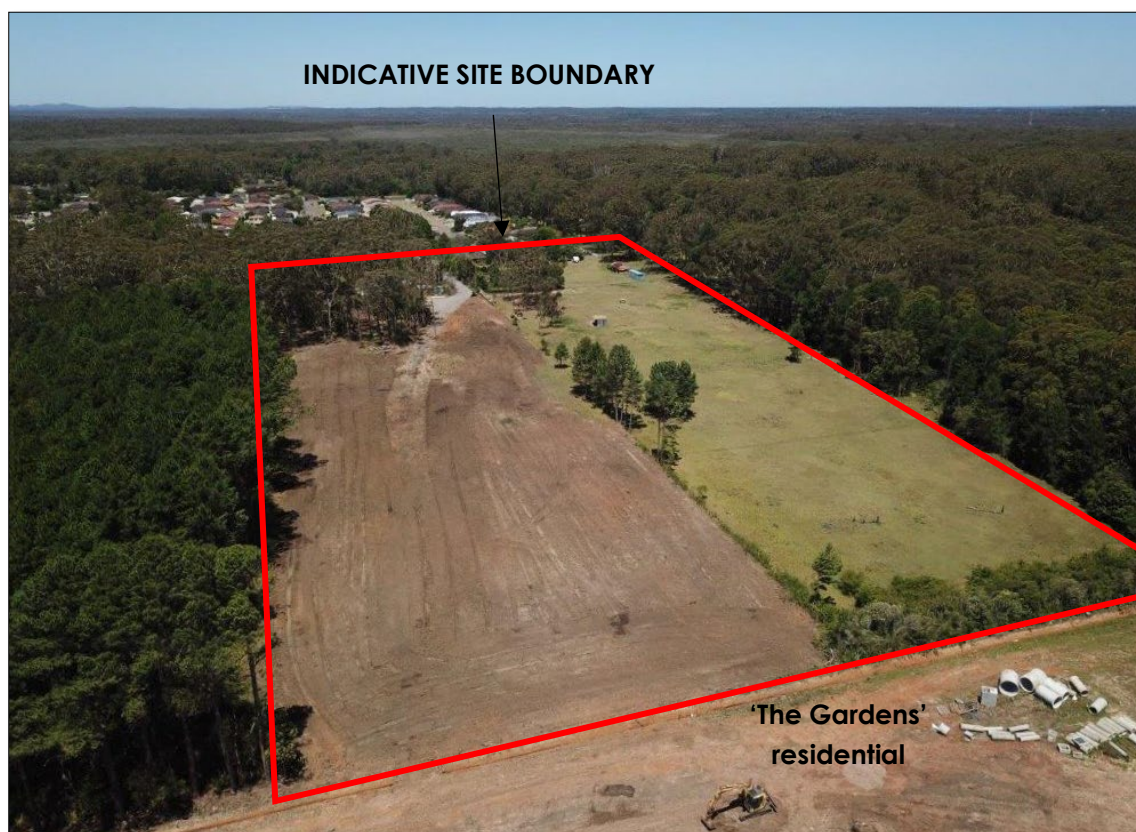


Plate 4: South east showing future road access from 'The Gardens'



Plate 5: Forest vegetation dominated by pine trees (T1 & T2)



Plate 6: Managed vegetation within school grounds between T2 and T3



Plate 7: Brocklesby Road looking south towards T4



Plate 8: Sydney Coastal DSF along T7 to the south west of the site.



Plate 9: Managed rear yard of 37 Brocklesby Road looking west along boundary with No. 39



Plate 10: Rear yard of 37 Brocklesby Road observed to be well maintained and classified as a low threat



Plate 11: Front yard of 37 Brocklesby Road observed as managed land



Plate 12: Rear of subject site to continue to be managed as an APZ – looking south



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Job no: 2239

Figure 12

NSW State Vegetation Type



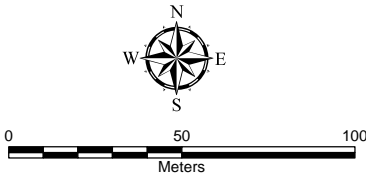
BUSHFIRE
PLANNING
AUSTRALIA

- Subject Site
- 100m Buffer
- 140m Buffer

Vegetation Class

- Coastal Dune Dry Sclerophyll Forests
- Hunter- Macleay Dry Sclerophyll Forests
- Northern Hinterland Wet Sclerophyll Forests
- Sydney Coastal Dry Sclerophyll Forests
- Not native vegetation

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022
Vegetation: © State Government of NSW and Department of Planning and Environment 2022
Aerial photo: NearMap 03/04/2022



A3 Scale: 1:2,182

File:2239-MedowieSBS-Fig3a-Vegetation-NSW-SVT-221114Date: 14/11/2022

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Figure 13 - Vegetation Communities



Legend

Study Area (Lot 2 DP 508780, Lots 300 & 301 DP 625002)

Vegetation Type

- PCT 3581 Hunter Coast Foothills Apple Forest (low)
- PCT 3581 Hunter Coast Foothills Apple Forest (moderate)
- Low Condition Grassland
- Planted/Exotic
- Cleared

4.3. Slope Assessment

The slope assessment was undertaken as follows:

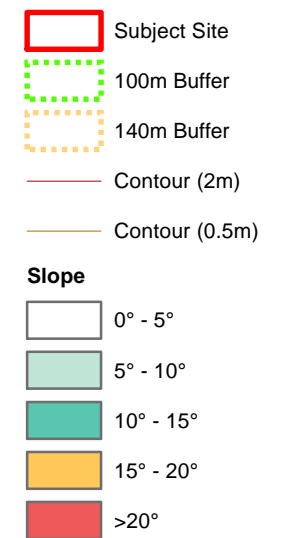
- ❑ Review of LiDAR point cloud data - including DEM (NSW LPI);
- ❑ Detail survey of existing contours; and
- ❑ Site inspection on 24 May and 13 December 2022.

An assessment of the slope over a distance of 140m in the hazard direction from the site boundary was undertaken. The effective slope was then calculated under the classified vegetation where there was a fire run greater than 50m. The topography of the site has 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.

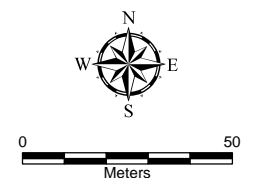
The effective slope in all directions is shown in **Figure 14**, **Figure 15** and **Table 5**.

Figure 14

Slope Analysis: LiDAR



SOURCE:
Cadastral Boundary: NSW Department of Finance,
Services and Innovation 2022
Surface analysis: Derived from LiDAR - Newcastle 1
metre Resolution Digital Elevation Model ©
Department Finance, Services and Innovation 2012
Aerial Photo: NearMap 03/04/2022



A3 Scale: 1:1,800

File:2239-MedowieSBS-Fig5a-SlopeLiDAR-221114

Date: 14/11/2022

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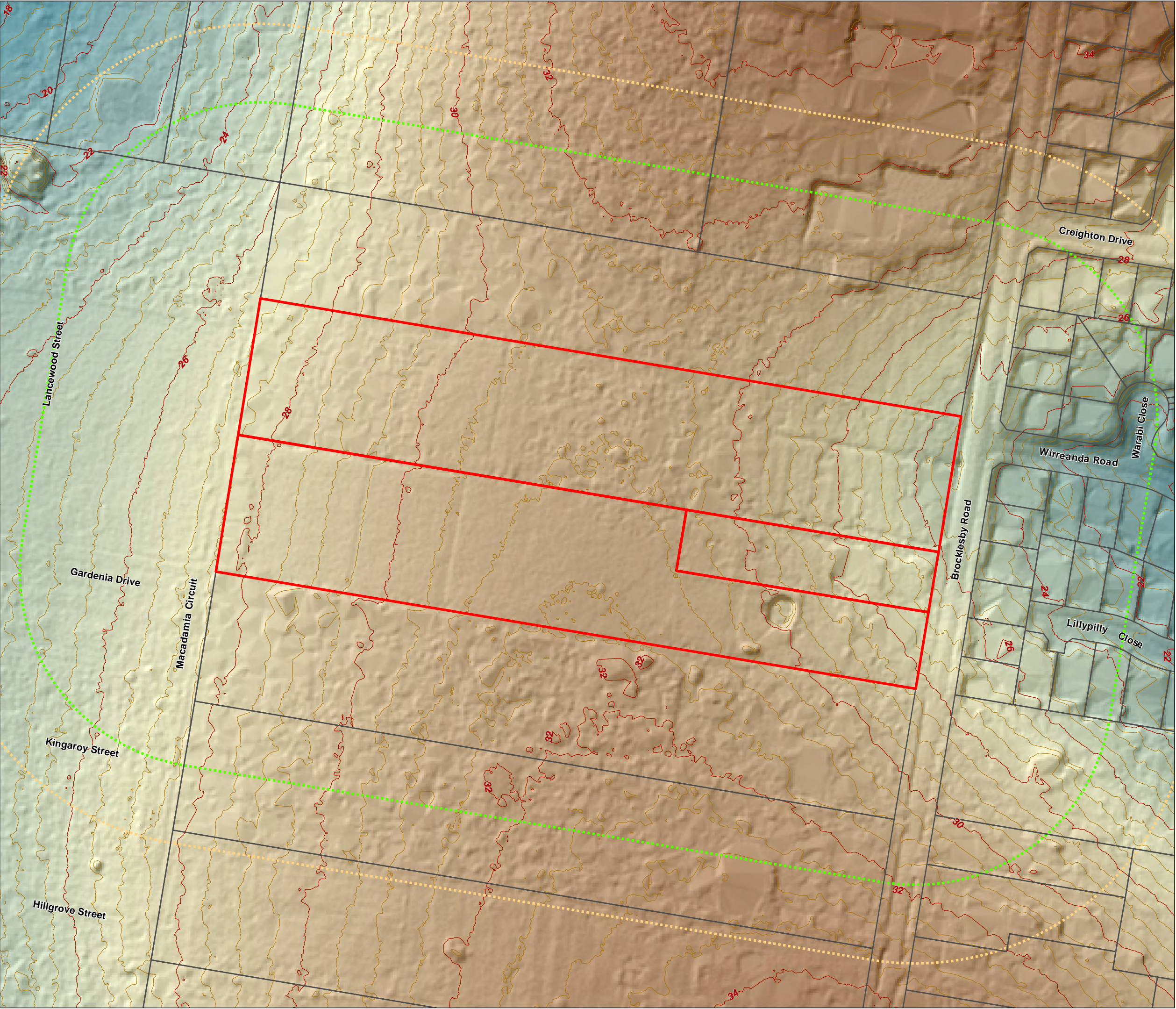


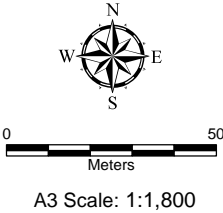
Figure 15

Digital Elevation Model



- Subject Site
- 100m Buffer
- 140m Buffer
- Contour (2m)
- Contour (0.5m)

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022
Surface analysis: Derived from LiDAR - Newcastle 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012



File:2239-MedowieSBS-Fig4a-DEM-221114 Date: 14/11/2022

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4.4. Results

The site inspection formed part of a reliability assessment to determine whether the site's mapped characteristics were consistent with the actual slope and vegetation characteristics observed on the site. It was confirmed on site the predominant vegetation classification presenting as a bushfire hazard to north and south of the site was identified as a *forest*; specifically *Sydney Coastal Dry Sclerophyll Forest* vegetation formation in accordance with the descriptions contained in Keith. The vegetation communities have been verified as indicated on the Vegetation Communities figure (**Figure 13**) prepared by Habitat Environmental Services. Habitat identified the vegetation present within the site as Plant Community Type (PCT) 3851 Hunter Coast Foothills Apple Forest. The BioNet Vegetation Classification confirms the equivalent Keith Vegetation Class to PCT 3851 is *Sydney Coastal DSF*.

Vegetation identified as a *Forest*, namely *Sydney Coastal DSF* exists within the northern portion of the development site (Lot 2 DP508780) and extends within and beyond 140m from the site. This is expected to be cleared as part of the proposed development. A small isolated patch of Hunter Macleay Dry Sclerophyll Forest exists in the north-eastern corner of the site, along Brocklesby Road.

Vegetation identified as *Sydney Coastal DSF* also exists within and along the southern site boundary. This vegetation continues within and beyond 140m of the development site. Apart from this narrow corridor of vegetation within the southern portion of the development site, the remainder of the site is managed and is not considered a bushfire hazard.

The primary bushfire hazard is located immediately from the northern proposed development boundary and extends north to Ferodale Road and east to Wirreanda Public School as vegetation largely remains unmanaged. Similarly, the adjoining lot to the north is partially managed as a rural residential property, although the *forest* vegetation extends beyond 100m from the proposed development.

The vegetation formation representing the greatest hazard was adopted for the purpose of the hazard assessment as shown in **Table 5**. The vegetation class and effective slope in all directions is shown in **Figure 16**.



Table 5: Slope and Vegetation

Transect	Vegetation Description	Vegetation Formation and Class (PBP 2019)	Slope
T1 North	Unmanaged forest vegetation interspersed with pine trees and identified as the primary hazard	<i>Forest</i> (Sydney Coastal DSF)	0.2° Downslope
T2 North	Unmanaged forest vegetation interspersed with pine trees and identified as the primary hazard	<i>Forest</i> (Sydney Coastal DSF)	-1.1° Upslope
T3 North	Managed playground within primary school; mature tree cover >30%	<i>Excluded</i> (managed land)	-1.9° Upslope
T4 South-east	Small corridor (<2,500m ²) of <i>forest</i> vegetation located on the eastern side of Brocklesby Road and greater than 20m from the site	<i>Excluded</i> (low threat vegetation)	-1.8° Upslope
T5 South	Managed and landscaped curtilage surrounding existing dwelling	<i>Excluded</i> (managed land)	-1.2° Upslope
T6 South	Managed and landscaped curtilage surrounding existing dwelling	<i>Excluded</i> (managed land)	-1.7° Upslope
T7 South-west	Unmanaged forest vegetation within 140m from the southern site boundary	<i>Forest</i> (Sydney Coastal DSF)	-0.3° Upslope
T8 South	Unmanaged forest vegetation within 140m from the southern site boundary	<i>Forest</i> (Sydney Coastal DSF)	-1.2° Upslope
T9 West	Residential subdivision currently being developed	<i>Excluded</i> (Cleared lands)	1.7° Downslope

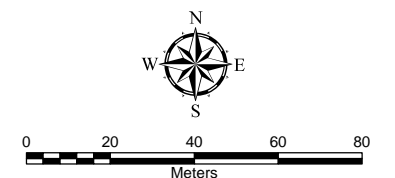
Figure 16

Slope & Vegetation Assessment



- | | | | |
|--|--------------------|--|--------------------------------|
| | Subject Site | | SFPP (School) |
| | 100m Buffer | | Forest (Sydney Coastal DSF) |
| | 140m Buffer | | Freshwater Wetland |
| | Contour (2m) | | Low-Threat Vegetation Excluded |
| | Contour (0.5m) | | Cleared / Managed Land |
| | Fire Hydrant | | |
| | RL | | |
| | Downslope transect | | |
| | Upslope transect | | |

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022
Surface analysis: Derived from LiDAR - Newcastle 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012
Aerial Photo: Site BPA 13/12/2022, Surrounds - NearMap 03/04/2022



A3 Scale: 1:1,800

File:2239-MedowieSBS-Fig6-SlopeVeg-230517 Date: 17/05/2023

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4.5. Significant Environmental Features

There are no known environmental features of significance within the development footprint or the balance of the site. The development footprint is wholly located within that part of the site that is predominantly cleared.

4.6. Threatened Species, populations or ecological communities

The area of the site to be affected by the proposed development has been identified to minimise impact on any threatened species, population or ecological community under the *Biodiversity Conservation Act 2016*. All bushfire mitigation measures; including APZs have considered the existing and potential biodiversity values to avoid impact where possible.

4.7. Aboriginal Objects

A search of the AHIMS database (results contained in **Appendix B**) revealed there are no Aboriginal sites or places recorded in or near the subject site.

5. Bushfire Protection Measures

This BAR has adopted the methodology to determine the appropriate Bushfire Protection Measures (BPMs) detailed in PBP 2019. As part of the BAR, the recommended BPMs demonstrate the aims and objectives of PBP 2019 have been satisfied; including the matters considered by the RFS necessary to protect persons, property and the environment from the danger that may arise from a bushfire.

5.1. 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. 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). In this instance the entire APZ and the balance of the development site shall be managed as an IPA.

An APZ can include the following:

- ❑ Lawns;
- ❑ Discontinuous gardens;
- ❑ Swimming pools;
- ❑ Roads, driveways and managed verges;
- ❑ Unattached non-combustible garages with suitable separation from the dwelling;
- ❑ Open space / parkland; and
- ❑ Car parking.

The presence of a few shrubs or trees in the APZ 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 recommended in the APZ.

5.1.1. Determining the Appropriate Setbacks

To achieve compliance with the performance criteria for APZs (Table 5.3a), the Acceptable Solutions outlined in Table A1.12.2 of PBP 2019 may be adopted as a deemed-to-satisfy solution.

As the site lies within the Port Stephens City Council LGA, it is assessed under a FDI rating of 100. To ensure the APZs achieve the intent of Section 5.3.1 of PBP 2019, the APZs have been determined to ensure all lots are able to accommodate a dwelling that will not be exposed to radiant heat levels exceeding 29kW/m².

Refer to **Table 6** for the required APZs.

Table 6: Required APZ setback - FDI @ 100

Transect	Vegetation Formation (PBP 2019)	Slope	Required APZ (PBP 2019 Table A1.12.2)
T1 North	<i>Forest</i> (Sydney Coastal DSF)	Flat	24m
T2 North	<i>Forest</i> (Sydney Coastal DSF)	-1.1° Upslope	24m
T3 North	<i>Excluded</i> (managed land)	-1.9° Upslope	N/A
T4 South-east	<i>Excluded</i> (low threat vegetation)	-1.8° Upslope	N/A
T5 South	<i>Excluded</i> (managed land)	-1.2° Upslope	N/A
T6 South	<i>Excluded</i> (managed land)	-1.7° Upslope	N/A
T7 South-west	<i>Forest</i> (Sydney Coastal DSF)	-0.3° Upslope	24m
T8 South	<i>Forest</i> (Sydney Coastal DSF)	-1.2° Upslope	24m
T9 West	<i>Excluded</i> (Cleared lands)	1.7° Downslope	N/A

5.2. Access

Primary access will continue to be provided directly from Brocklesby Road. In addition to the Brocklesby Road frontage, the site will have direct access to Macadamia Circuit to the west when the approved residential subdivision (DA16-2018-733-4) is completed in 2023.

A network of perimeter and non-perimeter roads will be provided in accordance with Table 5.3b of PBP 2019. All perimeter roads are 10.5m wide which allows for on-street parking on the non-hazard side of the street. The non-perimeter roads are 8m wide which also allows for on-street parking whilst providing a 5.5m wide carriageway. Accordingly, both road designs comply with the Acceptable Solutions and satisfy the Performance Criteria for Access by providing safe operational access with provision for on-street parking outside the carriageway.

5.3. Services - water, electricity and gas

5.3.1. Water

The site is connected to a reliable reticulated water supply. A new water supply main will be extended to ensure all future lots are able to connect to the reticulated water supply.

5.3.2. Electricity

All electricity services will continue to connect to the existing overhead transmission lines. All new transmission lines will be located underground.

5.3.3. Gas

Any reticulated or bottled gas will be installed and maintained according to the requirements of the relevant authorities and AS 1596-2002.



5.4. Construction Standards - Bushfire Attack Level

All future buildings, including single dwellings (Class 1a buildings), constructed within the site are recommended to satisfy the Performance Requirements of the National Construction Code: Building Code of Australia (NCC).

Accordingly, all forthcoming habitable buildings shall satisfy the requirements of Part 3.10.5 of Volume 2 of the NCC. The *Deemed-to-Satisfy* (DTS) provision of the NCC can only be achieved if dwellings in bushfire prone areas are constructed in accordance with Australian Standard *AS3959-2018 Construction of buildings in bushfire prone areas*. Alternatively, the DTS provisions can also be achieved if the habitable building is constructed in accordance with the NASH Standard 'Steel Framed Construction in Bushfire Areas'.

Building design and the materials used for construction of future dwellings should be chosen based on the information contained within AS3959-2018, and accordingly the designer/architect should be made aware of this recommendation.

The determinations of the appropriate bushfire attack level (BAL) is based on the maximum potential radiant heat exposure. BALs 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 BAL is derived by assessing the:

- ❑ Relevant FDI = 100;
- ❑ Flame temperature = 1090K;
- ❑ Slope = level;
- ❑ Vegetation classification = *forest*; and
- ❑ Building location.

The greatest bushfire hazard was found to the north of the site being a *forest* namely *Sydney Coastal Dry Sclerophyll Forest*.

The objective of the concept development layout is to demonstrate all future lots will be exposed to BAL-29 or less. The network of perimeter roads provide defensible space between the future dwellings and

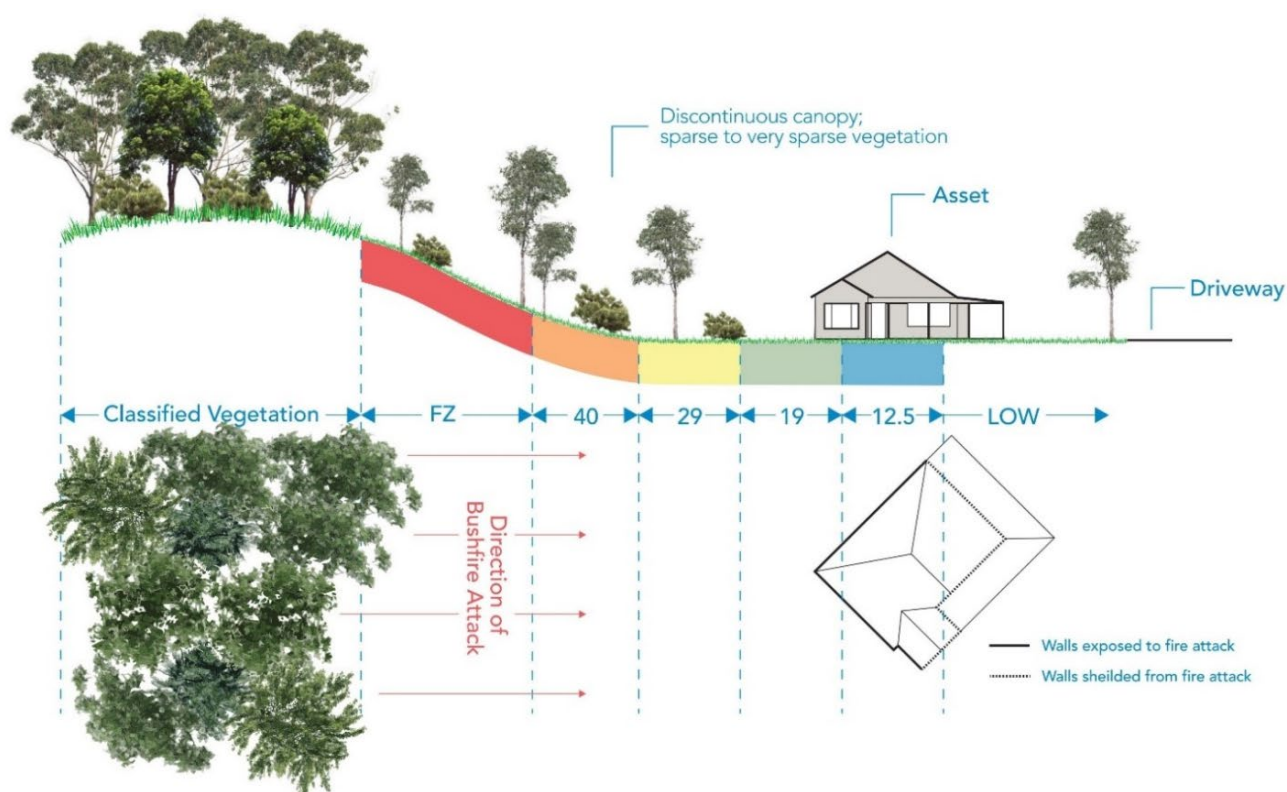


Figure 17: BAL example



Table 7: Bushfire Attack Levels

Transect	Vegetation Classification (PBP 2019)	Slope	APZ Provided	Distance from Hazard PBP 2019 Table A1.12.5	Bushfire Attack Level (BAL)
T3-T6 & T9	Excluded	Various	>100m	>100m	BAL-LOW
T1	Forest (Sydney Coastal Dry Sclerophyll Forest)	0.2° Downslope	29m	0m-<22m	BAL-FZ
				22m-<29m	BAL-40
				29m-<40m	BAL-29
				40m-<54m	BAL-19
				54m-<100m	BAL-12.5
				>100m	BAL-LOW
T2	Forest (Sydney Coastal Dry Sclerophyll Forest)	-1.1° Upslope	24m	0m-<18m	BAL-FZ
				18m-<24m	BAL-40
				24m-<33m	BAL-29
				33m-<45m	BAL-19
				45m-<100m	BAL-12.5
				>100m	BAL-LOW
T7	Forest (Sydney Coastal Dry Sclerophyll Forest)	-0.3° Upslope	24m	0m-<18m	BAL-FZ
				18m-<24m	BAL-40
				24m-<33m	BAL-29
				33m-<45m	BAL-19
				45m-<100m	BAL-12.5
				>100m	BAL-LOW
T8	Forest (Sydney Coastal Dry Sclerophyll Forest)	-1.2° Upslope	24m	0m-<18m	BAL-FZ
				18m-<24m	BAL-40
				24m-<33m	BAL-29
				33m-<45m	BAL-19
				45m-<100m	BAL-12.5
				>100m	BAL-LOW

Figure 18

BAL Contour Plan



- Subject Site

100m Buffer

140m Buffer

Fire Hydrant

1.8m Radiant Heat Shield

Asset Protection Zone

Required Bushfire Attack Levels (PBP 2019 Table A1.12.5)

BAL - FZ

BAL - 40

BAL - 29

BAL - 19

BAL - 12.5

BAL - Low
- SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022
Aerial Photo: Site BPA 13/12/2022, Surrounds - NearMap 03/04/2022
- 0 20 40 60
Meters
A3 Scale: 1:1,500
- File:2239-MedowieSBS-Fig7-BALs-230517 Date: 17/05/2023
- The information shown on this plan may be insufficient for some types of design. GEOVIEW should be consulted as to the suitability of the information shown herein prior to the commencement of any works based on this plan.
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5.5. Landscaping and Vegetation Management

In APZs and IPAs, the design and management of the landscaped areas in the vicinity of buildings have the potential to improve the chances of survival of people and buildings. Reduction of fuel does not require the removal of all vegetation. Trees and plants can provide some bushfire protection from strong winds, intense heat and flying embers (by filtering embers) and changing wind patterns.

Generally landscaping in and around a bushfire hazard should consider the following:

- ❑ Priority given to retaining species that have a low flammability;
- ❑ Priority given to retaining 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;
- ❑ Priority given to retaining smooth barked species over stringy bark; and
- ❑ Create discontinuous or gaps in the vegetation to slow down or break the progress of fire towards the dwellings.

Landscaping within APZs and IPAs should give due regard to fire retardant plants and ensure that fuel loads do not accumulate as a result of the selected plant varieties.

The principles of landscaping for bushfire protection aim to:

- ❑ Prevent flame impingement on dwellings;
- ❑ Provide a defendable space for property protection;
- ❑ Reduce fire spread;
- ❑ Deflect and filter embers;
- ❑ Provide shelter from radiant heat; and
- ❑ Reduce wind speed.

Plants that are less flammable have the following features;

- ❑ High moisture content;
- ❑ High levels of salt;
- ❑ Low volatile oil content of leaves;
- ❑ Smooth barks without 'ribbons' hanging from branches or trunks; and
- ❑ Dense crown and elevated branches.

Avoiding understorey planting and regular trimming of the lower limbs of trees also assists in reducing fire penetration into the canopy. Rainforests species such as *Syzygium* and figs are preferred to species with high fine fuel and/or oil content.

Trees with loose, fibrous or stringy bark should be avoided. These trees can easily ignite and encourage ground fire to spread up to, and then through the crown of trees.

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.



6. Conclusion and Recommendations

Bushfire Planning Australia prepared a Strategic Bushfire Study (SBS) and Bushfire Assessment Report (BAR) to support a planning proposal to amend the Port Stephens Local Environmental Plan 2013 (PSLEP) to:

- ❑ Rezone site from RU2 – Rural Landscape to R2 – Low Density Residential
- ❑ Reduce the Minimum Lot Size from 2 hectares to 350m²; and
- ❑ Identification as an Urban Release Area to trigger PSLEP 2013.

The proposed amendments to the PSLEP 2013 will affect 39, 39A & 41 Brocklesby Road, Medowie; legally referred to as Lot 301 & 300 DP625002 and Lot 2 DP508780 respectively.

Following the successfully rezoning, the subject site will be subdivided to create approximately 12.5 dwelling lots per hectare. In addition to the Brocklesby Road frontage, the site will have direct access to Macadamia Circuit to the west when the approved residential subdivision (DA16-2018-733-4) is completed in 2023.

The BAR found the site was exposed to medium to high bushfire hazard located to the north-west and a medium bushfire hazard to the south-west of the subject site. The predominant vegetation surrounding the site in unmanaged conditions is consistent with a *forest*, specifically *Sydney Coastal Dry Sclerophyll Forest* vegetation formation as described in PBP 2019. The BAR concludes that the hazard identified can be successfully mitigated by applying the requirements of PBP 2019, including Asset Protection Zones (APZs).

Subject to the following recommendations, the proposed land use can be considered to be appropriate in its bushfire context:

1. The capacity of the road network must be sufficient to deal with occupants of the site in an emergency situation; this should include a minimum of two points of access which provide two different routes of travel away from the site.
2. Details of the proposed community should be provided to the Local Emergency Management Committee to enable awareness in emergency response.

The following key recommendations have been designed to enable the proposed development to maintain an acceptable level of protection from the residual risk of a bushfire that may occur in the existing vegetation, in accordance with *Planning for Bush Fire Protection 2019*:

3. The entire development site; including all residential lots and open space shall be managed as an Inner Protection Area (IPA) as outlined within Section 5.1 of this report;
4. Access/egress will be provided in accordance with Section 5.2 of this report to ensure the safe evacuation of occupants whilst also affording fire fighters safe operational access and a defensible space to work within;
5. Non-perimeter roads shall be 8m wide (including provision for on-street parking);
6. Perimeter roads shall be 10.5m wide (including provision for on-street parking);
7. All temporary turning heads shall be constructed in accordance Appendix A3.3 of PBP 2019;
8. Building envelopes will be setback in accordance with minimum APZs to achieve maximum radiant heat levels of 29kW/m² as indicated in Section 5.4 of this report;
9. All new lots are to be connected to a reliable water supply network in accordance with Section 5.3.1 of this report. The water supply is to have suitable fire hydrants located throughout the development site that are outside of parking reserves and road carriageways, clearly marked and provided for the purposes of bushfire protection;
10. Gas and electricity supplies will be provided in accordance with Section 5.3.2 of this report so as to not contribute to fire ignitions within the development; and

11. Vegetation within road verges (including swales) to be consistent with a grassland vegetation classification with tree canopy less than 10% at maturity (and considered unmanaged);

In conclusion the site was found to be appropriate for the intended land use that will permit low density residential development. Redevelopment of the subject site will not expose future residents to an unacceptable bushfire risk.

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection and production (May 2023).

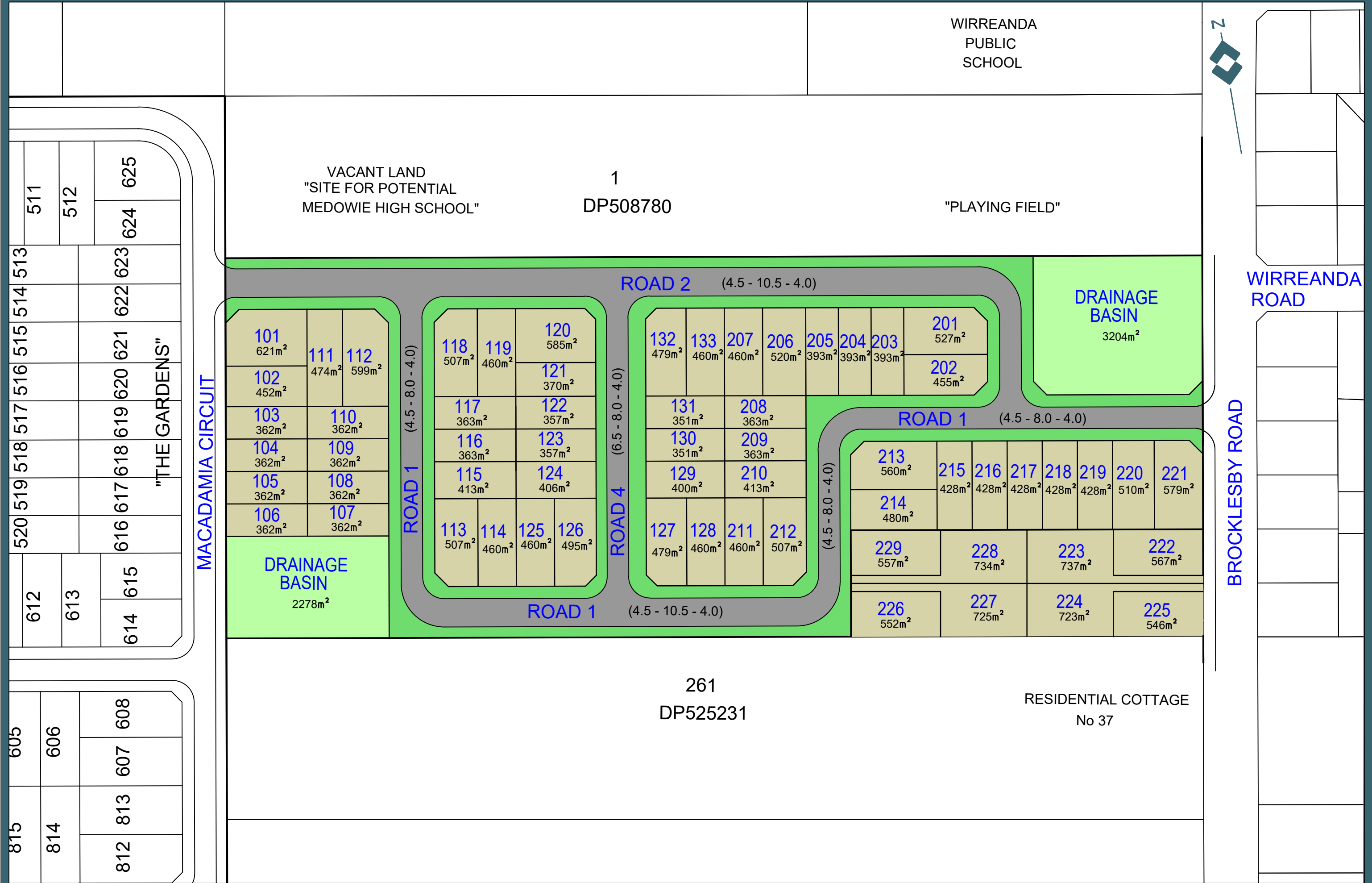
Should the above recommendations be implemented, the existing bushfire risk should be suitably mitigated to offer an acceptable level of protection to life and property for those persons and assets occupying the site but they do not and cannot guarantee that the area will not be affected by bushfire at some time.



7. References

- ❑ NSW Rural Fire Service (2005). Standards for Asset Protection Zones. NSW Rural Fire Service.
- ❑ NSW Rural Fire Service (2019). Planning for Bushfire Protection – A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners.
- ❑ Ramsay, GC and Dawkins, D (1993). Building in Bushfire-prone Areas – Information and Advice. CSIRO and Standards Australia.
- ❑ Rural Fires and Environmental Assessment Legislation Amendment Act 2002.
- ❑ Standards Australia (2018). AS 3959 – 2018: Construction of Buildings in Bushfire-prone Areas.

Appendix A: Proposed Plan of Subdivision



TITLE: PROPOSED SUBDIVISION PF LOT 2 DP508780, LOT 300 AND 301 DP625002
41, 39 AND 39A BROCKLESBY ROAD MEDOWIE

OVERALL PLAN



Date: 07.11.22		Scale: 1:1250 A3		Designed: KU		Project No	
Cad Ref: HD361 r6						HD361	
6	INCREASE BASIN LOT			KU	17.05.23	Drawing No HD01	Revision 6
5	WIDEN THE FOOTPATH ON ROAD 4			KU	13.04.23		
4	ADD STAGING			KU	15.12.22		
No	Amendment			Drawn	Date		



Appendix B: AHIMS Search Results

Katrina Greville

Date: 12 December 2022

21 Costata Crescent

Adamstown New South Wales 2289

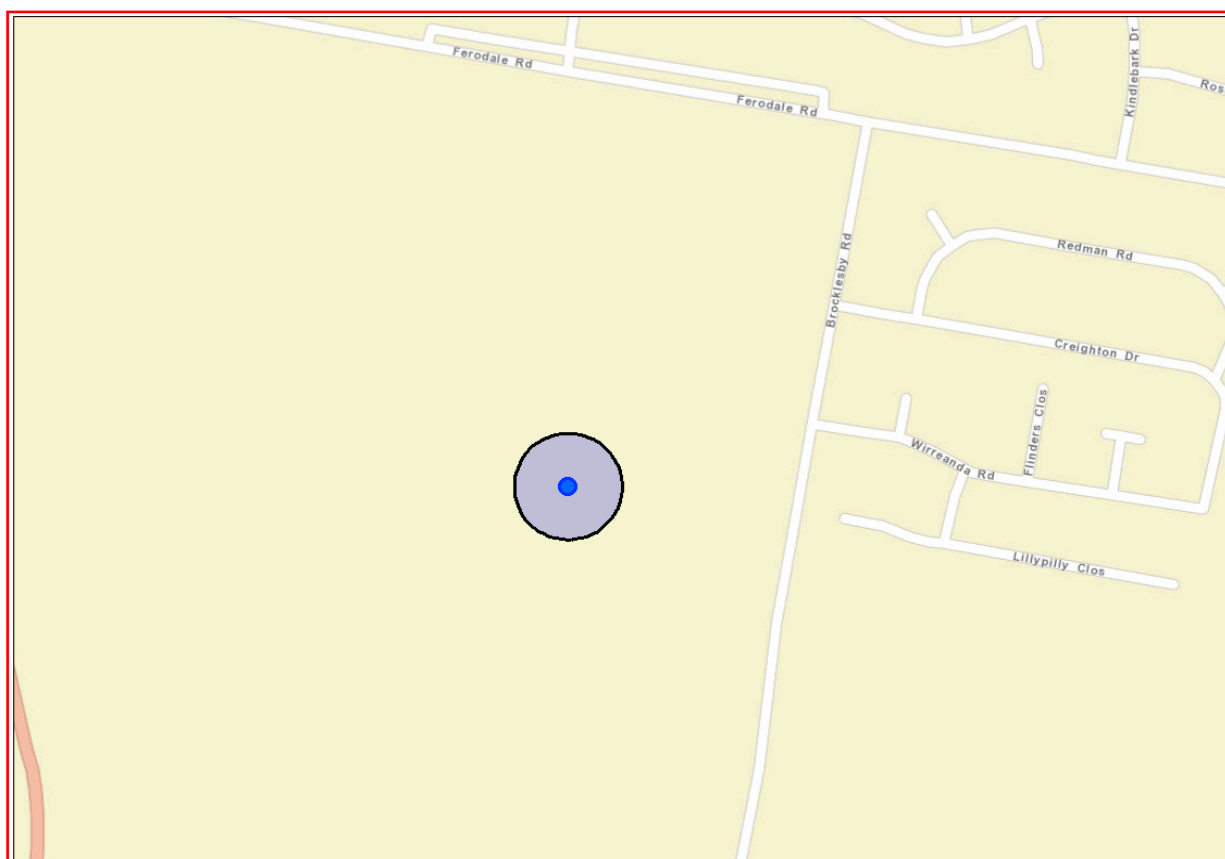
Attention: Katrina Greville

Email: klmukevski@bigpond.com

Dear Sir or Madam:

AHIMS Web Service search for the following area at Address : 39 BROCKLESBY ROAD MEDOWIE 2318 with a Buffer of 50 meters, conducted by Katrina Greville on 12 December 2022.

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 Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	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 \(https://www.legislation.nsw.gov.au/gazette\)](https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW 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 to be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW 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.



Appendix C: PBP 2019 – Compliance Table

Appendix D: Planning for Bushfire Protection 2019 - Compliance Table: Chapter 5 - Residential Subdivision

Table 1: Aims and Objectives of Planning for Bushfire Protection 2019

Objectives	Satisfied	Comment
➤ Afford buildings and their occupants protection from exposure to a bush fire	✓	All lots within the proposed development are provided with sufficient separation from the nearest bushfire hazard by public roads or low threat vegetation contained within stormwater detention basins.
➤ Provide for a defensible space to be located around buildings	✓	Defensible space by way of an APZ is provided between all new lots and the bushfire hazard to ensure radiant heat levels are below critical limits (29kW/m ²).
➤ Provide appropriate separation between a hazard and buildings, which, in combination with other measures, prevent the likely fire spread to buildings	✓	Appropriate APZs are provided between the proposed lots and the hazard, which in addition to other mitigation measures such as suitable construction, will provide an acceptable level of protection to the buildings, and prevent the spread of fire to the buildings and onto adjoining buildings.
➤ Ensure that safe operational access and egress for emergency service personnel and residents is available	✓	Public road access will be provided from Brocklesby Road to the east and a road connection through to Macadamia Circuit to the west through an existing adjoining development.
➤ Provide for ongoing management and maintenance of BPMs	✓	All owners will be responsible for the management and maintenance of the private property.
➤ Ensure that utility services are adequate to meet the needs of firefighters	✓	The development includes all essential utility services to meet the needs of firefighters; including a reliable water supply.

Table 2: Performance Criteria and Acceptable Solutions for residential subdivisions (Chapter 5 PBP 2019)

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
5.3.1 ASSET PROTECTION ZONES Table 5.3a To provide sufficient space and maintain reduced fuel loads, so as to ensure radiant heat levels at buildings are below critical limits and to prevent direct flame contact with a building.	Potential building footprints must not be exposed to radiant heat levels exceeding 29kW/m ² on each proposed lot.	APZs are provided in accordance with Tables A1.12.2 and A1.12.3 based on the FFDI.	✓	All proposed lots may be exposed to a maximum potential radiant heat level no greater than 29kW/m ² . An APZ of 24m was calculated using Table A1.12.2 of PBP 2019.
	APZs are managed and maintained to prevent the spread of a fire towards the building.	The APZ is managed in accordance with the requirements of Appendix 4	✓	All new landowners will be required to manage their respective lot as an IPA.
	The APZ is provided in perpetuity.	APZs are wholly within the boundaries of the development site.	✓	There are no exceptional circumstances that would require an APZ to be located external to the development site.
	APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is negated.	The APZ is not located on lands with a slope exceeding 18°	✓	The maximum slope of the site is 5° or less.
LANDSCAPING	Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Landscaping is in accordance with APZ standards (see Appendix 4). Fencing is constructed in accordance with section 7.6.	✓	All new landscaping has considered the requirements of APZs per Appendix 4. All new fencing will be colorbond or similar non-combustible material.
5.3.2 ACCESS (General Requirements) Table 5.3b To provide safe operational access for emergency services personnel in suppressing a bush fire, while residents are accessing or egressing an area.	Fire fighters are provided with safe all weather access to structures	Property access roads are two-wheel drive, all-weather roads	✓	Public road access will be provided from Brocklesby Road to the east and Macadamia Circuit to the west. All new roads will be constructed in accordance with Council DCP and engineering specifications and satisfy the Acceptable Solutions in Table 5.3b.
		Perimeter roads are provided for residential subdivisions of three or more allotments	✓	
		Subdivisions of three or more allotments have more than one access in and out of the development		
		Traffic management devices are constructed to not prohibit access by	✓	

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
		emergency services vehicles.		
		Access roads must provide suitable turning areas in accordance with Appendix 3.	✓	
ACCESS ROAD CAPACITY	The capacity of access roads is adequate for firefighting vehicles.	The capacity of road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges and causeways are to clearly indicate load rating.	✓	
ACCESS TO WATER	There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.	✓	All proposed lots are able to be connected to a reticulated water supply.
		Hydrants are provided in accordance with AS2419.1:2005	✓	
		There is suitable access for Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	✓	
PERIMETER ROADS	Perimeter access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while occupants are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	There are two-way sealed roads.	✓	A 10.5m wide paved carriageway will be provided allowing for an 8m wide unobstructed path of travel and on-street parking outside the carriageway.
		8m carriageway width kerb to kerb.	✓	
		Hydrants are to be located clear of parking areas.	✓	
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	✓	
		Curves of roads have a minimum inner radius of 6m.	✓	
		The maximum grade road is 15° and average grade is 10°.	✓	
		The road crossfall does not exceed 3°.	✓	

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; and	✓	
NON-PERIMETER ROADS	Non-perimeter access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while occupants are evacuating.	Minimum 5.5m width kerb to kerb.	✓	The proposed road network is required to connect with the approved subdivision layout. A 8m wide paved carriageway will be provided allowing for an 5.5m wide unobstructed path of travel and on-street parking outside the carriageway. All roads; including non-perimeter roads will be constructed in accordance with PBP 2019.
		Parking is provided outside of the carriageway.	✓	
		Hydrants are to be located clear of parking areas.	✓	
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	✓	
		Curves of roads have a minimum inner radius of 6m.	✓	
		The maximum grade road is 15° and average grade is 10°.	✓	
		The road crossfall does not exceed 3°.	✓	
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; and	✓	
5.3.3 SERVICES Table 5.3c To provide adequate services for water for the protection of buildings during and after the passage of a bushfire, and not to locate gas and electricity so as not to contribute to the risk of fire to a building. WATER	Adequate water supplies is provided for firefighting purposes	Reticulated water is to be provided to the development, where available	✓	A reticulated water supply is provided.
		A static water supply is provided where no reticulated water is available	N/A	
		Static water supplies shall comply with Table 5.3d	N/A	
	Water supplies are located at regular intervals	Fire hydrant spacing, design and sizing comply with AS2419.1:2005;	✓	A reticulated water supply is provided.
		Hydrants are not located within any road carriageway;	✓	

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
	The water supply is accessible and reliable for firefighting operations	Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	✓	A reticulated water supply is provided.
	Flows and pressures are appropriate	Fire hydrant flows and pressures comply with AS2419.1:2005.	✓	
	The integrity of the water supply is maintained	All above ground water service pipes are metal, including and up to any taps.	Able to comply	
ELECTRICITY	Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings.	Where practicable, electrical transmission lines are underground.	✓	The proposed new lots will be connected to the existing underground electricity service.
		Where overhead electrical transmission lines are proposed as follows: → lines are installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas; and → no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines	N/A	
GAS	Location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	Reticulated or bottled gas is installed and maintained in accordance with AS 1596:2014 and the requirements of relevant authorities, metal piping is to be used.	✓	Any new gas connections will be underground and will be unlikely to create an additional hazard risk to surrounding bushland.
		All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side;		



Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
		Connections to and from gas cylinders are metal:		
		Polymer-sheathed flexible gas supply lines are not used; and		
		Above-ground gas service pipes are metal, including and up to any outlets.		

Appendix D: Local Planning Directions

Table 1: Local Planning Directions - Direction 4.3

Direction 4.3	Provisions	Complies	Comment
Direction 4.3 (3) A planning proposal must, where development is proposed, comply with the following provisions, as appropriate:	a. provide an Asset Protection Zone (APZ) incorporating at a minimum: <ul style="list-style-type: none"> i. an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and ii. an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road 	✓	As shown on Figure 18 , all new lots are able to accommodate a building envelope that ensures future dwellings are exposed to BAL-29 or less; thereby ensuring no dwellings are exposed to radiant heat levels greater than 29kW/m ² . All APZs will be managed as an Inner Protection Area (IPA).
	b. for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the <i>Rural Fires Act 1997</i>), the APZ provisions must be complied with	N/A	Not applicable to this proposed development.
	c. contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks	✓	Public road access will be provided from Brocklesby Rd to the east and a new connection to Macadamia Circuit to the west.
	d. contain provisions for adequate water supply for firefighting purposes	✓	A reticulated water supply will be provided throughout the residential development and accessible to all new lots.
	e. minimise the perimeter of the area of land interfacing the hazard which may be developed	✓	The planning proposal designed the subdivision to provide defensible space between hazard to the north and south and the proposed residential lots.
	f. introduce controls on the placement of combustible materials in the Inner Protection Area.	✓	All APZs (including IPAs) are required to be established and maintained in accordance with Appendix 4 of PBP 2019.