

Bushfire Hazard Report

Eden Gardens

307 Lane Cove Road, Macquarie Park

Prepared for Thunderbirds are Go Pty Ltd

Document Tracking

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| Project Address | Eden Gardens 307 Lane Cove Road (corner Fontenoy Road), Macquarie Park, NSW 2113, Australia |
| Site Details | Lot 10, DP 1071734. |
| Local Government Area | Ryde City Council |

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Document Control

| Version | Primary Author(s) | Description | Date Completed |
|---------|-------------------|-------------|------------------|
| 1.2 | Lew Short | Final | 24 February 2021 |



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Glossary of Terms

| | |
|----------|--|
| APZ | Asset Protection Zone |
| AS2419 | Australian Standard – Fire hydrant installations |
| AS3959 | Australian Standard – Construction of buildings in bushfire-prone areas 2009 |
| BAL | Bushfire Attack Level |
| BCA | Building Code of Australia |
| BFSA | Bush Fire Safety Authority |
| EPA Act | Environmental Planning & Assessment Act 1979 |
| FDI | Fire Danger Index |
| ha | Hectare |
| m | Metres |
| PBP 2019 | Planning for Bush Fire Protection 2019 |
| RF Act | Rural Fires Act 1997 |
| LGA | Local Government Area |

1. Introduction

Blackash Bushfire Consulting has been engaged by Thunderbirds are Go Pty Ltd to provide a Bushfire Hazard Assessment (BHA) for the redevelopment of the existing uses within Eden Gardens at Eden Gardens 307 Lane Cove Road (corner Fontenoy Road), Macquarie Park, NSW 2113, Australia (Figure 1) which is legally known as Lot 10 DP1071734 (the site). The BHA will accompany a development application (DA) to City of Ryde Council (Council).

The site is within designated Bushfire Prone Land and the provisions of NSW Rural Fire Service (RFS) document Planning for Bushfire Protection 2019 (PBP) are applicable.

Eden Gardens were given development consent by Ryde Council on 3rd June 2003 for the following existing uses; Retail Garden Centre, Garden related Retail Facilities, Café, Educational Facilities, Display Gardens, Outdoor "Green" Theatre and onsite car park. In 2012 the site was rezoned to allow a function centre.

This DA seek approval for alterations and additions to the existing garden centre and construction of an 18 storey office building at the site (Figure 2). The proposal will entail:

- Alterations and additions to the existing garden centre including:
- Retention of the existing at grade parking spaces fronting Lane Cove Road and the underground parking spaces directly below
- Excavation to provide additional underground spaces on the north-east of the site
- Provision of end of trip facilities and service rooms in the basement level
- Alterations and additions of the existing main garden centre building located on the west of the site including amendments to the garden centre store, café, amenities, food and beverage venue, neighbourhood shops and provision of a winter garden
- Expansion of the existing function spaces in the south-west of the site
- Provision of a new outdoor garden centre, including nursery, in the north-west of the site
- A multi-level car park in the mid-north of the site with rooftop activity and wellness zone, and
- Provision of a storage room, loading bay, waste room and rock climbing wall at the ground level of the proposed multi-storey car park.
- Construction of a new 18-storey commercial office building in the centre of the site.
- A new restaurant including outdoor and indoor dining spaces in the mid-east of the site. (Noting the fit-out of the restaurant does not form part of this DA and will be subject of separate approval).
- Landscape works in various places and retention of existing display gardens.

The proposal does **not** include:

- residential development
- residential subdivision or
- Special Fire Protection Purpose development.

As such, the proposal is not Integrated Development as it relates to bushfire. The intended use is for redevelopment of the existing site for commercial development. As commercial development, S. 4.14 of the *Environmental Planning and Assessment Act 1997* (EPA Act) is applicable for the assessment of the application. The site is an existing commercial development and the infill provisions of PBP 2019 apply. As commercial development, the proposal must meet the aims and objectives of PBP. This will be demonstrated in this report.

The subject site sits at the intersection of residential and business zoning and the Lane Cove National Park. As the site is bound by two major roads, Lane Cove Road and M2 Motorway.

A pre-DA meeting was held with the applicants design team and the NSW Rural Fire Service (RFS) on 7 March 2019 for the proposed new development at Eden Gardens. The RFS were supportive of the approach for redevelopment and utilisation of the site and the design team has taken the pre DA advice and the requirements of Planning for Bushfire Protection 2019 as the requirements for the application. The pre DA meeting with the RFS to identify bushfire issues and to manage uncertainty associated with the bushfire aspects of the project. The RFS feedback has been incorporated into the planning to date and is reflected in this BHA.

The site is identified as being bushfire prone and bushfire has been a key consideration throughout the design and development of the Masterplan for the site. The design has located the proposed redevelopment in the site as far as possible from bushfire prone land. The design has located the car park which will act as a radiant heat shield to the north of the site.

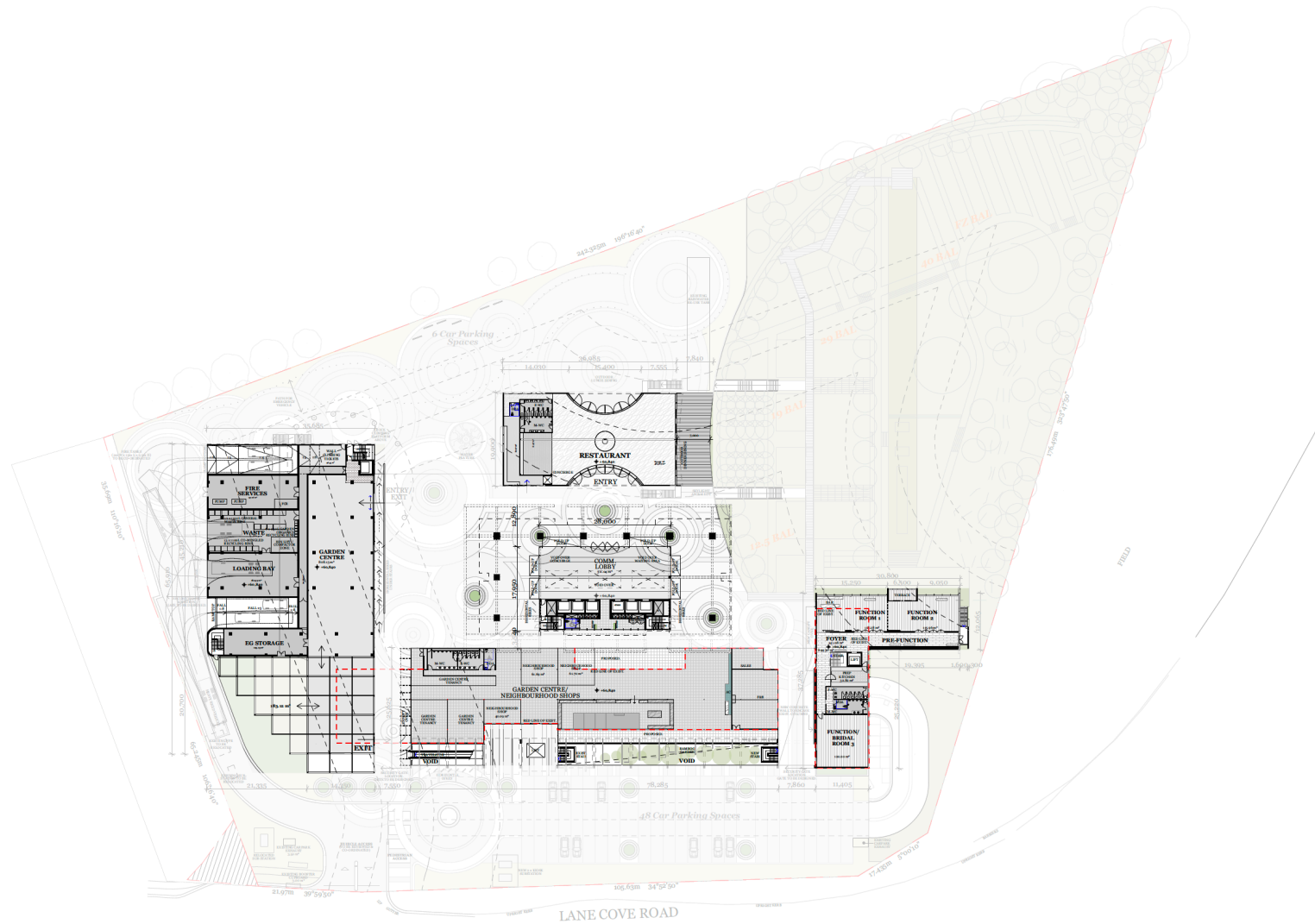
A detailed Bushfire Emergency Management and Evacuation Plan will be completed prior to occupation.

This report has been completed by Lew Short who is an accredited level Three Practitioner by the Fire Protection Association of Australia (BPAD16373). A number of site visits have been completed in 2019 and 2020 to validate bushfire requirements.

Figure 1 Site Location



Figure 2 Site Plan



| Rev. | Date | By | Chk | Description |
|------|------------|-----|-----|-------------|
| 1 | 14/04/2022 | PKL | JK | PRELIMINARY |
| 2 | 14/04/2022 | PKL | JK | PRELIMINARY |
| 3 | 14/04/2022 | PKL | JK | PRELIMINARY |

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Project Name
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Lane Cove
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 Macquarie Park, NSW
 2113

Project Number
 Drawing Name
 Scale
 Date

12000
 1:800 @A1
 14/04/2022

Client

Eden Gardens

Drawing Number
 Revision

DA105

2. Site Description

Eden Gardens is located at 307 Lane Cove Road (cnr Fontenoy Road), Macquarie Park. The entry to the site is from Lane Cove Road (Figure 1) The site is bound to the west by Lane Cove Road (6 lanes) and the Hills M2 Motorway and on-ramp to the south. Existing residential development is to the east of Lane Cove Road with Tuckwell Park at the corner of Lane Cove Road and Fontenoy Road. A significant area of managed grassland is adjacent to the M2 on-ramp. Lane Cove National Park is to the north and east of the site.

The site is an 'island site', located at the north-eastern corner of the intersection of the M2 Motorway and Lane Cove Road. The site is situated on the periphery of the Macquarie Park Corridor. The corridor comprises a mix of technology focused commercial development and high density RFBs. Four high rise RFBs are located directly to the west of the site on the adjacent side of Lane Cove Road.

2.1. Existing Improvements

The site currently comprises an integrated horticultural development known as Eden Gardens. The centre includes:

- Garden centre and service areas
- Café comprising indoor and outdoor dining
- Function hire centre for wedding, business events, conferences, education and garden events
- Large international grade display gardens
- Eden Garden administrative office, and
- Underground and above ground car parking.

Photos of the existing development are illustrated below:



Photograph 1 Existing walkway adjoining the cafe area (Source: City Plan)



Photograph 2 Existing garden area at the south, looking south-east (Source: City Plan)



Photograph 3 Garden Centre looking west (Source: City Plan)



Photograph 4 Service area on the north boundary (Source: City Plan)



Photograph 5 Existing Eden Gardens



Photograph 6 Looking from the eastern boundary into the site showing existing garden centre



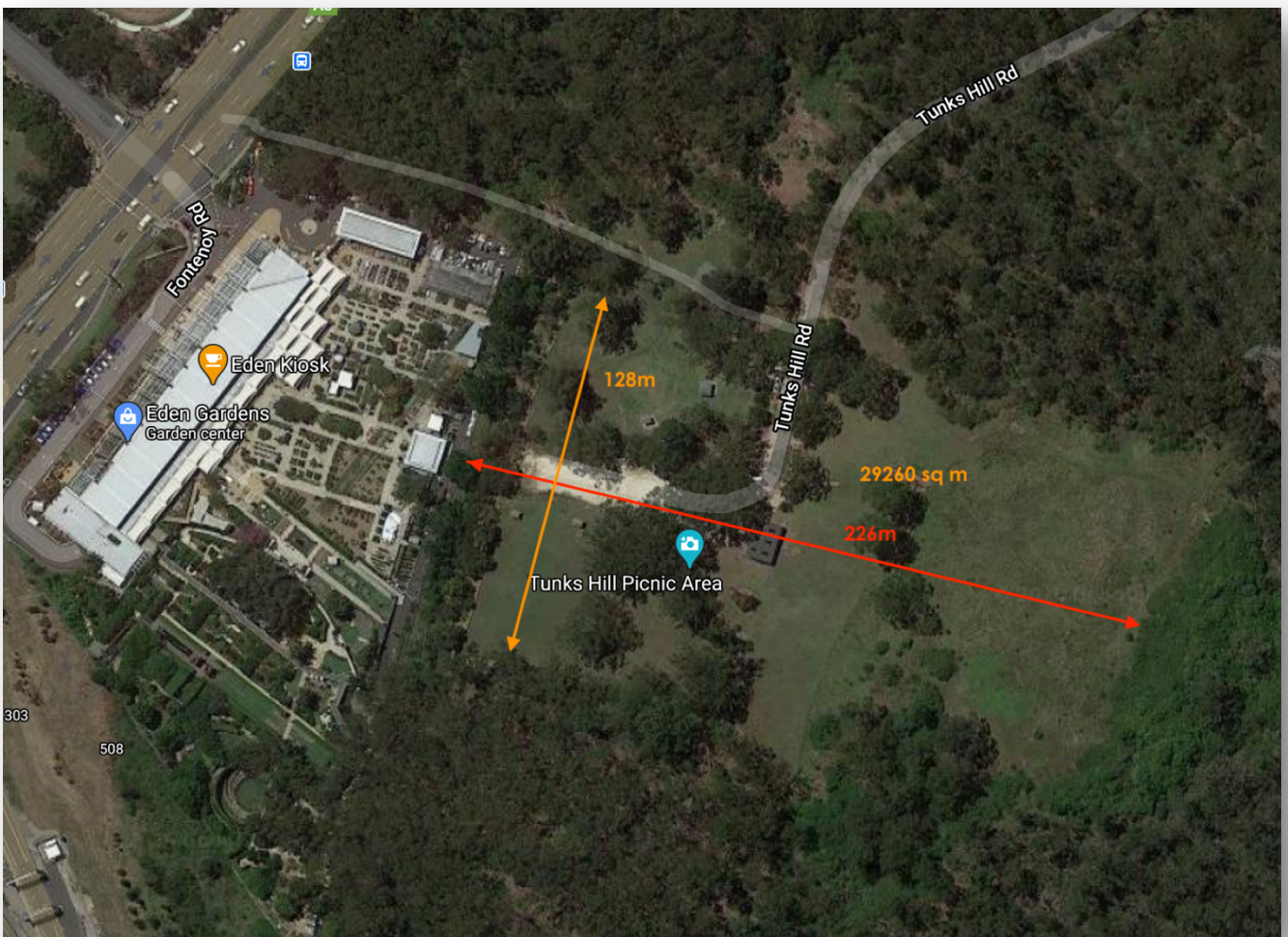
Photograph 7 Entrance to the site as viewed from the lights on the west side of Fontenoy Road (Source: City Plan)



2.2. Surrounding Uses

The Tunks Hill Picnic Area within Lane Cove National Park runs nearly the full length of the eastern boundary of the site (Figure 2) and has a cleared and managed area of 29,260 sq metres (2.926 ha). A line of trees is between the site and Tunks Hill picnic area. However, this is narrow and wedged between the site and the cleared areas within Tunks Hill Picnic area and is not considered to be a hazard. Photographs 7 - 10 show the managed picnic area that meets RFS Standards for Asset Protection Zones and is not a hazard.

Figure 3 Tunks Hill Picnic Area



Photograph 8
Managed areas within the Tunks Hill Picnic Area



Photograph 9
Managed areas within the Tunks Hill Picnic Area



Photograph 10
Managed areas within the Tunks Hill Picnic Area



Photograph 11 Commercial development along the east side of Lane Cove Road, site marked with a yellow pin (Source: City Plan)



3. Pre DA-Meeting

A pre-DA meeting was held with the applicants design team and the NSW Rural Fire Service (RFS) on 7 March 2019 for the proposed new development at Eden Gardens (see Attachment 2).

Present at the meeting were Nika Fomin, David Boverman and Kalpana Varghese from the RFS and Simon Ainsworth, Dominic Gaetani and Nick Byrne (DKO) and Lew Short.

The proposed uses were accepted by the RFS within the site which reflected the zoning compatibility with the Macquarie Park corridor while balancing the bushfire risk posed to any future development.

The RFS accepted:

- A Function/Conference centre to hold 400 people with attached restaurants and a garden bar.
- A child care centre which has been located the furthest distance from the bushland.
- Up to 16 – 20 story tower within the site.

The setback distances were discussed with RFS; It was accepted:

- Up to 16 story tower BAL 40
- A Function/Conference centre **BAL 40 under PBP 2006 or BAL 10 for PBP 2018**
- A child care centre BAL 10
- Garden Centre – BAL 40
- Restaurant – BAL 40
- Microbrewery – BAL 40
- Function Centre POD's – BAL 40 – we would have to call them something different – meeting rooms etc

The function centre was the one area the RFS were uncomfortable with and requested that it meet the 10kw line. Ms Fomin accepted that an alternative solution could be presented with exits at the 10kw line but this was not the RFS preferred outcome. Mr Boverman accepted the value of keeping the tower as far back from the hazard as possible and thought there was merit in moving the function centre closer to the hazard.

The RFS accepted the multi-story tower. Multi-storey buildings are required to comply with the performance criteria within Chapter 5 of PBP 2018. Because of the challenges that multi-storey buildings pose when located in bushfire prone areas, a fully engineered performance-based solution should be prepared which will include a BFDB. This is a detailed document that will need to be appended to or incorporated into the DA bushfire report.

The access issues were not of concern to RFS as we can meet the requirements.

The emergency management and evacuation issues will need to be addressed in a detailed bushfire evacuation plan for the site. The RFS flagged not occupying the function centre on Catastrophic Fire Danger Rating days.

4. Legislative Framework

The intended use is for redevelopment of the existing site for commercial development. There are no existing or proposed uses as part of the application that are Integrated Development. As commercial development, S. 4.14 of the *Environmental Planning and Assessment Act 1997* (EPA Act) is applicable for the assessment of the application.

The site is an existing commercial development and the infill provisions of PBP 2019 apply.

As commercial development PBP categorises the development as 'Other' development.

The EP&A Act s.4.14 requires that the consent authority be satisfied that the relevant specifications and requirements of PBP 2019 are complied with for development on Bushfire Prone Land (PPL). This applies to any development other than subdivision of land that could lawfully be used for residential purposes or development for a Special Fire Protection Purpose (SFPP). PBP 2019 (p. 20) identifies that this can be achieved by the following means:

a. the consent authority is satisfied that the development conforms to the specifications and requirements of PBP; or

b. the consent authority has been provided with a certificate by a person who is recognised by the NSW RFS as a qualified consultant in bush fire risk assessment stating that the development conforms to the relevant specifications and requirements; or

c. If the consent authority is satisfied that the development does not conform to the relevant requirements of PBP, it may still grant consent to the development but only after it has consulted with the Commissioner of the NSW RFS concerning measures to be taken with respect to the development to protect persons, property and the environment from danger that may arise from a bush fire.

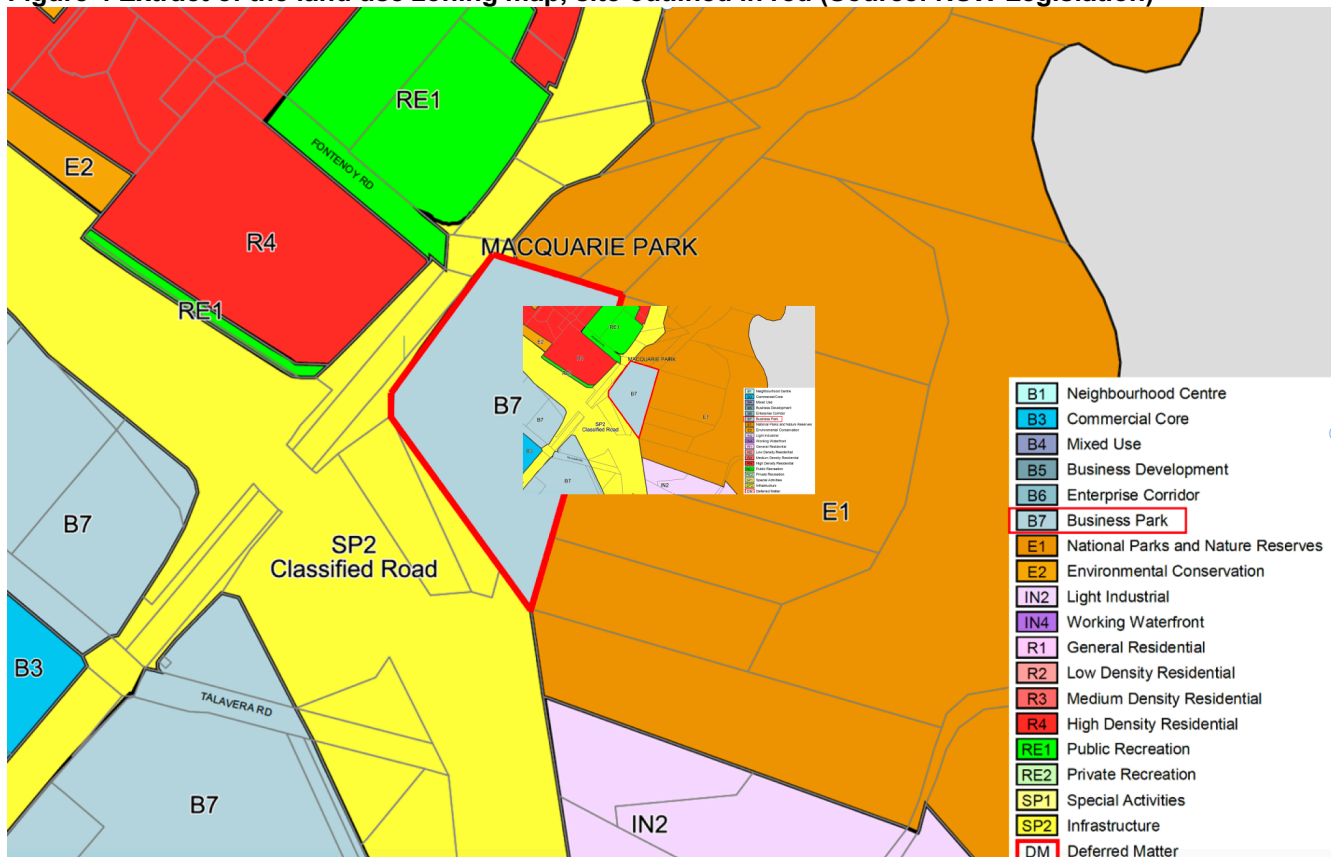
4.1. Zoning and Permissibility

The Ryde LEP is the primary environmental planning instrument applying to the site. Pursuant to the RLEP the site is zoned B7 Business Park as illustrated in Figure 4.

The proposed garden centre, office premises neighbourhood shops, restaurant and cafe are permissible with development consent in the B7 zone. Function centres are not specified in item 2 or 4, hence as permissible with consent by virtue of not strictly being prohibited in the zone. The proposed wellness and active rooftop is ancillary to the office building and the rock climbing wall to the garden centre.

The proposal is consistent with the zone objectives as it involves the construction of a new 18-storey office tower which consequently facilitates employment opportunities in the locality. The design delivers a unique office experience given the adjoining national park, the display gardens and landscape setting and complimentary uses including a garden centre, restaurant and cafes, neighbourhood shops. These uses support the day-to-day needs of workers on the site.

Figure 4 Extract of the land use zoning map, site outlined in red (Source: NSW Legislation)



5. Planning for Bushfire Protection 2019

PBP 2019 (section 8.1) includes retail development in the broad category of commercial development within 'Other' development. In order to comply with PBP the following conditions must be met:

- satisfy the aim and objectives of PBP outlined in Chapter 1;
- consider any issues listed for the specific purpose for the development set out in this chapter; and
- propose an appropriate combination of BPMs.

For the retail and commercial part of the development, these must meet the aim and objective of PBP 2019 and provide separation from the hazard such that the buildings provide appropriate separation between a hazard and buildings which, in combination with other measures, minimises material ignition. PBP 2019 does not specify the design parameters for these types of buildings. However, all development on BPL must satisfy the aim and objectives of PBP 2019.

The aim of PBP (p. 10) is to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.

The objectives (p. 10) are to:

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

This report will demonstrate that the aim and objectives have been met.

'Other development' refers to any type of development that is not covered by Chapters 5 to 7 of PBP 2019. This includes retail, commercial uses, industrial uses, infrastructure and development which involves large numbers of people.

PBP 2019 (section 8.3.1 p. 76) provides guidance for Class 5 to 8 buildings include offices, shops, factories, warehouses, public car parks and other commercial and industrial facilities. PBP 2019 (p. 76) states that

The NCC does not provide for any bush fire specific performance requirements for these particular classes of buildings. As such AS 3959 and the NASH Standard are not considered as a set of Deemed to Satisfy provisions, however compliance with AS 3959 and the NASH Standard must be considered when meeting the aims and objectives of PBP.

Whilst bush fire is not captured in the NCC for Class 5-8 buildings, the following objectives will be applied in relation to access, water supply 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 provide for the storage of hazardous materials away from the hazard wherever possible.*

The general fire safety construction provisions of the NCC are taken as acceptable solutions.

By articulating the tolerable risk through PBP 2019 and the pre-DA process, the RFS have provided a bottom line for assessment requirements within a performance-based framework.

The process that has been used in the performance-based assessment as part of this BHA, has worked within the framework required by the RFS and the Building Code of Australia and in keeping with good practice for the development of land.

The deemed to satisfy provisions of PBP have been used as the basis of this assessment.

No performance based calculations have been used in this assessment.

5.1. Infill Development

As the site is an existing retail and commercial development, the infill provisions of PBP 2019 apply. The main intent is that a better bushfire risk outcome is provided than currently exists on the site. The existing use was explained to the RFS at the pre DA meeting.

The Bushfire Protection Measures (BPM) for infill development include provisions relating to APZs, access, water supply, electricity and gas services, construction standards, landscaping and emergency evacuation.

PBP 2019 (p. 64) requires that proposals for infill development are to:

- *provide a defensible space to enable unimpeded access for firefighting around the building;*
- *provide better bush fire outcomes on a redevelopment site than currently exists, commensurate with the scale of works proposed;*
- *design and construct buildings commensurate with the bush fire risk;*
- *provide access, services and landscaping to aid firefighting operations;*
- *not impose an increased bush fire management and maintenance responsibility on adjoining land owners; and*
- *increase the level of bush fire protection to existing dwellings based on the scale of the proposed work and level of bush fire risk.*

5.2. Multi storey development

Section 8.2.2 of PBP 2019 provides requirements for multi storey residential development. While the commercial tower is not residential, it exceeds three storeys in height and is considered to be multi-storey buildings for the purpose of PBPO 2019 (p. 74).

Multi-storey buildings are required to comply with the performance criteria within Chapter 5 of PBP 2019, including the requirement for an APZ which meets a threshold of 29kW/m². PBP 2019 (p. 74) identifies additional considerations with multi-storey residential buildings and the key issues are as follows:

- Population - higher resident densities can pose issues for emergency management;
- Location – bush fire impacts can be increased where high rise buildings are located in higher elevations or on ridge tops;
- Egress - is more challenging and places an increased demand on road infrastructure during evacuation;
- Construction - there is a higher external façade surface area that may be exposed to bush fire attack and: car and storage facilities on the ground level can provide an additional fuel

loading; balconies and external features can easily trap embers which can ignite combustible materials.

- Height -the height can result in increased exposure to convective heat.

Blackash have adopted a best practice, performance-based approach to new development in bushfire prone areas. This assessment is based on project specifics and takes into account various factors such as the bushfire prone nature of the land, topography, vegetation, bushfire risk and proposed use/ population in the consideration of the assessment against RFS requirements.

6. Bushfire Prone Land

The site is identified as 'bushfire prone land' (see Figure 5) as mapped by Council for the purposes of Section 10.3 of the EPA Act and the legislative requirements for new development on bushfire prone lands are applicable.

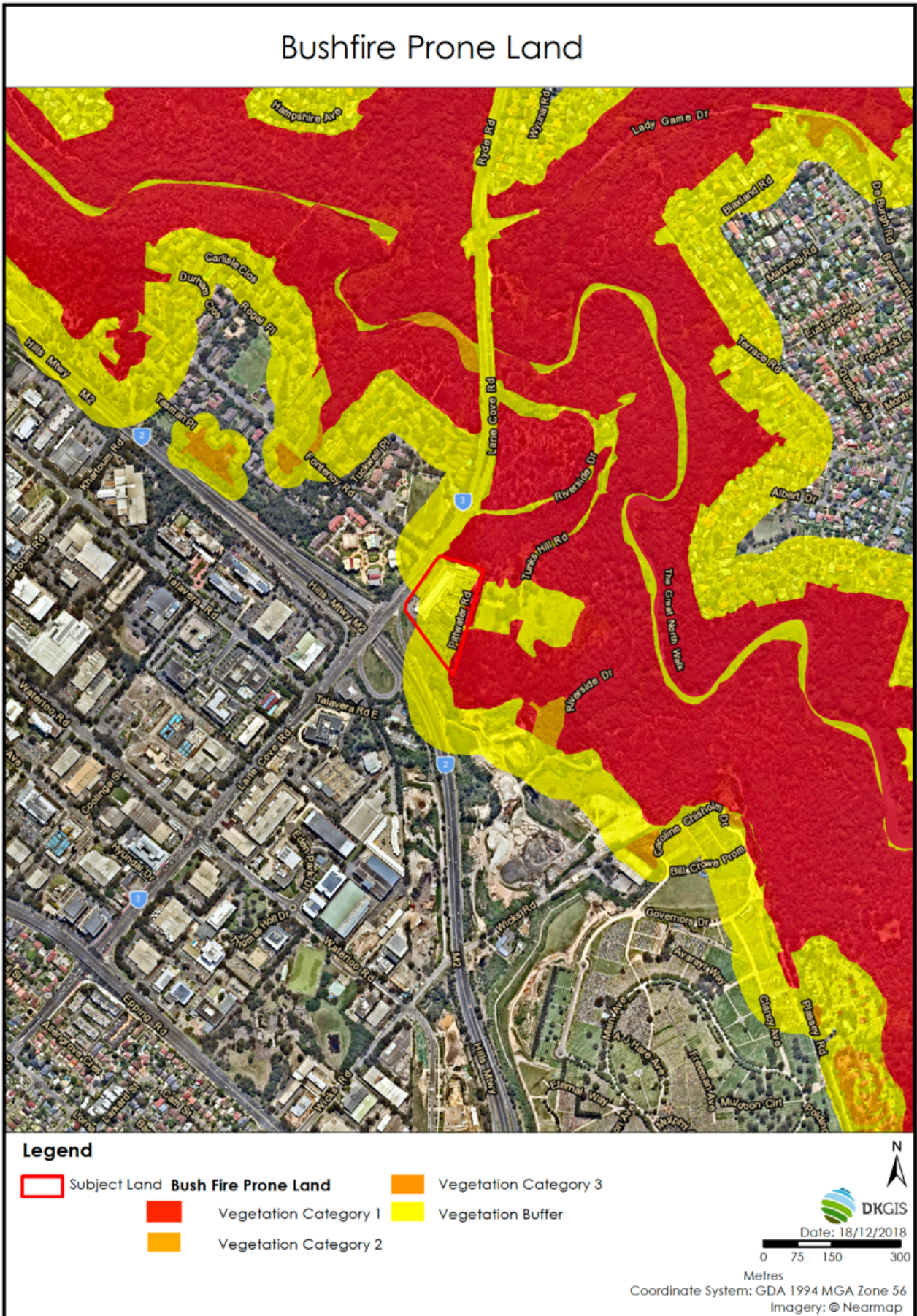
Bushfire prone land maps (**BPLM**) provide a trigger for the development assessment provisions and consideration of sites that are bushfire prone. The BPLM is a trigger for the consideration of Bushfire Protection Measures (**BPMs**) for new development. It is not intended as a detailed measure of risk. The map does not form part of the site assessment process, which must be carried out in accordance with the Site Assessment Methodology outlined in Appendix 1 of PBP 2019.

Bushfire prone land (**BFPL**) is land that has been identified by council, which can support a bushfire or is likely to be subject to bushfire attack. Bushfire prone land maps are prepared by local council and certified by the Commissioner of the RFS.

Figure 4 shows that the site has bushfire prone Category 1 vegetation to the north and south east (all off site) of the site. The site is affected by the 100m Category 1 buffer.

The map is considered an accurate depiction of land that could carry a bushfire.

Figure 5 Bushfire Prone Land



7. Bushfire Context

The site is bushfire prone and sits on a gentle ridgeline with Lane Cove National Park to the north and east of the site. The vegetation is forest and the area has a history of bushfires running through the Lane Cove Valley. The fire path is confined between the existing development. However, the orientation of the Lane Cove National Park is north west that provides a direct fire path past the site.

Lane Cove Road provides access to the site. The intersection of Lane Cove Road and Fontenoy Road has a set of traffic lights with flow being managed to Eden Gardens. A right-hand turn lane is provided into the site with the traffic lights.

The bushfire season in the Sydney area generally runs from 1 October to 31 March. Prevailing weather conditions associated with the bushfire season in the area are strong northwest winds, low humidity and high temperatures. These conditions combined with dry vegetation dramatically influence the behaviour of bushfires in the area.

There is potential for the site to be impacted from two sides (north and east) with bushfire attack in the form of ember attack, smoke, radiant heat and direct flame contact. The bushfire attack from the east is significantly reduced by Tunks Hill Picnic area that runs nearly the entire length of the eastern side of the Lot. The picnic area is well managed, has good access for fire fighters and meets the RFS Standards for APZ. Potential exists for a fire to be driven into the south east of the site from the east. However, easterly winds are cooler, with higher moisture content and higher humidity.

Fires burning under a westerly or north westerly influence will push past the site and will not directly impact it. There is potential for fire to impact the north of the site. And, in consideration of this, the car park has been placed to the north of the site to provide a radiant heat shield to the remainder of the site.

Landuse planning is a process that relies on a sound understanding of the risks associated with natural hazards and relies on balancing often competing interests. From a strategic planning perspective, the proposed uses are in keeping with the aim and objectives of PBP 2019 and provide for the development of the land and protection of life and property from bushfire.

7.1. Assessment Framework

PBP 2019 uses a performance-based approach and identifies objectives and detailed performance criteria to satisfy desired outcomes and meet the Aim and Objectives. Ultimately, the aim of the performance-based approach is to demonstrate that bushfire protection is afforded to a proposed development commensurate with the assessed level of bushfire risk and the characteristics of the occupants.

This can be achieved by either applying the identified acceptable solutions, or by preparing a performance-based solution.

A performance-based solution is designed to achieve the appropriate level of protection by tailoring a package of measures which meet the intent and performance criteria relevant to the proposed development.

PBP 2019 (p. 13) notes that *performance-based solutions allow flexibility and innovation in responding to site-specific opportunities and constraints while still meeting the identified performance criteria*. The PBP 2019 framework also requires the consideration of a broad range of issues and information, including bushfire risk, community expectations, environmental protection and the application of new science, processes and technologies.

This BHA has provided a deemed to satisfy solution for the assessment and determination of radiant heat and commensurate APZs within the site. The report provides substantiated evidence and clearly demonstrates how the specific objectives and performance criteria are to be met.

8. Bushfire Threat Assessment

The RF Act (Section 3) provides a hierarchy (based on highest priority) to consider and provide for bushfire protection in NSW. This hierarchy provides:

1. For the protection of persons from injury or death, and property from damage, arising from fires, and
2. For the protection of infrastructure and environmental, economic, cultural, agricultural and community assets from damage arising from fires, and
3. For the protection of the environment.

While PBP 2019 is clear that no development in bushfire prone areas can be guaranteed to be entirely safe from bushfires (p. 1), the aim of the document is to utilise the planning system to provide for the protection of human life, while having due regard to development potential, on site amenity and protection of the environment. As such, a balance needs to be struck between the development potential of the site, environmental impact and the need to provide satisfactory bushfire protection.

8.1. Performance-based solutions

To achieve compliance with PBP, applications must comply with either the acceptable solutions or a performance-based solution (or a combination of both).

Performance-based solutions allow flexibility and innovation in responding to site-specific opportunities and constraints while still meeting the identified performance criteria. They also allow the consideration of a broad range of issues and information, including bushfire risk, community expectations, environmental protection and the application of new science, processes and technologies.

Performance-based solutions must provide substantiated evidence and clearly demonstrate how the specific objectives and performance criteria are to be met. PBP 2013 notes that performance-based solutions may be undertaken for any of the BPMs detailed in Chapter 3 and supported in accordance with the submission requirements for performance-based solutions in Appendix 2.

Table 1 provides a breakdown of the assessment pathway for the Bushfire Protection Measures.

Table 1 Acceptable or Alternate Solution Proposed

| Bushfire Protection Measure | Performance | Acceptable Solution |
|--|--|--|
| Fire Behaviour | No | YES - Uses the FDI from PBP |
| APZ | No | In accordance with PBP Table A1.12.5 |
| Emergency Management Arrangements | Can meet RFS requirements. To be completed prior to occupation | |
| Water Supply & Utilities | No | YES |
| Access | YES – perimeter road not provided around the entire site. | NO Alternative solution providing access to areas proposed |
| Building Design and Construction | No | BAL 29 for Tower BAL 40 for commercial buildings |
| Landscaping | No | YES – meets RFS Standards for Asset Protection Zones. |

8.2. Methodology

The following assessment is prepared in accordance with PBP 2019. This assessment is based on various site inspections, detailed GIS mapping and desktop assessment of the site utilising the following resources:

- Planning for Bush Fire Protection 2019;
- Council Bushfire Prone Land Map;
- Aerial mapping;
- Detailed GIS analysis

The methodology used in this assessment is in accordance with PBP 2019 and is outlined in the following sections.

8.3. Methodology to Determine APZ

PBP 2019 provides a methodology to determine the size of an APZ that may be required to offset possible bushfire attack.

An APZ is a buffer zone between a bush fire 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 vegetation type, slope and the nature of the development.

The APZ consists of managed land. Managed land (PBP 2019 p. 112) is:

Land that has vegetation removed or maintained to a level that limits the spread and impact of bushfire. It may include existing 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 will be managed to meet the requirements of an asset protection zone.

These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation.

8.4. Bushfire Hazard

An assessment of the Bushfire Prone Land is necessary to determine the application of bushfire protection measures such as APZ locations and future building construction levels. A Bushfire hazard includes any vegetation that has the potential to carry fire and threaten lives, property or the environment.

The vegetation formations (bushfire fuels) and the topography (effective slope) combine to create the bushfire threat that may affect bushfire behaviour at the site, and which determine the planning and building response of PBP 2019.

8.5. Forest Fire Danger Index

The fire weather is dictated by PBP 2019 and assumes a credible worst-case scenario and an absence of any other mitigating factors relating to aspect or prevailing winds. The Forest Fire Danger Index (**FFDI**) measures the degree of danger of fire in Australian vegetation.

For the purposes of PBP 2019, the FFDI required to be used for development assessment purposes is based on local government boundaries¹. Ryde is identified in PBP 2019 as having an assessment Forest Fire Danger Index (**FFDI**) of 100. The risk-based assessment has been undertaken with an FDI 100.

It may be possible that days of higher FFDI may be experienced at the proposal site. This may result in fire situations where conditions challenge survivability of buildings and their occupants. The framework provided for by PBP 2019 has been used in this assessment.

¹ https://www.rfs.nsw.gov.au/_data/assets/pdf_file/0007/55285/Local-government-areas-and-FDI.pdf

8.6. Vegetation Assessment

The RF Regulation requires a classification of the vegetation on and surrounding the property (in accordance with the system for classification of vegetation contained in PBP 2019).

Vegetation types give rise to radiant heat and fire behaviour characteristics. The predominant vegetation is determined over a distance of at least 140 metres in all directions from the proposed site boundary or building footprint on the development site. Where a mix of vegetation types exist, the type providing the greater hazard is said to predominate.

Predominant Vegetation is classified by structure or formation using the system adopted by Keith (2004) and by the general description using PBP 2019 and is shown in Figure 6.

Vegetation affecting the site has been assessed as forest.

Figure 6 Vegetation & Slope



8.7. Slopes Influencing Bushfire Behavior

The RF Reg requires an assessment of the slope of the land on and surrounding the property (out to a distance of 100 metres from the boundaries of the property or from the proposed development footprint).

The effective slope¹ influencing fire behaviour approaching the sites has been assessed in accordance with the methodology specified within PBP 2019.

This is conducted by measuring the worst-case scenario slope where the vegetation occurs over a 100m transect measured outwards from the development boundary or the existing/ proposed buildings. Figure 6 shows the effective slopes relevant to the proposal.

Slopes affecting the site are in the category of 0 – 5 degrees downslope in accordance with PBP 2019.

8.8. 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 vegetation type, slope and the nature of the development.

The APZ can include roads or properties managed to be consistent with APZ standards set out in the NSW RFS document "*Standards for Asset Protection Zones*". A fuel-reduced, physical separation between buildings and bushfire hazards is a key element in the suite of bushfire measures and dictates the type of construction necessary to mitigate bush fire attack.

As commercial development, the required separation in accordance with PBP 2019 is 40kW as shown in Table 2. All APZs for the site and proposed uses have been based on the deemed to satisfy provisions from Table A1.12.5 of PBP 2019 (see Table 2). This has been done to provide APZs that meet the required RFS standards. No modelling or performance-based calculations have been completed to reduce the APZs.

Tunks Hill Picnic Area is managed area to the east of the site and meets the RFS Standards for APZ.

The calculation of APZs are based on the vegetation type, slope and separation of an asset from unmanaged areas of vegetation. The provision of APZ has been based on the acceptance by the RFS of the Blackash approach to the development as outlined in the pre DA meeting (see section 7).

The proposed development requires the removal of several trees on-site as detailed in the Statement of Environmental Effects.

The landscape plan (Figure 7 and 8) recognises the iconic existing landscape elements including the subterranean bamboo forest at the entry to the neighbourhood retail area, the 'Eden Tree' sculpture, the aerial canopy walk through in the lower garden, the lower garden and surrounding scribbly gum forest, the spiral recycle water collection basin and the ceremonial lawn with the tower folly at its eastern axis. These elements are maintained, enhanced and celebrated within the broader context of the redeveloped exterior design. The landscaping has been designed with consideration of bushfire requirements and the RFS Standards for Asset Protection Zones.

Figure 7 Locality plan of the existing landscape features (Source: Realm Studios)



Figure 8 Extract of the general landscape arrangement (Source: Realm Studios)

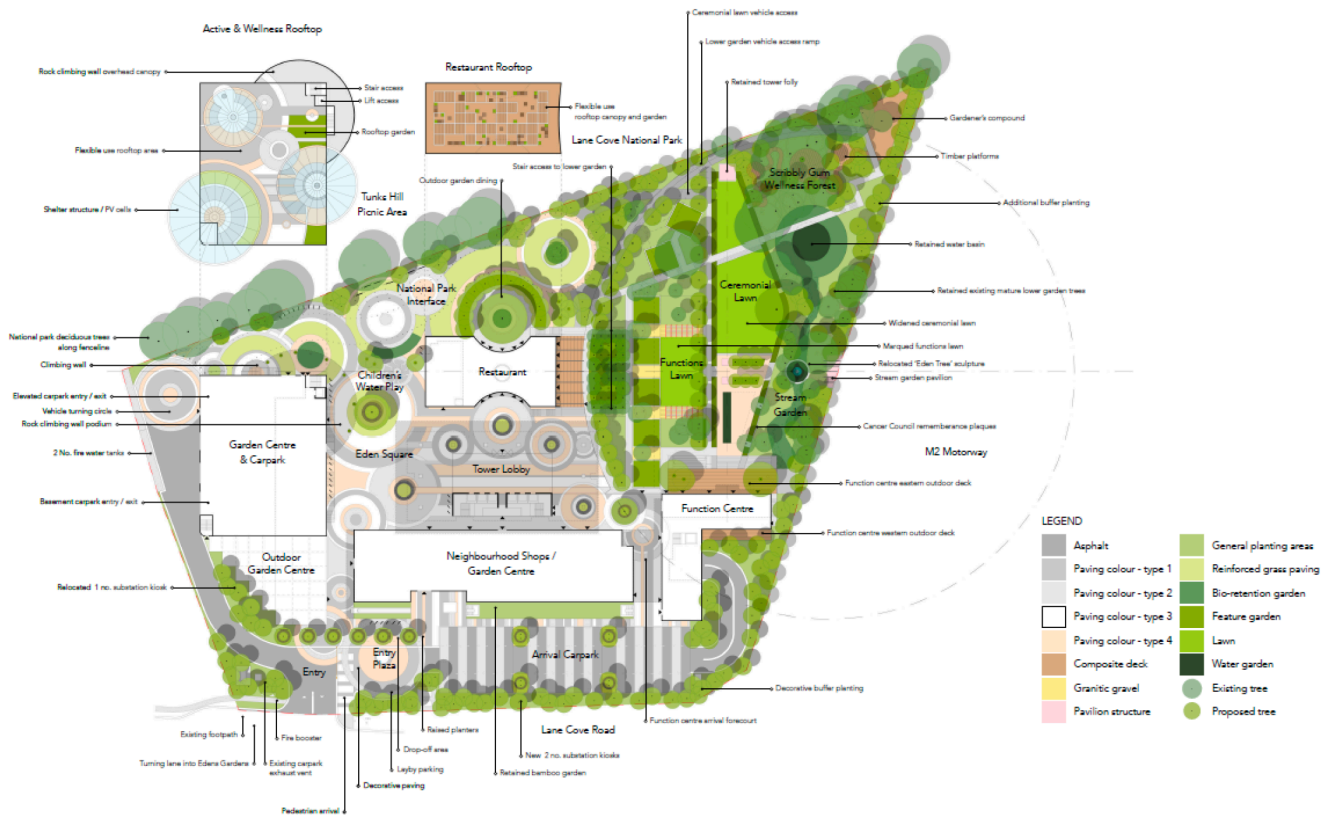


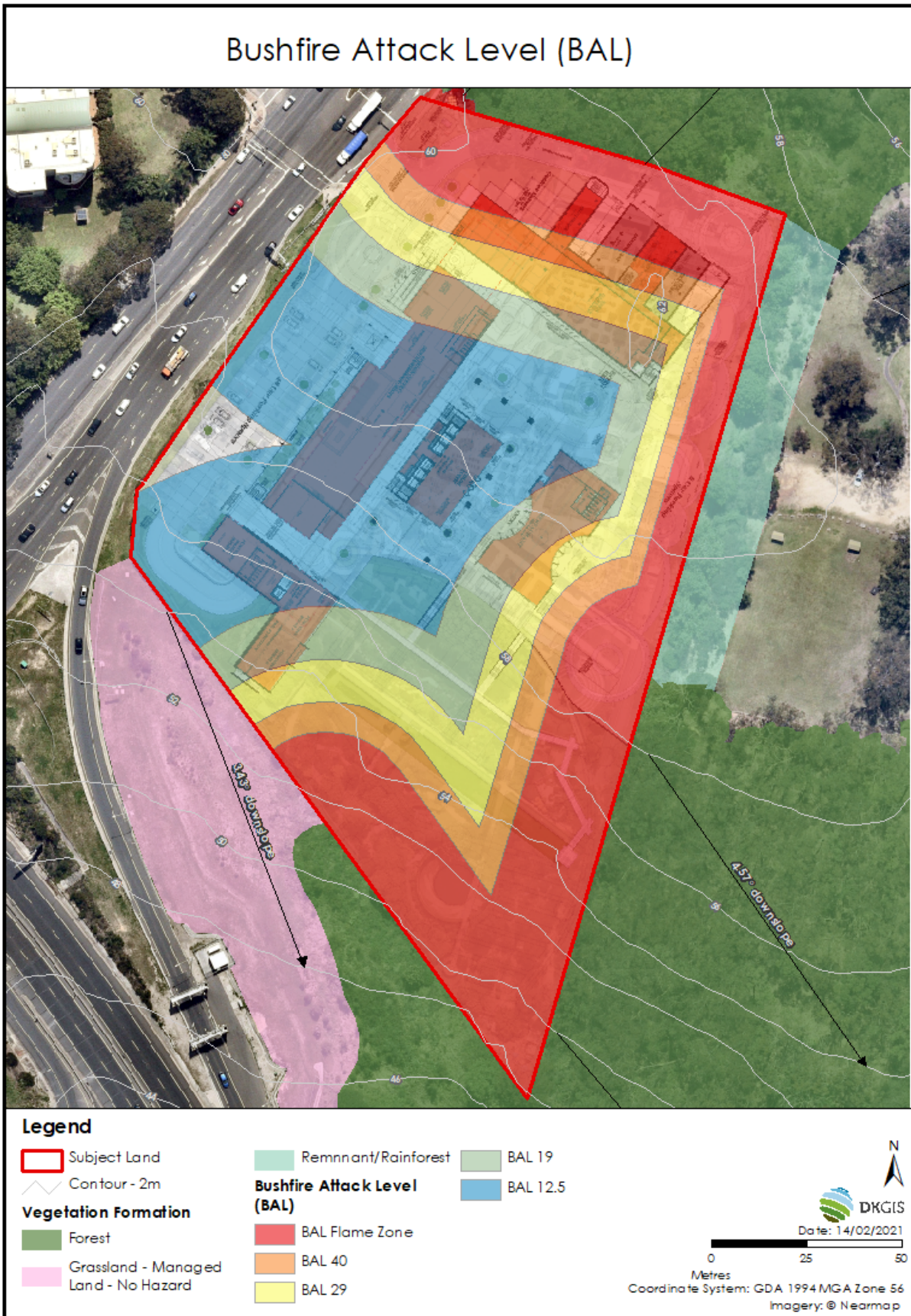
Table 2 Commercial APZs source Planning for Bushfire Protection 2019 p. 91

Table A1.12.5

Determination of BAL, FFDI 100 – residential developments

| KEITH VEGETATION FORMATION | BAL-FZ | BUSH FIRE ATTACK LEVEL (BAL) | | | | |
|-------------------------------|---|------------------------------|---------------------------------|----------|----------|-----------|
| | | BAL-40 | BAL-29 | BAL-19 | BAL-12.5 | |
| | | Distance (m) asset | to predominant vegetation class | | | |
| ALL UPSLOPE AND FLAT LAND | Rainforest | < 8 | 8 -< 11 | 11 -< 16 | 16 -< 23 | 23 -< 100 |
| | Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland | < 18 | 18 -< 24 | 24 -< 33 | 33 -< 45 | 45 -< 100 |
| | Grassy and Semi-Arid Woodland (including Mallee) | < 9 | 9 -< 12 | 12 -< 18 | 18 -< 26 | 26 -< 100 |
| | Forested Wetland (excluding Coastal Swamp Forest) | < 7 | 7 -< 10 | 10 -< 14 | 14 -< 21 | 21 -< 100 |
| | Tall Heath | < 12 | 12 -< 16 | 16 -< 23 | 23 -< 32 | 32 -< 100 |
| | Short Heath | < 7 | 7 -< 9 | 9 -< 14 | 14 -< 20 | 20 -< 100 |
| | Arid-Shrublands (acacia and chenopod) | < 5 | 5 -< 6 | 6 -< 9 | 9 -< 14 | 14 -< 100 |
| | Freshwater Wetlands | < 4 | 4 -< 5 | 5 -< 7 | 7 -< 11 | 11 -< 100 |
| | Grassland | < 8 | 8 -< 10 | 10 -< 15 | 15 -< 22 | 22 -< 50 |
| | Rainforest | < 11 | 11 -< 14 | 14 -< 21 | 21 -< 29 | 29 -< 100 |
| > 0 > 5 DEGREES – DOWNSLOPE | Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland | < 22 | 22 -< 29 | 29 -< 40 | 40 -< 54 | 54 -< 100 |
| | Grassy and Semi-Arid Woodland (including Mallee) | < 12 | 12 -< 16 | 16 -< 23 | 23 -< 32 | 32 -< 100 |
| | Forested Wetland (excluding Coastal Swamp Forest) | < 9 | 9 -< 12 | 12 -< 18 | 18 -< 26 | 26 -< 100 |
| | Tall Heath | < 13 | 13 -< 18 | 18 -< 26 | 26 -< 36 | 36 -< 100 |
| | Short Heath | < 8 | 8 -< 10 | 10 -< 15 | 15 -< 22 | 22 -< 100 |
| | Arid-Shrublands (acacia and chenopod) | < 5 | 5 -< 7 | 7 -< 11 | 11 -< 16 | 16 -< 100 |
| | Freshwater Wetlands | < 4 | 4 -< 6 | 6 -< 8 | 8 -< 12 | 12 -< 100 |
| | Grassland | < 9 | 9 -< 12 | 12 -< 17 | 17 -< 25 | 25 -< 50 |
| | Rainforest | < 14 | 14 -< 18 | 18 -< 26 | 26 -< 37 | 37 -< 100 |
| | Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland | < 28 | 28 -< 36 | 36 -< 49 | 49 -< 65 | 65 -< 100 |
| > 5 > 10 DEGREES – DOWNSLOPE | Grassy and Semi-Arid Woodland (including Mallee) | < 15 | 15 -< 20 | 20 -< 28 | 28 -< 39 | 39 -< 100 |
| | Forested Wetland (excluding Coastal Swamp Forest) | < 12 | 12 -< 16 | 16 -< 23 | 23 -< 33 | 33 -< 100 |
| | Tall Heath | < 15 | 15 -< 20 | 20 -< 29 | 29 -< 40 | 40 -< 100 |
| | Short Heath | < 9 | 9 -< 12 | 12 -< 18 | 18 -< 25 | 25 -< 100 |
| | Arid-Shrublands (acacia and chenopod) | < 6 | 6 -< 8 | 8 -< 12 | 12 -< 18 | 18 -< 100 |
| | Freshwater Wetlands | < 5 | 5 -< 6 | 6 -< 10 | 10 -< 14 | 14 -< 100 |
| | Grassland | < 10 | 10 -< 13 | 13 -< 20 | 20 -< 28 | 28 -< 50 |
| | Rainforest | < 17 | 17 -< 23 | 23 -< 34 | 34 -< 46 | 46 -< 100 |
| | Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland | < 36 | 36 -< 45 | 45 -< 60 | 60 -< 77 | 77 -< 100 |
| | Grassy and Semi-Arid Woodland (including Mallee) | < 19 | 19 -< 25 | 25 -< 36 | 36 -< 49 | 49 -< 100 |
| > 10 > 15 DEGREES – DOWNSLOPE | Forested Wetland (excluding Coastal Swamp Forest) | < 15 | 15 -< 20 | 20 -< 29 | 29 -< 41 | 41 -< 100 |
| | Tall Heath | < 17 | 17 -< 22 | 22 -< 32 | 32 -< 44 | 44 -< 100 |
| | Short Heath | < 10 | 10 -< 13 | 13 -< 20 | 20 -< 29 | 29 -< 100 |
| | Arid-Shrublands (acacia and chenopod) | < 7 | 7 -< 9 | 9 -< 14 | 14 -< 20 | 20 -< 100 |
| | Freshwater Wetlands | < 5 | 5 -< 7 | 7 -< 11 | 11 -< 16 | 16 -< 100 |
| | Grassland | < 11 | 11 -< 15 | 15 -< 23 | 23 -< 32 | 32 -< 50 |
| | Rainforest | < 23 | 23 -< 30 | 30 -< 42 | 42 -< 56 | 56 -< 100 |
| | Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland | < 46 | 46 -< 56 | 56 -< 73 | 73 -< 92 | 92 -< 100 |
| | Grassy and Semi-Arid Woodland (including Mallee) | < 24 | 24 -< 32 | 32 -< 44 | 44 -< 59 | 59 -< 100 |
| | Forested Wetland (excluding Coastal Swamp Forest) | < 19 | 19 -< 26 | 26 -< 37 | 37 -< 50 | 50 -< 100 |
| > 15 > 20 DEGREES – DOWNSLOPE | Tall Heath | < 19 | 19 -< 25 | 25 -< 36 | 36 -< 49 | 49 -< 100 |
| | Short Heath | < 11 | 11 -< 15 | 15 -< 23 | 23 -< 32 | 32 -< 100 |
| | Arid-Shrublands (acacia and chenopod) | < 7 | 7 -< 10 | 10 -< 16 | 16 -< 23 | 23 -< 100 |
| | Freshwater Wetlands | < 6 | 6 -< 8 | 8 -< 13 | 13 -< 18 | 18 -< 100 |
| | Grassland | < 13 | 13 -< 17 | 17 -< 26 | 26 -< 36 | 36 -< 50 |

Figure 9 Commercial Bushfire Attack Level



9. Water Supplies

The Site land is currently serviced by reticulated water. Reticulated mains will be located throughout the site servicing the proposed buildings.

The proposed developments will be located within 70 m of hydrants. The fire hydrant system (incorporating internal and external hydrant connections) will be designed to ensure coverage in accordance with AS 2419.1:2005 and NCC Clause E1.3. This complies with PBP 2019.

10. Gas and electrical supplies

Gas and electricity supply for the new development will comply with PBP 2019.

Any gas services are to be installed and maintained in accordance with Australian Standard AS/NZS 1596 'The storage and handling of LP Gas' (Standards Australia 2008). This complies with PBP 2019.

11. Access

Roads will be provided throughout the site based on the existing access arrangements.

Internal roads will comply with PBP 2019 such that roads will provide safe operational access for emergency services personnel in suppressing a bushfire, while occupants are accessing or egressing an area (PBP 2019 p. 57). Specifically, roads will meet PBP 2019 such that:

- roads are a minimum 5.5m width kerb to kerb;
- parking is provided outside of the carriageway width; and hydrants are located clear of parking areas;
- curves of roads have a minimum inner radius of 6m;
- the road crossfall does not exceed 3°;
- a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
- the capacity of road surfaces and any bridges/ causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges and causeways are to clearly indicate load rating
- hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression, and
- hydrants are provided in accordance with AS 2419.1:2005

12. Assessment Against the Aim and Objective of PBP

All development in Bushfire Prone Areas needs to comply with the aim and objectives of PBP 2018. Table 4 shows the compliance with PBP 2019.

Table 3 Compliance with Aim & Objectives of PBP

| Aim | Meets Criteria | Comment |
|--|-----------------------|---|
| <i>The aim of PBP is to use the NSW development assessment system to provide for the protection of human life (including fire fighters) and to minimise impacts on property from the threat of bushfire, while having due regard to development potential, onsite amenity and the protection of the environment.</i> | YES | <ul style="list-style-type: none"> APZ can be met for Commercial purposes throughout the site. |
| Objectives | Meets Criteria | Comment |
| <i>Afford occupants of any building protection from exposure to a bushfire.</i> | YES | <ul style="list-style-type: none"> Minimum APZs can be provided that would produce acceptable radiant heat levels at critical levels to the building and can comply with AS3959. APZs providing 29kW of radiant heat to office tower have been provided. APZs providing 40kW of radiant heat to commercial development have been provided. |
| <i>Provide for defensible space to be located around buildings.</i> | YES | <ul style="list-style-type: none"> Defensible space can be provided on all sides of the development. Clear access is provided around all buildings |
| <i>Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings.</i> | YES | <ul style="list-style-type: none"> Deemed to satisfy requirements for complying APZ can be met for Commercial purposes throughout the site. |
| <i>Ensure that safe operational access and egress for emergency service personnel and occupants is available.</i> | YES | <ul style="list-style-type: none"> The site has direct access to public roads. Access and egress for emergency vehicles and evacuation are provided to meet the requirements of PBP 2019. |
| <i>Provide for ongoing management and maintenance of bushfire protection measures.</i> | YES | <ul style="list-style-type: none"> A landscape and bushfire management plan for the site could be provided. |
| <i>Ensure that utility services are adequate to meet the needs of firefighters.</i> | TBC | <ul style="list-style-type: none"> To be determined pending site plans. |

13. Recommendations

A Bushfire Safety Authority is requested from the RFS for the DA that specifies that:

1. The entire site is managed as an Inner Protection Area as per RFS Standards for Asset Protection Zones.
2. Asset Protection Zones for commercial developments are as indicated on Figure 9.
3. The existing buildings will be upgraded to provide ember protection on openable windows
4. The carpark will be built to BAL Flame Zone in accordance with AS3959
5. The commercial tower will be built to BAL 29 in accordance with AS3959
6. Roads will comply with PBP 2019 requirements.

14. Conclusion

This DA seeks approval for alterations and additions to the existing garden centre at 307 Lane Cove Road, Macquarie Park. The development proposal involves the renewal of the existing garden centre and function spaces, construction of an office building, provision of neighbourhood shops, café and restaurant, on-site parking, landscaping, and services.

This Bushfire Hazard Assessment report has been completed in accordance with the requirements of Planning for Bushfire Protection 2019 for the infill development of the existing retail and commercial use at Eden Gardens.

Permissible with development consent in the B7 Business Park zone, consistent with the zone objectives and appropriate within its context of the site and surrounding area

The application follows a pre lodgement meetings with the RFS to identify bushfire issues and to manage uncertainty associated with the bushfire aspects of the project. The RFS feedback has been incorporated into the design and planning for the project.

The proposal has been designed specifically to address the requirements of *Planning for Bushfire Protection 2019*.

The application complies with all aspects of *Planning for Bushfire Protection 2019* and presents minimal bushfire risk. Council and the RFS ought to support the application subject to the recommendations at Section 14.



Lew Short | Director

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

Appendix 1 References

Councils of Standards Australia AS3959 (2009) – *Australian Standard Construction of buildings in bushfire-prone areas*

Councils of Standards Australia AS2419 (200) – *Fire Hydrant Installations*

Keith, David (2004) – *Ocean Shores to Desert Dunes – The Native Vegetation of New South Wales and the ACT*. The Department of Environment and Climate Change

Hines et. al. (2010) *Overall fuel hazard assessment guide, 4th edition July 2010*, Fire and adaptive management, report no. 82

Niche Environment & Heritage (26 July 2018) *Preliminary Ecological Assessment*

NSW Rural Fire Service (2015) *Guide for Bushfire Prone Land Mapping*

NSW Rural Fire Service (2006). *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Homeowners*. Australian Government Publishing Service, Canberra

NSW Rural Fire Service (2019). *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Homeowners*. Draft for Public Exhibition

NSW Rural Fire Service (2017) *Short Fire Run Methodology for assessing bushfire risk for low risk vegetation*

NSW Rural Fire Service (2019) *Comprehensive vegetation fuel loads factsheet* (RFS March 2019).

NSW Government (1979) *Environmental Planning and Assessment Act 1979*. NSW Government Printer

Southeast Engineering and Environmental (March 2019) *Bushfire fuel hazard sampling and vegetation formation mapping: Squires Way, Nth Wollongong*

Appendix 2 Pre DA-Meeting with RFS



PRE-DA ADVICE MEETING SUMMARY

Attendees: Lew Short – Blackash Bushfire Consulting & Members of the Project Team
Kalpana Varghese, Team Leader - Development Assessment and Planning
Nika Fomin, Manager - Planning and Environment Services (East)

Subject: 307 Lane Cove Road Macquarie Park
RFS Ref. DOC18/169462

Time and date: 07 March 2019 **Location:** New South Wales Rural Fire Service (NSW RFS)
Head Quarters
4 Murray Rose Avenue Sydney Olympic Park

Details of the proposal

- Mixed use development for an adaptive re-use of the existing site to provide:
- SFPP
 - A function/conference centre for 400 people with restaurants and garden bar
 - A child care centre,
 - A sixteen storey high rise commercial tower.
 - Residential subdivision
 - Other

Bush fire protection issues discussed

- Hazard Assessment Application of *Pre-release Planning for Bush Fire Protection (PBP) 2018* provisions
- Asset Protection Zones Discussion of the concept plans
- Access
- Construction Standards
- Services
- Emergency and Evacuation Planning

Documentation / plans referenced

Documentation, including concept plans, provided by the bush fire consultant on 06 March 2019

Advice Provided

- No objection is raised in principle to the locations proposed for the commercial tower and the child care centre, given both buildings will be exposed to radiant heat levels of 10kW/m² or less.
 - Multi-storey buildings need to address the additional considerations set out in section 8.2.2 of *PBP 2018*.
 - Child care centre is a special fire protection purpose (SFPP) development and is therefore required to demonstrate compliance with section 4.2.7 of *PBP 2006* or chapter 6 of *PBP 2018* (whichever is applicable at the time of lodgement of the development application).
- Location of the proposed function centre needs careful re-consideration to demonstrate compliance with *PBP* as the requirements change significantly between the current and future versions.
 - The proposed function centre is not considered as a SFPP development under *PBP 2006* and is required to comply with section 4.2.6 of *PBP 2006* and NSW RFS Community Resilience Fact Sheet 2/14 *Places of public worship and other public assembly buildings on bush fire prone land*.
 - Buildings used for public assembly are considered as SFPP development under *PBP 2018* and are required to demonstrate compliance with radiant heat level exposure of 10kW/m² or less in accordance with section 6.1.1 of *PBP 2018*.
- Access provisions need to demonstrate compliance with the acceptable solutions or performance criteria of *PBP* to ensure safety of fire fighters and evacuating occupants during a bush fire emergency.
 - This may need to be supported by a traffic impact study detailing the capacity of the existing road infrastructure to facilitate evacuation from the subject site.
- An emergency management and evacuation plan needs to be prepared for the proposed facility consistent with *Development Planning- A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan December 2014*.

Disclaimer

RFS advice is based on information provided and policy and legislative requirements applicable at the time. The advice should be copied into, or referenced in, any subsequent development application.

All efforts are made to identify issues of relevance and likely concern with the preliminary proposal. However, the comments and views in this document are based only on the plans and information submitted for preliminary assessment and discussion at the pre-DA meeting. You are advised that: -

- The views expressed may vary once detailed plans and information are submitted and formally assessed in the development application process, or as a result of issues contained in submissions by interested parties;
- Given the complexity of issues often involved and the limited time for full assessment, no guarantee is given that every issue of relevance will be identified;
- Amending one aspect of the proposal could result in changes which would create a different set of impacts from the original plans and therefore require further assessment and advice; and,
- The Pre-DA advice given does not bind Council officers, the elected Council members, or other parties to the DA process.

Signed:



Kalpana Varghese
Team Leader
Development Assessment and Planning
Planning and Environment Services (East)



Nika Fomin
Manager
Planning and Environment Services (East)

Date: 12 March 2019