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Bushfire Risk Assessment

Proposed Development: Construction of 'Class 1a' dwelling and 'Class 10a office/shed

Location: Lot 2 DP880732
51 Rock Road
Bungalora NSW

Client: Dainen Keogh

Our Ref: 2007Keo1007

Date of Issue: 10 September 2020

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‘Prepare—Act—Survive’

In the Event of an Emergency Call:

‘000’

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EXPIRY

The bushfire risk assessment and resulting BAL rating contained in this report should not be relied upon for a period extending 6 months from date of issue. If this report was issued more than 6 months ago, it is recommended that the validity of the determination be confirmed with the Accredited Practitioner and where required an updated report should be issued.

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EXECUTIVE SUMMARY

This Bushfire Risk Assessment relates to a proposed development located at:	Lot 2 DP880732 51 Rock Road Bungalora NSW
Client/s:	Dainen Keogh
Site inspection date:	1 September 2020
Proposed development:	Construction of 'Class 1a' dwelling and 'Class 10a office/shed
Site Plans by:	Preliminary set by: Shane Denman Architect, dated: 24/08/2020 A full set of plans shall be provided by the applicant to accompany the DA. All design and site plans must ensure compliance with the minimum building setbacks in relation to this development as proposed and the recommendations contained herein.
What is the Bushfire Attack Level (BAL) as per AS3959–2009?	BAL-29 – entire garage; & BAL-19 – entire remaining dwelling structure (Ref. Appendix A); & BAL-LOW – office/shed
Does this development satisfy the Aims and Objectives of PBP?	YES
Are performance solutions presented herein?	NO
Does this development require referral to the NSW Rural Fire Service?	NO – The consent authority must be satisfied the development conforms to the relevant specifications and requirements prior to granting of consent. If not satisfied, the consent authority should consult with the Commissioner of the NSW Rural Fire Service under s.4.14 EP&A Act.
This assessment has been prepared and Certified by Melanie Jackson BPAD-Level 3 Certified Practitioner; FPAA Cert. No: 21977	

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ABBREVIATIONS

Abbreviation	Description
APZ	Asset protection zone
AS3959	Australian Standard – Construction of Buildings in Bushfire Prone Areas
BAL	Bush fire attack level
BCA	Building Code of Australia
BFDB	Bush fire design brief
BFPL	Bush fire prone land
BFPL Map	Bush fire prone land map
BFSA	Bush fire safety authority
BLE	Building location envelope
BPM	Bush fire protection measure
DA	Development application
DCP	Development control plan
EP&A Act	*Environmental Planning & Assessment Act 1979*
FFDI	Forest fire danger index
GFDI	Grass fire danger index
IPA	Inner protection area
kW/m^2	Kilowatts per metre squared
LEP	Local environmental protection plan
NSW RFS	NSW Rural Fire Service
OPA	Outer protection area
PBP	Planning for Bushfire Protection
RF Act	*Rural Fires Act 1997*
RF Reg	*Rural Fire Regulation 2013*
SEPP	*State Environmental Planning Policy*
SFPP	Special fire protection purpose
SFR	Short fire run

1 INTRODUCTION

Bushfire Risk Pty Ltd was engaged by the client/s to conduct a Bushfire Risk Assessment in support of a Development Application (DA). The purpose of the assessment is to determine category of bushfire attack and construction level for the proposed development on behalf of the client/s.

The development shall be carried out on the lot/s referred to as the 'Subject Site' (Figure 1) and where applicable, existing or future dwellings shall be sited within a Building Location Envelope which shall be referred to as a 'BLE' throughout this document.

1.1 Subject Site

Address: Lot 2 DP880732
51 Rock Road Bungalora NSW.

1.2 Proposed Development

Construction of 'Class 1a' dwelling and 'Class 10a office/shed.

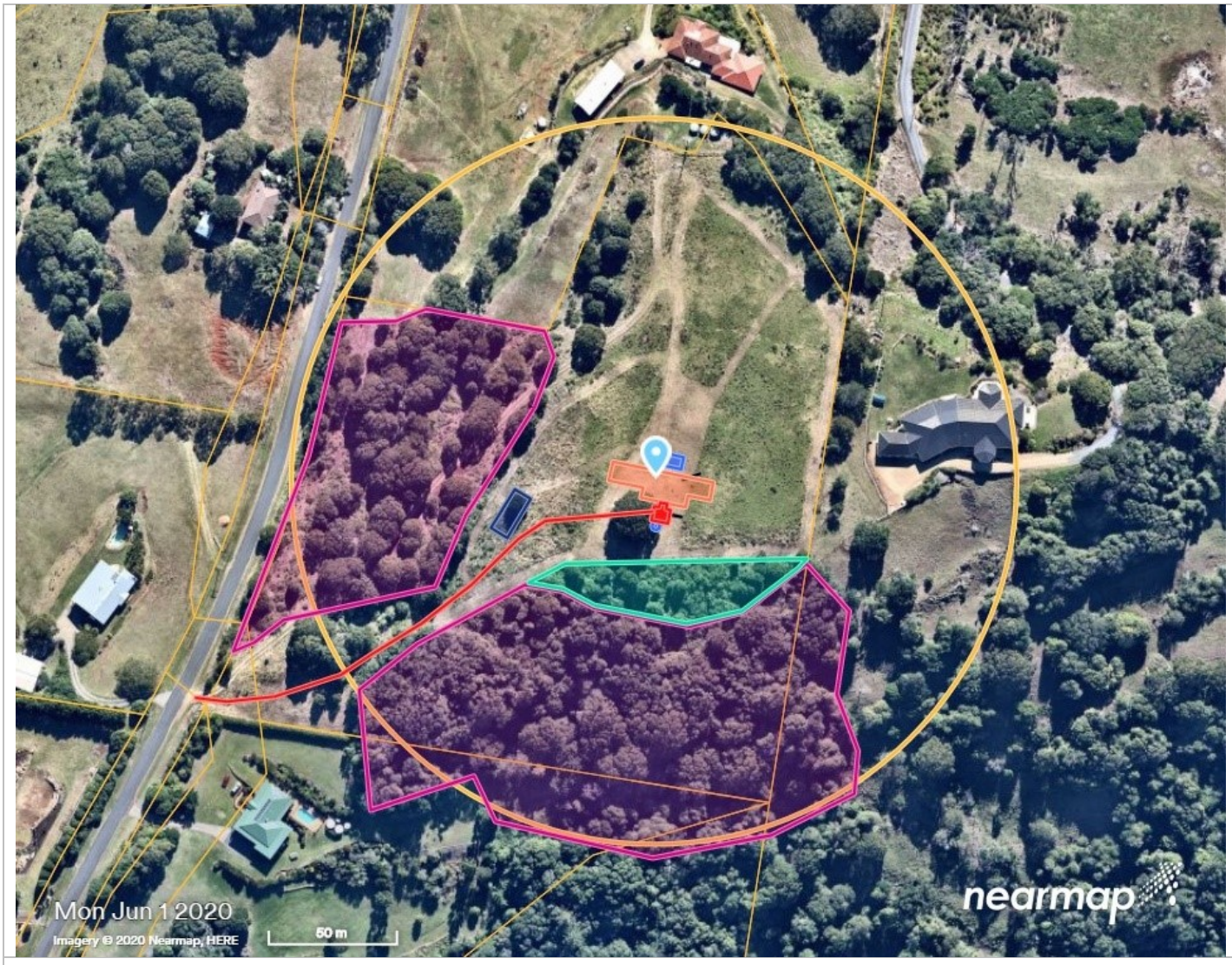


Figure 1: Aerial image of the subject site (Nearmap 2020)

Figure 2: BFPL Map (NSW Government 2020)

1.3 Legislation

1.3.1 Building on Bushfire Prone Land

The National Construction Code (NCC) contains Performance Requirements and Deemed-to-Satisfy provisions relating building on Bushfire Prone Land (BFPL). Construction on BFPL must comply with AS3959-2018 – Construction of buildings in bushfire prone areas (AS3959) or the National Association of Steel Framed Housing (2014) Steel Framed Construction in Bush Fire Areas (NASH Standard) as varied in NSW. These requirements are considered Deemed-to-Satisfy solutions, however, do not extend to BAL-FZ or where modified by specific conditions of the relevant development consent.

1.3.2 Bushfire Prone Land

The subject site is mapped as 'Bush Fire Prone Land' (BFPL) under s.10.3 Environmental Planning and Assessment Act 1979 (EPA Act), triggering the legislative requirements for building on bushfire prone land is applicable (Figure 2).

1.3.3 Infill Development

The proposed development is classified as 'infill' development, which refers to the development of land by the erection of, or alteration or addition to, a dwelling which does not require the spatial extension of services including public roads, electricity, water and sewerage and is within an existing lot. Infill development requires an assessment under s.4.14 EPA Act 1979.

An assessment of the bushfire risk was undertaken against section 7 – *Residential Infill Development* PBP 2019.

1.4 Aim & Objectives

1.4.1 Aim and Objectives of PBP 2019

All development on BFPL must satisfy the aim and objectives of Planning for Bush Fire Protection (PBP 2019). This report demonstrates how the requirements can be met by ensuring suitable Bushfire Protection Measures (BPM) are put in place commensurate with the level of risk and characteristics of the occupants.

The aim of PBP is to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.

The objectives are to:

- Afford buildings and their occupants protection from exposure to a bush fire.
- Provide for a defendable space to be located around buildings.
- Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings.
- Ensure that appropriate operational access and egress for emergency service personnel and occupants is available.
- Provide for ongoing management and maintenance of BPMs; and
- Ensure that utility services are adequate to meet the needs of firefighters.

1.4.2 Objectives for Infill Development (s.7 PBP 2019)

- Provide a defendable space to enable unimpeded access for firefighting around the building.
- Provide better bushfire outcomes on a redevelopment site than currently exists.
- Design and construct buildings commensurate with the bushfire risk.
- Provide access, services, and landscaping to aid firefighting operations.
- Not impose an increased bushfire management and maintenance responsibility on adjoining landowners; and
- Increase the level of bushfire protection to existing dwellings based on the scale of the proposed work and level of bushfire risk.

2 BUSHFIRE RISK ASSESSMENT

This Bushfire Risk Assessment includes an analysis of the hazard, threat and subsequent risk to the development as proposed and provides recommendations that the proposal satisfies the aim and objectives of PBP, Specific Objectives for Infill Development and Intent of Measures. by demonstrating compliance against the performance criteria or acceptable solutions, thereby providing adequate bushfire protection measures (BPM) to the proposed development commensurate with the level of risk and characteristics of the occupants.

The assessment shall incorporate provisions to ensure appropriate separation distances between the BLE and the hazard and associated BAL rating pursuant to the site assessment methodology described in PBP 2019. Deviations from the acceptable solutions shall be addressed by providing performance solutions to demonstrate compliance.

The results and recommendations herein, aim to satisfy the requirements of PBP by incorporating the suite of BPM in combination, commensurate with the level of bushfire risk, occupant, and site characteristics for the proposed development to be deemed acceptable.

2.1 Methodology

2.1.1 PBP 2019

The bushfire risk assessment was carried out pursuant to the requirements set out in s.7 – Residential Infill Development PBP 2019.

2.1.2 Site Analysis

A desktop and onsite assessment were carried out pursuant to the methodology described in PBP 2019 as follows:

- As per the acceptable solutions, the minimum setbacks were assessed against Table A1.12.3 Appendix 1 PBP.
- The acceptable solution as per the methodology described in Appendix 1 – Site Assessment Methodology using table A1.12.6 – Determination of BAL, FFDI 80 – residential development (PBP 2019) was used to determine the BAL rating and appropriate APZ/setbacks for the proposed development.

2.1.3 Vegetation & Environmental Features

The assessment and classification of the predominant vegetation types on and surrounding the subject site (out to a minimum distance of 140m from the boundaries of the property) was undertaken, using Keith (2006) vegetation classification system as described in PBP (Table 1).

2.1.4 Slope & Aspect

An assessment of the aspect and effective slope, being the land under the classified vegetation most likely to have the greatest effect on bushfire behaviour within 100m of the site was undertaken and the results presented in the assessment table/s herein (Table 2).

Slope analysis was undertaken using the following assessment methodology:

- Desktop assessment of mapped 10m contours available via the NSW Government (2020) *ePlanning Spatial Viewer* platform.
- On-site ground truthing was undertaken, assessing the slope using a Leopold Laser Range Finder and comparison with the desktop assessment to determine the effective slope of the hazard; tabulated in the results table/s herein (Ref. Table 2 & 3).

2.1.5 Bushfire Protection Measures (BPM)

The BPMs are a set of measures to be satisfied which aim to reduce risk from bushfires and enhance occupant survival, property protection and community resilience to bushfire attack. Analysis of the BPMs shall be undertaken commensurate to the level of risk to occupants and the subject site. Recommendations provided are based on the results. BPMs to be satisfied include the following:

- APZ
- Access
- Construction
- Siting and design
- Landscaping
- Services
- Emergency and evacuation planning

3 ANALYSIS & RESULTS

The following sections describe in detail, the vegetation type, slope, access, availability of water supplies and environmental considerations for the subject site and surrounds.

3.1 Site Inspection Details

A site assessment of the subject site was undertaken by Melanie Jackson (BPAD-Level 3 Accredited Practitioner No. 21977) on 1 September 2020.

Table 1: Vegetation Analysis

Vegetation Classification, Direction & Description	Photos
Managed land – North This area consists of a well-managed lot with a dwelling sited near the northern boundary adjacent to the subject site classified as a low bushfire threat to the subject site.	 Photo 1: managed land north
Managed land – East This area consists of managed grazed pasture, towards the boundary and a residence to the east, considered a low bushfire threat to the subject site.	 Photo 2: managed land east
Rainforest – Southeast & south The subject site is managed for 39m to the south which reverts to rainforest vegetation with dense Camphor and lantana along the edges closest to the BLE. This area presents as a medium bushfire threat to the BLE.	 Photo 3: rainforest south

Vegetation Classification, Direction & Description	Photos
Rainforest – Southwest & west This area presents as bushfire prone land, due to the mixed Camphor laurel, lantana and rainforest regrowth over grassland. This area traverses the proposed driveway presents as a moderate to low bushfire threat to the subject site.	 Photo 4: camphor, rainforest mix regrowth west

3.2 Bushfire Protection Measures

3.2.1 APZ

Minimum setbacks (APZ) as presented in Table 2 & 3 herein, relate to the separation distance between the BLE and the hazard. The APZ is to be managed within the bounds of the subject site in perpetuity pursuant to Appendix 4 – Asset Protection Zone Requirements (PBP).

3.2.2 Access

A sealed property access road is proposed, which shall replace the existing access. The proposed road shall be constructed as per the acceptable solutions (Ref. Table 4) to demonstrate compliance.

3.2.3 Water Supplies for Fire Fighting Purposes

The provision of a min. 20,000 litre water supply (i.e. non-combustible tank) for firefighting purposes shall be installed as per the acceptable solutions and recommendations presented herein. The swimming pool may be nominated provided direct access up to and within 4m of the water source is provided (Ref. Table 4 herein).

3.2.4 Electricity & Gas Services

The subject site currently has no electricity. Therefore provisions for services including electricity and gas supplies, shall be provided in accordance with the acceptable solutions. Refer to the recommendations contained herein.

3.2.5 Construction Requirements

The recommended BAL rating/s for the proposed development is as follows:

BAL-29 – entire garage; &
BAL-19 – entire remaining dwelling structure (Ref. Appendix A); &
BAL-LOW – office/shed

In addition, the NSW variations to AS3959 are required; Refer to Table 44 – BPM Compliance Table presented herein.

3.2.6 Landscaping

The existing APZ currently presents as an existing well-managed APZ. Future landscaping shall be undertaken in accordance with the acceptable solutions i.e. landscaping and APZ management as per the NSW RFS document '*Standards for Asset Protection Zones*' (RFS 2005).

3.2.7 Emergency Planning

It is recommended occupants of the site prepare a bushfire survival plan and practice it annually. A guide to preparing a 'Bushfire Survival Plan' is available for download on the NSW RFS website: www.rfs.nsw.gov.au (RFS 2019).

3.2.8 Likely Environmental Impacts

The scope of this report does not include an environmental assessment and should be read in conjunction with the Statement of Environmental Effects (SEE) and any supporting assessments and reports submitted in support of the DA.

The following was considered during the assessment process:

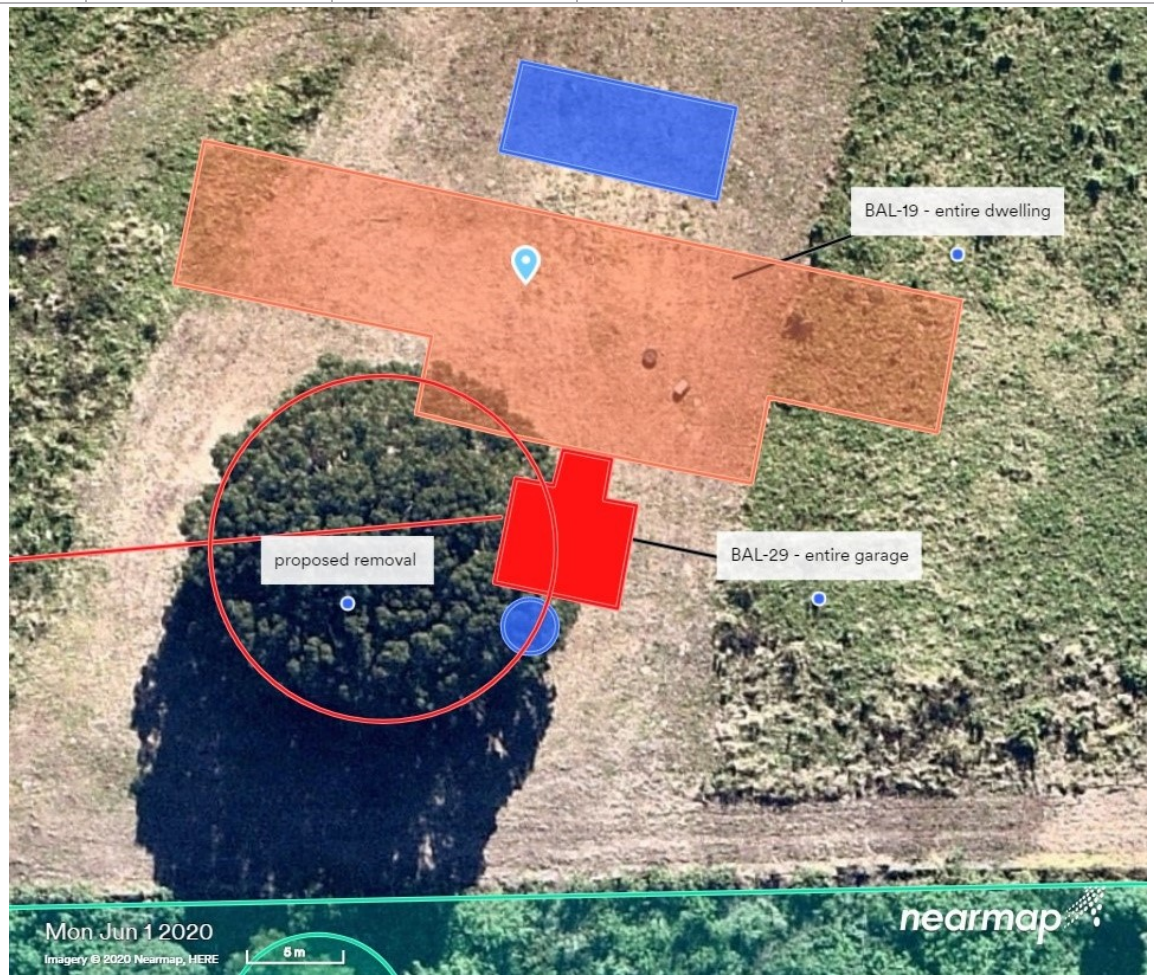
- This application includes the proposal to remove one large and one small Camphor laurel tree in order to construct the dwelling.
- Prior to undertaking any tree removal and/or pruning, the applicant should seek further advice from Council.
- The APZ shall be managed in perpetuity as an Inner Protection Area (IPA) as per the 'Summary of Results' Table 2 & 3 presented herein.

3.3 Summary of Results – APZ & BAL Rating

A summary of the findings of the onsite bushfire risk assessment is presented in the following table/s (Table 2 & 3).

Table 2: Main Residence – Results Summary – APZ & BAL Rating

Hazard Analysis			Min. APZ by Method		Asset Protection Zone (APZ)			BAL
Direction	**Vegetation Class**	**Hazard Slope (°)**	**Table A1.12.3 (m)**	**Table A1.12.6 Existing setback (m)**	**IPA (m)**	**OPA (m)**	**Total APZ (m)**	**Highest BAL**
North	Managed land	-	Complies	>50	36	-	36	-
East	Rainforest	0 level	Complies	>50	36	-	36	-
South	Rainforest	15-20 downslope	Complies	30 (to garage) 36 (to remaining dwelling structure)	32 38	- -	32 38	BAL-29 (Garage) & BAL-19 (Entire house)
West	Rainforest	15-20 downslope	n/a	36	36	-	36	BAL-19



RECOMMENDED BAL RATING:
BAL-29 – entire garage; &
BAL-19 – entire remaining dwelling structure (Ref. Appendix A)

NOTES:
Provided the dwelling is situated more than the min. APZ from the hazard then the BAL rating may be constructed one rating lower (i.e. BAL-19) in its entirety than the highest BAL rating for the garage (BAL-29).

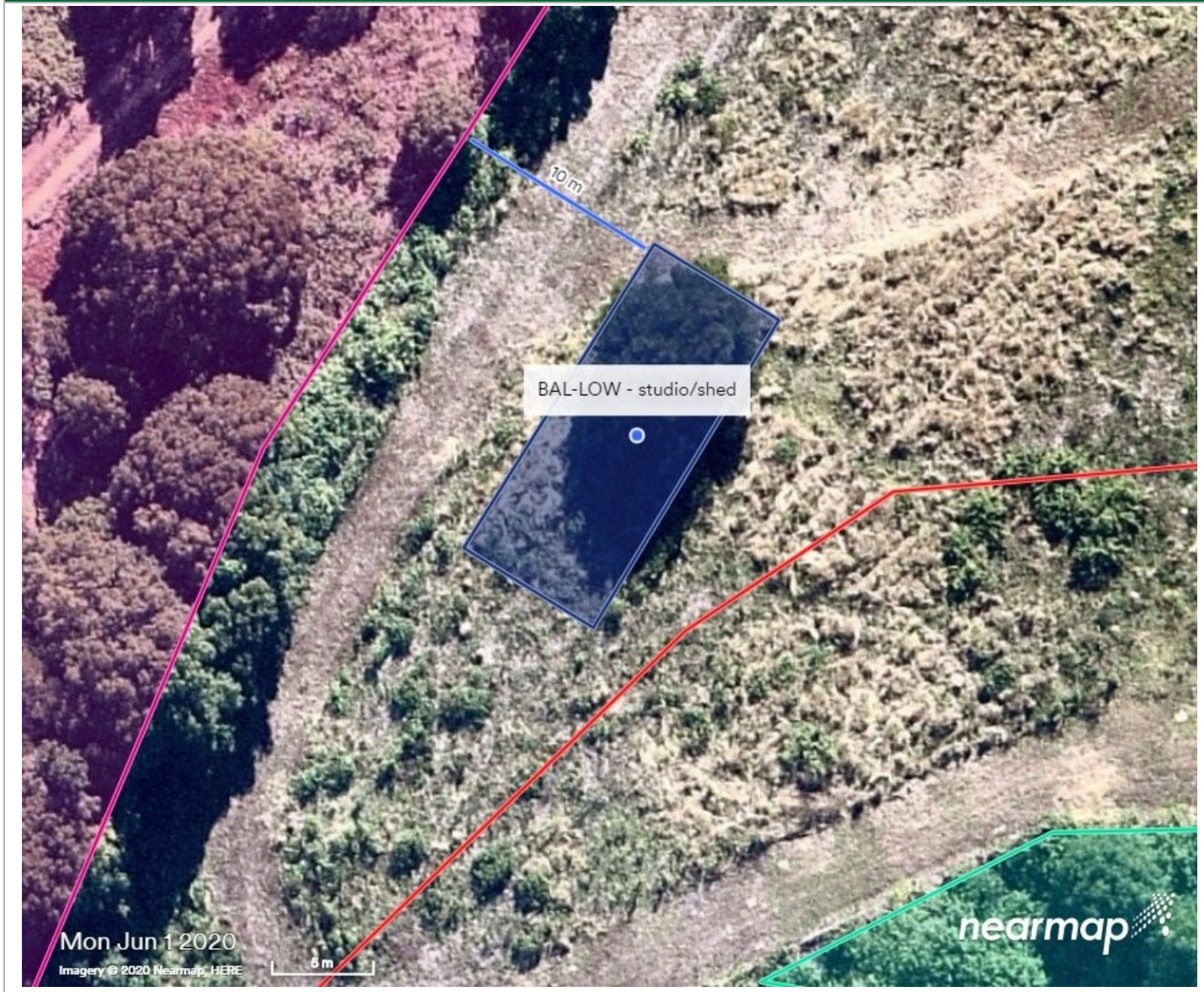
LEGEND:

	Subject Site
	BLE – Dwelling – BAL-19
	BLE – Garage – BAL-29
	Rainforest
	Low fuel area – recently cleared
	Property Access
	Static Water Supply (indicative)

Date: 10/09/2020
Map source: Nearmap 2020
Not to scale

Table 3: Office/shed– Results Summary – APZ & BAL Rating

Hazard Analysis



RECOMMENDED BAL RATING:
BAL-LOW – no construction requirements in relation to bushfire

NOTES:
Additional construction requirements in relation to bushfire are not required for structures situated more than 6m from a habitable dwelling. It is however recommended to retain a 10m APZ in all directions.

LEGEND:

	Subject Site
	BLE – Dwelling – BAL-19
	BLE – Garage – BAL-29
	Rainforest
	Low fuel area – recently cleared
	Property Access
	Static Water Supply (indicative)

Date: 10/09/2020
Map source: Nearmap 2020
Not to scale

4 RECOMMENDATIONS & COMPLIANCE

The following table/s indicate the extent to which the proposed development conforms with or deviates from the standards, specific objectives, performance criteria and acceptable solutions set out in *s.7 – Residential Infill Development* (PBP).

The results and recommendations herein are commensurate with the level of bushfire risk and characteristics of the occupants for the proposed development, by applying the suite of BPM in combination, being the site specific requirements that must be satisfied in order to comply. The table below specifies the method used to demonstrate compliance i.e. acceptable solution or performance based solution, against the BPMs and provides recommendations to ensure the intent of each BPM shall be met (Table 4).

Table 4: BPM compliance against the performance criteria & acceptable solutions – *s.7 Residential Infill Development* (PBP)

BPM	Performance Criteria	Acceptable Solutions	Compliance & Recommendations
s.7.4 Intent of measures: To minimise the risk of bushfire attack and provide protection for emergency services personnel, residents and others assisting firefighting activities.			
The intent may be achieved where:			
APZ	• APZs are provided commensurate with the construction of the building; and • A defendable space is provided.	• An APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1.6	Complies with the acceptable solution. • The APZ satisfies the minimum distances for APZs as per Table A1.12.3. • The APZ has been provided commensurate with the BAL rating for construction of the building/s and setbacks provided as per Table A1.12.6 PBP. • The APZ distances presented in Table 2 & 3 herein apply.
APZ	• APZs are managed and maintained to prevent the spread of a fire to the building.	• APZs are managed in accordance with the requirements of Appendix 4 of PBP.	Comply with the acceptable solutions. The APZ shall be: • Managed in perpetuity as an IPA, • Remove weeds as a priority to preserve native vegetation where possible. • Prune trees away from the building roofline (min. 2m) mow lawns etc. as per the requirements of Appendix 4 PBP for the distances set out herein (summarised above).
APZ	• The APZ is provided in perpetuity. APZ maintenance is practical, soil stability is not compromised and the potential for	• APZs are wholly within the boundaries of the development site. • APZ are located on lands with a slope less than 18 degrees.	Complies with the acceptable solutions.

	crown fires is minimised.		
Access	• Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	• Property access roads are two-wheel drive, all-weather roads.	Comply with the acceptable solution.
Access	• The capacity of access roads is adequate for firefighting vehicles.	• The capacity of road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes), bridges and causeways are to clearly indicate load rating.	The proposed property access road shall comply with the acceptable solutions.
Access	• There is appropriate access to water supply.	• Hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005. • There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	Comply with the acceptable solution for reticulated water supplies. • Access to within 4m of the nominated water supply shall be provided.
Access	• Firefighting vehicles can access the dwelling and exit the property safely.	• At least one alternative property access road is provided for individual dwellings or groups of dwellings that are located more than 200 metres from a public through road. Note: 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	The proposed property access road shall be constructed as per the acceptable solutions and the following: • Install a turning area suitable for firefighting vehicles to manoeuvre/exit the site, by providing one the following options pursuant to Appendix 3 (PBP): 1. Construct a loop road around the dwelling. 2. Construct a turning circle near the dwelling. Or 3. Provide a reversing area near the dwelling.

		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 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. • Property access must 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; and • A development comprising more than three dwellings has formalised 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,	• In relation to grades, curves, crossfall and clearances, turning area shall be constructed as per the acceptable solutions.

		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	• An adequate water supply is provided for firefighting purposes.	• Reticulated water is to be provided to the development where available. • A static water supply is provided where no reticulated water supply is available.	Comply with the acceptable solution.
Water Supplies	• The integrity of the water supply is maintained.	• All above-ground water service pipes external to the building are metal, including and up to any taps.	Comply with the acceptable solution.
Water Supplies	• A static water supply is provided for firefighting purposes in areas where reticulated water is not available.	• Where no reticulated water supply is available, water for firefighting purposes is provided in accordance with Table 5.3d. • A connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure; 65mm Storz outlet with a ball valve is fitted to the outlet. • Ball valve and pipes are adequate for water flow and are metal. • Supply pipes from tank to ball valve have the same bore size to ensure flow volume. • Underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank. • A hardened ground surface for truck access is supplied within 4m.	Comply with the acceptable solutions and the following: • Ensure a min. 20,000 litre water supply is made available for firefighting purposes at all times. • The water source shall be made available or located within the APZ and away from the structure (e.g. within 20m of the dwelling). • The water supply shall meet the requirements of the acceptable solutions and the requirements as per the RFS fast fact '*Water Supplies for Firefighting Purposes*' (2012) is acceptable where applicable. • Provide suitable access up to the water source as per the acceptable solutions.

		• Above-ground tanks are manufactured from concrete or metal. • Raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F of AS 3959). • Unobstructed access can be provided at all times; underground tanks are clearly marked. • Tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters. • All exposed water pipes external to the building are metal, including any fittings. • Where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump and are shielded against bush fire attack. • Any hose and reel for firefighting connected to the pump shall be 19mm internal diameter; and • Fire hose reels are constructed in accordance with AS/NZS 1221:1997 and installed in accordance with the relevant clauses of AS 2441:2005.	
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; and • 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	Comply with the acceptable solutions • Any upgrades to the electricity supply services shall be conducted in accordance with the acceptable solution.

		• 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, and 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.	Comply with the acceptable solutions where installed.

Construction Standards	• The proposed building can withstand bush fire attack in the form of embers, radiant heat, and flame contact.	• BAL is determined in accordance with Tables A1.12.5 to A1.12.7; and
		• Construction provided in accordance with the NCC and as modified by section 7.5 (please see advice on construction in the flame zone).
			Comply with the acceptable solutions and the NSW variations to AS3959 as follows:
			• The min. recommended BAL rating is:
			  • BAL-29 – entire garage; &
			  BAL-19 – entire remaining dwelling structure (Ref. Appendix A); &
			  BAL-LOW – office/shed
			• The BAL was determined in accordance with Table A1.12.6. and
			The following NSW variations for construction must be applied:
			• Clause 3.10 of AS3959 is deleted and any sarking used for BAL-12.5, BAL-19, BAL-29 or BAL-40 shall:

			• Be non-combustible; or • Comply with AS/NZS 4200.1, be installed on the outside of the frame, and have a flammability index of not more than 5 as determined by AS1530.2; and • Clause 5.2 ad 6.2 of AS3959 is replaced by Clause 7.2 of AS3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL; and • Clause 5.7 and 6.7 of AS3959 is replaced by clause 7.7 of AS3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL; and • Fascia's and bargeboards, in BAL-40, shall comply with: • Clause 8.4.1(b) of AS3959; or • Clause 8.6.6 of AS3959.
Construction Standards	• Proposed fences and gates are designed to minimise the spread of bush fire.	• Fencing and gates are constructed in accordance with section 7.6.	Comply with the acceptable solutions as follows: • All fences in bushfire prone areas should be made of either hardwood or non-combustible material. • 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.
Construction Standards	• Proposed Class 10a buildings are designed to minimise the spread of bush fire.	• Class 10a buildings are constructed in accordance with section 8.3.2.	Comply with the acceptable solutions as follows: The NCC defines a class 10 building as a non-habitable building or structure such as a: • Class 10a – a non-habitable building being a private garage, carport, shed or the like; or

			• Class 10b – a structure being a fence, mast, antenna, retaining or free-standing wall, swimming pool, or the like; or • Class 10c – a private bushfire shelter. There are no bushfire protection requirements for Class 10a buildings located more than 6m from a dwelling in bushfire prone areas. Where a Class 10a building is located within 6m of a dwelling it must be constructed in accordance with the NCC.

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.	• Compliance with the NSW RFS '*Asset protection zone standards*' (see Appendix 4).
		• A clear area of low-cut lawn or pavement is maintained adjacent to the house; fencing is constructed in accordance with section 7.6; and
		• Trees and shrubs are located so that:
		  • The branches will not overhang the roof.
		  • The tree canopy is not continuous; and
		  • Any proposed windbreak is located on the elevation from which fires are likely to approach.
			Comply with the acceptable solutions and the following:
			• Landscaping is to be managed in accordance with Appendix 4 (PBP) and where required fences shall be constructed as follows:
			• All fences in bush fire prone areas should be made of either hardwood or non-combustible material.
			• 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.
			Layout of gardens in an APZ When creating and maintaining a garden that is part of an APZ you should:
			• Ensure that vegetation does not provide a continuous path to the house.
			• Remove all noxious and environmental weeds.
			• Plant or clear vegetation into clumps rather than continuous rows.
			• Prune low branches two metres from the ground to prevent a ground fire from spreading into trees.

			• Locate vegetation far enough away from the asset so that plants will not ignite the asset by direct flame contact or radiant heat emission. • Plant and maintain short green grass around the house as this will slow the fire and reduce fire intensity. Alternatively, provide non-flammable pathways directly around the dwelling. • Ensure that shrubs and other plants do not directly abut the dwelling. Where this does occur, gardens should contain low-flammability plants and non-flammable ground cover such as pebbles and crush tile, and • Avoid erecting brush type fencing and planting "pencil pine" type trees next to buildings, as these are highly flammable.

5 CONCLUSION

The combination of BPM's and recommendations contained within this document, aim to reduce the impacts of a bushfire attack to the occupants, firefighters, building/s, and environment. With the aim to reduce consequences of ember attack and direct flame contact with building/s able to be constructed within the proposed BLE. Acceptable and performance solutions in relation the bushfire protection measures in combination were used to demonstrate compliance against the performance criteria of PBP.

This report makes the determination through a detailed Bushfire Risk Assessment that the proposed development does not appear to negatively affect the proposed BLE, having been sited where radiant heat levels are unlikely to exceed critical limits and direct flame contact negated.

The consent authority must be satisfied the development conforms to the relevant specifications and requirements prior to granting of consent. If it is not satisfied the proposed development meets the specifications and requirements the consent authority should consult with the Commissioner of the NSW Rural Fire Service under s.4.14 EP&A Act.

As a BPAD Level 3 accredited practitioner, recognised by the NSW Rural Fire Service, all elements of bushfire attack and BPMs in combination have been considered commensurate with the level or risk in relation to the proposed development.

In conclusion and provided the proposed development is carried out in accordance with the recommendations contained herein, the development, in my professional opinion, shall satisfy the objectives and performance criteria of PBP in relation to the requirements set out in s.7 *Residential Infill Development* (PBP).

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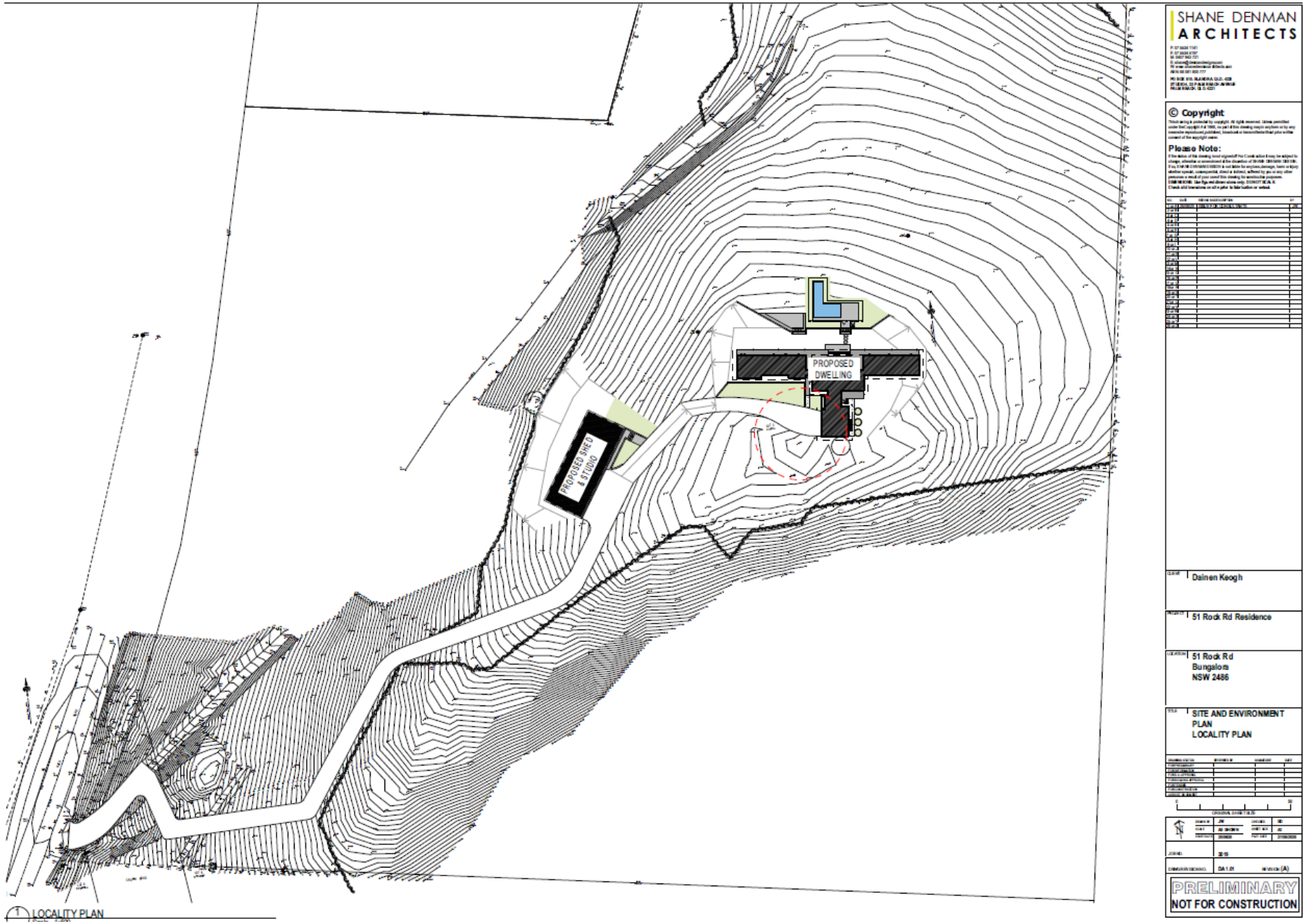
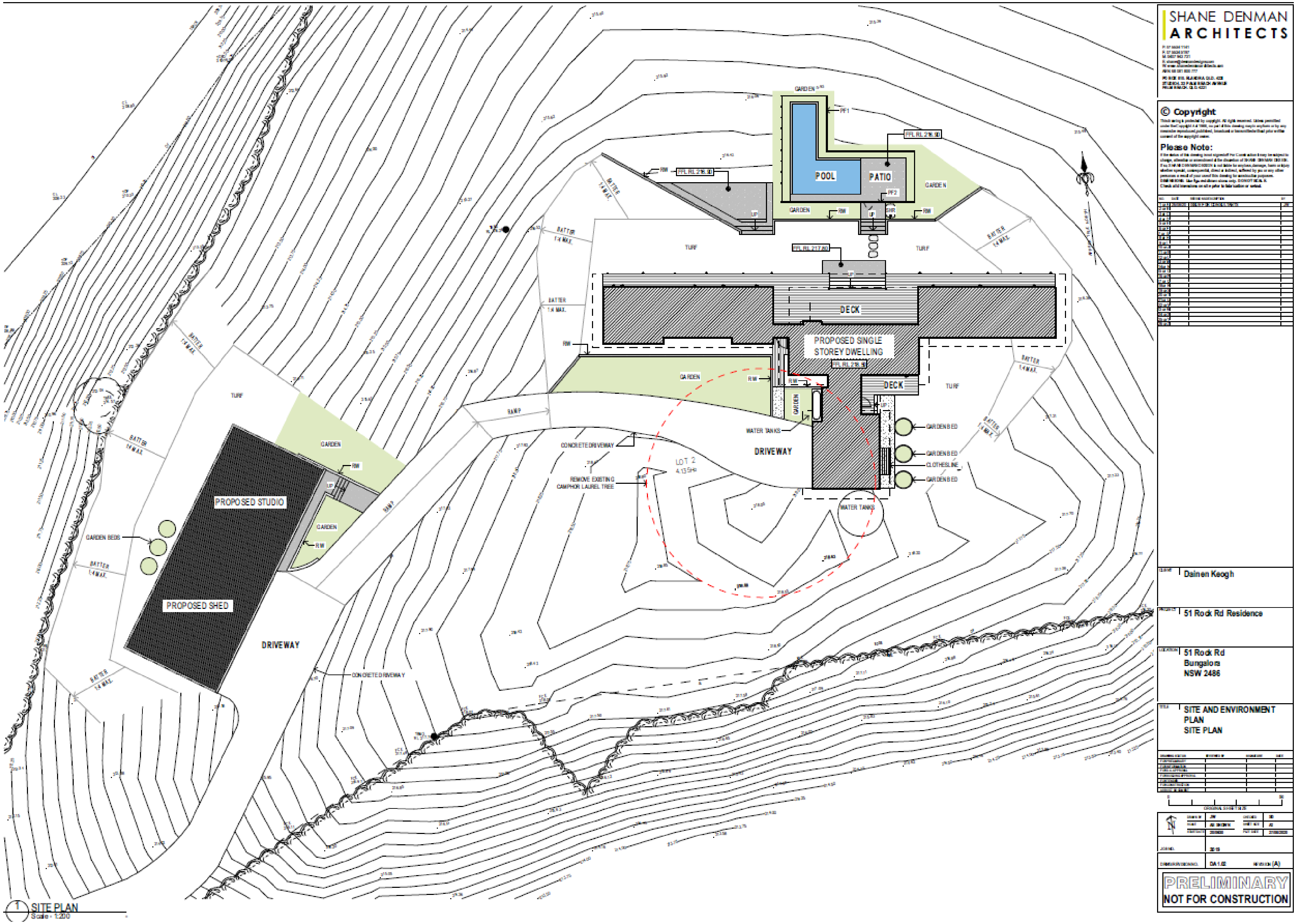
APPENDIX A – SITE & BAL PLANS

Plans by: Preliminary set by: Shane Denman Architect, dated: 24/08/2020.

A full set of plans shall be provided by the applicant to accompany the DA. All design and site plans must ensure compliance with the minimum building setbacks in relation to this development as proposed and the recommendations contained herein.


PROPOSED DWELLING
PROPOSED SHED & STUDIO
1 LOCALITY PLAN
SHANE DENMAN ARCHITECTS
© Copyright
Please Note:
Dalnen Keogh
51 Rock Rd Residence
51 Rock Rd
Bungalora
NSW 2486
SITE AND ENVIRONMENT PLAN
LOCALITY PLAN
DA1.01
PRELIMINARY
NOT FOR CONSTRUCTION


SHANE DENMAN
ARCHITECTS
© Copyright
Please Note:
POOL
PATIO
GARDEN
TURF
BATTER 1:4 MAX.
DECK
PROPOSED SINGLE STOREY DWELLING
DECK
DRIVEWAY
WATER TANKS
GARDEN BED
CLOTHESLINE
CONCRETE DRIVEWAY
REMOVE EXISTING CAMPHOR LAUREL TREE
RAMP
LOT 2
PROPOSED STUDIO
PROPOSED SHED
GARDEN BEDS
DRIVEWAY
CONCRETE DRIVEWAY
Dainen Keogh
51 Rock Rd Residence
51 Rock Rd
Bungalora
NSW 2486
SITE AND ENVIRONMENT
PLAN
SITE PLAN
PRELIMINARY
NOT FOR CONSTRUCTION
SITE PLAN
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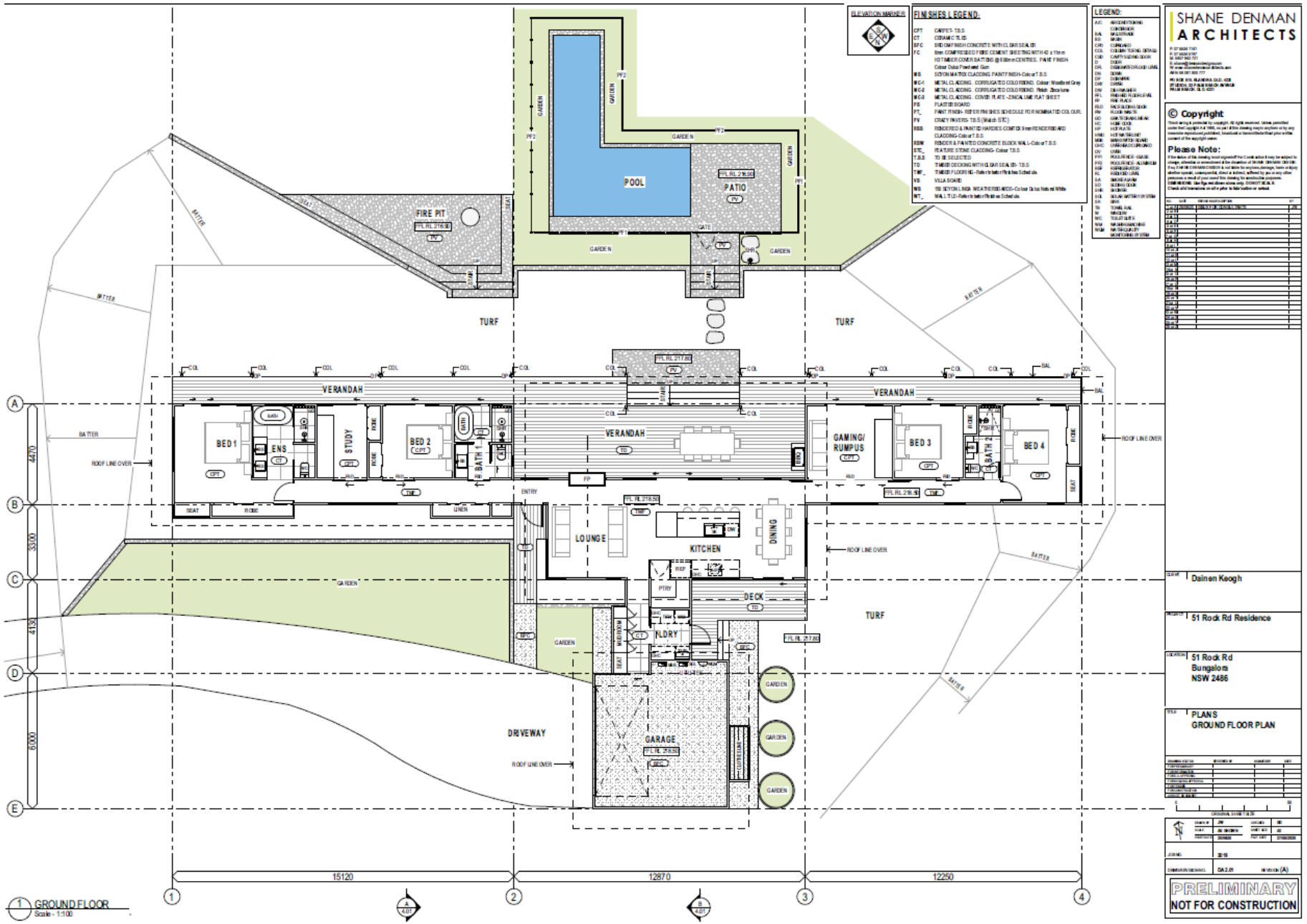
ELEVATION MARKER
FINISHES LEGEND.
LEGEND:
SHANE DENMAN ARCHITECTS
© Copyright
Please Note:
POOL
PATIO
FIRE PIT
TURF
VERANDAH
BED 1
ENS
STUDY
BED 2
BATH 1
GAMING/ RUMPUS
BED 3
BATH 2
BED 4
LOUNGE
KITCHEN
DINING
DECK
LDRY
GARAGE
DRIVEWAY
GARDEN
ROOF LINE OVER
BATTER
ENTRY
Dalnen Keogh
51 Rock Rd Residence
51 Rock Rd
Bungalora
NSW 2486
PLANS
GROUND FLOOR PLAN
PRELIMINARY
NOT FOR CONSTRUCTION
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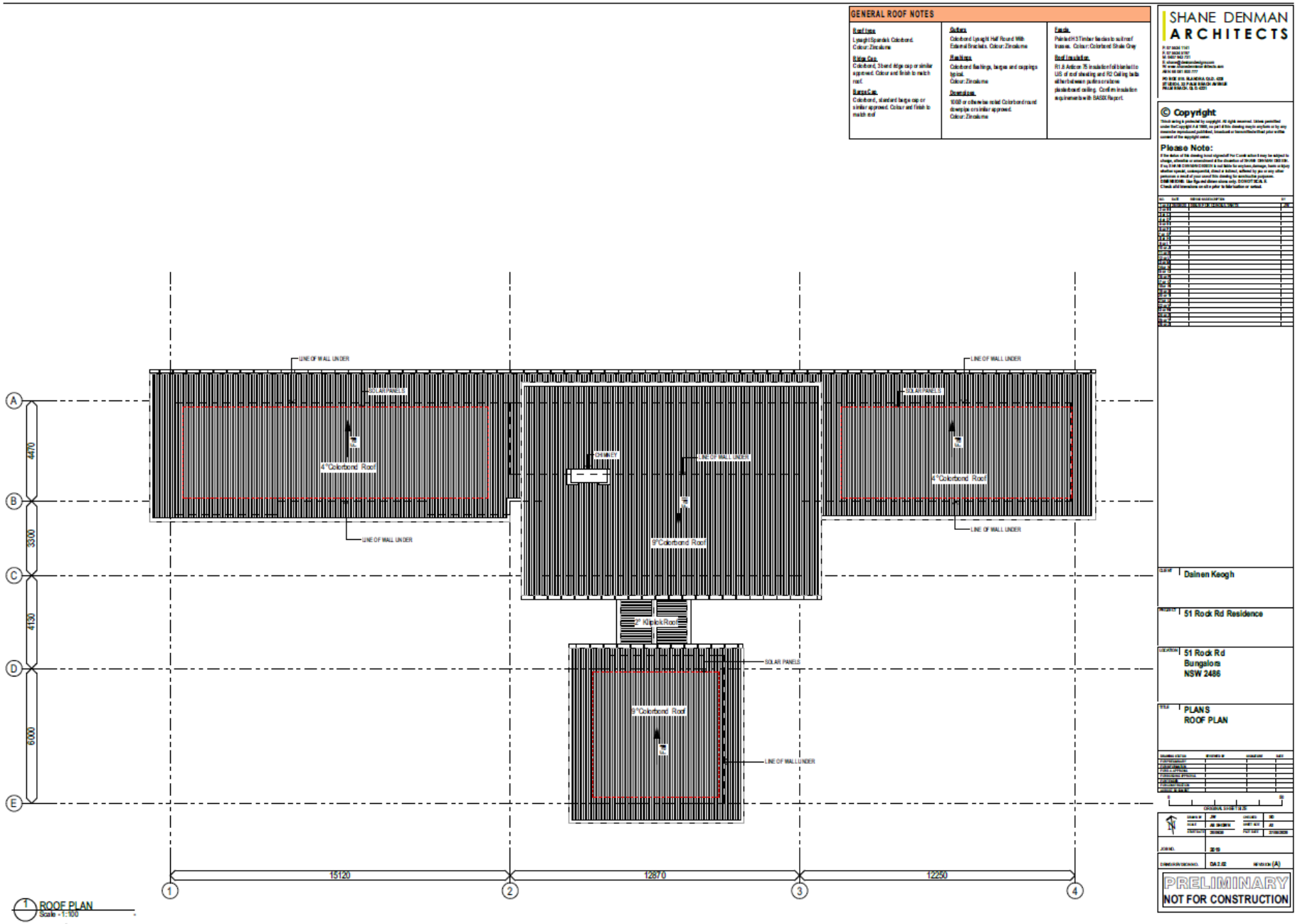
12250
GROUND FLOOR
Scale - 1:100


GENERAL ROOF NOTES
Roof Iron
Lysaght Spandek Colorbond.
Colour: Zincalume
Ridge Cap
Colorbond, 3bend ridge cap or similar approved. Colour and finish to match roof.
Barge Cap
Colorbond, standard barge cap or similar approved. Colour and Finish to match roof
Gutters
Colorbond 1gauge Half Round With External Brackets. Colour: Zincalume
Flashings
Colorbond flashings, barges and cappings typical.
Colour: Zincalume
Downpipes
100Ø or otherwise noted Colorbond round downpipe c/w to inlet approved.
Colour: Zincalume
Fascia
Painted H3 Timber fascias to suit roof trusses. Colour: Colorbond Shale Grey
Roof Insulation
R1.8 Anticon 75 insulation foil blanket to U/S of roof sheeting and R2 Ceiling batts either between purlins or below plasterboard ceiling. Confirm insulation requirements with BASIX Report.
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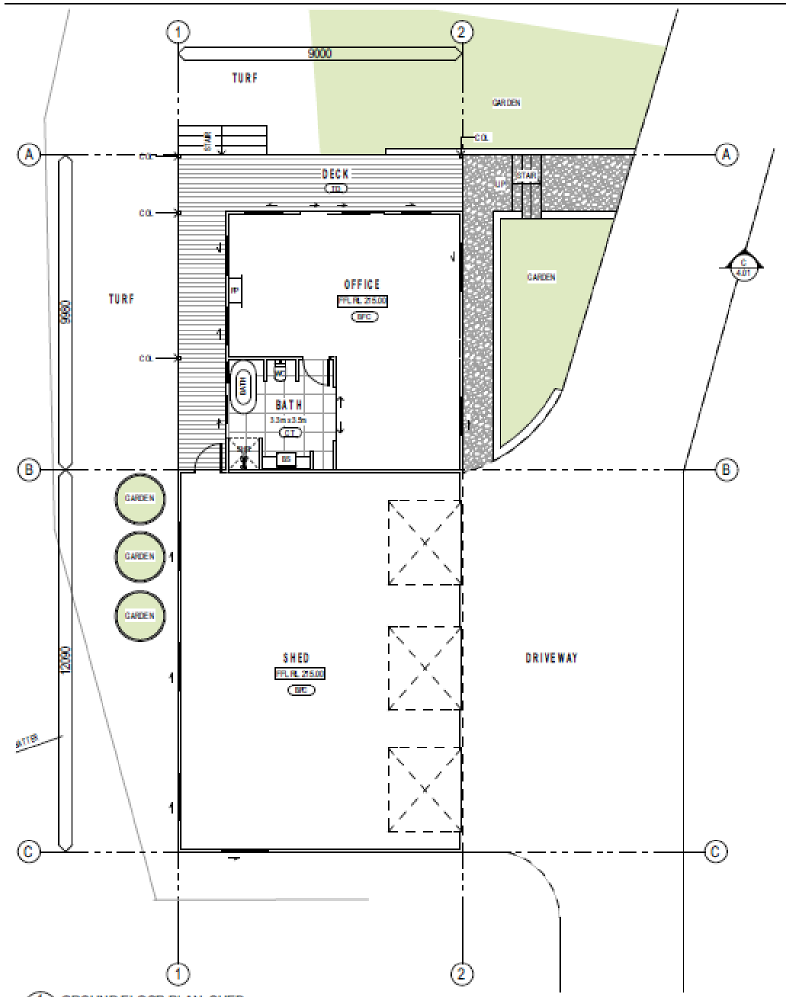
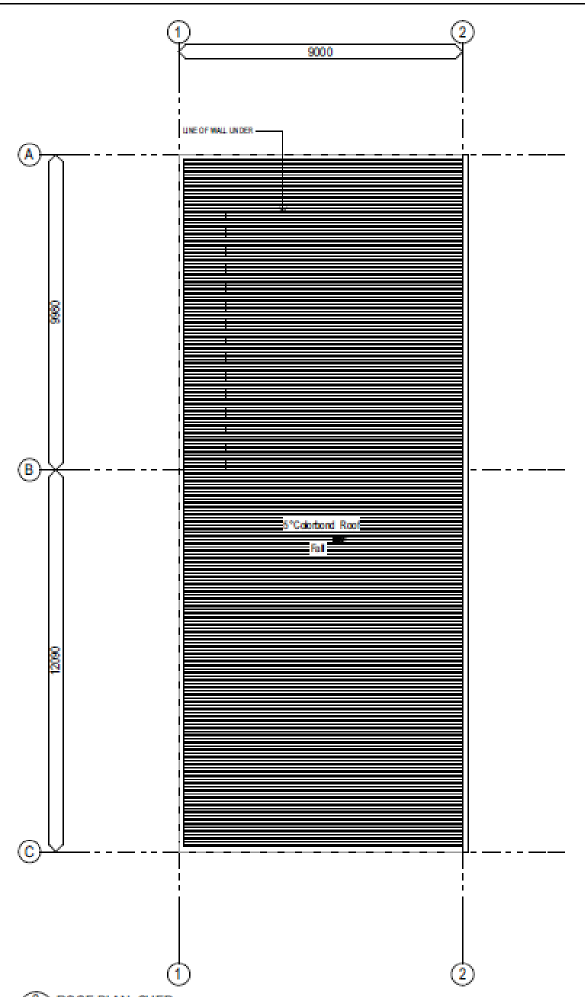
Please Note:
LINE OF WALL UNDER
SOLAR PANELS
4°Colorbond Roof
CHIMNEY
LINE OF WALL UNDER
9°Colorbond Roof
2° Kliplok Roof
SOLAR PANELS
9°Colorbond Roof
LINE OF WALL UNDER
LINE OF WALL UNDER
SOLAR PANELS
4°Colorbond Roof
LINE OF WALL UNDER
A
B
C
D
E
4470
3300
4130
6000
1
2
3
4
15120
12870
12250
1 ROOF PLAN
Scale - 1:100
CLIENT Dainen Keogh
PROJECT 51 Rock Rd Residence
LOCATION 51 Rock Rd
Bungalora
NSW 2486
TITLE PLANS
ROOF PLAN
JOB 2515
DRAWING NO. DA 2.02
REVISION (A)
PRELIMINARY
NOT FOR CONSTRUCTION



1 GROUND FLOOR PLAN_SHED
Scale - 1:100



2 ROOF PLAN_SHED
Scale - 1:100

FINISHES LEGEND:

CPT	CARPET - T.B.S
CT	CERAMIC TILES
BFC	BROOM FINISHED CONCRETE WITH CLEAR SEALER
FC	6mm COMPRESSED FIBRE CEMENT SHEETING WITH 42 x 11mm HD TIMBER COVER BATTENS @ 600mm CENTRES. PAINT FINISH - Colour Dulux Powdered Gum
MB	SCYON MATRIX CLADDING. PAINT FINISH - Colour T.B.S
MC-1	METAL CLADDING. CORRUGATED COLORBOND. Colour Woodland Grey
MC-2	METAL CLADDING. CORRUGATED COLORBOND. Finish Zincalume
MC-3	METAL CLADDING. COVER PLATE - ZINCALUME FLAT SHEET
PB	PLASTERBOARD
PT_	PAINT FINISH - REFER FINISHES SCHEDULE FOR NOMINATED COLOUR.
PV	CRAZY PAVERS - T.B.S (Match STC)
RSB	RENDERED & PAINTED HARDIES COMTEX 9mm RENDERBOARD CLADDING - Colour T.B.S
RBW	RENDER & PAINTED CONCRETE BLOCK WALL - Colour T.B.S
STC_	FEATURE STONE CLADDING - Colour T.B.S
T.B.S	TO BE SELECTED
TD	TIMBER DECKING WITH CLEAR SEALER - T.B.S
TMF_	TIMBER FLOORING - Refer Interior Finishes Schedule.
VB	VILLA BOARD
WB	150 SCYON LINEA WEATHERBOARDS - Colour Dulux Natural White
WT_	WALL TILE - Refer Interior Finishes Schedule.

SHANE DENMAN ARCHITECTS

© Copyright

Please Note:

CLIENT: Dainen Keogh

PROJECT: 51 Rock Rd Residence

LOCATION: 51 Rock Rd Bungalora NSW 2486

TITLE: PLANS FLOOR PLAN_SHED

DRAWING/REV NO.: DA 2.03 REVISION (A)

PRELIMINARY
NOT FOR CONSTRUCTION

APPENDIX B – RFS GUIDELINES & FAST FACTS

APPENDIX 3

ACCESS

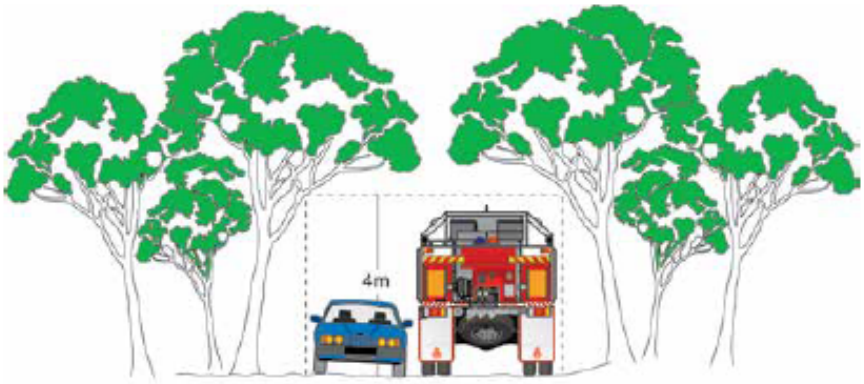
This appendix provides design principles for emergency service vehicle access.

A3.1 Vertical clearance

An unobstructed clearance height of 4 metres should be maintained above all access ways including clearance from building construction, archways, gateways and overhanging structures (e.g. ducts, pipes, sprinklers, walkways, signs and beams). This also applies to vegetation overhanging roads.

Figure A3.1

Vertical clearance.



A3.2 Vehicle turning requirements

Curved carriageways should be constructed using the minimum swept path as outlined in Table A3.2.

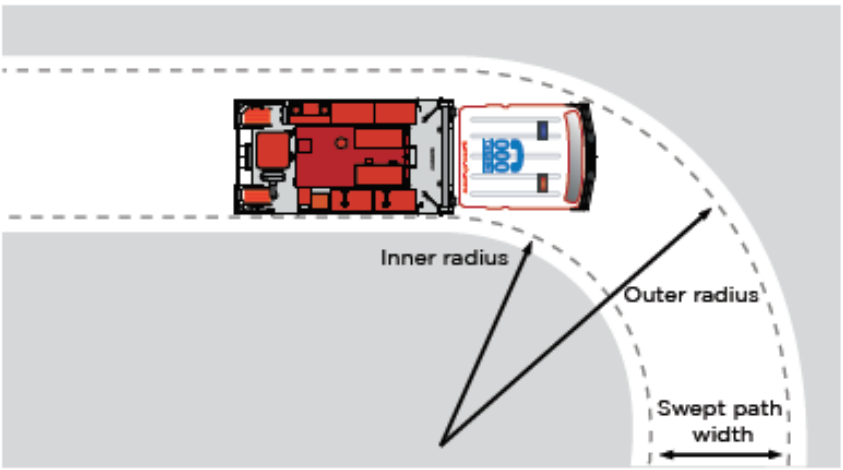
Table A3.2

Minimum curve radius for turning vehicles.

Curve radius (inside edge in metres)	Swept path (metres width)
< 40	4.0
40 - 69	3.0
70 - 100	2.7
> 100	2.5

Figure A3.2a

Swept path width for turning vehicles.



The radius dimensions given are for wall to wall clearance where body overhangs travel a wider arc than the wheel tracks (vehicle swept path). The swept path shall include an additional 500mm clearance either side of the vehicle.

Figure A3.2b

Roundabout swept path.

Example of a swept path as applied to a roundabout. The distance between inner and outer turning arcs allows for expected vehicle body swing of front and rear overhanging sections (the swept path).

A3.3 Vehicle turning head requirements

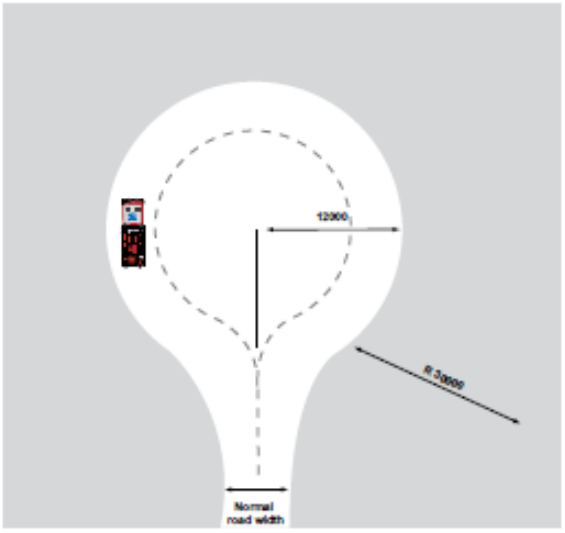
Dead ends that are longer then 200m must be provided with a turning head area that avoids multipoint turns. "No parking" signs are to be erected within the turning head.

The minimum turning radius shall be in accordance with Table A3.2. Where multipoint turning is proposed the NSW RFS will consider the following options:

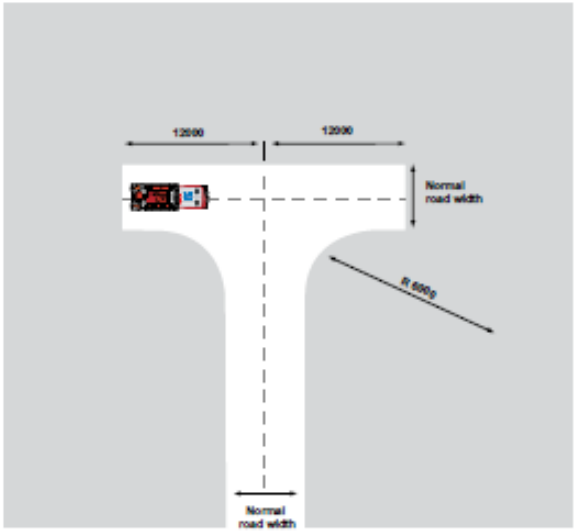
Figure A3.3

Multipoint turning options.

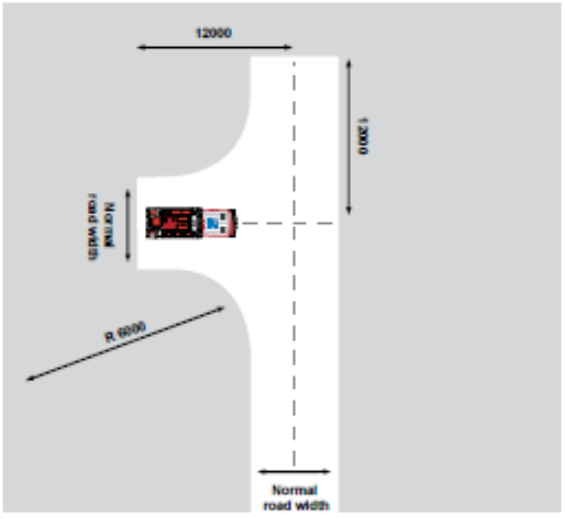
Type A



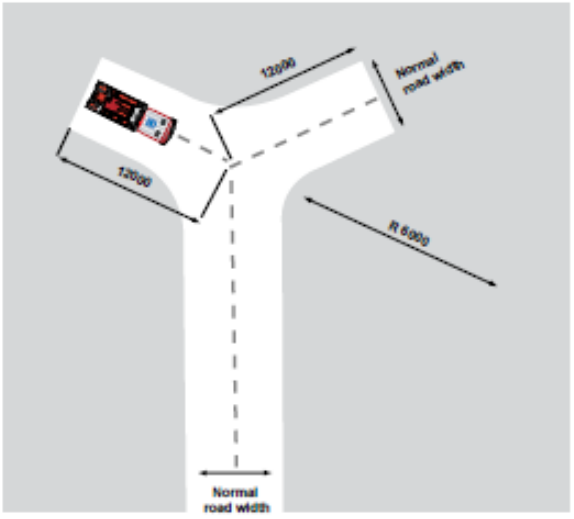
Type B



Type C



Type D



A3.4 Passing bays

The construction of passing bays, where required, shall be 20m in length and provide a minimum trafficable width at the passing point of 6m.

Figure A3.4

Passing bays can provide advantages when designed correctly. Poor design can and does severely impede access.

A3.5 Parking

Parking can create a pinch point in required access. The location of parking should be carefully considered to ensure fire appliance access is unimpeded. Hydrants shall be located outside of access ways and any parking areas to ensure that access is available at all times.

Figure A3.5

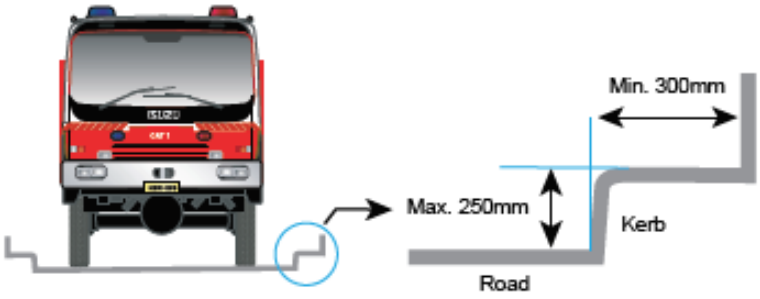
Hydrants and parking bays.

A3.6 Kerb dimensions

All kerbs constructed around access roads should be no higher than 250mm and free of vertical obstructions at least 300mm back from the kerb face to allow clearance for front and rear body overhang.

Figure A3.6

Carriageway kerb clearance dimensions.



A3.7 Services

Hydrant services should be located outside the carriageway and parking bays to permit traffic flow and access. Setup of standpipes within the carriageway may stop traffic flow. Hydrant services shall be located on the side of the road away from the bush fire threat where possible.

A3.8 Local Area Traffic Management (LATM)

The objective of LATM is to regulate traffic an acceptable level of speed and traffic volume within a local area.

Traffic engineers and planners should consider LATM devices when planning for local traffic control and their likely impact on emergency services. LATM devices by their nature are designed to restrict and impede the movement of traffic, especially large vehicles.

Where LATM devices are provided they are to be designed so that they do not impede fire vehicle access.

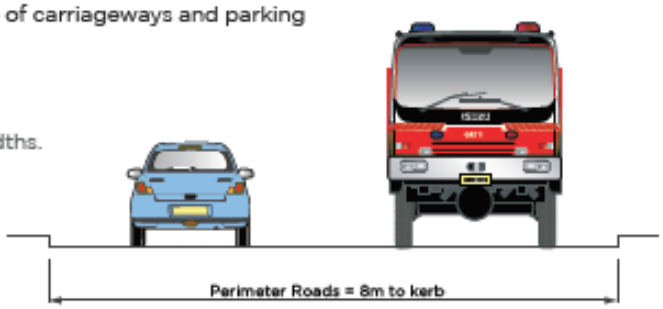
A3.9 Road types

A3.9.1 Perimeter Roads

Perimeter roads are to be provided with a minimum clear width of 8m. Parking and hydrants are to be provided outside of carriageways. Hydrants are to be located outside of carriageways and parking areas.

Figure A3.9a

Perimeter road widths.

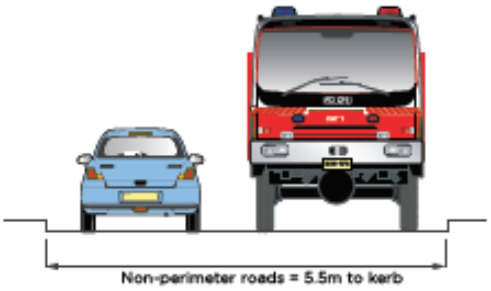


A3.9.2 Non-perimeter Roads

Non-perimeter roads shall be provided with a minimum clear width of 5.5m. Parking is to be provided outside of the carriageway and hydrants are not to be located in carriageways or parking areas.

Figure A3.9b

Non-perimeter road widths.



A3.9.3 Property access

Property access roads are to be a minimum of 4m wide.

Figure A3.9c

Property access road widths.

APPENDIX 4

ASSET PROTECTION ZONE REQUIREMENTS

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

Careful attention should be paid to species selection, their location relative to their flammability, minimising continuity of vegetation (horizontally and vertically), and ongoing maintenance to remove flammable fuels (leaf litter, twigs and debris).

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 building or structure. It is located between the building or structure and the bush fire hazard.

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

An APZ provides:

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

Bush fire fuels should be minimised within an APZ. This is so that the vegetation within the zone does not provide a path for the spread of fire to the building, 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 building;
- damage to the building asset from intense radiant heat; and
- ember attack.

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 and bush fire threat. 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).

A4.1.1 Inner Protection Areas (IPAs)

The IPA is the area closest to the building and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and act as a defendable 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 building, consisting of a mown lawn and well maintained gardens.

When establishing and maintaining an IPA the following requirements apply:

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 2m above the ground;
- tree canopies should be separated by 2 to 5m; 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

- grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and
- leaves and vegetation debris should be removed.

A4.1.2 Outer Protection Areas (OPAs)

An OPA is located between the IPA and the unmanaged vegetation. It is an area where there is maintenance of the understorey and some separation in the canopy. The reduction of fuel in this area aims to decrease the intensity of an approaching fire and restricts the potential for fire spread from crowns; 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.

When establishing and maintaining an OPA the following requirements apply:

Trees

- tree canopy cover should be less than 30%; and
- canopies should be separated by 2 to 5m.

Shrubs

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

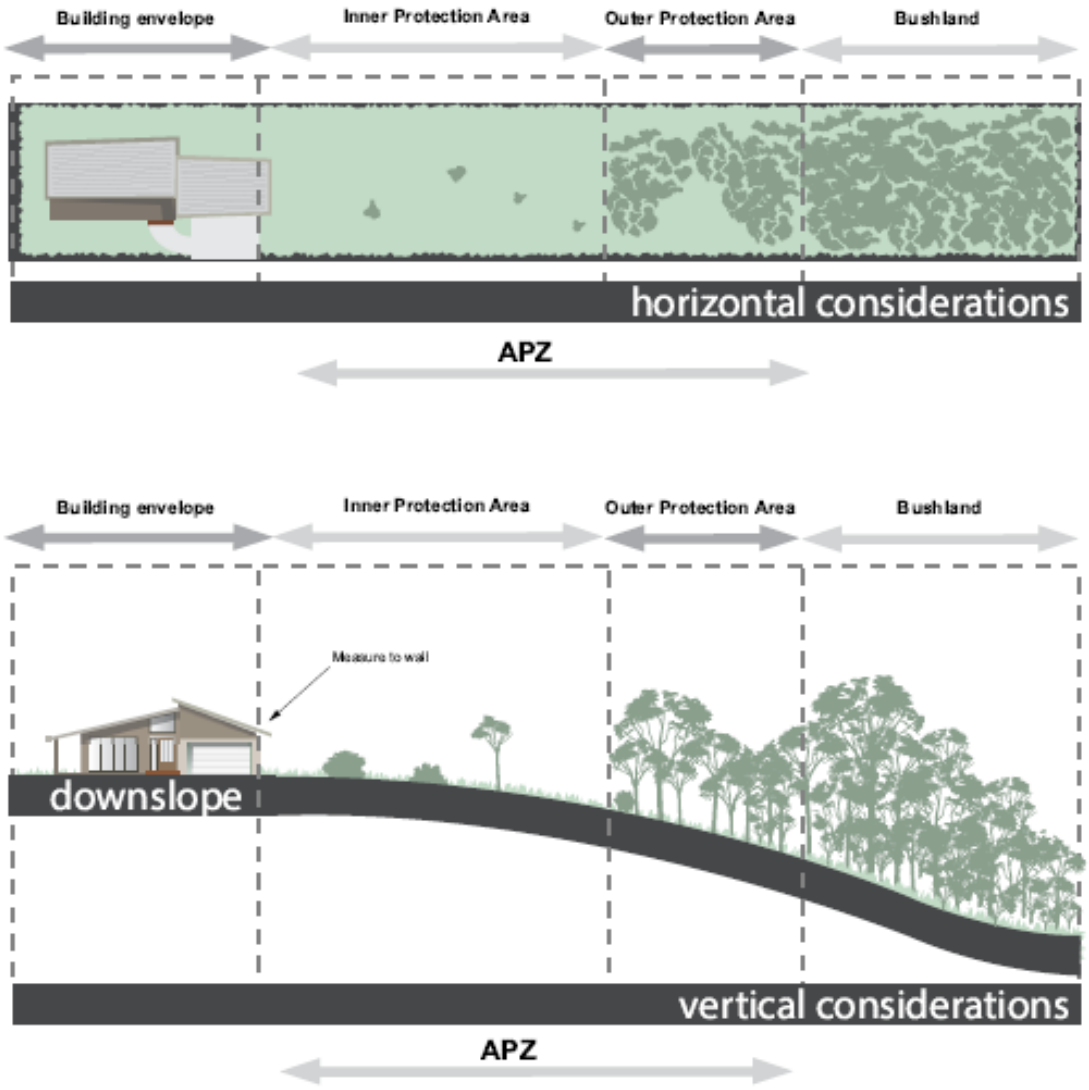
Grass

- grass should be kept mown to a height of less than 100mm; and
- leaf and other debris should be removed.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance of the IPA and OPA as described above should be undertaken regularly, particularly in advance of the bush fire season.

Figure A4.1

Typical Inner and Outer Protection Areas.



NSW RURAL FIRE SERVICE

COMMUNITY RESILIENCE FAST FACTS

3/08

Water Supply for Fire Fighting Purposes

This Fast Fact clarifies the NSW Rural Fire Service (RFS) position on the requirement for water supplies for development in bush fire prone areas.

Adequate water supply is critical for effective fire fighting. Where a non reticulated water supply is provided or the reticulated water supply is deemed inadequate, an additional onsite stored supply of water for fire fighting will be required. Non reticulated water is a supply that is not piped by council or a water authority and includes rainwater, ground water or surface water.

In the past, additional water sources could take the form of a static water supply (SWS) or a dedicated water supply. The RFS has traditionally required that an alternate supply of water be 'dedicated' for fire fighting purposes in line with the provisions of *Planning for Bush Fire Protection* 2006 (PBP). Dedicated water implies that the supply shall be in the form of a tank of water and has traditionally not included swimming pools or dams. The term also implies that the supply must be isolated from other domestic water supplies and used solely for fire fighting purposes.

From a practical fire fighting point of view, any source of available water will be utilised during a bush fire event and dedicated tanks are not always the most practical option.

In light of the above and the increasing demand for sustainable and efficient use of our water resources, the RFS will no longer require water to be solely 'dedicated' for fire fighting purposes and will allow more flexibility in satisfying the water requirements of PBP. As such, water holding structures such as tanks, swimming pools and dams can be considered.

Therefore, the RFS conditions addressing water supply will no longer refer to a 'dedicated' water supply and will simply state that a supply of water shall be provided for 'fire fighting purposes'. This position will also apply to previously issued conditions referring to dedicated supplies. As such, the water source can be used for other purposes and allow for the circulation of fresh water. The onus will be on the property owner to provide suitable water supply arrangements for fire fighting that meet the RFS requirements and ensure that any water sources are maintained at the appropriate capacity (see Table 4. of PBP).

Water capacities, access (tanker or pedestrian) for fire fighters and the provision of appropriate connections should also be considered when determining if a proposed water source is suitable. Furthermore, the property owner is encouraged to place a 'SWS' sign in a visible location on the street front.

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