



REPORT

Brookvale Structure Plan – Strategic Bush Fire Advice Report

PREPARED FOR
NORTHERN BEACHES COUNCIL

May 2024





ACKNOWLEDGEMENT OF COUNTRY

Meridian Urban acknowledges the Traditional Owners and Custodians of the lands and waters where we live and work.

As resilience practitioners we have a responsibility in listening to and elevating Indigenous voices through our practice, and meaningfully engaging in processes of reconciliation. We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers, and pay our respect to Elders past, present and future.

Meridian Urban's 'Reflect' Reconciliation Action Plan (RAP) details our commitments to advancing cultural change, active participation and inclusive and informed approaches, with a focus on increasing economic and social equity for Aboriginal and Torres Strait Islander peoples and supporting First Nations self-determination. A copy of our RAP can be viewed online at meridianurban.com.

REVISION SCHEDULE AND QUALITY STATEMENT

Signature or typed name (DOCUMENTATION ON FILE)

Rev No.	Date	Description	Prepared by	Reviewed by	Approved by
1	28/03/2024	Draft Report	MS / KK	KK	LG
2	29/04/2024	Council comments incorporated	MS	KK	LG
3	7/05/2024	Final Report	MS	KK	KK

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Summary of findings and recommendations

This bush fire advice report has been prepared for Northern Beaches Council (Council) to provide strategic bush fire advice.

A summary of the key findings is included below:

- Once completed, Council should endorse the updated Northern Beaches Bush Fire Risk Management Plan (BFRMP);
- The ability to establish asset protection zones (APZs) on public land, in accordance with *Planning for Bush Fire Protection 2019* (PBP 2019), is heavily constrained by the existing settlement pattern and terrain;
- The area at risk of bush fire is already established with limited vacant land for new industrial development. Other areas in the study area which are targeted for intensification are located well outside of the fire hazard and not impacted. Notwithstanding, any density increases adjacent to the western boundary of employment land in the Brookvale structure plan area should be managed through the introduction of development controls;
- Ensure agreements for access within private property by New South Wales Rural Fire Service (RFS) and Council for the purpose of fire management are in place;
- Include a condition of any new development to execute a Section 88E instrument under the *Conveyancing Act 1919* to establish a positive covenant on the Certificate of Title detailing the areas to be maintained for access for the purpose of fire management; and
- Include a planning provision for the requirement of any new development to ensure that sufficient water supply quantities and pressure is provided in accordance with PBP 2019.

The mitigation measures above are considered appropriate to mitigate the potential risk relating to the changes proposed by the Brookvale structure plan to a tolerable level, having regard to the potential fire behaviour and intensity, and the limitations on this presented by the landscape context and the existing urban settlement pattern – the type and extent of which is not proposed to change.

Brookvale Structure Plan – Strategic Bush Fire Advice Report

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1 Introduction

1.1 Project background

In August 2015, Northern Beaches Council (Council) resolved to commence preparation of a structure plan for Brookvale to support the coordinated growth of the centre. In September 2017, after several months of preparation and engagement activities, Council exhibited the draft Brookvale structure plan. The draft structure plan envisaged several land use planning recommendations for the structure plan area.

Since that time, the Greater Sydney Commission finalised the Greater Sydney Region Plan and the North District Plan in March 2018. These plans reinforced Brookvale as Council's prime activity centre capable of facilitating a large proportions of the local government area's (LGA) future residential and employment growth; the primacy of Brookvale was further bolstered with the endorsement of Council's Local Strategic Planning Statement (LSPS) reflecting a similar aspiration.

Council prepared and endorsed the Brookvale structure plan in November 2023. The Brookvale structure plan proposes the delivery of 1,350 new dwellings and 900 new jobs over the next 15 years. The Brookvale structure plan optimises Brookvale's revitalisation and growth as a combined strategic centre with Dee Why. The extent of the structure plan area is displayed in **Figure 1-1** below.



Figure 1-1: Structure plan area

The structure plan identified that a number of technical studies must first be prepared to inform any future rezonings within the structure plan area, including, but not limited to a bush fire strategic study.

1.2 Purpose of report

Meridian Urban have been engaged by Council to prepare a report providing strategic bush fire advice to support the preparation of a planning proposal, development control plan and a contributions plan prepared in accordance with Section 7.11 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.2.1 Study area

The study area is the area recommended for future rezoning in the Brookvale structure plan (see **Figure 1-2** below). This report will focus on areas exposed to potential bush fire hazard, particularly the properties located within the General industry zone along Old Pittwater Road and Clearview Place arising from Allenby Park, comprising part of the Industrial west character sub-precinct.

This report also investigated the privately managed properties to the north-east of Allanby Park known as Lot 8 Beacon Hill Road, Brookvale and 8 Aperta Place, Beacon Hill. These allotments and the surrounding residential properties are included in the structure plan area. However, it is understood they are not proposed to accommodate any further intensification and as such this area has not been investigated for potential bush fire hazard.

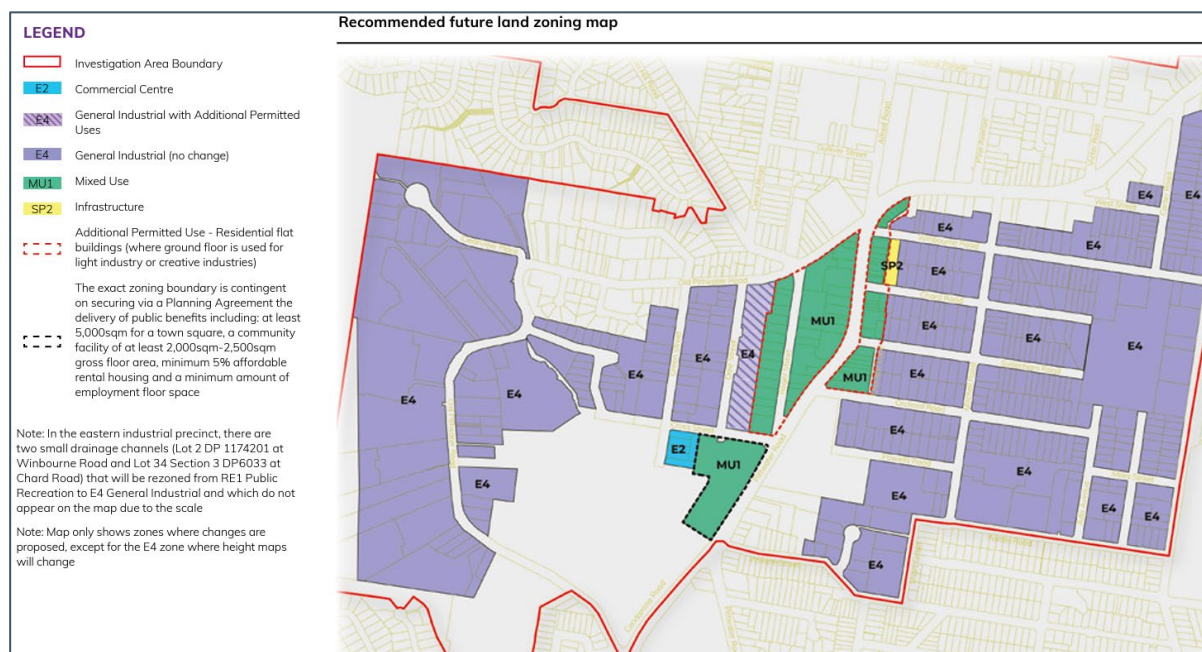


Figure 1-2: Future Land use zoning map (Source: Brookvale structure plan)

The area opposite Allenby Park that is exposed to potential bush fire hazard is an established industrial area (see **Figure 1-3**) that provides a range of larger industrial and manufacturing businesses and urban services, as well as more bespoke industries such as high technology industries including software designers and film production studios. There is limited vacant land available for new development, with some existing buildings up to 3-4 storeys in height.



STUDY AREA

LEGEND

Brookvale Structure Plan Area (White Line)

Map Number: 1.1
Revision: A

Project: 24-001
Page: A3
Date: 27/03/2024

0 0.1 0.2 km



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Figure 1-3: Study area

1.3 Project methodology

The preparation of strategic bush fire advice report for the Brookvale structure plan has been undertaken in five (5) phases as listed below:



Figure 1-4: Project methodology

1.4 Structure of this report

This report comprises of five sections as outlined below:

1	Introduction
	Provides an overview of the project, purpose of the report and the project methodology.
2	Policy context
	Provides an overview of the Brookvale structure plan policy context.
3	Strategic bush fire advice
	Provides an assessment of bush fire risk in the Brookvale structure plan area against the criteria outlined in <i>Planning for Bushfire Protection 2019</i> .
4	Recommendations
	Summarises the advice and recommendations for future development within the Brookvale structure plan area that is potentially at risk of bush fire.
5	References
	Lists the references as relevant.

2 Local policy context

2.1 Towards 2040: Local Strategic Planning Statement

Council's LSPS came into effect in March 2020 to provide a long-term vision and planning priorities to guide land use planning initiatives for Brookvale and the wider Northern Beaches LGA to the year 2040. The LSPS outlines the actions required to achieve Council's key priorities.

Priority 24 of the LSPS identified Brookvale strategic centre as an employment and innovation centre requiring precinct-level planning for infrastructure and growth. The LSPS recommended a place-based review of the then draft Brookvale Structure Plan to support long-term opportunities for higher density housing and industrial growth as a transit supportive employment centre.

Summary: The LSPS outlines Council's long-term vision for the region and identified Brookvale as a key strategic centre to support higher density housing and industrial growth.

2.2 Brookvale structure plan

The Brookvale structure plan was prepared to shape the future development of Brookvale over the next 15 years, providing strategic planning outcomes to achieve new housing and employment targets.

The Brookvale structure plan identifies five (5) character sub-precincts and future land use planning aspirations for these areas, being:

1. The Core;
2. Roger Street;
3. Pittwater Road;
4. Industrial east; and
5. Industrial west.

A map outlining the extent of these precincts is located in **Figure 2-1** below.

The Brookvale structure plan has recommended potential statutory planning controls, for land use planning changes through both built form outcomes and changes of uses for certain lots in each of the five (5) character sub-precincts.

The structure plan also identified that a number of technical studies must first be prepared to inform any future rezonings within the Brookvale structure plan area, including, but not limited to a bush fire strategic study.

The Industrial west character sub-precinct is of particular note, with bush fire prone land extending along the western boundary of the precinct and therefore it is the sub-precinct most exposed to bush fire hazard, this is expanded upon in Section 2.3 of this report.

Summary: The Brookvale structure plan identified that a strategic bush fire advice report is required for the areas at risk of bush fire (i.e. part of the Industrial west character sub-precinct).

2.2.1 Industrial west character sub-precinct

The Brookvale structure plan outlines that the Industrial west character sub-precinct will continue to primarily support a range of larger industrial and manufacturing businesses and urban services, while supporting more bespoke industries, such as high technology industries including software designers and film production studios. It also notes opportunities for less intrusive employment activities along Dale Street, such as office scale.

Of note, the Brookvale structure plan identifies capacity for building height increases in the precinct up to 18m (equivalent of 4 storeys).

Summary: Whilst facilitating increased building height in the precinct of up to 18m, the Brookvale structure plan does not envisage much change from existing land uses.

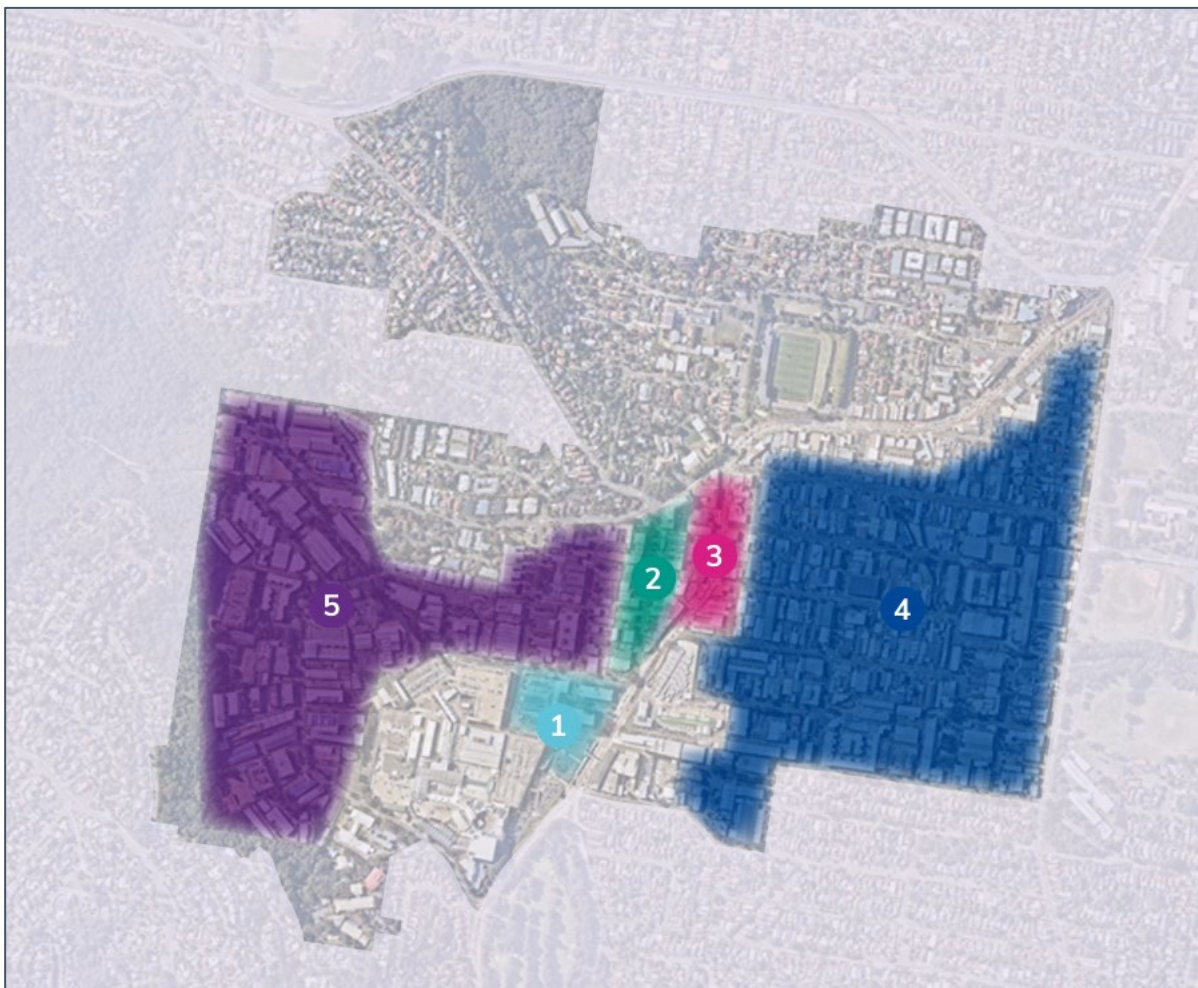


Figure 2-1: Character sub-precincts identified in the Brookvale structure plan

2.3 Bush fire prone land map

Bush fire prone land is an area of land that can sustain or is likely to be subject to bush fire threat. Bush fire prone areas are defined as those areas containing or within:

- 100m of Category 1 vegetation (high risk); or
- 30m of Category 2 (lower risk) or 3 (medium risk) vegetation.

The area of greatest exposure to bush fire in the Brookvale structure plan area is located within the Industrial west character sub-precinct as identified in **Figure 2-2** below; originating from Allenby Park immediately west of the structure plan area. Allenby Park is a pocket of relatively steep, remnant bushland that has significant environmental and biodiversity values.

Council's current bush fire prone land map was certified on 7 August 2020 by the Commissioner of the NSW Rural Fire Service.

The bush fire prone area may impact envisaged building height increases in the Industrial west character sub-precinct, particularly along the western portion. An increase in building height effectively permits an intensification of people and property in what is a bush fire prone area, thereby exposing more people to higher level of risk.

Summary: A section of land along the western boundary of the study area in the Industrial west sub-precinct is identified as being prone to bush fire.

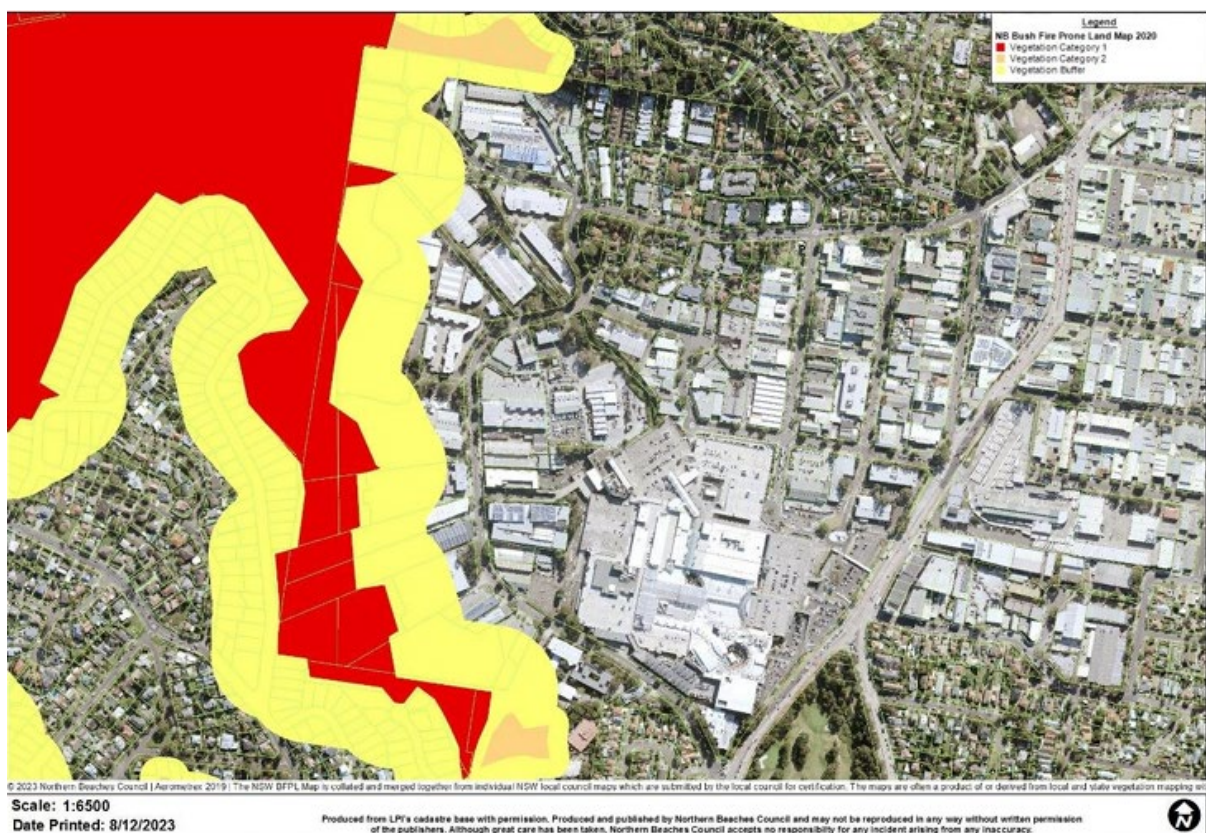


Figure 2-2: Extent of bush fire prone land in the study area

2.4 Bush Fire Risk Management Plan

Under the *Rural Fires Act 1997*, a Bush Fire Risk Management Committee (BFRMC) must be formed for local authority (Council) area where there is a reasonable risk of bush fire and requires the preparation of an associated bush fire management plan. A bush fire risk management plan is a strategic document prepared for a local council area that identifies community assets at risk from bush fire and strategies to protect these assets. Allenby Park is identified in the *Warringah Pittwater Bush Fire Risk Management Plan* (the Warringah Pittwater BFRMP) which was prepared in 2010 for the then Warringah and Pittwater Shire Council areas by the previous Warringah Pittwater Bush Fire Management Committee (now the Northern Beaches Council BFRMC).

The Northern Beaches BFMC is currently preparing an updated BFRMP for the LGA. The draft Northern Beaches BFRMP was prepared in mid-2023 and a final BFRMP is expected to be endorsed by Council shortly.

Council currently has a number of bush fire management plans for various bushland reserves. However, many of these plans pre-date the Warringah Pittwater BFRMP and warrant updating which Council is currently investigating.

2.5 Allenby Park Fire Regime Management Plan

Allenby Park, which is immediately west of the Brookvale structure plan area covers approximately 55 hectares of predominantly bushland. The area provides habitat for a number of flora and fauna species including threatened species; *Tetratheca glandulosa* and the Powerful Owl (*Ninox strenua*). Whilst no endangered ecological communities are mapped within the park, vegetation communities of regional significance, including Forest Oak Forest and Coachwood Rainforest may be found.

Internal uses within the park include educational and recreational activities such as bushwalking and picnics. The park also contains a large parcel of Sydney Water land, located in the north-western corner.

The *Allenby Park Fire Regime Management Plan, November 2006* (the AP FRMP) provides that:

- With the exception of an Aboriginal Childrens Home at the end of Lyly Road, no special protection developments, such as schools, hospitals or retirement villages occur along the park boundaries.
- Access within the park is considered to be insufficient to allow adequate response to fire events. Due to ecological constraints, the existence of slopes over 15 degrees and past planning decisions, retrospective implementation of fire trails within Asset Protection Zone (APZ) areas is considered impractical within some areas. As such access is to be managed by:
 - **Maintenance / upgrading of the access road** at Derna Crescent which provides access into Allenby Park in proximity to the Brookvale structure plan;
 - **Identification / creation and use of proposed fire access areas** (see **Figure 2-3**) which include public roads/ land, for which no additional management actions are required. Other areas fall within private lands where agreements for access by RFS and Council for the purpose of fire management is required and which negotiations should have commenced in 2006;
 - **APZ management** to allow effective personnel access as required, noting:
 - That given the nature of this site it is not considered possible to provide adequate APZs in accordance with Planning for Bush Fire Protection 2001 (PBP 2001) whilst still maintaining the ecological value of the park;
 - It is not practical to implement APZ's in areas where slopes exceed 18 degrees. Due to the topography of site there will be instances where the achievable APZ will be less than 20 metres. In such areas the APZ is to be implemented to the maximum extent possible that does not require clearing of slopes greater than 18 degrees;
 - A 20m wide APZ has been recommended for residential areas;
- **Bush fire management zones** are identified including APZs, Fire Exclusion Zones (FEZ), Land Management Zones (LMZ) and Strategic Fire Advantage Zones (SFAZ) (see **Figures 2-3**); and
- **Fire management** is co-ordinated on a landscape scale by the Northern Beaches Bush Fire Management Committee (BFMC). The management of the park is the

responsibility of Northern Beaches Council. The NSW Fire Brigade is responsible for fire suppression efforts in the park and for mapping any fires that occur.

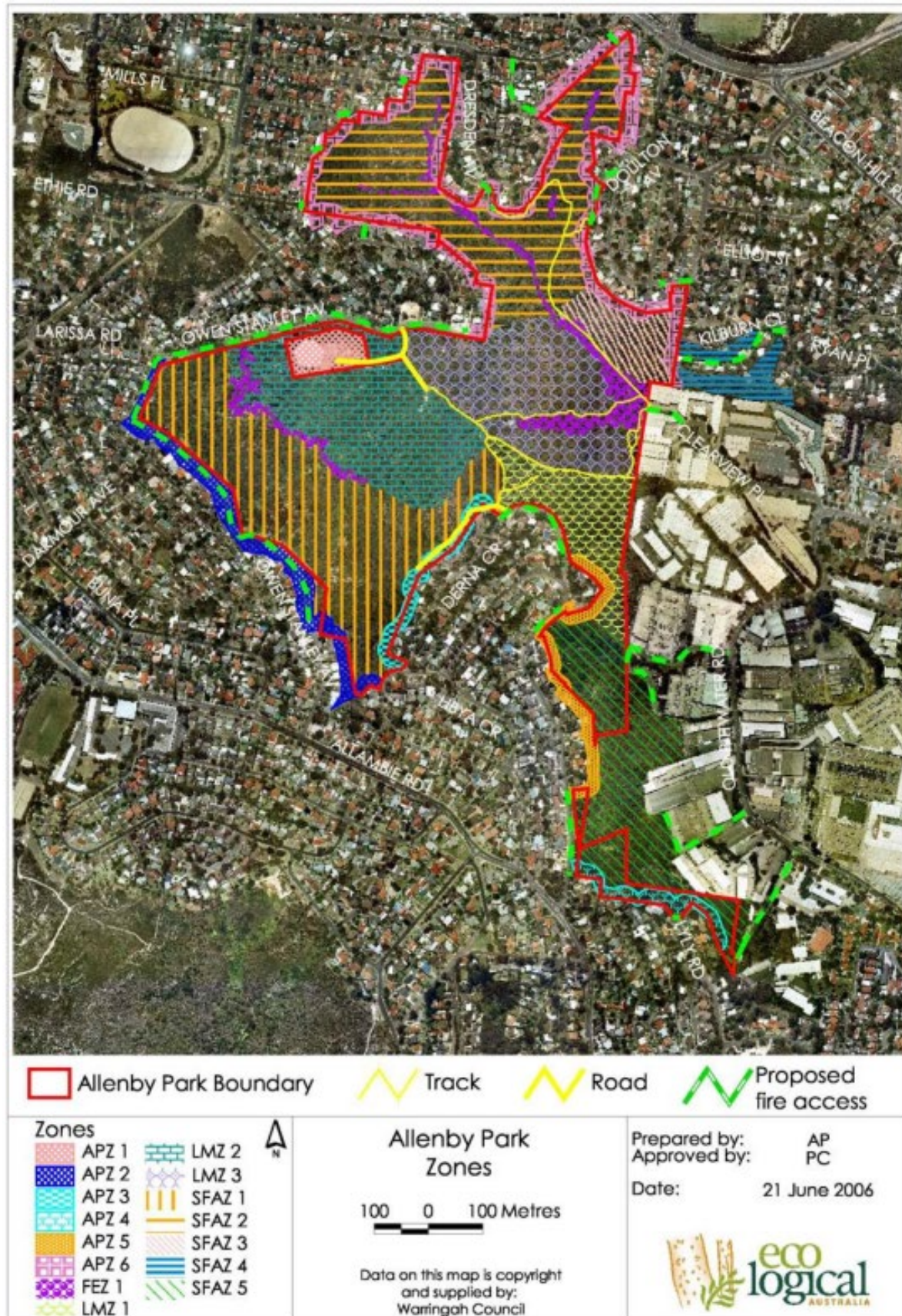


Figure 2-3: Prescribed Fire Management Zones (Source: Allenby Park Fire Regime Management Plan)

3 Strategic bush fire advice

3.1 Statutory requirements

Planning for Bush Fire Protection 2019 (PBP 2019) provides a series of development standards for designing and building on bush fire prone land. It also triggers additional planning and development controls on bush fire prone land for any new development or building work. As a portion of the study area is located within a bush fire prone area, PBP 2019 is applicable. PBP 2019 is also used to give effect to the Building Code of Australia's Australian Standard AS3959-2009 'Construction of Buildings in Bush Fire Prone Areas'.

Two main phases for planning are provided by the NSW land use planning framework including:

- Strategic planning, and
- Development assessment.

3.1.1 Strategic planning

Strategic planning is the preparation of planning instruments and policies and includes the making of Local Environmental Plans (LEPs), Development Control Plans (DCPs) and planning proposals. Chapter 4 of PBP 2019 provides that strategic bush fire planning and studies are needed to avoid high risk areas, ensure that zoning is appropriate to allow for adequate emergency access, egress, and water supplies, and to ensure that future compliance with PBP 2019 is achievable. It further states that the most important objective for strategic planning is to identify whether new development is appropriate subject to the identified bush fire risk on a landscape scale.

Appropriate consideration of bush fire hazards at the strategic planning phase is required by the Section 9.1(2) of the EP&A Act and PBP 2019, and should be considered in applying the Section 9.1 Local Planning Directions – 4.3 Planning for Bushfire Protection Local Planning Direction. PBP 2019 also notes that the NSW RFS be consulted with during the preparation of any masterplan / precinct plan.

Chapter 4 of the PBP 2019 includes several broad strategic planning principles land use planning must consider, these are:

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

Strategic development proposals in bush fire prone areas require the preparation of a strategic bush fire study. A strategic bush fire study must include as a minimum:

Table 3-1: Table 4.2.1 Bush fire strategic study excerpt from PBP 2019

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

The following assessment and analysis address the 'strategic issues' identified by the strategic bush fire study requirements provided by Chapter 4 of PBP 2019 to inform planning for the Brookvale structure plan.

3.1.2 Development assessment

At the development assessment phase, development on land that is identified as bush fire prone land must comply with PBP 2019. Commercial and industrial development on bush fire prone land is captured by Section 4.14 of the EP&A Act and must comply with the aim and objectives of PBP 2019.

Section 4.14 of the EP&A Act requires that the consent authority (i.e. Council) be satisfied that the relevant specifications and requirements of PBP 2019 are complied with for development on bush fire prone land. Any development on bush fire prone land will need to demonstrate to the consent authority that the development conforms with PBP 2019. This can be demonstrated through a certificate by a suitably qualified consultant stating that development conforms with PBP 2019. If the development does not conform, the consent authority may still grant approval, subject to consultation with the Commissioner NSW Rural Fire Service confirming the development protects people, property, and the environment from the risk of bush fire.

The aims and objectives of PBP 2019 provide for:

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

The PBP 2019 also outlines a series of objectives for Class 5 to 8 buildings under the National Construction Code, including industrial land uses. These objectives include:

- 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
- To provide for the **storage of hazardous materials away from the hazard** wherever possible.

Summary: PBP 2019 outlines a series of standards that any future any future development or building work in the bush fire prone area must adhere to.

3.2 Bush fire landscape assessment

The first aspect of a strategic bush fire study focuses on the bush fire hazard landscape, having regard to the assessment considerations outlined below.

Table 3-2: PBP 2019 strategic bush fire landscape assessment requirements

Issue	Detail	Assessment considerations
Bush fire landscape assessment	A bush fire landscape assessment considers the likelihood of a bush fire, its potential severity and intensity and the	• The bush fire hazard in the surrounding area, including: ○ Vegetation ○ Topography

Issue	Detail	Assessment considerations
	potential impact on life and property in the context of the broader surrounding landscape.	○ Weather • The potential fire behaviour that might be generated based on the above; • Any history of bush fire in the area; • Potential fire runs into the site and the intensity of such fire runs; and • The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.

The above assessment considerations are addressed as follows.

3.2.1 Vegetation

In terms of the vegetation communities present in Allenby Park, it is noted that these were mapped by Eco Logical Australia Pty Ltd as part of preparing the AP FRMP. Specimens mapped by Eco Logical include blackwood-scribbly gum and peppermint-angophora across most of the parkland adjacent to the study area.

The vegetation in Allenby Park to the immediate west of the Brookvale structure plan area, and the surrounds comprises of in-tact remnant bushland consisting of native plants, dominated by dry sclerophyll forest based on the classification system used within the publication D. A. (2004) Ocean Shores to Desert Dunes: The native vegetation of New South Wales and the ACT framework (see **Figure 3-1** (Source: State Vegetation Type Map layer, December 2023)). This forest community largely comprises Sydney Coastal Dry Sclerophyll Forest with a shrub understorey with 21.3 t/ha surface fuel load and 27.3 t/ha fuel load including the canopy layer.

This varies slightly for a small patch to the north-west of the study area where limited wet sclerophyll is present, in one of the lower-lying parts of the Allenby Park reserve. Increased fuel loads are present in this area and this was broadly verified by field inspection undertaken in February 2024. A surface fuel load of 22 t/ha is estimated in this location, up to 36.6 t/ha including canopy layer.

3.2.2 Topography

The landscape of the Brookvale structure plan area is predominantly flat. The western boundary of the structure plan area, and particularly to the rear of the industrial properties along the western side of Old Pittwater Road is steep, and is upslope (see **Figure 3-1**).

The slope of the land under classified vegetation has a direct influence on the rate of fire spread, its intensity and level of radiant heat flux. The effective slope is the slope of the ground under the hazard (being the vegetation), this is usually the steepest slope.

Allenby Park experiences a significant change in levels falling from west to east, including rocky cliff faces which are exposed in part. Contours are expressed at the Figure over-page.



VEGETATION FORMATION AND LANDSCAPE SLOPE

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Vegetation Formation From State Vegetation Type Map (SVTM) (December 2023)

LEGEND

Brookvale Structure Plan Area (White Line)	Grasslands
Cadastral	Heathlands
Contour 5m	Rainforests
Contour 20m	Saline Wetlands
Fire Trails	Dry Sclerophyll Forests (Shrubby sub-formation)
Forested Wetlands	Wet Sclerophyll Forests (Grassy sub-formation)
Freshwater Wetlands	Wet Sclerophyll Forests (Shrubby sub-formation)

Map Number: 1.1
Revision: A

Project: 24-001
Page: A3
Date: 3/05/2024

0 0.1 0.2 km

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Figure 3-1: Vegetation formation and landscape slope (Source: State Vegetation Type Mapp layer, December 2023)

3.2.3 Fire weather and local climate

The climate of Sydney, and the Northern Beaches LGA is humid subtropical with cooler winters and hotter summers, this weather is largely influenced by its proximity to the Pacific Ocean.

Allenby Park forms part of the Greater Sydney region for which PBP 2019 prescribes a Forest Fire Danger Index (FFDI) of 100. The FFDI measures the degree of fire danger for Australian vegetation relative to prevailing weather and climatic conditions which vary across days and seasons. The new Australian Fire Danger Rating System (AFDRS) transitions the measurement of fire weather to the Fire Behaviour Index (FBI). At this stage, PBP 2019 continues to measure fire weather using the FFDI. However, over time this is likely to transition.

Pursuant to PBP 2019, the 1:50 year fire weather scenario (based on annual return interval, or an annual exceedance probability of two per cent) is adopted for the purposes of informing land use planning approaches. This reflects by the same approach adopted by Australian Standard AS3959-2018 – Construction of buildings in bush fire prone areas.

As part of this report, data on wind speed and direction, rainfall and humidity data has been gathered from the Bureau of Meteorology website from the Macquarie Park (Willandra Village) Weather Station (066156) and the Terry Hills AWS Weather Station (066059), which are approximately 15km and 9.7km away respectively from the Brookvale structure plan area as the closest weather stations. Macquarie Park (Willandra Village) commenced data collection from 1970 to 2023 and provides a more comprehensive data set compared with Terry Hills, which has only been operating since 2004. Notwithstanding, data from both stations is provided below.

The 2019-20 fire weather season was record breaking for NSW. On 12 November 2019, a catastrophic fire danger warning was issued for Greater Sydney, the first of three 7-day State of Emergency declarations were issued for NSW in November, December and January.

In 2020 the Bureau of Meteorology issued a Special Climate Statement detailing the climatic factors which contributed to dangerous fire weather conditions in the 2019-20 fire season, confirming large areas of Australia had their highest accumulated FFDI for December in 2019. It also notes 2019 had the highest December accumulated FFDI for Australia as a whole, continuing the pattern seen in the spring period across NSW.

From a climate perspective, the Metropolitan Sydney Climate Change Snapshot (Office of Environment and Heritage, 2014) which is based on NSW and ACT Regional Climate Modelling (NARClIM 1.0) data provides the following:

- Maximum temperatures are projected to increase between 2020-2039 by 0.3-1.0 degree Celsius and by 1.6-2.5 degrees Celsius between 2060-2079;
- Minimum temperatures are also projected to increase over the above periods;
- The number of hot days will increase and the number of cold nights will decrease;
- Rainfall is projected to decrease over spring and winter periods, but projected to increase over summer and autumn periods; and
- Both average and severe fire weather days are projected to increase in summer and spring by 2070 (affecting both the peak risk season as well as the prescribed burn periods).

With NARClIM 2.0 data yet to be released, it could be assumed that an estimated 10 per cent uptick in FFDI may provide a reasonable proxy for climate change impact on FFDI, increasing it to 110. It is acknowledged this may not be a scientifically-accurate estimation of climate change impact on fire weather, however in the absence of relative data it aims to reflect the general increasing trend in fire intensity, also acknowledging the associated increase projected for fire frequency.

3.2.3.1 Wind speed and direction

Monthly climate statistics from 'Climate Data Online' provide wind information for the region from the Macquarie Park (Willandra Village) Weather Station from 1970 to 2023.

Monthly Bureau of Meteorology statistics for the 3pm observations (around the time where FFDI peaks each day) have been considered for each month of the fire season from August to March, and then annually. Observations of weather over the past approximately 50 years of the Bureau of Meteorology have indicated that the prevailing wind direction is from the South-East.

3.2.3.2 Rainfall

Mean rainfall data is available via the Bureau of Meteorology's 'Climate Data Online' facility, with data sourced from the Macquarie Park (Willandra Village) Weather Station from 1970 to 2023 and from Terry Hills AWS Weather Station from 2004 (see **Figure 3-2**).

The highest mean rainfall months each year are typically January, February and March where the rainfall exceeds 120mm in each month. Rainfall decreases significantly in May before increasing in June. July through to September experiences periods of lower rainfall before increasing again slightly in October. The months of August and September (Spring) as the period of increased bush fire hazard, with lower soil and biomass moisture contents from the drier winter period combining with rising daytime temperatures increases the bush fire risk.

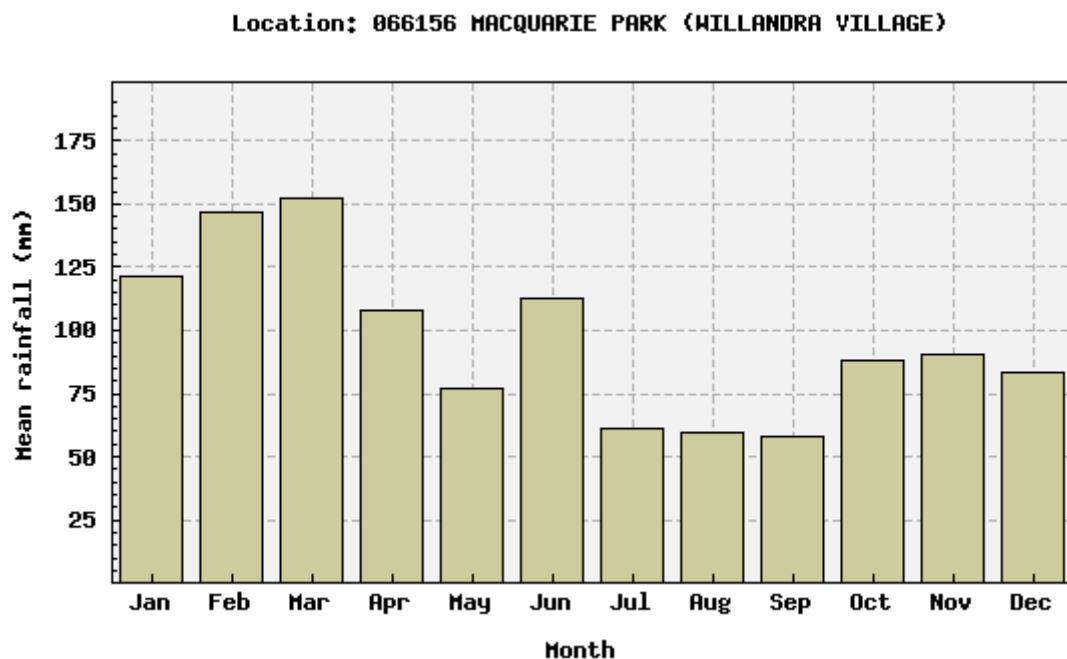


Figure 3-2: Mean rainfall for Macquarie Park (Willandra Village) Weather Station (Source: BoM)

Location: 066059 TERREY HILLS AWS

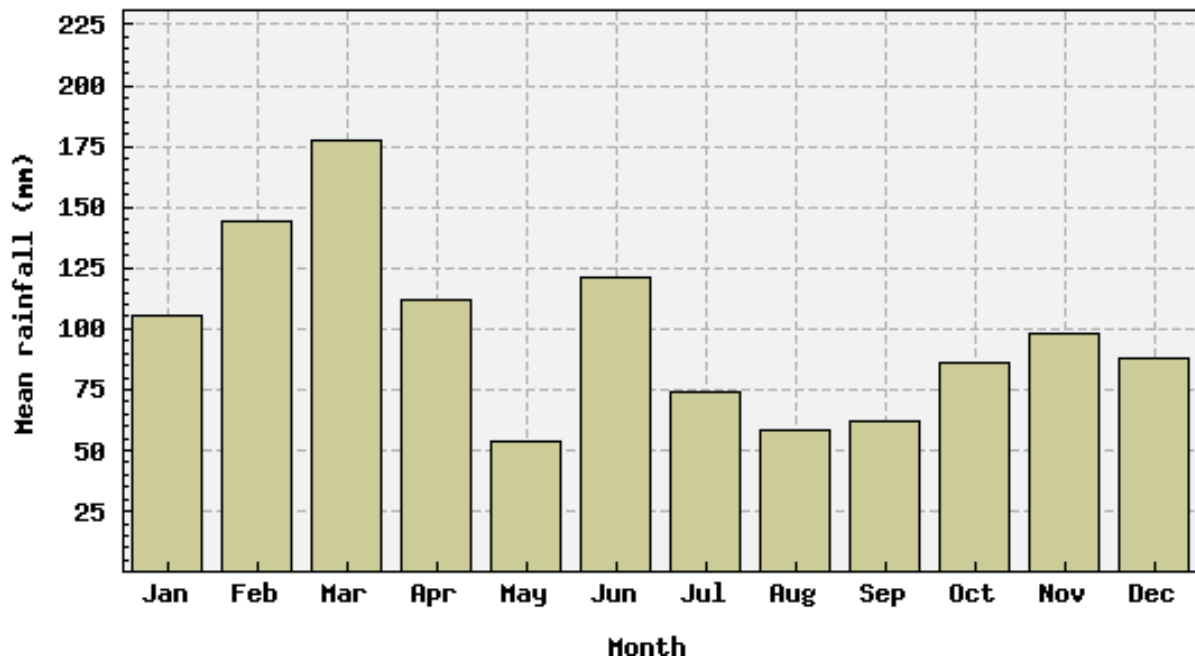


Figure 3-3: Mean rainfall for Terry Hills AWS Weather Station (Source: BoM)

3.2.4 Fire behaviour, fire history and key fire runs

The AP FRMP identified that 80 per cent of Allenby Park has been burnt since 1952. The most recent fire to occur on the site was in 2005 due to arson, resulting in areas of Fire Exclusion Zone (consisting of Coachwood Rainforest) being burnt (see **Figure 3-4**). The AP FRMP further provides that past fires seem to have been concentrated in the north, especially around the park boundaries.

Allenby Park is not identified as being subject to recent fire as part of the NSW Government Fire Extent and Severity Mapping available via the SEED portal.



WILDFIRE HISTORY

LEGEND

Brookvale Structure Plan Area (White Line)	Heathlands
Wildfire History NPWS (2005-2006)	Rainforests
Cadastral	Saline Wetlands
Fire Trails	Dry Sclerophyll Forests (Shrubby sub-formation)
Forested Wetlands	Wet Sclerophyll Forests (Grassy sub-formation)
Freshwater Wetlands	Wet Sclerophyll Forests (Shrubby sub-formation)
Grasslands	

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Map Number: 1.1
Revisions: A

Project: 24-001
Page: A3
Date: 24/04/2024

0 0.1 0.3 km

Figure 3-4: Allenby Park Fire history

The part of the Allenby Park bushland corridor that extends along the western boundary of the Brookvale structure plan area is elevated above the industrial west character sub-precinct. This part of the bushland corridor is also more than 100m in width in parts. Whilst this provides opportunity for fire runs, these runs are limited in the case of west to easterly transition, given the steep terrain across the corridor. Likelihood of fire runs toward the sub-precinct are higher from the north, running south along the corridor. This also limits the effect that the change in terrain is likely to have, but it also potentially reduces the width of the corridor exposed to running fire from the north. Irrespective, application of the short fire run procedure is not adopted for the purpose of this study.

The results of the fireline intensity for this area are presented below, for four (4) attributes:

1. Dry sclerophyll fuel loads at FFDI 100;
2. Dry sclerophyll fuel loads at FFDI 110;
3. Wet sclerophyll fuel loads at FFDI 100; and
4. Wet sclerophyll fuel loads at FFDI 110.

It is noted that wet sclerophyll communities occurs only in a small isolated patch to the north-west of the sub-precinct.

			
Calculated March 14, 2024, 12:47 pm (MDc v.4.9)			
Brookvale West			
Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	2.73 km/h
Vegetation classification	Forest	Flame length	21.07 m
Understorey fuel load	21.3 t/ha	Flame angle	52 °, 62 °, 69 °, 73 °, 75 ° & 82 °
Total fuel load	27.3 t/ha	Elevation of receiver	8 m, 8.91 m, 9.27 m, 9.31 m, 9.289999999999999 m & 8.44 m
Vegetation height	n/a	Fire intensity	38,627 kW/m
Effective slope	1 °	Transmissivity	0.861, 0.838, 0.8090000000000001, 0.783, 0.77 & 0.714
Site slope	1 °	Viewfactor	0.608, 0.4545, 0.3085, 0.2095, 0.1703 & 0.046
Flame width	100 m	Minimum distance to < 40 kW/m ²	17 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	22.6 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	32 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	43.7 m
		Minimum distance to < 10 kW/m ²	50.9 m
Rate of Spread - McArthur, 1973 & Noble et al., 1980 Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980 Elevation of receiver - Douglas & Tan, 2005 Flame angle - Douglas & Tan, 2005 Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005			

Figure 3-5: Fireline intensity calculation for dry sclerophyll fuels at FFDI 100

FLAMESOL FPA AUSTRALIA			
Calculated April 4, 2024, 4:46 pm (MDc v.4.9)			
Brookvale West (cc)			
Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	110	Rate of spread	3.01 km/h
Vegetation classification	Forest	Flame length	22.85 m
Understorey fuel load	21.3 t/ha	Flame angle	52 °, 61 °, 68 °, 72 °, 74 ° & 81 °
Total fuel load	27.3 t/ha	Elevation of receiver	8.68 m, 9.57 m, 9.99 m, 10.05 m, 10.04 m & 9.199999999999999 m
Vegetation height	n/a	Fire intensity	42,490 kW/m
Effective slope	1 °	Transmissivity	0.859, 0.834, 0.805, 0.779, 0.766 & 0.711
Site slope	1 °	Viewfactor	0.6122, 0.4567, 0.3099, 0.2103, 0.1712 & 0.0461
Flame width	100 m	Minimum distance to < 40 kW/m ²	18.3 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	24.3 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	34.2 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	46.4 m
		Minimum distance to < 10 kW/m ²	53.8 m
Rate of Spread - Mearthur, 1973 & Noble et al., 1980 Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980 Elevation of receiver - Douglas & Tan, 2005 Flame angle - Douglas & Tan, 2005 Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005			

Figure 3-6: Fireline intensity calculation for dry sclerophyll fuels at FFDI 110 (climate change proxy applied)

FLAMESOL FPA AUSTRALIA			
Calculated April 4, 2024, 5:01 pm (MDc v.4.9)			
Brookvale West WS			
Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	2.82 km/h
Vegetation classification	Forest	Flame length	22.77 m
Understorey fuel load	22 t/ha	Flame angle	52 °, 61 °, 68 °, 72 °, 74 ° & 81 °
Total fuel load	36.6 t/ha	Elevation of receiver	8.65 m, 9.529999999999999 m, 9.960000000000001 m, 10.02 m, 10.01 m & 9.16 m
Vegetation height	n/a	Fire intensity	53,488 kW/m
Effective slope	1 °	Transmissivity	0.858, 0.834, 0.805, 0.779, 0.767 & 0.711
Site slope	1 °	Viewfactor	0.61, 0.4551, 0.3099, 0.2108, 0.171 & 0.0461
Flame width	100 m	Minimum distance to < 40 kW/m ²	18.3 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	24.3 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	34.1 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	46.2 m
		Minimum distance to < 10 kW/m ²	53.7 m
Rate of Spread - Mearthur, 1973 & Noble et al., 1980 Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980 Elevation of receiver - Douglas & Tan, 2005 Flame angle - Douglas & Tan, 2005 Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005			

Figure 3-7: Fireline intensity calculation for wet sclerophyll fuels at FFDI 100

FLAMESOL FPA AUSTRALIA			
Calculated April 4, 2024, 5:06 pm (MDc v.4.9)			
Brookvale West WS (cc)			
Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	110	Rate of spread	3.11 km/h
Vegetation classification	Forest	Flame length	24.61 m
Understorey fuel load	22 t/ha	Flame angle	52 °, 61 °, 67 °, 72 °, 73 ° & 81 °
Total fuel load	36.6 t/ha	Elevation of receiver	9.35 m, 10.31 m, 10.69 m, 10.85 m, 10.78 m & 9.99 m
Vegetation height	n/a	Fire intensity	58,837 kW/m
Effective slope	1 °	Transmissivity	0.855, 0.83, 0.801, 0.775, 0.763 & 0.708
Site slope	1 °	Viewfactor	0.6119, 0.4578, 0.3114, 0.2115, 0.1718 & 0.0463
Flame width	100 m	Minimum distance to < 40 kW/m²	19.8 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	26 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	36.3 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	48.9 m
		Minimum distance to < 10 kW/m²	56.6 m
Rate of Spread - McArthur, 1973 & Noble et al., 1980 Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980 Elevation of receiver - Douglas & Tan, 2005 Flame angle - Douglas & Tan, 2005 Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005			

Figure 3-8: Fireline intensity calculation for wet sclerophyll fuels at FFDI 110 (climate change proxy applied)

For the dry sclerophyll community, fireline intensity range from 38,627kW/m to 42,490kW/m (climate adjusted), and likewise this is elevated further for the isolated patch of wet sclerophyll where a pocket of increase fire behaviour and intensity may be driven by the fuel characteristics in this specific location.

Despite this potential, likelihood of reaching these levels of fireline intensity is limited by the terrain and also the width of the corridor. Notwithstanding, bush fire can still occur and the results of the fireline intensity indicate that a bush fire could pose a risk to development and its occupants.

3.2.5 Enabling land management and firefighting suppression

The AP FRMP provides that given the ecological and slope constraints within the park, access is insufficient to allow adequate response to fire events. The AP FRMP further provides that given the nature of the park, it is not considered possible to provide adequate APZs in Allenby Park nor on the adjacent properties in the Industrial west character sub-precinct that would accord with PBP given the:

- Presence of high ecological values including fire intolerant species and assets which are to exclude fires (both wildfires and hazard reduction burning) in some parts of the park; and
- Steep topography of site, with slopes exceeding 18 degrees in some areas; and

- The area exposed to potential bush fire hazard is currently an established urban interface area with limited vacant land for new industrial development, with some existing buildings already up to 3-4 storeys in height

The AP FRMP recommends a 20m wide APZ for residential areas.

The most appropriate land management for Allenby Park is through prescribed works with the park having a history of hazard reduction burns.

Bush fire management zones and associated fire management actions were identified within the AP FRMP. Along the western and northern boundary of the Brookfield structure plan adjacent to Allenby Park, the following management zones and associated fire management actions were identified (see **Figure 2-3** and **Figure 3-8**):

- **FEZ1** – Areas containing fire intolerant species and assets and are to exclude fires (both wildfires and hazard reduction burning) due to the presence of fire intolerant assets for the life of the AP FRMP;
- **LMZ1** – Areas where two fires within five years will reach the threshold;
- **LMZ3** – Areas where one fire before 2011 or two fires in five years will reach the threshold;
- **SFAZ5 and SFAZ3** – Due to practicality and potential ecological impacts, it has been agreed by all parties that SFAZ 5 and SFAZ 3 only be burnt once within the life of the AP FRMP. This may result in fuel exceeding ELA's recommended fuel prescription for maximum fine fuel loading within a range of 8 – 18 tonnes per hectare; and
- **SFAZ4** – Areas where prescribed burning is to be undertaken, ensuring sufficient areas of old age class communities are left within the reserve with two fires in five years reaching the threshold.

There is a continuation of this program with burns planned in the future, however there are significant challenges given topography constraints and access restrictions into the park, and subsequently a significant amount of planning and preparation is required from agencies. The continued program of hazard reduction burns will, as indicated in the AP FRMP:

- Provide for fuel reduced areas which enable the protection of assets by fire fighters when Asset Protection Zones are not in place;
- Complement Asset Protection Zones where insufficient protection is provided;
- Provide fuel reduced zones in areas of high ignition potential (e.g. along roads, rail lines, power lines etc.) to slow the development of fires, reduce their spread, and provide for safe suppression; and
- Provide strategically located fuel reduced areas to reduce the vulnerability of assets which are susceptible to fire.

Given the date of the AP FRMP, it is strongly recommended that bush fire threat is managed in accordance with the latest BFRMP.

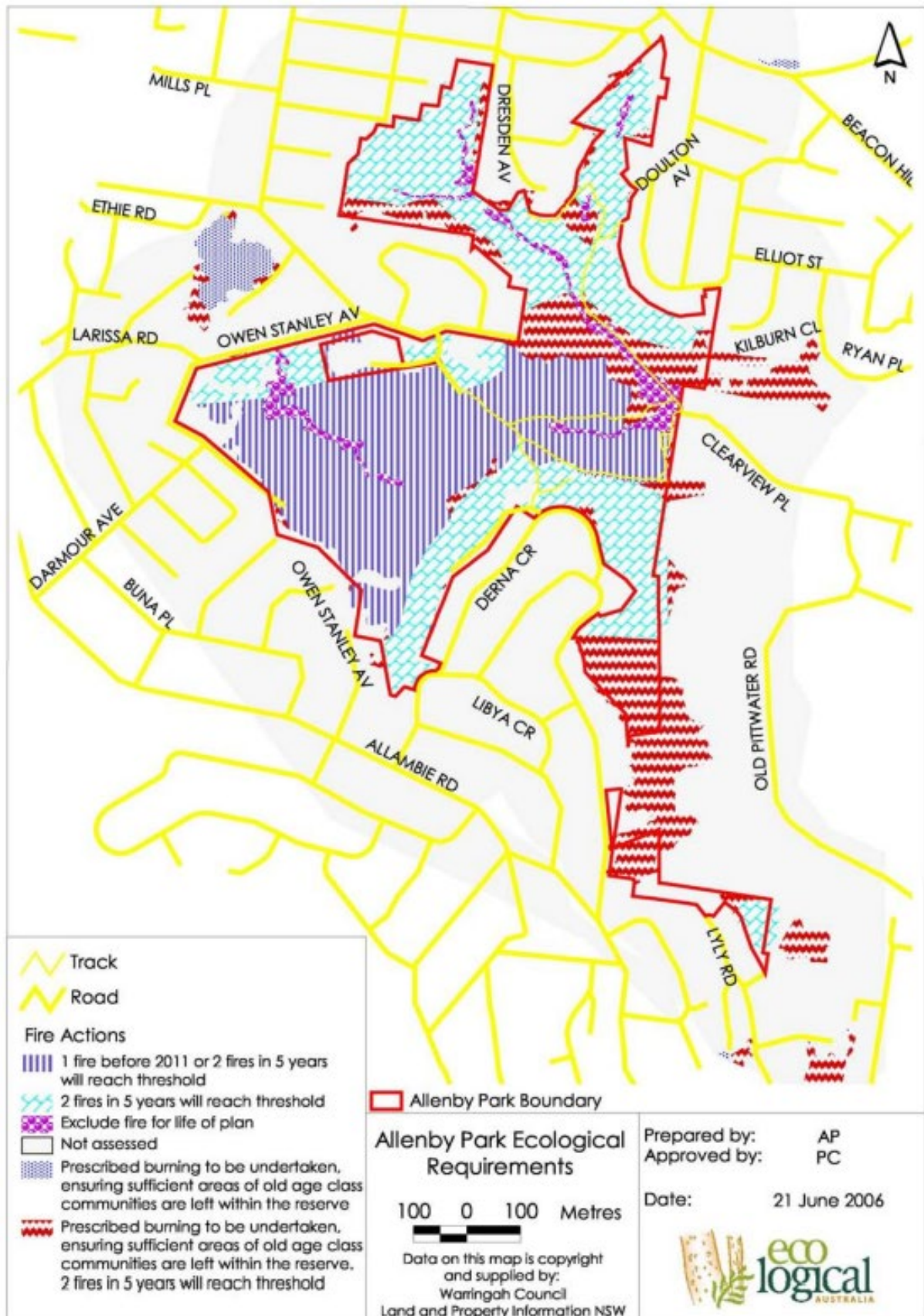


Figure 3-9: Ecological fire requirements (Source: Allenby Park Fire Regime Management Plan)

3.3 Land use assessment

The second aspect of a strategic bush fire study focuses on the assessment of the appropriateness of potential land uses, having regard to the assessment considerations outlined below.

Table 3-3: PBP 2019 strategic land use assessment requirements

Issue	Detail	Assessment considerations
Land use assessment	The land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses.	- The risk profile of different areas of the development layout based on the above landscape study; - The proposed land use zones and permitted uses; - The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site); and - The impact of the siting of these uses on APZ provision.

The above assessment considerations are addressed as follows.

3.3.1 Land use risk profile, siting and asset protection

This study focuses on Allenby Park, particularly the interface between Allenby Park and the industrial west sub-precinct area of the Brookvale structure plan.

The area exposed to potential bush fire hazard is currently an established urban interface area with limited vacant land for new industrial development, with some existing buildings already up to 3-4 storeys in height. The construction of the existing buildings also uses limited non-flammable materials however, not all are of contemporary building standard.

The Brookvale structure plan proposes **no change** to the provision of existing land uses which will continue to primarily support a range of larger industrial and manufacturing businesses and urban services, as well as more bespoke industries such as high technology industries including software designers and film production studios. Other areas in the study area which are targeted for intensification are located well outside of the fire hazard and not impacted.

The Brookvale structure plan recommends an increase in building height up to 3-4 storeys in the Industrial west character sub-precinct, which is exposed to bush fire hazard. Whilst some existing buildings are already up to 18 metres in height, any further intensification of development should be cognisant of the bush fire threat and provide measures that reduce the risk to life and property. It is noted that to this end and in accordance with section 4.14 of the EP&A Act, PBP would be required to be assessed. APZs would be required, though Chapter 8 of PBP 2019 notes that APZs for industrial activities are intended to be fit-for-purpose and such no specific APZ requirements are provided. It is noted however, that the area exposed to potential bush fire hazard is currently an established urban interface area with limited vacant land for new industrial development. Notwithstanding, where new or redevelopment is proposed, APZs could be encouraged within the boundaries of each land parcel, through opportunities for hardstand, outdoor storage, vehicle turn arounds and car parking to occupy APZ areas. Such design solutions are considered acceptable from a strategic perspective, acknowledging the urban context of the area and ability for immediate evacuation into the existing urban environment. Development control standards which reflect this could be considered.

The continuation of Council's existing program of hazard reduction is the most appropriate bush fire management approach for this area, noting that it is recommended that bush fire

threat is managed in accordance with the Northern Beaches BFRMP and incorporates the latest fire science and industry practices.

3.4 Access and egress

The strategic bush fire study provisions also requires a focus on the assessment of emergency access and evacuation ability, having regard to the assessment considerations outlined below.

Table 3-4: PBP 2019 strategic access and egress (evacuation) requirements

Issue	Detail	Assessment considerations
Access and egress	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	- The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile; - The location of key access routes and direction of travel; and - The potential for development to be isolated in the event of a bush fire.

The above assessment considerations are addressed as follows.

The western boundary of the Industrial west character sub precinct is the only identified area of bush fire hazard in the Brookvale structure plan area. Other areas in the study area which are targeted for intensification are located well outside of the fire hazard and not impacted.

There are a series of existing road connections within the Brookvale structure plan area, with access and egress maintained to the front of existing industrial properties located along the western boundary. Opportunity for further subdivision is largely limited. Where amalgamation of parcels occur, increased opportunity for bush fire protection measures to be implemented will exist. The rear of the properties along Old Pittwater Road are affected by and directly adjoin bush fire prone land. Creating access and egress via the rear of the property and a de facto buffer of hardstand is likely unfeasible for the large part, with access likely to be maintained through the front of properties.

The established road network is anchored by Old Pittwater Road which links with Condamine Street in the south and Pittwater Road in the north. It is a key access road for the Warringah Mall. A gridded street pattern is present, with additional connections to Pittwater Road provided by Cross Street. Alternative egress is provided in the north via Beacon Hill Road and in the south via Smith Avenue. The urban context of the sub-precinct provides multiple opportunities for evacuation immediately and directly to the broader urban area, away from the hazard interface. This area generally comprises high vehicle volumes on a daily basis, peaking during normal business hours and reducing outside of business hours – in evenings and on weekends.

3.5 Emergency services

The strategic bush fire study provisions further require the assessment of emergency services requirements, having regard to the assessment considerations outlined below.

Table 3-5: PBP 2019 strategic emergency services requirements

Issue	Detail	Assessment considerations
Emergency services	An assessment of the future impact of new	Consideration of the increase in demand for emergency services responding to a

Issue	Detail	Assessment considerations
	development on emergency services.	bush fire emergency including the need for new stations/ brigades; and Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency.

The above assessment considerations are addressed as follows.

3.5.1 Increase in demand and reliance on emergency services

It could be contemplated that any intensification of urban development inherently increases the local employment population, which in-turn increases demand or reliance on local emergency services.

However, given the nature and extent of industrial activities already established in the industrial west character sub-precinct, as well as those which may locate within the area into the future is likely to require continuous government investment in:

- The ongoing program of bush fire hazard reduction in accordance with the BFRMP;
- Continued fire services resources, training, facilities and equipment for urban fire, HAZMAT and bush fire suppression; and
- Noting the nature of the intended changes proposed by the Brookvale structure plan for the industrial west character sub-precinct, it is not anticipated that reliance on future fire suppression services would be higher than at present.

3.5.2 Ability for suppression

Given the extent of site coverage of the existing industrial development in this area, together with the steep slope constraints, it is not considered possible to provide a perimeter road. Notwithstanding, the network of existing road connections and access and egress via private properties provides control line points for enabling access for firefighting operations in case of emergency. Carparking and hardstand areas would also facilitate such on-site outcomes.

The AP FRMP also identifies a number of fire access points, as well as access roads and tracks (see **Figure 2-3**). The AP FRMP also provides that agreements for access within private property by RFS and Council for the purpose of fire management were required to be obtained and negotiations can commence for this in future if they have not already. Council should seek to endorse the Northern Beaches Council BFRMP to reflect this.

As part of a condition of development, a Section 88E instrument under the *Conveyancing Act 1919* should be executed to establish a positive covenant on the Certificate of Title detailing the areas to be maintained for access for the purpose of fire management.

3.6 Infrastructure

The strategic bush fire study provisions further require the assessment of infrastructure requirements, having regard to the assessment considerations outlined below.

Table 3-6: PBP 2019 strategic considerations for infrastructure

Issues	Detail	Assessment considerations
Infrastructure	An assessment of the issues associated with infrastructure and utilities.	The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants; and

Issues	Detail	Assessment considerations
		Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.

The above assessment considerations are addressed as follows.

3.6.1 Water supply

The area is already serviced by reticulated water supply. Sufficient water supply quantities and pressure is required as part of any water supply system for the precinct.

Compliance with the above satisfies the PBP 2019 provisions in relation to flow, pressure and integrity of the water supply. PBP 2019 further requires that hydrants are not located within any road carriageway. Noting the age of this area, hydrant access may require performance-based solutions for development on the basis of the limitations of the existing settlement pattern.

Provisions in relation to water supply are required to be incorporated within any development controls, as a fundamental component of firefighting.

3.6.2 Strategic infrastructure proximity and protection

A powerline transmission easement traverses east-west through the centre of Allenby Park from Owen Stanley Avenue to Clearview Place in the Industrial west character sub-precinct. It is assumed the infrastructure is maintained in accordance with industry specifications relating to bush fire protection. The onus is on the asset owner to ensure the transmission lines are managed from a risk perspective. Additionally, there does not appear to be any high pressure gas pipelines present within Allenby Park.

3.7 Adjoining land

The strategic bush fire study provisions require the assessment of implications for adjoining lands, having regard to the assessment considerations outlined below.

Table 3-7: PBP 2019 strategic considerations for adjoining land

Issue	Detail	Assessment considerations
Adjoining land	The impact of new development on adjoining landowners and their ability to undertake bush fire management.	Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans.

The above assessment considerations are addressed as follows.

3.7.1 Impact on adjoining lands

In terms of adjoining lands and landholders, it is noted that the majority of the surrounding land comprises existing industrial land uses. For land management relating to these uses, and given the nature and extent of the already established industrial activities, ongoing government investment in land management is likely to be required through a program of hazard reduction burns in accordance with the Northern Beaches BFRMP.

For residential activities in the broader structure plan area, the exposure remains unchanged as no change to existing densities at the interface is proposed.

4 Recommendations

The Brookvale structure plan identified that a strategic bush fire report is required for areas at risk of bush fire. This study focused on Allenby Park, particularly the interface between Allenby Park and the industrial west sub-precinct area of the Brookvale structure plan.

4.1 Strategic bush fire observations

Based on the assessment of the strategic bush fire study requirements under Chapter 4 of PBP 2019, the following advice is provided:

Landscape

- The AP FRMP provides that given the ecological and slope constraints within the park, access is constrained for fire response. This is exacerbated by the existing settlement pattern. It is not considered possible to provide adequate APZs on public land in accordance with PBP and confined within the relevant allotment;
- The AP FRMP recommended a 20m wide APZ for residential areas. It is acknowledged the majority of residential development in the area was constructed prior to the introduction of PBP;

Land uses

- The area at risk of bush fire is established with limited vacant land for new industrial development, with some existing buildings up to 3-4 storeys in height;
- The Brookvale structure plan proposes no change to the provision of existing land uses which will continue to primarily support a range of larger industrial and manufacturing businesses and urban services, as well as more bespoke industries such as high technology industries including software designers and film production studios;
- Other areas in the study area which are targeted for intensification are located well outside of the fire hazard and not impacted;
- The Brookvale structure plan recommends an increase in building height in the Industrial west character sub-precinct, which is exposed to bush fire hazard. Whilst some existing buildings are already up to 3-4 storeys in height, any intensification of development should be cognisant of the bush fire threat and provide measures that reduce the risk to life and property;
- The continuation of the program of hazard reduction burns is the most appropriate bush fire management approach for this area and will complement the bush fire protection measures in place for the existing industrial area (though these should not be relied upon to the exclusion of other measures);

Access and egress:

- Creating access and egress via the rear of the property and a de facto buffer of hard stand is likely unfeasible, with access likely to be maintained through the front of properties;

Emergency services:

- Given the nature and extent of industrial activities already established in the area, as well as those which may locate within the area into the future is likely to require continuous government investment in:
 - The ongoing program of bush fire hazard reduction burns in accordance with the Northern Beaches BFRMP; and

- Continued fire services resources, training, facilities and equipment for urban fire, HAZMAT and bush fire suppression;
- Given the extent of existing industrial development in this area, together with the steep slope constraints, it is not considered possible to provide a perimeter road.
- The network of existing road connections and access and egress via private properties provides control line points for enabling access for firefighting operations in case of emergency. Carparking and hardstand areas would also facilitate such on-site outcomes;
- Agreements for access within private property by RFS and Council for the purpose of fire management should be required with a condition of development requiring a Section 88E instrument under the *Conveyancing Act 1919* to be executed to establish a positive covenant on the Certificate of Title detailing the areas to be maintained for access for the purpose of fire management.

Infrastructure:

- The area is already serviced by reticulated water supply. Sufficient water supply quantities and pressure is required as part of any water supply system for the precinct in accordance with PBP 2019;
- A powerline transmission easement traverses east-west through Allenby Park. It is assumed the infrastructure is maintained in accordance with industry specifications relating to bush fire protection. The onus is on the asset owner to ensure the transmission lines are managed from a risk perspective; and

Adjoining land

- The majority of the surrounding land comprises existing industrial activities and therefore ongoing government investment in land management is likely to be required through a program of hazard reduction burns in accordance with the Northern Beaches Council BFRMP. However, it should be noted that these burns cannot be relied upon as they are dependent on weather and fire agency resources.

4.2 Mitigation measures

Based on the above advice, the following bush fire mitigation measures are recommended (see **Figure 4-1**):

- Council to contribute to the implementation of the Northern Beaches BFRMP;
- Ensure through assessment processes that the heights of buildings are not increased from current requirements, along the western boundary adjacent to bush fire prone land in the Brookvale structure plan area;
- Incorporate development controls, where possible, with options for hardstand, vehicle turn around, car parking, outdoor storage to provide separation to the hazard such as:

Development is to orient hardstand, manoeuvring and vehicle parking to the rear, or otherwise provide separation between the built form and adjoining bush fire hazard.

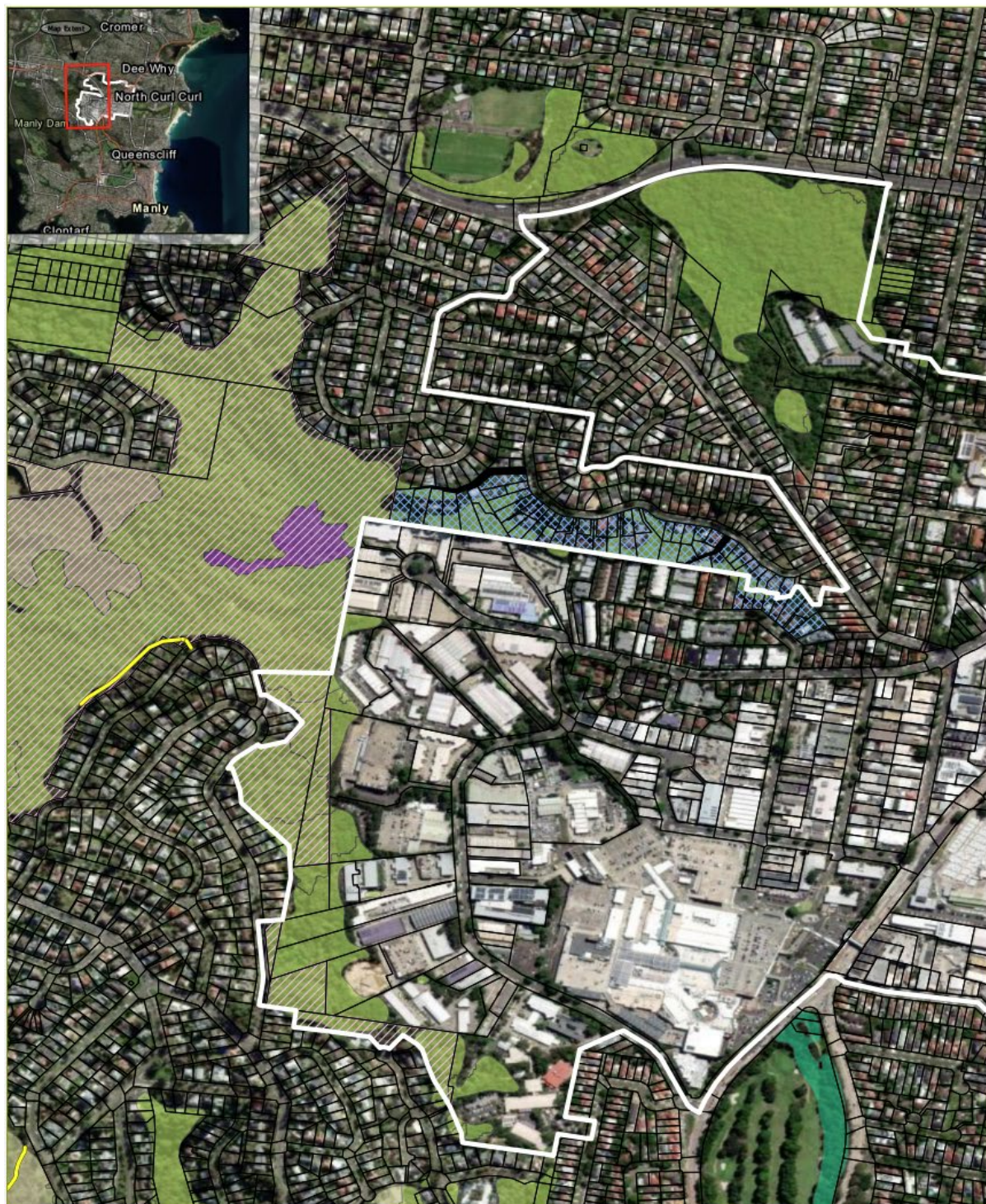
- Ensure agreements for access within private property by RFS and Council for the purpose of fire management are in place;
- Include a condition of any new development to execute a Section 88E instrument under the *Conveyancing Act 1919* to establish a positive covenant on the Certificate

of Title detailing the areas to be maintained for access for the purpose of fire management; and

- Include a planning provision for the requirement of any new development to ensure that sufficient water supply quantities and pressure is provided in accordance with PBP 2019.

The bush fire strategic outcomes map on the following page provides an overview of the vegetation communities, existing AP FRMP extents and measures, and fire trail network. It highlights that some parts of the corridor are situated on private land, and land management therefore is the responsibility of various private landholders in perpetuity.

The mitigation measures above are considered appropriate to mitigate the potential risk relating to the changes proposed by the Brookvale structure plan to a tolerable level, having regard to the potential fire behaviour and intensity, and the limitations on this presented by the landscape context and the existing urban settlement pattern – the type and extent of which is not proposed to change.



BUSHFIRE STRATEGIC OUTCOME

LEGEND

Brookvale Structure Plan Area (White Line)	Grasslands
Cadastre	Heathlands
No Consequence	Rainforests
Areas Covered By Existing FMP	Saline Wetlands
Fire Trails	Dry Sclerophyll Forests (Shrubby sub-formation)
Forested Wetlands	Wet Sclerophyll Forests (Grassy sub-formation)
Freshwater Wetlands	Wet Sclerophyll Forests (Shrubby sub-formation)

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0 0.1 0.2 km

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Figure 4-1: Bush fire strategic outcomes (Source: State Vegetation Type Mapp layer, December 2023)

