Bushfire Protection Assessment: Proposed Subdivision 44-46 O'Connell St Caddens

Vantager Group

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Project Name	Bushfire Protection Assessment: Proposed Subdivision 44-46 O'Connell St Caddens
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Status	**Final**
Version Number	**v3**
Last saved on	**1 September 2020**

This report should be cited as 'Eco Logical Australia. 2020 Draft Bushfire Protection Assessment: Proposed Subdivision 44-46 O'Connell St Caddens. Prepared for Vantager Group.'

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Vantager Group

Template 2.8.1

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1. Property and proposal

Table 1: Subject site summary

Street address or property name:	29 & 46-66 O'Connell Street		
Suburb, town or locality:	Caddens	Postcode:	2747
Lot/DP no:	Lot 6 DP 593628, Lot 3 DP 1103503 & Lot 2 DP 1217434		
Local Government Area:	Penrith City Council		
Zoning:	B2 Local Centre & R3 Medium Density Residential		
Type of development:	Residential subdivision		

1.1 Description of proposal

The proposal is for subdivision of 2 lots into 190 residential lots, 2 commercial lots and a lot for open space and remnant vegetation (See **Figure 1**).

The subject land is bounded by Nepean TAFE College Kingswood Campus on the north and University of Western Sydney (UWS) Penrith & Werrington Campuses on the west, east and south.

1.2 Assessment process

The proposal was assessed in accordance with Section 100B of the *Rural Fires Act 1997,* Clause 44 of the *Rural Fires Regulation 2013* and *Planning for Bush Fire Protection* (RFS 2019), herein referred to as PBP.

Assessment included a review of background documentation, design team consultation, GIS analysis and a site inspection undertaken by ELA's Ecologist Belinda Failes on 27 November 2019. This assessment is based on information contained within the site plan provided by PBD Architects in **Figure 1** (Project No. 191113 dated 05.08.2020)

Table 2 identifies the bushfire protection measures assessed and whether these involved acceptable or performance solutions.

Table 2: Summary of bushfire protection measures assessed

Bushfire Protection Measure	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	☑	☐	3.1
Landscaping	☑	☐	3.2
Construction standard	☑	☐	3.3
Access	☑	☐	3.4
Water supply	☑	☐	3.5
Gas and electrical supplies	☑	☐	3.5

1.3 Bush fire prone land status

The subdivision includes land classified as bush fire prone on the Penrith City Council's bush fire prone land (BFPL) map[1].

1.4 Current legislation and PBP version

This report has been prepared in accordance with Planning for Bush Fire Protection 2019 (herein referred to as PBP) in its entirety and the development complies with all relevant acceptable solutions in this version of PBP.

1.5 Significant environmental features

An assessment of significant environmental features, threatened species, populations or ecological communities under the *Biodiversity Conservation Act 2016* that may potentially be affected by the proposed bushfire protection measures has not been undertaken in this report as it is covered by other parts of the Development Application (DA) process.

1.6 Aboriginal cultural heritage

An assessment of any Aboriginal cultural heritage objects (within the meaning of the *National Parks and Wildlife Act 1974*) that may potentially be affected by the proposed bushfire protection measures has not been undertaken in this report as it is covered by other parts of the DA process.

The impact footprint of the bushfire protection measures (e.g. Asset Protection Zone (APZ)) is clearly identified within this report and therefore capable of being assessed by suitably qualified persons as required. Penrith City Council is the determining authority for this development; they will assess more thoroughly any potential Aboriginal cultural heritage issues.

[1] https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address

Street Trees Schedule

Tree Code	Botanical Name	Common Name	Mature Height	Spacing*	Pot Size
T01	*Eucalyptus crebra*	Narrow-leaved Ironbark	25m	As Shown	75L
T02	*Corymbia maculata*	Spotted Gum	25-45m	As Shown	75L
T03	*Angophora subvelutina*	Broad leaved Apple	12m	As Shown	110ML
T04	*Acacia implexa*	Hickory Wattle	5-8m	As Shown	110ML
T05	*Eucalyptus moluccana*	Grey Box	25m	As Shown	100L
T06	*Eucalyptus fibrosa*	Red Ironbark	35-40m	As Shown	45L
T07	*Eucalyptus amplifolia*	Cabbage Gum	30-35m	As Shown	75L
T08	*Eucalyptus tereticornis*	Forest Red Gum	30m	As Shown	75L

* Final tree positioning to be determined at CC stage

Figure 1: Subdivision layout

2. Bushfire threat assessment

Figure 2 shows the effective slope and predominant vegetation on transect lines representing the highest bushfire threat potentially posed to the subdivision from various directions.

The effective slope has been determined from 2 m contour data and revised where required by site assessment.

The predominant vegetation has been determined from desktop assessment and revised where required by site assessment.

The vegetation to the western side of O'Connell Street forms a large reserve as part of Kingswood Campus, UWS. This vegetation covers an area of approximately 7.5 ha in size is classified by PBP as 'Forest'.

Within the southern part of the subject land, existing vegetation is proposed to be retained and regenerated as Cumberland Plain Woodland within a reserve of approximately 2 ha. This vegetation is classified by PBP as 'Forest'. Photos are shown in Appendix C.

Figure 2 and **Table 5** show the vegetation and slope information assessed. Where required additional information is provided within Table 3 on why and how the chosen slope and vegetation has been calculated.

The site is located within the Local Government Area (LGA) of Penrith and has a Fire Danger Index (FDI) of 100.

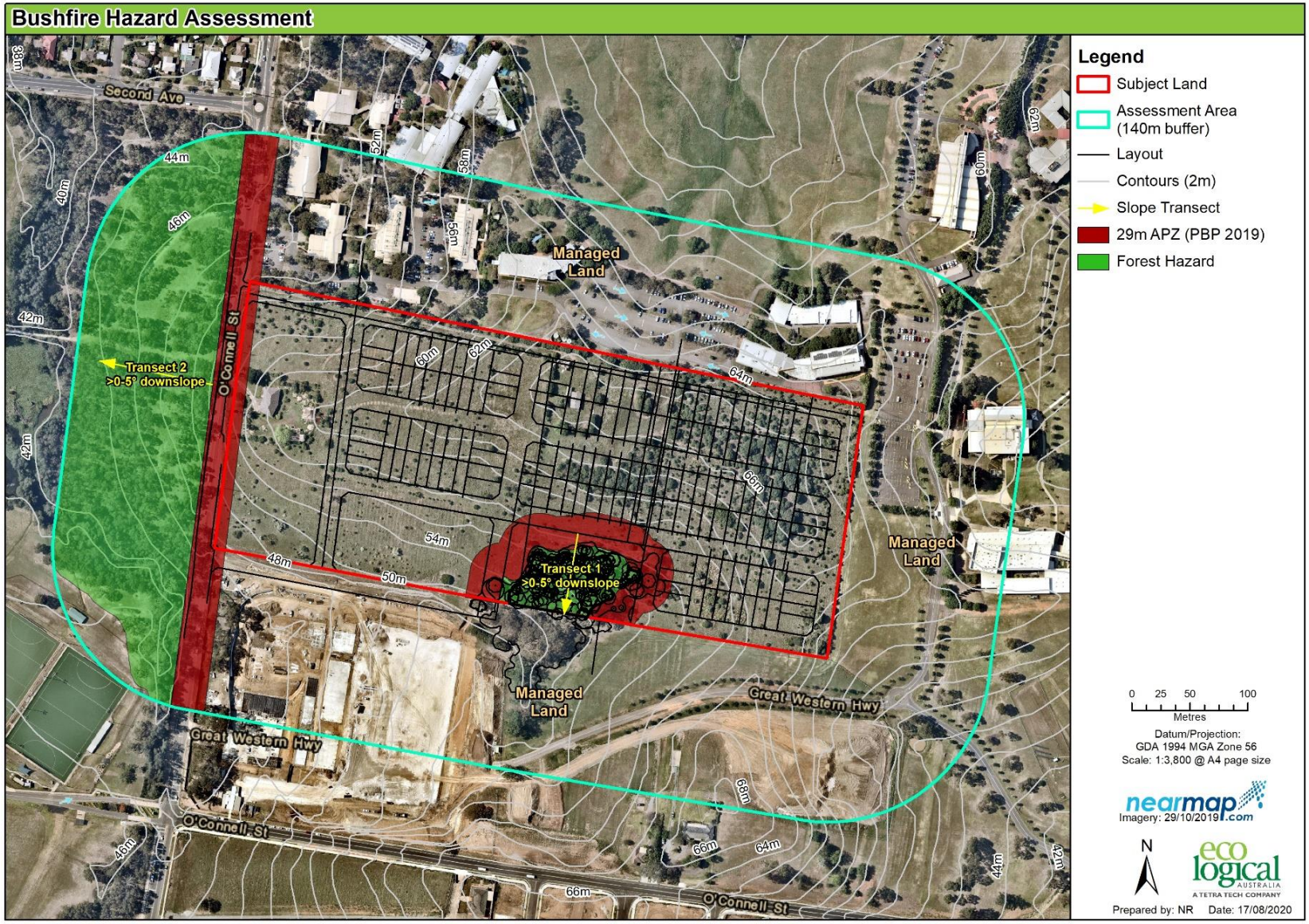

Figure 2: Bushfire hazard assessment and Asset Protection Zones (APZ)

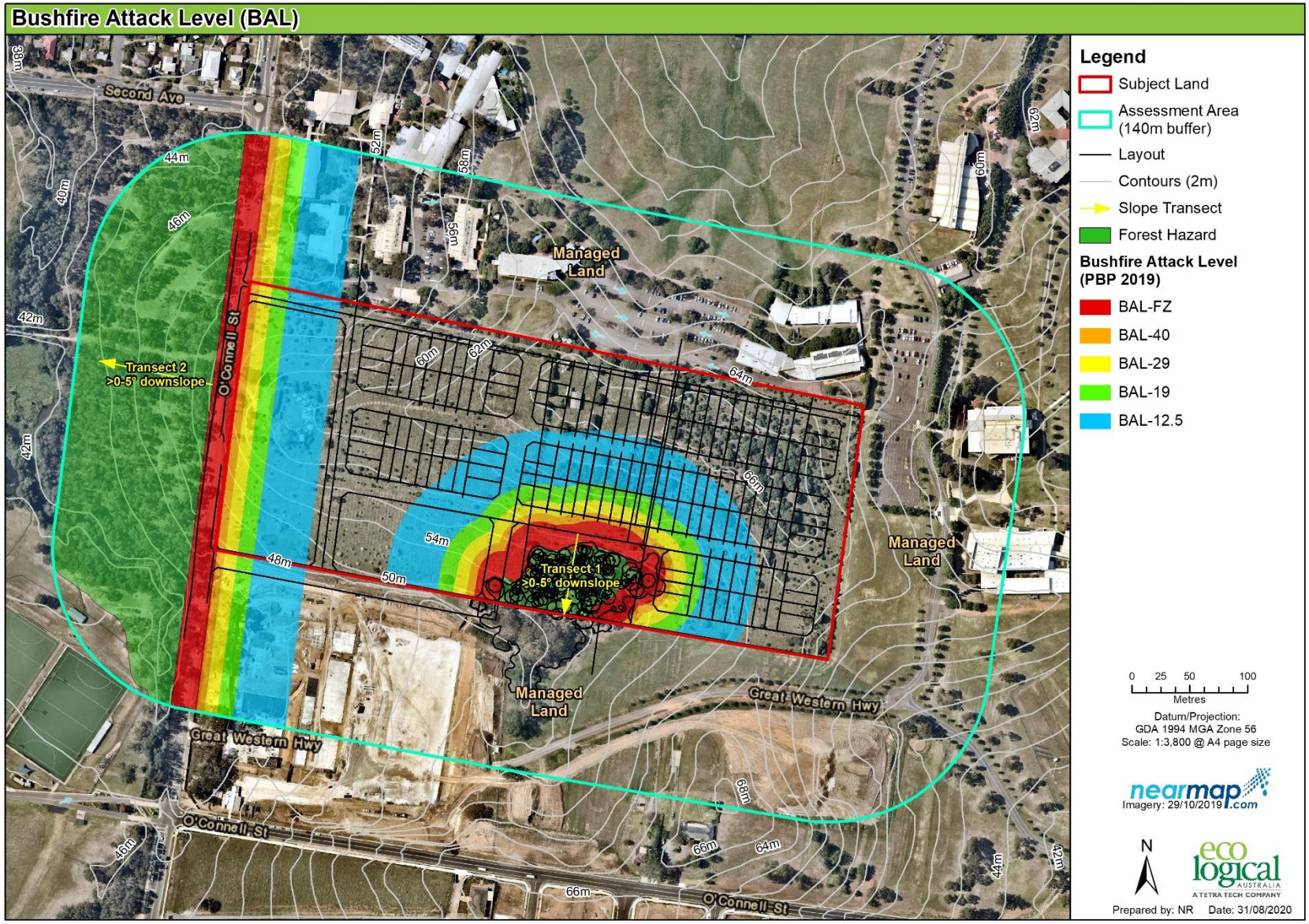

Figure 3: Bushfire Attack Levels (BAL)

3. Bushfire protection measures

3.1 Asset Protection Zones (APZ)

Table 5 shows the dimensions of the APZ required in each of the transect line directions; and where relevant, information on how the APZ is to be provided is included. The footprint of the required APZ is also shown in **Figure 2**.

The compliance of the proposed APZ with regards to Section 5.3.1 of PBP, is detailed in **Table 3**.

Table 3: APZ requirements and compliance (adapted from table 5.3a of PBP)

Performance Criteria	Acceptable Solutions	Compliance Notes
The intent may be achieved where:		
Potential building footprints will not be exposed to radiant heat levels exceeding 29 kW/m² on each proposed lot.	APZs are provided in accordance with tables A1.12.2 and A1.12.3 based on the FDI.	Complies APZ provided in accordance with table A1.12.2 as shown in Table 5 and Figure 2
APZs are managed and maintained to prevent the spread of a fire towards the building.	APZs are managed in accordance with the requirements of Appendix 4 of PBP.	To comply APZ to be managed in accordance with PBP. Fuel management specifications provided in Table 11.
The APZ is provided in perpetuity.	APZs are wholly within the boundaries of the development site.	Complies APZ located wholly within development site.
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	APZs are located on lands with a slope less than 18 degrees.	Complies APZ is not located on slopes greater than 18°.

3.2 Landscaping

The compliance of the proposed landscaping with regards to Section 5.3.1 of PBP is detailed in **Table 4**.

Table 4: Landscaping requirements and compliance (adopted from table 5.3a of PBP)

Performance Criteria	Acceptable Solutions	Compliance Notes
The intent may be achieved where:		
Landscaping is managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Landscaping is in accordance with Appendix 4 of PBP; and Fencing is constructed in accordance with Section 7.6 of PBP.	To comply APZ / Landscaping is to be managed in accordance with PBP. Landscaping specifications provided in Table 11. Fencing to be constructed in accordance with Section 7.6 of PBP.

3.3 Construction standards

The Bushfire Attack Level (BAL) for future buildings within the proposed subdivision will be determined during the individual dwelling Complying Development Certificate (CDC) or DA process, however, a maximum of BAL-29 is provided by the subdivision design.

A preliminary BAL map is provided in Figure 3 demonstrating the potential exposure of the proposal to differing BALs.

Table 5: Bushfire hazard assessment and APZ requirements

Lot # OR direction from development boundary	Transect	Slope	Vegetation	PBP required APZ (PBP 2019)	Proposed APZ	PBP 2019 Bushfire Attack Level (BAL)	Comment
South	1	Downslope >0 to 5 degrees	Forest	29 m	≥29 m	BAL-29: 29 to 40 m BAL-19: 40 to 54 m BAL-12.5: 54 to 100 m BAL-LOW: >100 m	APZ provided in road reserve, lot setback and within managed areas of Residue Lot 335 Park.
West	2	Downslope >0 to 5 degrees	Forest	29 m	≥29 m	BAL-29: 29 to 40 m BAL-19: 40 to 54 m BAL-12.5: 54 to 100 m BAL-LOW: >100 m	APZ provided in road reserve and lot setback
All other Directions				Managed Land			

3.4 Access

Public road access to the subdivision is via O'Connell Street.

Figure 1 shows the internal and perimeter access within the subdivision. The performance criteria and acceptable solutions for each of these access types are shown in Table 12**,** Table 13**,** and Table 14 (**Appendix B**), along with comment on the subdivision design compliance or otherwise.

A summary of the compliance approach can be found in **Table 6** below.

Table 6: Access summary of compliance

Access type	Compliance approach	Further details
General	Can comply with all acceptable solutions	Table 12
Perimeter road	Can comply with all acceptable solutions	Table 13
Non-perimeter road	Can comply with all acceptable solutions	Table 14
Property Access	Not applicable	

3.5 Services – Water, electricity and gas

3.5.1 Water

The compliance of the proposed water supply with regards to Section 5.3.3 of PBP is detailed in **Table 7**.

Table 7: Water supply requirements (adapted from table 5.3c of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
Adequate water supplies is provided for firefighting purposes.	Reticulated water is to be provided to the development where available; .	Complies Proposal serviced by a reticulated water.
Water supplies are located at regular intervals; and The water supply is accessible and reliable for firefighting operations.	Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1 (SA 2005); Hydrants are not located within any road carriageway; and Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	Can comply The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and table 5.3c and table 5.3d of PBP.
Flows and pressure are appropriate.	Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1 (SA 2005).	
The integrity of the water supply is maintained.	All above-ground water service pipes are metal, including and up to any taps; and Above-ground water storage tanks shall be of concrete or metal.	

3.5.2 Electricity services

The compliance of the proposed supply of electricity services with regards to Section 5.3.4 of PBP is detailed in **Table 8**.

Table 8: Requirements for the supply of Electricity services (adapted from table 5.3c of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	Where practicable, electrical transmission lines are underground; Where overhead, electrical transmission lines are proposed as follows: Lines are installed with short pole spacing (30 m), unless crossing gullies, gorges or riparian areas; and No part of a tree is closer to a power line than the distance set out in ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Assets (ISSC3 2016).	Complies Electricity services to the subject site are located underground. Can comply The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and table 5.3c of PBP.

3.5.3 Gas services

The compliance of the proposed supply of gas services (reticulated or bottle gas) with regards to Section 5.3.4 of PBP is detailed in **Table 9**:

Table 9: Requirements for the supply of gas services (adapted from table 5.3c of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 – The Storage and handling of LP gas, the requirements of relevant authorities, and metal piping is used; All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 m and shielded on the hazard side; Connections to and from gas cylinders are metal; Polymer-sheathed flexible gas supply lines are not used; and Above-ground gas service pipes are metal, including and up to any outlets.	Can comply The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and table 5.3c of PBP.

4. Conclusion

The proposed subdivision complies with either the acceptable or performance solutions within 'Planning for Bush Fire Protection 2019', identified in **Table 10**.

Table 10: Summary of bushfire protection measures assessed

Bushfire Protection Measures	Complies	Requirements	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	☑	APZ dimensions are detailed in Table 5 and shown in Figure 2. Identified APZ to be maintained in perpetuity to the specifications detailed in Table 11.	☑	☐	3.1
APZ Maintenance plan	☑	Any future landscaping meets the requirements of PBP listed in Table 4.	☑	☐	3.2
Construction standard	☑	BAL for dwellings to be determined at individual CDC/DA stage however, a maximum of BAL-29 is achievable.	☑	☐	3.3
Access	☑	Access to meet standards summarised in **Table 6**.	☑	☐	3.4
Water supply	☑	Reticulated water supply to meet PBP acceptable solution specifications for a subdivision.	☑	☐	3.5
Electricity service	☑	Electricity supply located underground.	☑	☐	3.5
Gas service	☑	Gas services are to be installed and maintained in accordance with AS/NZS 1596:2014.	☑	☐	3.5

5. Recommendations

It is recommended that the subdivision be issued a Bush Fire Safety Authority.

[redacted]

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[redacted]

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Principle Consultant, NRM and Bushfire

6. References

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NSW Rural Fire Service (RFS). 2019. Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Homeowners - issued December 2019. Australian Government Publishing Service, Canberra.

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Standards Australia (SA). 2018. *Construction of buildings in bushfire-prone areas,* AS 3959:2018. SAI Global, Sydney.

Travers Bushfire and Ecology. 2017. *Bushfire Protection Assessment, Proposed Residential Subdivision, Lot 6 DP 593628 & Lot 3 DP1103503, 46a & 46-66 O'Connell Street, Caddens*

Travers Bushfire and Ecology. 2017. *Flora and Fauna Assessment, Proposed Residential Development 46-66 O'Connell Street, Caddens,* reference A16195F

Appendix A – Asset protection zone and landscaping standards

The following APZ management specifications in Table 11 apply to the APZs specified in **Table 5** and shown in Figure 2. These APZ management specifications should be considered for any landscaping and ongoing management within the subject land.

The APZs identified in **Table 5** are to be maintained in perpetuity and management undertaken on an annual basis (as a minimum) and prior to the commencement of the fire season.

Further details on APZ implementation and management can be found on the NSW RFS website (https://www.rfs.nsw.gov.au/resources/publications).

Table 11: APZ management specifications

Vegetation Strata	Inner Protection Area (IPA)
Trees	Tree canopy cover should be less than 15% at maturity; Trees (at maturity) should not touch or overhang the building; Lower limbs should be removed up to a height of 2 m above ground; Canopies should be separated by 2 to 5 m; and Preference should be given to smooth barked and evergreen trees.
Shrubs	Create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided; Shrubs should not be located under trees; Shrubs should not form more than 10% ground cover; and Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.
Grass	Should be kept mown (as a guide grass should be kept to no more than 100 mm in height); and Leaves and vegetation debris should be removed.

Appendix B – Access specifications

Table 12: General access requirements (adapted from table 5.3b of PBP)

Performance Criteria	Acceptable Solutions	Compliance notes
The intent may be achieved where:		
Firefighting vehicles are provided with safe, all-weather access to structures.	Property access roads are two-wheel drive, all-weather roads;	Complies
	Perimeter roads are provided for residential subdivisions of three or more allotments;	Complies.
	Subdivisions of three or more allotments have more than one access in and out of the development;	Complies
	Traffic management devices are constructed to not prohibit access by emergency services vehicles;	Can comply
	Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient;	Can comply
	All roads are through roads;	Complies
	Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end;	Complies. No dead end roads proposed.
	Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road;	Can comply
	Where access/egress can only be achieved through forest, woodland or heath vegetation, secondary access shall be provided to an alternate point on the existing public road system;	Not applicable. Access via existing managed road network.
	One way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.	Complies. No one way road proposed.
The capacity of access roads is adequate for firefighting vehicles.	The capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges/causeways are to clearly indicate load rating.	Can comply

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
	Hydrants are provided in accordance with the relevant clauses of AS 2419.1:2017 – Fire hydrant installations system design, installation and commissioning; and	Can comply
	There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	Not applicable

Table 13: Perimeter road requirements (adapted from table 5.3b of PBP)

Performance Criteria	Acceptable Solutions	Compliance Notes
The intent may be achieved where:		
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	Are two-way sealed roads;	Complies
	Minimum 8m carriageway width kerb to kerb;	Complies. Proposed roads are 9m in width.
	Parking provided outside of the carriageway width;	Can comply
	Hydrants are located clear of parking areas;	Can comply
	There are through roads, and these are linked to the internal road system at an internal of no greater than 500m;	Complies
	Curves of roads have a minimum inner radius of 6m;	Can comply The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and table 5.3b of PBP.
	The maximum grade road is 15 degrees and average grade is 10 degrees;	
	The road crossfall does not exceed 3 degrees;	
	A minimum vertical cleared of 4m to any overhanging obstructions, including tree branches, is provided.	

Table 14: Non-perimeter road requirements (adapted from table 5.3b of PBP)

Performance Criteria	Acceptable Solutions	Compliance notes
The intent may be achieved where:		
	Minimum 5.5m width kerb to kerb;	Complies. Proposed roads are 9m in width.

Performance Criteria	Acceptable Solutions	Compliance notes
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	Parking is provided outside of the carriageway width;	Can comply
	Hydrants are located clear of parking areas;	Can comply
	Roads 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	Can comply The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and table 5.3b of PBP.
	The road crossfall does not exceed 3 degrees;	
	A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	

Appendix C- Photographs

Photo 1: View of vegetation on western elevation

Photo 2: View of vegetation on southern elevation

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