

Preliminary Bushfire Strategic Study

Eden Estates, Newcastle

Prepared for

Eden Estates (Newcastle) Pty Ltd



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Prepared by	Lew Short
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Client Details:	Eden Estates (Newcastle) Pty Ltd c/o Mr. Trevor Jensen Harrington Estates 1 Forestgrove Drive Harrington Park, NSW 2567
BlackAsh Contact Details	
Lew Short	Principal
0419 203 853	lew.short@blackash.com.au

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Lew Short | Principal

BlackAsh Bushfire Consulting

B.A., Grad. Dip. (Design for Bushfires), Grad. Cert. of Management (Macq), Grad. Cert. (Applied Management)

Fire Protection Association of Australia BPAD Level 3 BPD-PA 16373

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Glossary

This section defines those core terms and concepts which are adopted throughout the body of this report.

Term	Definition
Asset Protection Zone (APZ)	A fuel-reduced area surrounding a built asset or structure which provides a buffer zone between a bushfire hazard and an asset. The APZ includes a defensible space within which firefighting operations can be carried out. The size of the required APZ varies with slope, vegetation and FFDI.
Bushfire	A general term used to describe fire in vegetation, includes grass fire.
Bushfire attack mechanisms	The various ways in which a bushfire can impact upon people and property and cause loss or damage. These mechanisms include flame contact, radiant heat exposure, ember attack, fire wind and smoke.
Bushfire Attack Level (BAL)	A means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact. The BAL is used as the basis for establishing the requirements for construction to improve protection of building elements and to articulate bushfire risk.
Bushfire Design Requirements	A separate (Attachment 17) design document to assist the master planning with requirements and specifications to provide compliance with PBP 2019.
Bushfire prone land (BFPL)	An area of land that can support a bushfire or is likely to be subject to bushfire attack, as designated on a bushfire prone land map.
Bushfire Hazard	Any vegetation that has the potential to threaten lives, property or the environment.
Bushfire Strategic Study	Provides the opportunity to assess whether new development is appropriate in the bushfire hazard context.
Bushfire Threat	Potential bushfire exposure of an asset due to the proximity and type of a hazard and the slope on which the hazard is situated.
Risk	The degree of risk presented by that interaction will depend on the likelihood and consequence of the bushfire occurring. Risk may be defined as the chance of something happening, in a specified period of time that will have an impact on objectives. It is measured in terms of consequences and likelihood.

Risk assessment	A systematic process of evaluating the potential risks that may be involved in a projected activity or undertaking, having regard to factors of likelihood, consequence, vulnerability and tolerability.
Risk-based land use planning	The strategic consideration of natural hazard risk and mitigation in informing strategic land use planning activities.
Hazard	A hazard is any source of potential harm or a situation with a potential to cause loss. A hazard is therefore the source of risk.
Likelihood	The chance of an event occurring. Likelihood may be represented as a statistical probability (such as an Annual exceedance probability), or whether this is not possible, it can be represented qualitatively using measures such as 'likely', 'possible' and 'rare'.
Managed land	Land that has vegetation removed or maintained to a level that limits the spread and impact of bushfire. This may include developed land (residential, commercial or industrial), roads, golf course fairways, playgrounds, sports fields, vineyards, orchards, cultivated ornamental gardens and commercial nurseries. Most common will be gardens and lawns within curtilage of buildings. These areas are managed to meet the requirements of an APZ.
Mitigation	The lessening or minimizing of the adverse impacts of a bushfire event. The adverse impacts of bushfire cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. Mitigation measures include engineering techniques, retrofitting and hazard-resistant construction as well as on ground works to manage fuel and separate assets from bushland.
Planning for Bushfire Protection 2019 (PBP 2019)	NSW Rural Fire Service publication effective from 1 March 2020 which is applicable to all new development on bushfire prone land in NSW.

1. Executive Summary

The provision of bushfire safety is a complex area of land use planning and development assessment. The NSW Rural Fire Service (RFS) document *Planning for Bushfire Protection 2019* (PBP 2019) provides the framework for new development in NSW within a strong legislative framework. From a land utilisation perspective, the Eden Estates site has the space to meet the bushfire requirements. Bushfire is a key consideration and design requirement in the development of the Eden Estates Planning Proposal and subsequent reporting that will require adjusting of the plan

Development proposals in bushfire prone areas require the preparation of a Strategic Bushfire Study. This document has been completed in accordance with PBP 2019 strategic principles and the requirements identified within Table 4.2.1 of PBP 2019 (Appendix 1). This Preliminary Bushfire Strategic Study is not an operational document and is based on a probable worst-case design fire scenario of a 1:50 year bushfire event affecting the areas¹.

In a bushfire context, strategic land use planning must ensure that future land uses are in appropriate locations to minimise the risk to life and property from bushfire attack. The broad principles which apply to this analysis are²:

- ensuring land is suitable for development in the context of bushfire risk and broader environmental impacts;
- ensuring new development on BFPL will comply with the minimum requirements of PBP 2019;
- minimising reliance on performance-based solutions;
- providing adequate infrastructure associated with emergency evacuation and firefighting operations; and
- facilitating appropriate ongoing land management practices.

The Preliminary Strategic Bushfire Study provides the opportunity to assess whether new development is appropriate in the bushfire context. It also provides the ability to assess the strategic implications of future development for bushfire mitigation and management.

¹ As required by Planning for Bushfire Protection 2019

² Planning for Bushfire Protection 2019 p. 34

2. Introduction

Blackash Bushfire Consulting has been engaged by Eden Estates (Newcastle) Pty Ltd in relation to Eden Estates Planned Precinct which is 574ha site (the site) which is shown in Figure 1. The sites straddle the Newcastle and Lake Macquarie local government areas either side of the Link Road. This area has been identified for further investigation and possible future development.

Eden Estates (Newcastle) Pty Ltd are the new owners of the site (2020) and have undertaken preliminary investigation on the site looking at constraints and opportunities and have identified the potential for the site to accommodate 3000-4000 dwellings with a mix of housing. Land to the west of the site has been successfully rezoned for residential purposes and is going through the development application process. The development of areas surrounding the site will remove large areas of bushfire risk.

A Preliminary Structure Plan has been prepared for the site to inform a Planning Proposal to rezone land within the site. The purpose of this design report is to present the Preliminary Structure Plan for the Eden Estates landholding and explain the site considerations and development objectives that have influenced the design for the site.

As the population increases, the issue of preparing for and mitigating against the risk of bushfire has become increasingly complex. The *Preliminary Bushfire Strategic Study* will inform various stakeholders and specialist areas in the development of the planning process. Ultimately, a range of issues will need to be worked through in the design process to meet the government requirements for the Planning Proposal while having due regard to bushfire issues, environmental and ecological considerations and utilisation of the site for development.

This *Preliminary Bushfire Strategic Study* is the first step in understanding the bushfire risk. The *Preliminary Strategic Bushfire Study* is a high level assessment and consideration of bushfire risk and matters that need to be considered as the design and planning process proceeds.

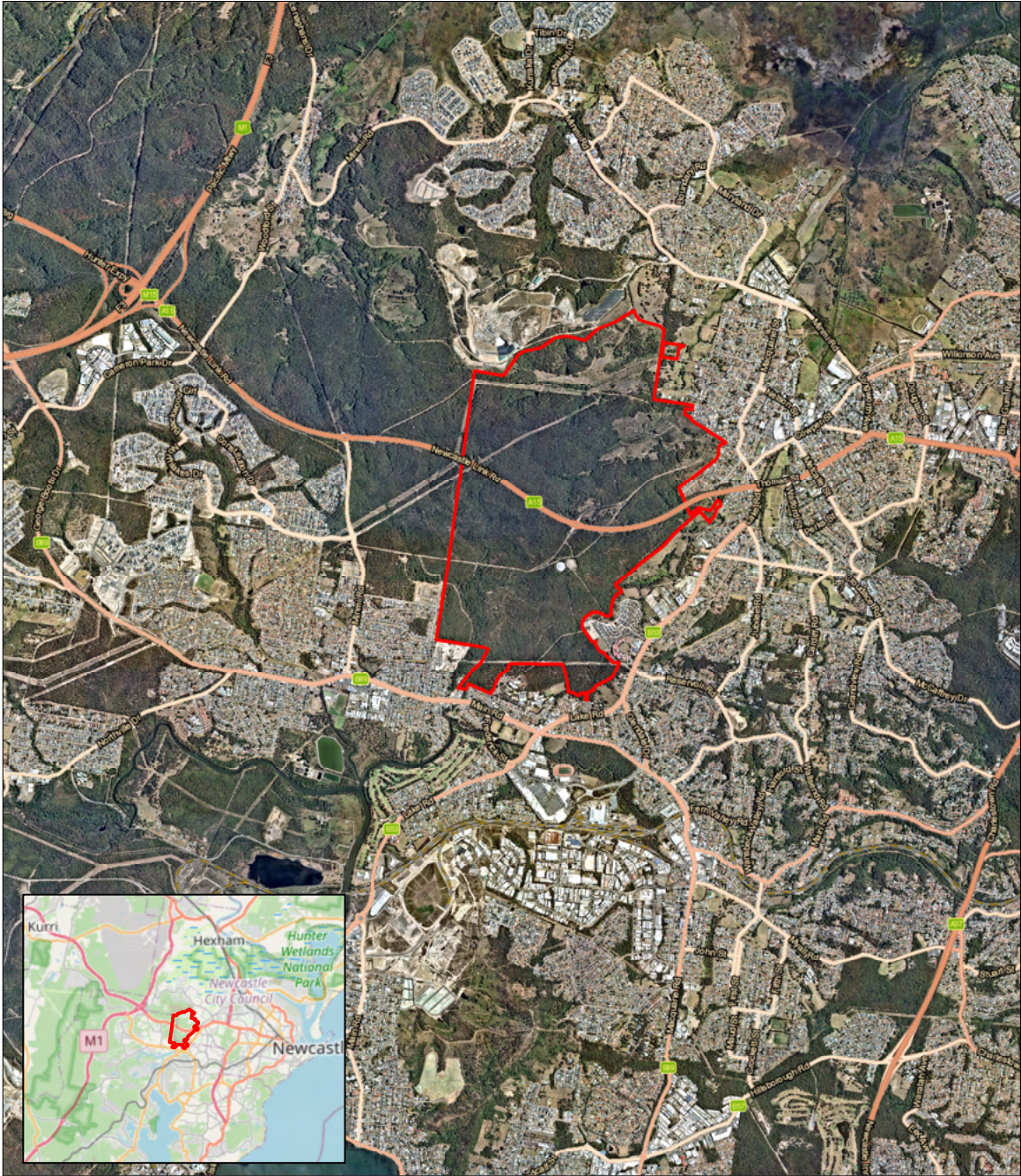
The *Preliminary Bushfire Strategic Study* has not analysed the bushfire risk or compliance with the NSW Rural Fire Service (RFS) document *Planning for Bushfire Protection 2019* (PBP 2019). This high-level document is to inform strategic land use planning for the site ahead of any formal submission made to New South Wales Rural Fire Service. Bushfire is a key consideration in the Master Planning process, and it is expected that this process would inherently build-in bushfire resilient land use planning approaches throughout design processes culminating in a Bushfire Strategic Study.

The land within the site previously formed part of the New Wallsend Colliery, and has only recently been disposed of by The Newcastle Wallsend Coal Company, a subsidiary of Glencore (2020), following a significant mine closure process in consultation with the State Government.

During the past 15-20 years and whilst the mine closure process has been occurring, the surrounding regional and local context to the Site has continued to evolve, with urban development zoning (and development at various stages of the approval and delivery pipeline) now extending to the majority of the site perimeter, other than where it adjoins Summerhill Waste Management Centre, some larger lots to the edge of Wallsend north to the north and north-west.

Details of the site, including road infrastructure and asset protection zones has not been determined. Detailed work will be provided to test compliance with PBP 2019.

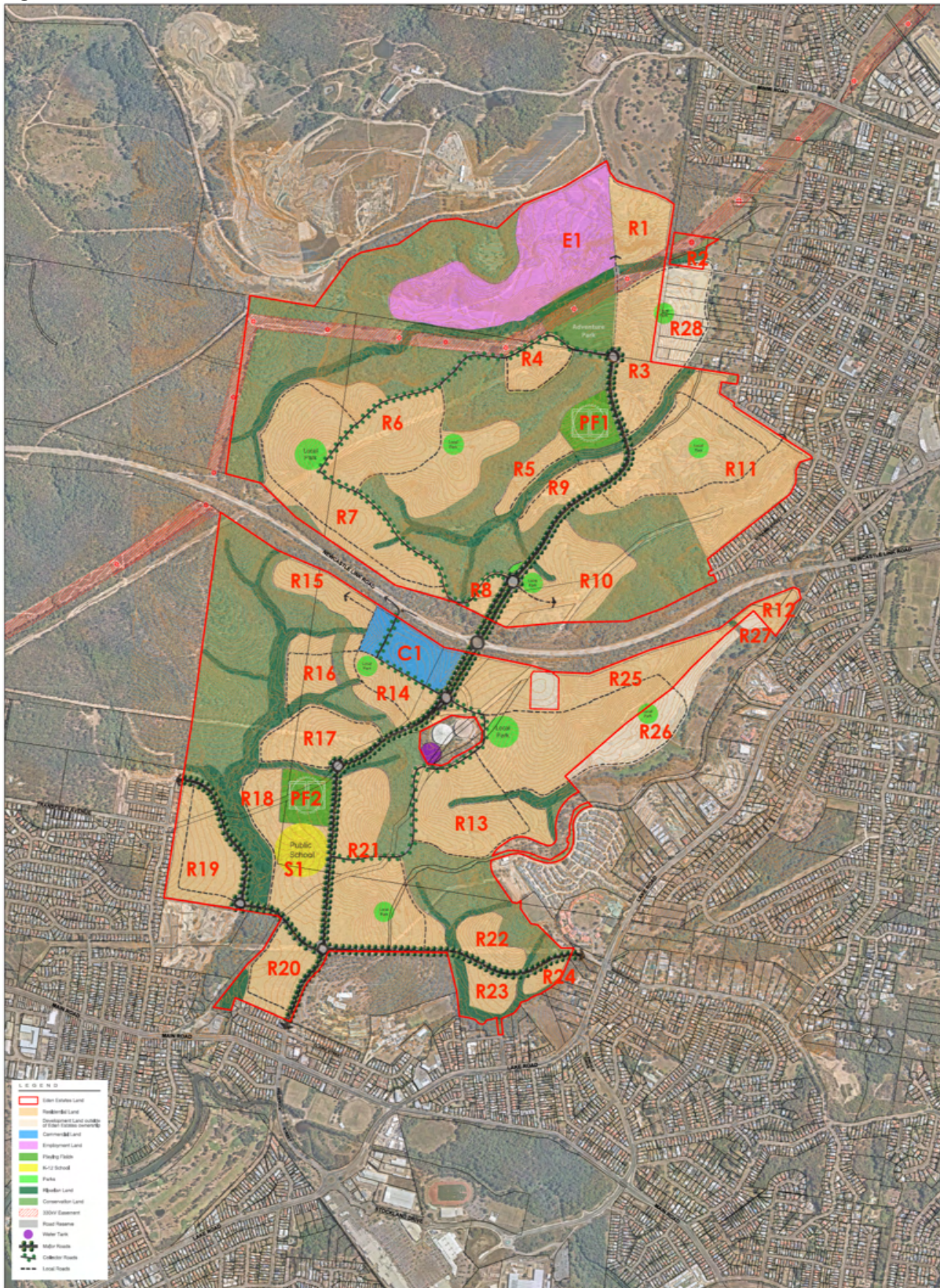
Figure 1 Study Area



Legend
 Subject Land


 **DKGIS**
Date: 7/05/2020
0 0.5 1
Kilometers
Coordinate System: GDA 1994 MGA Zone 56
Imagery: © Nearmap

Figure 2 Structure Plan



3. Site and Context

The 574ha Site (refer Figure 2), straddling the Newcastle and Lake Macquarie local government areas either side of the Link Road, has been identified for further investigation and possible future development since at least the implementation of local environmental plans and the regional plans and strategies prepared 15-20 years ago. Since that time, the Site has largely been placed into various 'holding zones' according to each Council's preference, until such time as investigations proceed to determine land that is suitable for urban development and land that should be protected for environmental purposes.

The land previously formed part of the New Wallsend Colliery, and has only recently been disposed of by The Newcastle Wallsend Coal Company, a subsidiary of Glencore (2020), following a significant mine closure process in consultation with the State Government.

During the past 15-20 years and whilst the mine closure process has been occurring, the surrounding regional and local context to the Site has continued to evolve, with urban development zoning (and development at various stages of the approval and delivery pipeline) now extending to the majority of the site perimeter, other than where it adjoins Summerhill Waste Management Centre, some larger lots to the edge of Wallsend north to the north and north-west. Large areas to the west and north west of the site have already been successfully rezoned with Das in play for development of these areas. The development of these areas will remove vegetation that currently constitutes a bushfire hazard.

The NSW Government has continued to advance the strategic location of the area (refer Figure 1) through investment in regional and local transport infrastructure, including upgrades to the M1 motorway (eastern seaboard national highway and connections to Sydney), opening of the Hunter Expressway and upgrades to the Link Road itself. These critical inter-regional connections also include the rail network and nearby station at Cardiff, the stage 1 roadworks for the possible Glendale Transport Interchange and the Munibung Road extension linking Cardiff to Lake Road.

More recent regional and metropolitan planning have maintained and reinforced the intention for investigations to proceed over the Site to determine the contribution it can make to the Region. Key considerations for the Site are that whilst the Site contains ecological values, it importantly sits outside the regional biodiversity corridor (Watagan to Stockton) that sits north of Minmi and west of the M1 motorway, and is not identified for regional improvements to the blue and green grid connections to that corridor.

The Site sits on the edge of the Metropolitan Core and within a regionally significant catchment and growth area. It is in proximity to multiple significant strategic centres, metropolitan catalyst areas and renewals corridors that are already and will continue to attract significant Government and private investment.

Within 5km of the Site are catalyst areas of North-West Lake Macquarie, John Hunter Health and Innovation Precinct and Callaghan, which together have been identified for an additional 4,700 jobs by 2036 (to an employment capacity of over 30,000 in those three areas alone), with investments exceeding \$1,000M. These catalyst areas will increase capacity of health and emerging medical research, tertiary education, innovation and research clusters, business parks, large format retail, advanced manufacturing, sport, along with urban renewal and housing.

The site sits within proximity to regionally and locally significant open space, recreation and sporting resources, including Blue Gum Hills Regional Park, Speers Point Park and the Hunter Sports Centre, as well as the Sugarloaf Ranges and Lake Macquarie. The Site forms part of and joins with regional cycling routes that connect Lake Macquarie and Glendale to the Newcastle City Centre (including along the Link Road and the off-road cycleway that traverses the Site generally along the former tramway).

Two of four identified priority multimodal corridors connect from the metropolitan core (Newcastle City Centre and the Transport Interchange) and extend west, through Broadmeadow and Hamilton, to catalyst areas nearby the Site, linking towards the Link Road and Main Road and the Site. This illustrates the site's connectivity to regional land uses and other critical employment nodes such as the Port and Airport. These areas in addition to those within 5km of the site are also attracting significant Government and private investment, with housing, employment and a nationally significant sport and entertainment precinct, with associated urban renewal.

The location of the site and the importance of its connections make it well suited for development, and contributing to Greater Newcastle transitioning to a metropolitan city, where opportunities for housing, jobs, education and recreation are linked together and support each other.

The regional direction for the site as a housing release area is reinforced by Newcastle and Lake Macquarie local strategic planning statements and recent contribution plans.

The current clear regional and local strategic framework is for the site to be a housing release area, supported by infrastructure planning and delivery, with timely and cost-effective biodiversity outcomes that identify high conservation significance at a landscape scale to avoid and minimise impacts, and then offset development areas.

Eden Estates (Newcastle) Pty Ltd are the new owners of the site (2020) and have undertaken preliminary investigation on the site looking at constraints and opportunities and have identified the potential for the site to accommodate 3000-4000 dwellings with a mix of housing. It is noted that the City of Newcastle's local infrastructure planning identify potential yields of 1200 lots for that part of the site within the LGA. An upper range is provided noting an increased expectation from regional planning strategies (reflected also in local strategies) for urban release areas to increase their density and dwelling yields to make more efficient use of urban development footprint.

Whilst regional and local strategies identify that 60% of housing targets are to be provided through infill and renewal areas (a 10% increase from 2017), the role and contribution of greenfield areas to housing remains. Across a total of some 30,500 new dwelling identified for Newcastle and Lake Macquarie LGAs to 2036, some 12,200 dwellings (40%) are identified to be catered for in greenfield areas. The site may contribute 16-24% of that greenfield dwelling outcome (or 6.5-10% of total new dwellings to 2036).

In addition to the strategic context of housing being provided in this location explained above, given the site is under single ownership, increases the ability to resolve issues holistically and in a coordinated manner, including biodiversity planning and infrastructure planning and delivery. This pipeline of housing and activity can positively contribute and support the surrounding catalyst, renewal and strategic centres, and does not displace or minimise the delivery of dwellings and substantive infill development to also occur in renewal corridors and catalyst areas..

4. Strategic Planning for Bushfires

The strategic planning system is particularly important in contributing to the creation of resilient, safe and sustainable communities that are in keeping with the policy and intent of government.

Comprehensive consideration of bushfires and risks in the planning system needs sound understanding of the landscape context and risks, as well as clarity on risk management principles and on the approach to strategic planning and development controls that will adequately mitigate identified risks. Where there are competing policy objectives, such as biodiversity conservation and fuel reduction, an agreed methodology or guidance is critical.

As such, planning decisions must be based on the best available evidence and rigorous merits-based assessment to ensure that new development - people, homes and businesses are not exposed to unacceptable risk from bushfire.

The determination or support of an application may involve the use of discretion in planning decisions to ensure that effective risk-based land use planning decisions are made to preserve life and reduce the impact of bushfires on life, property and the environment.

Simply, the strategic context is to gain understanding as to the level of risk and determine if people should be exposed to this risk. Strategic planning by its very virtue requires these matters to be considered and decisions to be in the best interest of those that will realise and bear the burden of future risk.

Improved land use planning decisions and building controls for developments in bushfire prone areas are intrinsic to an integrated approach to the fire management. The application of legislation, policy, and guidelines provides one of the most effective means of bushfire planning to ensure future developments are resilient and capable of protecting life.

The importance of sound land use planning has been recognised in most significant bushfire inquiries, including Natural Disasters in Australia which noted that land use planning that takes into account natural hazard risks is the single most important mitigation measure in preventing future disaster losses in areas of new development and that planning and development controls must be effective, to ensure that inappropriate developments do not occur³.

A balanced approach to new development in Bush Fire Prone Areas that recognises the need to protect human life, provide safe operating environment for fire and emergency services while having due regard to the environmental impacts, development potential of land and the need to cater for growing populations is needed.

³ Ellis, S et al (2004) National Inquiry on Bushfire Mitigation and Management (p.92)

5. Landuse Planning Considering Bushfire Risk

Australia has a history of high consequence bushfires, which have caused loss of life, damage and disruption. Risk based land use planning provides the tolerable bushfire risk levels through documents such as PBP 2019, legislation, policy and guidelines.

Land use planning can be an effective tool in minimising or avoiding the impact of natural hazards such as bushfire. From a risk management perspective, the safest approach is always to avoid high risk areas. Local land use strategies such as the LEP should consider and identify land affected by natural hazards and direct development away from inappropriate and constrained lands.

Risk based land use planning has consistently been identified as one of the key means to reduce natural disaster risks to assets and communities. Improved risk-based land use planning in areas that are subject to natural hazard are fundamental to developing and enhancing resilient development, critical infrastructure and communities.

For land use planning relating to bushfire, the State, through the RFS establishes the risk appetite of government, generally through the development and implementation of high-level land use planning legislation, regulation and policy (such as PBP 2019). The role of government in dealing with complex proposals and projects is to consider often competing views, such as the tension between providing asset protection zones and impact on biodiversity on the desired planning outcomes.

Strategic land use planning is a process that identifies the priorities and aspirations of government and the community. The fundamental components of land use planning include consideration about how land is used, where communities are located and what the community and political expectations are in terms of utilisation, amenity, risk tolerance, conservation and development.

6. Legislative Context

The landuse planning framework as it relates to landuse planning and bushfire in NSW includes:

Strategic planning phase

- *Environmental Planning and Assessment Act, 1979* (EP&A Act) s.9.1 Directions by the Minister (cf previous s 117) where PBP 2019 should be considered in applying the Section 9.1 Direction. PBP 2019 is called up by the s. 9.1 directive giving it legislative weight.
- Section 9.1(2) of the EPA Act provides Planning Direction 4.4 *Planning for Bushfire Protection* (Attachment 1). Direction 4.4 deals with planning for bushfire protection and applies where a planning authority prepares a planning proposal that will affect or is close to bushfire prone land. Importantly, a planning proposal must:
 - (a) *have regard to Planning for Bushfire Protection*
 - (b) *introduce controls that avoid placing inappropriate developments in hazardous areas, and*
 - *ensure that bushfire hazard reduction is not prohibited within the APZ.*

Amongst other things, the direction requires that a planning proposal must have regard to Planning for Bushfire Protection 2019 and it must introduce controls that avoid placing inappropriate developments in hazardous areas.

Development assessment

- **Bushfire Prone Land** is designated in accordance with s.10.3 of the EPA Act. Bushfire prone land (BFPL) is land that has been identified and prepared by local council which can support a bushfire or is subject to bushfire attack and certified by the Commissioner of the NSW RFS. The Bushfire Prone Land Maps provide a trigger for formal assessment of new development and compliance with PBP 2019.
- **Integrated development** s.4.46 of the EPA Act and 4.47 Development that is integrated development (cf previous s 91A) requires a bushfire safety authority (BFSA) is under Section 100B of the RF Act from the NSW RFS for residential and rural residential subdivision and Special Fire Protection Purpose (SFPP) developments on BFPL. An application for a BFSA must address the extent to which the development complies with PBP 2019.

Special fire protection purpose" means the purpose of the following:

- (a) *a school,*
- (b) *a child care centre,*
- (c) *a hospital (including a hospital for the mentally ill or mentally disordered),*

- (d) a hotel, motel or other tourist accommodation,
 - (e) a building wholly or principally used as a home or other establishment for mentally incapacitated persons,
 - (f) seniors housing within the meaning of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004
 - (g) a group home within the meaning of State Environmental Planning Policy No 9-- Group Homes
 - (h) a retirement village,
 - (i) any other purpose prescribed by the regulations
- Building work on BFPL must comply with the requirements of the **National Construction Code** (NCC). Under the Deemed to Satisfy provisions of the NCC, building work on BFPL must comply with Australian Standard 3959 *Construction of buildings in bushfire-prone areas* (AS 3959) or the National Association of Steel Framed Housing (2014) *Steel Framed Construction in Bushfire Areas* (NASH Standard).

Exempt and Complying Development

Section 100B of the Rural Fires Act 1997 (RF ACT) specifically excludes complying development for the purposes of the EPA Act despite any environmental planning instrument. This removes the availability of complying deformity codes to be prepared and used for residential and rural residential subdivision and SFPP development.

Some straightforward residential, commercial and industrial development can be undertaken as Exempt or Complying Development under various SEPPs and LEPs. Exempt Development is minor building works that can be carried out without development approval, such as decks, garden sheds, carports and fences. Complying Development can be undertaken on lower risk BFPL for infill residential development up to and including BAL-29 where the appropriate construction requirements and all other relevant development standards have been met. To date, Complying Development is not permitted on higher risk BFPL (BAL-40 or BAL-FZ) and a DA is required in these circumstances.

In certain circumstances, a BAL Certificate must be obtained from the local council or a person recognised by the NSW RFS as a suitably qualified consultant in bushfire assessment, stating that the development meets deemed to satisfy provisions and is not located in BAL 40 or BAL-FZ.

General Obligations

All owners and land managers (both public and private) have a duty to prevent the occurrence and spread of bushfires on or from their land. This responsibility is legislated under section 63 of the Rural Fires Act 1997.

Risk management is undertaken through Bushfire Risk Management Plans (BFRMP) and associated works plans. Annual programs to implement the treatments identified in the BFRMP will be undertaken by the relevant land managers and firefighting authorities. Treatments may include such things as hazard reduction burning, land use planning, grazing, community education, fire trail maintenance and community engagement.

7. Planning for Bushfire Protection 2019

All new development on bushfire prone land must comply with PBP 2019. The **aim** of PBP 2019 (p. 10) is *to provide for the protection of human life and minimise impacts on property from the threat of bushfire, while having due regard to development potential, site characteristics and protection of the environment.*

The **objectives** (PBP 2019 p. 10) are to:

- *Afford buildings and their occupants protection from exposure to a bushfire*
- *Provide for a defendable 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; and*
- *Ensure that utility services are adequate to meet the needs of firefighters*

PBP 2019 articulates the regulatory framework (Figure 3) for new development in NSW, along with the relevant bushfire protection measures to be contemplated in the delivery of bushfire-resilient design, development and ongoing management. The document provides detailed provisions for various types of development which is focussed at residential and SFPP development.

To achieve compliance with PBP 2019, proposals must comply with either the acceptable solutions or the performance criteria. The RFS currently assess all performance-based applications against PBP

2019. NSW has a state variation to the BCA that excludes a deemed to satisfy arrangement for BAL Flame Zone applications.

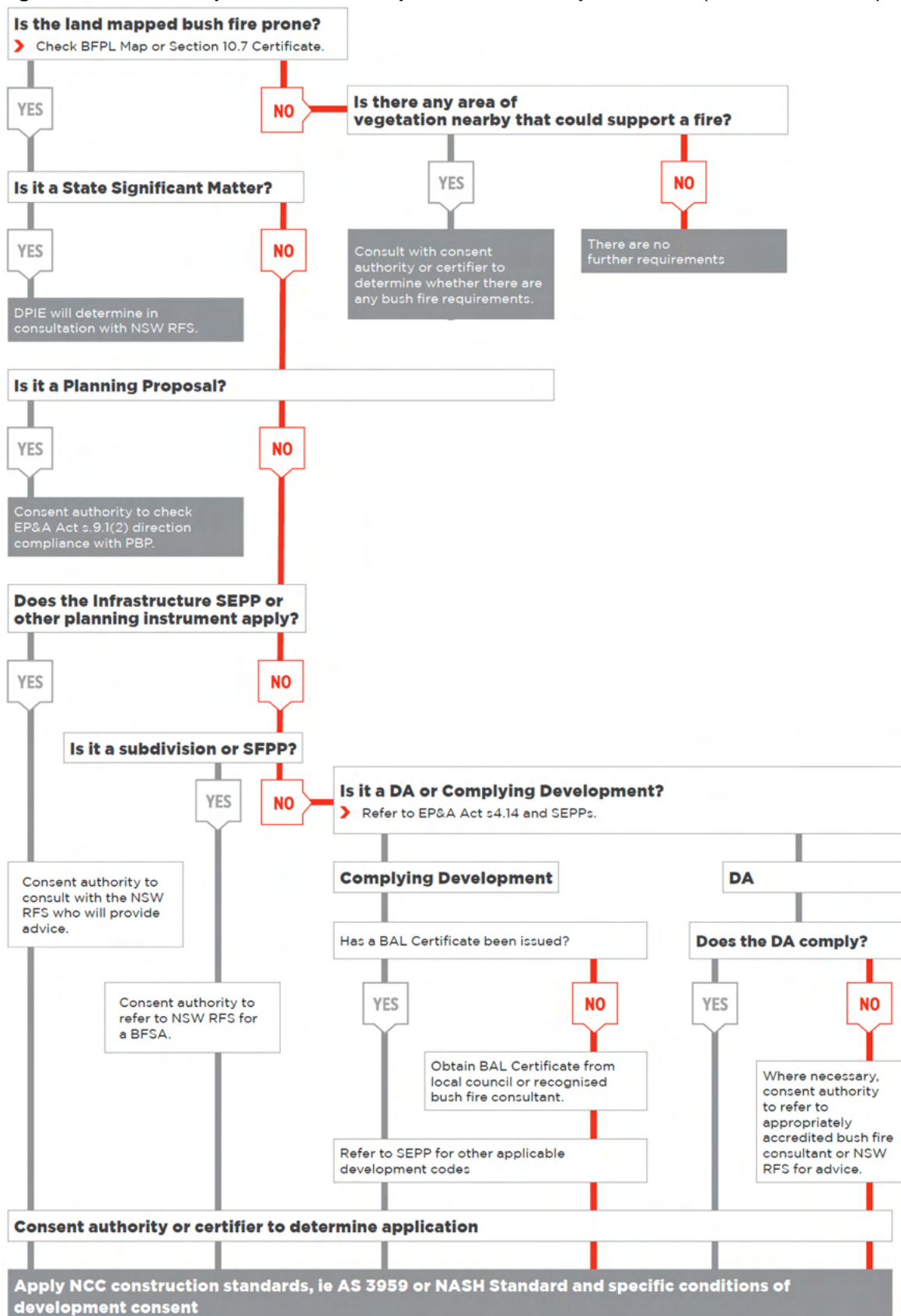
While PBP 2019 is a performance-based document, the RFS have established and confirmed minimum standards for new development (PBP 2019 p. 26 and within each performance criteria – p. 43 for residential subdivision and p. 55 for SFPP development).

- *For new residential development, APZ requirements are based on radiant heat level exposure to buildings not exceeding 29kW/m² (calculated on a flame temperature of 1090 Kelvin).*
- *SFPP developments, 10kW/m² (calculated on a flame temperature of 1200 Kelvin) is the maximum exposure at any point of the building wall or façade.*

Some dispensations are provided for specific types of SFPP development such as camping, bed and breakfast/ farm stay, ecotourism and manufactured home estates (PBP 2019 p. 55).

Commercial, industrial and “other” development must meet the aim and objectives of PBP 2019.

Figure 3 Assessment process for development in bushfire prone areas (source PBP 2019 p. 23)



7.1. Planning for Bushfire Protection Strategic Planning

PBP 2019 (p. 19) notes that:

The most important objective for strategic planning is to identify whether new development is appropriate subject to the identified bushfire risk on a landscape scale. An assessment of proposed land uses and potential for development to impact on existing infrastructure is also a key element of the strategic planning process in bushfire prone areas. Land use planning policies can be introduced to limit the number of people exposed to unacceptable risk.

Eden Estates are required to ensure that bushfire management principles are given appropriate consideration. In a bushfire context, strategic planning must ensure that future land uses are in appropriate locations to minimise the risk to life and property from bushfire attack. An expectation should be that future development will be able to comply with PBP 2019 at the DA stage or by meeting specific standards for a streamlined assessment.

PBP 2019 (p. 34) identifies the broad principles for strategic planning which apply to the risk assessment of an area which includes:

- *ensuring land is suitable for development in the context of bushfire risk;*
- *ensuring new development on BFPL will comply with PBP 2019;*
- *minimising reliance on performance-based solutions;*
- *providing adequate infrastructure associated with emergency evacuation and firefighting operations; and*
- *facilitating appropriate ongoing land management practices.*

Importantly, PBP 2019 (p. 34) articulates the strategic planning principles that should provide for the exclusion of inappropriate development in bushfire prone areas as follows:

- *the development area is exposed to a high bushfire risk and should be avoided;*
- *the development is likely to be difficult to evacuate during a bushfire due to its siting in the landscape, access limitations, fire history and/or size and scale;*
- *the development will adversely effect other bushfire protection strategies or place existing development at increased risk;*
- *the development is within an area of high bushfire risk where density of existing development may cause evacuation issues for both existing and new occupants; and*

-
- *the development has environmental constraints to the area which cannot be overcome.*

A new requirement of PBP 2019 is that strategic development proposals in bushfire prone areas require the preparation of a *Strategic Bushfire Study*. This document will be completed as part of this project. PBP 2019 requires that a Strategic Bushfire Study must include, as a minimum, the components identified in Table 1. These will be addressed in detail in the subsequent Bushfire Strategic Study.

PBP 2019 (p. 34) notes that:

Once these strategic issues have been addressed, an assessment of whether the proposal can comply with this document should be carried out. If the strategic issues cannot be resolved, then the proposal cannot comply with PBP and will not be supported by the NSW RFS.

Given the site is under single ownership, this increases the ability to resolve issues holistically and in a coordinated manner, including biodiversity, bushfire and infrastructure planning and delivery.

Table 1 Requirements of a Bushfire Strategic Study (PBP 2019 p. 35)

ISSUE	DETAIL	ASSESSMENT CONSIDERATIONS
Bush fire landscape assessment	A bush fire landscape assessment considers the likelihood of a bush fire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.	➤ The bush fire hazard in the surrounding area, including: ➤ Vegetation ➤ Topography ➤ Weather ➤ The potential fire behaviour that might be generated based on the above; ➤ Any history of bush fire in the area; ➤ Potential fire runs into the site and the intensity of such fire runs; and ➤ The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.
Land use assessment	The land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses.	➤ The risk profile of different areas of the development layout based on the above landscape study; ➤ The proposed land use zones and permitted uses; ➤ The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site); and ➤ The impact of the siting of these uses on APZ provision.
Access and egress	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	➤ The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile; ➤ The location of key access routes and direction of travel; and ➤ The potential for development to be isolated in the event of a bush fire.
Emergency services	An assessment of the future impact of new development on emergency services.	➤ Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/brigades; and ➤ Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency.
Infrastructure	An assessment of the issues associated with infrastructure and utilities.	➤ The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants; and ➤ Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.
Adjoining land	The impact of new development on adjoining landowners and their ability to undertake bush fire management.	➤ Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans.

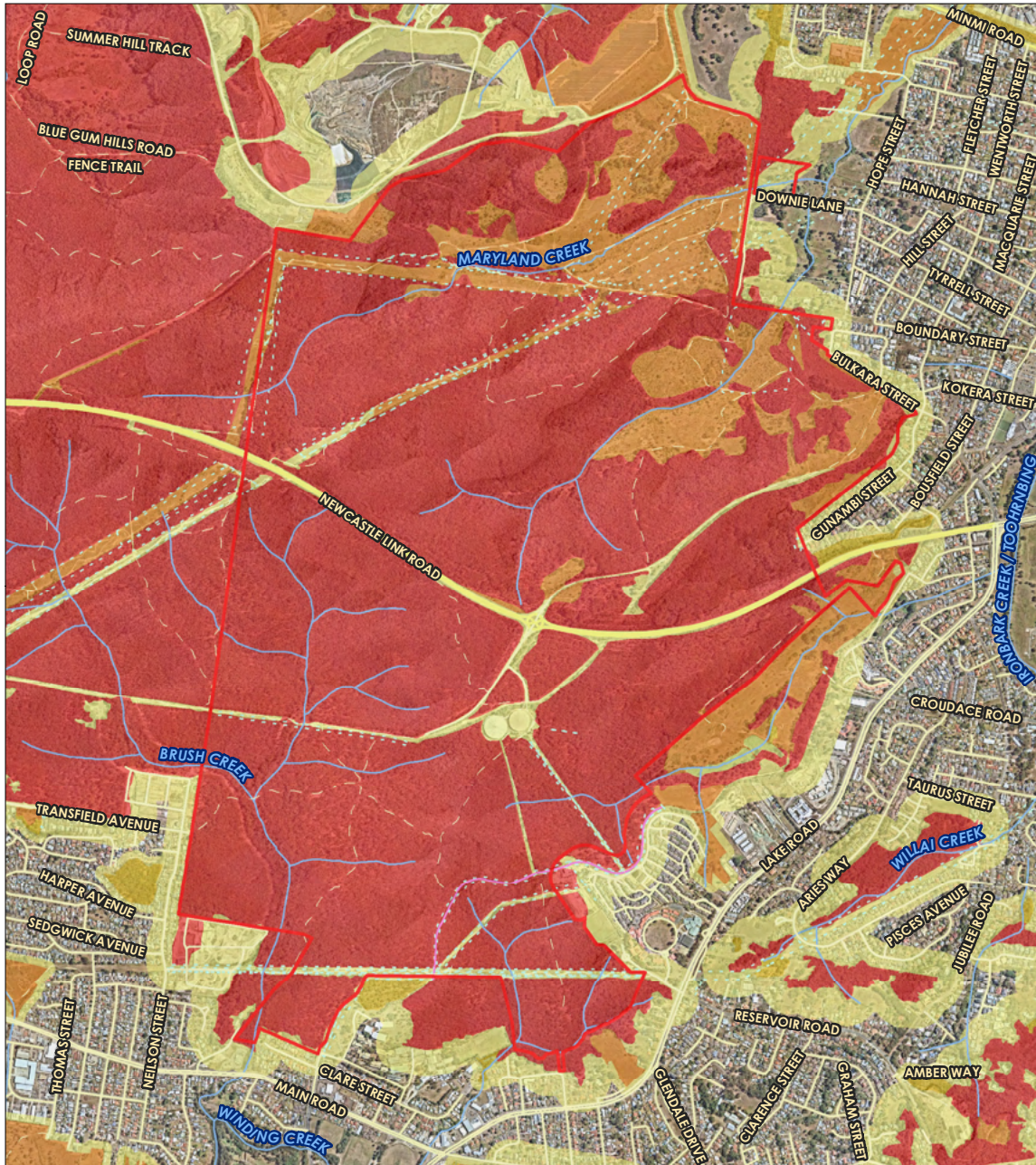
8. Bushfire prone land

The study area is identified as being within 'bushfire prone land' (see Figure 4) for the purposes of Section 10.3 of the EPA Act and the legislative requirements for development on bushfire prone lands are applicable. All development on bushfire prone land must consider and comply with PBP 2019 and the Ministerial Direction for development on bushfire prone land.

Bushfire prone land maps provide a trigger for the development assessment provisions and consideration of sites that are bushfire prone. Bushfire prone land (BFPL) is land that has been identified by council, which can support a bushfire or is subject to bushfire attack. Bushfire prone land maps are prepared by local council and certified by the Commissioner of the NSW RFS.

Bushfire prone maps are an indication of potential bushfire attack and are not a risk assessment of land. The Bushfire Prone Map is considered to accurately identify land that is capable of sustaining a bushfire and areas that may be subject to bushfire attack.

Figure 4 Bushfire Prone Land Map (current plan)



Legend

- | | |
|-----------------|----------------------------|
| Subject Land | Proposed Cycleway |
| Minor Road | Bushfire Prone Land |
| Major Road | Vegetation Category 1 |
| Track-Vehicular | Vegetation Category 2 |
| Watercourse | Vegetation Category 3 |
| Easement | |



Date: 15/12/2020

0 250 500

Meters

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

9. Components of the Strategic Bushfire Study

A Strategic Bush Fire Study must include, as a minimum, the components in Table 4.2.1. (Appendix 2) which is in the following sections. This assessment is preliminary in nature and is intended to inform the design and master planning process.

9.1. Bushfire Landscape Assessment

A bushfire landscape assessment considers the likelihood of a bushfire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape. The broader landscape and the potential size or scale of a bushfire is an important consideration in the planning process. The likelihood of a bushfire, its severity and intensity, and the potential impact on life and property varies depending on where a site is located in the surrounding landscape.

There are a number of factors that influence the potential bushfire behaviour at a landscape scale, including:

- extent and continuity of vegetation
- topography
- the potential fire run and area that is likely to be impacted by the fire, for example a fire in a grassland may only impact one or two streets into a residential area however a large bushfire may impact many kilometres in front of the main fire
- the location and exposure of the urban area, township, isolated rural area to bushfire
- the extent of neighbourhood-scale damage the bushfire may produce.

This preliminary bushfire landscape assessment has been completed through a risk-based land use planning lens in order to determine the extent of bushfire risk of the future context. This preliminary bushfire landscape assessment acknowledges the identification of the site as a precinct within which development could occur, in response to growth and housing pressures currently facing the Newcastle area. However, whilst this need has been considered throughout this process, the core objective of this assessment is to flag bushfire considerations and demonstrate to the various stakeholders that bushfire risk has and continues to be considered in the planning for the site.

The site is subject to a range of environmental and topographical features which will dictate the urban form of the area, including complex water catchment, bushfire, vegetation corridors, mine subsidence,

drainage and biodiversity values. The site is geographically divided by the Newcastle Link Road which transitions west to east through the centre of the site.

The site is bushfire prone and extensively vegetated with intact native vegetation through much of the site. The site is located within a landscape comprising areas of complex terrain with forest vegetation which is likely to result in varied fire behaviour based upon localised terrain, fuel and wind conditions.

Two types of hazard are relevant in terms of bushfire hazard including:

- landscape scale hazard – where large expanses of bushland over tens to hundreds of hectares are located in immediate proximity to, and may traverse, urban periphery suburbs/townships
- localised hazard – which is most commonly presented by fragmented areas of vegetation larger than 1 hectare in size.

These two types of hazard present different types of fire behaviour, fire intensity and potential rate of spread characteristics. The site is exposed to both landscape scale risk and localised bushfire risk. For the purposes of this strategic risk assessment, the primary focus remains on landscape level hazard and risk but noting that localised fragmentation of vegetation can contribute to a 'landscape of fire' in extreme and catastrophic events given the extent of spotting that may occur.

9.1.1. Vegetation Assessment

Vegetation is the fundamental physical component of determining the bushfire behaviour.

Vegetation, in broad terms provides the available fuel to be consumed by a bushfire. Fuel load and arrangement represents a considerable component in dictating to a large degree the behaviour of fire in terms of intensity, rate of spread and flame height, and typically relates to dead plant material less than 6mm thick, and live plant material thinner than 3mm.

Vegetation type, density and arrangement can further influence fire behaviour and intensity. Vertical and horizontal continuity is also a significant element. Thus, vegetation forms a key consideration within this report. The vegetation provides a basis for the determination for bushfire intensity mapping.

The vegetation assessment has been completed in accordance with PBP 2019. The predominant Vegetation is classified by structure or formation using the system adopted by David Keith (2004) and by the general description using PBP 2019. Vegetation types give rise to radiant heat and fire behaviour characteristics. The predominant vegetation has been determined for the site over a

distance of at least 140 metres in all directions from the proposed site boundary or key assets on the development site. Where a mix of vegetation types exist, the type providing the greater hazard is said to predominate.

The vegetation mapping has been completed for the study area as:

- Regional scale mapping of Plant Community Types (PCT) as shown in Figure 5
- Vegetation Community mapping as shown in Figure 6

Figure 5 Vegetation Assessment PCT

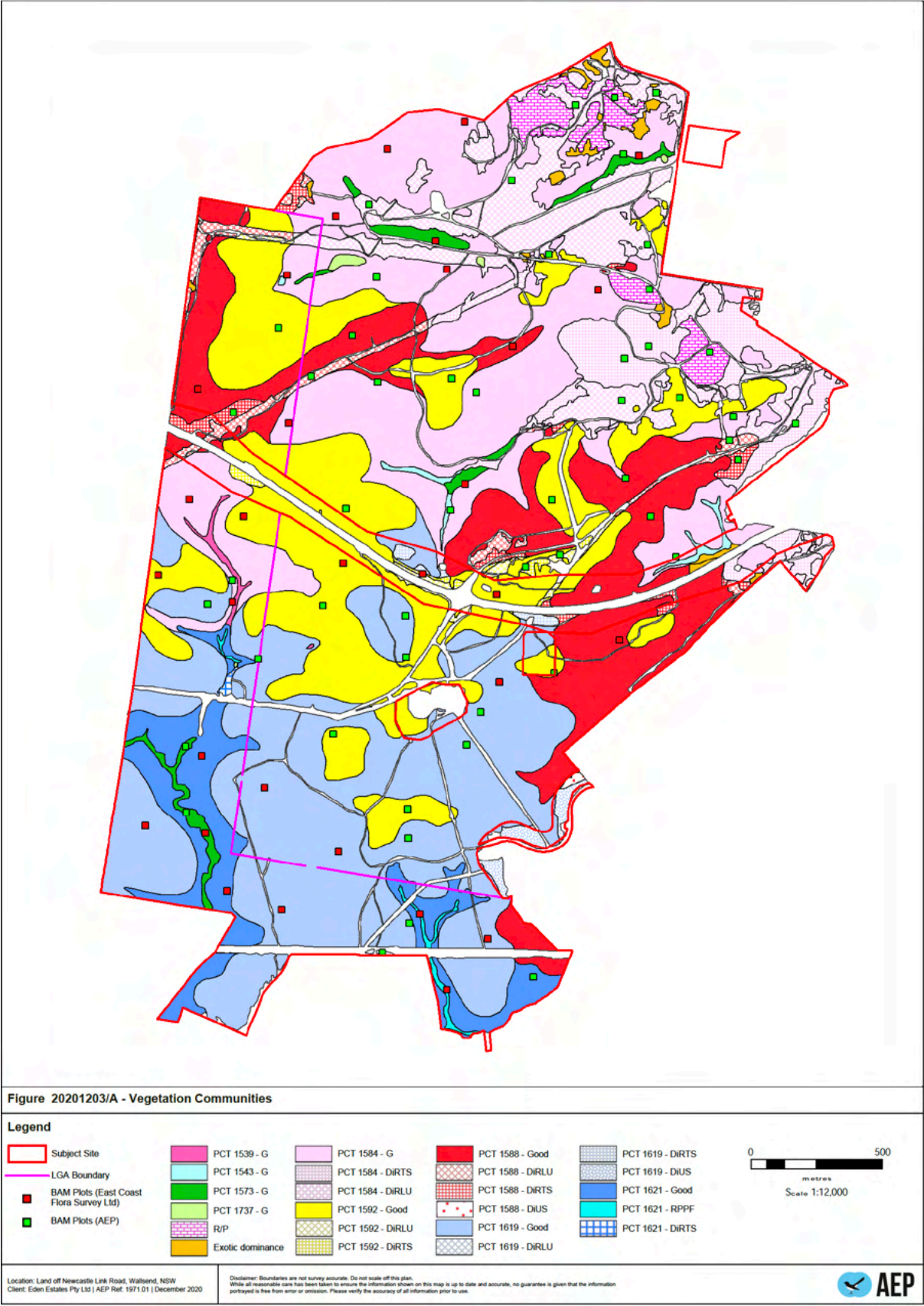


Figure 6 Vegetation Community



Legend

- | | |
|--|--|
| Subject Land | Urban/Managed |
| Minor Road | Dry sclerophyll forests |
| Major Road | Shrublands |
| Track-Vehicular | Wet sclerophyll forests |
| Keith_Formation | |
| Unknown/Other | |

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Imagery: © Nearmap

10. Slopes

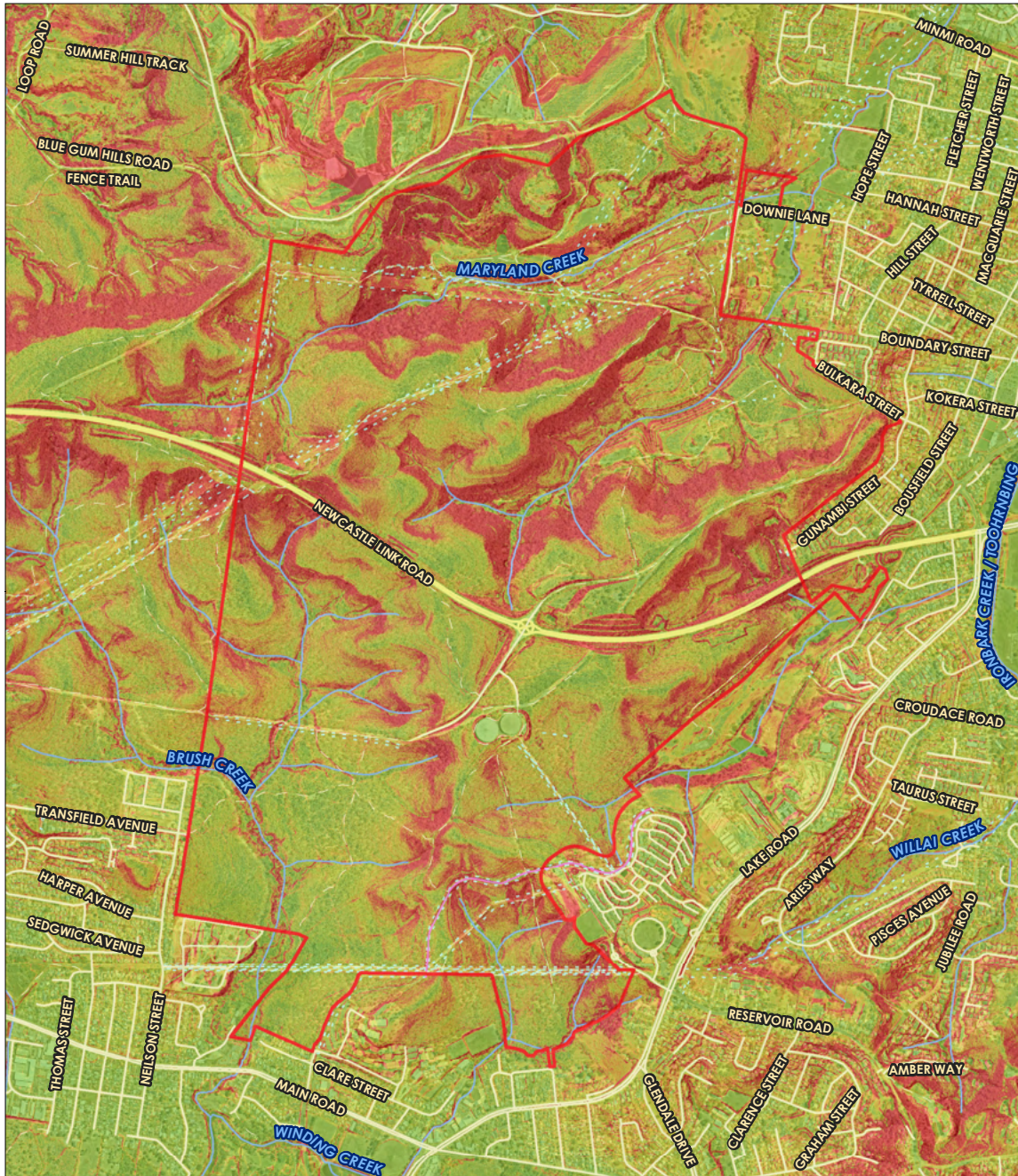
PBP 2019 requires assessment of slope. The slope of the land under the classified vegetation has a direct influence on the rate of fire spread, the intensity of the fire and the ultimate level of radiant heat flux. The effective slope is the slope of the ground under the hazard (vegetation).

In identifying the effective slope, it may be found that there are a variety of slopes covering different distances within the vegetation. The effective slope is considered to be the slope under the vegetation which will most significantly influence the bush fire behaviour for each aspect. This is usually the steepest slope.

Assessment of the slope has been completed at Figure 7. The slopes affecting the site vary considerably. North of the Newcastle Link Road, the slopes are steep with steeply carved valleys running to riparian areas. South of Newcastle Link Road, the land is more moderate with land dipping toward Brush Creek.

Utilisation of the site as shown in Figure 2 is based on the terrain and desire to maintain vegetated corridors along the riparian areas.

Figure 7 Slope Assessment



Legend

 Subject Land	— Track-Vehicular	Slope	 15-20°
— Dist	— Watercourse	 Flat	 >20°
— Slope	— Easement	 0-5°	
— Minor Road	— Proposed Cycleway	 5-10°	
— Major Road		 10-15°	

N


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Coordinate System: GDA 1994 MGA Zone 56
Imagery: © Nearmap

11. Bushfire Risk Management Plan

Blackash has completed the analysis of the two relevant Bushfire Risk Management Plans (BFRMP) affecting the site, being the City of Newcastle BFRMP (2018-2023) and the Lake Macquarie BFRMP (2012).

The RF Act creates the Bush Fire Coordinating Committee (BFCC). The BFCC is a statutory body representing the Crown and is responsible for planning in relation to bushfire prevention and coordinated bushfire fighting. The BFCC must constitute various Bushfire Management Committees (BFMC) (Part 3, Division 3). BFMCs are required to prepare *Bushfire Risk Management Plans* for submission to the BFCC (Part 3, Division 4). If a *Bushfire Management Plan* applies to land, the land must be identified/mapped as prone to bushfire under the EP&A Act (see section 10.3 EP&A Act).

A BFRMP is a strategic document that identifies community assets at risk and sets out a five-year program of coordinated multi-agency treatments to reduce the risk of bushfire to the assets. While the BFRMP is a landscape scale approach to bushfire management, it generally is focused on the treatment of risk on public land (i.e. national park, council, etc.) as reflected by the agencies that sit on the committee. As such, large private holdings such as Eden Estate often are underrepresented as parties to the risk planning process. This has both negative and positive elements.

Annual programs to implement the treatments identified in the BFRMP will be undertaken by the relevant land managers and firefighting authorities. Treatments may include such things as hazard reduction burning, land use planning, grazing, community education, fire trail maintenance and community engagement.

Existing fire management, statutory planning and building frameworks either tacitly or explicitly result in acceptance of bushfire risk by government for vulnerable assets. It has been the Blackash experience that managers of land must be able to demonstrate a risk-based approach to preventing the spread and occurrence of bushfire on or from their land.

Fire Weather and Risk

The typical / average climate in the Lake Macquarie and Newcastle BFMC area is subtropical and the bushfire season generally runs from August to March. Prevailing weather conditions associated with the bushfire season are north-westerly winds accompanied by high day-time temperatures and low relative humidity⁴.

⁴ Lake Macquarie and Newcastle Bushfire Risk Management Plans

The Australasian Fire and Emergency Services Authorities Council (AFAC) position paper on *Bushfires and Community Safety* (2010) notes that:

Bushfire loss can be reduced or avoided in some cases, but cannot be entirely prevented. A balance needs to be struck between measures taken to reduce or avoid harm and loss due to bushfire, and the protection of other values.

This compromise involves acceptance of the inevitability of some loss of life, property, infrastructure and community assets. Governments can assist the community to determine the level of risk it is prepared to accept. AFAC member agencies can inform governments and communities about these risks. The risk management approach adopted should be consistent with planning for other natural hazards.

The risk planning process is a means to understand and mitigate risk. Understanding the bushfire risk and risk plan obligations is a seminal component of work for Eden Estates in future fire management planning.

Bushfire Risk Management Plan Review Results

The 2 BFRMPs did not identify many assets within the site.

- The City of Newcastle (CoN) BFRMP only identified the Hunter Water reservoir infrastructure (CoN ID38).
- The Lake Macquarie (LMCC) BFRMP (now 8 years since published) identified school complexes (LMCC ID37 and ID38) and more broadly 'urban residential' development in the northern LGA interface.

The BFRMP assets have been given a risk rating (likelihood/consequence) and priority in accordance with the Bushfire Coordinating Committee Guidelines for *Bushfire Risk Management Plans*.

The risk planning process is undertaken by Local Bush Fire Management Committees (BFMC) across NSW, which identify assets at risk of bushfire in an area. This can include communities, buildings, infrastructure as well as culturally and environmentally significant locations. The BFMC then develop strategies to protect those assets, including scheduled work to deal with the risk of bushfires in an area. These works may range from a community engagement event to hazard reduction activities and should identify vulnerable assets within the area of focus.

The Risk Plan for the site designates the fire likelihood as 'Possible', and the consequence to the vulnerable communities (schools, aged care/seniors living) is 'Catastrophic', while the residential assets (assumes more mobile persons and able to protect) is a 'Major' consequence.

These same likelihood, consequence and risk classifications have been brought forward to identified assets. Identified assets are shown from the Risk Plan in Table 2 Assets at Risk and Treatment with the treatment codes shown in Table 3. The assets at bushfire risk are shown in Figure 8.

The Eco Logical Australia (ELA) Bushfire Management Plan (BMP) (2013) undertook a risk assessment of the site and identified transport and power services infrastructure across the site, neighbouring residential, cultural and biodiversity assets at risk. The ELA BMP provided management approaches for zones APZ, SFAZ and LMZ; and ignition prevention. Five (5) specific APZ were designated and performance measures provided.

- Nielson Street recommended 15m APZ was provided in general
- George Street APZ was present (north) but not to the west (3m) due to riparian strip
- Gunambi Street APZ was maintained. Of interest were recent approvals for new dwellings (32, 40, 56 & 58 Gunambi Street), potentially using the 20m APZ for approval
- Fryar Crescent APZ, 30m not maintained at time of site visit
- Elmore Glen APZ easement. There is an existing easement in favour of the retirement village, and no management responsibility for the site landowner.

Blackash have identified additional and recently constructed elements adjacent to the site:

- New subdivision development on Nielson Street Edgeworth – there is an evident 20m management zone (APZ?) within the site, whereby ground and shrub fuels managed, and canopy trees remain
- New subdivision development Heartwood Estate Edgeworth – no APZ provided on the site, future development may determine the site management
- Third Street Wallsend – existing residential area needs to be considered, although development (bike track and Woodlands Estate entry road) provide for suitable setbacks from the site to adjacent structures
- Boundary Road Wallsend – Rural residential and isolated dwellings on boundary road need to be considered, although they have suitable setbacks from the site.

New development (post August 2002) is required to comply with the RFS document Planning for Bushfire Protection. Measures included within the consent will require APZs to be contained wholly within the created lots, thereby reducing some of the burden on Eden Estates for bushfire

management (unless a formal easement has been put in place as part of the consent). Managed land is considered part of the APZ. This can include roads, pathways, parks etc.

Table 2 Assets at Risk and Treatment

Asset ID	Asset Description	Likelihood	Consequence	Risk	Priority	Treatment Codes	Source
CoN ID38	Economic - Hunter Water Reservoir	Possible	Major	High	3B	100;101;102	CoN
LMCC ID37	Glendale Schools complex	Possible	Catastrophic	Very High	2B	4;5;152;153;189	LMCC
LMCC ID38	Glendale Macquarie College	Possible	Catastrophic	Very High	2B	4;5;154;155;190;21	LMCC
LMCC ID117	Residential settlement Cameron Park – Northern Interface UR (Glendale/Edgeworth)	Possible	Major	High	3B	245;4;5;256;266;21	LMCC
ELA APZ1	Nielson Street Residences (Edgeworth)	Possible	Major	High	N/A	15 m wide APZ recommended on site to complement existing residence setbacks within lots	ELA 2013
ELA APZ2	George Street Residences (Glendale)	Possible	Major	High	N/A	10 m wide APZ to the north and 15 m APZ to the west	ELA 2013
ELA APZ3	Gunambi Street Residences (Wallsend)	Possible	Major	High	N/A	20 m wide APZ recommended on site to complement existing residence setbacks within lots	ELA 2013
ELA APZ4	Fryar Crescent Residence (Wallsend)	Possible	Major	High	N/A	30 m wide APZ recommended on site to protect directly adjacent residence	ELA 2013
ELA APZ5	Elmore Glen (APZ easement)	Possible	Catastrophic	Very High	N/A	APZ land which varies in width to a maximum of approximately 16 m	ELA 2013
BA ID1	New Nielson Residences (Edgeworth)	Possible	Major	High	N/A	APZ managed on site	Blackash 2020
BA ID2	New – Heartwood Estate	Possible	Major	High	N/A	new development	Blackash 2020
BA ID3	Third Street, Wallsend	Possible	Major	High	N/A	setbacks exist	Blackash 2020
BA ID4	Boundary Road, Wallsend	Possible	Major	High	N/A	setbacks exist	Blackash 2020

Table 3 Treatment codes (CoN and LMCC BFRMPs)

Treatment Strategy	Treatment Ref	Treatment Action	Responsible Agency
Community education	153/155 /266	Undertake Community Engagement Activity	NSWFB/RFS
Hazard reduction	4	Implement Burning Program in Mapped SFAZ	Multiple, incl. land owner
	189/190 /245 /100	Inspect APZ & Maintain as Required	Land owner LGA/RFS <i>Hunter Water</i>
	21	Investigate Implementation of Burning within LMZ	Multiple, incl. land owner
Preparedness	5	Inspect and Maintain Fire Trails	Multiple, incl. land owner
	152/154	Review Institutional Emergency Procedures	Land owner
	256	Prepare and Update PIP for Urban Interface	NSWFB
	101	Maintain Fire Trails	Other/Hunter Water
Ignition Management	102	Maintain fire trail security	Other/Hunter Water

Legend

100m Buffer	Cadastre	Mangrove Swamps	Ecological
Subject Land	Keith Formation	Shrublands	Lake Macquarie
Minor Road	Unknown/Other	Wet sclerophyll forests	Newcastle
Major Road	Urban/Managed	BFRMP Analysis	
Track-Vehicular	Dry sclerophyll forests	Blackash	
Contour - 2m			

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Metres

Coordinate System: GDA 1994 MGA Zone 56
Imagery: ©Nearmap

Date: 26/05/2020

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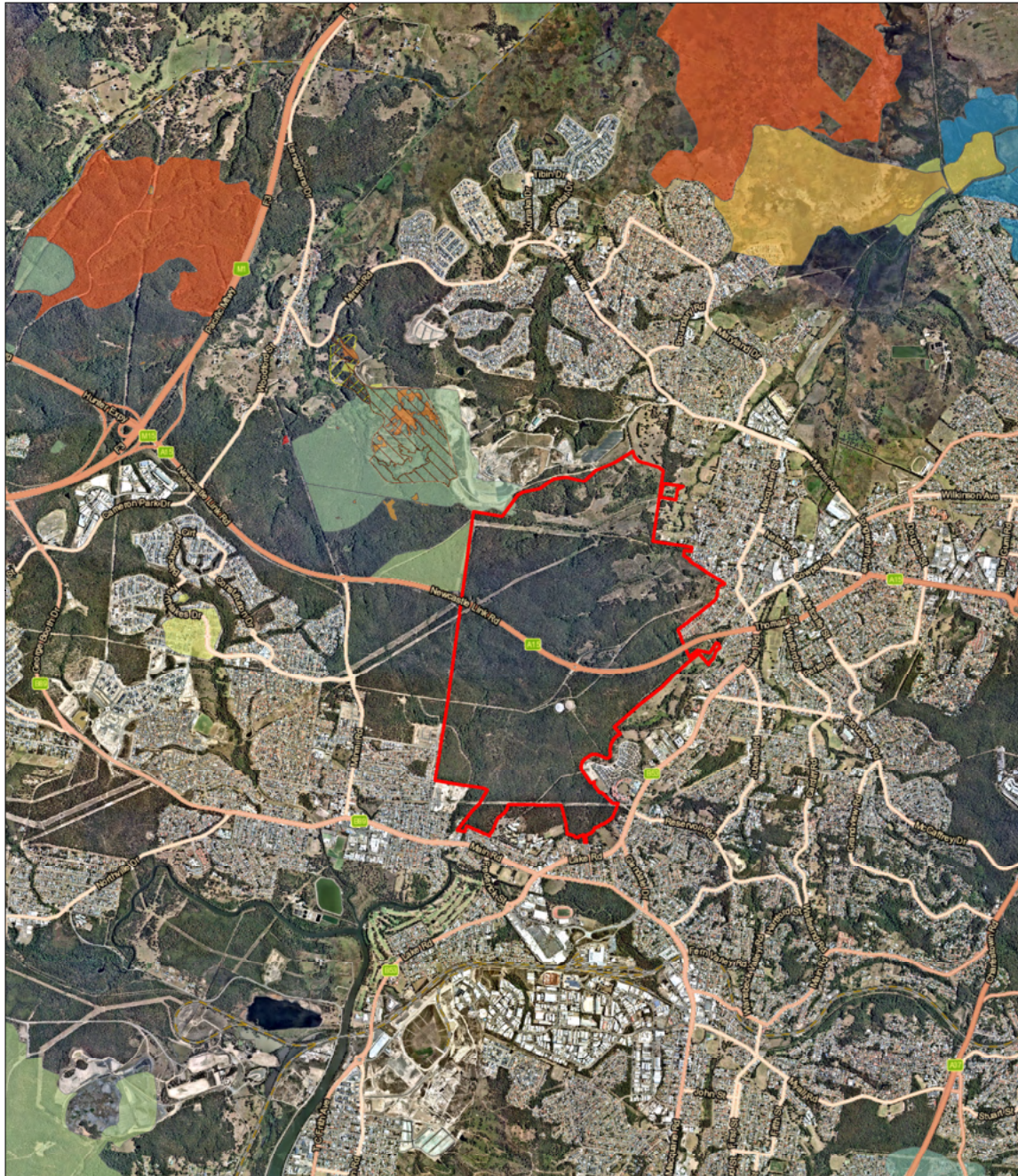
12. Bushfire History

The bushfire history affecting the study area is shown in Figure 8. The site does not have a record of planned burns or wildfire affecting the site. However, Figure 8 shows that there is a history of fire within the vicinity of the site. A planned burn was completed to the north west of the site in 2015-2016. Small areas of wildfire were also to the north west of the site in 2012-2013.

The 2019–20 bushfires in New South Wales (NSW) have been unprecedented in their extent and intensity. As of 3 February 2020, the fire ground in NSW covers 5.4 million hectares (7% of the state).⁵ The site is long unburnt which would provide maximum fuel loads being available to wildfire.

⁵ <https://www.environment.nsw.gov.au/topics/parks-reserves-and-protected-areas/fire/park-recovery-and-rehabilitation/recovering-from-2019-20-fires/understanding-the-impact-of-the-2019-20-fires>

Figure 9 Fire History



Legend

 Subject Land	 1992-93 Wildfire	 2004-05 Wildfire	 2010-11 Wildfire	 2018-19 Wildfire
Prescribed Burn	 1994-95 Wildfire	 2005-06 Wildfire	 2011-12 Wildfire	
 1998-99 Prescribed Burn	 1996-97 Wildfire	 2006-07 Wildfire	 2012-13 Wildfire	
 2015-16 Prescribed Burn	 2001-02 Wildfire	 2008-09 Wildfire	 2013-14 Wildfire	
Wildfire	 1990-91 Wildfire	 2002-03 Wildfire	 2009-10 Wildfire	 2014-15 Wildfire


 Date: 7/05/2020
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 Kilometers
 Coordinate System: GDA 1994 MGA Zone 56
 Imagery: © Nearmap

13. Fire Runs

Two types of hazard are relevant for the subject area in terms of bushfire hazard including:

- landscape hazard – where large expanses of contiguous bushland provide for large scale fires to run across the landscape and impact assets. These fires would generally be called ‘campaign’ fires by the NSW RFS as they burn for an extended period of time across large areas.
- localised hazard – can occur in smaller fragmented areas of vegetation larger than 1 hectare in size and will often be considered as local fires or small scale fires that can start in close proximity to assets and run quickly before they are suppressed. These fires do not form larger campaign fires.

These two types of hazard scenarios present different types of fire behaviour, fire intensity and potential rate of spread characteristics. Importantly, they can be planned for differently. As a general rule of thumb, landscape scale fires occur on days of elevated Bushfire Danger Ratings and as such a degree of planning can be undertaken by emergency managers..

The site is exposed to both landscape-level and localised bushfire hazards. PBP 2019 takes a precautionary view for new development in Bushfire Prone Areas with a 1:50 year fire weather scenario (or 98th percentile) used as the design fire (PBP 2019 p. 84). This provides a probable worst case for a planning framework to consider bushfire risk. Similarly, PBP 2019 does not use aspect as an indicator of bushfire risk, with the underlying assumption being a fire can impact an asset from any direction at maximum intensity. These components negate the need for detailed consideration of fire runs into the site as a probable worst-case assessment is required as part of the assessment against PBP 2019.

That being said, it is accepted that the potential for landscape scale campaign fires and localised fires to sequentially or simultaneously impact on the study area is highly likely.

14. Fire Intensity

Fire intensity describes the energy released from the bushfire or characteristics of the fire behavior such as flame length and rate of spread. A widely used measure of fire intensity is fireline intensity, which is the rate of heat transfer per unit length of the fire line (measured in kWm^2) and represents the radiant energy release in the flaming front. One kW/m is equivalent to the energy released by a small bar radiator. Fire intensity depends upon how much fuel is burnt and how fast it burns. Fireline intensity is a good measure of how likely the fire is to propagate and how difficult it will be to stop, and thus it is a critical component of fire behavior models used to inform fire-suppression activities. Fire severity refers to the ecosystem impacts of a fire such as mortality of trees or loss in biodiversity.

PBP 2019 and the *Australian Standard for Construction of Buildings in Bushfire Prone Areas* (AS3959) uses the radiant heat as an indicator of bushfire risk and to determine the size of APZs and commensurate construction level from AS3959.

Bushfire intensity mapping has been completed for the site (Figure 10). The assessment of bushfire intensity for this study leverages on a classification of topography (slope and aspect) and vegetation formations / fuel across the study area. The assessment has used the base requirements within PBP 2019 as inputs for the modelling.

The model provides an indication of the potential head fire intensity from the direction of attack for the scenario's being modelled, with intensities greater than $4,000 \text{ kW/m}$ generally considered uncontrollable in all weather conditions. Table 4 provides an indication of RFS fire intensity.

The models were generated spatially for the specific locations within the study area utilising the following parameters to identify the potential bushfire intensity:

- Terrain (slope and aspect);
- Fuel (vegetation);
- Likely bushfire weather scenarios including the Forest Fire Danger Index (FFDI) and wind direction.

The modelling approach calculates potential head fire intensity using established fire intensity formulae documented in Cheney et al 2012 (for Forest and Woodland), Anderson et al 2015 (for Heath and Shrubland), and Cheney et al 1998 (for Grassland).

Table 4 Bushfire Intensity – source NSW RFS Crew Leader Manual

Fire Danger	Flame height (@12.5 T/Ha)	Intensity (KW/m) (@12.5 T/Ha)	Significance and recommended strategy
Low	0 - 0.5m	0 - 50	Fire should generally self extinguish
Moderate	0.5 - 1.5m	50 - 500	Hand tool line should hold fire. Direct attack recommended.
High	1.5 - 3.0m	500 - 2000	Too intense for direct attack. Parallel attack recommended.
Very High	3.0 - 10m	2000 - 4000	Crown fire at upper intensities. Indirect attack recommended.
Extreme	> 10m	> 4000	Crowning, spotting and major fire runs likely. Control efforts probably ineffective. Defensive strategy recommended.

It is noted that each bushfire event is different, responding to changes in fuel, weather conditions and FFDI. Thus, the model is an indication of what could be experienced under the bushfire weather scenario modelled provided the fuel and terrain are similar to the input data used in the model.

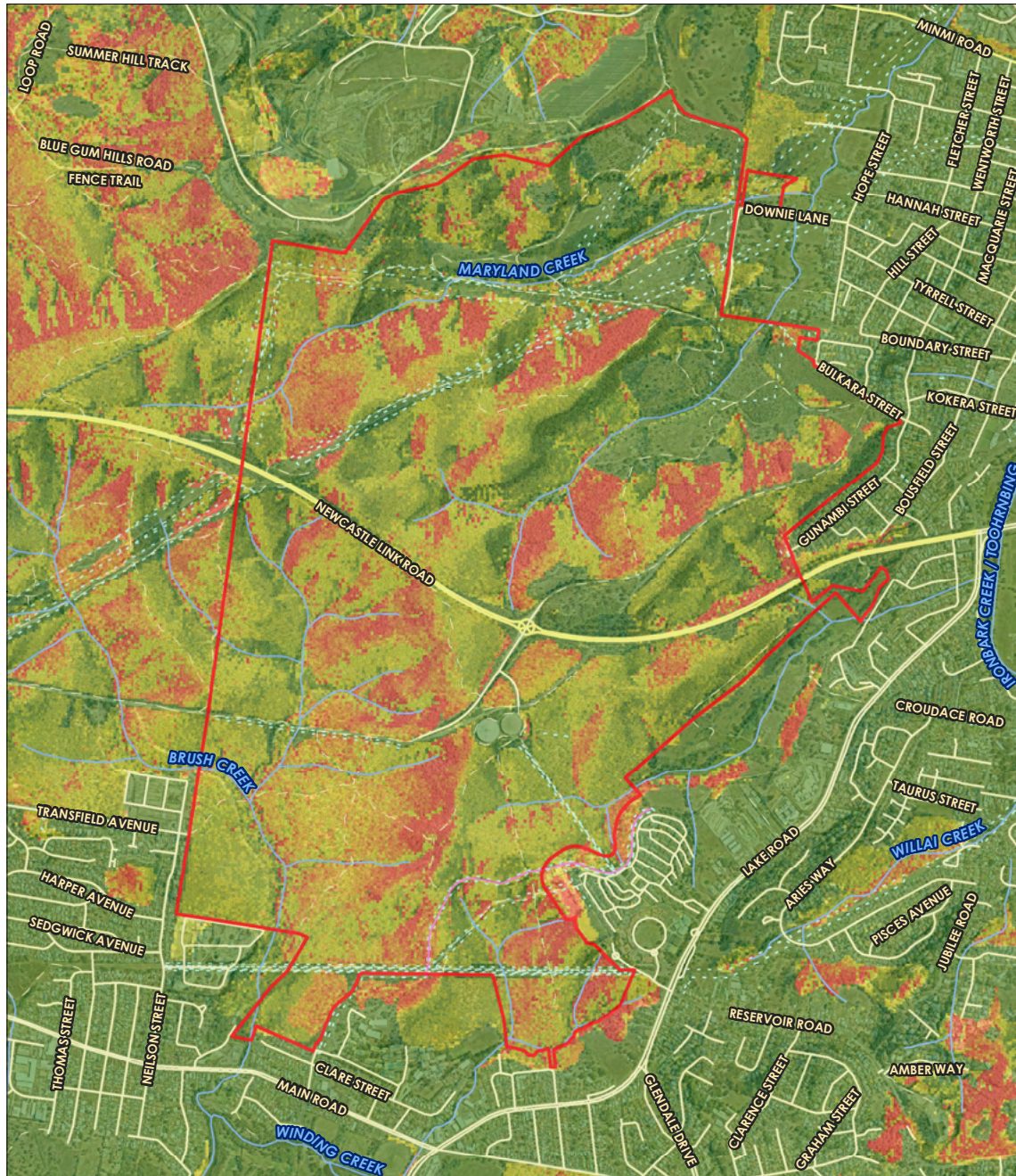
It is important to note that the model of potential fire intensity does not provide an indication of ignition risk or the rate of spread of a bushfire. It is specifically noted that, although the grassland areas will not carry a fire of the same intensity as the forested areas, these areas potentially have the highest risk of ignition and rate of spread. Conversely, fires within the grassland areas are potentially more controllable under certain weather conditions given the lower potential fire intensities in these locations.

It is lastly noted that the above intensity modelling approach does not account for events under extreme fire behaviour / weather including such phenomena as:

- Spotting/Fire storm;
- Fire tornado/whirls;
- Pyro-convective events;

The Bushfire Intensity mapping has been provided at Figure 10. This will change as land within and adjoining the site are developed and the hazard is removed.

Figure 10 Bushfire Intensity



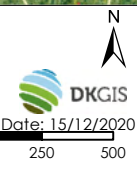
Legend

- Subject Land
- Dist
- Slope
- Minor Road
- Major Road
- Track-Vehicular
- Watercourse
- Easement
- Proposed Cycleway

Fire Intensity (kW/m)	
	<1,000
	1,000 - 15,000
	15,000 - 30,000

	30,000 - 60,000
	60,000 - 90,000
	90,000 - 120,000
	120,000 - 150,000

	150,000 - 180,000
	180,000 - 250,000
	> 250,000



Coordinate System: GDA 1994 MGA Zone 56
Imagery: © Nearmap

14.1. Landuse Assessment

PBP 2019 requires that the land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses. Matters for consideration (once other functional areas have completed studies) will be:

- The risk profile of different areas of the development layout based on the above landscape study;
- The proposed land use zones and permitted uses;
- The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site); and
- The impact of the siting of these uses on APZ provision.

This landuse risk assessment is not a bushfire management plan. This risk assessment seeks to analyse the extent of bushfire risk relevant to the site. The core objective of this risk assessment is to determine the suitability of the site and areas identified within it to respond to bushfire risk. This will address the fundamental strategic planning principle within PBP 2019 of if an area is suitable for development.

PBP 2019 (p. 34) notes that

Some specific locations have significant fire history and are recognised as known fire paths. These areas may require detailed analysis. The broad principles which apply to this analysis are:

- *ensuring land is suitable for development in the context of bushfire risk;*
- *ensuring new development on BFPL will comply with PBP;*
- *minimising reliance on performance-based solutions; providing adequate infrastructure associated with emergency evacuation and firefighting operations; and*
- *facilitating appropriate ongoing land management practices.*

Strategic planning should provide for the exclusion of inappropriate development in bush fire prone areas as follows:

- *the development area is exposed to a high bushfire risk and should be avoided;*
- *the development is likely to be difficult to evacuate during a bushfire due to its siting in the landscape, access limitations, fire history and/or size and scale;*
- *the development will adversely effect other bushfire protection strategies or place existing development at increased risk;*

- the development is within an area of high bush fire risk where density of existing development may cause evacuation issues for both existing and new occupants; and
- the development has environmental constraints to the area which cannot be overcome.

14.1.1. Bushfire Risk Identification

Risk is defined as 'the effect of uncertainty on objectives'. Managing risk helps government, organisations, institutions, businesses and communities make good decisions in an environment full of uncertainty. Good risk management identifies and protects what people and society value.

NERAG provides a contextualised, emergency-related risk assessment method consistent with the Australian Standard AS/NZS ISO 31000:2018 *Risk management – principles and guidelines*. NERAG provides a method to contextualise, assess and manage emergency risks so that action can be taken and good decisions made to minimise harm and loss when shocks and stresses occur. For the purposes of this risk assessment, the likelihood and consequence criteria relate to the average occurrence of an FFDI 100 fire event which is the accepted fire weather event for land use planning and building construction provisions Newcastle.

For the Strategic Bushfire Study, the risk assessment follows the parameters set out by PBP 2019 in terms of matters to consider in making a determination as the availability of an area for future use.

14.1.2. Defining Acceptable Risk

In order to understand the nature of bushfire risks posed to the assets and people within the site, it is critical to contemplate the elements of bushfire risk which may be relevant.

The tolerable level risk has been provided by PBP 2019. The radiant heat and forms of bushfire attack can be reduced by increasing the size of the asset protection zones. However, this may have other knock on effects such as impacts on ecological integrity of adjoining land.

With respect to property loss, CSIRO studies have found that approximately 98% of all building loss has been found to occur on days when the FFDI exceeded 45 (Blanchi & Lucas, 2010). In events where the FFDI exceeds 50, fire suppression at any part of a fire line is virtually impossible due to the intensity and unpredictable behaviour of a fire (Leonard & Blanchi, 2012). The management of risk will need to be carefully considered within the development of Eden Estates. Building design and construction, fuel

management (APZ and separation). The minimum requirements are outlined within PBP 2019 and can be provided within the site.

In considering risk to life, it is incumbent to examine historical bushfire-related life loss research. In 2012, the CSIRO in conjunction with the Bushfire Corporative Research Centre undertook a comprehensive study into matters of both life and house loss across utilising over 110 years (1901-2011) of data across 260 bushfire events (Blanchi et al. 2012). Over this period, a total of 825 known civilian and firefighter fatalities have occurred (Blanchi et al. 2012)⁶. Important findings of this research are as follows:

- Fire weather and proximity to forest are very strong contextual drivers for defining the potential for fatalities to occur.
- 78% of all fatalities occurring within 30m of the forest and 50% of all fatalities occurring on days exceeding an FFDI of 100
- The location of fatal exposure provides a useful context with 58% occurring out in the open and 28% occurring inside structures, of particular interest is the fact that for bushfires occurring under weather conditions exceeding an FFDI value of 100, fatalities within structures represents over 75% of all fatalities.
- 50% of all recorded fatalities have occurred on days exceeding FFDI 100 (most fatalities occur as a result of infrequent but high magnitude events)
- Late evacuation is the most common activity persons were engaged in at time of death (30.3 per cent) followed by sheltering inside a structure (24.8 per cent) and defending a property outside (20.7 per cent)
- For those instances where sufficient data is available with respect to fatalities occurring during the act of evacuation, most were trapped on roads by either fallen trees or become bogged, the remainder having run off the road due to poor visibility as a result of smoke conditions;
- The percentage of fatalities within structures appears to be increasing over time, mostly attributed to the 2009 Victorian Bushfires where 118 of the 173 fatalities occurred inside a structure
- Most fatalities occur between the hours of 3pm and 9pm – when FFDI is at its peak (3pm) and when summer cool-change winds occur. 90 per cent of fatalities occur immediately after afternoon wind changes

In considering the above findings, there remain two key contextual matters which reflect the extent of fatalities in certain situations, including:

⁶ https://www.bushfirecrc.com/sites/default/files/managed/resource/life_house_loss_report_final_0.pdf

1. there is a direct relationship between fire intensity (as a function of FFDI) and both property and life loss, over distance from the bushland interface; and
2. the afternoon cool-wind change is likely a key phenomenon in situations where life loss occurs. These winds change the direction of the fire front, where the wide fire flank transitions to the head of the fire, creating a drastic spike in fire intensity and rate of spread over a wide distance and in a direction, which is not anticipated by the general community. These situations can lead to higher proportions of people taking passive shelter (i.e. the window to evacuate has passed) and attempting late evacuation, as can the 'wait and see' mindset. Topographic conditions can also result in the same effect, where residents may not be aware of an approaching fire until it reaches a nearby ridgeline.

Considering the high risk nature of the site, a key risk management activity will be to not expose people to unreasonable risk and to provide multiple redundant systems/ options for people who may be caught by fire and cannot evacuate out of bushfire prone areas.

14.2. Access and Egress

PBP 2019 requires a study of the existing and proposed road networks both within and external to the master plan area or site layout. Key considerations are:

- The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile;
- The location of key access routes and direction of travel; and
- The potential for development to be isolated in the event of a bushfire.

These requirements will need to be considered by bushfire experts with the traffic engineers and master planners.

The road network will be crucial to provide access for fire fighters and to provide options for occupants and residents to evacuate. Eden Estates has indicated that all areas will be provided with perimeter roads and options for evacuation in accordance with PBP 2019.

Given the intent to terrain vegetation corridors through the site, the provision of asset protection zones adjacent to pinch points will be provided. Key APZs along roads (see Figure 2) will be:

- The connection of R3 to R2
- The connection of R4 to R6
- Perimeter APZ along R7 and R8
- The connection of R10 to R9
- The connection to R16 to R14 and R17
- The connection of R17 to R18 and R21
- The connection of R21 to R13
- The connection of R22, R23 and R24 to built up areas to the south of the site

The Newcastle Link Road that dissects the site and runs east west is a significant road. It is a divided four lane wide with two lanes each way. The speed limit is 90km/h. from the site back into Newcastle. The outer suburbs of Newcastle are approximately 2km from the main entry to the site with a travel time of approximately 2m. Other connections will be provided from the site to surrounding suburbs that are not bushfire prone.

Access issues will be explored more fully in subsequent studies.

15. Emergency Management and Evacuation

For new development, particularly where there are fingers of bushland presenting potential pinch points for fire, emergency management arrangements and evacuation will be crucial to ensuring that the right balance is found between the availability of areas to be developed with the absolute need to protect human life and to provide a safe operating environment for fire fighters.

Matters for consideration within the site include:

- Community Refuges⁷
- Neighbourhood Safer Places and places of last resort
- Construction standards and designs to provide minimum standards
- Evacuation planning & arrangements
- Networked systems and alerts
- Communication towers and communications networks and vulnerability⁸
- Community Protection Plans⁹
- Other warning mechanisms – i.e. sirens¹⁰
- Plans of Management and associated works

The focus of the Emergency Management and Evacuation arrangements should recognise the bushfire risk of the site and put in place strategies that do not expose people to the effects of bushfire attack.

⁷ <https://www.cfa.vic.gov.au/plan-prepare/community-fire-refuges>

⁸ https://www.rfs.nsw.gov.au/_data/assets/pdf_file/0012/4314/Practice-Note-1-11-Telecommunications-Towers-in-Bush-Fire-Prone-Areas.pdf

⁹ <https://www.rfs.nsw.gov.au/plan-and-prepare/know-your-risk/community-protection-plans>

¹⁰ <https://www.cfa.vic.gov.au/warnings-restrictions/community-alert-sirens>

16. Water supply

Water supply is one of the key bushfire protection measures identified by NSWRFs in PBP 2019. Water supply will comply with PBP 2019 requires.

17. Electricity Infrastructure

Consideration of electricity supplies is important from a bushfire resilience perspective in terms of the community's ability to access information and warnings, to power pumps to essential services (i.e. to pump stations and reservoirs), etc. Notwithstanding this, power outages in bushfire events is common. However, undergrounding of new services can mean all the difference during emergencies in addition to avoid a potential new ignition sources. Electricity infrastructure will comply with PBP 2019.

18. Gas utilities

Gas infrastructure and bushfire are at obvious odds and thus, it is important the treatment of gas utilities is undertaken with the potential threat of bushfire in mind. This is articulated in PBP 2019. Gas supply will comply with PBP 2019.

19. Overview of bushfire attack mechanisms

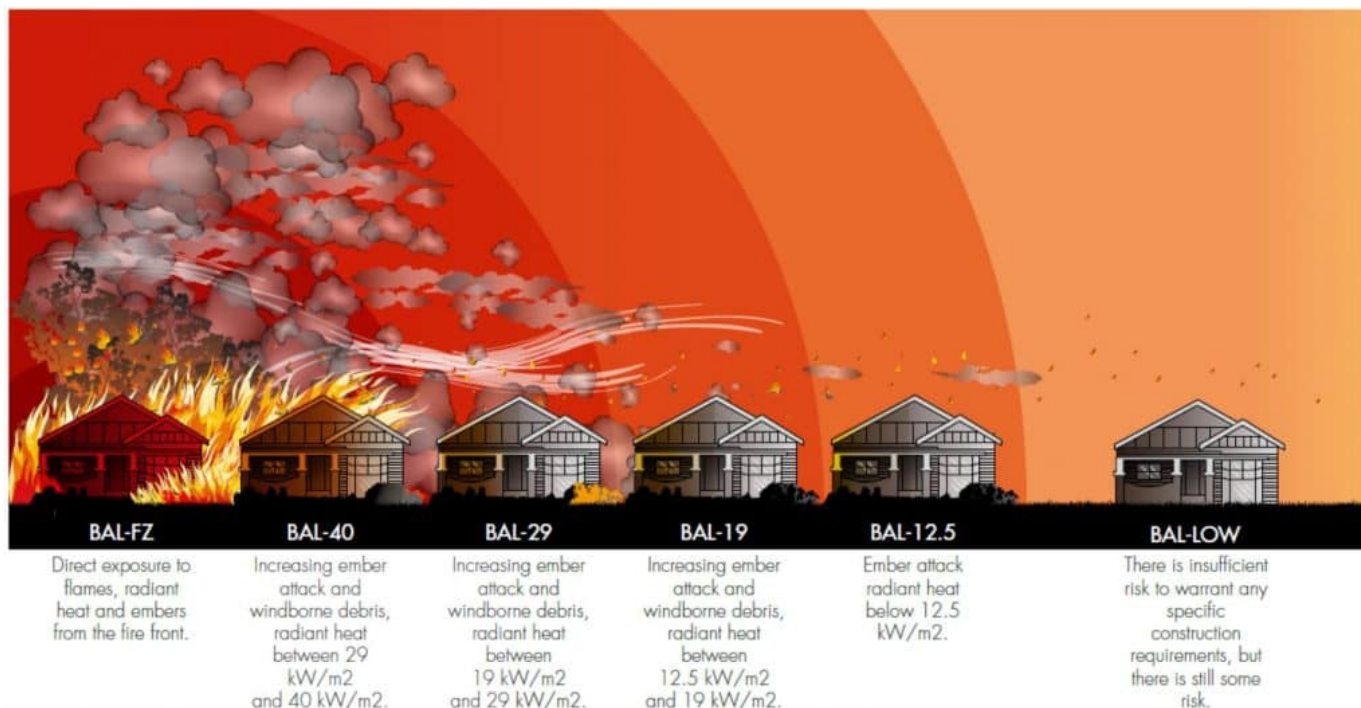
Bushfires have long remained a fundamental characteristic of the Australian bush landscape, and likewise Australians have long retained a strong affinity with bush environments. There remain a number of common factors which are associated with bushfire hazard and events and these include the incidence of fire weather, availability of fuel along with its type, structure and continuity or fragmentation, and the context of development at the bushland interface.

Bushfire attack refers to the various methods (see Figure 9) in which bushfire may impact upon life and property and principally encompass:

- Direct flame contact
- Ember attack
- Radiant heat flux
- Fire-driven wind
- Smoke

In the progression of a bushfire event, these methods interact either exclusively or in concert and are explained in the following section.

Figure 11 Forms of Bushfire Attack



19.1. Direct flame contact

Direct flame attack refers to flame contact from the main fire front, where the flame which engulfs burning vegetation is one and the same as that which assumes contact with the building. It is the highest level of bushfire attack as a consequence of direct flame contact from the fire front in addition to radiant heat flux and ember attack.

19.2. Ember attack

The convective forces of bushfire raise burning embers into the atmosphere on prevailing winds and deposit them to the ground ahead of the fire front. Typically, ember attack occurs approximately 30 minutes prior to the arrival of the fire front and continues during the impact of the fire front and for several hours afterwards, thus it is the longest lasting impact of bushfire attack.

Ember attack is attack by smoldering or flaming windborne debris that is capable of entering or accumulating around a building, and that may ignite the building or other combustible materials and debris.

In essence, building loss via ember attack relates largely to the vulnerabilities of each building, its distance from hazardous vegetation and whether an occupant (or the like) is present to actively defend it. It is estimated by the CSIRO that approximately 80 to 90 per cent of buildings lost by bushfire are lost as a result of ember attack either in isolation or in combination with radiant heat impact.

19.3. Radiant heat flux

Exposure to radiant heat remains one of the leading causes of fatalities associated with bushfire events. Measured in kilowatts per m² (kWm²), radiant heat is the heat energy released from the fire front which radiates to the surrounding environment, deteriorating rapidly over distance.

In terms of impact on buildings, radiant heat can pre-heat materials making them more susceptible to ignition, or can cause non-piloted ignition of certain materials if the energy transmitted reaches a threshold level. Radiant heat can also damage building materials such as window glazing, allowing openings into a building through which embers may enter. Radiant heat impact is an especially important factor in building-to-building ignition, with buildings becoming the fire source feature.

In terms of radiant heat exposure for humans, it can cause pain to unprotected skin in milder situations or life threatening and fatal injury in higher exposure thresholds. The effects of radiant heat are shown in Table 3.

Table 5 The effects of radiant heat (NSWRFS 2006)

Radiant Heat Flux	Likely Effects	Approx. distances
>29 – 110 kW/m ²	Flame Zone	0 - 20 metres
29 kW/m ²	Ignition of most timbers without piloted ignition (3 minutes exposure) (Level 3 construction) during the passage of a bush fire. Toughened glass could fail.	20 metres
19 kW/m ²	Screened float glass could fail (Level 2 construction) during the passage of a bush fire.	27 metres
12.5 kW/m ²	Standard float glass could fail (Level 1 construction) during the passage of a bush fire. Some timbers can ignite with prolonged exposure and with piloted ignition source (eg embers).	40 metres
10 kW/m ²	Critical conditions. Firefighters not expected to operate in these conditions although they may be encountered. Considered to be life threatening < 1 minute in protective equipment. Fabrics inside a building could ignite spontaneously with long exposures.	45 metres
7 kW/m ²	Likely fatal to unprotected person after exposure for several minutes	55 metres
4.7 kW/m ²	Extreme conditions. Firefighter in protective clothing will feel pain. (60 seconds exposure)	70 metres
3 kW/m ²	Hazardous conditions. Firefighters expected to operate for a short period (10 minutes)	100 metres
2.1 kW/m ²	Unprotected person will suffer pain after 1 minute exposure – non fatal.	140 metres

19.4. Fire driven wind

The convective forces of bushfire typically result in strong to gale force fire-driven winds which in itself, can lead to building damage. The typical effects of fire driven wind include the conveyance of embers, damage from branches and debris hitting the building, as well as direct damage to vulnerable building components such as lifting roofs or roof materials and the damage / breakage of windows.

19.5. Smoke

Smoke emission remains a secondary effect of bushfire and is one which is typically not addressed by bushfire assessments. Irrespective, it is important to note the potentially severe impact of smoke emission on the human respiratory system. It can lead to difficulties in breathing, severe coughing, blurred or otherwise compromised vision, and can prove fatal. It is also important to note that toxic smoke can occur during bushfire, particularly where buildings or materials are ignited. With regard to evacuation, it can reduce visibility and create difficulties for particularly vulnerable persons.

20. Bushfire Attack Levels

The Bushfire Attack Level (**BAL**) is a means of measuring the severity of a building's or sites potential exposure to ember attack, radiant heat and direct flame contact (see Table 5). In the Building Code of Australia through AS3959, the BAL is used as the basis for establishing the requirements for construction to improve protection of building elements and to understand the radiant heat exposures for people in the open.

The determination of BALs for key areas would be a key component for the master planning for the sites within the subject area.

Table 6 Radiant Heat Flux and Bushfire Attack Levels (source PBP 2019 p. 85)

Heat flux exposure	Description	AS 3959 construction level
N/A	Minimal attack from radiant heat and flame due to the distance of the building from the vegetation, although some attack by burning debris is possible. There is insufficient threat to warrant specific construction requirements.	BAL-LOW
≤12.5	Attack by burning debris is significant with radiant heat (not greater than 12.5kW/m ²). Radiant heat is unlikely to threaten building elements (such as unscreened glass). Specific construction requirements for ember protection and accumulation of debris are warranted.	BAL-12.5
>12.5 ≤19	Attack by burning debris is significant with radiant heat flux (not greater than 19kW/m ²) threatening some building elements (such as screened glass). Specific construction requirements for embers and radiant heat are warranted.	BAL-19
>19 ≤29	Attack by burning debris is significant and radiant heat flux (not greater than 29kW/m ²) threatens building integrity. Specific construction requirements for ember and higher levels of radiant heat are warranted. Some flame contact is possible.	BAL-29
>29 ≤40	Radiant heat flux and potential flame contact could threaten building integrity.	BAL-40
>40	Significant radiant heat and significantly higher likelihood of flame contact from the fire front will threaten building integrity and result in significant risk to residents.	BAL-FZ

21. Asset protection zones

An APZ is a buffer zone between a bushfire hazard and buildings. The APZ is managed progressively to minimise fuel loads and reduce potential radiant heat levels, flame, smoke and ember attack. The appropriate APZ distance is based on FFDI, vegetation type, slope and the nature of the development. The APZ can include roads or land managed to be consistent with APZ standards set out in RFS document *Standards for Asset Protection Zones*.

The APZ provides a fuel-reduced, physical separation between buildings, assets (roads as evacuation routes) at risk and bushfire hazards. The APZ is a key element in the suite of bushfire measures and dictates the type of construction necessary to mitigate bushfire attack. There is a converse relationship between the size of the APZ and the BAL. The larger the APZ, the lower the BAL. The smaller the APZ, the higher the BAL.

A fundamental principle within PBP 2019 (p. 28) is that:

An APZ imposed by a development consent condition must be maintained for the lifetime of the development, unless modified by a subsequent consent. In order to guarantee that an APZ can be managed in perpetuity, APZs should be contained within the overall development site and not on adjoining lands.

APZ considerations, including inputs, outputs, acceptable locations and acceptable management will need to be worked through as part of the design and development process.

The APZs associated with new SFPP development are based on vulnerable SFPP Uses achieving 10kW of radiant heat at the building and lower risk SFPP achieving BAL 29. The APZ requirements for new SFPP development in accordance with PBP 2019 are considerable.

Due to the terrain and the need to keep vegetation corridors, APZs will be provided adjacent to key roads that traverse bushfire prone areas. The size and location of these APZs will be worked through in subsequent studies. Key APZs along roads (see Figure 2) will be:

- The connection of R3 to R2
- The connection of R4 to R6
- Perimeter APZ along R7 and R8
- The connection of R10 to R9
- The connection to R16 to R14 and R17

-
- The connection of R17 to R18 and R21
 - The connection of R21 to R13
 - The connection of R22, R23 and R24 to built up areas to the south of the site

This issue will require further consideration in the planning of the proposal.

22. Conclusion

This report considers the extent of potential bushfire risk relevant to the proposed community of Eden Estates. This assessment has been undertaken through the lens of risk-based land use planning in order to identify the extent of bushfire risk considerations and the legislative and policy considerations to provide for the protection of human life and minimise impacts on property from the threat of bushfire, while having due regard to development potential, site characteristics and protection of the environment.

This report provides pathways forward for consideration and testing, namely, to identify the most appropriate balance between risk acceptability based upon the requirements of Planning for Bushfire Protection 2019, site utilisation and risk tolerance. In considering the planning proposal, it is incumbent on the regulators to consider that land to the west of the site has already been successfully rezoned for residential purposes and is going through the development application process. The development of areas surrounding the site will remove large areas of bushfire risk.

Given the size of the site, bushfire is an issue that can be worked through. The Bushfire Strategic Assessment will undertake a detailed analysis of the site to provide compliance with the 4.4 Planning Directive and Planning for Bushfire Protection 2019. It is appreciated that subsequent testing and analysis may result in adjustments to the plan. We are confident that the plan can be adjusted to comply with PBP 2019.

Appendix 1 References

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Appendix 2 Strategic Bushfire Study Requirements

source Planning for Bushfire Protection 2019 p. 35.

Table 4.2.1

Bush Fire Strategic Study

ISSUE	DETAIL	ASSESSMENT CONSIDERATIONS
Bush fire landscape assessment	A bush fire landscape assessment considers the likelihood of a bush fire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.	➤ The bush fire hazard in the surrounding area, including: ➤ Vegetation ➤ Topography ➤ Weather ➤ The potential fire behaviour that might be generated based on the above; ➤ Any history of bush fire in the area; ➤ Potential fire runs into the site and the intensity of such fire runs; and ➤ The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.
Land use assessment	The land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses.	➤ The risk profile of different areas of the development layout based on the above landscape study; ➤ The proposed land use zones and permitted uses; ➤ The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site); and ➤ The impact of the siting of these uses on APZ provision.
Access and egress	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	➤ The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile; ➤ The location of key access routes and direction of travel; and ➤ The potential for development to be isolated in the event of a bush fire.
Emergency services	An assessment of the future impact of new development on emergency services.	➤ Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/brigades; and ➤ Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency.
Infrastructure	An assessment of the issues associated with infrastructure and utilities.	➤ The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants; and ➤ Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.
Adjoining land	The impact of new development on adjoining landowners and their ability to undertake bush fire management.	➤ Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans.

Attachment 2 Planning Direction

LOCAL PLANNING DIRECTIONS

Section 9.1(2) of the *Environmental Planning and Assessment Act 1979*

4.4 Planning for Bushfire Protection

Objectives

- (1) The objectives of this direction are:
 - (a) to protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas, and
 - (b) to encourage sound management of bush fire prone areas.

Where this direction applies

- (2) This direction applies to all local government areas in which the responsible Council is required to prepare a bush fire prone land map under section 10.3 of the *Environmental Planning and Assessment Act 1979* (the EP&A Act), or, until such a map has been certified by the Commissioner of the NSW Rural Fire Service, a map referred to in Schedule 6 of that Act.

When this direction applies

- (3) This direction applies when a relevant planning authority prepares a planning proposal that will affect, or is in proximity to land mapped as bushfire prone land.

What a relevant planning authority must do if this direction applies

- (4) In the preparation of a planning proposal the relevant planning authority must consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 3.34 of the Act, and prior to undertaking community consultation in satisfaction of Schedule 1, clause 4 of the Act, and take into account any comments so made,
- (5) A planning proposal must:
 - (a) have regard to *Planning for Bushfire Protection 2019*,
 - (b) introduce controls that avoid placing inappropriate developments in hazardous areas, and
 - (c) ensure that bushfire hazard reduction is not prohibited within the APZ.
- (6) 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:
 - (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,
 - (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,
 - (c) contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks,
 - (d) contain provisions for adequate water supply for firefighting purposes,
 - (e) minimise the perimeter of the area of land interfacing the hazard which may be developed,
 - (f) introduce controls on the placement of combustible materials in the Inner Protection Area.

Consistency

- (7) A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) that the council has obtained written advice from the Commissioner of the NSW Rural Fire Service, to the effect that, notwithstanding the non-compliance, the NSW Rural Fire Service does not object to the progression of the planning proposal.

Direction 4.4 – issued 20 February 2020