



Strategic Bush Fire Study

Watagan Park, Cooranbong – Town Centre and
Neighbourhood Centre

Prepared for

Johnson Property Group

V2 Final / August 2022

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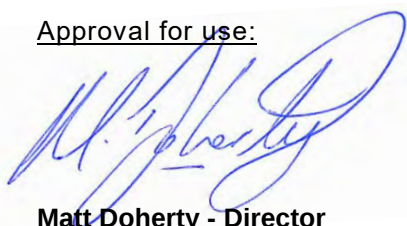
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DOCUMENT STATUS

Project Particulars			
Project Name	Strategic Bush Fire Study: Watagan Park, Cooranbong – Town Centre and Neighbourhood Centre		
Job Number	16001		
Client	Johnson Property Group		
Status	Final		
Version	Date	Prepared by	Details
V1	31-3-2022	MD/ES	Draft for client review
V2	26-8-2022	MD/RD/ES	Final for submission

Approval for use:



Matt Doherty - Director

26 August 2022

This report has been prepared in accordance with Appendix 2 of Planning for Bushfire Protection 2019 and certifies the development conforms to the specifications and requirements of S4.14 of the Environmental Planning and Assessment Act 1979.

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

EXECUTIVE SUMMARY

MJD Environmental has been engaged by Johnson Property Group to prepare a Strategic Bush Fire Study (SBFS) to accompany a planning proposal for map layer amendments at Watagan Park, Cooranbong, being an existing Urban Release Area (URA) in the Lake Macquarie Local Government Area (LGA).

The assessment considers and assesses the bushfire hazard and associated potential threats relevant to the proposal, and to outline the minimum mitigative measures which would be required in accordance with *Planning for Bush Fire Protection 2019* (PBP), as adopted through the *Environmental Planning & Assessment Amendment* (Planning for Bush Fire Protection) *Regulation 2020*.

In order to determine whether the proposed development is bushfire-prone, and if so, which setbacks and other relevant Bush Fire Protection Measures (BPM) will be appropriate, this assessment adhered to the methodology and procedures outlined in PBP (2019) via assessment of acceptable solutions as outlined in Chapter 4 and Chapter 5 of PBP (2019).

This assessment has been made based on the bushfire hazards in and around the site at the time of site inspection and report production.

PBP (2019) states in Chapter 4, the study of bushfire context ensures that future land uses are in appropriate locations to minimise the risk to life and property from bush fire attack. Services and infrastructure that facilitate effective suppression of bushfires also need to be provided for at the earliest stages of planning.

The bushfire risk is considered at the macro-scale, looking at fire runs, steep slopes and any areas of isolation. The amount of proposed development interfacing vegetation was also considered. Firefighting access and evacuation potential was considered as well as an assessment of traffic volumes and evacuation routes. The study highlighted areas with a significant fire history and any known fire paths

The broad principles which apply to this analysis are:

- ensuring land is suitable for development in the context of bush fire risk;
- ensuring new development on bushfire prone land (BFPL) will comply with PBP;
- minimising reliance on performance-based solutions;
- providing adequate infrastructure associated with emergency evacuation and firefighting operations; and
- facilitating appropriate ongoing land management practices.

Strategic planning should provide for the exclusion of inappropriate development in bush fire prone areas in the following circumstances:

- the development area is exposed to a high bush fire risk and should be avoided;
- the development is likely to be difficult to evacuate during a bushfire due to its siting in the landscape, access limitations, fire history and/or size and scale;
- the development will adversely affect other bushfire protection strategies or place existing development at increased risk;
- the development is within an area of high bush fire risk where density of existing development may cause evacuation issues for both existing and new occupants; and
- the development has environmental constraints to the area which cannot be overcome.

A strategic assessment across the local landscape and local site assessment presented in this report has determined that the site does not exhibit any significant features that would make it more likely to experience a bushfire of undue severity or intensity. The potential impact on life and property of the site is not worsened by the context of the broader surrounding landscape in which it is situated.

The proposed land use is appropriate to the site and surrounding landscape.

In summary, this strategic assessment has determined that the proposed development is able to comply with PBP (2019) as;

- the land is suitable for development in the context of bushfire risk
- new development on BFPL will comply with PBP 2019
- reliance on performance-based solutions is minimised
- infrastructure associated with emergency evacuation and firefighting operations is adequate.
- Ongoing land management practices are appropriate

Furthermore, the development is not deemed inappropriate from a bushfire risk perspective due to the following factors;

- The area is not exposed to a high bushfire risk
- The development is not likely to be difficult to evacuate during a bushfire due to its siting in the landscape, access limitations, fire history &/or size and scale.
- The development will not adversely effect other bushfire protection strategies or place existing development at increased risk.
- The development is not within an area of high bushfire risk where density of exiting development may cause evacuation issues for both existing and new occupants;
- The development does not have environmental constraints which cannot be overcome.

In summary, the following key recommendations have been generated to enable the proposal to comply with PBP (2019).

- Direct access will be provided to each lot / development area in the Town Centre and Neighbourhood Centre areas
- The following APZ will be required, however the final and specific details and requirements will be determined with each future development application, additionally each future residential lot is to be managed as an IPA in perpetuity.

Direction	Vegetation Classification	Slope Class	APZ (Table A1.12.2 PBP 2019)	APZ provided
Area 1 (East)				
North	Forest	1.9° Downslope	29m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.
North-east	Forest	0.3° Upslope	24m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.
East	Rainforest	1.9° Downslope	14m	A temporary APZ to be provided between the proposal area over future Watagan Park Development areas per Figure 4. APZ to be maintained until development occurs.

Direction	Vegetation Classification	Slope Class	APZ (Table A1.12.2 PBP 2019)	APZ provided
South	Forest	1.2° Downslope	29m	Approved 25m per PBP (2006) – LMCC DA reference DA/1725/2017
North-west	Forest	2° Upslope	24m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.
		0.2 – 3.2° Downslope	29m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.
Area 2 (West)				
North-east	Forest	3.5° Downslope	29m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.

- Careful consideration of future site landscaping and ongoing fuel management must occur to minimise the potential impact of bushfire on the site. Landscaping must be managed in accordance with Appendix 4 of PBP 2019 “Asset Protection Zone Requirements”.
- Assessment has demonstrated that a future residential dwelling on each lot within the proposed subdivision, can be established with a BAL exposure of no greater than BAL-29.
- Services have been assessed and are to be provided and connected to the site in accordance with PBP (2019).

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GLOSSARY OF TERMS AND ABBREVIATIONS

Term/ 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	Biodiversity Conservation Act 2016
BMP	Bush Fire Management Plan
BPA	Bush Fire Prone Area (Also Bushfire Prone Land)
BPL	Bush Fire Prone Land
BPLM	Bush Fire Prone Land Map
BPM	Bush Fire Protection Measures
DoE	Commonwealth Department of the Environment
DPI Water	NSW Department of Primary Industries – Water
EPA Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
FDI	Fire Danger Index
FMP	Fuel Management Plan
ha	hectare
IPA	Inner Protection Area
LGA	Local Government Area
LLS Act	Local Land Services Act 2013
OPA	Outer Protection Area
OEH	NSW Office of Environment and Heritage
PBP or PBP (2019)	Planning for Bushfire Protection 2019
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation
RFS	NSW Rural Fire Service
TSC Act	NSW Threatened Species Conservation Act 1995 (as repealed)

1 Introduction

MJD Environmental has been engaged by Johnson Property Group to prepare a Strategic Bush Fire Study (SBFS) to accompany a planning proposal for map layer amendments at Watagan Park, Cooranbong, being an existing Urban Release Area (URA) in the Lake Macquarie Local Government Area (LGA). Hereafter referred to as the site. Refer to **Figure 1**.

The assessment aims to consider and assess the bushfire hazard and associated potential threats relevant to the proposal, and to outline the minimum mitigative measures which would be required in accordance with *Planning for Bush Fire Protection 2019* (PBP), as adopted through the *Environmental Planning & Assessment Amendment* (Planning for Bush Fire Protection) *Regulation 2020*.

In order to determine whether the proposed development is bushfire-prone, and if so, which setbacks and other relevant Bush Fire Protection Measures (BPM) will be appropriate, this assessment adhered to the methodology and procedures outlined in PBP (2019) via assessment of acceptable solutions as outlined in Chapters 4 and 5 of PBP (2019).

This assessment has been made based on the bushfire hazards in and around the Site at the time of report production.

1.1 Aims & Objectives

PBP (2019) states in Chapter 4, the study of bushfire context ensures that future land uses are in appropriate locations to minimise the risk to life and property from bush fire attack. Services and infrastructure that facilitate effective suppression of bushfires also need to be provided for at the earliest stages of planning.

The bushfire risk is considered at the macro-scale, looking at fire runs, steep slopes and any areas of isolation. The amount of proposed development interfacing vegetation will also be considered. Firefighting access and evacuation potential must be considered as well as an assessment of traffic volumes and evacuation routes. The study will highlight areas with a significant fire history and any known fire paths

The broad principles which apply to this analysis are:

- ensuring land is suitable for development in the context of bush fire risk;
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- the development will adversely affect other bushfire protection strategies or place existing development at increased risk;
- the development is within an area of high bush fire risk where density of existing development may cause evacuation issues for both existing and new occupants; and
- the development has environmental constraints to the area which cannot be overcome.

1.2 Description of Proposal

This SBFS has been prepared to support the Planning Proposal to amend the Lake Macquarie Local Environmental Plan 2014 (LMLEP) to make amendments to the Watagan Park Urban Release Area (URA). The proposed amendments are the result of an urban design review undertaken for the future Town Centre and Neighbourhood Centre, and surrounding future medium density residential areas. It will also adjust the current zone boundaries around two public open space areas so that the zoning reflects the areas being delivered under a local planning agreement with Council, and rectify minor anomalies between LEP mapping and current road and lot layouts.

The Planning Proposal covers two areas within the Watagan Park URA, that are already zoned for higher density development and commercial uses to service the URA. These areas, Area 1 and Area 2, and the proposed amendments are described below, and shown on plans contained in Appendix A.

Area 1 (part of Lot 8450 DP 1250919, located at 35 McCullough Street, Cooranbong)

Area 1 is currently zoned R2 Low Density Residential, RE1 Public Open Space, B4 Mixed Use and R3 Medium Density Residential. It has maximum building heights of 8.5m, 10m and 13m, and a minimum lot size of 450m² and 900m², which correlate with the R2 and R3 zones respectively. There is no minimum lot size applicable to the RE1 and B4 zoned land.

The Planning Proposal seeks the following amendments to the LMLEP:

- Adjust the RE1 zone to reflect the agreed location and extent of the Neighbourhood Park (1.3ha), and re-allocate the adjoining R3 and B4 mixed use zone boundaries to suit;
- Amend Height of Building mapping to reflect abovementioned zoning adjustments, and further amend to increase parts of Area 2 from 10m and 13m to a maximum height of 23m (to facilitate 3 – 6 storey buildings); and
- Amend minimum lot size mapping to ensure areas identified as R3 continue to have a minimum lot size of 900m², and no minimum lot size stipulated for RE1 and B4 land (as per current approach for these zones under LMLEP).

Area 2 (part of Lot 236 DP 1273921, located at 30 Maguire Drive, Cooranbong)

Area 2 is currently zoned R2 Low Density Residential, B1 Neighbourhood Centre and R3 Medium Density Residential. The Planning Proposal seeks minor amendments to the LEP mapping to rectify anomalies in the zoning, minimum lot size and height of building controls, to reflect the current road and lot layouts. The Planning Proposal extends the current RE1 zone boundary to reflect the agreed location and extent of Local Park North.

Refer to **Appendix A** for plans of the proposal.

1.3 Background

Watagan Park Estate is a master planned residential subdivision located in the suburb of Cooranbong, in the south west of Lake Macquarie LGA, within the North Cooranbong URA.

Watagan Park Estate is a State Significant Site which has been subject to a comprehensive planning process, culminating in the land being rezoned and Concept Approval (MP07_0147) being issued under the former Part 3A provisions in 2008. The land is identified for a combination of conservation, low- and medium-density residential, commercial and public open space purposes, with the approved Concept Plan estimating approximately 2,500 residential dwellings.

Development to date within Watagan Park has focussed on the delivery of the low-density residential areas. These areas are now either registered, under construction, benefiting from development consent or forming part of development applications currently being assessed.

The focus of this Planning Proposal is the mixed-use area (Town Centre) and smaller neighbourhood centre, and the surrounding medium density residential area. These areas are yet to be developed; however, the land uses have been established under the respective zoning and Part 3A Concept Approval as outlined previously.

Noting the above, the Planning Proposal represents an evolution of the planning framework for Watagan Park Estate, rather than a fundamental change the established zoning and land uses

Refer to **Appendix B** for the approved Watagan Park Concept Plan along with Precinct Plan.

WATAGAN PARK - TOWN CENTRE AND
NEIGHBOURHOOD CENTRE
FIGURE 1: SITE LOCATION

Legend

- Watercourse
- Proposed Layout
- Subject Site
- Slope Classification Buffer (100m)
- Vegetation Classification Buffer (140m)
- Cadastral Boundaries



0 45 90 180
Meters
1:3,500

MJDEnvironmental

Aerial: NearMap (2022) | Data: MJD Environmental, ADW
Johnson, AJ & C (2022), Spatial Services (2020) |
Datum/Projection: GDA 1994 MGA Zone 56 | Date: 31/03/2022 |
Version 1 | GIS\16001 - Watagan Park, North Cooranbong\5. GIS
| This plan should not be relied upon for critical design
dimensions.

WATAGAN PARK - TOWN CENTRE AND
NEIGHBOURHOOD CENTRE

**FIGURE 2: BUSHFIRE PRONE
LAND**

Legend

- Proposed Layout
- Subject Site
- Slope Classification Buffer (100m)
- Vegetation Classification Buffer (140m)
- Environmental Conservation Areas
- Cadastral Boundaries

Bushfire Prone Land

- Vegetation Category 1
- Vegetation Category 2
- Vegetation Category 3
- Vegetation Buffer



0 50 100 200

Meters
1:4,000

MJDEnvironmental

Aerial: NearMap (2022) | Data: MJD Environmental, ADW
Johnson, NSW RFS (2022), Spatial Services (2020) |
Datum/Projection: GDA 1994 MGA Zone 56 | Date: 26/08/2022 |
Version 1 | GIS\16001 - Watagan Park, North Cooranbong\5. GIS
| This plan should not be relied upon for critical design
dimensions.

2 Bushfire Hazard Analysis

2.1 Vegetation Assessment

Methodology

The vegetation in and around the Site, to a distance of 140m, has been assessed in accordance with PBP 2019. This assessment has been made via a combination of:

- Aerial photo interpretation;
- On-site vegetation classification; and
- Reference to regional community vegetation mapping (including Greater Hunter and Keith).

These vegetation communities have been classified for bushfire purposes into structure and formation using the system adopted by Keith (2004) and using Figure A1.2 of PBP (2019) with due regard to Appendix 1 of PBP (2019).

Vegetation Classification

Vegetation classification has been presented in **Table 1** below and **Figure 3**.

Table 1 Vegetation Classification

Direction	Description	Vegetation Classification
Area 1 (East)		
North	▪ Concept approved Watagan Park future development areas currently characterised by vegetated area and former airstrip.	No Hazard / Forest
North-east	▪ Concept approved Watagan Park future development areas currently characterised by vegetated area, former airstrip and cleared areas.	No Hazard / Forest
East	▪ Concept approved Watagan Park future development areas currently characterised by vegetated area, former airstrip and cleared areas including Avondale School and future Sports Field. ▪ Remnant Vegetation – less than 1ha in area	No Hazard / Rainforest
South	▪ Watagan Park Estate residential area. ▪ Environmental Conservation Area (ECA 1)	No Hazard / Forest
West	▪ Watagan Park Estate residential area.	No Hazard
North-west	▪ Concept approved Watagan Park future development areas currently characterised by vegetated area. ▪ Environmental Conservation Area (ECA 2)	Forest
Area 2 (West)		
North	▪ Watagan Park Estate residential area. ▪ Existing cleared areas maintained as APZ until development occurs	No Hazard
North-east	▪ Concept approved Watagan Park future development areas currently characterised by vegetated area.	Forest
East	▪ Watagan Park Estate residential area.	No Hazard
South	▪ Watagan Park Estate residential area.	No Hazard
West	▪ Watagan Park Estate residential area.	No Hazard

2.2 Slope Assessment

Methodology

In accordance with PBP (2019), an assessment of the slope was conducted throughout the Site (where a hazard is present) and for a distance of 100m around the Site in the hazard direction. Both the average slope and maximum slopes were considered to determine the level of gradient which will most significantly influence fire behaviour on the Site. The slope transect was categorised within the slope classification under PBP Appendix A1.4.

Slope assessment was assisted by:

- Preparation of elevation model based on Digital Elevation Model data derived from state LiDAR; and
- Preparation of slope assessment based on NSW 1m contours.

Effective Slope

The slope class under the bushfire hazard within 100m is presented in **Table 2** below and **Figure 3**.

Table 2 Slope Class

Direction	Vegetation Classification	Slope Class
Area 1 (East)		
North	Forest	1.9° Downslope
North-east	Forest	0.3° Upslope
East	Rainforest	1.9° Downslope
South	Forest	1.2° Downslope
North-west	Forest	2° Upslope
		0.2 – 3.2° Downslope
Area 2 (West)		
North-east	Forest	3.5° Downslope

WATAGAN PARK - TOWN CENTRE AND
NEIGHBOURHOOD CENTRE

**FIGURE 3: VEGETATION AND
SLOPE CLASSIFICATION**

Legend

- Elevation (m)
 - Transects
 - Proposed Layout
 - Contours (1m)
 - Subject Site
 - Slope Classification Buffer (100m)
 - Vegetation Classification Buffer (140m)
 - Environmental Conservation Areas
 - Cadastral Boundaries
 - Temporary APZ
- Vegetation (Keith 2004)**
- Forest (ECA)
 - Forest
 - Rainforest (Low Threat)
 - Managed Land
 - Approved Temporary APZ
 - Development Footprint



0 45 90 180
Meters
1:3,500

MJD Environmental

Aerial: NearMap (2022) | Data: MJD Environmental, ADW
Johnson, AJ & C (2022), Spatial Services (2020) |
Datum/Projection: GDA 1994 MGA Zone 56 | Date: 23/08/2022 |
Version 2 | GIS\16001 - Watagan Park, North Cooranbong\5. GIS
| This plan should not be relied upon for critical design
dimensions.

3 Bushfire Protection Measures

PBP sets out a suite of BPMs and criteria that require consideration and assessment for applicable proposals on bushfire prone land in order to provide an adequate level of protection to new developments.

The measures required to be assessed are listed below and discussed throughout this chapter:

- Asset Protection Zones (APZ)
- Bushfire Attack Levels (BAL) set out in PBP 2019
- Landscaping and Fuel Management

Measures pertaining to the items listed below are addressed in Chapter 4 of this report as it relates to the Strategic Bush Fire Study:

- Access
- Services – Water supply, Gas and Electricity
- Emergency Management

3.1 Asset Protection Zones

An APZ is a buffer zone between the hazard and buildings that is progressively managed to minimise bushfire hazard (fuel loads and reduce potential radiant heat levels, flame, ember and smoke attack) PBP (2019), in order to mitigate risk to life and asset.

An APZ can include the following:

- Lawns;
- discontinuous gardens;
- swimming pools;
- driveways;
- detached garages;
- open space / parkland;
- car parking; and
- cycleway and formed walkways.

The site lies within the Lake Macquarie City Council LGA and therefore is assessed under an FFDI (Forest Fire Danger Index) rating of 100. As per Table A1.12.2 within PBP (2019), the acceptable solution setbacks have been calculated based on the bushfire hazard analysis presented in Chapter 2. Notably, as the planning proposal is for future residential subdivision, performance criteria for APZs is satisfied if radiant heat levels 29kW/m² or less are experienced at the building or in this case suitable area exists to establish a dwelling at BAL-29 or lower exposure. Refer to **Table 3** detailing the acceptable solution residential development APZ setbacks. Acceptable solution APZ for residential development is detailed in **Figure 4**.

Table 3 Required APZ (PBP 2019)

Direction	Vegetation Classification	Slope Class	APZ (Table A1.12.2 PBP 2019)	APZ provided
Area 1 (East)				
North	Forest	1.9° Downslope	29m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.
North-east	Forest	0.3° Upslope	24m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.
East	Rainforest	1.9° Downslope	14m	A temporary APZ to be provided between the proposal area over future Watagan Park Development areas per Figure 4. APZ to be maintained until development occurs.
South	Forest	1.2° Downslope	29m	Approved 25m per PBP (2006) – LMCC DA reference DA/1725/2017
North-west	Forest	2° Upslope	24m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.
		0.2 – 3.2° Downslope	29m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.
Area 2 (West)				
North-east	Forest	3.5° Downslope	29m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.

3.2 Determining BAL

By considering the bushfire hazard analysis outcomes presented in Chapter 2, Table A1.12.5 of Appendix 1 of PBP (2019) was applied to the vegetation classification and slope analysis to calculate BAL for residential development based on separation from the hazard for the site. Refer to **Table 4** and **Figure 5**.

Table 4 BAL (Residential Developments PBP 2019)

Direction	Vegetation Classification	Slope Class	APZ (Table A1.12.2 PBP 2019)	APZ provided	Separation Distance (m)	BAL
Area 1 (East)						
North	Forest	1.9° Downslope	29m	100m	<22 22-<29 29-<40 40-<54 54-<100	BAL- FZ BAL-40 BAL-29 BAL-19 BAL-12.5
North-east	Forest	0.3° Upslope	24m	100m	<18 18-<24 24-<33 33-<45 45-<100	BAL- FZ BAL-40 BAL-29 BAL-19 BAL-12.5
East	Forest	1.9° Downslope	29m	Temporary and variable	<22 22-<29 29-<40 40-<54 54-<100	BAL- FZ BAL-40 BAL-29 BAL-19 BAL-12.5
South	Forest	1.2° Downslope	29m	25m per PBP (2006) (LMCC DA/1725/2017)	<22 22-<29 29-<40 40-<54 54-<100	BAL- FZ BAL-40 BAL-29 BAL-19 BAL-12.5
North-west	Forest	2° Upslope	24m	100m	<18 18-<24 24-<33 33-<45 45-<100	BAL- FZ BAL-40 BAL-29 BAL-19 BAL-12.5
		0.2 – 3.2° Downslope	29m	100m	<22 22-<29 29-<40 40-<54 54-<100	BAL- FZ BAL-40 BAL-29 BAL-19 BAL-12.5
Area 2 (West)						
North-east	Forest	3.5° Downslope	29m	100m	<22 22-<29 29-<40 40-<54 54-<100	BAL- FZ BAL-40 BAL-29 BAL-19 BAL-12.5

3.3 Landscaping & Fuel Management

All future landscaping on the Site should be designed and managed to minimise impact of bushfire based on the principles set out in PBP (2019) being:

- Prevent flame contact / direct ignition on the dwelling;
- Provide a defendable space for property protection;
- Reduce fire spread;
- Deflect and filter embers;
- Provide shelter from radiant heat; and
- Reduce wind speed.

In this manner, consideration should be given to species selection, planting location, flammability and size at maturity to ensure discontinuous canopy/ structure both vertically and horizontally to ensure the above principles are met.

Ongoing fuel management across the site as part of the maintenance regime should comply with the NSW RFS 'Asset protection zone standards' and *Appendix 4 - Asset Protection Zone Requirements* of PBP (2019) which provides guidance on maintenance activities to assist in achieving the landscape principles.

Fencing and gates are to be constructed in accordance with PBP (2019) section 7.6 as follows:

Fences and gates in bush fire prone areas may play a significant role in the vulnerability of structures during bush fires. In this regard, all fences in bush fire prone areas should be made of either hardwood or non-combustible material.

However, in circumstances where the fence is within 6m of a building or in areas of BAL-29 or greater, they should be made of non-combustible material only.

WATAGAN PARK - TOWN CENTRE AND
NEIGHBOURHOOD CENTRE

**ATTACHMENT 4: REQUIRED
ASSET PROTECTION ZONES**

Legend

- Proposed Layout
- Subject Site
- Slope Classification Buffer (100m)
- Vegetation Classification Buffer (140m)
- Environmental Conservation Areas
- Cadastral Boundaries
- Temporary APZ
- Approved Asset Protection Zone (LMCC DA reference DA/1725/2017)
- Required Asset Protection Zones (2019)
- Vegetation (Keith 2004)**
 - Forest (ECA)
 - Rainforest (Low Threat Vegetation)



0 30 60 120

Meters
1:2,600

MJDEnvironmental

Aerial: NearMap (2022) | Data: MJD Environmental, ADW
Johnson, AJ & C (2022), Spatial Services (2020) |
Datum/Projection: GDA 1994 MGA Zone 56 | Date: 26/08/2022 |
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dimensions.

WATAGAN PARK - TOWN CENTRE AND
NEIGHBOURHOOD CENTRE

**FIGURE 5: REQUIRED BUSHFIRE
ATTACK LEVELS (PBP 2019)**

Legend

- Proposed Layout
- Subject Site
- Slope Classification Buffer (100m)
- Vegetation Classification Buffer (140m)
- Environmental Conservation Areas
- Cadastral Boundaries
- Temporary APZ
- Approved Asset Protection Zone (LMCC DA reference DA/1725/2017)
- Required Asset Protection Zones (2019)

Vegetation (Keith 2004)

- Forest (ECA)
- Rainforest (Low Threat Vegetation)

Required Bushfire Attack Levels

PBP 2019

- BAL-FZ
- BAL-40
- BAL-29
- BAL-19
- BAL-12.5



0 30 60 120

Meters
1:2,600

MJDEnvironmental

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4 Bush Fire Strategic Study

4.1 Bush Fire Landscape Assessment

The following criteria are set out in Chapter 4 Table 4.2.1 of PBP (2019) and require consideration for the Planning Proposal:

This bushfire landscape assessment considers the likelihood of a bush fire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.

- *The Bushfire hazard in the surrounding area, including:*
 - o *Vegetation*
 - o *Topography*
 - o *Weather*
- *The potential fire behaviour that might be generated based on the above;*
- *Any history of bush fire in the area;*
- *Potential fire runs into the site and the intensity of such fire runs; and*
- *The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.*

A landscape analysis relating to bushfire has been undertaken within a 2 kilometre buffer of the site. This analysis has considered:

- Topography (**Figure 6**)
- Mean annual rain fall (**Figure 7**)
- Mean annual temperatures (**Figure 8**)
- Wildfire History (**Figure 9**)
- Current / proposed landuse over zoning (**Figure 10**)
- Current / proposed maximum height of building map (**Figure 11**)
- Current / proposed minimum lot size map (**Figure 12**)
- Additional permitted use map extent (**Figure 13**)

The bushfire hazard surrounding the site is generally represented by topography consisting of gentle sloping lands at the foothills of the Watagan Range. The approved Watagan Estate has largely removed vegetation in existing developed areas. Future development will generally remove all remaining vegetation save the Environmental Conservation Areas (ECA) situated to the north concept boundary and in the mid-southern concept area (refer to **Appendix B** for the approved Watagan Park Concept Plan along with Precinct Plan).

Beyond the Watagan Park development area the land connects to rural and bushland areas to the north, north-east and west. To the east and south the development connects with existing developed areas of Cooranbong, which includes a school, University and local shops.

Vegetation in the locality is characterised by Keith (2004) as Dry Sclerophyll Forest on the foothills and Freshwater Wetlands, Forested Wetlands on the floodplain. Riparian corridors have an association with wet sclerophyll forests.

The temperate climate as evidenced by the mean precipitation and temperatures is characteristic of the coastal zone with warm to hot summers at peak and cool winter periods. Rainfall patterns generally make for a dryer period in the peak of summer under normal conditions.

On the basis of the local climate coupled with vegetation and topography, history of severe fire behaviour in the area is well documented. NSW NPWS fire history records several recent wildfires that occurred in close proximity to the site as follows:

- To the east, a small wildfire occurred in a paddock approximately 1km from the boundary of the Town Centre on private property – fires recorded: 1998-99.
- To the north, fires burned in the Olney State Forest approximately 2.5km from the northern boundaries – fires recorded: 2000-01 and 2018-19.
- To the west, fires occurred approximately 3km from the site – fires recorded: 1963-64, 1980-81, 1985-86, 1989-90, 2001-02, 2019-20.

A table has been provided in **Appendix C** lists all fires larger than 1Ha that occurred within 10km of the site (NPWS fire history data – 7/3/2022). These fires occurred within the Lake Macquarie, Cessnock and Central Coast LGAs.

Potential fire runs into the site and the intensity of such fire runs

Potential fire runs into the site from Watagan Park concept approval areas are limited to the ECA situated to the immediate north of Area 1. Locally (outside the Watagan Park concept approval) a large tract of vegetation is present to the west with connections to the Watagan Range. Extant vegetation situated to the east is fragmented by Freemans Drive and the M1 Motorway. However, as development is progressing within the approved Watagan Park concept plan, vegetation connectivity in the immediate vicinity of the site shall be removed to a minimum of 100m in all directions with the exception of a small patch of vegetation on Avondale College grounds approx. 85m to the east and the ECA 2 area to the north of Area 1. Therefore, the potential for severe fires to develop within the site are significantly diminished.

The immediate hazard interface presented by the northern ECA situated to the north-west of Area 1 is a linear finger of vegetation approx. 210m in length and of variable width 42m to 86m. This in turn connects to a riparian corridor situated within the larger ECA patch. A fire run toward the development in this area would occur on land with a 0-5° downslope classification for which a perimeter road and appropriate setbacks have been adopted to achieve an acceptable solution APZ.

The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.

The planning proposal does not generally seek to change approved road and circulation arrangements. Upon completion the Watagan Park development shall provide a perimeter road at the hazard interface, namely the northern Environmental Conservation Areas. This design element aids emergency services in the access to and suppression of any fire that occurs within this vegetated area. Perimeter roads also bound the developed interface to the southern Environmental Conservation Area. These perimeter roads all circulate or connect to main collector roads, Jeremiah Dive and McCullough Street. Connections exist within the already developed areas to Freemans Drive via Patrick Drive and to Avondale Road via Wainman Drive.

The findings of this bushfire landscape assessment are that the site does not exhibit any significant features that would make it more likely to experience a bushfire of undue severity or intensity. The potential impact on life and property of the site is not worsened by the context of the broader surrounding landscape in which it is situated.

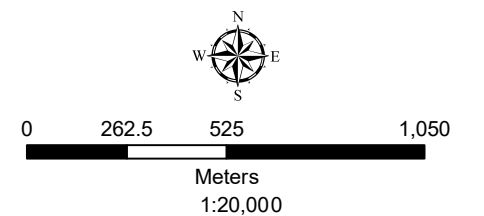
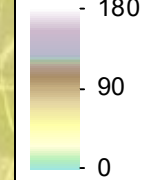
WATAGAN PARK - TOWN CENTRE AND
NEIGHBOURHOOD CENTRE

**FIGURE 6: DIGITAL ELEVATION
MODEL**

Legend

- Watercourse
- Subject Site
- 2km Buffer from Site

Elevation (m)



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2020 | Data: MJD Environmental, ADW Johnson (2022), Spatial
Services (2020) | Datum/Projection: GDA 1994 MGA Zone 56 |
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WATAGAN PARK - TOWN CENTRE AND
NEIGHBOURHOOD CENTRE

**FIGURE 7: MEAN ANNUAL
PRECIPITATION**

Legend

- Watercourse
- Subject Site
- 2km Buffer from Site

**Mean Annual Precipitation
(mm)**

- 1,021 - 1,040
- 1,041 - 1,060
- 1,061 - 1,080
- 1,081 - 1,100
- 1,101 - 1,120
- 1,121 - 1,140
- 1,141 - 1,160



0 262.5 525 1,050
Meters
1:20,000

MJDEnvironmental

Aerial: Nearmap (2021), © Department of Customer Service
2020 | Data: MJD Environmental, ADW Johnson (2022), Spatial
Services (2020) | Datum/Projection: GDA 1994 MGA Zone 56 |
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Cooranbong/5. GIS | This plan should not be relied upon for
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**FIGURE 8: MEAN ANNUAL
TEMPERATURE**

Legend

- Watercourse
 - Subject Site
 - 2km Buffer from Site
- Mean Annual Temperature**
- 16.5 - 16.7
 - 16.8 - 17
 - 17.1 - 17.2
 - 17.3 - 17.4
 - 17.5 - 17.6



0 262.5 525 1,050

Meters
1:20,000

MJDEnvironmental

Aerial: Nearmap (2021), © Department of Customer Service
2020 | Data: MJD Environmental, ADW Johnson (2022), Spatial
Services (2020) | Datum/Projection: GDA 1994 MGA Zone 56 |
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Cooranbong\5. GIS | This plan should not be relied upon for
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WATAGAN PARK - TOWN CENTRE AND
NEIGHBOURHOOD CENTRE
FIGURE 9: WILDFIRE HISTORY

Legend

- Watercourse
- Subject Site
- 2km Buffer from
- Historical Wildfires



0 262.5 525 1,050
Meters
1:20,000

MJDEnvironmental

Aerial: Nearmap (2021), © Department of Customer Service
2020 | Data: MJD Environmental, ADW Johnson (2022), Spatial
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critical design dimensions.



4.2 Land Use Assessment

The following criteria are set out in Chapter 4 Table 4.2.1 of PBP (2019) and require consideration for the Planning Proposal:

The land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses

- *The risk profile of different areas of the development layout based on the above landscape study;*
- *The proposed land use zones and permitted uses;*
- *The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site); and*
- *The impact of the siting of these uses on APZ provision.*

The site is situated within an existing concept plan approval area, specifically an area identified for a Town Centre and Neighbourhood Centre including commercial and residential development and recreation areas (parks) to serve the local residential population. The proposal seeks to rationalise the existing zoning to be consistent with approved roads and/or super lot development areas by making minor adjustments to zone boundaries only. There are no new land zones proposed. Refer to **Figure 10** that depicts the zone rationalisation diagrammatically.

To facilitate the intended outcomes for the Town Centre and Neighbourhood Centre development areas, adjustments are proposed to the minimum lot size (**Figure 11**) to reflect zoning adjustments, along with an adjustment to the maximum height of buildings (**Figure 12**).

The Town Centre and Neighbourhood Centre is appropriately located within the context of Watagan Park given that the area is situated centrally in the overall concept approval area, proximate to recreation zones and the provision of supporting services. Key collector road networks have been designed to circulate vehicles and pedestrians efficiently into and out of the Town Centre and Neighbourhood Centre. Due to the central location, the areas will be buffered from proximate bushfire hazards occurring further northward at a distance of greater than 100m, save the finger of northern ECA land discussed previously. In all cases public road access routes circulate away from the northern hazard to the south toward the existing Cooranbong suburb.

Figure 10 Existing / Proposed Land Use Zoning



Figure 11 Existing / Proposed Maximum Height of Building Map

Figure 12 Existing / Proposed Minimum Lot Size Map



4.3 Access and Egress

The following criteria are set out in Chapter 4 Table 4.2.1 of PBP (2019) and require consideration for the Planning Proposal:

A study of the existing and proposed road networks both within and external to the masterplan area or site layout

- *The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile;*
- *The location of key access routes and direction of travel; and*
- *The potential for development to be isolated in the event of a bush fire.*

In the event of a serious bushfire threat to the proposed development, it will be essential to ensure that adequate ingress/ egress and the provision of defendable space are afforded in the residential development design with due regard to the requirements of Table 5.3b, and Appendix 3 of PBP (2019).

Direct access to the Town Centre and Neighbourhood Centre will occur via the surrounding public road network. The onsite road layout ensures a direct egress from the development away from the primary bushfire hazards proximate to the site (ECA lands to the north). Site circulation paths provide internal roads linking to the site access points from surrounding public roads namely Jeremiah Drive and the unnamed roads to be constructed. These roads all circulate or connect to a main collector roads, Jeremiah Drive and McCullough Street.

SIDRA modelling has been conducted by McLaren Traffic Engineering to study modified traffic volumes to those approved in the Local Council Planning Agreement for the approved road networks including loading on internal (to the approved concept plan development area) and externally to key existing public road network connections outside Watagan Park. The results of the modelling indicated that the modified traffic volumes would maintain an acceptable service level for roads and intersections.

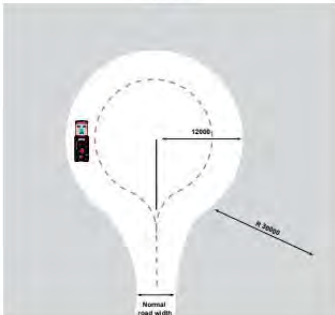
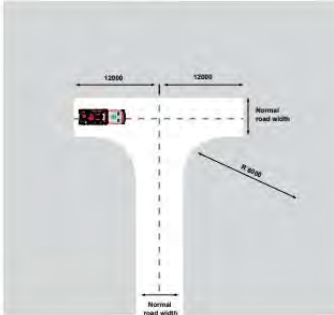
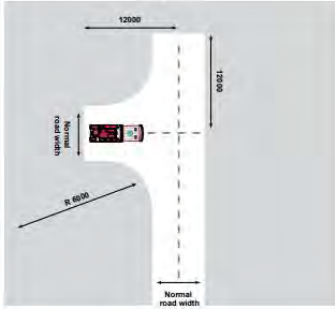
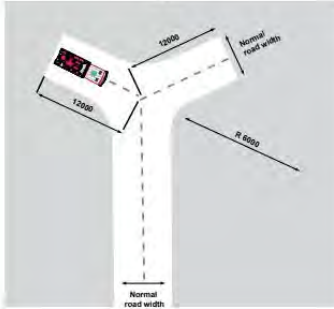
Refer to **Appendix B** for the approved Watagan Park Concept Plan along with Precinct Plan that show access and circulation.

The following summarises the requirements of Table 5.3b, and Appendix 3 of PBP (2019). Deviations from the above acceptable solutions for access may be considered (depending on the situation) through a performance-based assessment.

Table 5 Acceptable solutions for access (PBP 2019)

Performance Criteria	Acceptable Solutions
The intent may be achieved where:	
General Requirements ▪ Firefighting vehicles are provided with safe, all-weather access to structures.	▪ property access roads are two-wheel drive, all weather roads; ▪ perimeter roads are provided for residential subdivisions of three or more allotments; ▪ subdivisions of three or more allotments have more than one access in and out of the development; ▪ traffic management devices are constructed to not prohibit access by emergency services vehicles; ▪ 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; ▪ all roads are through roads; ▪ dead end roads are not recommended, but if unavoidable, are not more than 200 metres in length, incorporate a minimum 12

Performance Criteria	Acceptable Solutions
	metres outer radius turning circle, and are clearly sign posted as a dead end; - where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road; - where access/egress can only be achieved through forest, woodland and heath vegetation, secondary access shall be provided to an alternate point on the existing public road system; and - one way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.
the capacity of access roads is adequate for firefighting vehicles.	the capacity of perimeter and non-perimeter road surfaces and any bridges/ causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges/ causeways are to clearly indicate load rating.
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; - hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005; and - there is suitable access for a Category 1 fire appliances to within 4m of the static water supply where no reticulated supply is available.
Perimeter access roads Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	- are two-way sealed roads; - minimum 8m carriageway width kerb to kerb; - parking is provided outside of the carriageway width; hydrants are located clear of parking areas; - are through roads, and these are linked to the internal road system at an interval of no greater than 500m; - curves of roads have a minimum inner radius of 6m; - the maximum grade road is 15 degrees and average grade of not more than 10 degrees; - the road crossfall does not exceed 3 degrees; and - a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
Non-perimeter access roads Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	- minimum 5.5m carriageway width kerb to kerb; - minimum 5.5m carriageway width kerb to kerb; - parking is provided outside of the carriageway width; hydrants are located clear of parking areas; - roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m; - curves of roads have a minimum inner radius of 6m; - the road crossfall does not exceed 3 degrees; and - a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
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 distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles.

Performance Criteria	Acceptable Solutions										
	In circumstances where this cannot occur, the following requirements apply: - minimum 4m carriageway width; - 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; - a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; - provide a suitable turning area in accordance with Appendix 3; <table border="1"> <thead> <tr> <th>Curve radius (inside edge in metres)</th><th>Swept path (metres width)</th></tr> </thead> <tbody> <tr> <td>< 40</td><td>4.0</td></tr> <tr> <td>40 - 69</td><td>3.0</td></tr> <tr> <td>70 - 100</td><td>2.7</td></tr> <tr> <td>> 100</td><td>2.5</td></tr> </tbody> </table> Type A  Type B  Type C  Type D  - curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; - the minimum distance between inner and outer curves is 6m; - the crossfall is not more than 10 degrees; - maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; and - a development comprising more than three dwellings has access by dedication of a road and not by right of way. <i>Note: Some short constrictions in the access may be accepted where they are not less than 3.5m wide, extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.</i>	Curve radius (inside edge in metres)	Swept path (metres width)	< 40	4.0	40 - 69	3.0	70 - 100	2.7	> 100	2.5
Curve radius (inside edge in metres)	Swept path (metres width)										
< 40	4.0										
40 - 69	3.0										
70 - 100	2.7										
> 100	2.5										

4.4 Emergency Services

The following criteria are set out in Chapter 4 Table 4.2.1 of PBP (2019) and require consideration for the Planning Proposal:

An assessment of the future impact of new development on emergency services.

- Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/brigades; and
- Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency.

The Watagan Park concept approval was assessed and approved by the NSW RFS. This planning proposal will not change or modify the potential demand on services during an emergency event given that development to occur on the subject lands does not occur directly adjacent to a hazard.

Access and supporting services (hydrants) have been designed at the hazard interface to allow ease of ingress via perimeter roads while occupants egress.

Several stations and brigades are situated in the area surrounding Watagan Park including:

- Cooranbong, Dora Creek and Wyee Rural Fire Brigades
- Martinsville Rural Fire Station
- Fire and Rescue NSW Morisset Station

The planning proposal is not considered to significantly impact on the ability of emergency services to carry out fire suppression in a bush fire emergency, nor would it place an undue demand on the resources of existing emergency services in the area.

4.5 Infrastructure

The following criteria are set out in Chapter 4 Table 4.2.1 of PBP (2019) and require consideration for the Planning Proposal:

An assessment of the issues associated with infrastructure and utilities.

- The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants;
- Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.

In addition, any future residential subdivision over the site will need to comply with the acceptable solution criteria for services outlined in Chapter 5 of PBP (2019) as summarised in **Table 6** below.

The planning proposal is considered to be able to satisfy the requirements of Chapter 4 and Chapter 5 of PBP (2019) given:

- The Site will be connected to the reticulated water and recycled supply.
- The Site shall be connected to the existing power supply.
- Any future gas connection will be installed in accordance with the provisions of PBP (2019).
- Fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005.

Table 6 Acceptable solutions for services (PBP 2019)

Performance Criteria	Acceptable Solutions
The intent may be achieved where:	
Reticulated water supplies ▪ water supplies are easily accessible, reliable and located at regular intervals.	▪ reticulated water is to be provided to the development, where available

Performance Criteria	Acceptable Solutions										
- flows and pressure are appropriate - the integrity of the water supply is maintained If reticulated water supplies are considered inadequate or shall not be connected as part of the proposal, the PBP (2019) performance criteria for 'non-reticulated' water supply shall apply as detailed below.	- a static water supply is to be provided where no reticulated water is available - reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads - fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005. - hydrants are not located within any road carriageway - all above ground water and gas service pipes external to the building are metal, including and up to any taps										
Non-reticulated water supply areas for rural-residential and rural developments (or settlements) in bush fire prone areas, a water supply reserve dedicated to firefighting purposes is provided and maintained. The supply of water can be an amalgam of minimum quantities for each lot in the subdivision (community titled subdivisions), or held individually on each lot. <table border="1"> <thead> <tr> <th>Development Type</th><th>Water Requirements</th></tr> </thead> <tbody> <tr> <td>Residential lots (<1000m²)</td><td>5,000L/lot</td></tr> <tr> <td>Rural-residential lots (1000-10,000m²)</td><td>10,000L/lot</td></tr> <tr> <td>Large rural/lifestyle lots (>10,000m²)</td><td>20,000L/lot</td></tr> <tr> <td>Multi-dwelling housing (including dual occupancies)</td><td>5,000L/dwelling</td></tr> </tbody> </table> Table 5.3d PBP 2019	Development Type	Water Requirements	Residential lots (<1000m ²)	5,000L/lot	Rural-residential lots (1000-10,000m ²)	10,000L/lot	Large rural/lifestyle lots (>10,000m ²)	20,000L/lot	Multi-dwelling housing (including dual occupancies)	5,000L/dwelling	- the minimum dedicated water supply required for firefighting purposes for each occupied building excluding drenching systems, is provided in accordance with Table 5.3d (refer to insert on left) - there is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available - static water supply is not required to be solely dedicated for firefighting purposes and can include water holding structures such as tanks, pools, and dams - static water supply must be accessible, reliable, adequate, and available for the life time of the development - the provision of appropriate connections as detailed above for reticulated water supplies must be considered if a static water supply is to be suitable - a 'SWS' (Static Water Supply) sign in a visible location should be installed
Development Type	Water Requirements										
Residential lots (<1000m ²)	5,000L/lot										
Rural-residential lots (1000-10,000m ²)	10,000L/lot										
Large rural/lifestyle lots (>10,000m ²)	20,000L/lot										
Multi-dwelling housing (including dual occupancies)	5,000L/dwelling										
Electricity Services location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings	- where practicable, electrical transmission lines are underground. - where overhead electrical transmission lines are proposed: - 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 <i>ISSC3 Guideline for Managing Vegetation Near Power Lines</i>.										

Performance Criteria	Acceptable Solutions
Gas services 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/NZ 1596:2014 – <i>The storage and handling of LP Gas</i>, and the requirements of relevant authorities. Metal piping is to be used. - all fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation. - Above-ground gas service pipes are metal, including and up to any outlets. - Connections to and from gas cylinders are metal. - polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used.

4.6 Adjoining Land

The following criteria are set out in Chapter 4 Table 4.2.1 of PBP (2019) and require consideration for the Planning Proposal:

The impact of new development on adjoining landowners and their ability to undertake bush fire management.

- Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans.*

The planning proposal will not have implications on neighbouring property owners or managers that should necessitate them to modify or change their bushfire management. Site development will occur in areas that are generally 100m or greater from a proximate bushfire hazard.

Assessment of the site set out in **Chapter 2** and **Chapter 3** of this report has determined that an APZ can be established from hazards (zoned C2 Environmental Conservation situated northward) without a reliance on adjacent land owners that do not form a part of the approved Watagan Park.

5 Conclusion & Recommendations

MJD Environmental has been engaged by Johnson Property Group to prepare a Strategic Bush Fire Study (SBFS) to accompany a planning proposal for map layer amendments at Watagan Park, Cooranbong, being an existing URA in the Lake Macquarie LGA.

The assessment considers and assesses the bushfire hazard and associated potential threats relevant to the proposal, and to outline the minimum mitigative measures which would be required in accordance with *Planning for Bush Fire Protection 2019* (PBP), as adopted through the *Environmental Planning & Assessment Amendment* (Planning for Bush Fire Protection) *Regulation 2020*.

In order to determine whether the proposed development is bushfire-prone, and if so, which setbacks and other relevant Bush Fire Protection Measures (BPM) will be appropriate, this assessment adhered to the methodology and procedures outlined in PBP (2019) via assessment of acceptable solutions as outlined in Chapter 4 and Chapter 5 of PBP (2019).

This assessment has been made based on the bushfire hazards in and around the site at the time of site inspection and report production.

PBP (2019) states in Chapter 4, the study of bushfire context ensures that future land uses are in appropriate locations to minimise the risk to life and property from bush fire attack. Services and infrastructure that facilitate effective suppression of bushfires also need to be provided for at the earliest stages of planning.

The bushfire risk is considered at the macro-scale, looking at fire runs, steep slopes and any areas of isolation. The amount of proposed development interfacing vegetation was also considered. Firefighting access and evacuation potential was considered as well as an assessment of traffic volumes and evacuation routes. The study highlighted areas with a significant fire history and any known fire paths

The broad principles which apply to this analysis are:

- ensuring land is suitable for development in the context of bush fire risk;
- ensuring new development on bushfire prone land (BFPL) will comply with PBP;
- minimising reliance on performance-based solutions;
- providing adequate infrastructure associated with emergency evacuation and firefighting operations; and
- facilitating appropriate ongoing land management practices.

Strategic planning should provide for the exclusion of inappropriate development in bush fire prone areas in the following circumstances:

- the development area is exposed to a high bush fire risk and should be avoided;
- the development is likely to be difficult to evacuate during a bushfire due to its siting in the landscape, access limitations, fire history and/or size and scale;
- the development will adversely affect other bushfire protection strategies or place existing development at increased risk;
- the development is within an area of high bush fire risk where density of existing development may cause evacuation issues for both existing and new occupants; and
- the development has environmental constraints to the area which cannot be overcome.

A strategic assessment across the local landscape and local site assessment presented in this report has determined that the site does not exhibit any significant features that would make it more likely to experience a bushfire of undue severity or intensity. The potential impact on life and property of the site is not worsened by the context of the broader surrounding landscape in which it is situated.

The proposed land use is appropriate to the site and surrounding landscape.

In summary, this strategic assessment has determined that the proposed development is able to comply with PBP (2019) as;

- the land is suitable for development in the context of bushfire risk
- new development on BFPL will comply with PBP 2019
- reliance on performance-based solutions is minimised
- infrastructure associated with emergency evacuation and firefighting operations is adequate.
- Ongoing land management practices are appropriate

Furthermore, the development is not deemed inappropriate from a bushfire risk perspective due to the following factors;

- The area is not exposed to a high bushfire risk
- The development is not likely to be difficult to evacuate during a bushfire due to its siting in the landscape, access limitations, fire history &/or size and scale.
- The development will not adversely effect other bushfire protection strategies or place existing development at increased risk.
- The development is not within an area of high bushfire risk where density of exiting development may cause evacuation issues for both existing and new occupants;
- The development does not have environmental constraints which cannot be overcome.

In summary, the following key recommendations have been generated to enable the proposal to comply with PBP (2019).

- Direct access will be provided to each lot / development area in the Town Centre and Neighbourhood Centre areas
- The following APZ will be required, however the final and specific details and requirements will be determined with each future development application, additionally each future residential lot is to be managed as an IPA in perpetuity.

Direction	Vegetation Classification	Slope Class	APZ (Table A1.12.2 PBP 2019)	APZ provided
Area 1 (East)				
North	Forest	1.9° Downslope	29m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.
North-east	Forest	0.3° Upslope	24m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.
East	Rainforest	1.9° Downslope	14m	A temporary APZ to be provided between the proposal area over future Watagan Park Development areas per Figure 4. APZ to be maintained until development occurs.

South	Forest	1.2° Downslope	29m	Approved 25m per PBP (2006) – LMCC DA reference DA/1725/2017
North-west	Forest	2° Upslope	24m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.
		0.2 – 3.2° Downslope	29m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.
Area 2 (West)				
North-east	Forest	3.5° Downslope	29m	A temporary APZ of 100m to be provided between the proposal area over future Watagan Park Development areas. APZ to be maintained until development occurs.

- Careful consideration of future site landscaping and ongoing fuel management must occur to minimise the potential impact of bushfire on the site. Landscaping must be managed in accordance with Appendix 4 of PBP 2019 “Asset Protection Zone Requirements”.
- Assessment has demonstrated that a future residential dwelling on each lot within the proposed subdivision, can be established with a BAL exposure of no greater than BAL-29.
- Services have been assessed and are to be provided and connected to the site in accordance with PBP (2019).

6 Bibliography

Keith D. (2004). *Ocean Shore to Desert Dunes*. Department of Environmental and Conservation. Sydney

McLaren Traffic Engineering (2022) Traffic Advice on Planning Proposal of Proposed Increased Lot Yield at Watagan Park Subdivision, Cooranbong.

NSW Planning & Environment (2022). *ePlanning Spatial Viewer*. Accessed from:
<https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address>

NSW Rural Fire Service (2019). *Planning for Bushfire Protection – A Guide for Councils, Planners, Fire Authorities, and Developers*.

Appendix A Plans of Proposal

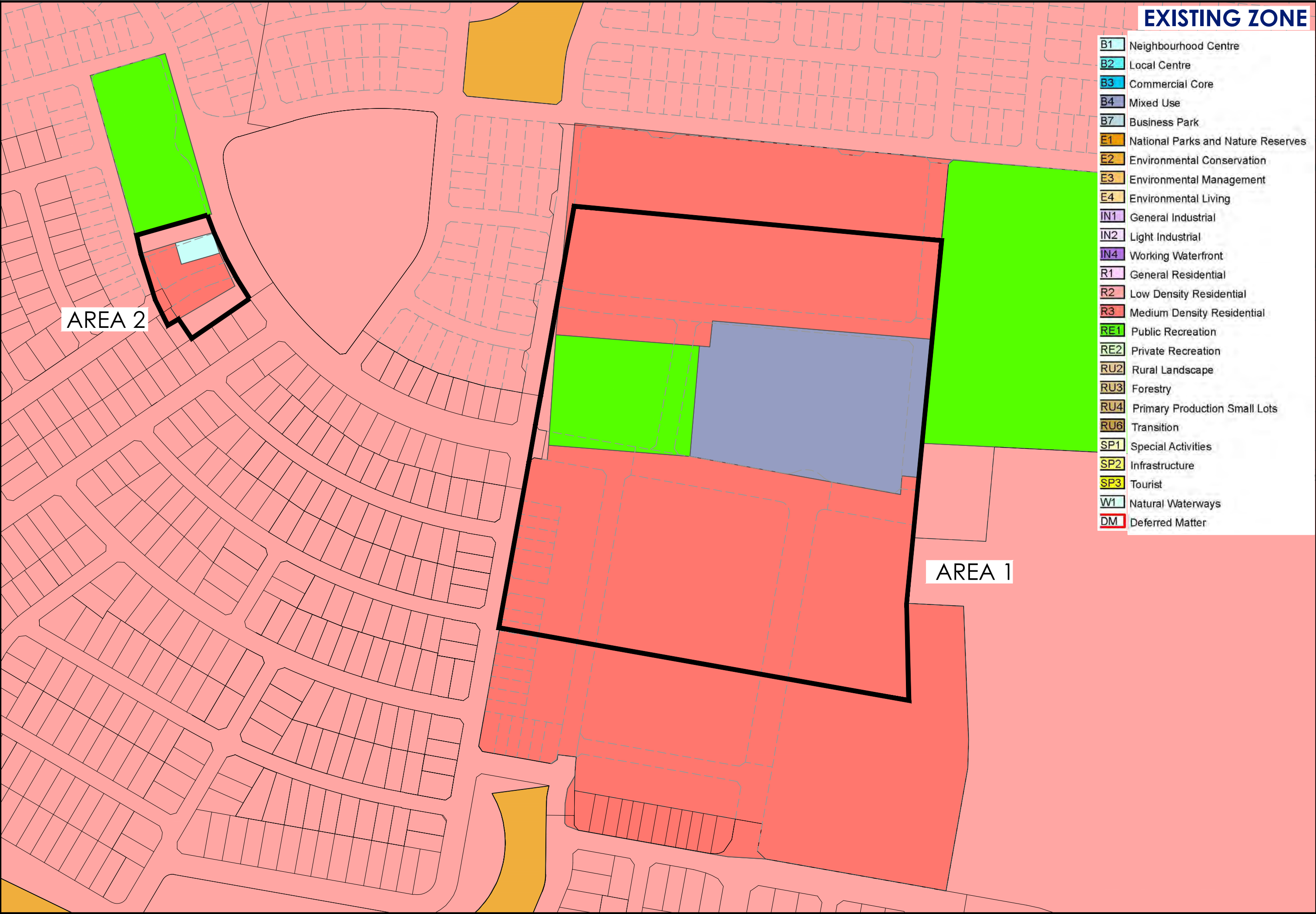


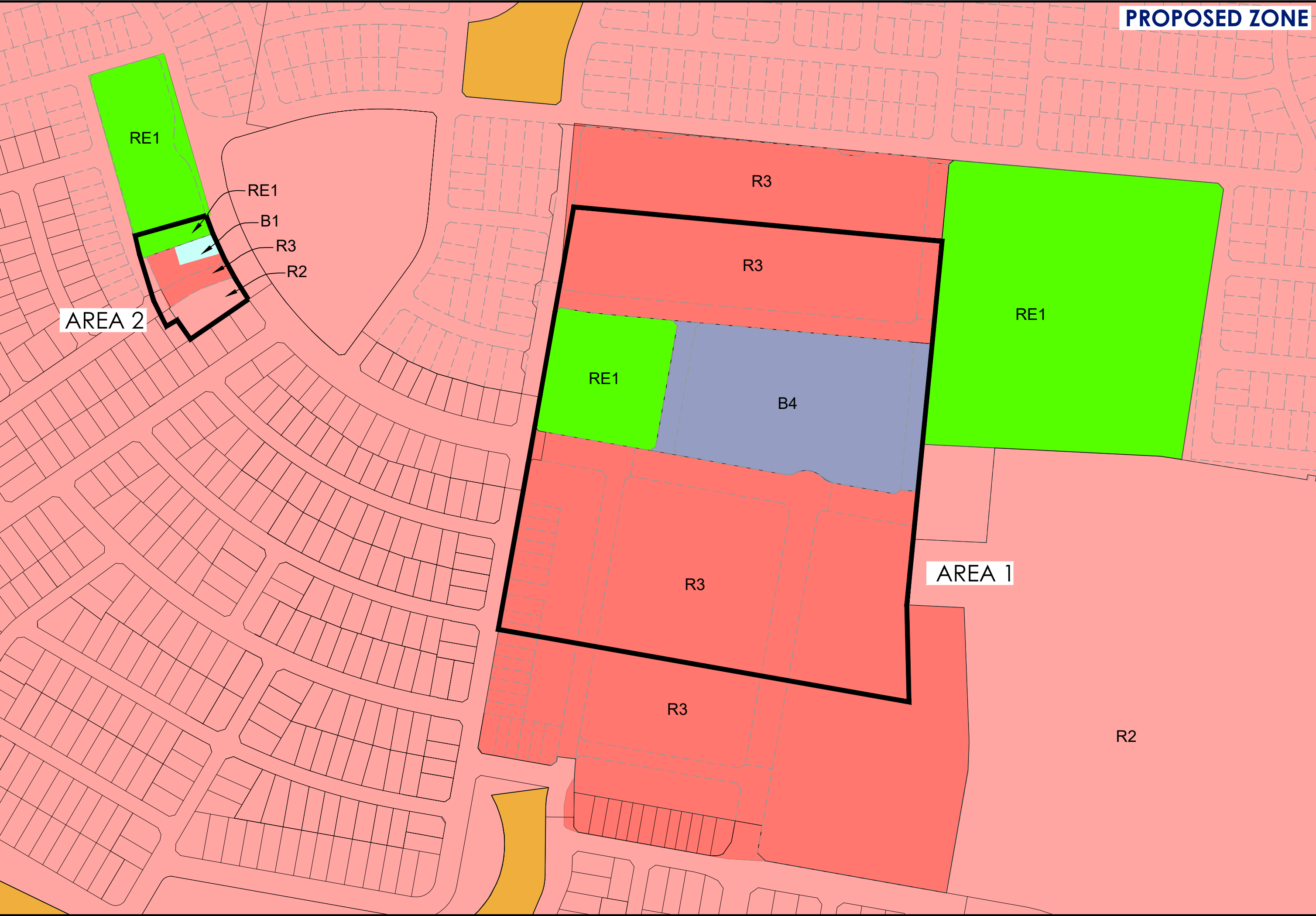
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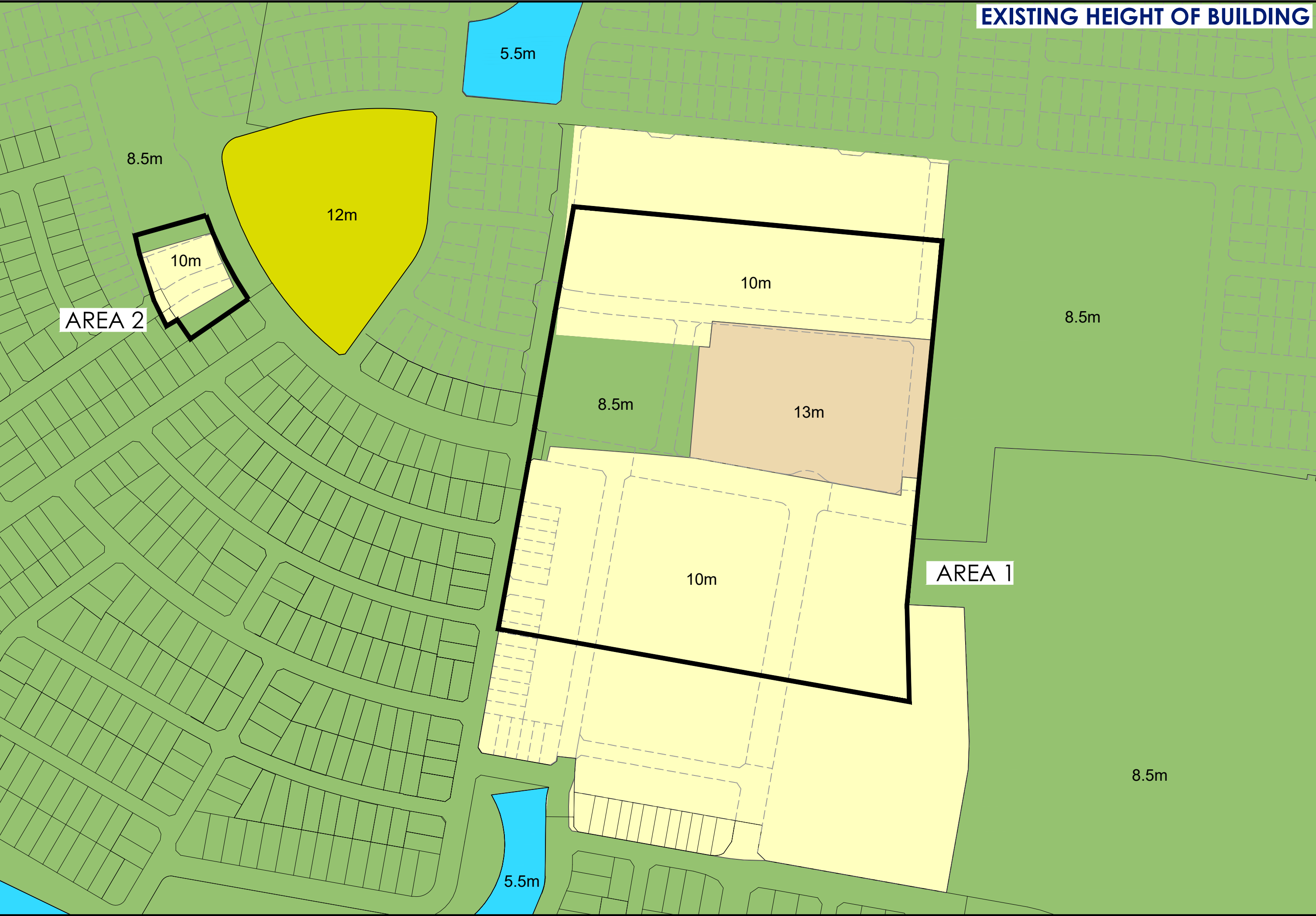
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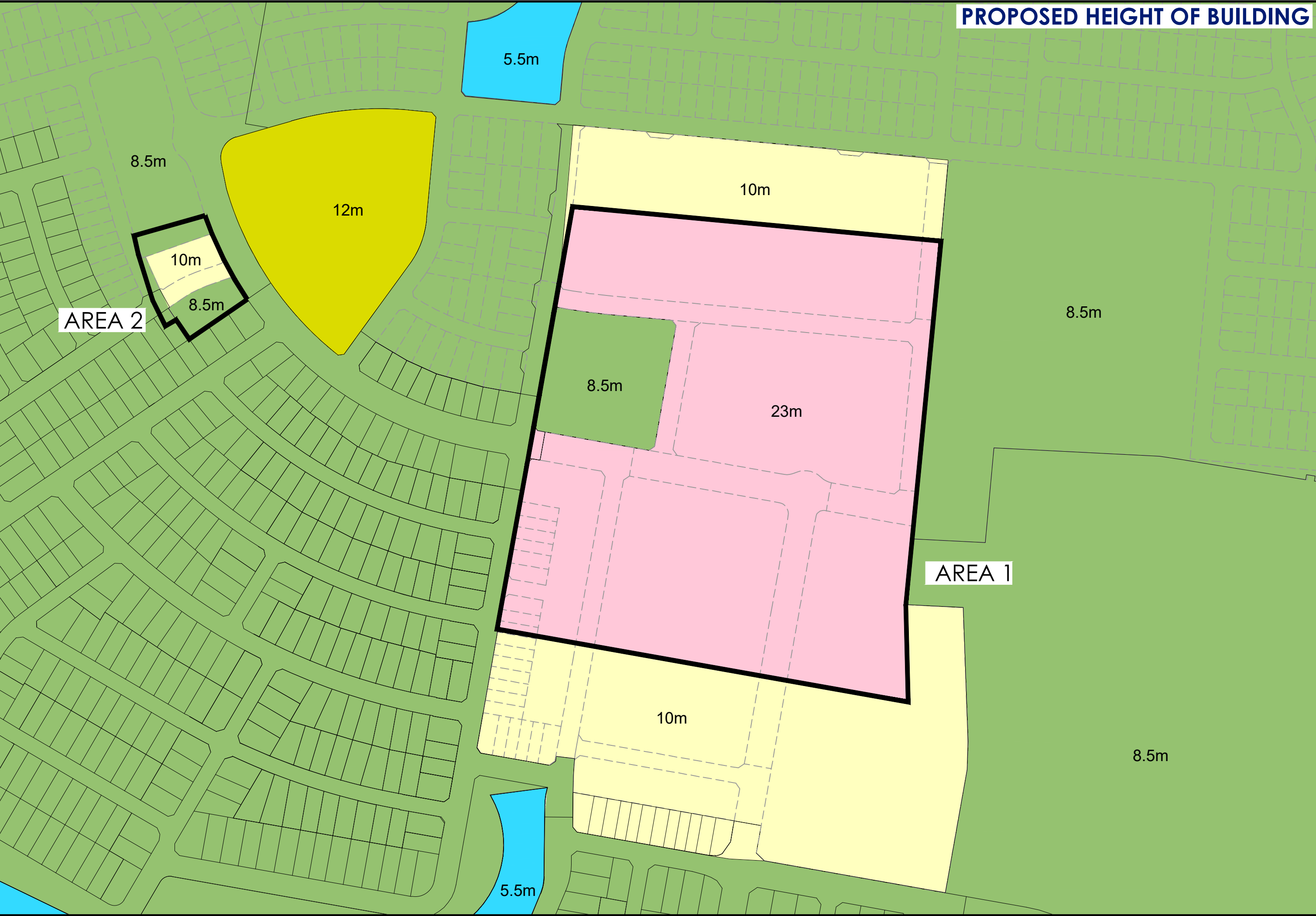
LEGEND

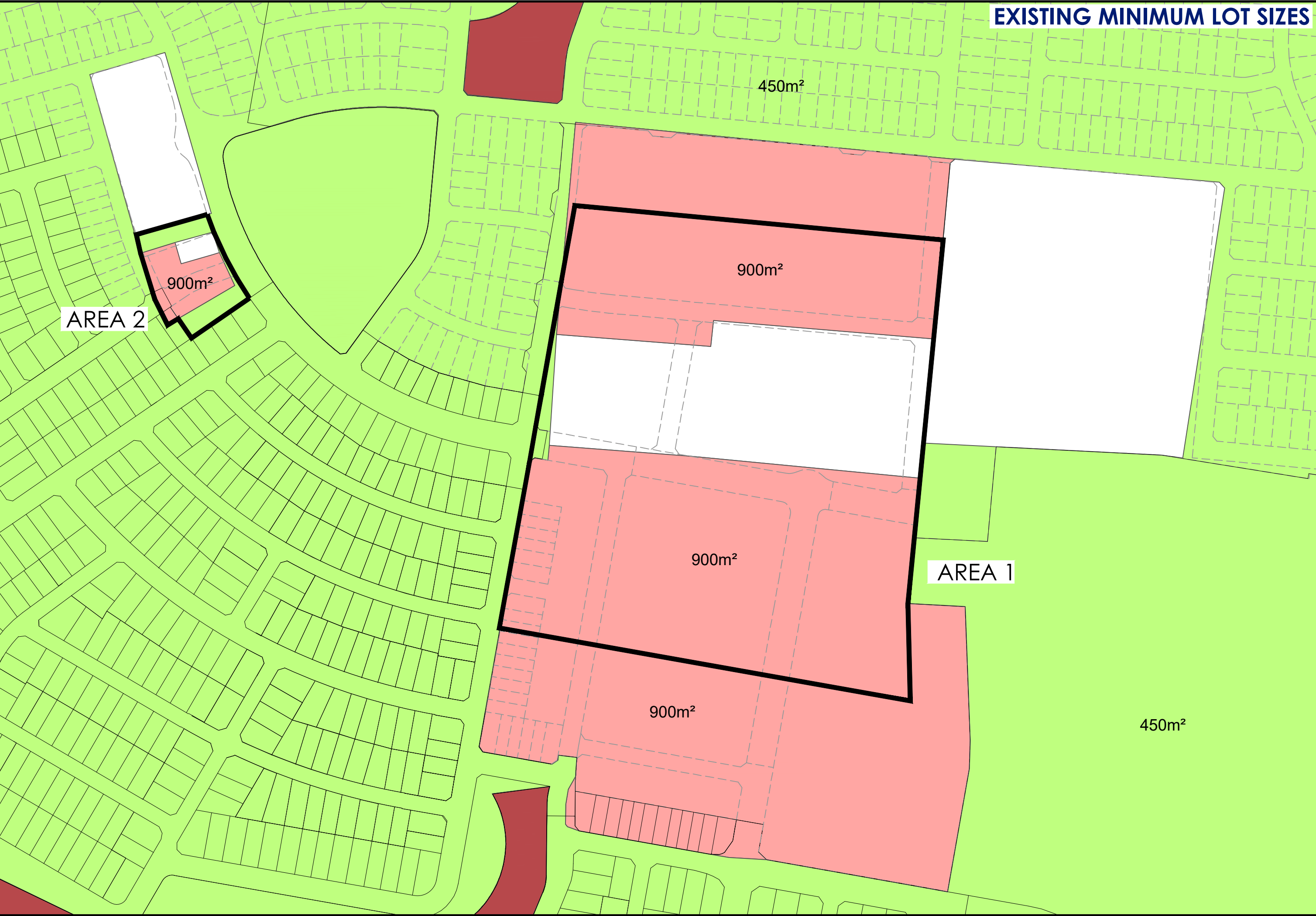
- SUBJECT SITE
- EXISTING CADASTRE
- FUTURE LOTS (APPROVED & CURRENTLY PROPOSED)

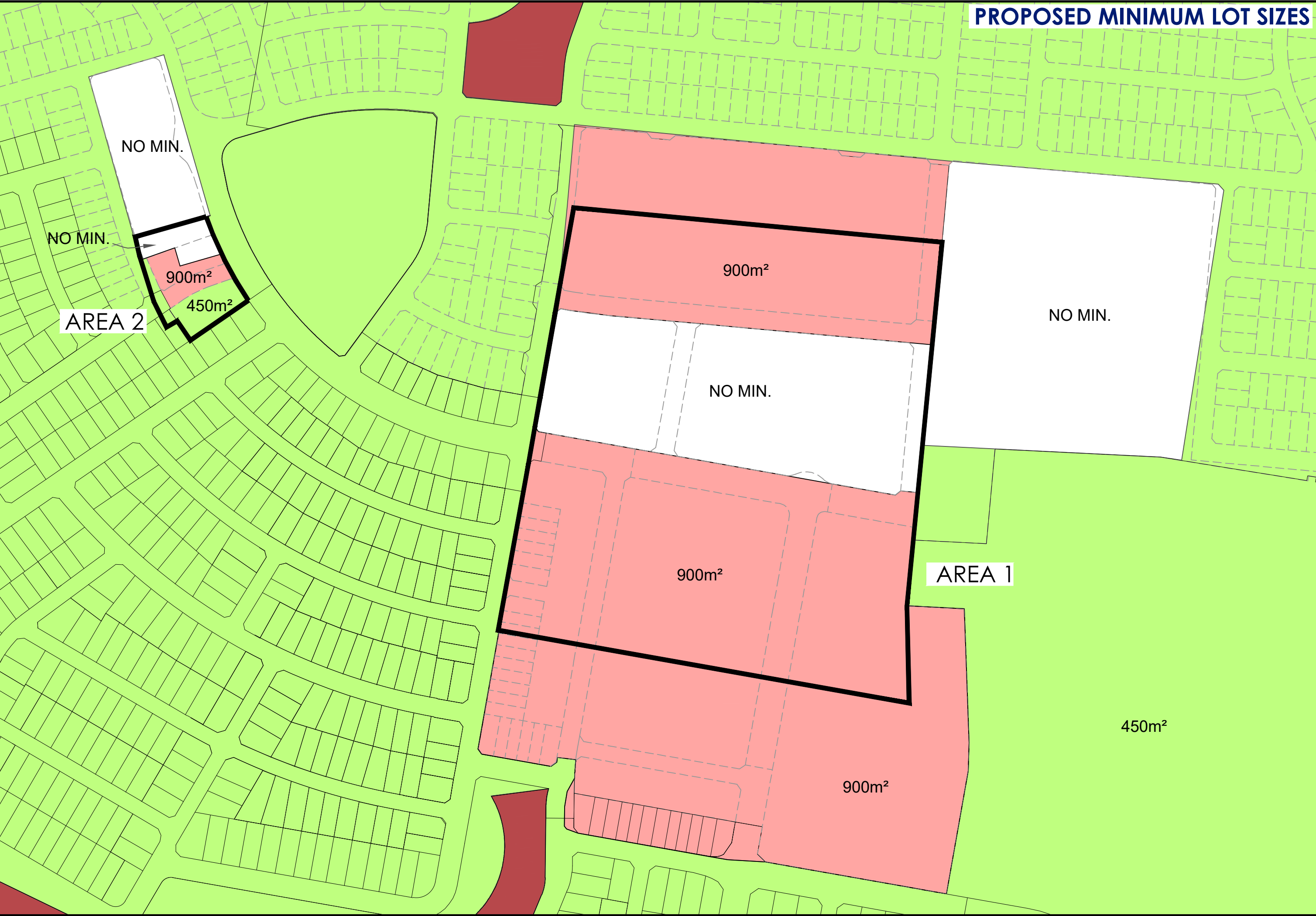












Appendix B

Approved Watagan Park Concept Plan along with Precinct Plan

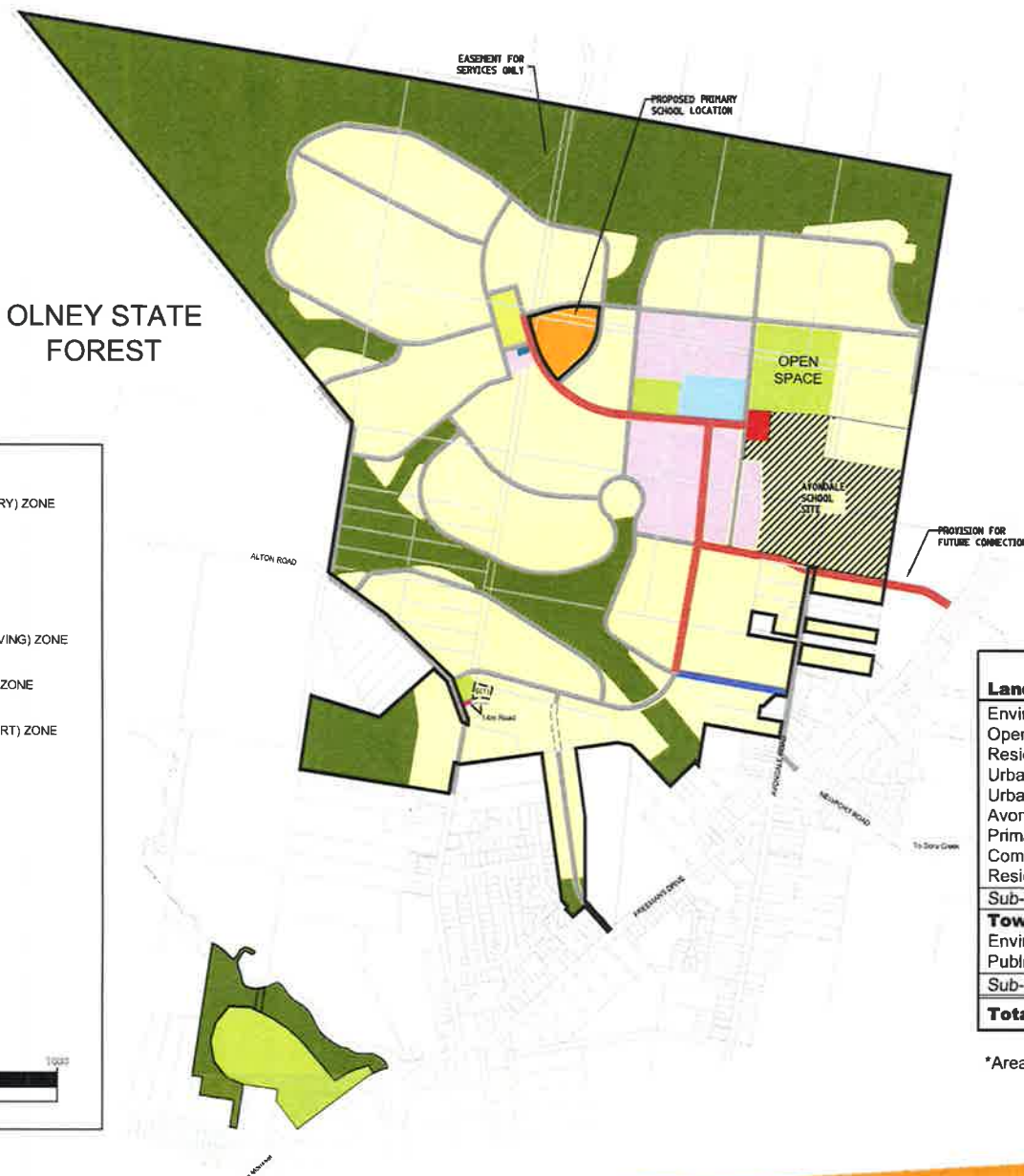
Appendix C LAND USE PLAN

NORTH COORANBONG RESIDENTIAL STATE CONCEPT PLAN 2008



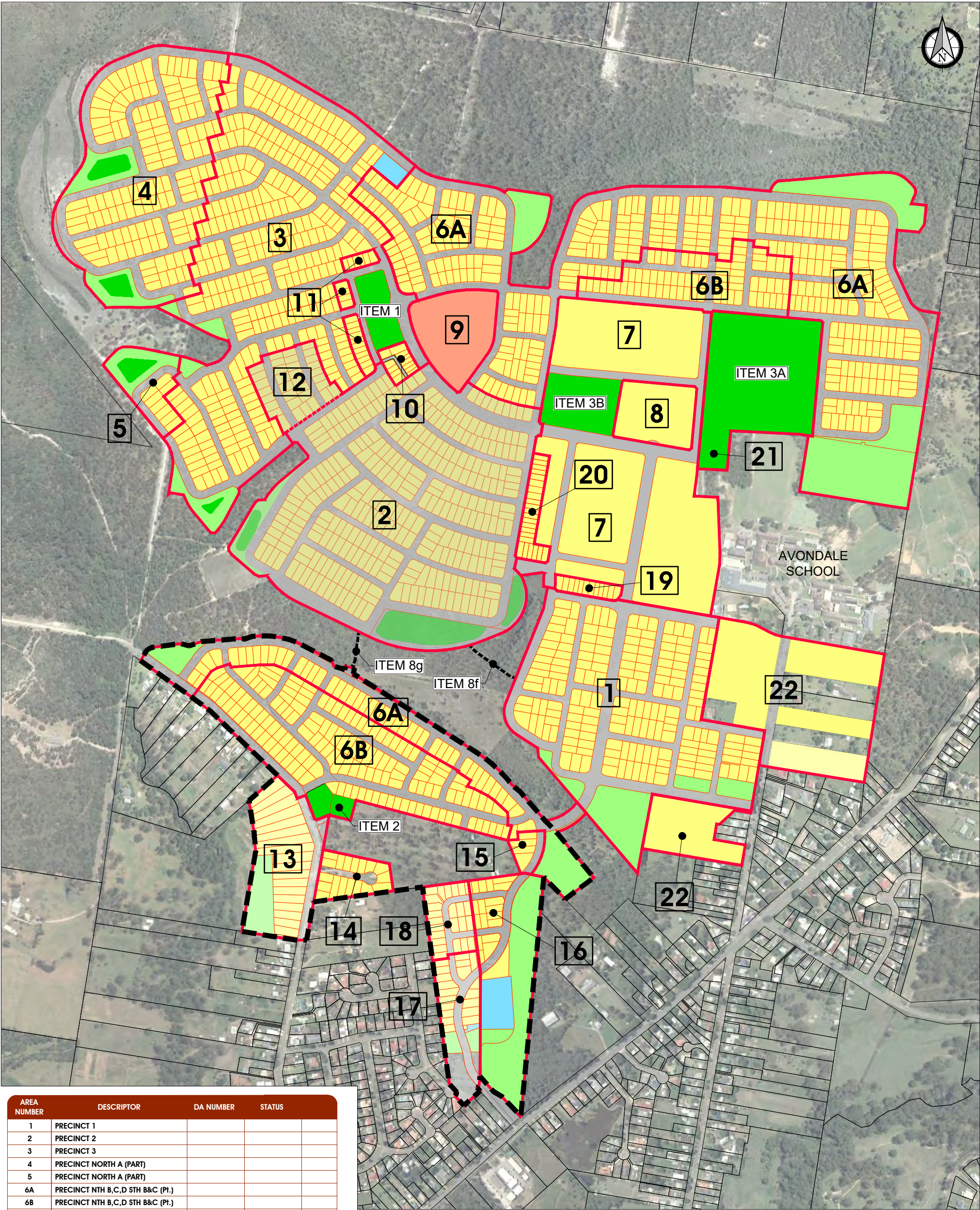
(REVISED 10 OCTOBER 2008)

OLNEY STATE
FOREST



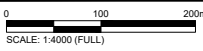
Land Use	Ha	% (approx of 355.26 Ha)
Environmental Conservation Area	111.95	31.52%
Open Space	7.1	2.00%
Residential (Urban Living)	19.25	5.42%
Urban Centre (Core)	0.15	0.04%
Urban Centre (Support)	2.60	0.73%
Avondale School Site	14.70	4.14%
Primary School Site	3.00	0.84%
Community Facilities	0.55	0.15%
Residential	181.18	51.00%
Sub-Total	340.48	
Town Common		
Environmental Conservation Area	7.18	2.02%
Public Recreation	7.6	2.14%
Sub-Total	14.78	
Total	355.26	100.00%

*Areas calculated by scale only and subject to survey.



 SOUTHERN ZONE

AREA NUMBER	DESCRIPTOR	DA NUMBER	STATUS
1	PRECINCT 1		
2	PRECINCT 2		
3	PRECINCT 3		
4	PRECINCT NORTH A (PART)		
5	PRECINCT NORTH A (PART)		
6A	PRECINCT NTH B,C,D STH B&C (Pt.)		
6B	PRECINCT NTH B,C,D STH B&C (Pt.)		
7	PRECINCT NORTH E		
8	MIXED USE LOT (2.209Ha)		
9	DET		
10	PRECINCT 3 RESIDUE		
11	PRECINCT 3 SLH		
12	PRECINCT 3 STAGE 3.1		
13	PRECINCT SOUTH A (Pt.)		
14	MEARS SUBDIVISION		
15	PRECINCT SOUTH (Pt.) PATRICK DRIVE		
16	PRECINCT SOUTH E THOMPSON		
17	TWINE SUBDIVISION		
18	PRECINCT SOUTH D (Pt.) (Twine 2)		
19	COURIN DR SLH SUBDIVISION		
20	PRECINCT NORTH E STAGE 2		
21	PRECINCT NORTH D RESIDUE		
22	NON DEVELOPER LAND	---	---

ver.	date	comment	drawn	level information	scale (A1 original size)	notes
C	30-09-21	UPDATE PLAN TO COMMENTS	RJC	DATUM: N/A CONTOUR INTERVAL: N/A	 SCALE: 1:4000 (FULL)	

drawing title:

D.A. MASTERPLAN

property description: WATAGAN PARK, COORANBONG

council: LAKE MACQUARIE

dwg ref: SK-006-B

pm: LG

client:



Appendix C

List of recorded fires over 1Ha within 10km of site

Fire Name	Fire number	Label	Start Date	End Date	Area (Ha)
Unnamed	4	1956-57 Wildfire	29/11/1956	2/12/1956	170.64
Unnamed	16	1957-58 Wildfire	10/10/1957	12/10/1957	43.44
Unnamed	25	1957-58 Wildfire	15/11/1957	18/11/1957	45.91
Unnamed	7	1962-63 Wildfire	7/09/1962	7/09/1962	7.28
Unnamed	12	1962-63 Wildfire	13/09/1962	14/09/1962	5.72
Unnamed	15	1962-63 Wildfire	30/09/1962	1/10/1962	48.52
Unnamed	1	1963-64 Wildfire	11/09/1963	13/09/1963	182.30
Unnamed	7	1963-64 Wildfire	1/03/1964	2/03/1964	24.53
Unnamed	4	1964-65 Wildfire	17/08/1964	18/08/1964	14.59
Unnamed	19	1964-65 Wildfire	5/03/1965	21/03/1965	363.22
Unnamed	25	1964-65 Wildfire	7/03/1965	11/03/1965	187.86
Unnamed	10	1965-66 Wildfire	5/11/1965	7/11/1965	13.08
Unnamed	22	1965-66 Wildfire	9/04/1966	12/04/1966	23.41
Unnamed	2	1967-68 Wildfire	15/12/1967	16/12/1967	5.54
Unnamed	6	1968-69 Wildfire	30/09/1968	2/10/1968	55.10
Unnamed	28	1968-69 Wildfire	5/04/1969	6/04/1969	11.74
Unnamed	1	1971-72 Wildfire	7/09/1971	10/09/1971	476.56
Unnamed	7	1971-72 Wildfire	28/09/1971	5/10/1971	638.70
Unnamed	1	1972-73 Wildfire	12/09/1972	14/09/1972	50.58
Unnamed	1	1974-75 Wildfire	15/10/1974	17/10/1974	45.03
Unnamed	0	1977-78 Wildfire	14/10/1977	17/10/1977	103.18
Unnamed	0	1978-79 Wildfire	15/02/1979	17/02/1979	14.05
Unnamed	15	1979-80 Wildfire	2/12/1979	5/12/1979	212.66
Unnamed	22	1979-80 Wildfire	17/12/1979	18/12/1979	34.48
Unnamed	2	1980-81 Wildfire	22/08/1980	2/09/1980	376.88
Unnamed	14	1980-81 Wildfire	9/09/1980	15/09/1980	69.46
Unnamed	15	1980-81 Wildfire	17/09/1980	19/09/1980	118.28
Unnamed	16	1980-81 Wildfire	24/09/1980	25/09/1980	17.62
Unnamed	18	1980-81 Wildfire	1/10/1980	9/10/1980	412.26
Unnamed	1	1981-82 Wildfire	2/09/1981	4/09/1981	161.58
Unnamed	5	1981-82 Wildfire	29/09/1981	8/10/1981	153.71
Unnamed	2	1984-85 Wildfire	9/10/1984	10/10/1984	8.40
Unnamed	3	1984-85 Wildfire	14/12/1984	14/12/1984	9.15
Unnamed		1984-85 Wildfire			18.77
Unnamed		1984-85 Wildfire			1.90
Unnamed	8	1985-86 Wildfire	25/04/1986	26/04/1986	139.12
Unnamed	9	1985-86 Wildfire	25/04/1986	27/04/1986	25.86
Unnamed		1986-87 Wildfire			59.48
Unnamed	1	1988-89 Wildfire	7/10/1988	30/10/1988	96.18
Unnamed	512	1989-90 Wildfire	23/08/1989	24/09/1989	9.99
Unnamed	502	1989-90 Wildfire	11/09/1989	13/09/1989	68.90
Unnamed	529	1989-90 Wildfire	8/10/1989	9/10/1989	83.27
Unnamed	534	1989-90 Wildfire	15/10/1989	16/10/1989	51.60
Unnamed	507	1990-91 Wildfire	4/03/1991	4/03/1991	13.39
Pulbah Island	90/168	1990-91 Wildfire			64.29

Fire Name	Fire number	Label	Start Date	End Date	Area (Ha)
Unnamed	442501	1995-96 Wildfire	31/07/1995	1/08/1995	89.40
Unnamed	442502	1995-96 Wildfire	16/08/1995	17/08/1995	71.35
Unnamed	442504	1995-96 Wildfire	23/08/1995	24/08/1995	133.73
Unnamed	442006	1996-97 Wildfire	25/08/1996	25/08/1996	116.18
Unnamed	442017	1996-97 Wildfire	21/11/1996	21/11/1996	7.27
Unnamed	442018	1996-97 Wildfire	27/11/1996	27/11/1996	2.12
Unnamed	442520	1996-97 Wildfire	15/12/1996	15/12/1996	7.77
Unnamed	422025	1996-97 Wildfire	15/01/1997	15/01/1997	222.21
Unnamed	0	1996-97 Wildfire	3/04/1997	3/04/1997	33.00
Unnamed		1996-97 Wildfire			27.29
Unnamed		1996-97 Wildfire			9.46
Unnamed		1996-97 Wildfire			59.48
Unnamed	TM502	1997-98 Wildfire	17/08/1997	17/08/1997	28.20
Unnamed	TM503	1997-98 Wildfire	23/08/1997	25/08/1997	44.85
Unnamed	TM508	1997-98 Wildfire	1/10/1997	15/10/1997	52.75
Unnamed	TM511	1997-98 Wildfire	20/10/1997	20/10/1997	5.49
Unnamed	H588	1997-98 Wildfire	3/11/1997	5/11/1997	16.08
Unnamed	TM519	1997-98 Wildfire	6/11/1997	9/11/1997	31.32
Unnamed	H534	1997-98 Wildfire	15/12/1997	15/12/1997	1.64
Unnamed	H535	1997-98 Wildfire	15/12/1997	15/12/1997	11.70
Unnamed	H543	1997-98 Wildfire	2/01/1998	9/01/1998	93.63
Unnamed	H554	1997-98 Wildfire	18/01/1998	18/01/1998	19.49
Unnamed	H556	1997-98 Wildfire	28/01/1998	9/02/1998	414.07
Unnamed	H557	1997-98 Wildfire	29/01/1998	30/01/1998	1.32
Unnamed	H561	1997-98 Wildfire	3/02/1998	4/02/1998	1.09
Unnamed	H567	1997-98 Wildfire	24/02/1998	5/03/1998	108.15
Unnamed	H569	1997-98 Wildfire	26/02/1998	5/03/1998	14.52
Unnamed	H581	1997-98 Wildfire	24/03/1998	24/03/1998	1.83
Unnamed	H586	1997-98 Wildfire	8/04/1998	8/04/1998	10.17
Unnamed	H99/003	1998-99 Wildfire	3/08/1998	3/08/1998	11.57
Unnamed	HM99/004	1998-99 Wildfire	11/09/1998	27/10/1998	1.81
Unnamed	HM99/025	1998-99 Wildfire	13/01/1999	14/01/1999	14.60
Unnamed	HM99/032	1998-99 Wildfire	26/01/1999	4/02/1999	1.32
Unnamed	HM00/001	1999-00 Wildfire	20/08/1999	21/09/1999	2.46
Unnamed	HM00/023	1999-00 Wildfire	20/01/2000	20/01/2000	1.00
Unnamed	HM00/012	1999-00 Wildfire	3/02/2000	3/02/2000	4.38
Unnamed	HM00/015	1999-00 Wildfire	9/02/2000	9/02/2000	5.75
Unnamed	HM00/017	1999-00 Wildfire	10/02/2000	11/02/2000	5.51
Unnamed	HM00/019	1999-00 Wildfire	21/02/2000	22/02/2000	8.71
Unnamed	HM00/022	1999-00 Wildfire	24/04/2000	26/04/2000	2.52
Unnamed	HM01/001	2000-01 Wildfire	19/07/2000	19/07/2000	3.76
Unnamed	HM01/001A	2000-01 Wildfire	27/08/2000	27/08/2000	59.27
Unnamed	HM01/003	2000-01 Wildfire	31/08/2000	1/09/2000	4.62
Unnamed	HM01/002	2000-01 Wildfire	31/08/2000	1/09/2000	7.10
Unnamed	HM01/004	2000-01 Wildfire	1/09/2000	1/09/2000	9.89

Fire Name	Fire number	Label	Start Date	End Date	Area (Ha)
Unnamed	HM01/005	2000-01 Wildfire	3/09/2000	4/09/2000	9.42
Unnamed	HM01/009	2000-01 Wildfire	5/09/2000	5/09/2000	15.12
Unnamed	HM01/011	2000-01 Wildfire	9/09/2000	9/09/2000	8.00
Ingles Rd/Watagans	00/01-23	2000-01 Wildfire	6/10/2000	11/10/2000	118.54
Ingles Rd/Watagans	00/01-23	2000-01 Wildfire	6/10/2000	11/10/2000	542.79
Unnamed	HM01/039	2000-01 Wildfire	25/10/2000	3/11/2000	233.29
Unnamed	HM01/044	2000-01 Wildfire	6/12/2000	13/12/2000	88.48
Unnamed	HM01/047	2000-01 Wildfire	30/12/2000	2/01/2001	2.26
Morisset Fire	00/01-40	2000-01 Wildfire	6/01/2001	9/01/2001	51.26
Unnamed	HM01/050	2000-01 Wildfire	11/01/2001	5/02/2001	26.69
Unnamed	HM01/053	2000-01 Wildfire	12/01/2001	14/01/2001	53.62
Unnamed	HM01/056	2000-01 Wildfire	21/01/2001	5/03/2001	1.28
Unnamed	?	2001-02 Wildfire	1/07/2001	30/06/2002	15.80
Unnamed	HM02/004	2001-02 Wildfire	19/08/2001	19/08/2001	2.35
Unnamed	HB02/006	2001-02 Wildfire	22/08/2001	29/08/2001	1.59
Unnamed	HM02/026	2001-02 Wildfire	29/09/2001	2/10/2001	5.25
Unnamed	HM02/029	2001-02 Wildfire	15/10/2001	15/10/2001	9.07
Unnamed	HM02/033	2001-02 Wildfire	29/10/2001	4/11/2001	47.23
Unnamed	HM02/038	2001-02 Wildfire	30/10/2001	4/11/2001	155.28
Unnamed		2001-02 Wildfire			4.15
Unnamed		2001-02 Wildfire			14.14
Unnamed		2001-02 Wildfire			30.74
Monkey Face	CCHR-0203-2	2002-03 Wildfire	21/07/2002	22/07/2002	13.37
German Point	HR0203-9	2002-03 Wildfire	10/09/2002		133.90
Myall Range	CCHR-0203-38	2002-03 Wildfire	8/12/2002	21/12/2002	32.88
Killingsworth		2002-03 Wildfire			3910.67
Martinsville		2002-03 Wildfire			86.02
Watagans Road	Mostly Off Park	2003-04 Wildfire	10/09/2003		35.66
Heaton Road	CCHR-0304-9	2003-04 Wildfire	27/09/2003		6.93
Wishing Well	0405-6	2004-05 Wildfire	26/09/2004	26/09/2004	2.46
Ingles Road	0405-15	2004-05 Wildfire	7/11/2004	7/11/2004	1.27
Slippery Rock	0405-27	2004-05 Wildfire	30/04/2005		1.98
Hawkmount Fire		2005-06 Wildfire	11/10/2005	12/10/2005	113.01
Morisset Hospital		2005-06 Wildfire	27/10/2005		21.51
Mt Faulk Rd	CC/HR	2005-06 Wildfire	24/12/2005		89.27
Telopia Road	6021316921	2005-06 Wildfire	13/03/2006	14/03/2006	45.01
Eraring		2005-06 Wildfire	24/03/2006		25.02
Woods Point		2005-06 Wildfire	7/05/2006	9/05/2006	5.41
Walkers Ridge Fire	6092318320	2006-07 Wildfire	23/09/2006	4/10/2006	23.65
Wattagan Forest Road	7100421719	2007-08 Wildfire	4/10/2007	8/10/2007	16.02
Wakefield fire	0708-05	2007-08 Wildfire	12/10/2007	20/10/2007	3.10
Martinsvill Hill Rd		2008-09 Wildfire	24/11/2008	25/11/2008	3.32

Fire Name	Fire number	Label	Start Date	End Date	Area (Ha)
Congewai	9112228720	2009-10 Wildfire	22/11/2009	29/11/2009	35.52
Sugarloaf Fire	11012634068	2010-11 Wildfire	26/01/2011	1/02/2011	10.71
Turners Road	13101780707	2013-14 Wildfire	17/10/2013	2/11/2013	138.48
Clay Road Fire	14092972597	2014-15 Wildfire	29/09/2014	1/10/2014	19.11
Cessnock Rd, Ryhope	17081669498	2017-18 Wildfire	16/08/2017	18/08/2017	59.11
Heatons Lookout	17090372534	2017-18 Wildfire	3/09/2017	29/09/2017	1061.27
Hickory Road	17091374128	2017-18 Wildfire	13/09/2017	29/09/2017	22.33
Mount Faulk Rd, Cooranbong	18082010463	2018-19 Wildfire	20/08/2018	25/08/2018	41.73
(Pacific Mtwy), Wakefield	19021227583	2018-19 Wildfire	11/02/2019	14/02/2019	289.28
Watagan Rd, Martinsville	19102652988	2019-20 Wildfire	25/10/2019	1/11/2019	158.20
Watagan Rd, Martinsville	19102652988	2019-20 Wildfire	25/10/2019	1/11/2019	59.15
German Point Rd, Watagan Forest	19112660104	2019-20 Wildfire	25/11/2019	3/12/2019	4.21
Green Break	21042514063	2020-21 Wildfire	24/04/2021	26/04/2021	4.95