Travers

bushfire & ecology

bushfire protection assessment

Proposed Seniors Living Development
Bankstown Golf Club

Lot 13 DP 584447 & Lot 612 DP 837981
70 Ashford Avenue, Milperra

Under Section 100B of the Rural Fires Act (1997)

September 2019
(Ref: 18HPS03)

Bushfire Protection Assessment

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File:	18HPS03

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The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

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EXECUTIVE SUMMARY

A bushfire protection assessment has been undertaken for the purpose of a Site Compatibility Certificate in support of a proposed senior's housing development including the construction of approximately 149 independent living units and new clubhouse within the eastern portion of the existing Bankstown Golf Club located at 70 Ashford Avenue, Milperra.

The proposed development is categorised by the NSW Rural Fire Service (RFS) as being a special fire protection purpose (SFPP) development and as a result the proposed future development is to comply with *Planning for Bush Fire Protection (PBP).* This proposal has been prepared in accordance with the pre-release version of *Planning for Bush Fire Protection 2018 (PBP 2018)* in its entirety and the proposed development can comply with all relevant performance requirements in this version of *PBP.*

PBP dictates that the subsequent extent of bushfire attack that can potentially impact a SFPP building must not exceed a radiant heat flux of 10kW/m^2. This rating assists in determining the size of the asset protection zone (APZ) to provide the necessary defendable space between hazardous vegetation and a building.

The assessment found that bushfire can potentially affect the proposed development from the narrow strip of forest vegetation located to the west and north of the proposed development area resulting in the proposed buildings being exposed to potential radiant heat and ember attack.

The bushfire risk posed to the development can be mitigated as appropriate bushfire protection measures can be in place and managed in perpetuity.

The assessment has concluded that the proposed development can provide compliance with:

- APZs in accordance with the performance criteria outlined in *Pre-release PBP 2018;*
- Provision of access in accordance with the performance criteria outlined in *Pre-release PBP 2018*;
- Water, electricity and gas supply in compliance with the acceptable solutions outlined in *Pre-release PBP 2018;*
- Future dwelling construction in compliance with the appropriate construction sections of *AS3959-2018*, and *Pre-release PBP 2018 (BAL 12.5)*.

GLOSSARY OF TERMS

APZ	asset protection zone
AS1596	*Australian Standard – The storage and handling of LP Gas*
AS2419	*Australian Standard – Fire hydrant installations*
AS3745	*Australian Standard – Planning for emergencies in facilities*
AS3959	*Australian Standard – Construction of buildings in bushfire-prone areas 2009*
BAL	bushfire attack level
BCA	*Building Code of Australia*
BSA	bushfire safety authority
EEC	endangered ecological community
EP&A Act	*Environmental Planning & Assessment Act 1979*
FDI	fire danger index
ha	hectare
IPA	inner protection area
m	metres
OPA	outer protection area
PBP	*Pre-release Planning for Bush Fire Protection 2018*
RF Act	*Rural Fires Act 1997*
RFS	NSW Rural Fire Service
SFPP	special fire protection purpose
TSC Act	*Threatened Species Conservation Act 1995*

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Introduction 1

Travers bushfire & ecology has been requested to undertake a bushfire protection assessment for the proposed senior's housing development including the construction of approximately 149 independent living units and new clubhouse within the eastern portion of the existing Bankstown Golf Club located at 70 Ashford Avenue, Milperra.

The western portion of the site is located on land mapped by Cantebury-Bankstown Council as being bushfire prone. This triggers a formal assessment by Council in respect of the NSW Rural Fire Service (RFS) policy against the provisions of *Planning for Bush Fire Protection (PBP).*

1.1 Aims of the assessment

The aims of the bushfire protection assessment are to:

- review the bushfire threat to the landscape
- undertake a bushfire attack assessment in accordance with *PBP*
- provide advice on mitigation measures, including the provision of asset protection zones (APZs), construction standards and other specific fire management issues
- review the potential to carry out hazard management over the landscape.

1.2 Project synopsis

The proposed senior's housing development will include the construction of approximately 149 independent living units and new clubhouse within the eastern portion of the existing Bankstown Golf Club. The proposal includes the construction of four (4) residential flat buildings with four (4) to six (6) stories with basement car parking facilities. The proposal also includes the construction of a community services building and golf club (refer Figure 1.1 & 1.2).

Access to the site will be provided via Bullecourt Avenue in the south and Ashford Avenue in the east.

Figure 1.1 – Proposed site plan
(Source: Altis Architecture, July 2019)

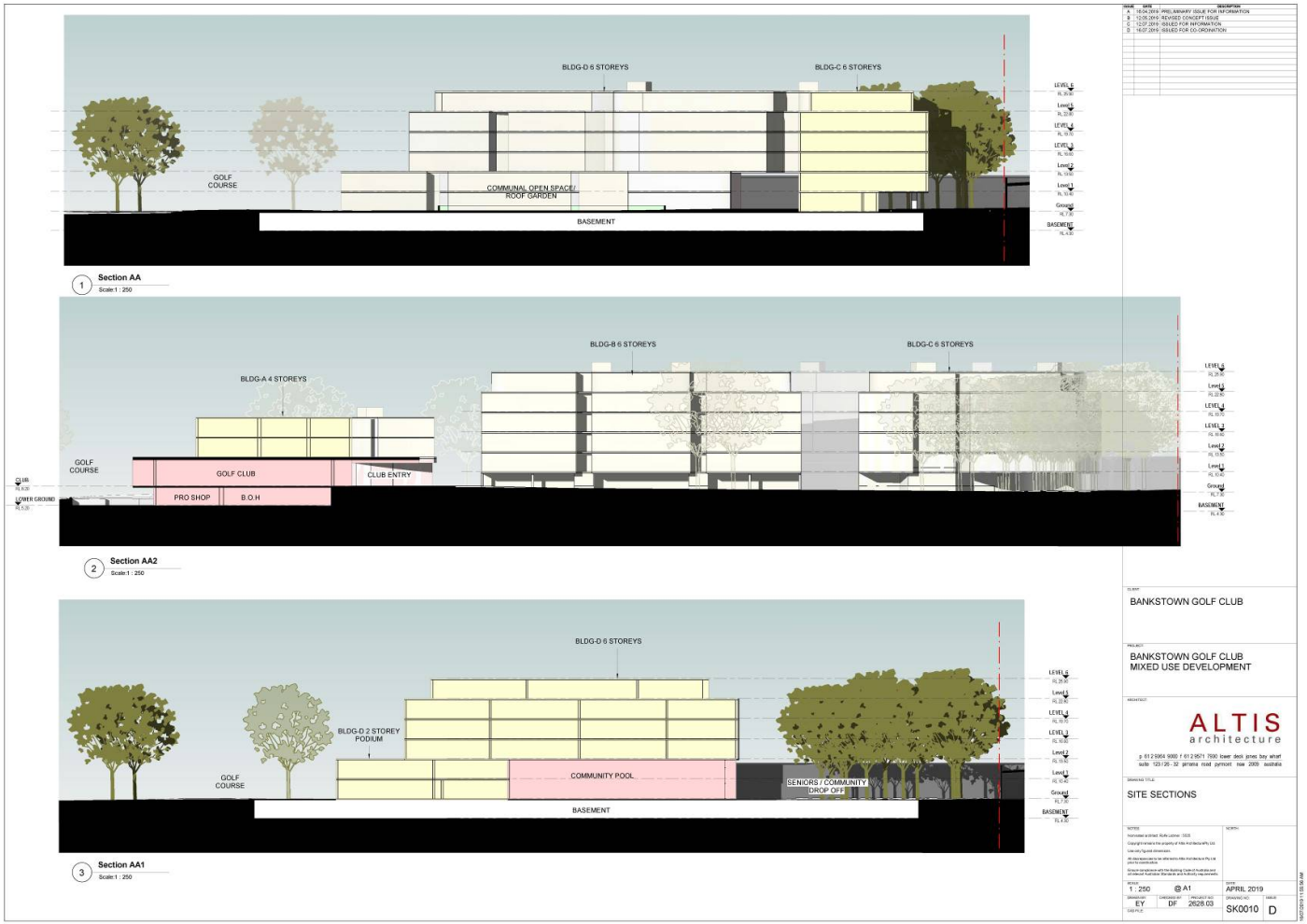


Figure 1.2 – Proposed section
(Source: Altis Architecture, July 2019)

1.3 Information collation

To achieve the aims of this report, a review of the information relevant to the property was undertaken prior to the initiation of field surveys. Information sources reviewed include the following:

- Site and floor plans prepared by *Altis Architecture* dated April 2019 (revision D).
- *NearMap* aerial photography
- Topographical maps DLPI of NSW 1:25,000
- Australian Standard 3959 *Construction of buildings in bushfire-prone areas (AS3959)*
- *Pre-release Planning for Bush Fire Protection 2018 (PBP) (RFS).*

An inspection of the proposed development site and surrounds was undertaken by Nicole van Dorst in February 2019 to assess the topography, slopes, aspect, drainage, vegetation and adjoining land use. The identification of existing bushfire measures and a visual appraisal of bushfire hazard and risk were also undertaken.

1.4 Site description

Bankstown Golf Club is located located within Lot 13 DP 584447 and Lot 612 DP 837981, No. 70 Ashford Avenue, Milperra, within the local government area (LGA) of Canterbury-Bankstown. The proposed development area is located within the south-eastern corner of the site with access available from Ashford Avenue in the east and Bullecourt Avenue in the south (refer Figure 1.3).

The development site currently supports a carpark, golf club and maintenance building. The nearest mapped bushfire prone vegetation is located within the western portion of the site (over 400m from the development area) and extends into the adjoining land in the west and north. The land surrounding the proposed development area is dominated by managed fairways with narrow strips of bushland leading towards the development to the west and north.

Figure 1.3 – Aerial appraisal *(source: SixMaps)*

1.5 Legislation and planning instruments

1.5.1 Environmental Planning and Assessment Act (EP&A Act)

The *EP&A Act* governs environmental and land use planning and assessment within New South Wales. It provides for the establishment of environmental planning instruments, development controls and the operation of construction controls through the *BCA*. The identification of bushfire prone land is required under Section 10.3 of the *EP&A Act*.

1.5.2 Bushfire prone land

Bushfire prone land maps provide a trigger for the development assessment provisions. The western portion of Lot 13 is mapped by Canterbury-Bankstown Council as bushfire prone (refer Figure 1.4) and as a result the proposed development must be assessed against the provisions of PBP.

As depicted below the proposed development is located over 400m from the bushfire prone land, however is required to be assessed against the provisions of PBP.

Figure 1.4 – Bushfire Prone Land Map
(source: Planning Portal, 2019)

1.5.3 Planning for Bush Fire Protection (PBP)

Bushfire protection planning requires the consideration of the RFS planning document entitled *PBP. PBP* provides planning controls for building in bushfire prone areas as well as guidance on effective bushfire protection measures.

The policy aims to provide for the protection of human life (including fire fighters) and to minimise impacts on property and the environment from the threat of bushfire, while having

due regard to development potential, on site amenity and protection of the environment. More specifically, the aims and objectives for all development located on bushfire prone land should:

1. Afford occupants of any building adequate protection from exposure to a bushfire.

2. Provide for a defendable space to be located around buildings.

3. Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition.

4. Ensure that safe operational access and egress for emergency service personnel and residents is available.

5. Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in the APZ.

6. Ensure that utility services are adequate to meet the needs of fire fighters (and others who may assist in bushfire fighting).

As the development is a type of development regarded by the RFS as a special fire protection purpose (SFPP) development, *PBP* requires additional objectives to be considered. These include the need to:

- minimise levels of radiant heat, smoke and ember attack through increased APZ, building design and siting;
- provide an appropriate operational environment for emergency service personnel during firefighting and emergency management;
- ensure the capacity of existing infrastructure (such as roads and utilities) can handle the increase in demand during emergencies as a result of the development; and
- ensure emergency evacuation procedures and management which provides for the special characteristics and needs of occupants.

The nature of SFPPs means that occupants may be more vulnerable to bushfire attack for one or more of the following reasons:

- they may be less educated in relation to bushfire impacts
- they may have reduced capacity to evaluate risk and to respond adequately to the bushfire threat
- they may present organisational difficulties for evacuation and / or management
- they may be more vulnerable through stress, anxiety and smoke impacts arising from bushfire threat
- there may be significant communication barriers
- supervision during a bushfire may be difficult
- logistical arrangements for the numbers of residents may be complicated in terms of alternate accommodation, transport, healthcare and food supplies.

In addition, *PBP* outlines the bushfire protection measures required to be assessed for new development in bushfire prone areas. The proposal has been assessed in compliance with the following measures:

- asset protection zones
- building construction and design
- access arrangements
- water supply and utilities

- landscaping, and
- emergency management arrangements.

1.6 Environmental and cultural constraints

The majority of the development site is currently managed and consists of canopy trees only. General maintenance of existing vegetation is recommended (i.e. pruning of trees which may overhang or touch the proposed buildings) and future management within the 34.5m APZ is to occur in accordance with PBP 2018 (Appendix 4).

Bushfire Threat Assessment 2

To assess the bushfire threat and to determine the required width of an APZ for a development, a review of the elements that comprise the overall threat needs to be completed.

PBP provides a methodology to determine the size of any APZ that may be required to offset possible bushfire attack. These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation.

2.1 Hazardous fuels

PBP guidelines require the identification of the predominant vegetation formation, for a distance of at least 140m from a proposed development envelope, in accordance with David Keith (2004) to determine APZ distances for SFPP developments.

Vegetation located within 140m of the proposed development works has been mapped by Sydney Metro Vegetation Mapping 2016 below in Figure 2.1.

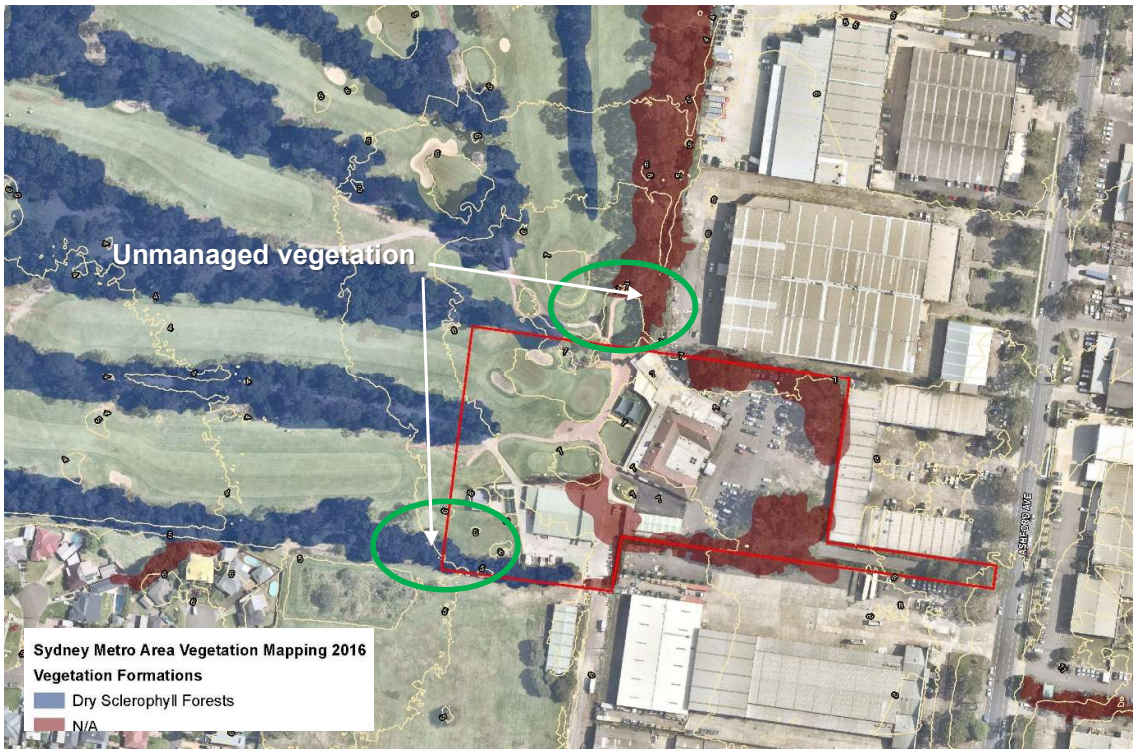


Figure 2.1 – Vegetation formations
(Source: Sydney Metro Vegetation Mapping 2016)

As depicted in Figure 2.1 vegetation within 140m of the site is identified as Cumberland Dry Sclerophyll Forest. Whilst the majority of this vegetation is 'managed' there are two (2) strips of vegetation that do pose a low bushfire risk to the site in the north and west (refer Photo 1 & 2).

A site inspection was undertaken to verify if these strips of vegetation fall within the 'exclusion' category' identified in AS3959 (2018). Whilst the Category 1 vegetation located to the west is located over 400m from the site the remnant unmanaged vegetation 'fingers' are located within 20m of the development site to the west and north of the site (refer Figure 2.1)

In accordance with Clause 2.2.3.2 of AS3959 (2018) vegetation which can be excluded from being mapped as bushfire prone, includes:

- Single areas of vegetation less than 1 hectare in area and not within 100m of other areas of vegetation being classified;
- Multiple areas of vegetation less than 0.25 hectares in area and not within 20m of the site, or each other or of other areas of vegetation being classified
- Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation), regardless of length and not within 20m of the site or each other, or other areas of vegetation being classified vegetation;
- Vegetation regarded as low threat due to factors such as flammability, moisture content for fuel load. This includes maintained lawns, golf courses (such as playing areas and fairways) etc.

The remnant vegetation to the west and north is a strip of >20m and therefore cannot be excluded.

Photo 1 – Strip of unmanaged forest to the west.

Photo 2 – Strip of unmanaged forest to the north.

The remainder of the vegetation is not mapped as bushfire prone. As depicted within the following photos 3 - 5 this vegetation consists of canopy trees only, no shrubs and managed / mown grass, typical of a golf course. This vegetation is unable to sustain a fire.

Photo 3 – Managed land to the west (non-hazard)

Photo 4 – Managed land to the north-west (non-hazard)

Photo 5 – Managed land to the north (non-hazard)

2.2 Bushfire attack assessment

A fire danger index (FDI) of 100 has been used to calculate bushfire behaviour on the site using an FDI 100 based on the sites location within the Greater Sydney region.

Table 2.1 provides a summary of the bushfire attack assessment using a performance based assessment (Method 2 AS3959).

Table 2.1 – Bushfire attack assessment

Aspect	Vegetation within 140m of development (refer Note 1)	Effective slope of land	APZ required *PBP 2018* (metres)	APZ provided (metres)
North-east, south and east	Managed / industrial development	N/A	N/A	>100m
West & north	Cumberland Dry Sclerophyll Forest (30m Flame width)	1^{0D}	79	34.5m (refer Note 1)

Note 1: A performance based assessment using Appendix B of *AS3959* was undertaken to determine the required minimum APZ based on the fuel loads associated with Cumberland Dry Sclerophyll Forest (Comprehensive fuel load 14/24.97 t/ha) on a 1 degree downslope and reduced flame width of 30m. The results of the assessment, provided below, were prepared using the minimum distance calculator by *Flamesol.*

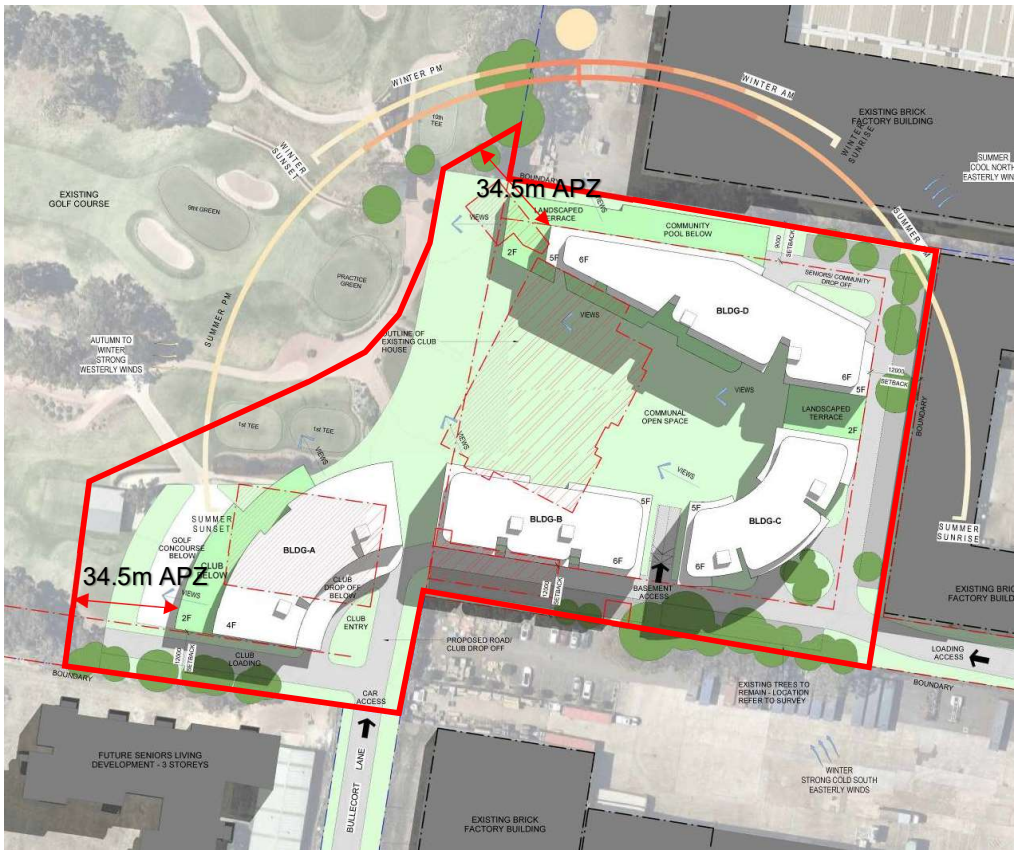


Figure 2.2 – Asset Protection Zone

FPA AUSTRALIA | FLAMESOL

Calculated July 25, 2019, 3:50 pm (MDc v.4.8)

Bankstown Golf Course

Minimum Distance Calculator - AS3959-2009 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	1.8 km/h
Vegetation classification	Forest	Flame length	14.69 m
Surface fuel load	14 t/ha	Flame angle	55 °, 59 °, 63 °, 67 °, 69 ° & 78 °
Overall fuel load	24.97 t/ha	Elevation of receiver	6.01 m, 6.29 m, 6.54 m, 6.76 m, 6.86 m & 7.18 m
Vegetation height	n/a	Fire intensity	23,222 kW/m
Effective slope	1 °	Transmissivity	0.865, 0.852, 0.835, 0.8179999999999999, 0.8090000000000001 & 0.758
Site slope	0 °	Viewfactor	0.4131, 0.303, 0.2029, 0.1362, 0.1099 & 0.0294
Flame width	30 m	Minimum distance to < 40 kW/m²	15.59999999999996 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	19.2 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	24.50000000000008 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	30.70000000000017 m
		Minimum distance to < 10 kW/m²	34.50000000000022 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

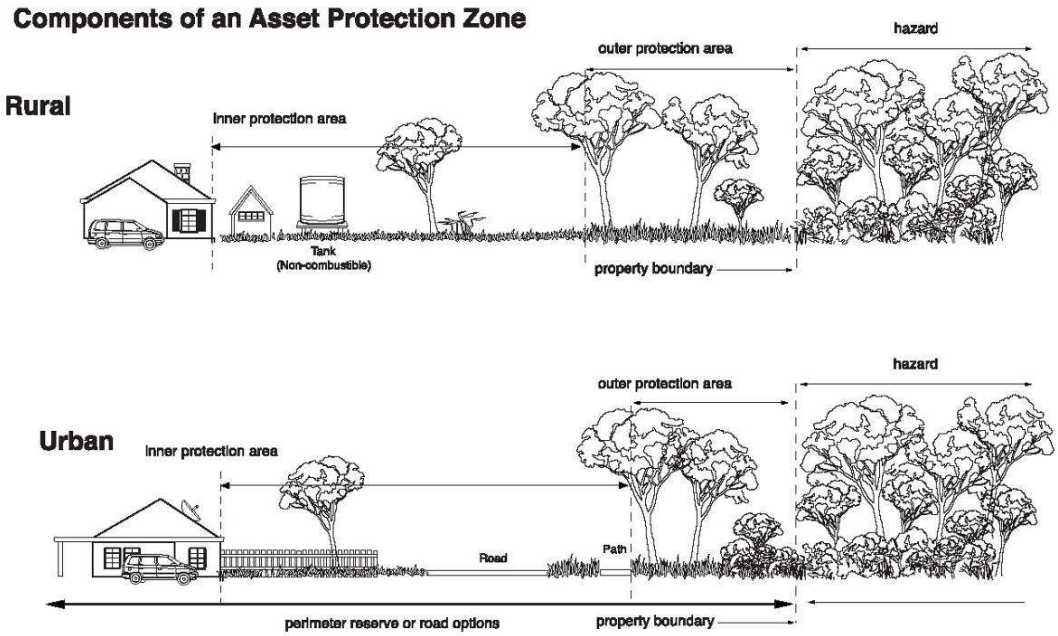
Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Specific Protection Issues

3

3.1 Asset protection zones

APZs are areas of defendable space separating hazardous vegetation from buildings. The APZ generally consists of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The OPA is closest to the bush and the IPA is closest to the dwellings. The IPA cannot be used for habitable dwellings but can be used for all external non-habitable structures such as pools, sheds, non-attached garages, cabanas, etc. A typical APZ, and therefore defendable space, is graphically represented below:



APZs and progressive reduction in fuel loads (Source: RFS, 2006)

Note: Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought in regard to vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

PBP dictates that the subsequent extent of bushfire attack that can potentially emanate from a bushfire must not exceed a radiant heat flux of 10kW/m^2 for SFPP developments. This rating assists in determining the size of the APZ to provide the necessary defendable space between hazardous vegetation and a building.

Table 3.1 outlines the proposal's compliance with the performance criteria for APZs.

Table 3.1 – Performance criteria for asset protection zones

Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
ASSET PROTECTION ZONES (APZS)	Radiant heat levels of greater than 10kW/m² (calculated at 1200K) are not experienced by emergency service personnel and occupants during firefighting and emergency management.	The building is provided with an APZ in accordance with table A1.12.1 (See Appendix 1)	☐	☑	Complies with the performance criteria (refer Section 2.2)
	Issues relating to slope are addressed: maintenance is practical, soil stability is not compromised and the potential for crown fires is negated	The APZ is not located on lands with a slope exceeding 18°	☑	☐	Complies
	APZs are managed and maintained to prevent the spread of a fire towards the building	The APZ is managed in accordance with the requirements of Appendix 4 of this document, and is wholly within the boundaries of the development site	☑	☐	Complies. Vegetation within the APZ will be managed to the standards of an IPA
		Mechanisms are in place to provide for the maintenance of the APZ over the life of the development	☑	☐	Complies. An 88B instrument will ensure the APZ is managed in perpetuity.
		Other structures located within the APZ need to be located further than 6m from the refuge building	☑	☐	Complies
Landscaping	Landscaping is managed to minimise flame contact, reduce radiant heat levels, minimise embers and reduce the effect of smoke on residents and firefighters	Landscaping is in accordance with 'Asset protection zone standards' (see Appendix 4)	☑	☐	Complies. The APZ is to be managed as an IPA.

3.2 Building protection

Building construction standards for the proposed future apartment buildings and clubhouse located within 100m of bushfire prone land are to be applied in accordance with BAL 12.5 *AS3959 Construction of buildings in bushfire prone areas (2018)* and *Pre-release Planning for*

Bush Fire Protection 2018. Please note that if any portion of a building falls within 100m of the bushfire hazard, the entire building is to comply with BAL 12.5.

3.3 Hazard management

The ongoing management of the development site and to a distance of 34.5m to the north-west and west is to occur in accordance with the standards of an inner protection area as outlined in RFS guidelines *Standards for Asset Protection Zones* (RFS, 2005), with general landscaping design principles to comply with Appendix 4 of *PBP*.

In terms of implementing and / or maintaining APZs, there is no physical reason that would constrain hazard management from being successfully carried out by normal means (e.g. mowing).

Landscaping within the site is to comply with the principles of Appendix 4 of *PBP 2018.*

A summary of the guidelines for managing APZs (including landscaping guidelines) is attached as Appendix 2 to this report.

3.4 Access for fire fighting operations

Access to the site will be provided via Bullecourt Avenue in the south and Ashford Avenue in the east.

Access and its compliance with PBP is provided in Table 3.2 below:

Table 3.2 – Performance criteria for access

Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
FIREFIGHTING VEHICLES	Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	SFPP access roads are two-wheel drive, all-weather roads.	☑	☐	Complies
		Access is provided to all structures and hazard vegetation.	☑	☐	All buildings are within 70m of an access road.
		Traffic management devices are constructed to not prohibit access by emergency services vehicles.	☑	☐	Complies. Can be a condition of consent.
		Access roads must provide suitable turning areas in accordance with Appendix 3.	☑	☐	The final design is to incorporate turning heads in compliance with this condition & Figure 3.1.

Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
ACCESS ROAD CAPACITY	The capacity of access roads is adequate for firefighting vehicles.	The capacity of road surfaces and any bridges / causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges and causeways are to clearly indicate load rating.	☐	☐	N/A. There are no bridges.
ACCESS TO WATER	There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.	☑	☐	Complies. Can be a condition of consent.
		Hydrants are provided in accordance with *AS 2419.1:2005*	☑	☐	
		There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	☑	☐	
NON-PERIMETER ROADS	Non-perimeter access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while occupants are evacuating	Minimum 5.5m width kerb to kerb.	☑	☐	Complies. Roads are to 5.5m wide
		Parking is provided outside of the carriageway width.	☑	☐	Complies. Can be a condition of consent.
		Hydrants are located clear of parking areas.	☑	☐	Complies. Can be a condition of consent.
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	☑	☐	Complies
		Curves of roads have a minimum inner radius of 6m.	☑	☐	Complies. Can be a condition of consent.

Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
		The maximum grade road is 15° and average grade is 10°.	☑	☐	Complies.
		The road crossfall does not exceed 3°.	☑	☐	Complies.
		A minimum vertical clearance of 4m to any Overhanging obstructions, including tree branches, is provided.	☑	☐	Complies. Can be a condition of consent.

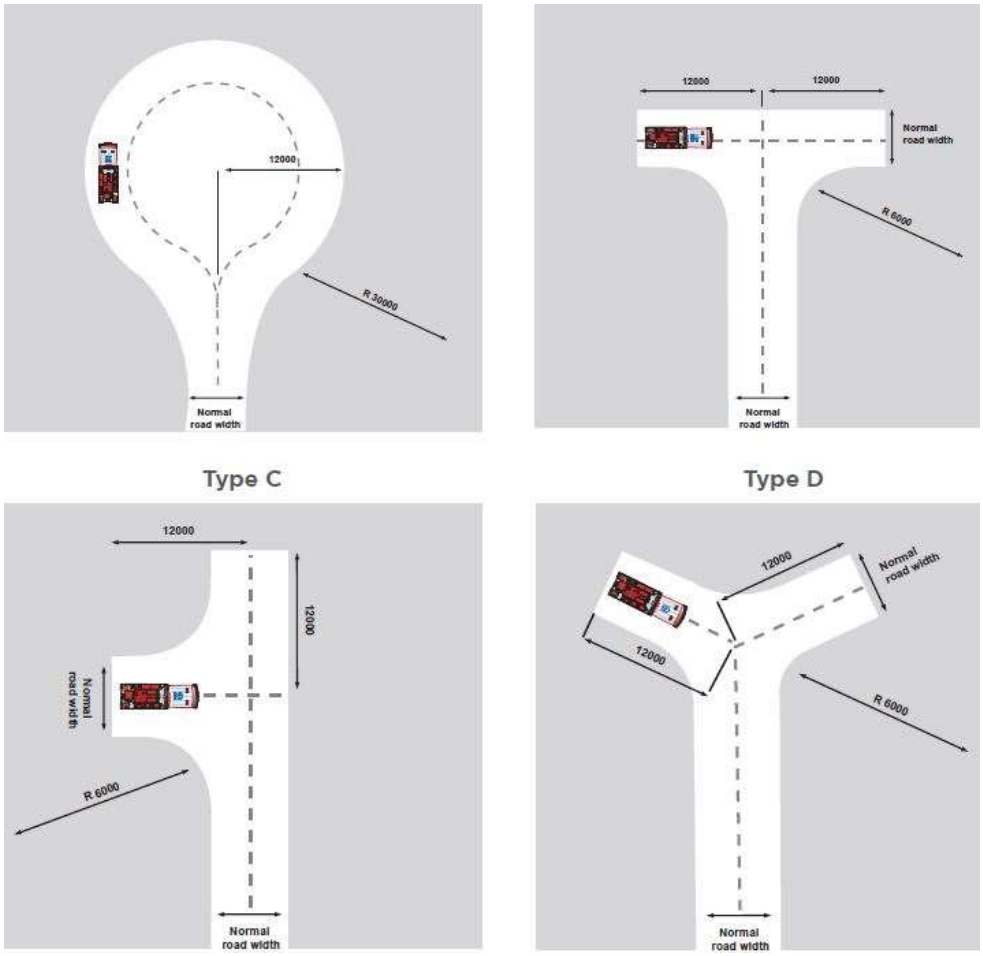


Figure 3.1 – Turning head requirements
(source: Pre-release PBP 2018)

3.5 Water supplies

Town reticulated water supply is available to the proposed development in the form of an underground reticulated water system

Table 3.3 outlines the proposal's compliance with the performance criteria for reticulated water supply.

Table 3.3 – Performance criteria for reticulated water supplies

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Water supplies are easily accessible and located at regular intervals.	Access points for reticulated water supply to SFPP developments incorporate a ring main system for all internal roads.	☑	☐	Can be made a condition of consent.
	Fire hydrant spacing, sizing and pressures comply with *AS2419.1*. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority, once development has been completed. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles.	☑	☐	Can be made a condition of consent.
	The provisions of public roads in Section 4.1.3 of *PBP* in relation to parking are met.	☑	☐	Can be made a condition of consent.

3.6 Gas

Any proposed gas supply is to ensure compliance with the acceptable solutions outlined in Table 3.4.

Table 3.4 – Performance criteria for gas supplies

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Location of gas services will not lead to the ignition of surrounding bushland land or the fabric of buildings.	Reticulated or bottled gas bottles are to be installed and maintained in accordance with *AS1596:2014* and the requirements of relevant authorities. Metal piping is to be used.	☑	☐	Can be made a condition of consent.
	All fixed gas cylinders are to be kept clear of flammable materials to a distance of 10m	☑	☐	Can be made a condition of consent.

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
	and shielded on the hazard side of the installation.			
	Connections to and from gas cylinders are metal.	☑	☐	Can be made a condition of consent.
	If gas cylinders are to be kept close to the building the release valves must be directed away from the building and at least 2m away from any combustible material, so that they do not act as a catalyst to combustion.	☑	☐	Can be made a condition of consent.
	Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.	☑	☐	Can be made a condition of consent.
	Above-ground gas service pipes external to the building are metal, including and up to any outlets.	☑	☐	Can be made a condition of consent.

3.7 Emergency and evacuation planning

Table 3.5 outlines the required performance criteria for the proposal's emergency procedures

Table 3.5 – Performance criteria for emergency and evacuation planning (*PBP* guidelines pg.39)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
A bush fire emergency and evacuation management plan is prepared.	Bush fire emergency management and evacuation plan is prepared consistent with the: • The NSW RFS document: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan* • NSW RFS *Schools Program Guide* (where applicable) • Australian Standard *AS 3745:2010 Planning for emergencies in facilities*; and • Australian Standard *AS 4083:2010 Planning for emergencies – Health care facilities* (where applicable),	☑	☐	Can be made a condition of consent.

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Suitable management arrangements are established for consultation and implementation of the emergency and evacuation plan.	An Emergency Planning Committee is established to consult with residents (and their families in the case of aged care accommodation and schools) and staff in developing and implementing an Emergency Procedures Manual, and detailed plans of all emergency assembly areas including 'on-site' and 'off-site' arrangements as stated in *AS 3745* are clearly displayed, and an annual (as a minimum) trial emergency evacuation is conducted.	☑	☐	Can be made a condition of consent.

Conclusion & Recommendations

4

4.1 Conclusion

A bushfire protection assessment has been undertaken for the purpose of a Site Compatibility Certificate in support of a proposed senior's housing development including the construction of approximately 149 independent living units and new clubhouse within the eastern portion of the existing Bankstown Golf Club located at 70 Ashford Avenue, Milperra.

The assessment found that bushfire can potentially affect the proposed development from the narrow strip of forest vegetation located to the west and north of the proposed development area resulting in the proposed buildings being exposed to potential radiant heat and ember attack.

The bushfire risk posed to the development can be mitigated as appropriate bushfire protection measures will be in place and managed in perpetuity.

The assessment has concluded that the proposed development will provide compliance with:

- APZs in accordance with the performance criteria outlined in *Pre-release PBP 2018;*
- Provision of access in accordance with the performance criteria outlined in *Pre-release PBP 2018*;
- Water, electricity and gas supply in compliance with the acceptable solutions outlined in *Pre-release PBP 2018;*
- Future dwelling construction in compliance with the appropriate construction sections of *AS3959-2018*, and *Pre-release PBP 2018 (BAL 12.5)*.

4.2 Recommendations

Recommendation 1 - APZs are to be applied to the development to a distance of 34.5m to the north and west and to the property boundary in the east and south. The APZ is to be managed as an IPA. A summary of the guidelines for managing APZs is attached as Appendix 2.

Recommendation 2 – Adequate access is to be provided to the site in compliance with Table 6.4b of PBP 2018.

Recommendation 3 – Gas, electricity and water supply is to comply with Table 6.4c of *PBP 2018*.

Recommendation 4 - An emergency / evacuation plan is to be prepared consistent with the RFS *Guidelines for the Preparation of Emergency / Evacuation Plans* and in compliance with Table 6.4b of PBP 2018.

REFERENCES

Australian Building Codes Board (2010) – *Building Code of Australia*, Class 1 and Class 10 Buildings Housing Provisions Volume 2

Chan, K.W. (2001) – *The suitability of the use of various treated timbers for building constructions in bushfire prone areas*. Warrington Fire Research

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

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

Rural Fire Service (2018) – *Pre-release Planning for bushfire protection – a guide for councils, planners, fire authorities and developers*. NSW Rural Fire Service

Rural Fire Service (2006) - Bushfire Attack Software on RFS web site

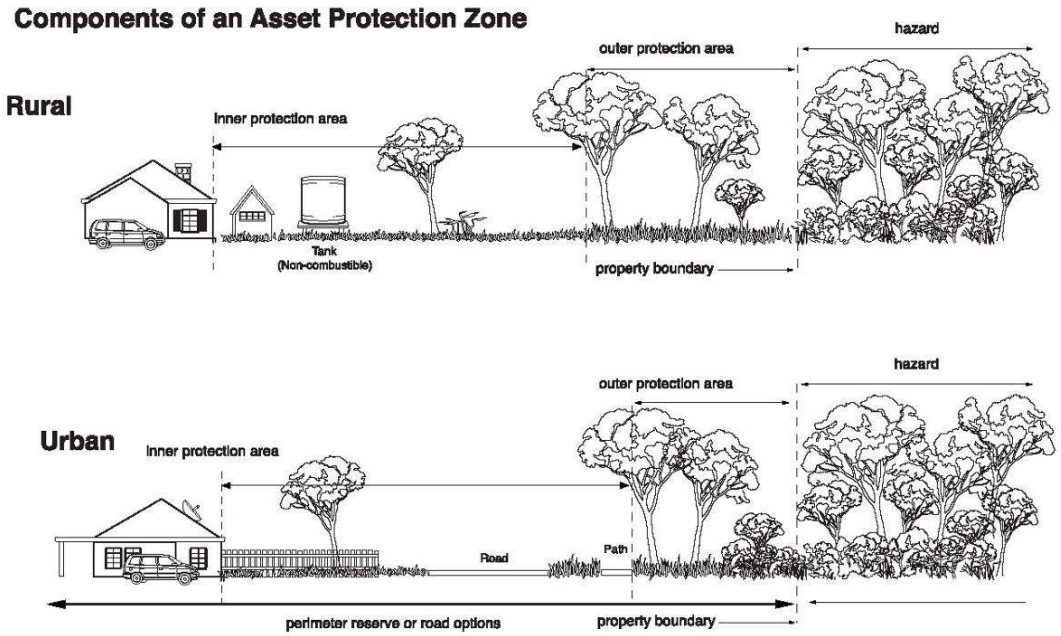
Tan, B., Midgley, S., Douglas, G. and Short (2004) - *A methodology for assessing bushfire attack.* RFS Development Control Service

Management of Asset Protection Zones

A1

The RFS provides basic advice in respect of managing APZs through documents such as, *Standards for Asset Protection Zones* (RFS, 2005), with landscaping to comply with Appendix 5 of *PBP*.

The APZ generally consists of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The OPA is closest to the bush and the IPA is closest to the dwellings. A typical APZ is graphically represented below:



APZs and progressive reduction in fuel loads (Source: RFS, 2006)

> **Note:** Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought in regard to vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

The following provides maintenance advice for vegetation within the IPA.

Inner protection area (IPA)
Fuel loads within the IPA are to be maintained so it does not exceed 4t/ha.

Trees are to be maintained to ensure;

- canopy cover does not exceed 15%
- trees (at maturity) do not touch or overhang the building
- tree canopies (at maturity) should be well spread out and not form a continuous canopy

- there should be no unmanaged vegetation within 10m of windows, doorways, eaves and gutters
- lower limbs should be removed up to a height of 2m above ground

Shrubs are to be maintained to ensure;

- large discontinuities or gaps in vegetation
- shrubs should not be located under trees
- shrubs should be in clumps no greater than $5m^2$
- shrubs should be no closer than 10 metres from an exposed window or door.

Grass is to be maintained to ensure:

- a height of 10cm or less
- leaves and debris is removed.

Landscaping to the site is to comply with the principles of Appendix 5 of *PBP*. In this regard the following landscaping principles are to be incorporated into the development:

- suitable impervious areas being provided immediately surrounding the building such as courtyards, paths and driveways;
- restrict planting in the immediate vicinity of the building which may over time and if not properly maintained come in contact with the building;
- when considering landscape species consideration needs to be given to estimated size of the plant at maturity;
- avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies;
- use smooth bark species of trees species which generally do not carry a fire up the bark into the crown;
- avoid planting of deciduous species that may increase fuel at surface/ ground level (i.e. leaf litter);
- avoid climbing species to walls and pergolas;
- locate combustible materials such as woodchips/mulch, flammable fuel stores away from the building;
- locate combustible structures such as garden sheds, pergolas and materials such timber garden furniture way from the building; and
- use of low flammability vegetation species.