

Bush Fire Assessment Report

LGA:	Byron Shire Council
SP:	SP 96105
Street Address:	1 Kendall Street Byron Bay
Building Use:	Class 1a Residential Dwellings (non-SFPP)
Development:	Multi-Storey Residential Buildings (x2) (s4.14)
Prepared For:	Duncan Band


Prepared By:	Peter Thornton BPAD-L3 Accredited Practitioner No. 14867   BPAD Bushfire Planning & Design Accredited Practitioner Level 3
Report Reference:	23/047
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1.0 EXECUTIVE SUMMARY

The applicant has advised that the proposed development application will not include any form of subdivision or be of a use that would be considered as a Special Fire Protection Purpose development e.g. short-term accommodation etc. In turn, this report has been prepared to assess the proposed two (2) multi-storey residential buildings at SP 96105, 1 Kendall Street Byron Bay against the requirements of s4.14 of the Environmental Planning and Assessment Act 1979 and Planning for Bushfire Protection 2019.

The report establishes the proposed buildings are located on mapped bushfire prone land and provides recommendations consistent with the acceptable solutions of Planning for Bushfire Protection (PBP) 2019.

The existing residential building located in the northeast corner of the subject property was granted development consent (No. 10.2015.398) with several bushfire protection measures including BAL construction and associated asset protection zone as detailed below identifying trees in a Vegetation Management Plan permitted to remain for compliance with an Inner Protection Area as conditioned in DA 10.205.398.

In this regard, the recommended asset protection zones will be within the previously approved Inner Protection Area. However, the report does consider the proximity of the existing trees to the proposed development i.e. canopy not overhanging or touching the buildings.

4) Bush Fire - Asset Protection Zones

The intent of measures is to provide sufficient space and maintain reduced fuel loads so as to ensure radiant heat levels of buildings are below critical limits and to prevent direct flame contact with a building. To achieve this, the following conditions shall apply:

At the commencement of building works and in perpetuity the property around the building shall be managed as follows:

- *North to the boundary as an Inner Protection Area.*
- *East to the boundary as an Inner Protection Area.*
- *South for a total distance of 54 metres as an Inner Protection Area.*
- *South West for a total distance of 27 metres as an Inner Protection Area.*
- *West for a total distance of 33 metres as an Inner Protection Area.*

Requirements for an Inner Protection Area are outlined within section 4.1.3 and appendix 5 of 'Planning for Bush Fire Protection 2006' (PBP) and the NSW Rural Fire Service's document 'Standards for asset protection zones', however the trees identified on the site plan are permitted within the IPA. A Vegetation Management Plan (VMP) is to be created which specifically identifies the existing trees and method of fuel management.

The vegetation formation has been confirmed by the consultant ecologist as "Forested Wetland (excluding Coastal Swamp Forest)" pursuant to A1.2 and reflected in Table A1.12.3 PBP2019 within 70m of the site.

A site-specific ecological assessment was undertaken by Biodiversity Assessments & Solutions on 10 March 2023 as shown in Figure 5 (full ecological advice in Appendix B). The assessment has considered this vegetation formation as the most likely to influence the bushfire behaviour at the interface of the asset protection zone.

Existing street hydrants will provide adequate coverage of the existing building and proposed buildings, negating the requirement for bushfire related property access. Bushfire construction will be compliant with the acceptable solutions of Table A1.12.3 PBP2019, it being noted the proposed development will not compromise the Bushfire Attack Level (BAL) construction of the existing building.

The following table is provided as a summary of the recommendations and method of assessment for each consideration relating to Planning for Bushfire Protection 2019.

MEASURE	RECOMMENDATION	METHOD OF ASSESSMENT
Construction Standards	<p>The proposed northern building (Units 13-18) is to be constructed to BAL 19 AS 3959-2018 + Section 7.5 Planning for Bushfire Protection 2019.</p> <p>The proposed southern building (Units 19 & 20) is to be constructed to BAL 29 AS 3959-2018 + Section 7.5 Planning for Bushfire Protection 2019.</p> <p>Construction specification detailing compliance shall be shown on the plans submitted with the application for a construction certificate and certified by a registered building certifier.</p>	Acceptable Solution
APZ Required	<p>At the commencement of works and in perpetuity 12m to the south, southwest, west, and to the boundary to the north of the proposed northern building (Units 13-18) as an Inner Protection Area (IPA) is to be managed and maintained in accordance with Appendix 4 of Planning for Bushfire Protection 2019 and the requirements of 'Standards for Asset Protection Zones' (RFS 2005) (see attached Appendix C & Appendix D). The existing trees adjacent to the building as shown in Figure 7 can remain with no part of the canopy to overhang or touch the building and the understorey is to be managed as an IPA.</p> <p>At the commencement of works and in perpetuity 10m to the north, 8m to the south, southwest and west, and to the boundary to the east of the proposed southern building (Units 19 & 20) as an Inner Protection Area (IPA) is to be managed and maintained in accordance with Appendix 4 of Planning for Bushfire Protection 2019 and the requirements of 'Standards for Asset Protection Zones' (RFS 2005) (see attached Appendix C & Appendix D).</p>	Acceptable Solution

	<p>The existing trees adjacent to the building as shown in Figure 7 can remain with no part of the canopy to overhang or touch the building and the understorey is to be managed as an IPA.</p> <p>The Vegetation Management Plan approved with development consent No. 10.2015.398 is to be amended to reflect the proposed development layout and setbacks. The amended VMP is to establish actions relating to any required tree pruning to ensure tree canopies do not touch or overhang the proposed buildings.</p> <p>Advisory note - any future buildings/structures within the recommended APZ, including Class 10a and exempt development, must be specifically assessed by an appropriately Accredited Bushfire Practitioner in consultation with NSW RFS to ensure the asset protection zone recommended is not compromised due to additional building fuel loads within the APZ or compromising defensible space.</p>	General advice only
Water Supply	Street hydrants in Kendall Street provide coverage in accordance with AS 2419.1-2021	Acceptable Solution
Electricity & Gas Supply	New electricity and gas are to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 & Cl. 5.8 of AS3959-2018.	Acceptable Solution
Landscape	New landscaping is to be undertaken in accordance with Appendix 4 of PBP2019.	Acceptable Solution
Access	Standard driveways acceptable	Acceptable Solution

2.0 INTRODUCTION

2.1 GENERAL

The purpose of this report is to establish suitable bushfire mitigation measures for the proposed multi-storey residential buildings at SP 96105, 1 Kendall Street Byron Bay for Council to make determination of the proposed development pursuant to the requirements of s4.14 of the *Environmental Planning and Assessment Act 1979*.

The recommendations within this report address the aims and objectives of Planning for Bushfire Protection 2019 to reduce the risk of ignition of the buildings in a bushfire event. It is noted however that bushfire is a natural phenomenon and there can never be any guarantee that a building or occupants will not be adversely affected by bushfire.

2.2 SIGNIFICANT ENVIRONMENTAL FEATURES

An assessment is to be undertaken, if applicable, regarding:

- SEPP (Biodiversity and Conservation) 2021
- SEPP (Resilience and Hazards) 2021
- Biodiversity Conservation Act 2016 (NSW)
- Local Land Services Act 2013 (NSW)
- Land Management (Native Vegetation) Code 2017 (NSW)
- National Parks and Wildlife Act 1974 (NSW)
- Environmental Protection and Biodiversity Conservation Act 1999 (Cwlth)

Note: This report does not consider the above legislation and in this regard this report should be read in conjunction with the Statement of Environmental Effects submitted with the development application. It is noted, the application does require tree removal within the proposed building footprints and some potential pruning of existing trees which can remain as shown in Figure 7 to avoid canopy touching and overhanging the proposed buildings.

At the time of reporting compensatory planting had not been proposed and therefore has not been considered with this report. Notwithstanding this, any replanting will not be able to occur with the existing approved Inner Protection Areas and will need to occur within the unmanaged areas of the site and not result in a change of Vegetation Formation relied upon by this report.

2.3 PROPOSED DEVELOPMENT

The applicant is proposing a development at SP 96105, 1 Kendall Street Byron Bay as shown on the site plan in Figure 2. Access is by way of Kendall Street which supports a reticulated street hydrant system.

A description of the proposed development has been provided as follows:¹

The proposed development at 1 Kendall Street, Byron Bay - SP 96105 seeks consent for alterations and additions to an existing multi dwelling housing development. The existing development, approved in accordance with DA 10.2015.398.1 on 19 October 2015, comprises 12 dwellings. The proposal seeks consent for an additional 8 dwellings comprising 6 x 1 bedroom dwellings and 2 x 2 bedroom dwellings. Resident and visitor car parking for an additional 13 vehicles is also provided. The proposed strata subdivision of the new dwellings is also proposed.

The proposal responds to the well documented need for long term key worker rental accommodation in Byron Shire. The subject lot is well serviced by the existing water, sewer, NBN and electricity grid infrastructure.

¹ Planners North (Kate Singleton), email correspondence dated 7.11.2023



Figure 1: Location of subject property (yellow circle)

Source: BSC online mapping

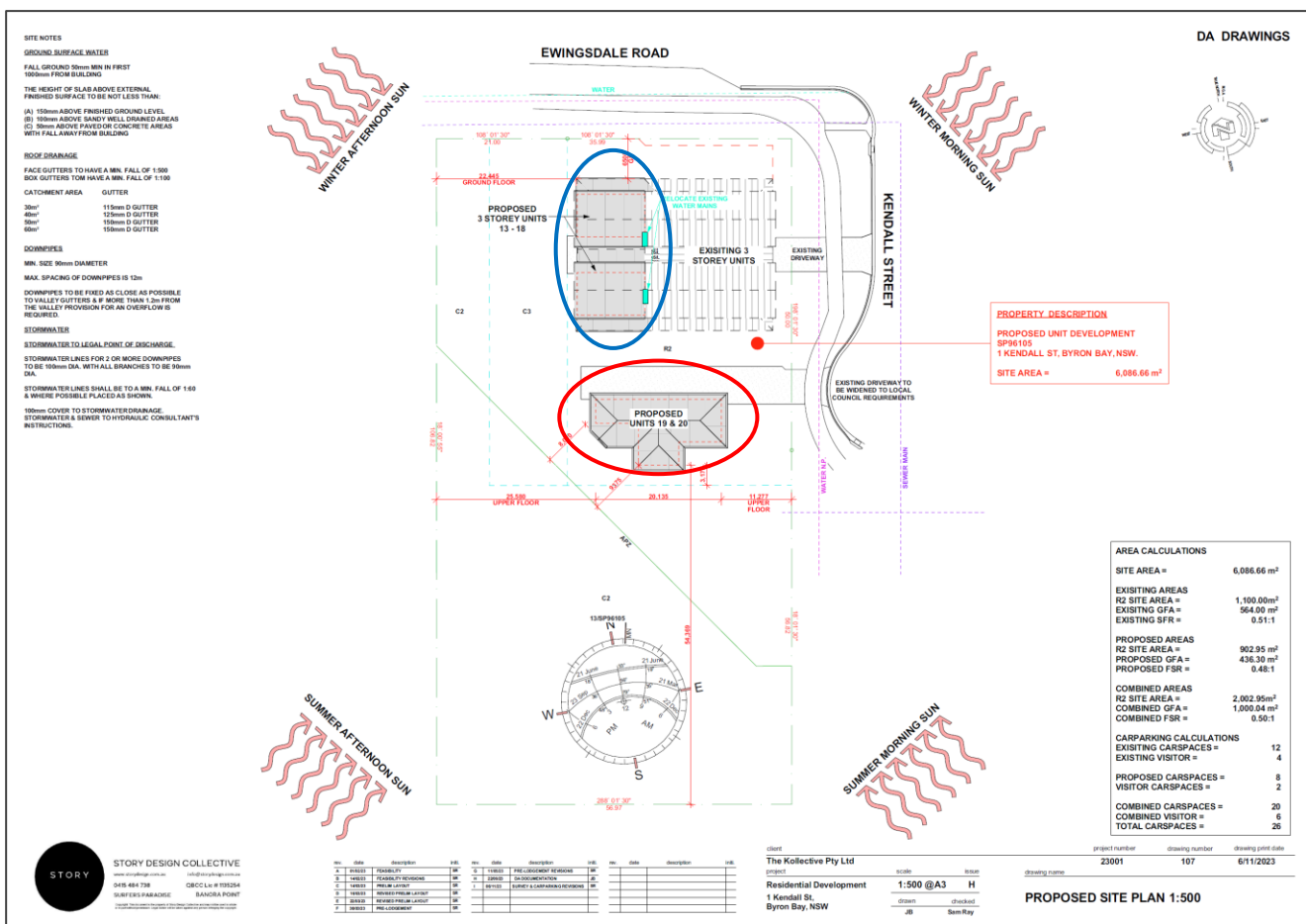


Figure 2: Site plan (proposed northern building (blue circled) proposed southern building (red circled))

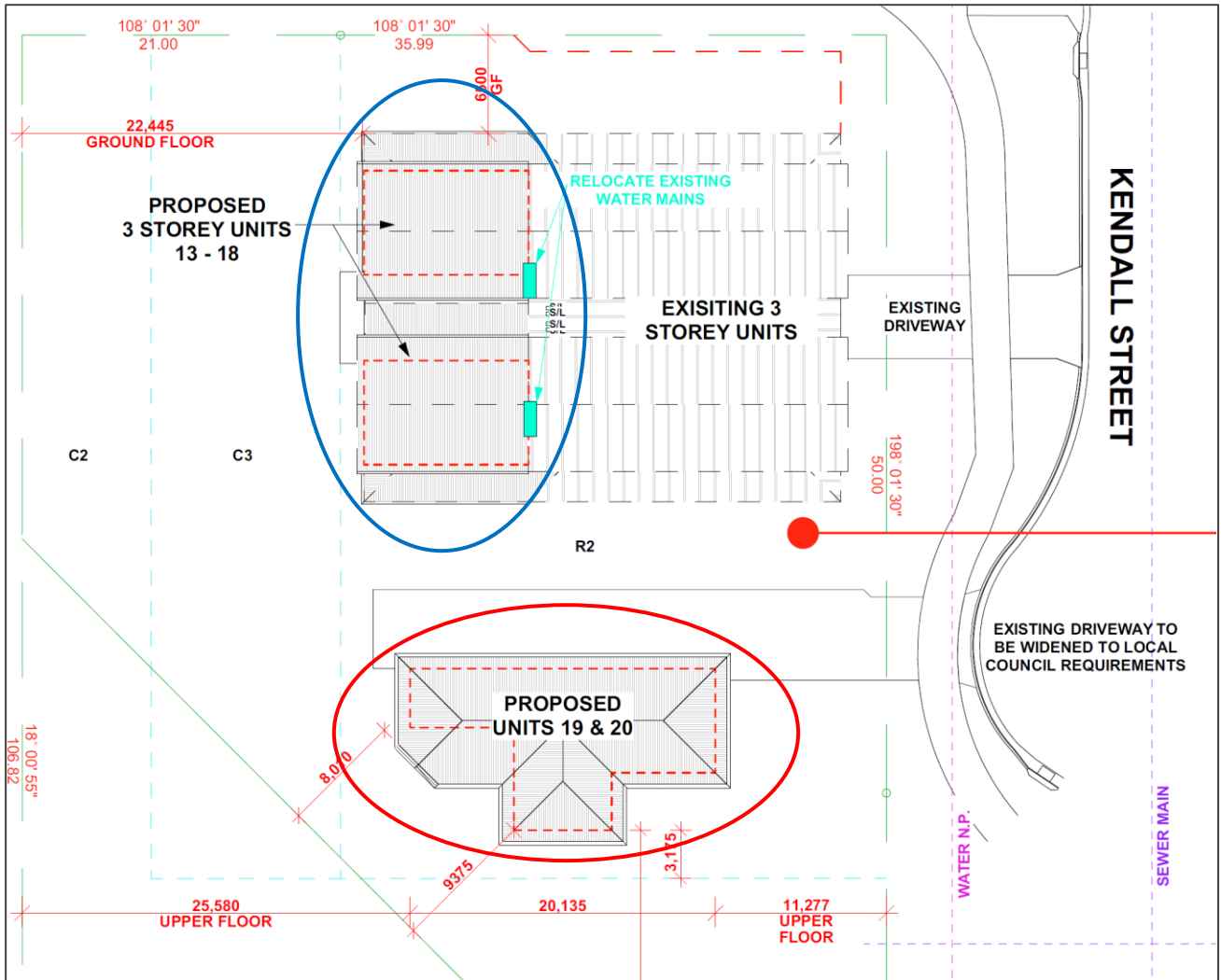


Figure 3: Site plan (close up)



Location of proposed buildings

3.0 BUSHFIRE THREAT ASSESSMENT

3.1 BUSHFIRE PRONE LAND MAP

The bushfire prone mapping identifies the subject allotment as being bushfire prone (Figure 4). Aerial mapping and inspection of the site reveals that the bushfire prone land map is considered reasonably accurate with respect to the current bushfire hazard except the mapping appears to overstate the location of the bushfire hazard vegetation within the subject allotment.



Figure 4: Bushfire prone land map

Source: BSC online mapping

3.2 ASSESSMENT – ASSET PROTECTION ZONES & CONSTRUCTION STANDARDS

Identification of the vegetation formations for each aspect within 140 metres of the proposed buildings as per Keith (2004) classifications was undertaken and is detailed as follows. The slope was measured onsite with a 'Tru Pulse 3600 R' laser range finder and inclinometer with the assessment undertaken.

Asset Protection Zones are areas established and maintained to ensure that bushfire fuels are progressively reduced between the development and the bushfire hazard. The asset protection zone incorporates an Inner Protection Area (IPA) having reduced fuel loadings.

The site inspection identified low fuel loads within the Forested Wetland vegetation within 100m of the subject site with exception to a narrow run to the northwest of the site where the forested wetland is within 70m of the subject property.

To confirm the vegetation formation is classified as “Forested Wetland excluding Coastal Swamp Forest)” the applicant commissioned Biodiversity Assessments & Solutions to provide confirmation of the vegetation formations pursuant to PBP2019 (Figure 5). It is noted that mangroves are not considered a bushfire hazard by PBP2019.

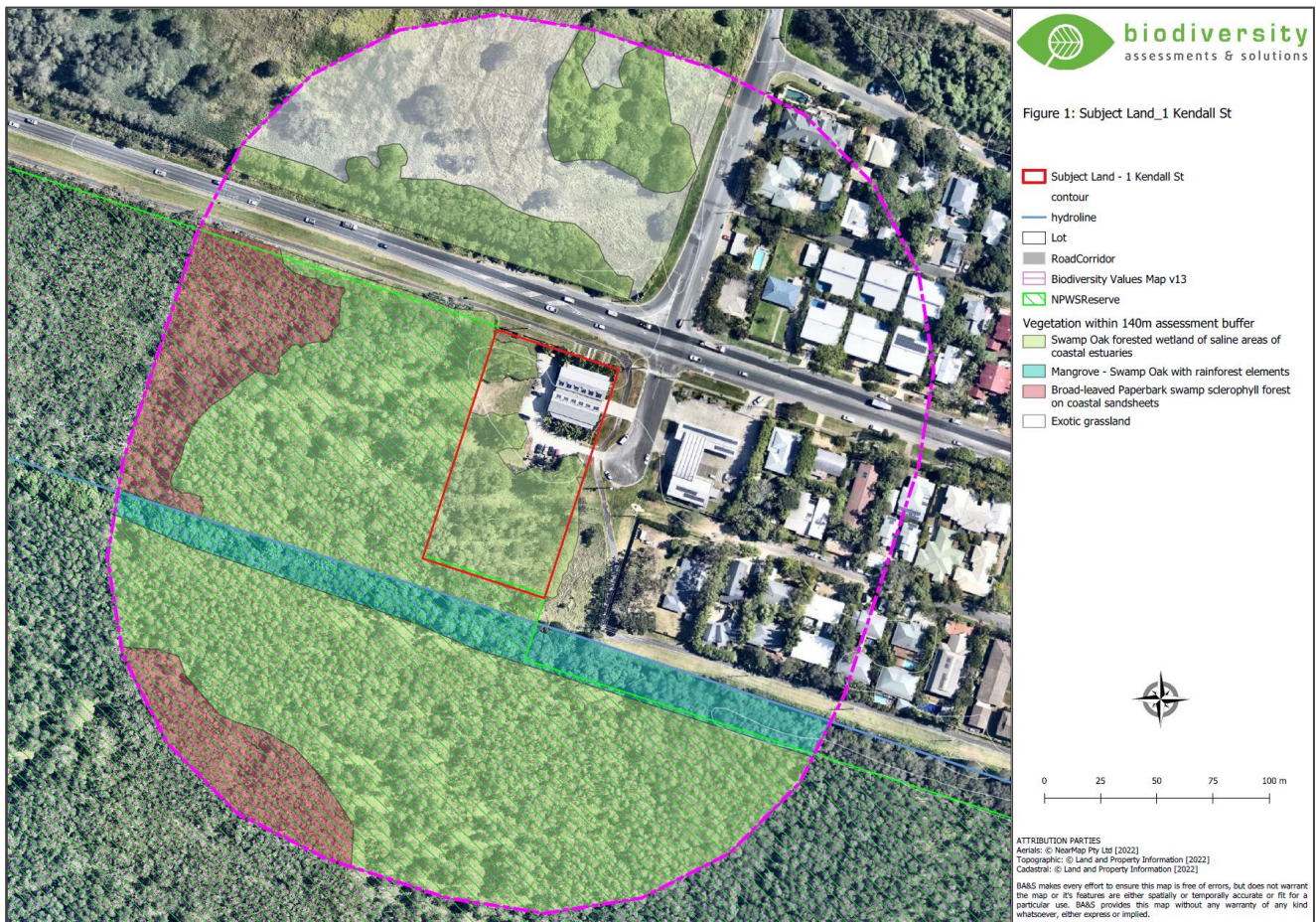


Figure 5: Location of Swamp Oak Forested Wetland on and adjacent to the subject property.

As shown in Figure 5, there is significant area of Forested Wetland generally within 100m of the subject property and buildings. This vegetation is considered the most likely to influence the forecast bushfire behaviour given there is sufficient distance for a fire decrease fire intensity from the Forest vegetation (red shading Figure 5) for the rate of spread to be solely influenced by the lower fuel loads associated with Forested Wetland. This is reflected in the bushfire assessment in Table 1 determining the required APZ setback and Bushfire Attack Level construction for the proposed development.

The existing residential building located in the northeast corner of the subject property was granted development consent (No. 10.2015.398) with several bushfire protection measures including BAL

construction and associated asset protection zone as detailed below identifying trees in a Vegetation Management Plan permitted to remain for compliance with an Inner Protection Area as conditioned in DA 10.205.398.

In this regard, the recommended asset protection zones will be within the previously approved Inner Protection Area. However, the report does consider the proximity of the existing trees to the proposed development i.e. canopy not overhanging or touching the buildings shown in Figure 7.

Current condition of development consent No. 10.2015.398 -

4) Bush Fire - Asset Protection Zones

The intent of measures is to provide sufficient space and maintain reduced fuel loads so as to ensure radiant heat levels of buildings are below critical limits and to prevent direct flame contact with a building. To achieve this, the following conditions shall apply:

At the commencement of building works and in perpetuity the property around the building shall be managed as follows:

- North to the boundary as an Inner Protection Area.*
- East to the boundary as an Inner Protection Area.*
- South for a total distance of 54 metres as an Inner Protection Area.*
- South West for a total distance of 27 metres as an Inner Protection Area.*
- West for a total distance of 33 metres as an Inner Protection Area.*

Requirements for an Inner Protection Area are outlined within section 4.1.3 and appendix 5 of 'Planning for Bush Fire Protection 2006' (PBP) and the NSW Rural Fire Service's document 'Standards for asset protection zones', however the trees identified on the site plan are permitted within the IPA. A Vegetation Management Plan (VMP) is to be created which specifically identifies the existing trees and method of fuel management.

Table 2

Building	APZ required South	APZ required Southwest	APZ Required West
Existing Building	54m	27m	33m
Southern Building	8m (within the 54m IPA of existing building)	8m (within the 27m IPA of existing building)	8m (within the 33m IPA of existing building)
Northern Building	12m (within the 54m IPA of existing building)	12m (within the 27m IPA of existing building)	12m (within the 33m IPA of existing building)

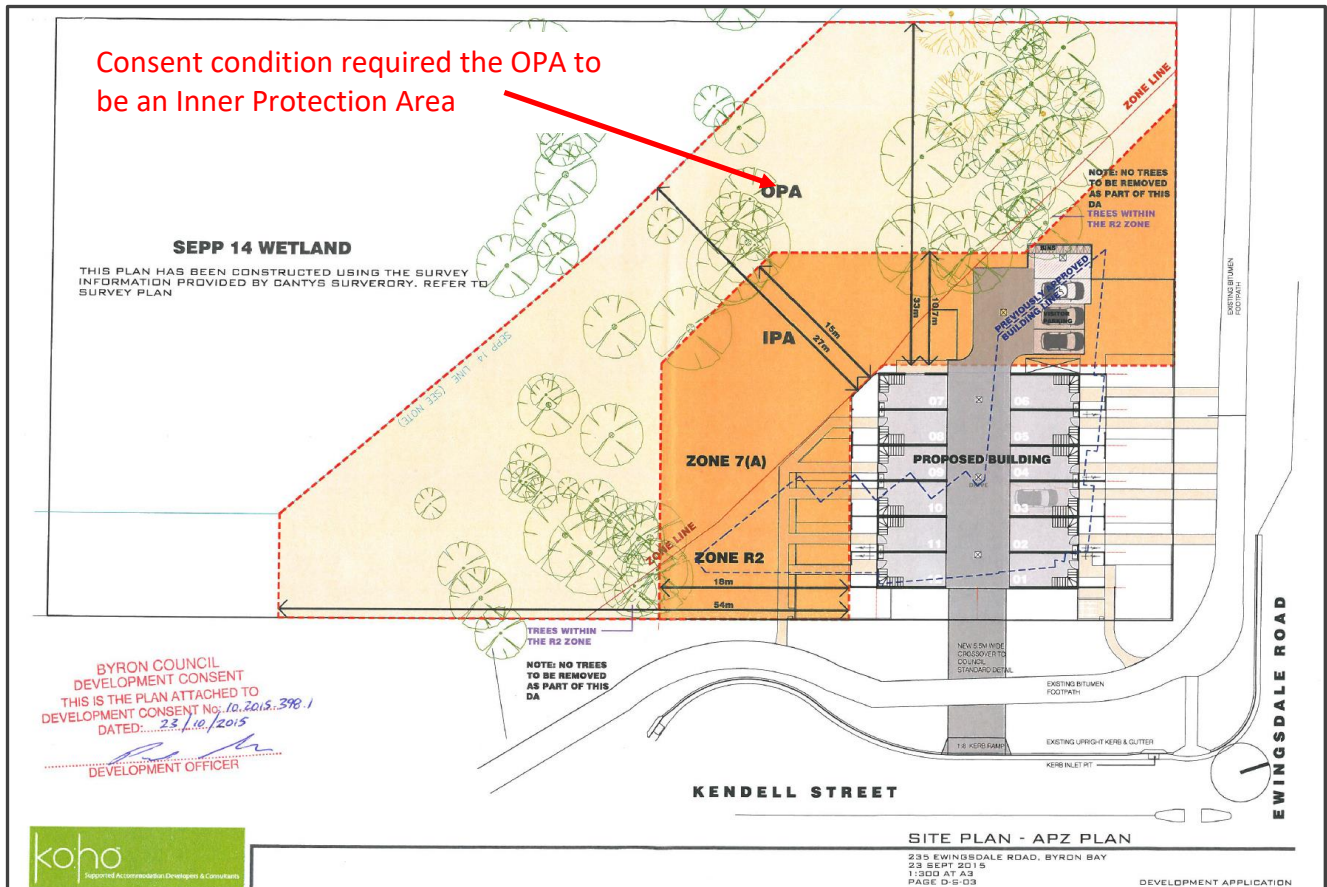


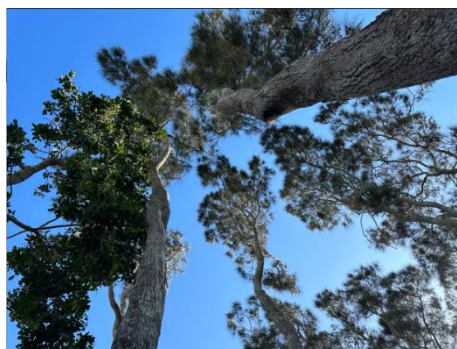
Figure 6: Approved APZ for Development Consent No. 10.2015.398.1

The assessment has included the small number of existing trees located adjacent to the buildings as identified in Figure 7. The subject existing trees will not significantly increase the bushfire risk to the buildings provided the tree canopies do not overhang or touch the buildings. In this regard, the identified existing trees must be periodically pruned if required to ensure ongoing compliance and the understorey of the trees are to be managed as an IPA at all times to ensure fuel loads are kept to a minimum.

As shown in the following photos, there trees within the southeast corner of the property are disconnected from the primary hazard, have minimal canopy and are well managed beneath so as not to create sufficient fire intensity to sustain fire within the canopy.



Disconnected canopy.



Sparse canopy coverage.



Management beneath trees.

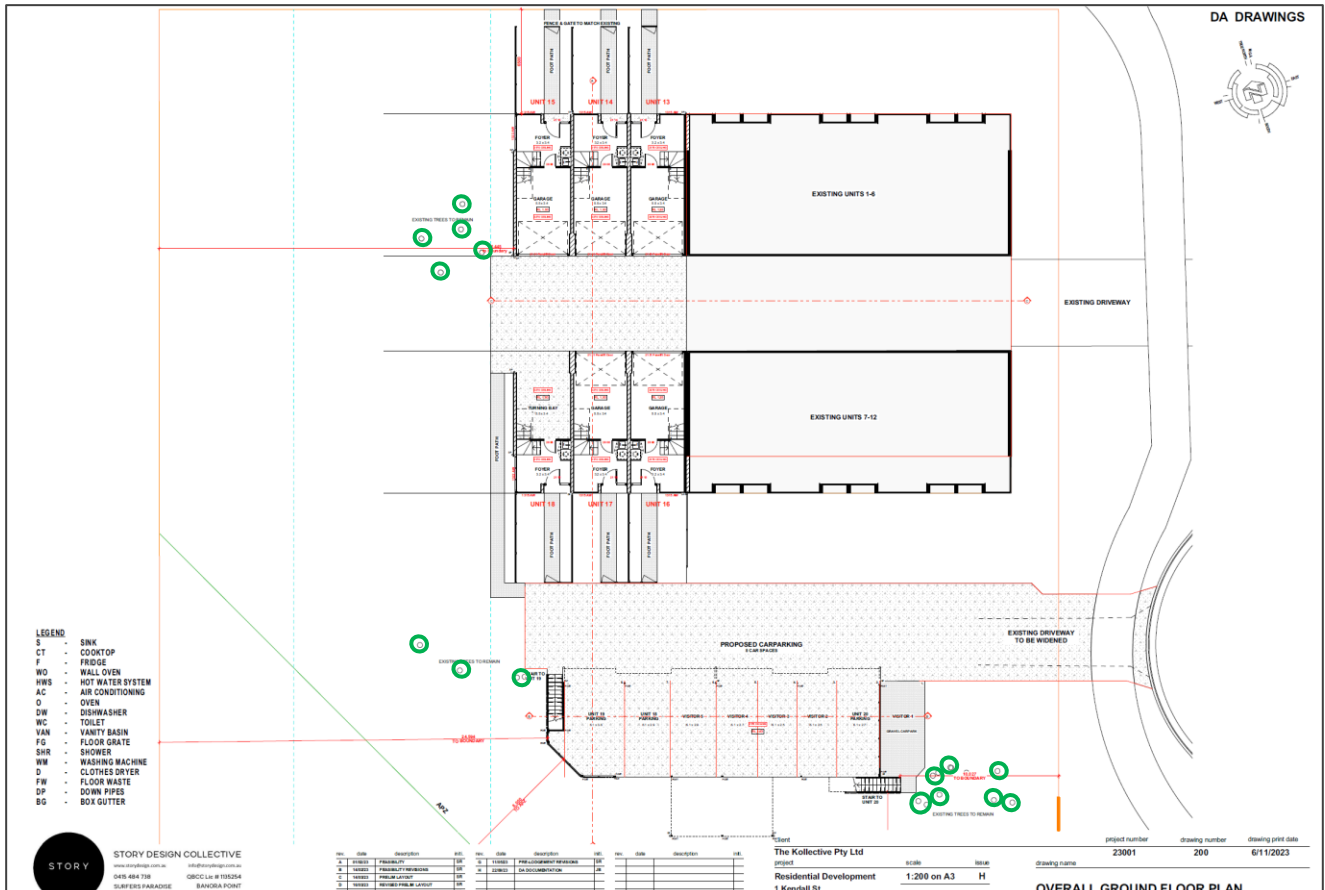


Figure 7: Trees to remain (green circled) with management as per report recommendations



Figure 8: Bushfire threat analysis

Source: Nearmap, 17.03.2023

Boundary & proposed buildings (white/red icons) approximate location, not to scale or design, for illustrative purposes only. Existing building northeast corner (purple dashed).

The following table summarises the category of bushfire attack pursuant to Planning for Bushfire Protection 2019.

Table 1: Summary Bushfire Threat Assessment, APZs & Construction Standards					
ASPECT	SLOPE	VEG. CLASS Figure A1.2 PBP2019	APZ REQUIRED Table A1.12.6 PBP2019	APZ RECOMMENDED	CONSTRUCTION AS 3959-2018
North	To the north is a 30m wide non-hazard road reserve being Ewingsdale Road and then remnant vegetation and grassland located on relatively flat ground. The bushfire hazard is approximately 40m from the proposed northern building and approximately 70m from the proposed southern building.				
	Flat	Remnant Grassland	<u>Northern Building</u> 14m 14m	<u>Northern Building</u> To the boundary (managed road reserve 30m wide)	<u>Northern Building</u> BAL 19 + s.7.5 PBP 2019 (dictated by west)
		Remnant Grassland	<u>Southern Building</u> 9m 10m	<u>Southern Building</u> 10m	<u>Southern Building</u> BAL 29 + s.7.5 PBP 2019 (dictated by west)
East	To the east is a non-hazard road reserve being Kendall Street and then managed residential properties. To the southeast adjacent to the cul-de-sac is a reasonably well managed area with a formed pathway leading to Byron Street.				
	n/a	Non-hazard and managed land	<u>Northern Building</u> n/a	<u>Northern Building</u> n/a (existing building)	<u>Northern Building</u> BAL 19 + s.7.5 PBP 2019
			<u>Southern Building</u> n/a	<u>Southern Building</u> To the boundary	<u>Southern Building</u> BAL 29 + s.7.5 PBP 2019 (dictated by south)
South, Southwest & West	<p>The vegetation to the south and west of the proposed buildings is Forested Wetland (excluding Coastal Swamp Forest) located on relatively flat ground. This vegetation formation is consistent with ecological advice received by Biodiversity Assessments & Solutions Pty Ltd on 10 March 2023 which assessed the vegetation as consistent with Coastal Floodplain Wetland with some small patches of Swamp Sclerophyll vegetation identified greater than 70m from the boundary of the subject property as shown in Figure 5 (full ecological advice in Appendix B).</p> <p>Some trees will be required to be removed to facilitate the location of the buildings however identified trees in Figure 7 can remain with a recommendation requiring pruning of existing trees where overhanging or touching the proposed buildings and the understorey to be managed as an IPA.</p> <p>The approved APZ for the existing building for development consent No. 10.2015.398.1 is shown in Figure 9.</p>				

	Flat	Forested Wetland	<u>Northern Building</u> 12m	<u>Northern Building</u> 12m	<u>Northern Building</u> BAL 19 + s.7.5 PBP 2019 (dictated by southwest)
		Forested Wetland	<u>Southern Building</u> 8m	<u>Southern Building</u> 8m	<u>Southern Building</u> BAL 29 + s.7.5 PBP 2019 (dictated by southwest)



Forested Wetland with grassy understorey to the south and west of the property.



Trees in APZ to the west in northern precinct



Trees in APZ in southern precinct



Existing trees within the previously approved Inner Protection Area will be adequate to support the recommended APZ setbacks.

Figure 9 provides a visual demonstration that the proposed buildings are located to ensure the recommended APZs (IPA) are within the previously approved Inner Protection Areas thereby not requiring further assessment of the IPA structure.

It is noted though, the previous condition required –

“A Vegetation Management Plan (VMP) is to be created which specifically identifies the existing trees and method of fuel management”. (development consent No. 10.2015.398)

In this regard, the VMP will need to be amended to reflect the proposed development layout and setbacks. The amended VMP will need to identify actions relating to any required tree pruning to ensure tree canopies do not touch or overhang the proposed buildings and that the understorey of trees to remain is managed as an IPA.

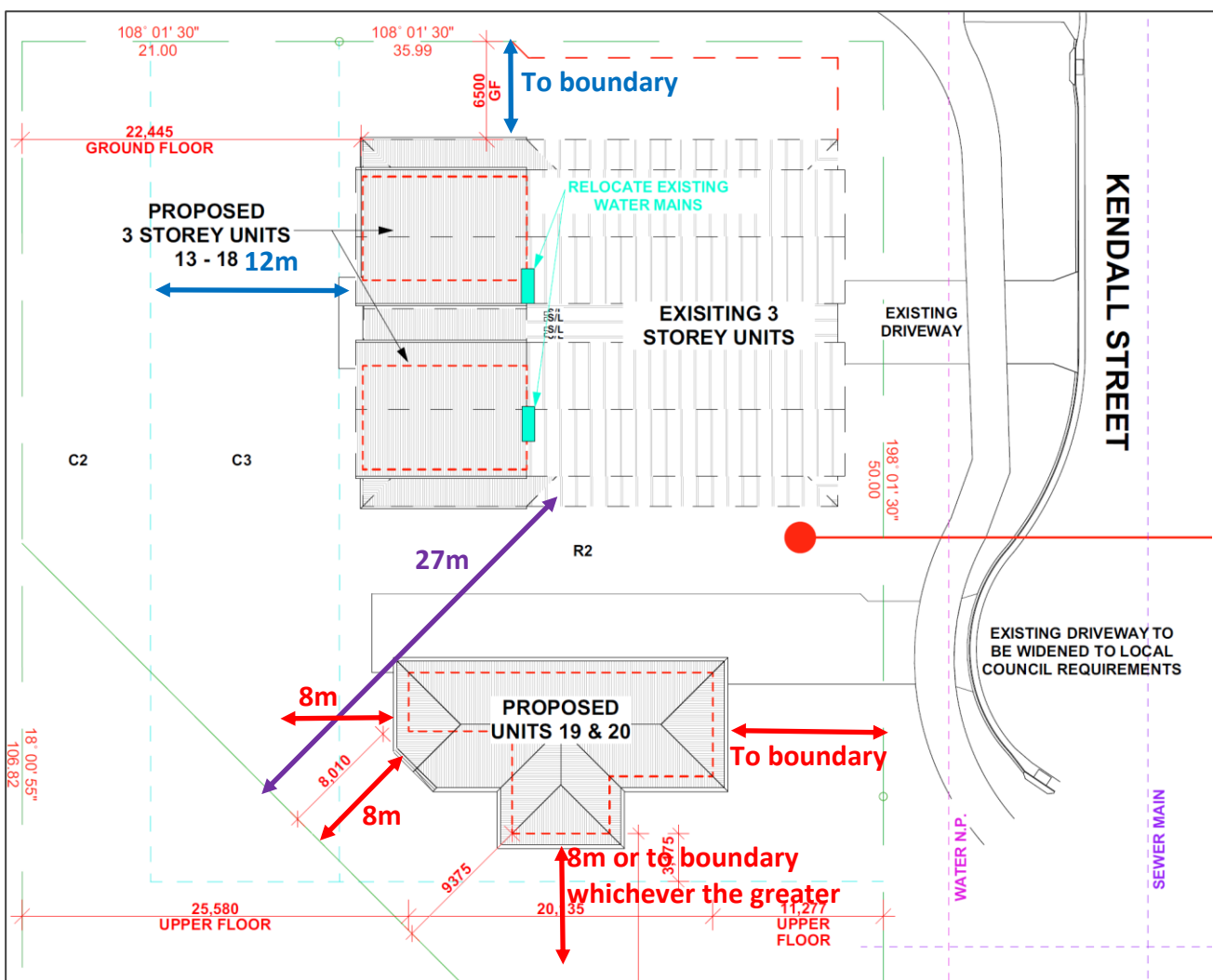


Figure 9: Demonstration that the proposed buildings are located to ensure the recommended APZs (IPA) of southern building (red arrows) and northern building (blue arrows) are within the previously approved IPA areas.

4.0 ACCESS AND WATER SUPPLY

The property access is provided by way of Kendall Street providing access from the public road system giving fire fighters access to the proposed buildings.

The access table in Section 7.4 of Planning for Bushfire Protection 2019 does not require specific access requirements where the access from the public road supporting hydrants to the most distant part of a building has an unobstructed path of 70m. In this respect it is considered a standard driveway/s will be acceptable.

A reticulated water supply and street hydrants provide coverage of the development in accordance with AS 2419.1 – 2021. It is noted that hydrant pressures and flows have not been tested as part of this report.

5.0 ELECTRICITY AND GAS SERVICES

New electrical transmission lines if required are to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 as follows:

- where practicable, electrical transmission lines are underground; and
- where overhead, electrical transmission lines are proposed as follows:
 - lines are installed with short pole spacing (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 accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.

The following aspects are to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 should a gas service be considered:

- reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 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
- above-ground gas service pipes are metal, including and up to any outlets.

Additionally, gas installations are to comply with Clause 5.8 of AS 3959-2018. External gas pipes and fittings above ground shall be of steel or copper construction having a minimum wall thickness in accordance with gas regulations or 0.9mm whichever is greater. The metal pipe shall extend a minimum of 400mm within the building and 100mm below ground.

6.0 LANDSCAPING

Most buildings adversely impacted upon in a bushfire event happen through ember attack and in this regard combustible material surrounding the building e.g. landscaping can play a significant part during the event. Adequate management of landscaping is critical to the survivability of an asset and for occupant safety during a bushfire.

It is recommended that new landscaping is undertaken in accordance with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 as follows and managed and maintained for the life of the development.

- compliance with the NSW RFS 'Asset protection zone standards' (see Appendix 4 of PBP 2019);
- 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.

This office has not specifically assessed landscape plans. In this regard it is recommended the landscaping plans be accompanied by a design statement of compliance from the landscape designer, relevant to the recommendations in this report and to be assessed by the consent authority for compliance.

7.0 CONCLUSION

This assessment provides recommendations consistent with the acceptable solutions of Planning for Bushfire Protection 2019 as contained in Section 1 of this report. Further details to achieve conforming with Planning for Bushfire Protection will need to be provided to the consent authority as part of the assessment to demonstrate compliance with the recommendations of this report, particularly relating to any required tree pruning.

Detailed assessment of the plans for compliance with the recommended Bushfire Attack Level will need to be provided on plan submitted with the application for construction certificate and approved by a registered building certifier.

DISCLAIMER

This report was prepared for the purposes and exclusive use of the stated client to accompany an application to Byron Shire Council specifically relating to the proposed multi-storey residential buildings on the subject property and is not to be used for any other purpose or by any other person or Corporation. BCA Check Pty Ltd accepts no responsibility for any loss or damage suffered howsoever arising to any person or Corporation who may use or rely on this report in contravention of the terms of this clause. This report is not intended for or to be used where aluminium composite panels or intumescent paints are proposed. The report is not to be construed as an assessment of the building materials or compliance with the recommended bushfire attack level/s.

As identified in Planning for Bushfire Protection 2019 and the Building Code of Australia the report is to provide recommendations to reduce the risk of ignition and does not guarantee the complete protection of the building in the event of bush fire or that the building will not be adversely impacted upon.

Reporting has been based on the relevant Council and Rural Fire Service Guidelines. However, recommendations or suggestions given in this report are based on our site investigation at the time of reporting. In some cases site conditions may change dramatically within a few years due to rapid vegetation re-growth and invading weed species.

REFERENCES

Keith, D.A. (2004). *'Ocean Shores to Desert Dunes: The Native Vegetation of New South Wales and the ACT'*. NSW Department of Environment and Conservation.

NSW Rural Fire Service (2019), *Planning for bushfire protection, A guide for councils, planners, fire authorities and developers'*. November 2019, NSW Government.

Standards Australia, (2018), *AS3959 Construction of buildings in bushfire prone areas*, Australian Standards, Sydney.

LEGISLATION

Environmental Planning and Assessment Act 1979 and Regulations 2000. *New South Wales*. Parliamentary Counsel's Office, NSW Government Information Service.

Rural Fires Act 1997. *New South Wales*. Parliamentary Counsel's Office, NSW Government Information Service.

Rural Fires Regulation. *New South Wales*. Parliamentary Counsel's Office, NSW Government Information Service.

APPENDIX A: Site and architectural plans

SITE NOTES

GROUND SURFACE WATER

FALL GROUND 50mm MIN IN FIRST
100mm FROM BUILDING

THE HEIGHT OF SLAB ABOVE EXTERNAL
FINISHED SURFACE TO BE NOT LESS THAN:

- (A) 150mm ABOVE FINISHED GROUND LEVEL
(B) 100mm ABOVE SANDY WELL DRAINED AREAS
(C) 50mm ABOVE PAVED OR CONCRETE AREAS
WITH FALL AWAY FROM BUILDING

ROOF DRAINAGE

FACE GUTTERS TO HAVE A MIN. FALL OF 1:500
BOX GUTTERS TO HAVE A MIN. FALL OF 1:100

CATCHMENT AREA	GUTTER
30m ²	115mm D GUTTER
40m ²	125mm D GUTTER
50m ²	150mm D GUTTER
60m ²	150mm D GUTTER

DOWNPIPES

MIN. SIZE 90mm DIAMETER

MAX. SPACING OF DOWNPIPES IS 12m

DOWNPIPES TO BE FIXED AS CLOSE AS POSSIBLE
TO VALLEY GUTTERS & IF MORE THAN 1.2m FROM
THE VALLEY PROVISION FOR AN OVERFLOW IS
REQUIRED.

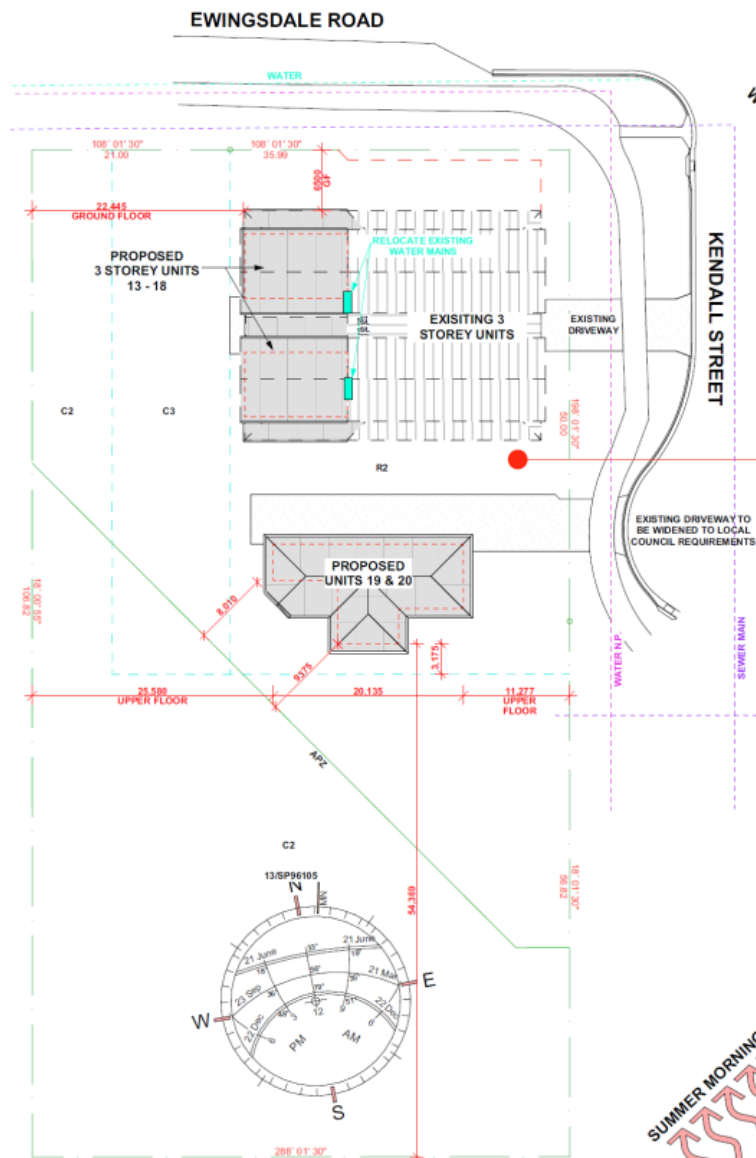
STORMWATER

STORMWATER TO LEGAL POINT OF DISCHARGE

STORMWATER LINES FOR 2 OR MORE DOWNPIPES
TO BE 100mm DIA. WITH ALL BRANCHES TO BE 90mm
DIA.

STORMWATER LINES SHALL BE TO A MIN. FALL OF 1:60
& WHERE POSSIBLE PLACED AS SHOWN.

100mm COVER TO STORMWATER DRAINAGE.
STORMWATER & SEWER TO HYDRAULIC CONSULTANT'S
INSTRUCTIONS.



PROPERTY DESCRIPTION

PROPOSED UNIT DEVELOPMENT
SP96105
1 KENDALL ST, BYRON BAY, NSW.

SITE AREA = 6,086.66 m²

AREA CALCULATIONS

SITE AREA = 6,086.66 m²

EXISTING AREAS

R2 SITE AREA = 1,100.00m²
EXISTING GFA = 564.00 m²
EXISTING SFR = 0.51:1

PROPOSED AREAS

R2 SITE AREA = 902.95 m²
PROPOSED GFA = 436.30 m²
PROPOSED FSR = 0.48:1

COMBINED AREAS

R2 SITE AREA = 2,002.95m²
COMBINED GFA = 1,000.04 m²
COMBINED FSR = 0.50:1

CARPARKING CALCULATIONS

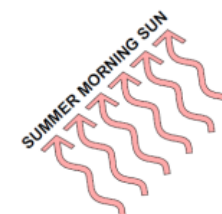
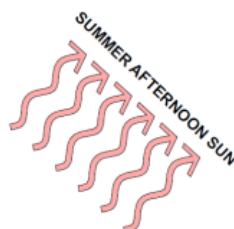
EXISTING CARSPACES = 12
EXISTING VISITOR = 4

PROPOSED CARSPACES =

VISITOR CARSPACES = 2

COMBINED CARSPACES =

COMBINED VISITOR = 6
TOTAL CARSPACES = 26



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www.storydesigncollective.com.au
0415 484 738
SURFERS PARADISE
BANORA POINT

rev	date	description	int	rev	date	description	int	rev	date	description	int
A	05/03/23	FEASIBILITY	SR	G	11/03/23	PRE-DOCUMENTATION REVISIONS	SR				
B	14/03/23	FEASIBILITY REVISIONS	SR	H	02/04/23	DA DOCUMENTATION	JB				
C	14/03/23	PRELIM LAYOUT	SR	I	05/11/23	SURVEY & CARPARKING REVISIONS	SR				
D	14/03/23	REVISED PRELIM LAYOUT	SR								
E	05/03/23	REVISED PRELIM LAYOUT	SR								
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client
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Byron Bay, NSW

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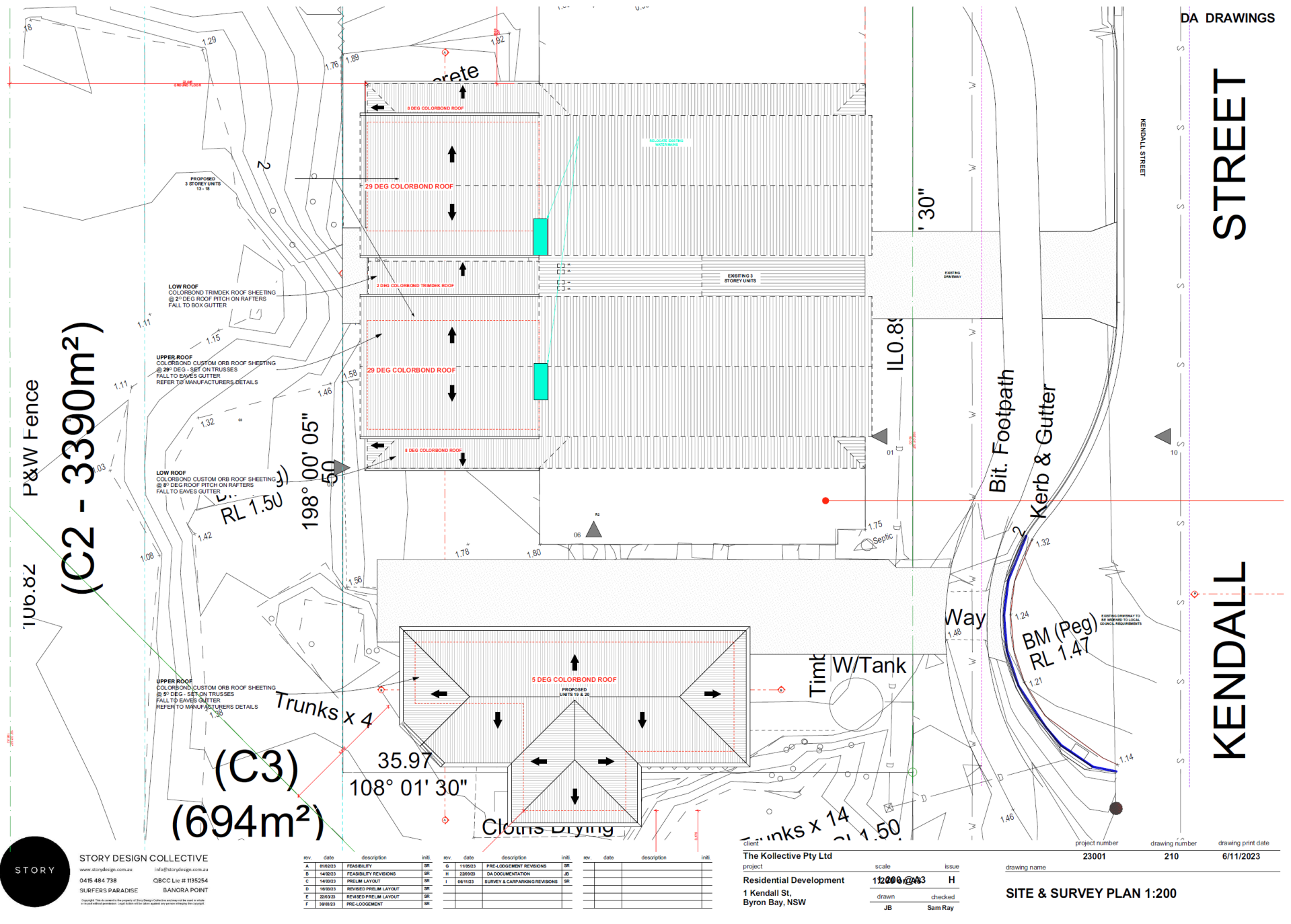
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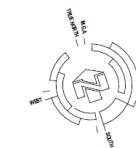
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23001
drawing number
107
drawing print date
6/11/2023

PROPOSED SITE PLAN 1:500

STREET

KENDALL STREET





- LEGEND**
- S - SINK
 - CT - COOKTOP
 - F - FRIDGE
 - WO - WALL OVEN
 - HWS - HOT WATER SYSTEM
 - AC - AIR CONDITIONING
 - O - OVEN
 - DW - DISHWASHER
 - WC - TOILET
 - VAN - VANITY BASIN
 - FG - FLOOR GRATE
 - SHR - SHOWER
 - WM - WASHING MACHINE
 - D - CLOTHES DRYER
 - FW - FLOOR WASTE
 - DP - DOWN PIPES
 - BG - BOX GUTTER



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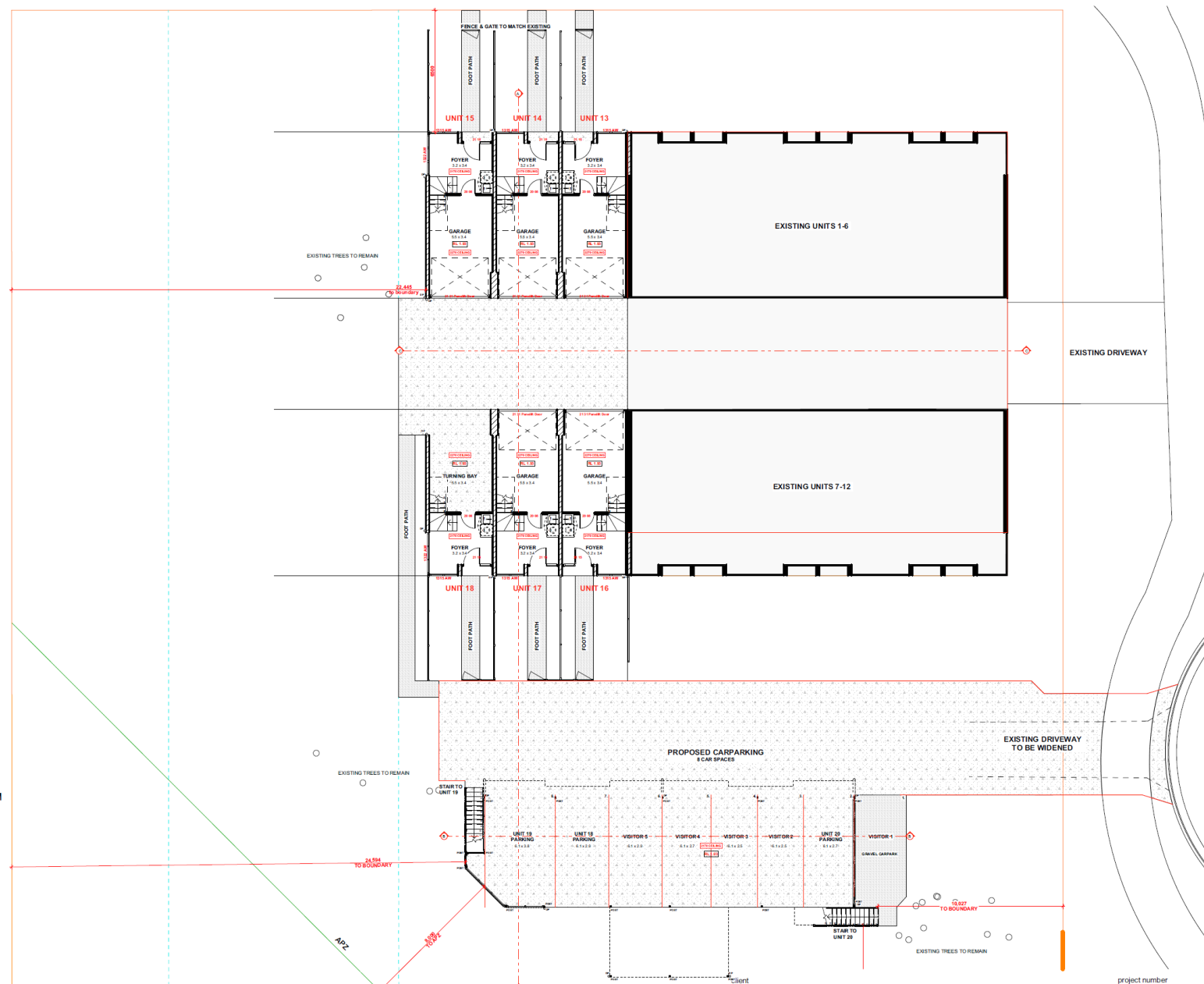
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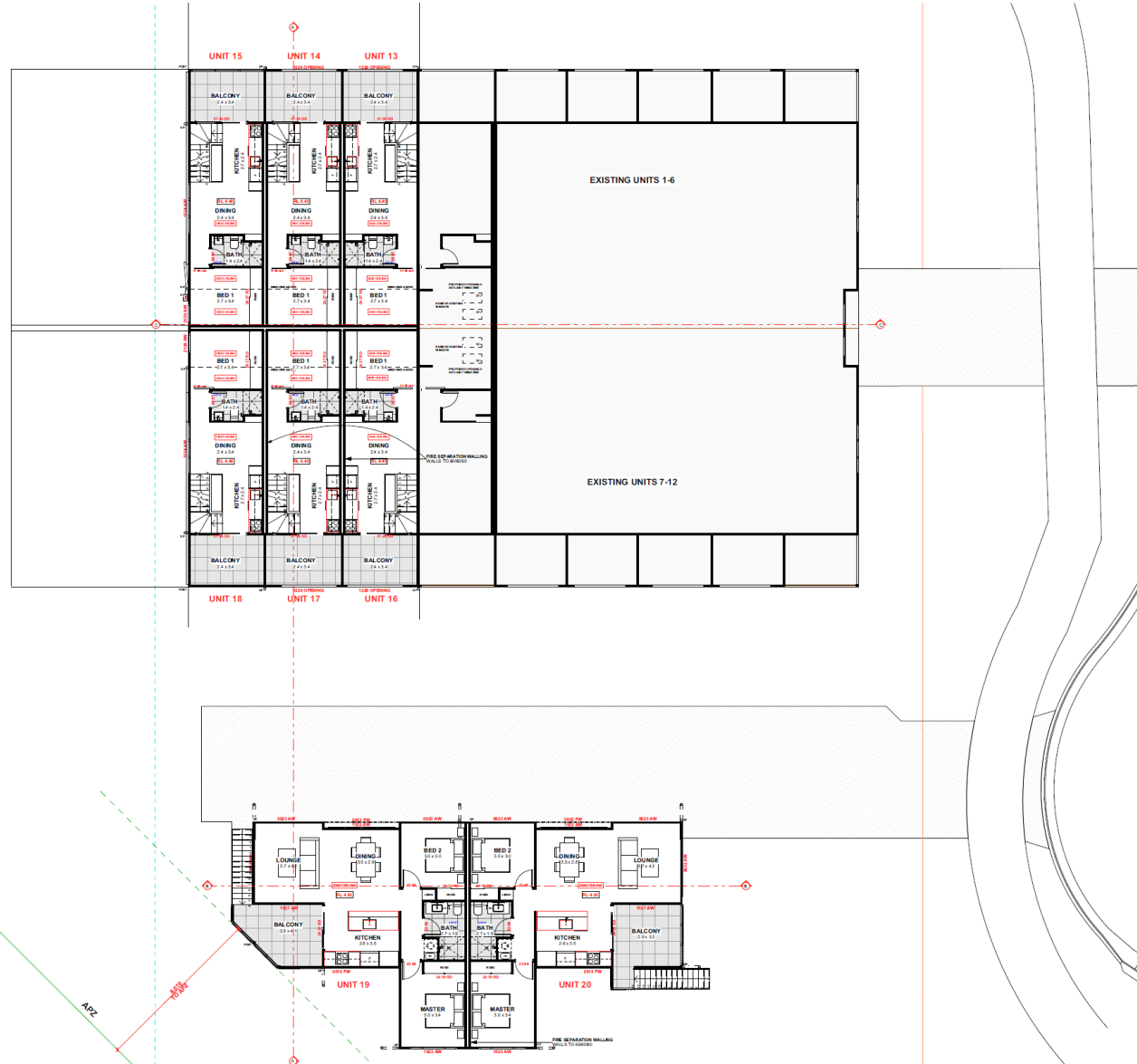
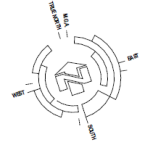
The Kollektive Pty Ltd
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OVERALL GROUND FLOOR PLAN





STORY

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client
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project
Residential Development

**1 Kendall St,
Byron Bay, NSW**

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OVERALL FIRST FLOOR PLAN

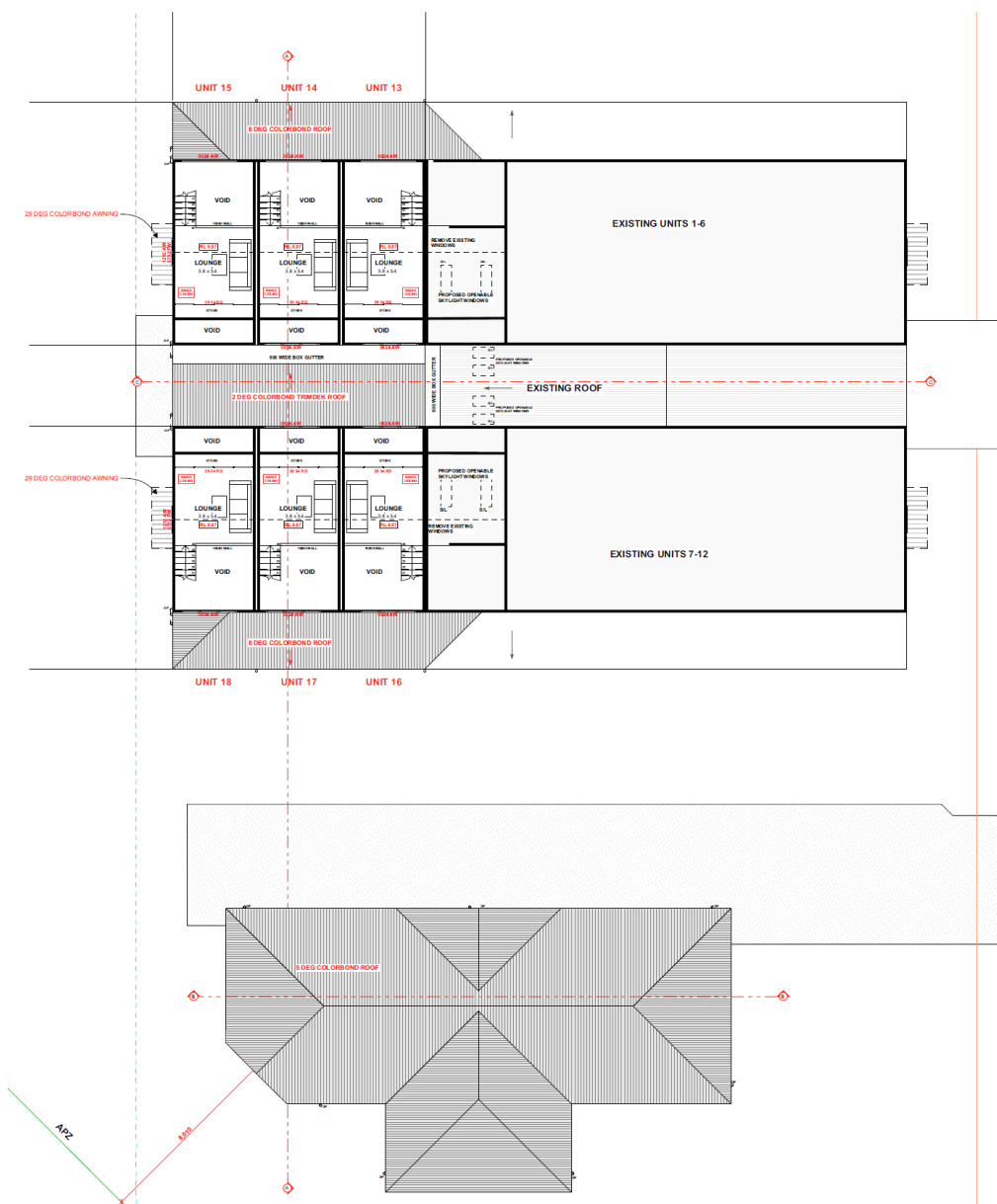
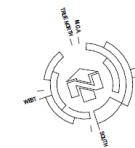
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The Collective Pty Ltd

project

Residential Development
 1 Kendall St,
 Byron Bay, NSW

project number

23001

drawing number

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drawing print date

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OVERALL SECOND FLOOR PLAN

22,445
to boundary

FOOT PATH

UNIT 18 AREA CALCULATIONS:	
<u>GROUND FLOOR</u>	
FOYER -	7.9m ²
<u>FIRST FLOOR</u>	
LIVING -	26.68m ²
BALCONY -	8.12m ²
<u>SECOND FLOOR</u>	
LIVING -	10.89m ²
<u>STORAGE</u>	
ALL FLOORS -	4.5m ²
<u>TOTAL AREA =</u>	58.09m ²



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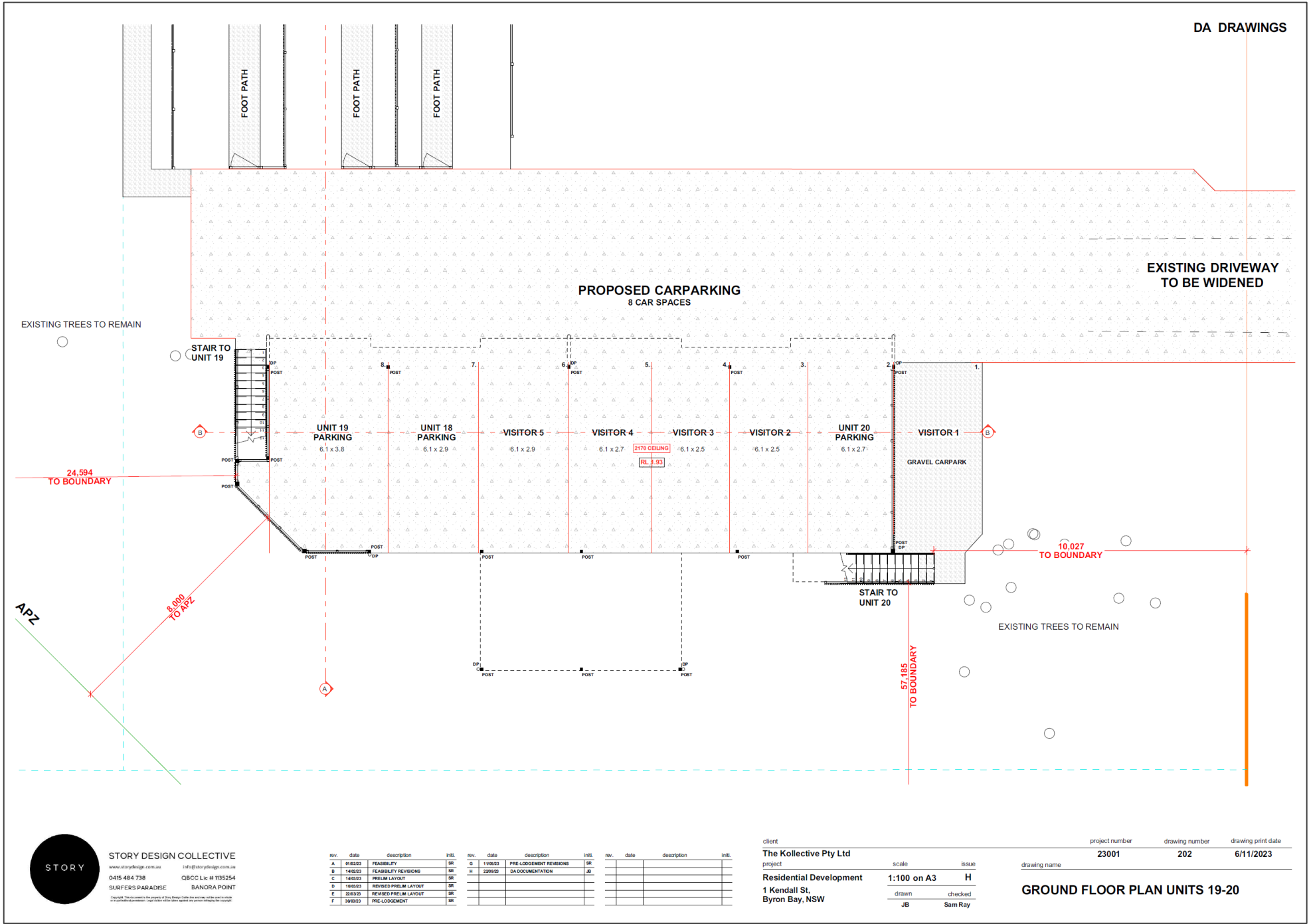
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GROUND FLOOR PLAN UNITS 13-18

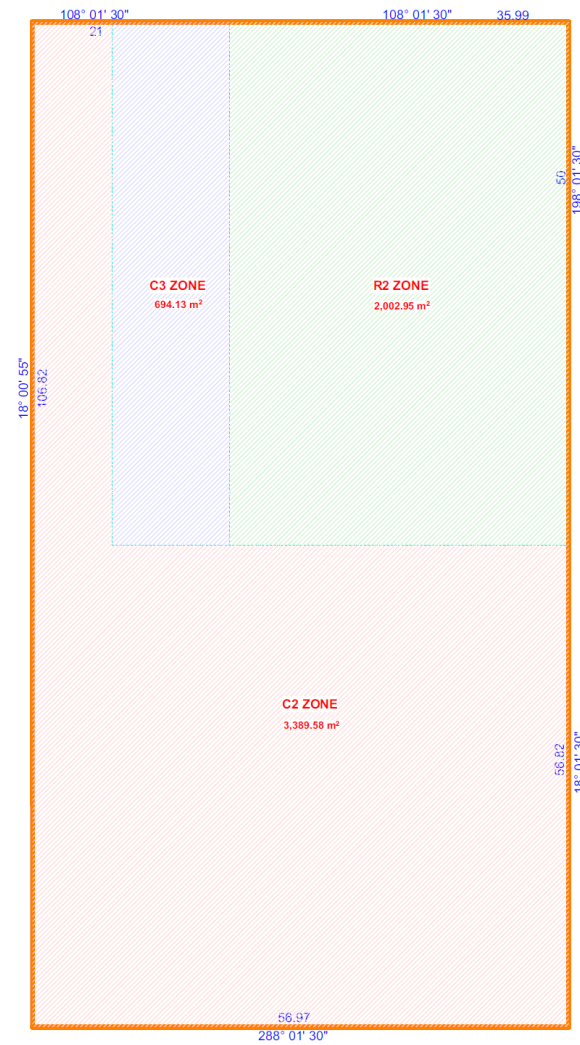
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1 Kendall St, Byron Bay, NSW	drawn SR	checked Sam Ray	

**APPENDIX B: Ecological Advice – Biodiversity Assessments & Solutions (BA&S) Pty
Ltd, dated 10.03.2023**

10th March 2023

Kollective Kendall Pty Ltd

Attn: Duncan Band

Ecological Advice - Vegetation Classification for 1 Kendall St, Byron Bay

Biodiversity Assessments & Solutions (BA&S) Pty Ltd has been asked to review the vegetation classification for the vegetation community within and adjacent to Lot 9 DP 96105, 1 Kendall Street Byron Bay. To inform this review, BA&S undertook a site inspection on the 9th March 2023, and reviewed previous ecological assessments relating to the site and land adjacent to it.

Vegetation beyond the existing footprint and managed vegetation area of 1 Kendall St is overwhelmingly dominated in the overstorey by Swamp Oak (*Casuarina glauca*), with an understorey dominated by Common Reed (*Phragmites australis*), Bare Twig-rush (*Machaerina juncea*) or exotic *Paspalum* spp., with occasional patches of Mangrove Fern (*Acrostichum speciosum*). The vegetation assemblage indicates the significant influence that estuarine water plays in flora species present, fed by a large drain containing mangroves (Plate 4), located approx. 15 - 20 m south of the subject land.

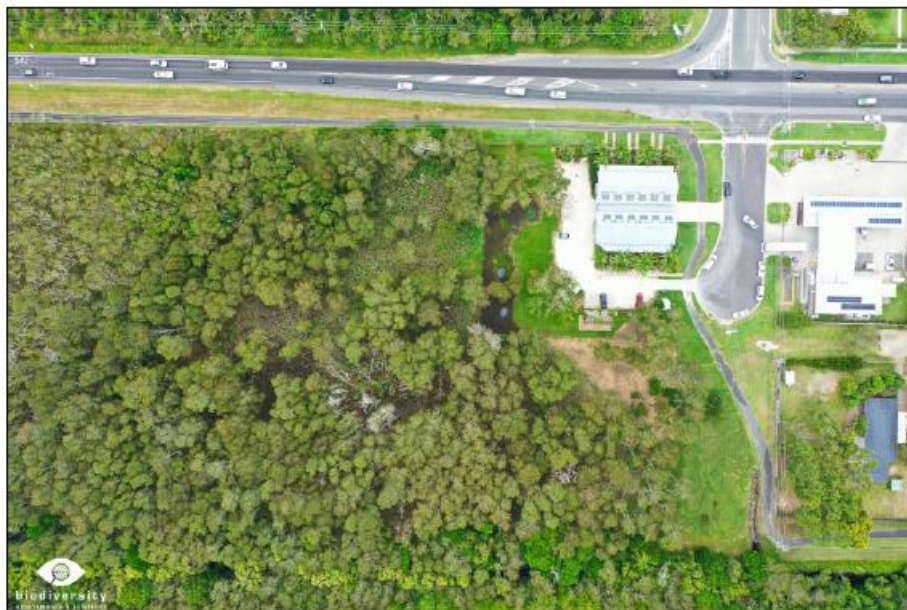


Plate 1: Aerial showing Swamp Oak woodland to the west (left) and south (bottom) of the building, with the line of mangroves along the estuarine drain seen at the bottom of the plate.

Rare to occasional rainforest species including Tuckeroo (*Cupaniopsis anacardioides*) appear in the mid storey. Vegetation within the subject land to the south of the existing development is already being managed as an Asset Protection Zone (APZ) (Plate 2).

The vegetation observed is most closely aligned with the *Coastal Floodplain Wetland* vegetation formation described in Keith (2004), within the *Forested Wetlands* vegetation class. An absence of

species such as Broad-leaved Paperbark (*Melaleuca quinquenervia*) or Swamp Mahogany (*Eucalyptus robusta*) indicates that vegetation adjacent to the subject land is NOT analogous with the description in Keith (2004) for the vegetation formation *Coastal Swamp Forest*.

Areas more analogous with Swamp Sclerophyll vegetation (containing *Melaleuca quinquenervia*) occur in small patches within the assessment circle (Attachment 1), however these areas are >70 m from the boundary of the subject land.



Plate 2: Vegetation on the southern portion of the subject land with a Swamp Oak canopy and Common Reed understorey, with managed APZ identifiable on the left side of Plate 1.



Plate 3: Vegetation to the south and west is a Swamp Oak canopy and Common Reed understorey.

The opinion of the author is supported by previous ecological assessments undertaken for the subject land which described the adjacent vegetation as Swamp Oak Woodland (Parker 2011 and Parker 2015), which again, aligns most closely with the vegetation formation *Coastal Floodplain Wetland* described in Keith (2004).



Plate 4: Large drain with mangroves located approx. 15m south of subject land southern boundary.



Plate 5: Mangrove Fern, Bare Twig-rush and Swamp Oak are all saline tolerant species which demonstrate tidal influence within the Swamp Oak woodland.

In conclusion, following the site assessment and literature review, it is considered that the vegetation associated with the subject land and adjacent vegetation is analogous with the description in Keith (2004) for *Coastal Floodplain Wetland*.

Attachment 1 shows the vegetation assemblages within a 140 m assessment buffer from the subject land boundary.

Please don't hesitate to contact me should you require further information.

Regards

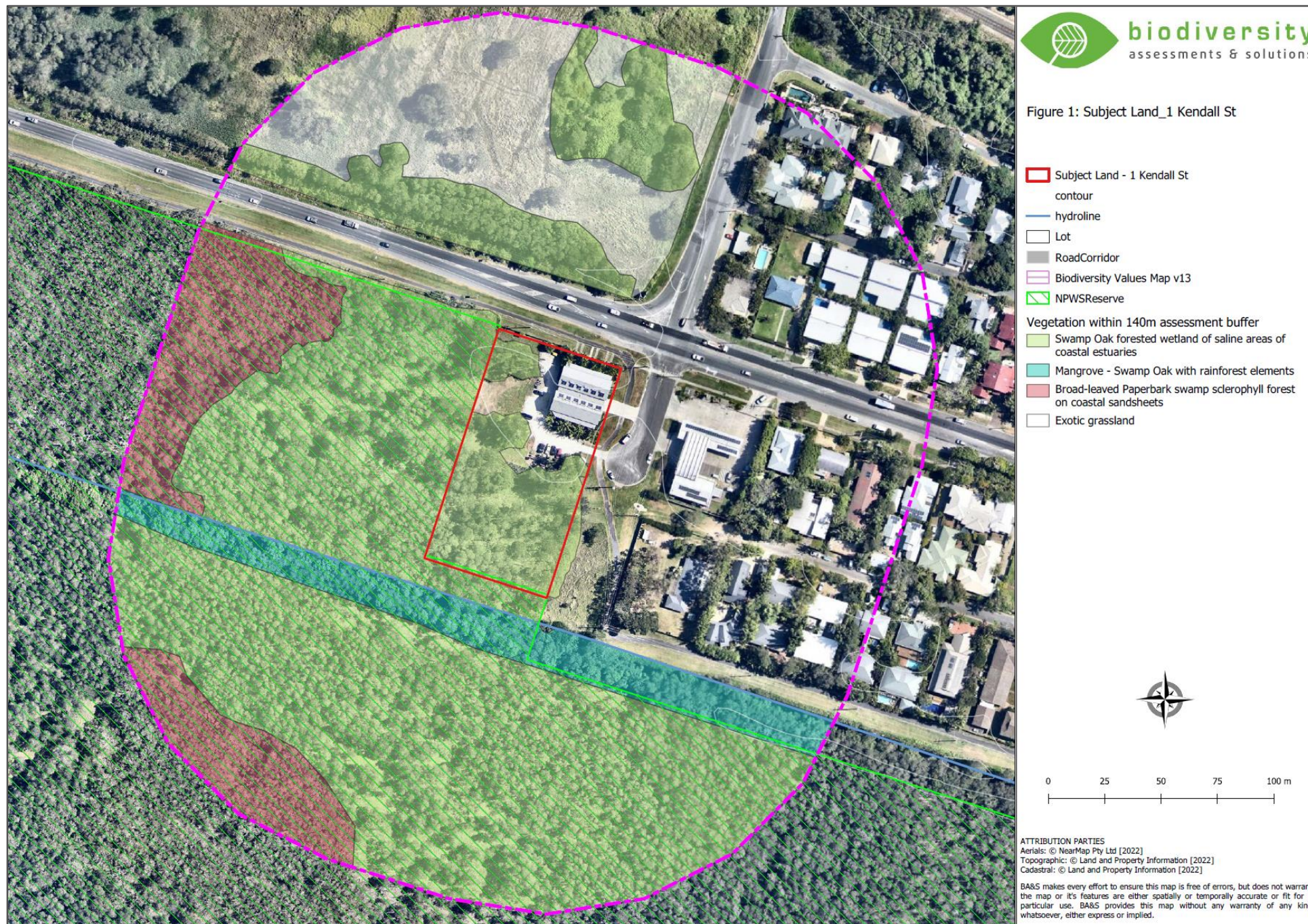


Adam Gosling

M: 0435 868 791

E: adam@biodiversityassessments.com.au

Attachment 1: Vegetation Mapping



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 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 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.

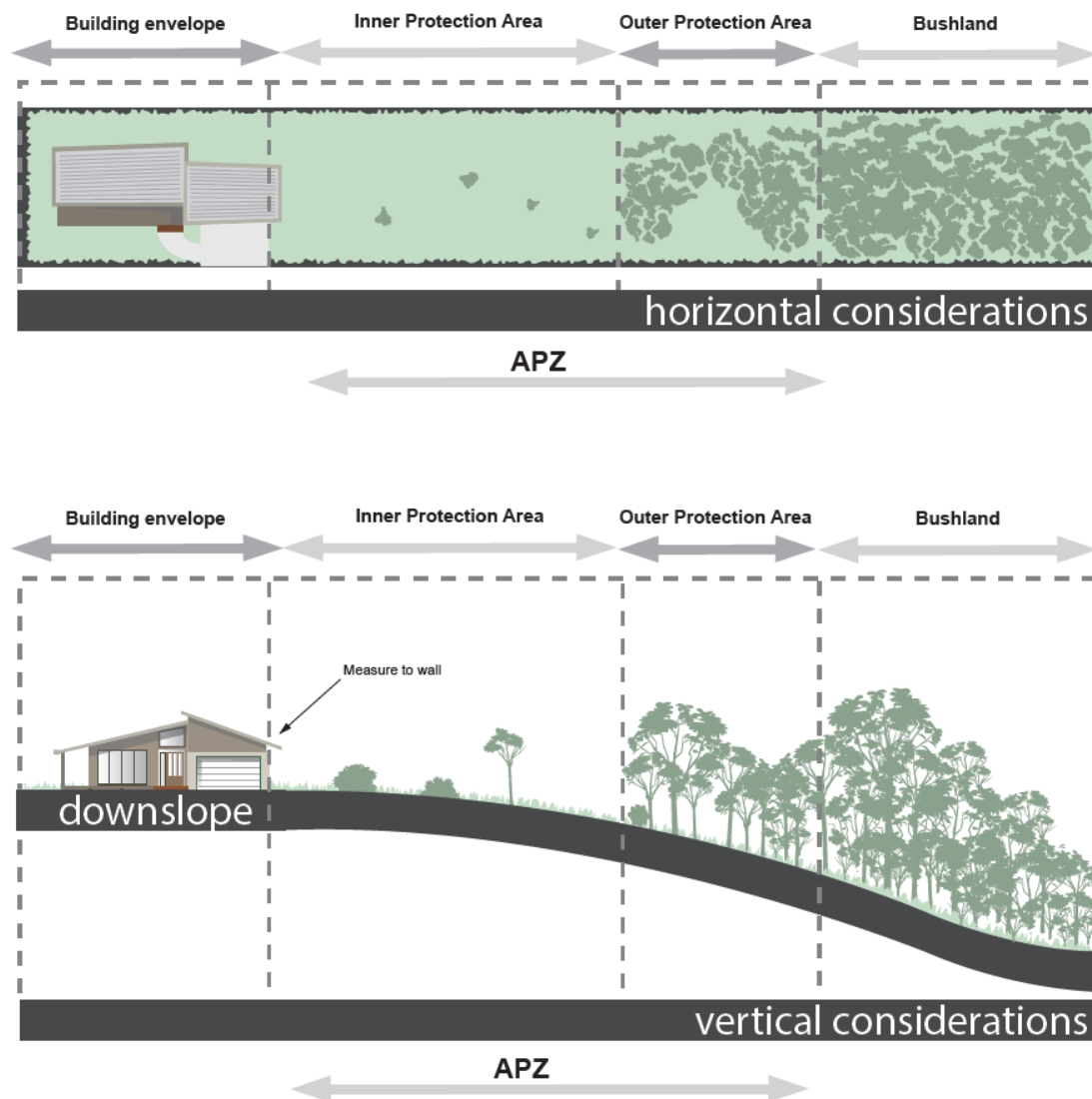
Grass

- 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.



APPENDIX D: Standards for Asset Protection Zones (RFS 2005)

standards

for asset protection zones

protection

NSW RURAL FIRE SERVICE



STANDARDS FOR ASSET PROTECTION ZONES

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WHAT IS AN ASSET PROTECTION ZONE?	3
WHAT WILL THE APZ DO?	3
WHERE SHOULD I PUT AN APZ?	4
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STEP 2. DETERMINE WHAT APPROVALS ARE REQUIRED FOR CONSTRUCTING YOUR APZ.....	5
STEP 3. DETERMINE ASSET PROTECTION ZONE WIDTH	5
STEP 4. DETERMINE WHAT HAZARD REDUCTION METHOD IS REQUIRED TO REDUCE BUSH FIRE FUEL IN YOUR APZ	6
STEP 5. TAKE MEASURES TO PREVENT SOIL EROSION	9
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INTRODUCTION

For thousands of years bush fires have been a natural part of the Australian landscape. They are inevitable and essential, as many Australian plants and animals have adapted to fire as part of their life cycle.

In recent years developments in bushland areas have increased the risk of bush fires harming people and their homes and property. But landowners can significantly reduce the impact of bush fires on their property by identifying and minimising bush fire hazards. There are a number of ways to reduce the level of hazard to your property, but one of the most important is the creation and maintenance of an Asset Protection Zone (APZ).

A well located and maintained APZ should be used in conjunction with other preparations such as good property maintenance, appropriate building materials and developing a family action plan.

WHAT IS AN ASSET PROTECTION ZONE?

An Asset Protection Zone (APZ) is a fuel reduced area surrounding a built asset or structure. This can include any residential building or major building such as farm and machinery sheds, or industrial, commercial or heritage buildings.

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 may 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.

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.

WHAT WILL THE APZ DO?

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; and
- ember attack on the asset.

3

WHERE SHOULD I PUT AN APZ?

An APZ is located between an asset and a bush fire hazard.

The APZ should be located wholly within your land. You cannot undertake any clearing of vegetation on a neighbour's property, including National Park estate, Crown land or land under the management of your local council, unless you have written approval.

If you believe that the land adjacent to your property is a bush fire hazard and should be part of an APZ, you can have the matter investigated by contacting the NSW Rural Fire Service (RFS).

There are six steps to creating and maintaining an APZ. These are:

1. Determine if an APZ is required;
2. Determine what approvals are required for constructing your APZ;
3. Determine the APZ width required;
4. Determine what hazard reduction method is required to reduce bush fire fuel in your APZ;
5. Take measures to prevent soil erosion in your APZ; and
6. Landscape and regularly monitor in your APZ for fuel regrowth.

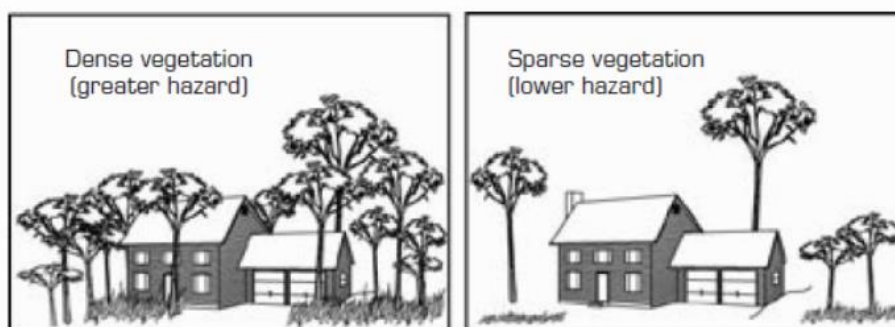
STEP 1. DETERMINE IF AN APZ IS REQUIRED

Recognising that a bush fire hazard exists is the first step in developing an APZ for your property.

If you have vegetation close to your asset and you live in a bush fire prone or high risk area, you should consider creating and maintaining an APZ.

Generally, the more flammable and dense the vegetation, the greater the hazard will be. However, the hazard potential is also influenced by factors such as slope.

- A large area of continuous vegetation on sloping land may increase the potential bush fire hazard.
- The amount of vegetation around a house will influence the intensity and severity of a bush fire.
- The higher the available fuel the more intense a fire will be.



Isolated areas of vegetation are generally not a bush fire hazard, as they are not large enough to produce fire of an intensity that will threaten dwellings.

This includes:

- bushland areas of less than one hectare that are isolated from large bushland areas; and
- narrow strips of vegetation along road and river corridors.

If you are not sure if there is a bush fire hazard in or around your property, contact your local NSW Rural Fire Service Fire Control Centre or your local council for advice.

STEP 2. DETERMINE WHAT APPROVALS ARE REQUIRED FOR CONSTRUCTING YOUR APZ

If you intend to undertake bush fire hazard reduction works to create or maintain an APZ you must gain the written consent of the landowner.

Subdivided land or construction of a new dwelling

If you are constructing an APZ for a new dwelling you will need to comply with the requirements in *Planning for Bushfire Protection*. Any approvals required will have to be obtained as part of the Development Application process.

Existing asset

If you wish to create or maintain an APZ for an existing structure you may need to obtain an environmental approval. The RFS offers a free environmental assessment and certificate issuing service for essential hazard reduction works. For more information see the RFS document *Application Instructions for a Bush Fire Hazard Reduction Certificate* or contact your local RFS Fire Control Centre to determine if you can use this approval process.

Bear in mind that all work undertaken must be consistent with any existing land management agreements (e.g. a conservation agreement, or property vegetation plan) entered into by the property owner.

If your current development consent provides for an APZ, you do not need further approvals for works that are consistent with this consent.

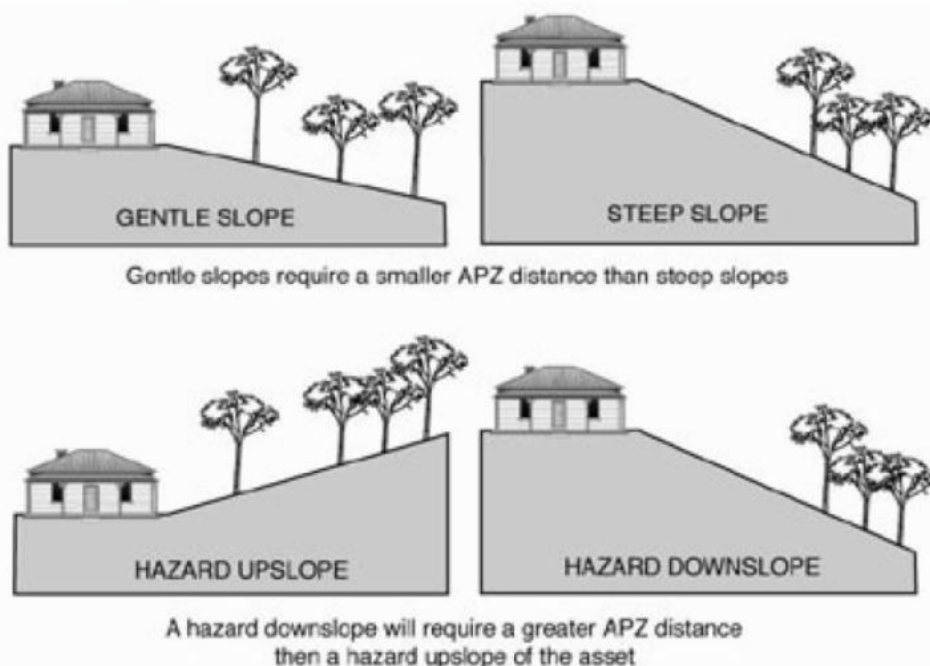
If you intend to burn off to reduce fuel levels on your property you may also need to obtain a Fire Permit through the RFS or NSW Fire Brigades. See the RFS document *Before You Light That Fire* for an explanation of when a permit is required.

STEP 3. DETERMINE THE APZ WIDTH

The size of the APZ required around your asset depends on the nature of the asset, the slope of the area, the type and structure of nearby vegetation and whether the vegetation is managed.

Fires burn faster uphill than downhill, so the APZ will need to be larger if the hazard is downslope of the asset.

5



Different types of vegetation (for example, forests, rainforests, woodlands, grasslands) behave differently during a bush fire. For example, a forest with shrubby understorey is likely to result in a higher intensity fire than a woodland with a grassy understorey and would therefore require a greater APZ width.

A key benefit of an APZ is that it reduces radiant heat and the potential for direct flame contact on homes and other buildings. Residential dwellings require a wider APZ than sheds or stockyards because the dwelling is more likely to be used as a refuge during bush fire.

Subdivided land or construction of a new dwelling

If you are constructing a new asset, the principles of *Planning for Bushfire Protection* should be applied. Your Development Application approval will detail the exact APZ distance required.

Existing asset

If you wish to create an APZ around an existing asset and you require environmental approval, the Bush Fire Environmental Assessment Code provides a streamlined assessment process. Your Bush Fire Hazard Reduction Certificate (or alternate environmental approval) will specify the maximum APZ width allowed.

For further information on APZ widths see *Planning for Bushfire Protection* or the *Bush Fire Environmental Assessment Code* (available on the RFS website), or contact your local RFS Fire Control Centre.

STEP 4. DETERMINE WHAT HAZARD REDUCTION METHOD IS REQUIRED TO REDUCE BUSH FIRE FUEL IN YOUR APZ

The intensity of bush fires can be greatly reduced where there is little to no available fuel for burning. In order to control bush fire fuels you can reduce, remove or change the state of the fuel through several means.

Reduction of fuel does not require removal of all vegetation, which would cause environmental damage. Also, trees and plants can provide you with some bush fire protection from strong winds, intense heat and flying embers (by filtering embers) and changing wind patterns. Some ground cover is also needed to prevent soil erosion.

Fuels can be controlled by:

1. raking or manual removal of fine fuels

Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter) and bark should be removed on a regular basis. This is fuel that burns quickly and increases the intensity of a fire.

Fine fuels can be removed by hand or with tools such as rakes, hoes and shovels.

2. mowing or grazing of grass

Grass needs to be kept short and, where possible, green.

3. removal or pruning of trees, shrubs and understorey

The control of existing vegetation involves both selective fuel reduction (removal, thinning and pruning) and the retention of vegetation.

Prune or remove trees so that you do not have a continuous tree canopy leading from the hazard to the asset. Separate tree crowns by two to five metres. A canopy should not overhang within two to five metres of a dwelling.

Native trees and shrubs should be retained as clumps or islands and should maintain a covering of no more than 20% of the area.

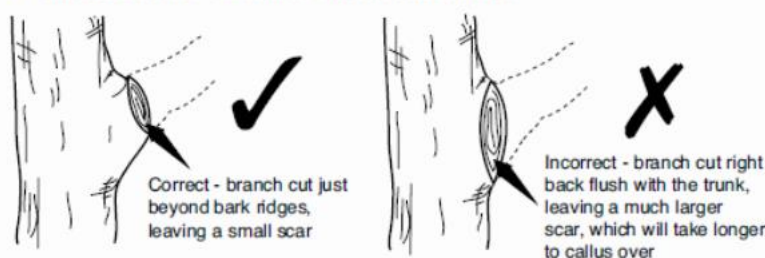
When choosing plants for removal, the following basic rules should be followed:

1. Remove noxious and environmental weeds first. Your local council can provide you with a list of environmental weeds or 'undesirable species'. Alternatively, a list of noxious weeds can be obtained at www.agric.nsw.gov.au/noxiousweed/;
2. Remove more flammable species such as those with rough, flaky or stringy bark; and
3. Remove or thin understorey plants, trees and shrubs less than three metres in height

The removal of significant native species should be avoided.

Prune in accordance with the following standards:

- Use sharp tools. These will enable clean cuts and will minimise damage to the tree.
- Decide which branches are to be removed before commencing work. Ensure that you maintain a balanced, natural distribution of foliage and branches.
- Remove only what is necessary.
- Cut branches just beyond bark ridges, leaving a small scar.
- Remove smaller branches and deadwood first.



There are three primary methods of pruning trees in APZs:

1. Crown lifting (skirting)

Remove the lowest branches (up to two metres from the ground). Crown lifting may inhibit the transfer of fire between the ground fuel and the tree canopy.

2. Thinning

Remove smaller secondary branches whilst retaining the main structural branches of the tree. Thinning may minimise the intensity of a fire.

3. Selective pruning

Remove branches that are specifically identified as creating a bush fire hazard (such as those overhanging assets or those which create a continuous tree canopy). Selective pruning can be used to prevent direct flame contact between trees and assets.

Your Bush Fire Hazard Reduction Certificate or local council may restrict the amount or method of pruning allowed in your APZ.

See the *Australian Standard 4373 (Pruning of Amenity Trees)* for more information on tree pruning.

4. Slashing and trittering

Slashing and trittering are economical methods of fuel reduction for large APZs that have good access. However, these methods may leave large amounts of slashed fuels (grass clippings etc) which, when dry, may become a fire hazard. For slashing or trittering to be effective, the cut material must be removed or allowed to decompose well before summer starts.

If clippings are removed, dispose of them in a green waste bin if available or compost on site (dumping clippings in the bush is illegal and it increases the bush fire hazard on your or your neighbour's property).

Although slashing and trittering are effective in inhibiting the growth of weeds, it is preferable that weeds are completely removed.

Care must be taken not to leave sharp stakes and stumps that may be a safety hazard.

5. Ploughing and grading

Ploughing and grading can produce effective firebreaks. However, in areas where this method is applied, frequent maintenance may be required to minimise the potential for erosion. Loose soil from ploughed or graded ground may erode in steep areas, particularly where there is high rainfall and strong winds.

6. Burning (hazard reduction burning)

Hazard reduction burning is a method of removing ground litter and fine fuels by fire. Hazard reduction burning of vegetation is often used by land management agencies for broad area bush fire control, or to provide a fuel reduced buffer around urban areas.

Any hazard reduction burning, including pile burns, must be planned carefully and carried out with extreme caution under correct weather conditions. Otherwise there is a real danger that the fire will become out of control. More bush fires result from escaped burning off work than from any other single cause.

It is YOUR responsibility to contain any fire lit on your property. If the fire escapes your property boundaries you may be liable for the damage it causes.

Hazard reduction burns must therefore be carefully planned to ensure that they are safe, controlled, effective and environmentally sound. There are many factors that need to be considered in a burn plan. These include smoke control, scorch height, frequency of burning and cut off points (or control lines) for the fire. For further information see the RFS document *Standards for Low Intensity Bush Fire Hazard Reduction Burning*, or contact your local RFS for advice.

7. Burning (pile burning)

In some cases, where fuel removal is impractical due to the terrain, or where material cannot be disposed of by the normal garbage collection or composted on site, you may use pile burning to dispose of material that has been removed in creating or maintaining an APZ.

For further information on pile burning, see the RFS document *Standards for Pile Burning*.

In areas where smoke regulations control burning in the open, you will need to obtain a Bush Fire Hazard Reduction Certificate or written approval from Council for burning. During the bush fire danger period a Fire Permit will also be required. See the RFS document *Before You Light that Fire* for further details.

STEP 5. TAKE MEASURES TO PREVENT SOIL EROSION

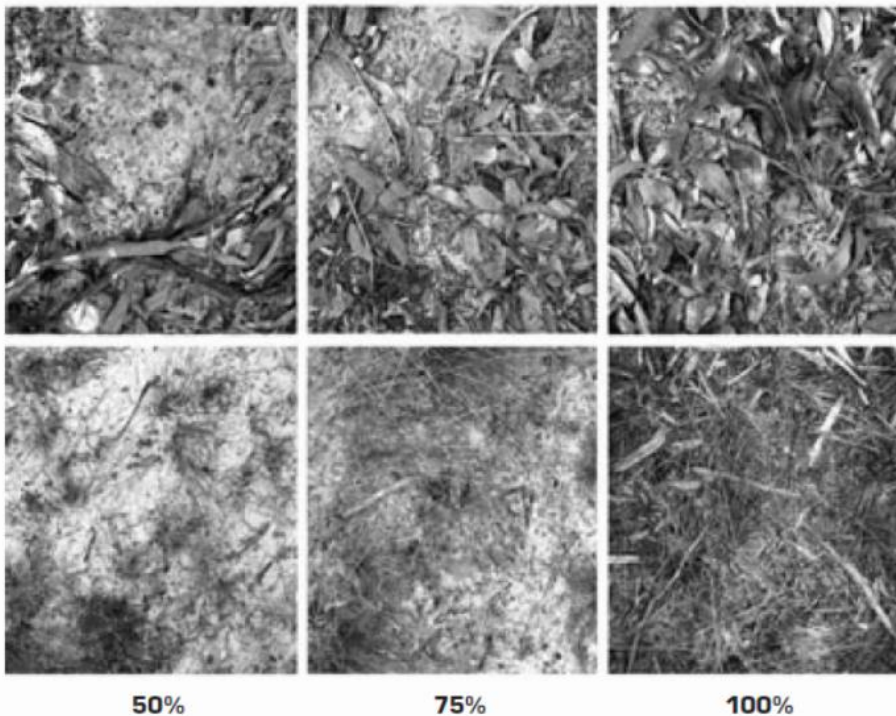
While the removal of fuel is necessary to reduce a bush fire hazard, you also need to consider soil stability, particularly on sloping areas.

Soil erosion can greatly reduce the quality of your land through:

- loss of top soil, nutrients, vegetation and seeds
- reduced soil structure, stability and quality
- blocking and polluting water courses and drainage lines

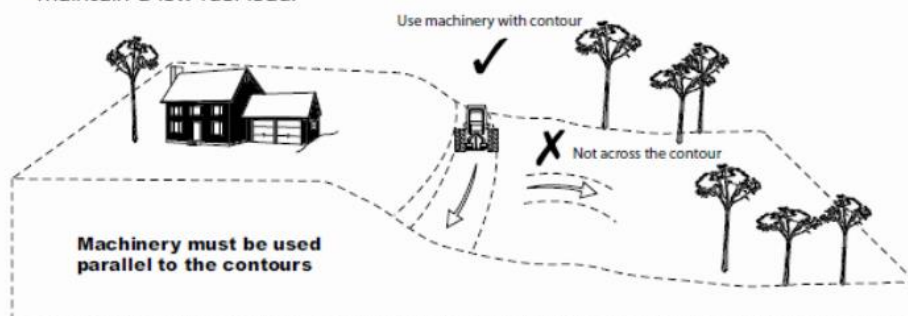
A small amount of ground cover can greatly improve soil stability and does not constitute a significant bush fire hazard. Ground cover includes any material which directly covers the soil surface such as vegetation, twigs, leaf litter, clippings or rocks. A permanent ground cover should be established (for example, short grass). This will provide an area that is easy to maintain and prevent soil erosion.

When using mechanical hazard reduction methods, you should retain a ground cover of at least 75% to prevent soil erosion. However, if your area is particularly susceptible to soil erosion, your Hazard Reduction Certificate may require that 90% ground cover be retained.



Ground Cover

To reduce the incidence of soil erosion caused by the use of heavy machinery such as ploughs, dozers and graders, machinery must be used parallel to the contours. Vegetation should be allowed to regenerate, but be managed to maintain a low fuel load.



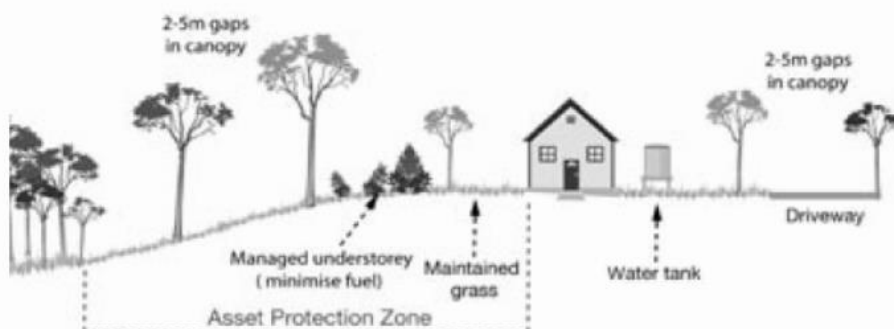
STEP 6. ONGOING MANAGEMENT AND LANDSCAPING

Your home and garden can blend with the natural environment and be landscaped to minimise the impact of fire at the same time. To provide an effective APZ, you need to plan the layout of your garden to include features such as fire resistant plants, radiant heat barriers and windbreaks.

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.



Removal of other materials

Woodpiles, wooden sheds, combustible material, storage areas, large quantities of garden mulch, stacked flammable building materials etc. should be located away from the house. These items should preferably be located in a designated cleared location with no direct contact with bush fire hazard vegetation.

Other protective features

You can also take advantage of existing or proposed protective features such as fire trails, gravel paths, rows of trees, dams, creeks, swimming pools, tennis courts and vegetable gardens as part of the property's APZ.

PLANTS FOR BUSH FIRE PRONE GARDENS

When designing your garden it is important to consider the type of plant species and their flammability as well as their placement and arrangement.

Given the right conditions, all plants will burn. However, some plants are less flammable than others.

Trees with loose, fibrous or stringy bark should be avoided. These trees can easily ignite and encourage the ground fire to spread up to, and then through, the crown of the trees.

Plants that are less flammable, have the following features:

- high moisture content
- high levels of salt
- low volatile oil content of leaves
- smooth barks without "ribbons" hanging from branches or trunks; and
- dense crown and elevated branches.

When choosing less flammable plants, be sure not to introduce noxious or environmental weed species into your garden that can cause greater long-term environmental damage.

For further information on appropriate plant species for your locality, contact your local council, plant nurseries or plant society.

If you require information on how to care for fire damaged trees, refer to the Firewise brochure *Trees and Fire Resistance; Regeneration and care of fire damaged trees*.

WIND BREAKS

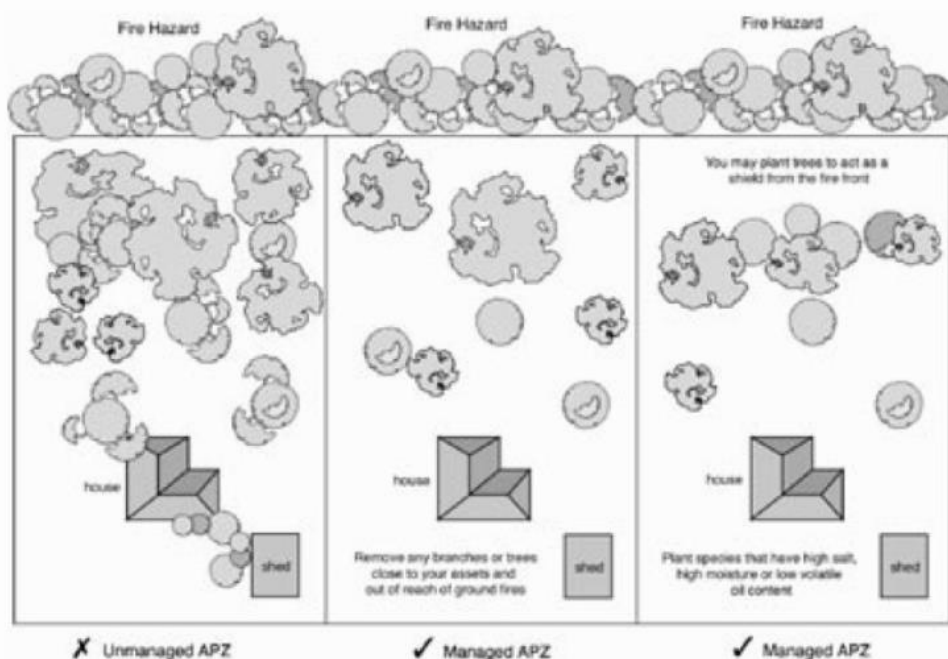
Rows of trees can provide a wind break to trap embers and flying debris that could otherwise reach the house or asset.

You need to be aware of local wind conditions associated with bush fires and position the wind break accordingly. Your local RFS Fire Control Centre can provide you with further advice.

When choosing trees and shrubs, make sure you seek advice as to their maximum height. Their height may vary depending on location of planting and local conditions. As a general rule, plant trees at the same distance away from the asset as their maximum height.

When creating a wind break, remember that the object is to slow the wind and to catch embers rather than trying to block the wind. In trying to block the wind, turbulence is created on both sides of the wind break making fire behaviour erratic.

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HOW CAN I FIND OUT MORE?

The following documents are available from your local Fire Control Centre and from the NSW RFS website at www.rfs.nsw.gov.au.

- Before You Light That Fire
- Standards for Low Intensity Bush Fire Hazard Reduction Burning
- Standards for Pile Burning
- Application Instructions for a Bush Fire Hazard Reduction Certificate

If you require any further information please contact:

- your local NSW Rural Fire Service Fire Control Centre.
Location details are available on the RFS website or
- call the NSW RFS Enquiry Line 1800 679 737
(Monday to Friday, 9am to 5pm), or
- the NSW RFS website at www.rfs.nsw.gov.au.

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