

Strategic Bush Fire Study

Planning Proposal

Gilead

Reference Number: 160700

Prepared For:
Lendlease Communities
(Figtree Hill) Pty Ltd

23rd June 2022



Prepared By:
**Building Code & Bushfire
Hazard Solutions Pty Limited**

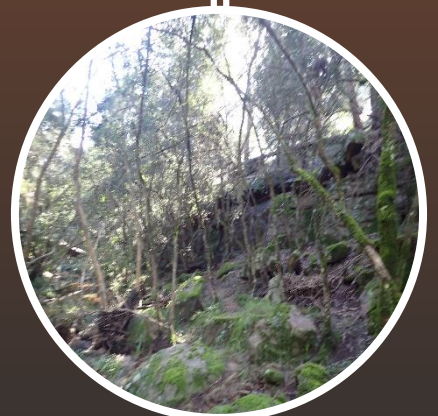
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Version Control				
Version	Date	Author	Reviewed by	Details
1	26/05/2022	Stuart McMonnies	Andrew Muirhead	Draft Report
2	20/06/2022	Stuart McMonnies	Ian Tyerman	Final Report

List of Abbreviations:

APZ	Asset Protection Zone
AS3959	Australian Standard 3959 – 2018
BAL	Bushfire Attack Level
BPMs	Bushfire Protection Measures
BPLM	Bush Fire Prone Land Map
Council	Campbelltown City Council
DA	Development Application
DCP	Campbelltown (Sustainable City) Development Control Plan
EP&A Act	Environmental Planning and Assessment Act - 1979
FRNSW	Fire & Rescue NSW
IPA	Inner Protection Area
ISP	Indicative Structure Plan
NCC	National Construction Code
NP	National Park
NSP	Neighbourhood Safer Places
PBP	Planning for Bush Fire Protection – 2019
ROW	Right of Way
RF Act	Rural Fires Act - 1997
RFS	NSW Rural Fire Service
SBFS	Strategic Bush Fire Study
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose
SWS	Static Water Supply

Executive Summary

The Planning Proposal will establish the Urban Development Zone for land capable of development and introduce a C2 Environmental Conservation zone for land containing key fauna habitat to be retained as well as land that native bushland is to be reconstructed.

The subject site is located within the Greater Macarthur Growth Area which will provide for 15,000 new homes to the broader south Campbelltown region. Lendlease's landholding at Gilead has been identified as a Priority Precinct and will make the first contribution to housing supply in the region of approximately **3,300** new homes, retail centre and education facilities.

The subject site is depicted on Campbelltown Council's Bushfire Prone Land Map as containing Category 1 and 3 Vegetation and their associated buffer zones and is therefore considered 'bushfire prone'.

In relation to this Planning Proposal Campbelltown City Council is required to apply section 9.1(2) of the *Environmental Planning and Assessment Act 1979*. Direction 4.4 Planning for Bushfire Protection identifies matters for consideration for proposals that affect or are in proximity to land mapped as bushfire prone. Under these directions the following objectives apply:

- i. to protect life, property and the environment from bush fire, by discouraging the establishment of incompatible land uses in bush fire prone areas; and*
- ii. to encourage sound management of bush fire prone areas.*

A key consideration for planning proposals in bushfire prone areas is limiting or excluding inappropriate development commensurate with the level of risk.

This precinct level Strategic Bush Fire Study has evaluated the Structure Plan against the strategic planning principles outlined in Chapter 4 'Strategic Planning' of *Planning for Bush Fire Protection 2019* and concluded the proposal is appropriate in the bushfire hazard context.

In addition to the precinct specific Strategic Bush Fire Study an assessment of the proposed land zoning against the specific Bushfire Protection Measures of *Planning for Bush Fire Protection 2019* has concluded that the future Masterplan and subsequent stages have the capacity to satisfy this document.

We are satisfied that the proposed Structure Plan, in combination with the Bushfire Protection Measures discussed herein will not result in areas that are difficult to evacuate, create control difficulties during a bushfire or adversely affect other bush fire protection strategies or place existing development at increased risk.

1.0 Introduction

Building Code and Bushfire Hazard Solutions P/L has been commissioned by Lendlease Communities (Figtree Hill) Pty Ltd to prepare an independent Strategic Bush Fire Study for its land holdings at Gilead.

The land consists of five properties including Lot 2 in DP 1218887, Lot 2 in DP 249393, Lot 1 in DP 603675, Lot 2 DP 603674 and part of Lot 5 in DP 1240836 and have a combined area of 495ha.

The Planning Proposal will establish the Urban Development Zone for land capable of development and introduce a C2 Environmental Conservation zone for land containing key fauna habitat to be retained as well as land that native bushland is to be reconstructed. This report specifically addresses the strategic bushfire planning requirements and has been used to shape and inform the Planning Proposal and associated development outcomes.

The subject site is depicted on Campbelltown Council's Bushfire Prone Land Map as containing Category 1 and 3 Vegetation and their associated buffer zones and is therefore considered 'bushfire prone'.

In relation to this planning proposal Campbelltown Council is required to apply section 9.1(2) of the *Environmental Planning and Assessment Act 1979*. Direction 4.4 Planning for Bushfire Protection identifies matters for consideration for proposals that affect or are in proximity to land mapped as bushfire prone. Under these directions the following objectives apply:

- i. to protect life, property and the environment from bush fire, by discouraging the establishment of incompatible land uses in bush fire prone areas; and*
- ii. to encourage sound management of bush fire prone areas.*

The proposal must demonstrate compliance with the s9.1(2) Directions and the relevant specification and requirements of *Planning for Bush Fire Protection 2019* (PBP).

The application of PBP requires satisfactory demonstration of the aim and objectives and the specific objectives and bushfire protection measures relevant to the type of development. In this instance the proposal relates to a planning proposal and therefore in addition to the aim and objectives detailed in Chapter 1 'Introduction' the proposal must satisfy Chapter 4 'Strategic Planning' of PBP.

The bushfire protection measures detailed in Chapter 5-8 of PBP have also been considered for the future Residential, Special Fire Protection Purpose and Commercial development.

2.0 Background

The subject site is located within the Greater Macarthur Growth Area which is a Growth Area incorporating Glenfield to Macarthur urban renewal precincts and the land release precincts to the south of Campbelltown, including Gilead, North Appin and Appin.

Greater Macarthur will provide for 15,000 new homes to the broader south Campbelltown region. Lendlease's landholding at Gilead has been identified as a Priority Precinct and will make the first contribution to housing supply in the region of approximately **3,300** new homes, retail centre and education facilities.

Importantly, it will secure key conservation outcomes including the establishment of linked fauna corridors between the Georges River and Nepean River.

To facilitate both the housing and conservation outcomes for the site, a Planning Proposal is being prepared to rezone the site under the *State Environmental Planning Policy (Precincts – Western Parkland City) 2021*.

The Planning Proposal will establish the Urban Development Zone for land capable of development and introduce a C2 Environmental Conservation zone for land containing key fauna habitat to be retained as well as land that native bushland is to be reconstructed. This report specifically addresses the Strategic Bushfire Study and has been used to shape and inform the Planning Proposal and associated development outcomes.

The adjacent Figtree Hill was rezoned in September 2017 to facilitate residential development of 1,700 allotments.

Figtree Hill has been subject to multiple Development Applications, including the following which are consistent with its Indicative Structure Plan and have been issued General Terms of Approval, under Division 4.8 of the *Environmental Planning and Assessment Act 1979*, and Bush Fire Safety Authority, under Section 100B of the *Rural Fires Act 1997* by the NSW Rural Fire Service.

- Stage 1 A-B subdivision, including staged subdivision to create 333 residential lots, 5 residue lots with associated civil works, road construction, stormwater management facilities, land contouring and tree removal (743/2018/DA-SW, RFS Ref: D18/5972)
- Stage 1 C-E subdivision, including staged subdivision to create 138 residential lots, 3 residue lots with associated civil works, road construction and land contouring. (2867/2018/DA-SW, RFS Ref: D18/6965)
- Stage 1F subdivision, including subdivision to create 6 residential lots, 1 residue lot with associated civil works, road construction and land contouring. (2472/2019/DA-SW)

As part of the stakeholder engagement for this project the following meetings occurred with the NSW Rural Fire Service:

- Briefing meeting via Microsoft Teams with Assistant Commissioner Mathew Smith (19 May 2022).
- Site meeting with Assistant Commissioner Mathew Smith and Macarthur Operational Officer Andrew Person (2 June 2022).

3.0 Purpose of Report

The purpose of this Strategic Bush Fire Study is to provide an independent bushfire assessment together with appropriate recommendations for bushfire mitigation measures considered necessary having regard to development within a designated 'bushfire prone' area.

This Strategic Bush Fire Study evaluates the Structure Plan against section 4 'Strategic Planning' of *Planning for Bush Fire Protection 2019*.

4.0 Scope of this Report

The scope of this report is limited to providing a bushfire assessment and recommendations for the subject site (refer to Figure 01) and proposed Structure Plan. Where reference has been made to the surrounding lands, this report does not purport to directly assess those lands; rather it may discuss bushfire impact and/or progression through those lands and possible bushfire impact to the subject site.

5.0 Legislative Framework

The *Environmental Planning and Assessment Act* 1979 (EP&A Act) is the primary land use planning statute in NSW.

Section 10.3 of the EP&A Act requires a Council to prepare a Bush Fire Prone Lands Map if a Bush Fire Risk Management Plan applies to land within their local government area.

In this instance the subject site is depicted on Campbelltown Council's Bushfire Prone Land Map as containing Category 1 and 3 Vegetation and their associated buffer zones. The subject site is therefore considered to be 'bushfire prone'.

When preparing a planning proposal s9.1(2) of the EP&A Act is required to be applied. Direction 4.4 '*Planning for Bushfire Protection*' of the s9.1(2) Direction, applies when a Council prepares a draft LEP that affects, or is in proximity to, land mapped as bushfire prone. Under these directions the following objectives apply:

- i. to protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas; and
- ii. to encourage sound management of bush fire prone areas.

Under direction 4.4 the Commissioner of the NSW RFS must be consulted and any comments taken into account. As part of the consultation process with the NSW RFS, a bush fire assessment is required to be submitted to demonstrate compliance with the s9.1(2) Directions and Planning for Bush Fire Protection (PBP).

Consideration must be given to limiting or excluding incompatible development in bushfire affected areas commensurate with the level of risk. A key principle to ensure this is that future development is designed and sited capable of complying with PBP.

As outlined in PBP the NSW Rural Fire Service also encourages the application of zones that limit or exclude inappropriate development in bushfire prone areas where:

- *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 bush fire due to its siting in the landscape, access limitations, fire history and/or size and scale;*
- *the development will adversely effect other bush fire 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.*

The rezoning of this land is being progressed by a Planning Proposal that is intending to amend *Statement Environmental Planning Policy (Precincts - Western Parkland City)* 2021 to establish appropriate land use zones and associated development standards.

6.0 Aerial, BPLM, Land Zoning & Structure Plans

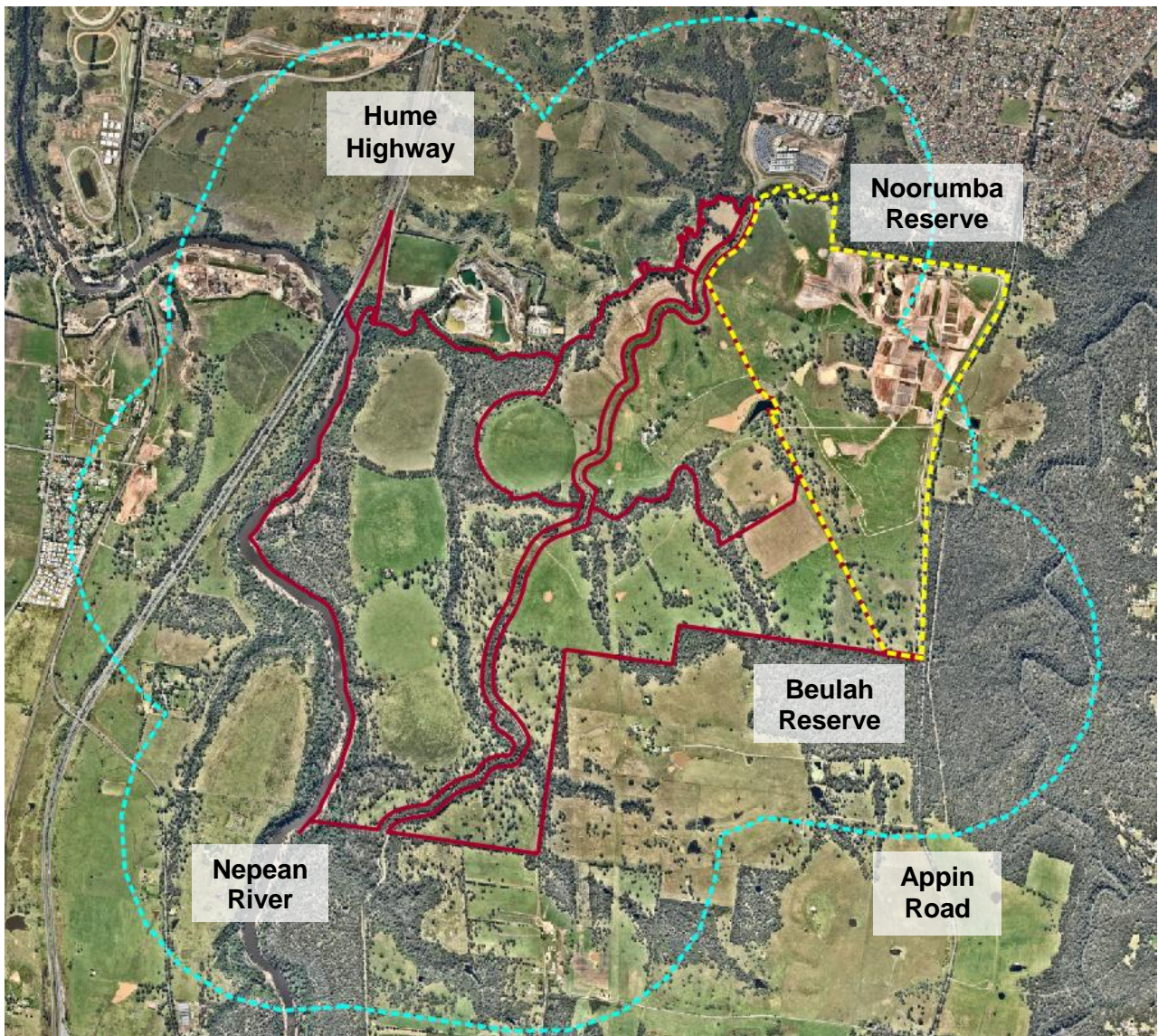


Figure 01: Aerial view of the subject area
Subject site (red outline)
1 kilometre buffer (blue dotted outline)
Figtree Hill (yellow dotted outline)

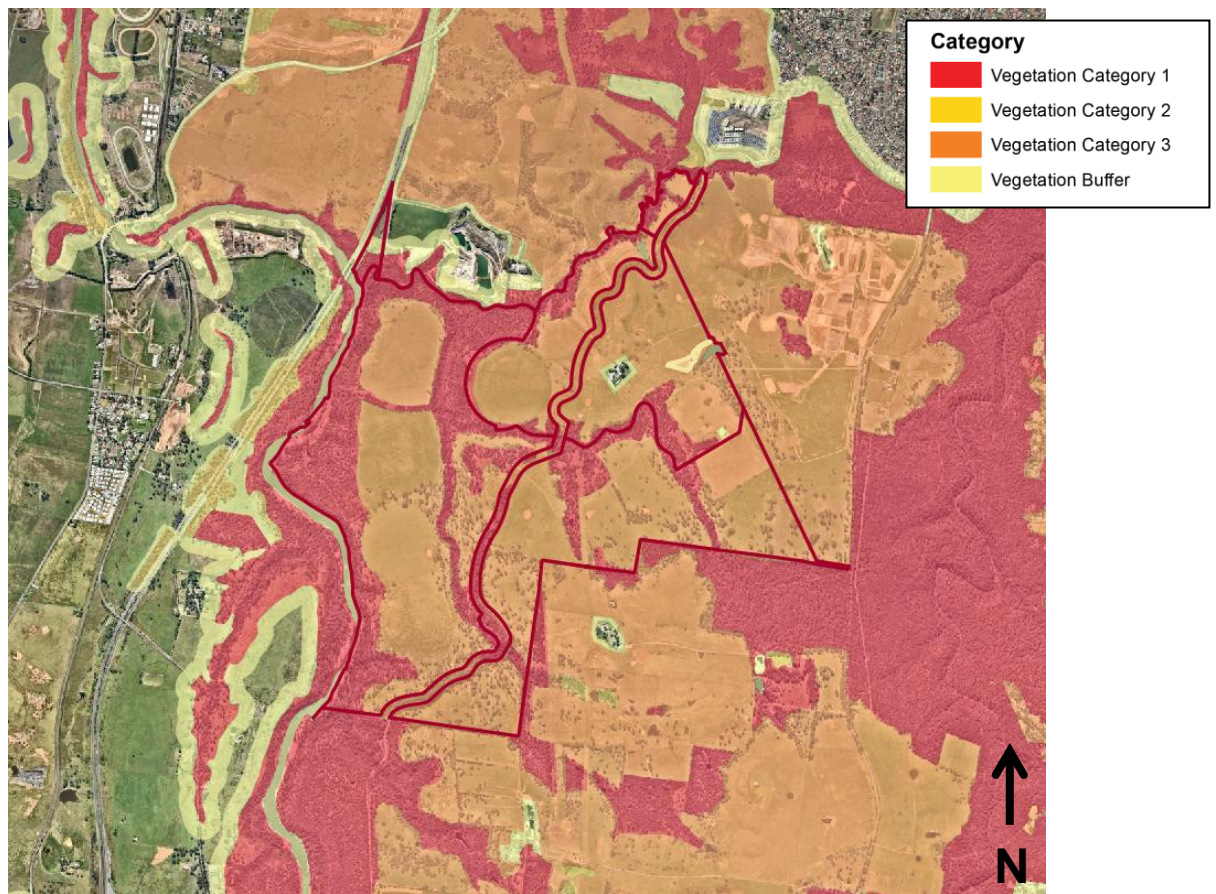


Figure 02: Extract from Council's Bushfire Prone Land Map

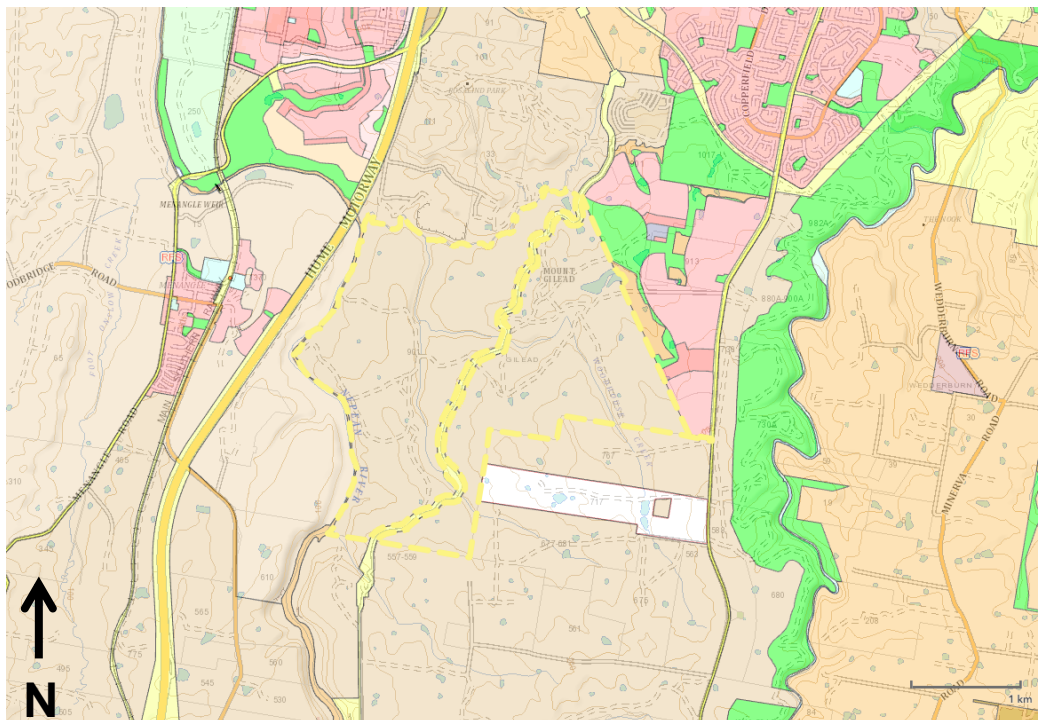


Figure 03: Extract of existing Land Use Zone Map

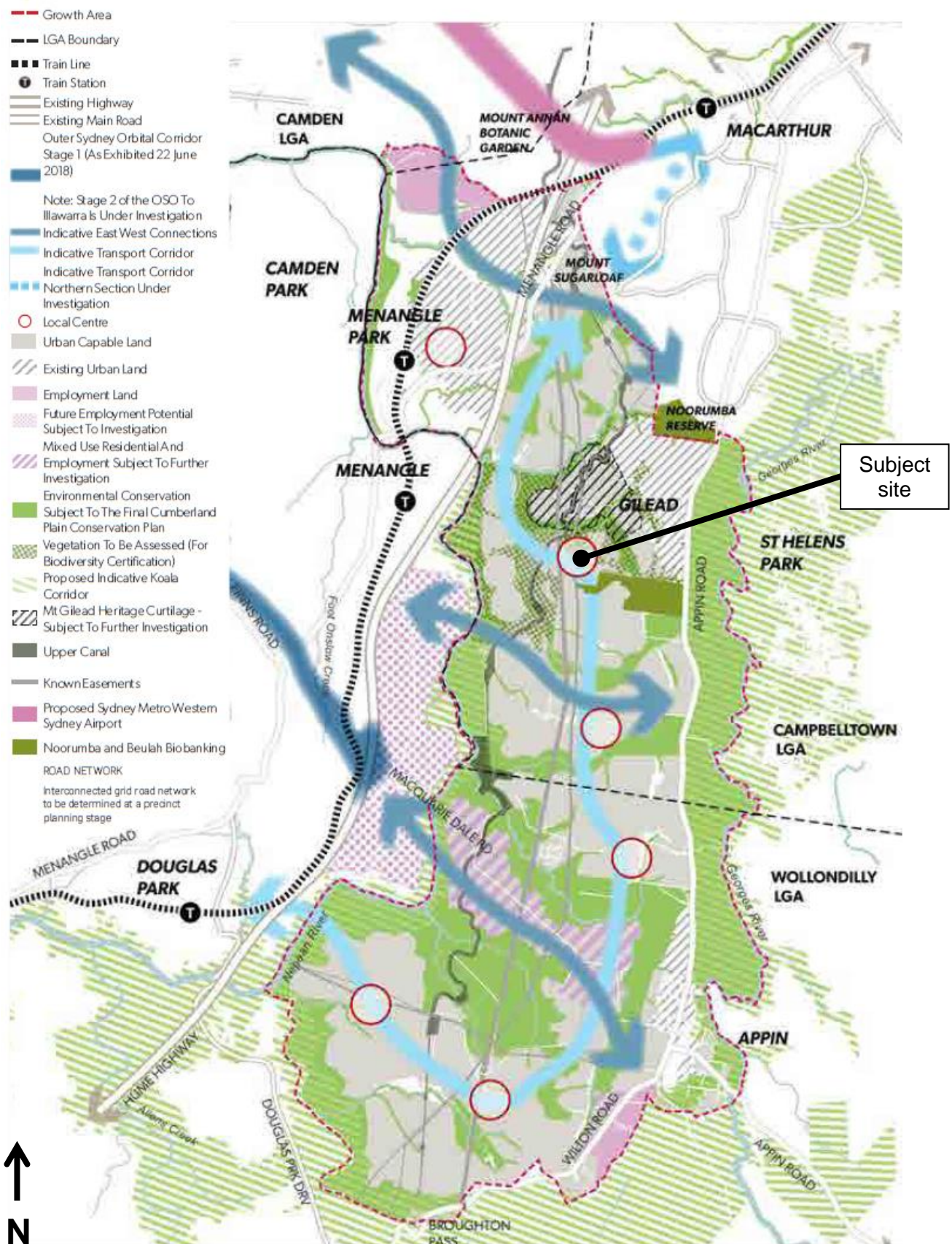


Figure 04: Greater Macarthur Structure Plan (land release areas)

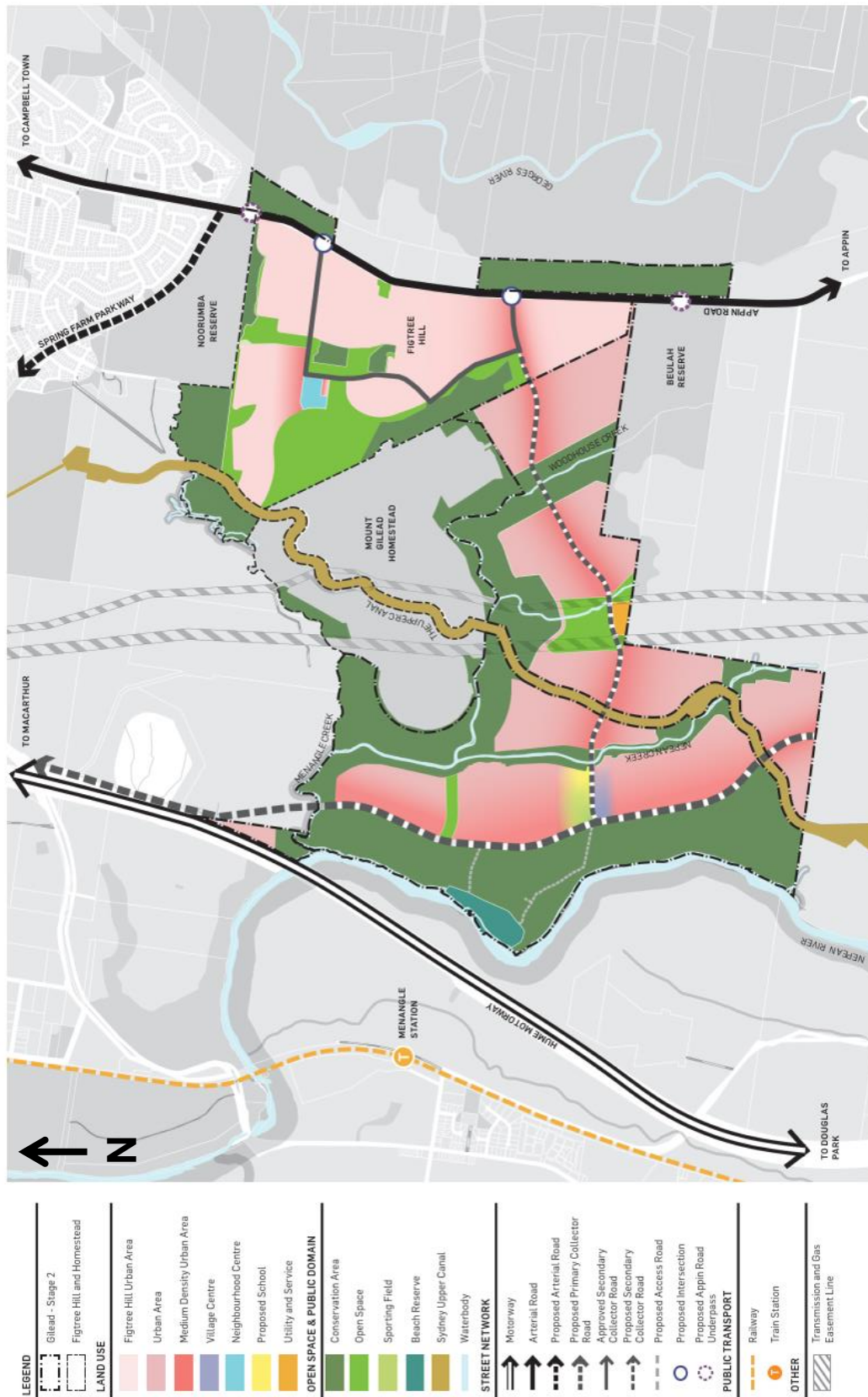


Figure 05: Extract of the Draft Gilead Structure Plan

7.0 Greater Macarthur Growth Area Strategic Bushfire Study

A Strategic Bushfire Study has been prepared for the overall Greater Macarthur Growth Area by Eco Logical Australia (2021). This study evaluated the Indicative Land Use Plan for the Land Release Area of the Greater Macarthur Growth Area (refer to Figure 04) under the strategic planning requirements of PBP.

The subject site is located within Gilead (C) precinct and part of Gilead (D) precinct (refer to Figure 06 overleaf) of the overall Greater Macarthur Growth Area.

The findings of the Eco Logical Australia study at a regional planning scale are:

- *The Indicative Land Use Plan complies with the strategic planning principles of PBP;*
- *The Indicative Land Use Plan does not trigger the “inappropriate development” exclusion requirements of PBP;*
- *That the Acceptable Solution bushfire protection measures within PBP can be met by the future development envisaged by the Indicative Land Use Plan and it offers opportunity for protection measures beyond the minimum compliance under PBP;*
- *Compliance with PBP is not reliant on the intervention/response by emergency services or hazard management on adjoining land;*
- *The development contemplated by the Indicative Land Use Plan will not adversely impact the bushfire safety of occupants of nearby existing development and wherever possible, actually lower the risk.*

Specific to the Gilead (C) and (D) precincts the Eco Logical Australia study determined a ‘Moderate’ bushfire risk rating and provided the following conclusion / recommendation:

Moderate bushfire risk rating, based on exposure to both east and west fire attack, as well as from retained vegetation corridors within the Precinct and reduced off-site evacuation and on-site refuge options. However, the risk is not higher as it is unlikely that all off-site evacuation options would be cut at the same time. Further, there is on-precinct refuge capacity, albeit reduced for Open Space.

Precinct planning should be able to provide an appropriate combination of BPMs in accordance with PBP. Evacuation route, timing and capacity needs to be planned carefully for these sub-precincts, along with on-site refuge capacity, for redundancy.

This precinct level Strategic Bushfire Study has considered the additional items identified within the Eco Logical Australia study.

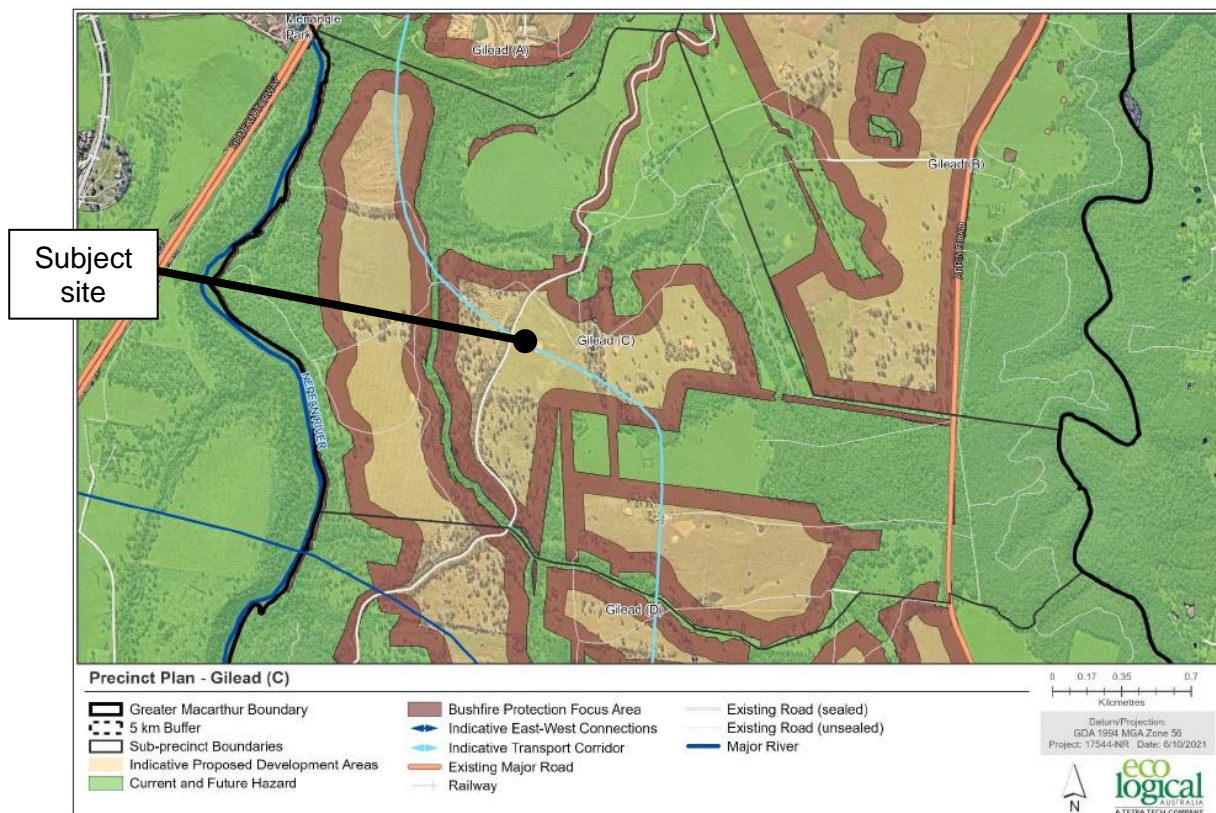


Figure 06: Precinct Plan – Gilead (C) and (D) – Strategic Bushfire Study Greater Macarthur Growth Area (Eco Logical Australia 2021)

8.0 Bushfire Assessment

This section provides an assessment of the proposed Structure Plan against the strategic bushfire planning requirements under PBP.

Once the strategic bushfire planning requirements have been addressed in the SBFS, an assessment of whether the future land uses have capacity to comply with the aim and objectives and specific bushfire protection measures of PBP must then be carried out.

While the proposed Structure Plan does not include the detail of a Masterplan, including road layouts and allotment configurations, these bushfire protection measures have been considered in section 8.02.

Where detail is absent, commentary is provided on the Structure Plans and future developments ability to comply with the relevant Bushfire Protection Measures.

8.01 Strategic Bush Fire Study

Planning proposals which relate to bushfire prone properties require the preparation of a Strategic Bush Fire Study. The SBFS provides opportunity to assess the broader landscape and ultimately assesses whether the new zones and proceeding development is appropriate in the bushfire hazard context.

The broad principles which apply to the SBFS analysis are:

- ensuring land is suitable for development in the context of bush fire risk;
- ensuring new development on 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.

The following assessment details the components in Table 4.2.1 of PBP which must be addressed in a SBFS.

Bushfire Landscape Assessment

The Bushfire Landscape Assessment component considers the likelihood of a bushfire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.

Location

The site consists of five properties including Lot 2 in DP 1218887, Lot 2 in DP 249393, Lot 1 DP603675, Lot 2 DP603674 and part of Lot 5 in DP 1240836 that have a combined area of 495ha.

The site is located within Campbelltown Council's local government area and is identified in Figure 01.

Access to the site is provided by a battle axe handle on the eastern side of Lot 2 in DP 1218887 that connects to Appin Road. Access to the site is also provided via an easement over land to the east that will be formalised through public roads being delivered by Lendlease as part of their Figtree Hill development.

Access will also be provided to the northern end of the site as indicated in the Structure Plan. The Structure Plan also makes provision for a further southern access point to be delivered as and when land to the south is rezoned and developed.

Rural properties boarder the southern boundary of the site including Beulah Reserve which contains a State Heritage Item and a registered BioBank. The Nepean River forms the western boundary of the site with Menangle Creek forming the majority of the northern boundary of the site.

A minor portion of the site (Lot 2 in DP 249393) has frontage to the Hume Highway and is accessed from Medhurst Road.

The Upper Canal is a State Heritage Item that traverses the site from South to North and there are a series of electrical transmission line and gas pipeline easements that traverse the central park of the site from North to South.

The site sits to the south and west of the Mt Gilead Homestead complex that is a State Heritage Item and is contained within Lot 1 in DP 1218887.

The site is within the Greater Sydney Fire Weather District and is captured by the Macarthur Bush Fire Risk Management Plan 2012.

Vegetation

The vegetation structure, connectivity and attributes are fundamental contributors to bushfire behaviour and its movement through the landscape.

As part of this assessment we have considered the potential bushfire runs that currently exist into the site, as well as the potential fire behaviour and impacts following the delivery of the Structure Plan, including proposed environmental conservation zones.

Historically the primary use of the site and neighbouring properties to the east, south and west has been for agriculture purposes, including the cultivation of arable crops and breeding and raising of livestock. These farming practices and other anthropological disturbances have resulted in degraded or fragmented vegetation.

Intact stands of vegetation are generally contained within the creek lines that traverse the site including the Menangle Creek, Nepean Creek and Woodhouse Creek and along the Nepean River.

To assess the potential fire runs into the site we have considered all existing vegetation within 1 kilometre (Figure 07).

The most significant catchments for a bushfire were identified to the northeast, southeast and south of the site, having direct link to heavily vegetated reserves, private allotments and defence lands.

The vegetation to the northwest and west, being the traditional fire path for severe bushfires, was found to be fragmented and does not provide opportunity for significant fire runs through forest or woodland vegetation.

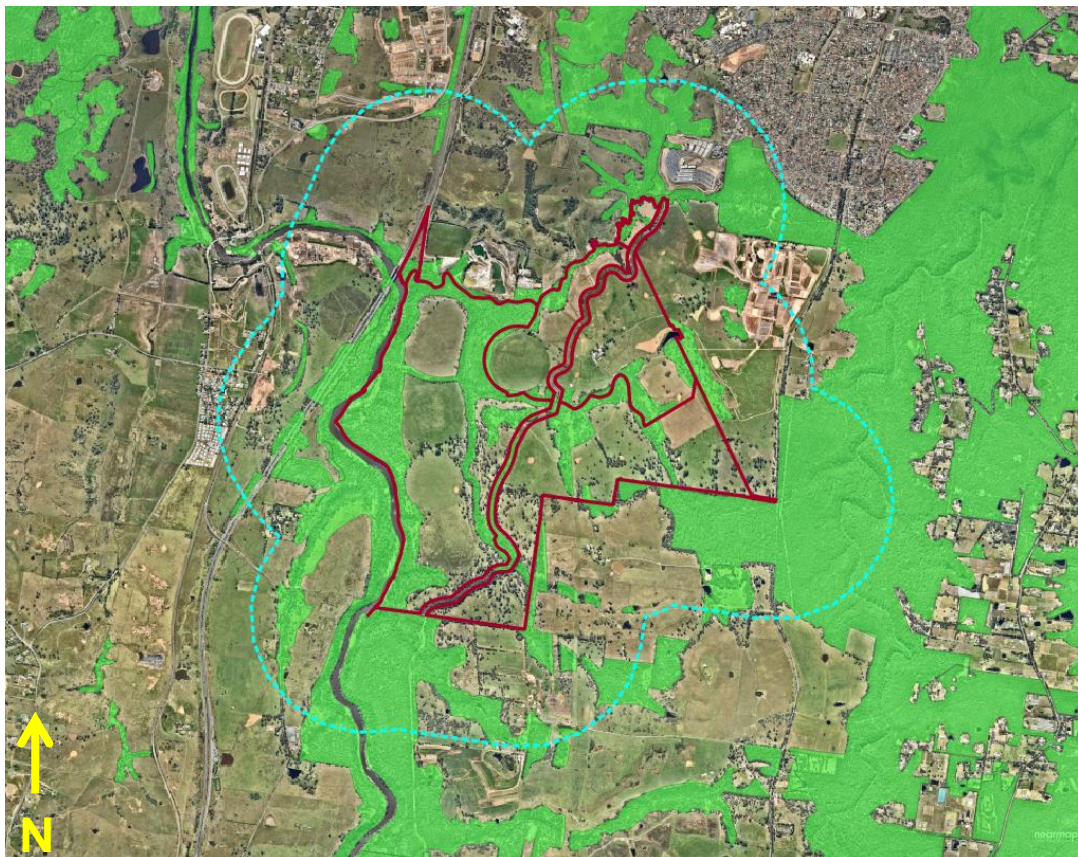


Figure 07: Aerial view of the subject area showing investigation area (red outline), 1km buffer (blue dotted outline) and existing bushfire hazards (green shade)

As part of the assessment of the potential fire behaviour and impacts we have considered land proposed to be zoned E2 Environmental Conservation to form part of the bushfire hazard.

We have assumed all other land within the site, being the Urban Area, Medium Density Urban Area, Village Centre, Proposed School, Utility and Service and Open Space will either be developed, maintained to the standard of an Asset Protection Zone or considered Low Threat Vegetation in accordance with A1.10 of PBP.

The existing vegetation and proposed restoration areas within the subject site are mapped (Ecological Australia 2022) as being Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest, Grey Box – Forest Red Gum grassy woodland, Forest Red Gum - Rough-barked Apple grassy woodland and Grey Myrtle dry rainforest (refer to Figure 08).

The following vegetation parameters for the site were adopted for this assessment:

Plant Community Type	Formation	Class	Surface and Elevation Fuel Load*	Overall Fuel Load (including bark and canopy)*
Grey Box – Forest Red Gum grassy woodland	Grassy Woodland	Coastal Valley Grassy Woodland	10 t/ha	18.07 t/ha
Forest Red Gum - Rough-barked Apple grassy woodland	Forested Wetlands	Coastal Floodplain Wetlands	8.2 t/ha	15.1 t/ha
Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest	Grassy Woodland	Coastal Valley Grassy Woodland	10 t/ha	18.07 t/ha
Grey Myrtle dry rainforest	Rainforests	Dry Rainforests	10 t/ha	13.2 t/ha

* Fuel loads from NSW Rural Fire Service publication Comprehensive Vegetation Fuel Loads (2019)

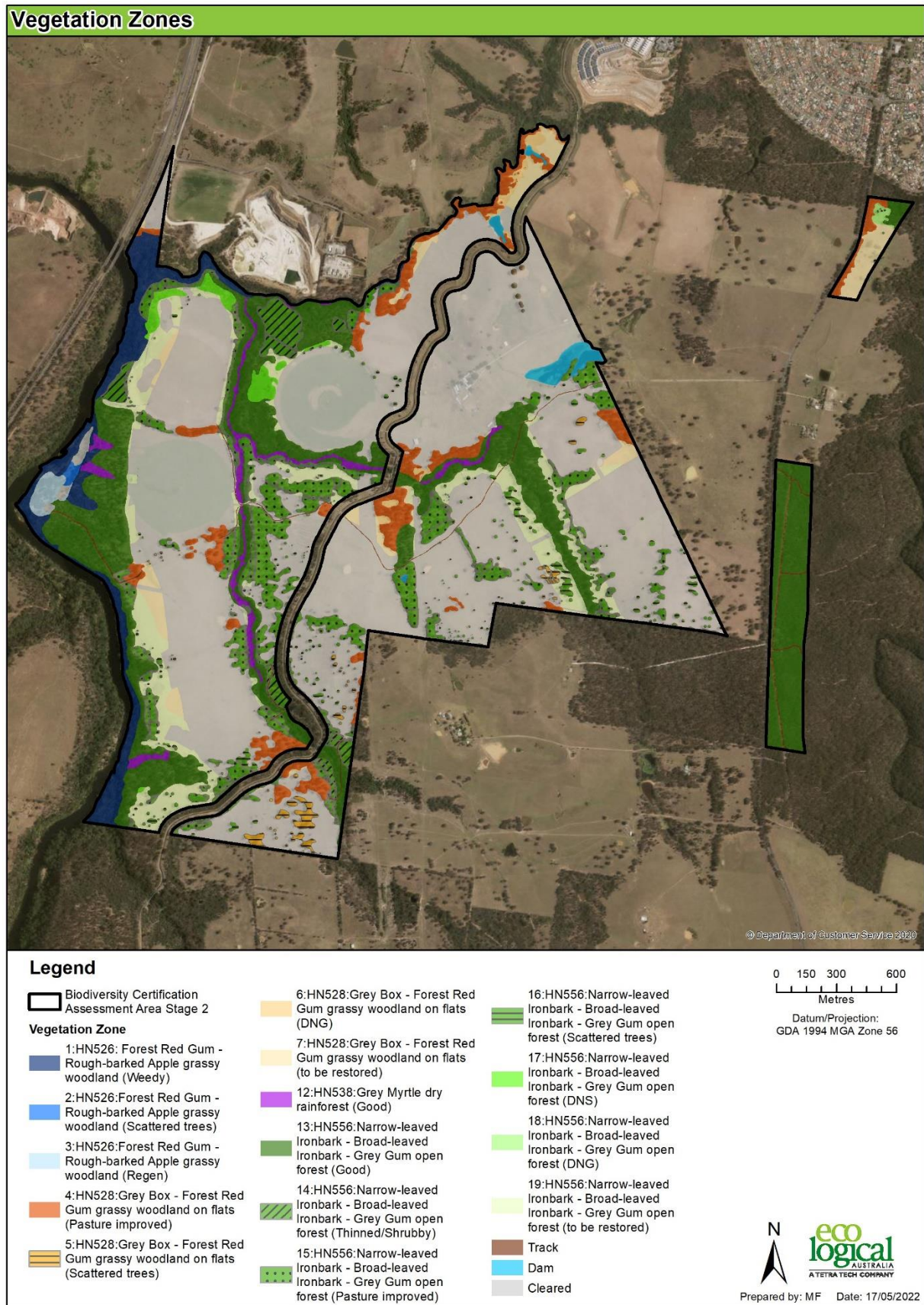


Figure 08: Vegetation mapping of site (Eco Logical Australia 2022)

Slope and Topography

The slope of the land under the classified vegetation has a direct influence on the forward rate of spread, fire intensity and radiant heat exposure. The effective slope is considered to be the slope under the classified vegetation which will most significantly influence bushfire behaviour toward the development site.

The slope that would **most significantly** influence bushfire impact was determined using 1 metre LiDar contour mapping of the subject area.

Generally the slope within the identified bushfire hazards was found to have minor undulations with the exception of incised and well defined gullies associated with the existing watercourses.

It is important to note that the incised banks / gullies associated within Nepean River, Nepean Creek and Woodhouse Creek have high concentrations of exposed rock, naturally restricting the growth of vegetation. The incised banks / gullies also contain small and large escarpments resulting in a degree of natural benching.

In addition the vegetation along much of the Woodhouse Creek and Nepean Creek corridors is mapped as Grey Myrtle dry rainforest.

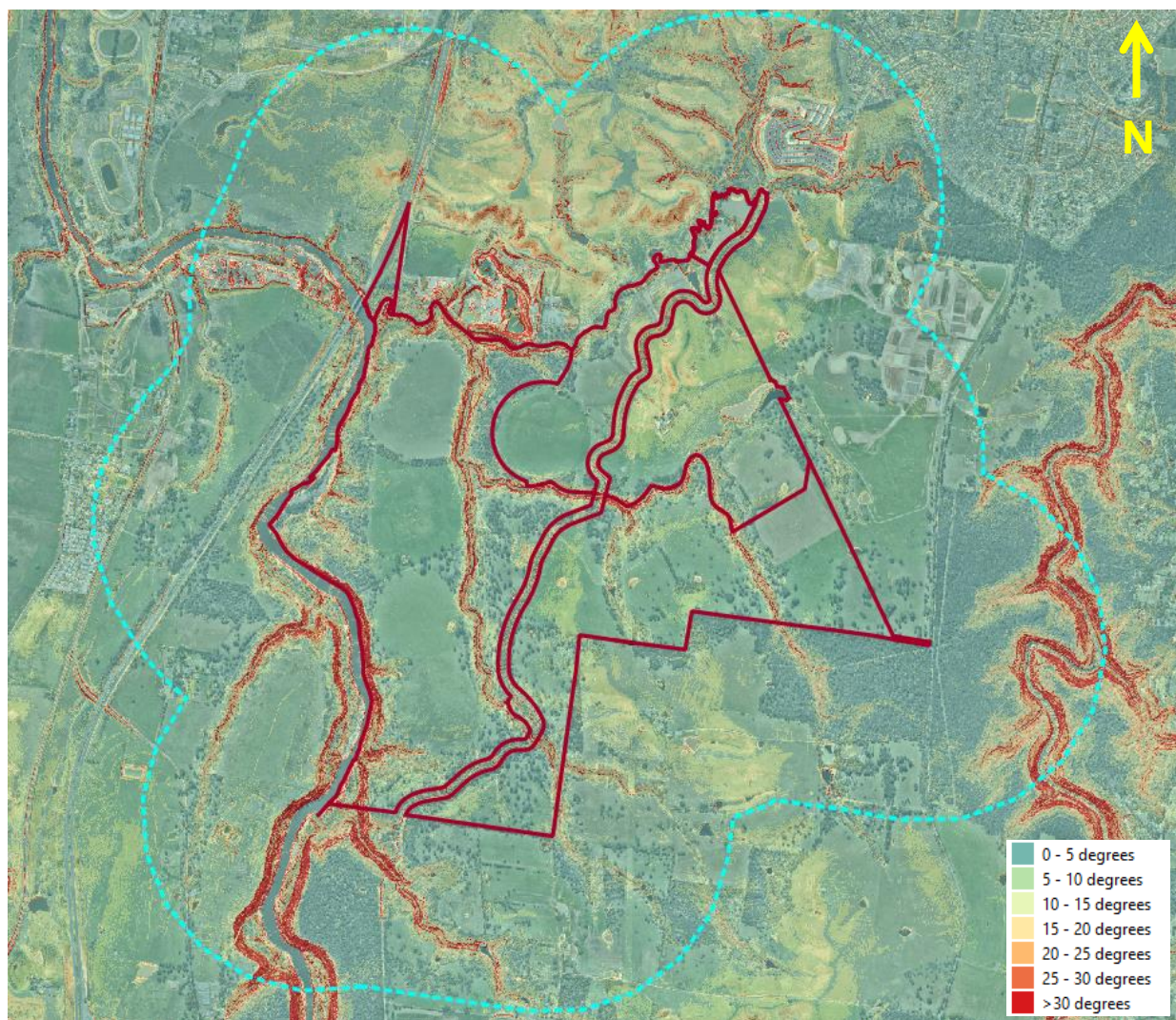


Figure 09: Slope within investigation area (red outline) and surrounding lands

Fire Weather

All development which attracts an Asset Protection Zone under PBP requires the identification of the relevant Fire Danger Index (FDI). The FDI required to be used for development assessment purposes is based on the local government boundaries, being Campbelltown Council in this instance.

In accordance with the NSW Rural Fire Service publication 'NSW Local Government Areas FDI' (2017) Campbelltown Council is located within the Greater Sydney Region Fire Weather District which attracts a Fire Danger Index (FDI) of 100 for bushfire planning purposes.

Previous Bushfire History

There are areas within NSW that have significant fire history and are recognised as known fire paths. In a planning context it is important to identify these locations and ensure incompatible development is not proposed.

In this instance there have been no recorded wildfires within the site or immediate neighbouring properties (source NPWS Fire History dataset).

The closest recorded wildfire was found to be a relatively small (20ha) fire in 1989-90 which occurred on the opposite side of Appin Road.

Larger wildfires have been recorded >750 metres to the northeast and east of the site.

Severe fire behaviour in this part of NSW is typically heavily influenced by hot dry northwest / westerly winds brought from inland Australia. These winds are the primary influence for the direction of a fire, generally pushing fires in a south-easterly / easterly direction. Strong winds associated with southerly changes that push fires in a northerly direction are an exception to this.

In this instance there have been no recorded wildfires to the northwest or west of the site. In addition there are no significant stands of vegetation to the northwest and west, with the largest fire runs being from the proposed Environmental Conservation lands along the existing watercourses.

The site is therefore not considered to be within a known fire path.

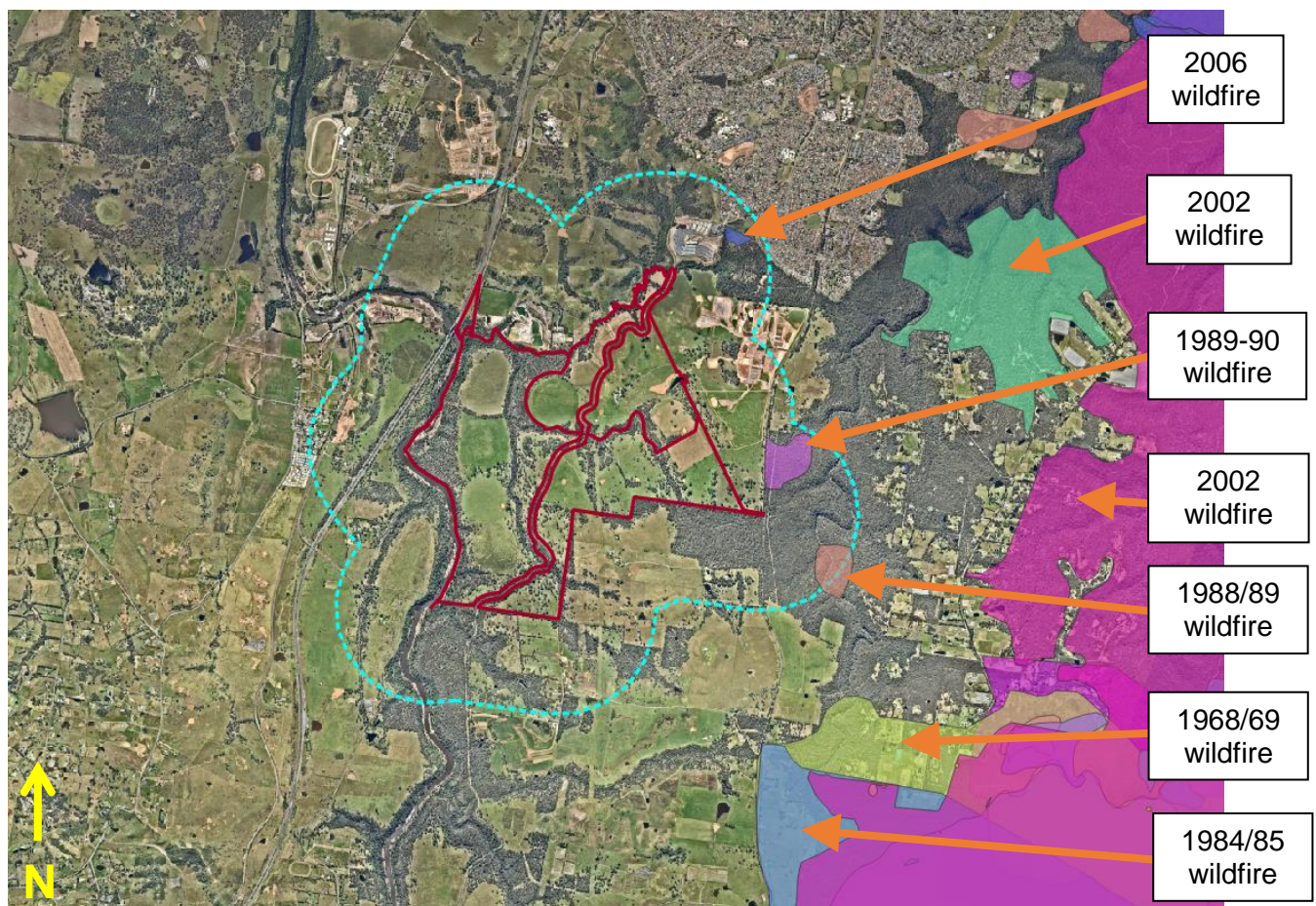


Figure 10: Aerial view of the subject area
Investigation area (red outline) and 1km buffer (blue dotted outline)

Potential Fire Behaviour

In this instance it has been identified that the largest fire catchments to the subject site are from the northeast, southeast / south and northwest.

In applying the parameters described in this section and the accepted assessment methodology described in PBP bushfire design modelling was undertaken to determine the intensity of three potential fires. These being:

1. A bushfire burning from the northeast through Noorumba Reserve, Conservation Areas and vegetated allotments toward the subject site. This scenario provides the largest catchments and available fire runs however as the interface is with Figtree Hill direct impacts (high radiant heat and flame contact) would not be experienced to the subject site. While the coastal influences of a fire burning in this direction are expected to reduce the Fire Danger Index as a margin of safety an FDI 100 was adopted;
2. A bushfire burning from the south / southeast through Beulah Reserve, vegetated reserves and private allotments and biobank sites toward the subject site. While the coastal influences of a fire burning in this direction are expected to reduce temperatures and humidity, stronger winds are also commonly experienced causing increased fire activity. As a margin of safety an FDI 100 was adopted;

3. A bushfire burning from the northwest through the vegetation along the existing watercourses. Due to the configuration of the watercourses there is limited opportunity for fires burning under these conditions to develop significant head widths. While the vegetation in this scenario is fragmented, narrow or disjointed this is the aspect commonly associated with severe fire behaviour.

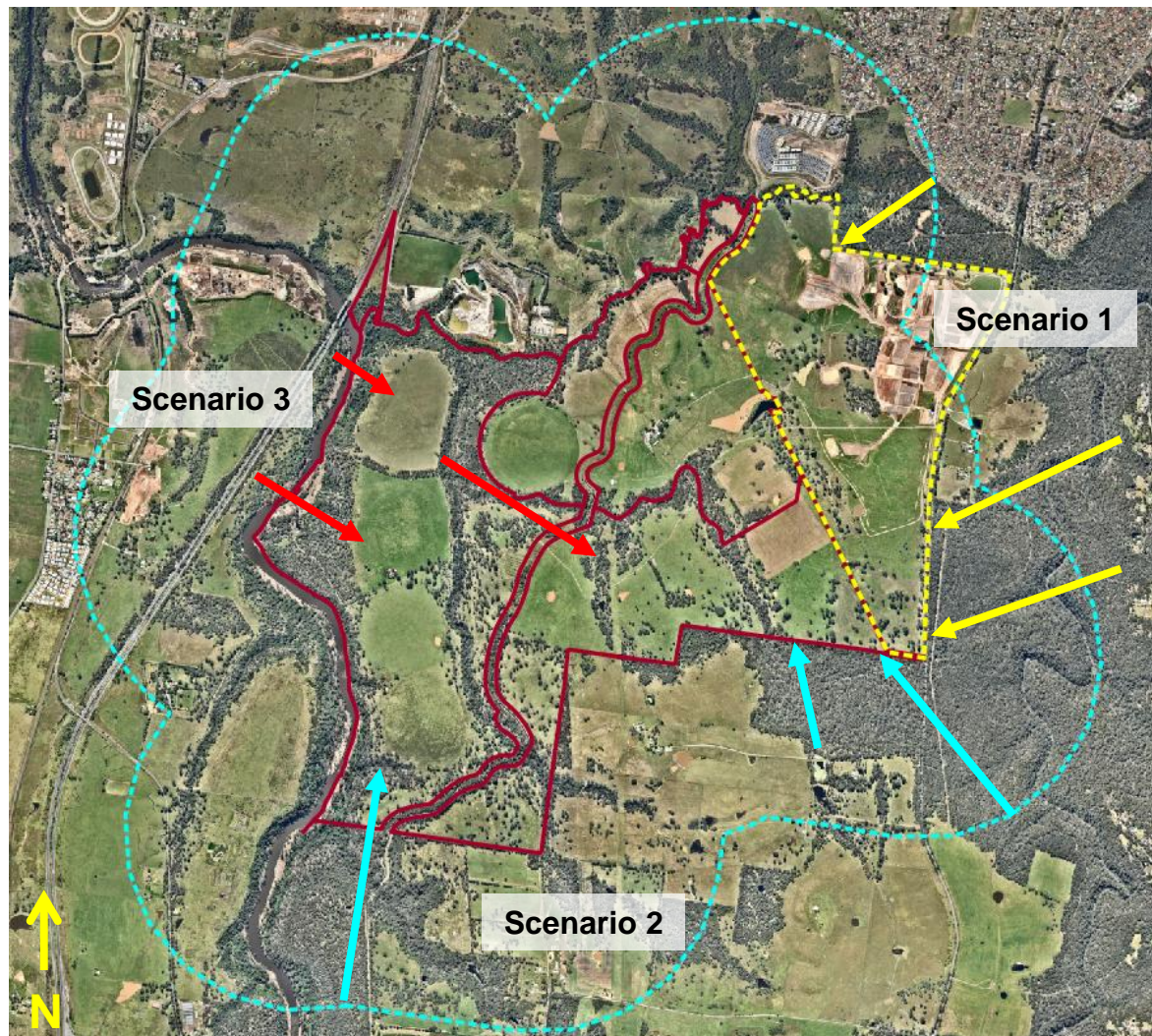


Figure 11: Aerial view of the subject area showing assessed fire runs
Subject site (red outline), Figtree Hill (yellow dotted outline) and 1 kilometer buffer (blue dotted outline)

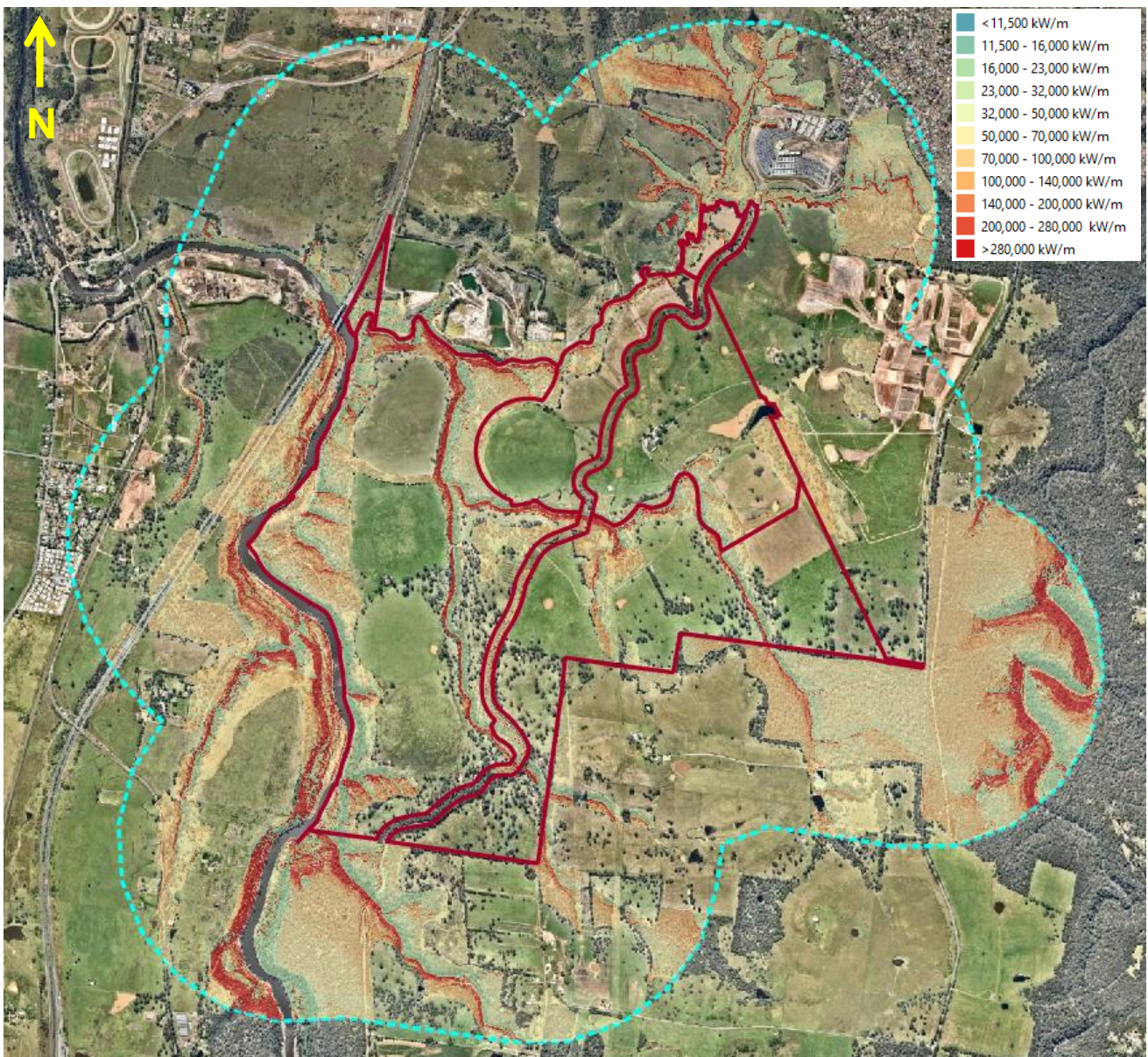


Figure 12: Fire intensity mapping of Scenario 1 (Northeast)
Subject site (red outline) and 1 kilometer buffer (blue dotted outline)

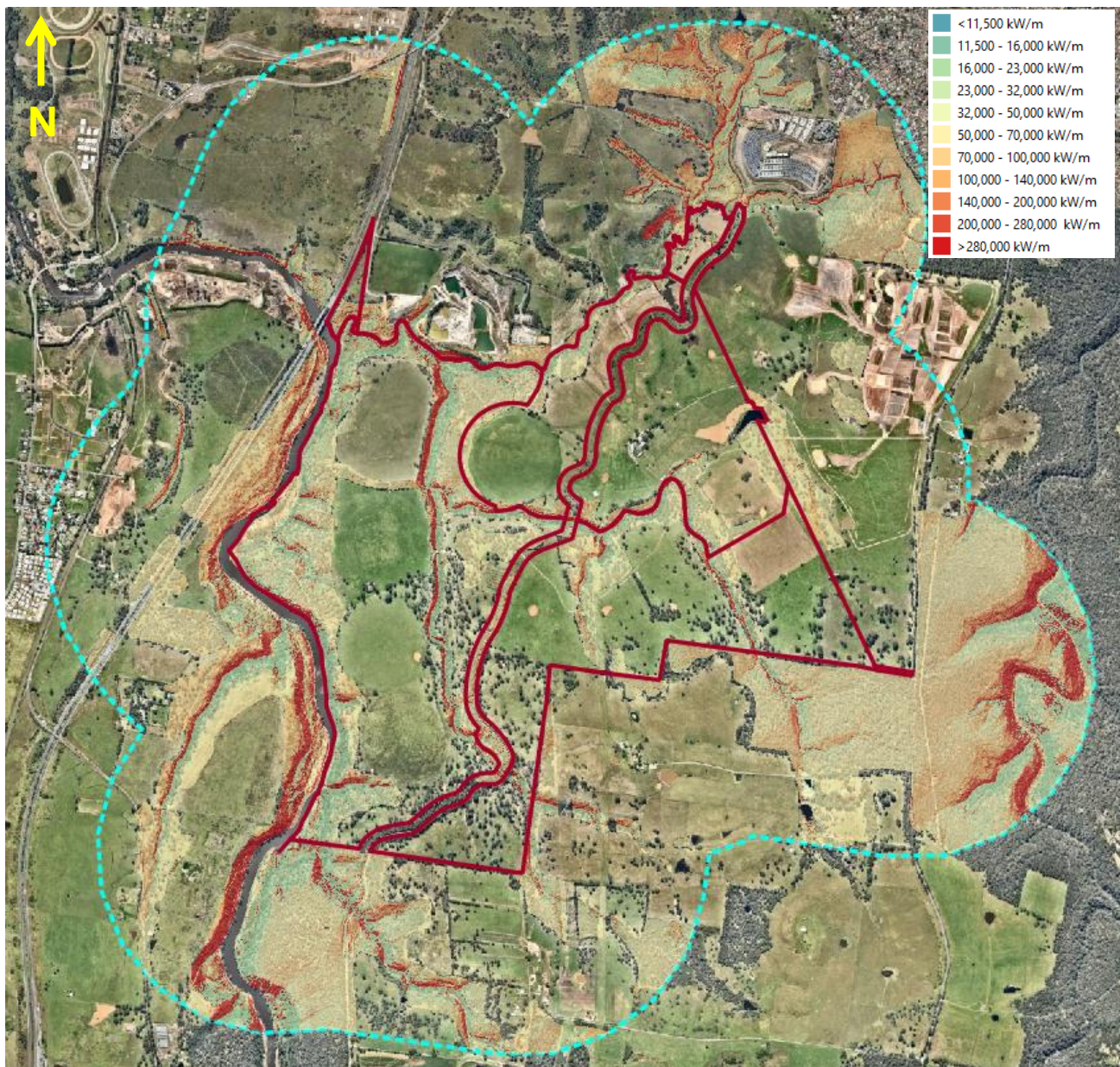


Figure 13: Fire intensity mapping of Scenario 2 (Southeast)
Subject site (red outline) and 1 kilometer buffer (blue dotted outline)

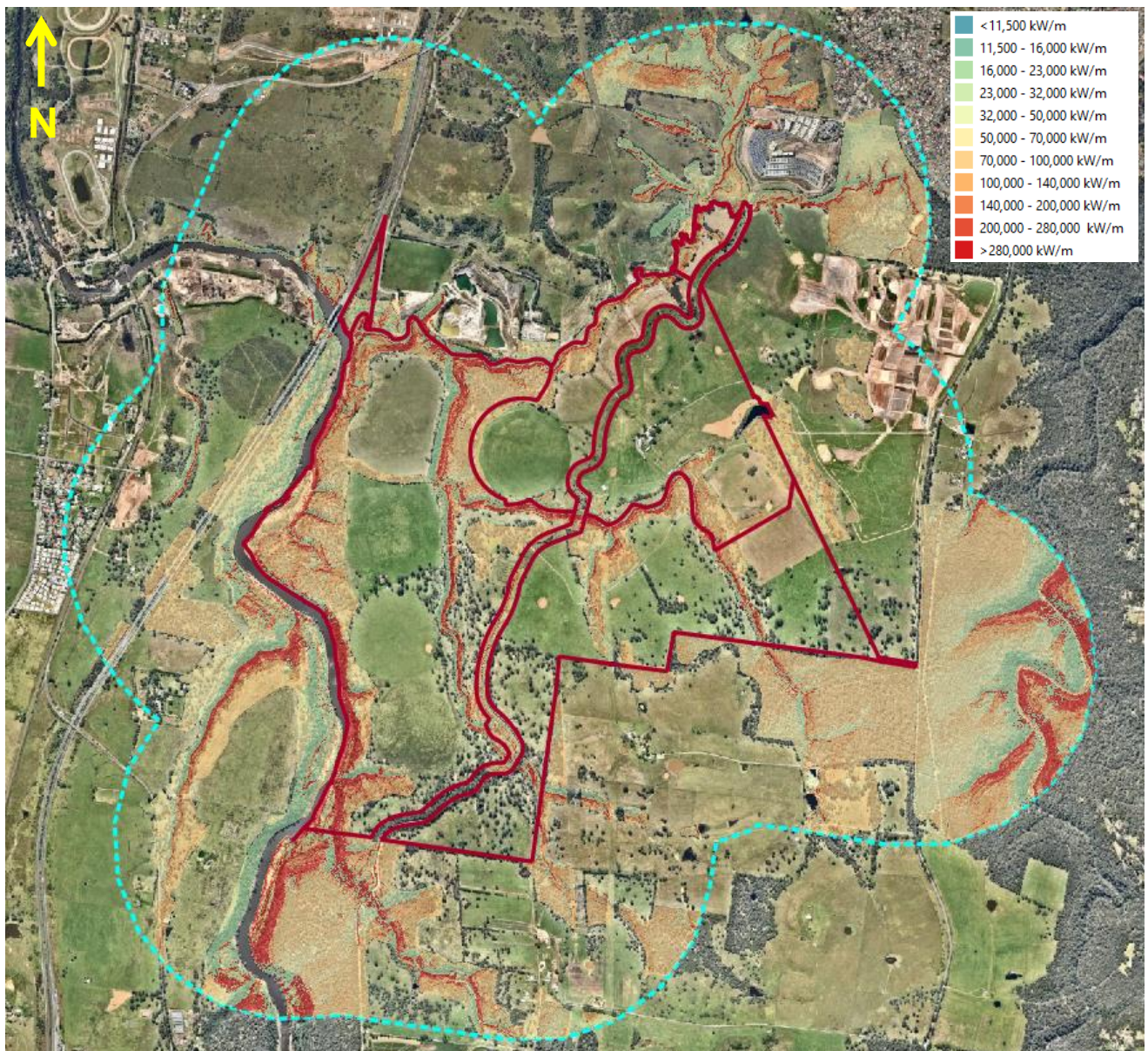


Figure 14: Fire intensity mapping of Scenario 3 (Northwest)
Subject site (red outline) and 1 kilometer buffer (blue dotted outline)

Access & Suppression

Access for attending fire services to undertake early suppression is a key factor in whether a fire has the opportunity to develop into a quasi-steady state at which point the opportunity to control / extinguish the fire becomes far more challenging.

Where good access is available it provides opportunity to control / extinguish a fire in its growth phase before developing further and consequently becoming more difficult to conduct direct attacks.

In this particular instance comprehensive access will be available to the bushfire hazards that are within or immediately adjacent the subject site via the future internal road network. The internal road network will include perimeter roads adjacent all identified hazards.

Access to the hazard in the broader landscape is available via existing public roads and classified fire trails. Refer to Figure 15 for the extent of existing roads / trails and classified fire trails in the subject area (source Transport NSW).

Classified fire trails must meet certain standards to be registered as such. This ensures that the NSW RFS and other fire agencies have confidence to deploy resources to a location, with confidence that they will be able to efficiently access and respond to an incident.

In consideration of the comprehensive access and its exposure to the public the identification and subsequent extinguishment of a bushfire within the site is considered reasonable.

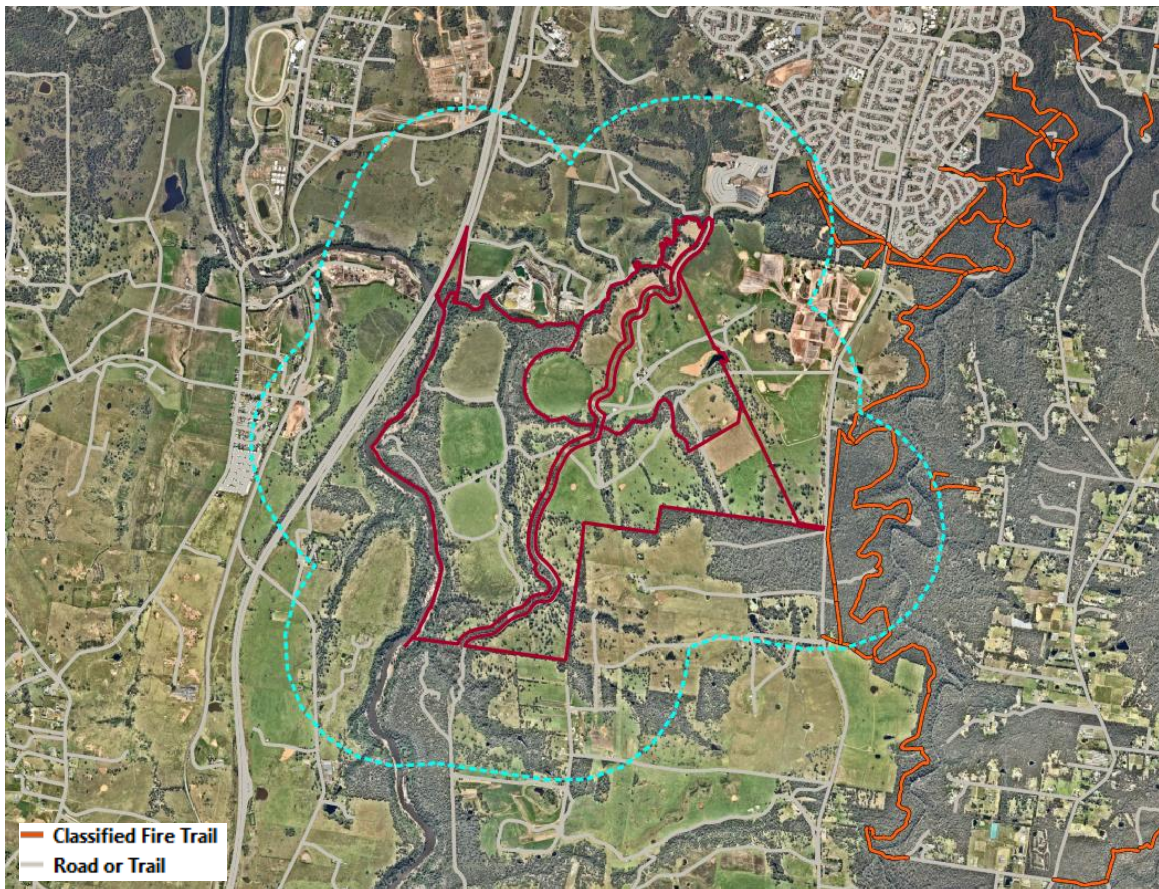


Figure 15: Aerial view of the subject area overlaid with roads / trails and classified fire trails (source Transport NSW)

Land Use Assessment

The Land Use Assessment identifies the most appropriate locations in the site for the proposed land uses.

In this instance the proposal provides a mix of land uses including open space, utility and service, commercial (village centre), low and medium density residential and a school. In a bushfire planning context the various land uses present different risk profiles and as such are assessed differently under PBP.

Special Fire Protection Purpose (SFPP):

SFPP development is one which is occupied by people who are considered to be at-risk members of the community. In a bushfire event, these occupants may be more susceptible to the impacts of bush fire.

SFPP development consequently attracts the highest Bushfire Protection Measures commensurate to the risk profile. Most notably SFPP development, attracts large minimum required Asset Protection Zones, which in instances can preclude future development.

SFPP development is defined under section 100B of the *Rural Fires Act 1997* as:

- (a) a school,
- (b) a child care centre,
- (c) a hospital (including a hospital for the mentally ill or mentally disordered),
- (d) a hotel, motel or other tourist accommodation,
- (e) a building wholly or principally used as a home or other establishment for mentally incapacitated persons,
- (f) seniors housing within the meaning of *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004*,
- (g) a group home within the meaning of *State Environmental Planning Policy No 9—Group Homes*,
- (h) a retirement village,
- (i) any other purpose prescribed by the regulations.

Section 46 of the *Rural Fires Regulation 2013* also lists additional SFPP development which are:

- (a) a manufactured home estate (within the meaning of *State Environmental Planning Policy No 36—Manufactured Home Estates*), comprising two or more caravans or manufactured homes, used for the purpose of casual or permanent accommodation (but not tourist accommodation),
- (b) a sheltered workshop, or other workplace, established solely for the purpose of employing persons with disabilities,
- (c) a respite care centre, or similar centre, that accommodates persons with a physical or mental disability or provides respite for carers of such persons,
- (d) student or staff accommodation associated with a school, university or other educational establishment,
- (e) a community bush fire refuge approved by the Commissioner

The proposed school site is a listed SFPP development (see below). In this regard a SFPP Asset Protection Zone overlay (attachment 01) has been prepared to depict the minimum required for SFPP development.

The APZ Overlay identifies the proposed school site has capacity to locate classroom and other assembly buildings outside the minimum required APZ for SFPP development.

The proposed school site is also located within proximity of the intersection of the proposed north/south Primary Collector Road and east/ west Collector Road providing opportunity for access and egress in multiple directions.

It is acknowledged that the village centre and residential zones can permit with consent, amongst other uses, a listed SFPP development. Where future SFPP development is proposed within these zones they will be the subject to independent Development Application which would be required to demonstrate compliance with the relevant specifications and requirements of PBP at that time.

Residential:

Residential development (increased density, subdivision, townhouses etc) presents the next highest risk profile and accordingly also attracts minimum required Asset Protection Zones. In this regard a Residential Asset Protection Zone overlay (attachment 02) has been prepared to depict the minimum required for residential development.

It should also be noted that this is a macro-level assessment and further refinement of the APZs at a micro level may be achieved.

The Asset Protection Zone Overlay demonstrates that the land proposed to be Urban Area and Medium Density Urban Area can accommodate a building footprint outside the minimum required APZs for residential development.

The delivery of a future residential development, will incorporate all current bushfire planning controls, including Asset Protection Zones and construction measures.

Commercial and Industrial:

Commercial development (excluding SFPP, hazardous industries or that which includes a managers residence) is considered to have the lowest risk profile of a built environment.

The National Construction Code (NCC) does not provide for any bush fire specific performance requirements for Class 5 to 8 structures and as such Australian Standard 3959 'Construction of buildings in bushfire-prone areas' does not apply as a set of 'deemed to satisfy' provisions.

Whilst bushfire is not captured in the NCC for Class 5-8 buildings, the following objectives will be applied in relation to access, water and services, and emergency and evacuation planning under PBP:

- to provide safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation;
- to provide adequate services of water for the protection of buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building;
- to provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development; and
- consideration of storage of hazardous materials away from the hazard wherever possible.

In addition to the above the infill residential development provisions detailed in Chapter 7 of PBP are also applied as the base for a package of measures any future commercial development. This includes the application of the residential APZs shown in (attachment 02).

The proposed Village Centre can achieve compliance with the residential APZs.

Land Use:

The proposed Structure Plan locates the village centre and school site within proximity of the intersection of the proposed north/ south Primary Collector Road and east/ west Collector Road providing opportunity for access and egress in multiple directions.

As illustrated on attachments 01 and 02 the proposed land uses have capacity to comply with the corresponding minimum required Asset Protection Zones.

In consideration of the landscape study and risk profiles we are of the opinion the proposed land uses are appropriate in the Structure Plan with final APZ and access requirements to be confirmed as part of future detailed design to inform both a Development Control Plan and subsequent development applications.

Access and Egress

It is important to assess the capacity of both the existing and proposed road networks both within and external to the investigation area to deal with evacuating residents and responding emergency services.

The delivery of the overall Structure Plan will see access / egress opportunities to the east, through Figtree Hill to Appin Road and to the northwest, via a newly constructed bridge to Medhurst Road. In addition provision has been included for a future connection to the south into neighbouring precincts. Refer to Figure 16 overleaf.

The approved and future stages of Figtree Hill will include an internal road network that complies with the access requirements of PBP. Figtree Hill will provide two (2) entry / egress points onto Appin Road, which is currently the subject of extensive road upgrades, including an increase from the existing two (2) lanes to four (4) lanes and provisions a further two (2) lanes.

The northwest connection to Medhurst Road also includes the provision of a four (4) lane Primary Collector Road and bridge. The delivery of this connection will also coincide with upgrades to Medhurst Road increasing the existing two (2) lanes to four (4) lanes.

The northwest connection has been flagged for early delivery of the future Masterplan to ensure access and egress is available in multiple directions.

The future roads will be delivered in accordance with the requirements of PBP including the provision of perimeter roads.

Consideration has also been given to the ability to provide onsite refuge points, alleviating pressure on the broader road system from occupants seeking to depart the precinct for an area of safety. In this regard bushfire design modelling was undertaken consistent with the NSW RFS publication 'Neighbourhood Safer Places – Guidelines for the Identification and Inspection of Neighbourhood Safer Places in NSW' to identify the compliant Building and Open Space locations.

As shown in Figure 17 a large portion of the proposed urban zone and school site achieves the criteria for a Neighbourhood Safer Place (NSP) building. In addition compliant areas for Open Space NSP have also been identified within the precinct and adjacent Figtree Hill.

In this instance the proposed Environmental Conservation areas, which are primarily corridors along existing watercourses, present the greatest threat post-delivery of the Structure Plan. From a bushfire planning perspective these corridors will be fragmented, narrow or disjointed and subsequently will not support broad scale fire events.

There must be sufficient time for residents / occupants to safely evacuate and a reasonable threat posed for emergency services to order / encourage the evacuation of an area.

In consideration of the characteristics of the bushfire threat, inclusive of size and rate of spread and the fact future development will comply with current bushfire planning controls, inclusive of Asset Protection Zones and construction standards, it is considered unlikely emergency services would order / encourage a large scale evacuation of the precinct.

It is acknowledged that future residents may choose to evacuate / relocate from the area based on their own individual risk assessment.

The primary access to Gilead will be via Appin Road and Menangle Road. Connected to these, M31 Hume Motorway, Narellan Road and the planned Spring Farm Link Road form a major movement corridors providing access to the wider local and regional road network in the event of large scale evacuation of the precinct.

The GMGA 2040 Plan has earmarked road network upgrades and network capacity improvements along Appin Road, Narellan Road, Menangle Road, Spring Farm Link Road (new four lane linking M31 Hume Motorway to Appin Road), and a new interchange at Spring Farm Link Road and M31 Hume Motorway. The role of these higher order roads and road upgrades proposed within the GMGA 2040 Plan will be vital in dispersing traffic efficient along these regional routes in the event of evacuation of the precinct.

In this context, the most effective means of evacuation will be via private vehicles allowing Gilead residents more control over their own evacuation, and public buses (or private buses) for those residents who do not have or are unable to use their own vehicles. The designated regional road evacuation routes in the event of evacuation of the Gilead precinct are:

- | | | |
|--------------------------|--------------------|------------|
| • Appin Road (B69) | • Menangle Road | • M31 Hume |
| • Narellan Road (B69) | • Spring Farm Link | Motorway |
| • The Northern Road (A9) | Road | |

The access and egress within the Gilead precinct and the above regional routes are considered acceptable.

The Structure Plan provides numerous evacuation routes and ample opportunity to relocate from the area.

Traffic studies will be progressively delivered as development is undertaken.

We understand that Lendlease is awaiting access to the Department of Planning and Environment's traffic model for the broader Greater Macarthur region. That said the proposed higher order road network is consistent with the Department's Land Use Plan (refer to Figure 04) been identified to cater for traffic movements of both the Gilead development and broader region.

Given the low risk nature of the site, 100% evacuation is unlikely to occur or be required. It is anticipated that a combination of shelter in place and evacuation would occur and the proposed higher order road network is capable of facilitating evacuation in a bushfire event.

The access and egress routes are considered acceptable.



Figure 16: Proposed Structure Plan with identified access / egress points

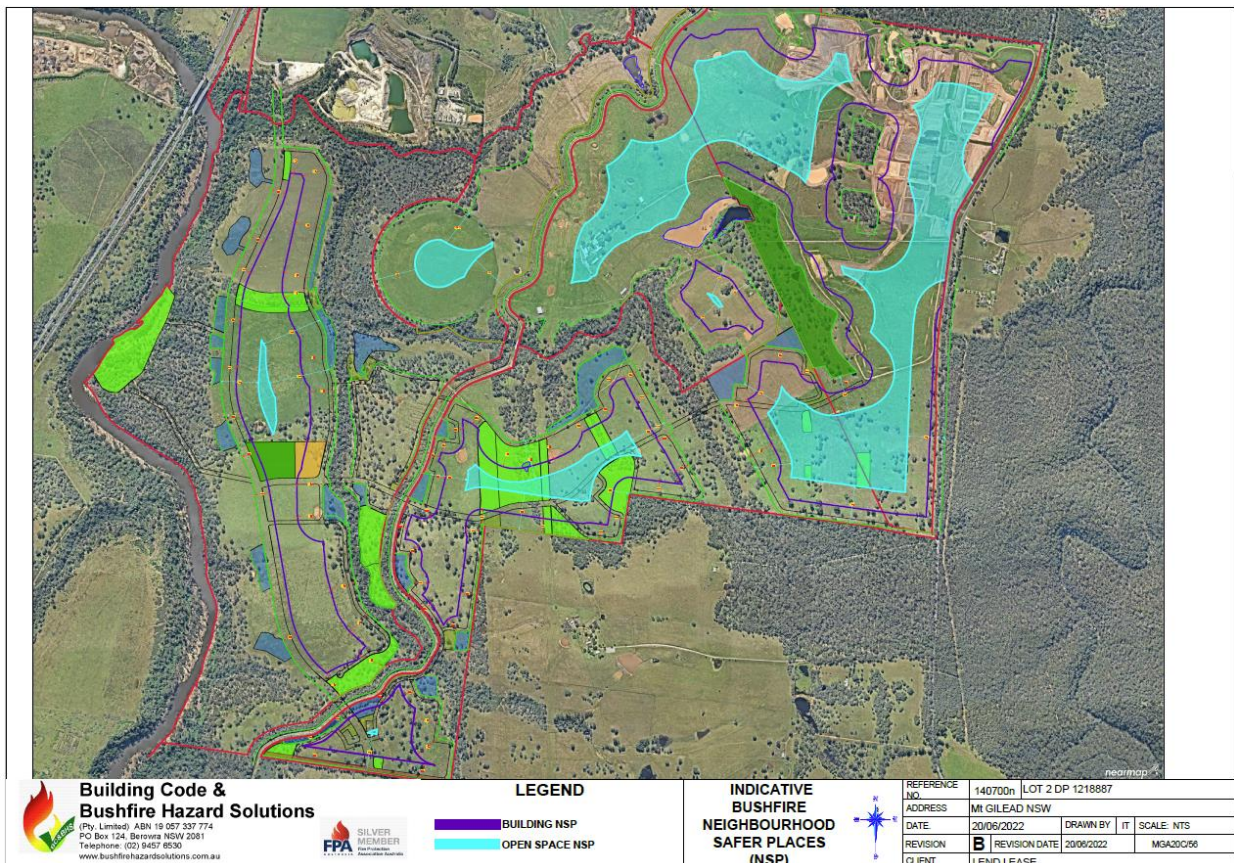


Figure 17: Proposed Structure Plan overlayed with Neighbouring Safer Places setbacks

Emergency Services

In some circumstances the scale of a planning proposal warrants a need to include provisions for a new fire station.

The site is located within a NSW Rural Fire Service area, with a station (Wedderburn Rural Fire Brigade) located along Wedderburn Road to the east of the subject site. Additional NSW Rural Fire Service stations are also located at Lynwood Park, Menangle and Menangle Park.

NSW Fire & Rescue also have stations located within the nearby townships of Rosemeadow and Campbelltown.

The Greater Macarthur 2040 Interim Plan identifies that two (2) new permanently staffed fire stations will be constructed and operated at Gilead and Appin.

In accordance with the Greater Macarthur 2040 Interim Plan the Structure Plan includes provision for a new fire station in the Utility and Service land use area adjacent the east / west Collector Road.

Infrastructure

An assessment of the issues associated with infrastructure and utilities must be undertaken. This assessment is to include the ability of the reticulated water system to deal with a major bushfire event in terms of pressures, flows and spacing of hydrants.

The site includes the following service infrastructure:

- Sydney Water Upper Canal,
- Central trunk gas line,
- Eastern gas pipeline,
- Two (2) high voltage electrical transmission lines,
- 10 metre wide water easement, and
- APA group gas line.

This infrastructure is generally located centrally within the site, travelling in a north-south direction, and will not be relocated as part of the proposed Structure Plan.

The proposed land use has responded to this existing infrastructure, specifically shifting the location of the proposed school away from the gas pipelines and high voltage electrical transmission lines.

The sizing, spacing and pressures of any future hydrant system within the precinct will comply with AS2419.1-2005. This hydrant system will be managed by Sydney Water, with system in place to increase capacity as needed.

Adjoining Lands

Consideration must be given to any implications that may be experienced on adjoining land as a result of the proposed land uses.

In this instance the proposed rezoning has not direct interface with any existing urban development. The proposed Structure Plan also does not propose any Conservation Areas immediately adjacent the adjoining Figtree Hill.

There will therefore be no increased pressure on Bushfire Protection Measures for adjacent lands.

8.02 Planning for Bush Fire Protection

As the strategic issues have been satisfactorily addressed in the SBFS, an assessment of compliance with PBP is required. This section addresses the capacity of the future Masterplan and subsequent stages to comply with the relevant specifications and requirements of PBP.

The application of PBP requires satisfactory demonstration of the aim and objectives and the specific objectives and bushfire protection measures relevant to the type of development. The bushfire protection measures detailed in Chapter 5-8 of PBP have been considered for the future Residential, Special Fire Protection Purpose and Commercial development.

The following table details the aim and objectives of *Planning for Bush Fire Protection 2019* and the proposals ability to comply.

Aim / Objective	Comment
<i>The aim of PBP is to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.</i>	With the inclusion of the recommendations made herein it is of our opinion that the aim of PBP has been satisfied.
<i>(i) afford buildings and their occupants protection from exposure to a bush fire;</i>	<p>The proposed land uses can support the minimum required Asset Protection Zones for residential and SFPP development.</p> <p>In conjunction with the application of the relevant Bushfire Attack Level under Australian Standard 3959 'Construction of buildings in bushfire-prone areas' future buildings and their occupants will be afforded protection from exposure to a bushfire.</p>
<i>(ii) provide for a defensible space to be located around buildings;</i>	<p>The future Masterplan will include perimeter roads to all conservation areas and identified bushfire hazards.</p> <p>These perimeter roads will also be serviced by hydrants at regular intervals, providing a logical fire-fighting platform and defensible space for attending fire services.</p>
<i>(iii) provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;</i>	The application of the minimum required APZs in conjunction with the relevant Bushfire Attack Level for the future buildings will prevent the likely fire spread to buildings.

Aim / Objective	Comment
<i>(iv) ensure that appropriate operational access and egress for emergency service personnel and occupants is available;</i>	<p>The delivery of the overall Structure Plan will see access / egress opportunities to the east, through Figtree Hill to Appin Road and to the northwest, via a newly constructed bridge to Medhurst Road. In addition provision has been included for a future connection to the south into neighbouring precincts.</p> <p>The Structure Plan provides numerous evacuation routes and ample opportunity to relocate from the area.</p> <p>The future Masterplan will include perimeter roads adjacent all conservation areas and identified bushfire hazards.</p> <p>The perimeter roads will provide direct access for attending fire services undertaking hazard reduction or fire suppression activities.</p> <p>All roads within the precinct and adjacent Figtree Hill will comply with the Access requirements detailed in PBP.</p>
<i>(v) provide for ongoing management and maintenance of bush fire protection measures, (BPMs); and</i>	<p>The specific bush fire protection measures of the future developments will be addressed within the submission documents of those developments.</p>
<i>(vi) ensure that utility services are adequate to meet the needs of firefighters.</i>	<p>The capabilities of the broader hydrant network is the responsibility of Sydney Water.</p> <p>The sizing, spacing and pressures of any future hydrant system within the site must comply with AS2419.1-2005.</p> <p>These future hydrants are considered to be the logical water supply for fire services undertaking hazard reduction and / or fire suppression activities.</p>

It is therefore of our opinion that the proposal can satisfactorily comply with the aim and objectives of *Planning for Bush Fire Protection 2019*.

Asset Protection Zones

Asset Protection Zones (APZs) for Special Fire Protection Purpose (SFPP) developments are determined from Table A1.12.1 of *Planning for Bush Fire Protection* 2019 (PBP) or bushfire design modelling achieving a radiant heat impact of no more than 10 kW/m² at a building footprint.

The minimum required Asset Protection Zones for the future SFPP development were determined from Table A1.12.1 of PBP and are depicted on the attached SFPP APZ Overlay (attachment 01).

APZs for residential subdivision and increased density are determined from Table A1.12.2 of PBP or bushfire design modelling achieving a radiant heat impact of no more than 29 kW/m² at a building footprint.

The minimum required Asset Protection Zones for the future residential development were determined from Table A1.12.2 of PBP and are depicted on the attached Residential APZ Overlay (attachment 02).

The Structure Plan has the capacity to comply with the minimum required Asset Protection Zones as detailed in PBP.

Fire Fighting Water Supply

The sizing, spacing and pressures of any future hydrant system must comply with AS2419.1-2005.

The future residential developments have the capacity to comply with the Water Supply requirements as detailed in PBP.

Access

Planning for Bush Fire Protection addresses design considerations for internal roads (public roads) for properties determined to be bushfire prone. In a bush fire prone area, the purpose of the road system is to:

- provide firefighters with access to structures, allowing more efficient use of firefighting resources;
- provide evacuation routes for firefighters and the public; and
- provide access to areas of bush fire hazard for firefighting and hazard mitigation purposes.

The Structure Plan does not include a detailed road design however does provide access / egress opportunities to the east, through Figtree Hill to Appin Road and to the northwest, via a newly constructed bridge to Medhurst Road. In addition provision has been included for a future connection to the south into neighbouring precincts. Refer to Figure 16.

The future Masterplan will include perimeter roads adjacent all conservations areas and identified bushfire hazards.

All roads within the precinct and adjacent Figtree Hill will comply with the Access requirements detailed in PBP.

9.0 Conclusion

Building Code and Bushfire Hazard Solutions P/L has been commissioned by Lendlease Communities (Figtree Hill) Pty Ltd to prepare an independent Strategic Bush Fire Study for its land holdings at Gilead.

The Planning Proposal will establish the Urban Development Zone for land capable of development and introduce a C2 Environmental Conservation zone for land containing key fauna habitat to be retained as well as land that native bushland is to be reconstructed. This report specifically addresses the strategic bushfire planning requirements and has been used to shape and inform the Planning Proposal and associated development outcomes.

The subject site is depicted on Campbelltown Council's Bushfire Prone Land Map as containing Category 1 and 3 Vegetation and their associated buffer zones and is therefore considered 'bushfire prone'.

We are satisfied that the proposed Structure Plan has the capacity to comply with the relevant specifications and requirements of Planning for Bush Fire Protection 2019.

Furthermore we are satisfied that the Structure Plan, in combination with the bushfire protection measures discussed herein will not result in areas that are difficult to evacuate, create control difficulties during a bushfire or adversely affect other bush fire protection strategies or place existing development at increased risk.

We are therefore in support of the Planning Proposal.

Should you have any enquiries regarding this project please contact me at our office.

Prepared by
Building Code & Bushfire Hazard Solutions P/L



Stuart McMonnies

Manager Bushfire Section
G. D. Design in Bushfire Prone Areas.
Certificate IV Fire Technology
Fire Protection Association of Australia BPAD – L3 Accredited Practitioner
Certification number – BPAD9400



10.0 Annexure 01

List of Referenced Documents

Campbelltown Council (2020). Campbelltown (Sustainable City) Development Control Plan – Volume 2, Site Specific Development control Plans, Part:7 Mt Gilead.

Eco Logical Australia (2021). Strategic Bushfire Study – Greater Macarthur Growth Area: Land Release Area

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

NSW Department of Planning and Environment (2018). Great Macarthur 2040 – An interim plan for the Greater Macarthur Growth Area.

Rural Fires Act 1997

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Rural Fire Service NSW (2005). *Standards for Asset Protection Zones*

Rural Fire Service (2019). *Comprehensive Vegetation Fuel Loads*

Rural Fire Service (2017). *NSW Local Government Areas FDI*

Rural Fire Service (2017). Neighbourhood Safer Places – Guidelines for the identifications and inspection of Neighbourhood Safer Places in NSW.

Standards Australia (2018). *AS3959 Construction of buildings in bushfire-prone areas*.

Acknowledgements to:

Geoscience Australia
Nearmap
Eco Logical Australia (vegetation mapping)

Attachments

Attachment 01:	Special Fire Protection Fire Asset Protection Zone Overlay
Attachment 02:	Residential Asset Protection Zone Overlay
Attachment 03:	Neighbourhood Safer Place Overlay



**Building Code &
Bushfire Hazard Solutions**

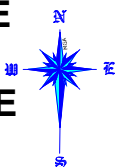
(Pty. Limited) ABN 19 057 337 774
PO Box 124, Berowra NSW 2081
Telephone: (02) 9457 6530
www.bushfirehazardsolutions.com.au



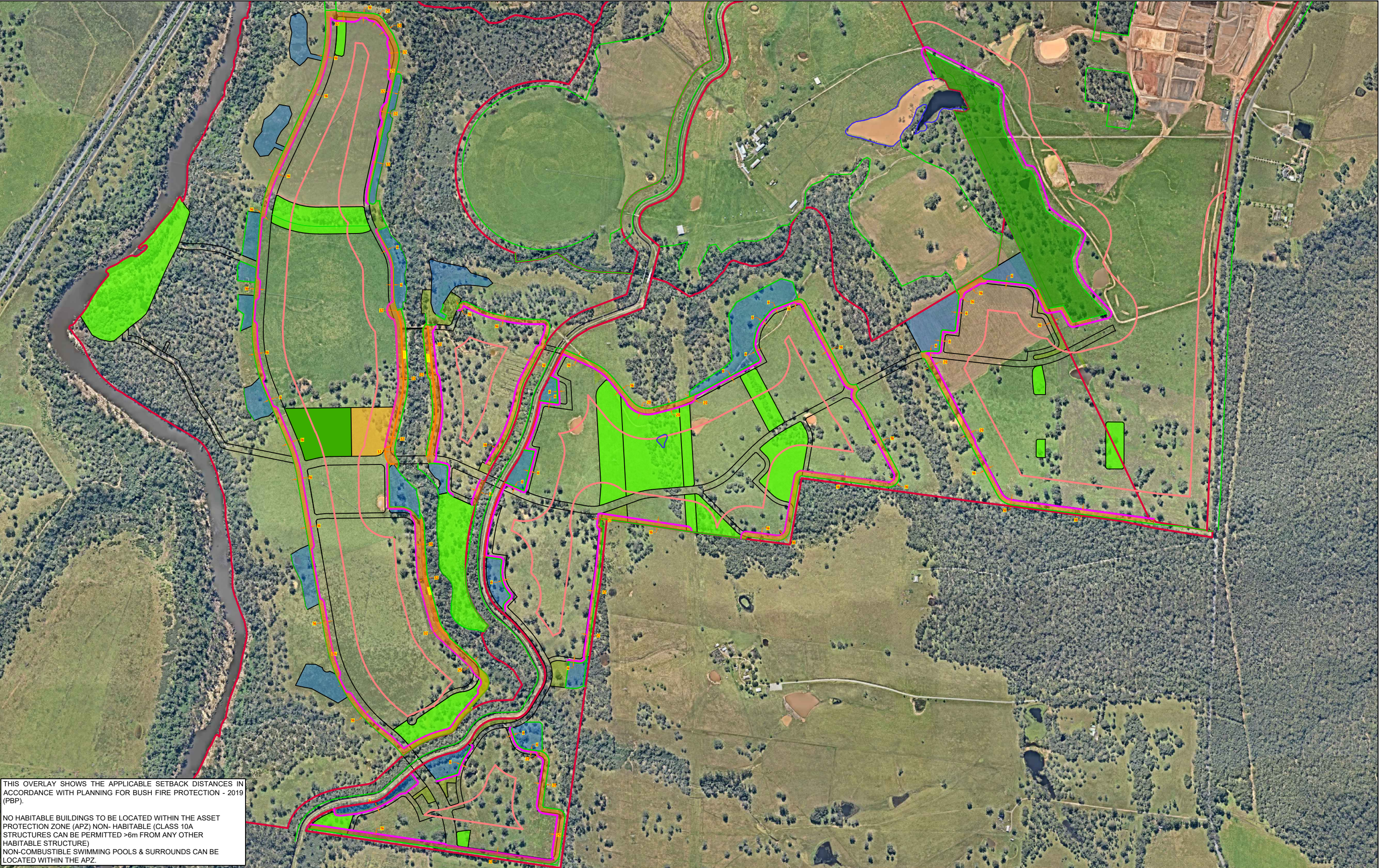
LEGEND

 **SFPP**

**INDICATIVE BUSHFIRE
SPECIAL FORE
PROTECTION PURPOSE
(SFPP)**



REFERENCE NO.	140700n	LOT 2 DP 1218887			
ADDRESS	Mt GILEAD NSW				
DATE.	20/06/2022		DRAWN BY	IT	SCALE: NTS
REVISION	B	REVISION DATE	20/06/2022		MGA20C/56
CLIENT	LEND LEASE				



THIS OVERLAY SHOWS THE APPLICABLE SETBACK DISTANCES IN ACCORDANCE WITH PLANNING FOR BUSH FIRE PROTECTION - 2019 (PBP).

NO HABITABLE BUILDINGS TO BE LOCATED WITHIN THE ASSET PROTECTION ZONE (APZ) NON- HABITABLE (CLASS 10A STRUCTURES CAN BE PERMITTED >6m FROM ANY OTHER HABITABLE STRUCTURE)

NON-COMBUSTIBLE SWIMMING POOLS & SURROUNDS CAN BE LOCATED WITHIN THE APZ.



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LEGEND

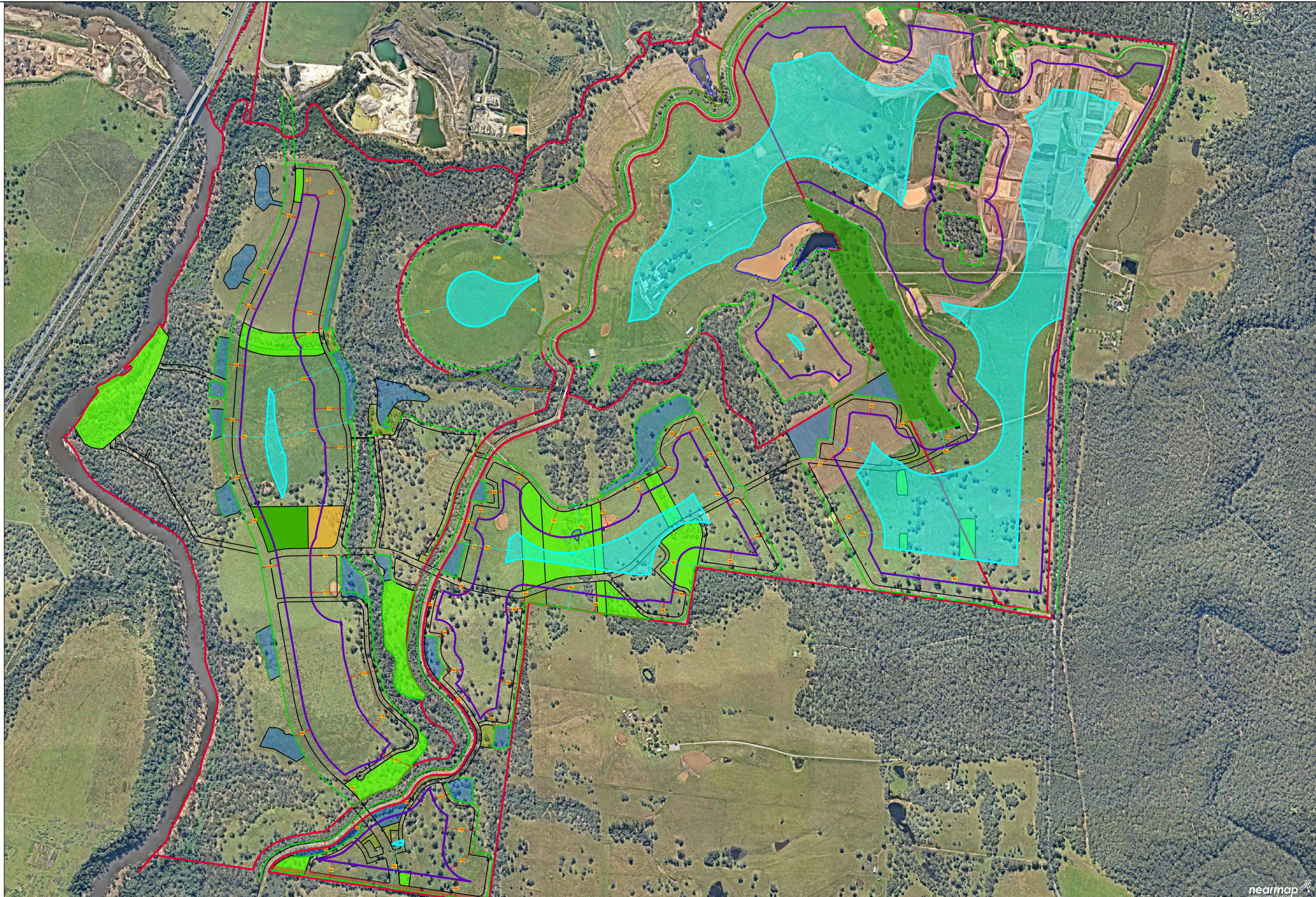
APZ - IPA

BAL 29

BAL LOW (≥100m)

INDICATIVE BUSHFIRE CONSTRUCTION (BAL) OVERLAY

REFERENCE NO.	140700n	LOT 2 DP 1218887
ADDRESS	Mt GILEAD NSW	
DATE.	20/06/2022	DRAWN BY IT SCALE: NTS
REVISION	B	REVISION DATE 20/06/2022 MGA20C/56
CLIENT	LEND LEASE	



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LEGEND

- BUILDING NSP
- OPEN SPACE NSP

INDICATIVE BUSHFIRE NEIGHBOURHOOD SAFER PLACES (NSP)



REFERENCE NO.	140700n	LOT 2 DP 1218887			
ADDRESS	Mt GILEAD NSW				
DATE.	20/06/2022		DRAWN BY	IT	SCALE: NTS
REVISION	B	REVISION DATE	20/06/2022		MGA20C/56
CLIENT	LEND LEASE				