

Bushfire Assessment Report

Proposed:
Mixed Use Development

At:
**741 Cudgen Road,
Cudgen NSW**

Reference Number: 240188

28 November 2023



Prepared By:
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Version Control				
Version	Date	Author	Reviewed	Details
1	7/11/2023	Stuart McMonnies	Andrew Muirhead	Draft Report
2	28/11/2023	Stuart McMonnies		Final Report

List of Abbreviations:

APZ	Asset Protection Zone
BPMs	Bushfire Protection Measures
BPLM	Bushfire Prone Land Map
Council	Tweed Shire Council
DA	Development Application
EP&A Act	Environmental Planning and Assessment Act 1979
FRNSW	Fire & Rescue NSW
IPA	Inner Protection Area
NCC	National Construction Code
OPA	Outer Protection Area
PBP	Planning for Bush Fire Protection 2019
PP	Planning Proposal
RFS	NSW Rural Fire Service
SFPP	Special Fire Protection Purpose
SEPP	State Environmental Planning Policy

Executive Summary

Building Code and Bushfire Hazard Solutions P/L has been commissioned by Centuria Capital to prepare an independent Bushfire Assessment Report for a Planning Proposal which seeks to facilitate a suite of health, residential and education-led land uses at 741 Cudgen Road, Cudgen.

Referred to as 'Cudgen Connection', the proposal comprises a best practice development proposal to facilitate a genuine, integrated health precinct, magnifying the NSW State Government's new Tweed Valley Hospital (TVH) into a \$1+ billion health and education precinct. Immediately adjoining the TVH, Cudgen Connection includes more than \$300 million of investment to provide facilities including, but not limited to:

- Private Hospital
- Private Mental Health Hospital
- Medi-Hotel
- Specialist Suites
- University Campus
- Essential Worker Housing
- Community Hub
- Shops
- Food & Drink Options
- Open Spaces and Plaza
- High Speed Fibre Cable Network
- Childcare
- Bus Interchange
- Undercroft & Street Carparking

The subject site comprises of an existing allotment (zoned RU1: Primary Production) located within Tweed Shire Council's local government area.

In this instance the subject site is depicted on Council's Bushfire Prone Land Map as containing Category 3 Vegetation and Vegetation Buffer. The subject site is therefore considered 'bushfire prone'.

To facilitate the future health, residential, retail and education land uses a Planning Proposal (PP) is required in the first instance to modify the land zoning.

In relation to this PP Tweed Shire 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 Strategic Bush Fire Study has been undertaken and concluded the proposal is appropriate in the bushfire hazard context.

A key consideration for planning proposals in bushfire prone areas is limiting or excluding incompatible development commensurate with the level of risk. In this regard the subject site is considered to have a low bushfire risk when considering the characteristics of the vegetation including fragmentation, public exposure and access and previous bushfire history.

In addition to the Strategic Bush Fire Study an assessment of the proposed land zoning against the specific Bushfire Protection Measures of PBP has concluded that future Development Applications have the capacity to satisfy this document.

It is of our opinion that the proposal provides an appropriate combination of Bushfire Protection Measures (BPMs) in accordance with *Planning for Bush Fire Protection 2019*.

Furthermore, we are satisfied that the proposed Master 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 Centuria Capital to prepare an independent Bushfire Assessment Report for a Planning Proposal which seeks to facilitate a suite of health, residential and education-led land uses at 741 Cudgen Road, Cudgen.

Referred to as 'Cudgen Connection', the proposal comprises a best practice development proposal to facilitate a genuine, integrated health precinct, magnifying the NSW State Government's new Tweed Valley Hospital (TVH) into a \$1+ billion health and education precinct. Immediately adjoining the TVH, Cudgen Connection includes more than \$300 million of investment to provide facilities including, but not limited to:

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In this instance the subject site is depicted on Council's Bushfire Prone Land Map as containing Category 3 Vegetation and Vegetation Buffer. The subject site is therefore considered 'bushfire prone'.

In relation to this planning proposal Tweed Shire 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 specifications 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 to facilitate a future mixed-use development 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 'Residential and Rural Residential Subdivisions', Chapter 6 'Special Fire Protection Purpose Development' and Chapter 8 'Other Development' of PBP have also been considered for the future applications.

2.0 Purpose of Report

The purpose of this Bushfire Assessment Report 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 Bushfire Assessment Report addresses Section 4 'Strategic Planning' of *Planning for Bush Fire Protection* 2019.

3.0 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). 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.

4.0 Aerial Image, BPLM, Zoning, Structure Plan & Master Plan

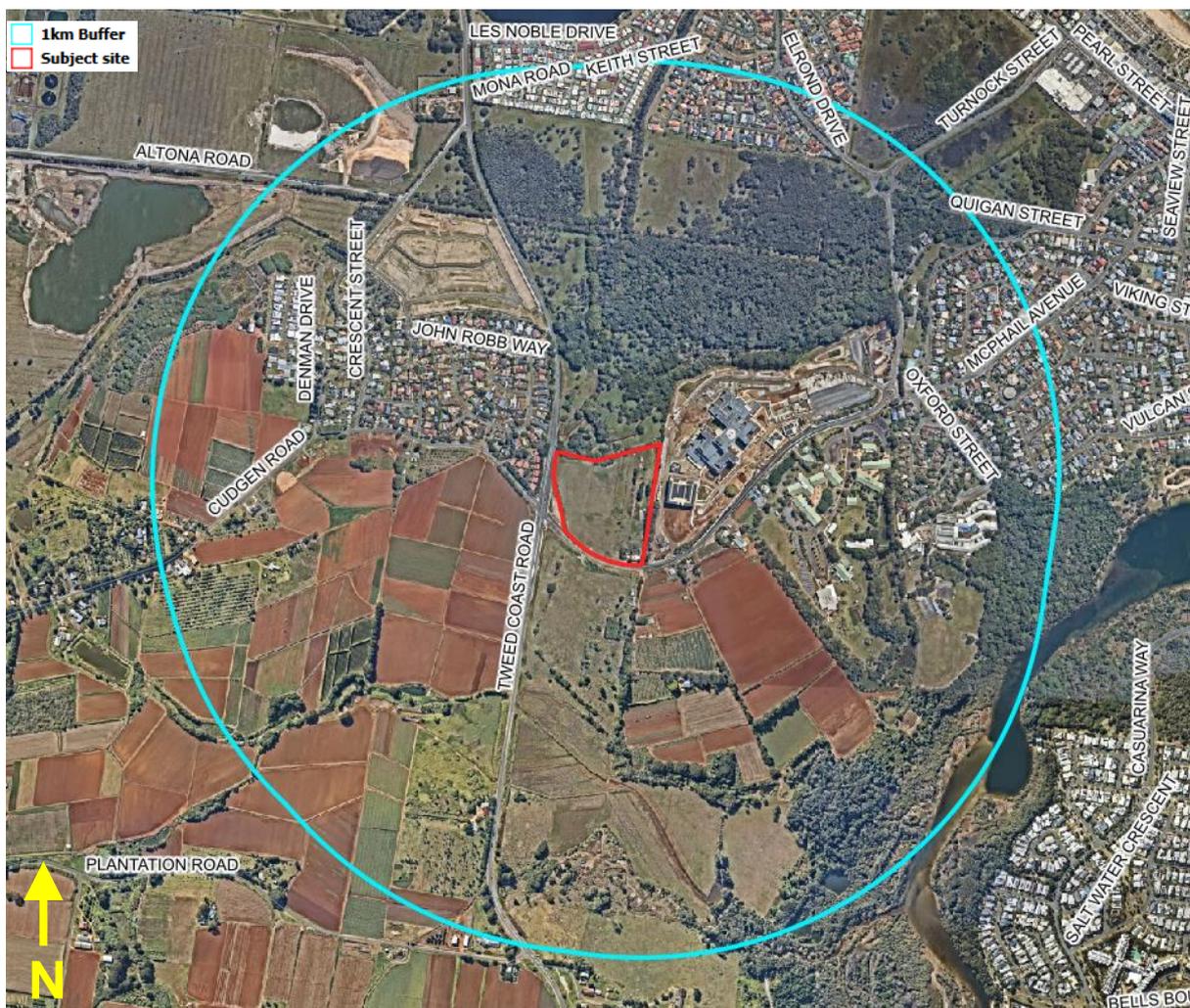


Figure 01: Aerial view of the subject area

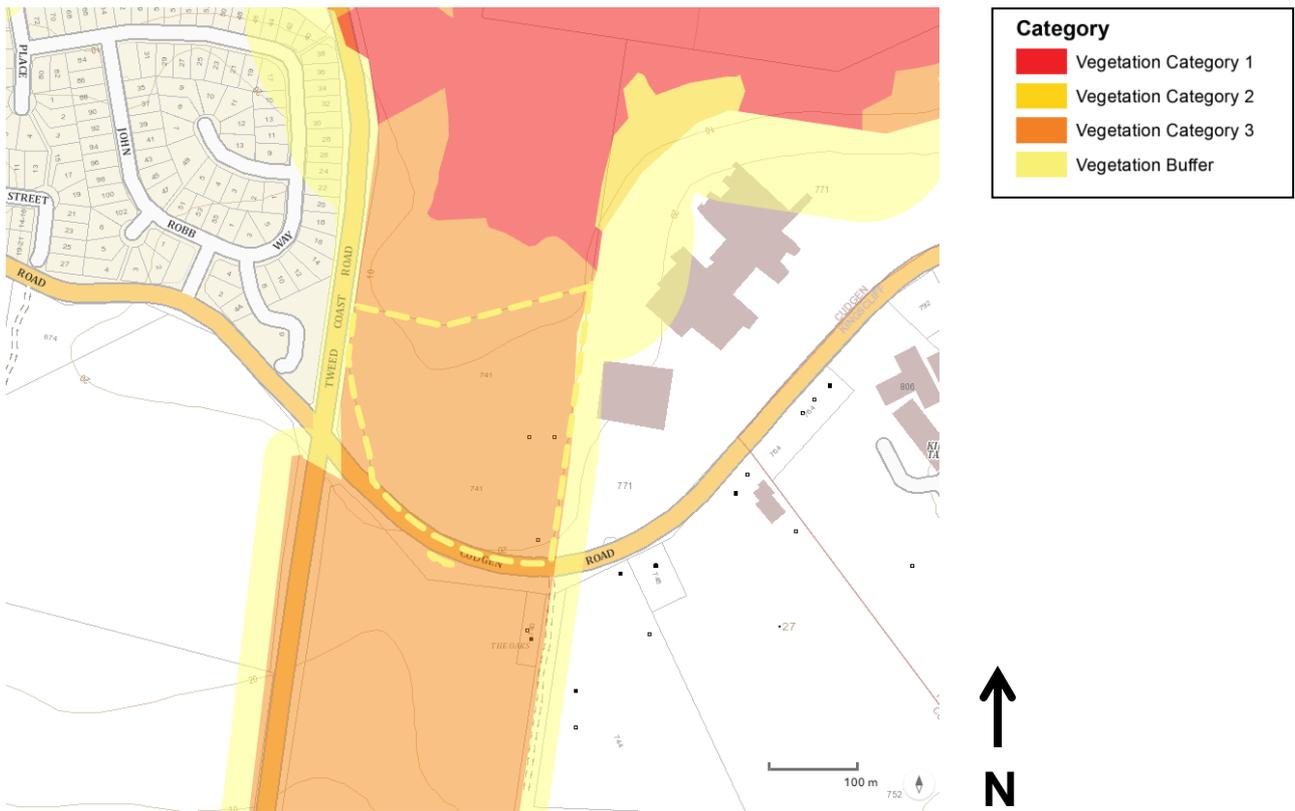


Figure 02: Extract from Tweed Shire Council's Bushfire Prone Land Map

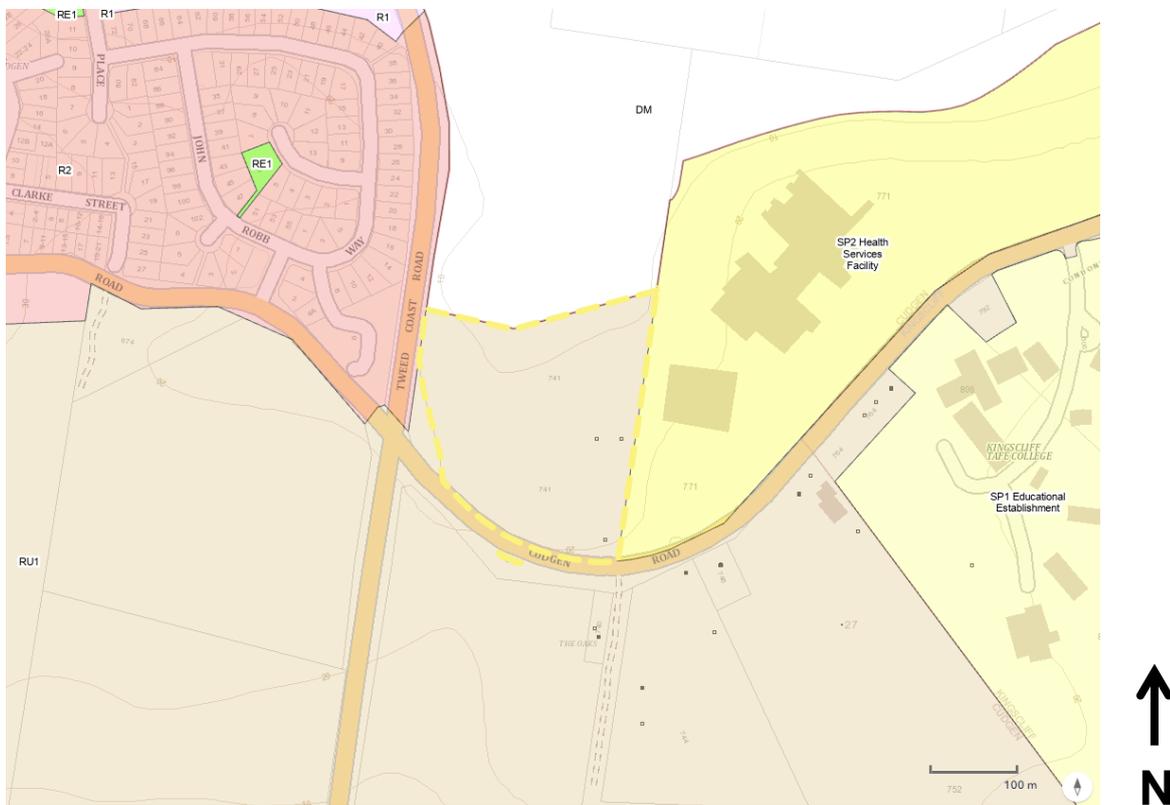


Figure 03: Land zoning of the subject area

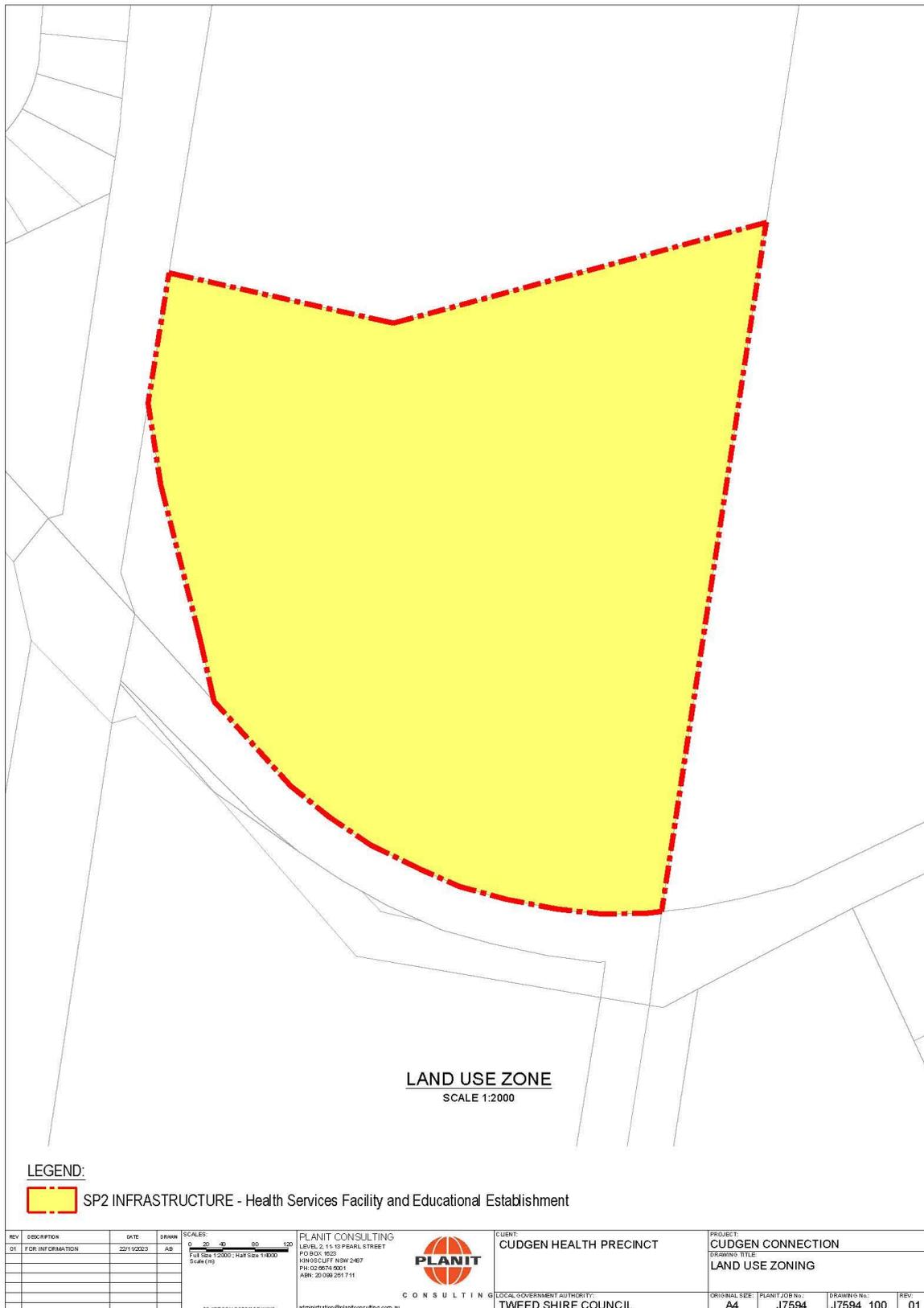


Figure 04: Proposed Zoning Map

5.0 Bushfire Assessment

5.01 Preface

Properties considered to be affected by possible bushfire impact are determined from the local Bushfire Prone Land Map as prepared by Council and/or the Rural Fire Service. All development within affected areas is subject to the application of the relevant specifications and requirements of 'Planning for Bush Fire Protection - 2019' (PBP).

PBP formally adopted on the 1st March 2020 provides for the protection of property and life (including fire-fighters and emergency service personnel) from bushfire impact.

In this instance the subject site is depicted on Council's Bushfire Prone Land Map as containing Category 3 Vegetation and Vegetation Buffer. The subject site is therefore considered '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 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.

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.*

We provide the following assessment in consideration of the above and *Planning for Bush Fire Protection 2019* to highlight the suitability of the site for residential development and the relevant Bushfire Protection Measures.

5.02 Strategic Bush Fire Study

Planning proposals which relate to bushfire prone properties require the preparation of a Strategic Bush Fire Study. The Strategic Bush Fire Study (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.

Once the strategic assessment has been addressed in the SBFS, an assessment of whether the future land uses can comply with the aim and objectives and specific bushfire protection measures of PBP must then be carried out. The assessment against PBP is addressed in section 5.03 of this report.

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.

A representative of Bushfire Hazard Solutions undertook a detailed site inspection on Thursday 21 September 2023. In addition to the collected site data this assessment has relied on:

- Aerial imagery of the subject area (NSW Spatial Services & Nearmap);
- 1 metre contour mapping of the subject area (Elevation and Depth Foundation Spatial Data – Geoscience Australia)
- NSW Planning Portal Spatial Viewer
- NSW State Vegetation Type Map (DPE 2022)
- *Figure 7 Ground-truthed vegetation mapping for the study area*, Cumberland Ecology

Location

The subject site comprises of an existing allotment legally identified as Lot 6 DP 727425 and known as 741 Cudgen Road, Cudgen (refer to Figure 02).

The subject site is located within Tweed Shire Council's local government area and is zoned RU1: Primary Production pursuant to *Tweed Local Environmental Plan 2014*.

The site has an area of approximately 5.69 hectares.

The new Tweed Valley Hospital, which is currently under construction, is located immediately to the east of the subject site.

The subject site has street frontage to Cudgen Road to the south and Tweed Coast Road to the west and abuts a large vegetated allotment to the north and Tweed Valley Hospital to the east.

The subject site is within the Far North Coast Bush Fire Management Committee (BFMC) area and Far North Coast Fire Weather District.

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 from the retained vegetation within the site.

The vegetation within the subject site was found to comprise of two distinct groups, being either highly modified (grazed pastures, managed land) or bushland (natural and small areas of exotic incursion).

To assess the potential fire runs into the site we have considered all bushfire hazards within 1 kilometre of the subject site. Refer to Figure 06 for the bushfire hazards within this area, which have been derived from Council's Bush Fire Prone Lands Map (Category 1 and 2 Vegetation).

Prevailing weather conditions associated with the bush fire season in the Far North Coast BFMC area are strong north to north westerly winds, with high temperatures and low humidity (Far North Coast Bush Fire Risk Management Plan, 2017).

In this instance there are no fire catchments to the northwest of the subject site, with this land comprising of new and established residential development and agricultural lands.

The vegetation in the broader landscape to the north and southeast, where fire catchments were identified, was found to be fragmented, broken by agricultural lands, educational establishments, roads and established residential development.

The comprehensive road network and surrounding developments also provide excellent exposure for the early detection of any unplanned fires in the broader landscape, facilitating an early response and ultimately suppression / containment by attending fire services.

The largest fire catchment was identified to be from the north and is approximately 900 metres in length. There has been no recorded wildfire along this catchment (source NPWS Fire History dataset, 120 year record period).

Bushfires impacting from this aspect, if travelling with prevailing weather conditions associated with the bush fire season in this region, will be influenced in a south-easterly direction toward the new Tweed Valley Hospital site.

The other identified catchment, to the southeast, provides a significantly smaller fire run (<300m) and would be burning against prevailing weather conditions to impact the subject site.



Figure 06: Aerial view of the subject area
1km buffer (blue dotted line), subject site (thick red outline), mapped vegetation (green shaded area)

In accordance with Appendix 1 'Site Assessment Methodology' of PBP we have undertaken an assessment of all vegetation formations within 140 metres of the development site for each aspect as per Keith (2004).

To establish the location and formation of retained vegetation within the subject site consideration has been given to *Figure 7 Ground-truthed vegetation mapping for the study area*, Cumberland Ecology.

In this regard it has been assumed that all areas outside the mapped 'PCT 3004: Far North Bangalow Palm Swamp Forest' will be managed in accordance with an Asset Protection Zone or developed.

Refer to Figure 09 for the extent of retained / protected vegetation within the subject site.



Figure 7. Ground-truthed vegetation mapping for the study area

Figure 07: Extract of Figure 7 Ground-truthed vegetation mapping for the study area (Cumberland Ecology)

It is acknowledged that the Kingscliff Locality Plan (B26, Tweed DCP 2008) identifies the land to the north of the subject site as 'Ecologically Significant' and 'Offset Planting Areas', suggesting future embellishment of the existing bushfire hazard could occur.

In this regard consideration has been given to the existing slashing ceasing and this slashed area regenerating. We received advice from the project ecologist that if slashing ceased it would initially remain weedy exotic grassland but in the long term would likely become mostly weedy rainforest regrowth, similar to that along the northern boundary of the subject site.

We have also considered the proposed planting shown on the approved Landscape Package for the adjacent Tweed Valley Hospital development.

This planting includes a narrow (approx. 10m) 'Vegetated Buffer' immediate adjacent most of the eastern boundary of the subject site. This 'Vegetated Buffer' widens (approx. 30m) along the Cudgen Road interface where it is opposite existing agricultural properties. The 'Vegetated Buffer' is broken by an entrance road and footpaths.

Collectively the 'Vegetated Buffer' was found to be marginally greater than a hectare in size (1.1ha) and is within 100 metres of Category 1 Vegetation, typically warranting consideration as a bushfire hazard.

The Bushfire Hazard Assessment Report (GeoLink, 2019) which formed part of the supporting package for the Tweed Valley Hospital SSDA (SSD-10353) considered the Landscape Package (included at Attachment C of that report) and provided the following compliance statement:

*A landscaping plan has been designed for the proposed development (refer to **Appendix C**) in accordance with the requirements of Appendix 4 of PBP Prerelease 2018. The full landscape package is appended to the Environmental Impact Statement for the proposal.*

The Bushfire Hazard Assessment Report assigned no hazard value to the proposed 'Vegetated Buffer', which at its closest point is approximately 34 metres from the Hospital building, referring to the dominant vegetation formation (within 140m) to the south and west to be 'Managed Land'.

The Development Consent for SSD-10353 includes a condition (B28(f)) that updated landscape plans must (amongst other conditions):

Comply with the principles of the current version of Planning for Bush Fire Protection

And at condition D35(c) that the applicant must prepare an Operational Landscape Management Plan to manage the revegetation and landscaping on-site and that this plan must (amongst other conditions):

Be consistent with the requirements of the most current version of Planning for Bushfire Protection

When considering the size, configuration and aforementioned conditions of consent we are prepared to support a Low Threat Vegetation classification in accordance with A1.10 of PBP for the 'Vegetated Buffer'.

The neighbouring private allotments to the south were found to be subject to varying degrees of management (crops, slashing, mowing and grazing). These allotments are zoned RU1: Primary Production.

We have reviewed historic high resolution aerial imagery to identify those allotments which present a grassland hazard from time to time. The potential grassland hazard was identified to be within neighbouring allotment to the south.

The vegetation to the south was subsequently assessed as a Grassland hazard.



Planning, Industry & Environment

Issued under the Environmental Planning and Assessment Act 1979

Approved Application no. SSD-10853

Signed: J. Capman

Granted on: 12 June 2020

8. LANDSCAPE MASTERPLAN



Fig 8.1 Landscape Zonal Plan

TWEED VALLEY HOSPITAL | SDR | LANDSCAPE REPORT

PREPARED BY TURF DESIGN STUDIO

OCTOBER 2019

1.4

Figure 08: Extract of the approved Landscape Masterplan for Tweed Valley Hospital

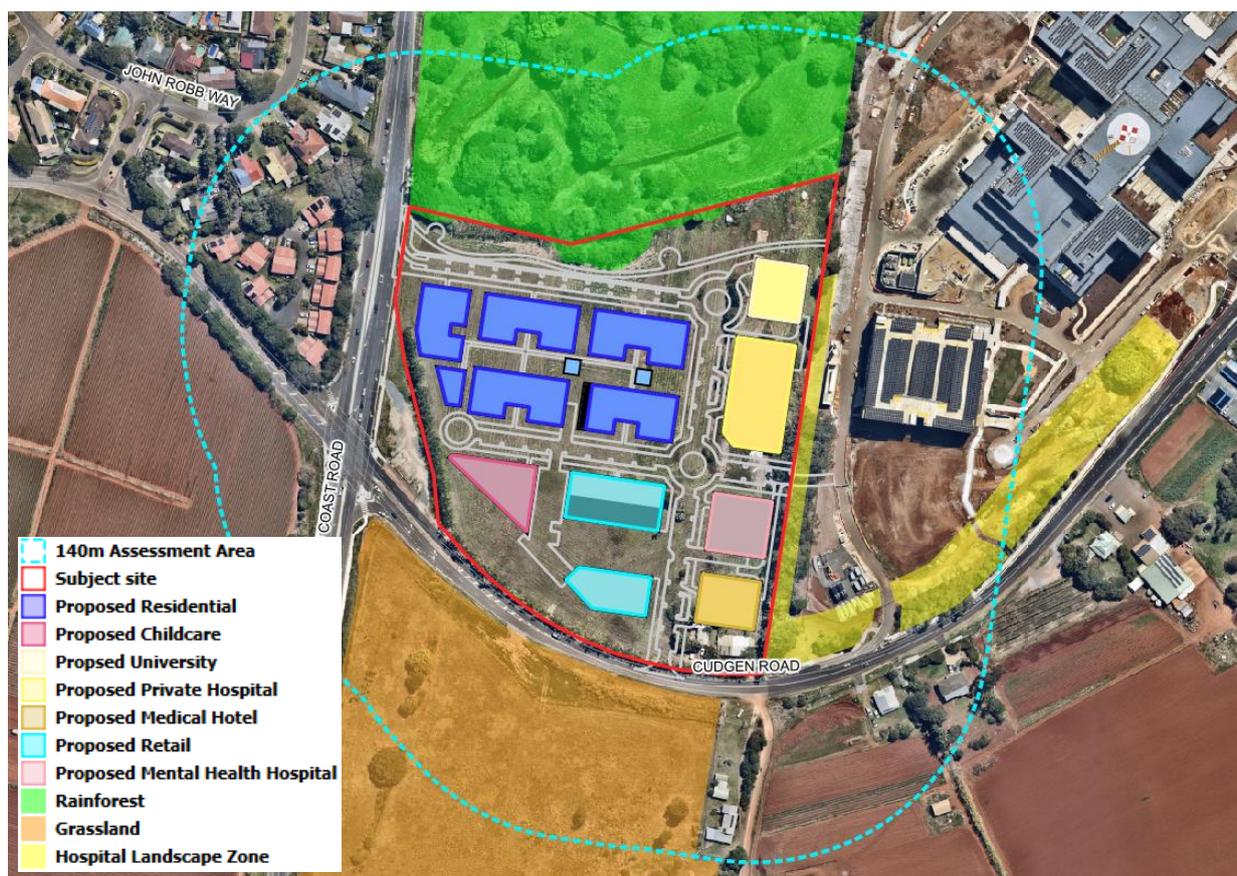


Figure 09: Aerial view of the subject area overlaid with vegetation assessment summary

The following vegetation parameters apply to the mapped vegetation:

Plant Community Type	Formation	Class	Surface and Elevation Fuel Load*	Overall Fuel Load (including bark and canopy)*
Far North Bangalow Palm Swamp Forest (PCT 3004)	Rainforests	Subtropical Rainforests	10 t/ha	13.2 t/ha
Grassland	Grassland	Grassland	6.0 t/ha	6.0 t/ha

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

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.

In accordance with A1.4 'Determine slope' of PBP the slope assessment is to be derived from the most detailed contour data available.

The slope that would **most significantly** influence bushfire impact was determined using 2 metre LiDAR contour mapping of the subject area.



Figure 10: Aerial image overlaid with contour data, ELVIS – Geoscience Australia (1 metre contours)

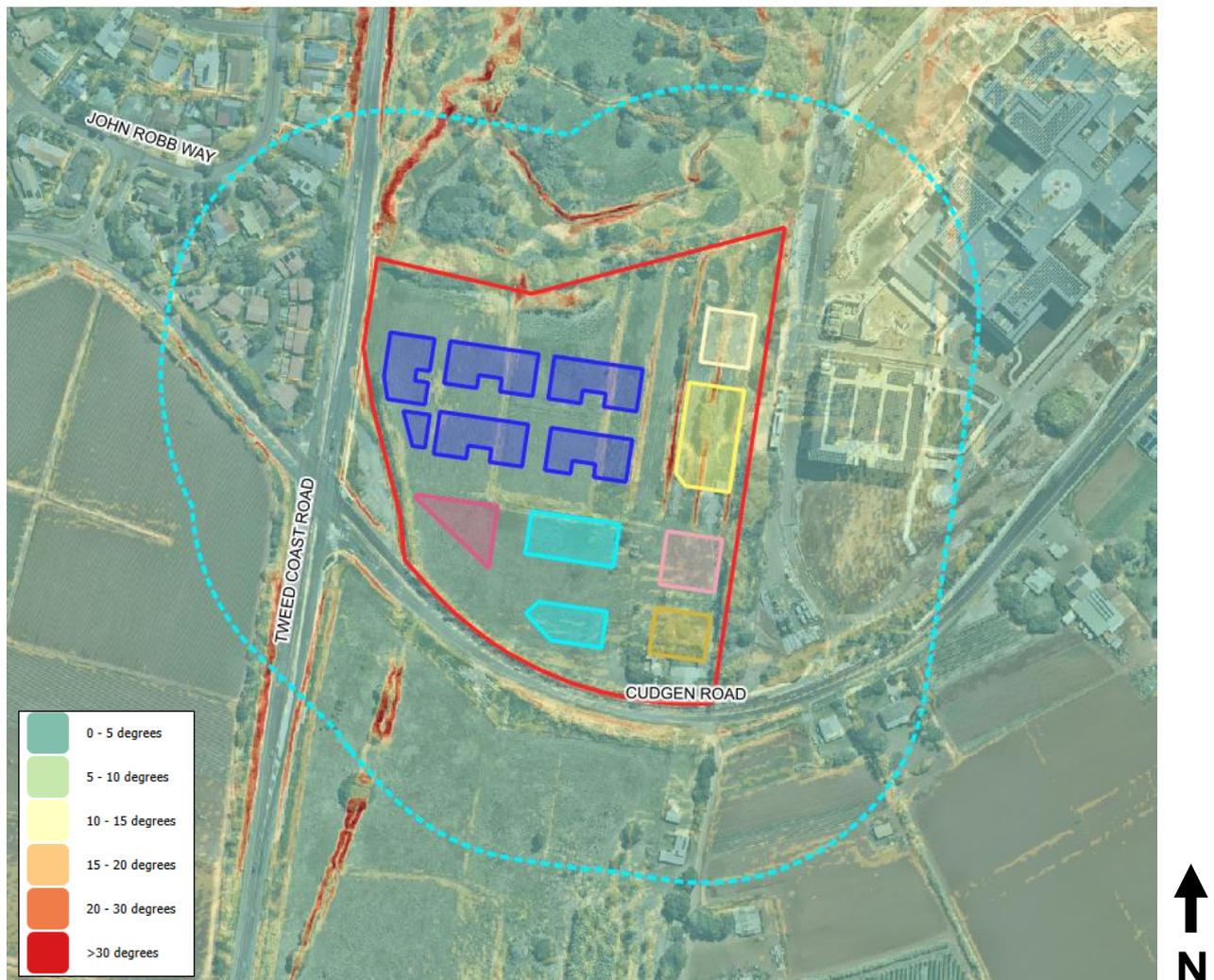


Figure 11: Slope categorisation for the subject site and surrounding area

Fire Weather

The FDI required to be used for development assessment purposes is based on local government boundaries, being Tweed Shire Council in this instance.

In accordance with the NSW Rural Fire Service publication 'NSW Local Government Areas FDI' (2017) Tweed Shire Council forms part of the Far North Coast Fire Weather District and attracts an FDI of 80.

As there are identified grassland hazards identified within the assessment area, Table 5.1.4a of PBP was also used to determine a Grassland Fire Danger Index (GFDI) of 110 for this hazard.

Previous Bushfire History

There are areas within NSW which have significant fire history and are recognised as known fire paths. While the fire history is more commonly considered as part of strategic planning (to ensure future development is not exposed to an unacceptable risk), it is useful to consider at a Development Application phase to ensure the land is suitable for development in the context of bushfire risk.

In this instance the closest recorded wildfires were found to be located 450 metres to the southeast of the subject site (source NPWS Fire History dataset). This fire occurred in the 1996-97 fire season.

Prevailing weather conditions associated with the bush fire season in the Far North Coast BFMCA area are strong north to north westerly winds, with high temperatures and low humidity. In this regard it is noted that there are no fire catchments to the northwest of the subject site.

The subject site is therefore not considered to be within a known fire path. Furthermore, in consideration of the previous bushfire history the likelihood of a bushfire occurring within the immediate area is considered unlikely.

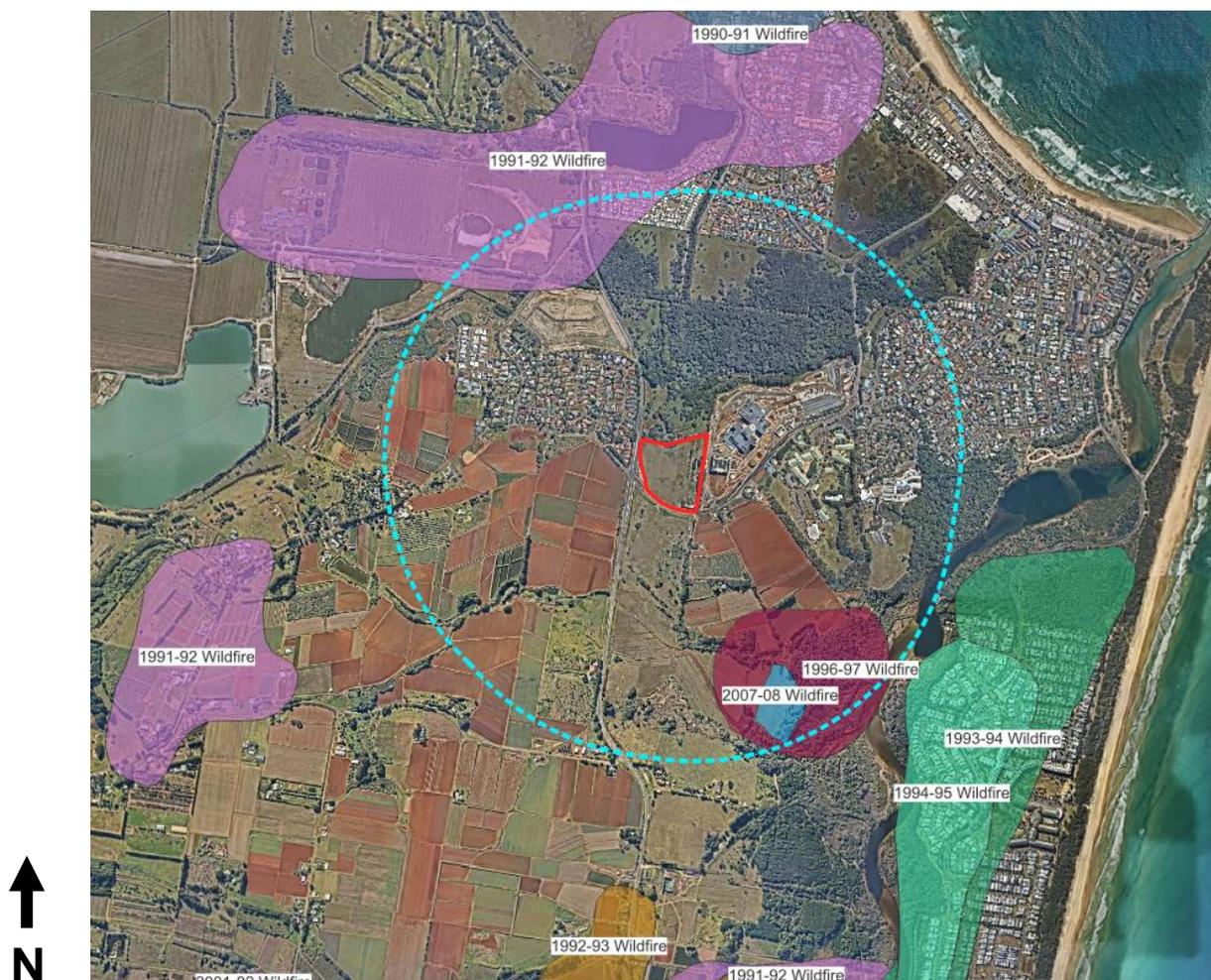


Figure 12: Aerial view of the subject area with previous wildfire history layer
Subject site (thick red outline) and 1km buffer (blue dotted line)
(source NPWS Fire History)

Potential Fire Behaviour

In this instance it has been identified that the largest fire catchments to the subject site are from the north and southeast.

In applying the parameters described in this section, higher fuel loads (consistent with Forest) and FDI (100) as a margin of safety and the accepted assessment methodology described in PBP bushfire design modelling was undertaken to determine the intensity of two potential bushfires. These being:

1. A bushfire burning from the north through vegetated allotments toward the subject site. The vegetation to this aspect provides the largest catchment toward the subject property. This is also an aspect which is associated with elevated fire behaviour; and
2. A bushfire burning from the southeast through vegetated associated with Cudgen Creek. 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. It is also acknowledged that the vegetation to this aspect is fragmented due to roads, Cudgen Creek and managed properties.

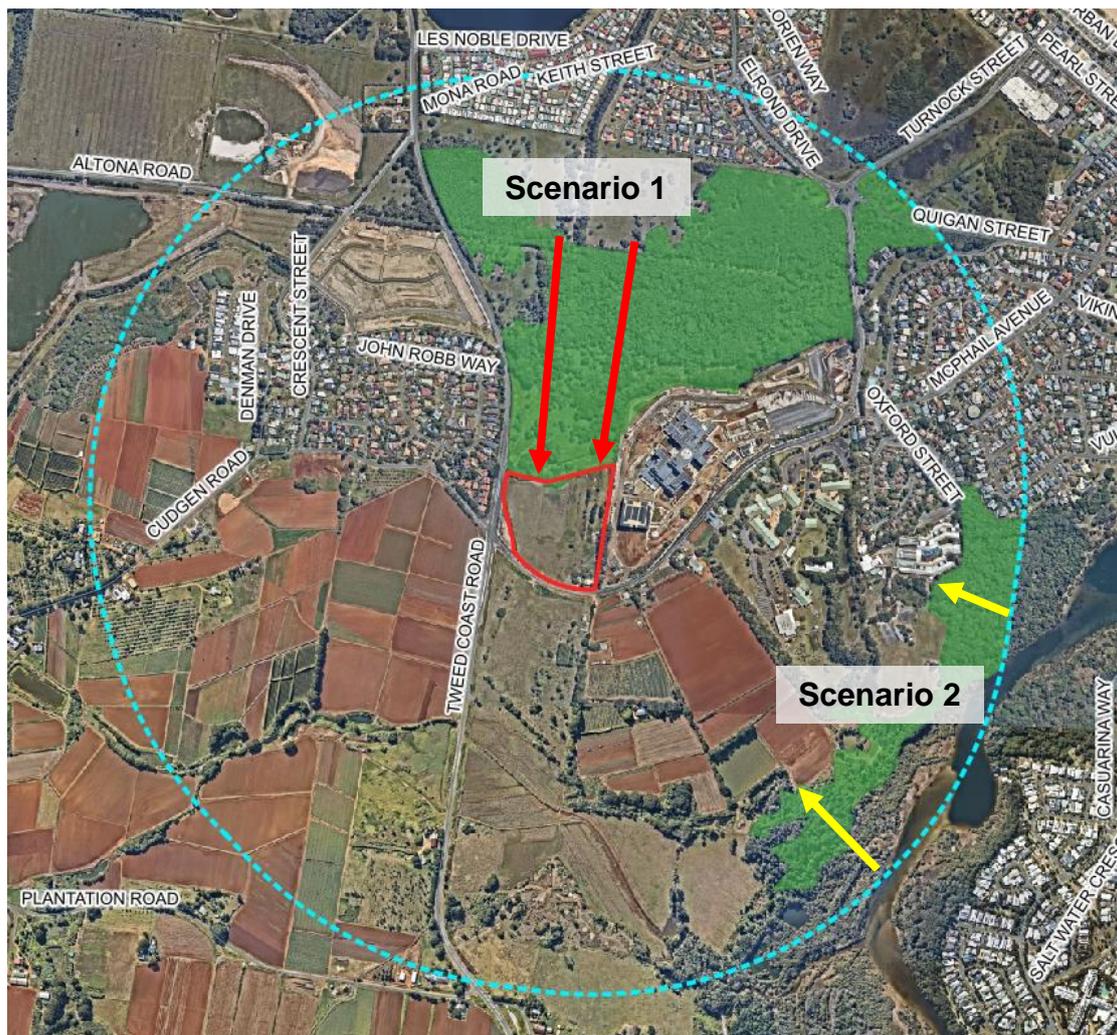


Figure 13: Aerial view of the subject area showing assessed fire runs

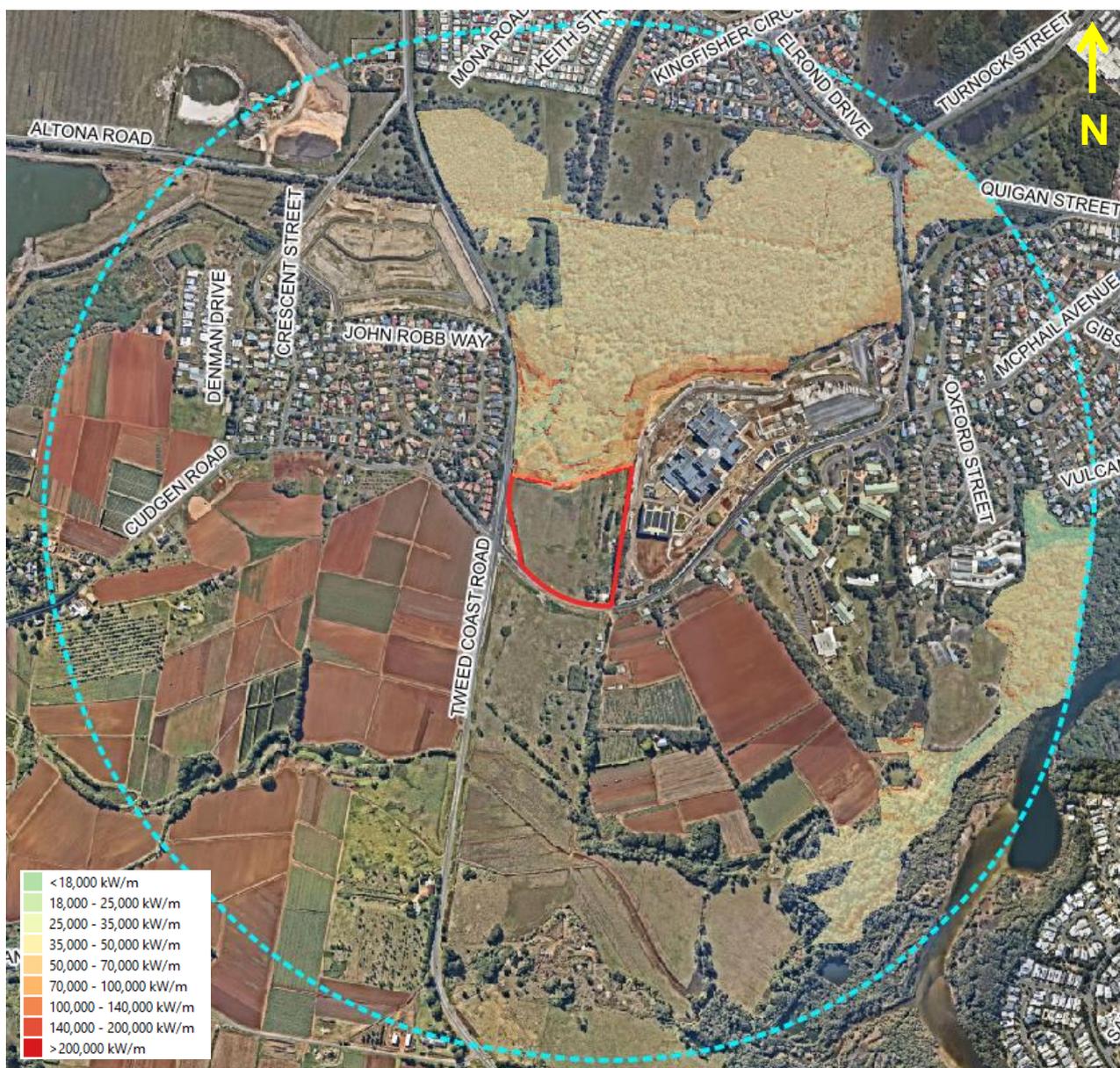


Figure 14: Fire intensity mapping of Scenario 1 (North)
 Subject site (red outline) and 1 kilometer buffer (blue outline)

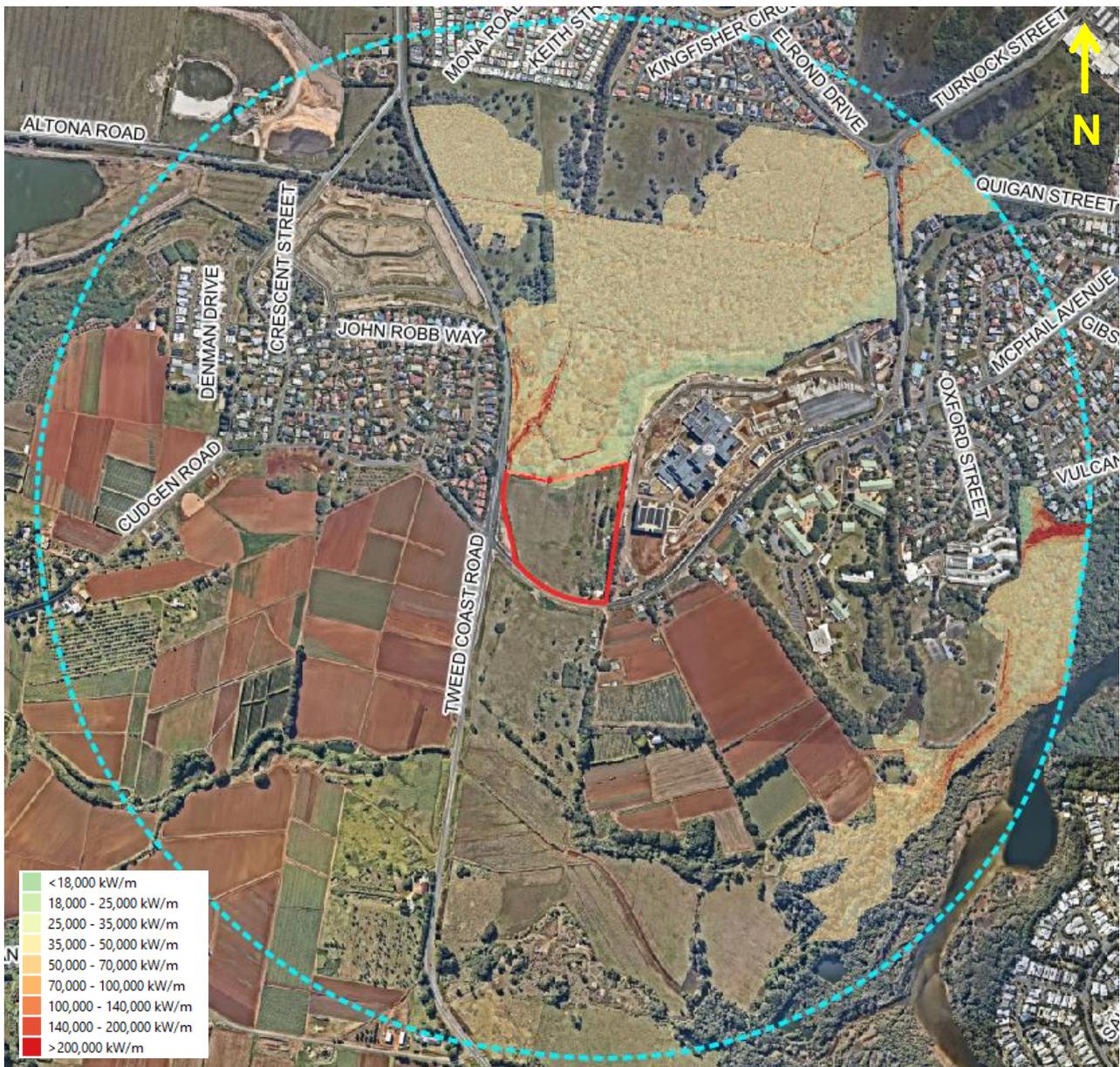


Figure 15: Fire intensity mapping of Scenario 2 (Southeast)
Subject site (red outline) and 1 kilometer buffer (blue outline)

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 access to the identified bushfire hazard to the north is available via Tweed Coast Road, Turncock Street, Elrond Drive and the perimeter access road within the adjacent Tweed Valley Hospital site.

In addition, the subject development also includes a perimeter road providing additional access opportunities for attending fire services undertaking hazard reduction or fire suppression activities.

In consideration of the comprehensive access available and its exposure to the public the identification and subsequent extinguishment / containment of a bushfire within the immediately study area is considered probable.



Figure 16: Aerial view of the subject area overlaid with roads and trails
(source Transport NSW)

Land Use Assessment

The Land Use Assessment identifies the most appropriate locations in the Master Plan area for the proposed land uses.

In this instance the proposal provides a mix of land uses including open space, residential, retail, hospital, hotel and university. In a bushfire planning context the various land uses present different risk profiles and as such are assessed differently under Planning for Bush Fire Protection.

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.

The proposed childcare, hotel and hospital (and student accommodation if proposed) are listed SFPP development under section 100B of the Rural Fires Act 1997.

The minimum required APZs have been determined from Table A1.12.1 of PBP to be 47 metres to the north and 36 metres to the south.

That attached SFPP Asset Protection Zone overlay (attachment 01) has been prepared to depict the minimum required APZs for SFPP development.

The APZ Overlay identifies that the location of the SFPP uses on the current Masterplan exceed the minimum required APZs.

Residential:

Residential development (increased density, subdivision, multi-storey buildings etc) presents the next highest risk profile and accordingly also attracts minimum required Asset Protection Zones.

The minimum required APZs have been determined from Table A1.12.3 of PBP to be 12 metres to the north and 10 metres to the south.

That attached Residential Asset Protection Zone overlay (attachment 02) has been prepared to depict the minimum required APZs for residential development.

The APZ Overlay identifies that the location of the Residential uses on the current Masterplan exceed the minimum required APZs.

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 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).

All proposed commercial land uses can achieve compliance with the residential APZs.

Land Use:

The proposed Master Plan locates the childcare, hotel and hospitals centrally or on the far side of the identified bushfire (rainforest) hazard.

The bushfire hazard is framed by managed open space and a perimeter road. These managed areas and road provide a logical firefighting platform and defensible space for fire services and maximise the land use when applying the 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.

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.

There must be sufficient time for residents / occupants to safely evacuate and 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 construction standards and Asset Protection Zones, it is considered likely that the response to a bushfire emergency would be 'shelter in place'.

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

Regardless the Master Plan provides numerous evacuation routes, south and east away from the bushfire hazard, and ample opportunity to relocate from the area.

Access will be available to the bushfire hazard interface for attending fire services via the proposed perimeter road, providing an excellent fire-fighting platform for fire suppression or hazard reductions activities.

The proposed road network will comply with the relevant access requirements outlined in *Planning for Bush Fire Protection 2019*.

Access to the hazards in the broader landscape is available via existing public roads. Refer to Figure 16 for the extent of existing roads in the subject area (source Transport NSW).

The access and egress routes are considered acceptable.

Emergency Services

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

The subject site is located within a Fire and Rescue NSW area, with a station located in the adjacent township of Kingscliff and additional resources in Tweed Heads.

The NSW Rural Fire Service have a station located in the township of Cudgen, located along Tweed Coast Road, approximately 1.6 kilometres from the subject site.

In consideration of the relatively modest size of the future development the existing fire service coverage is considered adequate.

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.

There are hydrants available along the existing surrounding public roads within the area, including Cudgen Road. Hydrant points are also available throughout the adjacent Tweed Valley Hospital development. The capabilities of the broader hydrant network is the responsibility of the water authority.

The sizing, spacing and pressures of any future hydrant system must comply with AS2419.1-2021.

It is understood that the proposal will not directly impact any existing electrical or gas infrastructure.

5.03 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 future developments capacity 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 Chapters 5, 6 and 8 of PBP have been considered.

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

Aim / Objective	Comment
<p><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></p>	<p>With the inclusion of the bushfire protection measures discussed herein it is of our opinion that the aim of PBP will be satisfied.</p>
<p><i>(i) afford buildings and their occupants protection from exposure to a bush fire;</i></p>	<p>The proposed land uses exceed the corresponding minimum required Asset Protection Zones.</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>
<p><i>(ii) provide for a defensible space to be located around buildings;</i></p>	<p>The conservations area, which in conjunction with the offsite hazard presents the highest direct bushfire threat, will be framed by a perimeter road and managed land. This road provides a defensible space for fire services and logical fire-fighting platform.</p>
<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></p>	<p>The application of the available APZs in conjunction with the relevant Bushfire Attack Level for the future buildings will prevent the likely fire spread to buildings.</p>

Objective	Comment
<i>(iv) ensure that appropriate operational access and egress for emergency service personnel and occupants is available;</i>	<p>The access design provides perimeter road adjacent the identified bushfire hazard allowing direct access for attending fire services undertaking fire suppression activities.</p> <p>Access to the hazard in the broader landscape is available via existing public roads.</p>
<i>(v) provide for ongoing management and maintenance of bush fire protection measures, (BPMs); and</i>	<p>The specific bushfire 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 the water authority.</p> <p>The sizing, spacing and pressures of any future hydrant system within the site must comply with AS2419.1-2021.</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 A1.12.3 of Planning for Bush Fire Protection 2019 (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 A1.12.3 of PBP and are depicted on the attached Residential APZ Overlay (attachment 02).

The available APZs consist of the land entirely within the subject site (including road and active open space).

The Master Plan exceeds with minimum required Asset Protection Zones as detailed in PBP.

Fire Fighting Water Supply

There are hydrants available along the existing surrounding public roads within the area, including Cudgen Road. Hydrant points are also available throughout the adjacent Tweed Valley Hospital development.

The sizing, spacing and pressures of any future internal hydrant system must comply with AS2419.1-2021.

The subject site has the capacity to comply with the Water Supply requirements as detailed in sections 5.3.3 and 6.8.3 of 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 subject site has street frontage to Cudgen Road to the south and Tweed Coast Road to the west.

The proposed Master Plan provides connection points to the adjacent public roads, and the Tweed Valley Hospital internal road, providing egress opportunities in three directions. In addition, a perimeter road is provided adjacent the bushfire hazard and the dead-end road does not exceed 200 metres in length, satisfying the Acceptable Solutions.

We are satisfied that the proposed internal road system has the capacity to comply with the requirements for Access under Chapters 5-8 of PBP.

6.0 Conclusion

Building Code and Bushfire Hazard Solutions P/L has been commissioned by Centuria Capital to prepare an independent Bushfire Assessment Report for a Planning Proposal which seeks to facilitate a suite of health, residential and education-led land uses at 741 Cudgen Road, Cudgen.

Referred to as 'Cudgen Connection', the proposal comprises a best practice development proposal to facilitate a genuine, integrated health precinct, magnifying the NSW State Government's new Tweed Valley Hospital (TVH) into a \$1+ billion health and education precinct. Immediately adjoining the TVH, Cudgen Connection includes more than \$300 million of investment to provide facilities including, but not limited to:

- Private Hospital
- Private Mental Health Hospital
- Medi-Hotel
- Specialist Suites
- University Campus
- Essential Worker Housing
- Community Hub
- Shops
- Food & Drink Options
- Open Spaces and Plaza
- High Speed Fibre Cable Network
- Childcare
- Bus Interchange
- Undercroft & Street Carparking

In this instance the subject site is depicted on Tweed Shire Council's Bushfire Prone Land Map as containing Category 3 Vegetation and Vegetation Buffer. The subject site is therefore considered 'bushfire prone'.

We are satisfied that the subject site and proposed Master 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 proposed Master 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



Stuart McMonnies

Director / Manager Bushfire Section
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BPAD Accreditation No. BPAD46966



7.0 Annexure 01

List of Referenced Documents

Australian Building Codes Board (2022). *National Construction Code Volume One - Building Code of Australia*. ABCB

Australian Building Codes Board (2022). *National Construction Code Volume Two - Building Code of Australia*. ABCB

ELVIS -Elevation -Foundation Spatial Data. Elevation.fsdf.org.au. Available at: <http://elevation.fsdf.org.au/>

Environmental Planning and Assessment Act 1979

GeoLink (2019). Bushfire Hazard Assessment Report – Tweed Valley Hospital, UPR 2682-1222, version 5, dated 24.09.2019

Keith, D. (2004). "Ocean Shores to Desert Dunes" Department of Environment and Conservation, Sydney

NSW Department of Planning and Environment (2019). *Planning Portal*. Accessed at: <https://www.planningportal.nsw.gov.au/>

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

Rural Fires Act 1997

Rural Fires Regulations 2022

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

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

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

Standards Australia (2014). *AS/NZS 1596 The storage and handling of LP Gas*

Acknowledgements to:

Geoscience Australia
Nearmap
Street-directory.com.au

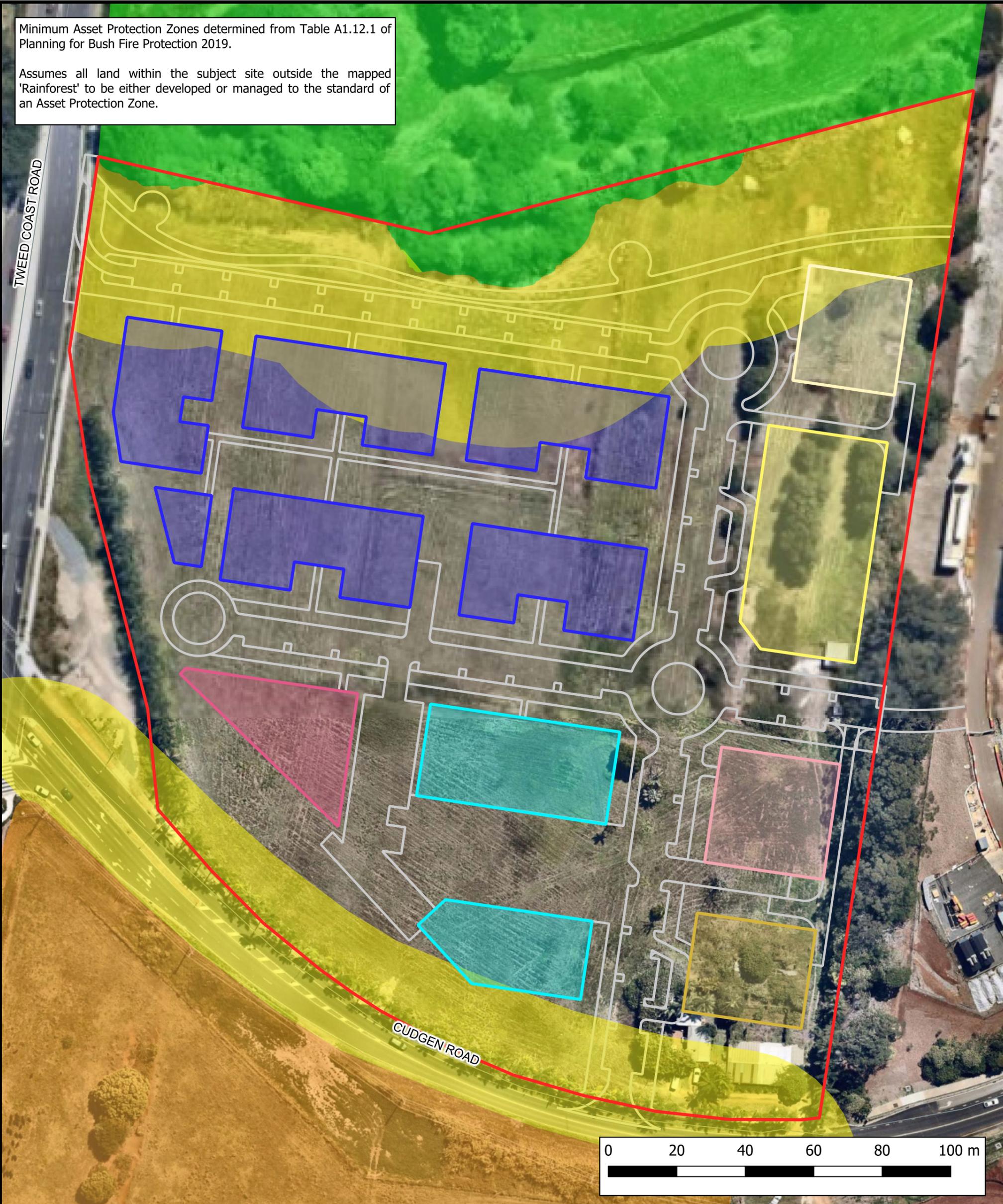
Attachments

Attachment 01: SFPP Asset Protection Zone Overlay

Attachment 02: Residential Asset Protection Zone Overlay

Minimum Asset Protection Zones determined from Table A1.12.1 of Planning for Bush Fire Protection 2019.

Assumes all land within the subject site outside the mapped 'Rainforest' to be either developed or managed to the standard of an Asset Protection Zone.



Legend

- | | | | |
|----------------------|---------------------------|---------------------------------|------------|
| Subject site | Proposed University | Proposed Retail | Rainforest |
| Proposed Residential | Proposed Private Hospital | Proposed Mental Health Hospital | Grassland |
| Proposed Childcare | Proposed Medical Hotel | Minimum Required SFPP APZ | |

BCBHS Ref: 240188
 Drawn by: SM
 Dated: 13/10/2023
 Issue: 1
 Client: Centuria Captial
 Address: 741 Cudgen Road, Cudgen



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Minimum Special Fire Protection Purpose APZ Overlay

Minimum Asset Protection Zones determined from Table A1.12.1 of Planning for Bush Fire Protection 2019.

Assumes all land within the subject site outside the mapped 'Rainforest' to be either developed or managed to the standard of an Asset Protection Zone.



Legend

- Subject site
- Proposed University
- Proposed Retail
- Rainforest
- Proposed Residential
- Proposed Private Hospital
- Proposed Mental Health Hospital
- Grassland
- Proposed Childcare
- Proposed Medical Hotel
- Minimum Required Residential APZ

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Minimum Residential APZ Overlay