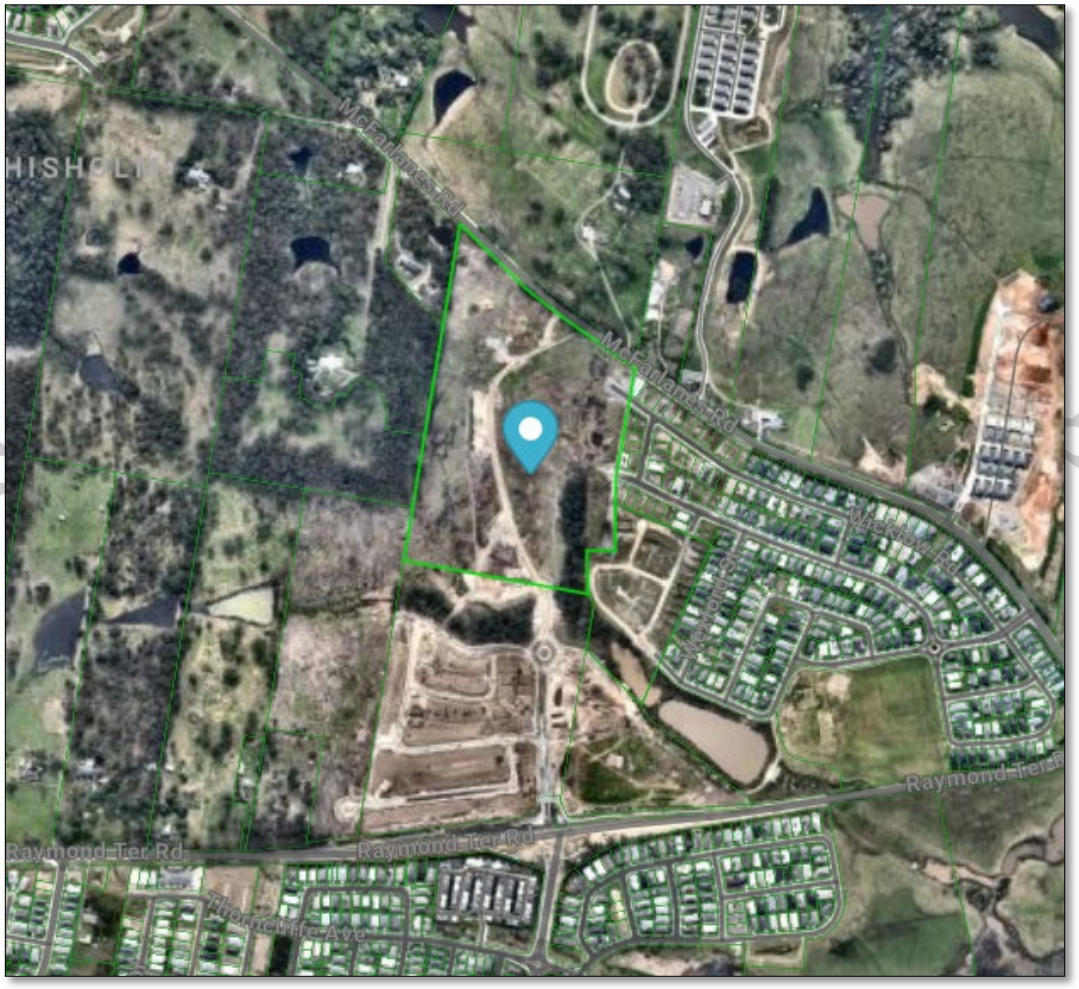
BUSHFIRE ASSESSMENT REPORT

Modification to Residential Subdivision

119 McFarlanes Road, Chisholm

Prepared for Allam Development No 1 Pty Ltd



Bushfire Planning Australia

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Disclaimer and Limitation

This report is prepared solely for Allam Development No 1 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: 2225 - Residential Subdivision

Version	Status	Purpose	Author	Review Date
1	Draft	Draft for Review	Katrina Greville	9 September 2024
2	Draft	Draft for Client Review	Stuart Greville	22 October 2024
3	Final	Final for Submission	Stuart Greville	30 October 2024
4	FINAL	Final for Submission	Stuart Greville	12 November 2024

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: 12 November 2024

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

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
BFSA	Bush Fire Safety Authority
BURA	Bush Fire Urban Release Area
DoE	Commonwealth Department of the Environment
DPI Water	NSW Department of Primary Industries – Water
EP& A Act	NSW Environmental Planning and Assessment Act 1979
EP&A Regs	NSW Environmental Planning and Assessment Regulation 2000
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

Executive Summary

Bushfire Planning Australia (BPA) has been engaged by Allam Development No 1 Pty Ltd (the 'Client') to undertake a Bushfire Assessment Report (BAR) to support the modification to a portion of the approved Sophia Waters residential subdivision (known as the 'Goodwin' property) located at 119 McFarlanes Road, Chisholm; legally referred to as Lot 82 DP1302072.

The Goodwin residential subdivision was approved under Development Application DA19-653 by Maitland City Council (MCC) and a subsequent modification was approved on 26 February 2024. The development was assessed by the NSW Rural Fire Service (RFS) for compliance under the RFS document Planning for Bushfire Protection 2006 (PBP 2006). A Bush Fire Safety Authority (BFSA) was issued by the RFS (RFS Ref: D19/2894) on 10 October 2019 subject to conditions (**Appendix A**).

The proposed modifications to the approved development include:

1. Replace the fire trail separating dwelling lots from the bushland interface along the riparian corridor with a perimeter road; and
2. Minor amendments to the internal road configuration to satisfy Condition 44 of the approved development.

The approved development comprises a 143-lot residential subdivision including environmental corridors and a detention basin. The design and layout (including roads) of the proposed subdivision is consistent with the Thornton North Master Plan prepared by MCC.

This BAR found the site was currently exposed to a moderate bushfire hazard located to the north-west of the subject site. The majority of vegetation within 500m of the site has been removed as part of the construction of several residential subdivisions. An isolated parcel of remnant vegetation will be retained and protected in perpetuity within part of the adjoining property immediately west zoned C3 Environmental Conservation (169 McFarlanes Road). The vegetation with the C3 zoned land observed in unmanaged conditions is consistent with a *forest,* specifically *Hunter Macleay Dry Sclerophyll Forest*.

The bushfire hazard in the surrounding landscape is currently and will continue to 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.

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**.

The BAR concludes the proposed modifications to the approved development provide a better outcome as a fire trail has been replaced by a perimeter road and greater defendable space is now provided for.

The following key recommendations have been designed to enable the proposed modifications development to achieve the aims and objectives of PBP 2006 and PBP 2019:

Subdivision BAL Plan

1. A comprehensively detailed Subdivision BAL Plan shall be prepared for each stage of the Proposed Development. A subdivision certificate (SC) for a stage cannot proceed unless Maitland City Council is satisfied that a detailed Subdivision BAL Plan has been prepared by a suitably qualified person for that stage in accordance with the NSW RFS endorsed Masterplan prepared by Bushfire Planning Australia (Titled: Figure 19 Subdivision BAL Plan – Permanent Ref: 2179-McFarlanesRd_Fig8-BALS-PERMANENT-230525, Dated 25 May 2023) and the Bushfire Assessment Report prepared by Bushfire Planning Australia Ref: 2179, Version 3, Dated 29 May 2023. Council may refer a detailed BAL plan to RFS for

consideration if not initially satisfied and, if RFS is satisfied with the detailed BAL plan, it will issue an amended Bush Fire Safety Authority for that stage.

Asset Protection Zones

2. At the issue of a subdivision certificate and in perpetuity, the entire site; with the exception of the land within the riparian corridor (Lot 5416 and part of Lot 5417), shall be managed as an Inner Protection Area (IPA) as outlined within Appendix 4 of PBP 2019 and the RFS document Standards for asset protection zones; or in accordance with the MCC approved Landscape Plan prepared by Terras Landscape Architects dated 4 October 2016 (Project no 10496.5 Revision A) (**Appendix F**);
3. An APZ as shown on **Figure 21** shall be established on Lots 5514, 5515 and 5516 and maintained as outlined in Appendix 4 of PBP 2019 and the RFS document Standards for asset protection zones;
4. Where a stage is being developed, adjoining land within an adjacent approved stage up to 100m shall be managed as a Temporary APZ as outlined Appendix 4 of PBP 2019 and the RFS document Standards for asset protection zones;

Access

5. Access roads shall satisfy the Performance Criteria of Table 5.3b of PBP 2019 as shown in **Appendix B**;
6. Perimeter roads shall comply with the following general requirements of Table 5.3b of PBP 2019 as shown on **Figure 21**:
    a. 8m wide road width measured kerb to kerb (with the exception of Road No MC17);
    b. Hydrants are located clear of parking areas;
    c. Curves of roads have a minimum inner radius of 6m;
    d. The road crossfall does not exceed 3 degrees; and
    e. A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches is provided.
7. Non-perimeter roads shall comply with the following general requirements of Table 5.3b of PBP 2019 as shown on **Figure 21**:
    a. 5.5m wide road width measured kerb to kerb;
    b. Hydrants are located clear of parking areas;
    c. Curves of roads have a minimum inner radius of 6m;
    d. The road crossfall does not exceed 3 degrees; and
    e. A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches is provided.
8. Temporary turning heads must be provided to temporary dead-end roads incorporating a turning head in accordance Appendix A3.3 of PBP 2019;

Construction and Design

9. 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;

Water and Utilities

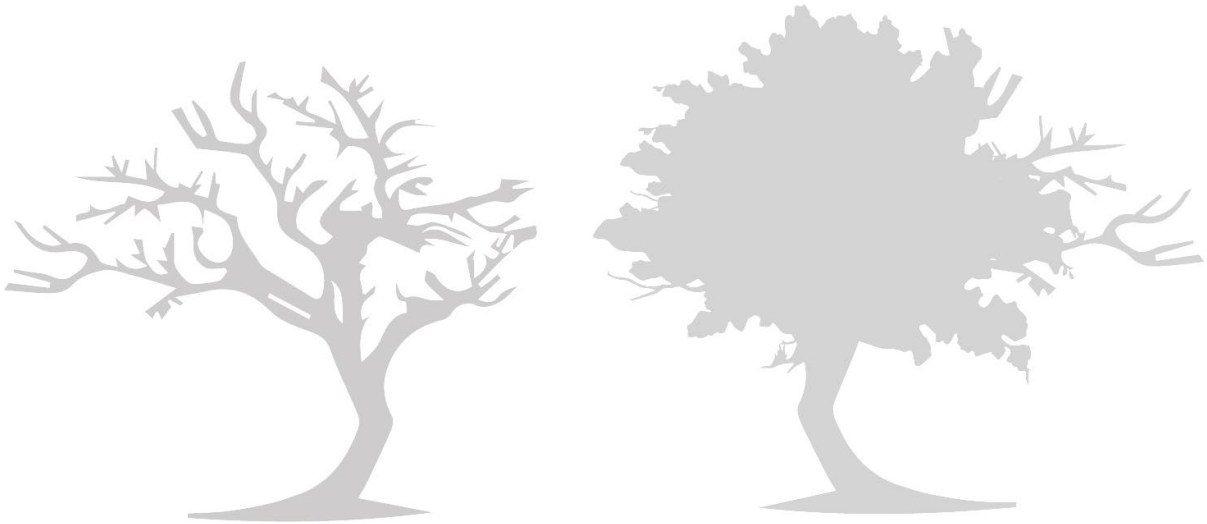
10. All new lots are to be connected to a reliable water supply network and that suitable fire hydrants are located throughout the development site that are clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure shall comply with AS2419.1 2005 and section 5.3.3 of PBP 2019; and

Landscaping

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

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection (March 2023) and production (November 2024).

Should the above recommendations be implemented, the existing bushfire risk should 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 at some time.



1. Introduction

Bushfire Planning Australia (BPA) has been engaged by Allam Development No 1 Pty Ltd (the 'Client') to undertake a Bushfire Assessment Report (BAR) to support the modification of an approved Sophia Waters residential subdivision (known as the 'Goodwin' property) located at 119 McFarlanes Road, Chisholm; legally referred to as Lot 82 DP1302072 and hereafter referred to as the 'site' (**Figure 2**).

The proposed modifications to the approved development (DA/2019/653) include:

1. Replace the fire trail along the bushland interface with the riparian corridor with a perimeter road; and
2. Minor amendments to the internal road configuration to satisfy Condition 44 of the approved development.

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 2022*.

It is noted the original development was assessed for compliance in accordance with PBP 2006.

1.1. Aims and Objectives

This BAR aims to assess the bushfire threat and recommends a series of bushfire protection measures that aim to minimise the risk of adverse impact of bush fires on life, property and the environment.

This assessment has been undertaken in accordance with Appendix 2 of *Planning for Bushfire Protection 2019* and clause 45 of the *Rural Fires Regulation 2022*. This assessment also addresses the aim and objectives of PBP 2019, being:

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

2. Site Description

Table 1: Site Details

Address	119 McFarlanes Road, Chisholm
Title	Lot 82 DP1302072
LGA	Maitland City Council
Site Area	16.06 ha
Land Use Zone	R1 General Residential (**Figure 1**)
Bushfire Prone Land	Vegetation Category 1, Vegetation Category 3 and Vegetation Buffer (**Figure 3**)
Context	The site is south of McFarlanes Road and is cleared ready for development with exception of a riparian corridor located in the south-eastern corner of the site. Similarly, surrounding lands to the east, south and south-west of the site are cleared in preparation of future development. Vegetation exists to the immediate west.
Topography	Majority of the site is flat with an upslope lining the riparian corridor towards the south-eastern corner of the site.
Fire History	The site lies within a local government area with a Fire Danger Index (FDI) rating of 100.

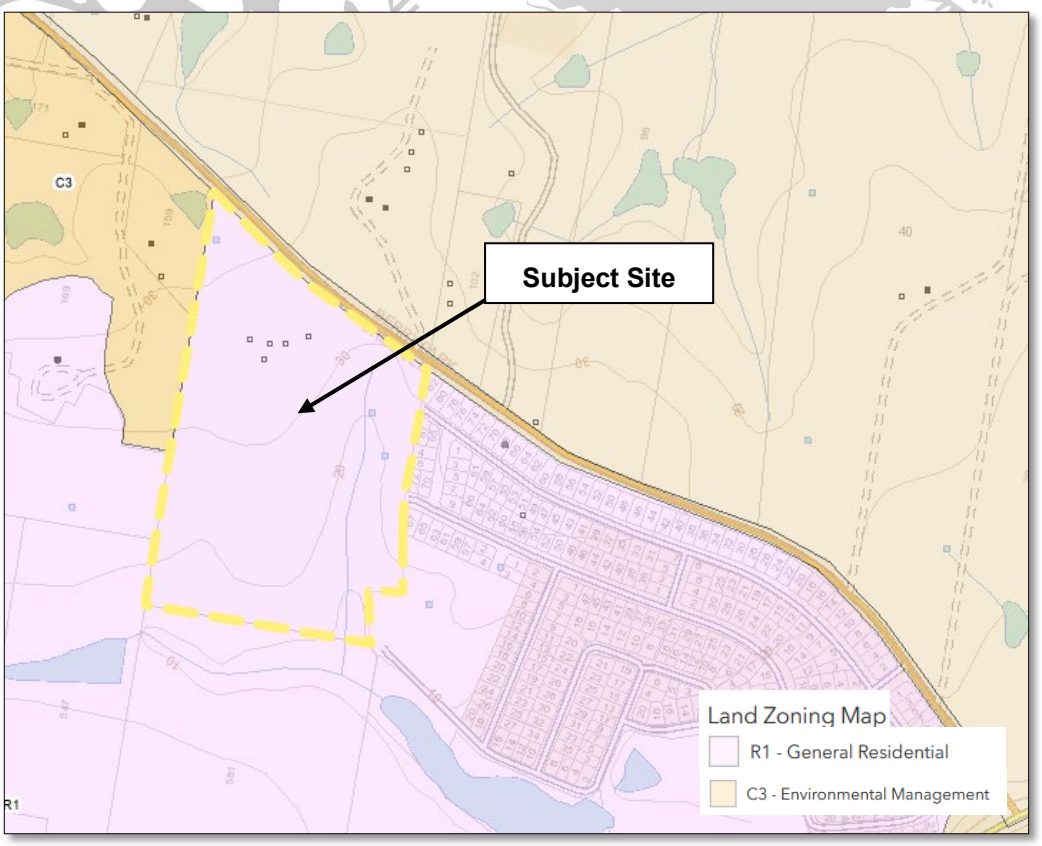
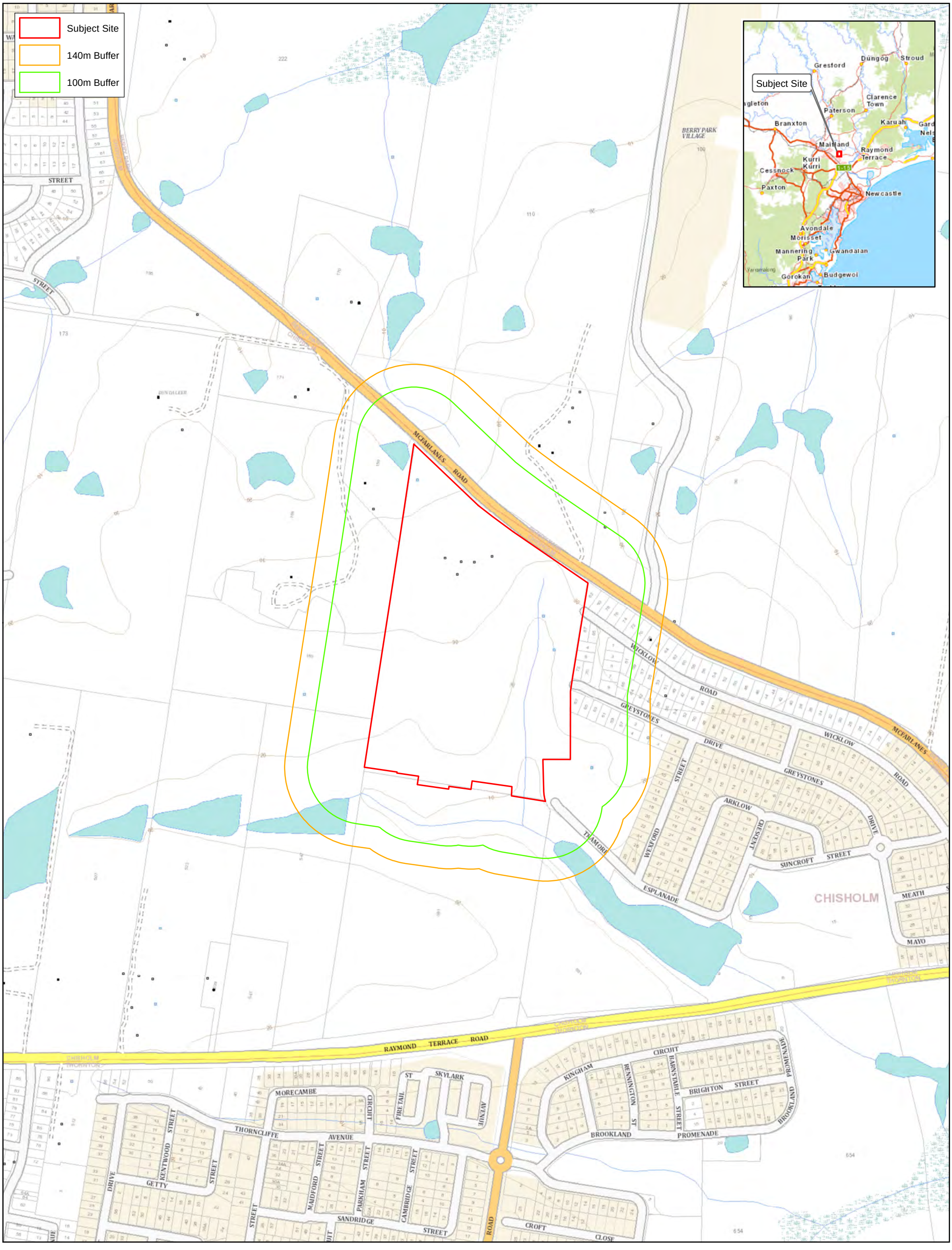


Figure 1: Maitland LEP 2011- Land Use Zone



BUSHFIRE PLANNING AUSTRALIA	Source:	Base Map © Department of Customer Service 2020	0 100 200 Meters A3 Scale: 1:1,500,000 Coordinate System: GDA 1994 MGA Zone 56
	Disclaimer:	No warranty is given in relation to the data (including accuracy, reliability, completeness, currency or suitability) and no liability is accepted (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.	**Project: Raymond Terrace Road, Chisholm Job no: 2225 (Goodwin)**
	File:	File: 2225-ChisholmGoodwin-Fig1-SiteLocation-240927 Date: 27/09/2024	**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 are currently being developed whilst connectivity to the west does not currently exist. Apart from the vegetation to be retained within the south-eastern corner of the site; all surrounding land is zoned for residential use and development applications have been submitted, or in the process of being submitted for the properties to the west of the site.

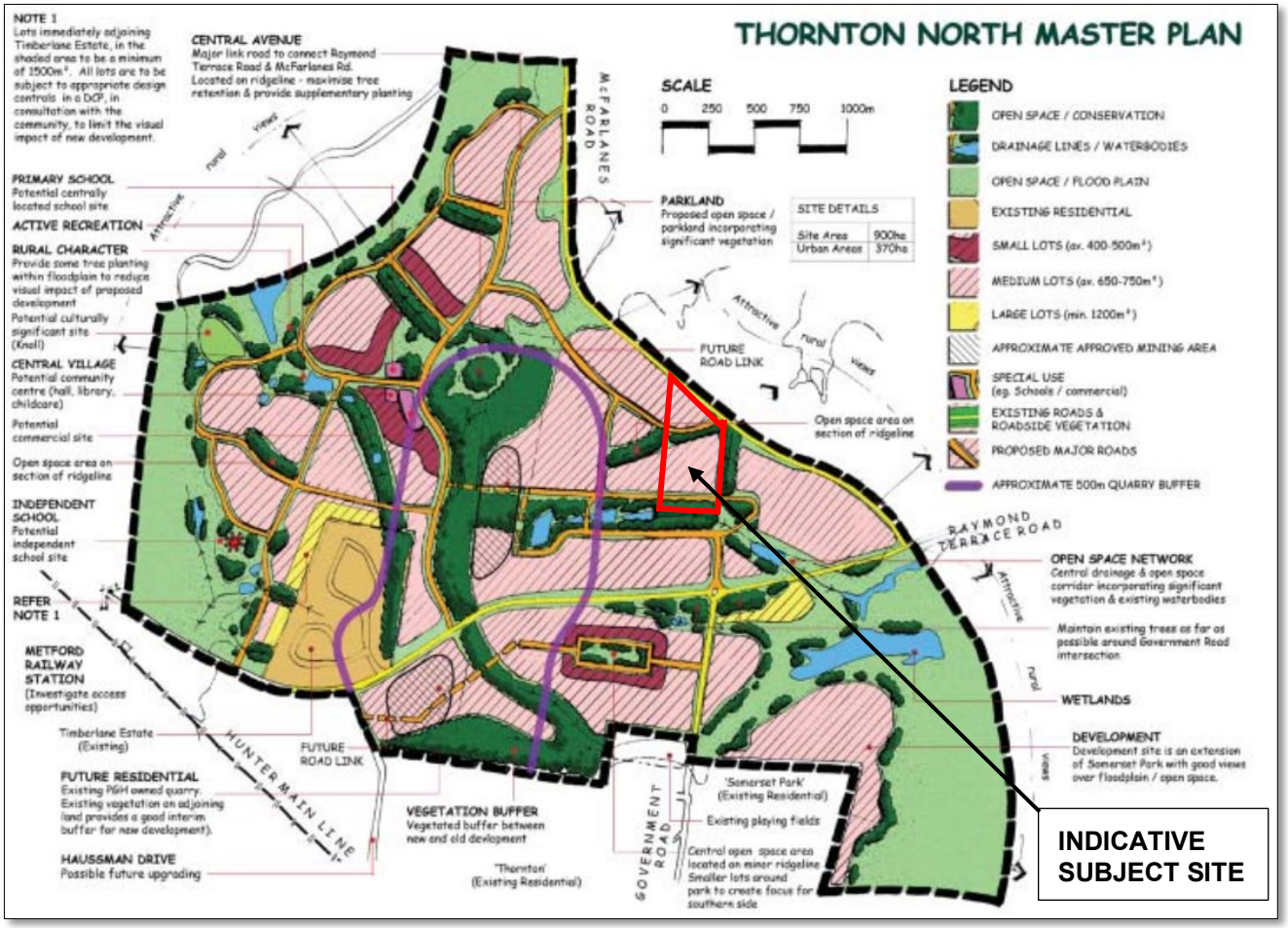


Figure 3: Thornton North Master Plan (Maitland City Council 2003)

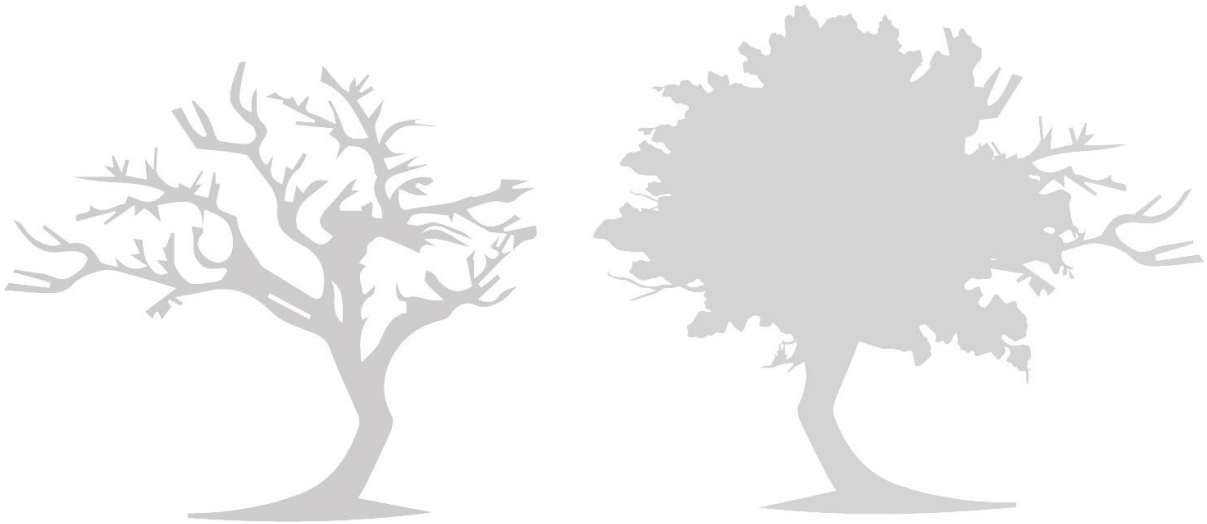
2.2. Bushfire Prone Land

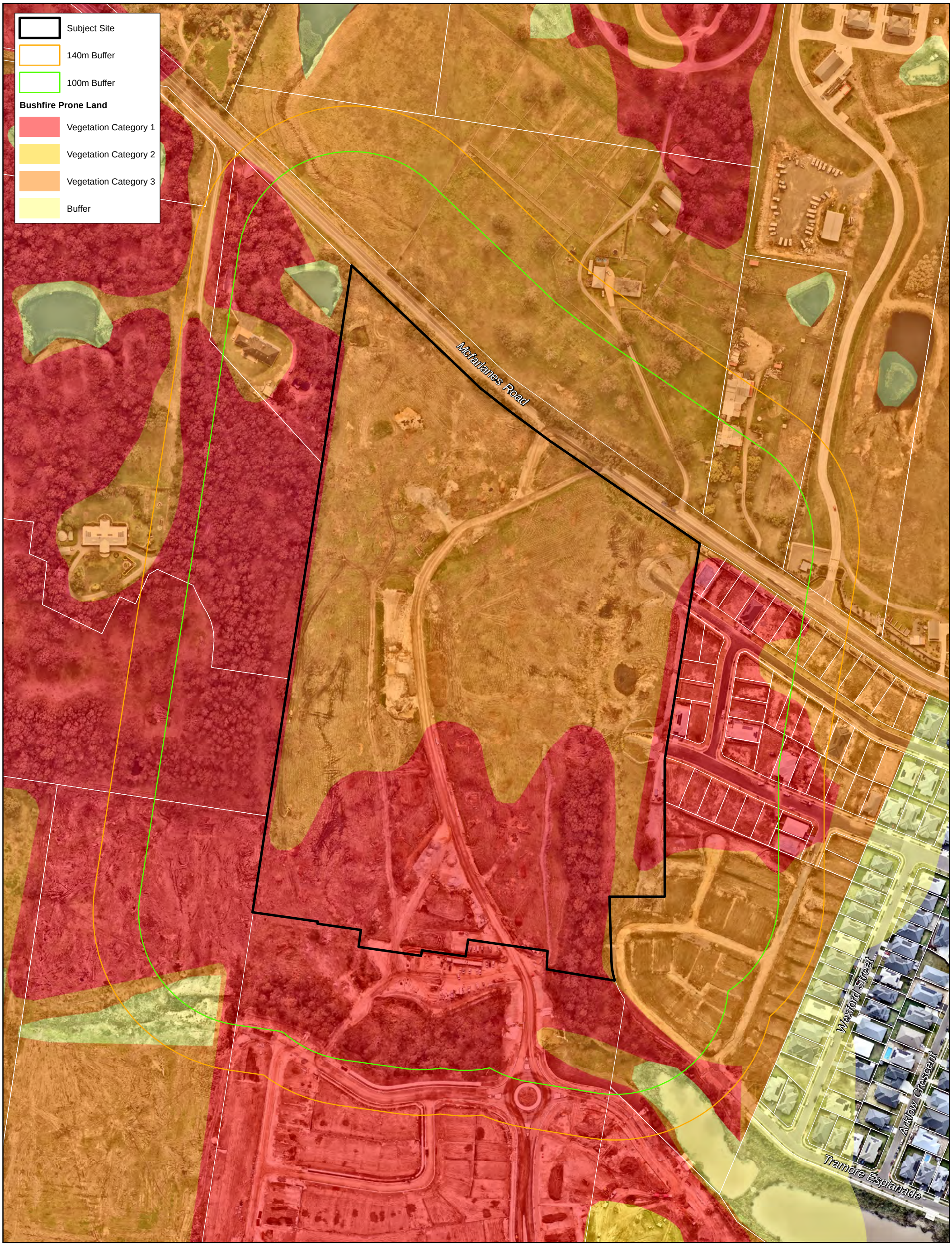
Bushfire activity is prevalent in landscapes that carry fuel and the two predominant bushfire types are grassland and forest fires. Factors such as topographic characteristics and quantity of fuel loads influence the intensity and spread of fire. The scale of a bushfire hazard is tailored to the characteristics 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 majority of the site is mapped as Vegetation Category 3 bushfire prone land with exception of a narrow strip along the eastern and western site boundaries in addition to the southern portion of the site being mapped as Vegetation Category 1 bushfire prone land.

Within and beyond 140m north and south-east of the site, Vegetation Category 3 bushfire land exists. Similarly, Vegetation Category 1 bushfire prone land exists to the east, south and west of the site however, vegetated land to the east and south has since been cleared removing any pre-existing bushfire hazard. Therefore, Vegetation Category 1 bushfire prone land located within and beyond 140m to the west is identified as the primary bushfire hazard.





BUSHFIRE PLANNING AUSTRALIA

Source:	Cadastral Boundary: NSW Department of Finance, Services and Innovation 2024 Aerial photo: NearMap 22/08/2024 NSW Bush Fire Prone Land: NSW Rural Fire Service 2024
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Meters

A3 Scale: 1:3,000

Coordinate System: GDA 1994 MGA Zone 56

Project: Raymond Terrace Road, Chisholm
Job no: 2225 (Goodwin)

Figure 4:

NSW Bush Fire Prone Land

2.4. Approved Development

Development Consent (as modified) was issued on 26 February 2024 for a Torrens Title subdivision including 143 residential lots and associated infrastructure. The approved development is designed in accordance with the Thornton North Master Plan and relied on public road access from the adjoining properties to the east and south.

The residential development to the south of the site ('Munro') is currently under construction, including a new intersection with Raymond Terrace Road and Government Road. The new intersection will enable the approved adjoining residential developments to proceed with construction.

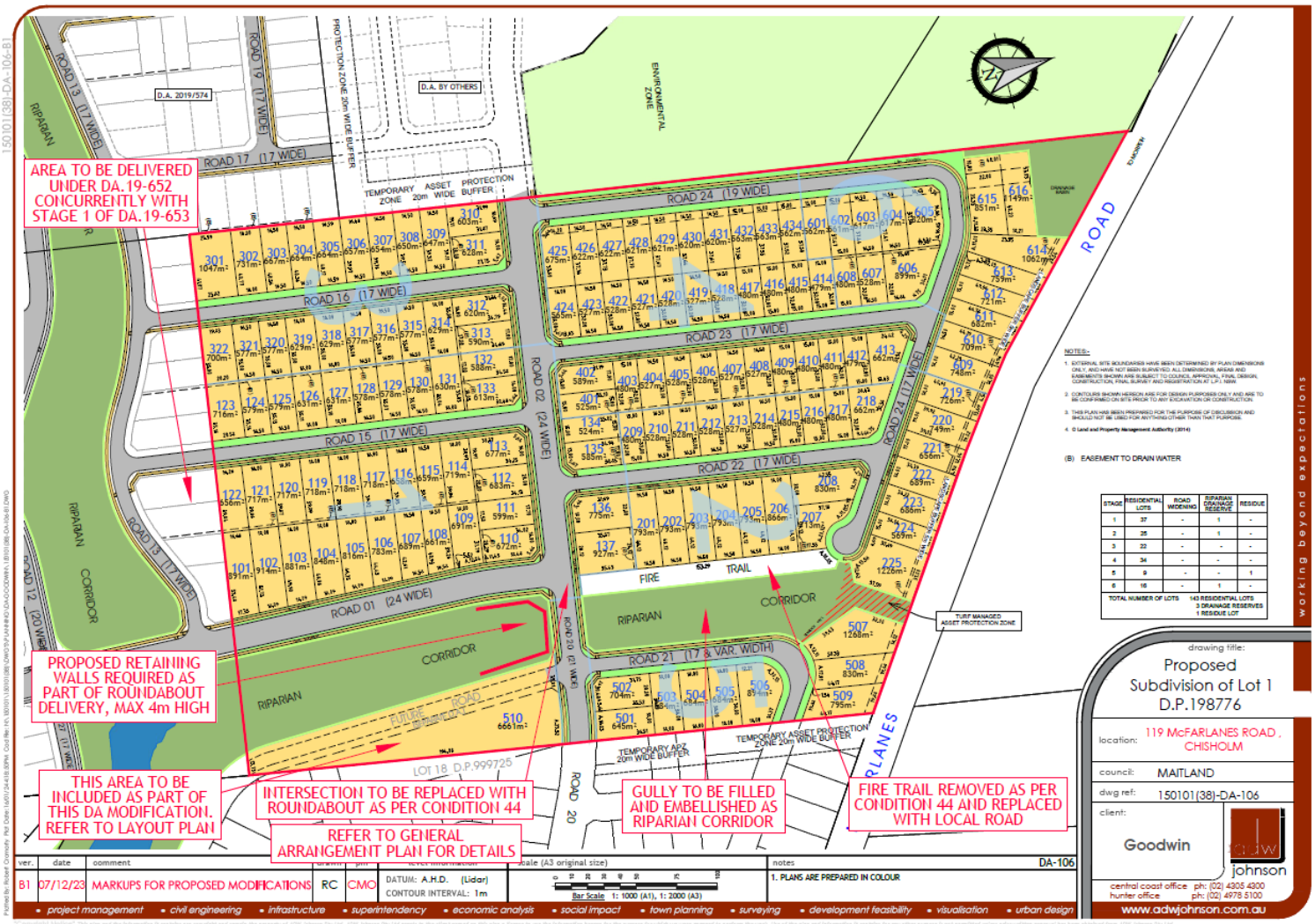

Figure 5: Approved Development - Proposed Modifications Noted in Red

2.5. Proposed Modification

The proposed modifications, shown in **Figures 6** and **Figure 7,** to the approved development (DA/2019/653) include:

1. Replace the fire trail along the bushland interface with the riparian corridor with a perimeter road; and
2. Minor amendments to the internal road configuration to satisfy Condition 44 of the approved development.

Although the original development satisfied the specifications and requirements of PBP 2006, the proposed modifications have also considered the requirements of PBP 2019. Should there be an inconsistency with the proposed modifications and compliance with PBP 2019, due consideration of the Acceptable Solutions contained in PBP 2006 should be applied.

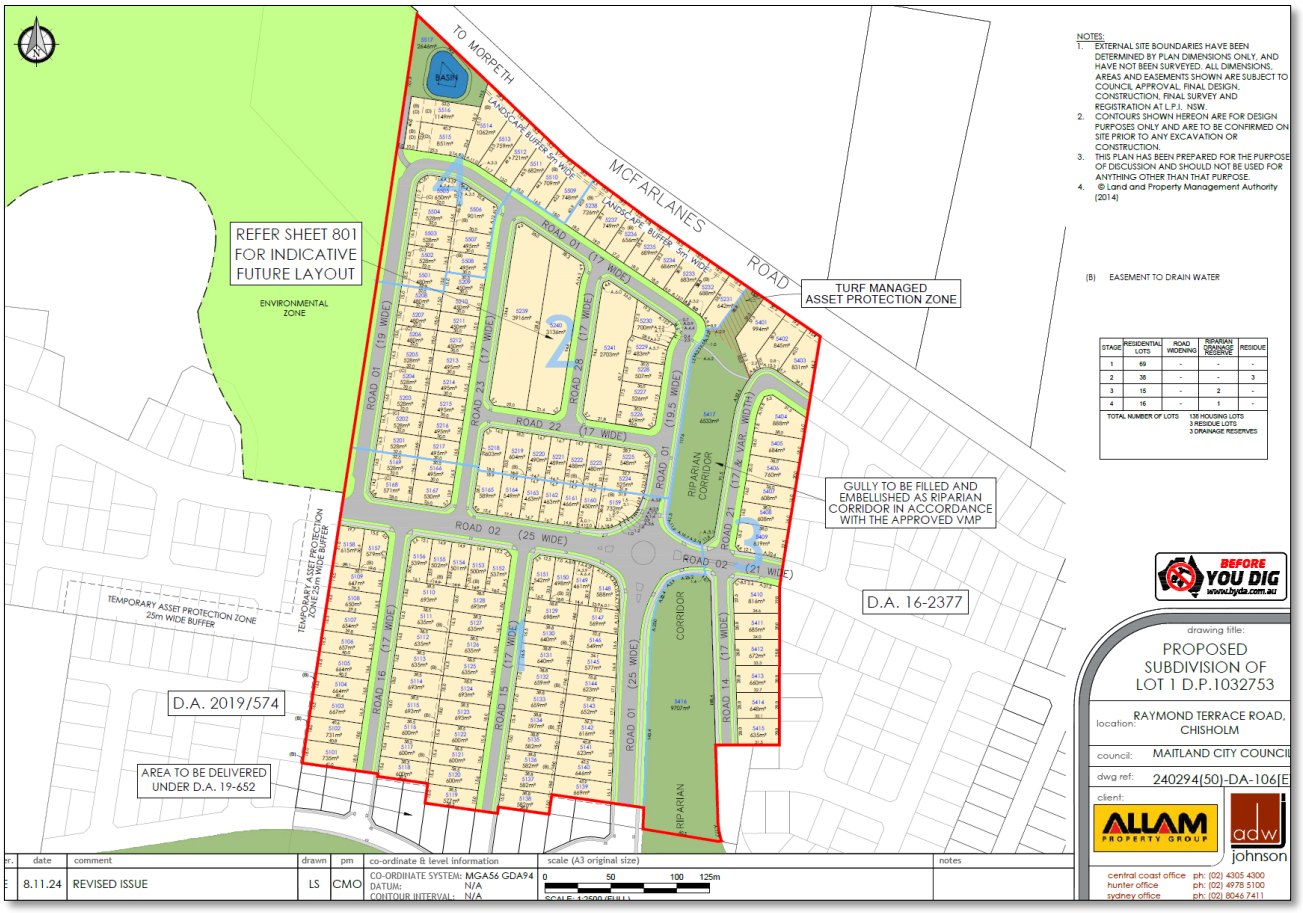

Figure 6: Proposed Development

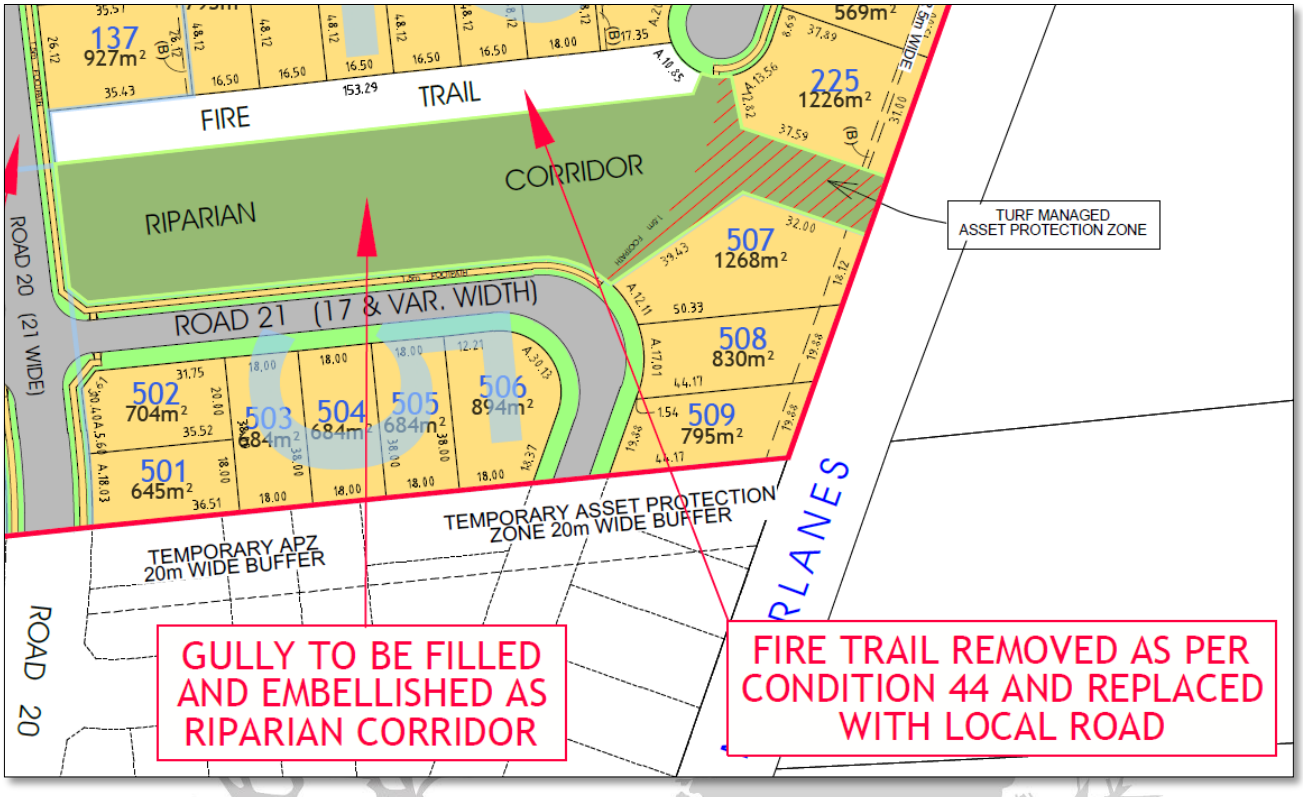

Figure 7: Approved Development with red markup indicating proposed modifications

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;
- Review of LiDAR point cloud data (NSW LPI);
- Reference to NSW State Vegetation Type, NSW Department of Planning, Industry and Environment 2023 (**Figure 9**);
- Landscape Concept Design, Terras Landscape Architecture October 2016 (**Figure 10**); and
- Site inspection completed by Stuart Greville.

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 the 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 9**) and any inconsistencies between the mapping sources were quantified during the site inspection and are discussed within this assessment.

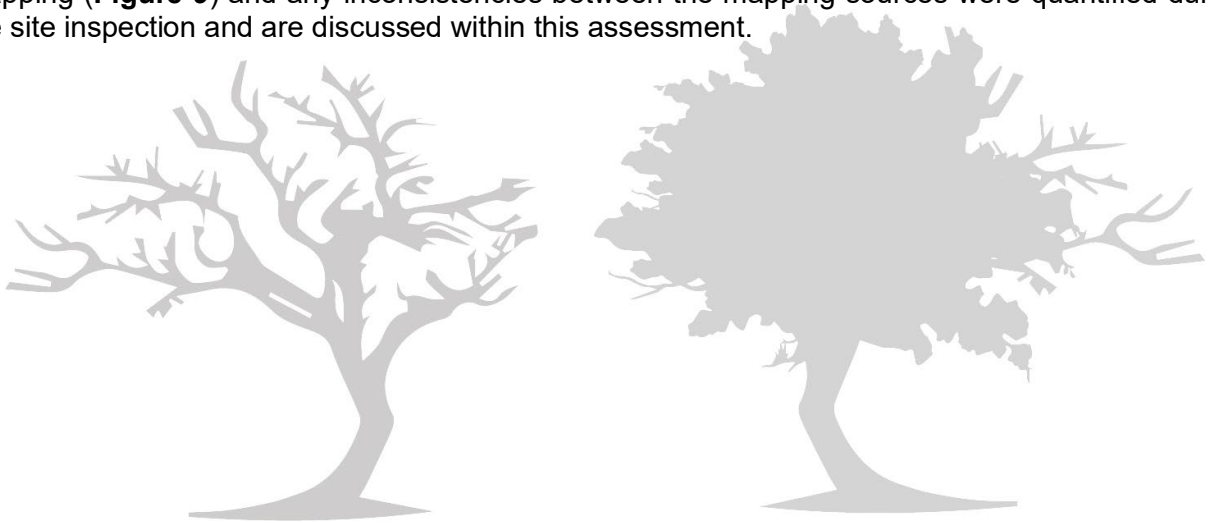

Plate 1: Looking north towards site from the 'Munro' development

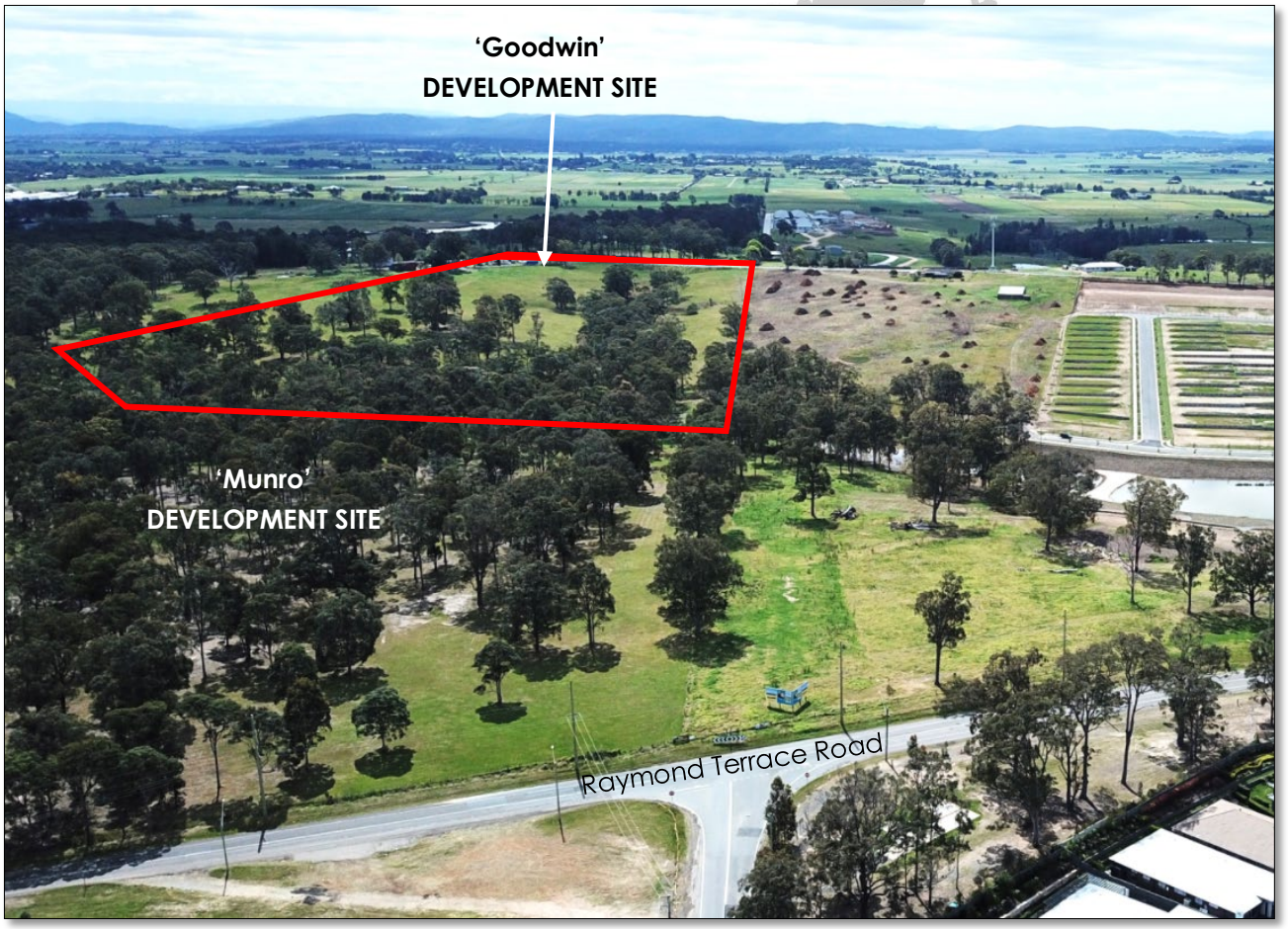

Plate 2: Looking north across intersection of Raymond Terrace Road and Government Road: pre-clearing (2021)

Figure 8: Aerial Image of Thornton North Urban Release Area (Mecone Mosaic 25 March 2024)

BUSHFIRE PLANNING AUSTRALIA

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File:	File: 2225-ChisholmGoodwin-Fig3-Vegetation-NSW-SVT-240927 Date: 27/09/2024

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0 25 50 75 100

Meters

A3 Scale: 1:2,500

Coordinate System: GDA 1994 MGA Zone 56

Project: Raymond Terrace Road, Chisholm Job no: 2225 (Goodwin)

Figure 9:

NSW State Vegetation Type

Figure 10: Approved Landscape Plan (Terras Landscape Architecture 2016)

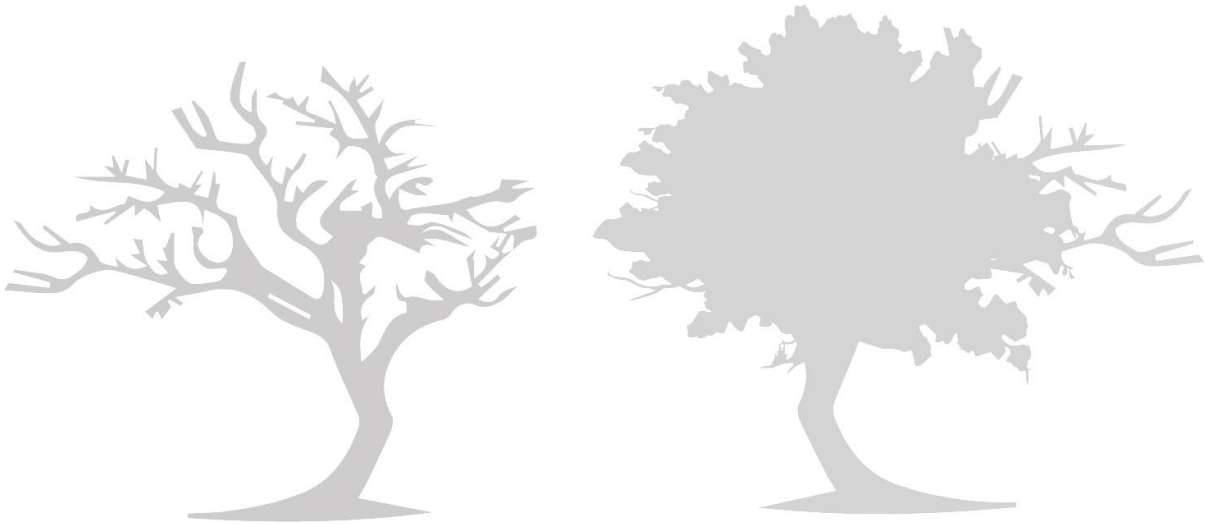
3.2. Slope Assessment

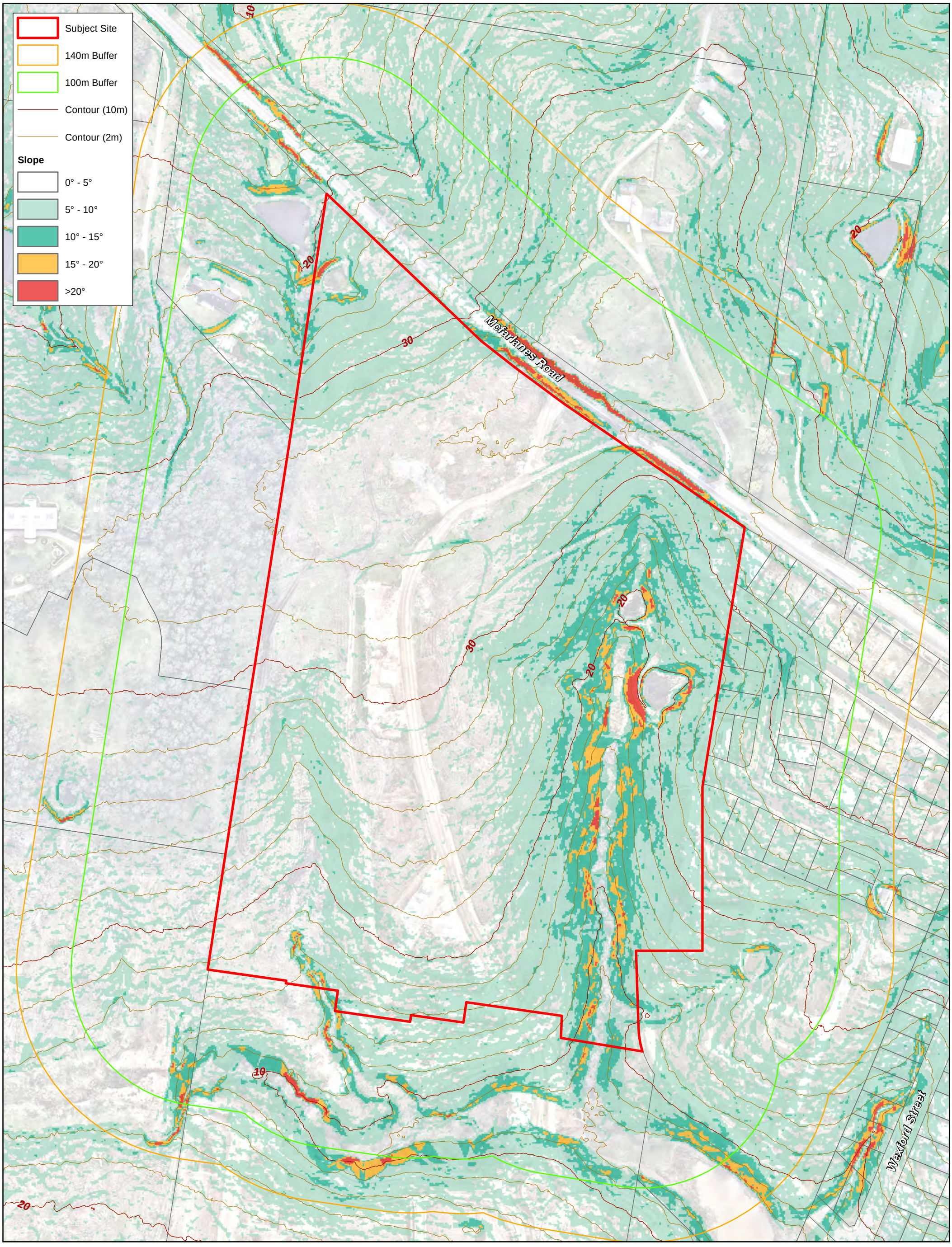
The slope assessment was undertaken as follows:

- Review of LiDAR point cloud data - including DEM (NSW LPI),
- Detail survey of existing contours; and
- Site inspection completed by Stuart Greville (Bushfire Planning Australia).

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 11, Figure 12** and **Table 2.**





BUSHFIRE PLANNING AUSTRALIA	Source:	Cadastral Boundary: NSW Department of Finance, Services and Innovation 2021 Aerial photo: NearMap 15/12/2021 Surface analysis: Derived from LiDAR - Newcastle 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2014
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Meters

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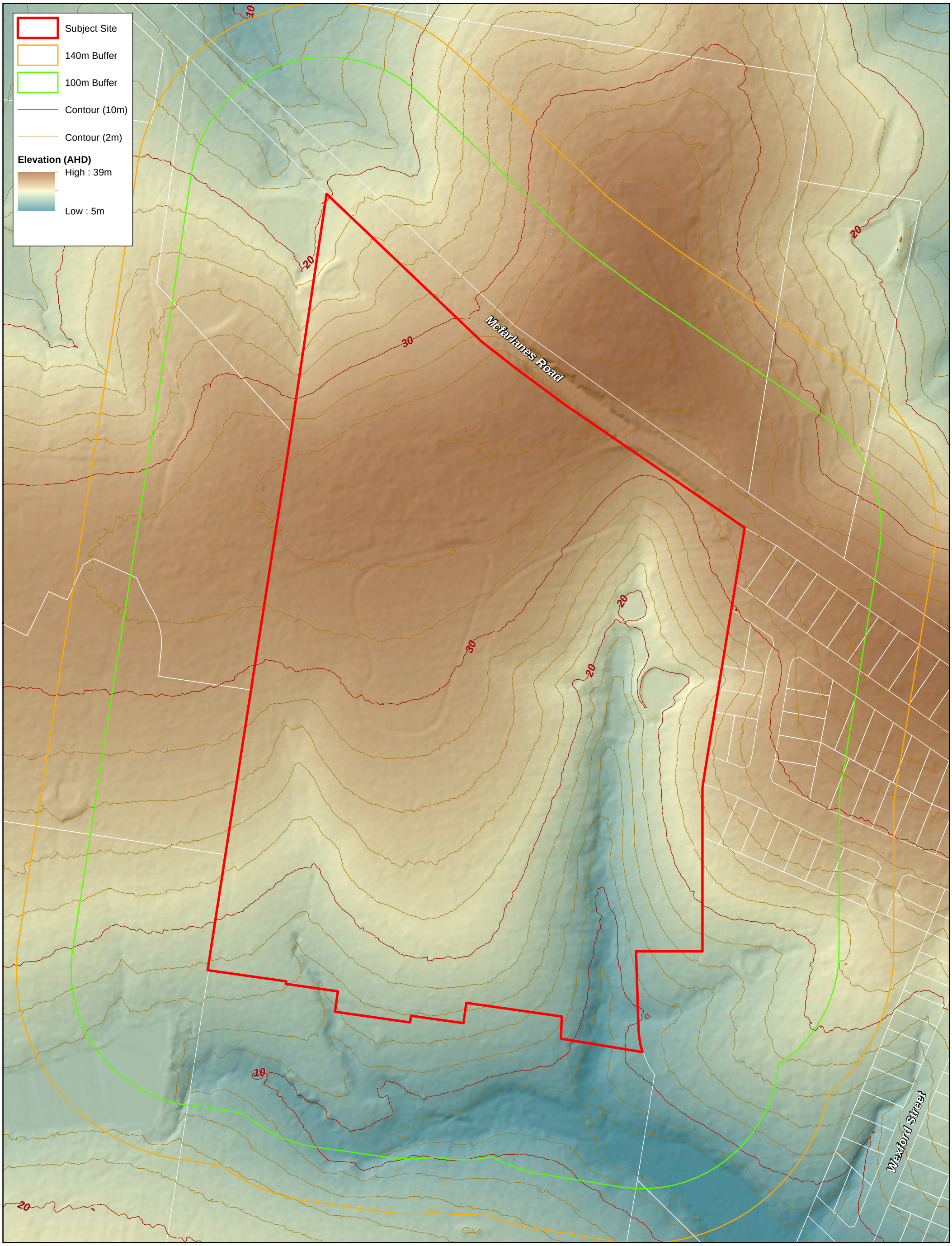
Coordinate System: GDA 1994 MGA Zone 56

Project: Raymond Terrace Road, Chisholm Job no: 2225 (Goodwin)

Figure 11:

Slope Analysis: LiDAR



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Source:	Cadastral Boundary: NSW Department of Finance, Services and Innovation 2024 Surface analysis: Derived from LiDAR - Newcastle 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2014
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0 25 50 75

Meters

A3 Scale: 1:2,500

Coordinate System: GDA 1994 MGA Zone 56

Project: Raymond Terrace Road, Chisholm Job no: 2225 (Goodwin)

Figure 12:

Digital Terrain Model

3.3. Slope & Vegetation Assessment 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 within and surrounding the site to the north-west is a *forest;* specifically, *Hunter Macleay Dry Sclerophyll Forest* vegetation formation in accordance with the descriptions contained in Keith. The primary bushfire hazard is the forest vegetation located to within and beyond 140m to the west / north-west of the proposed development.

As part of the proposed development, vegetation will also exist on site as part of the proposed Council dedicated reserve located in the within the existing riparian corridors.

Within the eastern side of the proposed development, a riparian corridor identified as a *forest;* specifically, *Hunter Macleay Dry Sclerophyll Forest* vegetation formation exists. This continues external to the development and runs parallel the southern boundary line and lined with approved residential subdivisions (DA/2019/1091 and DA/2019/574) on either side of the corridor.

To the north of the proposed development, separated by McFarlanes Road, are rural residential properties. Whilst parts of these properties are managed, the vegetation has been assessed as grassland to consider the potential bushfire hazard.

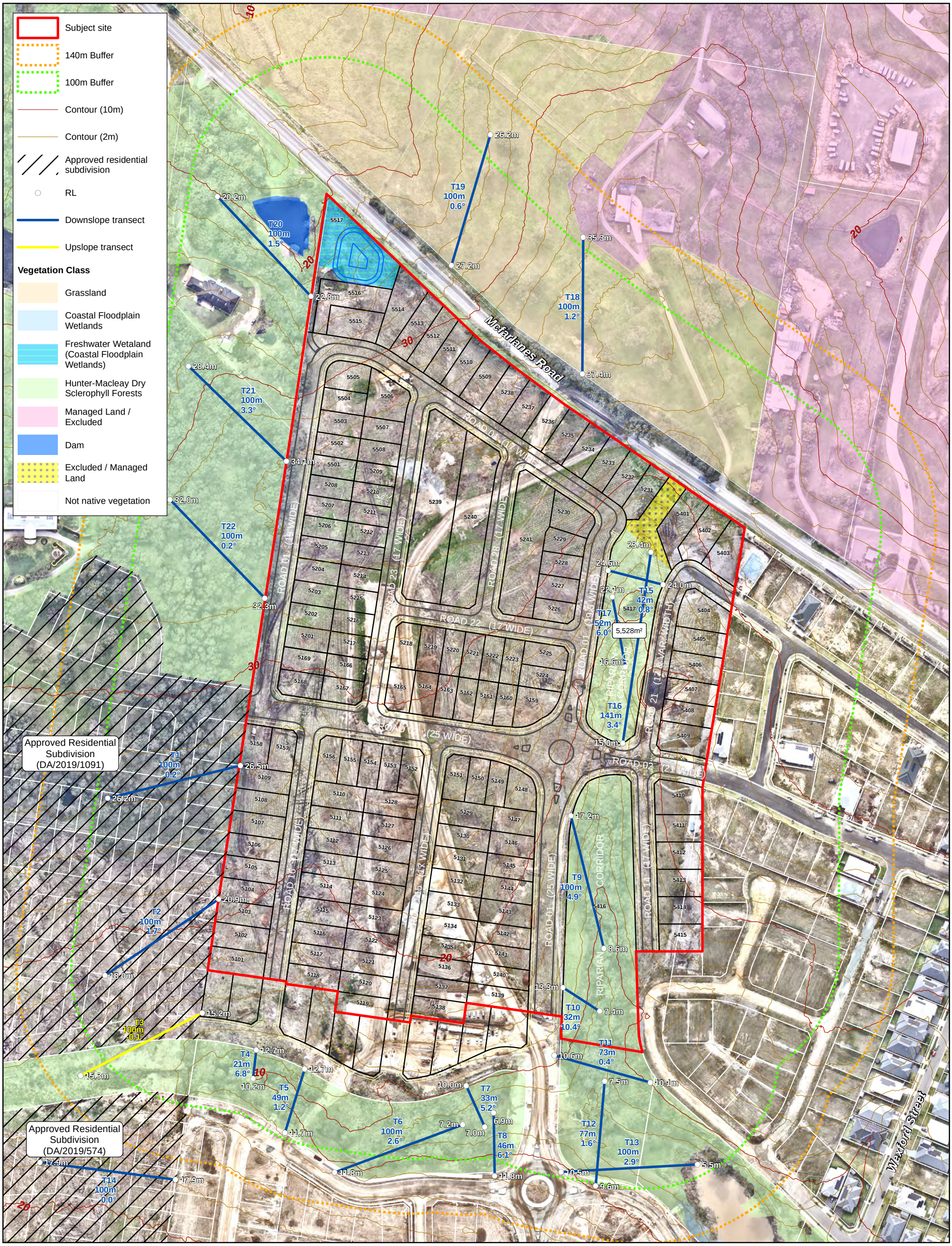
Adjoining properties to the east, south and south-west of the proposed development are cleared in preparation for future development. Cleared lands are not required to be considered for the purposes of PBP 2019.

The final bushfire hazard assessment defining vegetation classifications and effective slope is shown in **Table 2** and **Figure 13.**

Table 2: Slope and Vegetation Assessment Results

Transect	Vegetation Description	Vegetation Classification (PBP 2019)	Slope
T1 South-west	Approved residential development (DA/2019/1091) south-west of the site	Excluded (Approved Development)	0.2° Downslope
T2 South-west	Approved residential development (DA/2019/1091) south-west of the site	Excluded (Approved Development)	1.7° Downslope
T3 South-west	Approved residential development (DA/2019/1091) south-west of the site transitioning to riparian corridor – external to development site	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	-0.1° Upslope
T4 South	Remnant vegetation corridor south of the development– external to development site	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	6.8° Downslope
T5 South	Remnant vegetation corridor (49m wide) south of the development– external to development site	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	1.2° Downslope
T6 South	Remnant vegetation corridor south of the development– external to development site	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	2.6° Downslope
T7 South	Remnant vegetation corridor south of the development– external to development site	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	5.2° Downslope
T8 South	Remnant vegetation corridor south of the development– external to development site	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	6.1° Downslope
T9 On-site	Southern on-site remnant riparian corridor along and parallel to the eastern site boundary	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	4.9° Downslope
T10 On-site	Southern on-site remnant riparian corridor along and parallel to the eastern site boundary	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	10.4° Downslope
T11 South	Remnant vegetation corridor (73m wide) south of the development	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	0.4° Downslope
T12 South	Remnant vegetation corridor south of the development	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	2.9° Downslope
T13 South-east	Remnant vegetation corridor to an existing dam south of the development	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	0.3° Downslope
T14 South-west	Approved residential development (DA/2019/1091) south-west of the site	Excluded (Approved Development)	0.0° Downslope
T15 On-site	Northern on-site remnant riparian corridor along and parallel to the eastern site boundary	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	0.8° Downslope

Transect	Vegetation Description	Vegetation Classification (PBP 2019)	Slope
T16 On-site	Northern on-site remnant riparian corridor along and parallel to the eastern site boundary	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	3.4° Downslope
T17 On-site	Northern on-site remnant riparian corridor along and parallel to the eastern site boundary	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	6.0° Downslope
T18 North	Grassland on the northern side of McFarlanes Road	*Grassland*	1.2° Downslope
T19 North	Grassland on the northern side of McFarlanes Road	*Grassland*	0.6° Downslope
T20 North-west	Forest vegetation from the site's western boundary and identified as the primary bushfire hazard	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	1.5° Downslope
T21 West	Forest vegetation from the site's western boundary and identified as the primary bushfire hazard	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	3.3° Downslope
T22 West	Forest vegetation from the site's western boundary and identified as the primary bushfire hazard	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	0.2° Downslope



BUSHFIRE PLANNING AUSTRALIA	Source:	Cadastral Boundary: NSW Department of Finance, Services and Innovation 2023 Aerial photo: NearMap 22/08/2024 Surface analysis: Derived from LiDAR - Newcastle 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2014 NSW Vegetation Type: NSW Department of Planning, Industry and Environment 2022
	Disclaimer:	No warranty is given in relation to the data (including accuracy, reliability, completeness, currency or suitability) and no liability is accepted (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.
	File:	File: 2225-ChisholmGoodwin-Fig6-SlopeVeg-241111 Date: 11/11/2024

N

0 20 40 60 80

Meters

A3 Scale: 1:2,500

Coordinate System: GDA 1994 MGA Zone 56

Project: Raymond Terrace Road, Chisholm
Job no: 2225 (Goodwin)

Figure 13:

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.

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 minimise impact where possible.

3.6. Aboriginal Objects

A search of the AHIMS database (results contained in **Appendix C**) revealed there are no Aboriginal sites or places recorded in or near the subject site within a 200-metre buffer.

3.7. Bushfire Planning - Urban Release Area

The subject site is identified within a Bushfire Planning - Urban Release Area (URA) as indicated on **Figure 14** and **Figure 15**. As a subdivision of land within an URA, the assessment undertaken as part of the preparation of the BAR may exempt the proposed lots from reassessment of bushfire matters when future landowners 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 Bushfire Safety Authority (BFSA) it is requested the RFS endorse the included **Subdivision BAL Plan**.

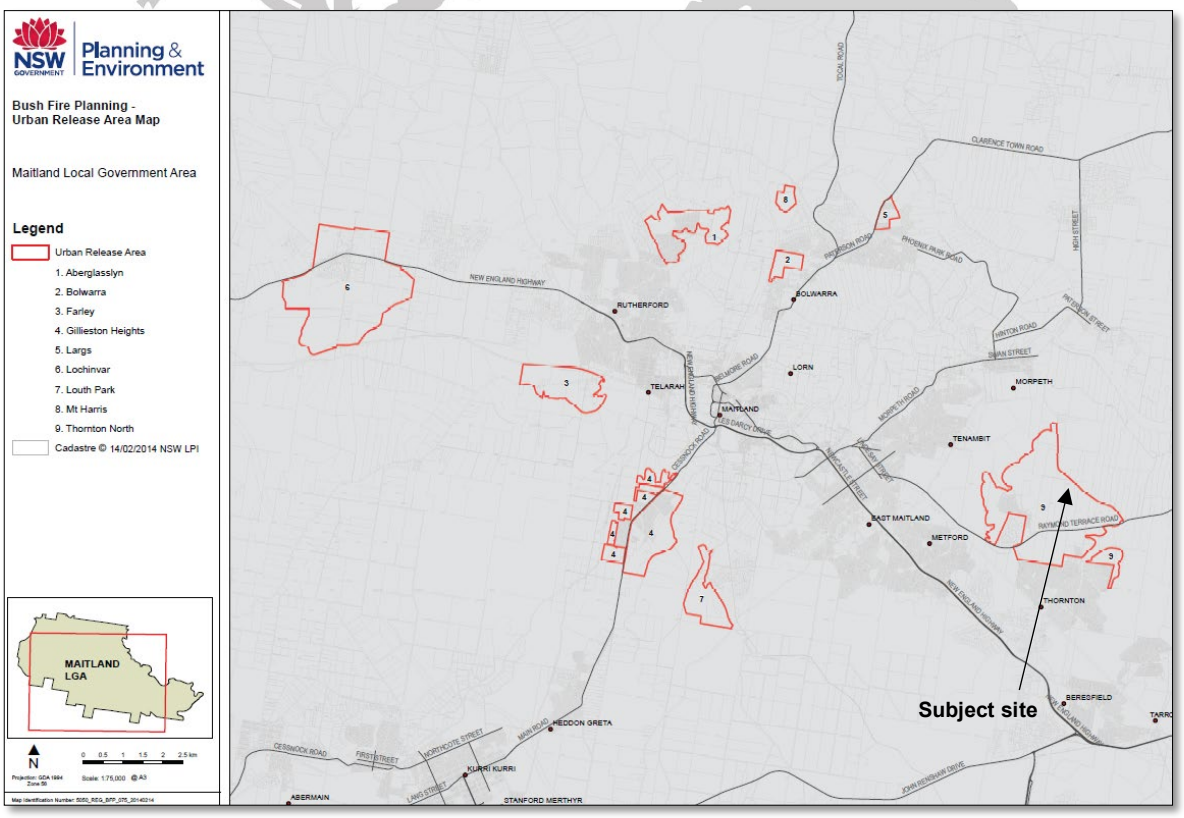


Figure 14: Bushfire Planning - Urban Release Area Map (Maitland LGA)

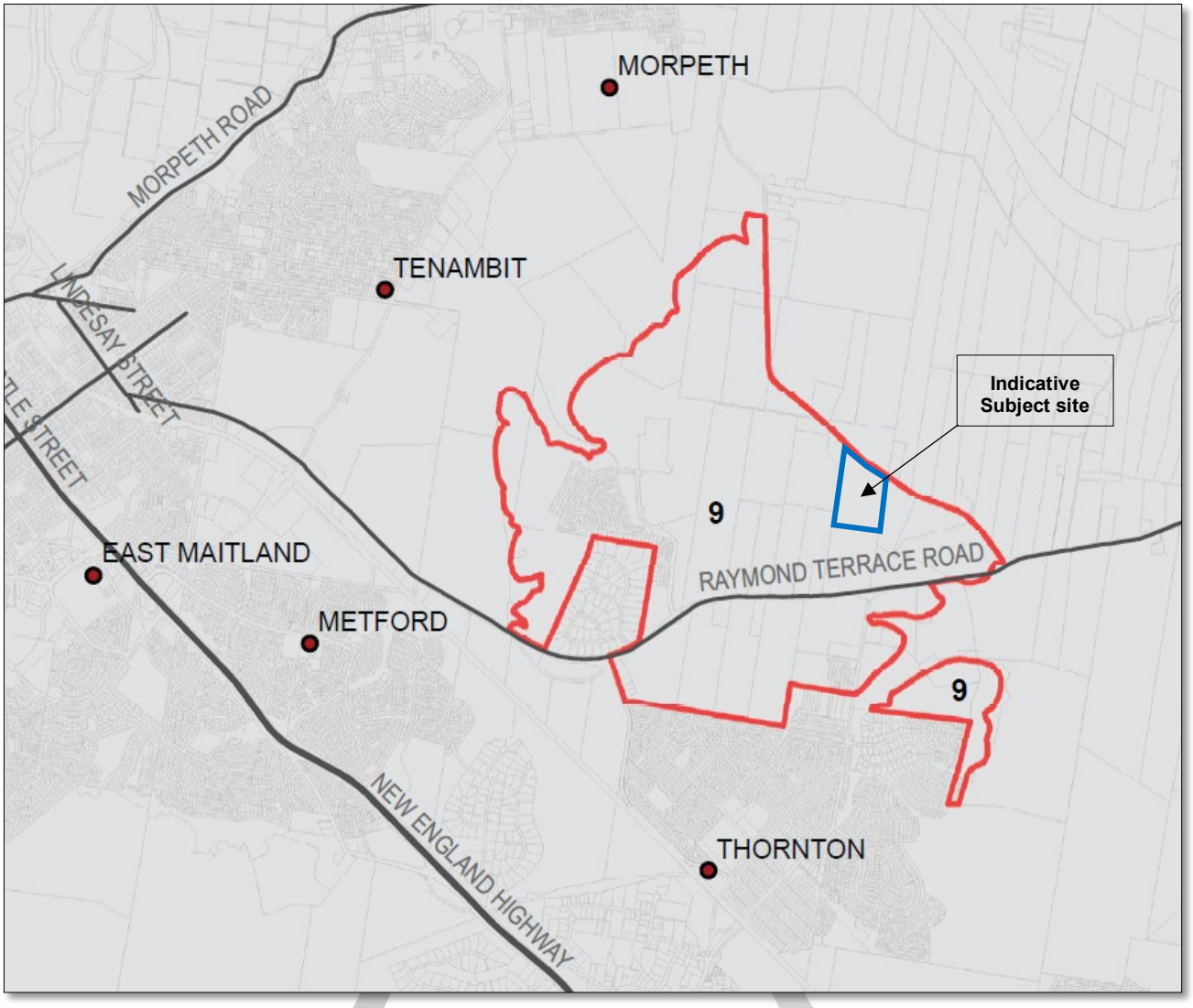


Figure 15: Bushfire Planning - Urban Release Area: Thornton North

4. Bushfire Protection Measures

This 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 satisified; 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) as shown in **Figure 16** and **Figure 17**.

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.

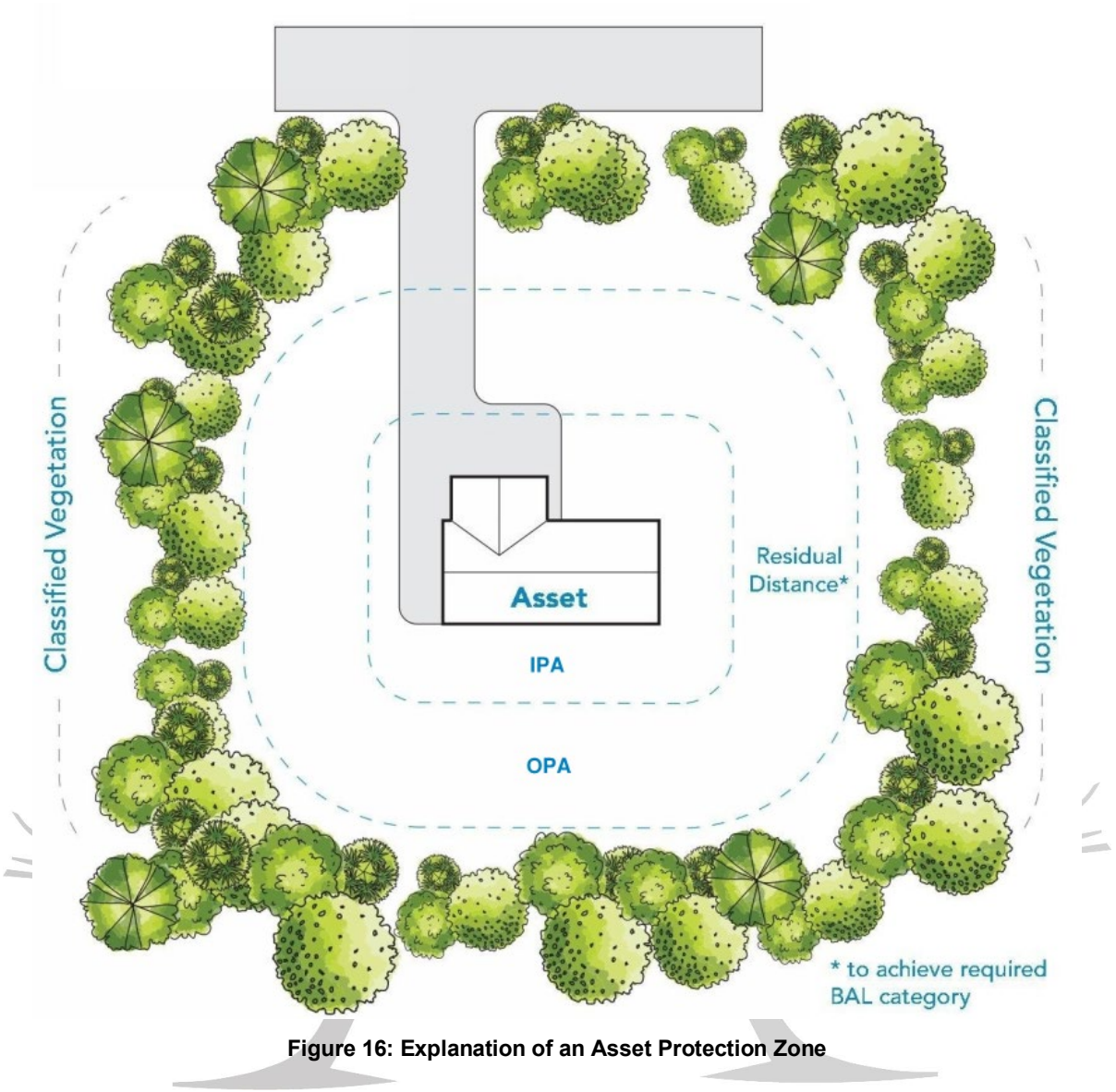


Figure 16: Explanation of an Asset Protection Zone

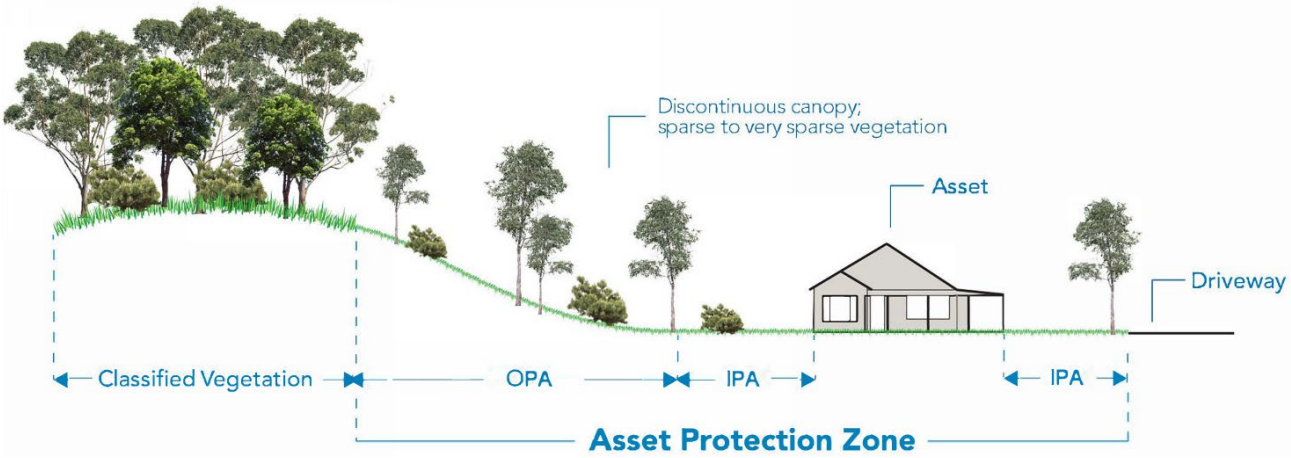


Figure 17: Asset Protection Zone profile

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-satisify 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-T22). 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 accomomodate 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 G**.

Refer to **Table 3** for the recommended APZs. **Figure 21** presents the APZs for the proposed development based on the existing bushfire hazard.

The required and 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. These are demonstrated in **Figure 21**.

Table 3: Required APZ setback - FDI @ 100

Transect	Vegetation Classification (PBP 2019)	Slope	PBP 2019 (Table A1.12.2)	Recommended APZ (Method 2 <29kW/m²)
T1 South-west	Excluded (Approved Development)	Flat* (0.2° Downslope)	N/A	N/A
T2 South-west	Excluded (Approved Development)	1.7° Downslope	N/A	N/A
T3 South-west	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	-0.1° Upslope	24m	16m
T4 South	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	6.8° Downslope	36m	23m
T5 South	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	1.2° Downslope	29m	17m
T6 South	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	2.6° Downslope	29m	18m
T7 South	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	5.2° Downslope	36m	21m
T8 South	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	6.1° Downslope	36m	22m
T9 On-site	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	4.9° Downslope	29m	20m
T10 On-site	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	10.4° Downslope	45m	27m
T11 South	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	Flat* (0.4° Downslope)	24m	16m
T12 South	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	2.9° Downslope	29m	18m
T13 South-east	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	Flat* (0.3° Downslope)	24m	16m
T14 South-west	Excluded (Approved Development)	Flat	N/A	N/A
T15 On-site	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	Flat* (0.8° Downslope)	24m	16m
T16 On-site	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	3.4° Downslope	29m	19m

Transect	Vegetation Classification (PBP 2019)	Slope	PBP 2019 (Table A1.12.2)	Recommended APZ (Method 2 <29kW/m^2)
T17 On-site	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	6.0° Downslope	36m	22m
T18 North	*Grassland*	1.2° Downslope	12m	12m
T19 North	*Grassland*	Flat* (0.6° Downslope)	10m	10m
T20 North-west	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	1.5° Downslope	29m	17m
T21 West	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	3.3° Downslope	29m	19m
T22 West	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	Flat* (0.2° Downslope)	24m	16m

* A slope that is less than 1 degree has been assessed as 'flat' as this is considered marginal and associated results are negligible.

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 defendable space are afforded in the subdivision layout for all future dwellings.

The proposed modification to the approved 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 B** for the development plans indicating the proposed access arrangements. It is noted that a fire trail was approved in lieu of a perimeter road along the western side of the northern riparian corridor. The proposed modification replaces the fire trail with a compliant perimeter road.

All approved roads have been designed either in accordance with or exceed the minimum required for an Acceptable Solution under PBP 2019 including minimum 10.5m (up to 12.0m) wide road carriageways for all perimeter roads and 8m wide non-perimeter roads. The exception being Road 14 and Road 21 east of the riparian corridor. These 2 roads connect directly with the approved residential subdivision of the McFarlane Estate.

Upon completion of the surrounding subdivisions, the remaining bushfire risk will be contained to the vegetation to be retained within the land to the west zoned C3 Environmental Conservation. Whilst this vegetation is greater than 1 hectare in size, it is contained by surrounding residential development and is not connected to any other large areas of bushfire hazardous vegetation. A marginal bushfire hazard is confined 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 (*forest*).

All perimeter roads and non-perimeter roads are required to be designed in accordance with Maitland City Council development control plan and engineering specifications. The approved 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.

The bushfire hazards to the west will be completely contained and separated by perimeter roads from the adjoining residential development. Accordingly, direct access and defendable space is available to wherever a bushfire is spreading. Furthermore, the network of public roads throughout the site provides road connections in every available direction. Accordingly, wherever a bushfire may occur, multiple evacuation routes are available for use by residents evacuating the area.

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

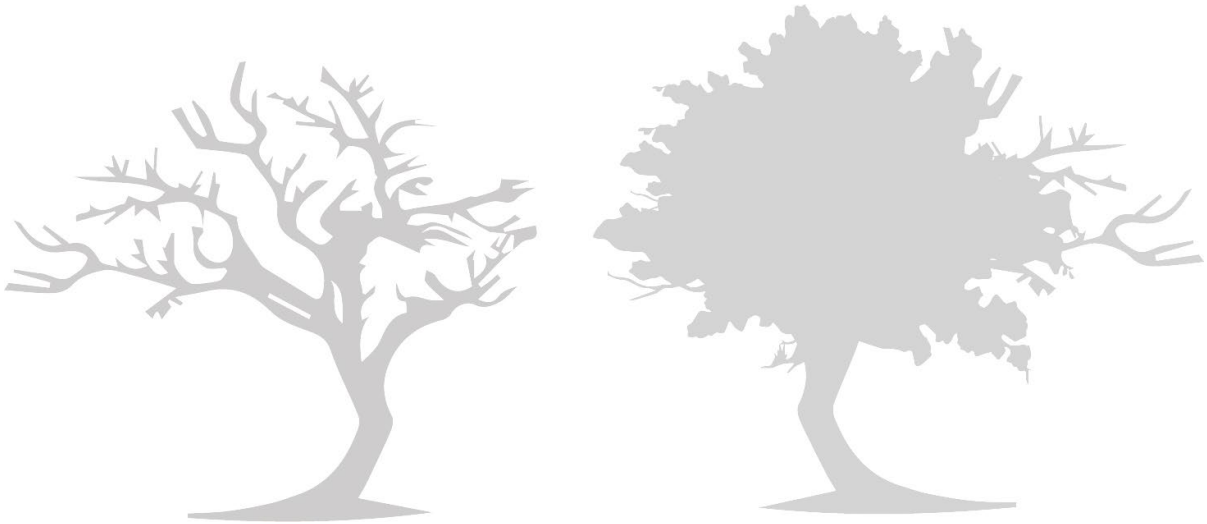
A reticulated water supply is able to be connected to all new lots in accordance with Table 5.3c of PBP 2019.

4.3.2. Electricity

Any new 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.



4.5. Emergency Services

There is a NSW Rural Fire Brigade is located at Kooralbyn Street, Thornton within 5.5km and approximately 7 minutes from the site (**Figure 18**). A second NSW Fire and Rescue Service fire station is located at 1 Chelmsford Drive, Metford within 8.8km (approximately 10 minutes) from the site (**Figure 19**).

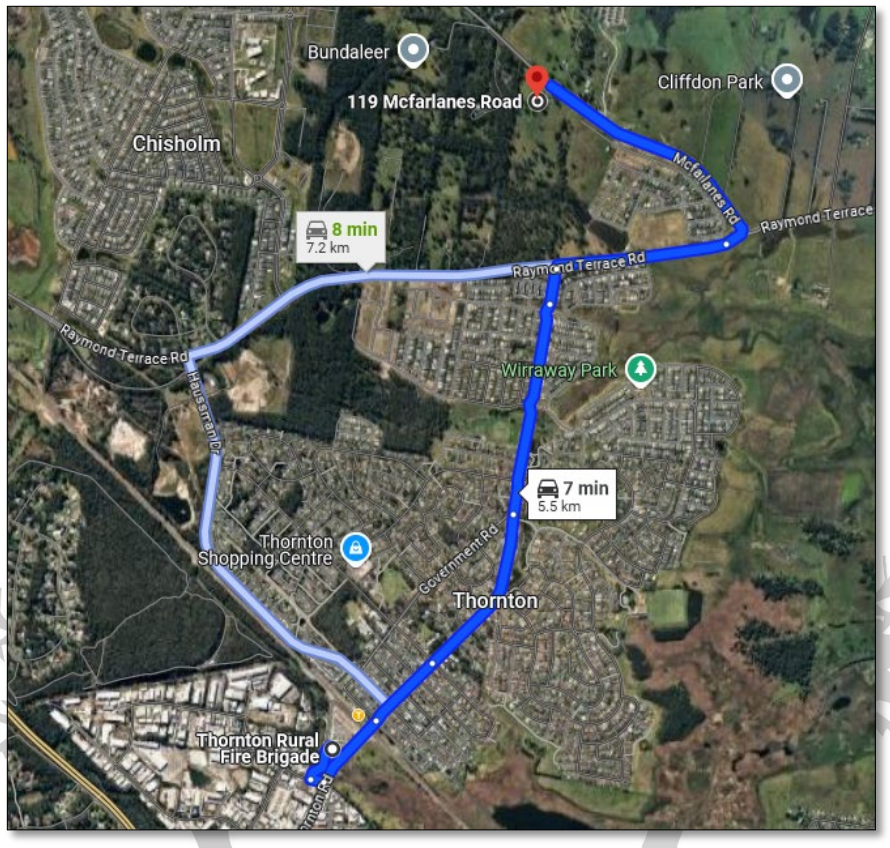


Figure 18: NSW Rural Fire Brigade - Thornton

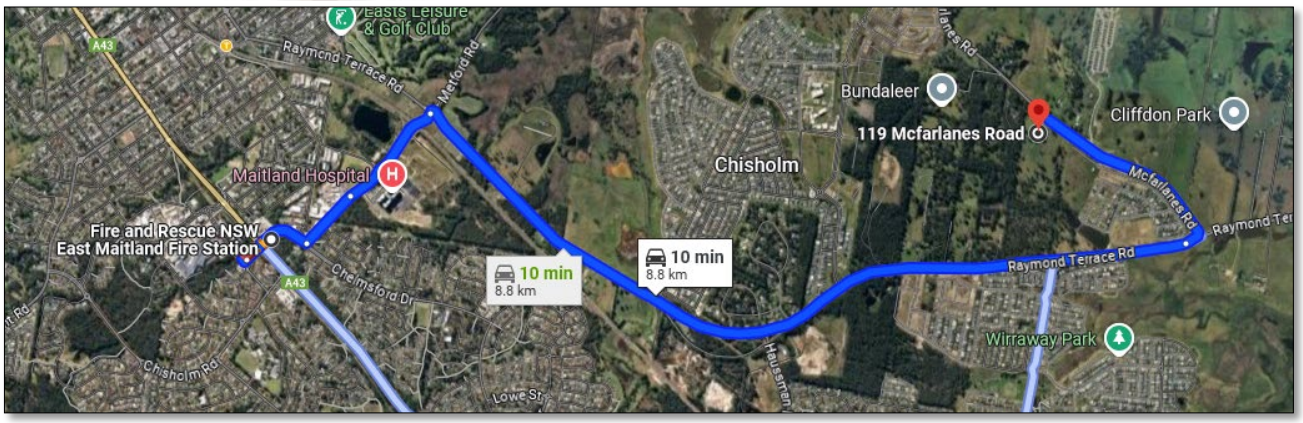


Figure 19: NSW Fire & Rescue - East Maitland

4.6. Construction Standards - Bushfire Attack Level

All buildings must satisfy the Performance Requirements of the National Construction Code: Building Code of Australia (BCA). Part 2.3 of Volume 2 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, any forthcoming habitable buildings must satisfy the requirements of Part 3.7.4 of the BCA. The *Deemed-to-Satisfy* (DTS) provision of the BCA 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 (**Figure 20**). 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 GFDI = *100*;
- Flame temperature = *1090K*;
- Slope = *downslope*;
- Vegetation classification = *forest* and *forested wetland*; and
- Building location.

The primary bushfire hazard is located to the west of the proposed development site and identified as a *forest (Hunter Macleay Dry Sclerophyll Forest)*. Additionally, the proposed drainage reserve will consist of a planting schedule commensurate with *Forested Wetland* and has been assessed accordingly.

The recommended BALs are shown in **Table 4** and **Figure 21**.

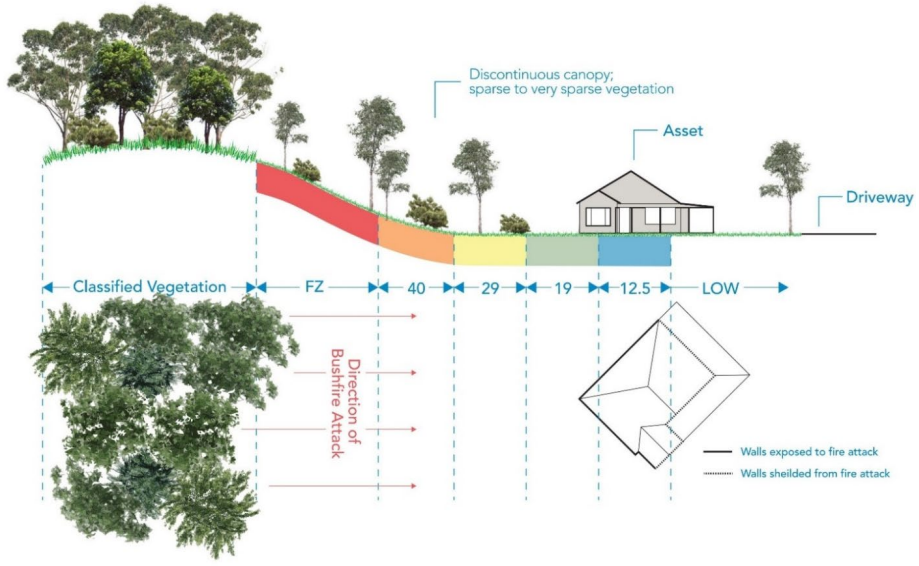


Figure 20: BAL example

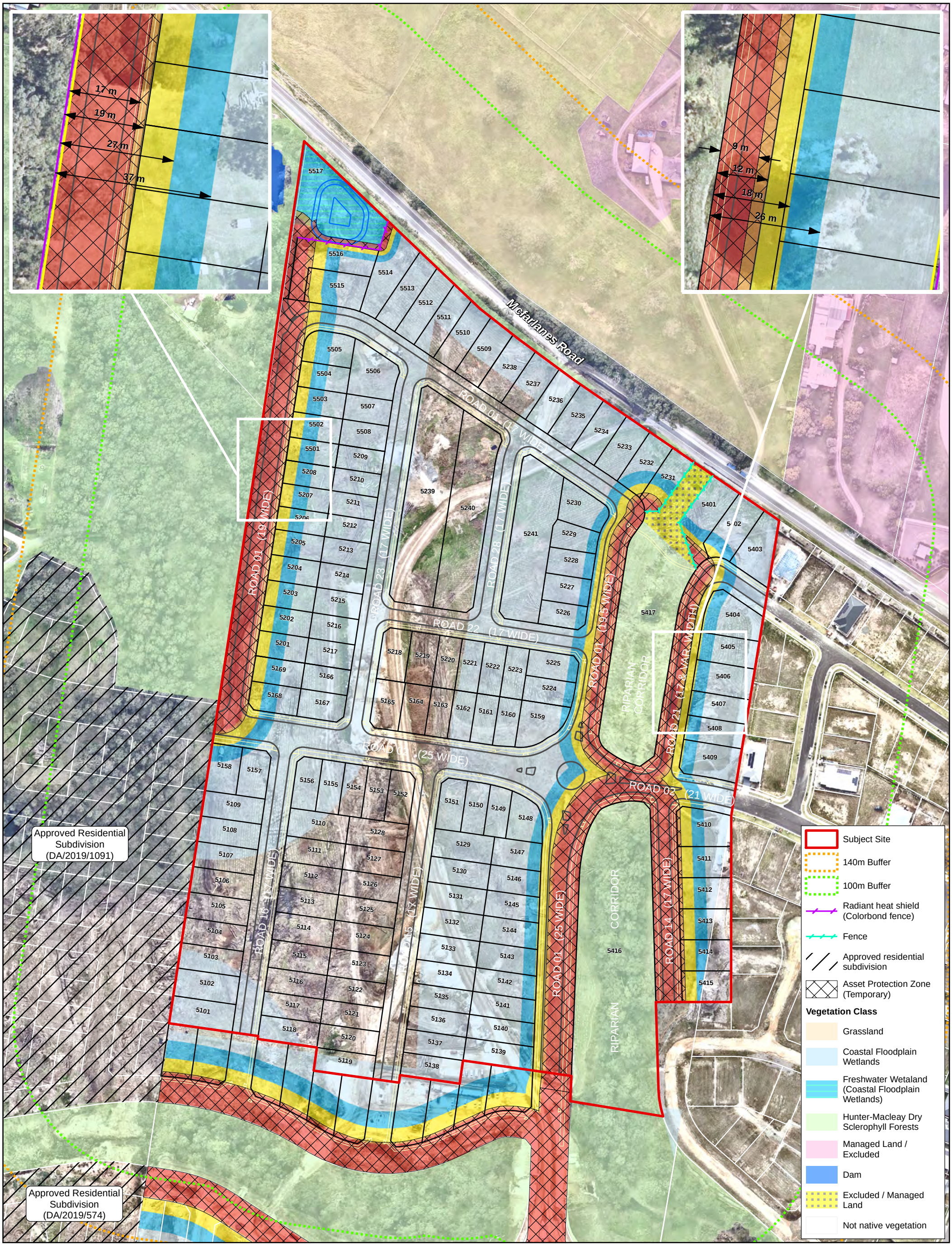
Table 4: Required Bushfire Attack Level

Transect	Vegetation Classification (PBP 2019)	Slope	Recommended APZ (<29kW/m²)	Distance from Hazard	Bushfire Attack Level (BAL)
T1, T2 & T14	Excluded (Managed Land or Approved Development)	Various	N/A	N/A	BAL-LOW
T3, T11, T13, T15 & T22	*Forest (Hunter Macleay DSF)*	Flat or Upslope	16m	0m-<14m	BAL-FZ
				14m-<16m	BAL-40
				16m-<23m	BAL-29
				23m-<32m	BAL-19
				32m-<100m	BAL-12.5
T4 South	*Forest (Hunter Macleay DSF)*	6.8° Downslope	23m	0m-<21m	BAL-FZ
				21m-<23m	BAL-40
				23m-<31m	BAL-29
				31m-<43m	BAL-19
				43m-<100m	BAL-12.5
T5 South	*Forest (Hunter Macleay DSF)*	1.2° Downslope	17m	0m-<15m	BAL-FZ
				15m-<17m	BAL-40
				17m-<24m	BAL-29
				24m-<34m	BAL-19
				34m-<100m	BAL-12.5
T6 South	*Forest (Hunter Macleay DSF)*	2.6° Downslope	18m	0m-<16m	BAL-FZ
				16m-<18m	BAL-40
				18m-<26m	BAL-29
				26m-<36m	BAL-19
				36m-<100m	BAL-12.5
T7 South	*Forest (Hunter Macleay DSF)*	5.2° Downslope	21m	0m-<19m	BAL-FZ
				19m-21m	BAL-40
				21m-<29m	BAL-29
				29m-<40m	BAL-19
				40m-<100m	BAL-12.5
T8 South	*Forest (Hunter Macleay DSF)*	6.1° Downslope	22m	0m-<20m	BAL-FZ
				20m-<22m	BAL-40
				22m-<30m	BAL-29
				30m-<42m	BAL-19
				42m-<100m	BAL-12.5

Transect	Vegetation Classification (PBP 2019)	Slope	Recommended APZ (<29kW/m²)	Distance from Hazard	Bushfire Attack Level (BAL)
T9 On-site	*Forest (Hunter Macleay DSF)*	4.9° Downslope	20m	0m-<19m	BAL-FZ
				19m-<20m	BAL-40
				20m-<29m	BAL-29
				29m-<40m	BAL-19
				40m-<100m	BAL-12.5
T10 On-site	*Forest (Hunter Macleay DSF)*	10.4° Downslope	27m	0m-<26m	BAL-FZ
				26m-<27m	BAL-40
				27m-<37m	BAL-29
				37m-<50m	BAL-19
				50m-<100m	BAL-12.5
T12 South	*Forest (Hunter Macleay DSF)*	2.9° Downslope	18m	0m-<17m	BAL-FZ
				17m-<18m	BAL-40
				18m-<26m	BAL-29
				26m-<36m	BAL-19
				36m-<100m	BAL-12.5
T16 On-Site	*Forest (Hunter Macleay DSF)*	3.4° Downslope	19m	0m-<17m	BAL-FZ
				17m-<19m	BAL-40
				19m-<27m	BAL-29
				27m-<37m	BAL-19
				37m-<100m	BAL-12.5
T17 South-west	*Forest (Hunter Macleay DSF)*	6.0° Downslope	22m	0m-<20m	BAL-FZ
				20m-<22m	BAL-40
				22m-<30m	BAL-29
				30m-<40m	BAL-19
				40m-<100m	BAL-12.5
T18 North	*Grassland*	1.2° Downslope	12m	0m-<9m	BAL-FZ
				9m-<12m	BAL-40
				12m-<17m	BAL-29
				17m-<25m	BAL-19
				25m-<50m	BAL-12.5
T19 North	*Grassland*	Flat* (0.6° Downslope)	10m	0m-<8m	BAL-FZ
				8m-<10m	BAL-40
				10m-<15m	BAL-29
				15m-<22m	BAL-19
				22m-<50m	BAL-12.5

Transect	Vegetation Classification (PBP 2019)	Slope	Recommended APZ (<29kW/m²)	Distance from Hazard	Bushfire Attack Level (BAL)
T20 North-west	*Forest (Hunter Macleay DSF)*	1.5° Downslope	17m	0m-<16m	BAL-FZ
				16m-<17m	BAL-40
				17m-<25m	BAL-29
				25m-<34m	BAL-19
				34m-<100m	BAL-12.5
T21 West	*Forest (Hunter Macleay DSF)*	3.3° Downslope	19m	0m-<17m	BAL-FZ
				17m-<19m	BAL-40
				19m-<27m	BAL-29
				27m-<37m	BAL-19
				37m-<100m	BAL-12.5
Basin	*Freshwater Wetland*	Flat	4m	0m-<4m	BAL-FZ
				4m-<4m	BAL-40
				4m-<7m	BAL-29
				7m-<11m	BAL-19
				11m-<19m	BAL-12.5

* A slope that is less than 1 degree has been assessed as 'flat' as this is considered marginal and associated results are negligible.



BUSHFIRE PLANNING AUSTRALIA

Source:	Cadastral Boundary: NSW Department of Finance, Services and Innovation 2021 Aerial photo: NearMap 22/08/2024
Disclaimer:	No warranty is given in relation to the data (including accuracy, reliability, completeness, currency or suitability) and no liability is accepted (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.
File:	File: 2225-ChisholmGoodwin-Fig7-BALs-241111 Date: 11/11/2024

0 20 40 60
Meters

A3 Scale: 1:2,200

Coordinate System: GDA 1994 MGA Zone 56

Project: Raymond Terrace Road, Chisholm Job no: 2225 (Goodwin)

Figure 21:

Subdivision BAL Plan

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 defendable 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.

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

Bushfire Planning Australia has been engaged by Allam Development No 1 Pty Ltd to undertake a Bushfire Assessment Report (BAR) to support the modification of an approved residential subdivision known as the Sophia Waters Development (Goodwin) located at 119 McFarlanes Road, Chisholm; legally referred to as Lot 82 DP1302072.

The Goodwin residential subdivision was approved under Development Application DA19-653 by Maitland City Council on 12 May 2020 and modified on 26 February 2024. The proposed modification will include:

1. an increase to the proposed perimeter road; and
2. compliant landscaping buffer planting treated as an inner protection area.

A key improvement to the approved development is the replacement of a fire trail with a perimeter road resulting in a development able to comply with PBP 2019; noting the approved development was required to satisfy PBP 2006. Accordingly, the development as modified provides an improved level of protection to all future residents.

The bushfire hazard in the surrounding landscape is currently and will continue to 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 BAR concludes the proposed modifications to the approved development provide a better outcome as a fire trail has been replaced by a perimeter road and greater defendable space is now provided for.

The following key recommendations have been designed to enable the proposed modifications development to achieve the aims and objectives of PBP 2006 and PBP 2019:

Subdivision BAL Plan

1. A comprehensively detailed Subdivision BAL Plan shall be prepared for each stage of the Proposed Development. A subdivision certificate (SC) for a stage cannot proceed unless Maitland City Council is satisfied that a detailed Subdivision BAL Plan has been prepared by a suitably qualified person for that stage in accordance with the NSW RFS endorsed Masterplan prepared by Bushfire Planning Australia (Titled: Figure 19 Subdivision BAL Plan – Permanent Ref: 2179-McFarlanesRd_Fig8-BALS-PERMANENT-230525, Dated 25 May 2023) and the Bushfire Assessment Report prepared by Bushfire Planning Australia Ref: 2179, Version 3, Dated 29 May 2023. Council may refer a detailed BAL plan to RFS for consideration if not initially satisfied and, if RFS is satisfied with the detailed BAL plan, it will issue an amended Bush Fire Safety Authority for that stage.

Asset Protection Zones

2. At the issue of a subdivision certificate and in perpetuity, the entire site; with the exception of the land within the riparian corridor (Lot 5416 and part of Lot 5417), shall be managed as an Inner Protection Area (IPA) as outlined within Appendix 4 of PBP 2019 and the RFS document Standards for asset protection zones; or in accordance with the MCC approved Landscape Plan prepared by Terras Landscape Architects dated 4 October 2016 (Project no 10496.5 Revision A) (**Appendix F**);
3. An APZ as shown on **Figure 21** shall be established on Lots 5514, 5515 and 5516 and maintained as outlined in Appendix 4 of PBP 2019 and the RFS document Standards for asset protection zones;
4. Where a stage is being developed, adjoining land within an adjacent approved stage up to 100m shall be managed as a Temporary APZ as outlined Appendix 4 of PBP 2019 and the RFS document Standards for asset protection zones;

Access

5. Access roads shall satisfy the Performance Criteria of Table 5.3b of PBP 2019 as shown in **Appendix B**;
6. Perimeter roads shall comply with the following general requirements of Table 5.3b of PBP 2019 as shown on **Figure 21**:
    a. 8m wide road width measured kerb to kerb (with the exception of Road No MC17);
    b. Hydrants are located clear of parking areas;
    c. Curves of roads have a minimum inner radius of 6m;
    d. The road crossfall does not exceed 3 degrees; and
    e. A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches is provided.
7. Non-perimeter roads shall comply with the following general requirements of Table 5.3b of PBP 2019 as shown on **Figure 21**:
    a. 5.5m wide road width measured kerb to kerb;
    b. Hydrants are located clear of parking areas;
    c. Curves of roads have a minimum inner radius of 6m;
    d. The road crossfall does not exceed 3 degrees; and
    e. A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches is provided.
8. Temporary turning heads must be provided to temporary dead-end roads incorporating a turning head in accordance Appendix A3.3 of PBP 2019;

Construction and Design

9. 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;

Water and Utilities

10. 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; and

Landscaping

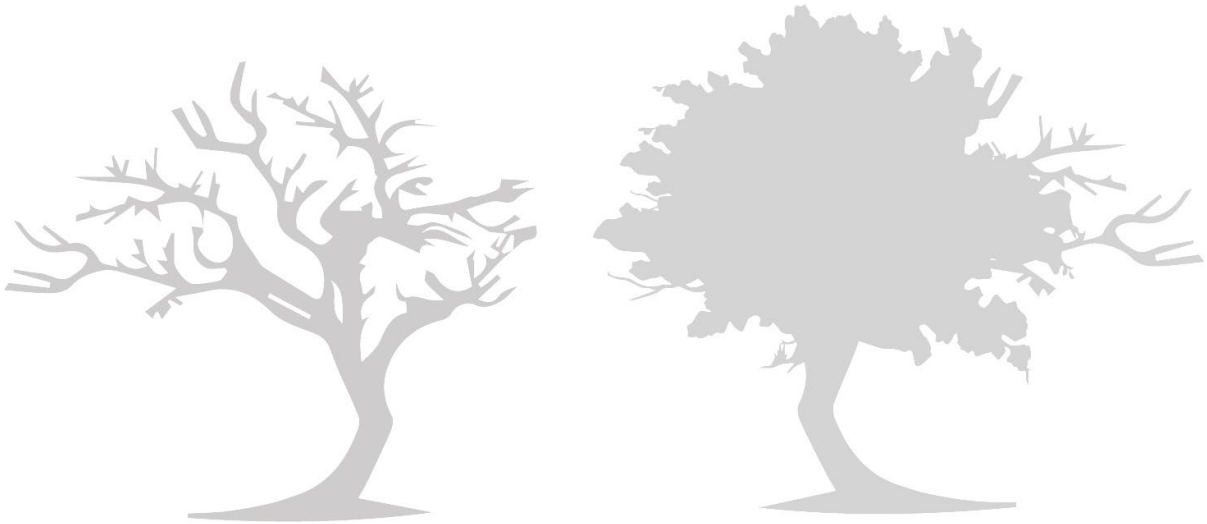
11. Consideration should be given to landscaping and fuel loads on site to decrease potential fire hazards on site.

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection (March 2023) and production and (November 2024).

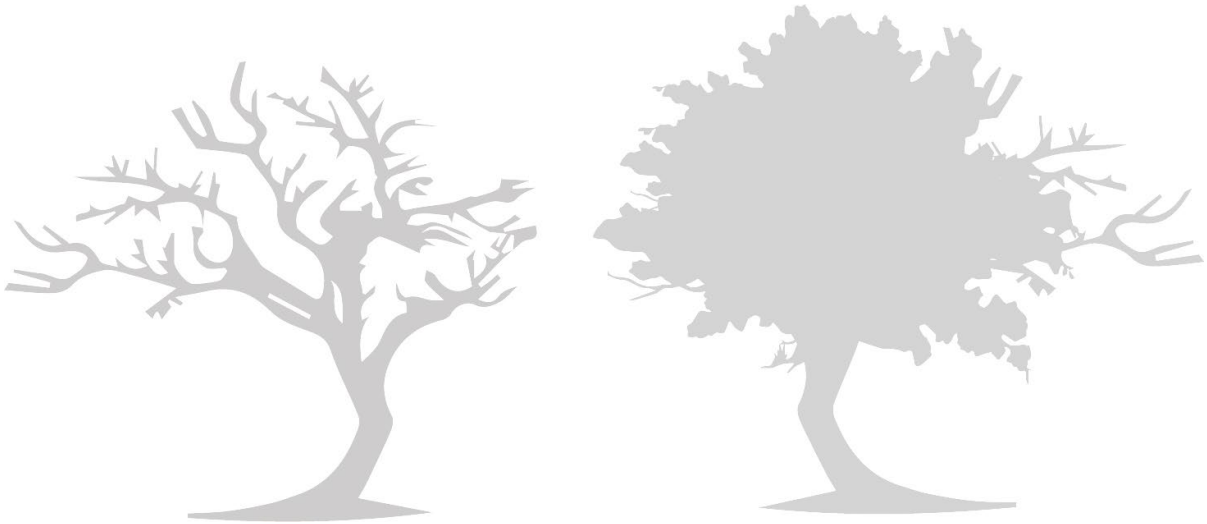
Should the above recommendations be implemented commensurate to the low threat hazard, the nominal bushfire risk can be suitably mitigated to offer an acceptable level of protection to life and property for those persons and assets occupying the site, but they do not and cannot guarantee that the area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

6. References

- Keith, D. (2004). Ocean Shores to Desert Dunes – The Native Vegetation of New South Wales and the ACT.
- 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: Bush Fire Safety Authority (D19/2894) dated 10 October 2019



All communications to be addressed to:

Headquarters
4 Murray Rose Ave
Sydney Olympic Park NSW 2127

Telephone: 1300 NSW RFS
e-mail: records@rfs.nsw.gov.au

Headquarters
Locked Bag 17
Granville NSW 2142

Facsimile: 8741 5433

The General Manager
Maitland City Council
PO Box 220
MAITLAND NSW 2320

Your Ref: DA/2019/653
Our Ref: D19/2894
DA19082620168 EJ

ATTENTION: Robyn Hawes

10 October 2019

Dear Sir/Madam

Integrated Development Application - 1//198776 - 119 Mcfarlanes Road Chisholm 2322

I refer to your correspondence dated 19 August 2019 seeking general terms of approval for the above Integrated Development Application.

The New South Wales Rural Fire Service (NSW RFS) has considered the information submitted. General Terms of Approval, under Division 4.8 of the 'Environmental Planning and Assessment Act 1979', and a Bush Fire Safety Authority, under Section 100B of the 'Rural Fires Act 1997', are now issued subject to the following conditions:

Asset Protection Zones

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

1. At the issue of a subdivision certificate, and in perpetuity, the entirety of all residential lots, drainage basin and turfed area shall be managed as an inner protection area (IPA) as outlined within section 4.1.3 and Appendix 5 of 'Planning for Bush Fire Protection 2006' and the NSW Rural Fire Service's document 'Standards for asset protection zones'.

2. At the issue of a subdivision certificate, a suitably worded instrument(s) shall be created which requires the management of a 25 metre asset protection zone (APZ) along the eastern and western boundaries of the subject site, within Lot 33 DP 794448, Lot 21 DP 832786 and Lot 18 DP 999725, pursuant to section 88 of the ‘Conveyancing Act 1919’. These APZs shall be managed as outlined within section 4.1.3 and Appendix 5 of 'Planning for Bush Fire Protection 2006' and the NSW Rural Fire Service's document 'Standards for asset protection zones'. This instrument may be lifted upon the development of the land to the east and west of the site such that the bush fire hazard has been permanently removed. The name of authority empowered to release, vary or modify the instrument shall be Maitland City Council.

Water and Utilities

The intent of measures is to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building. To achieve this, the following conditions shall apply:

3. Water, electricity and gas are to comply with section 4.1.3 of 'Planning for Bush Fire Protection 2006'.

Access

The intent of measures for public roads is to provide safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area. To achieve this, the following conditions shall apply:

4. Public road access shall comply with the following requirements of section 4.1.3 (1) of 'Planning for Bush Fire Protection 2006'.

- Urban perimeter roads are twoway, with a carriageway 8 metres minimum kerb to kerb.
- Road(s) shall be twowheel drive, all weather roads.
- The perimeter road is linked to the internal road system at an interval of no greater than 500 metres.
- Traffic management devices are constructed to facilitate unobstructed access by emergency services vehicles.
- Public roads have a cross fall not exceeding 3 degrees.
- Non perimeter road widths comply with Table 4.1 in 'Planning for Bush Fire Protection 2006'.
- Curves of roads (other than perimeter roads) are a minimum inner radius of 6 metres.
- The minimum distance between inner and outer curves is 6 metres.
- Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient.
- There is a minimum vertical clearance to a height of 4 metres above the road at all times.

- The capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicate load rating.
- Public roads greater than 6.5 metres wide locate hydrants outside of parking reserves to ensure accessibility to reticulated water supply for fire suppression.
- Public roads between 6.5 metres and 8 metres wide are ‘No Parking’ on one side with services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.
- Public roads 5.5 to 6.5 metres wide (kerb to kerb) provide parking within parking bays located outside the kerb to kerb space and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.
- Parking bays are a minimum of 2.6 metres wide from kerb to edge of road pavement. No services are located within the parking bays.
- Public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road.
- Dead end roads shall incorporate a temporary 12 metre outer radius turning circle which may be removed once construction of the adjoining road(s) commences.

The intent of measures for fire trails is to provide suitable access for fire management purposes and maintenance of APZs. To achieve this, the following conditions shall apply:

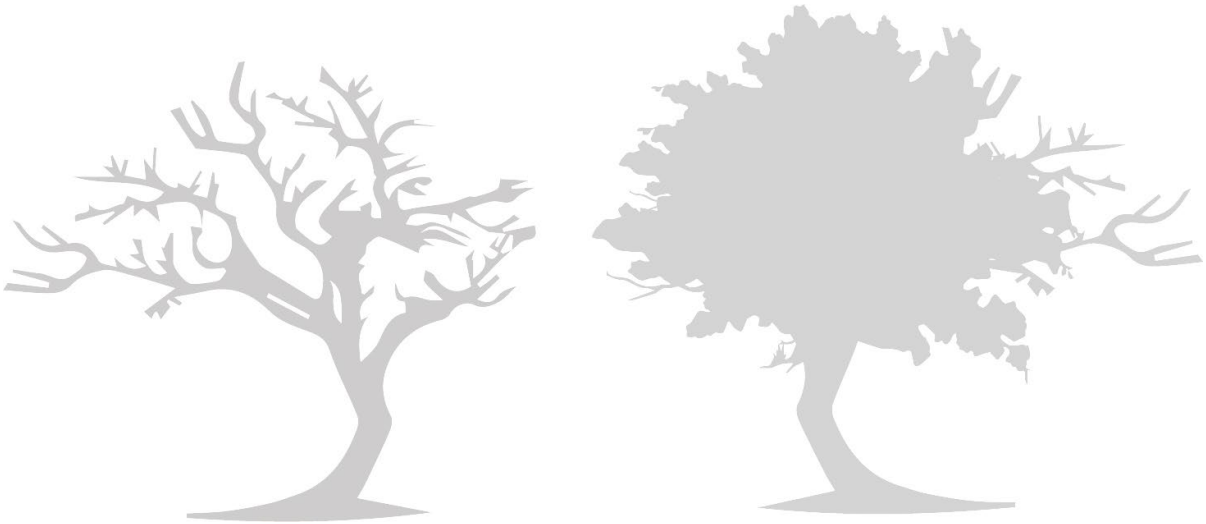
5. Fire trails shall comply with section 4.1.3 (3) of 'Planning for Bush Fire Protection 2006'.

General Advice – consent authority to note

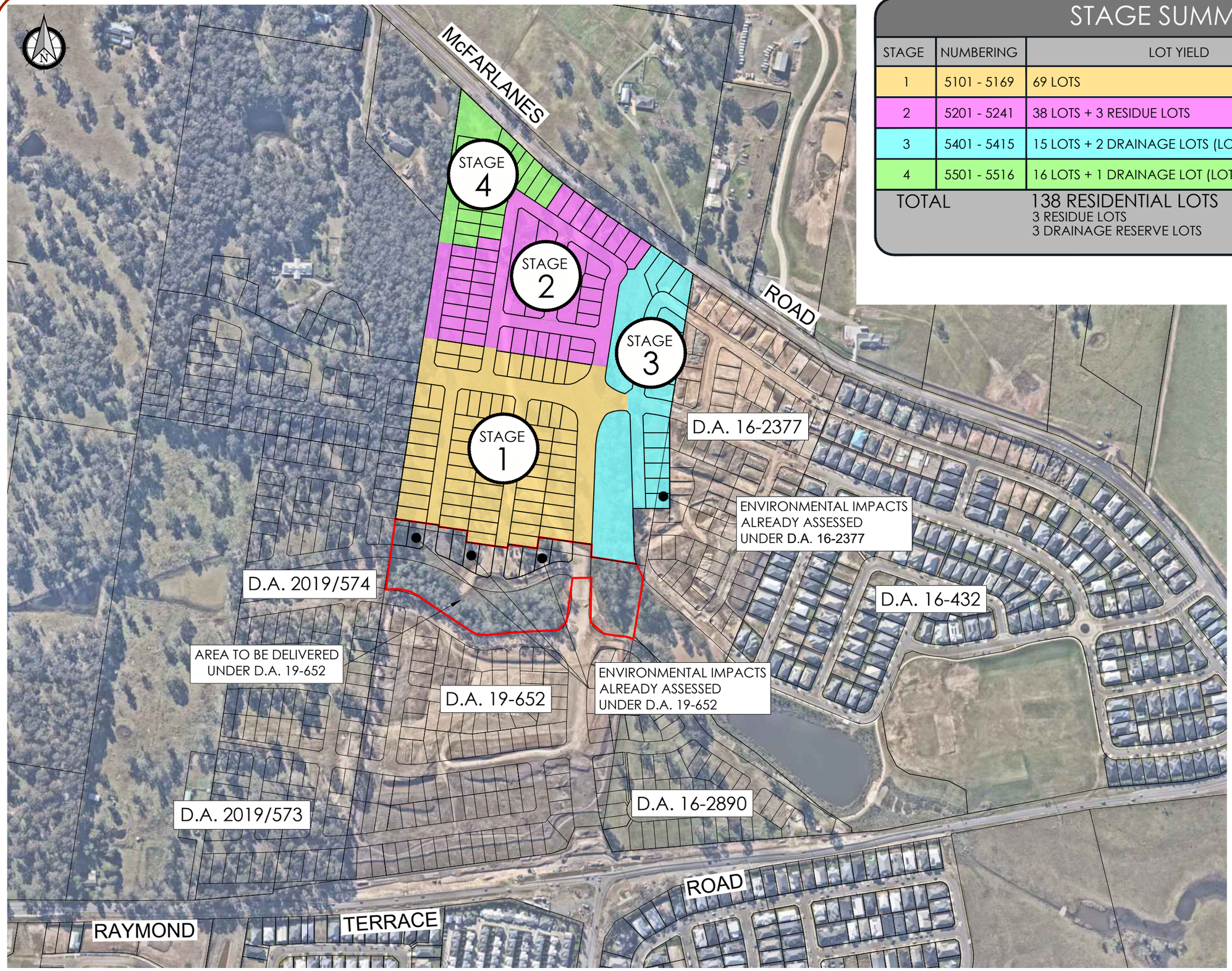
The above general terms of approval have been based upon the consent authority placing a condition of consent on the development which requires the completion of the proposed public road network associated with DA/2019/652, which provides the sole access to Raymond Terrace Road/Government Road, prior to the commencement of works associated with the subject subdivision.

Any future development application lodged for land in this subdivision may be subject to the requirements of 'Planning for Bush Fire Protection’. Provision of Asset Protection Zones within the lots boundaries and construction to AS3959 standards may be required.

Appendix B: Proposed Plan of Subdivision



240294(50)-DA-105[E]



STAGE SUMMARY

STAGE	NUMBERING	LOT YIELD	OWNER
1	5101 - 5169	69 LOTS	GOODWIN
2	5201 - 5241	38 LOTS + 3 RESIDUE LOTS	GOODWIN
3	5401 - 5415	15 LOTS + 2 DRAINAGE LOTS (LOT 5416 AND 5417)	GOODWIN
4	5501 - 5516	16 LOTS + 1 DRAINAGE LOT (LOT 5517)	GOODWIN
TOTAL		138 RESIDENTIAL LOTS 3 RESIDUE LOTS 3 DRAINAGE RESERVE LOTS	

ver.	date	comment	drawn	pm	co-ordinate & level information	scale (A3 original size)	notes
E	8.11.24	REVISED ISSUE	LS	CMO	CO-ORDINATE SYSTEM: MGA56 GDA94 DATUM: N/A CONTOUR INTERVAL: N/A	0 125 250m SCALE: 1:5000 (FULL)	

• project management • civil engineering • infrastructure • superintendency • economic analysis • social impact • town planning • surveying • development feasibility • visualisation • urban design

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working beyond expectations

drawing title:

CONTEXT STAGING PLAN

location: RAYMOND TERRACE ROAD, CHISHOLM

council: MAITLAND CITY COUNCIL

dwg ref: 240294(50)-DA-105[E]

client: ALLAM PROPERTY GROUP

adw johnson
central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100
sydney office ph: (02) 8046 7411
www.adwjohnson.com.au

240294(50)-DA-106[E]

NOTES:

1. EXTERNAL SITE BOUNDARIES HAVE BEEN DETERMINED BY PLAN DIMENSIONS ONLY, AND HAVE NOT BEEN SURVEYED. ALL DIMENSIONS, AREAS AND EASEMENTS SHOWN ARE SUBJECT TO COUNCIL APPROVAL, FINAL DESIGN, CONSTRUCTION, FINAL SURVEY AND REGISTRATION AT L.P.I. NSW.
2. CONTOURS SHOWN HEREON ARE FOR DESIGN PURPOSES ONLY AND ARE TO BE CONFIRMED ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION.
3. THIS PLAN HAS BEEN PREPARED FOR THE PURPOSE OF DISCUSSION AND SHOULD NOT BE USED FOR ANYTHING OTHER THAN THAT PURPOSE.
4. © Land and Property Management Authority (2014)

(B) EASEMENT TO DRAIN WATER

STAGE	RESIDENTIAL LOTS	ROAD WIDENING	RIPARIAN DRAINAGE RESERVE	RESIDUE
1	69	-	-	-
2	38	-	-	3
3	15	-	2	-
4	16	-	1	-
TOTAL NUMBER OF LOTS		138 HOUSING LOTS 3 RESIDUE LOTS 3 DRAINAGE RESERVES		

ver.	date	comment	drawn	pm	co-ordinate & level information	scale (A3 original size)	notes
E	8.11.24	REVISED ISSUE	LS	CMO	CO-ORDINATE SYSTEM: MGA56 GDA94 DATUM: N/A CONTOUR INTERVAL: N/A	0 50 100 125m SCALE: 1:2500 (FULL)	

drawing title:

PROPOSED SUBDIVISION OF LOT 1 D.P.1032753

location: RAYMOND TERRACE ROAD, CHISHOLM

council: MAITLAND CITY COUNCIL

dwg ref: 240294(50)-DA-106[E]

client: ALLAM PROPERTY GROUP

adw johnson

central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100
sydney office ph: (02) 8046 7411
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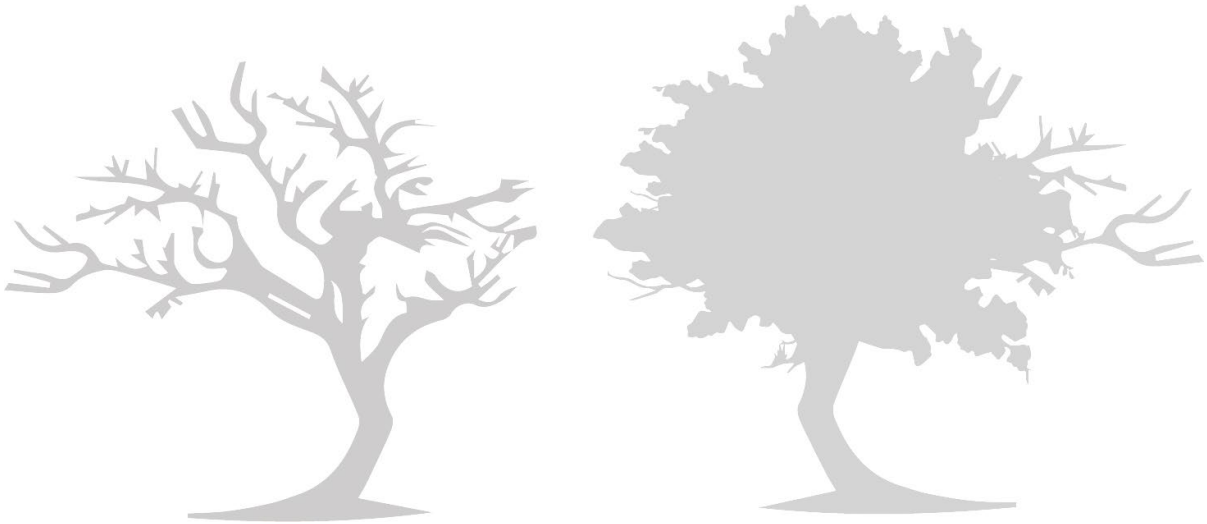
Appendix C: AHIMS Search Results



AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : 2225 Goodwin 200m

Client Service ID : 934586

Katrina Greville

21 Costata Crescent
Adamstown New South Wales 2289

Attention: Katrina Greville

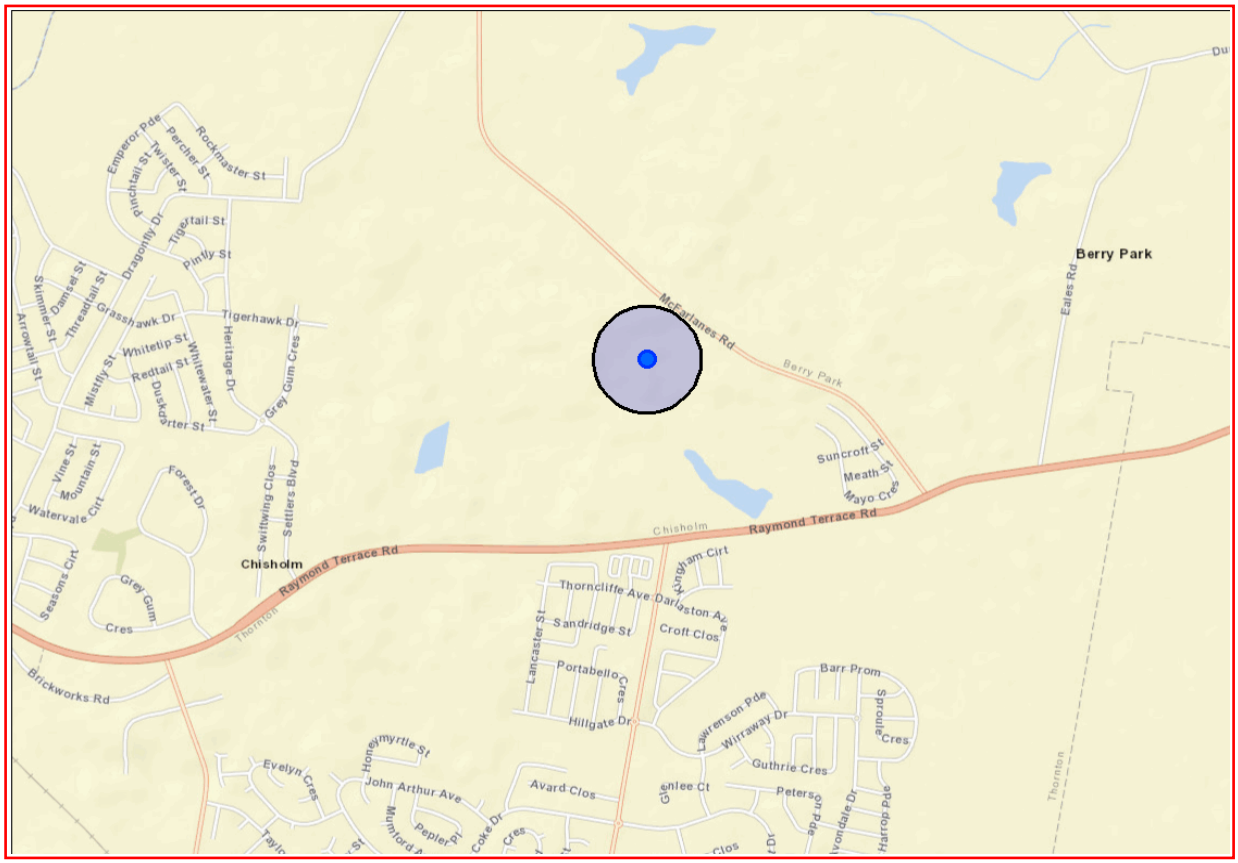
Email: klmukevski@bigpond.com

Date: 26 September 2024

Dear Sir or Madam:

AHIMS Web Service search for the following area at Address : 119 MCFARLANES ROAD CHISHOLM 2322 with a Buffer of 200 meters, conducted by Katrina Greville on 26 September 2024.

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:

0	**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) 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 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.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

Appendix D: Planning for Bushfire Protection 2019 - Compliance Table

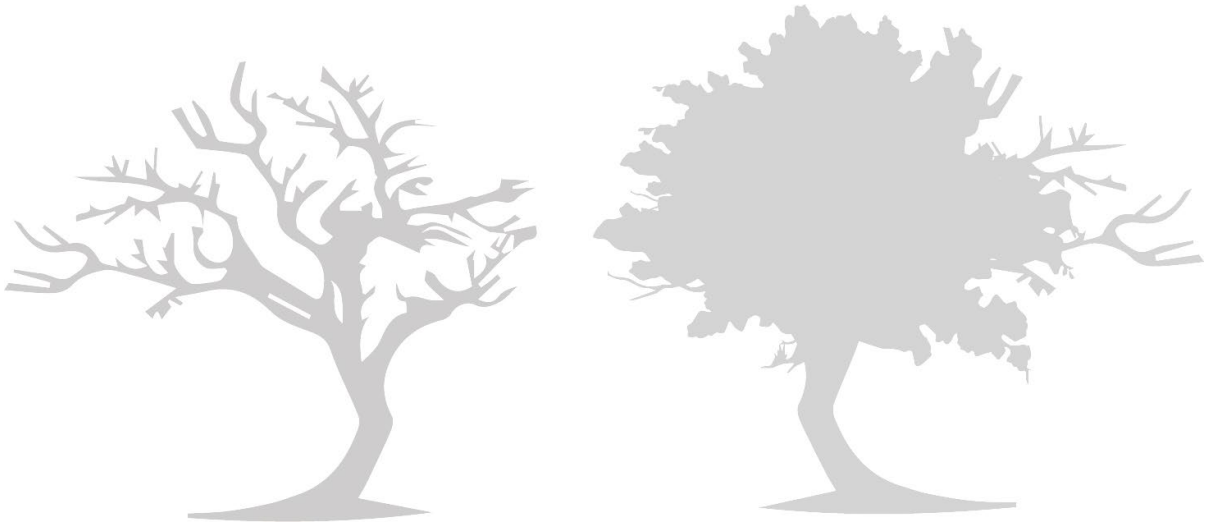


Table 1: Aims and Objectives of Planning for Bushfire Protection 2019

Objectives	Satisfied	Comment
➢ Afford buildings and their occupants protection from exposure to a bush fire	✓	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 multiple evacuation routes.
➢ Provide for a defendable space to be located around buildings	✓	Defendable 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/m^2).
➢ Provide appropriate separation between a hazard and buildings, which, in combination with other measures, prevent the likely fire spread to buildings	✓	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.
➢ Ensure that safe operational access and egress for emergency service personnel and residents is available	✓	Public road access will be provided from newly constructed roads connected to the eastern, southern and western adjoining developments.
➢ Provide for ongoing management and maintenance of BPMs	✓	All owners will be responsible for the management and maintenance of the private property.
➢ Ensure that utility services are adequate to meet the needs of firefighters	✓	The development includes all essential utility services to meet the needs of firefighters, including a reliable water supply.

Table 2: Performance Criteria and Acceptable Solutions for Residential Subdivisions (Chapter 5 PBP 2019)

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS	COMPLIES	COMMENT
✓ - Acceptable Solution PS - Performance Solution				
5.3.1 APZs **Table 5.3a** **Intent of Measure:** *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.*				
ASSET PROTECTION ZONES	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.	PS	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 (AS3959-2018) 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 10.0 ° 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 **Table 5.3b** *To provide safe operational access for emergency services personnel in suppressing a bush fire, while residents are accessing or egressing an area.*				
ACCESS (General Requirements)	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 (MCC) engineering standards. The road network has been designed in accordance with the Thornton North URA and is consistent with the recently approved developments including the adjoining 109 lot subdivision at 523 Raymond Terrace Road (DA2023/433).
		Perimeter roads are provided for residential subdivisions of three or more allotments	✓	

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS	COMPLIES	COMMENT
✓ - Acceptable Solution PS - Performance Solution				
		Subdivisions of three or more allotments have more than one access in and out of the development	✓	
		Traffic management devices are constructed to not prohibit access by emergency services vehicles.	✓	
		Access roads must provide suitable turning areas in accordance with Appendix 3.	✓	
	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.
	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.	✓	All perimeter roads are a minimum 10.5m and up to 12m 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 moderate 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.	✓	

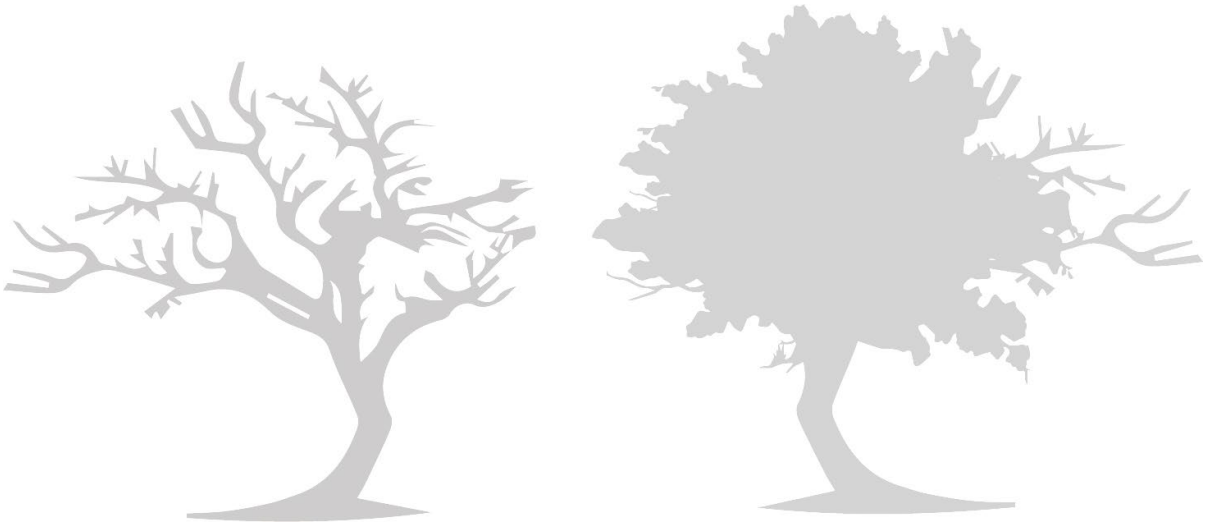
	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS	COMPLIES	COMMENT
✓ - Acceptable Solution PS - Performance Solution				
		The maximum grade road is 15° and average grade is 10°.	✓	
		The road crossfall does not exceed 3°.	✓	
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; and	✓	
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. An 8m wide paved carriageway will be provided allowing for a 5.5m wide unobstructed path of travel and on-street parking outside the carriageway. The moderate 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 is provided.	✓	

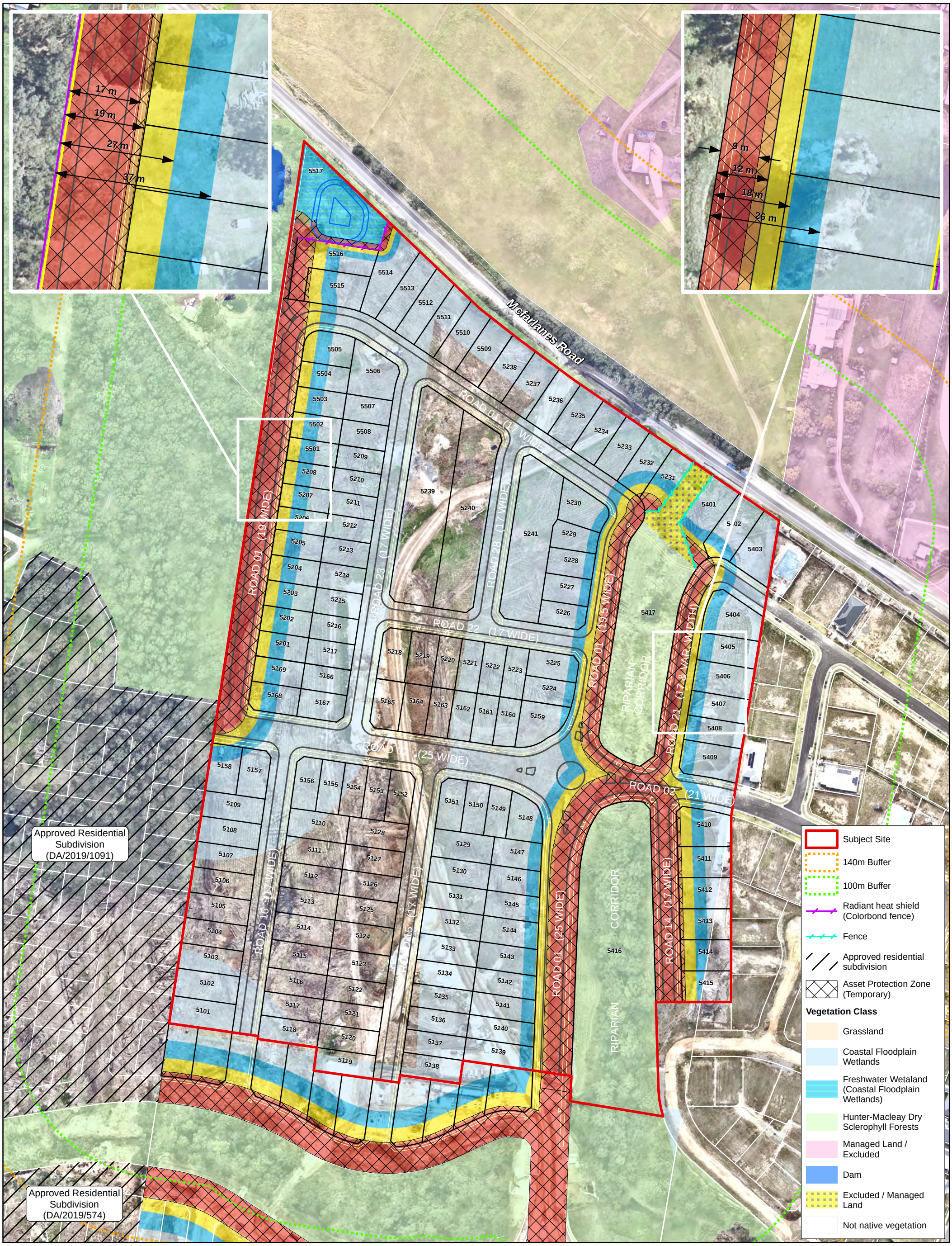
PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS	COMPLIES	COMMENT
✓ - Acceptable Solution PS - Performance Solution			
PROPERTY ACCESS	Firefighting vehicles can access the dwelling and exit the property safely.	There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distance external part of the proposed dwelling and the nearest part of the public access road.	**N/A**
		In circumstances where this cannot occur, the following requirements apply: Minimum 4m carriageway width;	**N/A**
		In forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay;	**N/A**
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches;	**N/A**
		Provide a suitable turning area in accordance with Appendix 3;	**N/A**
		Curves of roads have a minimum inner radius of 6m;	**N/A**
		The road crossfall does not exceed 10°;	**N/A**
		The maximum grade road is 15° and average grade is 10°;	**N/A**
		A development comprising more than three dwellings has access by dedication of a road and not by right of way.	**N/A**

PERFORMANCE CRITERIA		ACCEPTABLE SOLUTIONS	COMPLIES	COMMENT
✓ - Acceptable Solution PS - Performance Solution				
5.3.3 Services – Water, electricity and gas **Table 5.3c** *To provide adequate services for water for the protection of buildings during and after the passage of a bushfire, and not to locate gas and electricity so as not to contribute to the risk of fire to a building.*				
WATER	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 supplies are located at regular intervals The water supply is accessible and reliable for firefighting operations	Fire hydrant spacing, design and sizing comply with AS2419.1:2005;	✓	A reticulated water supply is provided.
		Hydrants are not located within any road carriageway;	✓	
		Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	✓	A reticulated water supply is provided.
	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.	✓	

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS	COMPLIES	COMMENT
✓ - Acceptable Solution PS - Performance Solution				
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.
		All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side;		
		Connections to and from gas cylinders are metal:		
		Polymer-sheathed flexible gas supply lines are not used; and		
		Above-ground gas service pipes are metal, including and up to any outlets.		

Appendix E: Subdivision BAL Plan





BUSHFIRE PLANNING AUSTRALIA

Source:	Cadastral Boundary: NSW Department of Finance, Services and Innovation 2021 Aerial photo: NearMap 22/08/2024
Disclaimer:	No warranty is given in relation to the data (including accuracy, reliability, completeness, currency or suitability) and no liability is accepted (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.
File:	File: 2225-ChisholmGoodwin-Fig7-BALs-241111 Date: 11/11/2024

0 20 40 60
Meters

A3 Scale: 1:2,200

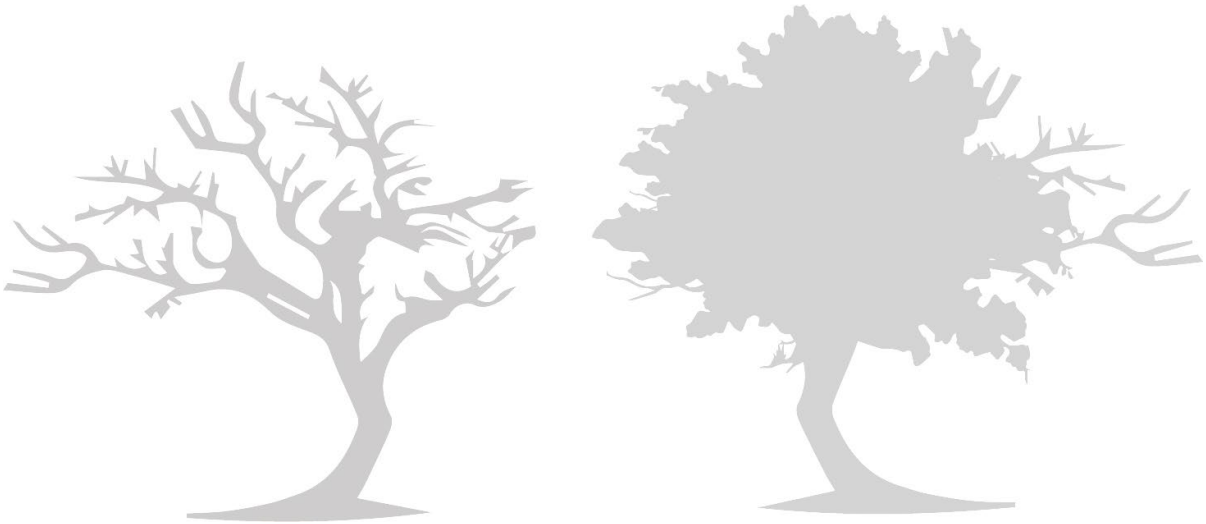
Coordinate System: GDA 1994 MGA Zone 56

Project: Raymond Terrace Road, Chisholm Job no: 2225 (Goodwin)

Figure 21:

Subdivision BAL Plan

Appendix F: Landscape Plans - Terras Landscape Architects



landscape concept design

thornton north residential subdivision - raymond terrace road, thornton north

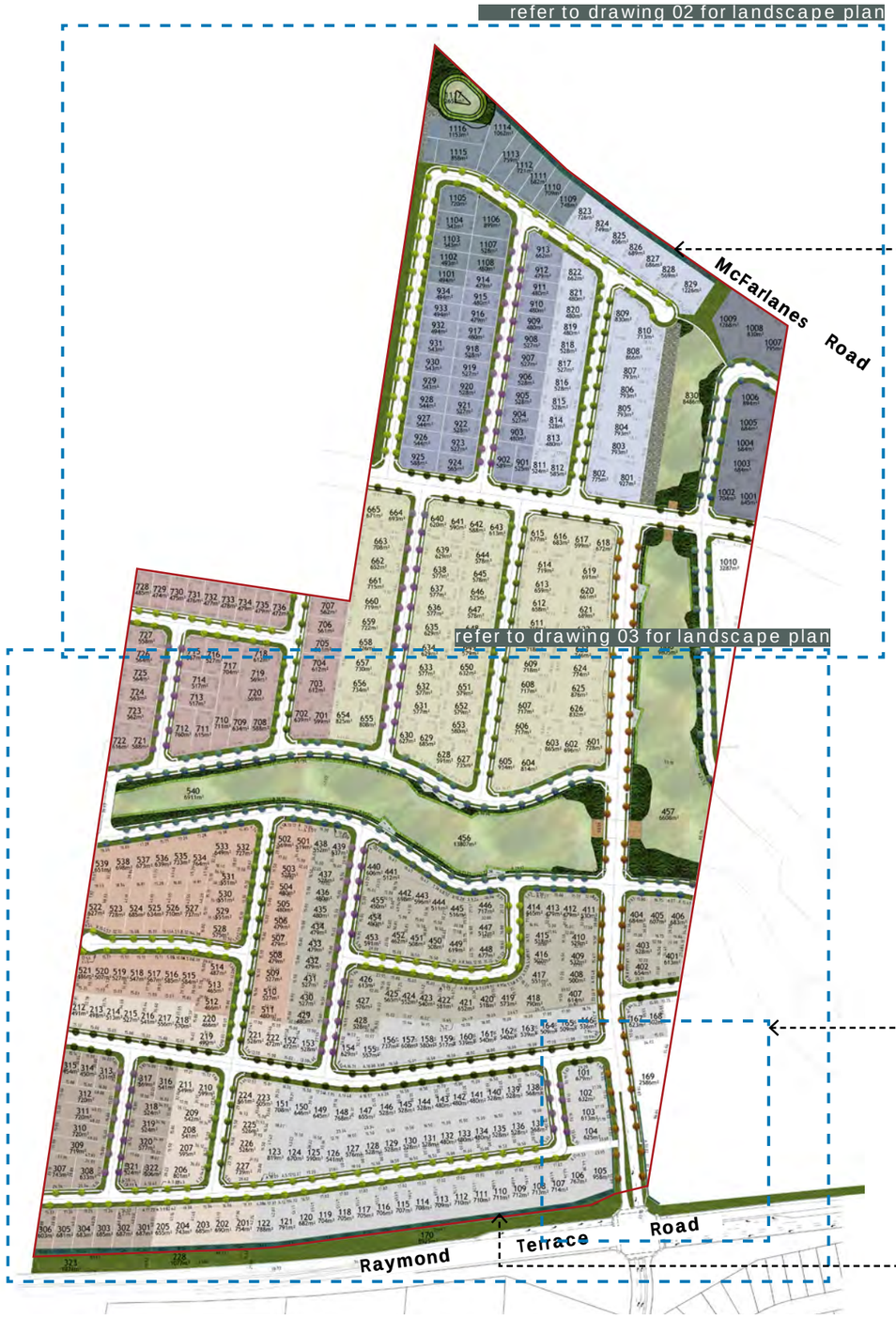
site: Raymond Terrace Road, Thornton North
client: Sidlay Pty Ltd
council: Maitland
proposal: concept design
project no: 10496.5
drawn: YY
date: 04.10.2016
revision: A

landscape masterplan

thornton north residential subdivision - raymond terrace road, thornton north

01

oct 2016



maitland city council

Approved Plans

NO. DA 19-653

DEVELOPMENT APPLICATION

12/05/2020

maitland city council

The approved plans form only part of the Schedule of Conditions. Other conditions may require amendments to the approved plans.

N

legend

- Lophostemon confertus
- Tristaniopsis laurina
- Elaeocarpus eumundii
- Backhousia citriodora
- Waterhousea floribunda
- Magnolia 'Little Gem'
- Landscape buffer zone w5m
- Riparian corridor
- Street landscape
- Stage 1
- Stage 2
- Stage 3
- Stage 4
- Stage 5
- Stage 6
- Stage 7
- Stage 8
- Stage 9
- Stage 10
- Stage 11
- M3 mass planting type 3
- M2 mass planting type 2
- M1 mass planting type 1
- rock base
- Project boundary

date:
04.10.2016

job number:
10496.5

scale:
1:5000 @ a3

drawn:
yy

revision:
A

terras landscape architects

landscape plan

thornton north residential subdivision - raymond terrace road, thornton north

02

oct 2016

maitland city council

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N

legend

- Lophostemon confertus
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- Elaeocarpus eumundii
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- Landscape buffer zone w5m
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- Street landscape
- Stage 1
- Stage 2
- Stage 3
- Stage 4
- Stage 5
- Stage 6
- Stage 7
- Stage 8
- Stage 9
- Stage 10
- Stage 11
- M3 mass planting type 3
- M2 mass planting type 2
- M1 mass planting type 1
- rock base
- Project boundary
- Retaining wall

date:
04.10.2016

job number:
10496.5

scale:
1:2500 @ a3

drawn:
yy

revision:
A

terras landscape architects

maitland city council

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NO. DA 19-653
DEVELOPMENT APPLICATION
12/05/2020

landscape plan

thornton north residential subdivision - raymond terrace road, thornton north

03

oct 2016

maitland city council

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N

legend

- Lophostemon confertus
- Tristaniopsis laurina
- Elaeocarpus eumundii
- Backhousia citriodora
- Waterhousea floribunda
- Magnolia 'Little Gem'
- Landscape buffer zone w5m
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- Stage 1
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- Stage 10
- Stage 11
- M3 mass planting type 3
- M2 mass planting type 2
- M1 mass planting type 1
- rock base
- Project boundary
- Retaining wall

date:
04.10.2016

job number:
10496.5

scale:
1:2500 @ a3

drawn:
yy

revision:
A

terras landscape architects

maitland city council

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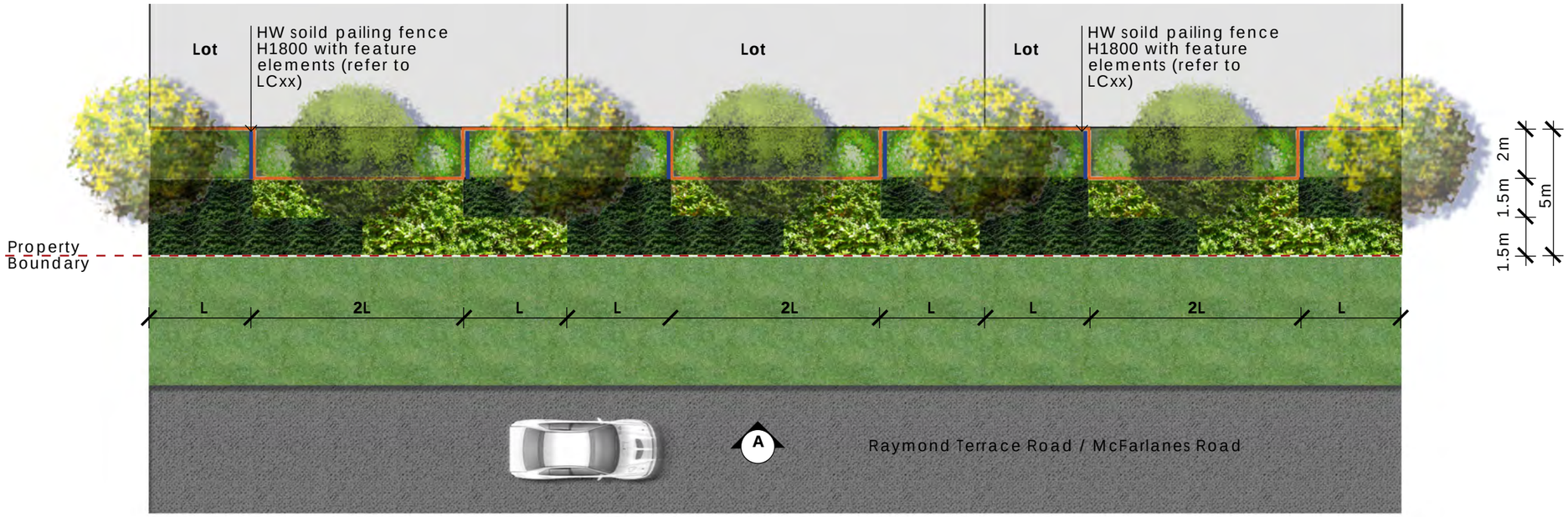
landscape buffer zone

thornton north residential subdivision - raymond terrace road, thornton north

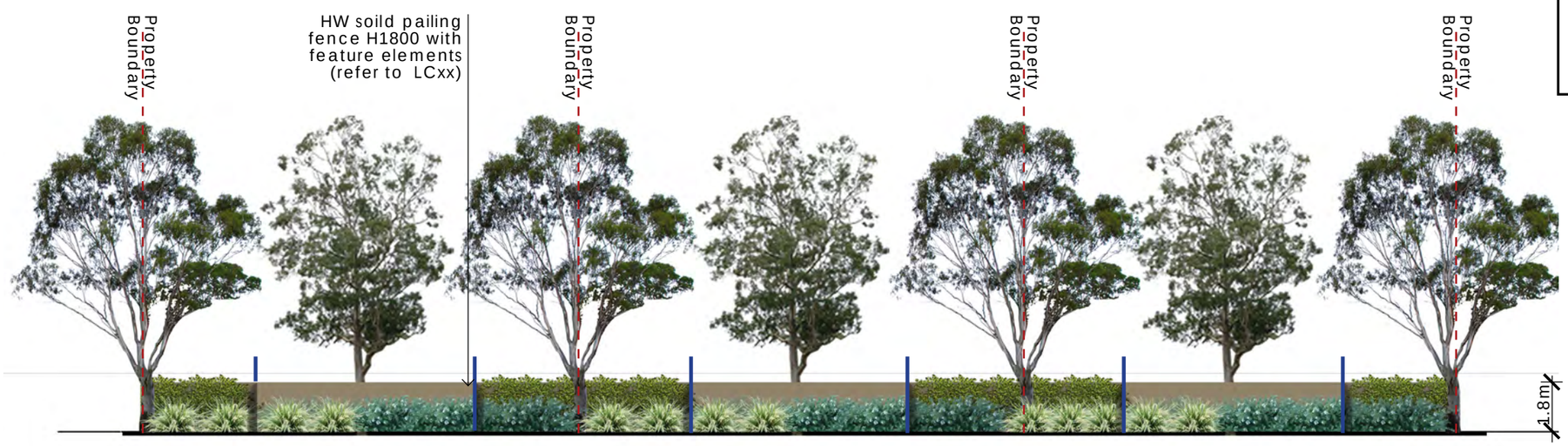
06

oct 2016



1 Typical landscape buffer zone plan

scale 1:200 @ A3



2 Typical landscape buffer zone elevation A

scale 1:200 @ A3

legend

- Proposed tree A *(Platanus orientalis 'Digitata')*
- Proposed tree B *(Elaeocarpus grandis)*
- Middle storey *(Callistemon 'Captain Cook')*
- Understorey A *(Lomandra longifolia 'Tanika')*
- Understorey B *(Trachelospermum jasminoides* 'Tricolour')
- Turf
- Property boundary
- Pailing Fence (H1800mm)
- Feature elements (refer to lc03)

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Approved Plans

NO. DA 19-653

DEVELOPMENT APPLICATION

12/05/2020

date:
04.10.2016

job number:
10496.5

scale:
as shown

drawn:
yy

revision:
A

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landscape buffer zone - element

thornton north residential subdivision - raymond terrace road, thornton north

07

oct 2016

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DEVELOPMENT APPLICATION

12/05/2020

Feature element

Laser cut corten steel panel (w2000mm x h2800mm)
to provide visual interest for people driving along
Raymond Terrace Road / McFarlane Road

maitland city council

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date:
04.10.2016

job number:
10496.5

scale:

drawn:
yy

revision:
A

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planting design

thornton north residential subdivision - raymond terrace road, thornton north

08

oct 2016

landscape buffer zone


Platanus orientalis ‘Digitata’


Elaeocarpus grandis


Callistemon ‘Captain Cook’


Liriope ‘Stripey White’


Lomandra longifolia ‘Tanika’

street trees


Lophostemon confertus


Tristaniopsis laurina


Elaeocarpus eumundii


Backhousia citriodora


Waterhousea floribunda


Magnolia ‘Little Gem’

plant schedule - landscape buffer zone

All trees supplied are to comply with AS 2303 trees stock for landscape use - 2015

CODE	BOTANICAL NAME	COMMON NAME	HEIGHT	POT SIZE
trees				
PLA dig	Platanus orientalis ‘Digitata’	Drawf Plane Tree	15m	75L
Ela gra	Elaeocarpus grandis	Blue Quandong	25m	75L
middle storey				
CAL CC	Callistemon ‘Captain Cook’	Bottlebrush	2m	200mm
groundcovers				
LIR SW	Liriope “Stripey White”	Variegated Turf Lily	0.5m	140mm
LOM tan	Lomandra longifolia ‘Tanika’	Tanika	0.5m	140mm

plant schedule - street trees

All trees supplied are to comply with AS 2303 trees stock for landscape use - 2015

CODE	BOTANICAL NAME	COMMON NAME	HEIGHT	POT SIZE
LOP ton	Lophostemon confertus	Queensland Brush Box	15m	75L
TRI lau	Tristaniopsis laurina	Water Gum	10m	75L
ELA eum	Elaeocarpus eumundii	Smooth Quandong	8m	75L
BAC cit	Backhousia citriodora	Lemon-scented Myrtle	6m	75L
WAT flo	Waterhousea floribunda	Weeping Lilly Pilly	12m	75L
MAG LG	Magnolia ‘Little Gem’	Little Gem	6m	75L

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Approved Plans
NO. DA 19-653
DEVELOPMENT APPLICATION
12/05/2020

maitland city council

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date:
04.10.2016

job number:
10496.5

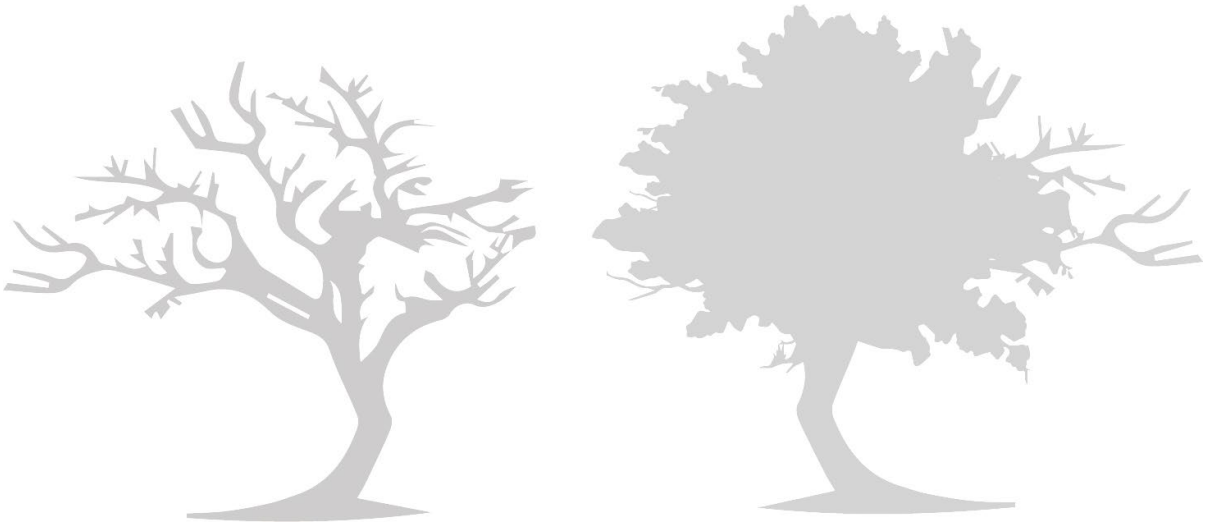
scale:

drawn:
yy

revision:
A

terras landscape architects

Appendix G: NBC Bushfire Attack Assessor V4.1 Results



NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 27/09/2024 **Assessment Date:** 27/09/2024

Site Street Address: 2225 Goodwin 119 McFarlanes Rd, 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 & T2 South-west

Vegetation Information

Vegetation Type: Non-Hazard
Vegetation Group: Non-Hazard
Vegetation Slope: 1.7 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: 0 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):** 1
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: T10 Onsite

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 10.4 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): 27

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): 10.96

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 60

Flame Length(m): 25.31

Maximum View Factor: 0.46

Rate Of Spread (km/h): 3.44

Inner Protection Area(m): 0

Transmissivity: 0.83

Outer Protection Area(m): 0

Fire Intensity(kW/m): 43763

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	20	26	37	50	73	6

Run Description: T11

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 0 Degrees

Vegetation Slope Type: Level

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): 16

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): 6.18

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 63

Flame Length(m): 13.87

Maximum View Factor: 0.446

Rate Of Spread (km/h): 1.68

Inner Protection Area(m): 0

Transmissivity: 0.856

Outer Protection Area(m): 0

Fire Intensity(kW/m): 21353

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	12	16	23	32	50	6

Run Description: T12 south

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 2.9 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): 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): 7.19

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 62

Flame Length(m): 16.28

Maximum View Factor: 0.449

Rate Of Spread (km/h): 2.05

Inner Protection Area(m): 0

Transmissivity: 0.849

Outer Protection Area(m): 0

Fire Intensity(kW/m): 26083

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	56	6

Run Description: T13 South-east

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 0 Degrees

Vegetation Slope Type: Level

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): 16

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): 6.18

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 63

Flame Length(m): 13.87

Maximum View Factor: 0.446

Rate Of Spread (km/h): 1.68

Inner Protection Area(m): 0

Transmissivity: 0.856

Outer Protection Area(m): 0

Fire Intensity(kW/m): 21353

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	12	16	23	32	50	6

Run Description: T14 south-west

Vegetation Information

Vegetation Type: Non-Hazard

Vegetation Group: Non-Hazard

Vegetation Slope: 0 Degrees

Vegetation Slope Type: Level

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: 0 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: T15 onsite

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 0 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): 0

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:

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

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	0

Run Description:	T16 onsite		

Vegetation Information

Vegetation Type:	Hunter Macleay DSF		
Vegetation Group:	Dry Sclerophyll Forests (Shrub/Grass)		
Vegetation Slope:	3.4 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):**	19

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):**	7.39
Radiant Heat(kW/m2):	29	**Flame Angle (degrees):**	62
Flame Length(m):	16.73	**Maximum View Factor:**	0.45
Rate Of Spread (km/h):	2.12	**Inner Protection Area(m):**	0
Transmissivity:	0.848	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	26999		

BAL Thresholds

	BAL-40:	**BAL-29:**	**BAL-19:**	**BAL-12.5:**	**10 kw/m2:**	**Elevation of Receiver:**
Asset Protection Zone(m):	14	19	27	37	57	6

Run Description: T17 onsite

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 6 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): 22

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): 8.51

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 61

Flame Length(m): 19.46

Maximum View Factor: 0.453

Rate Of Spread (km/h): 2.54

Inner Protection Area(m): 0

Transmissivity: 0.842

Outer Protection Area(m): 0

Fire Intensity(kW/m): 32304

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	16	21	30	40	63	6

Run Description: T18 north

Vegetation Information

Vegetation Type: Grassland

Vegetation Group: Grassland

Vegetation Slope: 1.2 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): 4.04

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 64

Flame Length(m): 8.99

Maximum View Factor: 0.438

Rate Of Spread (km/h): 18.36

Inner Protection Area(m): 11

Transmissivity: 0.87

Outer Protection Area(m): 0

Fire Intensity(kW/m): 56913

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: T19 North

Vegetation Information

Vegetation Type: Grassland

Vegetation Group: Grassland

Vegetation Slope: 0 Degrees

Vegetation Slope Type: Level

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): 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: 130

Program Outputs

Level of Construction: BAL 29

Peak Elevation of Receiver(m): 3.88

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 64

Flame Length(m): 8.63

Maximum View Factor: 0.438

Rate Of Spread (km/h): 16.9

Inner Protection Area(m): 0

Transmissivity: 0.872

Outer Protection Area(m): 0

Fire Intensity(kW/m): 52390

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:	T20 north-west		
Vegetation Information			
Vegetation Type:	Hunter Macleay DSF		
Vegetation Group:	Dry Sclerophyll Forests (Shrub/Grass)		
Vegetation Slope:	1.5 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:	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):**	6.7
Radiant Heat(kW/m2):	29	**Flame Angle (degrees):**	63
Flame Length(m):	15.04	**Maximum View Factor:**	0.448
Rate Of Spread (km/h):	1.86	**Inner Protection Area(m):**	0
Transmissivity:	0.852	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	23681		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	13	17	25	34	53	6

Run Description: T21 west

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 3.3 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: 0 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 19

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): 7.36

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 62

Flame Length(m): 16.67

Maximum View Factor: 0.45

Rate Of Spread (km/h): 2.11

Inner Protection Area(m): 0

Transmissivity: 0.848

Outer Protection Area(m): 0

Fire Intensity(kW/m): 26813

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	14	19	27	37	57	6

Run Description: T22 west

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 0 Degrees

Vegetation Slope Type: Level

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): 16

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): 6.18

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 63

Flame Length(m): 13.87

Maximum View Factor: 0.446

Rate Of Spread (km/h): 1.68

Inner Protection Area(m): 0

Transmissivity: 0.856

Outer Protection Area(m): 0

Fire Intensity(kW/m): 21353

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	12	16	23	32	50	6

Run Description: T3 South west

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 0.1 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): 16

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): 6.15

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 63

Flame Length(m): 13.81

Maximum View Factor: 0.446

Rate Of Spread (km/h): 1.67

Inner Protection Area(m): 0

Transmissivity: 0.856

Outer Protection Area(m): 0

Fire Intensity(kW/m): 21206

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	12	16	23	32	50	6

Run Description: T4 South

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 6.8 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): 23

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): 8.94

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 61

Flame Length(m): 20.44

Maximum View Factor: 0.454

Rate Of Spread (km/h): 2.69

Inner Protection Area(m): 0

Transmissivity: 0.84

Outer Protection Area(m): 0

Fire Intensity(kW/m): 34137

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	17	22	31	43	65	6

Run Description: T5 South

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 1.2 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: 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): 6.61

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 63

Flame Length(m): 14.85

Maximum View Factor: 0.447

Rate Of Spread (km/h): 1.83

Inner Protection Area(m): 0

Transmissivity: 0.853

Outer Protection Area(m): 0

Fire Intensity(kW/m): 23196

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	53	6

Run Description: T6 South

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 2.6 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): 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): 7.07

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 62

Flame Length(m): 16.02

Maximum View Factor: 0.449

Rate Of Spread (km/h): 2.01

Inner Protection Area(m): 0

Transmissivity: 0.85

Outer Protection Area(m): 0

Fire Intensity(kW/m): 25549

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	56	6

Run Description: T7 South

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 5.2 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: 0 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 21

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): 8.22

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 62

Flame Length(m): 18.62

Maximum View Factor: 0.452

Rate Of Spread (km/h): 2.41

Inner Protection Area(m): 0

Transmissivity: 0.844

Outer Protection Area(m): 0

Fire Intensity(kW/m): 30569

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	16	21	29	40	61	6

Run Description: T8 South

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 6.1 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): 22

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): 8.57

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 61

Flame Length(m): 19.59

Maximum View Factor: 0.453

Rate Of Spread (km/h): 2.56

Inner Protection Area(m): 0

Transmissivity: 0.842

Outer Protection Area(m): 0

Fire Intensity(kW/m): 32527

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	16	21	30	42	63	6

Run Description: T9 on site

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 4.9 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): 20

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): 8.08

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 62

Flame Length(m): 18.29

Maximum View Factor: 0.452

Rate Of Spread (km/h): 2.36

Inner Protection Area(m): 0

Transmissivity: 0.844

Outer Protection Area(m): 0

Fire Intensity(kW/m): 29943

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	15	20	29	40	60	6