Travers

bushfire & ecology

bushfire protection assessment

addendum

Proposed Residential Aged Care Facility
Lot 3 DP 805710
181 Forest Way, Belrose

as revised
September 2020
(Ref: 18MORR02)

Bushfire Protection Assessment
(addendum)

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Lot 3 DP 805710
181 Forest Way, Belrose

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EXECUTIVE SUMMARY

Travers bushfire & ecology (*TBE*) prepared as bushfire protection assessment for the proposed construction of a residential aged care facility at 181 Forest Way, Belrose in July 2017 and again with an addendum report provided in November 2019.

This revised, September 2020, bushfire assessment has been undertaken in support of the 2019 development application to take into account matters pertinent to the Section 34 Conference held in August 2020 in respect of the development application before the NSW Land & Environment Court. The matter of concerns raised were by Councils bushfire expert Mr Lew Short (*Blackash*) in relation to;

- The ongoing maintenance of the neighbouring landscape in the south.
- The vegetation formation located on the east.
- The modelling used to define the APZ in the north and south east and east.
- The access road width in the south and its capability to achieve 5.5m width.
- the need for lights and railings for the southern access road.

A further onsite meeting occurred with Mr Short on Tuesday 8 September 2020 for the purpose of defining the vegetation communities present in the south east sector.

This report also deals with matters of concern to Northern Beaches Council in relation to the impacts on *Grevillea calei*, Duffys Forest endangered ecological community (EEC). We believe this matter is not contested as Council accept there is no impact.

The RFS most recent advice in February 2020 simply addresses the issue raised by the neighbour at 179 Forest Way Belrose (to the immediate South) who has argued with the RFS against this development since the application was lodged. The matters related to the neighbours stated and written threat of revegetating their lands to create more bushfire prone lands with the intent of thwarting the Application before the Court.

However, at the Section 34 Conference the neighbour accepted that he had a development consent for the property which required the landscape to accord with a detailed landscape which was part of the consent.

This then realised that any threat of reafforestation by the neighbour on the land would require a development application to Council and a referral to the RFS. The latter would be required as the intent of his stated plan would make his home subject to BAL Flame Zone as per the *Australian Standard AS3959 Construction of buildings in bushfire prone areas*.

Given the neighbours dwelling is currently not built to current bushfire standards then the likelihood of approval from the RFS would be remote without significant and very costly building alterations to adhere to BAL FZ. On the day of the Section 34 Conference he agreed he would adhere to the development conditions that his land was subject to.

Notwithstanding the position the neighbour and their intentions provide to them I have nevertheless written a response to the matters raised - see table below.

Council Contention

The proposed development should be refused as the site is not suitable for the proposal having regard to the requirements of Planning for Bush Fire Protection. *Particulars*	
a) The New South Wales Rural Fire Service has not granted its consent or general terms of approval with respect to the proposed development and the current design of the proposal and the supporting bushfire documentation that has been provided by ***the applicant is considered unsatisfactory by the New South Wales Rural Fire Service.***	The RFS never stated the current design was unsatisfactory. Indeed, the RFS simply makes a statement that reflects the repeated threats made by the neighbour to the RFS during the DA process. The neighbour has very publicly advised the RFS on several occasions (known from Gippa documents gained by the Applicant) that their backyard will be revegetated into a forest and as a result this will become a more bushfire prone landscape. The RFS advised in their March 2020 letter *"The proposed development relies heavily upon the management of vegetation on the adjoining southern property for achieving the minimum required asset protection zone".* Currently the neighbours land is a well managed landscape and reflects the plan I submitted with my bushfire report in November 2019. In the plan that I issued for the DA (in November 2019) I mapped the bushfire hazards and the managed lawns. In terms of the latter this includes the level back yard area and the tennis court and the approved access road (to the tennis court) adheres to the term 'managed land' as described by the RFS in their planning policy entitled *'Planning for bushfire protection 2018'*. Furthermore, the neighbours landscape fully responds to the original development consent and landscape plan issued by Council in 1986 It was this same landscape condition that enabled the RFS to provide their formal consent to my clients (the Applicant's) previous DA in 2018. In that DA we also relied on the neighbours' managed backyard and the RFS accepted that situation and provided their approval in the form of a *bushfire safety authority* dated 30th November 2018. We relied on that same situation for the current

	application in my report dated November 2019. The definition of Managed Land published by the RFS is reflect also the most recent amendment to PBP 2006 that is via PBP 2019; which states the same words. "*Land that has vegetation removed or maintained to a level that limits the spread and impact of bush fire. This may include developed land (residential, commercial or industrial), roads, golf course fairways, playgrounds, sports fields, vineyards, orchards, cultivated ornamental gardens and commercial nurseries. Most common will be gardens and lawns within curtilage of buildings. These areas are managed to meet the requirements of an APZ".* Given the DA consent for these lands (dated February 1986 and landscape plan stamped by Council April 1979) replicating our application then we rely, and insist, on that landscape as being managed. We also rely on the fact the plans require Council consent. If those plans are to be varied then we are not aware of any application, by the owners of 179 Forest Way Belrose to Council, to vary those conditions. Should the neighbour seek to create a forest on his land he would need development consent from the Council. Given his land is located in a bushfire prone landscape he would need to prepare a bushfire report and submit that to Council in the DA lodgement package. I expect the neighbour would also need to relodge landscape plans that reflect the intended revegetation to a forest. The neighbour would also need to prepare a BCA report that advised how the current building which was not built to a bushfire code could be re-constructed to accord with the current bushfire code that being Australian Standard *AS 3959 2018 Construction of buildings in bushfire prone area.* On the basis of his stated intentions I would expect his dwelling would be categorised as being a Flame Zone affectation and would require significant building changes includes a complete new roof structure and external roof skin as well as all new windows and metal shields to those windows and doors. These being the basic changes required to adhere to BAL FZ. Moving on it is our position that we do not seek an APZ over the neighbors land. An APZ is

	defined by the RFS as being; *"A fuel-reduced area surrounding a built asset or structure which provides a buffer zone between a bush fire hazard and an asset. The APZ includes a defendable space within which firefighting operations can be carried out. The size of the required APZ varies with slope, vegetation and FFDI"* This definition represents what we have sort on my clients (the Applicants) land and has been mapped by me on my plan within our November 2019 bushfire report. It is the case that an APZ requires a DA consent as it typically requires the clearance of native vegetation including trees/shrubs and possibly earthworks; and along with the laws of the day whereby the clearance requires ecological consent from Council - and the likely offsetting of that vegetation loss. The Application before the Court did require consent from Council in respect of the impact upon native vegetation in the form of Duffys Forest which is an endangered ecological community. That consent was duly provided by Council during the processing of the DA following extensive mitigation of the proposed vegetation impacts. It is therefore a fact that no DA consent is required for an APZ over the neighbour's land because we say it is Managed Land and the DFA consent for that land also states it would be Managed Land. During negotiations the Applicant offered, in writing, the neighbour $270,000 but that figure was rejected. It was during the conversation when the Applicants representative Kelvin asked Trad (the neighbour) if he would consider a larger amount but Trad (the neighbour advised) it was $1.3m or nothing.
b) Having regard to the s.4.14 of the EP&A Act, Council is not satisfied that the proposal conforms to ***the specifications and requirements of*** **Planning for Bush Fire Protection** ***prepared by the NSW Rural Fire Service and will not result in unreasonable bushfire risk to future occupants.***	This particular is not what the RFS advised and is an exaggeration of the true facts of this case. The bushfire report prepared for the case provided complying measures to fully adhere to PBP 2018. The only issue is the threat of re-afforestion by the neighbour and whether that threat is reasonable given the facts of the case. Arising from the Section 34 Conference Councils bushfire expert Mr Lew Short (Blackash) advised that there were matters he required resolved as

	he was of the view the RFS were in error. Those matters were in relation to; • The ongoing maintenance of the neighbouring landscape in the south. • The vegetation formation located on the east. • The modelling used to define the APZ in the north and south east and east. • The access road width in the south and its capability to achieve 5.5m width. • the need for lights and railings for the southern access road. Those matters are dealt with in the body of this amended report
c) The proposal is unsatisfactory and does not promote the orderly development of land as it is ***not possible to establish the required asset protection zone ("APZ") within the boundaries of the site.***	The contention is manifestly incorrect as the RFS does not require an asset protection zone external to the boundary of the site. This was made clear in their 2018 consent. The development has provided the necessary APZ within the boundary of the site. The RFS seek an agreement between the parties *"The NSW Rural Fire Service can not support this development application by way of issuing a Bush Fire Safety Authority while there is on-going discrepancy over the extent of the management of vegetation on the adjoining property to the south.* *In this regard it is recommended that negotiations between the applicant and the owners of the adjoining property continue, for the purpose of obtaining an agreement and easement for a guarantee that the land will be managed for the life of the development"* Had this threat not be forthcoming the RFS would have approved the development as they did in 2018. More importantly the RFS are not aware of the 1986 development consent and the neighbours' obligations to that consent nor the neighbours' acceptance of those obligations at the Section 34 Conference in response by a question from the barrister for the Applicant.

Table E1 – summary of the revised scheme's compliance with the conditions of consent issued by the RFS in 2018, as well as a summary response to the issues addressed by Council.

Response to Northern Beaches Council meeting minutes following onsite meeting 28 February 2019	
Council concerns	**Response**
Previous DA2017/0697 was recommended for refusal based on potential impacts to known individuals of *Grevillea caleyi* (Critically Endangered) within the road reserve immediately north of the property. The bushfire Consultant to include a short statement justifying the turning area and confirming no trees / vegetation will be requiring pruning or removal.	*Travers bushfire & ecology* can confirm that no further clearing will be required within the adjoining road reserve or within the site to implement or utilise the existing access driveway. Refer Section 3.4 for further detail.
Colorbond fence: The submitted proposal included a 2.2m *Colorbond* fence along the northern boundary for 120m from the north-western corner, which will fragment the local occurrence of Duffys Forest EEC, as well as potentially indirectly impact on *Grevillea caleyi* and its habitat. Council's planning staff do not support the proposed fence.	The amended development layout supports a reduced fence length of 60m. As outlined in Section 2.3, an asset protection zone (APZ) of 25-30m has been provided from the retained Duffys Forest therefore negating the need for a fence to continue for the full 120m distance. As a result the fence will not impact on the EEC or on the *Grevillea caleyi* which is located further to the north.
Asset protection zone (APZ) - Council strongly recommends any APZ requirements be met within the property boundaries. If the APZ extends onto adjacent land, the property owner's consent must be submitted as well as the legal mechanism by which Council can enforce compliance in perpetuity.	The adjoining land was not considered an APZ but as existing 'managed' land. However, we are now provided with the knowledge that the neighbour will not continue to maintain / manage the garden bed. As a result, this area is no longer considered 'managed'. A worst-case scenario has been adopted and 'tall heath' has been used in the revised calculations. The site plan has been amended and the building is provided with what is in effect a 27m APZ extending from the southern boundary, as detailed in Section 2.3.

Landscaping – It is critical that a dense bushland buffer be retained or established along Forest Way. How this is done, given the bushfire risks on site, will need to be worked through with your bushfire consultant	A bushland buffer (5m width) is proposed to be planted adjacent to the site's western boundary between the development and Forest Way. This 5m strip of bushland will not pose a significant bushfire risk to the site based on the separation provided between the bushland strip and the building as well as the separation provided by the emergency turning head in the north and access in the south.
NSW RFS Condition	**Response**
Condition 1 – At the commencement of building works and in perpetuity the entire property shall be managed as an inner protection area (IPA) as outlined within section 4.2.7 and Appendix 5 of 'Planning for Bush Fire Protection 2006' and the NSW Rural Fire Service's document 'Standards for asset protection zones'. The 100 metre APZ to the east of the building may be managed as 70 metre IPA and 30 metre outer protection area (OPA).	Refer Section 2.3 of this report. The revised scheme maintains a 100m APZ to the east (70m IPA & 30m OPA). Due to the retention of Duffys Forest EEC within the site, the APZ to the north of the building is between 27-30m. The 27m dimension gains from a 2m width of insitu sandstone rock in the Duffs Forest zone and this can be relied on as 'equivalent to an APZ'. Thus the Schedule 1 attached to this report plan shows the

	APZ as being 25m but again will gain from the additional 2m. The APZ to the west is limited to a minimum 15m towards a proposed 5m wide bushland buffer adjacent to the Forest Way.
Condition 2 – The provision of water, electricity and gas shall comply with Section 4.1.3 and 4.2.7 of *PBP 2006.*	Refer Section 3.5 – 3.7. The revised scheme will maintain compliance with this condition.
Condition 3 – The proposed maintenance & fire egress path along the southern boundary and eastern elevation of the building shall comply with section 4.1.3 (3) of 'Planning for Bush Fire Protection 2006'.	Refer Section 3.4. The revised scheme will maintain compliance with this condition. Following a Section 34A Conference in August 2020 the width of the access to the rear of the development from 4m to 5.5m with available land to cater for swept path curve.
Condition 4 – Access along the Crown Road reserve to the point of entry into the site on the northern boundary shall comply with section 4.1.3 (3) of 'Planning for Bush Fire Protection 2006'.	Refer Section 3.4. The revised scheme will maintain compliance with this condition. Please note however that the access road in parts is limited to 3.5m width. As outlined in section 3.4 of this report, adequate access can still be provided for firefighting vehicles in compliance with the performance criteria.
Condition 5 – The proposed turning areas for emergency vehicles located on the northern & eastern elevations of the building shall be suitably designed to enable an MRV – Category 1 Tanker to turn around.	Refer Section 3.4. The revised scheme will maintain compliance with this condition with the provision of turning head as published by the RFS in PBP 2019 Section A3.3.
Condition 6 – A Bush Fire Emergency Management and Evacuation Plan shall be prepared consistent with 'Development Planning - A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan December 2014' and Australian Standard AS3745 2010 'Planning for Emergencies in Facilities'.	This condition will remain, and a bushfire emergency management and evacuation plan will be required prior to occupation.
Condition 7 – The proposed building shall comply with Sections 3 and 5 (BAL 12.5) Australian Standard AS3959-2009 'Construction of buildings in bush fire-prone areas' or NASH Standard (1.7.14 updated) 'National Standard Steel Framed Construction in Bushfire Areas – 2014' as appropriate and section A3.7 Addendum Appendix 3 of 'Planning for Bush Fire Protection 2006'.	The revised scheme will maintain compliance with this condition. The proposed external ground floor deck to the east is to comply with bushfire attack level (BAL) 19.
Condition 8 – A minimum 2.2-metre-high radiant heat shield made of non-combustible materials shall be constructed along the northern property boundary for a distance of 120 metres. All posts and rails shall be constructed of non-combustible materials. The bottom of the fence is to be in direct	The revised scheme will maintain the requirement for a 2.2m high radiant heat shield, however, based on the revised site plan, the fence length is reduced from 120m to 60m.

contact with the finished ground level or plinth.	
Condition 9 – Landscaping of the site shall comply with the principles of Appendix 5 of *'Planning for Bush Fire Protection 2006'.*	The revised scheme will maintain compliance with this condition

Travers bushfire & ecology can confirm that the bushfire risk posed to the development can be mitigated as appropriate bushfire protection measures have been incorporated into the development design and will be put in place so they can be managed in perpetuity or for the life of the development.

The assessment has concluded that the proposed development will provide compliance with the performance criteria as outlined within *PBP* and is subject to the following alternative solutions:

- APZs have been determined in accordance with Appendix B Method 2 (alternative solution) of *AS3959 Construction of buildings in bushfire prone areas (2009)* for the North, South east and South.

- Deemed to Satisfy APZ dimensions have been determined for the Easterly aspect.

- Provision of a 5.5m wide paved roadway to provide access to the southern and eastern building elevations to enable firefighting activities and property defence, as per previous approvals.

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
BSA	bushfire safety authority
DA	development application
EEC	endangered ecological community
EP&A Act	*Environmental Planning & Assessment Act 1979*
FDI	fire danger index
ha	hectare
IPA	inner protection area
m	metres
NCC	*National Construction Code*
OPA	outer protection area
PBP	*Planning for Bush Fire Protection 2006*
RF Act	*Rural Fires Act 1997*
RMS	Roads and Maritime Services
RFS	NSW Rural Fire Service
SFPP	special fire protection purpose
TSC Act	*Threatened Species Conservation Act 1995*

TABLE OF CONTENTS

Introduction 1

Travers bushfire & ecology has been requested to undertake a bushfire protection assessment for the proposed revised design and construction of a residential aged care facility at 181 Forest Way, Belrose. This September 2020 addendum bushfire assessment report has been undertaken to update matters pertinent to the Section 34 Conference held in respect of the development application before the NSW Land & Environment Court. The matter of concerns raised were in relation to;

- The ongoing maintenance of the neighbouring landscape in the south.
- The vegetation formation located to the east.
- The modelling used to define the APZ in the north, south east and east.
- The access road width in the south and its capability to achieve 5.5m width.
- the need for lights and railings for the southern access road.

1.1 Aims of the assessment

The aims of the bushfire protection assessment are to:

- address the concerns raised by Northern Beaches Council in previous development applications (DAs);
- 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 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 development is located on land mapped by Northern Beaches Council as being bushfire prone and this type of development triggers a formal assessment by Council in respect of the RFS policy entitled *Planning for Bush Fire Protection 2006 (PBP).*

The proposed development involves the construction of a residential aged care facility within the western portion of Lot 3 DP 805710.

The eastern portion of the site will be managed as an APZ for a distance of 100m. The facility will provide an overall one hundred and five (105) beds over four-storeys, landscaped courtyard, terrace and a parking / loading area with forty-five (45) car parks.

Figure 1.1 and Figure 1.2 depicts the proposal.

Schedule 1 shows the proposed development and bushfire protection measures, including APZs.

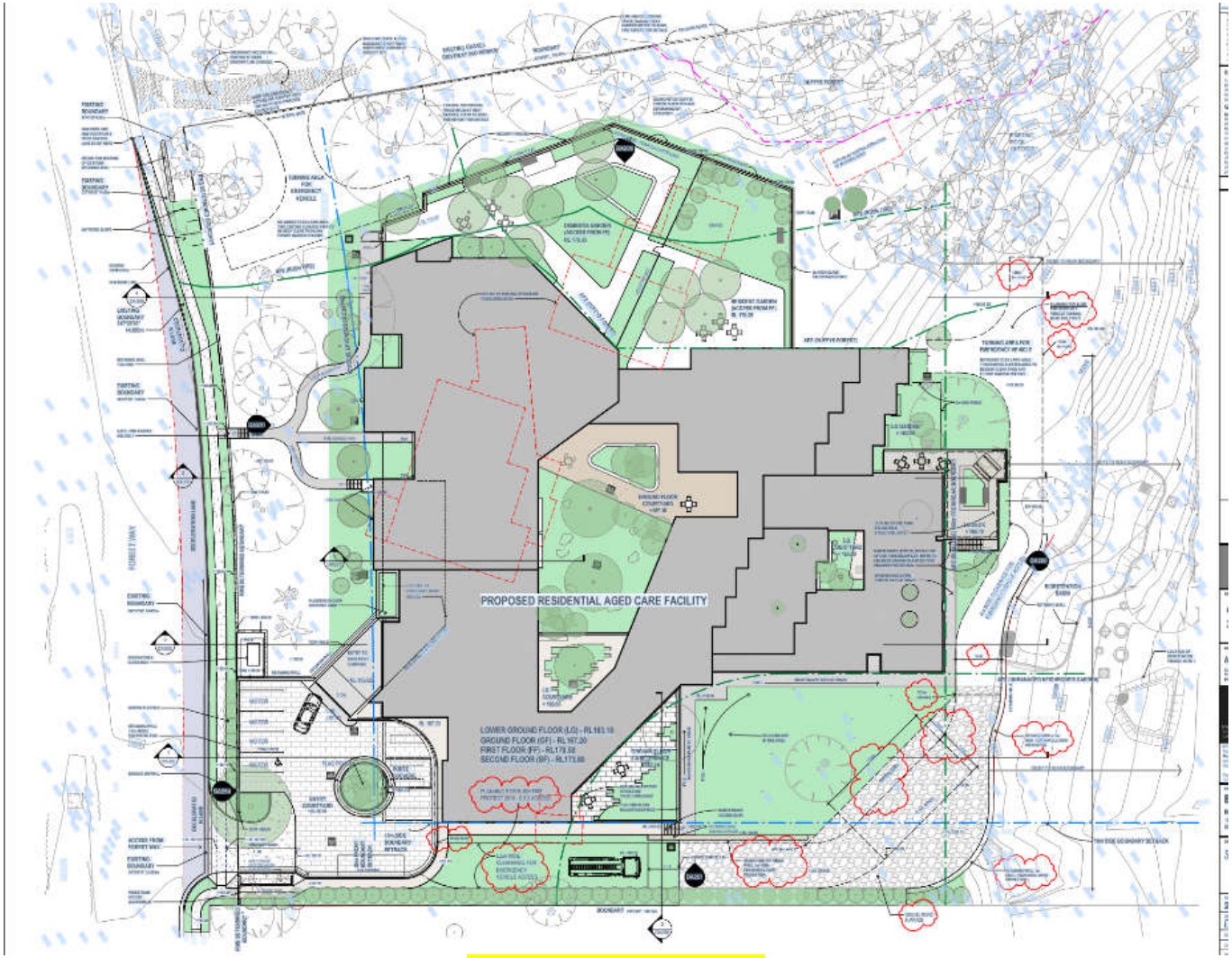


Figure 1.1 – Current site plan
(source: *Morrison Design Partnership*, dated September 2020)

Figure 1.2 – 3D Image looking from the south east
(source: *Morrison Design Partnership*, dated September 2020)

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 plans prepared by *Morrison Design Partnership,* project no. 2951 Dwg no. DA050 revision J, *dated* September 2020.
- Warringah Local Environmental Plan (2011)
- *NearMap* aerial photography
- Topographical maps DLPI of NSW 1:25,000
- Australian Standard 3959 *Construction of buildings in bushfire-prone areas (AS3959)*
- *Planning for Bush Fire Protection 2006 (PBP) (RFS).*

Inspections of the proposed development site and surrounds were undertaken by Nicole van Dorst and John Travers on numerous occasions 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

The property currently supports a residential dwelling, granny flat and outbuildings and is located to the east of Forest Way, Belrose within the local government area (LGA) of the Northern Beaches (refer Figure 1.3).

The site is moderately cleared with remnant canopy only. The vegetation beyond the site to the east and north-east supports forest vegetation associated with a bushland reserve, with remnant forest and tall heath located within the private land to the south and within the road reserve to the north.

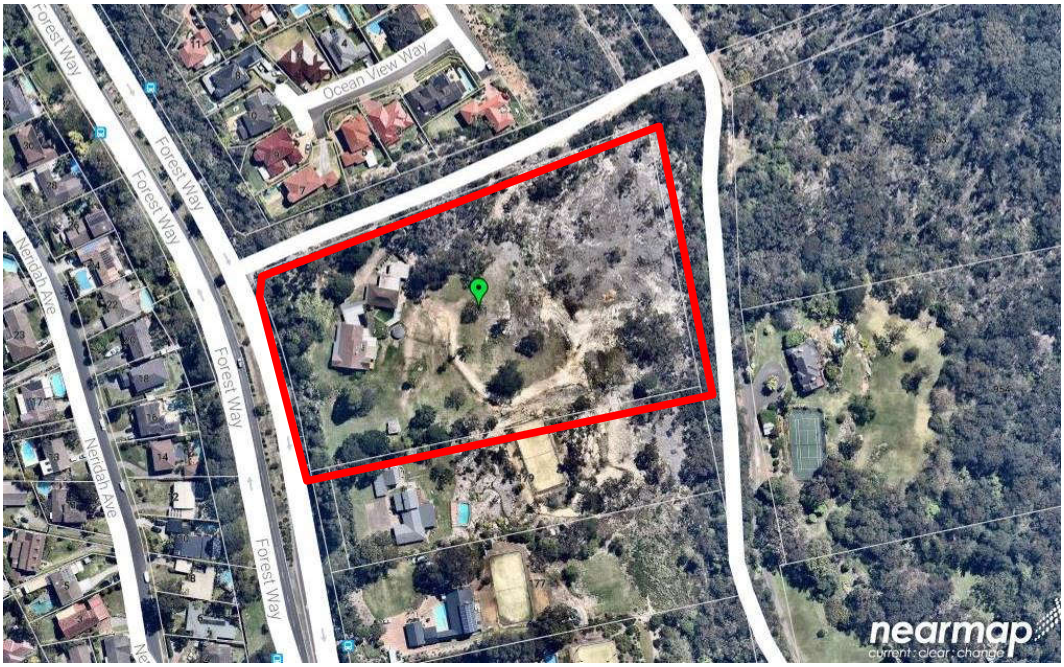


Figure 1.3 – Aerial appraisal
(source: NearMap)

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 *National Construction Code (NCC)*. The identification of bushfire prone land is required under Section 10.3 of the *Environmental Protection & Assessment Act 1979 (EP&A Act)*.

1.5.2 Bushfire prone land

Bushfire prone land maps provide a trigger for the development assessment provisions. The proposed development is located on land that is mapped by Northern Beaches Council as being bushfire prone (refer Figure 1.4).

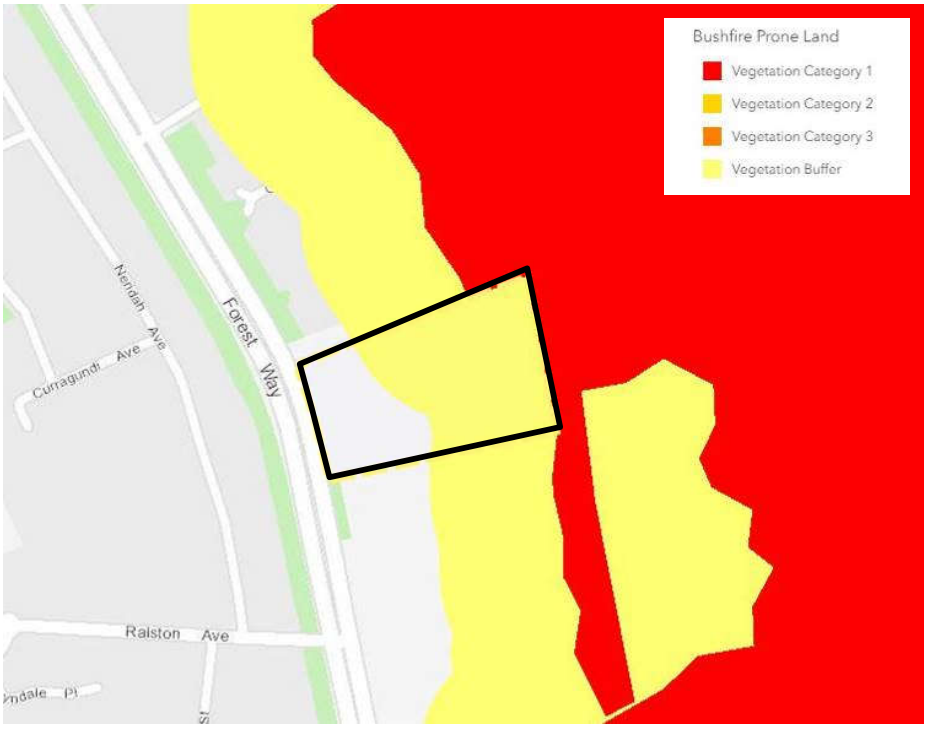


Figure 1.4 – Bushfire prone land map
(source: NSW Planning Portal, 2019)

The proposed development is an integrated development under Section 4.46 of the *EP&A Act.* Consequently, to proceed, the proposed development will require a bushfire safety authority (BSA) from the RFS. The Commissioner must be satisfied that the proposal complies with *PBP* before granting a BSA.

1.5.3 Rural Fires Act 1997 (RF Act)

This legislation is concerned with the prevention and control of bushfire, hazard reduction and administration.

Section 100B of the *Rural Fires Act 1007 (RF Act)* states that the Commissioner may issue a BSA for a special fire protection purpose (SFPP) development (aged care) when it occurs on bushfire prone land.

1.5.4 Planning for Bush Fire Protection 2006 (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 aged care development is a type of development regarded by the RFS as a SFPP development, *PBP* requires additional objectives to be considered. These include the need to:

7. Provide for the special characteristics and needs of occupants. Unlike residential subdivisions, which can be built to a construction standard to withstand the fire event, enabling occupants and fire fighters to provide property protection after the passage of fire, occupants of SFPP developments may not be able to assist in property protection. They are more likely to be adversely affected by smoke or heat while being evacuated.

8. Provide for safe emergency evacuation procedures. SFPP developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bushfire threats. During emergencies, the risk to fire fighters and other emergency services personnel can be high through prolonged exposure, where door to door warnings are being given and exposure to the bushfire is imminent.

The nature of SFPP developments means that occupants may be more vulnerable to bushfire attack for because they may;

- be less educated in relation to bushfire impacts
- may have reduced capacity to evaluate risk and to respond adequately to the bushfire threat

- present organisational difficulties for evacuation and / or management
- be more vulnerable through stress, anxiety and smoke impacts arising from bushfire threat
- have significant communication barriers
- increased supervision may be required during a bushfire
- 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.

1.5.5 National Construction Code (NCC) and the Australian Standard AS3959 Construction of buildings in bushfire-prone areas 2009 (AS3959)

The *NCC* is given effect through the *EP&A Act* and forms part of the regulatory environment of construction standards and building controls.

The *NCC* outlines objectives, functional statements, performance requirements and deemed to satisfy provisions.

In NSW, construction in bushfire prone areas applies to Classes 2, 3, 4 and 9b buildings or a Class 10a associated with Classes 2, 3, 4 and 9b buildings.

The construction manual for the deemed to satisfy requirements is the *AS3959*.

1.6 Environmental and cultural constraints

Cumberland Ecology have prepared a Biodiversity Development Assessment Report for a proposed Seniors Housing Development. The report states that the vegetation retained on the subject land will be modified as part of an APZ. All retained vegetation will be managed under a BMP, which will improve the function of the ecological communities present through weed control and active management. The mitigation measures recommended to be implemented include:

- Vegetation protection;
- Erosion, sedimentation and pollution control;
- Pre-clearing and clearing surveys;
- Weed control measures; and

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 in accordance with David Keith (2004) to determine APZ distances for SFPP developments. The hazardous vegetation is calculated for a distance of at least 140m from a proposed building envelope.

The northern boundary extent

Forest and tall heath to the north of the site. The bushfire risk posed by this vegetation is minimal due to its narrow width and fire run potential (i.e. <20m road side vegetation). The bushfire risk is further reduced by the presence of an existing service road / electrical easement. The vegetation is irregularly managed by T*ransGrid* guidelines (i.e. maintain a height less than 4m).

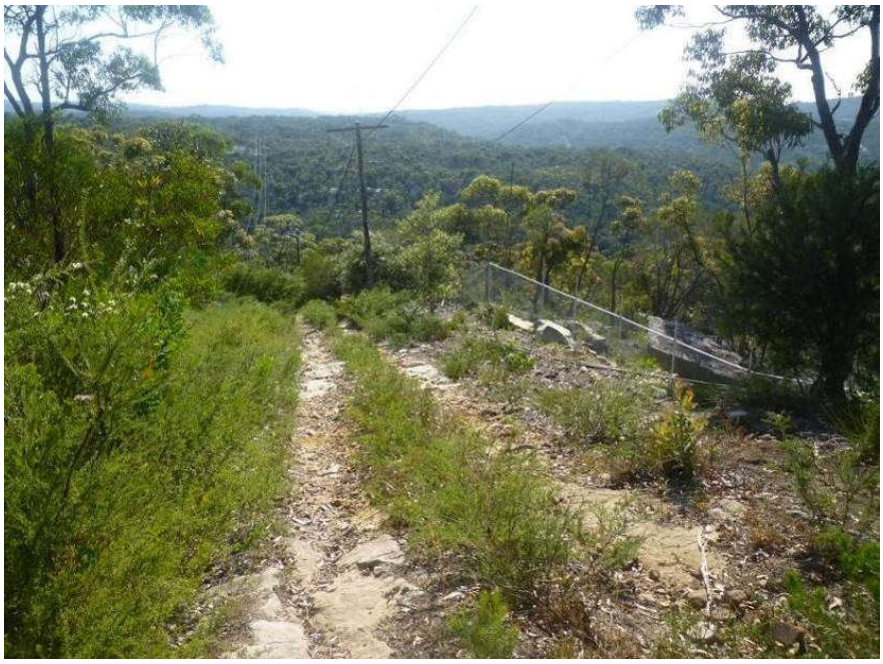


Photo 1 – Forest and tall heath vegetation to the north

As approved previously by the NSW RFS, a 24m APZ (to include the adjoining service road where it meets the site boundary) has been provided along with the construction of a 2.2m high *Colorbond* fence which will further reduce the radiant heat impact on the proposed development from the north.

Photo 2 – Vegetation to the north of the site on crown road reserve

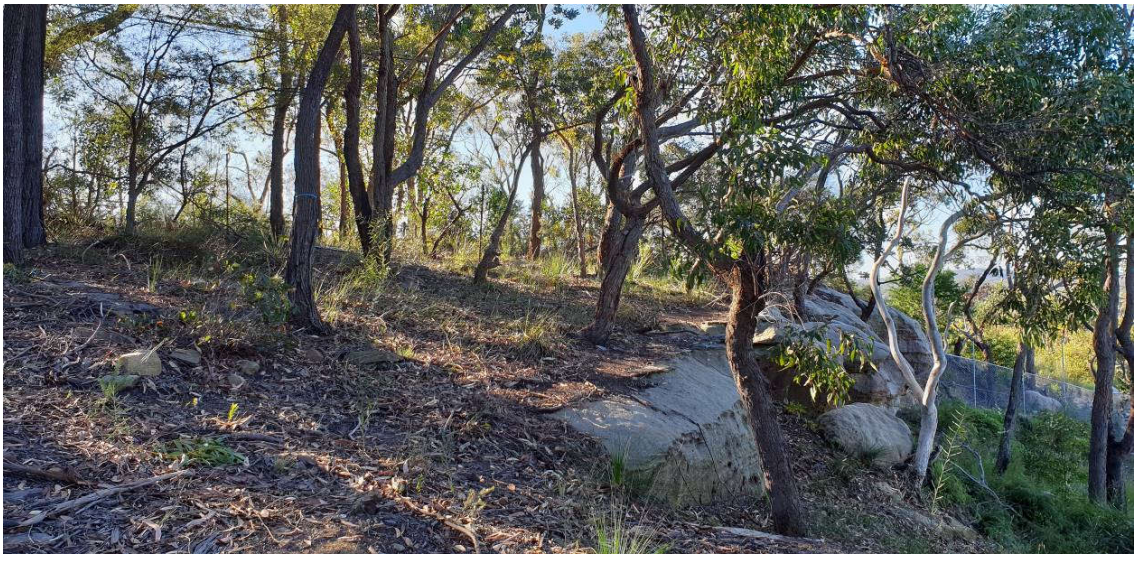


Photo 3 – Duffys Forest vegetation to the north of the site

Photo 4 – Presence of rock outcrops as the southern edge of the proposed Duffys Forest conservation zone on the northern boundary

Photo 5 – Presence of rock outcrops as the southern edge of the proposed Duffys Forest conservation zone on the northern boundary

The southeast boundary extent

Tall heath vegetation to the south-east of the site downslope of the tennis court. This vegetation community determination is supported by mapping prepared by *Native Vegetation of Sydney Metropolitan Area (2016)* – see Figure 2.1. The area consists of significant swathes of exposed rock with the irregular presence of regenerating Tall heath. This was agreed to be the NSW RFS previously in 2018. *TBE* has assumed a worst-case scenario and re-establishment of the vegetation to the south-east (i.e. east of the tennis court) to a 'tall heath formation'.

Figure 2.1 – Vegetation mapping

Forest vegetation is present on the eastern edge of the neighbours property at 179 Forest Way Belrose. Mapping of that is shown on Figure 2.2 below by way of a black dashed line.

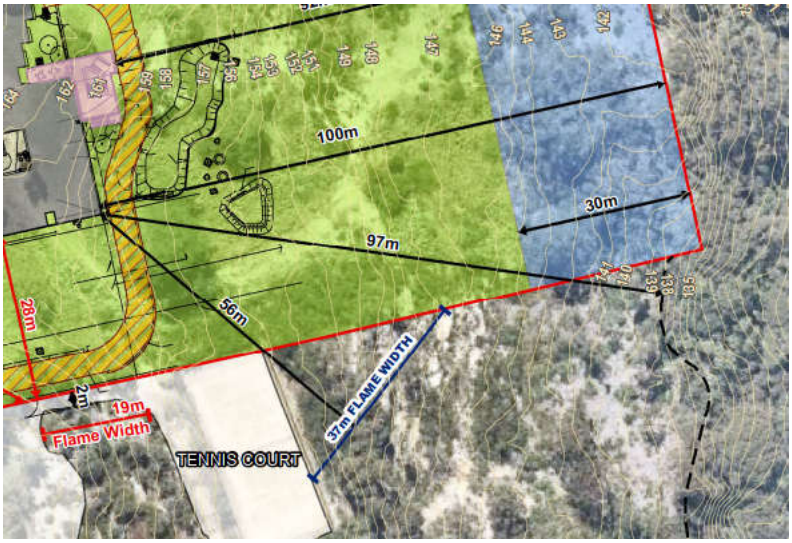


Figure 2.2 – Forest mapping

2.2 Effective slope

The effective slope is assessed for a distance of up to 100m. Effective slope refers to that slope which provides the most effect upon likely fire behaviour. A mean average slope may not in all cases provide sufficient information such that an appropriate assessment can be determined.

The effective slope within the hazardous areas is provided in Table 2.1 below.

2.3 Bushfire attack assessment

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

Table 2.1 provides a summary of the bushfire attack assessment and the minimum required APZs (i.e. to ensure radiant heat <10kWm^2).

Table 2.1 – Bushfire attack assessment

Aspect	**Predominant vegetation within 140m**	**Effective slope of land** (in degrees)	**APZ provided** (metres)	Radiant Heat (k/Wm^2)
North	Forest	5 up	30	9.81
North-east	Forest	10 up	25 but reliant on 2m of rock	9.06
East	Scrub	10-15	100	DTS
South east	Scrub	13.5	36	9.71
South	Scrub	5^{0C}	28m	9.44

2.3.1 Northern bushfire attack

A performance-based assessment using Appendix B of *AS3959* was undertaken to determine the radiant heat exposure based the location of the previous 25m dimension to the north. This is based on an upslope of 10 degrees and an APZ of 27m. The additional 2m arises (to the original 25m) from the presence rock (with no ground or surface fuels) located in the proposed conservation zone. See Photos 4 and 5 above for verification. The results of the assessment, provided below, were prepared using the bushfire attack level calculator developed by *Flamesol.*

Table 2.2 – Flamesol results

FPA AUSTRALIA | FLAMESOL

Calculated September 7, 2020, 4:02 pm (BALc v.4.8)

Belrose - the former northern 25m dimension location

Bushfire Attack Level calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	1.28 km/h
Vegetation classification	Forest	Flame length	11.66 m
Surface fuel load	21.4 t/ha	Flame angle	68 °
Overall fuel load	27.4 t/ha	Panel height	10.81 m
Vegetation height	n/a	Elevation of receiver	5.4 m
Effective slope	-10 °	Fire intensity	18,234 kW/m
Site slope	0 °	Transmissivity	0.826
Distance to vegetation	27 m	Viewfactor	0.0982
Flame width	20 m	Radiant heat flux	9.06 kW/m²
Windspeed	n/a	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,200 K		

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

2.3.2 Northern western bushfire attack

A performance-based assessment using Appendix B of *AS3959* was undertaken to determine the radiant heat exposure based the location of the previous 30m dimension to the north. This is based on a upslope of 5 degrees and an APZ of 30m. The results of the assessment, provided below, were prepared using the bushfire attack level calculator developed by *Flamesol.*

Table 2.3 – Flamesol results

FPA AUSTRALIA | FLAMESOL

Calculated September 7, 2020, 4:08 pm (BALc v.4.8)

Belrose - teh former 30m APZ to the north

Bushfire Attack Level calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	1.81 km/h
Vegetation classification	Forest	Flame length	15.1 m
Surface fuel load	21.4 t/ha	Flame angle	64 °
Overall fuel load	27.4 t/ha	Panel height	13.58 m
Vegetation height	n/a	Elevation of receiver	6.79 m
Effective slope	-5 °	Fire intensity	25,746 kW/m
Site slope	0 °	Transmissivity	0.821
Distance to vegetation	30 m	Viewfactor	0.1069
Flame width	20 m	Radiant heat flux	9.81 kW/m²
Windspeed	n/a	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,200 K		

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

2.3.3 Eastern bushfire attack

This was determined on a deemed to satisfy approach and an APZ of 100m was provided

2.3.4 South eastern bushfire attack

A performance-based assessment using Appendix B of *AS3959* was undertaken to determine the radiant heat exposure based the location of the previous 100m dimension to the east. This is based on a downslope of 13.5 degrees and an APZ of 56m and a flame width of 60m- see extract from Near maps below in Figure 2.3 which shows 53.4m but we used 60m as the flame width).

The dimension of 56m was based on the distance between the building and the boundary which is 36m; and the first 20m of the shrub vegetation being a small triangle of hazard which should be ignored for any calculation of fire behaviour – because of the small triangle shape.

The flame width used was calculated as per the Nearmaps figure shown below which shows the effective width of the likely flame on the neighbors land. The location of that line is in effect 21m from the common boundary thus a total of 56m (the apex of the northeast corner of the tennis court).

The results of the assessment, provided below, were prepared using the bushfire attack level calculator developed by *Flamesol.*

Figure 2.3 – Effective width of flame used for calculation although 60m was used in the calculation - see Figure 2.4 below

Table 2.4 – Flamesol results

Calculated September 7, 2020, 4:18 pm (BALc v.4.8)

Belrose - South eastern aspect

Bushfire Attack Level calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	10.57 km/h
Vegetation classification	Scrub	Flame length	21.1 m
Surface fuel load	36 t/ha	Flame angle	72 °
Overall fuel load	36 t/ha	Panel height	20.07 m
Vegetation height	3 m	Elevation of receiver	10.03 m
Effective slope	13.5 °	Fire intensity	196,706 kW/m
Site slope	0 °	Transmissivity	0.774
Distance to vegetation	56 m	Viewfactor	0.1122
Flame width	60 m	Radiant heat flux	9.710000000000001 kW/m²
Windspeed	45 km/h	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,200 K		

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

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

Note:

Within the 140m to the south east there is forest vegetation but it is located 97m away from the nearest corner of the building - see Figure 2.4 below.

Modelling in Table 2.5 below demonstrates that 97m produced 7.33 k/Wm2 which is below the required radiant heat threshold of 10 k/Wm2. A flame width of 50m was used in this calculation given that the depth of forest was less than 30m.

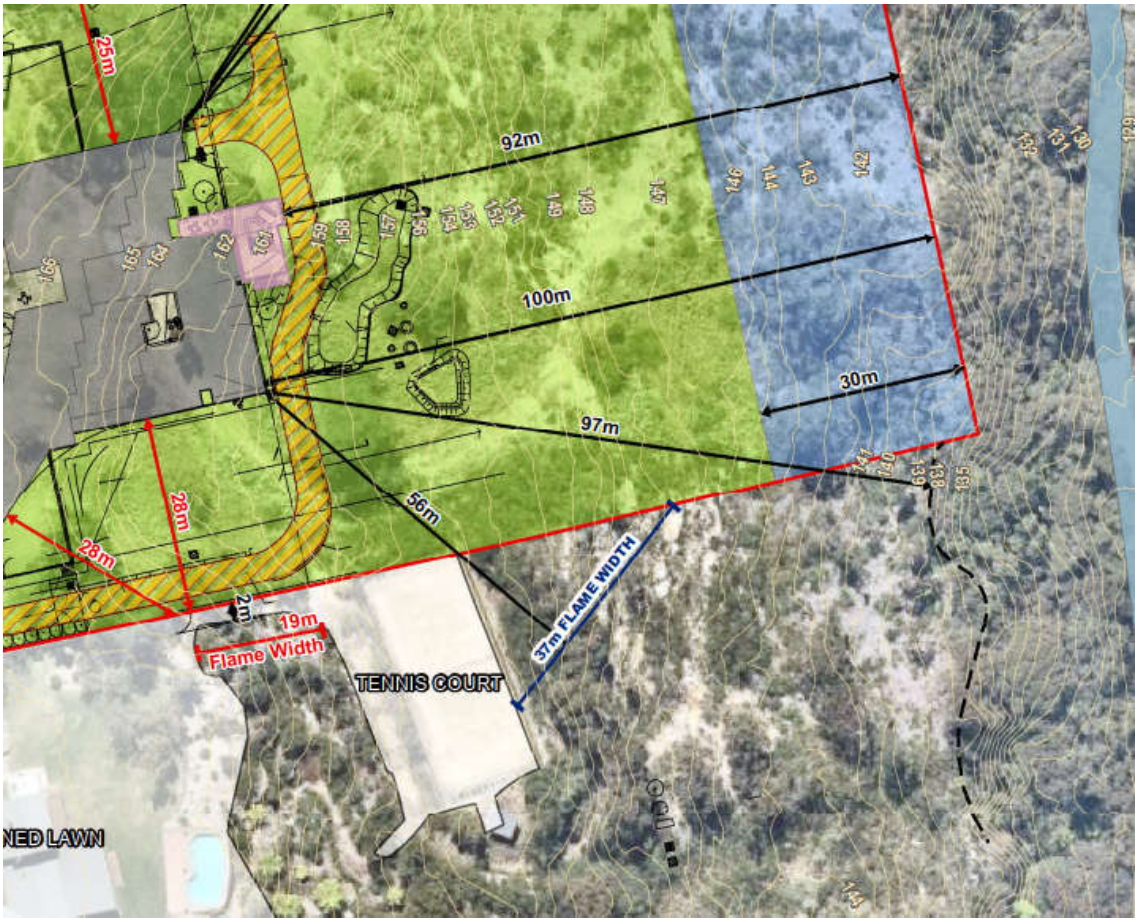


Figure 2.4 – distance from edge of building to nearest forest on east south east aspect

Table 2.5 – Flamesol results

Calculated September 9, 2020, 7:46 am (BALc v.4.8)

Souith east to forest

Bushfire Attack Level calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	7.22 km/h
Vegetation classification	Forest	Flame length	50.27 m
Surface fuel load	21.4 t/ha	Flame angle	63 °
Overall fuel load	27.4 t/ha	Panel height	44.79 m
Vegetation height	n/a	Elevation of receiver	22.39 m
Effective slope	15 °	Fire intensity	102,341 kW/m
Site slope	0 °	Transmissivity	0.743
Distance to vegetation	97 m	Viewfactor	0.0883
Flame width	50 m	Radiant heat flux	7.33 kW/m²
Windspeed	n/a	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,200 K		

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

Southern Eastern bushfire attack

A performance-based assessment using Appendix B of *AS3959* was undertaken to determine the radiant heat exposure based the location of the proposed 36m dimension to the southeast. This is based on a downslope of 13.5 degrees and an APZ of 36m to the boundary. The flame width available is 37m yet we used 60m in the calculation as shown at Table 2.6. The results of the assessment, provided below, were prepared using the bushfire attack level calculator developed by *Flamesol*.

The calculation has been based on determining the fire behaviour based on a minimum flame width. We have mapped the set back to correctly determine the location where fire behaviour is irrelevant to the equation and we have determined that as 20m from the boundary which makes the modelled dimension as being 56m – see Figure 2.5.

It is this 20m, being a small triangle, that is irrelevant to the calculation of possible fire behaviour – see Figure 2.5. The flame width at this point would be 37m but for the calculation we have used is a larger figure namely 60m.

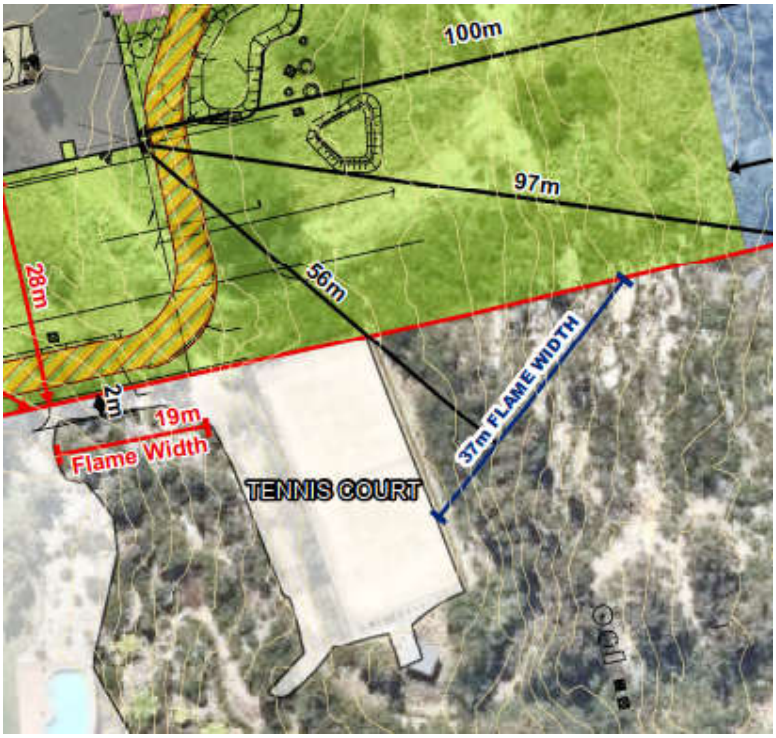


Figure 2.5 – Location of the flame width used to determine the likely fire behaviour from the south-eastern aspect

Table 2.6– Flamesol results

Calculated September 9, 2020, 3:47 pm (BALc v.4.8)

South east aspect

Bushfire Attack Level calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	10.57 km/h
Vegetation classification	Scrub	Flame length	21.1 m
Surface fuel load	36 t/ha	Flame angle	82 °
Overall fuel load	36 t/ha	Panel height	20.9 m
Vegetation height	3 m	Elevation of receiver	0.57 m
Effective slope	13.5 °	Fire intensity	196,706 kW/m
Site slope	10 °	Transmissivity	0.772
Distance to vegetation	56 m	Viewfactor	0.1077
Flame width	60 m	Radiant heat flux	9.289999999999999 kW/m²
Windspeed	45 km/h	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,200 K		

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

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

Southern bushfire attack

A performance-based assessment using Appendix B of *AS3959* was undertaken to determine the radiant heat exposure based the location of the proposed 28m dimension to the south. This is based on a downslope of 5 degrees and an APZ of 28m to the boundary plus 3m (given the angle) allowing for the internal road (2m) inside the boundary – thus 30m; and a flame width of 19m.

The results of the assessment, provided below in Table 2.7 were prepared using the bushfire attack level calculator developed by *Flamesol.*

Table 2.7– Flamesol results

FPA AUSTRALIA | FLAMESOL

Calculated September 9, 2020, 4:07 pm (BALc v.4.8)

Southern aspect

Bushfire Attack Level calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	5.88 km/h
Vegetation classification	Scrub	Flame length	16.11 m
Surface fuel load	36 t/ha	Flame angle	72 °
Overall fuel load	36 t/ha	Panel height	15.32 m
Vegetation height	3 m	Elevation of receiver	2.37 m
Effective slope	5 °	Fire intensity	109,422 kW/m
Site slope	10 °	Transmissivity	0.819
Distance to vegetation	30 m	Viewfactor	0.1026
Flame width	19 m	Radiant heat flux	9.4 kW/m²
Windspeed	45 km/h	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,200 K		

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

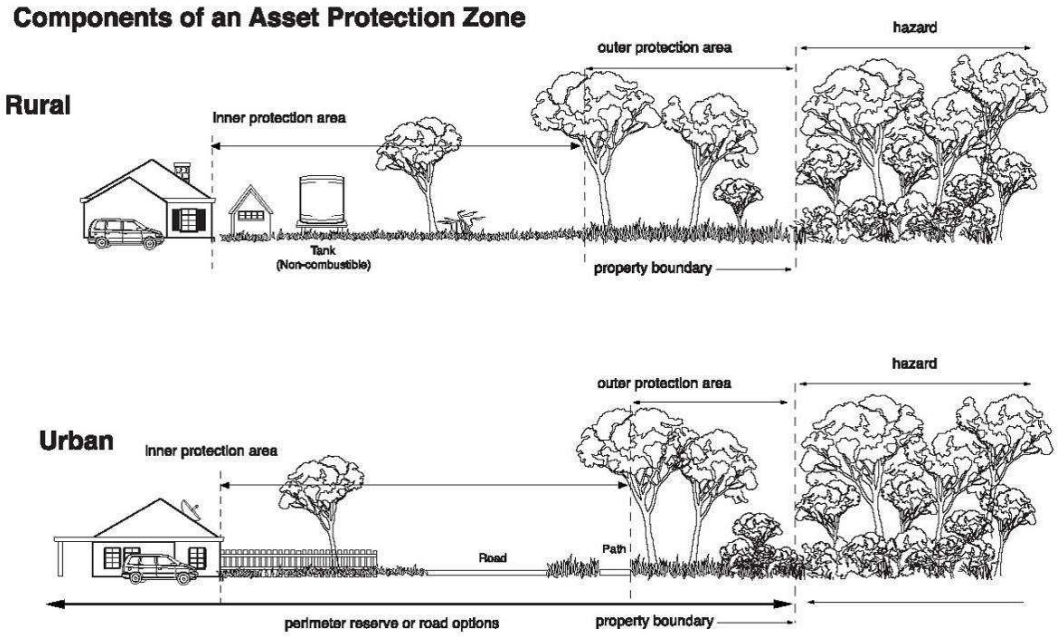
Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

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 10*kW/m*^{2} for SFPP developments.

This rating assists in determining the size of the APZ in compliance with Appendix 2 of *PBP* 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 (*PBP* guidelines pg. 19)

Performance criteria	Acceptable solutions	Complies
Radiant heat levels of greater than 10kW/m^2 will not be experience by occupants or emergency services workers entering or exiting a building.	An APZ is provided in accordance with the relevant tables and figures in Appendix 2 of *PBP.* Exits are located away from the hazard side of the building. The APZ is wholly within the boundaries of the development.	Complies with the performance criteria. As outlined in Section 2.3, a performance-based assessment has been undertaken to ensure all aspects of the building are not exposed to radiant heat >10kW/m^2. The external deck on the eastern façade is to be constructed to comply with BAL 19 (provided with a setback of 92m)
Applicant demonstrates that issues relating to slope are addressed: maintenance is practical, soil stability is not compromised and the potential for crown fire is negated.	Mechanisms are in place to provide for the maintenance of the APZ over the life of the development. The APZ is not located on land with a slope exceeding 18^o.	Complies – The APZ will consist of landscaped areas, roads and turf areas.
APZs are managed and maintained to prevent the spread of a fire towards the building.	In accordance with the requirements of *Standards for Asset Protection Zones* (*RFS* 2005).	Complies - to be made a condition of consent.

3.2 Building protection

The construction of Seniors Living buildings in bushfire prone areas must accord with BAL 12.5 of AS3959.

In addition the external deck on the eastern façade is to be constructed to comply with BAL 19 (provided with a setback of 92m).

3.3 Hazard management

Future development is to ensure that the APZ as depicted within Schedule 1 is undertaken with the following;

- Managed in accordance with RFS document *Standards for Asset Protection Zones* available from www.rfs.nsw.gov.au by following the link 'Publications' and 'Hazard Reduction' and that:

- Landscape design within the property is to be undertaken in accordance with Appendix 5 of *PBP* also available from www.rfs.nsw.gov.au by following the link 'Publications' and *Building in a Bush Fire Prone Area*.

3.4 Access for fire fighting operations

The primary access to the development will be via from Forest Way in the west. An existing service road / electrical easement is also located adjacent to the northern boundary of the site as well as a private access road extending from Morgan Road in the north which runs parallel to the eastern boundary of the site (refer Figure 3.1).

Figure 3.1 - Access

Public access to the facility will be limited to patrons, staff and visitors. The proposal will provide a single-entry driveway ramp (1:20 and 1:16) to an entry courtyard with *port cochere*, together with entry to a basement carpark as per the original proposal.

The revised scheme maintains firefighting access to all aspects of the building and to the rear of the site (for APZ maintenance) via the provision of the 5.5m wide road.

In respect to the bushfire matters raised by Northern Beaches Council, *Travers bushfire & ecology* provide the following response:

> ***Council comment: Previous DA2017/0697 was recommended for refusal based on potential impacts to known individuals of Grevillea***

caleyi (Critically Endangered) within the road reserve immediately north of the property.

Bushfire Consultant to include a short statement justifying the turning area and confirming no trees / vegetation will be requiring pruning or removal.

Travers bushfire & ecology can confirm that no further clearing will be required within the adjoining road reserve to the north or within the site to implement or utilise the existing access driveway. The following figure depicts the location of the *Grevillea caleyi* within the adjoining land.

Figure 3.2: *Grevillea caleyi* within the unformed road reserve
(source: *Cumberland Ecology*, 2017)

As depicted in Figure 3.2 above, the *Grevillea species* is located at the entry to the road to the north. The existing unformed road has a width of 3.5m. The only portion of this existing road proposed to be used as a secondary emergency access point is the first 20m length before the turning head is provided on site. *Planning for Bush Fire Protection (PBP)* allows for some short restrictions in access where they are not less than 3.5m and extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The existing unformed road does not require any further clearing to provide sufficient access for fire fighting vehicles and therefore there will be no impact on the *Grevillea sp.*

In addition, the proposed turning area within the property has been located to ensure no impact on existing vegetation. Confirmation from engineers is required to ensure that the existing ground surface is capable of carrying fully loaded firefighting vehicles of 15 tonnes.

Alternatively, *grass-crete* (capable of supporting 15 tonnes) can be used to minimise environmental impact.

In addition, Council had concerns that the area may be used for access outside of emergency situations. A compatible locked (RFS) gate will be included in the amended proposal to prevent this situation. The proposed gate is depicted in the site plan prepared by *Morrison Design* (refer Figure 3.3) as a sliding gate.

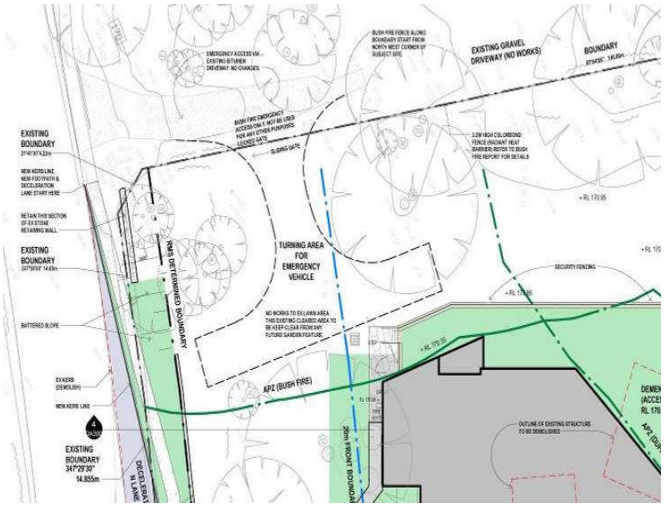


Figure 3.3: *Turning head dimensions*
(source: Morrison Design, 2019)

Photos 6 & 7 depict the existing bitumen driveway on the existing road reserve.

Photo 6 – Existing driveway access to the site (right of picture)
picture taken looking east

Photo 7 – Existing access looking west towards Forest Way.

Table 3.2 provides detail regarding design / construction and how the 'intent of measures' required by the RFS for internal roads is provided by the development i.e. "*to provide safe operational access for emergency services personnel in suppressing a bush fire, while residents are accessing or egressing an area*".

Table 3.3 outlines the design requirements for the fire trails.

Table 3.2 – Performance criteria for internal roads (*PBP* guidelines pg. 35)

Performance criteria	Acceptable solutions to RFS	Compliance comments
Internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle.	Internal roads are two-wheel drive, sealed, all weather roads.	Yes.
	Internal perimeter roads are provided with at least two traffic lane widths (carriageway 8m minimum curb to curb) and shoulders on each side, allowing traffic to pass in opposite directions.	A perimeter road is not proposed. The RFS did not require such a road in their 2018 consent following representations to them that no such road was warranted as all evacuation would be direct to the main Forest Way roadway and no use of the side or rear areas were required. PBP 2006 informs on this matter at Section 4.2.7 where it refers to the intent of the fire protection measure - *This being to "provide safe operational access for emergency service personnel in suppressing a bushfire whilst residents are accessing or egressing an area'*. The same section does not deal with the type of development subject to this DA as PBP 2006 assumes in the second paragraph the development is akin to a residential development e.g. *"Where those developments are being established, the requirements for public roads and car parking apply in the same way as new residential subdivisions. (See Section 4.1.3, Access – Public Roads)"* In this case PBP on page 20 of that section advises that perimeter roads is the preferred option to sperate bushland from urban areas with the intent of the measure being –

Performance criteria	Acceptable solutions to RFS	Compliance comments
		"*to provide safe operational access for emergency services personnel in suppressing a bush fire, while residents are accessing or egressing an area*" In this regard fire fighting access will be provided via the existing and proposed fire trails within and external to the site. The driveway / ramp to the porte cochere has a minimum width of 6.5m.. The proposed southern road access to the rear will be widened to 5.5m. A turn around area will be provided in the eastern aspect. The southern edge of that road will be protected by railing and lighting
	Roads are through roads. Dead end roads are not more than 100m in length from a through road, incorporate a minimum 12m outer radius turning circle, and are clearly sign posted as a dead end.	N/A
	Traffic management devices are constructed to facilitate access by emergency services vehicles.	Access is to be designed to allow access for fire fighting vehicles (i.e. 4m height clearance).
	A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	The port cochere is to have a minimum height clearance of 4m.
	Curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress.	The curve at the rear of the building is suitable for a fire truck to manoeuvre the corner being 5.5m minimum with an inner radius curve of 6m as shown on Figure 4.4 PBP 2006.

Performance criteria	Acceptable solutions to RFS	Compliance comments
	The minimum distance between inner and outer curves is 6m.	Yes
	Maximum grades do not exceed 15^{o} and average grades are not more than 10^{o}.	Yes
	Cross fall of the pavement is not more than 10^{o}.	Yes
	Roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than storm surge).	Yes
	Roads are clearly sign-posted and bridges clearly indicate load ratings.	Yes
	The internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes).	Yes

Table 3.3 – Performance criteria for fire trails (*PBP* guidelines pg. 24)

Performance criteria	Acceptable solutions	Compliant or not compliant
The width and design of the fire trails enables safe and ready access for fire fighting vehicles.	A minimum carriageway width of 4m with an additional 1m strip on each side of the trail clear of bushes and long grass. Sealed trails have a maximum grade of 15° and not more than 10° for unsealed roads. A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches. The cross fall of the trail is not more than 10°. The trail has the capacity for passing by: • reversing bays using the access to properties to reverse fire tankers, which are 6m wide and 8m deep to any gates, with a minimum turning radius of 6m and outer minimum radius of 12m and / or • a passing bay every 200m, 20m long x 3m wide, making a minimum trafficable width of 7m at the passing bay. •	The development provided a 5.5m wide pave roadway on the southern aspect. Portions of the fire trail over 10 degrees is to be sealed. The port cochere is to have a minimum height of 4m Yes
Fire trails are trafficable under all weather conditions. Where the fire trail joins a public road, access shall be controlled to prevent use by unauthorised persons.	The fire trail is accessible to fire fighters and maintained in a serviceable condition by the owner of the land. Appropriate drainage and erosion controls are provided. The fire trail system is connected to the property access road and / or through road system at intervals of at least 200m. Fire trails do not traverse a wetland or other land subject to periodic inundation (other than a flood or storm surge). Gates for fire trails are provided and locked with a key / lock system authorised by the local RFS.	Yes – can be made a condition of consent.

Performance criteria	Acceptable solutions	Compliant or not compliant
Fire trails designed to prevent weed infestation, soil erosion and other land degradation.	Fire trail design does not adversely impact on natural hydrological flows. Fire trail design acts as an effective barrier to the spread of weeds and nutrients. Fire trial construction does not expose acid-sulphate soils.	Yes – can be made a condition of consent.

3.5 Water supplies

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

Table 3.4 outlines the proposal's compliance with the performance criteria for reticulated water supply.

Table 3.4 – Performance criteria for reticulated water supplies (*PBP* guidelines pg. 37)

Performance criteria	Acceptable solutions	Complies
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. 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. The provisions of public roads in Section 4.1.3 of *PBP* in relation to parking are met.	Complies - can be made a condition of consent.

3.6 Gas

Table 3.5 outlines the required performance criteria for the proposal's gas supply.

Table 3.5 – Performance criteria for gas supplies (*PBP* guidelines pg. 37)

Performance criteria	Acceptable solutions	Complies
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* and the requirements of relevant authorities. Metal piping is to be used. All fixed gas cylinders are to be kept clear of flammable materials and located on the non hazard side of the development. If gas cylinders are to be kept close to the building the release valves must be directed away from the building and away from any combustible material, so that they do not act as a catalyst to combustion. Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.	Complies - can be made a condition of consent.

3.7 Emergency and evacuation planning

Table 3.6 outlines the required performance criteria for the proposal's emergency procedures

Table 3.6 – Performance criteria for emergency and evacuation planning (*PBP* guidelines pg.39)

Performance criteria	Acceptable solutions	Complies
An emergency and evacuation management plan is approved by the relevant fire authority for the area.	An emergency / evacuation plan is prepared consistent with the *RFS* Guidelines for the Preparation of Emergency / Evacuation Plan. *Note: The applicant should provide a copy of the above document to the local Bush Fire Management Committee for their information prior to the occupation of any accommodation of a SFPP*.	Complies - can be made a condition of consent.
Suitable management arrangements are established for consultation and implementation of the emergency and evacuation plan.	An emergency planning committee is established to consult with staff in developing and implementing and emergency procedures manual. Detailed plans of all emergency assembly areas including onsite and offsite arrangements as stated within *AS3745* are clearly displayed, and an annual trail emergency evacuation is conducted.	Complies - can be made a condition of consent.

Conclusion & Recommendations

4

4.1 Conclusion

This September 2020 addendum bushfire assessment report has been undertaken to update matters pertinent to the Section 34 Conference held in respect of the development application before the Court. The matter of concerns were raised in relation to;

- The ongoing maintenance of the neighbouring landscape in the south.
- The vegetation formation located on the east.
- The modelling used to define the APZ in the north and south east and east.
- The access road width in the south and its capability to achieve 5.5m width.
- the need for lights and railings for the southern access road.

This assessment has found that bushfire can potentially affect the proposed development from the forest vegetation located to external to the site's eastern boundary, as well as the remnant forest to the north and tall heath to the south and south-east resulting in possible flame, ember and radiant heat attack.

Travers bushfire & ecology can confirm that the bushfire risk posed to the development can be mitigated as appropriate bushfire protection measures have been incorporated into the development design and will be put in place and managed in perpetuity.

The assessment has concluded that the proposed development will provide compliance with the performance criteria as outlined within *PBP* and is subject to the following alternative solutions:

- APZs have been determined in accordance with Appendix B Method 2 (alternative solution) of *AS3959 Construction of buildings in bushfire prone areas (2009).*
- Provision of a fire trail paved roadway to provide access to the southern, eastern and northern building elevation to enable firefighting activities and property defence, as per previous approvals.

The following recommendations are provided to ensure that the development is in accordance with, or greater than, the requirements of *PBP.*

4.2 Recommendations

Recommendation 1 – At the commencement of building works and in perpetuity the APZ, as depicted in Schedule 1 – Bushfire Protection Measures prepared by *Travers bushfire & ecology* ref: 18MORR02, dated 7/9/20, shall be managed as an inner protection area (IPA) as outlined within section 4.2.7 and Appendix 5 of *Planning for Bush Fire Protection 2006* and the RFS document *Standards for asset protection zones*. The 100m APZ to the east of the building may be managed as 70 metre IPA and 30m outer protection area (OPA).

Recommendation 2 – The provision of water, electricity and gas shall comply with Section 4.1.3 and 4.2.7 of *PBP 2006.*

Recommendation 3 – The proposed access road on the southern aspect shall be constructed to 5.5m in width.

Recommendation 4 – Access along the Crown Road Reserve to the point of entry into the site on the northern boundary shall comply with section 4.1.3 (3) of *Planning for Bush Fire Protection 2006.* No further clearing of the existing 3.5m wide access road in Crown Reserve is required.

Recommendation 5 – The proposed turning areas for emergency vehicles located on the northern and eastern elevations of the building shall be suitably designed to enable an MRV – Category 1 Tanker to turn around.

Recommendation 6 – A Bush Fire Emergency Management and Evacuation Plan shall be prepared consistent with *Development Planning - A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan December 2014* and *Australian Standard AS3745 2010 Planning for Emergencies in Facilities.*

Recommendation 7 – The proposed building shall comply with Sections 3 and 5 (BAL 12.5) *Australian Standard AS3959-2009 Construction of buildings in bush fire-prone areas* or NASH Standard (1.7.14 updated) *National Standard Steel Framed Construction in Bushfire Areas – 2014* as appropriate and section A3.7 Addendum Appendix 3 of *Planning for Bush Fire Protection 2006*. The ground floor deck on the eastern façade is to comply with BAL 19.

Recommendation 8 – A minimum 2.2m high radiant heat shield made of non-combustible materials shall be constructed along the northern property boundary for a distance of 60m. All posts and rails shall be constructed of non-combustible materials. The bottom of the fence is to be in direct contact with the finished ground level or plinth.

Recommendation 9 – Landscaping of the site shall comply with the principles of Appendix 5 of *Planning for Bush Fire Protection 2006.*

Recommendation 10 – Low bollard lighting will be provided on the southern side of the access road on the southern aspect ramp for fire fighter safety.

REFERENCES

Australian Building Codes Board (2019) – *National Construction Code* 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 (2006) - *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

Plan of Bushfire Protection Measures

S1

Legend

- Site Boundary (Source: LPI)
- Contour - 1m (source: LiDAR)
- Service road / electrical easement
- Firetrail
- Existing private access
- Managed land

Proposed Development

- Lower Ground Deck (BAL 19)
- Residential aged care facility (BAL 12.5)

Asset Protection Zone (APZ)

- Inner Protection Area (IPA)
- Outer Protection Area (OPA)

Aerial source: Nearmap

0 10 20 m

Disclaimer: 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.

PROJECT & MXD REFERENCE	DATE & ISSUE NUMBER	SCALE & COORDINATE SYSTEM
181 Forest Way, Belrose 18MORR02_BF001	9/09/2020 Issue 1 BT	1:1,000 @A3 GDA 1994 MGA Zone 56

TITLE

Schedule 1 - Bushfire Protection Measures

Document Path: N:\GIS STORAGE\N Drive\18MORR02_ForestWay_Belrose\MXDs\18MORR02_BF001.mxd

Travers bushfire & ecology
www.traversecology.com.au

Referral Responses

A1

All communications to be addressed to:

Headquarters
15 Carter Street
Lidcombe NSW 2141

Telephone: 1300 NSW RFS
e-mail: records@rfs.nsw.gov.au

Headquarters
Locked Bag 17
Granville NSW 2142

Facsimile: 8741 5433

The General Manager
Northern Beaches Council
PO Box 882
MONA VALE NSW 1660

Your Ref: DA2018/1654
Our Ref: D18/7763
DA18102215674 GB

ATTENTION: Luke Perry

30 November 2018

Dear Mr Perry

Integrated Development Application - 3//805710 - 181 Forest Way Belrose 2085

I refer to your correspondence dated 22 October 2018 seeking general terms of approval for the above Integrated Development Application.

The New South Wales Rural Fire Service (NSW RFS) has considered the information submitted. General Terms of Approval, under Division 4.8 of the 'Environmental Planning and Assessment Act 1979', and a Bush Fire Safety Authority, under Section 100B of the 'Rural Fires Act 1997', are now issued subject to the following conditions:

Asset Protection Zones

The intent of measures is to provide sufficient space for fire fighters and other emergency services personnel, ensuring radiant heat levels permit operations under critical conditions of radiant heat, smoke and embers, while supporting or evacuating occupants. To achieve this, the following conditions shall apply:

1. At the commencement of building works and in perpetuity the entire property shall be managed as an inner protection area (IPA) as outlined within section 4.2.7 and Appendix 5 of 'Planning for Bush Fire Protection 2006' and the NSW Rural Fire Service's document 'Standards for asset protection zones'.

   The 100 metre APZ to the east of the building may be managed as 70 metre IPA and 30 metre outer protection area (OPA).

Water and Utilities

The intent of measures is to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building. To achieve this, the following conditions shall apply:

2. The provision of water, electricity and gas supplies shall comply with sections 4.1.3 and 4.2.7 of 'Planning for Bush Fire Protection 2006'.

Access

The intent of measures for fire trails is to provide suitable access for fire management purposes and maintenance of APZs. To achieve this, the following conditions shall apply:

3. The proposed maintenance & fire egress path along the southern boundary and eastern elevation of the building shall comply with section 4.1.3 (3) of 'Planning for Bush Fire Protection 2006'.

4. Access along the Crown Road Reserve to the point of entry into the site on the northern boundary shall comply with section 4.1.3 (3) of 'Planning for Bush Fire Protection 2006'.

5. The proposed turning areas for emergency vehicles located on the northern & eastern elevations of the building shall be suitably designed to enable a MRV – Category 1 Tanker to turn around.

Evacuation and Emergency Management

The intent of measures is to provide suitable emergency and evacuation (and relocation) arrangements for occupants of special fire protection purpose developments. To achieve this, the following conditions shall apply:

6. A Bush Fire Emergency Management and Evacuation Plan shall be prepared consistent with 'Development Planning - A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan December 2014' and Australian Standard AS3745 2010 'Planning for Emergencies in Facilities'.

Design and Construction

The intent of measures is that buildings are designed and constructed to withstand the potential impacts of bush fire attack. To achieve this, the following conditions shall apply:

7. The proposed building shall comply with Sections 3 and 5 (BAL 12.5) Australian Standard AS3959-2009 'Construction of buildings in bush fire-prone areas' or NASH Standard (1.7.14 updated) 'National Standard Steel Framed Construction in Bushfire Areas – 2014' as appropriate and section A3.7 Addendum Appendix 3 of 'Planning for Bush Fire Protection 2006'.

8. A minimum 2.2 metre high radiant heat shield made of non-combustible materials shall be constructed along the northern property boundary for a distance of 120 metres. All posts and rails shall be constructed of non-combustible materials. The bottom of the fence is to be in direct contact with the finished ground level or plinth.

Landscaping

9. Landscaping of the site shall comply with the principles of Appendix 5 of 'Planning for Bush Fire Protection 2006'.

Should you wish to discuss this matter please contact Garth Bladwell on 1300 NSW RFS.

Yours sincerely

Nika Fomin
Manager, Planning and Environment Services East

For general information on bush fire protection please visit www.rfs.nsw.gov.au