



Bushfire Assessment

Planning Proposal

Gwynneville Precinct

Homes NSW

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(Ref: 23061)

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Executive summary

Objective

This Bushfire Assessment Report was commissioned by Homes NSW to inform a Planning Proposal application seeking approval to rezone land to facilitate redevelopment and intensification of the Gwynneville Precinct to provide additional housing. The objective was to assess the bushfire hazard and recommend bushfire protection measures to achieve compliance with the relevant specifications and requirements for protection against bushfires.

Compliance with legislation and policy

A Planning Proposal on bushfire prone land must have regard to Section 9.1(2) Direction 4.3 – ‘Planning for Bush Fire Protection’ of the *Environmental Planning and Assessment Act 1979* as well as the NSW Rural Fire Service document ‘Planning for Bush Fire Protection 2019’. Although not mapped bushfire prone land at time of report publication, a revised map is due for release and may identify the site as bushfire prone land.

Bushfire hazard

The bushfire hazard consists of a low hazard corridor along the M1 Motorway corridor to the east of Irvine Street. The site is within an urbanised area and the hazards are confined to urban bushland patches which are separated from the site. There are no hazards within the site.

Measures to achieve compliance

Bushfire protection measures recommended within this report to achieve the requirements are listed below:

- Provision of APZ building setback to low hazard to the east of Irvine Street.
- Vegetation and landscaping within 100 m of the hazard is to be maintained to achieve Inner Protection Area (IPA) standards.
- Buildings comply with relevant BAL in accordance with Australia Standard AS 3959-2018 *Construction of buildings in bushfire prone areas*.
- Public road design within 100 m of the hazard is to comply with Table 5.3b of ‘Planning for Bush Fire Protection 2019’.
- Hydrants are to be installed as part of future developments in accordance with Australian Standard AS 2419.1:2021 – *Fire hydrant installations: System design, installation and commissioning*.

Conclusion

The report concludes that the Planning Proposal together with the recommended bushfire protection measures satisfies the specifications and requirements of Ministerial Direction No. 4.3 and *Planning for Bush Fire Protection*.

1 Introduction

1.1 Background

This Bushfire Assessment Report has been prepared by Peterson Bushfire on behalf Homes NSW (formerly the NSW Land and Housing Corporation - LAHC) to support a planning proposal for urban renewal of land at Gwynneville, NSW. It presents the assessment and recommendations to ensure compliance with the relevant bushfire protection legislation and policy.

This bushfire assessment has been prepared by a consultant accredited by the Fire Protection Association of Australia's BPAD scheme (Accreditation No. BPD-L3-18882).

1.2 Location and description of subject land


Covering approximately 9 hectares in area, the Gwynneville Precinct is located 2 km north-west of the Wollongong CBD. The site sits immediately south of the University of Wollongong, and east of the Botanic Gardens. Irvine Street makes up the site's eastern boundary, with Murphy Avenue to the south. The location of the Gwynneville Precinct is shown on Figure 1.

The Northfields Avenue Bus Interchange is approximately 150m northwest of the site, and North Wollongong Railway Station is approximately 1km to the east.

Many of the existing dwellings in Gwynneville were constructed by the NSW Government during the 1950s. The precinct is made up of predominantly single storey detached dwellings set in a modified grid-type street layout.



Legend

 Subject Land



Date: 15/06/2023

0 250 500 1,000
Metres

Figure 1: The Location of the Subject Land

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

1.3 Description of proposal

The Gwynneville precinct has been identified as a location capable of supporting more social, affordable and diverse private market housing for the Illawarra community, and to contribute to addressing NSW's housing crisis.

The site currently comprises approximately 131 residential lots, consisting of:

- A total of 79 social dwelling units on 75 individual lots owned by LAHC; and
- Approximately 56 privately owned dwelling units on 56 individual lots.

Over 60% of the homes in the precinct are owned by Homes NSW, providing an opportunity to consider additional density while taking into account key constraints such as traffic, views to and from Mount Keira as well potential to increase and embellish existing areas of open space.

Redevelopment of the Gwynneville precinct requires a formal rezoning process to confirm an amended land use zone; increased FSR and building heights, and result in improvements to the current street network pedestrian connectivity, open space / parkland, and public amenity.

Homes NSW propose amending the Wollongong Local Environmental Plan 2009 (WLEP) to help deliver a diverse range of housing typologies which will include additional social and affordable housing, market housing products and seniors housing, as well as opportunities to develop build-to-rent, key worker housing and student accommodation.

The planning proposal intends to change the current zone of the land from R2 Low Density Residential to R4 High Density Residential, with new and expanded areas of RE1 Public Recreation. This will create the opportunity for more low to mid- rise apartments in the precinct.

The base FSR of 0.5:1 and the height control of 9m that currently applies to the precinct is not proposed to change. However, building height and FSR incentives will facilitate site amalgamation to create lots more capable of accommodating increased density and providing amenity. Height and FSR bonuses will be contingent upon achieving design excellence outcomes, providing public benefits such as social and affordable housing, and increased public open space within the precinct.

Homes NSW aims to create a high-amenity, walkable residential neighbourhood with an increased density and choice of affordable and diverse housing options that provide for a broad range of community needs and family types - including students, people on low incomes, people with disability and seniors.

New residential development will enable increased housing choices within in a well-connected location benefiting from frequent free shuttle bus services operating between University of Wollongong, North Wollongong railway station and a multitude of destinations including the city centre and hospital.

2 Assessment requirements




Planning Proposal submissions involving sites mapped as containing 'bush fire prone land' must have regard to Section 9.1(2) Direction 4.3 – 'Planning for Bush Fire Protection' of the *Environmental Planning and Assessment Act 1979* as well as the NSW Rural Fire Service document 'Planning for Bush Fire Protection 2019' (referred to as 'PBP' throughout this report).

The site was not mapped as bushfire prone land on the Wollongong Bush Fire Prone Land Map at time of report publication. Figure 2 shows the closest bushfire prone land to the site, being 290 m to the south and 660 m to the west.




It is important to note that a draft map had been prepared and publicly exhibited prior to publication of this report. It has been reported anecdotally that the draft map has identified bushland remnants along the M1 Motorway to the east of Irvine Street and to the west within the Wollongong Botanic Gardens as bushfire prone vegetation which could identify the site as bushfire prone land upon certification and release of the map. This study has therefore been prepared on the basis that the site is considered bushfire prone land, as it is expected that the revised Wollongong Bush Fire Prone Land Map may be released during the assessment of the Planning Proposal or subsequent planning stages.



Legend

-  Watercourse
-  Subject Land
-  Cadastre

Bushfire Prone Land

-  Vegetation Category 1
-  Vegetation Category 2
-  Vegetation Buffer



Date: 15/06/2023

0 75 150 300
Metres

Figure 2: Bushfire Prone Land

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

2.1 Direction 4.3 requirements

When investigating the capability of bushfire prone land to be rezoned, submissions must have regard to Section 9.2 Direction 4.3 – ‘Planning for Bush Fire Protection’ of the *Environmental Planning and Assessment Act 1979*. The objectives of Direction 4.3 are:

- *To protect life, property and the environment from bushfire hazards, by discouraging the establishment of incompatible land uses in bushfire prone areas; and*
- *To encourage sound management of bushfire prone areas.*

Direction 4.3 instructs councils on the bushfire matters which need to be addressed when drafting and amending Local Environmental Plans (LEP). They are as follows:

- *In the preparation of a planning proposal the relevant planning authority must consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 3.34 of the Act, and prior to undertaking community consultation in satisfaction of clause 4, Schedule 1 to the EP&A Act, and take into account any comments made.*
- *A planning proposal must:*
 - *have regard to the document Planning for Bush Fire Protection 2019;*
 - *introduce controls that avoid placing inappropriate developments in hazardous areas; and*
 - *ensure that bushfire hazard reduction is not prohibited within the Asset Protection Zone (APZ).*
- *A planning proposal must, where development is proposed, comply with the following provisions, as appropriate:*
 - *provide an Asset Protection Zone (APZ) incorporating at a minimum:*
 - *an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and,*
 - *an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road.*
 - *for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under Section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with,*

- *contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks,*
- *contain provisions for adequate water supply for fire-fighting purposes,*
- *minimise the perimeter of the area of land interfacing the hazard which may be developed,*
- *introduce controls on the placement of combustible materials in the Inner Protection Area.*

2.2 PBP assessment requirements

Most of the Direction 4.3 provisions are specified within PBP. This report addresses both Direction 4.3 and PBP, combining responses to requirements where there is overlap between the requirements.

PBP also specifies the type of bushfire assessment and level of information and detail required for Planning Proposal submissions. PBP Section 4 'Strategic Planning' outlines the submission requirements. The Planning Proposal is to be assessed in accordance with PBP Section 4.4.1 whereby the nature, scale and risk of the proposal and its potential impact on the wider infrastructure network is such that a Strategic Bush Fire Study (SBFS) is not required in accordance with PBP Section 4.2. A SBFS is required for strategic development proposals whereby new areas are to be developed.

2.2.1 PBP assessment requirements for residential development

Chapter 5 of PBP addresses residential development and outlines the assessment methodology and protection measures, such as Asset Protection Zones (APZ), Bushfire Attack Levels (BAL), adequate access and water supply for fire-fighting, and vegetation management.

2.2.2 PBP assessment requirements for SFPP development

Chapter 6 of PBP addresses 'Special Fire Protection Purpose' (SFPP) development and outlines the assessment methodology and protection measures, such as Asset Protection Zones (APZ), Bushfire Attack Levels (BAL), adequate access and water supply for fire-fighting, emergency management, and vegetation management. SFPP development that could be considered at the site includes seniors living.

3 Bushfire hazard

An assessment of the surrounding bushfire hazard is necessary to determine the suitability of the proposed future land use as well as the required bushfire protection measures, such as Asset Protection Zones (APZ), that may be required between future development and bushfire hazards. The bushfire hazard is a combination of vegetation and slope determined in accordance with methodology specified by PBP.

The site and surrounding bushfire hazards were inspected on 7th June 2023. Photographs are provided in Appendix A.

3.1 Predominant vegetation

The vegetation within 140 m of the site has been assessed in accordance with the methodology specified by PBP. The identified bushfire hazards are mapped on Figure 3 and described below. The hazards consist of planted vegetation along the M1 Motorway corridor to the east of the site and within the Wollongong Botanic Gardens to the west of the site.

To the east, the vegetation is separated from the site predominantly by Irvine Street. The vegetation forms a linear corridor aligned north to south, parallel to the site boundary along the eastern side of Irvine Street. Narrow corridors of vegetation may be classified as 'low hazard' in accordance with Section A1.11.1 of PBP, regardless of structure and floristics. The vegetation formation of 'rainforest' is used to determine APZ and BAL for low hazard vegetation.

To the west, the vegetation is planted wet sclerophyll forest within the Wollongong Botanic Gardens. The vegetation is greater than 100 m from the site. The gardens immediately adjacent the site and within at least 100 m is in a managed state and consists of ornamental displays within managed garden beds amongst expansive areas of lawns.

Within the southern portion of the site between Spearing Avenue and Murphys Avenue, a small patch of vegetation is situated along a drainage line within Spearing Reserve. The patch is less than 0.3 hectare and would not exceed 1 hectare with additional riparian plantings. The patch is therefore classified 'low threat vegetation – exclusion' in accordance with Section A1.10 of PBP. Due to its small size (i.e. less than 1 hectare) and significant separation from other bushfire hazards (i.e. greater than 100 m), the patch is not classified as a bushfire hazard and does not require consideration for the assessment of APZ and BAL.

3.2 Effective slope

The 'effective slope' influencing fire behaviour has been assessed in accordance with the methodology specified within PBP. This is conducted by measuring the slope that would most influence fire behaviour where the hazard occurs within 100 m of the subject land. The slope was determined using a 2 m contour layer as shown on Figure 3. The effective slope within the 100 m assessment area is within the PBP slope class of 'downslope 0-5 degrees' underneath the low hazard corridor to the east. The slope classes are indicated on Figure 3.



Legend

- Contour - 2m
- Watercourse
- Cadastre
- Subject Land

- Vegetation Assessment Buffer - 140m
- Asset Protection Zone - 14m
- Asset Protection Zone - SFPP - 47m

Vegetation Formation

- Forest
- Low Hazard
- Low Threat



Date: 15/06/2023

0 25 50 100
Metres

Figure 3: Bushfire Hazard Analysis and Asset Protection Zone

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

4 Addressing compliance

This section details how compliance with the assessment requirements listed in Section 2 are addressed. The response to requirements is set out following the structure of Direction 4.3, followed by PBP. There is duplication of requirements between Direction 4.3 and PBP; in these cases, the relevant report subsection is referred to for the appropriate response.

4.1 Direction 4.3

The objectives of Direction 4.3 can only be satisfied once the provisions are achieved. Demonstration of achieving the provisions is provided below (Section 4.1.2). Statements of how the objectives are achieved are as follows:

4.1.1 Objectives

Objective 1

“To protect life, property and the environment from bushfire hazards, by discouraging the establishment of incompatible land uses in bushfire prone areas”

The intention of the objective is to avoid a development outcome that is faced by or poses a risk that cannot be managed to an acceptable level (i.e. compliant with PBP). The assessment of ‘incompatible’, ‘inappropriate’ and ‘acceptable’ is a subjective one, and one that is not defined within PBP, legislation or related policy. To guide an assessment, reference should be made to the measures specified by PBP (see Section 4.2 of this report), such as the ability to establish and maintain adequate APZs, and the assurance of acceptable access and evacuation.

This Bushfire Assessment Report demonstrates that the hazard does not exceed an acceptable level. This is achieved by implementing the recommendations therefore making it compatible with the surrounding environment. The rezoning and intended uses do not involve a development outcome at significant or unacceptable risk.

Objective 2

“To encourage sound management of bushfire prone areas”

The recommended bushfire protection measures demonstrate sound management of the site for the intended use. The provisions and how they are to be addressed are listed in Section 4.1.2.

4.1.2 Provisions

Provision 1

“have regard to Planning for Bush Fire Protection 2019”

Addressing this provision is detailed in Section 4.2. The Planning Proposal complies with PBP.

Provision 2

“introduce controls that avoid placing inappropriate developments in hazardous areas”

The proposal is not considered inappropriate in the context of the surrounding environment (i.e. suburban) and the level of hazard (low). Controls (bushfire protection measures) will be set in place to ensure compliance with PBP. The controls are set out in Section 4.2.

Provision 3

“ensure that bushfire hazard reduction is not prohibited within the Asset Protection Zone (APZ)”

Bushfire hazard reduction is not required within the site or APZs as they are already a managed environment. The available APZs comprise of the site and adjoining managed lands that are routinely managed, such as road reserves and open space.

Provision 4

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

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

APZs will be provided as detailed in Section 4.2. Perimeter access is also available in the form of existing roads.

Provision 5

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

Section 4.2 details the application of compliant APZs.

Provision 6

“contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks”

The site benefits from existing two-way roads including a perimeter road. More detail on the access requirements is detailed in Section 4.2.

Provision 7

“contain provisions for adequate water supply for fire-fighting purposes”

All aspects of future development will have a hydrant supply that complies with PBP. More details are provided at Section 4.2.

Provision 8

“minimise the perimeter of the area of land interfacing the hazard which may be developed”

The hazard interface is fixed and defined by the existing low hazard corridor to the east. Hazard interface areas are not excessive and do not create incursions of hazard into the development, ‘bottle-necks’ or ‘pinch-points’.

Provision 9

“introduce controls on the placement of combustible materials in the Inner Protection Area”

Section 4.2 details the how the subject land is to be maintained to be compliant with the standard of an Inner Protection Area.

4.2 Planning for Bush Fire Protection 2019 (PBP)

Compliance with ‘Planning for Bush Fire Protection 2019’ (PBP) is achieved by addressing the provisions of PBP Chapter 5 ‘Residential and Rural Residential Subdivisions’ and Chapter 6 ‘Special Fire Protection Purpose Developments’. Sections 4.2.1 to 4.2.6 below outline the bushfire protection measures integrated into the design to ensure compliance with PBP.

4.2.1 Asset Protection Zones (APZ)

Using the hazard parameters of vegetation and slope discussed in Section 3, the Acceptable Solution Asset Protection Zone (APZ) between future buildings and the bushfire hazard has been determined in accordance with PBP (Table A1.12.1 for SFPP development and Table A1.12.2 for residential development). Table 1 on the following page lists the APZ results and the APZ is shown on Figure 3.

Only one APZ is required to the site, which is situated along Irvine Street. A 14 m APZ is required for residential development, which is wholly accommodated within the Irvine Street road reserve, and a 47 m APZ is required for SFPP uses such as seniors living. The larger SFPP APZ impacts the eastern edge of the site fronting Irvine Road.

Table 1: Determination of APZ

Location ¹	Vegetation ²	Slope ³	Residential APZ ⁴	SFPP APZ ⁵
North	Managed	Not required	Not required	Not required
East	Low hazard	Downslope 0-5°	14 m	47 m
South	Managed / low threat - exclusion	Not required	Not required	Not required
West	Forest	Not required	Not required	Not required

¹ Location of hazard with reference to site boundary.

² Predominant vegetation classification over 140 m from site boundary.

³ Effective slope assessed over 100 m from site boundary where the bushfire hazard occurs.

⁴ Minimum APZ required by PBP Acceptable Solution for residential development (Table A1.12.2).

⁵ Minimum APZ required by PBP Acceptable Solution for SFPP development (Table A1.12.1).

4.2.2 Construction standards

The Bushfire Attack Levels (BAL) for the site have been determined in accordance with PBP Table A1.12.5. Figure 4 shows the BALs affecting the site.

Buildings are to be designed and constructed to comply with the relevant BAL as mapped. The corresponding BAL construction specifications are listed within Australian Standard AS 3959-2018 *Constructions of buildings in bushfire-prone areas* (AS 3959). The NSW variation to AS 3959 is also to be applied to the BAL requirements. The variation can be found at Section 7.5.2 of PBP.



Legend

- Contour - 2m
- Watercourse
- Cadastre
- Subject Land

Vegetation Assessment Buffer - 140m

Vegetation Formation

- Forest
- Low Hazard

Low Threat

Bushfire Attack Level

- BAL Flame Zone
- BAL 40

BAL 29

BAL 19

BAL 12.5

roadsegment



DKGIS

Date: 15/06/2023

0 25 50 100
Metres

Figure 4: Bushfire Attack Level

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

4.2.3 Vegetation management and landscaping

The site and available APZs currently comply with the performance of an Inner Protection Area (IPA) as described within Appendix A4.1.1 of PBP.

Trees and landscaping will be removed to allow construction of buildings. Proposed landscaping within the lots impacted by BALs (refer to Figure 4) should comply with IPA requirements. Lots outside of the BAL affectation area should not be required to comply as these areas will not be within 100 m of a bushfire hazard and therefore not bushfire prone land by definition.

The IPA requirements stated within PBP are repeated below:

A4.1.1 Inner Protection Areas (IPAs)

The IPA is the area closest to the building and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and act as a defendable space. Vegetation within the IPA should be kept to a minimum level. Litter fuels within the IPA should be kept below 1cm in height and be discontinuous.

In practical terms the IPA is typically the curtilage around the building, consisting of a mown lawn and well maintained gardens.

When establishing and maintaining an IPA the following requirements apply:

- **Trees**
 - *tree canopy cover should be less than 15% at maturity;*
 - *trees at maturity should not touch or overhang the building;*
 - *lower limbs should be removed up to a height of 2m above the ground;*
 - *tree canopies should be separated by 2 to 5m; and*
 - *preference should be given to smooth barked and evergreen trees.*
- **Shrubs**
 - *create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided;*
 - *shrubs should not be located under trees;*
 - *shrubs should not form more than 10% ground cover; and*
 - *clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.*
- **Grass**
 - *grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and*
 - *leaves and vegetation debris should be removed.*

4.2.4 Access

Alternate access and egress

PBP requires an access design that enables safe evacuation whilst facilitating adequate emergency and operational response.

The site benefits from multiple access points into the surrounding road network. Two access points onto Irvine Street to the east are available, and a third access point onto Murphys Avenue to the south is also available. The adjoining road network provides access into all directions.

The multiple access roads ensure compliance with PBP in regard to alternate access for evacuation and operational response.

Perimeter access

Irvine Street will provide compliant perimeter access and defensible space to the bushfire hazard identified within 100 m of the site.

Design standards of public roads

The roads that are within 100 m of the bushfire hazard (i.e. impacted by BAL on Figure 5) are to comply with the PBP Acceptable Solutions for public roads in bushfire prone areas as required by PBP Table 5.3b. The requirements are repeated below.

Irvine Street complies with the standard of a 'perimeter road' as it can maintain an 8 m wide carriageway with cars parked on either side. The remaining streets do not comply with a 'non-perimeter road' standard as they are not wide enough to accommodate on-street parking whilst maintaining a minimum 5.5 m carriageway width. The roads are 7 m wide and currently allow parking on either side.

PBP design standards for roads servicing residential subdivision:

- *Property access roads are two-wheel drive, all weather roads.*
- *Perimeter roads are provided for residential subdivisions of three or more allotments.*
- *Subdivisions of three or more allotments have more than one access in an out of the development.*
- *Traffic management devices are constructed to not prohibit access by emergency service vehicles.*
- *Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient.*
- *All roads are through roads.*
- *Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end.*

- *Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road.*
- *Where access/egress can only be achieved through forest, woodland or heath vegetation, secondary access shall be provided to an alternate point on the existing public road system.*
- *One way public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.*
- *The capacity of perimeter and non-perimeter road surfaces and any bridges and causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); Bridges/causeways to clearly indicate load rating.*
- *Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.*
- *Hydrants are provided in accordance with AS 2419.1:2005 – Fire hydrant installations: System design, installation and commissioning.*
- *There is suitable access for a Category 1 fire appliance to within 4 m of the static water supply where no reticulated supply is available.*
- *Perimeter roads are:*
 - *two-way sealed roads;*
 - *minimum 8 m carriageway width kerb to kerb;*
 - *parking is provided outside of the carriageway width;*
 - *hydrants are located clear of parking reserves;*
 - *through roads, and these are linked to the internal road system at an interval of no greater than 500 m;*
 - *curves of roads have a minimum inner radius of 6 m;*
 - *the maximum road grade is 15° and average grade of not more than 10°;*
 - *the road crossfall does not exceed 3°;*
 - *a minimum vertical clearance of 4 m to any overhanging obstruction, including tree branches, is provided.*
- *Non-perimeter roads are:*
 - *Minimum 5.5 m width kerb to kerb;*
 - *parking is provided outside of the carriageway width;*
 - *hydrants are located clear of parking areas;*

- *through roads, and these are linked to the internal road system at an interval of no greater than 500 m;*
- *curves of roads have a minimum inner radius of 6 m;*
- *the road crossfall does not exceed 3°;*
- *a minimum vertical clearance of 4 m to any overhanging obstruction, including tree branches, is provided.*

4.2.5 Water supply for fire-fighting

Future buildings will require fire hydrants to be installed to comply with Australian Standard AS 2419.1 – 2021 *Fire Hydrant Installations - System Design, Installation and Commissioning* (AS 2419).

4.2.6 Emergency management

A 'Bushfire Emergency Management and Evacuation Plan' is typically prepared for buildings or facilities prior to occupation. Plans are to be prepared in accordance with the NSW Rural Fire Service document 'A Guide to Developing a Bushfire Emergency Management and Evacuation Plan' (RFS 2014).

Given the nature of the low hazards and suburban context, preparation of such plans for future development proposals is not considered essential.

5 Conclusion

The information presented in this Bushfire Assessment Report demonstrates that the proposal to amend the zoning at the subject land to allow redevelopment and intensification can satisfy the Ministerial Direction No. 4.3 – ‘Planning for Bush Fire Protection’ and the requirements of ‘Planning for Bush Fire Protection 2019’.

Bushfire protection measures recommended within this report to achieve the requirements are listed below:

- Provision of APZ building setback to low hazard to the east of Irvine Street.
- Vegetation and landscaping within 100 m of the hazard is to be maintained to achieve Inner Protection Area (IPA) standards.
- Buildings comply with relevant BAL in accordance with Australia Standard AS 3959-2018 *Construction of buildings in bushfire prone areas*.
- Public road design within 100 m of the hazard is to comply with Table 5.3b of ‘Planning for Bush Fire Protection 2019’.
- Hydrants are to be installed as part of future developments in accordance with Australian Standard AS 2419.1:2021 – *Fire hydrant installations: System design, installation and commissioning*.



David Peterson
Director



References

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NSW Rural Fire Service (RFS) 2019. *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities, and Developers*. State of New South Wales through the NSW Rural Fire Service, 2019.

Standards Australia. 2018. *Construction of buildings in bushfire-prone areas*, AS 3959, Standards Australia International Ltd, Sydney.

Standards Australia 2021. *Fire hydrant installations - System design, installation and commissioning*, AS2419.1, Standards Australia International Ltd, Sydney.

Appendix A - Photographs



Photograph 1: Low threat (exclusion) riparian vegetation within Spearing Reserve



Photograph 2: Commencement of forest hazard within botanic gardens over 100 m to the west



Photograph 3: Managed trees over lawn within botanic gardens adjacent western boundary of site



Photograph 4: Example of managed garden beds within botanic gardens

