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ADDENDUM BUSHFIRE HAZARD ASSESSMENT

23 LOT SUBDIVISION

7 REG GRUNDY DRIVE, BUNDANOON, NSW

LGA: Wingecarribee

Lot 18 DP 1219744

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ADDITIONAL INFORMATION
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BUSHFIRE HAZARD ASSESSMENT

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DISCLAIMER

The recommendations provided in the summary of this report are a result of the analysis of the proposal in relation to the requirements of Planning for Bushfire Protection 2019. Utmost care has been taken in the preparation of this report however there is no guarantee of human error. The intention of this report is to address the submission requirements for Development Applications on bushfire prone land. There is no implied assurance or guarantee the summary conditions will be accepted in the final consent and there is no way Harris Environmental Consulting is liable for any financial losses incurred should the recommendations in this report not be accepted in the final conditions of consent. This bushfire assessment provides a risk assessment of the bushfire hazard as outlined in the PBP 2019 and AS3959 2018. It does not provide protection against any damages or losses resulting from a bushfire event.

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EXECUTIVE SUMMARY

This addendum report provides a modified Bushfire Hazard Assessment for a proposed 23 lot subdivision at 7 Reg Grundy Drive, Bundanoon, NSW. The following demonstrates how the modified lot layout provides BAL 29 building envelopes. The APZ proposed will be provided through land management to APZ standards using 88B instruments on the community land. The *Vegetation Management Plan for Erith Street Bundanoon*. Report prepared for Civil Development Solution (VMP) provides the management plan for protecting and rehabilitating the two newly created "community lots" and a guide to managing the associated Asset Protection Zone, including the proposed 88B easements.

The assessment demonstrates how the proposed 23 lots can meet BAL 29 or less.

The bushfire prone vegetation within 140 m of the proposed subdivision is classified as:

- Remnant on the northern and eastern elevations;
- Forest on the north-eastern elevation;
- Riparian Corridor within the centre of the subject area.

Asset Protection Zones (APZ) are provided in this report to demonstrate where future development would be setback from the bushfire hazard vegetation. The specific construction standards for any future dwellings will be determined when a DA for a specific dwelling is lodged in the future.

The proposed subject lots will be located on Reg Grundy Drive. The existing development of road is a two-wheel drive, all weather road with the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles. The proposed road meets the acceptable solutions required for Non-Perimeter roads.

Property Access will be from Reg Grundy Road. Lots 1-20, 22-23 will be able to provide an unobstructed path less than 70m between the most distant external part of the proposed building envelope (or future dwelling) and the nearest part of the public road. Therefore, no specific access requirements are necessary.

Lot 21 will require property access that exceeds 70 m from the public road. The subject lot will be required to comply with the property access requirements outlined in Table 5.3b *PBP 2019*.

The access throughout the subdivision is a proposed public road. This road is proposed as a two-wheel drive, all weather perimeter road. The proposed width of 8 m kerb to kerb. The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.

Electricity and services are to be located so as not to contribute to the risk of fire to the proposed dwellings on each lot. Reticulated or bottled gas is to be installed and maintained in accordance with Australian Standard AS/NZS 1596:2008: The storage and handling of LPG gas to meet the requirements of relevant authorities.

1. PROPOSAL FOR ADDENDUM

The owners of 7 Reg Grundy Drive, Bundanoon, NSW, propose an amended 23 Lot Subdivision on Lot 18 DP 1219744. The plan includes 22 Lots for residential development and one lot reserved for drainage.

Figure 1 shows modified subdivision to accommodate community lots.

Figure 2 shows the proposed layout of the land components as shown in the NARLA Vegetation Management Plan, 2022. This shows the community land, access and 88b APZs.

Figure 3 shows the management zones within the subject property (NARLA Vegetation Management Plan, 2022).

FIGURE 1 PROPOSED SUBDIVISION PLAN

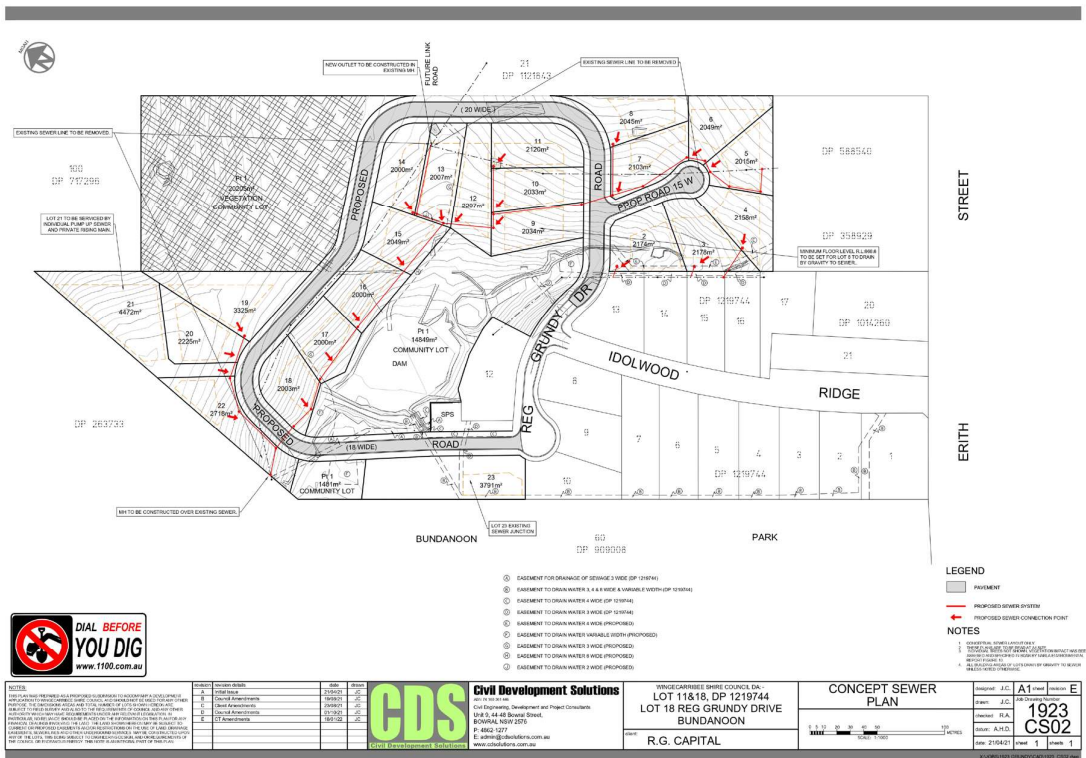


FIGURE 2 NARLA VMP COMPONENTS OF SUBJECT LAND

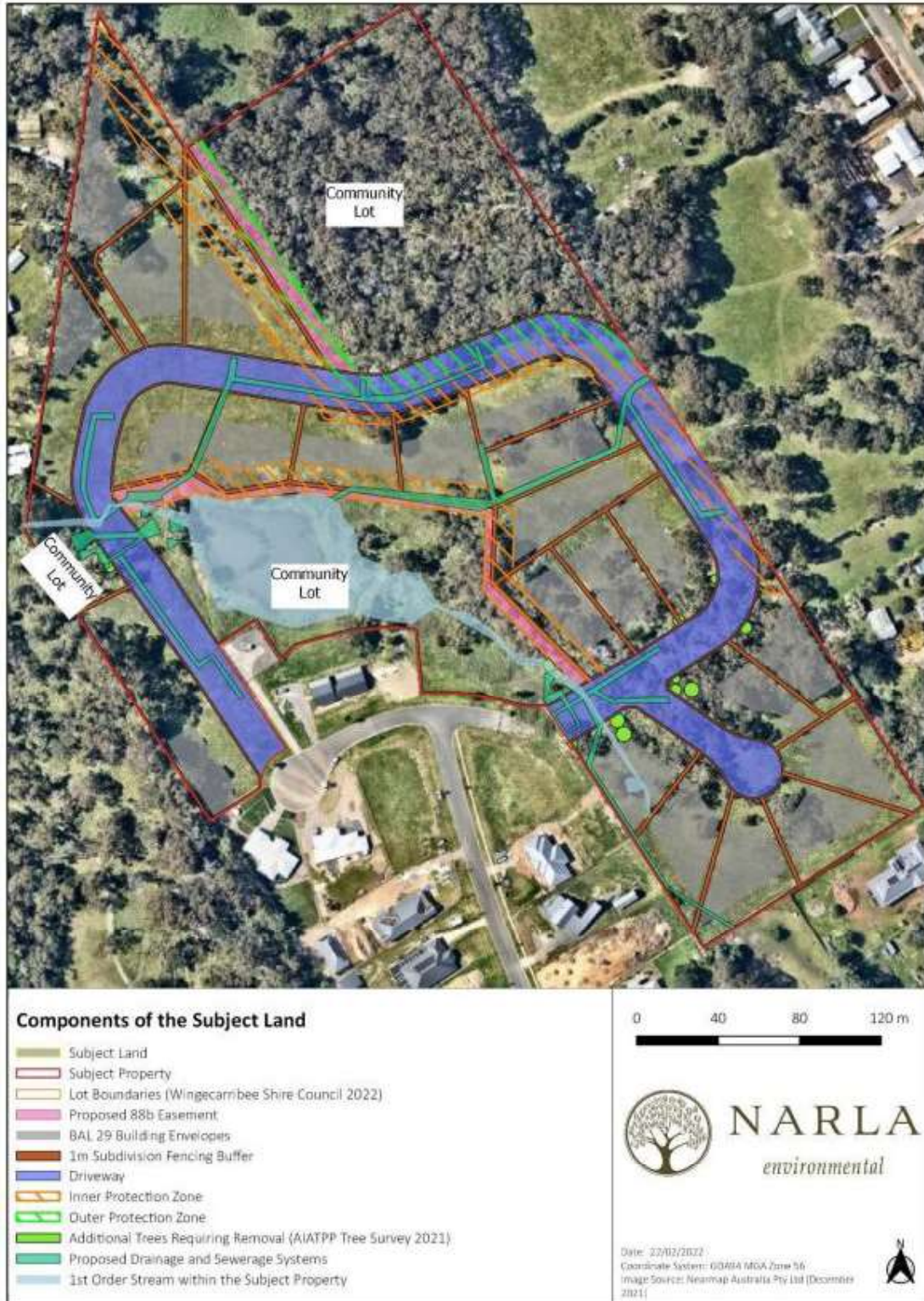
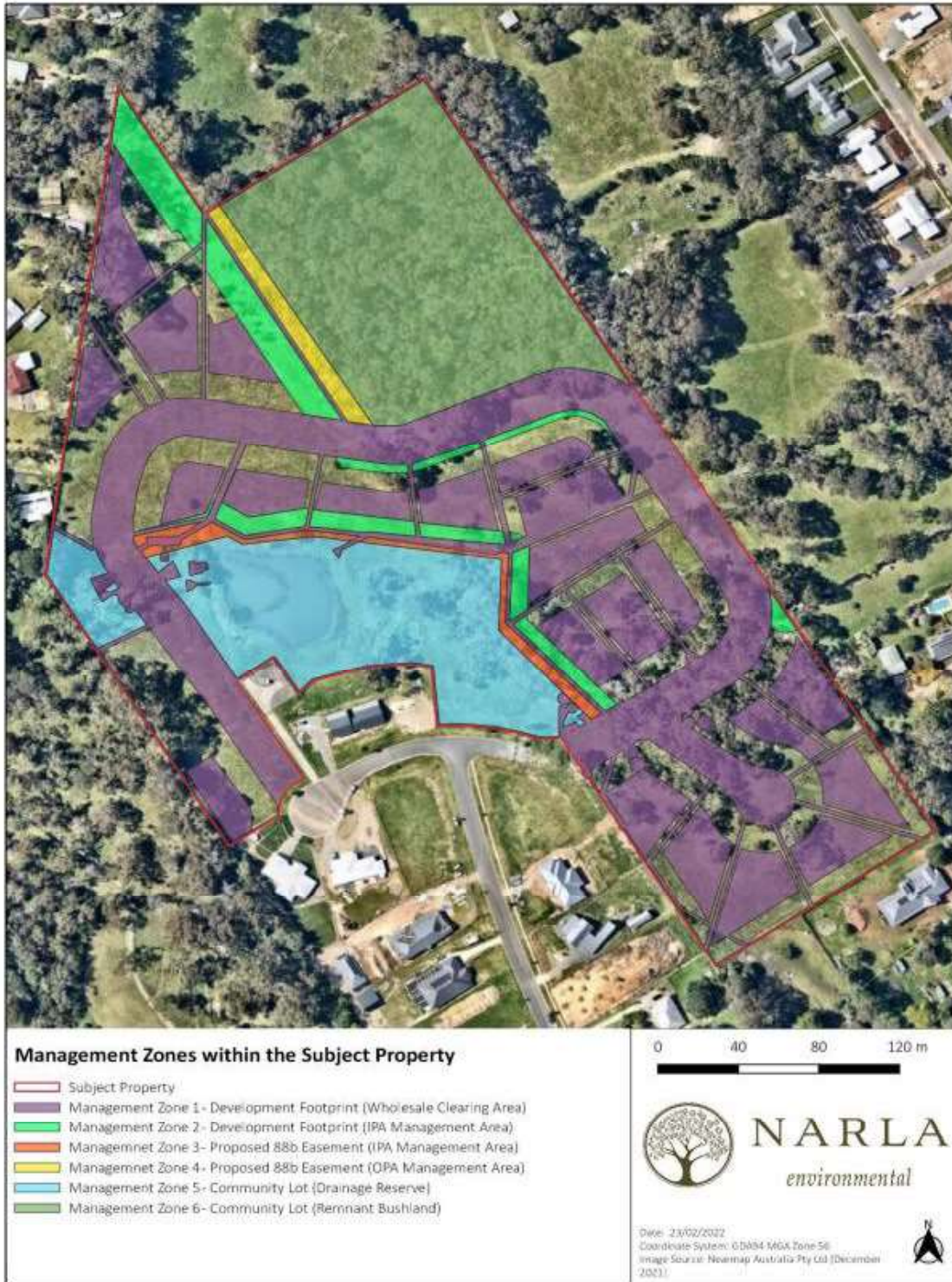


FIGURE 3 NARLA VMP MANAGEMENT ZONES WITHIN SUBJECT PROPERTY



2. SITE LOCATION

2.1 General Location

As shown in Figure 4, the subject lot is located along Eirth Street located on the eastern side of the expanding urban settlement of Bundanoon. The site is accessed via the newly established Idolwood Ridge and will extend from the existing partially formed Reg Grundy Drive.

Figure 5 provides a broad scale aerial view of the subject site demonstrating the limited extent of surrounding vegetation. Figure 6 shows a close up aerial view of the subject area with plans overlaid.

FIGURE 4 LOCATION OF PROPERTY

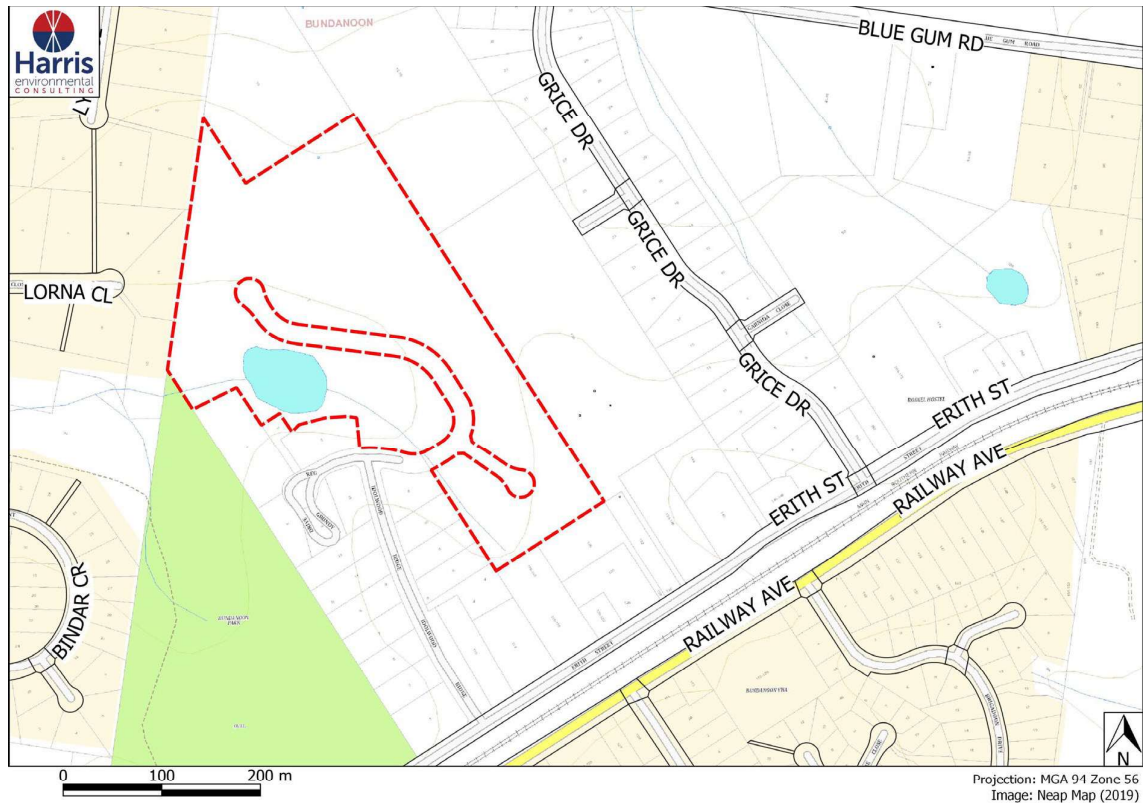


FIGURE 5 EXTENDED AERIAL VIEW OF THE SUBJECT LOT



FIGURE 6 CLOSE UP AERIAL



3. PLANNING LAYERS

The following planning layers are described in Table 1 and shown in the Figures below:

TABLE 1 PLANNING LAYERS

MAP	FIGURE	DESCRIPTION
Bushfire Prone Land Map	7	The subject lot is mapped "Vegetation Category 1" and "Vegetation Buffer 100m".
LEP Zone Map	8	The subject lot is classified as "R2 Low Density Residential".
Vegetation Mapping	9	Historic vegetation mapping of the South East NSW has classified the surrounding vegetation class as Southern Highlands Shale Woodland' (Tozer et al 2010).
Biodiversity Values Map	Appx. II	There are no biodiverse values mapped in the proposed development.

FIGURE 7 BUSHFIRE PRONE MAP

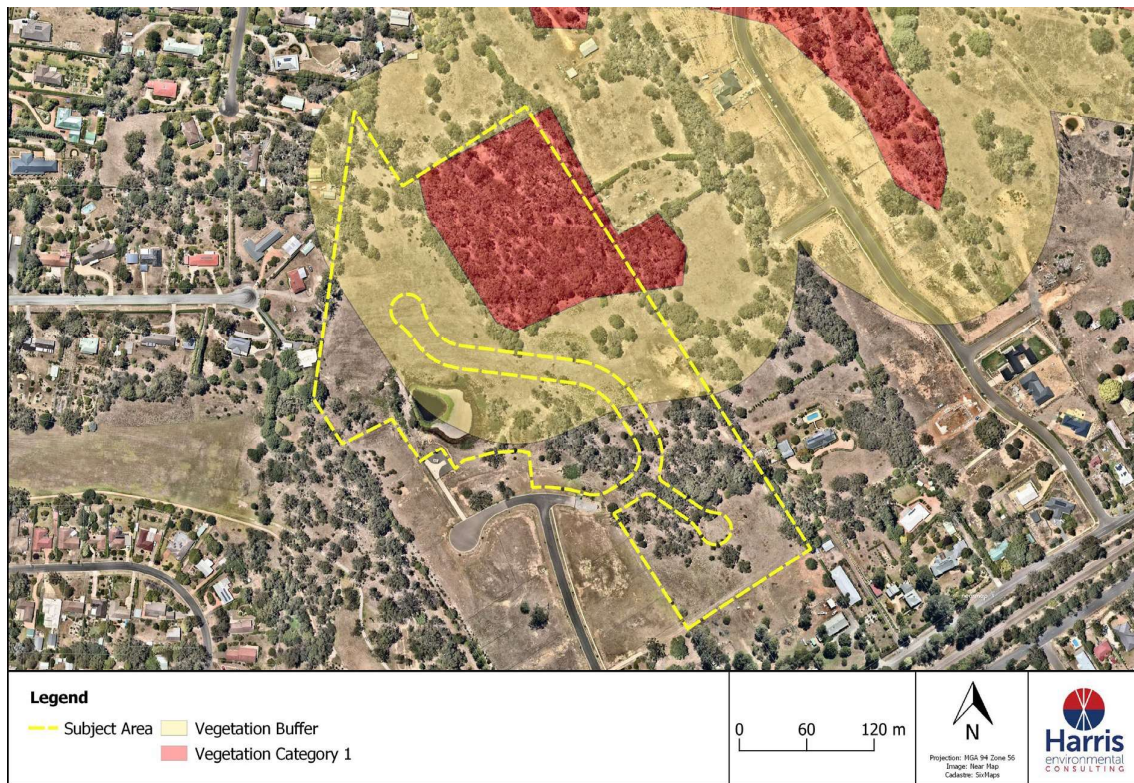


FIGURE 8 LEP ZONE MAPPING

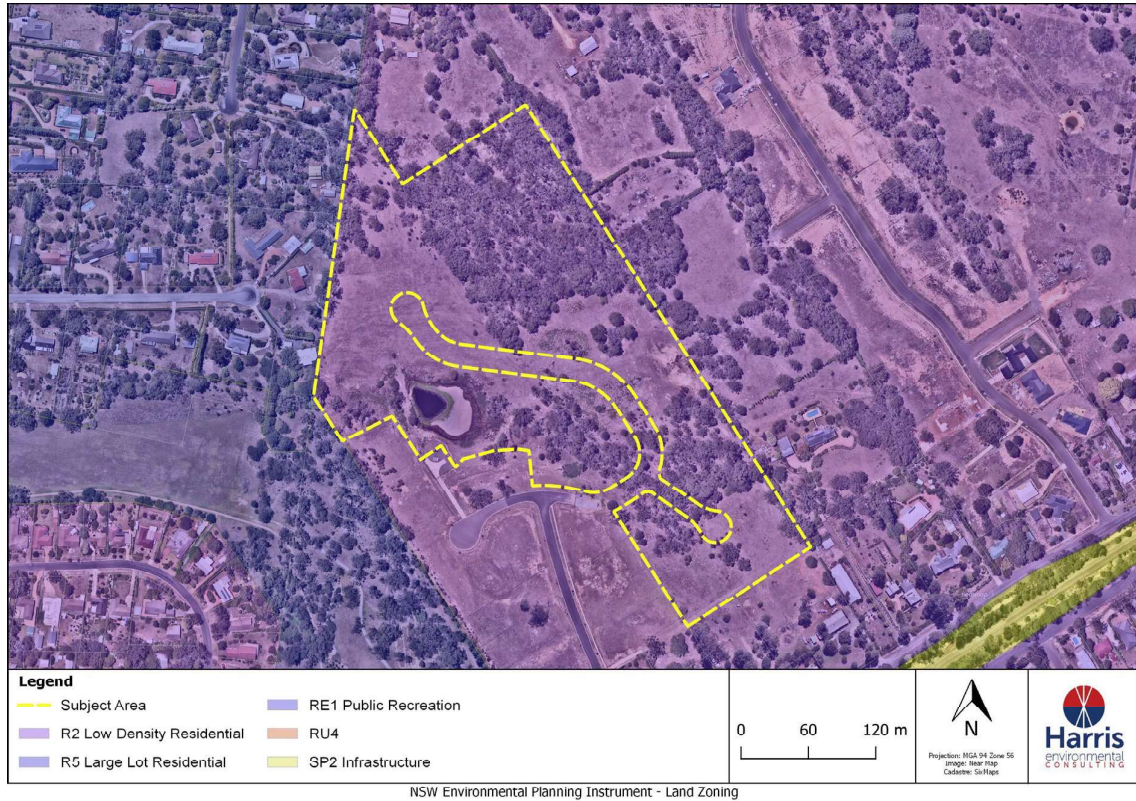


FIGURE 9 VEGETATION MAPPING



4. SITE DESCRIPTION

4.1 Identification of Significant Environmental Features

A Biodiversity Development Assessment Report for Erith Street, Bundanoon for Civil Development Solutions on behalf of R.G. Capital has been prepared by Narla Environmental (2020). The report provides the following results:

- One (1) Plant Community Type, PCT 944: Mountain Grey-gum – Narrow-leaved Peppermint grassy woodland on shales of the Southern Highlands, southern Sydney Basin Bioregion was located within the Subject Land. This vegetation community is consistent with Southern Highlands Shale Woodlands in the Sydney Basin Bioregion in the Sydney Basin Bioregion, which is listed as an Endangered Ecological Community under the NSW Biodiversity Conservation Act 2016 (BC Act). This threatened ecological community was identified as an SAI entity, therefore a determination of whether or not the proposed impacts would be considered likely to cause a serious and irreversible impact was undertaken in accordance with Section 9.1 of the BAM (DPIE 2020a).
- Targeted surveys were conducted within the appropriate survey period for all species predicted to occur by the BAMC with One (1) Species Credit species being confirmed present as utilising the Subject Land. Biodiversity offset credit calculations have been performed in accordance with the BAM (DPIE 2020a) and using the BAMC Version 1.3.0.00 (DPIE 2020b). The following credits are required to be offset in order to mitigate the impacts upon biodiversity as a result of the proposed development for 71 Southern Myotis Species Credits.

In summary the report concludes that the surrounding vegetation formations have been classified as Southern Highlands Shale Woodland that corresponds to a Keith classification of Wet Sclerophyll Forest in a condition that had no trees and shrubs present.

The subject lot was identified as providing habitat for Southern Mitosis Species and the proposed development will be required to offset 71 species credits.

A Vegetation Management Plan (VMP) and Koala Assessment Report (KAR) have been created to outline the restoration and protection of the first order watercourse located along the southern border of the property, as well as the koala habitat to remain in the northern corner.

4.2 Vegetation Formation Within 140 M Of Proposed Subdivision

Figure 10 shows the managed and unmanaged land within 140 m of the proposed subdivision.

The square parcel of vegetation on the eastern side of proposed Lots 19 and 21 has been classified as Southern Highlands Shale Woodland, that when assessed under Keith (2004) is classified as Forest. The vegetation is characterised by a dominant eucalypt canopy consisting of a low lying understory of Acacias and Pittosporum.

The land on Lot 21 DP 1121843 has been extensively cleared and is currently present as small remnant pockets amongst exotic grass species. The vegetation has been classified as Remnant using the simplified approach outlined in *Appendix A1.11.1 of the PBP 2019*. The predominate bushfire threat has been taken as Remnant and will use the APZ setbacks for Rainforest.

The land on the eastern elevation on Lot 60 DP 909008 has been classified as managed according to Section A1.10 PBP 2019 as a maintained public reserve.

Within the centre of the subdivision, the area is proposed to be retained for drainage purposes. It has assumed upon site inspection and aerial analysis that the area will be revegetated to meet the classification of riparian corridor. This will need to be reassessed in accordance with any Vegetation Management Plan produced at the individual DA assessment. For the purposes of this subdivision report his vegetation has been classified as Riparian Corridor and will use the APZ setbacks for Rainforest.

5. BUSHFIRE THREAT ASSESSMENT

5.1 Asset Protection Zones (APZ)

Table A1.12.5 *Planning for Bushfire Protection 2019* has been used to determine the width of the required APZs.

An FDI of 100 was used for this location.

Table 2 below shows the APZ and BAL determination for the proposed subdivision.

Table 3 demonstrates how the proposed building envelopes meet BAL 29 and demonstrates the area available in (m²) for development

Figure 11 shows the proposed setbacks and Asset Protection Zones required to provide BAL 29 building envelopes.

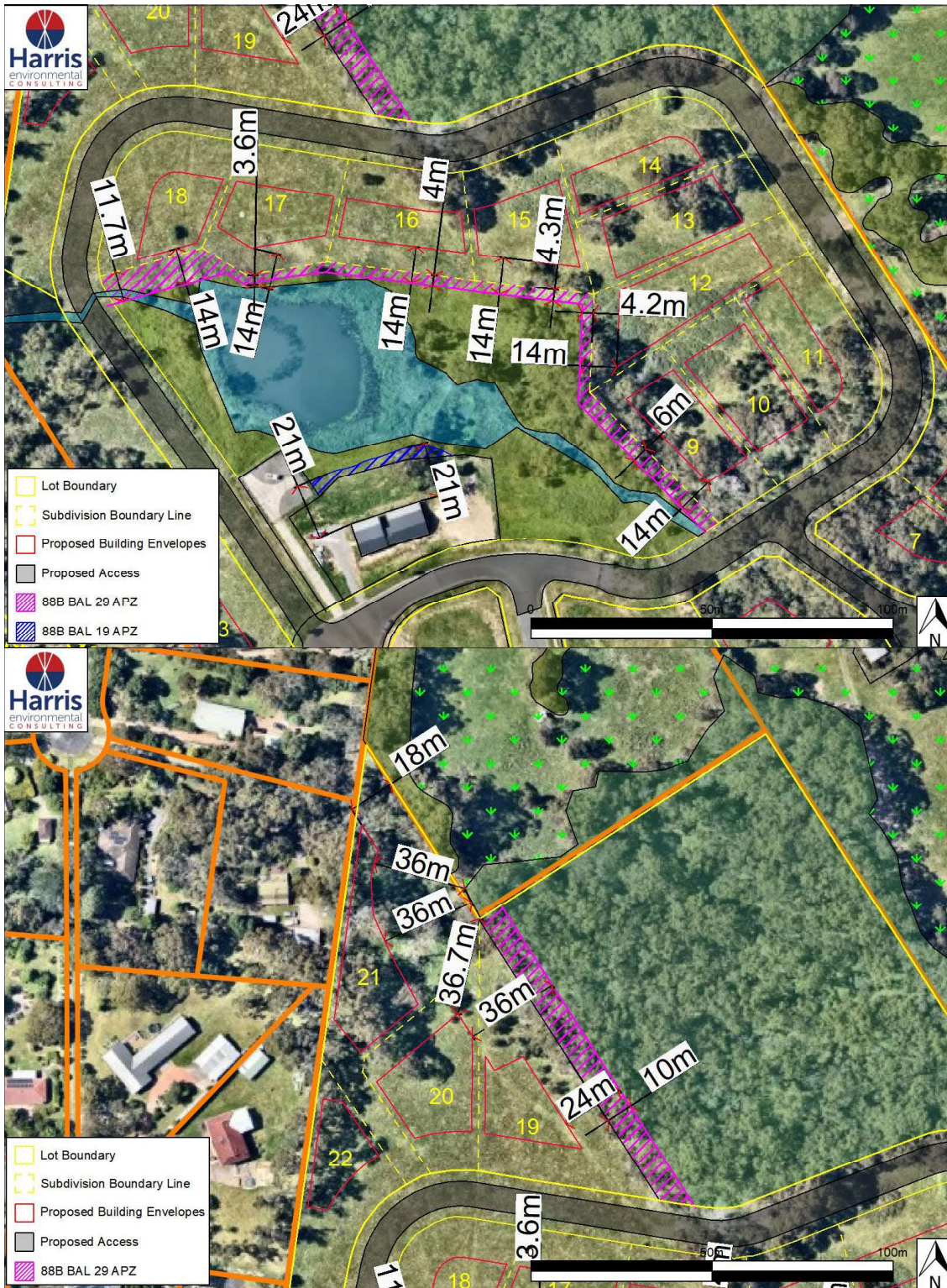
TABLE 2 APZ AND BAL DETERMINATION FOR BAL 29

Keith Vegetation Formation	Effective Slope		
	Up Slopes and Flat	>0°-5°	>5°-10°
	Distance (m) from asset to vegetation formation		
Forest	24	/	36
Rainforest	11	14	18
Grassland	10	/	/

TABLE 3 AVAILABLE BAL 29 BUILDING ENVELOPES

Proposed Lot	Hazard & Slope	Distance to Hazard	BAL 29 Building Envelope Size (m²)
9	Downslope 0-5° Riparian Corridor	14 m	834
10	Downslope 0-5° Riparian Corridor	36 m	1072
11	Level Low Hazard	35 m	758
12	Downslope 0-5° Riparian Corridor	14 m	1238
13	Upslope Forest Downslope 0-5° Riparian Corridor	54 m 16 m	1070
14	Upslope Forest Downslope 0-5° Riparian Corridor	34 m 16 m	702
15	Upslope Forest Downslope 0-5° Riparian Corridor	35 m 14 m	889
16	Upslope Forest Downslope 0-5° Riparian Corridor	34 m 14 m	662
17	Downslope 0-5° Riparian Corridor	14 m	792
18	Downslope 0-5° Riparian Corridor	14 m	675
19	Upslope Forest	24 m	748
20	Downslope 5-10° Forest	36 m	1091
21	Downslope 5-10° Forest Downslope 5-10° Remnant	36 m 18 m	1204
22	Downslope 5-10° Forest	66 m	619

FIGURE 11 PROPOSED BAL 29 ASSET PROTECTION ZONES



5.2 Outer Protection Zones

The vegetation classification for bushfire purposes on the northern elevation for this site is "Forest". Forest vegetation can be managed as an Inner Protection Area (IPA) and Outer Protection Area (OPA). The IPA is critical for providing a defensible space and managing heat intensities at the building surface. The OPA serves to reduce the potential length of flames, filtering embers and reducing the likelihood of crown fires.

The IPA should provide a tree canopy cover less than 15% and any tree canopies must be located greater than 2 metre from any part of the proposed dwelling roofline. Garden beds of flammable shrubs should not be located under trees and should be no greater than 10m from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above ground.

An OPA should provide a tree canopy cover of less than 30% and should have understory managed (mowed) to treat all shrubs and grasses on an annual basis in advance of the fire season (September).

The general location of the IPA and OPA are shown in Figure 12 and outlined below.

The IPA should be:

- 0-14 m from Lots 9, 11-21 building envelopes.

The OPA should be:

- 14-24 m from Lots 14-16 and 19-21 building envelopes.

FIGURE 12 IPA AND OPA REQUIREMENTS



5.3 Relevant Construction Standard

The Australian Standard AS3939 – 2018 is the enabling standard that addresses the performance requirements of both parts 2.3.4 and Part GF5.1 of the Building Code of Australia for the construction of the Class 1, 2 and Class 3 buildings within a designated Bushfire Prone Area.

The following was determined for this site:

Relevant fire danger index.....FDI 100
Flame temperature1090 K

Lots 1 – 23 can provide building envelopes that meet **BAL 29** or less.

5.4 Safe Operational Access

The *PBP 2019* requires the provision of safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area.

The proposed subject lots will be located on Reg Grundy Drive. The existing development of road is a two-wheel drive, all weather road with the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.

Reg Grundy Drive is a through, perimeter road of approximately 500 m in length. This road is required to meet the following performance criteria:

- 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.

The proposed cul-de-sac is a proposed non-perimeter road. This road is required to meet the following performance criteria:

- 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 cross fall does not exceed 3 degrees;
- A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

Property Access will be from Reg Grundy Road. Lots 1-20 and 22-23 will be able to provide an unobstructed path less than 70m between the most distant external part of the proposed building envelope (or future dwelling) and the nearest part of the public road. Therefore, no specific access requirements are necessary.

As shown in Figure 13, Lot 21 will require property access that exceeds 70 m from the public road. The subject lot will be required to comply with the property access requirements outlined in Table 5.3b *PBP 2019* as follows:

- Minimum 4m carriageway width;
- A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches;
- Provide a suitable turning area in accordance with Appendix 3; 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.

FIGURE 13 ACCESS



5.5 Adequate Water and Utility Services

No development is proposed and therefore this requirement is not applicable. However, for future subdivision planning the applicant in the future will be required by the PBP to:

- Either ensure there is at least 10,000 water supply available for firefighting purposes at each proposed dwelling or;
- Provide access points for reticulated water that incorporates a ring main system for all internal roads.

Any bottled gas proposed will be required to be installed and maintained in accordance with AS1596 and the requirements of the relevant authority. If gas cylinders need to be kept close to the buildings, the release valves must be directed away from the building and away from any combustible material. Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.

The existing electrical supply to the surrounding area is provided as an above ground service. Electrical transmission lines, if above ground, will be managed in accordance with specifications issued by Energy Australia.

6. SUMMARY

- Asset Protection Zones (APZ) are provided in this report to demonstrate where future development would be setback from the bushfire hazard vegetation. The specific construction standards for any future dwellings will be determined when a DA for a specific dwelling is lodged in the future.
- Asset Protection Zones consistent with the setbacks listed in Table 2.4.2 AS 3959.
- Asset Protection Zones for BAL 29 or less can be provided on the proposed lots and are wholly within the boundaries of the development site.
- The proposed subject lots will be located on Reg Grundy Drive. The existing development of road is a two-wheel drive, all weather road with the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.
- Property Access will be from Reg Grundy Road. Lots 1-20, 22-23 will be able to provide an unobstructed path less than 70m between the most distant external part of the proposed building envelope (or future dwelling) and the nearest part of the public road. Therefore, no specific access requirements are necessary.
- Lot 21 will require property access that exceeds 70 m from the public road. The subject lot will be required to comply with the property access requirements outlined in Table 5.3b *PBP 2019*. This will be determined when a DA for a specific dwelling is lodged in the future.
- Firefighting water supply is not required as no development is proposed.
- Electrical services and gas services are not proposed.

7. REFERENCES

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APPENDIX I DEFINITIONS & ABBREVIATIONS

Asset Protection Zone- A fuel reduced area surrounding a buffer zone between a bushfire 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.

Bush fire prone area- an area of land that can support a bush fire or is likely to be subject to bushfire attack, as designated on a bush fire prone land map

Bush fire prone vegetation (BFPV) – A map prepared by Council in accordance with RFS guidelines and defining area of vegetation by BFPV categories

Bushfire prone land map (BFPL) A map prepared in accordance with RFS guidelines and certified by the Commissioner of the NSW RFS under section 146 (2) of the Environmental Planning and Assessment Act (1979)

Effective Slope: The land beneath the vegetation which most significantly effects fire behavior, having regard to the vegetation present.

Fire Danger Index (FDI) The chance of a fire starting, its rate of spread, its intensity and the difficulty potential for its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long- and short term drought effects.

Grasslands- Grassed areas capable of sustaining a fire. Under Australia standard 3959 Construction of buildings in bushfire -prone areas, identified as low open shrubland, hummock grassland, closed tussock grassland, tussock grassland, open tussock, sparse open tussock, dense sown pasture, sown pasture, open herb field and sparse open herb field. Grass, whether exotic or native, which is regularly maintained at or below 10 cm in height (includes maintained lawns, golf course, maintained public reserves, parklands, nature strips and commercial nurseries) are regarded as managed land

Inner Protection Area (IPA): the component of an APZ which closest to the asset (measured from unmanaged vegetation). It consists of an area maintained to minimal fuel loads so that a fire path is not created between the hazard and the building.

fire hazard: the potential for land to carry a bush fire, utilizing materials or fuels that can be ignited

Managed land- Managed land is land that has vegetation removed or maintained to limit the spread and impact of bushfire. It may include existing developed land (i.e. residential, commercial or industrial) roads, golf course fairways, playgrounds or sports fields, vineyards, orchards, cultivated ornamental gardens, and commercial nurseries.