



BUSH FIRE STRATEGIC STUDY

SUNSET STAGE 2 PLANNING PROPOSAL

Sunset, 141 Googong Road Googong

Lot 2 DP 255492

Prepared for Hugh Cooke

4 October 2024



EXECUTIVE SUMMARY

EMBER Bushfire Consulting has been by Hugh Cooke C/- Urbane Studio to prepare a Bushfire Strategic Study (BFSS) in support of a planning proposal for Sunset Stage 2 residential subdivision at lot 2 DP 255492, 141 Googong Road, Googong located adjacent to growing residential community of Sunset Stage 1 and Googong Township.

The proposed subdivision is located on land designated bushfire prone by the Queanbeyan-Palerang Regional Council (QPRC) and NSW RFS. As a result, proposal requires the application of Section 9.1(2) of the Environmental Planning and Assessment Act (1979) (EP&A Act). Under Direction 4.4 of the EP&A Act, Planning for Bush Fire Protection applies to planning proposals on designated Bush Fire Prone Land.

The report establishes the level of bushfire threat to the Study Area and examines bushfire protection in accordance with the principles of Section 4 of PBP 2019 to ensure –

- the land is suitable for development in the context of bush fire risk;
- future development on BFPL can comply with PBP 2019;
- will minimise reliance on performance-based solutions;
- will provide adequate infrastructure associated with emergency evacuation and firefighting operations; and

- facilitate appropriate ongoing land management practices.

The recommendations contained in this report are designed to inform the design of the master plan and support the planning proposal stage only.

The subject site possesses a moderate to high threat profile, partly given the woodland vegetation classification but mostly due to the steep slopes associated with a deep gully and creek to the west of the proposed developable area.

Large APZ dimensions have been recommended along the western aspect to moderate this threat to an acceptable level.

Proposed egress is via a single-entry point at Gorge Creek Drive. Access to the broader public road network is via Googong Road and Old Cooma Road. As part of a performance-based design a gated emergency only access lane will be provided to Googong Road is proposed to provide an alternative access point and to enable through road access for emergency services. A perimeter road is provided around the subdivision.

Any planned services throughout the subdivision will be required to meet the standards and specifications set out with PBP (2019).

All reasonable judgment has been applied in this assessment which would indicate that the concept subdivision is capable of supporting development that can comply with PBP 2019.

CERTIFICATION STATEMENT

Document Title:	Bush Fire Strategic Study Sunset Stage 2, Planning Proposal, Googong
EMBER Reference:	JD.77.22.1
Lot & DP Number	Lot 2 DP 255492
Street Address	141 Googong Road, Googong
Local Government Area	Queanbeyan Palerang Regional Council
Description of the development	Planning proposal
Type of assessment under Planning for Bushfire Protection (2019)	Section 4 – Bush Fire Strategic Study
Is referral of the proposal to the NSW RFS required?	Yes – Direction 4.4 of the EP&A Act (1979)
Has a pre-DA lodgment or bush fire design brief been provided to the NSW RFS?	No
Highest radiant heat flux determined for indicative development.	* $<29\text{kW/m}^2$ (*with APZ and mandatory building setbacks in place.)
Highest level of construction applicable:	Bushfire Attack Level (BAL) -29
Accreditation Scheme / Level of accreditation	Bushfire Planning and Design (BPAD) Accreditation Scheme administered by the Fire Protection Association Australia (FPAA)
Prepared by:	Jeff Dau – BPAD 33128 - Level 3
Verified by:	Rob McGregor – BPAD 33130 – Level 2

The author (Jeffrey Dau) hereby certifies that:

- A thorough, in person, survey of the study area was carried out on 13th October 2021;
- A subsequent bushfire threat assessment was undertaken of the site and the proposal per the relevant sections of the NSW Rural Fire Service (NSW RFS) document Planning for Bushfire Protection 2019 (PBP 2019);
- A detailed Bush Fire Strategic Study is attached per the submission requirements of Section 4 of PBP, together with recommendations needed for future development to satisfy the specifications and requirements of PBP;
- That I am a person recognised by NSW RFS as a qualified consultant in bush fire risk assessment; and
- That subject to the recommendations contained in this report, the proposed development conforms to the relevant specifications and requirements of PBP.

Furthermore, I am aware that this report is to be submitted in support of a development application for this site and will be relied upon by Council as the basis for ensuring that the bushfire risk management aspects of the proposal have been addressed per PBP.



7/10/2024

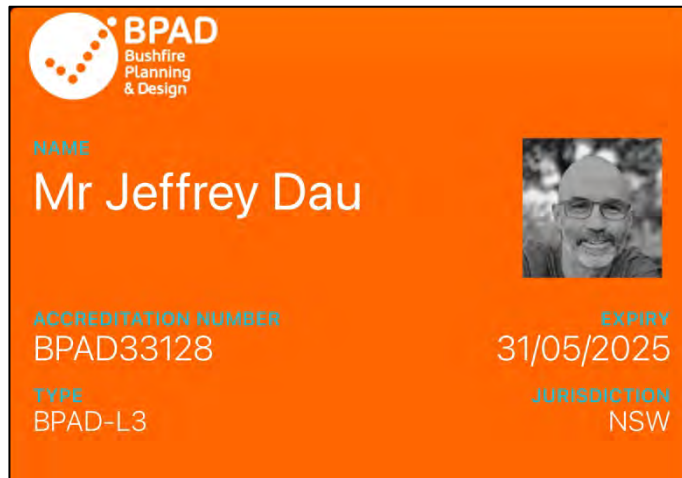


DOCUMENT CONTROL

Information	Detail
Document Title:	Bush Fire Strategic Study Sunset Stage 2, Planning Proposal, Googong
EMBER Reference:	JD.77.22.1
Other Reference:	
Version:	1.0
Version Control:	1.0 – Published Version– 6.1.22 1.1 – Updated subdivision layout proposed 1.2 – Updated to provide further information for QPRC including assessment of slopes, APZs and access. 1.3 – Updated to Planning Proposal, amendments to block layout and ready for resubmission. – 4.10.24
Status:	Issued

KEY DETAILS OF DEVELOPMENT

Information	Detail
Zoning of subject land	R1 – General Residential C2 – Environmental Conservation
Zoning of adjoining lands	R1 – General Residential C2 – Environmental Conservation
Lot size	Consistent with General Residential Zoning
Staging issues	Subject site is proposed Stage 2 to the existing Sunset development to the west.
Development classification	Planning Proposal
Type of assessment	Bush Fire Strategic Study
Fire weather area	Southern Ranges
Fire Danger Index	100
Predominant vegetation	Woodland Vegetation
Slope	Ranging from flat, with some areas reaching up to 25° downslope.
Environmental constraints	Typical Biodiversity Offset Scheme (BOS)
Cultural constraints	Nil known
Method of meeting performance requirements	Using acceptable and performance solutions.



BPAD-L3

Bushfire Planning and Design Accreditation Scheme

The holder of this card is accredited, in accordance with the FPA Australia Bushfire Planning and Design Accreditation Scheme, to assess potential bushfire risk and provide advice to manage the risk for existing buildings and for future developments using the follow methods:

1. The determination of Bushfire Attack Levels using simplified methods and the applicable Deemed-to-Satisfy construction requirements.
2. The development of planning and building applications and reports by applying the prescribed design requirements in accordance with local regulatory requirements.
3. The development of planning and building applications and reports by developing alternative design solutions in accordance with local regulatory requirements.

Fire Protection Association Australia
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HOW TO READ THIS DOCUMENT

Section 1 – Introduction and overview of the subject site and proposed development.

Section 2 – Identification of key factors contributing to bushfire threat, including planning considerations and assessment of overall risk.

Section 3 – Discussion of strategic bush fire considerations.

Section 4 – Assessment of the recommended and required bushfire protection measures necessary for life safety and compliance purposes.

Section 5 – Summary of recommendations.

Section 6 – Conclusion

DEFINITIONS

Asset Protection Zone (APZ) - A fuel-reduced area surrounding a built asset or structure that provides a buffer zone between a bushfire hazard and an asset. The APZ includes a defensible space within which firefighting operations can be carried out. The size of the required APZ varies with slope, vegetation and FFDI.

Bushfire attack - Attack of a built asset or structure by burning embers, radiant heat or flame generated by a bush fire.

Bushfire hazard - Any vegetation that can potentially burn and threaten lives, property or the environment.

Bush fire protection measures (BPMs) - A range of measures used to minimise the risk from a bush fire that needs to be complied with. BPMs include APZs, construction provisions, suitable access, water and utility services, emergency management and landscaping.

Bushfire risk - is the likelihood and consequence of a bushfire igniting, spreading and causing life loss or damage to buildings of value to the community.

Managed land - Land with vegetation removed or maintained to a level that limits the spread and impact of bush fire. This may include developed land, roads, golf course fairways, playgrounds, sports fields, vineyards, orchards,

cultivated ornamental gardens and commercial nurseries. The most common will be gardens and lawns within the curtilage of buildings. These areas are managed to meet the requirements of an APZ.

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1 INTRODUCTION AND OVERVIEW

1.1 BACKGROUND

EMBER Bushfire Consulting has been engaged by Hugh Cooke C/- Urbane Studio to prepare a Bush Fire Strategic Study (BFSS) in support of a planning proposal for a residential subdivision "Sunset Stage 2" at lot 2 DP 255492, 141 Googong Road, Googong (the subject site) located adjacent to growing residential community of Sunset Stage 1 and Googong Township.

This report is Version 1.3 following on from initial constraints report and a request to submit the formal planning proposal.

The planning proposal is located on land designated bushfire prone by NSW Rural Fire Service (NSW RFS) and Council and, as a result, requires the application of Section 9.1(2) of the Environmental Planning and Assessment Act (1979) (EP&A Act). Under Direction 4.4 of the EP&A Act, Planning for Bush Fire Protection applies to planning proposals on designated Bush Fire Prone Land (BFPL).

Under Direction 4.4, planning proposals should adhere to the following objectives:

- to protect life, property, and the environment from bushfire hazards by discouraging the establishment of incompatible land uses in bushfire prone areas; and

- to encourage sound management of bushfire prone areas.

The principles for assessment of the planning proposal are provided in Section 4 Strategic Planning, Planning for Bush Fire Protection (2019) (PBP 2019) and is therefore the key reference for this report.

The broad principles of Section 4 are to:

- ensure land is suitable for development in the context of bush fire risk;
- ensure new development on BFPL will comply with PBP;
- minimise reliance on performance-based solutions;
- provide adequate infrastructure associated with emergency evacuation and firefighting operations; and
- facilitate appropriate ongoing land management practices.

Accordingly, this BFSS addresses the issues identified in Table 4.2.1 Bush Fire Strategic Study of PBP 2019.

Should the planning proposal be successful future development of land will be required to satisfy the aims and objectives of PBP 2019 and therefore, is also addressed in this report.

This assessment was prepared through a desktop study of the Study Area and an in-person survey completed on 13.10.21 by Level 3 Accredited Bushfire Practitioner Jeff Dau from EMBER Bushfire Consulting.

1.2 AIM AND OBJECTIVES

The aim of this report is to:

- Evaluate the potential bushfire threat to the Study Area.
- Assess the capacity of the proposed concept subdivision development to adequately support the subdivision of land and the erection of dwellings while providing:
 - the minimum bushfire protection necessary to offer life safety to the occupants;
 - improve property protection and facilitate fire service intervention during a bushfire event; and
 - due regard to development potential, site characteristics and protection of the environment.
- Provide initial principles for how any future subdivision and development of land may satisfy the relevant performance criteria for rural residential subdivisions provided in Section 5 PBP 2019.

1.3 LIMITATIONS AND DISCLAIMER

This report is primarily concerned with assessing the capacity of the proposal to withstand the impacts of a bushfire, including ember attack, radiant heat exposure and flame contact.

Where necessary protection measures will be recommended to provide a level of protection to the occupants, fire fighters and the structures themselves.

It should be kept in mind that the measures recommended cannot guarantee the proposed development will survive a bushfire event on every occasion. This is primarily due to the dependence on ongoing vegetation management, the unpredictable behaviour of fire, and extreme weather conditions.

EMBER Bushfire Consulting has prepared this report with all reasonable diligence. The information contained in this report has been gathered from field investigations of the site as well as plans provided by the Village Building Co.

1.4 COPYRIGHT NOTICE

This document is copyrighted. It is a breach of the Copyright Act (1968) for this document to be used to support a development application or any other purpose for any persons/entities other than those for whom this document was prepared.

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1.5 STAKEHOLDERS

Table 2 – Stakeholders

Stakeholder	Role	Contact	Detail
Property Owner	Proponent	Hugh Cooke	0418 693 282
Place Logic	Urban Design	Giselle Ravarian	0401 290 227
Capital Ecology	Ecologist	Rob Spiers	0412 474 415
QPRC	Consent Authority	Not Given	6285 6000
NSWRFS	Consent Authority	Not Given	02 4475 1300

1.6 THE PLANNING PROPOSAL

The concept subdivision (Figure 4) proposes ~85 residential lots, ranging from ~630 m² to ~1800 m². The subdivision is bounded by two (2) riparian corridors. One that separates Sunset Stage 1 to the east and a more prominent, deeper cut creek to the west.

Access/egress to the subdivision will be provided primarily in one location utilising existing road infrastructure provided by Sunset Stage 1. For safety and compliance purposes a gated emergency only access lane will be provided to provide multiple access points and through road access for emergency services.

While the proposed access arrangements do not strictly meet some of the acceptable solutions provided in PBP 2019, a number of performance based designs could be developed to satisfy the performance criteria for access.

An APZ of varying width, utilising the edge road and adjacent roadside easements running along the western and northern edge will be required.

1.7 CONCEPT DESIGN

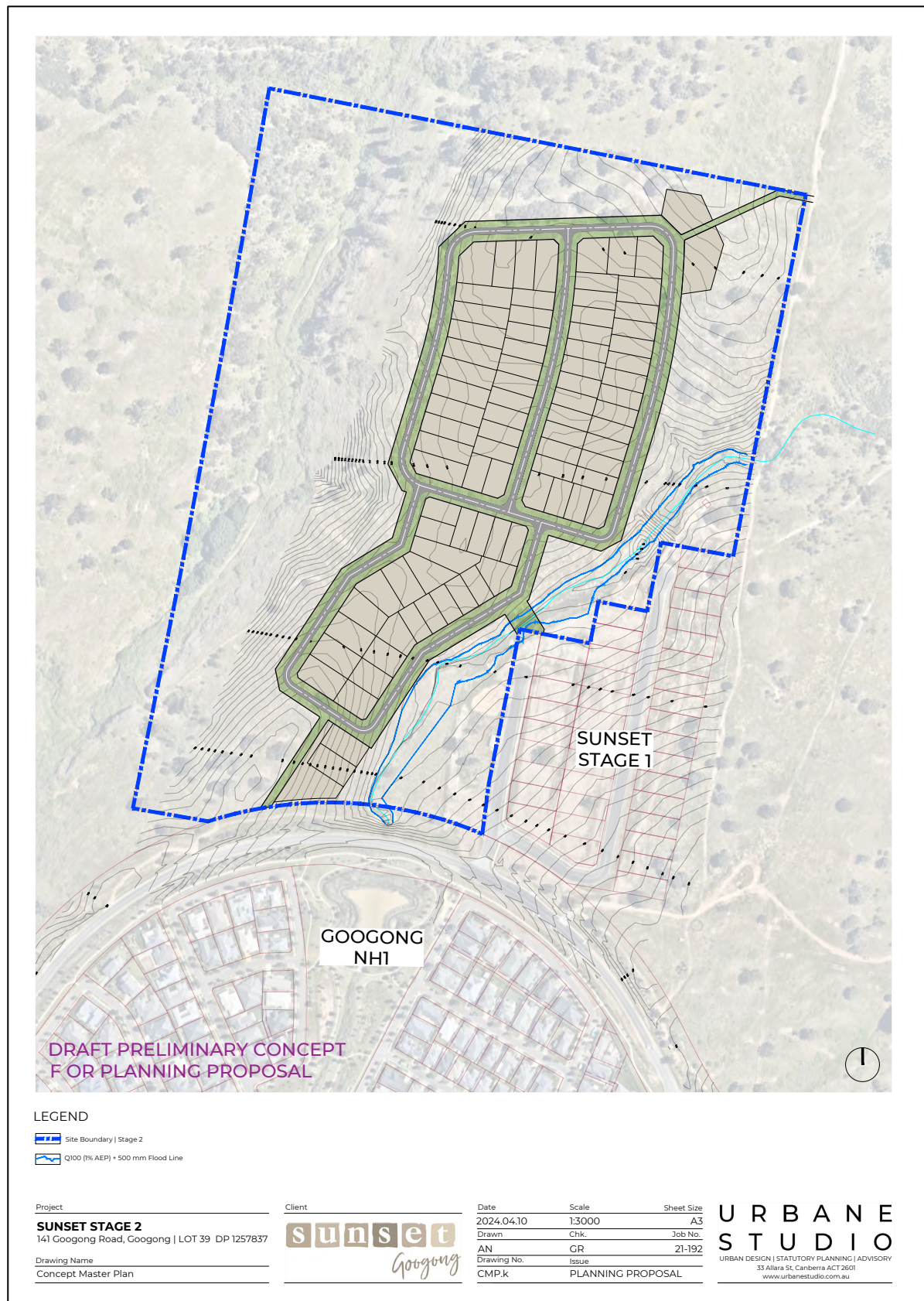


Figure 1 – Concept subdivision design (Urbane Studio, 2024)

1.8 SUBJECT SITE LOCATION

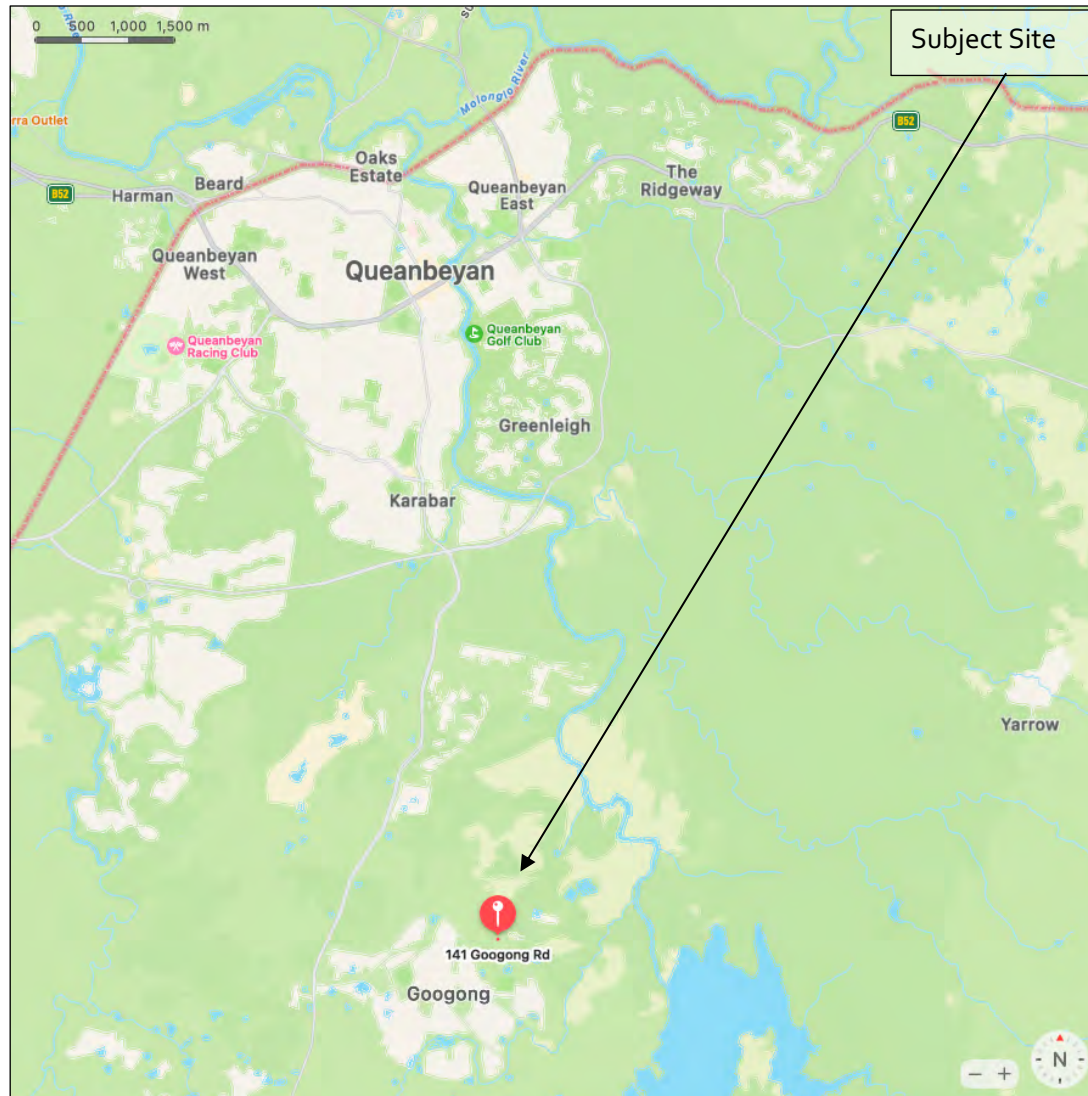


Figure 2 - Subject site regional context (GTPL, 2022)

The subject site is in the Southern Tablelands of NSW, ~7 km south of Queanbeyan and directly adjacent and to the north of the newly established Googong Township (Figure 2).

The study area occupies a long-standing rural property known as Sunset, which falls within the administration area of the Queanbeyan Palerang Regional Council (QPRC).

Historically, the dominant land use of the area was primary production along with water supply infrastructure, including Googong Reservoir and surrounding catchment reserve.

More recently however the area has seen significant land use change with the creation of large-scale residential development through the construction of Googong Township to the south of the subject site (Figure 3).

The subject site is zoned R1 – General Residential and C2 – Environmental Conservation as is the surrounding blocks (Figure 4).

1.9 SUBJECT SITE DESCRIPTION

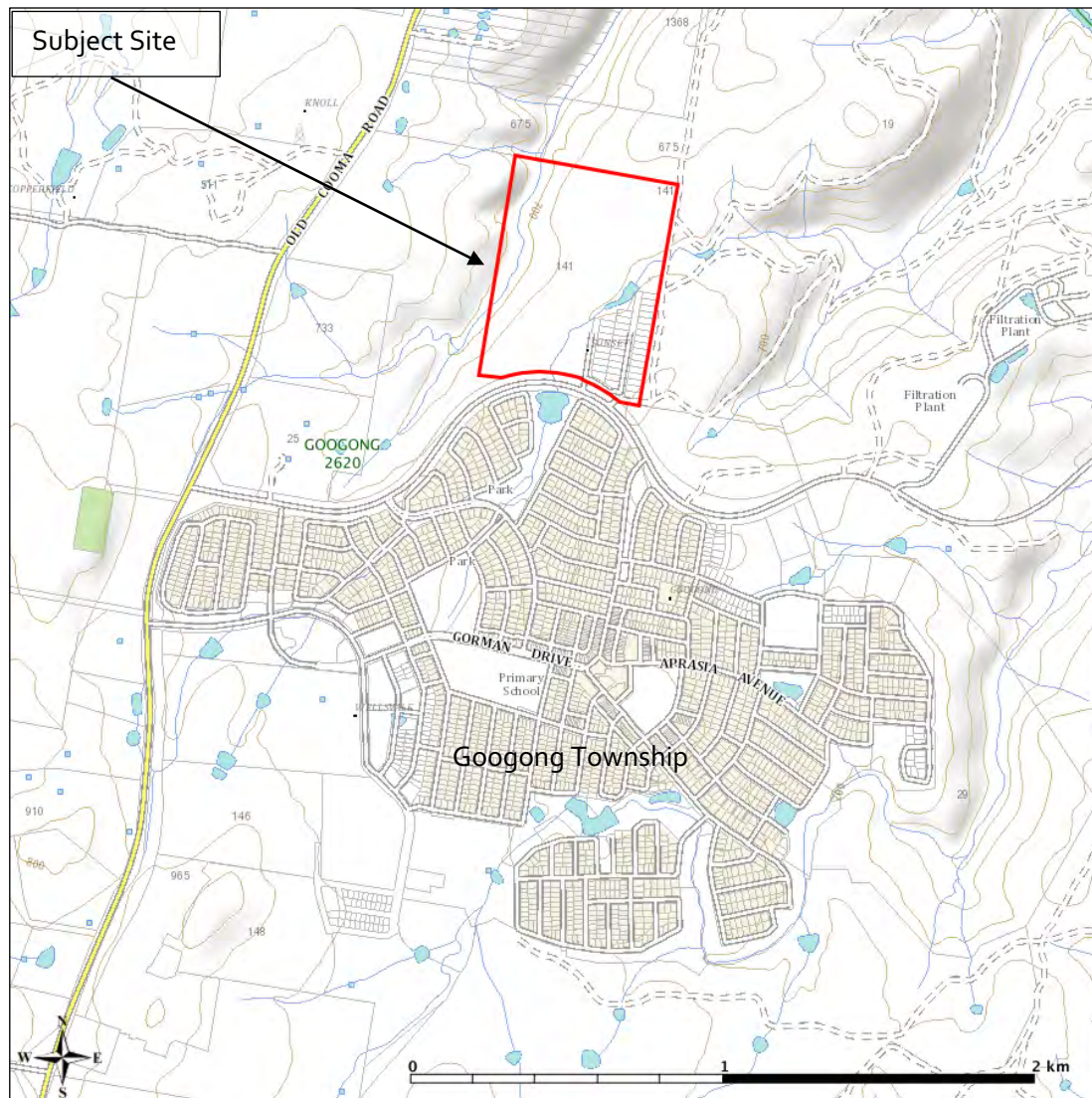


Figure 3 - Subject site local context (FireMaps, 2022)

The ~36 Ha rural property is situated along Googong Road, which while is a public no through road, does connect to the broader road network of Googong Township and therefore offers multiple access/egress points.

Stage 1 of the “Sunset” residential subdivision has been approved and is under construction. A drainage line and dam running along the southeastern quarter separates Stage 1 from the proposed Stage 2.

Topography to the North and East of the subject site is generally undulating, however to the West is a deep gully and creek which extends in a Northerly direction. Gradients along this gully are steep (up to 25°) and therefore any fire in this location has the potential of being greatly amplified, resulting in the need for large building setbacks from this area.

The subject site is characterised by urban development to the south, and east, open woodland to the north and west. Accordingly, land zoning is R1 – General Residential and C2 – Environmental Conservation (Figure 4).

1.10 LAND ZONING

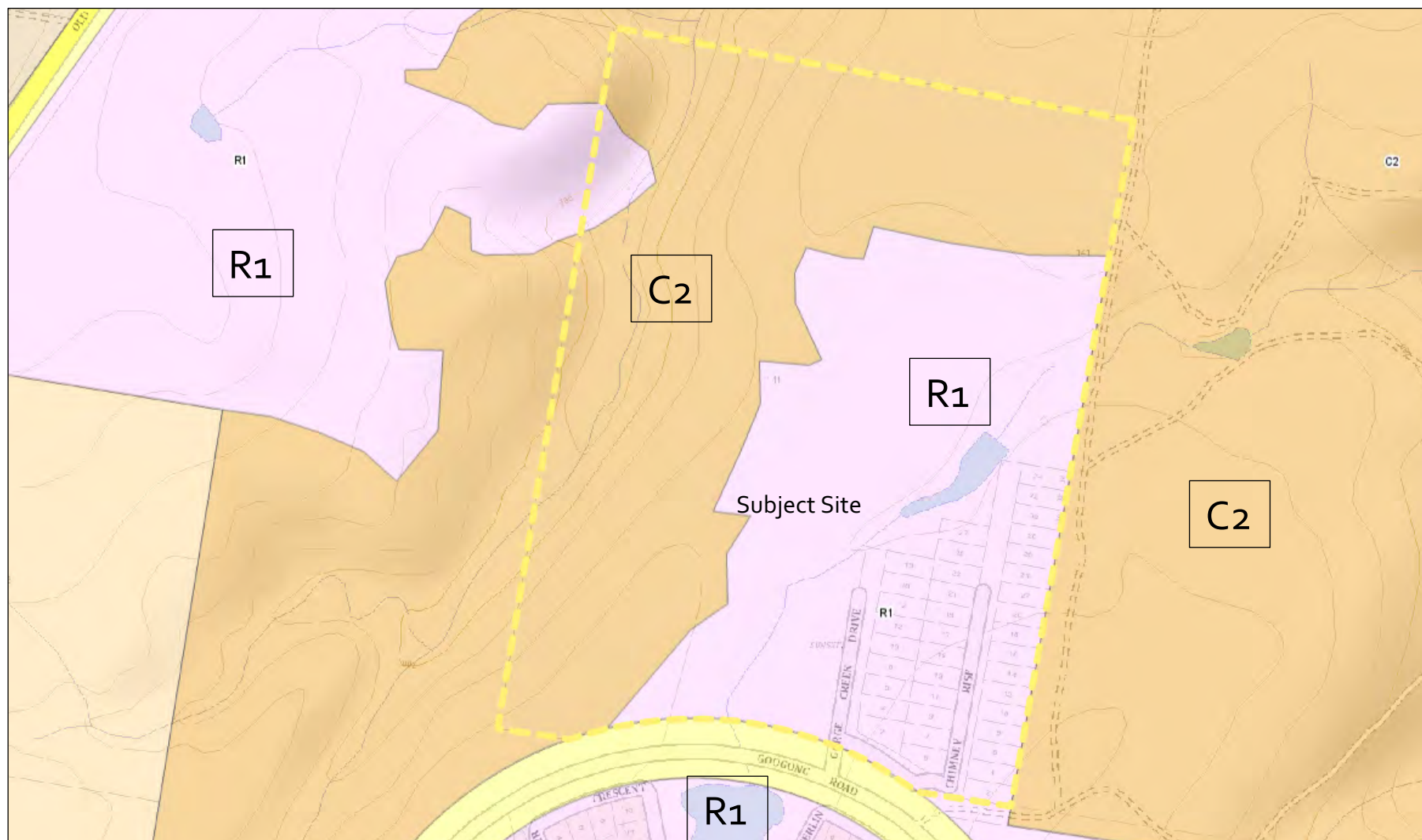


Figure 4 – Land zoning (NSW Planning Portal, 2022)

1.11 DEVELOPABLE AREA & PHOTO POINTS



Figure 5 – Proposed Developable Area (FireMaps, 2022)



Figure 6 – Photo points (FireMaps, 2022)

1.12 SUBJECT SITE PHOTOGRAPHIC DETAIL

Photo point 1



Photo point 3



Photo point 2



Photo point 4



Photo point 5



Photo point 7



Figure 12 –
Photo point 6



Photo point 8



Photo point 9



Photo point 11

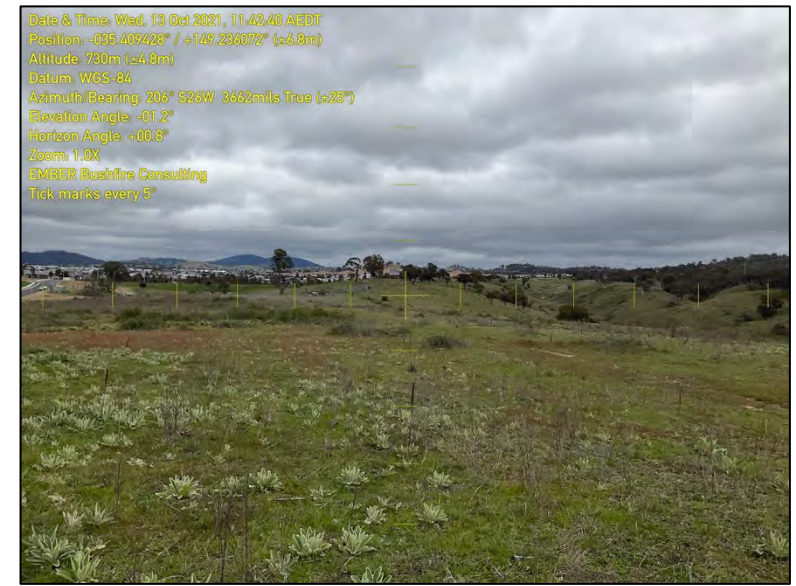


Photo point 10

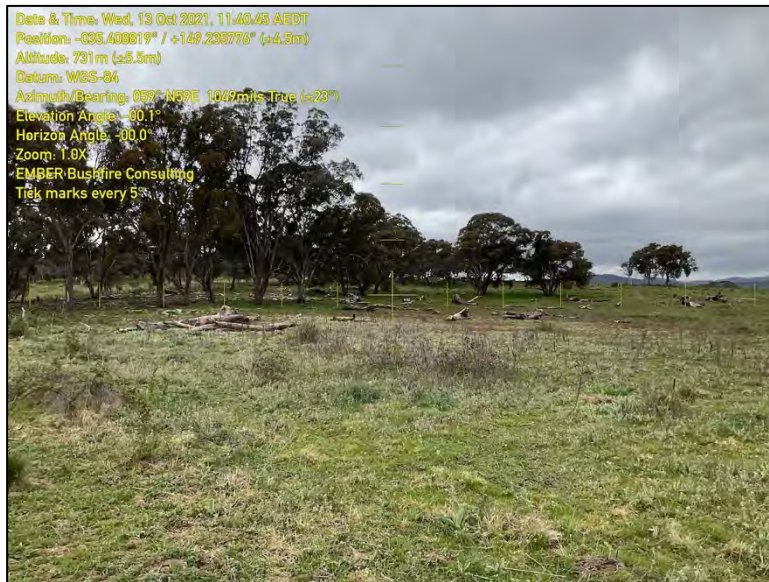


Photo point 12

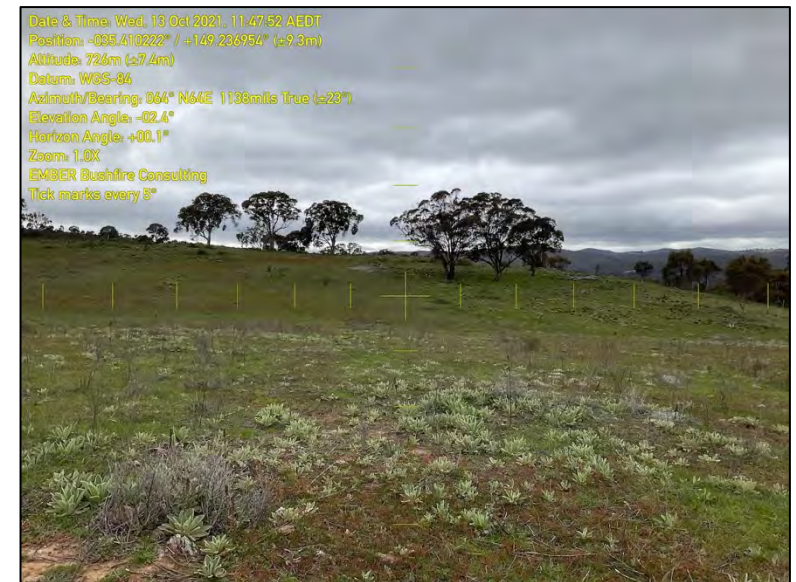


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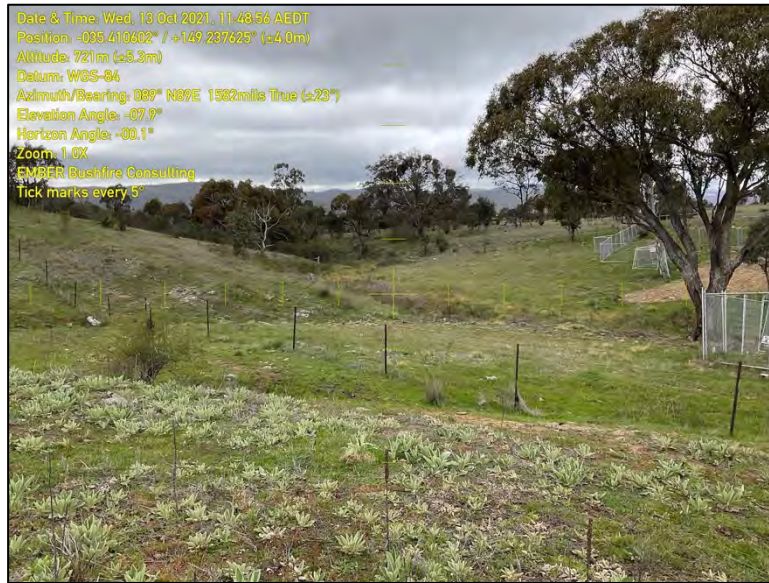


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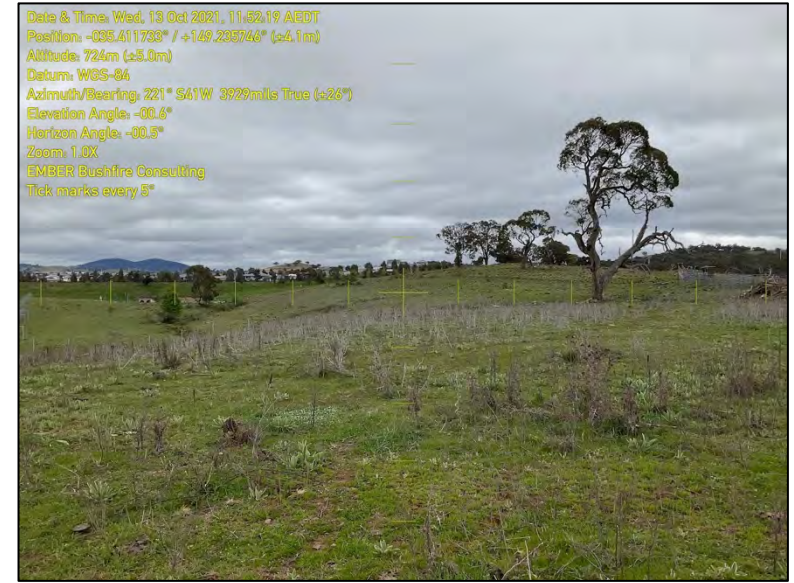
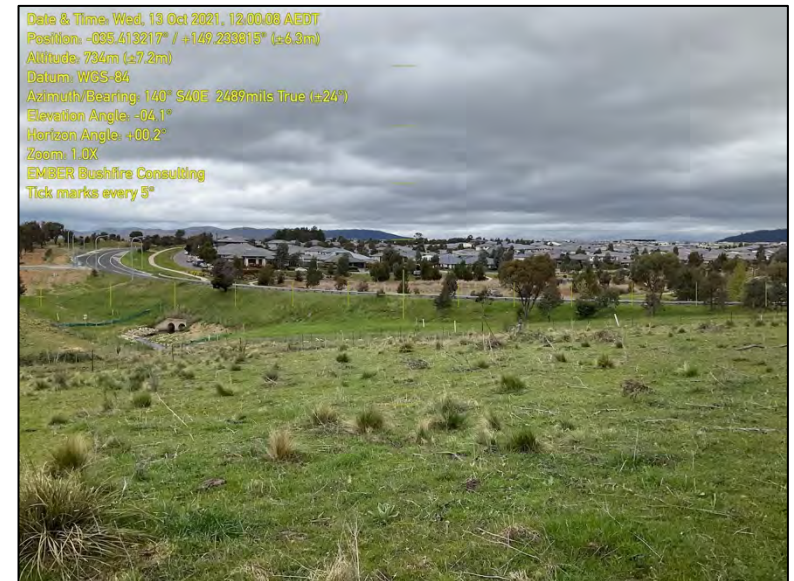


Photo point 14



Photo point 16



2 BUSHFIRE THREAT ASSESSMENT

2.1 METHODOLOGY

The methodology adopted to prepare this report is as follows:

Table 1 - Report methodology

Method	Task	Considerations
Desktop analysis	Review available mapping resources, policy documents & development plans	Online Maps Development Control Plans Local Environmental Plan
Site inspection	Evaluate context of site, determine bushfire threat, options for asset protection zones, access roads and infrastructure.	Ground truth online mapping data, validate vegetation class, obtain site measurements, assess existing structures and infrastructure.
Assessment of proposal against the NSW RFS Planning for Bushfire Protection (PBP 2019).	Assess the development proposal against the performance criteria of PBP 2019.	Could the proposal comply with the performance criteria provided under of PBP 2019.
Report	Preparation and publication of bushfire constraints report	Demonstrate the proposal is capable of meeting the aims and objectives of PBP 2019.

2.2 GENERAL BUSHFIRE ENVIRONMENT

To determine the potential bushfire threat posed to the subject site, the following environmental factors are adopted across the site.

Table 2 - Bushfire behaviour factors

Factor	Value
Fire Weather Area	Southern Ranges
FDI	100
Predominant Vegetation Classification	Woodland
Slope	Ranging from upslope to 20° downslope.

Note: A detailed bushfire hazard analysis is detailed below.

- *Vegetation formations within 140 m of the subject site were identified and classified in accordance with Appendix A1.2 of PBP 2019.*
- *Slopes within 100 m of the APZ have been calculated in accordance with A1.4 & A1.5 of PBP 2019.*
- *The fire danger index for the site has been determined in accordance with the NSW Rural Fire Service.*

2.3 FIRE HISTORY

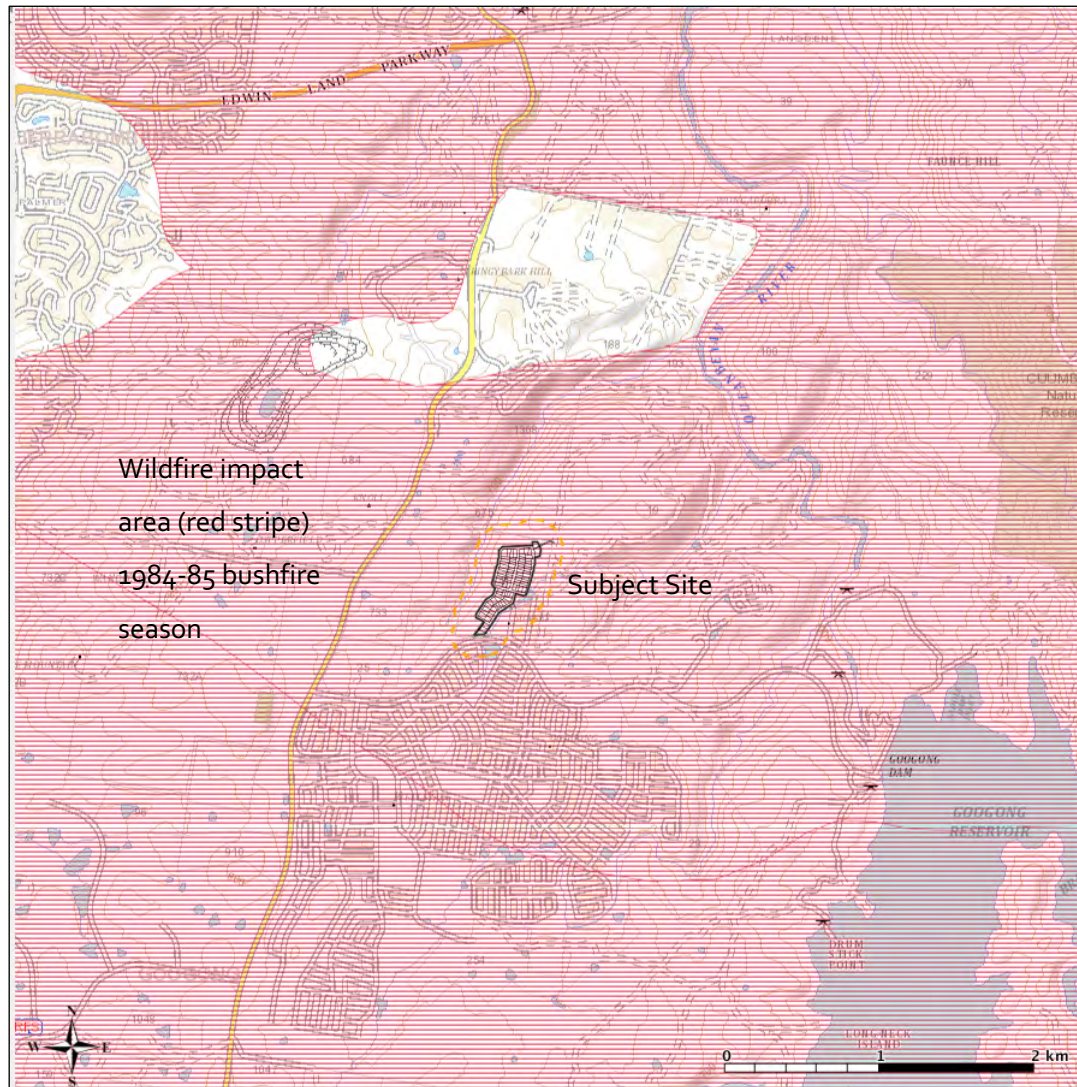


Figure 7 – Subject site Fire History Map. (FireMaps, 2024)

While the bushfire prone mapping clearly identifies that any development on the Study area will require a bush fire assessment and compliance with PBP 2019, fire history provides a clear picture of the true vulnerability of the site.

Figure 5 shows the fire history and extent of bushfires impacting the area surrounding the study area. The last major bushfire to impact the area was a wildfire during the 1984-85 bushfire season.

While land-use, population and the landscape has changed since that time the site is still considered vulnerable including from a fire event originating from the heavily vegetated areas of the Googong Foreshore Reserve to the east.

2.4 SUBJECT SITE BUSHFIRE PRONE MAPPING

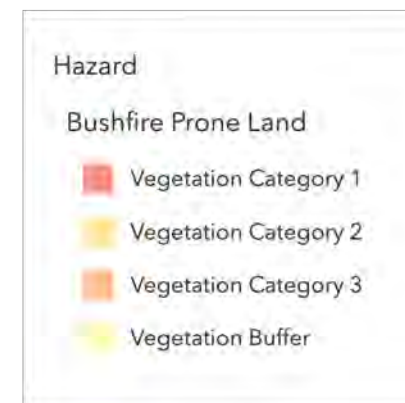


Figure 8 – Subject site Bushfire Prone Land Map. (FireMaps, 2024)

Bushfire prone mapping relative to the subject site (Figure 8) showing the subject site surrounded by areas of Vegetation Category 1 and Category 2 bush fire prone land as mapped by the QPRC.

The site assessment found this mapping to be a reasonable representation of the vegetation found on the site although land to the east is still showing as hazard despite recently being development with Sunset Stage 1.

Hazard classification key:



2.5 VEGETATION CLASSIFICATION

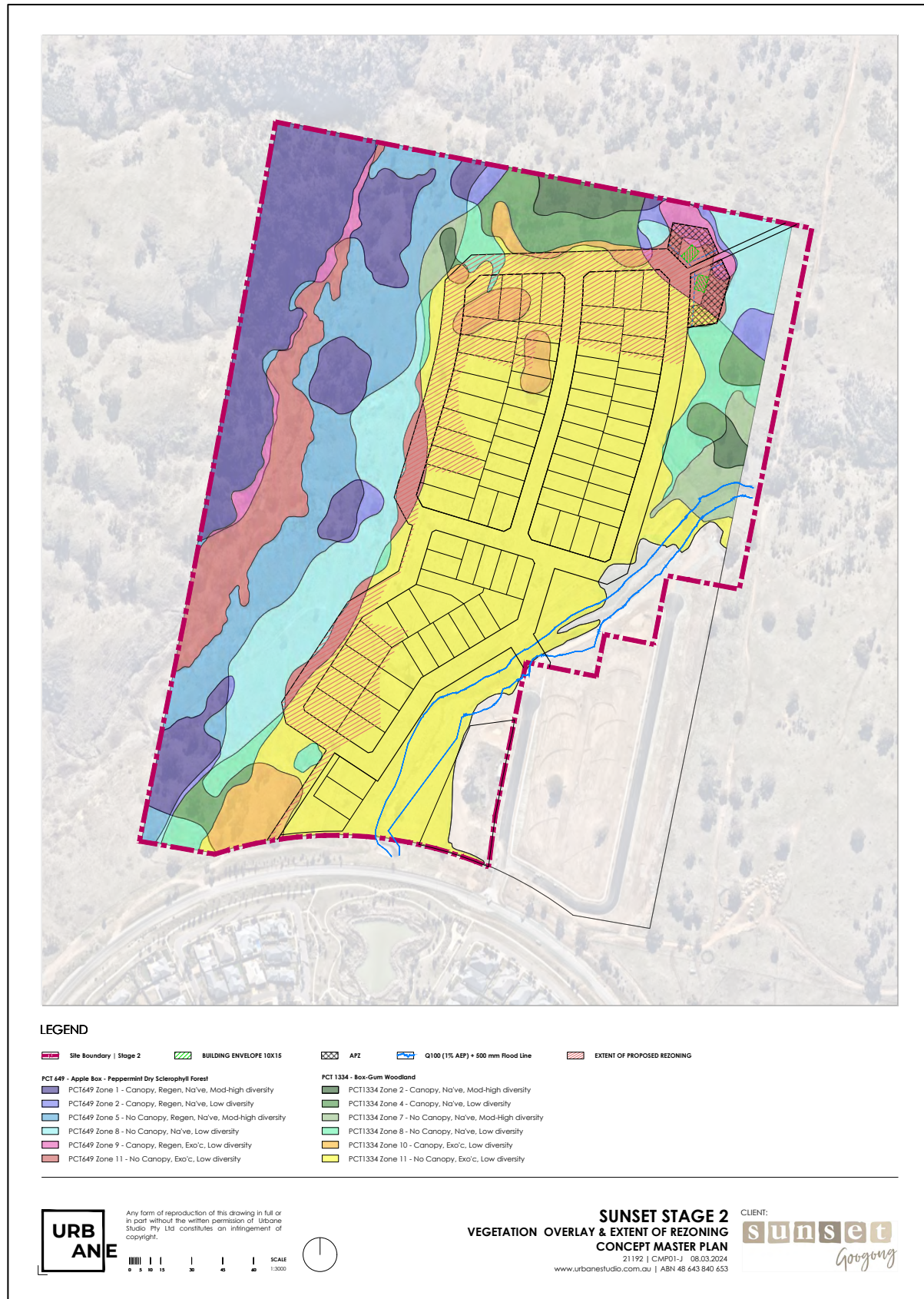


Figure 9 –Vegetation classification. (Urbane Studio, 2024)

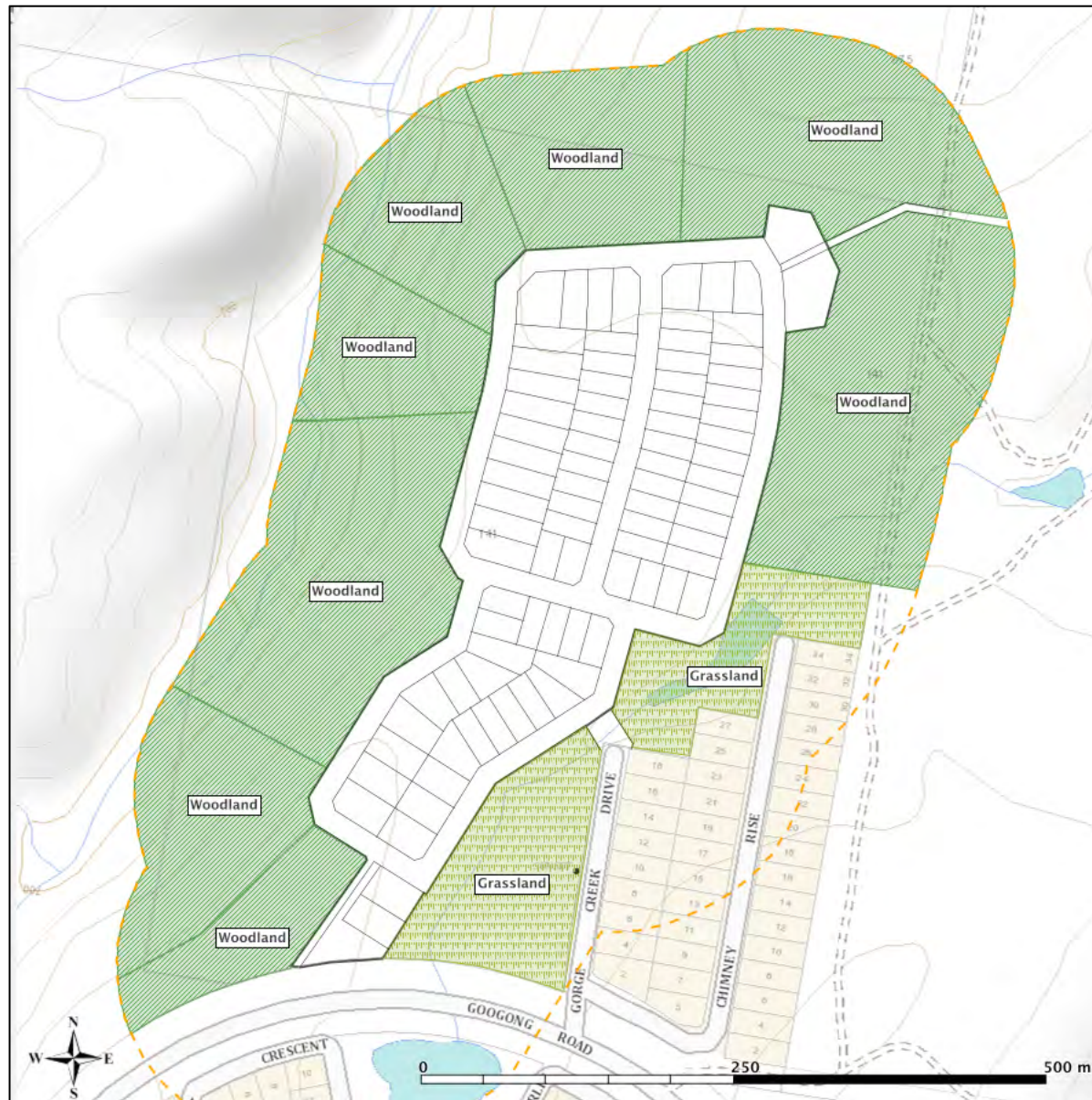


Figure 10 –Vegetation mapping. (Dau, 2024)

Vegetation formations within 140 m of the subject site were identified and classified (Figure 9) by Capital Ecology for the Biodiversity Development Assessment Report in September 2024. Figure 10 (adjacent) shows vegetation formations within 140 m of the concept design for the purposes of the hazard assessment.

All vegetation within the proposed developable area, and areas within Sunset Stage 1 subdivision currently under construction and within the Googong Township are classified as “Managed Land” and are excluded from assessment.

Any vegetation within the proposed developable area, such as urban open space (including along the creek line) must be subject to on-going vegetation management, in perpetuity.

While much of the Vegetation outside of the proposed developable area presents as Grassland a conservative approach is adopted and classified as Grassy Woodland.

2.6 SLOPE ASSESSMENT

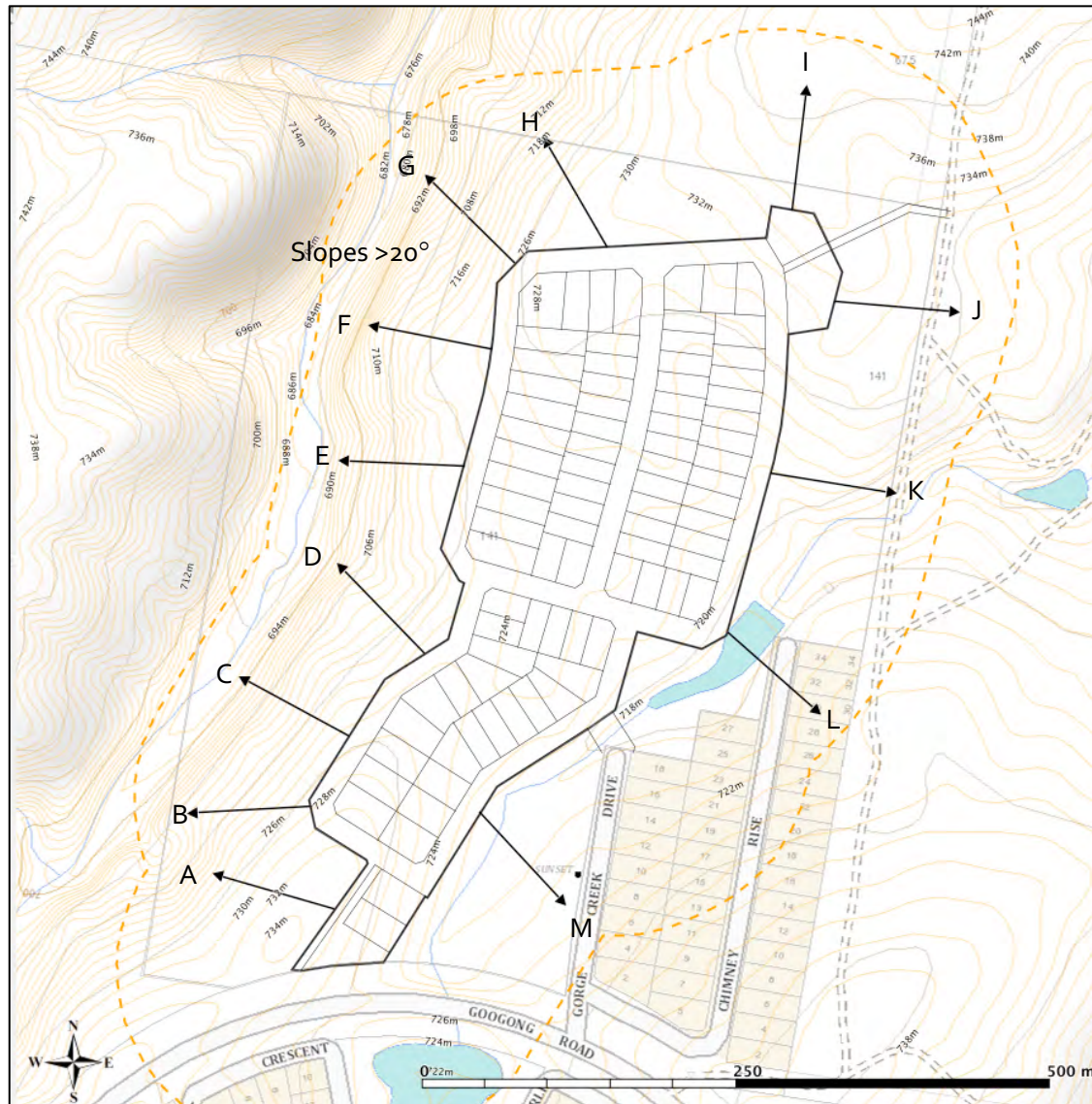


Figure 11 – Slope assessment. (Dau, 2024)

Transect	Aspect	Slope
A	W	10°-15° downslope
B	W	5°-10° downslope
C	W	15°-20° downslope
D	W	15°-20° downslope
E	W	15°-20° downslope
F	W	10°-15° downslope
G	NW	15°-20° downslope
H	NW	10°-15° downslope
I	N	Upslope
J	E	0°-5° downslope
K	E	0°-5° downslope
L	SE	Upslope
M	SE	Upslope

- Slope values selected are conservative. Average slopes are on typically less than those recorded above.
- Some slopes exceed 20° however this tends to be at the furthest extent of the 100 m transect.
- A compound slope analysis and rationalisation will be completed at the DA phase to show these steep areas are typically 80 m or more away from future dwellings and therefore do not typify actual terrain or conclusively determine fire behavior.

2.7 SITE BUSHFIRE ATTACK LEVEL (BAL) ASSESSMENT

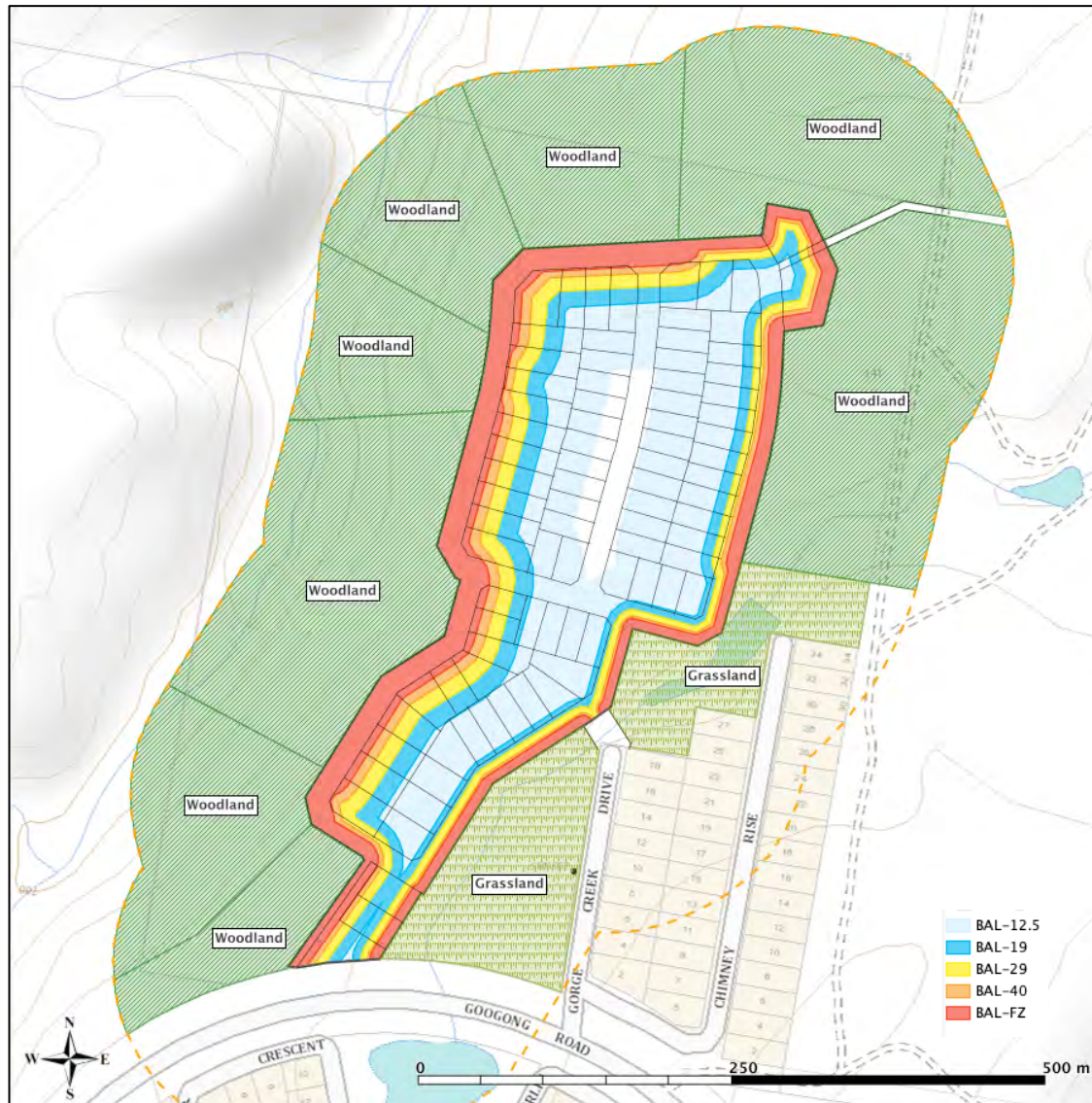


Figure 12 – BAL analysis. (Dau, 2024)

The site BAL assessment (Figure 12) considers vegetation classification, slope and the application of Asset Protection Zones (APZs) to represent the indicative BAL contours reaching into the developed site.

Proposed APZs, will include perimeter roads, adjoining road reserves and in some cases sections of residential land. Residential dwellings (Class 1a buildings) are not permissible within APZs.

All proposed APZs are on land that is less than 18° downslope and do not extend outside the subject site.

PBP 2019 requires all future residential buildings to be located in a location where radiant heat levels are less than 29 kW/m² (BAL-29). This benchmark is represented here by the boundary of the yellow and orange contour band.

As can be seen, most lots are located behind the 29 kW/m² threshold. Where higher radiant flux enters a lot building controls will be required to ensure safety and compliance with PBP 2019.

2.8 EMERGENCY SERVICES

The study area is amply serviced by both NSW Rural Fire Service and Fire & Rescue NSW.

The closest responding NSW RFS brigades and stations and resources available are:

Fernleigh Park (Swan Drive) (5 km / 6 min from the study area)

- 1 x Category 7 tanker

Jerrabomberra Creek (Old Cooma Road) (10 km / 9 min from the study area)

- 1 x Category 11 tanker
- 1 x Category 1 tanker
- 1 x Category 9 tanker

Queanbeyan City (Ellerton Drive) (11 km / 11 min from the study area)

- 2 x Category 7 tankers
- 1 x Category 1 tanker
- 1 x Category 9 tanker

Fire & Rescue NSW Station within 15 min from the study area include Queanbeyan Fire Station.

It should also be noted that ACT RFS, Parks and Conservation and ACT Fire & Rescue all have resources within proximity and capable of responding to the subject site as well if required.

3 STRATEGIC BUSHFIRE CONSIDERATIONS

3.1 BUSH FIRE LANDSCAPE ASSESSMENT

Vegetation –

It is prevalent from the site photos (1 to 16) that the study area is currently influenced by cleared land for the purpose of livestock grazing with small, scattered paddock trees throughout and a small area of remnant vegetation (narrow or small clusters of vegetation) to the west and north of the subject site.

For redundancy however, and to account for reestablishment of conservation areas a conservative approach has been taken for hazard analysis where the vegetation classification is aligned with Plant Community Type (PCT) Vegetation Zones identified in the biodiversity study (Figure 9).

This assessment considers potential future vegetation state and while the vegetation formation types of Woodland have been adopted for the purposes of APZ dimensions it is unlikely that these formations would reach their climax fuel loads, resulting in a significant factor of safety for the concept subdivision.

Topography –

The topography within the subject site is characterised by a broad predominately flat plateau in the middle, bounded a shallow drainage line to

the east and a sharp and deep gully to the west. Topography to the north is undulating.

Gradients along the western gully are steep and therefore fire behaviour has some potential to being amplified, resulting in the need for large building setbacks from this area. The concept design takes this into account, providing large APZs and deep blocks along the western side of the subdivision to accommodate residential buildings behind the 29 kW/m² threshold.

With an understanding that steeper slopes increases fire threat potential, the mild to steep topography of the study area provides a relatively moderate to high threat environment for the proposed future concept residential subdivision development. Large APZs and building setbacks among other bushfire protection measures will be provided such that the performance criteria for subdivisions under PBP 2019 can be satisfied.

Weather -

For planning and assessment purposes the Study Area attracts and Fire Danger Index (FDI) of 100 as assigned to the Queanbeyan-Palerang Weather District.

With that established however, as was seen during the recent Black Summer Fires in 2019-20, the area can experience elevated fire conditions in any given Summer and these conditions are not unusual in assessing fire potential over the normal.

Fire History -

The study area does demonstrate some history of fire, although it is infrequent and usually broad in scale.

While land-use, population and the landscape has changed since the time of the last fire the site is still considered vulnerable including from a fire event originating from the heavily vegetated areas of the Googong Foreshore Reserve to the east.

In the right context and environment however, PBP 2019 provides the necessary protection measures to mitigate bushfire risk and support development in bushfire prone environments with moderate threat much like the Study Area.

3.2 LAND USE ASSESSMENT

Apart from established residential living mainly to the south of the subject site, the predominant land use in this area is grazing of livestock, primary production and other small-scale agricultural enterprises that surround the local community and the Googong township.

To the east the study area is the Googong Foreshore which holds with it high conservation values. Future development of this land is unlikely and with landscape and vegetation management practices at a minimum, the threat from this direction will be persistent for the life of the development.

The conservative values adopted for the vegetation formations in the threat assessment will more than adequately take this persistent bushfire threat into account.

3.3 ACCESS ARRANGEMENTS

Proposed egress is via a single-entry point at Gorge Creek Drive (Sunset Stage 1). Access to the broader public road network is via Googong Road and Old Cooma Road. Access to Old Cooma Road is also available via Googong township.

It is understood that QPRC are not supportive of a second public access point into the concept subdivision, due to limitations of suitable sites for an intersection and the number of existing connecting roads onto to Googong Road.

As an alternative to second public access point, a gated emergency only access lane will be provided to provide multiple access points and through road access for emergency services.

3.4 EMERGENCY SERVICES

As identified, the source of bushfire risk is external to the developed area and that is likely to remain in perpetuity regardless of further future residential development in the area.

That being the case, the concept subdivision would be well serviced by the local RFS Brigades at Fernleigh Park, Jerrabomberra and Queanbeyan amongst many others in the Capital Region.

The proposed concept subdivision would significantly increase the number of residential structures in the area which would invariably increase demand for structural firefighting capabilities in the event of a fire. It would be assumed that this future demand will result in an increase in local firefighting resources and upgrading of existing facilities.

3.5 INFRASTRUCTURE

Water Supplies -

The proposed subdivision will be provided with reticulated water from the town's main water supply including fire hydrant system provided in accordance with the relevant clauses of AS 2419.1:2005 - Fire hydrant installations System design, installation and commissioning.

Other Infrastructure -

- **Electricity Services** – Electricity power supply throughout the proposed concept subdivision will be via a new underground mains electricity service and will be provided in accordance with the specifications set out in Table 7.4a of PBP (2019)
- **Gas Services** – It is envisaged that gas supplies to any future residence will be by bottled gas supplies and therefore supplies and fittings are to comply with specifications set out in Table 7.4a of PBP (2019)

3.6 ADJOINING LAND

The subject site is an undeveloped rural lot located within the greater Googong Township area, approximately 9 km due south of Queanbeyan central business district.

Land to the south and east of the study area is the recently developed residential land associated with Sunset Stage 1 and Googong Neighbourhoods 1, 2 and 3.

Land to the north and west of the study area is predominantly grassland and open woodland for the purpose of livestock grazing.

3.7 STRATEGIC BUSHFIRE CONSIDERATIONS CONCLUDING STATEMENT.

The subject site is:

- designated Bushfire Prone.
- is currently dominated by Grassland fuels but likely to be Woodland fuels given the conservation values into the future.
- considered a moderate to high threat environment, largely due to steep slopes bounding the site to the west.
- has a recent but infrequent history of bush fire threat and impact.
- has access that is largely compliant with acceptable solutions of PBP 2019 with the exception that a typical through access will not be provided.
- is near existing infrastructure and amenities.

In general terms, the proposed concept subdivision will largely comply with the broad aims and objectives of PBP 2019 and there is good opportunity to provide a range of bushfire protection improvements that address the bushfire threat and the compliance requirements of PBP 2019.

While access arrangements are not strictly provided in accordance with PBP 2019 a performance solution will be required to address the departure from providing through road access.

The predominate vegetation type within the study area is conservatively classified as Woodland and while these do represent an elevated threat, given the large APZs this level of threat can be moderated to acceptable levels.

The history of bushfire in the area demonstrates that the long term and ongoing threat remains from the areas surrounding the township where large areas of woody vegetation is predominant. In the event of a bushfire, the proposed concept subdivision is well positioned with emergency services located nearby.

4 BUSHFIRE PROTECTION MEASURES

In response to the bushfire threat assessment, any future subdivision of land on the subject site will require the appraisal of the standard Bushfire Protection Measures (BPMs) required by Section 5 Residential and Rural Residential Subdivisions of PBP 2019.

The full suite of protection measures expected of the development by PBP 2019 is provided in Appendix A of this report.

4.1 BPM DISCUSSION AND RECOMMENDATIONS:

4.1.1 ASSET PROTECTION ZONES:

Discussion:

APZs are determined through the analysis of slope and vegetation (Figure 11 & 10) and crossed referenced to dimensions provided for residential subdivisions in Table A1.12.2 PBP 2019.

The subject site possesses a relatively moderate to high bushfire threat profile along the western boundary given the woodland classification and topography that is moderate to steep in places. Slopes have been assessed at up to 15°-20°. Consequently, APZs and setbacks of are general larger than normal i.e. **32 m** wide. Setbacks to the north where slopes are flat or upslope are more modest at **12 m** wide. Setbacks to the east where slopes are up 5°-10° downslope are expected to be **20 m** wide.

Ideally wide perimeter roads and large, well-managed road easements would provide a significant proportion of the APZ along the western, northern and eastern boundary.

An indicative BAL assessment is provided in figure 12 demonstrating that most lots are located behind the 29 kW/m² threshold. Where higher radiant flux enters a lot, building controls will be required to ensure safety and compliance with PBP 2019.

It is expected that further refinement of APZ dimensions and locations will occur at the detailed design phase where further adjustments can be made to the final subdivision layout.

Recommendations:

- APZs can contain roads, some infrastructure, managed land and urban parks and open spaces but not residential dwellings.
- The concept design does appear to accommodate the required Min. APZ dimensions provided, which will ensure that any future dwellings will not be subjected to a radiant heat flux <29 kW/m² can and therefore will comply with the requirements of Table A1.12.2 PBP 2019.
- Where higher radiant flux (>29 kW/m²) encroaches into a lot, building controls that mandate building setbacks will be required to ensure safety and compliance with PBP 2019.

- Indicative APZs are not on slopes greater than 18° degrees.
- Some slopes with in 100 m of the site are >20° but tend to be at the furthest extent of the slope transects.
- Slopes >20° are typically 80 m or more away from future development allowing enough room for extended flame lengths.
- A compound slope analysis and rationalisation will need to be completed at the DA phase to show these steep areas are typically 80 m or more away from future dwellings and therefore do not typify actual terrain or conclusively determine fire behavior.

4.1.2 LANDSCAPING:

Recommendations:

- All landscape within the areas identified as APZ would require management in perpetuity and in accordance with the requirements of Asset Protection Zone Standards - Appendix 4 of PBP (2019) (Attachment B).

4.1.3 ACCESS:

Discussion:

The concept design provides perimeter roads adjacent to hazard for most of the development and this will serve well for the purposes of safety and for compliance with PBP 2019.

Two large lots in the northeast are not provided with perimeter roads. These will require a performance solution for the purposes of compliance.

Proposed egress is via a single-entry point at Gorge Creek Drive (Sunset Stage 1). Access to the broader public road network is via Googong Road and Old Cooma Road. Access to Old Cooma Road is also available via Googong township.

It is understood that QPRC are not supportive of a second public access point into the concept subdivision, due to limitations of suitable sites for an intersection and the number of existing connecting roads onto to Googong Road.

As part of a performance-based design a gated emergency only access lane will be provided to Googong Road is proposed to provide an alternative access point and to enable through road access for emergency services.

In summary the current access arrangements do not meet the following acceptable solutions for access.

- perimeter roads are provided for residential subdivisions of three or more allotments;
- subdivisions of three or more allotments have more than one access in and out of the development;

- dead end roads are not recommended, but if unavoidable, 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;

In lieu of strict compliance with the acceptable solutions for access the following designs may be used as the basis for performance-based designs

- Where perimeter roads are not provided:
 - mandatory setbacks for building footprints from boundaries
 - increased construction levels,
 - metal fencing and
 - perimeter fire trail.
- Where only one access is provided:
 - Inclusion of a gated emergency only access lane.

Recommendations:

- As a minimum, all road and access specifications and dimensions to comply with those detailed in PBP 2019 as provided here in (Attachment A).
- Performance based solutions will be required for the departures detailed above.

4.1.4 SERVICES – WATER, ELECTRICITY AND GAS:

Recommendations:

- Water Supplies – Future residences are to be provided with the water supplies which comply with the specifications set out in PBP (2019) which are provided in Appendix A of this report.
- Electricity Services – Future electricity supply throughout subject site is to be provided in compliance with the specifications set out in PBP (2019) which are provided in Appendix A of this report.
- Gas Services – Future gas supplies to any residence are to comply with specifications set out in PBP (2019) which are provided in Appendix A of this report.

4.1.5 CONSTRUCTION REQUIREMENTS AND OTHER PROTECTION MEASURES

Discussion:

The minimum APZ dimensions for any future residence opposite areas identified as hazard must be provided to ensure that any future dwelling can achieve the <29 kW/m² threshold and therefore compliance with Table A1.12.2 of PBP 2019. If the minimum APZ widths are provided as per Section 3.1.1 then compliance should be achievable.

Recommendations:

- Future construction must comply with the relevant sections of Australian Standard AS3959-2018 Amd 2 Construction of buildings in bush fire-prone areas as amended, or
- NASH Standard (1.7.14 updated) National Standard Steel Framed Construction in Bushfire Areas – 2014 as appropriate, and
- Section 7.5 of Planning for Bush Fire Protection 2019.

5 CONCLUSION

This report documents the findings from a Bush Fire Strategic Study for a proposed 85-lot residential subdivision at 141 Googong Road, Googong. The aim of the study is to assess whether the proposal is appropriate in the bush fire hazard context. The study establishes the level of threat posed by the surrounding environment; the bushfire protection measures required to achieve an acceptable level of safety, and the level of compliance of the concept subdivision against PBP 2019.

The report is based on a concept design that is close to the final proposed subdivision, but that may be subject to some minor to moderate changes. The concept design has been assessed as being capable of satisfying the broad aim and objectives of PBP 2019.

The subject site possesses a moderate to high threat profile, partly given the woodland vegetation classification but mostly due to the steep slopes associated with a deep gully and creek to the west of the proposed developable area.

Slopes greater than 20 degrees are present within 100 m of the proposed urban edge, however these tend to be at the furthest extent of the slope transects. Furthermore, these slopes are typically 80 m or more away. A detailed slope analysis at the DA stage will be conducted to provide precise verification that adequate setbacks are provided from development.

Large APZ dimensions have been recommended along the western aspect to moderate this threat to an acceptable level. Where higher radiant flux ($>29 \text{ kW/m}^2$) encroaches into a lot, building controls that mandate building setbacks will be required to ensure safety and compliance with PBP 2019.

Proposed egress is via a single-entry point at Gorge Creek Drive (Sunset Stage 1). Access to the broader public road network is via Googong Road and Old Cooma Road. As part of a performance-based design a gated emergency only access lane will be provided to Googong Road is proposed to provide an alternative access point and to enable through road access for emergency services.

Any planned services throughout the subdivision will be required to meet the standards and specifications set out with PBP (2019).

All reasonable judgment has been applied in this assessment which would indicate that the concept subdivision is capable of supporting development that can comply with PBP 2019.

6 REFERENCE

Australian Building Codes Board (ABCB), 2019, *National Construction Code - Building Code of Australia Volume 1 & 2*, Canberra

ePlanning Spatial Viewer, Department of Planning Industry and Environment, accessed 20 December 2021, <https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address>

Keith D, 2004, *Ocean Shores to Desert Dunes: the native vegetation of NSW and the ACT*, Dept of Environment and Conservation, NSW Government.

NSW Rural Fire Service, 2005, *Standards for Asset Protection Zones*. Sydney

NSW Rural Fire Service, 2019, *Planning for Bushfire Protection*. Sydney

Standards Australia, 2018, AS 3959-2018 *Construction of buildings in Bushfire Prone Areas* SAI Global, Melbourne.

ATTACHMENT A – PBP 2019 SPECIFICATIONS

The following tables outlines the performance criteria and generic acceptable solutions for any proposed subdivision of land for residential development.

Performance Criteria	Acceptable Solution
ASSET PROTECTION ZONES	
Potential building footprints must 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 FFDI.
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.
The APZs is provided in perpetuity.	APZs are wholly within the boundaries of the 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.
LANDSCAPING	
Landscaping is designed and 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; and - fencing is constructed in accordance with section 7.6.
ACCESS (General Requirements)	
firefighting vehicles are provided with safe, all-weather access to structures.	- property access roads are two-wheel drive, all-weather roads; - perimeter roads are provided for residential subdivisions of three or more allotments; - subdivisions of three or more allotments have more than one access in and out of the development; - traffic management devices are constructed to not prohibit access by emergency services vehicles; - maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient; - all roads are through roads; - dead end roads are not recommended, but if unavoidable, are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end; - where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road; - where access/egress can only be achieved through forest, woodland and heath vegetation, secondary access shall be provided to an alternate point on the existing public road system; and - 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.

Performance Criteria	Acceptable Solution
- the capacity of access roads is adequate for firefighting vehicles. - there is appropriate access to water supply.	- 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. - hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression; - hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005 - Fire hydrant installations System design, installation and commissioning; and - there is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.
PERIMETER ROADS	
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; - minimum 8m carriageway width kerb to kerb; - parking is provided outside of the carriageway width; - hydrants are located clear of parking areas; - are through roads, and these are linked to the internal road system at an interval of no greater than 500m; - curves of roads have a minimum inner radius of 6m; the maximum grade road is 15 degrees and average grade of not more than 10 degrees; - the road crossfall does not exceed 3 degrees; and - a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
NON-PERIMETER ROADS	
access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	- minimum 5.5m carriageway width kerb to kerb; - parking is provided outside of the carriageway width; - hydrants are located clear of parking areas; - roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m; - curves of roads have a minimum inner radius of 6m; - the road crossfall does not exceed 3 degrees; and - a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
PROPERTY ACCESS	
firefighting vehicles can access the dwelling and exit the property safely.	- There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles. In circumstances where this cannot occur, the following requirements apply: - minimum 4m carriageway width; - in forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay; - a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; - provide a suitable turning area in accordance with Appendix 3;

Performance Criteria	Acceptable Solution
	○ curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; ○ the minimum distance between inner and outer curves is 6m; ○ the crossfall is not more than 10 degrees; ○ maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; and ○ a development comprising more than three dwellings has access by dedication of a road and not by right of way. Note: Some short constrictions in the access may be accepted where they are not less than 3.5m wide, extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.
WATER SUPPLIES	
• adequate water supplies is provided for firefighting purposes.	• reticulated water is to be provided to the development where available; • a static water and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed; and • static water supplies shall comply with Table 5.3d.
• 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 2419.1:2005; • 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.
• flows and pressure are appropriate.	• fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
• 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.
ELECTRICITY SERVICES	
• 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 of 30m, 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 Guideline for Managing Vegetation Near Power Lines.
GAS SERVICES	
• 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 10m 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.

ATTACHMENT B – APZs, LANDSCAPING, FENCES AND GATES

In Australia, bush fires are a natural and essential aspect of the landscape as many plants and animals have adapted to fire as part of their life cycle. However, development adjacent to bush land areas has increased the risk of fire impacting on people and their assets. The impact on property and life can be reduced with responsible preparation and management of bush fire hazards.

In combination with other BPMs, a bush fire hazard can be reduced by implementing simple steps in reducing vegetation levels. This can be done by designing and managing landscaping to implement an APZ around the property.

This Appendix sets the standards which need to be met within an APZ.

A4.1 Asset protection zones

An APZ is a fuel-reduced area surrounding a built asset or structure.

For a complete guide to APZs and landscaping, download the NSW RFS document *Standards for Asset Protection Zones* at: www.rfs.nsw.gov.au/resources/publications.

An APZ provides:

- a buffer zone between a bush fire hazard and an asset
- an area of reduced bush fire fuel that allows suppression of fire
- an area from which backburning or hazard reduction can be conducted,
- an area which allows emergency services access and provides a relatively safe area for firefighters and home owners to defend their property.

Potential bush fire fuels should be minimised within an APZ. This is so that the vegetation within the planned zone does not provide a path for the transfer of fire to the asset either from the ground level or through the tree canopy.

An APZ, if designed correctly and maintained regularly, will reduce the risk of:

- direct flame contact on the asset
- damage to the built asset from intense radiant heat
- ember attack.

The APZ should be located between an asset and the bush fire hazard.

The methodology for calculating the required APZ distance is contained within Appendix 1. The width of the APZ required will depend upon the development type. APZs for new development are set out within Chapters 5, 6 and 7 of this document.

In forest vegetation, the APZ can be made up of an inner protection area (IPA) and an outer protection area (OPA).

Inner protection areas (IPAs)

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

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

When establishing and maintaining an IPA the following requirements apply:

Trees:

- canopy cover should be less than 15% (at maturity)
- trees (at maturity) should not touch or overhang the building
- lower limbs should be removed up to a height of 2m above ground
- canopies should be separated by 2 to 5m
- 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
- shrubs should not be located under trees
- shrubs should not form more than 10% ground cover
- 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 100mm in height)
- leaves and vegetation debris should be removed.

Outer protection areas (OPAs)

An OPA is located between the IPA and the unmanaged vegetation. Vegetation within the OPA can be managed to a more moderate level. The reduction of fuel in this area substantially decreases the intensity of an approaching fire and restricts the pathways to crown fuels; reducing the level of direct flame, radiant heat and ember attack on the IPA.

Because of the nature of an OPA, they are only applicable in forest vegetation.

In practical terms the OPA is an area where there is maintenance of the understorey and some separation in the canopy.

When establishing and maintaining an OPA the following requirements apply:

Trees:

- tree canopy cover should be less than 30%
- trees should have canopy separation
- canopies should be separated by 2 to 5m

Shrubs:

- shrubs should not form a continuous canopy
- shrubs should form no more than 20% of ground cover

Grass:

- should be kept mown (as a guide grass should be kept to no more than 100mm in height)
- leaf and other debris should be mown, slashed or mulched.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance of the IPA and OPA to the standards given above should be undertaken on an annual basis, in advance of the fire season, as a minimum.

FENCES & GATES (SECTION 7.6 PBP 2019)

Fences and gates in bush fire prone areas may play a significant role in the vulnerability of structures during bush fires. In this regard, all fences in bush fire prone areas should be made of either hardwood or non-combustible material.

However, in circumstances where the fence is within 6m of a building or in areas of BAL-29 or greater, they should be made of non-combustible material only..