Strategic Bushfire Study: Sealark Road, Callala Bay

Hare Bay Development Consortium

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Abbreviations

Abbreviation	Description
APZ	Asset Protection Zone
BFMC	Bush Fire Management Committee
BFPL	Bush Fire Prone Land
BRMP	Bushfire Risk Management Plan
DCP	Development Control Plan
DEM	Digital Elevation Model
ELA	Eco Logical Australia
EP&A Act	Environmental Planning and Assessment Act 1979
FFDI	Forest Fire Danger Index
GEV	Generalised Extreme Value
IPA	Inner Protection Area
LGA	Local Government Area
NPWS	National Parks and Wildlife Service
NSP	Neighbourhood Safer Place
NSW	New South Wales
OPA	Outer Protection Area
PBP	Planning for Bushfire Protection
RFS	Rural Fire Service
RF Act	Rural Fires Act 1997
t/ha	Tonnes per hectare

1. Introduction

1.1 Background

This Strategic Bushfire Study (the Study) contributes to the Planning Proposal for Sealark Road, Callala Bay (herein referred to as 'subject land') being prepared for public exhibition by Shoalhaven City Council.

The subject land is identified as Bushfire Prone Land by Shoalhaven City Council and certified by the Commissioner of the NSW Rural Fire Service. Therefore, Council must address Ministerial Direction 4.3 (Planning for Bushfire Protection) issued under Section 9.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The minimum components of a Study are listed in Table 4.2.1 of Planning for Bush Fire Protection 2019 (PBP; RFS 2019) have been provided herein with additional information where necessary.

1.2 Study area

The Study Area includes bushfire risk assessment within 5 km of the subject land (Figure 3 - Figure 8). The subject land is located within Lot 5 DP 1225356 and owned solely by Hare Bay Development Consortium.

The subject land adjoins the township of Callala Bay within the City of Shoalhaven (see Figure 1). Residential development exists to the west and south of the subject land with Jervis Bay National Park adjoining the north and east.

In addition to bushfire constraints the subject land is affected by other development constraints including environmental. These combined constraints determine the extent of the area suitable for residential development potential.

1.3 Planning Proposal process

The Sealark Road, Callala Bay Planning Proposal seeks to amend the Shoalhaven Local Environmental Plan (LEP) 2014 to rezone part of the land from C3 Environmental Management to a mix of R2 Low Density Residential and RE1 – Public Recreation with the balance of the land in majority to remain as C3 Environmental Management and dedicated to Jervis Bay National Park (refer Figure 2). The planning proposal considers bushfire risks strategically in the landscape rather than site specific and in so doing facilitates a better outcome compared to that under the current LEP provisions.

The planning proposal aims to:

- resolve the land's planning status in recognition of the environmental values and constraints and associated statutory and policy framework;
- rezone parts of the subject land that are less constrained to allow residential development, whilst providing protection the remaining land zoned 'C3 – Environmental Management';
- manage bushfire risk in accordance with PBP; and
- protect waterways and sensitive downstream ecosystems from the potential impacts arising from residential development. Aims and objectives.

The Study provides an assessment of the landscape bushfire risk and the residual risk for development following the provision of bushfire protection measures. It includes the following strategic assessment requirements from PBP (RFS 2019):

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

The proposal seeks to enable residential development, both single residential and medium density, public open space, roads and associated infrastructure. A Concept Layout Plan for the site is provided as Figure 3.

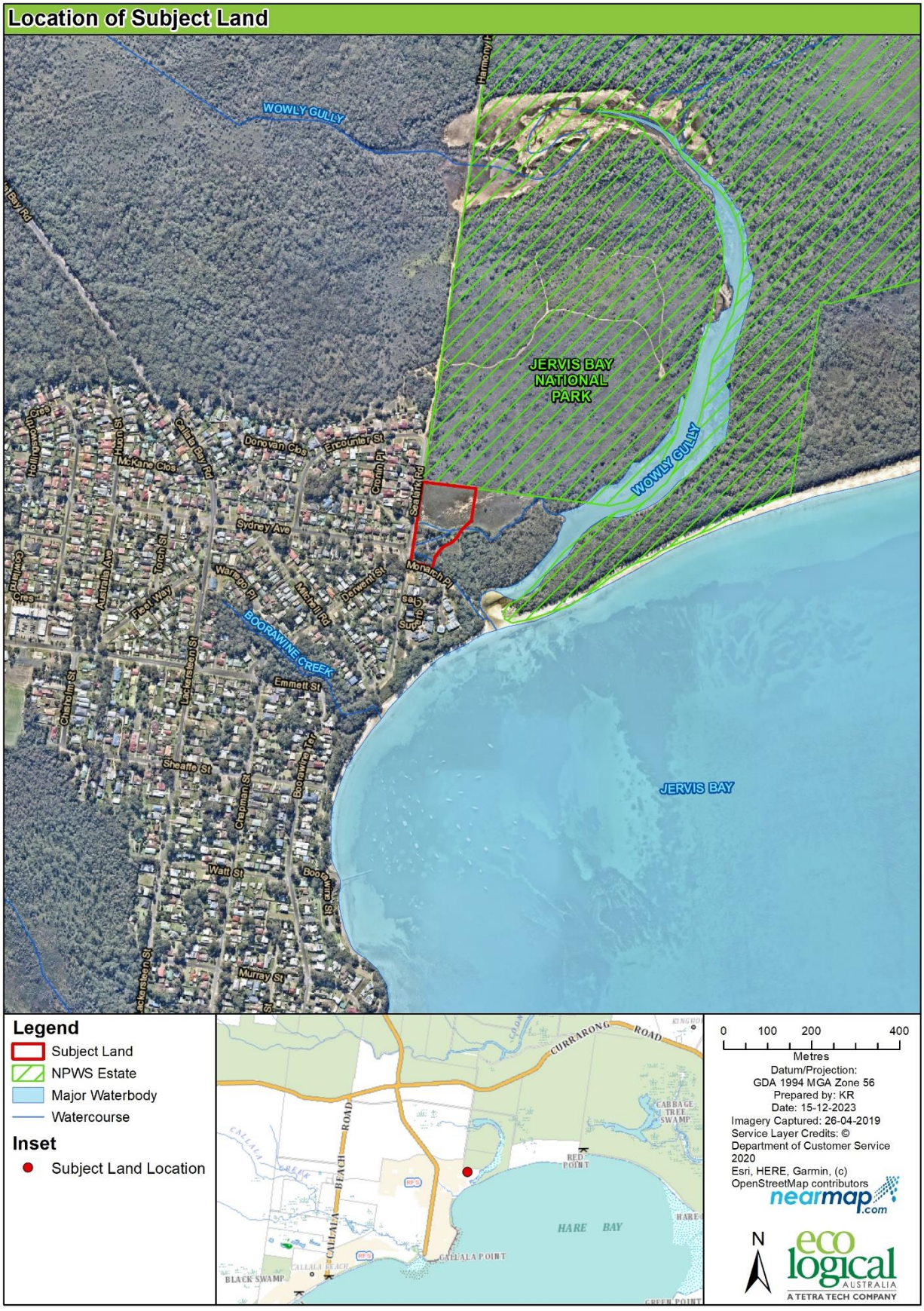

Figure 1: Location of subject land

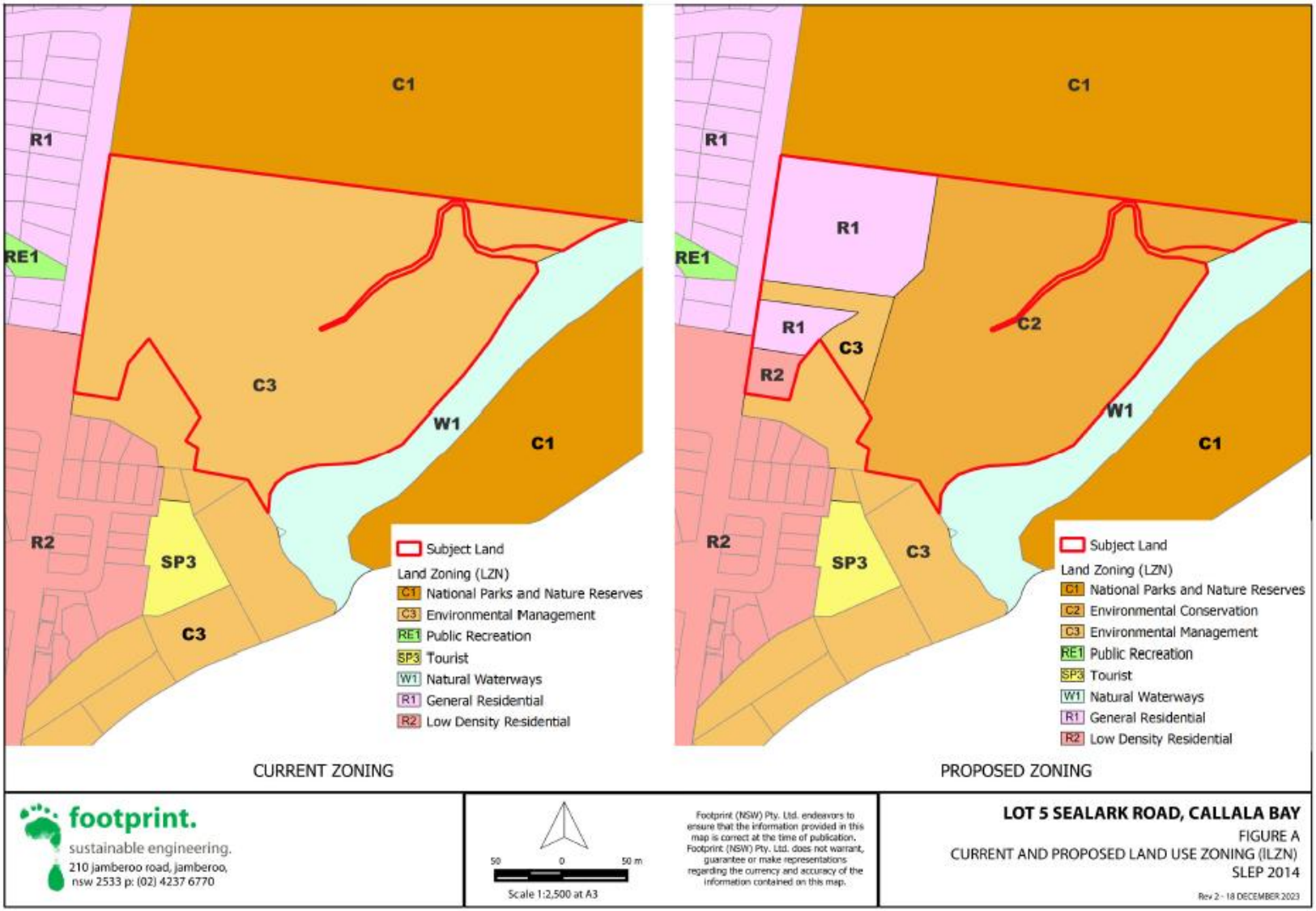

Figure 2: Proposed rezoning

Figure 3: Concept Layout Plan

2. Bushfire landscape risk assessment

The landscape bushfire risk includes assessment of bushfire hazard, potential fire behaviour and bushfire history within at least a 5 km radius of the subject land, herein called the 'study area'.

2.1 Bushfire hazard

The subject land is located abuts a wider area of bush fire prone land (Figure 7). The bushfire hazard is extensive to the east north and northwest and has the potential to expose the subject land to larger sized bushfires. Larger potential fire catchments (as occurs to the north and east of the subject land) increase the risk of exposure to landscape wide bushfires which are typically more difficult to control before they impact a site.

The bushfire hazard has been classified below using the PBP assessment methodology for vegetation and slope.

2.1.1 Vegetation

The subject land is within a landscape comprised predominantly of tall heath (north) and bangalay sand forest (east) (Figure 4).

Fires within Tall Heath are generally wind driven and may be less intense than forest fires which typically have higher flames due to the height of trees and a greater spotting potential. Both Tall Heath and Forest fires can be difficult (or impossible) to control under adverse fire weather conditions. The Bushfire Attack Level (BAL) for forest is typically higher than for Tall Heath as the flame heights associated with the burning of trees are typically higher in forests and therefore the extent (or panel) of radiant heat buildings can be exposed to is higher.

Vegetation has been classified into Keith Formations and Keith Class (Keith 2004) and assigned a potential total fuel load (tonnes / hectare) using Table A1.2.8 from PBP (RFS 2019). Figure 4 and Table 1 show the vegetation. Fuel loads, structure and composition are a major contributor to wildfire behaviour.

An unusual feature of Tall Heath fires is that they can spread rapidly in conditions where Forest fires may not. For example, in winter the fuel in forests is often too moist and cool to burn at uncontrollable intensities, however in Tall Heaths, regardless of time of year, if strong winds occur fire can spread very rapidly. The subject site is therefore potentially subject to bushfire attack year-round, rather than just the Bush Fire Danger Period. However, other aspects of Tall Heath fires are less problematic compared to Forest vegetation e.g. the Bushfire Attack Level and burning debris attack.

The vegetation within the C3 land to be dedicated to Jervis Bay National Park is consistent with Tall Heath, however as it is unclear whether the C3 land will regenerate to Forest or Tall Heath, the assessment has been conservative in assessing the vegetation as Forest.

Table 1: Vegetation formation, class and fuel allocation for the study area

Vegetation formation	Keith Class	Overall fuel including bark and canopy (t/ha)*
Rainforest	Rainforest	13.2
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	Southern Lowland Wet Sclerophyll Forests (WSF); Coastal Swamp Forest; Central Gorge Dry Sclerophyll Forest (DSF); Sydney Coastal DSF; South Coast Sands DSF; Blackbutt Tall Forest; North Coast WSF; Sydney Montane DSF	36.1
Woodland (grassy and woody)	Coastal Valley Grassy Woodland	20.2
Forested Wetland	Coastal Floodplain Wetlands	15.1
Freshwater Wetland	Coastal Freshwater Lagoons	4.4
Tall heath	Southern Montane Heath	36.9

*Overall fuel load including Bark and Canopy from Table A1.12.8 from PBP 2019 (RFS 2019)

2.1.2 Topography and slope

The subject land is bound by Jervis Bay National Park to the north and Wowly Gully to the east. The land is low lying with slopes ranging from 'all upslopes and flat land' to the north and '>0-5 degrees downslope' to the east.

Figure 5 (elevation map) shows that for a fire to approach the site from a distance (e.g. a larger fire) it would need to burn downhill. Whilst these downhill slopes are typically gentle, they nevertheless mitigate the fire intensity to some extent. The position of the subject land in the bushfire prone landscape (from a slope perspective) is relatively advantageous in that there is not slopes of significance where fire can run uphill at increased intensity toward the development.

The subject land is protected from the most adverse direction of bushfire attack in the locality i.e. under north-westerly, westerly and south-westerly winds. Whilst a fire threat from the north-west exists it can only occur from a flank fire and not a head fire, as development in the vicinity of Encounter Street in Callala Bay block a direct north-westerly fire attack toward the site.

Figure 6 illustrates the slope variation across the site and landscape. This figure is based upon GIS algorithms that are useful at a landscape scale but the zoomed in image within Figure 6 is misleading as small height variations in watercourses imply a more adverse slope grade than exists.

2.1.3 Bushfire weather

The timing and length of bushfire seasons is driven by seasonal climate and weather factors. However, the behaviour of fires is also strongly influenced by the weather conditions at the time the fire is burning, and in the case of fires in heath, wind strength is the primary weather factor determining rate of spread and difficulty of control. The historical weather patterns also provide an understanding of the potential bushfire behaviour, and its direction, intensity, and rate of spread.

The Shoalhaven region experiences mild temperatures throughout the year, with higher mean temperatures from November to March. Rainfall is variably distributed throughout the year, with a drier season typical from mid-winter to mid-summer. This pattern normally supports a predominantly spring

to summer fire season with slightly higher rainfall during the months preferred for fuel reduction burning (i.e. autumn and early winter).

Relative humidity is also variable, with higher humidity recorded in summer and early autumn, probably as a result of the higher incidence of on-shore winds. However, very low relative humidity can occur these same months and significantly increase bushfire risk.

The weather data (BoM 2016), local knowledge of fire weather patterns, and previous analysis of weather within the area (ELA 2013a), indicate that:

- Adverse fire weather conditions are most common in early spring, sometimes with a slight lessening in late spring and early summer and then building to another peak in mid to late summer;
- Southerly 'blusters' may adversely affect fire behaviour;
- Strong onshore winds may adversely affect fire behaviour during higher bushfire risk periods almost at any time outside of winter;
- Forest Fire Danger Index (FFDI) calculated from Point Perpendicular data is often significantly less than that of Nowra;
- Wind speed / direction and changes in Relative Humidity are the greatest influence / threat for Tall Heath fires; and
- The study area will have both inland and coastal influences.

Climate change is expected to bring longer bushfire season to parts of Australia, with an increasing number of extreme fire weather days, and increasing fire intensity.

Table 2: FFDI for a 1 in 50-year event

Weather Station	Max Recorded FFDI	All directions	N to SE	SE to SW	SW to N
Nowra	120	117	47	64	117

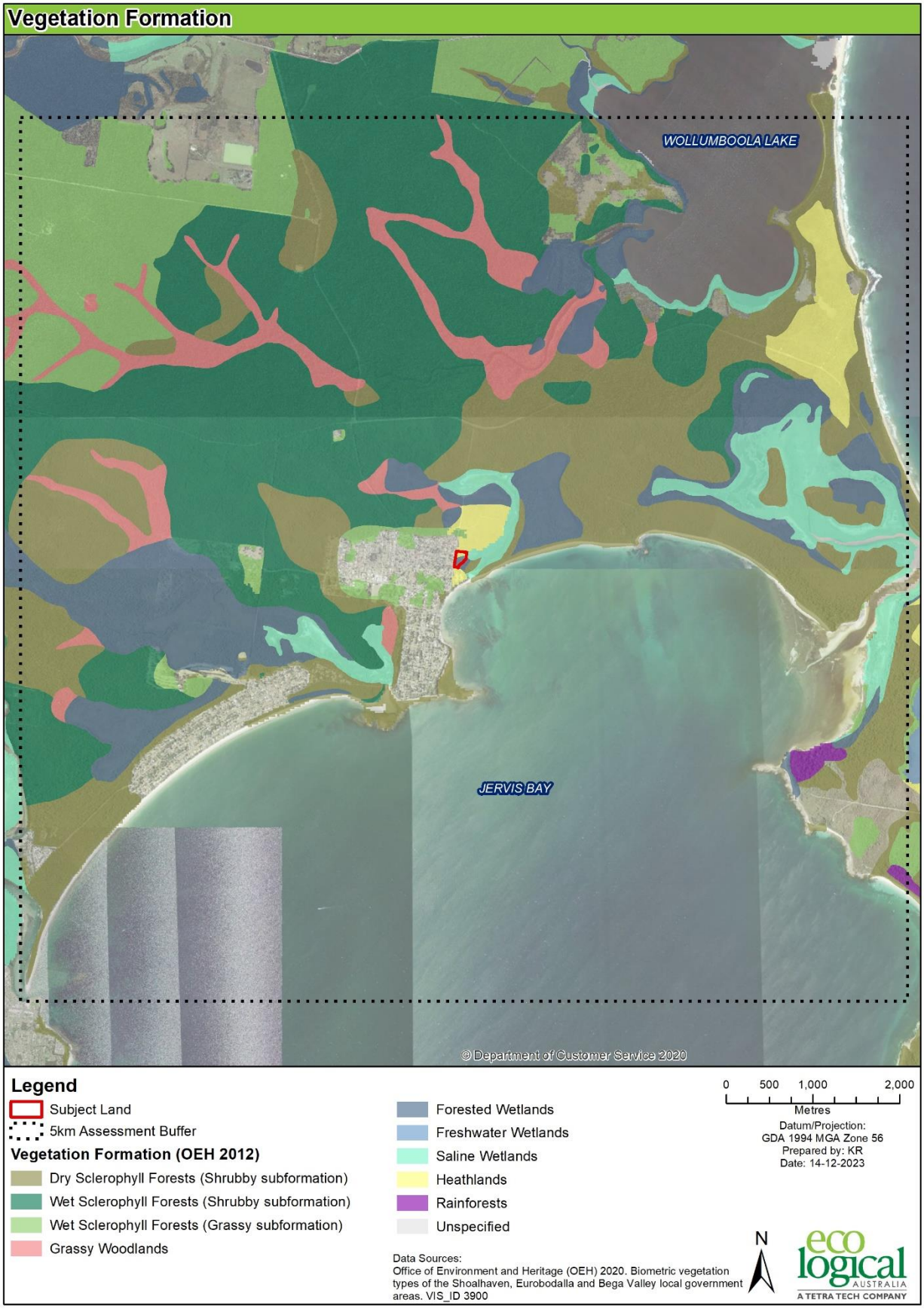

Figure 4: Vegetation map

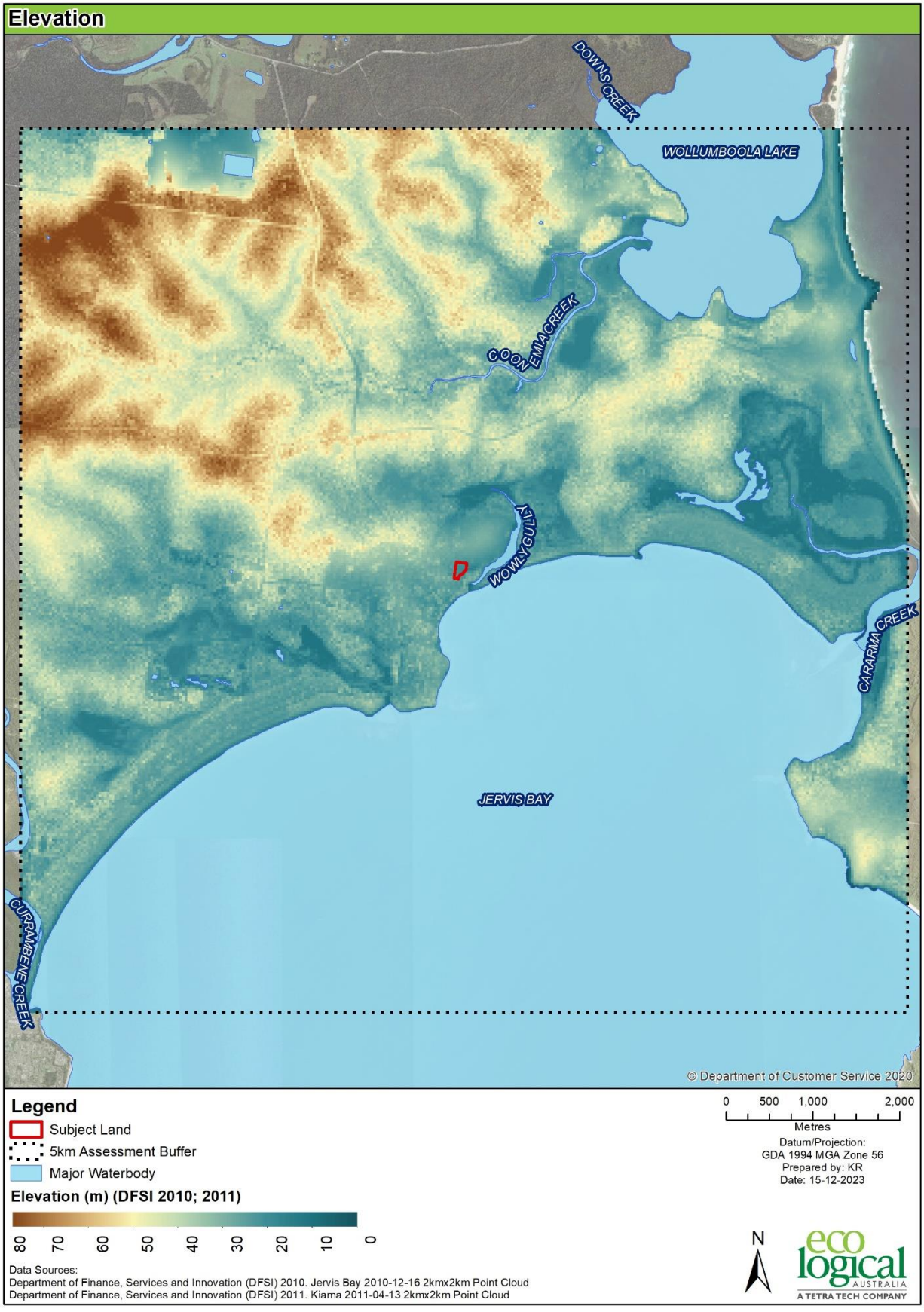

Figure 5: Elevation map

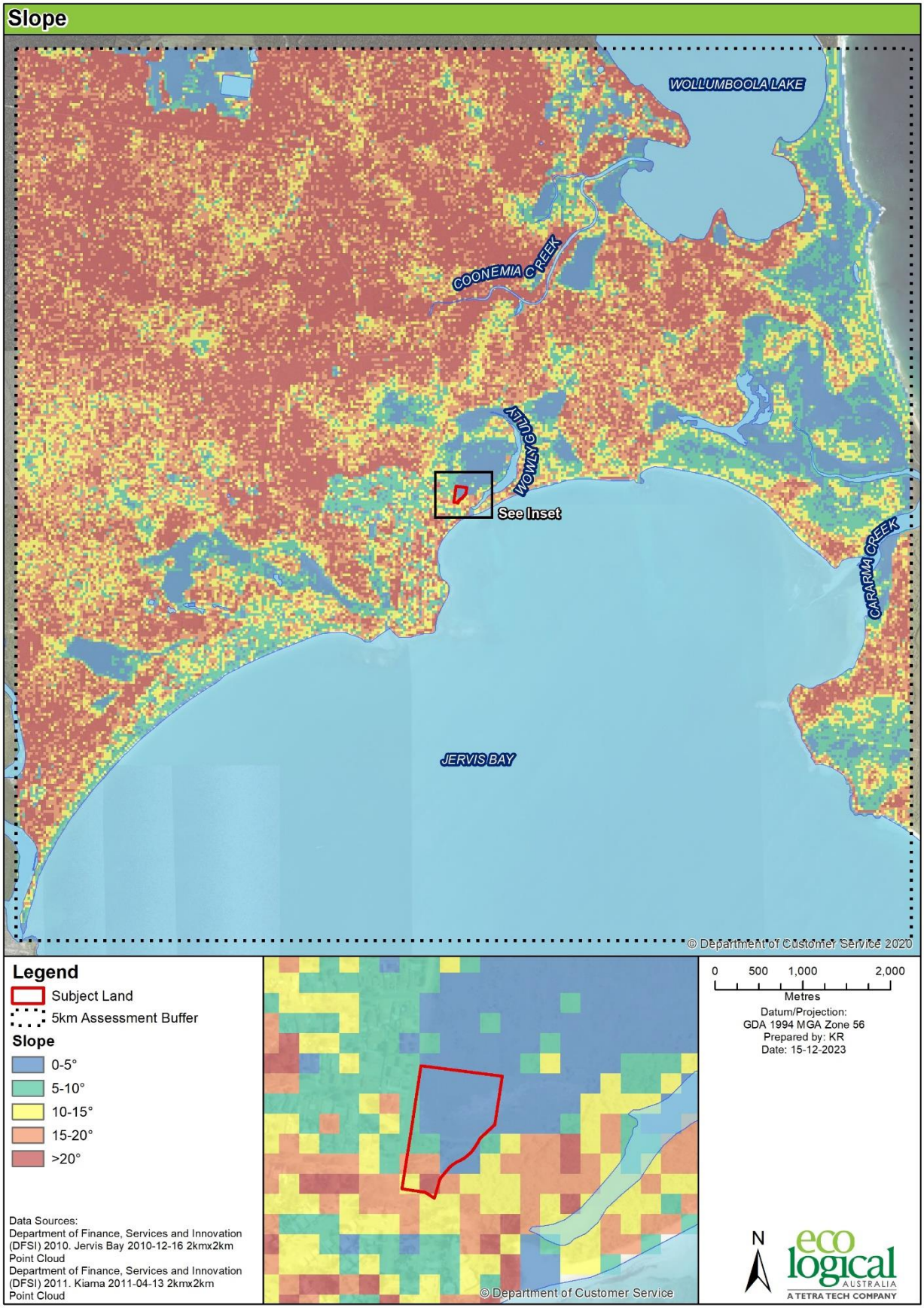

Figure 6: Slope

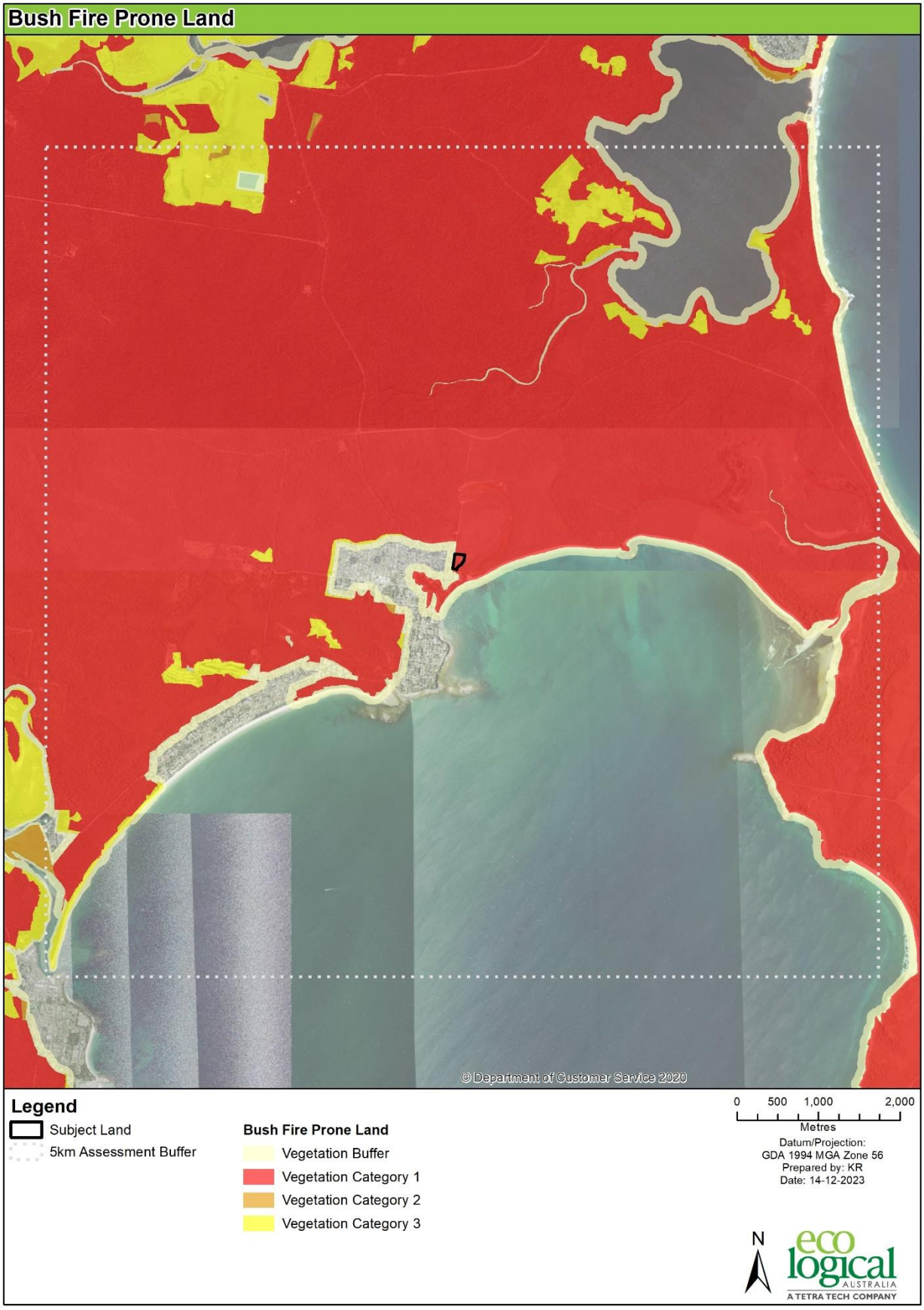

Figure 7: Bush Fire Prone Land Map

2.2 Potential fire behaviour

Uncontrollable fire intensities can occur in the Tall Heath and Forest abutting the development site. However, these will be far less frequent on the subject land than say on the western side of Callala Bay where westerly winds drive fire towards the village.

All native vegetation communities have the potential to burn at uncontrollable intensities unless they are burned at a very high frequency e.g. annually. This frequency of burning is rarely feasible and is inappropriate within the adjoining Jervis Bay National Park.

The Tall Heath communities abutting the subject land typically can carry uncontrollable fire intensities under adverse fire weather conditions after 3 years since last fire. Given the infrequent burning typically prescribed for Tall Heath in a national park (e.g. >8 years) the subject land will be at risk of higher intensity bushfire attack in most years. This however is the premise that PBP assumes in its design and standard for APZ and building construction.

2.3 Bushfire history

The Shoalhaven Local Government Area (LGA) has on average 600 bush fires per year, of which an average of twenty fires can be considered to be major fires requiring response by two or more fire authorities. The Shoalhaven can experience significant fire activity any time of the year and fires in isolated parts of the LGA may burn for several days or weeks.

Across these LGAs the main sources of fire ignition are identified as:

- Lightning Strikes;
- Arson; and
- Accidental ignitions (i.e. escaped pile burns, burning without a permit or associated construction activities.

Any of these potential ignition sources are possible in the vicinity of the site.

Figure 8 shows the wildfire history for the study area for the past 50 years from the NPWS fire history mapping data set. During site construction and operations, the following are potential ignition sources:

- Earth moving equipment;
- Vehicles;
- Power tools (such as welders, grinders);
- Mowers and slashers; and
- Accidental ignitions (such as discarded cigarettes).

2.4 Summary of landscape bushfire risk assessment

The subject land is exposed to a bushfire risk from the nearby forest and tall heath. As these vegetation communities will not be managed that will reliably lower the bushfire risk it can be assumed that higher intensity fires will impact the future development periodically.

Due to the lower Forest Fire Danger Index (FFDI) under winds from the east and north-east the subject land is not likely to receive wildfire as often as the western side of Callala Bay village; and these fires are also likely to be less intense (on average).

The expanse of Tall Heath abutting the subject land means that future dwellings face a year-round bushfire risk as fire in tall heath is wind driven, rather than driven by fuel dryness; although it is more difficult to start heath fires under moister cooler conditions outside the bushfire danger period.

The subject land benefits from bushfire protection from the north-west, west and south-west due to the protection provided by the Callala Bay village. This is a valuable bushfire advantage for this site; as is flat terrain and position in the landscape requiring all potential larger fires to spread downhill toward the site.

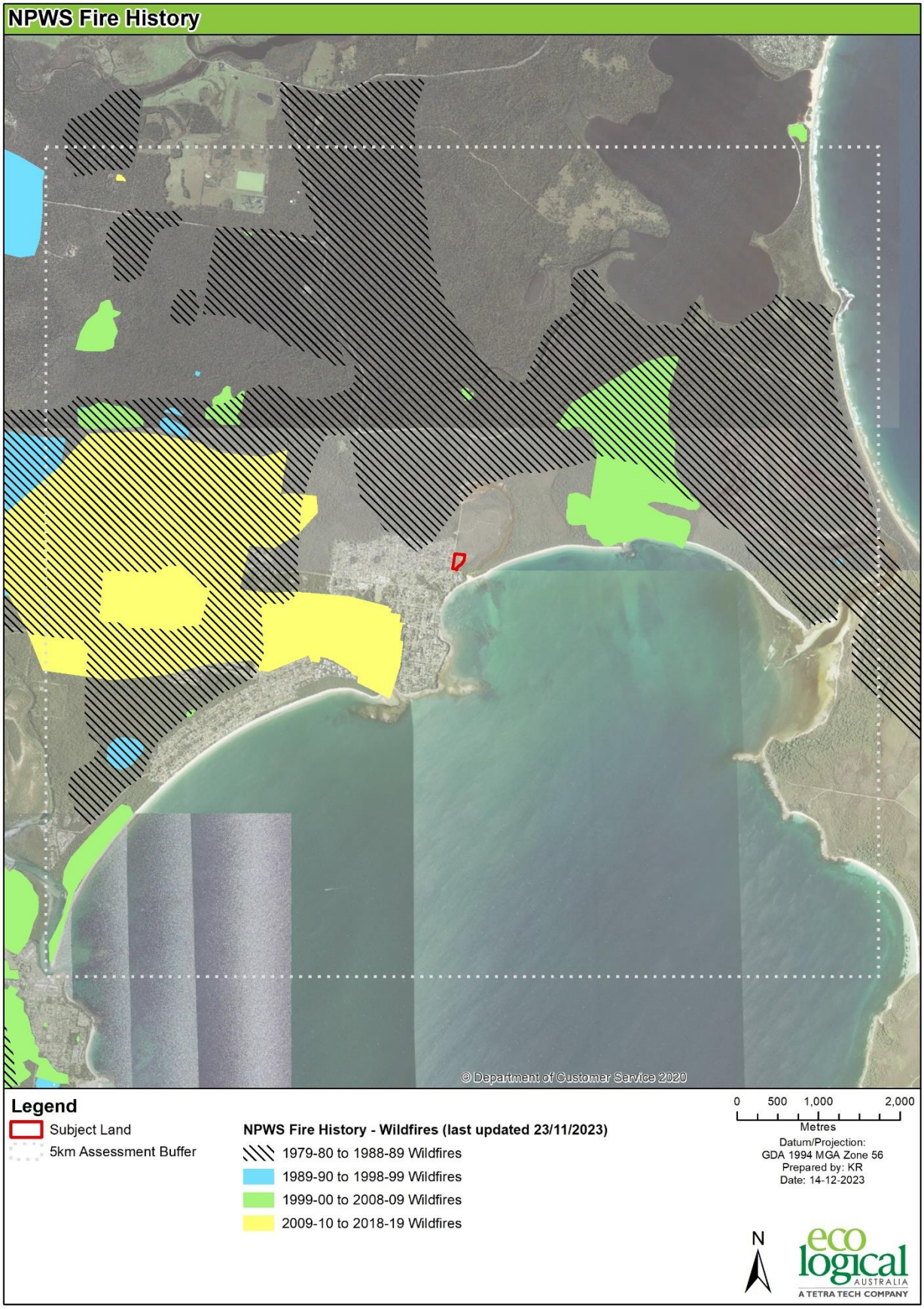

Figure 8: Fire history

3. Land use assessment

Callala Bay village abuts the subject land on its western side. Residential development of the proposed site will provide a more resilient urban interface than that existing off Sealark Street and Monarch Place, most of which was built prior to bushfire protection standards being required.

Whilst the proposal adjoins national park and adding some concern to its fire management, the increased resilience of any proposed development designed under PBP will potentially lower the life and property risk currently posed by fire in the national park. There is no need for the national park to provide APZ or other fuel measures abutting the site beyond what is currently undertaken within the Jervis Bay Fire Management Plan.

The additional length of urban interface abutting the national park is small and any additional prescribed burning considered necessary by national park managers to mitigate fire spread toward Callala Bay should be minimal.

4. Feasibility of Asset Protection Zones (APZs)

Figure 9 shows location of 4 transects used to assess the APZ requirements under PBP for the site and the resultant APZs. Table 3 identifies the slope and vegetation type used to determine these APZ. It is concluded that the required APZ under PBP for residential subdivision shown in Figure 9 are achievable without the need for alternate solutions or for off-site work by other land managers or agencies.

As the C3 land is to be dedicated to Jervis Bay National Park the assessment has not considered the potential for it to be managed for bushfire protection purposes and the worst-case scenario of regeneration to Forest has been assumed.

Table 3: Indicative APZs to achieve BAL 29

Direction	Transect #	Slope[1]	Vegetation[2]	PBP 2019 required APZ (residential)[3]	Available APZ	Comments
North	1-2	Upslope / Flat	Tall Heath	16 m	≥16 m	APZ provided wholly within subject boundaries.
East	3-4	>0-5 Degree Downslope	Forest	29 m	≥29 m	APZ provided within subject boundaries and within adjoining detention basin.

[1] Slope most significantly influencing the fire behaviour of the site having regard to vegetation found as per PBP.

[2] Predominant vegetation is identified, according to PBP.

[3] Assessment according to Table A1.12.2 of PBP 2019.

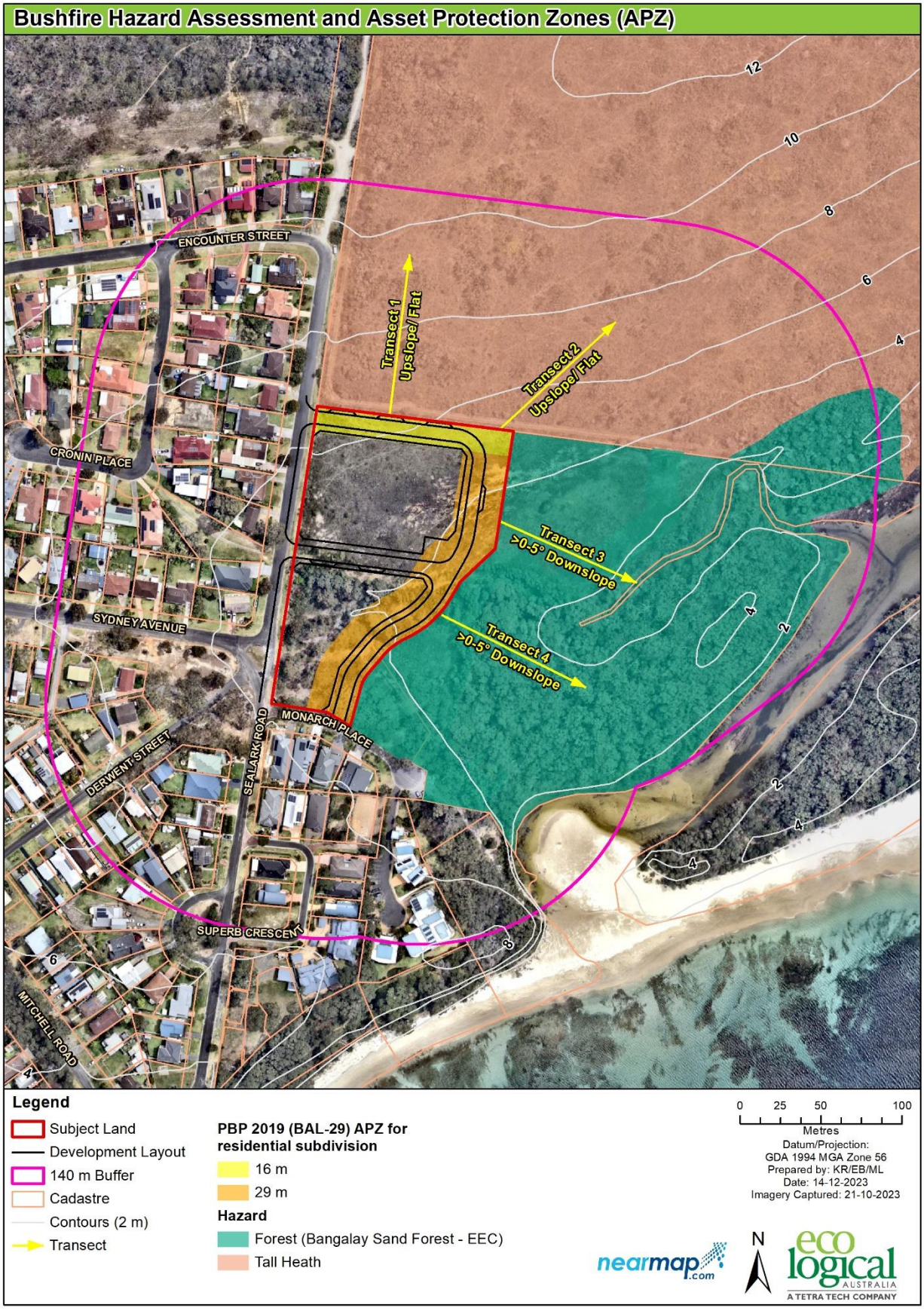

Figure 9: Asset Protection Zones for residential subdivision

5. Access and egress

The Conceptual Development Layout (Figure 3) provides:

- Three egress routes; (two onto Sealark Road to the west and one onto Monarch Place to the south).
- 8 m wide perimeter road between the bushfire hazard and all future buildings i.e. within Lots A and B.

The Conceptual Development Layout is capable of meeting the compliance criteria of Table 5.3b of PBP as per Table 4.

Table 4: Performance Criteria for residential development.

Performance Criteria	Acceptable Solutions	Compliance notes
General access requirements		
The intent may be achieved where:		
Firefighting vehicles are provided with safe, all-weather access to structures.	Property access roads are two-wheel drive, all-weather roads;	Can comply, detail not provided in concept.
	Perimeter roads are provided for residential subdivisions of three or more allotments;	Concept plan complies – refer Figure 3.
	Subdivisions of three or more allotments have more than one access in and out of the development;	Concept plan complies, access provided to Sealark Road in west and Monarch Place in south – refer Figure 3.
	Traffic management devices are constructed to not prohibit access by emergency services vehicles;	Can comply, detail not provided in concept.
	Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient;	Can comply, detail not provided in concept.
	All roads are through roads;	Concept plan complies – Refer Figure 3.
	Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end;	Not applicable All roads are through roads.
	Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road;	Can comply, detail not provided in concept.
	Where access/egress can only be achieved through forest, woodland or heath vegetation, secondary access shall be provided to an alternate point on the existing public road system;	Concept plan complies, access provided to Sealark Road in west and Monarch Place in south – refer Figure 3.

Performance Criteria	Acceptable Solutions	Compliance notes
	One way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.	Not applicable
The capacity of access roads is adequate for firefighting vehicles.	The capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges/causeways are to clearly indicate load rating.	Can comply, detail not provided in concept.
There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression;	Can comply The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and Table 5.3b of PBP.
	Hydrants are provided in accordance with the relevant clauses of AS 2419.1:2017 – Fire hydrant installations system design, installation and commissioning; and	
	There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	Not applicable – development will be serviced by reticulated water supply.
Perimeter road requirements		
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	Are two-way sealed roads;	Can comply, detail not provided in concept.
	Minimum 8m carriageway width kerb to kerb;	Concept plan complies – 8m wide perimeter road is proposed, refer Figure 3.
	Parking provided outside of the carriageway width;	Can comply, detail not provided in concept.
	Hydrants are located clear of parking areas;	Can comply, detail not provided in concept.
	There are through roads, and these are linked to the internal road system at an internal of no greater than 500m;	Concept plan complies – refer Figure 3.
	Curves of roads have a minimum inner radius of 6m;	Can comply, detail not provided in concept.
	The maximum grade road is 15 degrees and average grade is 10 degrees;	Can comply, detail not provided in concept.
	The road crossfall does not exceed 3 degrees;	Can comply, detail not provided in concept.
	A minimum vertical cleared of 4m to any overhanging obstructions, including tree branches, is provided.	Can comply, detail not provided in concept.
Non-perimeter road requirements		

Perimeter road requirements		
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	Minimum 5.5m width kerb to kerb;	Can comply, detail not provided in concept.
	Parking is provided outside of the carriageway width;	Can comply, detail not provided in concept.
	Hydrants are located clear of parking areas;	Can comply, detail not provided in concept.
	Roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m;	Can comply, detail not provided in concept.
	Curves of roads have a minimum inner radius of 6m	Can comply, detail not provided in concept.
	The road crossfall does not exceed 3 degrees;	Can comply, detail not provided in concept.
	A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	Can comply, detail not provided in concept.

6. Emergency services

The planning proposal and the increase in buildings and occupants is relatively small and is not considered a likely to increase the 'load' on emergency services requiring an upgrade of their services. The proximity of emergency services to the precinct are also considered adequate, subject to the of completion of all access roads prior to construction and occupation of new dwellings. There are two RFS brigades within 7 minutes travel time of the subject site:

- Callala Bay Brigade (1.5 km, 3 minutes travel time to south-west); and
- Callala Beach Brigade (4.8 km, 7 minutes travel time to south-west).

The development increases the bushland interface by less than 100 m but significantly improves the development bushland interface with more resilient buildings and access. The potential fire suppression workload resulting from an additional <100 m is considered more than compensated by the buildings interface buildings being constructed to contemporary bushfire protection standards and the interface having a wider (safer) perimeter road i.e. 8 m wide.

7. Evacuation

The majority of future residents will be located <100 m from egress onto Sydney Avenue which leads into the heart of the Callala Bay Village. Evacuation of future residents would not occur for fire emanating in the bushland to the east, however it is reasonably foreseeable for evacuation from bushfire threats from the NW - N – NE.

As uncontrolled fire over consecutive days is very unlikely from the NE (due to the subsidence pattern of NE winds overnight) the need for evacuation under NE winds is considered low. The primary

evacuation risk is likely to be associated with a NW approaching fire and under a fire threat from this direction the egress routes from the proposed development are not likely to be cut as they are well within the Callala Bay village perimeter.

Evacuation of the proposed site is also unlikely to complicate or adversely effect evacuation from existing Callala Bay residents as none would be required to move towards or past the development. Furthermore, through its shielding effects the development may negate the need for evacuation along parts of Sealark Road and Monarch Place.

8. Infrastructure

8.1 Water

The proposal is to be serviced by a reticulated water supply. Table 5 identifies the acceptable solution requirements of Section 5.3 of PBP.

The PBP acceptable solution requirements for water is achievable.

Table 5: Water supply requirements (adapted from Table 5.3c of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
Adequate water supplies is provided for firefighting purposes.	Reticulated water is to be provided to the development where available; A static water supply and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed; and Static water supplies shall comply with Table 5.3d of PBP.	Complies Proposal serviced by a reticulated water supply
Water supplies are located at regular intervals; and The water supply is accessible and reliable for firefighting operations.	Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1 (SA 2021); Hydrants are not located within any road carriageway; and Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	Can comply The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and Table 5.3c and Table 5.3d of PBP.
Flows and pressure are appropriate.	Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1 (SA 2021).	
The integrity of the water supply is maintained.	All above-ground water service pipes are metal, including and up to any taps; and Above-ground water storage tanks shall be of concrete or metal.	

8.2 Electricity

Electricity supply to the proposal will be underground. Table 6 identifies the acceptable solution requirements of Section 5.3 of PBP.

The PBP acceptable solution requirements for electricity is achievable.

Table 6: Requirements for the supply of electricity services (adapted from Table 5.3c of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	Where practicable, electrical transmission lines are underground; Where overhead, electrical transmission lines are proposed as follows: • Lines are installed with short pole spacing (30 m), unless crossing gullies, gorges or riparian areas; and • No part of a tree is closer to a power line than the distance set out in ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Assets (ISSC3 2016).	Complies Electricity services to the subject site are located underground. Can comply The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and table 5.3c of PBP.

8.3 Gas services

A decision on whether there will be gas supply connected to the development has not yet been made. The compliance for any gas services (reticulated or bottle gas) is to comply with Section 5.3.4 of PBP as detailed in Table 7.

Table 7: Requirements for the supply of gas services (adapted from Table 5.3c of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 – The Storage and handling of LP gas, the requirements of relevant authorities, and metal piping is used; • All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 m and shielded on the hazard side; • Connections to and from gas cylinders are metal; • Polymer-sheathed flexible gas supply lines are not used; and • Above-ground gas service pipes are metal, including and up to any outlets.	Can comply The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and table 5.3c of PBP.

9. Adjoining land

Future development will not be reliant on any off-site bushfire mitigation measures. All buildings and use will be designed to be resilient to bushfire attack in circumstances where no additional fuel management occurs outside of APZs etc.

Local Bushfire Management Committees will be updated annually of the bushfire protection measures in-built and proposed for the development.

The proposed land uses should not have a deleterious impact on the ability for bushfire management activities to be undertaken on adjoining land. Given the adherence to PBP and other land use planning requirements, the proposed land uses should not increase bushfire management needs for retained and/or adjoining bushfire prone vegetation.

10. Conclusions

A number of strategies can be provided in the form of planning controls such that the risk from bushfire is reduced to a level that meets the deemed to satisfy bushfire protection requirements under PBP.

The strategies assessed to reduce the bushfire risk associated with the re-zoning, include:

- PBP compliant setbacks from bushfire prone vegetation (APZs);
- A PBP compliant road system designed to provide safe access and egress from the site;
- Underground electricity and gas services where possible;
- Compliant water supplies;
- Appropriate design for emergency and evacuation response.

The need for bushfire evacuation of a future development is not likely to adversely interfere with the existing evacuation capacity in Callala Bay and the re-zoned development enables the development of a more bushfire resilient urban bushland interface than that which currently exists.

More detailed bushfire protection design is required at the subdivision stage, however the re-zoning application has provisions that allow this more detailed designed to achieve the deemed to satisfy requirements within PBP.

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