



BUSHFIRE ASSESSMENT REPORT

Proposed Industrial Subdivision

Nepean Business Park

Prepared for: Great River NSW Pty Ltd



Bushfire Planning Australia

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Ref: 1854
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Disclaimer and Limitation

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

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

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

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

Document Status: 1854 – Industrial Subdivision

Version	Status	Purpose	Author	Review Date
1	Draft	Draft for Review	Stuart Greville	29 th November 2018
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6	AMENDED	Amended for s34	Stuart Greville	27 th September 2021

Certification

As the author of this Bushfire Assessment Report (BAR), I certify this BAR provides the detailed information required by the NSW Rural Fire Service under Clause 44 of the Rural Fires Regulation 2013 and Appendix 2 of Planning for Bushfire Protection 2019 in accordance with the requirements of section 4.14 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).



Stuart Greville

Accredited Bushfire Practitioner

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Date: 27 September 2021

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

Executive Summary

Bushfire Planning Australia (BPA) has been engaged by the Great River NSW Pty Ltd (the 'Client') to undertake a Bushfire Assessment Report (BAR) for the proposed industrial subdivision of Lots 1, 2, and 3 DP1263486; Old Castlereagh Road, Penrith (the 'site') to create 92 lots.

The National Construction Code (NCC) does not provide for any bush fire specific performance requirements for the proposed development; being a development that will facilitate the construction of non-habitable buildings. The general fire safety construction provisions of the NCC are taken as acceptable solutions in this instance. However, a hazard assessment has been completed and found the site was exposed to a moderate bushfire hazard mainly located to the south west of the subject site. The predominant vegetation surrounding the site is consistent with a *forested wetland* vegetation formation as described in the NSW Rural Fire Service document Planning for Bushfire Protection 2019 (PBP 2019).

PBP 2019 refers to the proposed industrial development as 'Other development'. Given the unique features of these developments, compliance with PBP is strongly focused in satisfying the aims and objectives of PBP 2019.

The following recommendations when implemented will reduce the impact of a bushfire to an acceptable level for any future industrial (non-habitable) buildings and demonstrate the proposed development is able to comply with PBP 2019:

1. All areas of the site zoned 'EP' Employment shall be managed as an Inner Protection Area (IPA) as outlined within Appendix 4 of PBP 2019 and the RFS document Standards for asset protection zones;
2. Public road access is to be constructed in accordance with Table 5.3b of PBP 2019 and as shown of the development plans contained in **Appendix A**;
3. Any required Asset Protection Zones or setbacks for future structures are able to be provided within each lot;
4. A Bushfire Attack Level (BAL) certificate shall be prepared for any future development within designated bushfire prone land demonstrating the proposed building is not exposed to BAL-40 of BAL-FZ and that the development is able to confirm with the specifications and requirements of PBP 2019. Alternatively, a development application shall be submitted to the relevant consent authority supported by a Bushfire Assessment Report (BAR);
5. All new lots are to be connected to a reliable water supply network and that suitable fire hydrants are located throughout the development site that are clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure shall comply with AS2419.1 2005 and Table 5.3c of PBP 2019;
6. Consideration should be given to landscaping and fuel loads on site to decrease potential fire hazards on site; and
7. All hazardous materials to be stored on land within 100m of any designated bushfire prone land shall be stored in a secure enclosure away from the bushfire hazard.

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection and production (December 2018, April 2020 and December 2020).

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



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Appendices

Appendix A: Proposed Layout

Appendix B: AHIMS Search Results

Appendix C: Individual Expert Report - Stuart Greville 27 September 2021



Abbreviation	Meaning
APZ	Asset Protection Zone
AS2419 -2005	Australian Standard – Fire Hydrant Installations
AS3959-2018	Australian Standard – Construction of Buildings in Bush Fire Prone Areas
BAR	Bushfire Assessment Report
BAL	Bushfire attack level
BCA	Building Code of Australia
BC Act	NSW Biodiversity Act 2016
BMP	Bush Fire Management Plan
BPA	Bush Fire Prone Area (Also Bushfire Prone Land)
BFPL	Bush Fire Prone Land
BFPLM	Bush Fire Prone Land Map
BPM	Bush Fire Protection Measures
DoE	Commonwealth Department of the Environment
DPI Water	NSW Department of Primary Industries – Water
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
FDI	Fire Danger Index
FMP	Fuel Management Plan
ha	hectare
IPA	Inner Protection Area
LGA	Local Government Area
NCC	National Construction Code
OPA	Outer Protection Area
OEH	NSW Office of Environment and Heritage
PBP or PBP (2019)	Planning for Bushfire Protection 2019
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation
RFS	NSW Rural Fire Service
SFR	Short fire run
TSC Act	NSW Threatened Species Conservation Act 1995 (as repealed)
URA	Urban release area

1. Introduction

Bushfire Planning Australia (BPA) has been engaged by Great River NSW Pty Ltd (the 'Client') to undertake a Bushfire Assessment Report (BAR) for the proposed industrial subdivision of Lot 1, 2 and 3 DP1263486; Old Castlereagh Road, Penrith (the 'site') to create 92 lots.

Section 8.3 of PBP 2019 refers to any type of development that are not residential/ rural residential subdivisions, SFPPs or residential infill development as 'Other development'. The proposed industrial development will enable the construction of non-habitable buildings on each of the proposed lots.

The National Construction Code (NCC) does not provide for any bush fire specific performance requirements for other development; such as the proposed industrial subdivision. The general fire safety construction provisions of the NCC are taken as acceptable solutions in this instance.

Nevertheless, in order to demonstrate the proposed industrial subdivision is able to satisfy the aims and objectives of PBP 2019, this BAR was completed to determine the bushfire hazard that has the potential to threaten the proposed development. Based on this assessment, a series of bushfire protection measures that will provide for an increased level of protection on property and life from the threat of bushfire have been recommended; thereby satisfying the aims and objectives of PBP 2019.




2. Site Description

Table 1: Site Details

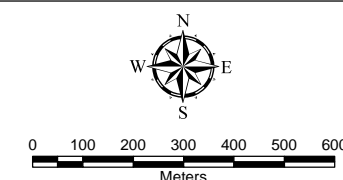
Address	14-278 Old Castlereagh Road, Penrith
Title	Lot 1, 2 and 3 DP1263486
LGA	Penrith City Council
Site Area	47 hectares
Land Use Zone	Employment (SEPP – Penrith Lakes)
Context	The site was formally used as a quarry and is currently vacant. The site is located within the Penrith Lakes Scheme. All development is subject to the provisions of SEPP (Penrith Lakes Scheme).
Topography	For the most part the site is flat, and then steeply drops down to the south west to the Nepean River.
Fire History	The site lies within a local government area with a Fire Danger Index (FDI) rating of 100.

Penrith Lakes
Figure 1
Site Location



-  The Subject Site
-  100m Buffer
-  140m Buffer

SOURCE:
 Base Map (c) NSW Land and property Information

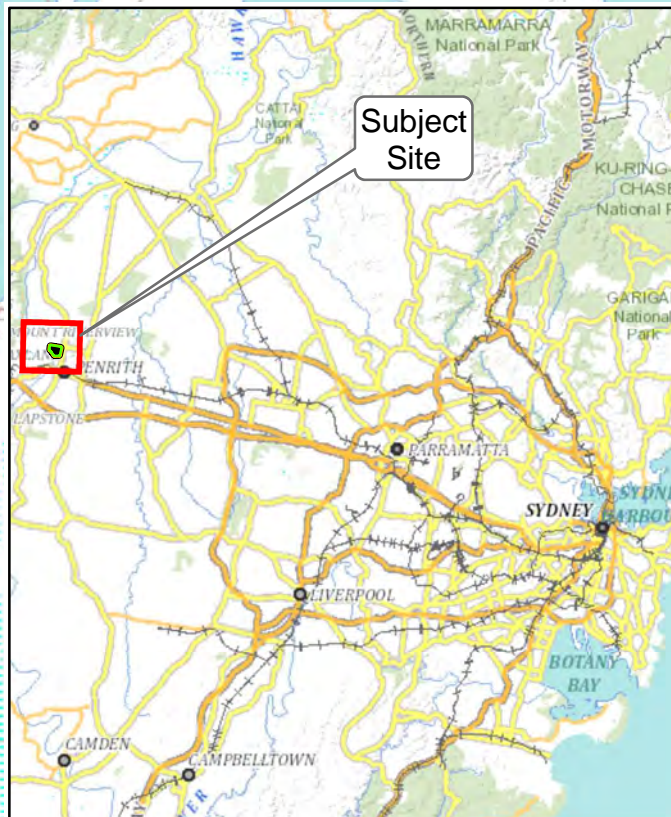


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File:PenrithLakes_Fig1_SiteLocation_181023 Date: 23/10/2018

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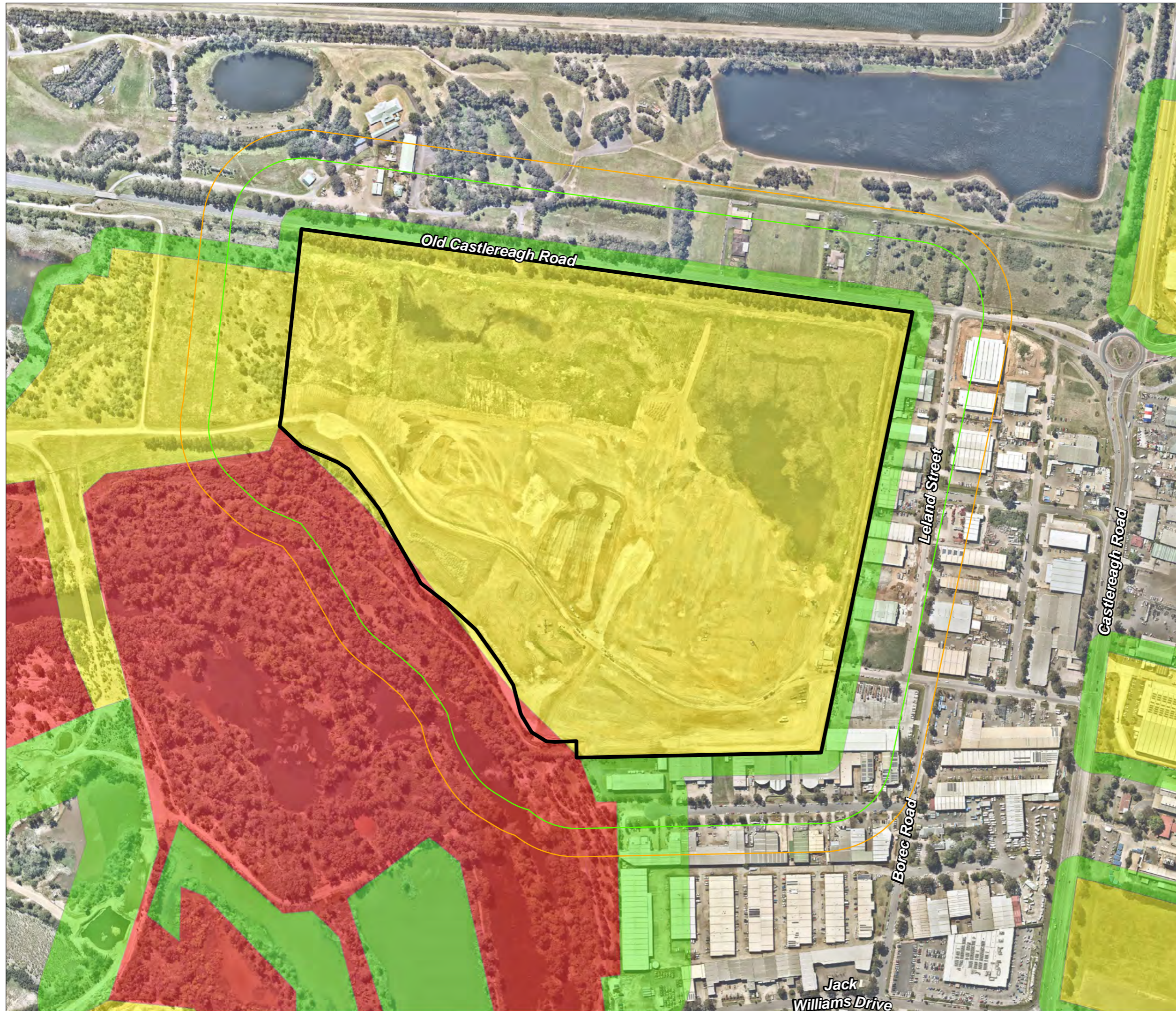
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2.1. Bushfire Prone Land

Bushfire activity is prevalent in landscapes that carry fuel and the two predominant bushfire types are grassland and forest fires. Factors such as topographic characteristics and quantity of fuel loads influence the intensity and spread of fire. The scale of a bushfire hazard is tailored to the characteristics of the hazard, the size and characteristics of the affected population, types of land use exposed to bushfire, predicted development growth pressures and other factors affecting bushfire risk. **Figure 2** demonstrates the entire site is either covered by Category 2 bushfire prone vegetation; being low risk. The south west boundary of the site adjoins Category 1 vegetation.

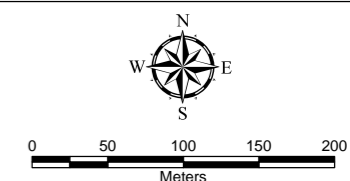
NSW Bush Fire Prone Land



- The Subject Site
- 100m Buffer
- 140m Buffer

- Bushfire Prone Land**
- Vegetation Category 1
 - Vegetation Category 2
 - Buffer

SOURCE:
Cadastral Boundary: NSW Department of Finance,
Services and Innovation 2018
NSW Bush Fire Prone Land: NSW Rural Fire
Service 2018
Watercourse: GeoScience Australia 2015
Aerial Photo: NearMap 01/10/2020



A3 Scale: 1:5,000

File:PenrithLakes_Fig2_BPL_201211 Date: 11/12/2020

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2.2. Proposed Development

The development involves the proposed industrial subdivision of Lot 1, 2 and 3 DP1263486; Old Castlereagh Road, Penrith (the 'site') to create 92 lots; including associated infrastructure.

A plan of the proposed subdivision is contained in **Appendix A** and shown in **Figure 3**.

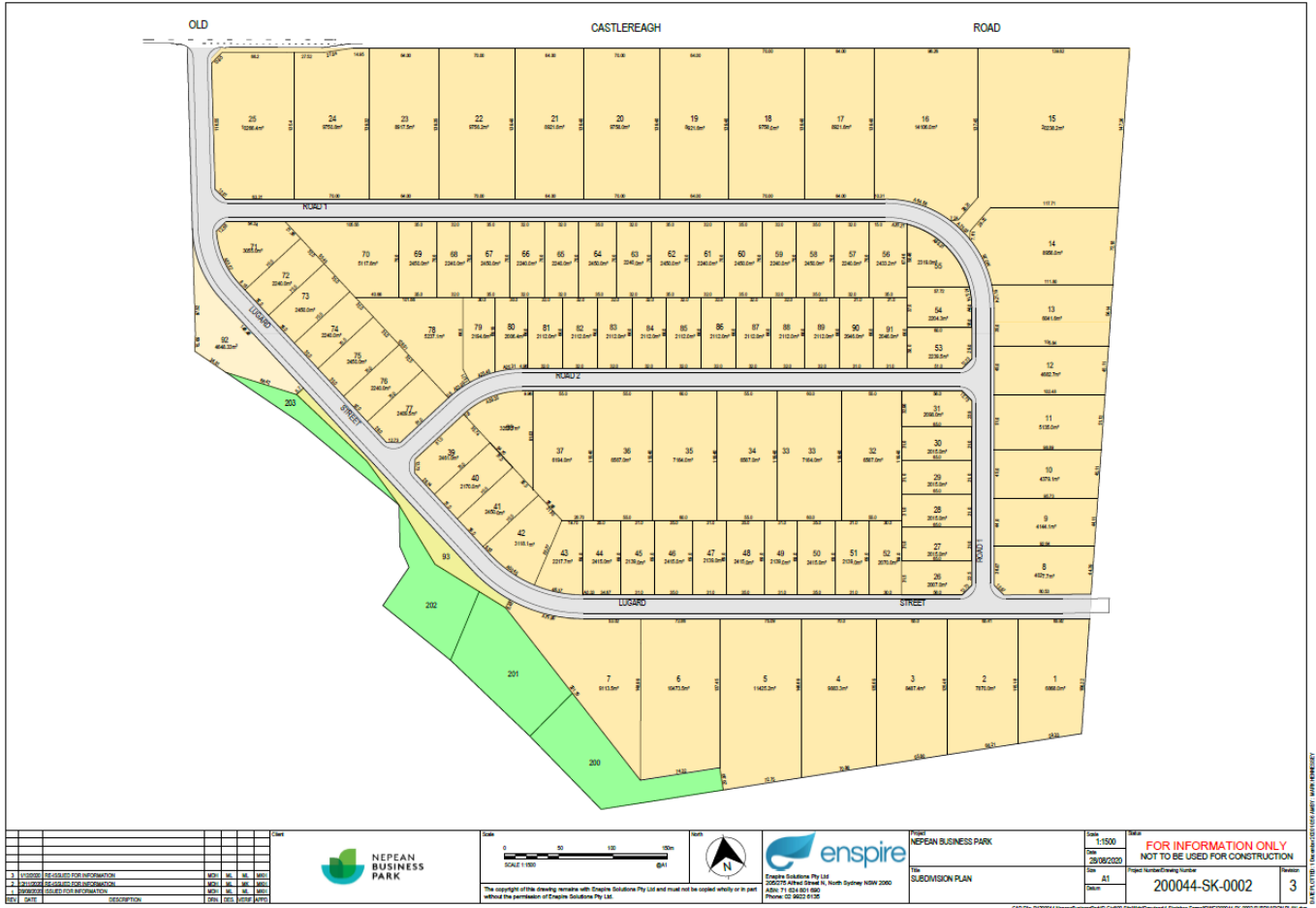


Figure 3: Plan of Proposed industrial Subdivision

2.3. Industrial Development

Section 8.3 of PBP 2019 provides specific advice for developments that are not residential subdivision, special fire protection purposes (SFPPs) or residential infill. The expected land uses would be limited to Class 5-8 and 10 buildings of the National Construction Code: Building Code of Australia (NCC). These classes of buildings include factories, warehouses, offices and other industrial facilities. Residential development and habitable buildings are not permissible on the subject site.

The general aims and objectives of PBP 2019 apply in relation to matters such as access, water and services, emergency planning and landscaping/ vegetation management. However, it is prudent that a suitable package of bushfire protection measures be proposed commensurate with the assessed level of risk of the future development. Accordingly, this BAR will recommend areas cleared of vegetation are maintained at the hazard interface to ensure defensible space is provided for firefighting purposes.

Notwithstanding the available bushfire protection measures outlined in PBP 2019, the NCC does not provide for any bushfire specific performance requirements for industrial (non-habitable buildings) and as such Australian Standard *AS3959-2018 Construction of buildings in bushfire prone areas* (AS3959-2018) does not apply as a set of deemed-to-satisfy provisions. In this regard, a BAL assessment is not required for any of the future buildings. However, the following objectives apply in relation to access, water and services, and emergency and evacuation planning:

- ❑ To provide safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation;
- ❑ To provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development;
- ❑ To provide adequate services of water for the protection of buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building; and
- ❑ Consideration of storage and hazardous materials away from the hazard wherever possible.

3. Bushfire Hazard Assessment

3.1. Vegetation Assessment

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

- ❑ Aerial Photograph Interpretation to map the vegetation classification and extent;
- ❑ Review of LiDAR point cloud data (NSW LPI);
- ❑ Reference to Keith Vegetation Formations mapping (Version 3.03 VIS_ID_3848) **Figure 4**; and
- ❑ Reference to Extant Native Vegetation mapping (Priority 5 Mapping Area VIS_ID 2195: DECCW 2004) **Figure 5**;
- ❑ Reference to Remnant Vegetation mapping (Remnant Vegetation of the western Cumberland subregion VIS_ID_42017: OEH 2013) **Figure 6**; and
- ❑ Site inspection 2nd November 2018.

In accordance with PBP 2019, an assessment of the vegetation over a distance of 100m in all directions from the site was undertaken. Vegetation that may be considered a bushfire hazard was identified in all directions from the development footprint. The vegetation classification is based on the revised Table 2.3 in AS3959-2018 and Appendix 1 of PBP 2019. The unmanaged fuel loads detailed in the RFS Comprehensive Vegetation Fuel Loads document have been adopted for the purpose of assessing the bushfire hazard. The findings of the site inspection were compared to the Keith Vegetation Formations mapping provided by the NSW RFS (**Figure 4**), the Extant Vegetation Mapping (**Figure 5**) and the Remnant Vegetation of the Cumberland subregion (**Figure 6**). The inconsistencies between the mapping sources was quantified during the site inspection. It was confirmed on site that both *forested wetland* and *woodland* vegetation formations are present within 140m of the site; it was the delineation between the two (2) vegetation formations that was surveyed.

The predominant vegetation classification presenting as a bushfire hazard was identified as a *forested wetland* in accordance with the descriptions contained in PBP 2019 as shown in **Figure 7** and **Table 2**.

Table 2: Vegetation formations

Direction of Bushfire Attack/ Transect	Vegetation or Other Infrastructure	Classification of Vegetation Formations AS3959-2018/ PBP 2019	RFS Vegetation Fuel Loads (March 2019)
West T1	Rehabilitated quarry, managed grassland, various access tracks/roads/ trails	<i>Managed Land/ Low-threat vegetation</i>	<4.5 t/ha
North T2/ T3 >20m	Peri-urban residential, sporting facilities, landscaped gardens and curtilages	<i>Managed Land/ Low-threat vegetation</i>	<4.5 t/ha
East & South T4/T5	Industrial buildings, roads, managed land	<i>Managed Land/ Low-threat vegetation</i>	0 t/ha
South west T6 – T11	Informal walking trail, steep embankment, forested wetland within river floodplain	<i>Forested Wetland (Coastal Floodplain Wetland)</i>	8.2/15.1 t/ha



Plate 1: Subject site looking from the south west.



Plate 2: South west site boundary looking east along general alignment of Great River Walk



Plate 3: Forest wetland between site and Nepean River



Plate 4: Typical vegetation to south west of the site



Plate 5: Typical vegetation commensurate with forested wetland

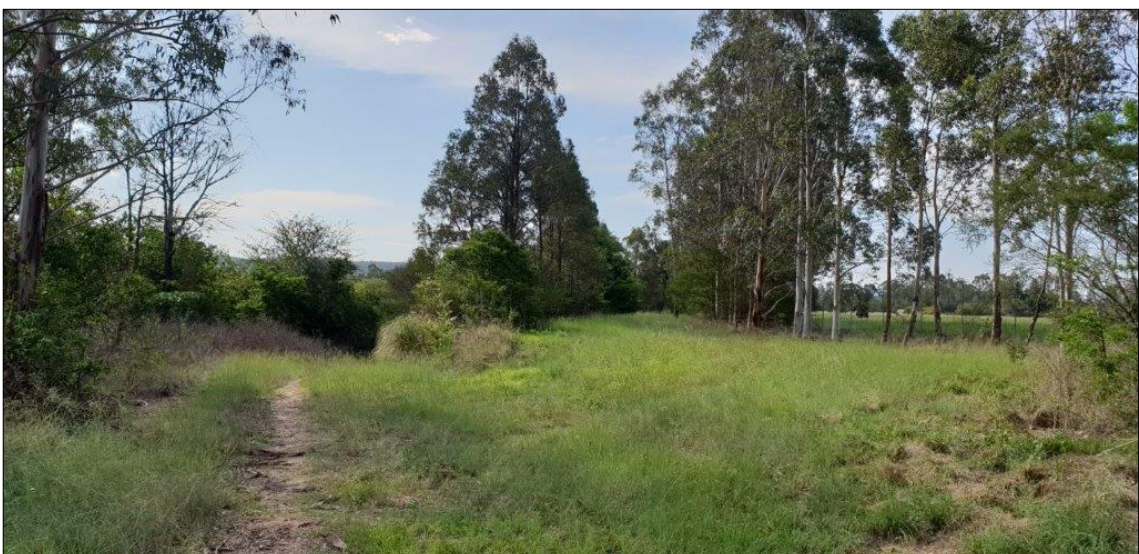


Plate 6: The Great River Walk will be extended along the south west site boundary



Plate 7: Southern end of site connects to the existing Great River Walk



Plate 8: Looking west towards southern boundary of the site

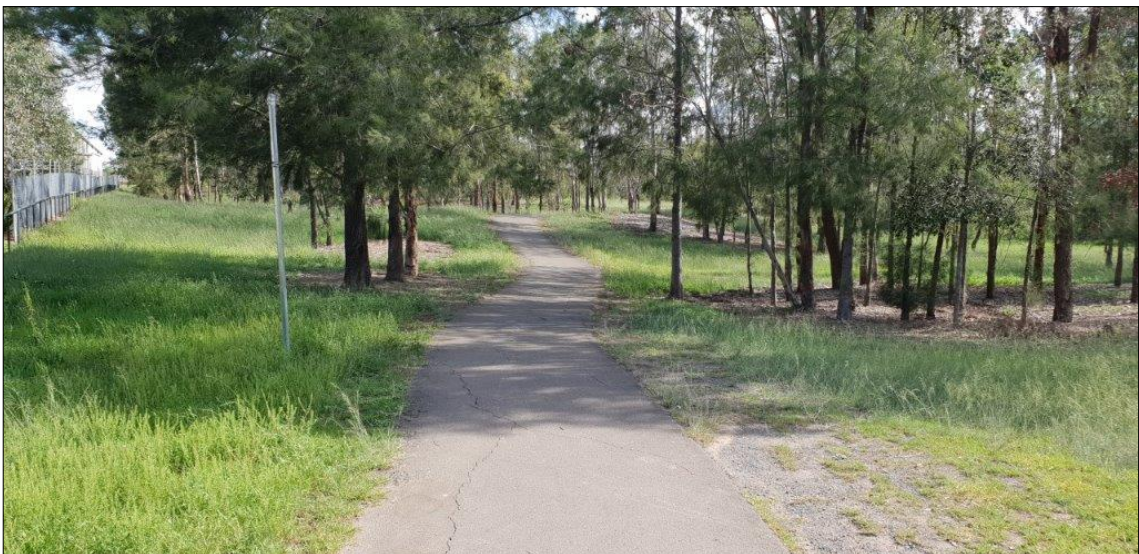


Plate 9: Great River Walk looking south through woodland

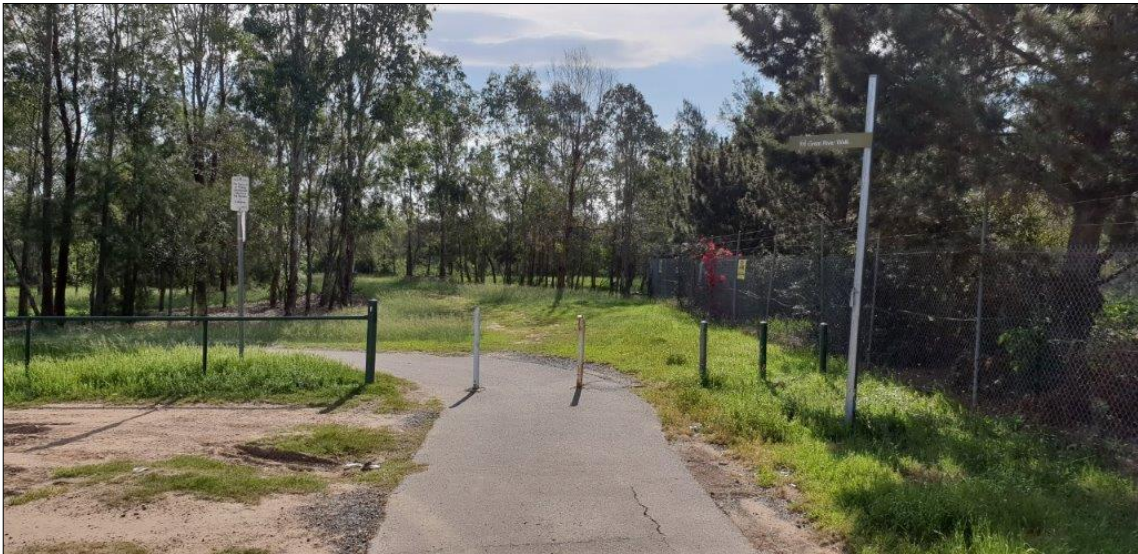





Plate 10: Access to Great River Walk from western end Cassola Place



Vegetation (Keith)



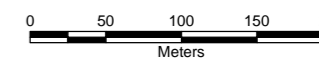
BUSHFIRE
PLANNING
AUSTRALIA

-  The Subject Site
-  100m Buffer
-  140m Buffer

Vegetation Formation

-  Cleared
-  Coastal Floodplain Forests

SOURCE:
Cadastral Boundary: NSW Department of Finance,
Services and Innovation 2018
Vegetation Formation: Vegetation Formations and
Classes of NSW (version 3.03 - 200m Raster) -
David A. Keith and Christopher C. Simpson.
VIS_ID 3848
Aerial Photo: NearMap 01/10/2020



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Date: 11/12/2020





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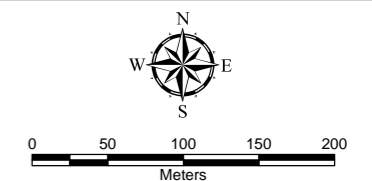


Penrith Lakes
Figure 5
Extant Native Vegetation



-  The Subject Site
-  100m Buffer
-  140m Buffer
-  Forested Wetlands

SOURCE:
 Cadastral Boundary: NSW Department of Finance,
 Services and Innovation 2018
 Vegetation: Priority 5 Mapping Area (P5MA) -
 Vegetation Extent VIS_ID 2195 NSW Department
 of Environment, Climate Change and Water
 (DECCW) 2004
 Aerial Photo: NearMap 01/10/2020



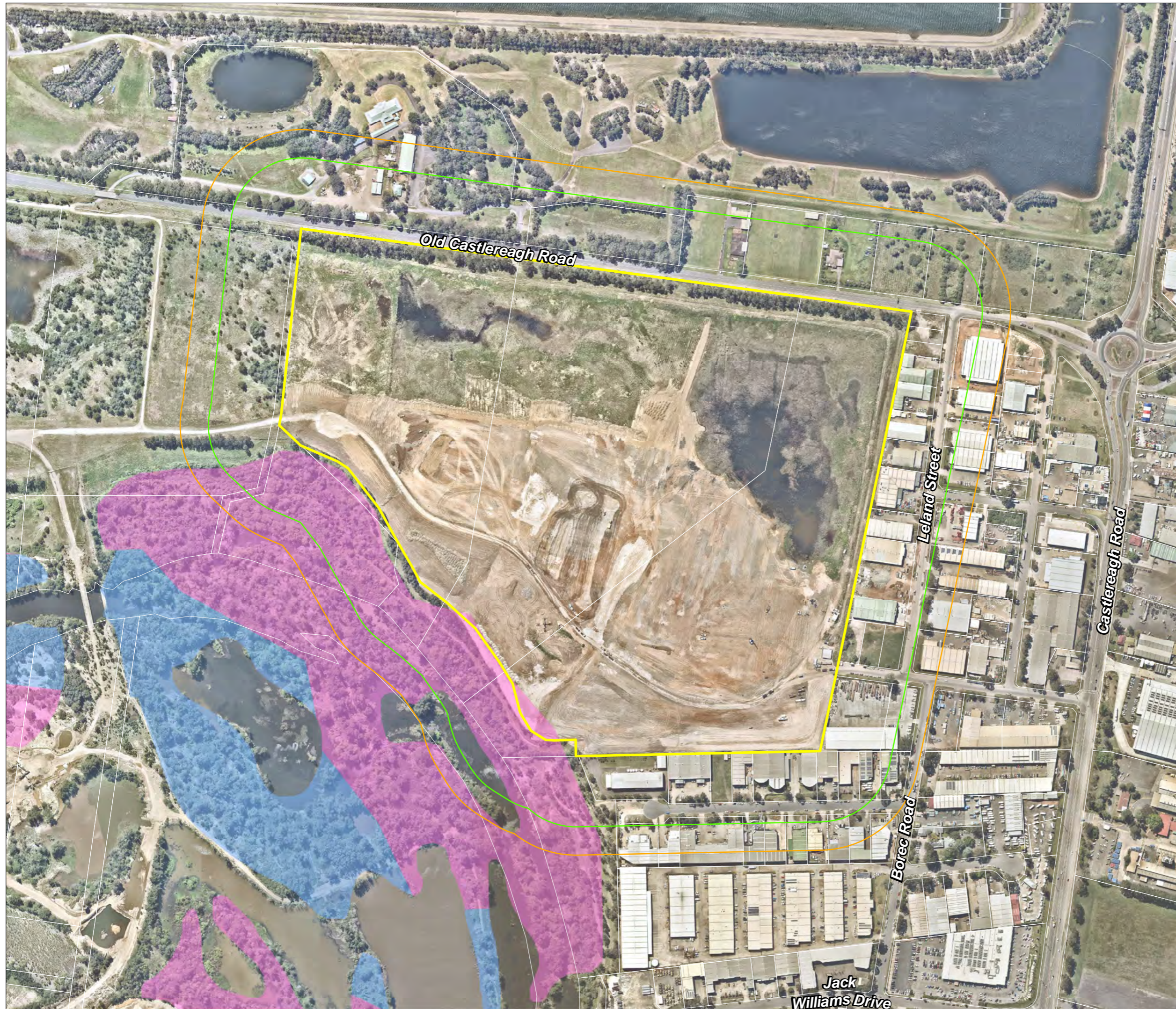
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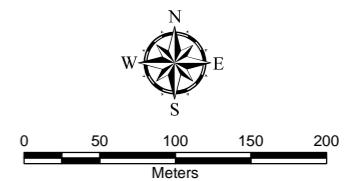
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Penrith Lakes
Figure 6
Remnant Vegetation



- The Subject Site
- 100m Buffer
- 140m Buffer
- Alluvial Woodland
- Riparian Forest

SOURCE:
 Cadastral Boundary: NSW Department of Finance, Services and Innovation 2018
 Vegetation: Remnant Vegetation of the western Cumberland subregion, Update. VIS_ID 4207, Office of Environment and Heritage (OEH) 2013
 Aerial Photo: NearMap 01/10/2020



A3 Scale: 1:5,000

File:PenrithLakes_Fig5_RemnantVeg_201211 Date: 11/12/2020

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3.2. Slope Assessment

The slope assessment was undertaken as follows:

- ❑ Review of LiDAR point cloud data – including DEM (NSW LPI);
- ❑ Detail survey of existing and design contours; and
- ❑ Site Inspection 2nd November 2018.

An assessment of the slope over a distance of 140m in the hazard direction from the site boundary was undertaken. The effective slope was then calculated under the classified vegetation where there was a fire run greater than 50m. The topography of the site has been evaluated to identify both the average slope and by identifying the maximum slope present. These values help determine the level of gradient which will most significantly influence the fire behaviour of the site.

The effective slope in all directions is shown in **Figures 7** and **Figure 8** and **Table 3**.

Table 3: Slope Analysis

Transect	Classification of Vegetation Formations AS3959-2018/ PBP 2019	Slope
T1	<i>Managed Land/ Low-threat vegetation</i>	0.4° downslope
T2	<i>Managed Land/ Low-threat vegetation</i>	1.6° downslope
T3	<i>Managed Land/ Low-threat vegetation</i>	0.1° upslope
T4	<i>Managed Land/ Low-threat vegetation</i>	0.1° upslope
T5	<i>Managed Land/ Low-threat vegetation</i>	0.4° upslope
T6	<i>Forested Wetland</i>	4.8° Downslope
T7	<i>Forested Wetland</i>	17.9° Downslope
T8	<i>Forested Wetland</i>	17.7° downslope
T9	<i>Forested Wetland</i>	2.4° Downslope
T10	<i>Forested Wetland</i>	6.9° Downslope
T11	<i>Forested Wetland</i>	4.6° downslope

Penrith Lakes
Figure 7
Elevation

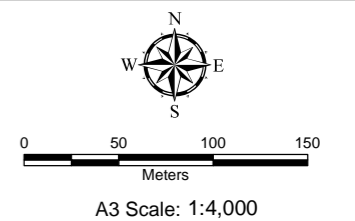


- The Subject Site
 - 100m Buffer
 - 140m Buffer
 - RL
 - Transect
 - Contour (5m)
 - Contour (1m)
- Elevation**
- High : 33.1m

Low : 11.2m



SOURCE:
 Cadastral Boundary: NSW Department of Finance, Services and Innovation 2018
 Surface Analysis: Based on PENRITH, 2kmx2km 1 metre Resolution Digital Elevation Model 2011
 Aerial Photo: NearMap 01/10/2020



File:PenrithLakes_Fig6_Elevation_201211 Date: 11/12/2020

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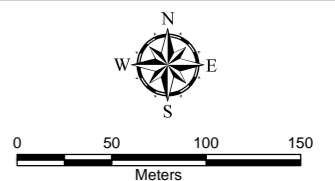


Slope and Vegetation Assessment



- The Subject Site
- 100m Buffer
- 140m Buffer
- RL
- Transect
- Forested Wetland
- Woodland

SOURCE:
 Cadastral Boundary: NSW Department of Finance, Services and Innovation 2018
 Surface Analysis: Based on PENRITH, 2kmx2km 1 metre Resolution Digital Elevation Model 2011
 Subdivision Layout: Ensipire Solutions Pty Ltd 2020
 Aerial Photo: NearMap 01/10/2020



File:PenrithLakes_Fig7_SlopeVeg_201211 Date: 11/12/2020

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3.3. Significant Environmental Features

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

3.4. Threatened Species, populations or ecological communities

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

3.5. Aboriginal Objects

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

4. Bush Fire Protection Measures

PBP 2019 refers to the proposed industrial development as 'Other development'. In order to comply with PBP, the development should:

- Note the range of available Bush Fire Protection Measures (BFPMs);
- Satisfy the aims and objectives of PBP 2019;
- Consider any matters listed for the specific purpose; and
- Propose an appropriate combination of BFPMs.

Additional provisions relevant to 'other development' detailed in PBP 2019 state that in order to comply with PBP 2019, the following conditions must be met:

- Satisfy the aims and objectives of PBP outlined in Chapter 1;
- Consider any issues listed for the specific purpose for the development; and
- Propose an appropriate combination of BFPMs.

This BAR has adopted the methodology to determine the appropriate BFPMs detailed in PBP 2019. As part of the BAR, the recommended BFPMs demonstrate the aims and objectives of PBP 2019 are able to be satisfied; including the matters considered by the RFS necessary to protect persons, property and the environment from the danger that may arise from a bushfire.

4.1. Asset Protection Zones

An APZ is an area surrounding a development that is managed to reduce the bushfire hazard to an acceptable level to mitigate the risk to life and property. The required width of the APZ varies with slope and the type of hazard.

4.1.1. Determining the Appropriate Setbacks

PBP 2019 does explicitly require the proposed industrial development to provide an APZ in accordance with Appendix 1 of PBP 2019. Notwithstanding, the provision of access and defensible space should be provided. In this instance consideration has been given to the type of hazard; including the average slope and also the steepest slope. Although over a distance of 100m the slope is mostly flat, the terrain rapidly steepens closer towards the site.

A perimeter road along the south west boundary provides separation and defensible space between the hazard of the proposed lots. Several lots (Lots 6, 7, 92 and 93) have rear or side boundaries at the hazard interface, however these lots will be able to provide rear setbacks within each lot that will further increase the separation between any future structures and the nearest potential bushfire hazard. This area of land should be managed as an IPA and will be assessed when a development application for the future use is lodged.

4.2. Access

In the unlikely event of a serious bushfire, it will be essential to ensure that adequate ingress / egress and the provision of defensible space are afforded in the subdivision layout. The following design specifications detailed in PBP 2019 are relevant to the proposed development:

- be two-wheel drive all weather roads;
- be through roads, but if unavoidable then dead ends should be not more than 200 metres in length, incorporate a minimum 12 metres turning circle (either in cul-de-sac or T-head formation) and should be clearly sign posted as dead ends;
- the capacity of road surfaces is sufficient to carry fully loaded fire fighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes for all other areas);
- non perimeter roads comply with table – Road widths for Category 1 Tanker;

- curves of roads (other than perimeter roads) are a minimum inner radius of 6 metres and minimal in number, to allow for rapid access and egress;
- maximum grade for sealed roads do not exceed 12.5°;
- have a minimum vertical clearance to a height of four metres at all times;
- parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement. No services or hydrants are located within the parking bays.

Public road access will be provided to all new lots with connections to the existing public road network on the eastern and northern; being Luard Street and Old Castlereagh Road respectively. All new roads have been designed in accordance with the required road widths for industrial estates under the relevant planning instrument. The proposed roads are wider than required by PBP 2019.

Refer to **Appendix 1** for proposed development showing access.

4.3. Services – water electricity and gas

4.3.1. Water

Fire hydrant spacing, sizing and pressure should comply with AS 2419.1 – 2005. Hydrants are not to be located within any road carriageway.

All lots within the proposed development will be connected to the internal reticulated water supply.

4.3.2. Electricity

All electricity services are located underground.

4.3.3. Gas

Any reticulated or bottled gas should be installed and maintained according to the requirements of the relevant authorities and AS 159-2002. It is expected that the location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.

4.4. Bushfire Emergency Procedures

It is recommended prior to occupation, an Emergency Management Plan is prepared for all future business occupying a lot within designated bush fire prone land.

4.5. Construction Standards – Bushfire Attack Level

The proposed land use zone will permit a variety of non-habitable buildings included bulky goods premises, general industries, warehouses and distribution centres. The NCC does not provide for any bushfire specific performance requirements for these particular classes of buildings. As such, AS3959-2018 are not considered as a set of deemed-to-satisfy provisions. However, compliance with AS3959-2018 and the NASH standard may be considered when meeting the aims and objectives of PBP 2019 – for future industrial buildings.

4.6. Sprinkler Systems and Other Fire Protection Measure

There are no other fire protection measures such as sprinkler systems that would provide additional protection to the proposed development. However the general fire safety construction provisions for industrial developments will likely be required for all future buildings.

4.7. Landscaping and Vegetation Management

The design and management of the landscaped areas in the vicinity of buildings have the potential to improve the chances of survival of people and buildings. Generally landscaping in and around a bushfire hazard should consider the following:

- Priority given to retaining species that have a low flammability;
- Priority given to retaining species which do not drop much litter in the bushfire season and which do not drop litter that persists as ground fuel in the bush fire season;

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

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

The principles of landscaping for bushfire protection aim to:

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

Plants that are less flammable have the following features;

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

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

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

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

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

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

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

5. Conclusion and Recommendations

Bushfire Planning Australia (BPA) completed a Bushfire Assessment Report (BAR) for the proposed industrial subdivision of Lots 308, 309 and 310 DP752021; Old Castlereagh Road, Penrith (the 'site') to create 92 lots.

The National Construction Code (NCC) does not provide for any bush fire specific performance requirements for the proposed development; being a development that will facilitate the construction of non-habitable buildings. The general fire safety construction provisions of the NCC are taken as acceptable solutions in this instance. However, a hazard assessment has been completed and found the site was exposed to a moderate bushfire hazard mainly located to the south west of the subject site.

The following recommendations when implemented will reduce the impact of a bushfire to an acceptable level for any future industrial (non-habitable) buildings and demonstrate the proposed development is able to comply with PBP 2019:

1. All areas of the site zoned 'EP' Employment shall be managed as an Inner Protection Area (IPA) as outlined within Appendix 4 of PBP 2019 and the RFS document Standards for asset protection zones;
2. Public road access is to be constructed in accordance with Table 5.3b of PBP 2019 and as shown of the development plans contained in **Appendix A**;
3. Any required Asset Protection Zones or setbacks for future structures are able to be provided within each lot;
4. A Bushfire Attack Level (BAL) certificate shall be prepared for any future development demonstrating the proposed building is not exposed to BAL-40 or BAL-FZ and that the development is able to confirm with the specifications and requirements of PBP 2019. Alternatively, a development application shall be submitted to the relevant consent authority supported by a Bushfire Assessment Report (BAR);
5. All new lots are to be connected to a reliable water supply network and that suitable fire hydrants are located throughout the development site that are clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure shall comply with AS2419.1 2005 and Table 5.3c of PBP 2019;
6. Consideration should be given to landscaping and fuel loads on site to decrease potential fire hazards on site; and
7. All hazardous materials to be stored on land within 100m of any designated bushfire prone land shall be stored in a secure enclosure away from the bushfire hazard.

In conclusion, should the recommendations above be duly considered and incorporated, the bushfire hazard present should be reduced to a level considered necessary to provide an adequate level of protection to life and property of the site, however they do not and cannot guarantee that the area will not be affected by a bushfire at any time.

6. References

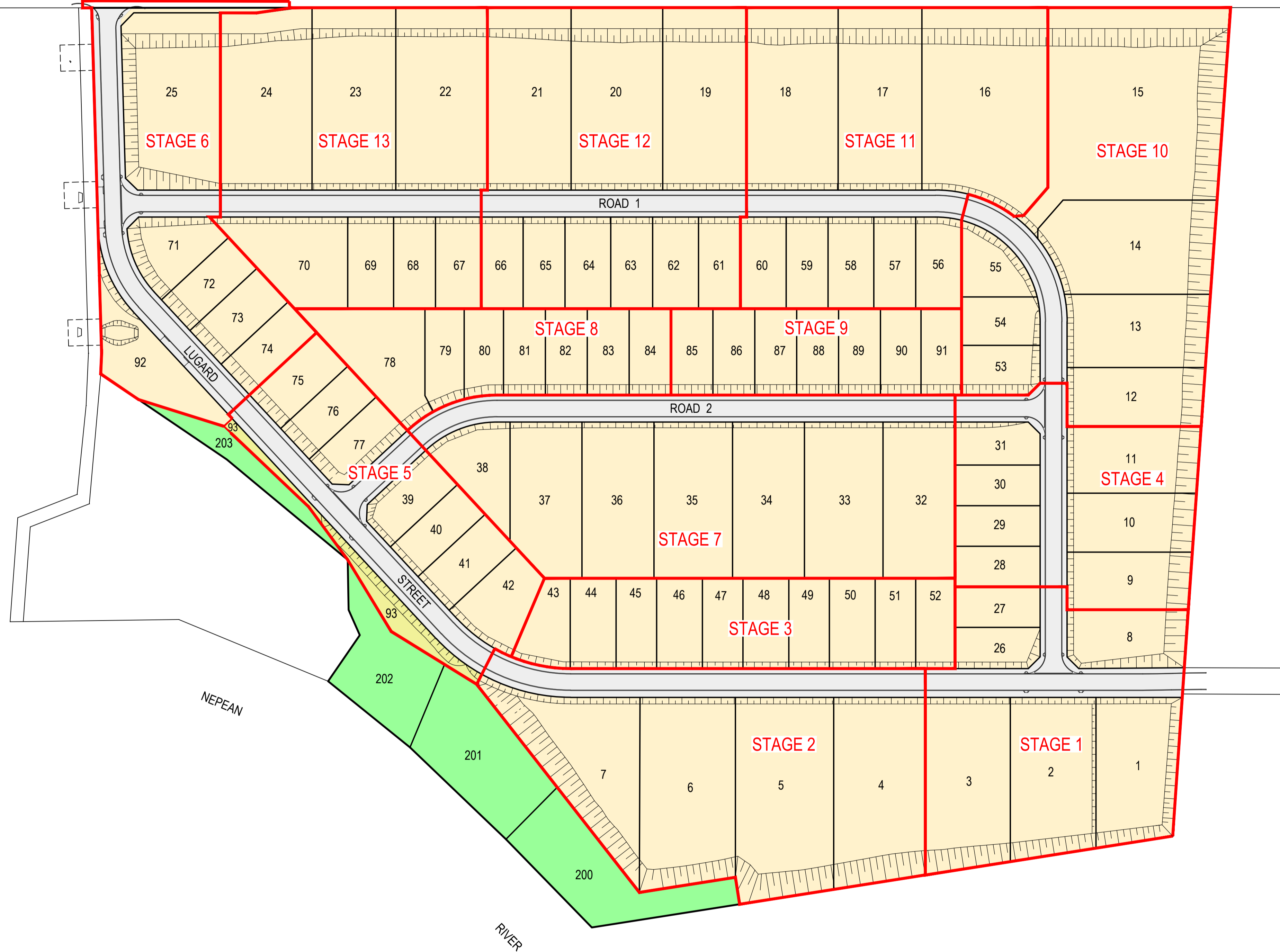
- ❑ NSW Rural Fire Service (2005). *Standards for Asset Protection Zones*. NSW Rural Fire Service.
- ❑ NSW Rural Fire Service (2019). *Planning for Bushfire Protection – A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners*.
- ❑ Ramsay, GC and Dawkins, D (1993). *Building in Bushfire-prone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

Appendix A: Proposed Layout

OLD

CASTLEREAGH

ROAD



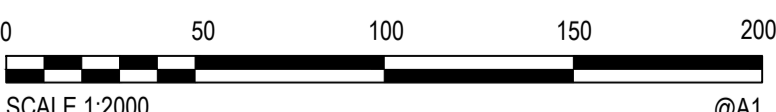
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Client



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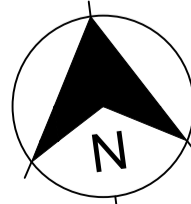
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PENRITH

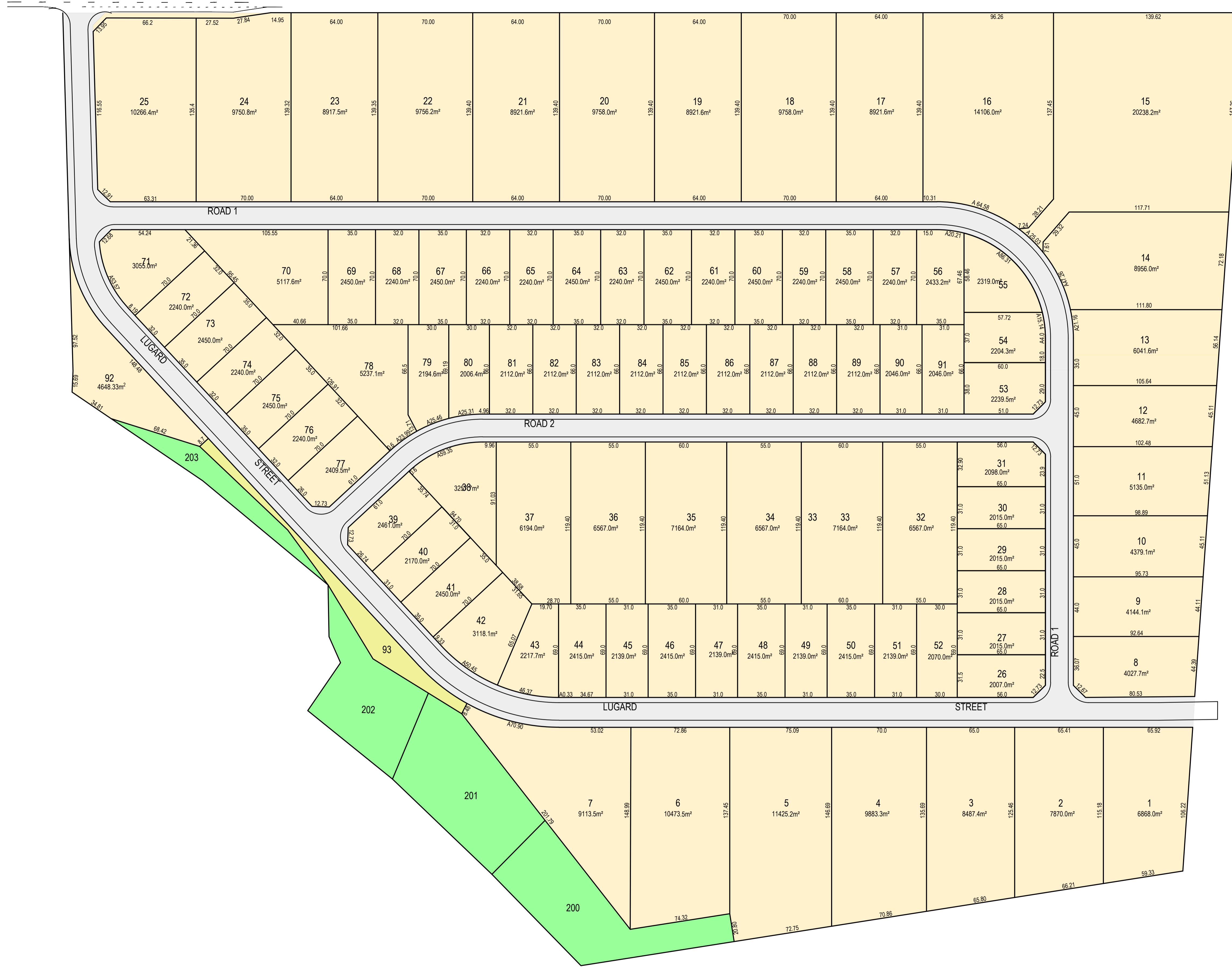
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Size A1	Revision 2
Datum AHD	

OLD

CASTLEREAGH

ROAD



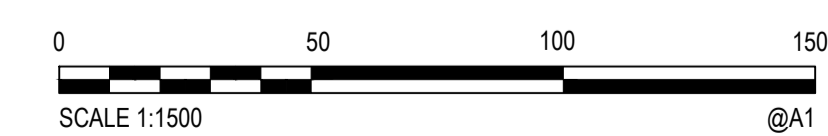
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2	12/11/2020	RE-ISSUED FOR INFORMATION	MDH	ML	MK	MKH
1	28/08/2020	ISSUED FOR INFORMATION	MDH	ML	ML	MKH

Client



NEPEAN BUSINESS PARK

Scale



SCALE 1:1500 @A1

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Project
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Title
SUBDIVISION PLAN

Scale
1:1500

Date
28/08/2020

Size
A1

Datum

Status
FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

Project Number/Drawing Number
200044-SK-0002

Revision
3



Appendix B: AHIMS Search Results

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

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

Important information about your AHIMS search

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



Appendix C: Individual Expert Report, Stuart Greville 27 September 2021



BUSHFIRE
PLANNING
AUSTRALIA



**BRONZE
MEMBER**
Fire Protection
Association Australia

INDIVIDUAL EXPERT REPORT

BUSHFIRE

Great River NSW Pty Ltd

v

Minister for Planning and Public Spaces

Land and Environment Court Proceedings No. 2021/00204069

27 September 2021

Introduction

I am the Director of Bushfire Planning Australia (BPA) of 21 Costata Crescent, Adamstown, NSW.

I have over 18 years in the development industry specialising as a bushfire consultant over the last 10 years following a progressive transition from urban and regional planning.

- B. Env. Sc. - UoN
- M. Urban and Regional Planning – USyd
- GradDip Bushfire Protection – WSU
- Fire Protection Association Australia: BPAD – Level 2 Accredited Bushfire Practitioner

Enclosed is a copy of my curriculum vitae.

I have been engaged on behalf of Great Rivers NSW Pty Ltd and have prepared this report in response to Point 7 outlined in the First Respondent's correspondence filed on 22 September 2021.

I acknowledge I have read Division 2 of Part 31 of the *Uniform Civil Procedure Rules 2005* and the Expert Witness Code of Conduct in Schedule 7 of the *Uniform Civil Procedure Rules 2005* and I agree to be bound by the terms of those documents.

Response to Applicant Actions

7. *Provide details of bushfire impacts, including:*

- *Written confirmation that no vegetation removal will occur in the environmental zone resulting from bushfire recommendations.*

BPA Response:

All bushfire mitigation measures are wholly contained with land zoned 'EP' Employment. There are no requirements to modify any land zoned 'E' Environment to ensure the proposed development is able to satisfy the *1.1 Aims and objectives* of the New South Wales Rural Fire Service (RFS) guideline *Planning for Bushfire Protection 2019* (PBP 2019).

- *Further information (like Asset Protection Zone examples on subdivision plan) that demonstrates Asset Protection Zones are achievable based on subdivision design and to demonstrate Lot 92 will allow future development.*

BPA Response:

There are no permanent Asset Protection Zones (APZs) required to ensure the development complies with the relevant specifications and requirements of PBP 2019. All vegetation on land within the site zoned 'EP' Employment shall be managed as an Inner Protection Area (IPA) in accordance with Appendix A4.1.1 of PBP 2019 and the RFS document *Standards for Asset Protection Zones*.

A non-residential permissible use on Lot 92 (referred to as 'Other non-residential development' in PBP 2019) is allowed where the applicable objectives of PBP 2019 are addressed for a building of Class 5 to 8 under the National Construction Code (NCC).

- *Bushfire consultant to clarify the term 'site' (i.e. only employment zone and not environmental) regarding where the recommendations apply.*

BPA Response.

The Bushfire Assessment Report (BAR) prepared by BAR defines the 'site' as the land comprising Lots 1, 2 and 3 DP1263486. The BAR determines the extent of bushfire attack the site is potentially exposed to and details the extent of bushfire mitigation measures required to protect the site from bushfire attack; regardless of the land use zone. All bushfire mitigation measures are wholly contained within land zoned 'EP' Employment. There is no requirement to disturb or modify any existing vegetation with the land zoned 'E' Environment.

Regards



Stuart Greville

