

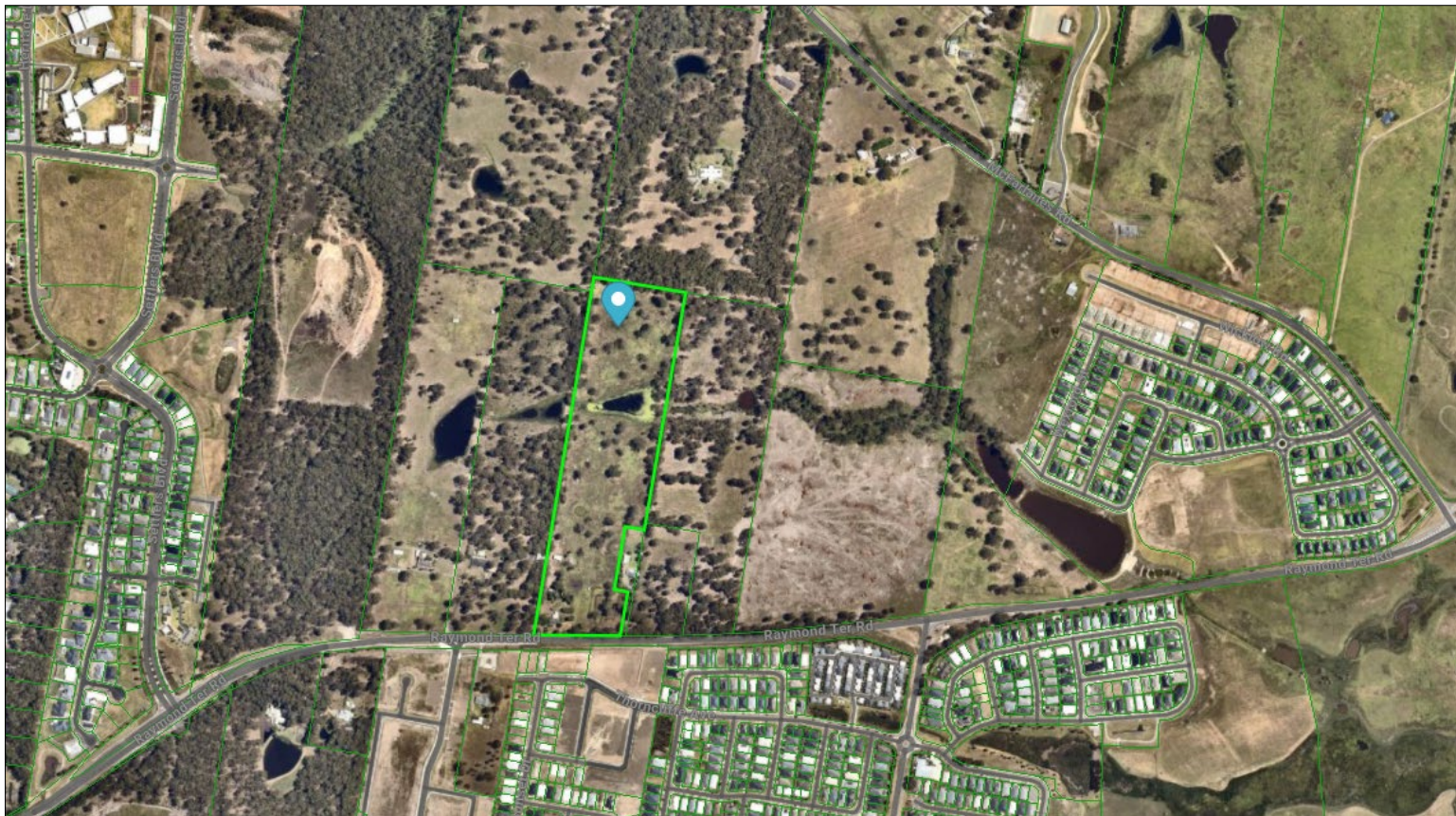


BUSHFIRE ASSESSMENT REPORT

Residential Subdivision

523 Raymond Terrace Road, Chisholm

Prepared for ACG Clovelly Road Pty Ltd



Bushfire Planning Australia

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BPA Reference: 22114 Chisholm

Date: 3 May 2023



Disclaimer and Limitation

This report is prepared solely for ACG Clovelly Road Pty Ltd (the 'Client') for the specific purposes of only for which it is supplied (the 'Purpose'). This report is not for the benefit of any other person; either directly or indirectly and is strictly limited to the purpose and the facts and matters stated in it and will not be used for any other application.

This report is based on the site conditions surveyed at the time the document was prepared. The assessment of the bushfire threat made in this report is made in good faith based on the information available to Bushfire Planning Australia at the time.

The recommendations contained in this report are considered to be minimum standards and they do not guarantee that a building or assets will not be damaged in a bushfire. In the making of these comments and recommendations it should be understood that the focus of this document is to minimise the threat and impact of a bushfire.

Finally, the implementation of the adopted measures and recommendations within this report will contribute to the amelioration of the potential impact of any bushfire upon the development, but they do not and cannot guarantee that the area will not be affected by bushfire at some time.

Document Status: 22114 - Residential Subdivision

Version	Status	Purpose	Author	Review Date
1	Draft	Draft for Review	Katrina Mukevski	15 March 2023
2	Draft	Draft for Client Review	Stuart Greville	1 May 2023
3	Final	Final for Submission	Stuart Greville	3 May 2023

Certification

As the author of this Bushfire Assessment Report (BAR), I certify this BAR provides the detailed information required by the NSW Rural Fire Service under Clause 45 of the Rural Fires Regulation 2022 and Appendix 2 of Planning for Bushfire Protection 2019 for the purposes of an application for a bush fire safety authority under section 100B(4) of the Rural Fires Act 1997.

Stuart Greville

Accredited Bushfire Practitioner

BPAD-26202

Date: 3 May 2023



In signing the above, I declare the report is true and accurate to the best of my knowledge at the time of issue.



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Terms and Abbreviations

Abbreviation	Meaning
APZ	Asset Protection Zone
AS2419-2005	Australian Standard – Fire Hydrant Installations
AS3959-2018	Australian Standard – Construction of Buildings in Bush Fire Prone Areas
BAR	Bushfire Assessment Report
BCA	Building Code of Australia
BC Act	NSW Biodiversity Act 2016
BMP	Bush Fire Management Plan
BPA	Bush Fire Prone Area (Also Bushfire Prone Land)
BPL	Bush Fire Prone Land
BPLM	Bush Fire Prone Land Map
BPM	Bush Fire Protection Measures
DoE	Commonwealth Department of the Environment
DPI Water	NSW Department of Primary Industries – Water
EPA Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
FDI	Fire Danger Index
FMP	Fuel Management Plan
ha	hectare
IPA	Inner Protection Area
LGA	Local Government Area
MCC	Maitland City Council
OPA	Outer Protection Area
OEH	NSW Office of Environment and Heritage
PBP 2019	Planning for Bushfire Protection 2019
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation
RFS	NSW Rural Fire Service
SFPP	Special Fire Protection Purpose
TSC Act	NSW Threatened Species Conservation Act 1995 (as repealed)



Executive Summary

Bushfire Planning Australia (BPA) has been engaged by ACG Clovelly Road Pty Ltd (the 'Client') to undertake a Bushfire Assessment Report (BAR) for the proposed residential subdivision located at 523 Raymond Terrace Road, Chisholm; legally referred to as Lot 100 DP847510. The proposed development comprises a 108 Torrens title residential subdivision to be constructed in several stages. The proposed subdivision is consistent with the Thornton North Master Plan prepared by Maitland City Council. As the plan of subdivision is consistent with the Master Plan, the proposed subdivision does not have access to an existing public road. Consequently, development of the subject site cannot be completed until the subdivision of one or more of the adjoining properties has been completed. With this in mind, in addition to assessing the existing bushfire hazard, the BAR designed a series of recommendations relevant to the proposed subdivision following subdivision of the adjoining properties.

This BAR found the site was currently exposed to high bushfire hazard located to the north, east and west of the subject site. The predominant vegetation surrounding the site in unmanaged conditions is consistent with a *forest*, specifically *Hunter Macleay Dry Sclerophyll Forest* vegetation formation as described in the NSW Rural Fire Service document Planning for Bushfire Protection 2019 (PBP 2019).

The bushfire hazard is likely to reduce over the next 2-5 years as the remaining land surrounding the subject site zoned for residential use is subdivided and the remaining hazardous vegetation removed. The only remaining vegetation presenting a long-term bushfire hazard is the vegetation contained within the riparian corridor that bisects the subject site.

The site is identified as the Thornton North Urban Release Area in the Maitland Local Government Area Bush Fire Planning – Urban Release Area Map. Accordingly, to benefit from the exemptions permitted under clause 273 of the Environmental Planning and Assessment Regulations 2000 (EP&A Regs) and in accordance with the NSW Rural Fire Service (RFS) User Guide for Subdivision of Urban Release Areas on Bush Fire Prone Land, a Subdivision BAL Plan has been prepared and is contained in **Appendix E**. As part of the application for a Bush Fire Safety Authority (BFSA) under section 100b of the Rural Fires Act 1997 (RF Act), we are also seeking endorsement of the Subdivision BAL Plan prior to the registration of the subdivision.

The BAR concludes the bushfire hazard the proposed development is exposed to can be successfully mitigated by applying a combination of bushfire mitigation measures including temporary and permanent Asset Protection Zones (APZs).

The following key recommendations have been designed to enable the proposed development to achieve the aims and objectives of PBP 2019:

1. All land within the development site; excluding the riparian corridor, is to be managed as an inner protection area (IPA) as outlined in Appendix 4 of PBP 2019 and the RFS document *Standards for asset protection zones*;
2. The APZs shown in **Figure 19 - Subdivision BAL Plan** shall be maintained in perpetuity in accordance with the requirements of Appendix 4 of PBP 2019;
3. Access shall be provided in accordance with the Performance Criteria detailed in Table 5.3b of PBP 2019. This will require the provision of a minimum of four (4) separate road access points provided from the development site to the east and west to ensure safe evacuation for all residents;
4. On-street vehicle parking may be permitted within road carriageways as all roads are a minimum 8m wide;
5. All temporary turning heads shall be constructed in accordance Appendix A3.3 of PBP 2019;
6. Vegetation within road verges (including swales) to be consistent with a grassland vegetation classification with tree canopy less than 10% at maturity (and considered unmanaged);
7. The Bushfire Attack Level (BAL) ratings identified in **Figure 19 - Subdivision BAL Plan** apply to all future dwellings to be constructed on the proposed lots. All future dwellings to be constructed on the proposed lots shall have due regard to the specific considerations given in

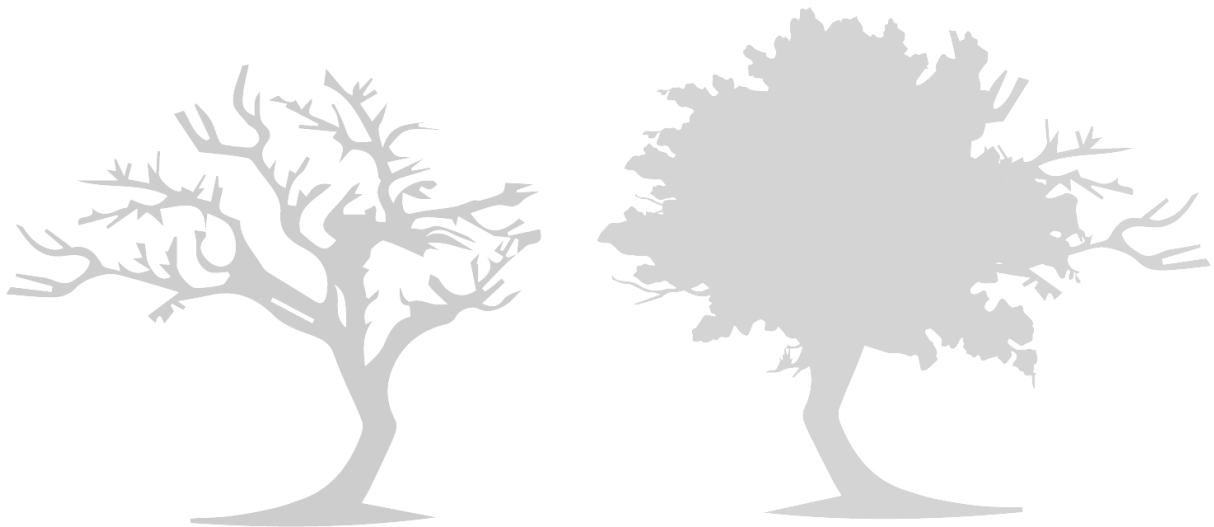


the National Construction Code: Building Code of Australia (BCA) which makes specific reference to Australian Standard AS3959-2018 Construction of buildings in bushfire prone areas (AS3959-2018) and the NASH Standard Steel Framed Construction in Bushfire Prone Areas;

8. All new lots are to be connected to a reliable water supply network and that suitable fire hydrants are located throughout the development site that are clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure shall comply with AS2419.1 2005 and section 5.3.3 of PBP 2019;
9. Consideration should be given to landscaping and fuel loads on site to decrease potential fire hazards on site; and
10. The Rural Fire Service endorse the Subdivision BAL Plan contained in **Appendix E**.

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection and production (May 2023).

Should the above recommendations be implemented commensurate to the low threat hazard, the nominal bushfire risk can be suitably mitigated to offer an acceptable level of protection to life and property for those persons and assets occupying the site but they do not and cannot guarantee that the area will not be affected by bushfire.





1. Introduction

Bushfire Planning Australia (BPA) has been engaged by ACG Clovelly Road Pty Ltd (the 'Client') to undertake a Bushfire Assessment Report (BAR) for a proposed residential subdivision located at 523 Raymond Terrace Road, Chisholm; legally referred to as Lot 100 DP847510 and hereafter referred to as the 'site' (**Figure 2**).

The proposed development will create 108 residential lots and associated infrastructure including 2 drainage reserves, 1 road widening lot and 1 residue lot over five (5) stages.

The assessment aims to consider and assess the bushfire hazard and associated potential bushfire threat relevant to the proposed development, and to outline the minimum mitigative measures which would be required in accordance with the provisions of the New South Wales Rural Fire Service (RFS) publication *Planning for Bushfire Protection 2019* (PBP 2019) that has been released and adopted through the *Environmental Planning and Assessment Amendment (Planning for Bushfire Protection) Regulation 2007* and the *Rural Fires Regulation 2013*.

1.1. Aims and Objectives

This Bushfire Assessment Report (BAR) addresses the aims and objectives of PBP 2019, being:

- ❑ Afford buildings and their occupants protection from exposure to a bushfire;
- ❑ Provide for a defensible 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 bushfire protection measures; and
- ❑ Ensure that utility services are adequate to meet the needs of firefighters.

2. Site Description

Table 1: Site Description

Address	523 Raymond Terrace Road, Chisholm
Title	Lot 100 DP847510
LGA	Maitland City Council
Site Area	10.17 ha
Land Use Zone	R1 General Residential (Figure 1)
Bushfire Prone Land	Vegetation Category 1, Vegetation Category 3 and Vegetation Buffer
Context	The site is located to the north of Raymond Terrace Road. The site currently consists of a dwelling, shed and dam. There is some mature vegetation scattered throughout the site, lining the site boundaries otherwise the remainder of the site is managed.
Topography	Majority of the site is flat with exception of a small portion of the site east of the dam which has a slope ranging from 0° to > 15°.
Fire History	The site lies within a local government area with a Fire Danger Index (FDI) rating of 100.

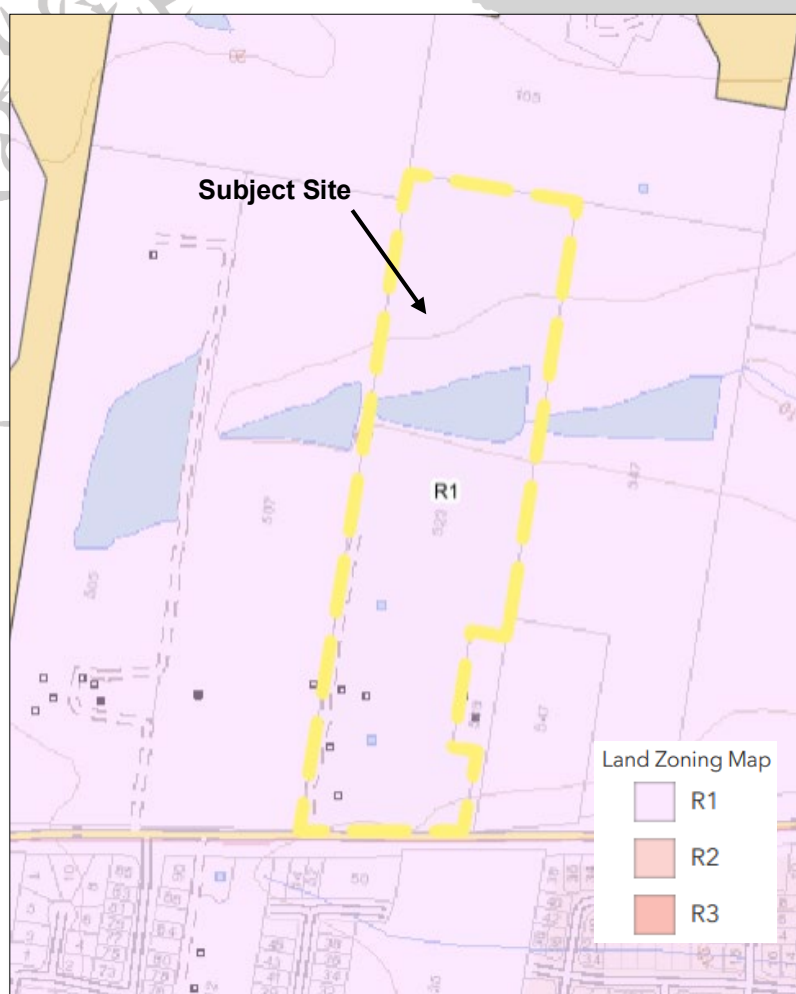
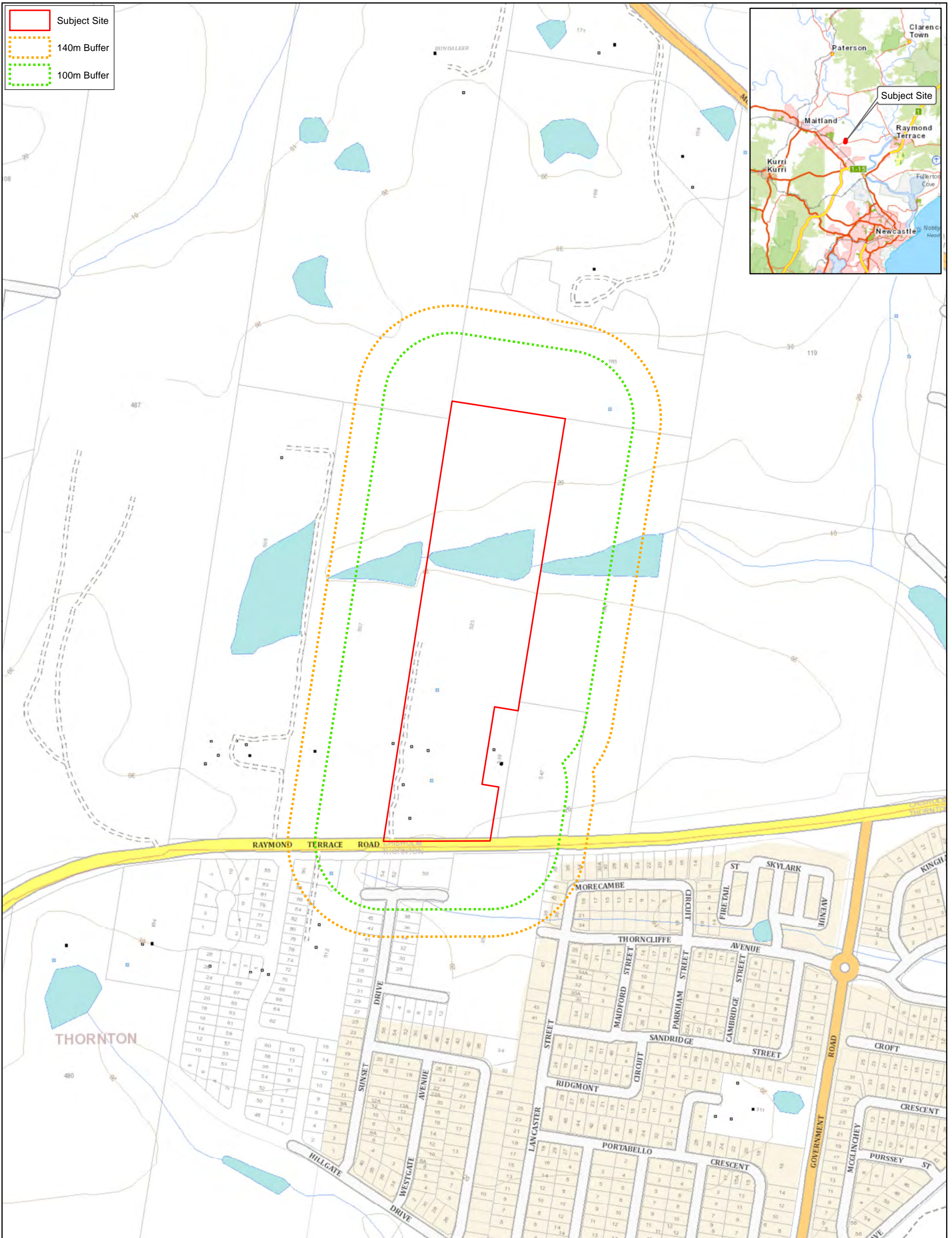
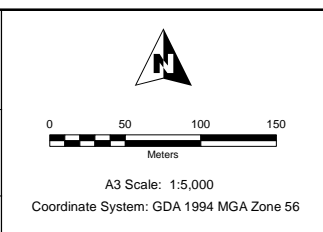


Figure 1: Land Use Zone (Maitland Local Environment Plan 2011)



Source:	Base Map © Department of Customer Service 2020
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**Project: 523 Raymond
Terrace Road, Chiscolm
Job no: 22114**

**Figure 2:
Site
Location**

2.1. Background

The subject site is located within the Thornton North Urban Release Area which was designed to ensure urban growth takes place in a co-ordinated and sustainable manner. Maitland City Council prepared the master plan to provide a logical framework for the progressive development of the urban release area. In some instances, the development of certain parcels of land relied on adjoining landowners to provide public road connections to facilitate the orderly development.

The proposed development relies on public road connections to the east and west that currently do not exist. Apart from the vegetation to be retained within the site; all surrounding land is zoned for residential use and development applications have been submitted, or in the process of being submitted for many of the properties to the north and east of the site.

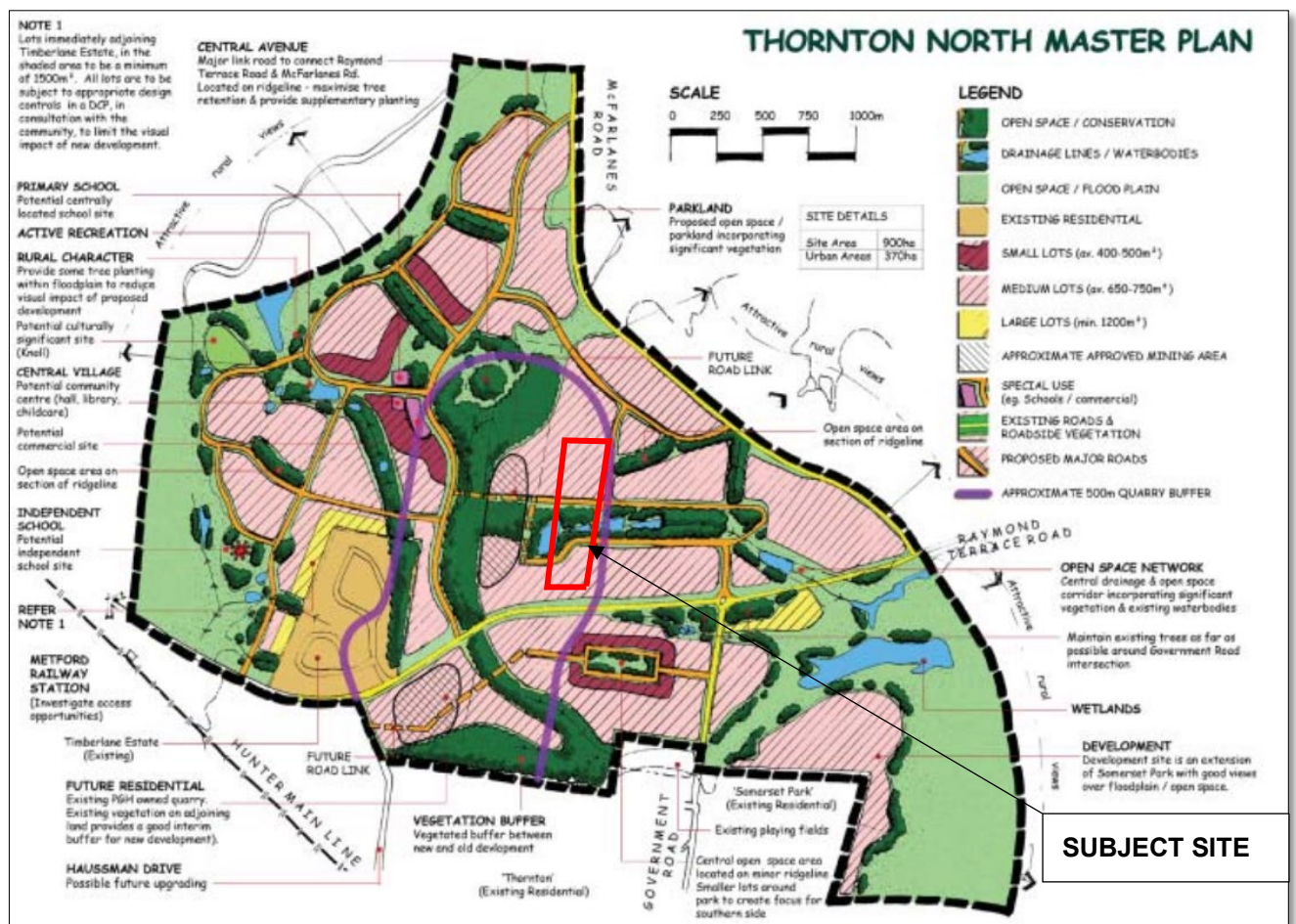


Figure 3: Thornton North Master Plan (Maitland City Council 2003)

2.2. Bushfire Prone Land

Bushfire activity is prevalent in landscapes that carry fuel and the two predominant bushfire types are grassland and forest fires. Factors such as topographic characteristics and quantity of fuel loads influence the intensity and spread of fire. The scale of a bushfire hazard is tailored to the characteristics of the hazard, the size and characteristics of the affected population, types of land use exposed to bushfire, predicted development growth pressures and other factors affecting bushfire risk.

Figure 4 demonstrates the entire site is mapped as bushfire prone land.

The entire site is mapped as Vegetation Category 3 bushfire prone land with exception of a narrow strip of Vegetation Category 1 bushfire prone land that exists along the northern and north-eastern site boundaries within the site. The existing dam is also identified as Vegetation Buffer bushfire prone land.

Vegetation Category 1 bushfire prone land also immediately surrounds the site within and beyond 140m from the site in all directions, with exception of the eastern, south-eastern and southern boundaries which is mapped as Vegetation Category 3 bushfire prone land. Neighbouring dams on adjoining properties to the east and west within 140m of the site are also mapped as Vegetation Buffer.

The primary bushfire hazard within 140m of the site is located to immediate north and west, however development applications have been lodged for both adjoining properties resulting in the existing vegetation being cleared. Assuming these developments are approved, the next primary bushfire hazard is identified to the west, greater than 100m from the proposed site.





	Source: Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022 Aerial photo: NearMap 05/12/2022 NSW Bush Fire Prone Land: NSW Rural Fire Service 2021	 A3 Scale: 1:3,000 Coordinate System: GDA 1994 MGA Zone 56	Project: 523 Raymond Terrace Road, Chiscolm Job no: 22114	Figure 4: NSW Bush Fire Prone Land
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	File: File: 22114-RaymondTerraceRd-Fig2-BFPL-221229 Date: 29/12/2022			

2.3 Proposed Development

The proposed development will create 108 residential lots and associated infrastructure including 2 drainage reserves, 1 road widening lot and 1 residue lot. This will occur over the following five stages:

- ❑ Stage 1: 40 lots and 1 drainage lot
- ❑ Stage 2: 42 lots
- ❑ Stage 3: 13 lots, 1 drainage reserve and 1 road widening
- ❑ Stage 4: 7 lots
- ❑ Stage 5: 6 lots and 1 residue lot.

A plan of the proposed subdivision is contained in **Appendix A** and shown in **Figure 5**.

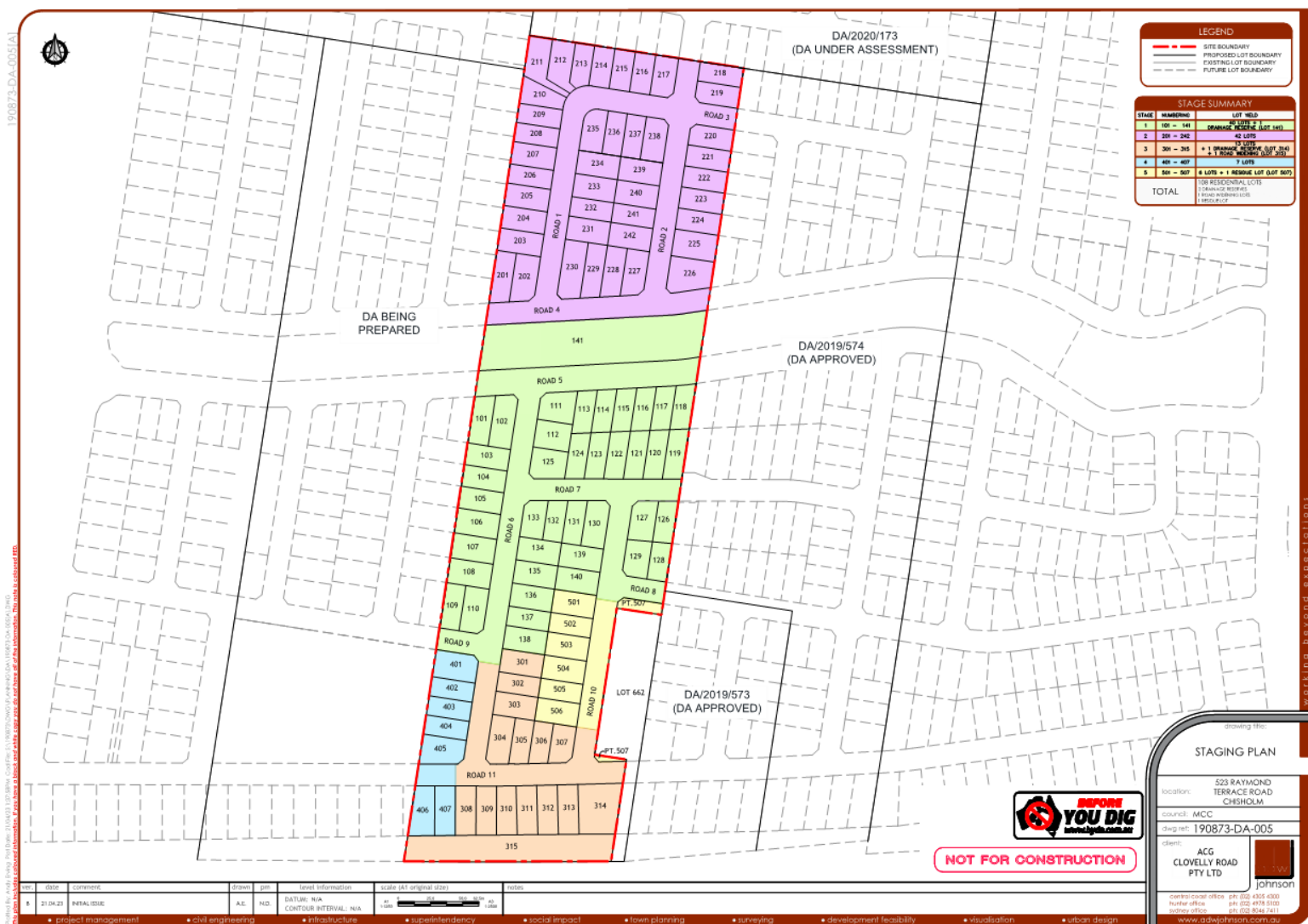


Figure 5: Proposed Development

3. Bushfire Hazard Assessment

3.1. Vegetation Assessment

Vegetation classification over the site and surrounding area has been carried out as follows:

- ❑ Aerial Photograph Interpretation to map the vegetation classification and extent;
- ❑ Reference to NSW State Vegetation Type Mapping, NSW Department of Planning, Industry and Environment 2022 (**Figure 6**);
- ❑ Site inspection by Stuart Greville (Bushfire Planning Australia) on 1 April 2023.

In accordance with PBP 2019, an assessment of the existing vegetation over a distance of 140m in all directions from the site was undertaken. Vegetation that may be considered a bushfire hazard was identified to the north, east and west of proposed development and identified as a *forest*, namely *Hunter Macleay Dry Sclerophyll Forest* according to both PBP 2019 and Keith vegetation classifications. The findings of the site inspection were compared to the NSW State Vegetation Type mapping (**Figure 6**). The inconsistencies between the mapping sources were quantified during the site inspection and are discussed within this assessment.



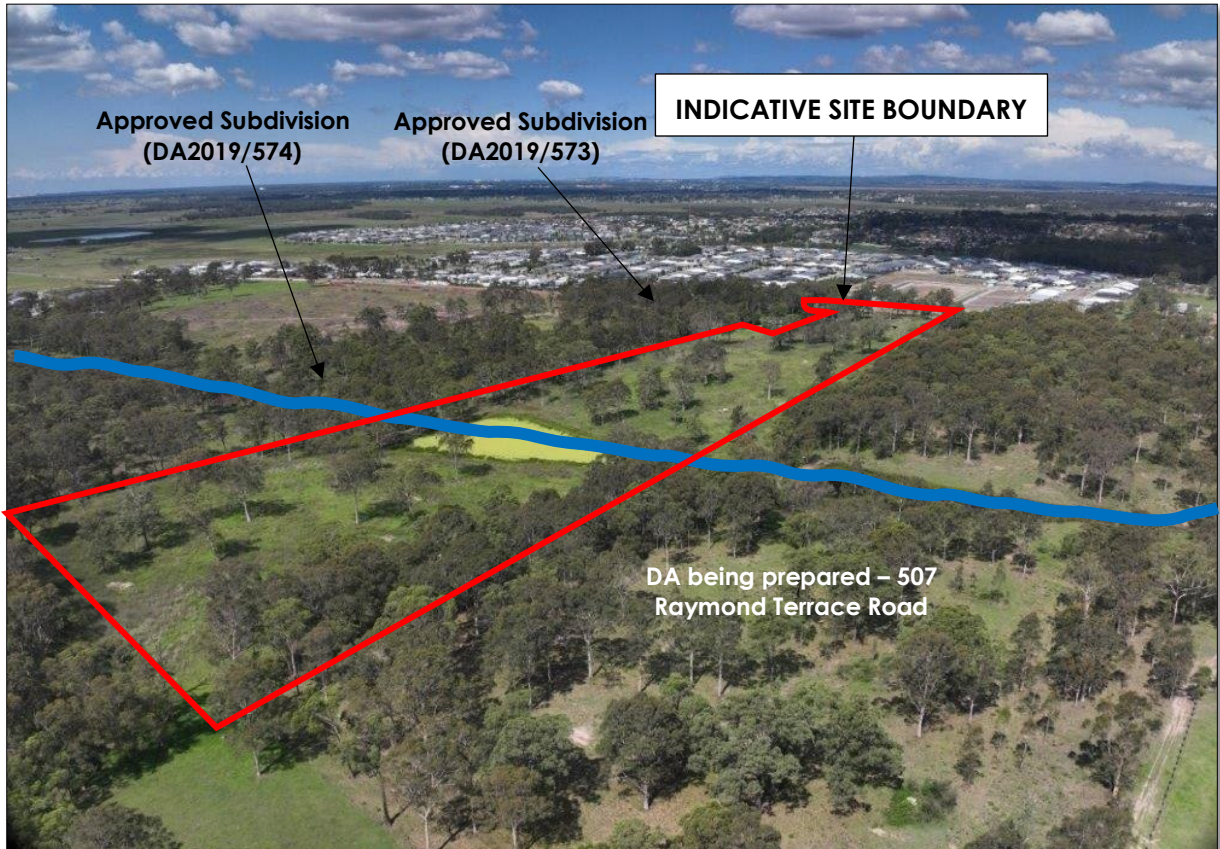


Plate 1: Subject site looking south east towards Thornton

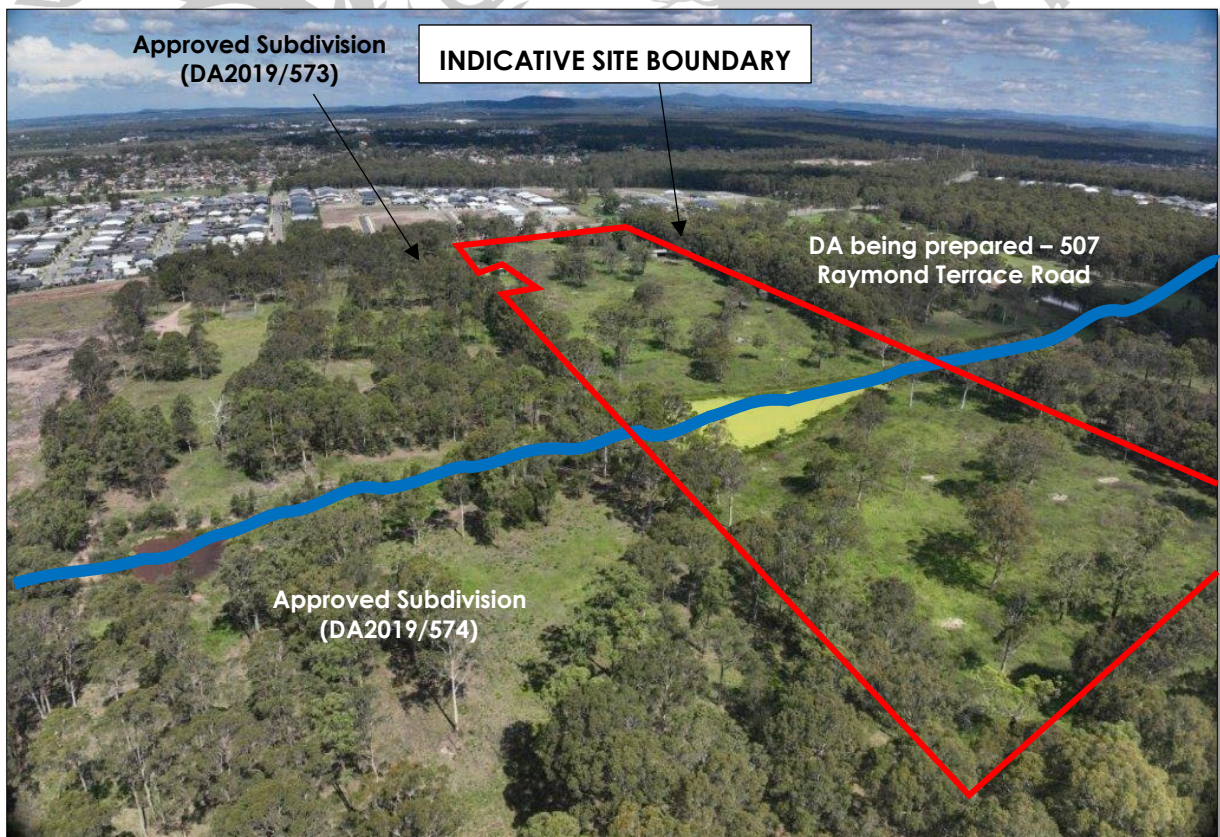


Plate 2: South west across site towards Raymond Terrace Road



Plate 3: Subject site is within the Thornton North Urban Release Area




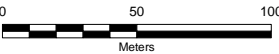
Plate 4: Vegetation surrounding site is a low condition grassy forest



Subject Site
 100m Buffer
 140m Buffer
Vegetation Class
 Hunter-Macleay Dry Sclerophyll Forests
 Not native vegetation



Source:	Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022 Aerial photo: NearMap; 05/12/2022 Vegetation: © State Government of NSW and Department of Planning and Environment 2022
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 Meters
 A3 Scale: 1:2,811
 Coordinate System: GDA 1994 MGA Zone 56

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**Figure 6:
NSW State
Vegetation Type**

3.2. Slope Assessment

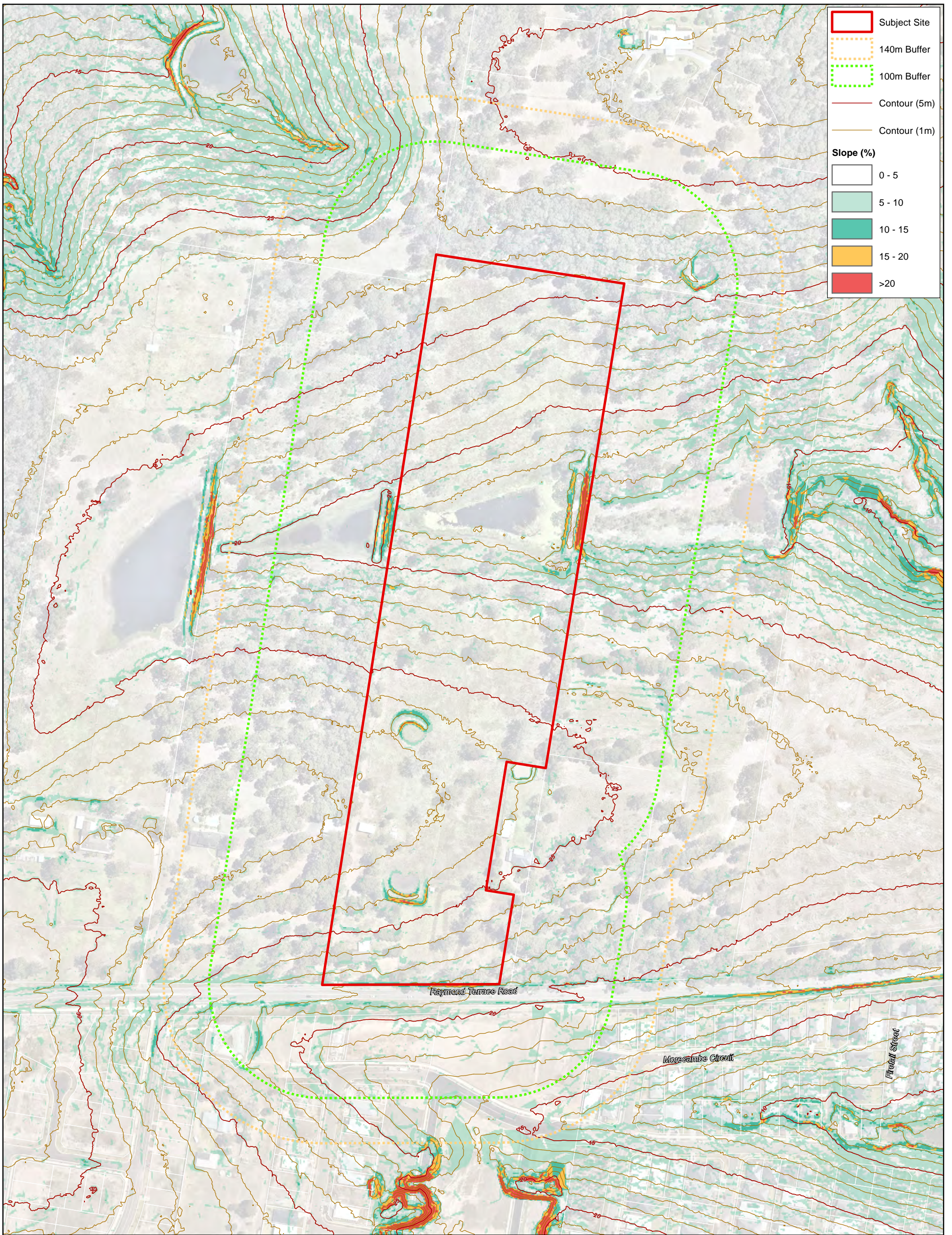
The slope assessment was undertaken as follows:

- ❑ Review of LiDAR point cloud data - including DEM (NSW LPI) (**Figure 7**);
- ❑ Detail survey of existing contours (**Figure 8**); and
- ❑ Site inspection by Stuart Greville (Bushfire Planning Australia) on 1 April 2023.

An assessment of the slope over a distance of 140m in the hazard direction from the site boundary was undertaken. The effective slope was then calculated under the classified vegetation where there was a fire run greater than 50m. The topography of the site has been evaluated to identify both the average slope and by identifying the maximum slope present. These values help determine the level of gradient which will most significantly influence the fire behaviour of the site.

The effective slope in all directions is shown in **Figure 9** and **Table 2**.

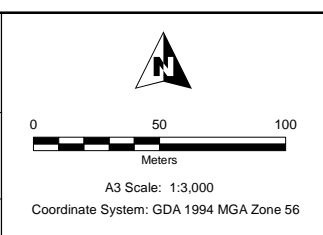




Source: Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022
Aerial photo: NearMap 05/12/2022
Surface analysis: Derived from LiDAR - Newcastle 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012

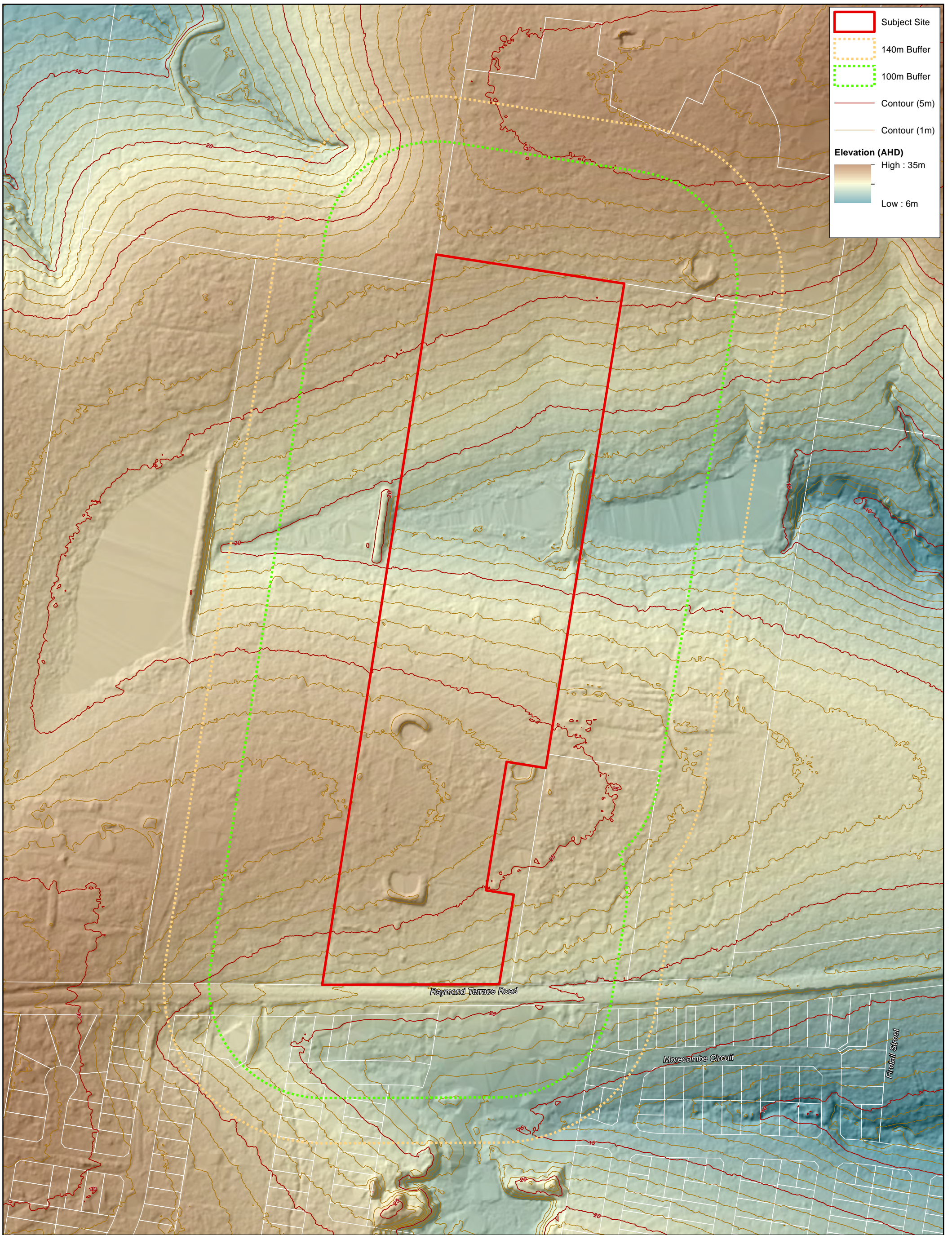
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Date: 29/12/2022



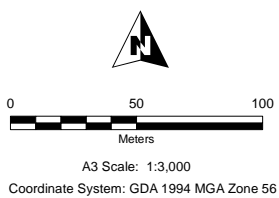
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Job no: 22114**

**Figure 7:
Slope Analysis:
LiDAR**



**BUSHFIRE
PLANNING
AUSTRALIA**

Source:	Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022 Aerial photo: NearMap 16/06/2022 Surface analysis: Derived from LIDAR - Newcastle 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012
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Job no: 22114**

**Figure 8:
Digital Elevation
Model**

3.3. Results

The site inspection formed part of a reliability assessment to determine whether the site's mapped characteristics were consistent with the actual slope and vegetation characteristics observed on the site.

It was confirmed during the site inspection, the predominant vegetation classification presenting as a bushfire hazard to the north, east and west of the site was identified as a *forest*, specifically, *Hunter Macleay Dry Sclerophyll Forest* vegetation formation in accordance with descriptions contained in Keith. This is identified as the primary bushfire hazard.

Additionally, to the east of the site, within and beyond 140m, there is a section of *grassland*, before transitioning to a *forest*. Managed land also exists to the immediate south-west of the site and north of Raymond Terrace Road.

Whilst acknowledging there are multiple development applications approved or currently under assessment by Maitland City Council, until these future developments are constructed and the vegetation is cleared, the existing bushfire hazard has been assessed for the purposes of this BAR.

As part of the proposed development, vegetation will also exist on site as part of the proposed drainage reserve located in place of the existing dam. Vegetation will consist of both *Freshwater Wetlands* and *Forested Wetlands* along the drainage batters and has been assessed accordingly.

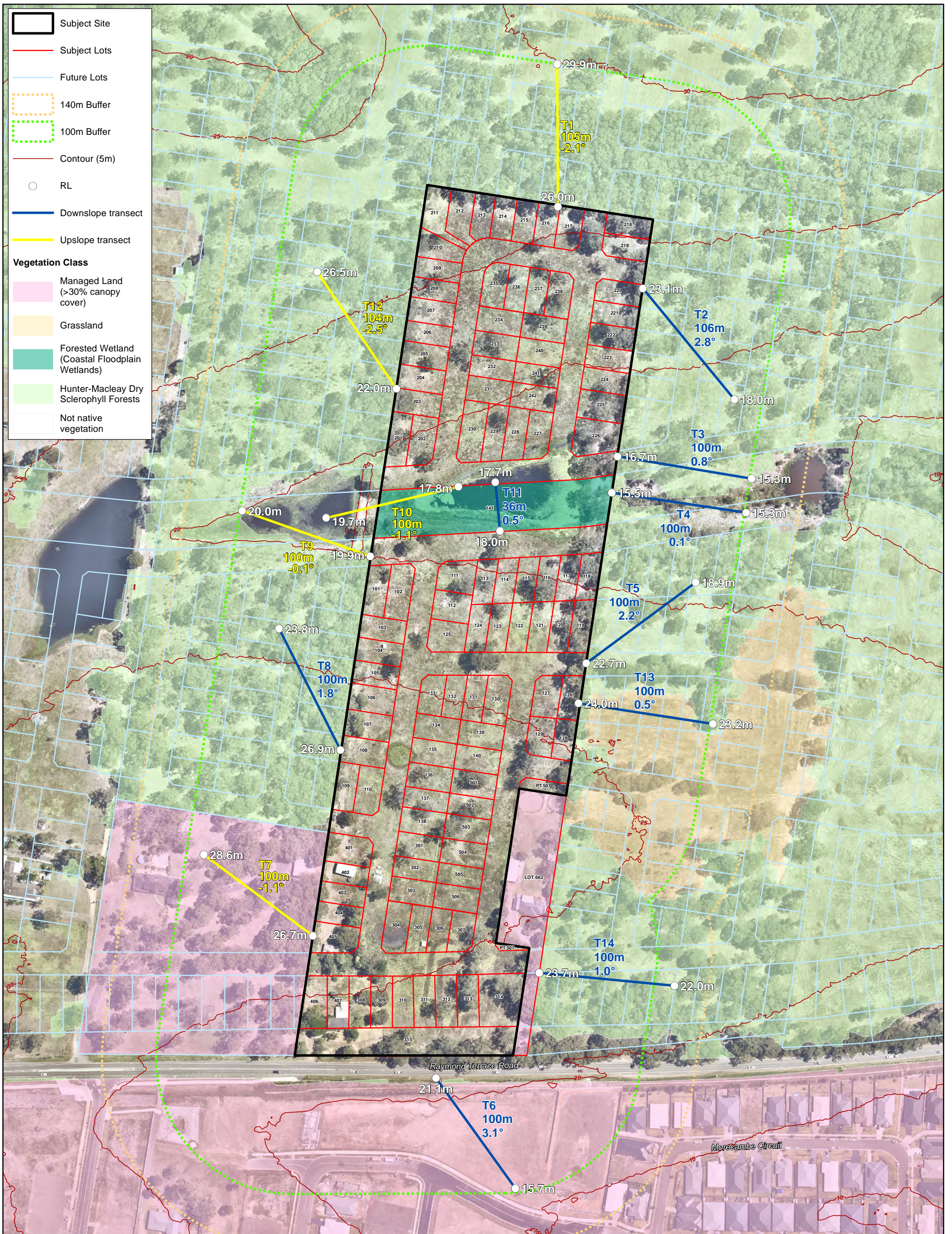
The final bushfire hazard assessment defining vegetation classifications and effective slope is shown in **Table 2** and **Figure 9**.





Table 2: Slope and Vegetation Assessment Results

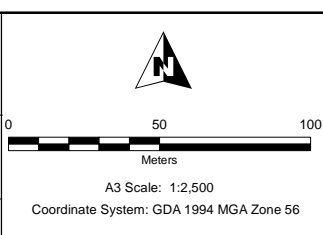
Transect	Vegetation Description	Vegetation Classification (PBP 2019)	Slope
T1 North	Forest north of the site - DA currently under assessment (DA2020/173)	Forest (Hunter Macleay Dry Sclerophyll Forest)	-2.1° Upslope
T2 East	Forest east of the site Approved Residential Subdivision (DA2019/574)	Forest (Hunter Macleay Dry Sclerophyll Forest)	2.8° Downslope
T3 East	Forested wetland within riparian corridor to be revegetated. Approved Residential Subdivision (DA2019/574)	Forested Wetlands (Coastal Floodplain Wetlands)	0.8° Downslope
T4 East	Freshwater wetland within riparian corridor to be revegetated. Approved Residential Subdivision (DA2019/574)	Freshwater Wetland (Coastal Freshwater Lagoons)	0.1° Downslope
T5 East	Forest east of site. Approved Residential Subdivision (DA2019/574)	Forest (Hunter Macleay Dry Sclerophyll Forest)	2.2° Downslope
T6 South	Existing property (managed land) south of the proposed development and on the southern side of Raymond Terrace Road	Low Threat (Managed land)	3.1° Downslope
T7 South-west	Existing property (managed land) south-west of the proposed development that is not part of any future development	Low Threat (Managed land)	-1.1° Upslope
T8 West	Forest west of the proposed development to the neighbouring site zoned residential future development	Forest (Hunter Macleay Dry Sclerophyll Forest)	1.8° Downslope
T9 West	Existing dam surrounded by forested wetland vegetation. This forms part of the proposed drainage reserve.	Forested Wetlands (Coastal Floodplain Wetlands)	-0.1° Upslope
T10 On site	Freshwater wetland surrounds the existing dam on site to the neighbouring dam on site. This forms part of the proposed drainage reserve.	Freshwater Wetland (Coastal Freshwater Lagoons)	-1.1° Upslope
T11 On site	Existing dam surrounded by forested wetland vegetation. This forms part of the proposed drainage reserve.	Forested Wetlands (Coastal Floodplain Wetlands)	0.5° Downslope
T12 West	Forest west of the proposed development to the neighbouring site zoned residential future development	Forest (Hunter Macleay Dry Sclerophyll Forest)	-2.5° Upslope
T13 East	Grassland east of the proposed development site. Approved Residential Subdivision (DA2019/574)	Grassland	0.5° Downslope
T14 South-east	Forest separated by Lot 662 (excluded from future development). Approved Residential Subdivision (DA2019/573)	Forest (Hunter Macleay Dry Sclerophyll Forest)	1.0° Downslope



Source: Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022
 Aerial photo: NearMap 05/12/2022
 Vegetation: © State Government of NSW and Department of Planning and Environment 2022
 Surface analysis: Derived from LiDAR - Newcastle 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012

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File: File: 22114-RaymondTerraceRd-Fig6-SlopeVeg-230503
 Date: 3/05/2023



Project: 523 Raymond Terrace Road, Chiscolm
Job no: 22114

Figure 9:
Slope & Vegetation Assessment

3.4. Significant Environmental Features

There are no known environmental features of significance within the development footprint or the balance of the site. The development footprint is wholly located within that part of the site that is predominantly cleared.

3.5. Threatened Species, populations or ecological communities

The area of the site to be affected by the proposed development has been identified to minimise impact on any threatened species, population or EEC. All bushfire mitigation measures; including APZs have considered the existing and potential biodiversity values to avoid or minimise impact where possible.

3.6. Aboriginal Objects

A search of the AHIMS database (results contained in **Appendix B**) revealed there is one (1) Aboriginal site or place recorded within 200m in or near the subject site. Bushfire protection measures considered this within this assessment.

3.7. Bushfire Planning - Urban Release Area

The subject site is identified within a Bushfire Planning – Urban Release Area (URA) as indicated on **Figure 10** and **11**. As a subdivision of land within an URA, the assessment undertaken as part of the preparation of the BMP may exempt the proposed lots from reassessment of bushfire matters when future land owners are ready to construct a dwelling on their lot/s. For the future landowners to benefit from the available exemptions, a Post-Subdivision Bush Fire Attack Level Certificate (PSBC) must be obtained to allow for the streamlined process. To facilitate the PSBC, a Subdivision BAL Plan is required that demonstrates the location of APZs and that all new lots can suitably accommodated a dwelling envelope achieving BAL-29 or less.

A **Subdivision BAL Plan** has been prepared and contained in **Appendix E**. As part of the application for a BFA it is requested the RFS endorse the included **Subdivision BAL Plan**.

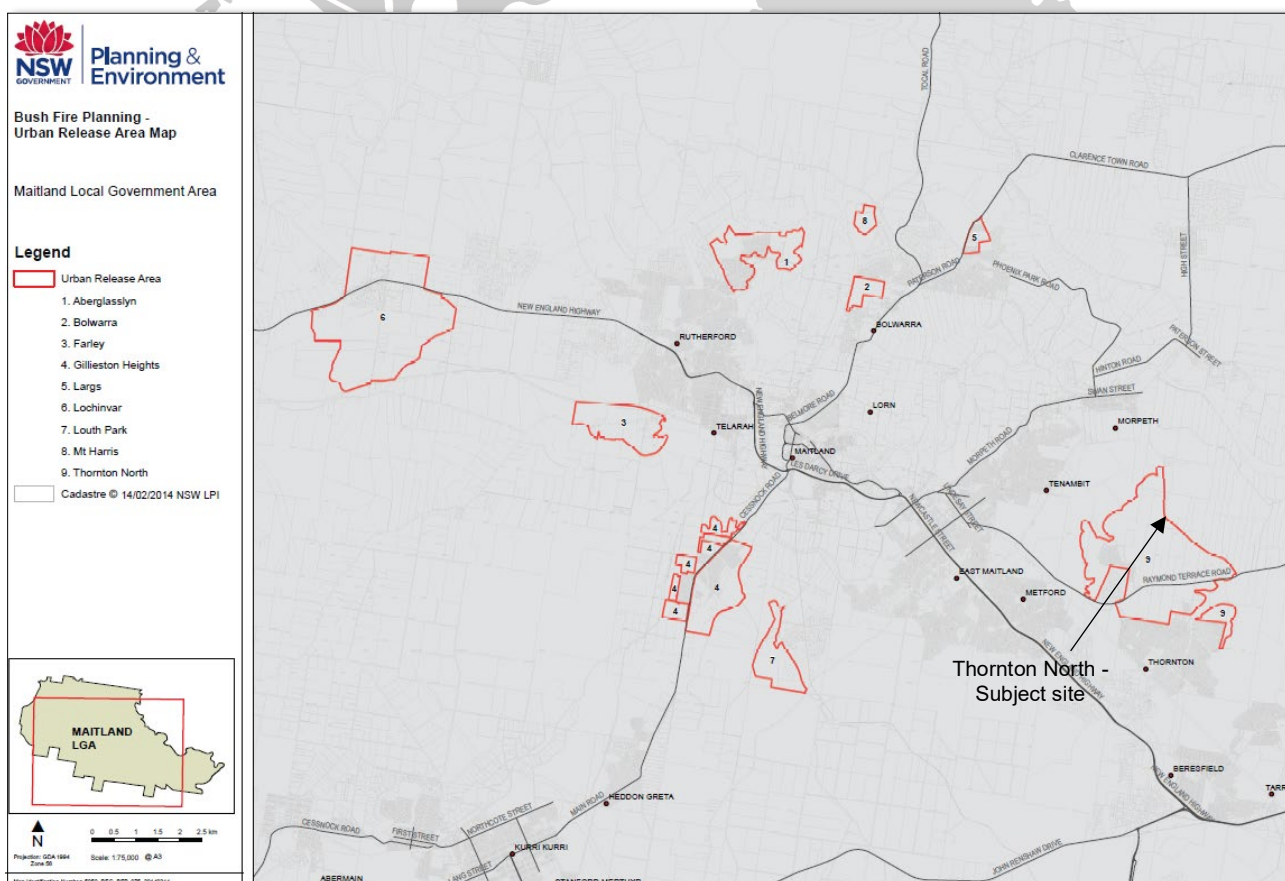


Figure 10: Bushfire Planning - Urban Release Area Map (Maitland LGA)

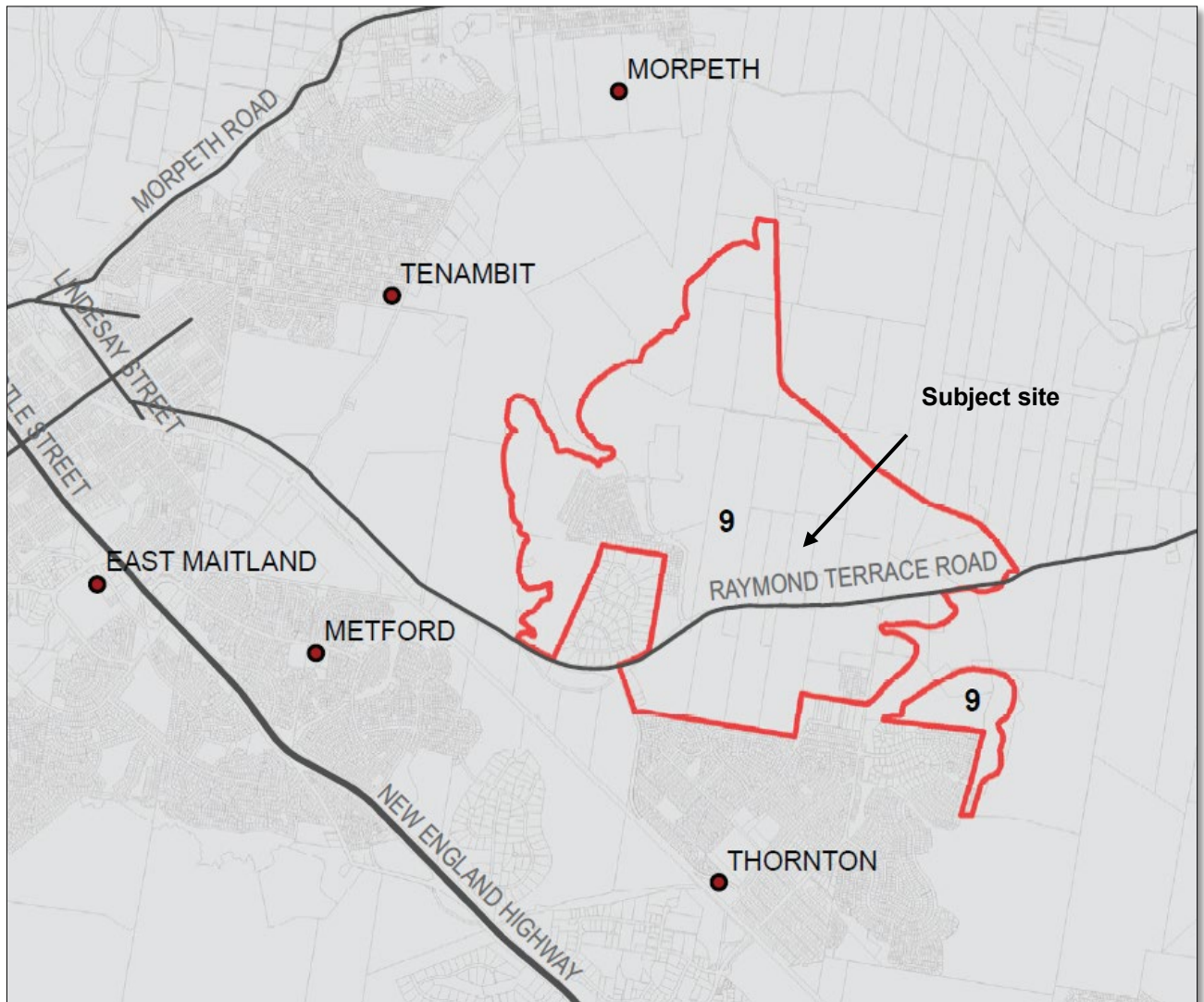


Figure 11: Bushfire Planning - Urban Release Area: Thornton North



4. Bushfire Protection Measures

This Bushfire Assessment Report (BAR) has adopted the methodology to determine the appropriate Bushfire Protection Measures (BPMs) detailed in PBP 2019. As part of the BAR, the recommended BPMs demonstrate the aims and objectives of PBP 2019 have been satisfied; including the matters considered by the RFS necessary to protect persons, property and the environment from the danger that may arise from a bushfire.

4.1. Asset Protection Zones

An APZ is an area surrounding a development that is managed to reduce the bushfire hazard to an acceptable level to mitigate the risk to life and property. The required width of the APZ varies with slope and the type of hazard. An APZ can consist of both an inner protection area (IPA) and an outer protection area (OPA). In this instance the entire APZ and the balance of the development site shall be managed as an IPA.

An APZ can include the following:

- ❑ Lawns;
- ❑ Discontinuous gardens;
- ❑ Swimming pools;
- ❑ Roads, driveways and managed verges;
- ❑ Unattached non-combustible garages with suitable separation from the dwelling;
- ❑ Open space / parkland; and
- ❑ Car parking.

The presence of a few shrubs or trees in the APZ is acceptable provided that they:

- ❑ Do not touch or overhang any buildings;
- ❑ Are well spread out and do not form a continuous canopy;
- ❑ Are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and
- ❑ Are located far enough away from any dwelling so that they will not ignite the dwelling by direct flame contact or radiant heat emission.

Woodpiles, wooden sheds, combustible material storage areas, large areas / quantities of garden mulch, stacked flammable building materials etc. are not recommended in the APZ.

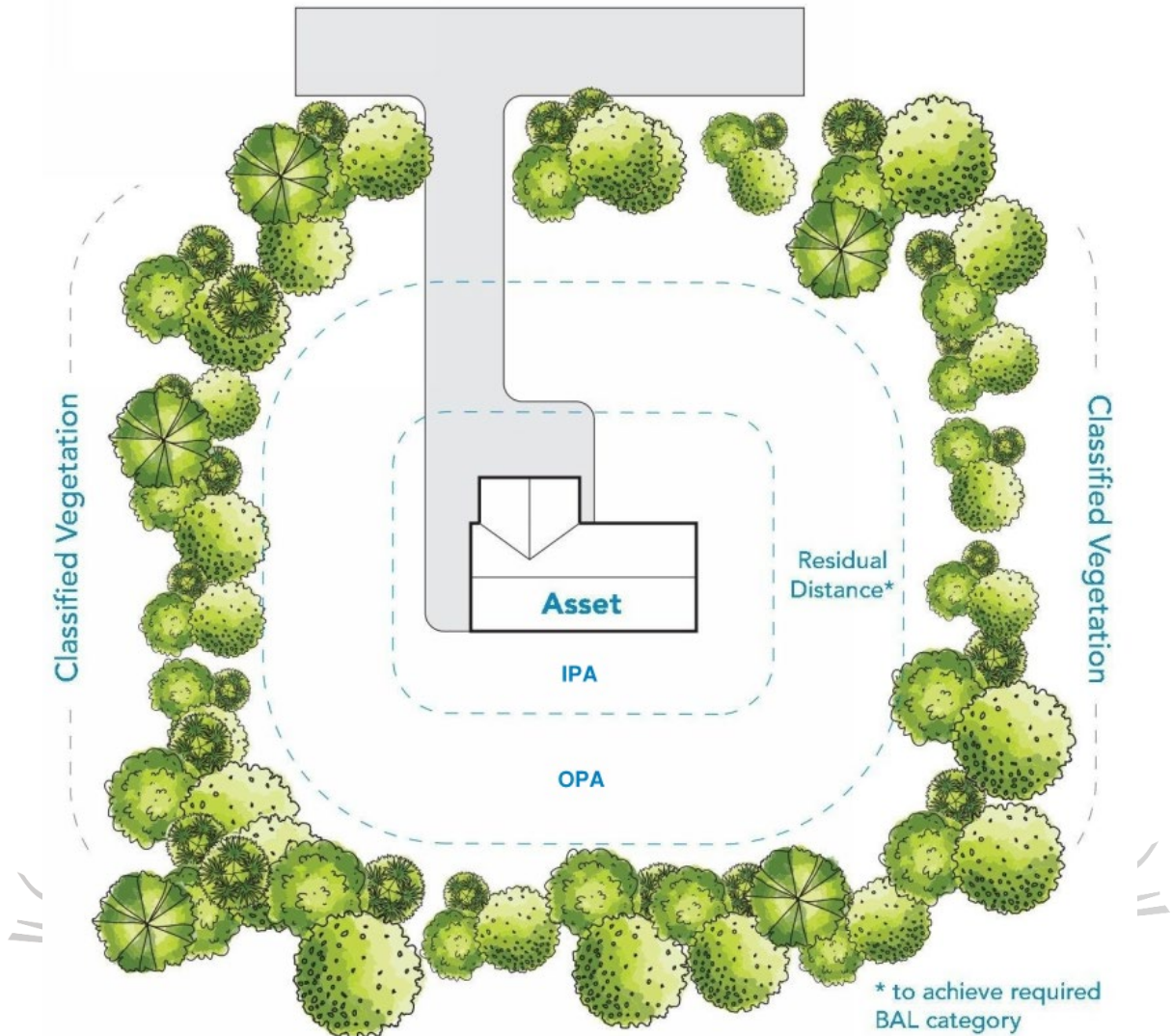


Figure 12: Explanation of an Asset Protection Zone

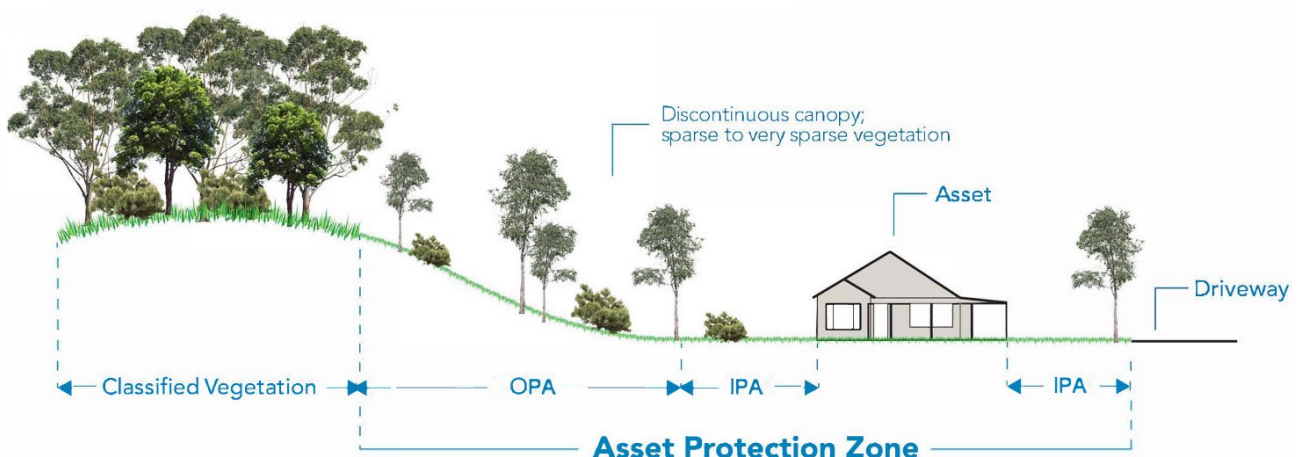


Figure 13: Asset Protection Zone profile

4.1.1. Determining the Appropriate Setbacks

To achieve compliance with the performance criteria for APZs (Table 5.3a), the Acceptable Solutions outlined in Table A1.12.2 of PBP 2019 may be adopted as a deemed-to-satisfy solution.

Alternatively, the appropriate APZ setback may be determined to achieve the Performance Criteria by adopting a performance-based solution. Based on the unique site characteristics identified by the BAR, the intensity of a bushfire event presented as the radiant heat exposure was calculated at several locations throughout the development site using the NBC Bushfire Attack Assessor V4.1. The nominated fuel loads for the respective vegetation classifications as published by the RFS in March 2019 have been used to determine the APZs and the effective slope obtained from the Digital Elevation Model (DEM) for each transect.

As the site lies within the Maitland City Council LGA, it is assessed under a FDI rating of 100. The Detailed Method (Method 2) outlined in Australian Standard *AS3959-2018 Construction of buildings in bushfire prone areas* was used to calculate the potential level of radiant heat flux generated at the nominated locations (see transects T1-T14). To ensure the APZs achieve the intent of Section 5.3 of PBP 2019, the APZs have been determined to ensure all lots are able to accommodate a dwelling that will not be exposed to radiant heat levels exceeding 29kW/m^2 . The NBC Bushfire Attack Assessor report detailing the inputs used is contained in **Appendix C**.

Refer to **Table 3** for the recommended APZs. **Figure 18** and **Figure 19** presents the APZs for the proposed development based on the existing bushfire hazard, noting there are both temporary and permanent APZs based on existing and future adjoining developments. The permanent APZs are required on the northern and southern sides of the environmental corridor. The temporary APZs are required along both sides of the environmental corridor and the eastern and western boundaries of both the northern and southern development sites. Additionally a temporary APZ is also required along the northern boundary of the northern development site, until adjoining developments are completed. It is noted the proposed development cannot be completed until public road access is provided following completion of the residential subdivision on the eastern boundary; being 547 Raymond Terrace Road, Chisholm.

Refer to **Table 3** and **Figure 18** and **Figure 19** for the required and recommended APZs for each transect.



Table 3: Required APZ setbacks

Transect	Vegetation Classification (PBP 2019)	Slope	PBP 2019 (Table A1.12.2)	Recommended APZ (29kW/m ²) Method 2
T1 North	Forest (Hunter Macleay Dry Sclerophyll Forest)	-2.1° Upslope	24m	14m
T2 East	Forest (Hunter Macleay Dry Sclerophyll Forest)	2.8° Downslope	29m	18m
T3 East	Forested Wetlands (Coastal Floodplain Wetlands)	0.8° Downslope	12m	10m
T4 East	Freshwater Wetland (Coastal Freshwater Lagoons)	0.1° Downslope	6m	5m
T5 East	Forest (Hunter Macleay Dry Sclerophyll Forest)	2.2° Downslope	29m	18m
T6 South	Low Threat (Managed land)	3.1° Downslope	N/A	N/A
T7 South-west	Low Threat (Managed land)	-1.1° Upslope	N/A	N/A
T8 West	Forest (Hunter Macleay Dry Sclerophyll Forest)	1.8° Downslope	29m	18m
T9 West	Forested Wetlands (Coastal Floodplain Wetlands)	-0.1° Upslope	10m	10m
T10 On site	Freshwater Wetland (Coastal Freshwater Lagoons)	-1.1° Upslope	5m	5m
T11 On site	Forested Wetlands (Coastal Floodplain Wetlands)	0.5° Downslope	12m	10m
T12 West	Forest (Hunter Macleay Dry Sclerophyll Forest)	-2.5° Upslope	24m	14m
T13 East	Grassland	0.5° Downslope	12m	11m
T14 South-east	Forest (Hunter Macleay Dry Sclerophyll Forest)	1.0° Downslope	29m	17m

The recommended APZs detailed in **Table 3** are considered to be acceptable in this instance and satisfies the Performance Criteria for APZs outlined in Table 5.3a of PBP 2019.

4.2. Access

In the unlikely event of a serious bushfire, it will be essential to ensure that adequate ingress/ egress and the provision of defensible space are afforded in the subdivision layout for all future dwellings.

The proposed road network consists of perimeter and non-perimeter roads which have been designed in accordance with Table 5.3b of PBP 2019. Refer to **Appendix A** for the development plans indicating the proposed access arrangements. Seven (7) public road connections are proposed to be constructed to connect to the future road network.

All roads have been designed either in accordance with or exceed the minimum required for an Acceptable Solution under PBP 2019 including minimum 8m wide road carriageways for all perimeter roads and non-perimeter roads. **Figure 14** indicates Road 5 has an 11m wide road carriageway with all remaining roads 8m wide. Upon completion of the surrounding subdivisions, the remaining bushfire risk will be contained to the narrow riparian corridor; which is less than 40m wide. Operational firefighting can occur from both sides of the 40m wide vegetated riparian corridor (*forested wetland*).

All new perimeter roads and non-perimeter roads are required to be designed in accordance with Maitland City Council development control plan and engineering specifications. The proposed 8m wide internal local streets (non-perimeter roads) are considered sufficiently wide enough to accommodate parking for light vehicles on both sides of road, outside of the primary vehicle carriageway. It is noted the standard for on-street parking required by Australian Standard *AS2890.5:2020 Parking facilities On-street parking* for roads with a speed limit of 50km/hr or less is to be between 2.0m and 2.3m. It is also noted that a RFS Category 1 Firefighting vehicle is 2.4m wide. Furthermore, applying the option of permitting short constrictions where the width of the access road may be reduced for sections less than 30m, an 8m wide road is considered wide enough to provide a continuous unobstructed carriageway with parking on both sides of the road. The combination of double width driveways along a typical residential local street will prevent a continuous line of parked cars on both sides of the local street. It is also unlikely that on-street parking demand in the locality would result in vehicles parked along both sides of non-perimeter (or perimeter) roads.



Figure 14: Excerpt of Detail Plan of Subdivision indicating road carriageway widths

Due to the lower risk bushfire hazard to the east, we request the RFS customise the conditions of the BFSAs to omit the Acceptable Solution requiring “*parking is provided outside of the carriageway width*”. This will permit some infrequent parking within the carriageway without compromising emergency services vehicles. Alternatively, the RFS may consider a minimum 4m wide carriageway for non-perimeter roads and a 6.5m wide carriageway for perimeter roads. Both options are still able to achieve the Intent of Measures for Access.

In summary, it is considered the proposed road network provides safe, all-weather two-way through roads and safe operational access for emergency service personnel and evacuation purposes; complying with the relevant provisions contained in Section 5.3.2 of PBP. Accordingly, the access requirements can be achieved by meeting the Performance Criteria under Table 5.3b of PBP 2019.

4.3. Services - water, electricity and gas

4.3.1. Water

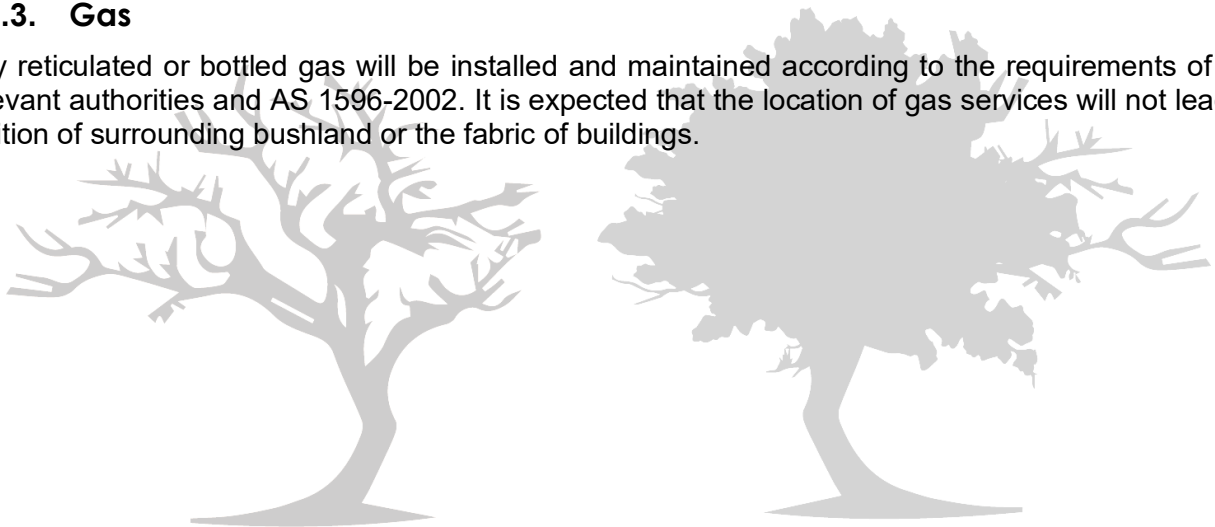
A reticulated water supply will be connected to all new lots in accordance with Table 5.3c of PBP 2019.

4.3.2. Electricity

All electricity services will be supplied and located underground.

4.3.3. Gas

Any reticulated or bottled gas will be installed and maintained according to the requirements of the relevant authorities and AS 1596-2002. It is expected that the location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.



4.4. Emergency Services

There is a NSW Rural Fire Brigade is located at Kooralbyn Street, Thornton within 4.4km (approximately 6 minutes from the site (**Figure 15**)). A second NSW Fire and Rescue Service Fire Station located at 1 Chelmsford Drive, Metford within 6km (approximately 8 minutes) from the site (**Figure 16**).

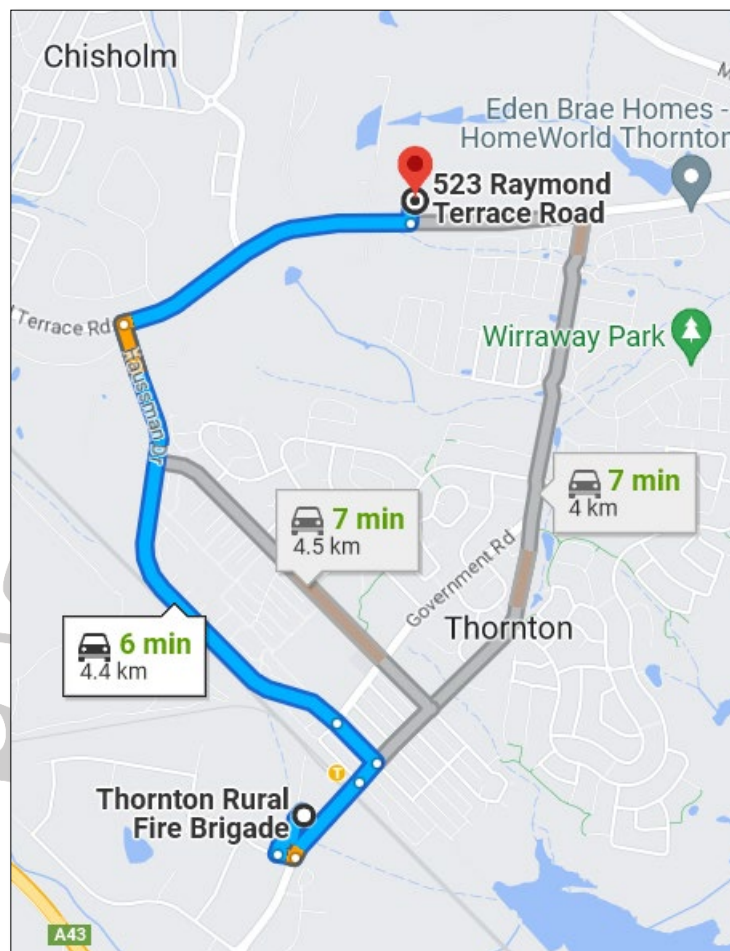


Figure 15: NSW Rural Fire Brigade - Thornton

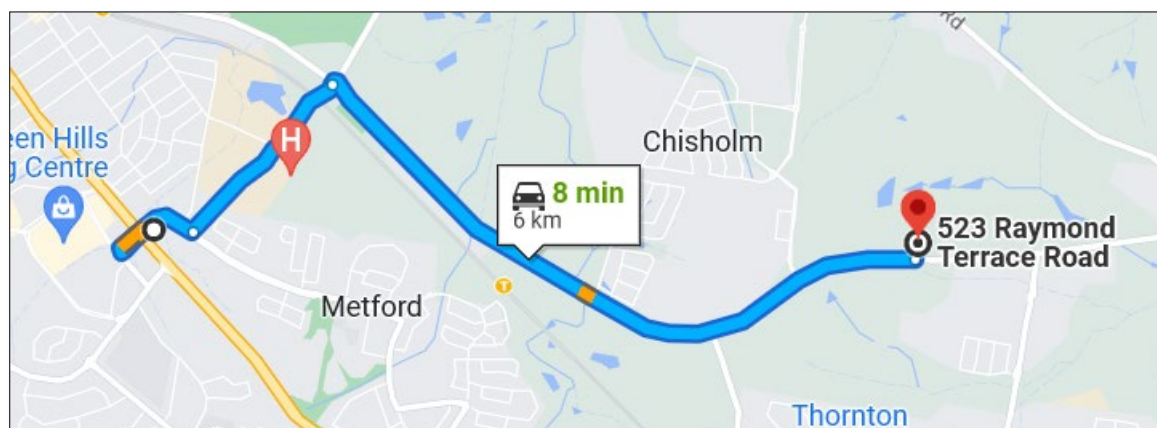


Figure 16: NSW Fire & Rescue - East Maitland

4.5. Construction Standards - Bushfire Attack Level

All buildings must satisfy the Performance Requirements of the National Construction Code: Building Code of Australia (NCC). Part 2.7 of Volume Two of the BCA applies to dwellings located within designated bushfire areas, which are defined as:

Land which has been designated under a power in legislation as being subject, or likely to be subject to, bushfires.

Accordingly, all forthcoming habitable buildings must satisfy the requirements of Part 3.10.5 of the NCC. The *Deemed-to-Satisfy* (DTS) provision of the NCC can only be achieved if dwellings in bushfire prone areas are constructed in accordance with Australian Standard *AS3959-2018 Construction of buildings in bushfire prone areas*. Alternatively, the DTS provisions can also be achieved if the habitable building is constructed in accordance with the NASH Standard 'Steel Framed Construction in Bushfire Areas'.

Building design and the materials used for construction of future dwellings should be chosen based on the information contained within AS3959-2018, and accordingly the designer/architect should be made aware of this recommendation.

The determinations of the appropriate bushfire attack level (BAL) is based on the maximum potential radiant heat exposure. BALs are based upon parameters such as weather modelling, fire-line intensity, flame length calculations, as well as vegetation and fuel load analysis. The determination of the BAL is derived by assessing the:

- ❑ Relevant FDI = 100;
- ❑ Flame temperature = 1090K;
- ❑ Slope = Varied;
- ❑ Vegetation classification = forest, forested wetland, freshwater wetlands and grassland; and
- ❑ Building location.

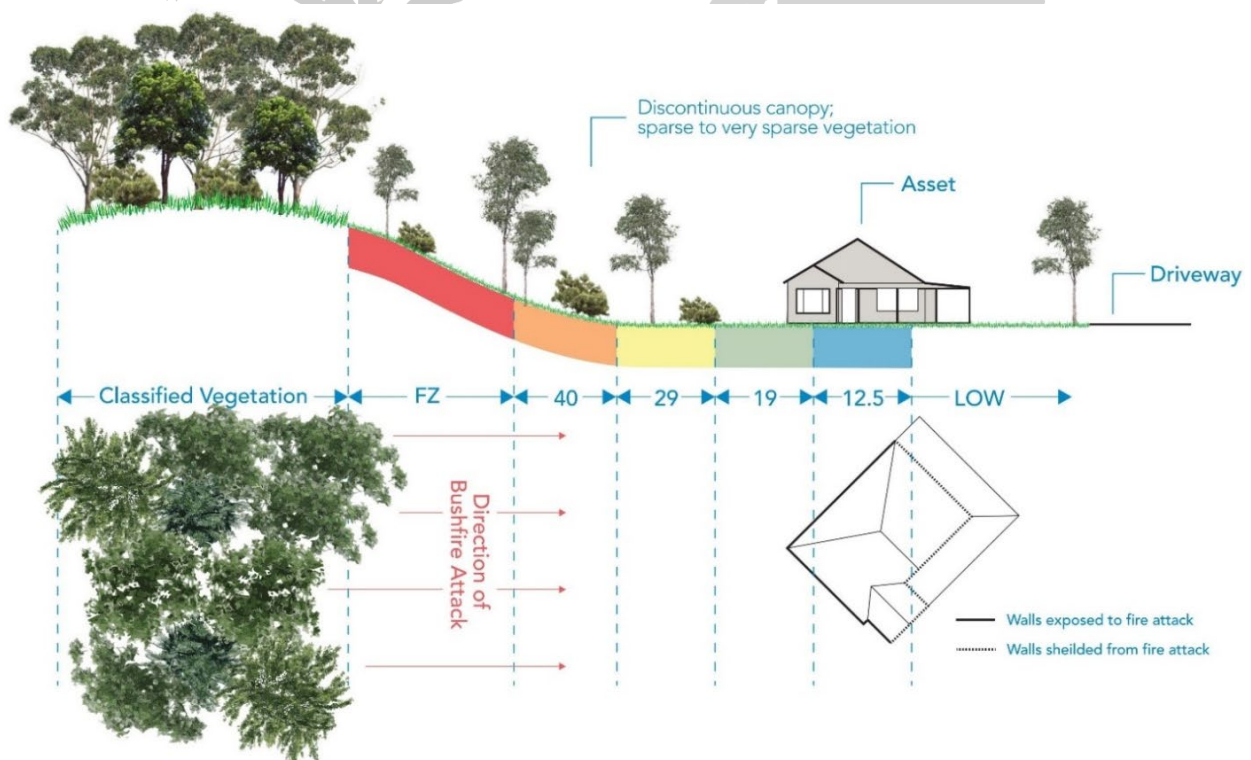


Figure 17: BAL example



The existing bushfire hazard was found to the north, east and west of the proposed development site and identified as a forest (*Hunter Macleay Dry Sclerophyll Forest*). This is considered a temporary hazard as all adjoining lots are in the process of being developed, however, until the vegetation is cleared it is considered a hazard it requires temporary BALs and is assessed accordingly (**Figure 18**).

The proposed drainage reserve corridor separating the northern and southern development sites will become the primary bushfire hazard once the neighbouring developments commence. The drainage reserve will consist of a planting schedule commensurate with *Forested Wetlands* and *Freshwater Wetlands*, requiring permanent BALs and assessed accordingly (**Figure 19**).

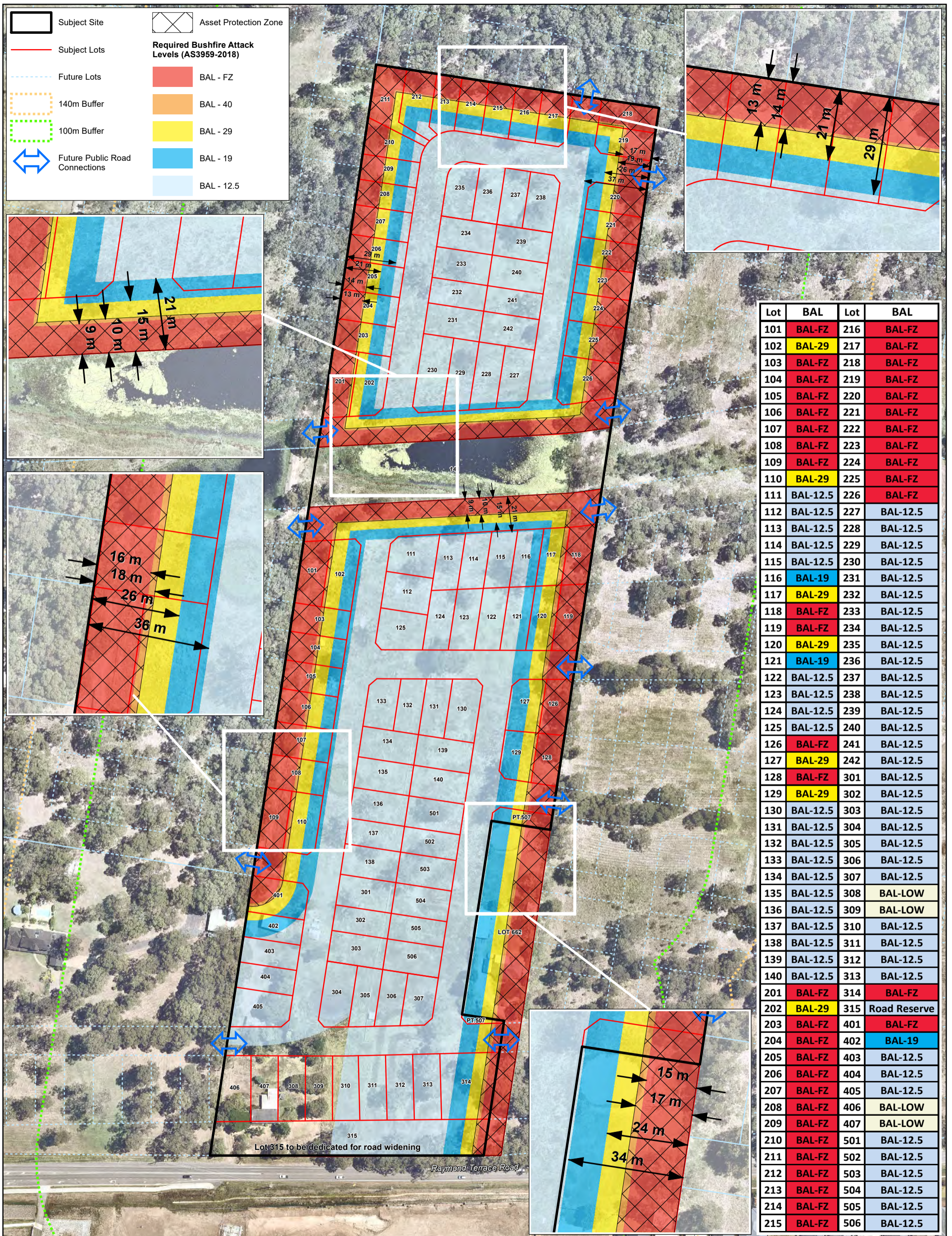
The recommended BALs are shown in **Table 4** and **Figure 18** and **Figure 19**.

Table 4: Required Bushfire Attack Level

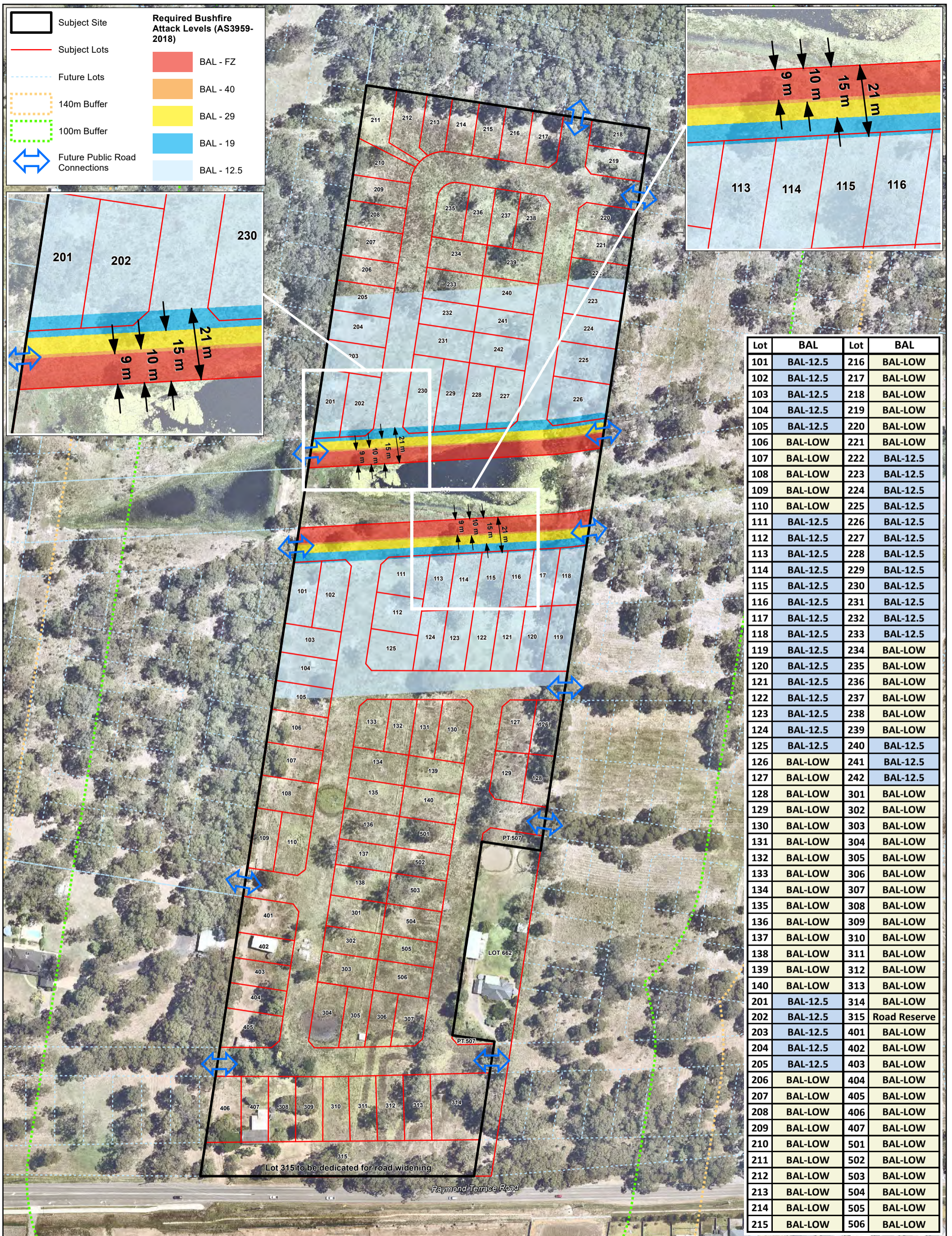
Transect	Vegetation Classification (PBP 2019)	Slope	Recommended APZ (<29kW/m ²)	Distance from Hazard	Bushfire Attack Level (BAL)
T1 North	Forest (Hunter Macleay DSF)	-2.1° Upslope	14m	0m-<13m	BAL-FZ
				13m-<14m	BAL-40
				14m-<21m	BAL-29
				21m-<29m	BAL-19
				29m-<100m	BAL-12.5
T2 East	Forest (Hunter Macleay DSF)	2.8° Downslope	18m	0m-<17m	BAL-FZ
				17m-<18m	BAL-40
				18m-<26m	BAL-29
				26m-<37m	BAL-19
				37m-<100m	BAL-12.5
T3 East	Forested Wetland (Coastal Floodplain Wetlands)	0.8° Downslope	10m	0m-<9m	BAL-FZ
				9m-<10m	BAL-40
				10m-<15m	BAL-29
				15m-<21m	BAL-19
				21m-<100m	BAL-12.5
T4 East	Freshwater Wetland (Coastal Freshwater Lagoons)	0.1° Downslope	5m	0m-<5m	BAL-FZ
				5m-<5m	BAL-40
				5m-<7m	BAL-29
				7m-<11m	BAL-19
				11m-<100m	BAL-12.5
T5 East	Forest (Hunter Macleay DSF)	2.2° Downslope	18m	0m-<16m	BAL-FZ
				16m-<18m	BAL-40
				18m-<26m	BAL-29
				26m-<36m	BAL-19
				36m-<100m	BAL-12.5
T6 South	Non-Hazard	3.1° Downslope	N/A	N/A	BAL-LOW



Transect	Vegetation Classification (PBP 2019)	Slope	Recommended APZ (<29kW/m ²)	Distance from Hazard	Bushfire Attack Level (BAL)
T7 South-west	<i>Non-Hazard</i>	-1.1° Upslope	N/A	N/A	BAL-LOW
T8 West	<i>Forest (Hunter Macleay DSF)</i>	1.8° Downslope	18m	0m-<16m	BAL-FZ
				16m-<18m	BAL-40
				18m-<25m	BAL-29
				25m-<35m	BAL-19
				35m-<100m	BAL-12.5
T9 West	<i>Forested Wetland (Coastal Floodplain Wetlands)</i>	-0.1° Upslope	10m	0m-<9m	BAL-FZ
				9m-<10m	BAL-40
				10m-<14m	BAL-29
				14m-<20m	BAL-19
				20m-<100m	BAL-12.5
T10 On-site	<i>Freshwater Wetland (Coastal Freshwater Lagoons)</i>	-1.1° Upslope	5m	0m-<5m	BAL-FZ
				5m-<5m	BAL-40
				5m-<7m	BAL-29
				7m-<11m	BAL-19
				11m-<100m	BAL-12.5
T11 On-site	<i>Forested Wetland (Coastal Floodplain Wetlands)</i>	0.5° Downslope	10m	0m-<9m	BAL-FZ
				9m-<10m	BAL-40
				10m-<15m	BAL-29
				15m-<21m	BAL-19
				21m-<100m	BAL-12.5
T12 West	<i>Forest (Hunter Macleay DSF)</i>	-2.5° Upslope	14m	0m-<13m	BAL-FZ
				13m-<14m	BAL-40
				14m-<21m	BAL-29
				21m-<29m	BAL-19
				29m-<100m	BAL-12.5
T13 East	<i>Grassland</i>	0.5° Downslope	11m	0m-<9m	BAL-FZ
				9m-<11m	BAL-40
				11m-<17m	BAL-29
				17m-<25m	BAL-19
				25m-<50m	BAL-12.5
T14 South-east	<i>Forest (Hunter Macleay DSF)</i>	1.0° Downslope	17m	0m-<15m	BAL-FZ
				15m-<17m	BAL-40
				17m-<24m	BAL-29
				24m-<34m	BAL-19
				34m-<100m	BAL-12.5



Lot	BAL	Lot	BAL
101	BAL-FZ	216	BAL-FZ
102	BAL-29	217	BAL-FZ
103	BAL-FZ	218	BAL-FZ
104	BAL-FZ	219	BAL-FZ
105	BAL-FZ	220	BAL-FZ
106	BAL-FZ	221	BAL-FZ
107	BAL-FZ	222	BAL-FZ
108	BAL-FZ	223	BAL-FZ
109	BAL-FZ	224	BAL-FZ
110	BAL-29	225	BAL-FZ
111	BAL-12.5	226	BAL-FZ
112	BAL-12.5	227	BAL-12.5
113	BAL-12.5	228	BAL-12.5
114	BAL-12.5	229	BAL-12.5
115	BAL-12.5	230	BAL-12.5
116	BAL-19	231	BAL-12.5
117	BAL-29	232	BAL-12.5
118	BAL-FZ	233	BAL-12.5
119	BAL-FZ	234	BAL-12.5
120	BAL-29	235	BAL-12.5
121	BAL-19	236	BAL-12.5
122	BAL-12.5	237	BAL-12.5
123	BAL-12.5	238	BAL-12.5
124	BAL-12.5	239	BAL-12.5
125	BAL-12.5	240	BAL-12.5
126	BAL-FZ	241	BAL-12.5
127	BAL-29	242	BAL-12.5
128	BAL-FZ	301	BAL-12.5
129	BAL-29	302	BAL-12.5
130	BAL-12.5	303	BAL-12.5
131	BAL-12.5	304	BAL-12.5
132	BAL-12.5	305	BAL-12.5
133	BAL-12.5	306	BAL-12.5
134	BAL-12.5	307	BAL-12.5
135	BAL-12.5	308	BAL-LOW
136	BAL-12.5	309	BAL-LOW
137	BAL-12.5	310	BAL-12.5
138	BAL-12.5	311	BAL-12.5
139	BAL-12.5	312	BAL-12.5
140	BAL-12.5	313	BAL-12.5
201	BAL-FZ	314	BAL-FZ
202	BAL-29	315	Road Reserve
203	BAL-FZ	401	BAL-FZ
204	BAL-FZ	402	BAL-19
205	BAL-FZ	403	BAL-12.5
206	BAL-FZ	404	BAL-12.5
207	BAL-FZ	405	BAL-12.5
208	BAL-FZ	406	BAL-LOW
209	BAL-FZ	407	BAL-LOW
210	BAL-FZ	501	BAL-12.5
211	BAL-FZ	502	BAL-12.5
212	BAL-FZ	503	BAL-12.5
213	BAL-FZ	504	BAL-12.5
214	BAL-FZ	505	BAL-12.5
215	BAL-FZ	506	BAL-12.5





4.7. Landscaping and Vegetation Management

In APZs and IPAs, the design and management of the landscaped areas in the vicinity of buildings have the potential to improve the chances of survival of people and buildings. Reduction of fuel does not require the removal of all vegetation. Trees and plants can provide some bushfire protection from strong winds, intense heat and flying embers (by filtering embers) and changing wind patterns.

Generally landscaping in and around a bushfire hazard should consider the following:

- ❑ Priority given to retaining species that have a low flammability;
- ❑ Priority given to retaining species which do not drop much litter in the bushfire season, and which do not drop litter that persists as ground fuel in the bush fire season;
- ❑ Priority given to retaining smooth barked species over stringy bark; and
- ❑ Create discontinuous or gaps in the vegetation to slow down or break the progress of fire towards the dwellings.

Landscaping within APZs and IPAs should give due regard to fire retardant plants and ensure that fuel loads do not accumulate as a result of the selected plant varieties.

The principles of landscaping for bushfire protection aim to:

- ❑ Prevent flame impingement on dwellings;
- ❑ Provide a defensible space for property protection;
- ❑ Reduce fire spread;
- ❑ Deflect and filter embers;
- ❑ Provide shelter from radiant heat; and
- ❑ Reduce wind speed.

Plants that are less flammable have the following features;

- ❑ High moisture content and / or 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.

Avoiding understorey planting and regular trimming of the lower limbs of trees also assists in reducing fire penetration into the canopy. Rainforests species such as *Syzygium* and figs are preferred to species with high fine fuel and/or oil content.

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

Consideration should be given to vegetation fuel loads present on site with particular attention to APZs.

Careful thought must be given to the type and physical location of any proposed site landscaping. Inappropriately selected and positioned vegetation has the potential to 'replace' any previously removed fuel load. Bearing in mind the desired aesthetic and environment sought by site landscaping, some basic principles have been recommended to help minimise the chance of such works contributing to the potential hazard on site.

Whilst it is recognised that fire-retardant plant species are not always the most aesthetically pleasing choice for site landscaping, the need for adequate protection of life and property requires that a suitable balance between visual and safety concerns be considered.

It is reiterated again that it is essential that any landscaped areas and surrounds are subject to ongoing fuel management and reduction to ensure that fine fuels do not build up.



5. Conclusion and Recommendations

5.1. Conclusion

Bushfire Planning Australia prepared a Bushfire Assessment Report for the proposed 108 lot residential subdivision at 523 Raymond Terrace Road, Chisholm. The proposed 108 lot subdivision is consistent with the Thornton North Master Plan prepared by Maitland City Council.

This BAR found the site was currently exposed to high bushfire hazard located to the north, east and west of the subject site. The predominant vegetation surrounding the site in unmanaged conditions is consistent with a *forest*, specifically *Hunter Macleay Dry Sclerophyll Forest* vegetation formation as described in the NSW Rural Fire Service document Planning for Bushfire Protection 2019 (PBP 2019).

The bushfire hazard will be substantially reduced over the next 2-5 years as the remaining land surrounding the subject site zoned for residential use is subdivided and the remaining hazardous vegetation removed. The only remaining vegetation presenting a long-term bushfire hazard is the vegetation contained within the riparian corridor that bisects the subject site.

As the site is identified as the Thornton North Urban Release Area in the Maitland Local Government Area Bush Fire Planning - Urban Release Area Map, a Subdivision BAL Plan has been prepared and is contained in **Appendix E**. As part of the application for a Bush Fire Safety Authority (BFSA) under section 100b of the Rural Fires Act 1997 (RF Act), we are also seeking endorsement of the Subdivision BAL Plan prior to the registration of the subdivision.

The BAR concludes the bushfire hazard the proposed development is exposed to can be successfully mitigated by applying a combination of bushfire mitigation measures including temporary and permanent Asset Protection Zones (APZs).

The following key recommendations have been designed to enable the proposed development to achieve the aims and objectives of PBP 2019:

1. All land within the development site; excluding the riparian corridor, is to be managed as an inner protection area (IPA) as outlined in Appendix 4 of PBP 2019 and the RFS document *Standards for asset protection zones*;
2. The APZs shown in **Figure 19 - Subdivision BAL Plan** shall be maintained in perpetuity in accordance with the requirements of Appendix 4 of PBP 2019;
3. Access shall be provided in accordance with the Performance Criteria detailed in Table 5.3b of PBP 2019. This will require the provision of a minimum of four (4) separate road access points provided from the development site to the east and west to ensure safe evacuation for all residents;
4. On-street vehicle parking may be permitted within road carriageways as all roads are a minimum 8m wide;
5. All temporary turning heads shall be constructed in accordance Appendix A3.3 of PBP 2019;
6. Vegetation within road verges (including swales) to be consistent with a grassland vegetation classification with tree canopy less than 10% at maturity (and considered unmanaged);
7. The Bushfire Attack Level (BAL) ratings identified in **Figure 19 - Subdivision BAL Plan** apply to all future dwellings to be constructed on the proposed lots. All future dwellings to be constructed on the proposed lots shall have due regard to the specific considerations given in the National Construction Code: Building Code of Australia (BCA) which makes specific reference to Australian Standard AS3959-2018 Construction of buildings in bushfire prone areas (AS3959-2018) and the NASH Standard Steel Framed Construction in Bushfire Prone Areas;
8. All new lots are to be connected to a reliable water supply network and that suitable fire hydrants are located throughout the development site that are clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure shall comply with AS2419.1 2005 and section 5.3.3 of PBP 2019;

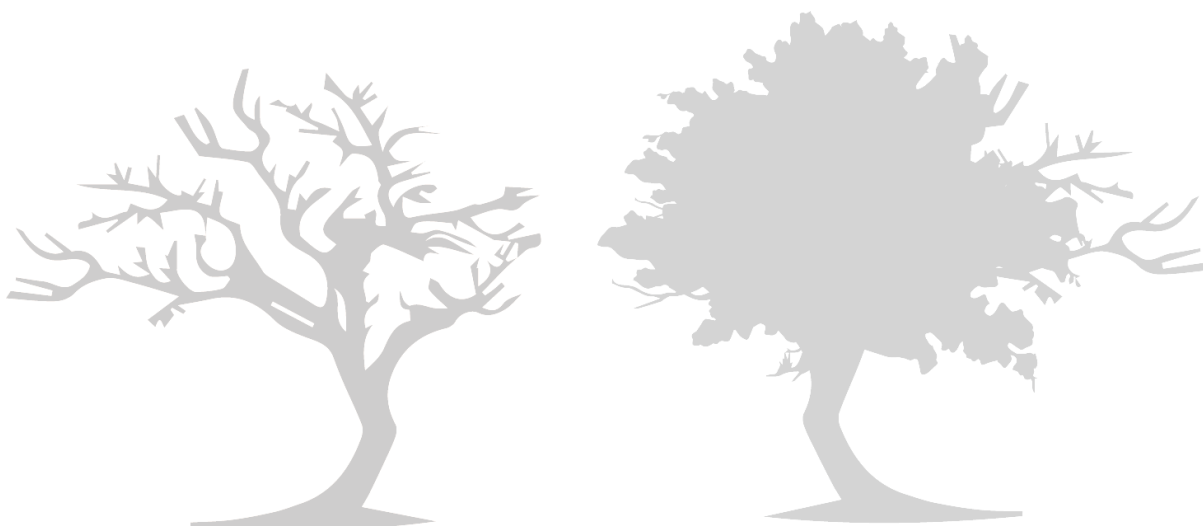


9. Consideration should be given to landscaping and fuel loads on site to decrease potential fire hazards on site; and

10. The Rural Fire Service endorse the Subdivision BAL Plan contained in **Appendix E**.

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection and production (May 2023).

Should the above recommendations be implemented commensurate to the low threat hazard, the nominal bushfire risk can be suitably mitigated to offer an acceptable level of protection to life and property for those persons and assets occupying the site but they do not and cannot guarantee that the area will not be affected by bushfire.



6. References

- ❑ NSW Rural Fire Service (2005). Standards for Asset Protection Zones. NSW Rural Fire Service.
- ❑ NSW Rural Fire Service (2019). Planning for Bushfire Protection – A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners.
- ❑ Ramsay, GC and Dawkins, D (1993). Building in Bushfire-prone Areas – Information and Advice. CSIRO and Standards Australia.
- ❑ Rural Fires and Environmental Assessment Legislation Amendment Act 2002.
- ❑ Standards Australia (2018). AS 3959 – 2018: Construction of Buildings in Bushfire-prone Areas.





Appendix A: Proposed Plan of Subdivision



DEVELOPMENT APPLICATION

"PROPOSED SUBDIVISION"

LOT 100 IN D.P.847510

523 RAYMOND TERRACE ROAD CHISHOLM



LOCALITY SKETCH
NOT TO SCALE

INDEX OF DRAWINGS	
DRAWING No.	TITLE NAME
190873-DA-001	COVER SHEET, INDEX OF DRAWINGS & LOCALITY SKETCH
190873-DA-002	OVERALL SITE PLAN
190873-DA-003	ZONING PLAN
190873-DA-004	OVERALL MASTERPLAN
190873-DA-005	STAGING PLAN
190873-DA-006	DETAIL PLAN SHEET 1
190873-DA-007	DETAIL PLAN SHEET 2
190873-DA-008	DETAIL PLAN SHEET 3
190873-DA-009	TRAFFIC MANAGEMENT PLAN



NOT FOR CONSTRUCTION

drawing title:
COVER SHEET, INDEX OF DRAWINGS & LOCALITY SKETCH

location:
523 RAYMOND TERRACE ROAD CHISHOLM

council: MCC

dwg ref: 190873-DA-001

client:
ACG CLOVELLY ROAD PTY LTD

central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100
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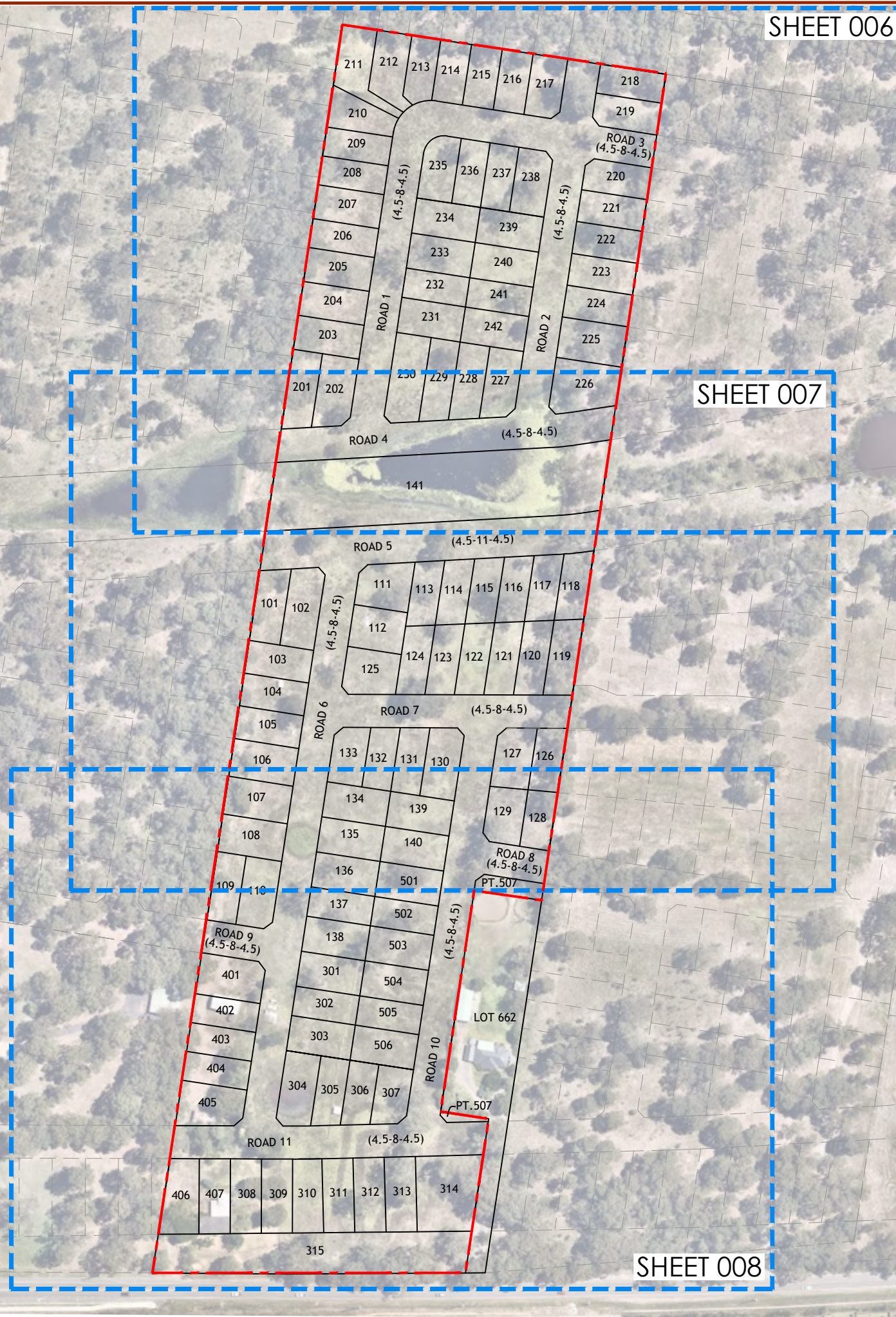
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B	21.04.23	INITIAL ISSUE	A.E.	N.D.	DATUM: N/A CONTOUR INTERVAL: N/A	NOT TO SCALE	



SHEET 006

LEGEND

- SITE BOUNDARY
- PROPOSED LOT BOUNDARY
- EXISTING LOT BOUNDARY
- FUTURE LOT BOUNDARY



SHEET 008



NOT FOR CONSTRUCTION

drawing title:

OVERALL SITE PLAN

location: 523 RAYMOND TERRACE ROAD CHISHOLM

council: MCC

dwg ref: 190873-DA-002

client: ACG CLOVELLY ROAD PTY LTD



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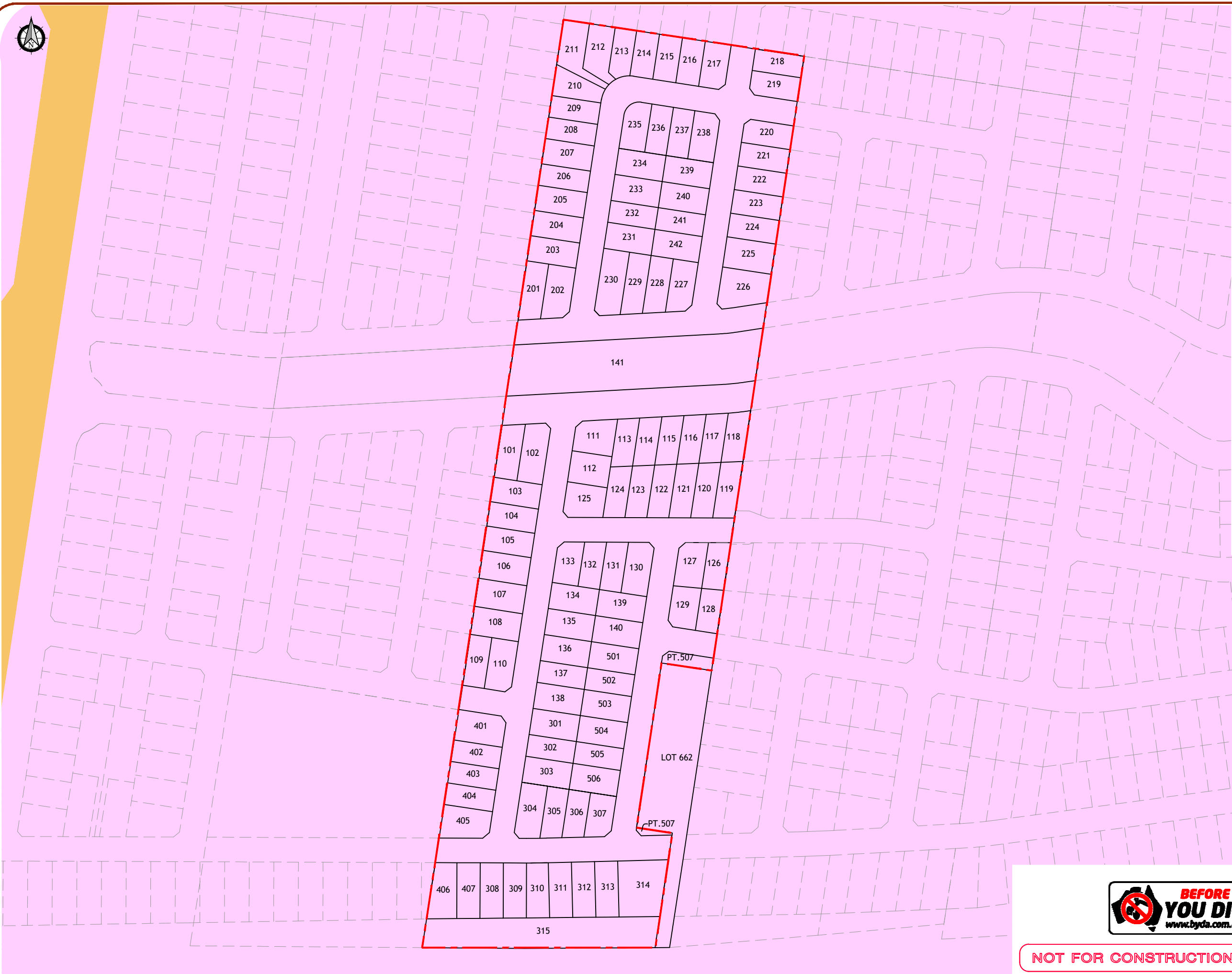


LEGEND

- SITE BOUNDARY
- PROPOSED LOT BOUNDARY
- EXISTING LOT BOUNDARY
- FUTURE LOT BOUNDARY

Zone

- B1 Neighbourhood Centre
- B2 Local Centre
- B3 Commercial Core
- B4 Mixed Use
- B5 Business Development
- B6 Enterprise Corridor
- E1 National Parks and Nature Reserves
- E2 Environmental Conservation
- E3 Environmental Management
- E4 Environmental Living
- IN1 General Industrial
- IN4 Working Waterfront
- R1 General Residential
- R2 Low Density Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU2 Rural Landscape
- RU3 Forestry
- RU5 Village
- SP1 Special Activities
- SP2 Infrastructure
- UL Unzoned Land
- W1 Natural Waterways
- W2 Recreational Waterways
- DM Deferred Matter



Plotted By: Andy Eving Plot Date: 21/04/23 1:37:48PM Cad File: S:\190873\DWG\PLANNING\DA\190873-DA-003[A].DWG
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drawing title:
ZONING PLAN

location: 523 RAYMOND TERRACE ROAD CHISHOLM

council: MCC

dwg ref: 190873-DA-003

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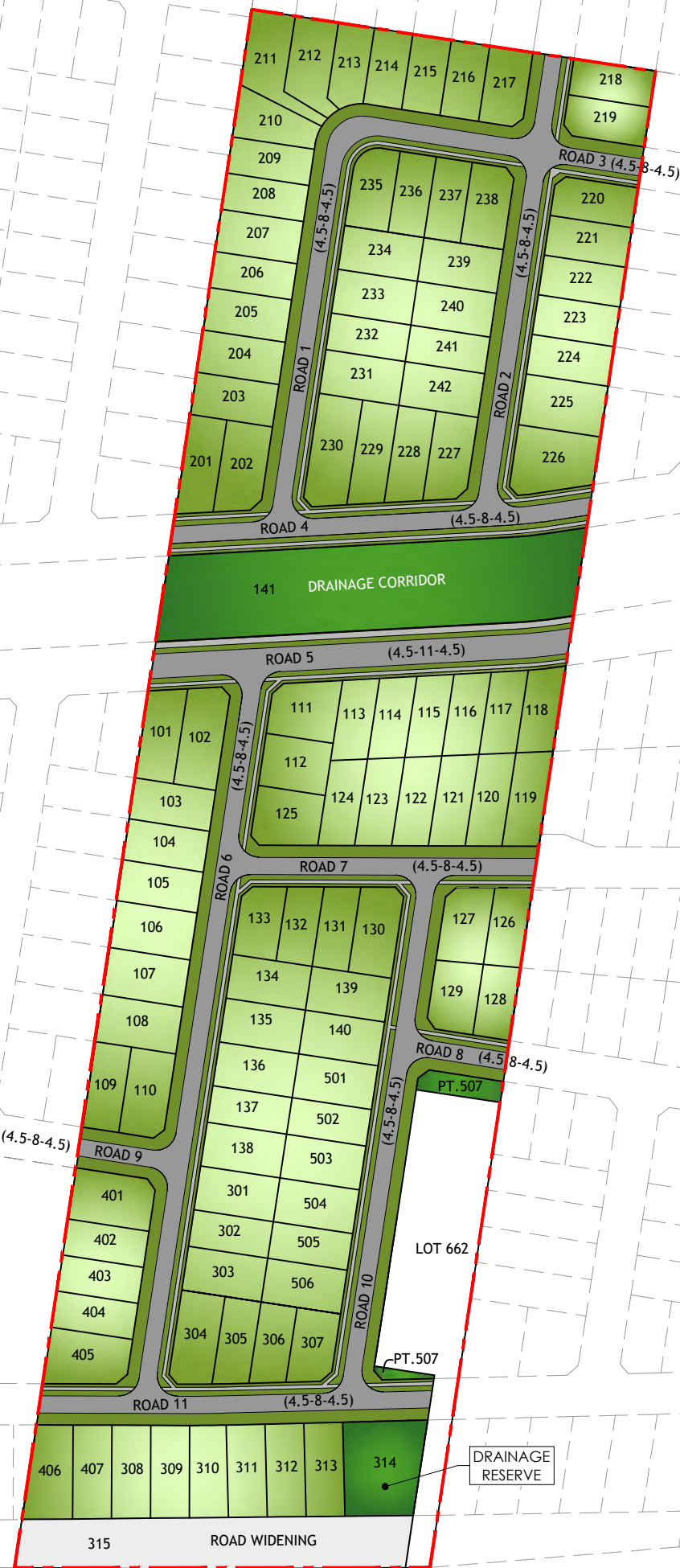
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- civil engineering
- infrastructure
- superintendency
- social impact
- town planning
- surveying
- development feasibility
- visualisation
- urban design

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LEGEND

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- EXISTING LOT BOUNDARY
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MASTER PLAN

location: 523 RAYMOND TERRACE ROAD CHISHOLM

council: MCC

dwg ref: 190873-DA-004

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DA/2020/173
(DA UNDER ASSESSMENT)

DA BEING
PREPARED

DA/2019/574
(DA APPROVED)

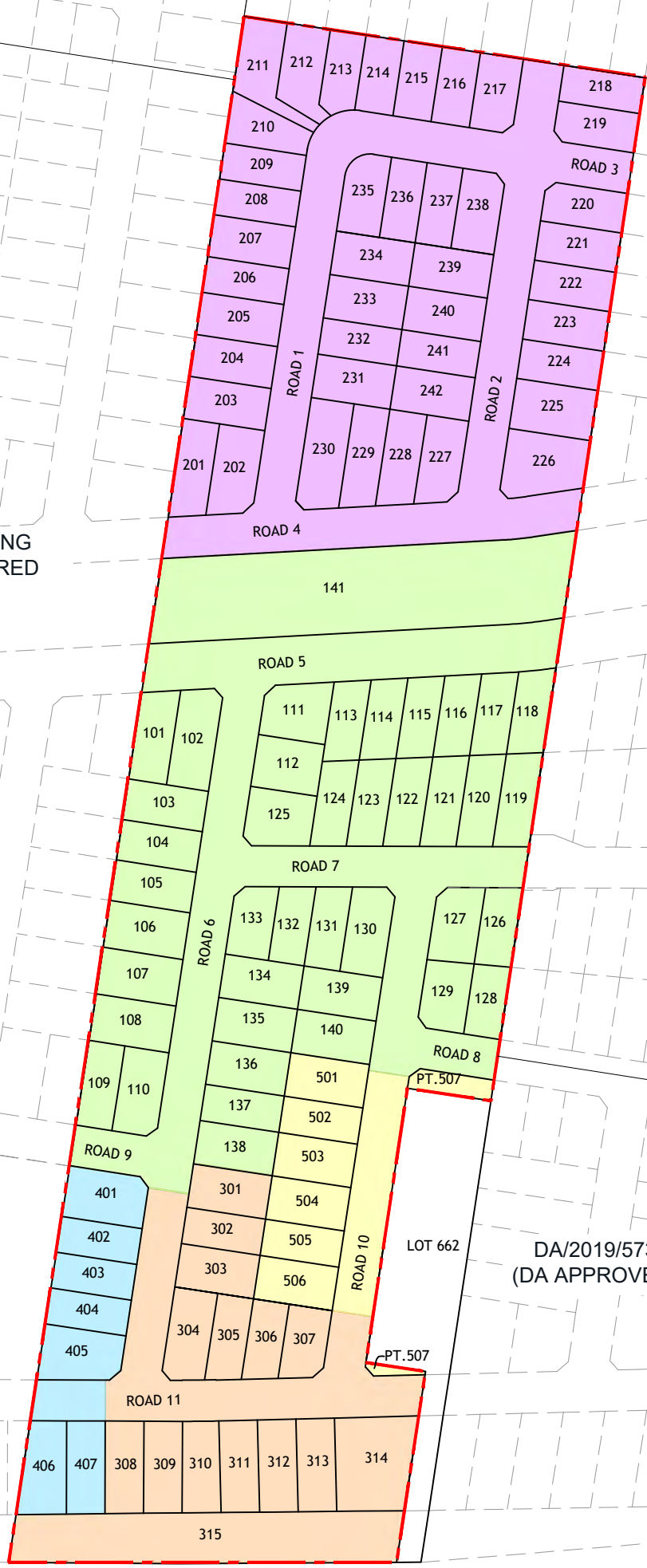
DA/2019/573
(DA APPROVED)

LEGEND

	SITE BOUNDARY
	PROPOSED LOT BOUNDARY
	EXISTING LOT BOUNDARY
	FUTURE LOT BOUNDARY

STAGE SUMMARY

STAGE	NUMBERING	LOT YIELD
1	101 - 141	40 LOTS + 1 DRAINAGE RESERVE (LOT 141)
2	201 - 242	42 LOTS
3	301 - 315	13 LOTS + 1 DRAINAGE RESERVE (LOT 314) + 1 ROAD WIDENING (LOT 315)
4	401 - 407	7 LOTS
5	501 - 507	6 LOTS + 1 RESIDUE LOT (LOT 507)
TOTAL		108 RESIDENTIAL LOTS 2 DRAINAGE RESERVES 1 ROAD WIDENING LOTS 1 RESIDUE LOT



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drawing title:
STAGING PLAN

location: 523 RAYMOND TERRACE ROAD CHISHOLM

council: MCC

dwg ref: 190873-DA-005

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- FUTURE LOT BOUNDARY

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DETAIL PLAN SHEET 1

location: 523 RAYMOND TERRACE ROAD CHISHOLM

council: MCC

dwg ref: 190873-DA-006

client:
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LEGEND

- SITE BOUNDARY
- PROPOSED LOT BOUNDARY
- EXISTING LOT BOUNDARY
- FUTURE LOT BOUNDARY



FOR CONTINUATION REFER SHEET 008



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- infrastructure
- superintendency
- social impact
- town planning
- surveying
- development feasibility
- visualisation
- urban design

drawing title:
DETAIL PLAN SHEET 2

location: 523 RAYMOND TERRACE ROAD CHISHOLM

council: MCC

dwg ref: 190873-DA-007

client: ACG CLOVELLY ROAD PTY LTD

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LEGEND

- SITE BOUNDARY
- PROPOSED LOT BOUNDARY
- EXISTING LOT BOUNDARY
- FUTURE LOT BOUNDARY



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DETAIL PLAN SHEET 3

location: 523 RAYMOND TERRACE ROAD CHISHOLM

council: MCC

dwg ref: 190873-DA-008

client: ACG CLOVELLY ROAD PTY LTD

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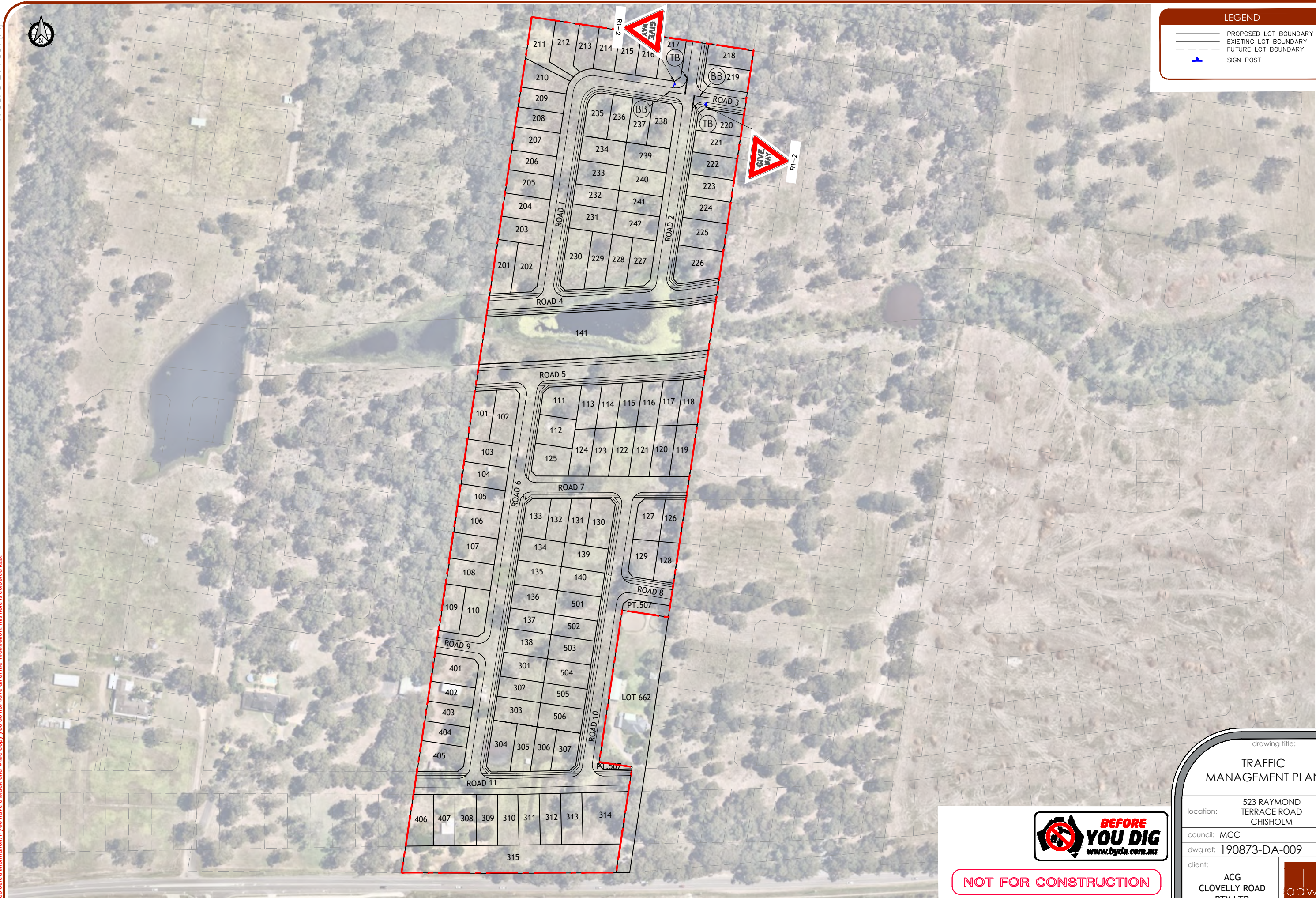
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LEGEND

- PROPOSED LOT BOUNDARY
- - - EXISTING LOT BOUNDARY
- - - FUTURE LOT BOUNDARY
- ⚓ SIGN POST



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TRAFFIC MANAGEMENT PLAN

location: 523 RAYMOND TERRACE ROAD CHISHOLM

council: MCC

dwg ref: 190873-DA-009

client:
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Appendix B: AHIMS Search Results



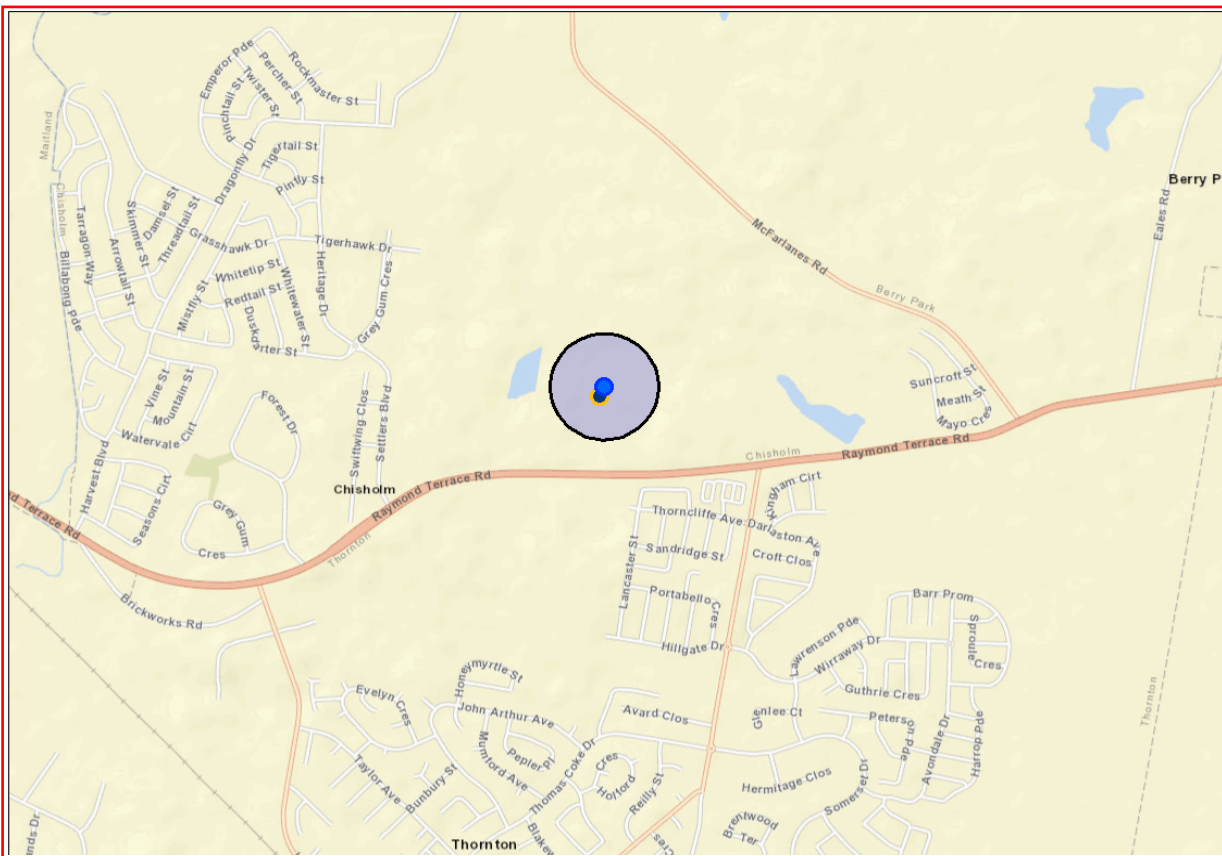
Katrina Greville
21 Costata Crescent
Adamstown New South Wales 2289
Attention: Katrina Greville
Email: klmukevski@bigpond.com

Date: 30 March 2023

Dear Sir or Madam:

AHIMS Web Service search for the following area at Address : 523 RAYMOND TERRACE ROAD CHISHOLM 2322 with a Buffer of 200 meters, conducted by Katrina Greville on 30 March 2023.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

1	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the [NSW Government Gazette \(https://www.legislation.nsw.gov.au/gazette\)](https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not to be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.



Appendix C: Planning for Bushfire Protection Compliance Table



Table 1: Aims and Objectives of Planning for Bushfire Protection 2019

Objectives	Satisfied	Comment
<ul style="list-style-type: none"> ➤ Afford buildings and their occupants protection from exposure to a bush fire 	<p>✓</p>	<p>All lots within the proposed development are provided with sufficient separation from the nearest bushfire hazard by public perimeter roads or adequate APZs and are provided with up to 5 different evacuation routes (for both the north and south precincts).</p>
<ul style="list-style-type: none"> ➤ Provide for a defensible space to be located around buildings 	<p>✓</p>	<p>Defensible space by way of an APZ is provided between all new lots and the bushfire hazard to ensure radiant heat levels are below critical limits (29kW/m²).</p>
<ul style="list-style-type: none"> ➤ Provide appropriate separation between a hazard and buildings, which, in combination with other measures, prevent the likely fire spread to buildings 	<p>✓</p>	<p>Appropriate APZs are provided between the proposed lots and the hazard, which in addition to other mitigation measures such as suitable construction, will provide an acceptable level of protection to the buildings, and prevent the spread of fire to the buildings and onto adjoining buildings.</p>
<ul style="list-style-type: none"> ➤ Ensure that safe operational access and egress for emergency service personnel and residents is available 	<p>✓</p>	<p>Public road access will be provided from newly constructed roads connected to the northern, eastern and western adjoining developments. Primary access is only dependent on the eastern development being completed.</p>
<ul style="list-style-type: none"> ➤ Provide for ongoing management and maintenance of BPMs 	<p>✓</p>	<p>All owners will be responsible for the management and maintenance of the private property.</p>
<ul style="list-style-type: none"> ➤ Ensure that utility services are adequate to meet the needs of firefighters 	<p>✓</p>	<p>The development includes all essential utility services to meet the needs of firefighters; including a reliable water supply.</p>

Table 2: Performance Criteria and Acceptable Solutions for residential subdivisions (Chapter 5 PBP 2019)

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
5.3.1 ASSET PROTECTION ZONES Table 5.3a To provide sufficient space and maintain reduced fuel loads, so as to ensure radiant heat levels at buildings are below critical limits and to prevent direct flame contact with a building.	Potential building footprints must not be exposed to radiant heat levels exceeding 29kW/m ² on each proposed lot.	APZs are provided in accordance with Tables A1.12.2 and A1.12.3 based on the FFDI.	✓	All new lots are able to accommodate a building envelope that ensures future dwellings are exposed to BAL-29 or less; thereby ensuring no dwellings are exposed to radiant heat levels greater than 29kW/m ² . The APZs were calculated using Method 2 (AS39590-2018) to demonstrate the minimum required APZ.
	APZs are managed and maintained to prevent the spread of a fire towards the building.	The APZ is managed in accordance with the requirements of Appendix 4	✓	All new landowners will be required to manage their respective lot as an IPA.
	The APZ is provided in perpetuity.	APZs are wholly within the boundaries of the development site.	✓	There are no exceptional circumstances that would require an APZ to be located external to the development site.
	APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is negated.	The APZ is not located on lands with a slope exceeding 18°	✓	The maximum slope of the site is 3.1° downslope or less.
LANDSCAPING	Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Landscaping is in accordance with APZ standards (see Appendix 4). Fencing is constructed in accordance with section 7.6.	✓	All new landscaping has considered the requirements of APZs per Appendix 4. All new fencing will be colorbond or similar non-combustible material.
5.3.2 ACCESS (General Requirements) Table 5.3b To provide safe operational access for emergency services personnel in suppressing a bush fire, while residents are	Fire fighters are provided with safe all weather access to structures.	Property access roads are two-wheel drive, all-weather roads	✓	All new roads are a minimum 8m wide (including non-perimeter roads) and satisfy PBP 2019 and Maitland City Council engineering standards. A minimum of four (4) access routes will be provided to the subdivision following completion of the first stage. Ultimately seven (7) access routes will be available for residents within the proposed subdivision.
Perimeter roads are provided for residential subdivisions of three or more allotments		✓		
Subdivisions of three or more allotments have more than one access in and out of the development		✓		

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
accessing or egressing an area.		Traffic management devices are constructed to not prohibit access by emergency services vehicles.	✓	
		Access roads must provide suitable turning areas in accordance with Appendix 3.	✓	
ACCESS ROAD CAPACITY	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.	✓	All new roads are designed in accordance with MCC engineering specifications. The proposed roads will have sufficient load capacity for all firefighting vehicles.
ACCESS TO WATER	There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.	✓	All proposed lots are able to be connected to a reticulated water supply.
		Hydrants are provided in accordance with AS2419.1:2005	✓	
		There is suitable access for Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	✓	
PERIMETER ROADS	Perimeter access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while occupants are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	There are two-way sealed roads.	✓	The entire development is protected by a perimeter road. All perimeter roads are a minimum 8m and up to 11m wide and are designed in accordance with the relevant PBP 2019 design requirements. It is recommended the RFS do not impose a condition requiring parking to be provided outside of the carriageway as the proposed development has a combination of 8m -11m wide perimeter roads. The lower risk bushfire hazard and the multiple evacuation routes result in a reduced risk of obstructions occurring to emergency services accessing the site.
		8m carriageway width kerb to kerb.	✓	
		Hydrants are to be located clear of parking areas.	✓	
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	✓	
		Curves of roads have a minimum inner radius of 6m.	✓	
		The maximum grade road is 15° and average grade is 10°.	✓	



Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
		The road crossfall does not exceed 3°.	✓	
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; and	✓	
NON-PERIMETER ROADS	Non-perimeter access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while occupants are evacuating.	Minimum 5.5m width kerb to kerb.	✓	All roads; including non-perimeter roads are 8m wide will be constructed in accordance with PBP 2019. It is recommended the RFS do not impose a condition requiring parking to be provided outside of the carriageway as the proposed development has a network of 8m wide non-perimeter roads, and 8m-11m wide perimeter roads. The lower risk bushfire hazard and the multiple evacuation routes result in a reduced risk of obstructions occurring to emergency services accessing the site.
		Parking is provided outside of the carriageway.	✓	
		Hydrants are to be located clear of parking areas.	✓	
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	✓	
		Curves of roads have a minimum inner radius of 6m.	✓	
		The maximum grade road is 15° and average grade is 10°.	✓	
		The road crossfall does not exceed 3°.	✓	
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; and	✓	
5.3.3 SERVICES Table 5.3c	Adequate water supplies is provided for firefighting purposes.	Reticulated water is to be provided to the development, where available	✓	A reticulated water supply is provided.
		A static water supply is provided where no reticulated water is available	N/A	
		Static water supplies shall comply with Table 5.3d	N/A	
WATER	Water supplies are located at regular intervals.	Fire hydrant spacing, design and sizing comply with AS2419.1:2005;	✓	A reticulated water supply is provided.

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
	The water supply is accessible and reliable for firefighting operations.	Hydrants are not located within any road carriageway;	✓	A reticulated water supply is provided.
		Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	✓	
	Flows and pressures are appropriate.	Fire hydrant flows and pressures comply with AS2419.1:2005.	✓	
	The integrity of the water supply is maintained.	All above ground water service pipes are metal, including and up to any taps.	Able to comply	
ELECTRICITY	Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings.	Where practicable, electrical transmission lines are underground.	✓	The proposed new lots will be connected to the existing underground electricity service.
		Where overhead electrical transmission lines are proposed as follows: → lines are installed with short pole spacing (30 metres), 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	N/A	
GAS	Location 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 1596:2014 and the requirements of relevant authorities, metal piping is to be used.	✓	Any new gas connections will be underground and will be unlikely to create an additional hazard risk to surrounding bushland.



Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution AS - Alternative Solution	
		<p>All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side;</p> <p>Connections to and from gas cylinders are metal:</p> <p>Polymer-sheathed flexible gas supply lines are not used; and</p> <p>Above-ground gas service pipes are metal, including and up to any outlets.</p>		



Appendix D: NBC Bushfire Attack Assessor V4.1 Results





NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 28/04/2023

Assessment Date: 28/03/2023

Site Street Address: 22114 523 Raymond Terrace Road, Chisholm

Assessor: Stuart Greville; Bushfire Planning Australia

Local Government Area: Maitland

Alpine Area: No

Equations Used

Transmissivity: Fuss and Hammins, 2002

Flame Length: RFS PBP, 2001/Vesta/Catchpole

Rate of Fire Spread: Noble et al., 1980

Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005

Peak Elevation of Receiver: Tan et al., 2005

Peak Flame Angle: Tan et al., 2005

Run Description: T1 - north

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 2 Degrees

Vegetation Slope Type: Upslope

Surface Fuel Load(t/ha): 14

Overall Fuel Load(t/ha): 24.6

Vegetation Height(m): 0.9

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 1 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 14

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1090

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg): 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 29

Peak Elevation of Receiver(m): 5.35

Radiant Heat(kW/m²): 29

Flame Angle (degrees): 64

Flame Length(m): 12.44

Maximum View Factor: 0.444

Rate Of Spread (km/h): 1.46

Inner Protection Area(m): 0

Transmissivity: 0.86

Outer Protection Area(m): 0

Fire Intensity(kW/m): 18600

BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m²: Elevation of Receiver:

Asset Protection Zone(m): 11 14 21 29 47 6

Run Description: T10 - west along riparian corridor

Vegetation Information

Vegetation Type: Coastal Freshwater Lagoons

Vegetation Group: Freshwater Wetlands

Vegetation Slope: 1 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 4.4

Overall Fuel Load(t/ha): 4.4

Vegetation Height(m): 1

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 1 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 5

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1090

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg) 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 29

Peak Elevation of Receiver(m): 1.78

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 65

Flame Length(m): 4.11

Maximum View Factor: 0.43

Rate Of Spread (km/h): 2.47

Inner Protection Area(m): 0

Transmissivity: 0.888

Outer Protection Area(m): 0

Fire Intensity(kW/m): 5607

BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:

Asset Protection Zone(m): 0 0 0 0 0 0

Run Description: T11 - across riparian corridor (36m wide)

Vegetation Information

Vegetation Type: Coastal Floodplain Wetlands

Vegetation Group: Forested Wetlands

Vegetation Slope: 1 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 8.2

Overall Fuel Load(t/ha): 15.1

Vegetation Height(m): 0.9

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 1 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 10

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1090

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg) 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 29

Peak Elevation of Receiver(m): 3.74

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 65

Flame Length(m): 8.64

Maximum View Factor: 0.437

Rate Of Spread (km/h): 1.05

Inner Protection Area(m): 0

Transmissivity: 0.872

Outer Protection Area(m): 0

Fire Intensity(kW/m): 8225

BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:

Asset Protection Zone(m): 7 10 15 21 35 6

Run Description: T12

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 2 Degrees

Vegetation Slope Type: Upslope

Surface Fuel Load(t/ha): 14

Overall Fuel Load(t/ha): 24.6

Vegetation Height(m): 0.9

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 14

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1090

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg) 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 29

Peak Elevation of Receiver(m): 5.55

Radiant Heat(kW/m2): 28.95

Flame Angle (degrees): 63

Flame Length(m): 12.46

Maximum View Factor: 0.443

Rate Of Spread (km/h): 1.46

Inner Protection Area(m): 11

Transmissivity: 0.86

Outer Protection Area(m): 3

Fire Intensity(kW/m): 18600

BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:

Asset Protection Zone(m): 11 14 21 29 47 6

Run Description: T13 - grassland east

Vegetation Information

Vegetation Type: Grassland

Vegetation Group: Grassland

Vegetation Slope: 1 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 6

Overall Fuel Load(t/ha): 6

Vegetation Height(m): 0

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 11

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1090

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg) 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 130

Program Outputs

Level of Construction: BAL 29

Peak Elevation of Receiver(m): 4.08

Radiant Heat(kW/m2): 26.69

Flame Angle (degrees): 66

Flame Length(m): 8.93

Maximum View Factor: 0.405

Rate Of Spread (km/h): 18.11

Inner Protection Area(m): 11

Transmissivity: 0.867

Outer Protection Area(m): 0

Fire Intensity(kW/m): 56133

BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:

Asset Protection Zone(m): 0 0 0 0 0 0

Run Description: T14 - east across adjoining property

Vegetation Information

Vegetation Type: Hunter Macleay DSF
Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)
Vegetation Slope: 1 Degrees **Vegetation Slope Type:** Downslope
Surface Fuel Load(t/ha): 14 **Overall Fuel Load(t/ha):** 24.6
Vegetation Height(m): 0.9 **Only Applicable to Shrub/Scrub and Vesta**

Site Information

Site Slope: 0 Degrees **Site Slope Type:** Downslope
Elevation of Receiver(m): Default **APZ/Separation(m):** 17

Fire Inputs

Veg./Flame Width(m): 100 **Flame Temp(K):** 1090

Calculation Parameters

Flame Emissivity: 95 **Relative Humidity(%):** 25
Heat of Combustion(kJ/kg) 18600 **Ambient Temp(K):** 308
Moisture Factor: 5 **FDI:** 100

Program Outputs

Level of Construction: BAL 29 **Peak Elevation of Receiver(m):** 6.58
Radiant Heat(kW/m2): 27.62 **Flame Angle (degrees):** 64
Flame Length(m): 14.65 **Maximum View Factor:** 0.427
Rate Of Spread (km/h): 1.8 **Inner Protection Area(m):** 13
Transmissivity: 0.851 **Outer Protection Area(m):** 4
Fire Intensity(kW/m): 22878

BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:
Asset Protection Zone(m): 13 17 24 34 52 6

Run Description: T2 - east

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 3 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 14

Overall Fuel Load(t/ha): 24.6

Vegetation Height(m): 0.9

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 1 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 18

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1090

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg) 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 29

Peak Elevation of Receiver(m): 6.98

Radiant Heat(kW/m2): 28.88

Flame Angle (degrees): 63

Flame Length(m): 16.38

Maximum View Factor: 0.447

Rate Of Spread (km/h): 2.07

Inner Protection Area(m): 14

Transmissivity: 0.849

Outer Protection Area(m): 4

Fire Intensity(kW/m): 26264

BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:

Asset Protection Zone(m): 14 18 26 37 56 6

Run Description: T3 - east along riparian corridor

Vegetation Information

Vegetation Type: Coastal Floodplain Wetlands

Vegetation Group: Forested Wetlands

Vegetation Slope: 1 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 8.2

Overall Fuel Load(t/ha): 15.1

Vegetation Height(m): 0.9

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 1 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 10

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1090

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg) 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 29

Peak Elevation of Receiver(m): 3.74

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 65

Flame Length(m): 8.64

Maximum View Factor: 0.437

Rate Of Spread (km/h): 1.05

Inner Protection Area(m): 0

Transmissivity: 0.872

Outer Protection Area(m): 0

BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:

Asset Protection Zone(m): 7 10 15 21 35 6

Run Description: T4 - east through riparian corridor

Vegetation Information

Vegetation Type: Coastal Freshwater Lagoons
Vegetation Group: Freshwater Wetlands
Vegetation Slope: 1 Degrees **Vegetation Slope Type:** Downslope
Surface Fuel Load(t/ha): 4.4 **Overall Fuel Load(t/ha):** 4.4
Vegetation Height(m): 1 **Only Applicable to Shrub/Scrub and Vesta**

Site Information

Site Slope: 1 Degrees **Site Slope Type:** Downslope
Elevation of Receiver(m): Default **APZ/Separation(m):** 5

Fire Inputs

Veg./Flame Width(m): 100 **Flame Temp(K):** 1090

Calculation Parameters

Flame Emissivity: 95 **Relative Humidity(%):** 25
Heat of Combustion(kJ/kg) 18600 **Ambient Temp(K):** 308
Moisture Factor: 5 **FDI:** 100

Program Outputs

Level of Construction: BAL 29 **Peak Elevation of Receiver(m):** 1.78
Radiant Heat(kW/m2): 29 **Flame Angle (degrees):** 65
Flame Length(m): 4.11 **Maximum View Factor:** 0.43
Rate Of Spread (km/h): 2.47 **Inner Protection Area(m):** 0
Transmissivity: 0.888 **Outer Protection Area(m):** 0
Fire Intensity(kW/m): 5607

BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:
Asset Protection Zone(m): 0 0 0 0 0 0

Run Description: T5 - east

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 2.5 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 14

Overall Fuel Load(t/ha): 24.6

Vegetation Height(m): 0.9

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 1 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 18

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1090

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg) 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 29

Peak Elevation of Receiver(m): 6.84

Radiant Heat(kW/m2): 28.04

Flame Angle (degrees): 64

Flame Length(m): 15.93

Maximum View Factor: 0.435

Rate Of Spread (km/h): 2

Inner Protection Area(m): 14

Transmissivity: 0.848

Outer Protection Area(m): 4

Fire Intensity(kW/m): 25373

BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:

Asset Protection Zone(m): 14 18 26 36 55 6

Run Description: T6 - south

Vegetation Information

Vegetation Type: Non-Hazard
Vegetation Group: Non-Hazard
Vegetation Slope: 3 Degrees **Vegetation Slope Type:** Downslope
Surface Fuel Load(t/ha): 0 **Overall Fuel Load(t/ha):** 0
Vegetation Height(m): 0 **Only Applicable to Shrub/Scrub and Vesta**

Site Information

Site Slope: 1 Degrees **Site Slope Type:** Downslope
Elevation of Receiver(m): Default **APZ/Separation(m):** 1

Fire Inputs

Veg./Flame Width(m): 100 **Flame Temp(K):** 1090

Calculation Parameters

Flame Emissivity: 95 **Relative Humidity(%):** 25
Heat of Combustion(kJ/kg) 18600 **Ambient Temp(K):** 308
Moisture Factor: 5 **FDI:** 100

Program Outputs

Level of Construction: BAL 29 **Peak Elevation of Receiver(m):** 0
Radiant Heat(kW/m2): 29 **Flame Angle (degrees):** 0
Flame Length(m): 0 **Maximum View Factor:** 0
Rate Of Spread (km/h): 0 **Inner Protection Area(m):** 0
Transmissivity: 0.905 **Outer Protection Area(m):** 0
Fire Intensity(kW/m): 0

BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:
Asset Protection Zone(m): 0 0 0 0 0 6

Run Description: T7 - west (temporary threat)

Vegetation Information

Vegetation Type: Non-Hazard
Vegetation Group: Non-Hazard
Vegetation Slope: 1 Degrees
Vegetation Slope Type: Upslope
Surface Fuel Load(t/ha): 0
Overall Fuel Load(t/ha): 0
Vegetation Height(m): 0
Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 1 Degrees
Site Slope Type: Downslope
Elevation of Receiver(m): Default
APZ/Separation(m): 101

Fire Inputs

Veg./Flame Width(m): 100
Flame Temp(K): 1090

Calculation Parameters

Flame Emissivity: 95
Relative Humidity(%): 25
Heat of Combustion(kJ/kg) 18600
Ambient Temp(K): 308
Moisture Factor: 5
FDI: 100

Program Outputs

Level of Construction: BAL LOW
Peak Elevation of Receiver(m): 0
Radiant Heat(kW/m2): 0
Flame Angle (degrees): 0
Flame Length(m): 0
Maximum View Factor: 0
Rate Of Spread (km/h): 0
Inner Protection Area(m): 101
Transmissivity: 0.722
Outer Protection Area(m): 0
Fire Intensity(kW/m): 0

BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:
Asset Protection Zone(m): 0 0 0 0 0 6

Run Description: T8 - west

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 2 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 14

Overall Fuel Load(t/ha): 24.6

Vegetation Height(m): 0.9

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 1 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 18

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1090

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg) 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 29

Peak Elevation of Receiver(m): 6.61

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 63

Flame Length(m): 15.5

Maximum View Factor: 0.448

Rate Of Spread (km/h): 1.93

Inner Protection Area(m): 0

Transmissivity: 0.852

Outer Protection Area(m): 0

Fire Intensity(kW/m): 24512

BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:

Asset Protection Zone(m): 13 18 25 35 54 6

Run Description: T9 - west along riparian corridor

Vegetation Information

Vegetation Type: Coastal Floodplain Wetlands
Vegetation Group: Forested Wetlands
Vegetation Slope: 0 Degrees **Vegetation Slope Type:** Downslope
Surface Fuel Load(t/ha): 8.2 **Overall Fuel Load(t/ha):** 15.1
Vegetation Height(m): 0.9 **Only Applicable to Shrub/Scrub and Vesta**

Site Information

Site Slope: 1 Degrees **Site Slope Type:** Downslope
Elevation of Receiver(m): Default **APZ/Separation(m):** 10

Fire Inputs

Veg./Flame Width(m): 100 **Flame Temp(K):** 1090

Calculation Parameters

Flame Emissivity: 95 **Relative Humidity(%):** 25
Heat of Combustion(kJ/kg) 18600 **Ambient Temp(K):** 308
Moisture Factor: 5 **FDI:** 100

Program Outputs

Level of Construction: BAL 29 **Peak Elevation of Receiver(m):** 3.55
Radiant Heat(kW/m2): 29 **Flame Angle (degrees):** 65
Flame Length(m): 8.18 **Maximum View Factor:** 0.437
Rate Of Spread (km/h): 0.98 **Inner Protection Area(m):** 0
Transmissivity: 0.873 **Outer Protection Area(m):** 0
Fire Intensity(kW/m): 7677

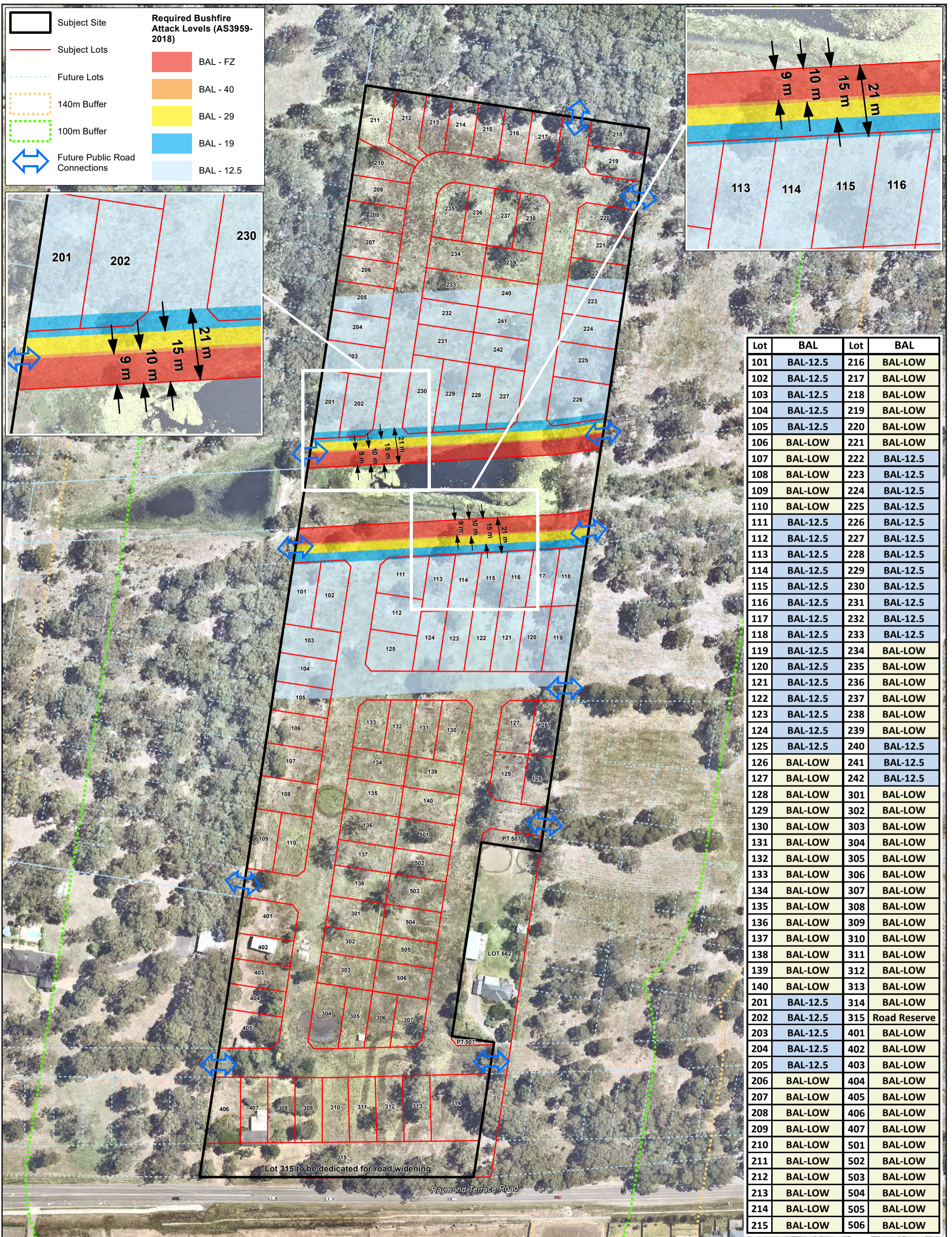
BAL Thresholds

BAL-40: BAL-29: BAL-19: BAL-12.5: 10 kw/m2: Elevation of Receiver:
Asset Protection Zone(m): 6 9 14 20 34 6



Appendix E: Subdivision BAL Plan





Lot	BAL	Lot	BAL
101	BAL-12.5	216	BAL-LOW
102	BAL-12.5	217	BAL-LOW
103	BAL-12.5	218	BAL-LOW
104	BAL-12.5	219	BAL-LOW
105	BAL-12.5	220	BAL-LOW
106	BAL-LOW	221	BAL-LOW
107	BAL-LOW	222	BAL-12.5
108	BAL-LOW	223	BAL-12.5
109	BAL-LOW	224	BAL-12.5
110	BAL-LOW	225	BAL-12.5
111	BAL-12.5	226	BAL-12.5
112	BAL-12.5	227	BAL-12.5
113	BAL-12.5	228	BAL-12.5
114	BAL-12.5	229	BAL-12.5
115	BAL-12.5	230	BAL-12.5
116	BAL-12.5	231	BAL-12.5
117	BAL-12.5	232	BAL-12.5
118	BAL-12.5	233	BAL-12.5
119	BAL-12.5	234	BAL-LOW
120	BAL-12.5	235	BAL-LOW
121	BAL-12.5	236	BAL-LOW
122	BAL-12.5	237	BAL-LOW
123	BAL-12.5	238	BAL-LOW
124	BAL-12.5	239	BAL-LOW
125	BAL-12.5	240	BAL-12.5
126	BAL-LOW	241	BAL-12.5
127	BAL-LOW	242	BAL-12.5
128	BAL-LOW	301	BAL-LOW
129	BAL-LOW	302	BAL-LOW
130	BAL-LOW	303	BAL-LOW
131	BAL-LOW	304	BAL-LOW
132	BAL-LOW	305	BAL-LOW
133	BAL-LOW	306	BAL-LOW
134	BAL-LOW	307	BAL-LOW
135	BAL-LOW	308	BAL-LOW
136	BAL-LOW	309	BAL-LOW
137	BAL-LOW	310	BAL-LOW
138	BAL-LOW	311	BAL-LOW
139	BAL-LOW	312	BAL-LOW
140	BAL-LOW	313	BAL-LOW
201	BAL-12.5	314	BAL-LOW
202	BAL-12.5	315	Road Reserve
203	BAL-12.5	401	BAL-LOW
204	BAL-12.5	402	BAL-LOW
205	BAL-12.5	403	BAL-LOW
206	BAL-LOW	404	BAL-LOW
207	BAL-LOW	405	BAL-LOW
208	BAL-LOW	406	BAL-LOW
209	BAL-LOW	407	BAL-LOW
210	BAL-LOW	501	BAL-LOW
211	BAL-LOW	502	BAL-LOW
212	BAL-LOW	503	BAL-LOW
213	BAL-LOW	504	BAL-LOW
214	BAL-LOW	505	BAL-LOW
215	BAL-LOW	506	BAL-LOW