

# Biodiversity Assessment

## Linnaeus Property Eco Tourism Mixed Use Proposal



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## Certification

As the author of this Biodiversity Assessment Report (BAR), I verify that:

- The development proposal subject to the BAR does not trigger the Biodiversity Offset Scheme (BOS) in the *Biodiversity Conservation Act 2016* (BC Act), and
- Five-part tests of significance completed in accordance with requirements of s7.3(1) of the BC Act concluded that the proposal would not significantly impact on biodiversity, and hence a Biodiversity Development Assessment Report (BDAR) is not required.



Ian Colvin  
Senior ecologist, GeoLINK  
01/02/2021

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## Executive Summary

This Biodiversity Assessment Report (BAR) was completed to assess potential ecological impacts of a proposed Eco Tourism Mixed Use development ('the Proposal') at Lot 1 DP1031848 Broken Head Road, Broken Head (known as 'Linnaeus Estate').

The Proposal occurs within and adjacent to previously cleared and modified habitat but is proximate to areas of native vegetation of high conservation which includes sensitive habitats.

The site contains areas of land mapped as being of Biodiversity Value (as per the Biodiversity Values Map and Threshold Tool); however these areas will not be impacted by the proposal. Native vegetation loss for the proposal is relatively low (~0.44 ha) and the minimum clearing threshold of 1 ha will not be exceeded. On this basis the proposal does not impact on biodiversity value land or exceed clearing thresholds, therefore the Biodiversity Offsets Scheme (BOS) is not triggered and a Biodiversity Development Assessment Report (BDAR) is not required.

Targeted field assessment completed for the Proposal indicates that:

- Seven threatened flora species occur within or in proximity to the Proposal area (Coolamon, Native Guava, Scrub Turpentine, Small-leaved Tamarind, Stinking Cryptocarya, Queensland Xylosma, White Lace Flower). No threatened flora will be affected by the Proposal.
- The Threatened Ecological Community (TEC) Littoral Rainforest is present within and adjacent to the Proposal. Small areas of modified Littoral Rainforest, totalling ~ 0.44 ha will be affected by the Proposal.
- Five threatened fauna species were confirmed during field assessments (Glossy Black-cockatoo, White-bellied Sea-eagle, Grey-headed Flying-fox, Little Bent-winged Bat, Yellow-bellied Sheath-tail-Bat) with several other threatened fauna species also historically recorded at the site (refer **Section 4.1.5**). Based on the habitat present and the site location there is potential for several additional threatened fauna species to occur on an opportunistic or seasonal basis.


Biodiversity impacts of the Proposal (refer to **Section 5**) include both direct and indirect impacts. Direct biodiversity impacts are likely to include:

- Loss of native vegetation: ~ 0.44 ha of modified littoral rainforest (PCT 1275) including an estimated 167 native trees (refer to **Table 5.1**).
- Reduction of fauna resources (fruiting/flowering trees and shrubs within PCT 1275).
- Disturbance (noise, human disturbance, machine operations) to fauna during development and construction.

Anticipated indirect impacts of the Proposal may include:

- Trampling and degradation of TECs and threatened flora habitat by patrons.
- Reduction of native vegetation structure and complexity from human disturbance, mowing and tree removal from maintenance activities.
- Increased potential for introduction and transmission of myrtle rust to the site and increasing pressure on already affected populations of the critically endangered species Native Guava and Scrub Turpentine.
- Potential for impacts on native fauna from increased light spill.
- Increased noise and disturbance which may negatively affect native fauna.
- Introduction of weed propagules to the site from increased vehicle and human disturbance.
- Ongoing disturbance to local fauna during occupation of the site from noise and human presence.



- 
- Minor increase in lighting. The need to minimise spill and use 'soft' lighting will be incorporated into the design and it would be unlikely that minor increases in lighting would affect native fauna at the site, or within adjacent environments (e.g. beachside areas).

Domestic animals are currently not permitted at the site under existing policies and this will not be altered. As such there is no likelihood of roaming animals posing a threat to native fauna. Furthermore, internal roads are low speed (30 km/hr) with signage and traffic calming devices at several locations. While the proposal would increase traffic volumes, traffic would be moving at low speeds and risks to fauna from vehicle collision are unlikely to be significant. Further, all patrons vehicles would be parked at the site entry (Precinct B) and patrons shuttled to Precinct A, from which they would move around the site on foot or by small electric buggies. On this basis, potential impacts to fauna would be very low.

Statutory assessment has been completed for the Proposal with regard to:

- Byron Development Control Plan (DCP) 2014.
- State Environmental Planning Policy (SEPP) Koala Habitat Protection 2020.
- SEPP Coastal Management 2018.
- *Biodiversity Conservation Act 2016*.
- *Fisheries Management Act 1994*.
- *Environment Protection and Biodiversity Conservation Act 1999*.

Compensation requirements in Chapter B2 of the Byron DCP have been met, with a total area of 0.652 ha to be planted as littoral rainforest. As required under Chapter B1 of the Byron DCP, these works will be completed as part of a Vegetation Management Plan.

Chapter B1 of the Byron DCP has been addressed, with a variation requested for some parts of the Proposal which do not meet setbacks to 'red flag' areas. Other aspects of Chapter B1 are largely complied with.

Statutory assessments determined that coastal wetlands and littoral rainforest depicted on the *Coastal Wetlands and Littoral Rainforests Area Map* would not be affected and habitat for threatened species and communities would not be significantly affected and hence a Biodiversity Development Assessment Report (BDAR) is not required. Furthermore, impacts on Matters of National Environmental Significance (MNES) in the EPBC Act are unlikely to be significant and referral to the Minister of the Environment is not required.

An assessment under SEPP Koala Habitat Protection 2020 concluded that potential Koala habitat is not present at the site; hence the policy does not apply.

To minimise biodiversity impacts of the Proposal, a range of recommendations have been prescribed (refer to **Section 6**).





# 1. Introduction

## 1.1 Overview

This Biodiversity Assessment Report (BAR) has been prepared for Linnaeus Property Trust with regard to a proposed Eco Tourism Mixed Use development at Lot 1 DP1031848 Broken Head Road, Broken Head (known as 'Linnaeus Estate'). The BAR will support a Statement of Environmental Effects (SEE) to be submitted to Byron Shire Council (BSC).

This BAR aims to identify ecological constraints and impacts of the project, which may include:

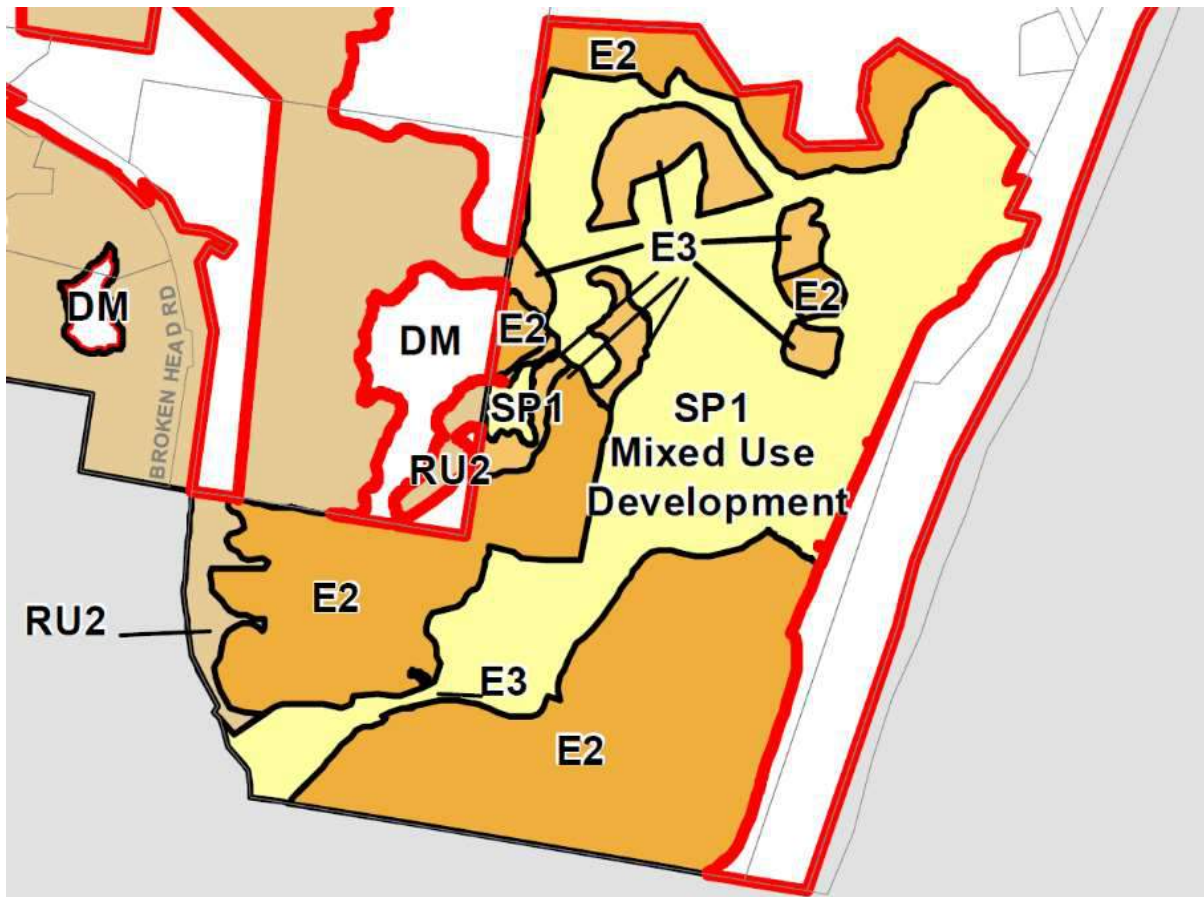
- Areas of intact native vegetation.
- Habitat for threatened species or communities listed in the *Biodiversity Conservation Act 2016* (BC Act) and/or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Significant habitat trees within the project footprint.
- Littoral wetlands and coastal wetlands gazetted under State Environmental Planning Policy (SEPP) Coastal Management 2018.
- Koala habitat, as per SEPP Koala Habitat Protection 2020.

Details of the project are summarised below:

<b>Site details</b>	Part Lot 1 DP1031848 being that part of the land on the eastern side of Broken Head Road, Broken Head
<b>LGA</b>	Byron Shire Council (BSC)
<b>Area</b>	~111 ha
<b>Zoning</b>	<ul style="list-style-type: none"><li>■ Byron Local Environmental Plan 2014<ul style="list-style-type: none"><li>- SP1 Mixed Use Development</li><li>- RU2 Rural Landscape</li><li>- E2 Environmental Conservation</li><li>- E3 Environmental Management</li></ul></li><li>■ Byron Local Environmental Plan 1988<ul style="list-style-type: none"><li>- 7(f1) Environmental Protection Coastal Lands (f1) Zone</li></ul></li></ul>
<b>Development type</b>	Eco Tourism

**Illustration 1.1** shows the site location and **Illustration 1.2** shows the site itself. A zoning extract from the Byron LEP 2014 is shown at **Figure 1.1**.





**Figure 1.1 Site Zoning**

## 1.2 Site Description


The site is ~112 ha in area and comprises a former grazing property which has been converted to a private education facility with onsite accommodation, referred to as 'Linnaeus Estate'. The site supports its own water treatment facility, with other infrastructure including a network of sealed internal roads, car parking areas and a swimming pool and tennis court.

Note: the south-eastern corner of the site (~0.31 ha) occurs west of Broken Head Road and is within Ballina Shire. This portion of the site is not referenced in this assessment.

## 1.3 Landscape Features

Large areas of intact native vegetation occur at the site, with extensive areas of coastal wetlands and littoral rainforest gazetted under State Environmental Planning Policy [SEPP] (Coastal Management) 2018 (refer to **Illustration 1.2**). The Proposal occurs in close proximity (i.e. within the 100 m buffer zone ['proximity area'] to areas mapped under SEPP Coastal Management 2018 but does not impinge on these areas. Placement of structures/infrastructure in proximity to mapped coastal wetlands/littoral rainforests was determined by downloading imagery from DPIE and integrating this with architectural designs. A GIS specialist was engaged to check data to ensure projections were consistent and that the potential for any spatial errors were minimised.





Large areas of the site are also mapped as land of biodiversity value (as per the Biodiversity Values Map and Threshold Tool); refer to **Illustration 1.3**. These areas are generally consistent with SEPP Coastal Management mapping (coastal wetlands and littoral rainforest).

The site lies within the South Eastern Queensland Bioregion as per the Interim Biogeographic Regionalisation for Australia (IBRA), Version 7. The majority of the site occurs within the Scenic Rim subregion (SEQ10) of the South Eastern Queensland Bioregion, with the southern and south-eastern portion of the site occurring within the Clarence Lowlands subregion. The Proposal lies wholly within the Scenic Rim subregion.

At a local level, the majority of the site forms part of the 'Summervale Range Mitchell Landscape' (DECC 2008), with the southernmost portion of the site lying within the 'Clarence - Richmond Barriers and Beaches' Mitchell Landscape.

## 1.4 Geology and Soils

Soil landscapes (eSPADE v2.0) at the site include:

- Billinudgel (bi): low rolling hills on metamorphics of the Neranleigh-Fernvale Group. Relief is 50–100 m, slopes 10–20% and locally >33%. Soils are typically shallow to moderately deep (100 cm), moderately well-drained Yellow Podzolic Soils and Yellow Podzolic Soil/Soloth intergrades on crests and slopes. Limitations: hardsetting, shallow, stony and erodible soils of low fertility. Steep slopes and localised mass movement.
- Disputed Plain (dp): basalt derived valley in-fills and alluvial fans forming gently inclined slopes. Relief 10–30 m, slopes 1–3%. Soils are typically deep (>200 cm), poorly drained Black Earths, Black Earth/Weisenboden intergrades and Dense Clays. Limitations: highly plastic soils of low permeability, low wet bearing strength and high surface movement potential with localised stoniness and waterlogging. Permanently high watertables.
- Black Rock (br): extremely low level to gently undulating beach ridge plains on Pleistocene beaches and dune sand. Elevation and relief are 1–2 m, slopes <5%. The topography is characterised by dune/swale systems aligned parallel to the coast. Soils are typically deep (>300 cm), well-drained Podzols on dunes. Deep (>300 cm), imperfectly drained Humus Podzols and Peaty Podzols in depressions and deep (>200 cm), waterlogged Acid Peats in swales. Deep (>300 cm), rapidly drained Siliceous Sands occur on newer, seaward dunes. Limitations: non-cohesive, highly permeable, highly acid soils of very low fertility. Organic soils in swales with permanently high watertables. High wind erosion hazard.

Soil and geological mapping for the site and surrounds is shown at **Illustration 1.4**.

Acid sulphate soil (ASS) probability mapping (eSPADE) indicates no known occurrence of ASS along the eastern portion of the site, with the southernmost portion of the site having areas of low ASS probability (L1 <1 m below ground surface; L2 1 - 3 m below ground surface); refer to **Illustration 1.5**.





## 1.5 The Proposal

### 1.5.1 The Proposal

The majority of the Proposal is located in the far north-east of the site (referred to as 'Precinct A'), with the proposed car parking and depot facility (referred to as 'Precinct B') occurring separately in the south of the site. Both sites are joined by an existing sealed road. The proposal is shown in context with existing facilities at the site in **Illustration 1.2**. Full details in relation to the architecture of the proposed development is provided in the Plan Set at **Appendix A**.

Consent is sought for a Mixed Use Development of the Linnaeus property permitting the existing facilities to continue to be used for Private Education; allowing the remaining existing facilities to also be used for eco-tourism and providing further new facilities for Eco Tourism purposes. The Proposal provides for the private education residences (#2 and 34) and the private education accommodation (#12-16) located within the 7(f1) zone and unbuilt #18 will continue with a private education use. Approved, but not built private education accommodation (#19-23 and #28-33) will not be constructed. Approval is sought to utilise the remaining existing built private education accommodation units (#3-11 and 17) and the existing built centre accommodation units (#24-27) for Eco Tourism purposes.

The private education residences and the private education accommodation located within the 7(f1) zone and unbuilt accommodation unit #18 will continue with a private education use. Approved, but not built private education accommodation will not be constructed at this time. Approval is sought to also utilise the remaining existing built private education accommodation units and the existing built centre accommodation units for Eco Tourism purposes. Further, 1 new rainforest retreat (C buildings); 4 new tree house cabins (B buildings); and 22 new beach cabins (A buildings) are proposed to be constructed and used for Eco Tourism accommodation.

In support of the Eco Tourism accommodation, consent is sought to erect two fire refuge buildings (with associated access pathways) and construct a depot and parking precinct, a shed, a wellness precinct and minor alterations to the existing centre.


External lighting will be included as part of the Proposal and will be minimal and understated with the aim of limiting glare and any adverse ecological impact ('light spill') whilst adhering to BCA and Australian Standards. The eco retreat will be lit with ambient light that is warm and closer to 'natural light' and will avoid using bright, white, artificial lighting. Low wattage, soft lighting will be used that is powered by solar.

Patrons of the Proposal will only have access to the north-east of the site (Precinct A and adjacent common buildings and facilities) and the network of existing walking paths. No other parts of the site will be available for patron access unless in the company of a guide. Two formalised beach access points occur at the site; patrons will have access to the northern pathway, which has been in use for many years.

### 1.5.2 Bushfire Provisions

From a bushfire compliance perspective, the Proposal will be implementing the eco-tourism provisions and performance criteria pursuant to *Planning for Bushfire (PBP) 2019*. This will result in the proposed cabins being sacrificial and not requiring specific Asset Protection Zones (APZs). However, APZs will be required to the Class 5-9 buildings including the nominated on-site refuge buildings (10kW/m<sup>2</sup>). Selective tree retention and proposed landscaping will be established in order to demonstrate compliance with the performance criteria for asset protection zones in PBP2019. APZs have been





calculated by using a combination of acceptable solutions and performance criteria (i.e. modelling in accordance with PBP2019). The APZ for the proposed refuge buildings are shown at **Figure 1.2**.

The existing approved sole occupancy units subject to a change of use to 'tourist' will maintain the current bushfire requirements subject to the current development consent conditions for these buildings (i.e. no further tree removal would be required).

## 1.6 Assessment Pathway

In the initial concept for the Proposal, several cabins were proposed within cleared areas mapped as littoral rainforest as per State Environmental Planning Policy [SEPP] (Coastal Management) 2018. These areas are biodiversity value land, and hence the proposal triggered a *Biodiversity Development Assessment Report* (BDAR). Assessment protocols using the Biodiversity Assessment Method (BAM) were then initiated.

The Proposal was then further refined and the cabins within mapped biodiversity value land were removed from the concept, hence the automatic trigger for a BDAR was removed. Further, the initial concept entry to the proposed southern carpark (in the quarry) was redesigned to avoid areas of mapped coastal wetland, and so automatic BDAR triggers were similarly removed. The Proposal and its relationship to areas of biodiversity value land is shown at **Illustration 1.3**.

To test the refined Proposal to determine whether it exceeded clearing requirements in the Biodiversity Offsets Scheme (BOS), the following steps were taken:

1. Review of the minimum lot size for the site (Byron LEP 2014): a minimum lot size of 40 ha is allocated to the site, and hence up to 1 ha of native vegetation may be removed as part of an application, before triggering the BOS.
2. Calculation of the total impacts of the proposal (cabins, APZs, paths/tracks) within areas containing native vegetation was completed by the project architect. Areas of mown pasture grass were not included in the calculations. The total impact of the proposal on native vegetation is approximately 0.44 ha (refer **Table 1.1**).

**Native vegetation loss for the Proposal is below the 1 ha clearing threshold, hence the BOS is not triggered and a BDAR is not required.**



**Table 1.1 Summary of Clearing Impacts within Native Vegetation**

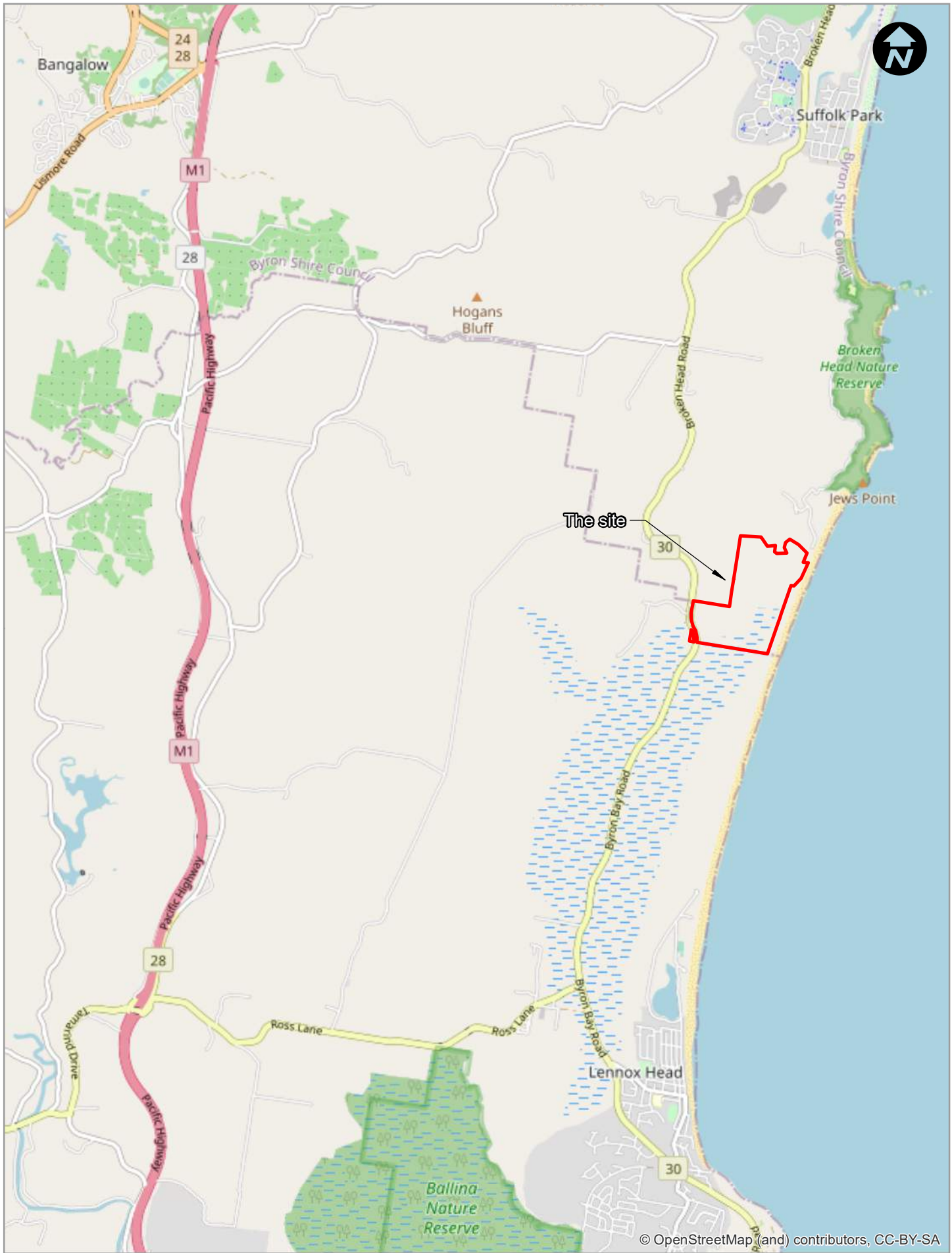
<b>Land Use</b>	<b>No.</b>	<b>Area (m<sup>2</sup>)</b>	<b>Total Area (m<sup>2</sup>)</b>
<b>Type A - Treehouse Cabins</b>			
Treehouse Cabins A.1 - A.8 (inc. decks)	8	nil	nil
Treehouse Cabins A.9 - A.22 (inc. decks)	14	132	1848
Boardwalk Access Path			622
Boardwalk Connections			248
Suspended Walkways (A.9 - A.22)			144.4
Refuge Pathways		nil	nil
<b>Type B - Rainforest Retreats</b>			
Rainforest Cabins B.4	1		76
Access path to B.1- B.4			473
<b>Type C - Treehouse Retreat</b>			
Treehouse Retreat C.1 (inc. decks + plunge)	1	94	94
Suspended Walkway			19
<b>CB.02 - Refuge Building</b>			
South Access across water course			40
Asset Protection Zone around refuge			860
<b>CB.06 - Depot Building</b>			
Proposed Access Road			10
		<b>TOTAL</b>	<b>4434.2</b>





Figure 1.2 Asset Protection Zones





Site Location - Illustration 1.1



558000

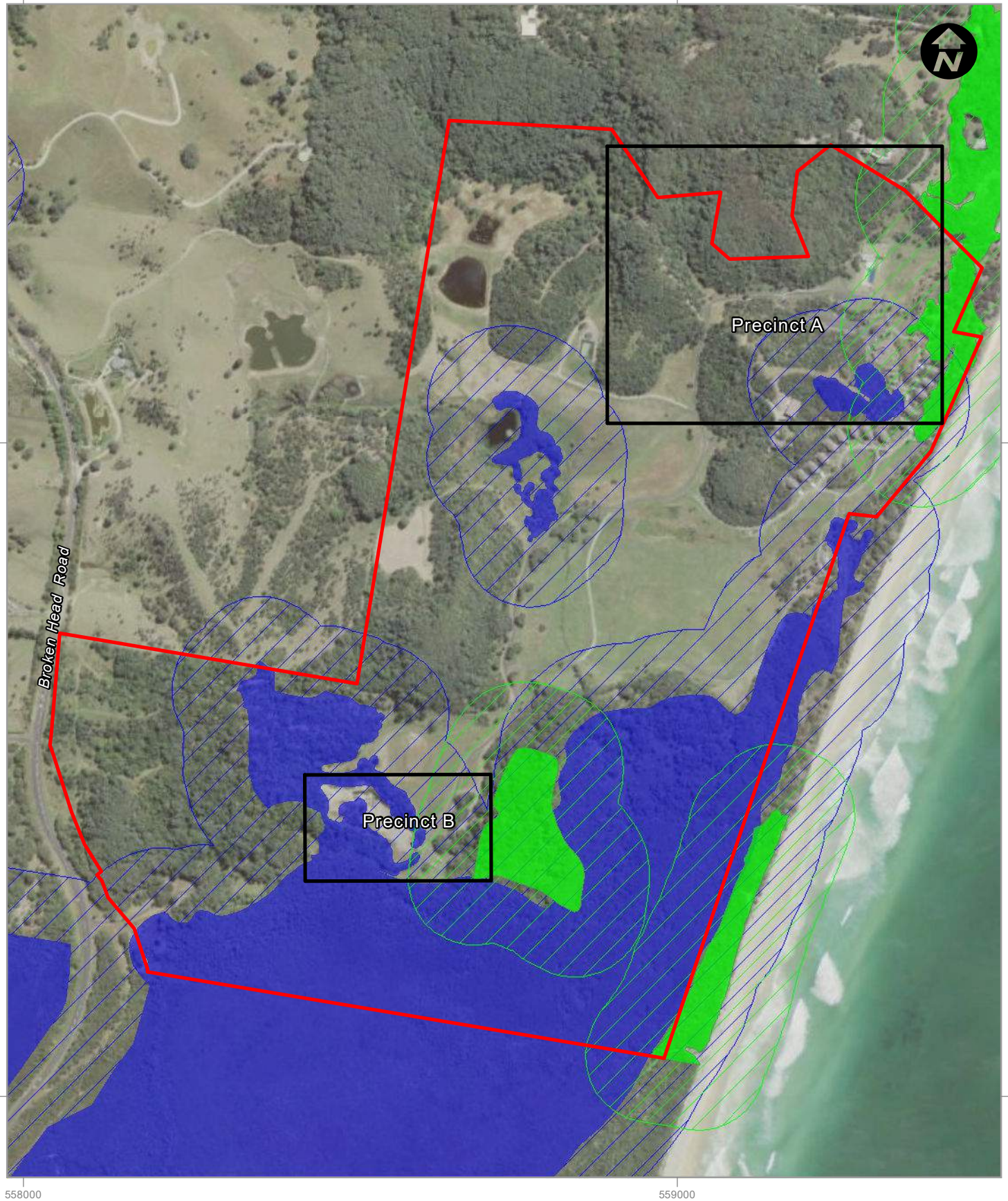
559000

6821000

6821000

6820000

6820000

**LEGEND**

- |  |   |
|--|---|
|  Site boundary                                       |  SEPP Coastal Management 2018 - Coastal Wetlands |
|  SEPP Coastal Management 2018 - Littoral Rainforests |  Proximity Area for Coastal Wetlands             |
|  Proximity Area for Littoral Rainforests             |   |

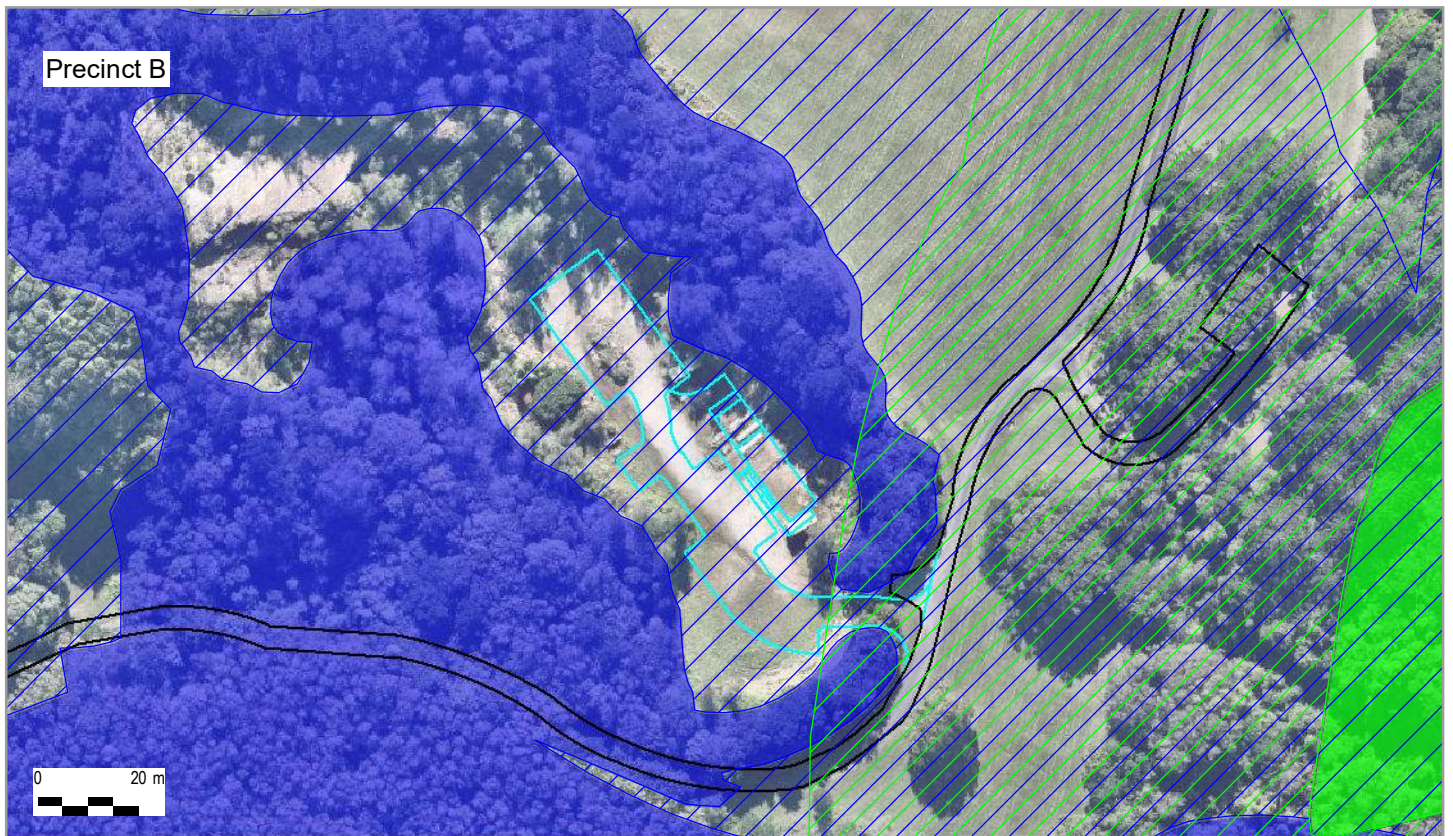
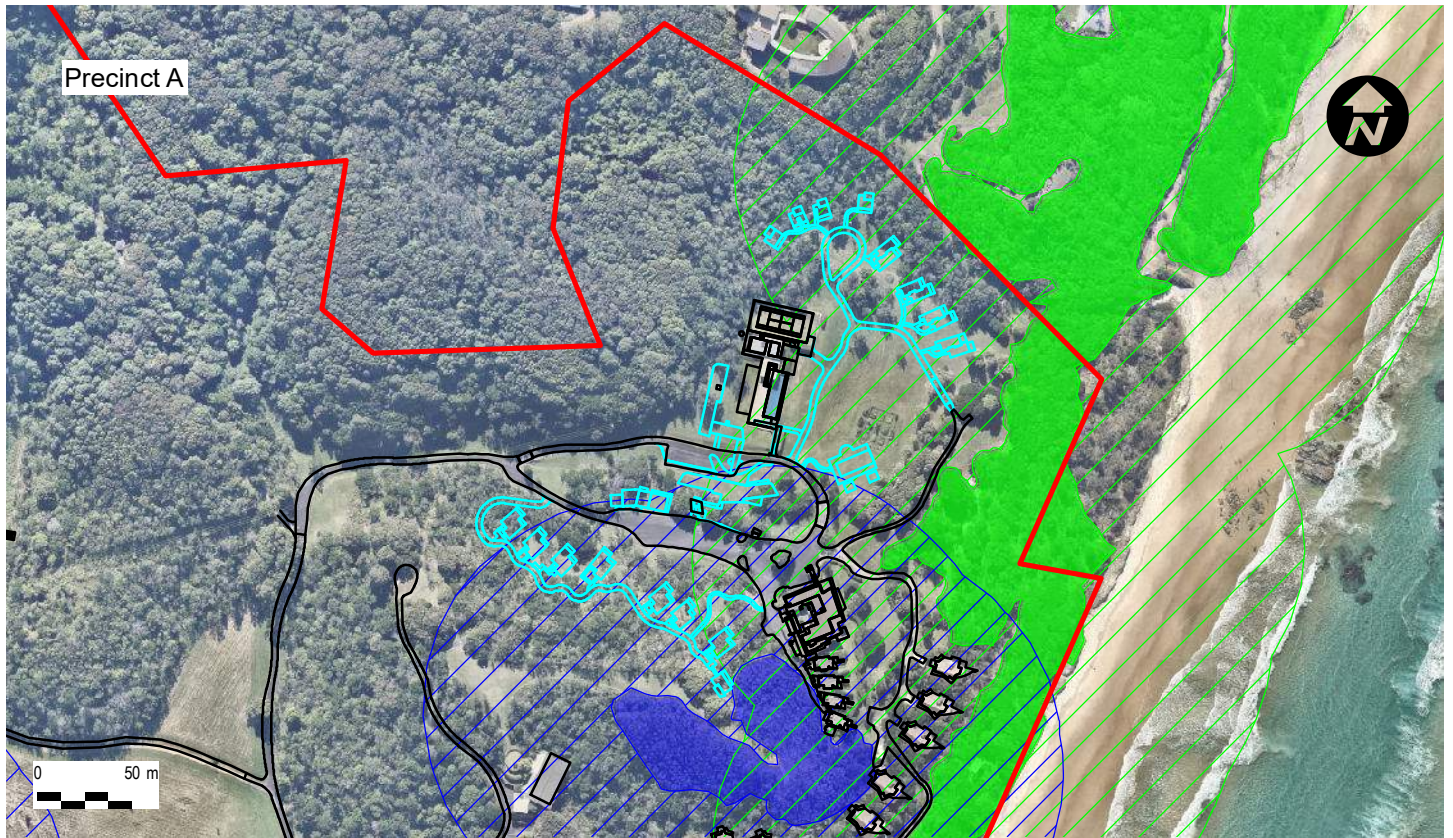
0 160 m



## The Site - Illustration 1.2

### Sheet 1 of 2





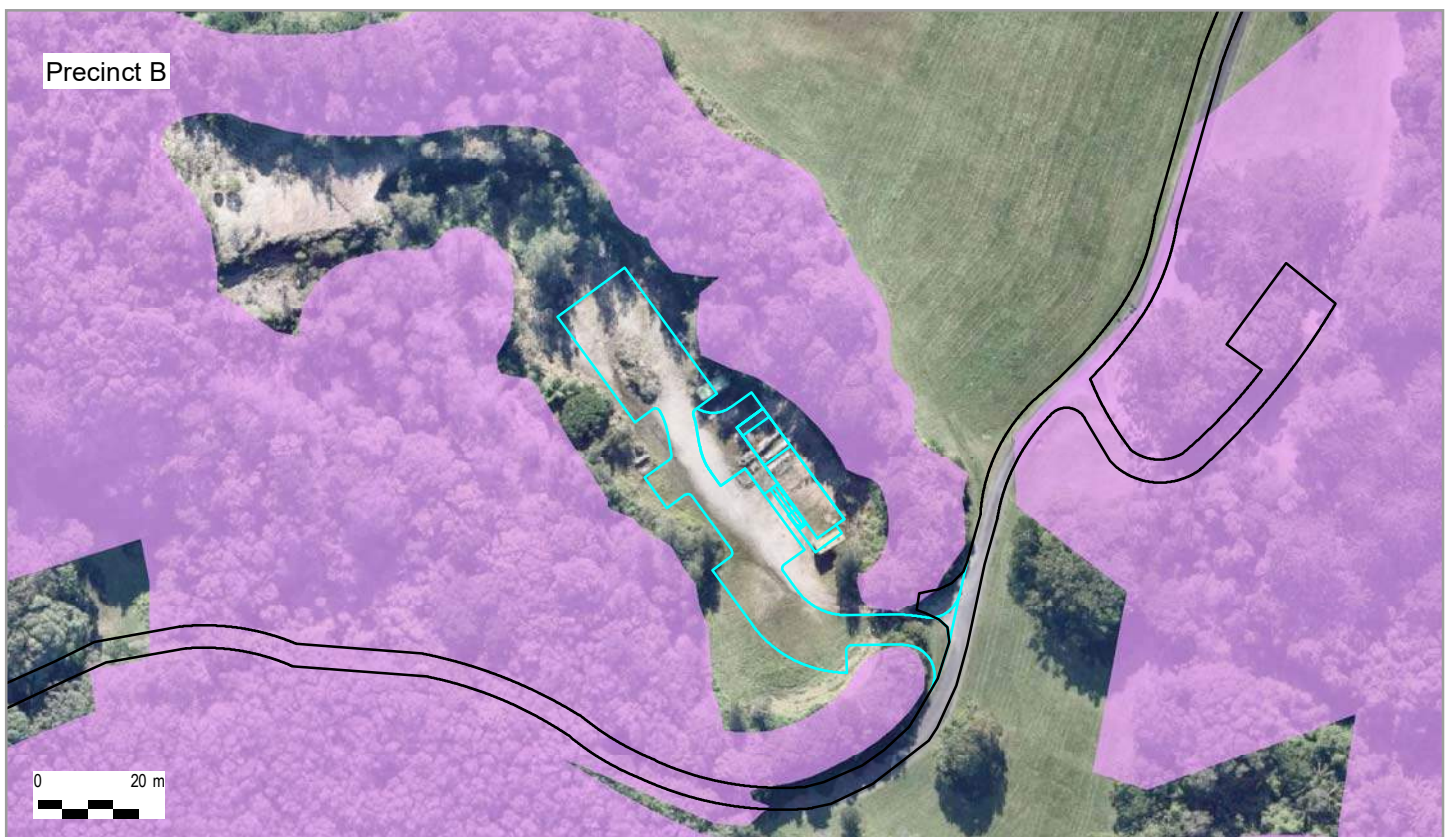
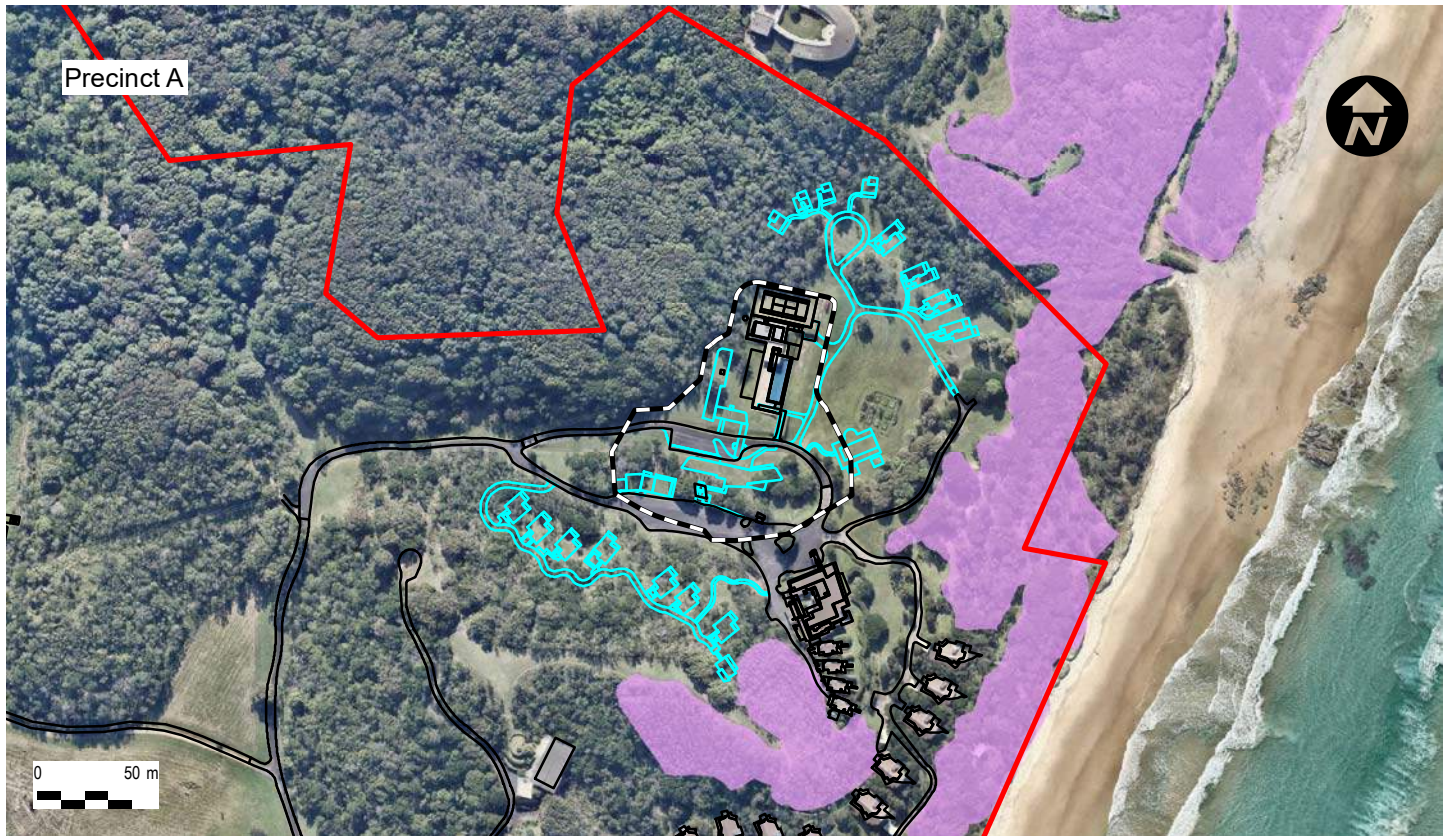
#### LEGEND

- |  |   |   |
|--|---|---|
| <span style="border: 2px solid red; display: inline-block; width: 20px; height: 10px;"></span> Site boundary   | <span style="background-color: #00FF00; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> SEPP Coastal Management 2018 - Coastal Wetlands | <span style="background-color: #0000FF; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> SEPP Coastal Management 2018 - Coastal Wetlands |
| <span style="border-bottom: 2px solid black; display: inline-block; width: 20px;"></span> Existing site layout | <span style="background-color: #00FF00; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Proximity Area for Littoral Rainforests         | <span style="background-color: #0000FF; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Proximity Area for Coastal Wetlands             |
| <span style="border-bottom: 2px solid cyan; display: inline-block; width: 20px;"></span> New layout design     |   |   |

0 30 m

## The Site - Illustration 1.2 Sheet 2 of 2





#### LEGEND



Site boundary

Proposed Asset Protection Zone (APZ)



Biodiversity Value mapping

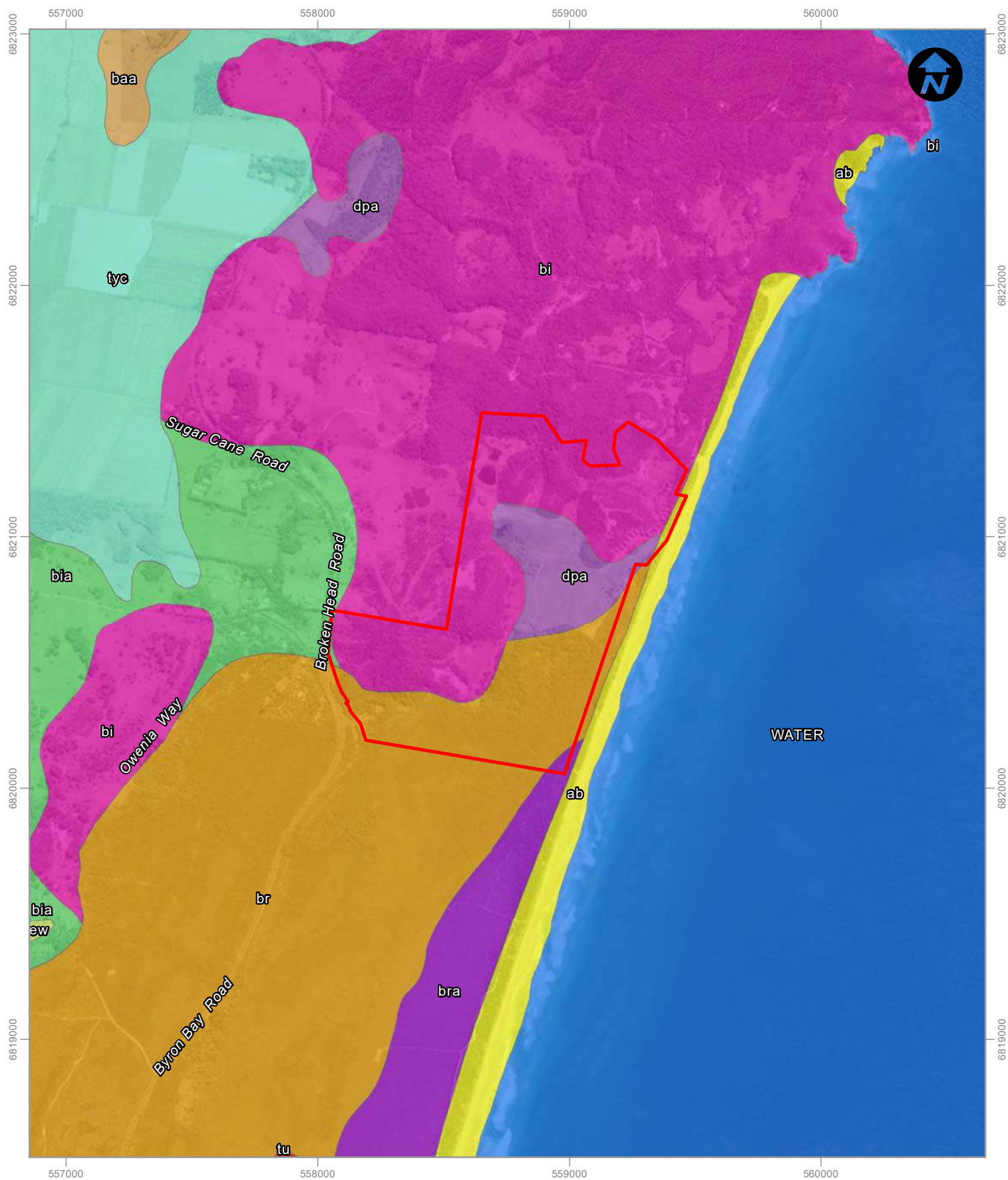
Existing site layout

New layout design

0 30 m

### Biodiversity Value Land - Illustration 1.3





# LEGEND

Site boundary

## Landscape Name

Angels Beach  
Bagotville variant a  
Billinudgel

Billinudgel variant a  
Black Rock  
Black Rock variant a  
Disputed Plain variant a

Ewingsdale  
Tuckean  
Tyagarah variant c  
Water

0 400 m

## Soil and Geological Mapping - Illustration 1.4

**GeoLINK**  
environmental management and design

Biodiversity Assessment - Lot 1 DP1031848 Broken Head Road  
Proposed Tourist Development  
3080-1049

Information shown is for illustrative purposes only  
Drawn by: AB Checked by: RE Reviewed by: ILC  
Source of base data: Nearmap and DFSI  
Date: 29/04/2020





# LEGEND

- Site boundary
- Acid Sulfate Soil Probability**
- Low probability of occurrence

0 400 m

**GeoLINK**  
environmental management and design

Biodiversity Assessment - Lot 1 DP1031848 Broken Head Road  
Proposed Tourist Development  
3080-1050

## Acid Sulfate Soils Mapping- Illustration 1.5

*Information shown is for illustrative purposes only*  
Drawn by: AB Checked by: RE Reviewed by: ILC  
Source of base data: Nearmap and DFSI  
Date: 29/04/2020





## 2. Methodology

### 2.1 Introduction

As noted, the initial Proposal impacted on biodiversity value land and a BDAR was therefore required. On this basis the site was assessed using the Biodiversity Assessment Method (BAM). Following redesign of the Proposal and avoidance of biodiversity value land (whereby a BDAR was not required), data and information gathered from the BAM process has been utilised where appropriate.

### 2.2 Desktop Review

Prior to the site assessment, the following desktop analysis was completed:

- A search of the BioNet Wildlife Atlas (10 km x 10 km grid centred on the site); completed 14 April 2020 and revised January 2021.
- A search of the Protected Matters Search Tool (PMST) for Matters of National Environmental Significance (MNES) within a five kilometre radius of the site (completed 14 April 2020; revised January 2021).
- Review of biodiversity values mapping (refer **Section 1.6**).
- Review of data in the Fisheries Spatial Data Portal (completed April 2020).
- Review of previous ecological assessment/reporting for the site (Parker 1997, Linnaeus Estate 2012).
- Review of records and habitat mapping in the *Byron Coast Comprehensive Koala Plan of Management (BCCKPoM)* (Byron Shire Council 2015).

Details of the survey methodology are provided in **Sections 2.3** and **2.4**. Results of database searches are attached at **Appendix B**.

### 2.3 Field Assessment

Field assessment utilised the following methodology over multiple site visits (refer to **Table 2.1**):

#### Flora

- Walking survey of all areas of vegetation within and in proximity to the Proposal searching for threatened flora and identification of threatened ecological communities. Locations of any significant features were taken by global positioning system (GPS).
- Completion of vegetation plots (20 m x 50 m) consistent with the BAM within affected vegetation.
- Ground-truthing Council mapping and typing of broad vegetation types at the site.
- Assessment and inventory of native trees impacted by proposed buildings, pathways, boardwalks etc.

#### Fauna

- Opportunistic survey of all fauna based on visual or aural observations.
- Dawn bird surveys on three occasions at three sites, based on the 'area search' method (20 mins at each 2 ha site).



- Nocturnal surveys over three nights, using a handheld spotlight and deploying an Anabat 'Express' detector (Titley Scientific) during survey transects at two locations over an entire night. Anabat files were sent to Greg Ford (Balance! Consulting) for expert analysis.
- Koala scat surveys using the SAT (Phillips & Callaghan 2011), with two sites assessed within Precinct A.
- Targeted searches for Swamp Mahogany (primary Koala feed tree) by walking the ecotone between extensive swamp forest and adjacent rainforest and Brush Box forest in the south of the site and completing opportunistic scat surveys under located trees. All Swamp Mahogany located were surveyed by GPS.

**Table 2.1 Summary of Field Assessment**

<i>Date</i>	<i>Task</i>	<i>Comments/ Weather</i>
<b>Diurnal Survey and Assessment</b>		
25/09/2019	Scoping impact sites, threatened flora searches, 2 x BAM plots (1 and 2)	fine and sunny
1/10/2019	Meeting with architects - site scoping, additional threatened flora survey and tagging	fine and sunny
15/10/2019	Meeting with architects and bushfire consultant - APZ scoping, defining brush box edge, tagging threatened flora for surveyors	fine and sunny
24/10/2019	Vegetation stratification and mapping, guava parent searches, general searches for threatened flora	fine and sunny
28/11/2019	BAM plots (3 and 4), tree survey ground truthing	fine and sunny
29/11/2019	BAM plot 5	fine and sunny
24/02/2020	Tree survey and tagging around pegged cabin sites; targeted threatened flora traverses; BAM plot 6	fine and sunny
07/04/2020	Visit with bushfire consultant to determine tree retention within APZ	Overcast, light rain
16/04/2020	Dawn bird survey #1 (1 hour)	fine and sunny
17/04/2020	Dawn bird survey #2 (1 hour)	fine and sunny
23/04/2020	Dawn bird survey #3 (1 hour)	fine and sunny
29/04/2020	Final vegetation mapping; selection of compensation area	fine and sunny
07/05/2020	Revisit compensation areas; SATs and Swamp Mahogany searches	fine and sunny
22/01/2021	Revisit cabins for new pathway design and tree impacts	fine and sunny
<b>Nocturnal Survey</b>		
15/04/2020	Nocturnal survey #1 (1.4 hours spotlighting/11 hours Anabat)	Mild and clear, 50% moon (last quarter)
20/04/2020	Nocturnal survey #2 (1.3 hours spotlighting and Anabat [combined])	Mild and clear, 6% moon (waning crescent)
22/04/2020	Nocturnal survey #3 (1.3 hours spotlighting/11 hours Anabat)	Mild and clear, 1% moon (waning crescent)

A summary of survey effort is provided at **Illustration 2.1**.





## 2.4 Threatened Flora Survey Details

Threatened flora were assessed during plot surveys, and via targeted preliminary surveys across all areas of native vegetation within/proximate to the Proposal area. Preliminary surveys were completed on six occasions during 2019 (refer **Table 2.1**). A final comprehensive targeted survey was completed in 2020 once the project design was finalised. Survey methodology included traversing all affected vegetation checking for threatened rainforest trees typical of littoral rainforest (Stinking Cryptocarya *Cryptocarya foetida*, White Lace Flower *Archidendron hendersonii*, Scented Acronychia *Acronychia littoralis* etc). When it became apparent that suckers of Native Guava were relatively common in some areas, close surveys of the ground layer were also completed.

At the initial site assessment a number of Acronychia in the north-east of the site were flowering or fruiting – all these trees were identified as Beach Acronychia (*A. imperforata*). The known population of Scented Acronychia in the south of the site was visited and a ‘type’ leaf sample taken (showing the visible and widely spaced oil dots). Type samples of Scented Acronychia were used for comparison against any larger leaved or more unusual looking Beach Acronychia to confirm identification.

A simple traverse of the southern carpark was completed on one occasion; this survey effort is adequate given the location comprises gravel hardstand with building debris and occasional weeds and native vegetation is largely absent.

Locations of any threatened flora were taken by GPS and stems marked with flagging tape. Many of these trees were later surveyed by registered surveyors and included in detailed design plans. Targeted survey effort is depicted at **Illustration 2.1**.

## 2.5 Conditions and Survey Limitations

Trees in flower/fruit at time of targeted fauna survey (April 2020) were very limited and included:

- Coast Banksia (*Banksia integrifolia*): very few immature inflorescences (negligible resource).
- Broad-leaved Paperbark (*Melaleuca quinquenervia*): minor flowering at end of flowering period (negligible resource).
- Beach Acronychia (*A. imperforata*): full flower (minor resource).
- Cheese Tree (*Glochidion ferdinandii*): in fruit (minor resource).
- Strangler Fig (*Ficus watkinsiana*): finishing fruit (minor resource).


The poor resources at the time of targeted fauna survey were unfortunate in terms of survey timing and would have substantially influenced results. Ideally fauna survey would have been completed during flowering periods of the two key resources at the site – Coast Banksia and Broad-leaved Paperbark. However, based on local fauna records, previous studies and vegetation/habitat mapping, predictions of fauna usage can be made with a high level of confidence.

While the survey only provides a ‘snapshot’ of fauna usage during a six-month period, the techniques utilised provide suitable sampling for a range of fauna with an emphasis on targeting species most likely to be affected by the Proposal.

Detailed trapping survey (Elliott traps, pitfall traps, cage traps, mist nets/harp traps, camera traps) was not completed for the Proposal on the basis of:

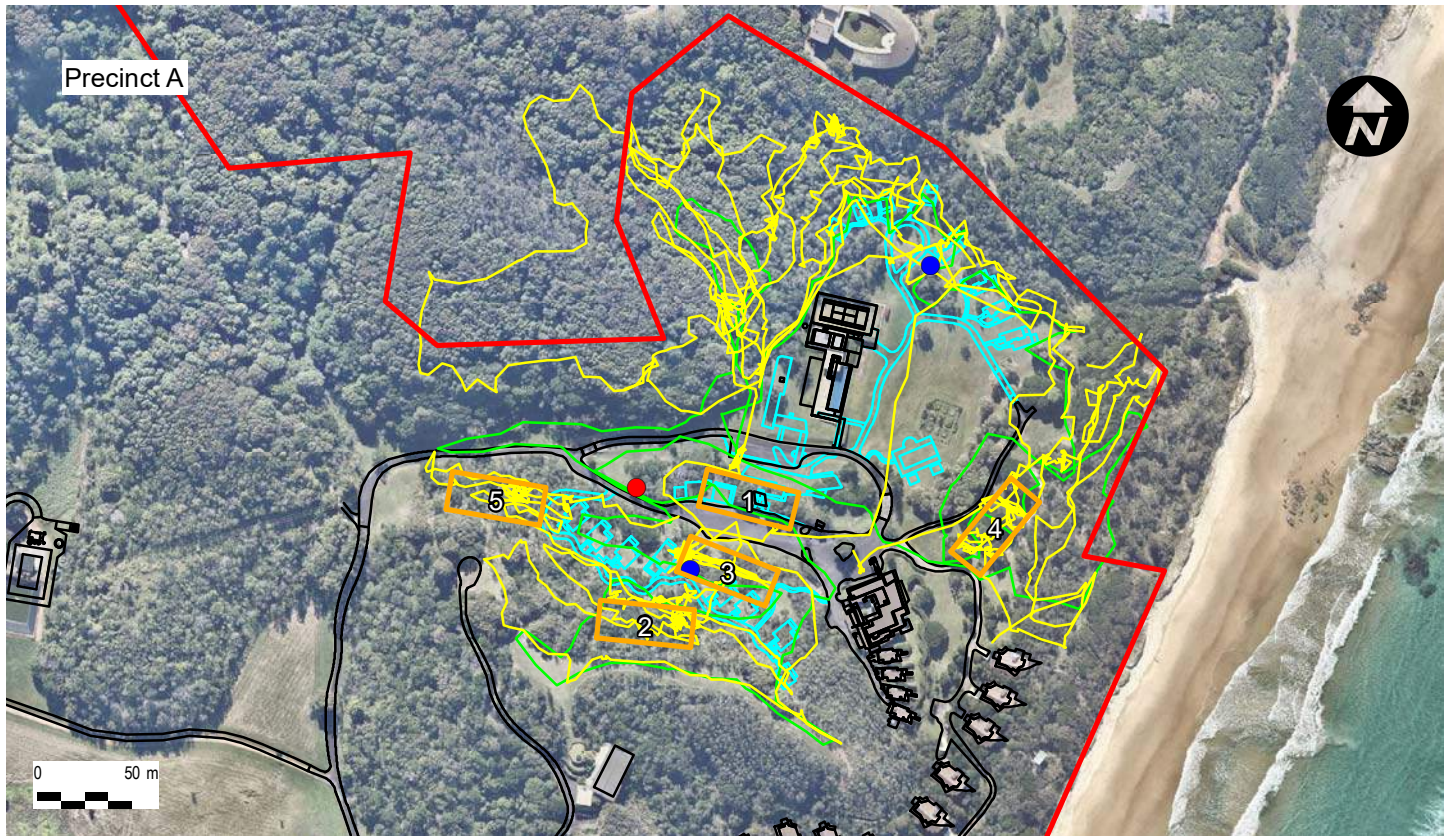
- Habitat within the Proposal is substantially disturbed and maintained by regular mowing.
- Vegetation within the Proposal is not structurally complex and elements such as an established midstorey and ground layer are generally absent.



- 
- No water bodies occur.
  - Only one hollow-bearing tree is present.
  - The Proposal area is subject to low levels of regular human disturbance from maintenance (mowing, weed control, landscaping), vehicle movements and human gatherings (tennis courts, pool and open spaces/walkways).

Where key resources were present for threatened fauna (e.g. Coast Banksia for the Common Blossom Bat), these species were considered as likely to be present and assessed on this basis.





#### LEGEND

- |   |   |  |   |
|---|---|--|---|
| <span style="border: 2px solid red; padding: 2px;"> </span> Site boundary       | <span style="border-bottom: 2px solid yellow; width: 50px; display: inline-block;"></span> Threatened flora traverses | <span style="border-bottom: 2px solid black; width: 50px; display: inline-block;"></span> Existing site layout | <span style="color: blue;">●</span> SAT plot                    |
| <span style="border: 2px solid orange; padding: 2px;"> </span> Flora plot (BAM) | <span style="border-bottom: 2px solid green; width: 50px; display: inline-block;"></span> Spotlighting/Anabat survey  | <span style="border-bottom: 2px solid cyan; width: 50px; display: inline-block;"></span> New layout design     | <span style="color: red;">●</span> Anabat - all night recording |
|   |   | <span style="border-bottom: 2px solid blue; width: 50px; display: inline-block;"></span> Flora survey          |   |

0 30 m

#### Survey Effort - Illustration 2.1



## 3. Vegetation

### 3.1 Desktop Analysis


#### 3.1.1 Database Search Results

BioNet search results identified records of 33 threatened flora species (with 19 species also listed in the EPBC Act) and potential habitat for ten Threatened Ecological Communities ('TECs'; with five of these listed under the EPBC Act) within 5 km of the site (refer to **Appendix B** and **Table 3.1** and **Table 3.2**). PMST results identified habitat for 31 threatened flora species and three threatened ecological communities within 5 km of the site.

**Table 3.1 Threatened Flora Recorded within 5 km of the Site**

Scientific Name	Common Name	BC Act	EPBC Act
<i>Acronychia littoralis</i>	Scented Acronychia	E	E
<i>Archidendron hendersonii</i>	White Lace Flower	V	-
<i>Arthraxon hispidus</i>	Hairy Jointgrass	V	V
<i>Caesalpinia bonduc</i>	Knicker Nut	E	-
<i>Chamaesyce psammogeton</i>	Sand Spurge	E	-
<i>Cryptocarya foetida</i>	Stinking Cryptocarya	V	V
<i>Davidsonia jerseyana</i>	Davidson's Plum	E	E
<i>Davidsonia johnsonii</i>	Smooth Davidson's Plum	E	E
<i>Diploglottis campbellii</i>	Small-leaved Tamarind	E	E
<i>Diuris byronensis</i>	Byron Bay Diuris	E	-
<i>Drynaria rigidula</i>	Basket Fern	E	-
<i>Elaeocarpus williamsianus</i>	Hairy Quandong	E	E
<i>Endiandra floydii</i>	Crystal Creek Walnut	E	E
<i>Endiandra hayesii</i>	Rusty Rose Walnut	V	V
<i>Endiandra muelleri</i> subsp. <i>bracteata</i>	Green-leaved Rose Walnut	E	-
<i>Floydia praealta</i>	Ball Nut	V	V
<i>Geodorum densiflorum</i>	Pink Nodding Orchid	E	-
<i>Gossia fragrantissima</i>	Sweet Myrtle	E	E
<i>Macadamia tetraphylla</i>	Rough-shelled Bush Nut	V	V
<i>Marsdenia longiloba</i>	Slender Marsdenia	E	V
<i>Melicope vitiflora</i>	Coast Euodia	E	-
<i>Niemeyera whitei</i>	Rusty Plum	V	-
<i>Peristeranthus hillii</i>	Brown Fairy-chain Orchid	V	-
<i>Phaius australis</i>	Southern Swamp Orchid	E	E
<i>Psilotum complanatum</i>	Flat Fork Fern	E	-
<i>Randia moorei</i>	Spiny Gardenia	E	E
<i>Rhodamnia rubescens</i>	Scrub Turpentine	CE	CE
<i>Rhodomyrtus psidioides</i>	Native Guava	CE	CE
<i>Senna acclinis</i>	Rainforest Cassia	E	-
<i>Syzygium hodgkinsoniae</i>	Red Lilly Pilly	V	V





Scientific Name	Common Name	BC Act	EPBC Act
<i>Syzygium moorei</i>	Durobby	V	V
<i>Tinospora tinoporoides</i>	Arrow-head Vine	V	-
<i>Xylosma terrae-reginae</i>	Queensland Xylosma	E	-

V= Vulnerable, E = Endangered; CE = Critically Endangered

**Table 3.2 TECs within 5 km of the Site**

Community	BC Act	EPBC Act
Coastal Cypress Pine Forest in the New South Wales North Coast Bioregion	E	-
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South-East Corner Bioregions	E	V
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South-East Corner Bioregions	E	-
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South-East Corner Bioregions	E	CE
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E	CE
Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	E	CE
Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	E	-
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South-East Corner Bioregions	E	-
*Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South-East Corner Bioregions	E	E
Themeda grassland on seaciffs and coastal headlands in the NSW North Coast, Sydney Basin and South-East Corner Bioregions	E	-
White Gum Moist Forest in the NSW North Coast Bioregion	E	-

V= Vulnerable, E = Endangered; CE = Critically Endangered

\*Not identified in BioNet search results, but known to occur locally

### 3.1.2 Council Mapping and Data

BSC completed detailed vegetation mapping for the site as part of Council's E-zones review process which appears generally accurate (refer to **Illustration 3.1**). Vegetation mapping has since been refined (refer **Appendix C**); vegetation communities within the proximity to the Proposal include:

#### Precinct A

- Coast Banksia-Rainforest
- Grey Ironbark-Pink Bloodwood-Brush Box-Rainforest
- Black Sheoak
- Coast Banksia-Brush Box-Rainforest
- Littoral Rainforest
- Swamp Oak-Rainforest
- Planted vegetation.

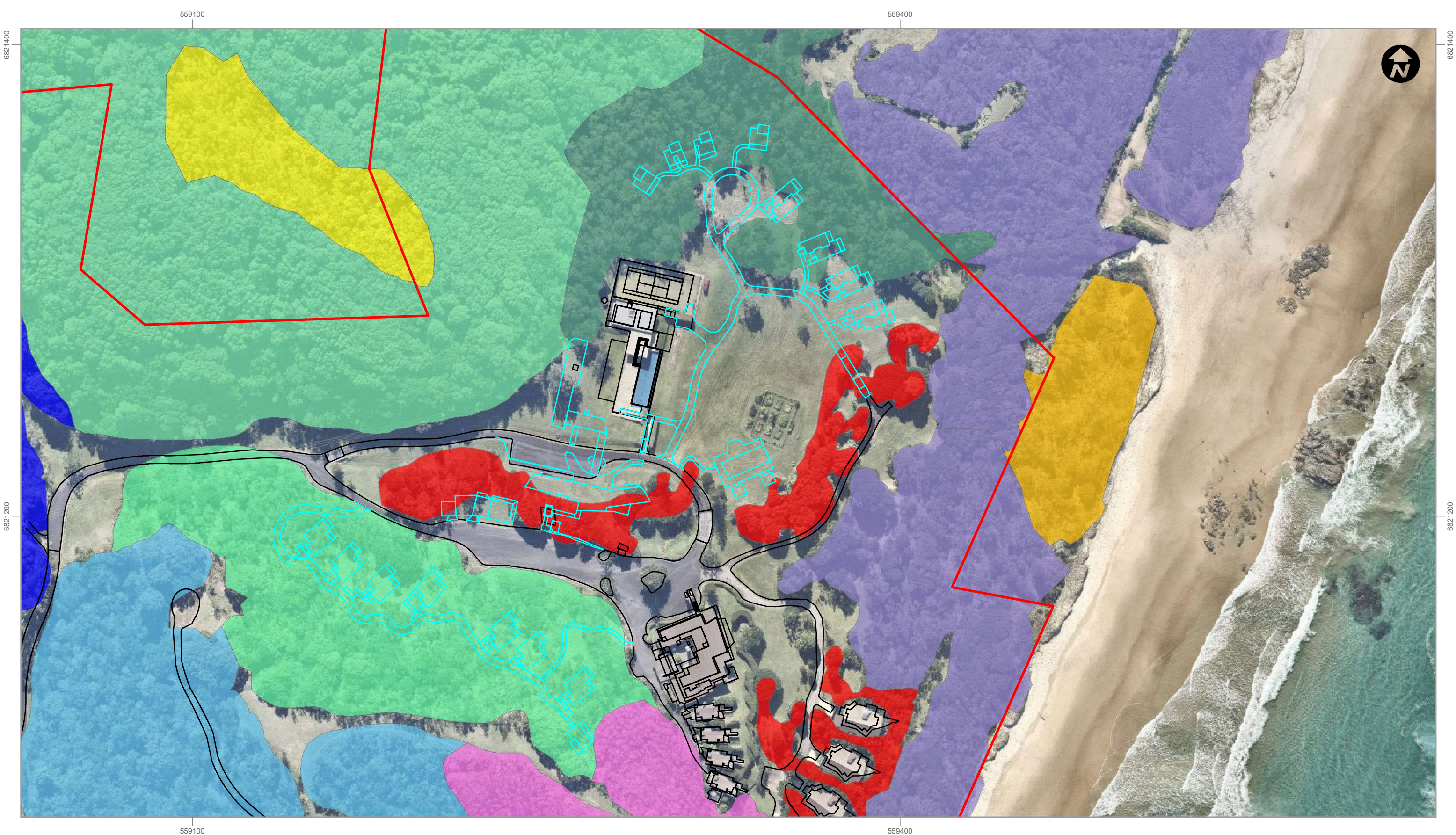




### **Precinct B**

- Swamp Oak
- Swamp Oak-Callicoma-Paperbark
- Hoop Pine-Rainforest
- Rainforest-Brush Box-Hoop Pine
- Paperbark.





**LEGEND**

- Site boundary
- Existing site layout
- New layout design

**Byron Vegetation (LM Vegtype)**

- |  |   |
|--|---|
| Black Sheoak                                     | Coast Banksia-Rainforest                          |
| Brush Box-Grey Ironbark-Pink Bloodwood-Brush Box | Grey Ironbark-Pink Bloodwood-Brush Box-Rainforest |
| Coast Banksia                                    | Littoral Rainforest                               |
| Coast Banksia-Brush Box-Rainforest               | PL  |
| Coast Banksia-Brush Box-Willow Bottlebrush       | Rainforest  |
|  | Swamp Oak-Rainforest                              |

0 30 Metres



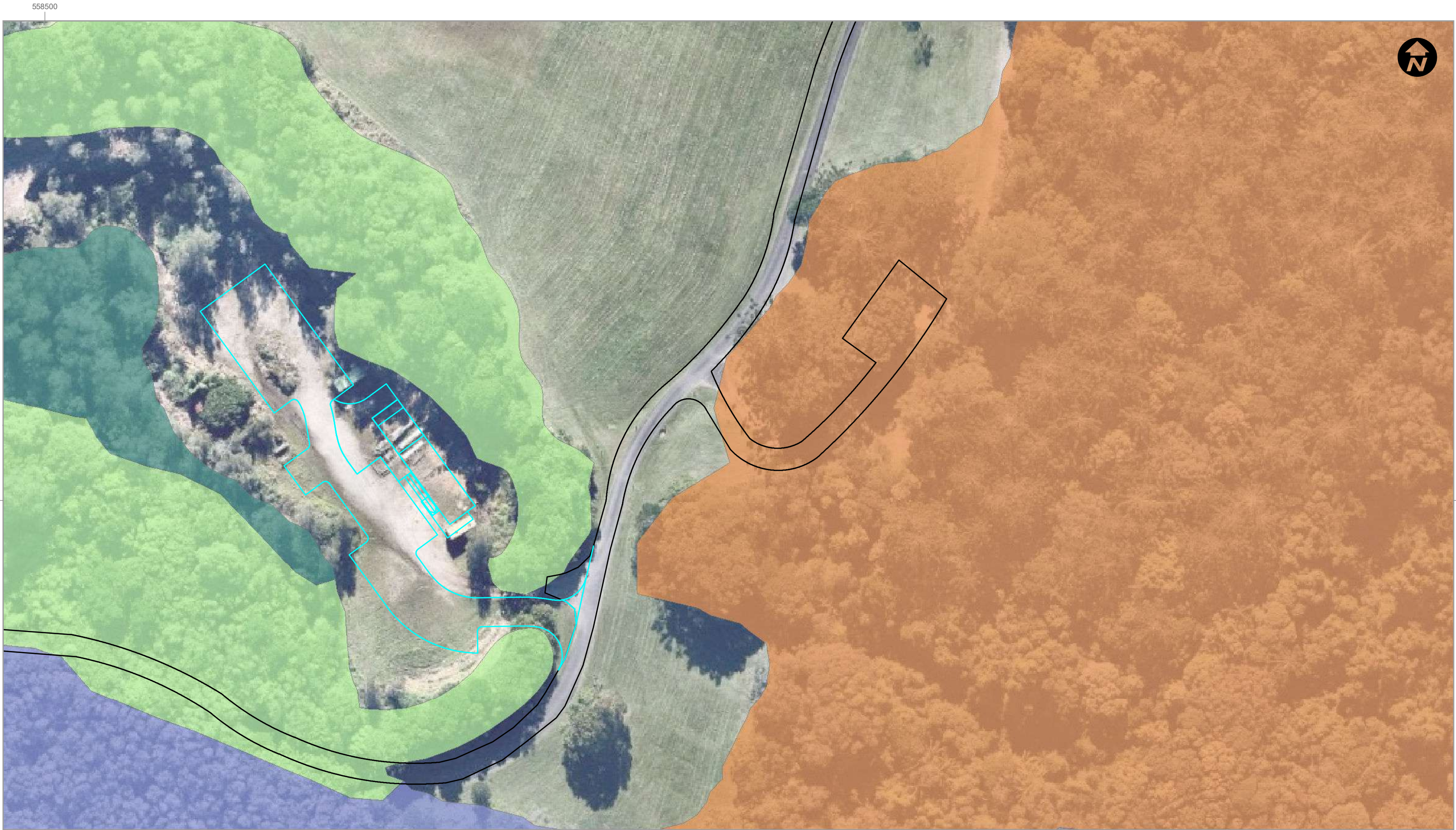
Biodiversity Assessment - Lot 1 DP1031848 Broken Head Road - Proposed Tourist Development  
3080-1045

**Precinct A Vegetation Mapping (BSC)**  
**Illustration 3.1 - Sheet 1 of 2**

Information shown is for illustrative purposes only  
Drawn by: AB Checked by: RE Reviewed by: ILC  
Source of base data: NearMap 11/06/2019, BSC and DFSI  
Date: 08/05/2020

GDA 1994 MGA Zone 56





**LEGEND**

Site boundary	<b>Byron Vegetation (LM Vegtype)</b>	Swamp Oak
Existing site layout	Hoop Pine-Rainforest	Swamp Oak-Callicoma-Paperbark
New layout design	Paperbark	







### 3.1.3 Previous Studies

A Flora and Fauna Assessment of the site was completed by Peter Parker in 1997. This study and later assessments have identified several threatened flora species at the site including: Scented Acronychia, Green-leaved Rose Walnut, Sweet False Galium, Rusty Plum, Red Lilly Pilly and Maundia (Linnaeus Estate 2012). A number of vegetation communities have been identified at the site including littoral rainforest, Brush Box forest, swamp forest, wallum heathland, Kangaroo Grass headlands, freshwater wetlands and dunal vegetation.

In 2019 Landmark Ecological Services (Landmark) completed ground-truthing of the draft Coastal Management SEPP (CMSEPP) mapping at the Linnaeus property and prepared a submission to the Department of Planning, Industry and Environment (DPIE). Field The assessment indicated a high degree of accuracy in relation to the vegetation classification with the exception of four polygons, where changes were recommended (refer to **Appendix D**). DPIE has not formally responded to the submission.

## 3.2 Site Features

### 3.2.1 Vegetation Communities

The site lies within a mosaic of extensive areas of native vegetation which typically comprises a mixture of swamp sclerophyll forest dominated by Broad-leaved Paperbark (*Melaleuca quinquenervia*), littoral rainforest (both Brush Box and Banksia/Tuckeroo dominated), regrowth (Banksia, wattle), heath and wetland communities. Broken Head Nature Reserve occurs approximately 800 m north of the site and encompasses approximately 110 ha of native vegetation including rainforest, dry sclerophyll forest, woodland, grassland and dunal vegetation. The southern boundary of the site abuts the eastern portion of Newrybar Swamp, an extensive area of heath and swamp forest which extends over approximately 4 km south to Lake Ainsworth at Lennox Head.

While parts of the site have been significantly cleared and modified from past grazing and agricultural practices, large areas of contiguous good quality native vegetation occur. The central portion of the site contain a large area of pasture (*Setaria*) which is regularly slashed and baled as livestock feed. Other areas of grassland are maintained by regular mowing and slashing.

Vegetation generally comprises swamp sclerophyll forest in lower lying portion of the site (in the southeast for example) and littoral rainforest throughout higher elevation areas and along hind dune areas. In the north of the site where the Proposal (Precinct A) located vegetation occurs as a fragmented grassy area which is regularly mown and which contains occasional scattered trees (Coast Banksia) and small pockets of littoral rainforest. Within the hill where the 'treehouses' (B-cabins) are proposed, lower slopes comprise mown grassland and scattered Coast Banksia with regenerating littoral rainforest along the mid and upper slopes.

Site vegetation mapping broadly corresponds with several plant community types (PCTs) in the BioNet Vegetation Classification system (refer to **Table 3.3**). PCTs for the north coast are currently under revision and the PCTs available for selection in the Scenic Rim and Clarence Lowlands subregions are very coarse (or in some cases do not exist). This is expected to change with the release of mapping and vegetation descriptions by NSW Environment, Energy and Science (EES) later in 2020.



**Table 3.3 Broad Vegetation Communities at the Site**


<b>Vegetation Community</b>	<b>PCT Equivalent</b>
<b>Moist sclerophyll Forest</b>	
Open forest dominated by Brush Box ( <i>Lophostemon confertus</i> ) with rainforest elements	751 Brush Box - Tuckeroo littoral rainforest on coastal headlands of the NSW North Coast Bioregion (in part)
Open forest dominated by Grey Ironbark ( <i>Eucalyptus siderophloia</i> )	n/a
<b>Swamp Sclerophyll Forest</b>	
Open forest dominated by Broad-leaved Paperbark ( <i>Melaleuca quinquenervia</i> ); infrequent Swamp Oak ( <i>Casuarina glauca</i> ). Includes small patches of planted Broad-leaved Paperbark in the central portion of the site	1064 Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
Swamp Oak scrub on perched coastal slopes and around disturbed areas	1235 Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion (in part)
<b>Rainforest</b>	
Hoop Pine ( <i>Araucaria cunninghamii</i> ) dominated rainforest	887 Hoop Pine - Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion (in part)
Littoral rainforest dominated by Coast Banksia ( <i>Banksia integrifolia</i> subsp. <i>integrifolia</i> ), Tuckeroo ( <i>Cupaniopsis anacardioides</i> ) and Beach Acronychia ( <i>Acronychia imperforata</i> )	PCT 1275 Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion
<b>Regrowth</b>	
Typically dominated by Coast Banksia or Brown Kurrajong ( <i>Commersonia bartramia</i> )	751 Brush Box - Tuckeroo littoral rainforest on coastal headlands of the NSW North Coast Bioregion (in part)
<b>Sedgelands</b>	
Grey Rush ( <i>Lepironia articulata</i> ) fringing dams and water bodies	1741 <i>Lepironia articulata</i> sedgeland
<b>Grasslands</b>	
Mown grasslands dominated by pasture grasses ( <i>Setaria sphacelata</i> *, <i>Cenchrus clandestinus</i> *)	n/a

\*Introduced species

While vegetation within and proximate to the Proposal have all been modified to some degree, they are all broadly consistent with littoral rainforest and generally align (as best they can) with PCT 1275 Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion based on characteristic species including Coast Banksia (*Banksia integrifolia* subsp. *integrifolia*), Tuckeroo (*Cupaniopsis anacardioides*), Beach Acronychia (*Acronychia imperforata*), Three-veined Laurel (*Cryptocarya triplinervis* var. *triplinervis*) and Brown Kurrajong (*Commersonia bartramia*).

PCT 784 Coastal headland heaths was considered for areas where Coast Banksia occur within mown grassland with few other species (Tuckeroo, Brown Kurrajong), however these areas are considered modified forms of littoral rainforest, evidenced by regeneration of rainforest species, and lacking other characteristic species of coastal headland heaths.





Due to the slight variations in modified forms of PCT 1275, a plot was completed within each vegetation zone to discriminate condition and species composition.

Other rainforest PCTs within the subregion include:

- PCT 751 *Brush Box - Tuckeroo littoral rainforest on coastal headlands of the NSW North Coast Bioregion.*
- PCT 887 *Hoop Pine - Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion.*
- PCT 1302 *White Booyong - Fig subtropical rainforest of the NSW North Coast Bioregion.*

None of these PCTs apply to the subject vegetation within/proximate to the Proposal, based on floristics, however vegetation characteristic of both PCT 751 and 887 are present in other parts of the site, with PCT 751 occurring extensively in the north of the site adjacent to Precinct A.

Other native vegetation in the area of Precinct A includes several areas of planted landscaping with typical species including Tuckeroo and Brush Box (*Lophostemon confertus*). A small stand of the Queensland species Weeping Paperbark (*Melaleuca leucadendra*) is planted in the north-east of the site.

As a former quarry, Precinct B (where the proposed carpark/depot area is located) is highly disturbed and has been formerly cleared and excavated. This quarry 'floor' comprises gravel hardstand (and weeds) and an area of mown grass (*Setaria*) and is more broadly surrounded by regrowth of Swamp Oak (*Casuarina glauca*) and pioneer rainforest species (*Macaranga*, Brown Kurrajong) Mounded landscape plantings [various native rainforest species] have also been installed around the quarry entry. While mapping under SEPP Coastal Management depicts this vegetation as 'coastal wetlands' this is incorrect, as the site is elevated and separated from true low-lying wetlands to the east. A submission to DPIE has been made to correct this mapping error (Landmark 2019), with all vegetation mapped as coastal wetlands nominated as littoral rainforest (inclusive of planted areas); refer to **Appendix D**. East of Precinct B, large areas of intact native vegetation occur including extensive swamp sclerophyll forest dominated by Broad-leaved Paperbark and rainforest dominated by Hoop Pine.

On this basis, broad native vegetation communities occurring within or adjacent to the Proposal area are described at **Table 3.4** and depicted at **Illustration 3.2**. Vegetation communities are classified in terms of approved PCTs where an appropriate PCT occurs.

*Note: PCTs for the north coast are currently poorly described and have a low level of confidence. These are currently under revision and will be amended later in 2021 with the release of mapping and vegetation descriptions by EES. PCTs have been selected for the Scenic Rim Bioregion and or Clarence Lowlands IBRA subregions on a 'best fit' basis.*

Photographs of vegetation communities at the site are provided at **Appendix E**. Flora plot data is provided at **Appendix F**.

Note: As the Proposal initially required a BDAR, BAM plots were completed in affected vegetation and Vegetation Integrity (VI) scores determined by utilising the BAM-Calculator (BAM-C). VI scores (scored out of 100, with 100 representing vegetation of very high quality) are cited in this report to provide context when discussing the condition of native vegetation communities. VI scores are summarised at **Appendix G**.



**Table 3.4 Vegetation Communities in the Proposal Area**

	<b>Vegetation Community</b>	<b>PCT</b>	<b>Comments</b>	<b>Affected by Proposal?</b>
	<b>Littoral Rainforest</b>			
1	<b>Closed forest (Tuckeroo, Beach Acronychia)</b> Tuckeroo dominated forest in the north-east of the site, with other common species including Beach Acronychia, Three-veined Laurel and Broad-leaved Ballart ( <i>Exocarpus latifolius</i> ). Coast Banksia is absent. Midstorey and ground layer sparse. Prickly Smilax ( <i>Smilax australis</i> ) is a common vine/scrambler	<i>PCT 1275 Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion</i>	Ranges from relatively undisturbed forest to fragmented and modified small patches	No
2	<b>Open forest (Coast Banksia, Tuckeroo)</b> Dominated by Coast Banksia with Tuckeroo, Brown Kurrajong ( <i>Commersonia bartramia</i> ) and Corkwood ( <i>Duboisia myoporoides</i> ). In the Proposal footprint this community is highly disturbed with the ground layer dominated by Molasses Grass* ( <i>Melinis minutiflora</i> ) and Paspalum* ( <i>P. mandiocanum</i> )	<i>PCT 1275 Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion (disturbed)</i>	Disturbed regrowth, weedy ground layer	Yes - access track to treehouse cabins
2m	<b>Open forest (Coast Banksia, Tuckeroo) - modified</b> Highly modified areas dominated by Coast Banksia with infrequent Tuckeroo/Brown Kurrajong; midstorey absent. Ground layer of pasture grass (mown)	<i>PCT 1275 Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion (derived/modified)</i>	Highly modified, regularly mown, little regeneration or diversity	Yes - treehouse and rainforest retreat cabins
	<b>Sclerophyll Forest</b>			
3	<b>Open forest (Brush Box)</b> Brush Box ( <i>Lophostemon confertus</i> ) dominated forest with common littoral rainforest species	<i>PCT 751 Brush Box - Tuckeroo littoral rainforest on coastal headlands of the NSW North Coast Bioregion</i>	In good condition, low disturbance	No
4	<b>Open forest (Grey Ironbark)</b> Grey Ironbark ( <i>Eucalyptus siderophloia</i> ) with grassland and regrowth rainforest species. Mown/disturbed areas	No equivalent	Small in area, disturbed by mowing, invasive grasses	No
	<b>Swamp Sclerophyll Forest</b>			
5	<b>Closed forest (Swamp Oak)</b> Swamp Oak scrub on eastern face of the treehouse hill with occasional rainforest species (Tuckeroo, Brown Kurrajong) at Precinct A. Regrowth with Brown Kurrajong and Macaranga ( <i>Macaranga tanarius</i> ) around quarry rim	<i>1235 Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion (in part)</i>	Regrowth - degraded around Precinct B, in moderate condition at Precinct A (some Lantana)	No
	<b>Landscape Plantings</b>			
6a	Planted landscaping dominated by Tuckeroo (Precinct A), with Lilly Pilly ( <i>Acmena smithii</i> , <i>Syzygium</i> sp.) (Precinct B)	<i>PCT 1275 Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion (derived)</i>	Planted trees, regularly mown, little regeneration or diversity	Unaffected in Precinct A; two trees removed in Precinct B
6b	Planted landscaping dominated by Brush Box and/or Weeping Paperbark* ( <i>Melaleuca leucadendra</i> )	No equivalent	Planted trees, regularly mown, little regeneration or diversity	No
6c	Planted landscaping of various species including native species (Tuckeroo) and ornamentals such as Norfolk Pine* and Benjamin's Fig*	No equivalent	Planted trees, regularly mown, little regeneration or diversity	No

\* Exotic species;





### 3.2.2 Threatened Flora

Seven threatened flora species (two of which are planted at the site) were recorded within the Proposal areas, with all but one occurrence within Precinct A:

- Coolamon (*Syzygium moorei*): four planted trees occur amongst landscape plantings, two of which occur within Precinct A. Both trees will be retained within the refuge building APZ.
- Native Guava (*Rhodomyrtus psidioides*): several small trees occur, along with numerous suckers. Initially all suckers were thought to be seedlings, however following advice that the species suckers freely (Bob Makinson [NSW Herbarium] 8 November 2019), closer investigation confirmed this to be the case. All suckers occurred in close proximity to seemingly dead parent trees (typically small trees <5 m in height with a single slender dead stem remaining). On this basis, the multiple sucker records in each vicinity could be considered as relating to a single tree. A single mature parent tree (~6 m in height) occurs in the north-east of the site, outside the development area. All trees were generally in poor to very poor condition, with the 'broomstick' effect evident at the end of most small branches where full dieback has occurred. All trees showed signs of Myrtle Rust scarring; no signs of active Myrtle Rust infection were recorded. All trees retained in-situ.
- Scrub Turpentine (*Rhodamnia rubescens*): several immature trees occur within the development area. Three mature trees occur outside the development area. All trees showed scarring from Myrtle Rust and were generally in poor condition and exhibited significant dieback ('broomstick effect'). No signs of active Myrtle Rust infection were recorded (consistent with the very dry conditions). No seedlings were observed, although a small sapling (~ 1 m in height) was recorded, indicating regeneration is occurring. All trees retained in-situ.
- Small-leaved Tamarind (*Diploglottis campbellii*): single tree planted along mound at entry to the quarry (Precinct B). Tree retained in-situ.
- Stinking Cryptocarya (*Cryptocarya foetida*): several immature trees and seedlings occur, mostly in the north-east of the site. All trees retained in-situ.
- White Lace Flower (*Archidendron hendersonii*): two mature trees occur within the north-east of the site; several other trees occur east of Precinct A. All trees retained in-situ.
- Queensland Xylosma (*Xylosma terrae-reginea*): three mature trees occur, along with several saplings and seedlings within a small area in the north of the site, outside the Proposal area. All trees retained in-situ.

The location of threatened flora is depicted at **Illustration 3.3**.

The large numbers of threatened flora indicate the site has high conservation values. While records of small populations of the critically endangered species Scrub Turpentine and Native Guava are encouraging, the poor health of these trees, death of several Native Guava, and the lack of flowering or fruiting suggests a poor prognosis for these two species in the long term, based on data showing both species to be in severe decline over their range (Makinson 2018). While suckers of Native Guava are encouraging, they are unlikely to persist and mature to flowering/fruiting stages based on the evidence to date (Bob Makinson [NSW Herbarium] 8 November 2019). Carnegie et al. (2016) note that persistent sucker regrowth recorded in the field typically failed after re-infection of trees. Larger scale studies (Fensham et al. 2020) also note that suckers are highly susceptible to infection.

At a final site inspection in January 2021 active Myrtle Rust infection was observed on an immature Scrub Turpentine in the development area with nearby more mature trees exhibition no signs of active infection and showing plenty of new growth.

Makinson provides the following information on Scrub Turpentine and Native Guava with regard to the effects of Myrtle Rust:



- Scrub Turpentine: The steep decline across the whole of the range of *Rhodamnia rubescens* is well documented. While some plants in many populations survive yearly bouts of infection and maintain some new growth, many do not, and the cumulative mortality rate is compounded by lack of fruiting in most populations in most years, and apparent cessation of seedling recruitment at nearly all locations for which appropriate seasonal reports are available. No signs of resistance at populational level have emerged, although there are sporadic reports of individuals (and very rarely small populations) with low or no infection incidence – possibly by chance. Effective extinction in the wild of this formerly common species within a very few years is likely.
- Native Guava: *Rhodomyrtus psidioides* is well documented as being in catastrophic decline across its range, with survivors being exceptional and almost certainly fortuitous in most cases. The window for seed collection from the wild has long passed (absent the long-term development of seed orchards), and only vegetative germplasm can now be collected from the wild. Surviving plants in cultivation, especially if with a known wild source, have acquired exceptional conservation value and should be protected with fungicide treatments where possible, as they may be vital sources of seed (even if selfed) for propagation, storage testing, and the capture of what remains of this species' genetic diversity. This formerly common species is the starkest case of rapid decline as a result of Myrtle Rust, and should be a lead candidate for emergency salvage to avoid total extinction.

Photographs of threatened flora are shown at **Plate 3.1** to **Plate 3.6**.

Tests of significance ('five-part tests') under Section 7.3 of the BC Act have been completed for threatened flora species recorded within/proximate to the Proposal (refer to **Section 7.5**).



**Plate 3.1** Native Guava suckers with flagging tape. Aggregations of suckers are considered to represent a single 'tree' at each location





**Plate 3.2** Mature Native Guava in very poor condition showing severe crown dieback



**Plate 3.3** Scrub Turpentine with leaf damage from Myrtle Rust





**Plate 3.4** Regenerating sapling of Scrub Turpentine in good health



**Plate 3.5** The same Scrub Turpentine in Plate 3.4 with active Myrtle Rust infection (January 2021)





**Plate 3.6** Mature Queensland Xylosma near the northern boundary

### 3.2.3 Threatened Ecological Communities (TECs)

#### 3.2.3.1 Biodiversity Conservation Act 2016


All areas of native vegetation dominated by Coast Banksia/Tuckeroo/Beach Acronychia (etc) within and proximate to the Proposal are characteristic of the threatened ecological community (TEC) *Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*, including regrowth areas around the quarry (refer to **Illustration 3.4**). While some areas dominated by Coast Banksia have been highly modified by thinning, underscrubbing and mowing these communities retain characteristic species associated with Littoral Rainforest (Tuckeroo, Brown Kurrajong, Corkwood).

Vegetation floristically characteristic of three other TECs (Swamp sclerophyll forest, Swamp oak floodplain forest, Freshwater wetlands) occurs elsewhere at the site, however these communities do not occur on an alluvial landscape (a requirement in determining these communities) and so no TECs apply to the Proposal.

Consolidated Hoop Pine forest in the south of the site is characteristic of the TEC *Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions*. This vegetation will not be affected by the Proposal.

A small area of Kangaroo Grass dominated vegetation is known to occur south east of the 'treehouses' which may be characteristic of the TEC *Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South-East Corner Bioregions*. This vegetation will not be affected by the Proposal.





Tests of significance ('five-part tests') under Section 7.3 of the BC Act have been completed for TECs within/proximate to the Proposal (refer to **Section 7.5**).

#### 3.2.3.2 *Environment Protection and Biodiversity Conservation Act 1999*

Littoral rainforest is also listed under the EPBC Act as the TEC *Littoral rainforests and coastal vine thickets of eastern Australia* and is subject to condition thresholds, where a minimum patch size of 0.1 ha applies in addition to having a weed cover of 70% or less and meeting specific levels of floristic diversity and/or at least 30% canopy cover of one rainforest canopy species (excluding Banksia and Eucalyptus species). The latter point (canopy cover) precludes all Banksia dominated areas of littoral rainforest as meeting criteria, while all other areas of 'softwood' dominated rainforest are likely candidates for meeting thresholds for TEC *Littoral rainforests and coastal vine thickets of eastern Australia* and therefore qualify as Matters of National Environmental Significance (MNES).

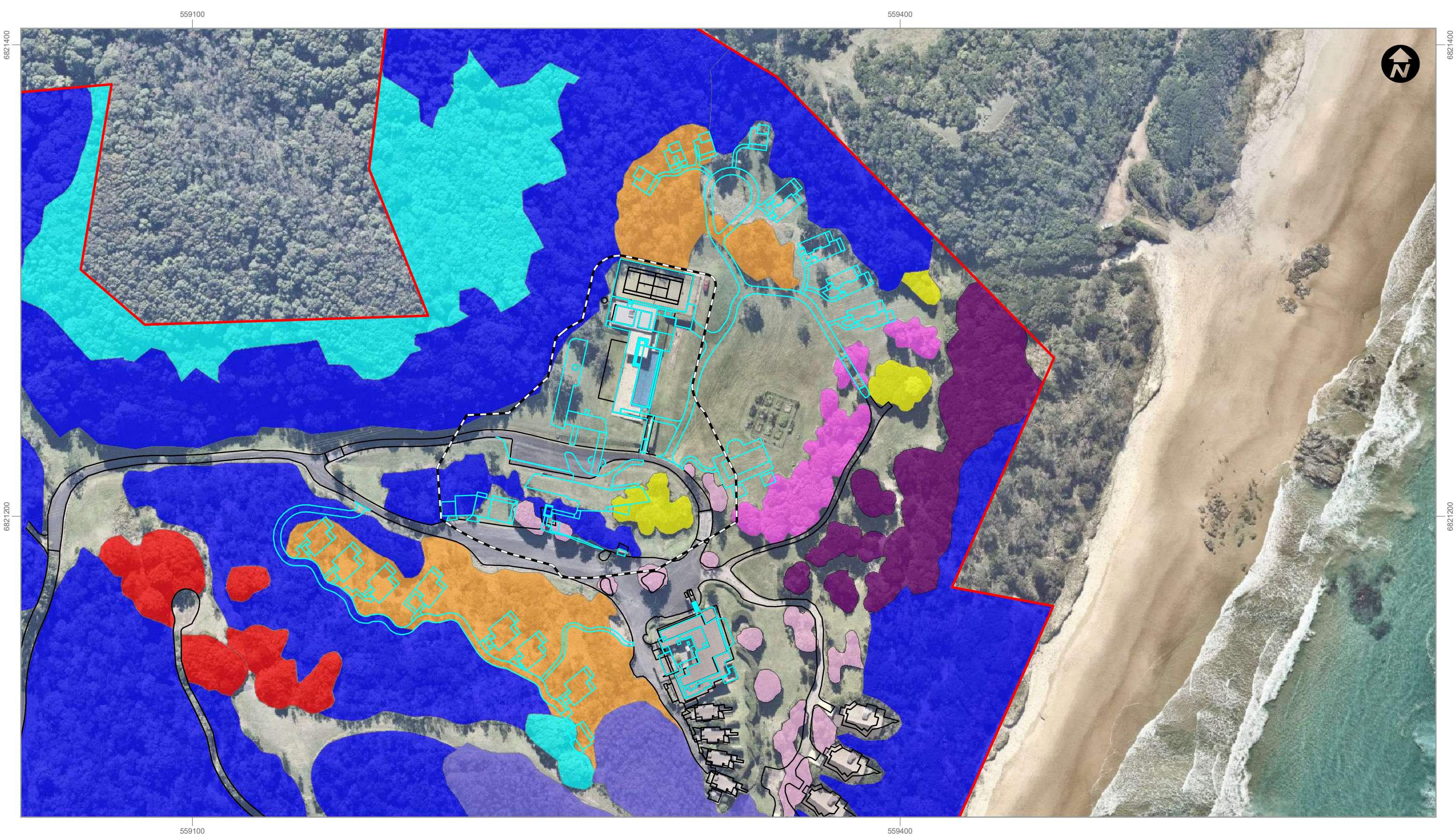
No areas of vegetation impacted by the Proposal meet the condition thresholds for the TEC *Littoral rainforests and coastal vine thickets of eastern Australia*.

#### 3.2.4 **Condition**

The portion of the site where the Proposal is located has been highly modified and disturbed from historical activities (clearing, grazing). Grassland areas are all maintained by regular mowing/slashing. Adjacent areas of consolidated native vegetation (Brush Box forest, littoral rainforest) are reasonably intact and in good condition.

The prevalence of weeds in the Proposal footprint is relatively low. Occasional weed species in the north of the site and around the 'treehouse' cabins include Winter Senna, Lantana and Bitou Bush, while invasive grasses such as Molasses Grass and Broad-leaved Paspalum are prevalent in disturbed areas west of the proposed treehouse cabins and along the northern boundary of the site.



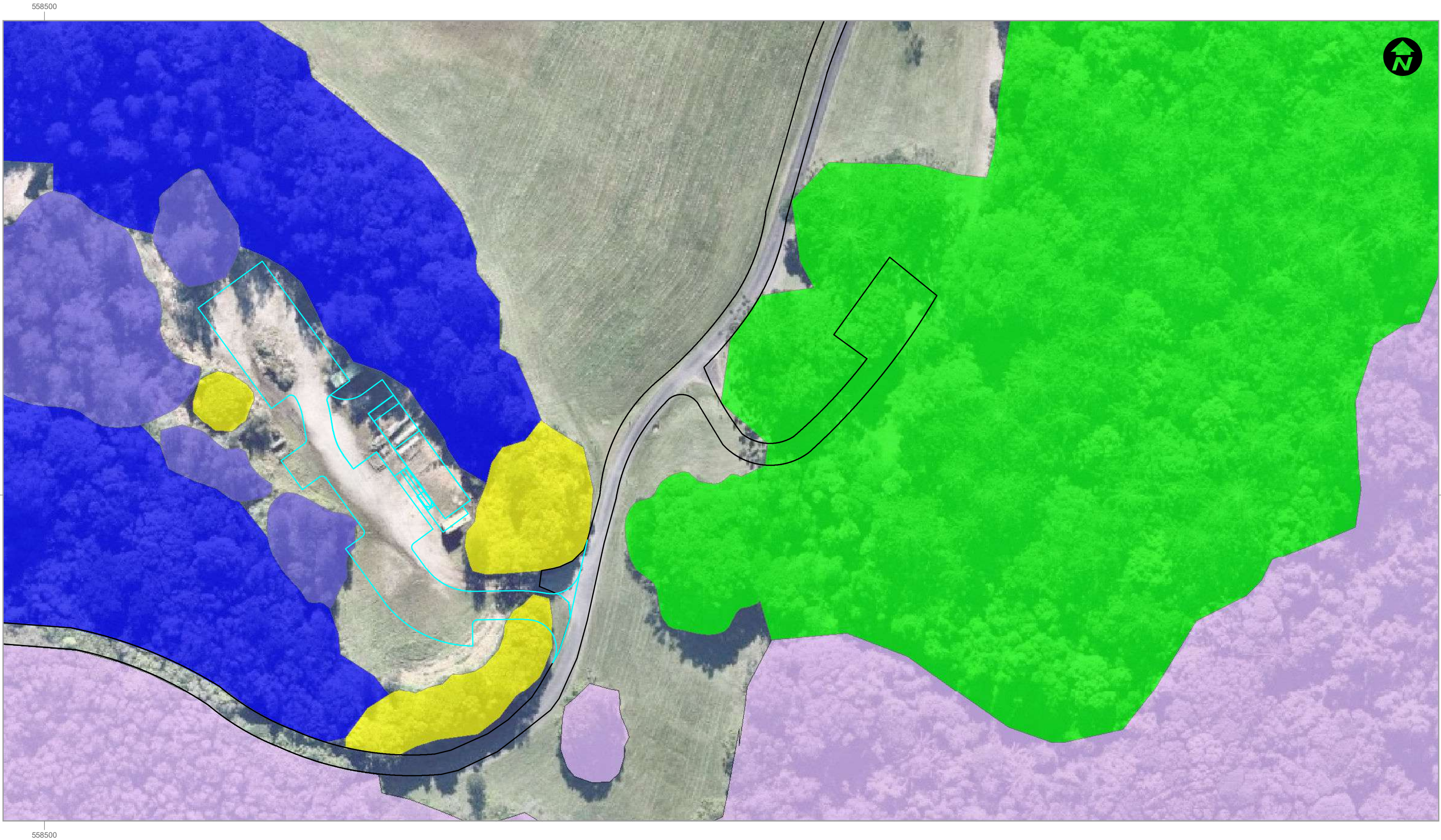










**LEGEND**

- |                                      |  |  |
|--------------------------------------|--|--|
| Site boundary                        | Closed forest (Swamp Oak)                                | Open forest (Brush Box)                          |
| Proposed Asset Protection Zone (APZ) | Closed forest (Tuckeroo, Coast Acronychia)               | Open forest (Coast Banksia, Tuckeroo)            |
| Existing site layout                 | Landscape plantings (Brush Box and/or Weeping Paperbark) | Open forest (Coast Banksia, Tuckeroo) - modified |
| New layout design                    | Landscape plantings (Tuckeroo, lilly pilly)              | Open forest (Grey Ironbark)                      |
|                                      | Landscape plantings (mixed)                              |  |







- LEGEND**
- |   |   |   |
|---|---|---|
|  Site boundary        |  Closed forest (Swamp Oak)                   |  Rainforest (Hoop Pine)                |
|  Existing site layout |  Landscape plantings (Tuckeroo, lilly pilly) |  Swamp forest (Broad-leaved Paperbark) |
|  New layout design    |  Open forest (Coast Banksia, Tuckeroo)       |   |

GDA 1994 MGA Zone 56

0 10 Metres

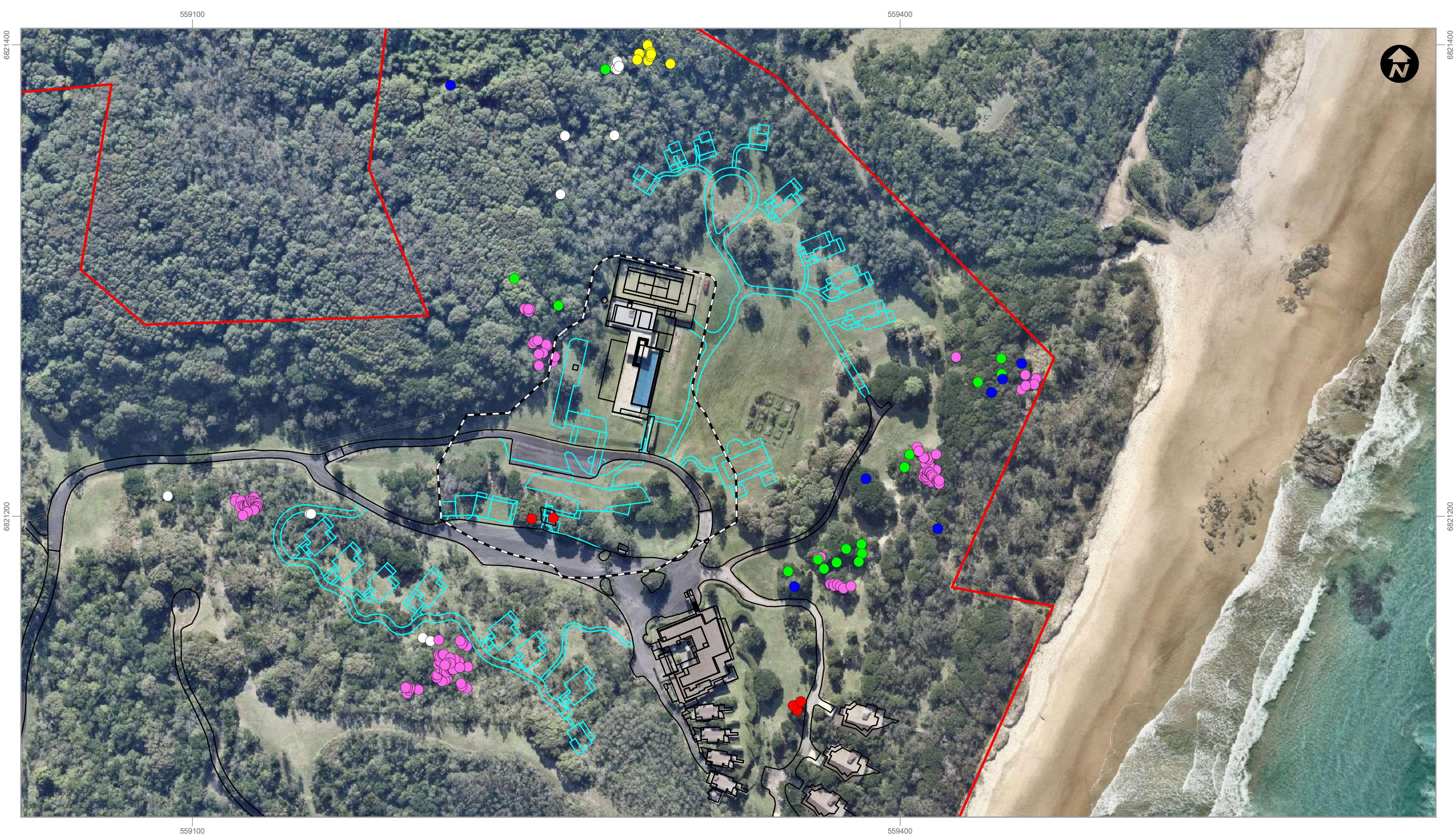


Biodiversity Assessment - Lot 1 DP1031848 Broken Head Road - Proposed Tourist Development  
3080-1061

Precinct B Vegetation Communities - Proposal Area  
Illustration 3.2 - Sheet 2 of 2

Information shown is for illustrative purposes only  
Drawn by: AB Checked by: RE Reviewed by: ILC  
Source of base data: NearMap 11/06/2019, and DFSI  
Date: 04/06/2020  
Revision A





- LEGEND**
- Site boundary
  - Proposed Asset Protection Zone (APZ)
  - Existing site layout
  - New layout design

- Threatened Flora (Biodiversity Conservation Act 2016)**
- Coolamon
  - Native Guava
  - Queensland Xylosma
  - Scrub Turpentine
  - Stinking Laurel
  - White Lace Flower







**LEGEND**

Site boundary

Existing site layout

New layout design

**Threatened Flora (Biodiversity Conservation Act 2016)**

● Native Guava






● Small-leaved Tamarind







**LEGEND**

-  Site boundary
-  Proposed Asset Protection Zone (APZ)
-  Existing site layout
-  New layout design
-  Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South-East Corner Bioregions

GDA 1994 MGA Zone 56

0 30 Metres

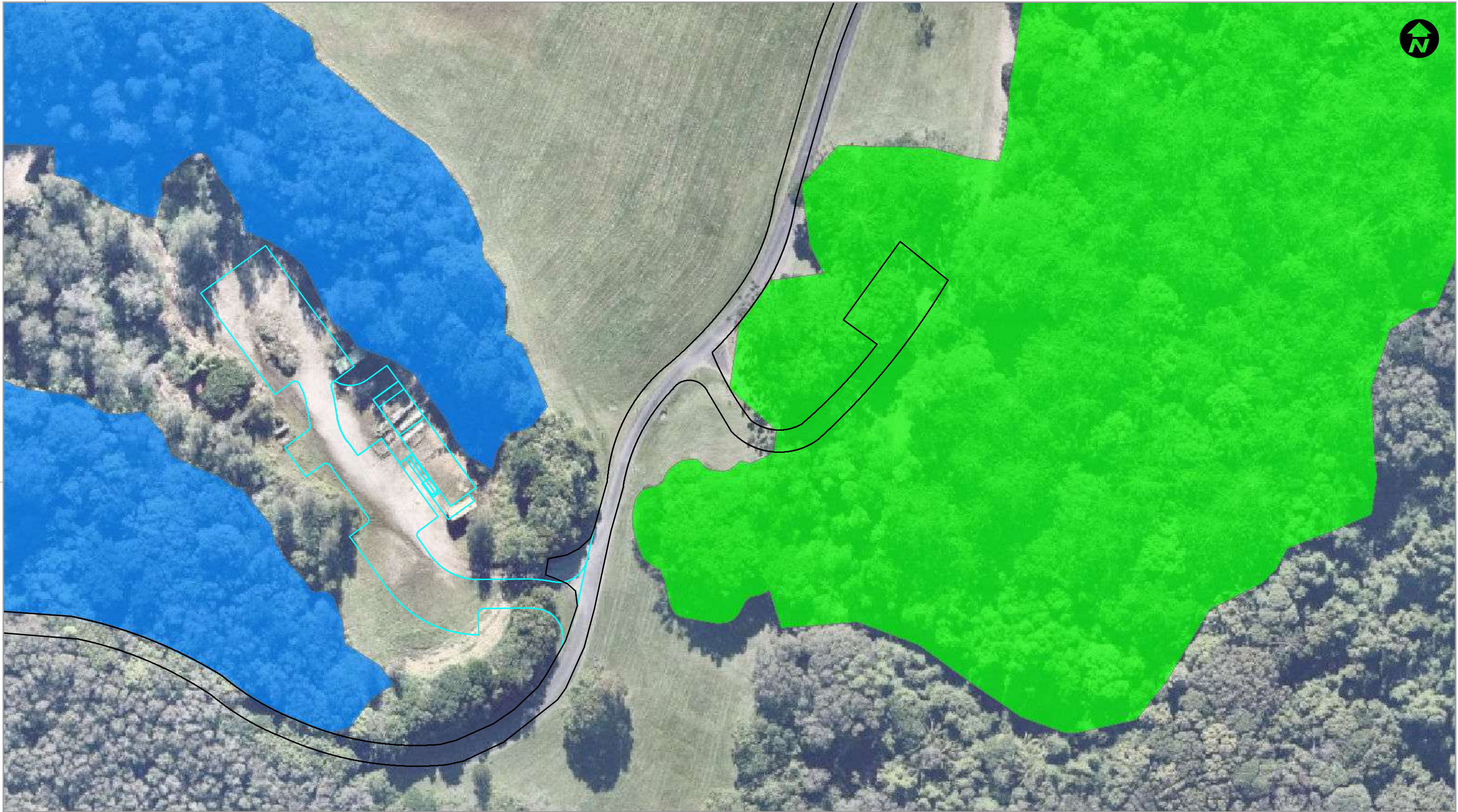


Biodiversity Assessment - Lot 1 DP1031848 Broken Head Road - Proposed Tourist Development  
3080-1062

Precinct A Threatened Ecological Communities  
Illustration 3.4 - Sheet 1 of 2

Information shown is for illustrative purposes only  
Drawn by: AB Checked by: RE Reviewed by: ILC  
Source of base data: NearMap 11/06/2019  
Date: 04/06/2020  
Revision A





**LEGEND**

Site boundary


Existing site layout

New layout design

Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South-East Corner Bioregions

Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions

GDA 1994 MGA Zone 56



Biodiversity Assessment - Lot 1 DP1031848 Broken Head Road - Proposed Tourist Development  
3080-1062

Precinct B Threatened Ecological Communities  
Illustration 3.4 - Sheet 2 of 2

*Information shown is for illustrative purposes only*  
Drawn by: AB Checked by: RE Reviewed by: ILC  
Source of base data: NearMap 11/06/2019  
Date: 04/06/2020  
Revision A



## 4. Fauna Habitat

### 4.1 Desktop Analysis

#### 4.1.1 Database Search Results

BioNet search results identified records of 49 threatened fauna species listed in the BC Act (including nine species also listed in the EPBC Act) within 5 km of the site (refer to search results at **Appendix B**). PMST results identified habitat for 60 threatened fauna species and 56 migratory fauna species listed in the EPBC Act within 5 km of the site.

**Table 4.1 Threatened Fauna Records Within 5 km of the Site**

Scientific Name	Common Name	BC Act	EPBC Act
<b>Invertebrates</b>			
<i>Petalura gigantea</i>	Giant Dragonfly	E	-
<i>Petalura litorea</i>	Coastal Petaltail	E	-
<i>Thersites mitchellae</i>	Mitchell's Rainforest Snail	E	CE
<b>Amphibians</b>			
<i>Crinia tinnula</i>	Wallum Froglet	V	-
<i>Litoria olongburensis</i>	Olongburra Frog	V	V
<b>Reptiles</b>			
<i>Caretta caretta</i>	Loggerhead Turtle	E	E
<i>Chelonia mydas</i>	Green Turtle	V	V
<i>Hoplocephalus stephensii</i>	Stephens' Banded Snake	V	-
<b>Birds</b>			
<i>Amauornis moluccana</i>	Pale-vented Bush-hen	V	-
<i>Anseranas semipalmata</i>	Magpie Goose	V	-
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V	-
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V	-
<i>Carterornis leucotis</i>	White-eared Monarch	V	-
<i>Circus assimilis</i>	Spotted Harrier	V	-
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E	-
<i>Glossopsitta pusilla</i>	Little Lorikeet	V	-
<i>Grus rubicunda</i>	Brolga	V	-
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	V	-
<i>Haematopus longirostris</i>	Pied Oystercatcher	E	-
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	-
<i>Hieraaetus morphnoides</i>	Little Eagle	V	-
<i>Ixobrychus flavicollis</i>	Black Bittern	V	-
<i>Lophoictinia isura</i>	Square-tailed Kite	V	-
<i>Ninox strenua</i>	Powerful Owl	V	-
<i>Pandion cristatus</i>	Eastern Osprey	V	-





Scientific Name	Common Name	BC Act	EPBC Act
<i>Pezoporus wallicus wallicus</i>	Eastern Ground Parrot	V	-
<i>Podargus ocellatus</i>	Marbled Frogmouth	V	-
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V	-
<i>Procelsterna cerulea</i>	Grey Ternlet	V	-
<i>Ptilinopus magnificus</i>	Wompoo Fruit-Dove	V	-
<i>Ptilinopus regina</i>	Rose-crowned Fruit-Dove	V	-
<i>Ptilinopus superbus</i>	Superb Fruit-Dove	V	-
<i>Sternula albifrons</i>	Little Tern	E	-
<i>Tyto longimembris</i>	Eastern Grass Owl	V	-
<i>Tyto novaehollandiae</i>	Masked Owl	V	-
<i>Tyto tenebricosa</i>	Sooty Owl	V	-
<b>Mammals</b>			
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V	-
<i>Miniopterus australis</i>	Little Bent-winged Bat	V	-
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V	-
<i>Myotis macropus</i>	Southern Myotis	V	-
<i>Nyctophilus bifax</i>	Eastern Long-eared Bat	V	-
<i>Phascolarctos cinereus</i>	Koala	V	V
<i>Planigale maculata</i>	Common Planigale	V	-
<i>Potorous tridactylus</i>	Long-nosed Potoroo	V	V
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V
<i>Syconycteris australis</i>	Common Blossom-bat	V	-

V = Vulnerable; E = Endangered; CE = Critically Endangered

#### 4.1.2 Fisheries Mapping

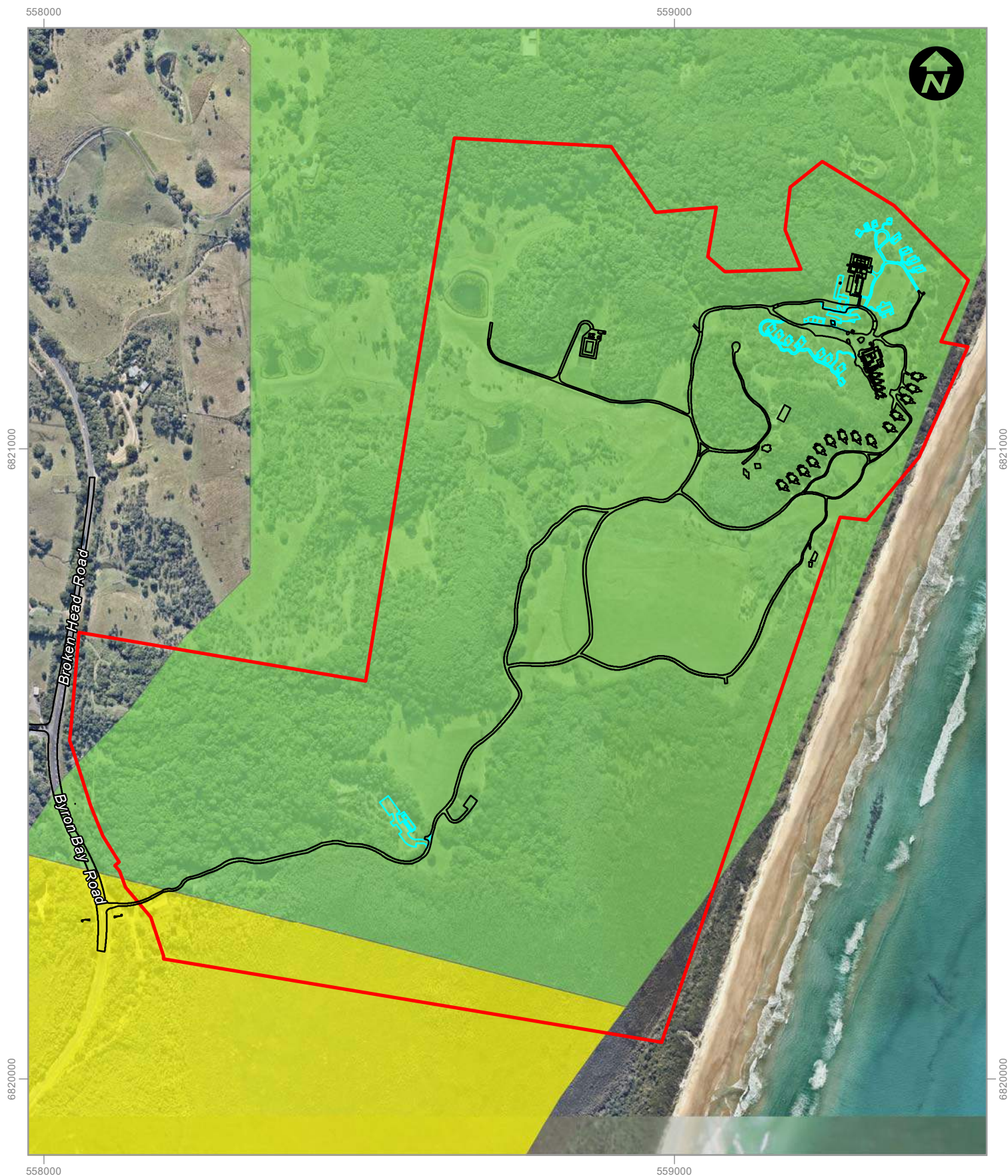
The Fisheries NSW Spatial Data Portal provides the following mapping information for the site:

- No marine vegetation (estuarine macrophytes) is mapped.
- No potential habitat for any threatened freshwater fish species is depicted.

#### 4.1.3 Wildlife Corridors

The site occurs within the Broken Head Regional Corridor which also connects with the Tyndale Newrybar Regional Corridor as per Scotts (2003); refer to **Illustration 4.1**. Together these modelled corridors connect a large portion of forested coastal fringe, with focal species including Common Blossom-bat and Northern Long-eared Bat. Scotts corridor mapping has been refined in the *Byron Biodiversity Conservation Strategy* (2004).





# LEGEND

- Site boundary
- Broken Head regional corridor: focal species - Eastern Blossom-bat/ Northern Long-eared Bat
- Newrybar regional corridor: focal species - Eastern Blossom-bat

- Existing site layout
- New layout design

0 150 m

## Wildlife Corridor Mapping - Illustration 4.1





#### 4.1.4 Council Mapping and Data

Review of Councils environmental values mapping (2012) indicates that the site:

- Contains areas of high conservation value vegetation.
- Occurs within a wildlife corridor.
- Contains areas of primary, secondary and tertiary Koala habitat.
- Contains threatened fauna habitat.
- Contains key fish habitat.
- Includes areas mapped as 'ecowetland'.

The *Byron Coast Comprehensive Koala Plan of Management* (BCKKPoM) (Byron Shire Council 2015) was adopted by Byron Shire Council on 4 August 2016 but has not yet been endorsed by the Department of Planning, Industry and Environment (the relevant approval authority). The site occurs within the 'South Byron Coast Koala management Area (KMA)' but does not form part of the 'Suffolk Park - Broken Head Koala Management Precinct'. This is presumably on the basis that no vegetation at the site is mapped as potential Koala habitat (i.e. primary, Secondary Class A or Secondary Class B habitat).

The BCKKPoM provisions do not apply to developments where provisional potential Koala habitat does not occur (as per figures 2 to 8 of the BCKKPoM).

#### 4.1.5 Previous Studies

Parker (1997) recorded a wide range of fauna at the site, including several threatened species: Grey-headed Flying-fox, Queensland Blossom-bat, Greater Broad-nosed Bat, Eastern Long-eared Bat, White-bellied Sea-eagle, Little Lorikeet, White-eared Monarch and Wallum Sedge Frog.

### 4.2 Site Features

#### 4.2.1 Habitat Values


The large area, diversity of habitat types and high-quality habitat within the site provides very good foraging, breeding and refuge/roosting habitat for numerous fauna species. The low levels of human presence at the site (and low levels of disturbance from light, vehicles etc) are also conducive to established fauna populations, further benefitted by the prohibition on domestic animals. Several species (Masked Lapwing, Australian Magpie, Pied Butcherbird, Swamp Wallaby) are clearly habituated to human presence at the site and freely forage within developed areas.

Several high-quality foraging resources occur extensively at the site and include:

- Nectar from Broad-leaved Paperbark, Coast Banksia and Pink-flowered Doughwood.
- Pollen from myrtaceae species such as Brush Box and Grey Ironbark.
- Fruit from a range of rainforest species such as Beach Acronychia, Tuckeroo, Cheese Tree, Three-veined Laurel (etc).

A range of common fauna species were observed during the field assessments. An inventory of all fauna records from the multiple site visits undertaken is provided at **Appendix H**. Results of the Anabat survey are provided at **Appendix I**.





The Proposal area itself supports fauna habitat of reduced quality due to its compromised structural complexity, regular maintenance (mowing/slashing/brushcutting) and proximity to commonly used areas (the swimming pool, carpark, congregation and open space areas).

One hollow-bearing tree occurs within Precinct A (a Coast Banksia with a small basal hollow of ~ 7 cm diameter); this tree will be retained. No other significant fauna habitat features occur. No preferred Koala feed trees species occur within the Proposal area.

#### 4.2.2 Lighting

Low wattage/low spill lighting is discreetly installed along several pathways and carpark areas within Precinct A and around the existing central building. The existing lighting is functional every night but is of relatively 'soft' nature and has little spill, with no elevated or harsh lighting. It is expected the existing lighting arrangements would be unlikely to affect the nocturnal foraging activities of any fauna species, while dense coastal scrub ensures that there is no penetration to adjacent dunal and beachside environments.

#### 4.2.3 Aquatic Habitat

No aquatic habitat occurs within the Proposal footprint; suitable habitat for any threatened species listed in the FM Act does not occur.

#### 4.2.4 Connectivity

The site has excellent connectivity to forested habitats to the north and south, with Broken Head Nature Reserve further north and Newrybar Swamp reserve abutting the southern boundary of the site (refer to **Illustration 4.1**). The Proposal would not result in any significant barriers to fauna movement or dispersal within broader coastal fauna corridors in the locality.

#### 4.2.5 Threatened and Significant Fauna Habitat

##### Threatened Fauna

Five threatened fauna species were confirmed from field survey as follows:

- Glossy Black-cockatoo (*Calyptorhynchus lathamii*): three birds were observed overflying the northern part of the site (Precinct A) on one occasion.
- White-bellied Sea-eagle (*Haliaeetus leucogaster*): a single bird was observed overflying the eastern part of the site on one occasion.
- Grey-headed Flying-fox (*Pteropus poliocephalus*): four animals observed feeding in a mature Strangler Fig east of the quarry.
- Little Bent-winged Bat (*Miniopterus australis*): recorded by Anabat.
- Yellow-bellied Sheath-tail-Bat (*Saccolaimus flaviventris*): recorded by Anabat.

Unresolved bat calls are also likely attributed to one of two other threatened microbat species (Southern Myotis, Eastern Long-eared Bat); refer to Anabat results at **Appendix I**.

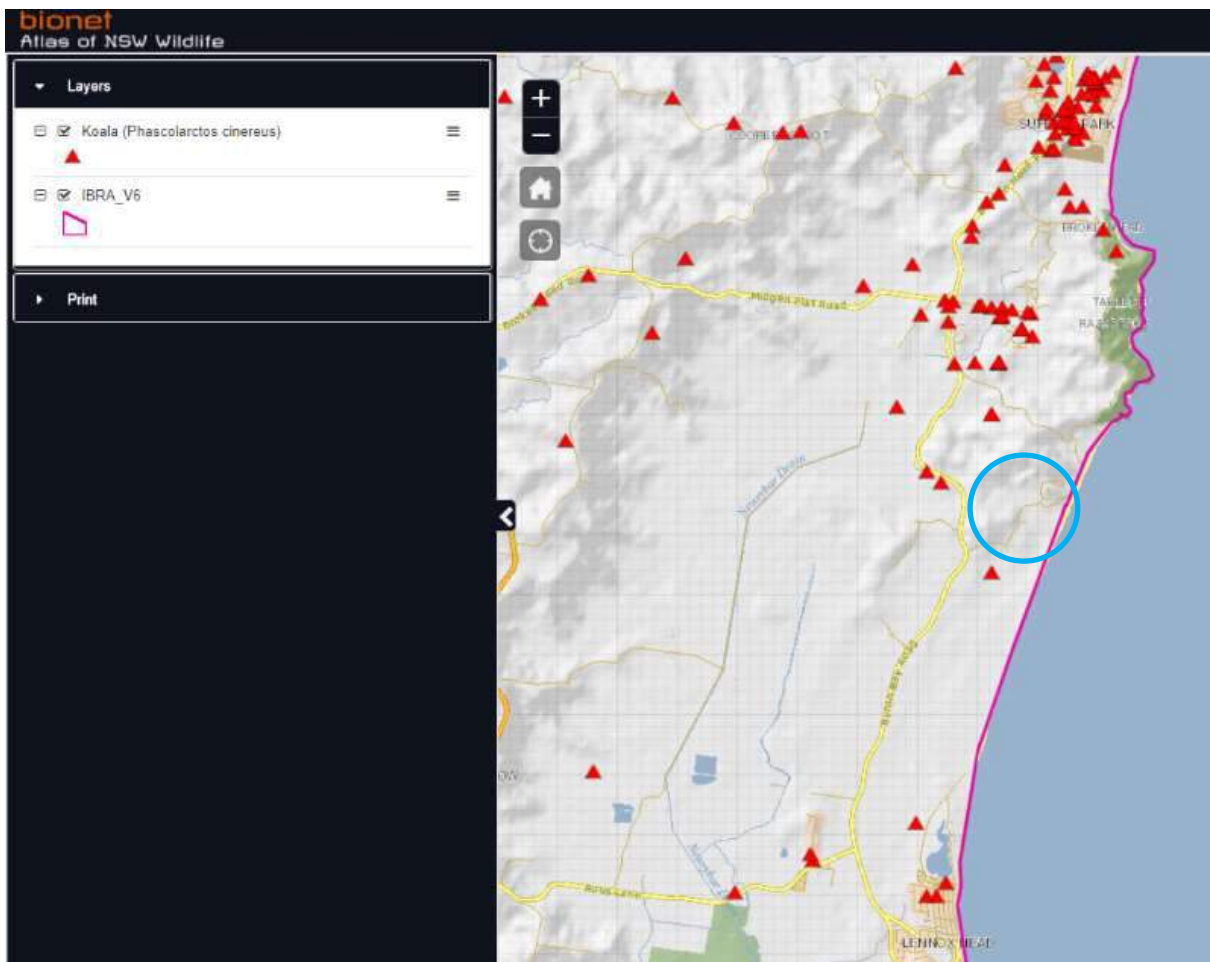


## Koalas

SAT plots did not return any signs of Koala use, as expected in vegetation communities where preferred feed trees are absent. A total of six of the primary feed tree Swamp Mahogany (*Eucalyptus robusta*) occur within the site (five naturally occurring trees and a single isolated planted tree); refer to **Illustration 4.2**.

A further eight Swamp Mahogany occur within the adjacent road reserve adjacent to the site entry. These trees provide the best Koala resources at the site however are very scant, would be insufficient to sustain even a single Koala and will not be affected by the Proposal.

Examination of Koala records in Bionet shows very few Koala records in the locality and none at the site (refer **Figure 4.1**). The record immediately south of the site is from 2006, while more recent records occur >2 km northwest of the site around Midgen Flat Road, where eucalypt forest (including occasional Tallowwood and Swamp Mahogany) occurs.



**Figure 4.1 Bionet Koala Records in Locality**

Note: Study area shown within the blue circle

Resources for other key threatened fauna at the site identified by previous studies (Grey-headed Flying-fox, Common Blossom-bat) are also mapped at **Illustration 4.2**, based on Coast Banksia and Broad-leaved Paperbark dominated communities.





## Migratory/Significant Fauna

Four migratory species listed in the EPBC Act were recorded:

- Rainbow Bee-eater: recorded aerial foraging in the north of the site on several occasions. No suitable nesting habitat occurs within the Proposal area.
- Rufous Fantail: recorded foraging around the edges of the quarry. Likely to forage broadly within wetter, more forested parts of the site.
- Satin Flycatcher: heard calling in the north of the site; a common species and likely to utilise more open and 'edge' communities over the entire site.
- Spectacled Monarch: heard calling from within denser forest east of the quarry. Likely to forage broadly within established rainforest within the site.

### 4.2.6 Potential for Threatened Species Occurrence

Based on the desktop analysis and habitat present, several threatened fauna species have potential to occur at the site and surrounds (refer to potential occurrence table at **Appendix J**). Tests of significance ('five-part tests') under Section 7.3 of the BC Act have been completed for threatened species recorded or considered as having potential to occur (refer to **Section 7.5** and **Appendix K**).



558000

559000

6821000

6821000

6820000

6820000

558000

559000

GDA 1994 MGA Zone 56

**LEGEND**

- Site boundary
- Existing site layout
- New layout design

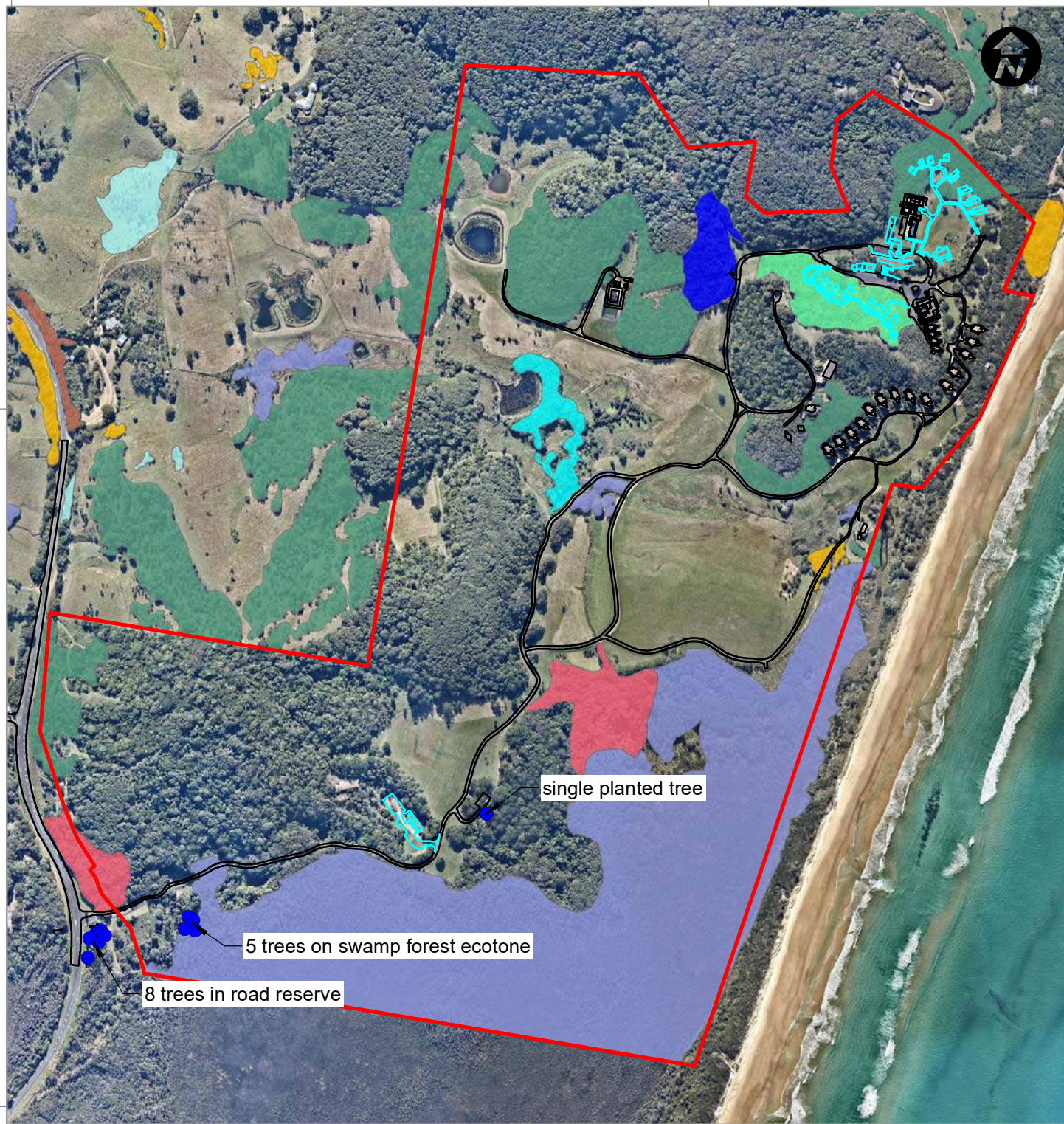
**Primary Koala resources (Swamp Mahogany)**

- Swamp Mahogany

**Primary nectar resources (Grey-headed Flying-fox, Common Blossom-bat)**

- Coast Banksia
- Coast Banksia regrowth
- Coast Banksia-Brush Box-Rainforest
- Coast Banksia-Brush Box-Willow Bottlebrush
- Coast Banksia-Rainforest
- Coast Banksia-Wattle-Camphor-Rainforest
- Paperbark
- Paperbark+Rainforest
- Paperbark-Swamp Box

0 150 Metres

**Key Threatened Fauna Resources - Illustration 4.2**





## 5. Biodiversity Impacts

### 5.1 Introduction

The design of the proposal has been developed over several months following preliminary field investigations which indicated that substantial numbers of threatened flora occurred at the site, and that the APZ for the initial concept would impact native vegetation (which was also a TEC and threatened flora habitat). Discussions and onsite meetings were then held with the project planner, architects and bushfire consultant to avoid sensitive habitats, minimise impacts on threatened flora habitat/TECs and reduce impacts on native vegetation from APZs. Following this conferencing the following refinements were made:

- Adoption of a 'sacrificial' approach to all of the dwellings so that APZs are only required to the central refuge building. No APZs apply to any of the proposed cabins, hence substantially reducing impacts on native vegetation.
- Liaising with the project bushfire consultant (Mr. Peter Thornton) to maximise permissible native tree retention within the prescribed APZ around the refuge building. On this basis, the planted Coolamon (and other select native trees) in this area will be retained.
- Re-siting the B-group cabins to ensure existing clearings were utilised and to move away from a drainage line and littoral rainforest/threatened flora habitat.
- Relocating the wellness facilities building into mown grassland so impacts to native vegetation were avoided (both directly and by APZs).
- Removing entirely a group of proposed cabins adjacent to mapped littoral rainforest (SEPP Coastal Management) in the north east of the site.
- Moving the A9 - A22 treehouse cabins and access path downslope (to the north) to avoid regenerating littoral rainforest and threatened species habitat.
- Siting the single C cabin within a disturbed and degraded area.
- Working with the project engineer to redesign the access path servicing the A-group treehouse cabins to avoid isolated trees of Native Guava and Scrub Turpentine.
- Redesigning the Precinct B carpark/utilities to avoid adjacent Swamp Oak and utilise disturbed areas as much as possible.

On this basis, direct biodiversity impacts have been significantly reduced for the final concept design, with the impacts from the proposal largely limited to:

- Loss of significantly modified littoral rainforest (A9 - A22 treehouse cabins) in reduced quality vegetation (VI score of 19).
- Loss of modified littoral rainforest (with infill plantings) for the refuge building (VI score of 45.9).

These losses are relatively low in the context of being small in area, within highly modified habitats. In the context of extensive native vegetation and fauna habitat at the site, the proposal utilises lower quality areas of vegetation and no unmodified environments would be affected.

Threatened flora habitat has been retained in-situ and various mitigation measures have been proposed (refer to **Section 6**). While the proposal occurs within and adjacent to sensitive habitats mitigation measures have been prescribed to minimise biodiversity impacts during the construction and operational phases of the project (refer to **Section 6**).



## 5.2 Impact summary

### 5.2.1 Direct Impacts

The Proposal will result in direct and permanent impacts to biodiversity from construction and operation (in perpetuity) of the proposed tourist development. While impacts of native vegetation have been calculated on an area basis, an inventory of tree loss has also been prepared to address the requirements of Chapter B2 of the Byron Development Control Plan (DCP) 2014 (refer to **Section 6.2** and **Section 7.1**). Schematic details of specific native tree loss (based on detailed survey and design) are provided at **Appendix L**.

For the refuge building, numerous trees require removal within the APZ. This area was assessed with the project bushfire consultant and 42 native trees and several non-endemic species (Norfolk Pine, Ornamental Figs) were identified for retention (predominantly based on risk, species [e.g. threatened species] or landscape value). These trees were tagged and surveyed by GPS. All other trees within the APZ were counted with 93 native trees > 3 m in height requiring removal.

Direct biodiversity impacts are likely to include:

1. Loss of native vegetation: ~ 0.44 ha of PCT 1275 (littoral rainforest in modified condition) including an estimated 167 native trees (refer to **Table 5.1**).
2. Reduction of fauna resources (fruiting/flowering trees and shrubs within PCT 1275).
3. Disturbance (noise, human disturbance, machine operations) to fauna during development and construction.

Some minor pruning of overhanging branches at select sites may also be required; the impacts of pruning works would not be significant.

**Table 5.1 Native Trees to be Removed**

Scientific Name	Common Name	No. for Removal*
<b>A-group Cabins (North)</b>		
<i>Nil</i>	n/a	0
<b>A-group Cabins (South) (including access boardwalk and pathways)</b>		
<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>	Coast Banksia	49
<i>Commersonia bartramia</i>	Brown Kurrajong	2
<i>Cupaniopsis anacardioides</i>	Tuckeroo	12
<i>Duboisia myoporoides</i>	Corkwood	2
<i>Mallotus discolor</i>	Yellow Kamala	2
<i>Notelaea longifolia</i>	Mock Olive	1
<b>B-group Cabins (including access road and pathways)</b>		
<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>	Coast Banksia	3
<b>C-group Cabin</b>		
<i>Duboisia myoporoides</i>	Corkwood	1
<b>Refuge Buildings</b>		
<i>nil</i>	n/a	0



Scientific Name	Common Name	No. for Removal*
<b>Refuge Building APZ</b>		
Total <u>combined</u> tree count ( <i>Banksia integrifolia</i> subsp. <i>integrifolia</i> , <i>Macaranga tanarius</i> , <i>Commersonia bartramia</i> etc)	n/a	93
<b>Wellness Facilities</b>		
Nil	n/a	0
<b>Bins/Store/Bike store/Boardwalk/Garden shed/Veggie patches etc</b>		
nil	n/a	0
<b>Precinct B</b>		
<i>Glochidion sumatranum</i>	Umbrella Cheese Tree	1
<i>Syzygium luehmannii</i>	Riberry	1
<b>Total Native Tree Loss</b>		<b>167</b>

\*Refer to survey plans at **Appendix L**

### 5.2.2 Indirect Impacts

Indirect impacts are development related activities not associated with clearing for the Proposal and may include matters such as increased noise, dust, light spill, weeds and pathogens and edge effects that can be reasonably attributed to the development. As the site occurs adjacent to contiguous habitats, consideration of indirect impacts is important.

Based on the construction requirements and nature of the development (tourism), anticipated indirect impacts of the Proposal may include:

1. Trampling and degradation of TECs and threatened flora habitat by patrons.
2. Reduction of native vegetation structure and complexity from human disturbance, mowing and tree removal from maintenance activities.
3. Increased potential for introduction and transmission of myrtle rust to the site and increasing pressure on already affected populations of the critically endangered species Native Guava and Scrub Turpentine.
4. Potential for impacts on native fauna from increased light spill.
5. Increased noise and disturbance which may negatively affect native fauna.
6. Introduction of weed propagules to the site from increased vehicle and human disturbance.
7. Ongoing disturbance to local fauna during occupation of the site from noise and human presence.
8. Minor increase in lighting (refer **Section 1.5**). The need to minimise spill and use 'soft' lighting will be incorporated into the design and it would be unlikely that minor increases in lighting would affect native fauna at the site, or within adjacent environments (e.g. beachside areas).

Domestic animals are currently not permitted at the site under existing policies and this will not be altered; as such there is no likelihood of roaming animals posing a threat to native fauna. Furthermore, internal roads are low speed (30 km/hr) with signage and traffic calming devices at several locations. While the proposal would increase traffic volumes, traffic would be moving at low speeds and risks to fauna from vehicle collision are unlikely to be significant. Further, all patrons vehicles would be parked at Precinct B and patrons shuttled to Precinct A, from which they would move around the site on foot or by small electric buggies. On this basis, potential impacts to fauna would be very low.



## 6. Mitigation and Compensation


### 6.1 Mitigation

Measures to minimise biodiversity impacts are prescribed in **Table 6.1** for Council's consideration when determining conditions of consent. Additional vegetation compensation measures are to address requirements in chapter B2 the Byron DCP (refer to **Section 7.1**) The location of proposed compensation measures are shown at **Illustration 6.1**.

**Table 6.1 Prescribed Mitigation Measures**


<i>Impact</i>	<i>Mitigation</i>	<i>Responsibility</i>
<b>Construction</b>		
Native vegetation loss and disturbance	1. Littoral rainforest (BV land) adjacent to the proposal footprint must be defined by parawebbing (or similar) and designated as a 'no go' area prior to clearing commencing.	Project contractor
	2. Vegetation removal must be completed sensitively using appropriate equipment to the minimum extent necessary.	Project contractor
	3. Opportunities for any vegetation retention within the APZ must be confirmed and clearly marked on site following discussion with the project bushfire consultant.	Project contractor/bushfire consultant
	4. Prior to any vegetation removal, an ecologist is to examine all affected areas for active nests, dreys or fauna. Clearing may only commence to the satisfaction of the project ecologist.	Project contractor/ecologist
	5. In the unlikely event that a Koala is recorded in proximity to the Proposal area during construction, vegetation clearing must be temporarily suspended within a range of 25m from any tree that is occupied by a Koala and must not resume until the Koala has moved from the tree of its own volition.	Project contractor/ecologist
	6. Vegetation to be cleared should not be pushed into adjacent vegetation but be chipped and the mulch retained for re-use onsite.	Project contractor
	7. No burning or other disposal of cleared vegetation shall occur.	Project contractor
	8. If lopping or pruning of any vegetation is required, it must be completed by a certified and experienced arborist in accordance with AS 4970-2009 <i>Protection of trees on development sites</i> .	Project contractor/arborist
Soil and water	9. Appropriate soil and erosion control measures must be implemented and maintained for the duration of construction.	Project contractor





<b>Impact</b>	<b>Mitigation</b>	<b>Responsibility</b>
Biosecurity	10. Measures must be implemented during construction works so that machinery and plant do not introduce weed seed or propagules to the site (e.g. by adoption and implementation of the 'Arrive Clean, Leave Clean' guidelines (DoE 2015)).	Project contractor
	11. Measures must be implemented during construction works to ensure hygiene protocols for minimising the introduction and spread of Myrtle Rust are developed and maintained in accordance with current best practice.	Project contractor
	12. Development and implementation of a Myrtle Rust control program* at Precinct A prior to construction commencing.	Linnaeus landscaper /experienced contractor.
<b>Operation/Occupation</b>		
Native vegetation loss and disturbance	13. Compensation plantings are completed to satisfy requirements of Chapter B2 of the Byron Development Control Plan (DCP) 2014 (refer to <b>Section 6.1</b> ), with 1670 native trees to be planted and maintained at the site.  Compensation plantings are proposed to adjoin and extend littoral rainforest in the northwest of the site over an area of approximately 0.652 ha (based on planting trees at 2 m centres) and seal a historically cleared boundary (refer to <b>Illustration 7.1</b> ).  The compensation plantings will require the preparation of a Vegetation Management Plan (VMP) in accordance with Council guidelines to prescribe planting, monitoring and reporting requirements for the compensation planting. The species schedule for the plantings must represent littoral rainforest in the locality, with a minimum 30% of Coast Banksia to compensate for the loss of flowering resources at the site.	Developer/appointed contractor
	14. The VMP prepared for the compensation plantings will also provide guidance on the management and maintenance of vegetation in the development area in the north-east of the site. The VMP will include any measures or related conditions of consent to mitigate road impacts on biodiversity (as per Chapter B2 of the Byron DCP).	Developer/appointed contractor
	15. Weed control works shall be completed within a 100 m radius of the proposal footprint, with all woody weeds controlled in accordance with best practice guidelines. Weed control works shall be informed by a baseline survey, with mapping and methodology written into a Weed Management Plan to be approved by Council.	Developer/appointed contractor





<b>Impact</b>	<b>Mitigation</b>	<b>Responsibility</b>
	16. Littoral rainforest adjacent to any of the cabins must be defined by bollards or other measures in conjunction with signs to ensure occupants do not enter sensitive areas.	Developer/appointed contractor
	17. 'Islands' of littoral rainforest within mapped Littoral rainforest (SEPP Coastal management) are to be protected by edging (timber or other) to limit entry by patrons and ensure mowing does not encroach into these areas. This will allow for regeneration and minimise potential for tree damage.	Developer/appointed contractor
Fauna disturbance	18. Exterior lighting must be designed and installed in accordance with 'soft lighting' principles to limit spill into adjacent habitats.	Developer/appointed contractor
Habitat degradation	19. Biodiversity information must be displayed and/or provided to all patrons providing information on the sensitive nature of the site and setting out protocols with regard to staying out of bushland areas, using formal paths etc.	Developer
Biosecurity	20. Myrtle Rust* monitoring and control within Precinct A.	Linnaeus landscaper /experienced contractor

#### **\*Myrtle Rust control**

Makinson (2018, p.171) suggests that control of myrtle rust may be practical in smaller situations such as home gardens and nurseries by using fungicides. While use of fungicides in the wild may have several problems, all plants of Native Guava and Scrub Turpentine in Precinct A occur on edges or in exposed/managed vegetation and are therefore easy to access, monitor and treat. Makinson also notes:

"...the use of fungicides in the wild, on a limited scale and subject to permit approvals, is of potential benefit in at least two types of situation. Both are likely to be applicable only to small numbers of plants in a spatially compact area...Another potential use of fungicide in the wild, not yet implemented for Myrtle Rust, is for the protection of small numbers of plants on a pro tem basis to extend the life or health of individuals of a species of high conservation priority..."

On this basis, treatment of Native Guava and Scrub Turpentine in Precinct A for myrtle rust may be feasible and practical and should be instigated. Having an experienced contractor develop a management plan (subject to review by EES) for Councils approval would be the first step of this process. If Council/EES support this approach the management plan would be implemented and include a monitoring component. These actions may all be conditioned as part of the project consent.

## **6.2 Compensation**

Chapter B2 of the Byron Development Control Plan (DCP) 2014 (refer **Section 7.1**), requires that a proposed development must identify and compensate for ('offset') the loss of native trees. Vegetation offsets must be completed in accordance with the *Byron Biodiversity Conservation Strategy* [BCS] (Byron Shire Council 2004). Section 5.1.2 (pp. 51-52) of the BCS establishes a '*no net vegetation loss policy*' whereby vegetation loss is compensated for via a replacement/offset schedule as follows:



- 1:1 for native trees of low ecological/heritage/aesthetic value.
- 1:5 for native trees of medium ecological/heritage/aesthetic value.
- 1:10 for native trees of high ecological/heritage/aesthetic value.

Chapter B2 of the Byron Development Control Plan (DCP) 2014 references the offset requirements in the BCS and provides some guidance in determining the ecological value of trees to be removed:

- Trees of low ecological value (1:1 replacement) includes trees not located in high conservation value vegetation and habitat, a wildlife corridor or which do not have habitat value for local wildlife.
- Trees of medium ecological value (1:5 replacement) includes local indigenous trees not located in high conservation value vegetation and habitat, a wildlife corridor or which do not have habitat value for local wildlife.
- Trees of high ecological value (1:10 replacement) includes local indigenous trees in high conservation value vegetation and habitat, local indigenous rainforest trees, trees within a wildlife corridor, trees with habitat value for local wildlife, trees with a diameter at breast height >50 cm.

Chapter B2 of the DCP also states: *'these ratios apply to survival rates after 2 years; therefore it is recommended to plant additional trees (10 – 20% more) to accommodate for a survival rate of less than 100% of the planted trees'*.

On the basis of this information, native tree removal for the Proposal would require 1:10 replacement/compensation.

**As detailed in Table 5.1, a total of 167 native trees would be removed for the proposal. Using the 1:10 replacement ratio, compensation of 1670 native trees is therefore required.**

An area of vacant grassland has been identified for compensation planting (refer to **Illustration 6.1**), with a total area of 0.652 ha to be planted as littoral rainforest dominated by Coast Banksia (i.e. to replace vegetation removed for the Proposal on a 'like for like' basis), based on planting 1670 trees at spacings of two metres.

A *Biodiversity Conservation Management Plan* (BCMP) has been prepared for the site (AWC 2017) identifying several areas for regeneration and planting. The compensation area will be implemented within Management Zone MZ4 of the BCMP within an area of Setaria, with regeneration of Coast Banksia, Riberry and Brown Kurrajong in some areas. Adjacent drainlines will be planted with suitable species such as Broad-leaved Paperbark and Pink-flowered Doughwood. An existing powerline through this area will be accommodated by buffers as required. The compensation planting will complement targets in the BCMP and be consistent with the E3 zoning ascribed to this portion of the site.

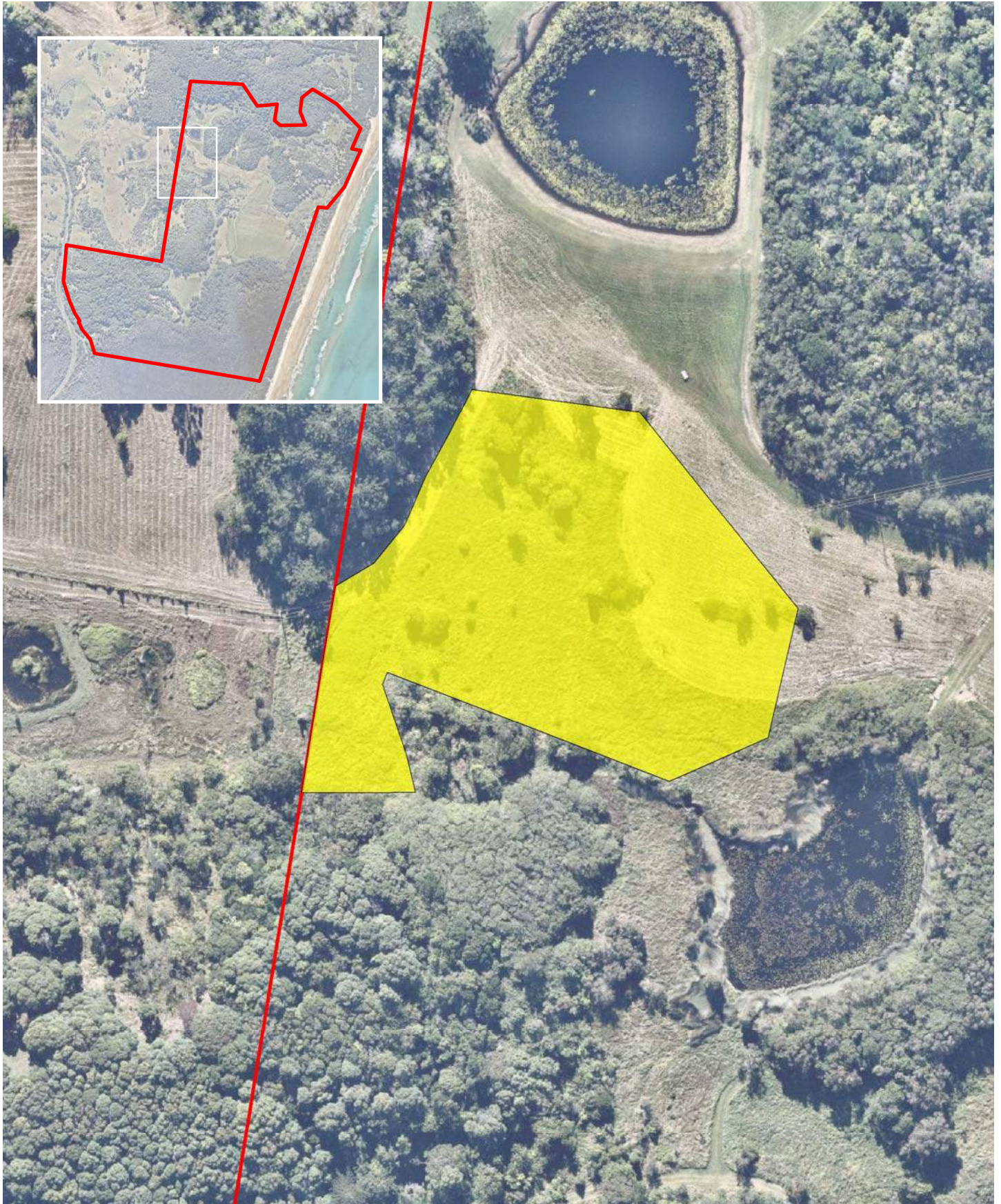
A Vegetation Management Plan (VMP) will be developed to inform the compensation planting and set out tasks, species schedules, preparation prescriptions and monitoring and reporting requirements as required to address criteria in Council's guidelines. A preliminary species schedule for compensation planting is provided at **Table 6.2** and can be modified following any feedback from BSC or other authorities.



**Table 6.2 Compensatory Plantings – Species Schedule**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Proportion</b>
<i>Acronychia imperforata</i>	Beach Acronychia	1%
<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>	Coast Banksia	50%
<i>Commersonia bartramia</i>	Brown Kurrajong	10%
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	Three-veined Laurel	5%
<i>Cupaniopsis anacardioides</i>	Tuckeroo	10%
<i>Duboisia myoporoides</i>	Corkwood	5%
<i>Glochidion ferdinandi</i>	Cheese Tree	5%
<i>Guioa semiglauca</i>	Guioa	1%
<i>Macaranga tanarius</i>	Macaranga	5%
<i>Mallotus discolor</i>	Yellow Kamala	1%
<i>Melicope elleryana</i>	Pink-flowered Doughwood	5%
<i>Polyscias elegans</i>	Celery Wood	1%
<i>Syzygium luehmannii</i>	Riberry	1%
<b>Total</b>		<b>100%</b>





#### LEGEND

- Site boundary
- Proposed compensation area

0 30 Metres

#### Proposed Compensation Area - Illustration 6.1





## 7. Statutory Assessment

The following sections assess the findings of the site assessment with regard to relevant statutory requirements.

### 7.1 Byron Development Control Plan 2014

#### 7.1.1 Chapter B1

Chapter B1 (Biodiversity) of the Byron Development Control Plan (DCP) 2014 came into force in December 2020 and aims to “...ensure that, subject to any relevant overarching state or commonwealth legislation, the planning and design of new development maintains or improves ecological values within Byron Shire thereby increasing the resilience of our natural areas and supporting both biodiversity and climate adaptation”.

The various sections of Chapter B1 are addressed in **Table 7.1**, and discussion of any matters of compliance are indicated. The Proposal does not meet some of the prescribed setbacks for red-flagged areas in Table 3 of Chapter B1, and hence seeks a variation to these matters. The variation seeks a reduced setback to ‘red flag’ areas from some parts of the Proposal on several matters based on:

- The Proposal is an eco tourism development and hence seeks to locate cabins close to and within vegetation.
- The development area has been historically disturbed and modified and is largely maintained by mowing and slashing.
- Precinct A has an ongoing history of occupation and human presence (including noise, lighting and vehicle use) – the Proposal will represent a minor intensification of these existing processes.
- The Proposal design has been modified and amended to reduce vegetation impacts while retaining the aesthetic of an eco tourism development (refer **Section 1.6**).
- Threatened flora will be retained in-situ.
- Noise and light will be at very low levels consistent with the ‘low key’ operation of the current facility.
- Traffic speeds will be low and at low densities.
- No domestic animals will be permitted.
- While the entire site is within a modelled wildlife corridor, the construction and operation of the Proposal will not hinder the dispersal ability of native fauna.
- Precinct B is an old quarry which is highly disturbed, with an existing hardstand access track, surrounded by constructed spoil banks; biodiversity values within this area are significantly reduced.
- SEPP wetland and rainforest communities at the site are poorly mapped at the site and do not accurately reflect in-situ vegetation.

These matters are further explored in **Table 7.1** and below.





**Table 7.1 Chapter B1 Byron DCP – Requirements and Compliance**

Objective/Requirement	Response
<b>B1.2.1 Development Envelope Controls</b>	
<p>1. <i>When defining the development envelope red flags and ecological setbacks set out in Table 3 of Chapter B1 must be retained on site (including any native vegetation therein).</i></p>	<p>The Proposal does not meet several of the ecological setback requirements (refer to <b>Table 7.2</b>) as follows:</p> <ul style="list-style-type: none"> <li>■ TECs: does not comply</li> <li>■ Important wetlands: does not comply</li> <li>■ Land within a defined wildlife corridor: does not comply</li> <li>■ Threatened fauna habitat: does not comply</li> <li>■ Threatened flora habitat: does not comply.</li> </ul> <p>These matters are sought as a variation and are discussed further in item #6 (below).</p>
<p>2. <i>Unless adequate pre-existing biodiversity offset arrangements have been made under a Council-endorsed strategic planning process (e.g. a master plan) or a State or Federal government approval, clearing of native vegetation or other habitat not red flagged in Table 3 will generally not be supported unless all of the following apply:</i></p> <ul style="list-style-type: none"> <li>a. <i>the area to be cleared is less than 5000 m<sup>2</sup>;</i></li> <li>b. <i>the clearing does not result in a significant decrease in habitat connectivity;</i></li> <li>c. <i>there are no other suitable locations on the site;</i></li> <li>d. <i>an ecological setback of 20m is maintained; and</i></li> <li>e. <i>adequate provision is made to compensate for any clearing ensuring no net loss to biodiversity.</i></li> </ul>	<ul style="list-style-type: none"> <li>a. The area to be cleared is &lt; 5000 m<sup>2</sup>.</li> <li>b. The Proposal would have negligible impacts on habitat connectivity in the context of an area which has been previously cleared, is highly modified and is maintained by mowing.</li> <li>c. While other suitable locations occur on the site, the Proposal aims to 'cluster' development and utilise existing services, utilities and amenities within an existing modified area.</li> <li>d. Setbacks to various biodiversity matters vary - some of these are not compliant with Table 3 in Chapter B1.</li> <li>e. Compensation is proposed to offset vegetation impacts in accordance with the requirements of Chapter B2 of the DCP.</li> </ul>
<p>3. <i>Where pre-existing offset arrangements or other biodiversity management measures secured under a Council-endorsed strategic planning process (e.g. a master plan) or a State or Federal government approval exists, such arrangements shall be:</i></p> <ul style="list-style-type: none"> <li>a. <i>implemented to the extent to which they are relevant to the development application under consideration; and</i></li> <li>b. <i>only varied because of specific impacts of the development, changed circumstances, or new information not previously considered.</i></li> </ul>	<p>n/a</p>





Objective/Requirement	Response
4. <i>In the case of HEV vegetation on the coastal floodplain (as per Council's current flooding information) consideration shall be given to increasing the ecological setbacks required under Table 3 to allow for future landward migration of native vegetation affected by climate change induced increases in tidal inundation and rises in the water table.</i>	n/a – the Proposal is not on the coastal floodplain or on flood affected land.
5. <i>Despite DCP 2014 Chapter D6 Subdivision, development involving the subdivision of land where HEV vegetation exists, or is adjacent to that land, must;</i> a. <i>formally define development envelopes on each proposed lot to ensure future development of the subdivided lots avoid any relevant red flagged areas associated with ecological setbacks; and</i> b. <i>with the exception of individual very large trees, stags or hollow-bearing trees, any proposed lot(s) with an area less than 1 hectare shall not include red flagged areas.</i>	n/a – the Proposal is not a subdivision; 'development envelopes' are clearly depicted.
6. <i>Minor variations to the red flagged areas identified in Table 3 may be considered to achieve practical outcomes.</i>	<p>A variation to impacts on red flag areas is sought where setbacks are not met:</p> <ul style="list-style-type: none"> <li>■ <b>TECs:</b> the banksia/littoral rainforest TEC in which the development is sited has been highly modified from thinning and mowing. This community will not have any setbacks on the basis of the ecotourism concept being that cabins are sited within or proximate to existing trees. The loss of trees within the Proposal footprint will be compensated for by compensatory plantings. The 'sacrificial' approach to bushfire management by not having APZs around any cabins further reduces impacts on areas of modified littoral rainforest TEC at the site.</li> <li>■ <b>Important wetlands:</b> areas of the Proposal occur in close proximity to areas of mapped coastal wetlands which do not represent 'true' wetlands. The tree house cabins occur proximate to an area of perched Swamp oak regrowth. The Landmark Assessment (refer <b>Appendix D</b>) recommended this polygon of mapping be removed on the basis that it does not fit the criteria for coastal wetlands or littoral rainforest. The wetlands mapped around the old quarry at Precinct B are recommended for reclassification as littoral rainforest by Landmark, however parts of this vegetation comprise planted</li> </ul>





Objective/Requirement	Response
	<p>vegetation along spoil walls and regrowth. The only true wetlands at the site are those in the south-east of the site (refer to vegetation plan), where extensive swamp sclerophyll forest dominated by Broad-leaved paperbark occurs.</p> <ul style="list-style-type: none"> <li>■ Land within a defined wildlife corridor: as the entire site lies within a modelled wildlife corridor of up to 1 km width, compliance with this matter is not possible. The Proposal is discrete and at a small scale; no elements of the Proposal would be likely to impact on dispersal of locally occurring native fauna and 'barrier effects' would not be created.</li> <li>■ Threatened fauna habitat: Grey-headed Flying-foxes and Common Blossom Bats may still freely access Coast Banksia within the Proposal footprint. The Proposal would not significantly impact on the lifecycle requirements of any threatened fauna species.</li> <li>■ Threatened flora habitat: All threatened flora will be retained insitu and be protected during the construction process; works would not occur within the Tree Protection Zone. Scrub Turpentine and suckers of Native Guava will be monitored for Myrtle Rust and treated according to expert advice. The Proposal would be unlikely to hinder the reproduction of threatened flora at the site or significantly impact on the existing seed bank. The potential for introducing/ spreading pathogens or pests would be strictly managed during the construction process and managed during operations by signage and patron education.</li> </ul>
<p>7. Any minor variation referred to above must not:</p> <ol style="list-style-type: none"> <li>a. trigger a subsequent red flag in another area defined within Table 3, or</li> <li>b. conflict with any statutory consideration that requires the retention of that area.</li> </ol>	<p>Noted - the Proposal will not trigger other red flag areas and none of the impacted vegetation/habitat proposed for removal is protected by any statutory consideration that requires the retention of that area.</p>
<p>8. A development application seeking a minor variation must:</p> <ol style="list-style-type: none"> <li>a. clearly demonstrate the variation sought;</li> <li>b. demonstrate that alternative layouts have been considered and that the impacts cannot be reasonably be avoided;</li> <li>c. show how the variation impact is consistent with the relevant planning principles and objectives of this DCP Chapter.</li> </ol>	<ol style="list-style-type: none"> <li>a. refer to item 6 (above)</li> <li>b. alternative layouts were considered (refer <b>Section 1.6</b>) and revised to reduce biodiversity impacts. As the Proposal is for an eco tourism development within the natural environment, impacts to trees are necessary to site cabins and allow for bushfire provisions. The approach of not having APZs and that refuge areas are provided substantially minimises</li> </ol>





Objective/Requirement	Response
	<p>further vegetation loss than if the Proposal utilised bushfire measures for a tourist development (Special Fire Protection Purpose [SFPP] provisions).  c. The planning principles and objectives of Chapter B2 are broadly met through the Proposal having minor impacts on vegetation/habitat within areas of modified and fragmented vegetation, while retaining threatened flora. The ecotourism proposal further minimises biodiversity impacts within a sensitive site by prohibiting domestic animals (with the exception of assistance animals), ensuring impacts of light spill are addressed through sensitive design and minimising any potential impacts on fauna via vehicular movements.</p>
<p>9. <i>Where a proposed development adjoins waterways or riparian areas Council may, where considered appropriate require bank stabilisation works, adequate arrangements for public access, measures to minimise pollution and sedimentation and or measures to reduce impacts of biting insects.</i></p>	<p>The existing watercourse behind the proposed primary refuge area is in good condition and will be retained in its current form. Other measures are not applicable.</p>
<p>10. <i>Development setbacks required to manage potential bushfire risk shall not overlap with red flagged areas referred to in Table 3 or other retained native vegetation.</i></p>	<p>Bushfire risk has been managed by provision of patron refuge areas, hence avoiding the need for APZs and greater vegetation impacts.</p>
<p>11. <i>A development setback required to manage potential bushfire risk may overlap with an ecological setback and be managed as an environmental management buffer.</i></p>	<p>Noted; bushfire design minimises impacts on native vegetation (refer above).</p>
<p>12. <i>Any clearing entitlement under the NSW Rural Fire Service 10/50 Vegetation Clearing Code of Practice for NSW (or similar subsequent provision) shall be regarded as a development setback.</i></p>	<p>n/a - the cabins will not be entitled to use 10/50 provisions as they are not permanent dwellings.</p>
<p>13. <i>Other [bushfire] acceptable solutions may be appropriate, however the application must demonstrate that:</i>  <i>a. there is no net loss to biodiversity; and</i>  <i>b. a clearly equivalent or superior long-term outcome can be assured; and</i>  <i>c. the variation is consistent with all the relevant planning principles and objectives of this DCP Chapter.</i></p>	<p>As noted, the Bushfire solution proposed minimises biodiversity impacts and has been accepted by NSW RFS.</p>
<p>14. <i>It is strongly advised that any proposal that involves variations to the measures within this DCP Chapter, or any proposed offsetting are discussed through Council's pre-lodgement consultation process prior to lodgement.</i></p>	<p>n/a</p>





Objective/Requirement	Response
15. If the development application is required to enter the Biodiversity Offset Scheme (BOS) under the Biodiversity Conservation Act 2016, the accompanying Biodiversity Development Assessment Report (BDAR) is to include assessment of all entities for serious and irreversible impacts on biodiversity values as defined under the Biodiversity Assessment Method (BAM).	n/a - the BOS is not triggered and a BDAR is not required.
16. If the development application is not required to enter the Biodiversity Offset Scheme (BOS) under the Biodiversity Conservation Act 2016, any native vegetation, threatened or other significant fauna habitat cleared, damaged, or degraded as a result of development shall be offset or otherwise compensated for in accordance with contemporary best practice or adopted Council policy. Such areas are to be secured in perpetuity as protected habitat and managed under a vegetation or biodiversity conservation management plan.	Complies; all vegetation impacted will be offset in accordance with requirements of Chapter B2 of the DCP.
17. Council may waive the requirement for offsetting where the proponent can demonstrate that they have voluntarily created equivalent habitat on the land (or adjoining land in the same ownership) which is subject to the development application.	n/a
<b>B1.2.2 Development Infrastructure and Other Controls</b>	
1. Roads and associated infrastructure are considered part of the development envelope and their location should be consistent with the provisions outlined (above) in Table 3.	No new roads are proposed. Vehicle tracks have been designed to occur within clear or open areas and to minimise any impacts on existing vegetation.
2. Wherever Council considers that on-going impacts to wildlife are likely to arise from new or upgraded roads, the proponent may be requested to carry out additional fauna surveys to determine the likely impacts on biodiversity values and explore fauna friendly road design such as; speed limits, traffic calming, signage, exclusion fencing and fauna crossing structures (under passes, overpasses etc.).	n/a
3. Where on-going impacts to wildlife are likely, the road design is to incorporate best practice fauna sensitive design features to facilitate unimpeded wildlife movement as well as minimising any other ongoing impacts on biodiversity values, paying particular attention to the requirements of any threatened fauna or other significant fauna. Such design features are to be monitored and maintained to minimise impacts on wildlife.	n/a





Objective/Requirement	Response
4. <i>During road construction and upgrading, appropriate environmental safeguards are to be employed to minimise any biodiversity impacts.</i>	n/a
5. <i>Fauna friendly road design structures shall be maintained by the proponent for a minimum period of five years after road dedication unless otherwise agreed by Council.</i>	n/a
6. <i>Where a vegetation or biodiversity conservation management plan is required, any measures or related conditions of consent to mitigate road impacts on biodiversity shall be incorporated into the management plan and implemented accordingly.</i>	n/a
7. <i>Where wildlife are likely to move between areas of suitable habitat (e.g. rural residential development), fencing must be designed to permit the free movement of native fauna (unless designed to specifically exclude movement such as along roads).</i>	n/a - no fencing is proposed
8. <i>Development design shall consider the potential impacts on biodiversity, paying particular attention to threatened fauna to ensure that fencing or other structures do not inadvertently direct native animals into danger.</i>	n/a - no fencing is proposed
9. <i>Fauna exclusion fencing (or other measures) shall be used where there is a significant fauna mortality risk as a result of crossing from one area of suitable habitat to another (e.g. busy roads) or entering built up areas (e.g. urban development with dogs).</i>	n/a - no fencing is proposed
10. <i>Any fauna exclusion fencing or other measures (including temporary structures to perform the same task) shall be constructed and operational prior to the physical commencement of works (including clearing vegetation, the use of heavy equipment for the purpose of breaking ground for bulk earthworks, or infrastructure for the proposed development).</i>	n/a - no fencing is proposed
11. <i>Fencing design shall include suitable clearances to maintain functionality and allow for access for replacement and routine maintenance.</i>	n/a - no fencing is proposed
12. <i>All exclusion fencing, fauna friendly fencing or other structures designed to protect fauna shall be monitored and maintained to minimise impacts on wildlife.</i>	n/a - no fencing is proposed
13. <i>Where appropriate, fencing, barriers or other measures shall be used to limit or control human access (e.g. motor vehicles) to environmentally sensitive areas.</i>	n/a - no fencing is proposed





Objective/Requirement	Response
14. Where a vegetation or biodiversity conservation management plan is required, any wildlife fencing measures or related conditions of consent shall be incorporated into the management plan and implemented accordingly.	n/a - no fencing is proposed
15. Where Council considers that wildlife impacts are likely to arise from noise, the proponent may be requested to carry out additional fauna surveys to determine the likely impacts on biodiversity, paying particular attention to threatened fauna or other significant fauna and explore appropriate mitigation measures including, but not limited to, suitable buffers to environmentally sensitive areas, traffic speed restrictions, timing of noisy activities and/or installing appropriate noise barriers.	<p>n/a - construction noise is unlikely to be significant or extensive, while noise during occupation is likely to be very low.</p> <p>Fauna around the Proposal area in the north of the site are largely habituated to human presence and a range of common urban adapted and open country species occur.</p>
16. Council will not support development where the impacts of noise on biodiversity values cannot be adequately mitigated.	Noise impacts of the Proposal are likely to be relatively low during construction and noise during operations is expected to be negligible compared to existing.
17. Where the development envelope contains or adjoins known bush stone curlew habitat or microbat colonies, street lighting must be of a type that does not attract insects.	n/a - no known bush stone curlew habitat or microbat colonies occurs proximate to the Proposal. Any lighting associated with the Proposal will be 'soft' lighting with low emittance.
18. Sports field lighting (or similar high intensity outdoor lighting) shall be designed to avoid light spill into natural areas.	n/a
19. Development adjacent to beaches must prevent light arising from development spilling onto beaches to avoid potential impacts on shorebird and turtle behaviour (e.g. nesting).	No lighting will spill through the eastern littoral rainforest and onto the adjacent beach; shorebird and turtle habitat would not be affected.
20. Where a vegetation or biodiversity conservation management plan is required, any measures or related conditions of consent to mitigate noise and lighting shall be incorporated into the management plan and implemented accordingly.	n/a
21. Council may prohibit the keeping of domestic animals where there is an unacceptable residual risk (i.e. a risk that cannot be adequately mitigated by other measures such as exclusion fencing) arising from the development to threatened or other significant species.	No domestic animals will be permitted, with the exception of assistance animals.
22. The application of the above measure (21) does not apply to "assistance animals" as defined under the Disability Discrimination Act 1992.	Noted.
23. Where permitted, all domestic animals are to be contained within the landholder's property and prevented from roaming in natural areas.	n/a





Objective/Requirement	Response
24. In larger scale developments involving subdivision, where domestic dogs are permitted, adequate provision should be made for exercising them off leash.	n/a
25. Where a vegetation or biodiversity conservation management plan is required, any measures or related conditions of consent to manage domestic animals shall be incorporated into the management plan and implemented accordingly.	n/a
26. Developments must be designed to minimise the likelihood of pest animal establishment/proliferation and where relevant, include measures to control pest animals.	n/a - should Cane Toads or other pest animals become established or proliferate at the site, they will be controlled as required.
27. Standing water bodies and constructed wetlands shall be designed to minimise their suitability for cane toads and other aquatic pest species (e.g. Mosquitofish ( <i>Gambusia spp.</i> )).	n/a
28. Where a vegetation or biodiversity conservation management plan is required, any measures or related conditions of consent to manage pest animals shall be incorporated into the management plan and implemented accordingly.	n/a
29. For developments involving subdivision a restrictive covenant under Part 6 (Division 4) of the Conveyancing Act 1919 shall be applied to prohibit the keeping of declared pest animals (foxes, rabbits etc.) and/or other pest animals considered to pose a significant risk to biodiversity relevant to the site.	n/a
30. Developments must be designed to minimise the establishment/proliferation of pest plant species (weeds) declared under the Biosecurity Act 2015, and where present, include measures to control them.	Pest plants within and proximate to the Proposal will be controlled and managed under a VMP.
31. All landscaping and landscape design shall be consistent with DCP 2014 Chapter B9 Landscaping.	Refer Landscape Plan (Plummer and Smith 2021) submitted as part of the Development Application
32. Where a vegetation or biodiversity conservation management plan is required, any measures or related conditions of consent to manage pest plants shall be incorporated into the management plan and implemented accordingly.	Pest plants within and proximate to the Proposal will be controlled and managed under a VMP.
<b>B1.2.3 Koala Habitat</b>	
1. For development in areas identified in the Byron Coast Comprehensive Koala Plan of Management (CKPoM), the provisions of Part 2 within the CKPoM apply.	n/a - no vegetation at the site is mapped as potential Koala habitat (i.e. primary, Secondary Class A or Secondary Class B habitat).
2. For development in areas outside of the identified areas within the CKPoM that have Koala use trees (Appendix 1 of Chapter B2) and or Koala habitat on or	The site (lot) contains the primary Koala feed tree Swamp Mahogany. Other Koala feed trees listed in Appendix 1 of Chapter B2 also occur on the site (Grey Ironbark, Broad-leaved Paperbark, Pink Bloodwood). Of these, only





Objective/Requirement	Response
adjacent to their Lot, irrespective of the size of the Lot, the requirements of this DCP Chapter apply.	Broad-leaved Paperbark occurs to any great extent at the site, within established wetlands in the south. It is noted that the list of trees cited may be reduced when SEPP Koala Habitat Protection is revised during 2021 and that the tree list is excessive and includes many tree species which are not extensively utilised as foraging resources by Koalas. In real terms, Koala habitat is essentially limited to Swamp Mahogany and adjacent swamp sclerophyll forests where refuge may be sought proximate to feed resources. The Proposal will have no impacts to Koala habitat.
3. The following mitigation measures are required to be addressed within any development application that has the potential to impact koalas and or koala habitat irrespective of Lot size.	
a. i. The entire development envelope must illustrate the required ecological setback as outlined in Table 3 to koala use trees (Appendix 1) and koala habitat.	Complies in part; no Koala feed trees occur within 20m of any parts of the Proposal, with the exception of a single Broad-leaved Paperbark within Precinct B - this tree will be retained insitu and be available to any dispersing animals.
b. i. Establishment of tree protection zones around retained koala use tree species as per the Australian Standards (AS 4970-2009 Protection of trees on development sites) before any construction or clearing commences and preclusion of any development activities within the tree protection zones until after all construction is completed.	Complies; the single Broad-leaved Paperbark within Precinct B will be retained within a tree protection zone as per AS 4970-2009.
b. ii. Any clearing of land not to commence until the proposed clearing area has been inspected for koala presence and written approval has been obtained from a suitably qualified person.	Included in construction mitigation measures (refer <b>Section 6.1</b> ).
b. iii. Clearing of native vegetation and or earthworks as part of any development must be temporarily suspended within a range of 25m from any tree that is occupied by a koala and must not resume until the koala has moved from the tree of its own volition.	Included in construction mitigation measures (refer <b>Section 6.1</b> ).
b. iv. Clearing in accordance with (ii) may only proceed for the day on which the inspection has been undertaken and where the suitably qualified person remains on site.	This measure will be included in clearing protocols.
b. v. Where (i)-(iv) do not apply, sites where Koalas are within a 2.5km range of Koala habitat are to be protected from disturbance through appropriate exclusion fencing from urban areas and roads.	n/a





<b>Objective/Requirement</b>	<b>Response</b>
<i>c. Dog attack (i - v)</i>	No dogs are permitted, with the exception of assistance animals.
<i>d. Vehicle Strike (i - iv)</i>	Traffic calming devices are in place, existing internal roads are limited to 40 km/hr.
<i>e. Swimming Pools (i - iii)</i>	The existing pool is already fenced and excludes Koalas from entry
<i>f. Bushfire (i and ii)</i>	n/a - bushfire protection measures will not impact on Koala habitat.
<i>g. Impediments to movement (i - iii)</i>	The Proposal will not hinder or impede any Koala movement due to its permeable nature and no fencing is proposed.
4. <i>All Koala use tree species (Appendix 1) planted or otherwise, are to be retained.</i>	Complies.
5. <i>All Koala use tree species (Appendix 1) that have been planted with public monies are to be retained and protected in perpetuity regardless of land tenure.</i>	n/a
6. <i>All Koala habitat and individual Koala use trees (Appendix 1) are to be illustrated on all site plans by stadia metric survey and include: location, area size (where applicable), plant community type (where applicable), species name, height and DBH.</i>	The single Broad-leaved Paperbark in Precinct B is depicted in Sheet 4 of <b>Appendix L</b> .
7. <i>All plantings of Koala use trees (Appendix 1) as a result of consent conditions under the Environmental Planning and Assessment Act 1979 are to be protected in perpetuity by an effective legal restriction on the title of land.</i>	n/a - no Koala feed trees are proposed for planting.
8. <i>All restoration of koala habitat as a result of consent conditions under the Environmental Planning and Assessment Act 1979 shall be protected in perpetuity by an effective legal restriction on the title of land.</i>	n/a
<b>B1.2.4 Ecological Assessment</b>	
1. <i>For development where the proposed development envelope does not overlap with red flagged areas or associated ecological setbacks in Table 3 and a vegetation or biodiversity conservation management plan is not required - various prescriptions apply.</i>	n/a - the Proposal is within a red flag area and will require a VMP.
2. <i>For development where the proposed development envelope does overlap with red flagged areas or associated ecological setbacks in Table 3, or a vegetation or biodiversity conservation management plan is required:</i>	
<i>a. A signed statement from a qualified ecologist stating that the Biodiversity Offset Scheme (BOS) does not apply to the development including:</i>	Complies; refer certification inside report cover.





Objective/Requirement	Response
<ul style="list-style-type: none"> <li>i. Information to support the conclusion that the proposal does not exceed the BOS threshold; and</li> <li>ii. A response to the five part test of significance set out under s7.3(1) of the BC Act.</li> </ul>	
<ul style="list-style-type: none"> <li>b. An ecological assessment (Appendix 2) or management plan (where applicable) prepared in accordance with the requirements of B1.2.5 Vegetation Management Plans and Biodiversity Conservation Management Plans.</li> </ul>	A VMP will be prepared as required to address conditions of consent.
3. For development where the proposed also triggers entry into the Biodiversity Offset Scheme (BOS) - various prescriptions apply	n/a
<b>B1.2.5 Vegetation Management Plans and Biodiversity Conservation Management Plans</b>	
<ul style="list-style-type: none"> <li>1. A Vegetation Management Plan (VMP) is required for any proposal:               <ul style="list-style-type: none"> <li>a. that will impact High Environmental Value (HEV) vegetation and/or a red flagged area, or requires management of an environmental management buffer within an ecological setback (Table 3); and or</li> <li>b. that has such a requirement under any other DCP Chapter (e.g. DCP Chapters D2, D3 and D6).</li> </ul> </li> </ul>	A VMP will be prepared as required to address conditions of consent.
<ul style="list-style-type: none"> <li>2. A Biodiversity Conservation Management Plan (BCMP) is required for any development that triggers the requirement of a VMP and also either:               <ul style="list-style-type: none"> <li>a. impacts a threatened fauna species known to occur on site (e.g. koala habitat); and or</li> <li>b. includes the subdivision of land (determined on a case by case basis).</li> </ul> </li> </ul>	n/a - a BCMP is not required as no threatened fauna species are likely to be significantly affected by the Proposal. It is noted that a BCMP has already been prepared for the site (refer Australian Wetlands Consulting 2017).
3. The requirement of a BCMP overrides the necessity of a VMP as both contain similar information and management actions. However, a BCMP generally has increased management actions over a longer period of time and requires more detailed information.	Noted; n/a.





**Table 7.2 Ecological Setbacks Required for Red-flagged Areas (Table 3 Chapter B1, Byron DCP)**

<b>Red Flag</b>	<b>Ecological Setback (m)</b>	<b>Compliance/comments</b>
<b>High Ecological Value (HEV) Vegetation</b>		
Threatened Ecological Communities (includes Critically Endangered, Endangered or Vulnerable listed under State or Commonwealth legislation)	30	Proposal does not comply; parts of the Proposal occur within modified littoral rainforest.
Over-cleared vegetation types (a vegetation type of which more than 70% has been cleared in the Catchment Management Area)	20	n/a - no over-cleared vegetation types (which are not TECs) occur within or proximate to the Proposal footprint.
Over-cleared landscapes (A Mitchell landscape in which more than 70% native vegetation cover has been cleared)	20	The majority of the site forms part of the 'Summervale Range Mitchell Landscape (DECC 2008a) with the southernmost portion of the site lying within the 'Clarence - Richmond Barriers and Beaches' Mitchell Landscape. The historical clearing status of these landscapes is not known with certainty, however significant historical clearing has occurred. Other native vegetation types at the site are sufficiently buffered from the Proposal.
Old-growth forests	30	n/a - no old growth forest occurs within or proximate to the Proposal footprint.
Important wetlands (wetlands protected under NSW State or Commonwealth legislation or policy. Includes wetlands mapped under the NSW State Environmental Planning Policy (SEPP) Coastal Management 2018)	50	Proposal does not comply; parts of the Proposal are <50 m from mapped Coastal Wetlands (refer to <b>Illustration 1.2</b> ). with cabin A1 <50 m from mapped Littoral Rainforests.
Other wetlands (any other wetland other than an Important wetland)	20	n/a - no other wetlands occur within or proximate to the Proposal footprint.
Other bushland on a slope >18 degrees	20	n/a - the Proposal occurs on land of < 18 degrees slope.
Pre-existing protected habitat (areas of existing habitat or other land provided with formal long-term protection designed to limit further development)	20 m or as above, whichever is larger	n/a
<b>Wildlife Corridors</b>		
Land within a defined wildlife corridor	20	Proposal does not comply; the entire site lies within the (modelled) Broken Head Regional Wildlife Corridor, which averages about 1 km in width.





Red Flag	Ecological Setback (m)	Compliance/comments
Threatened and Significant Species		
Areas with a species polygon for threatened fauna or other significant fauna that are known or predicted to occur at the site.	20	Proposal does not comply; proposed cabins are within areas of Coast Banksia dominated vegetation which may be used as a seasonal forage resource by the Grey-headed Flying-fox and Common Blossom Bat (and as foraging habitat for various microbat species) - such habitat occurs broadly at the site.
Areas with a species polygon for threatened flora or other significant flora that are known or predicted to occur at the site.	10	Proposal does not comply; some features of the Proposal are < 10m from several threatened trees which will be retained in-situ.
Koala Habitat		
Koala habitat outside of areas defined within a Comprehensive Koala Plan of Management.	20	n/a - no vegetation at the site is mapped as potential Koala habitat (i.e. primary, Secondary Class A or Secondary Class B habitat).
Isolated or scattered Koala use trees with evidence of Koala activity.	20	n/a - Koala resources do not occur within or proximate to the Proposal footprint. No evidence of Koala activity was confirmed at the site during field assessment.
Any other areas where Koalas are present and/or koala habitat is planted with public monies.	20	n/a
Waterways and Riparian Areas (from top of the bank)		
First order stream	10	Proposal does not comply; a minor waterway/drainline occurs near the primary bushfire refuge area.
Second order stream	20	n/a - no other waterways occur within or proximate to the Proposal footprint.
Third order stream	30	
Fourth order stream	40	
Estuarine area	50	
Flying-fox Camps		
Year round or intermittent	100	n/a - none present on site.
Other Habitat Features		
Very large native trees (local native trees that have a trunk diameter of greater than or equal to 0.8 metres at 1.4 metres above the natural ground level)	10	n/a - none present within or proximate to the Proposal footprint.





<b>Red Flag</b>	<b>Ecological Setback (m)</b>	<b>Compliance/comments</b>
Stags and hollow-bearing trees (a larger development setback may need to be considered to prevent damage to built structures in the event of a tree or stag fall)	10	No significant large stags occur; one hollow-bearing tree with a very small hollow (7 cm) will be retained insitu and is likely to meet buffer setbacks
Raptor nests	50	n/a - none present within or proximate to the Proposal footprint.





### 7.1.2 Chapter B2

To address Chapter B2 of the Byron Development Control Plan (DCP) 2014, a compensation planting of 1670 native trees will be completed. Details of vegetation offset requirements are provided in **Section 6.2** (refer also to **Illustration 6.1**). A Vegetation Management Plan (VMP) will be developed to inform the compensation planting and set out tasks, species schedules, preparation prescriptions and monitoring and reporting requirements as required to address criteria in Council's guidelines.

## 7.2 Coastal Management Act 2016

The *Coastal Management Act 2016* (CM Act) aims to achieve ecologically sustainable development that:

- Protects and enhances sensitive coastal environments, habitats and natural processes.
- Strategically manages risks from coastal hazards.
- Maintains and enhances public access to scenic areas, beaches and foreshores.
- Supports the objectives for our marine environments under the *Marine Estate Management Act 2014*.
- Protects and enhances the unique character, cultural and built heritage of our coastal areas, including Aboriginal cultural heritage.

The Act defines the coastal zone as comprising four coastal management areas. Each area has different characteristics and may at times overlap. The four coastal management areas are:


1. Coastal wetlands and littoral rainforests area; areas which display the characteristics of coastal wetlands or littoral rainforests that were previously protected by SEPP 14 and SEPP 26.
2. Coastal vulnerability area; areas subject to coastal hazards such as coastal erosion and tidal inundation.
3. Coastal environment area; areas that are characterised by natural coastal features such as beaches, rock platforms, coastal lakes and lagoons and undeveloped headlands.
4. Coastal use area; land adjacent to coastal waters, estuaries and coastal lakes and lagoons.

Precinct A occurs within the designated 100 m proximity area to mapped areas of littoral rainforest and Precinct B occurs within the proximity area to mapped areas of coastal wetland. It is noted that coastal wetlands mapped surrounding the quarry at Precinct B are actually regenerating (and planted) littoral rainforest and are significantly elevated from low lying swamp forest to the east.

The management objectives for coastal wetlands and littoral rainforests are as follows:

- a) *to protect coastal wetlands and littoral rainforests in their natural state, including their biological diversity and ecosystem integrity,*
- b) *to promote the rehabilitation and restoration of degraded coastal wetlands and littoral rainforests,*
- c) *to improve the resilience of coastal wetlands and littoral rainforests to the impacts of climate change, including opportunities for migration,*
- d) *to support the social and cultural values of coastal wetlands and littoral rainforests,*
- e) *to promote the objectives of State policies and programs for wetlands or littoral rainforest management.*





The Proposal is unlikely to impact adjacent coastal wetlands or littoral rainforests and occurs within previously disturbed and/or degraded areas. Further assessment of this matter is provided at **Section 7.3**.

### **7.3 State Environmental Planning Policy (Coastal Management) 2018**

SEPP Coastal Management 2018 aims to promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the *Coastal Management Act 2016*, including the management objectives for each coastal management area, by:

- a) *managing development in the coastal zone and protecting the environmental assets of the coast, and*
- b) *establishing a framework for land use planning to guide decision-making in the coastal zone, and*
- c) *mapping the 4 coastal management areas that comprise the NSW coastal zone for the purpose of the definitions in the Coastal Management Act 2016.*

As noted, the eastern portion of the site lies within the 100 m proximity area to two patches of coastal wetlands depicted on the *Coastal Wetlands and Littoral Rainforests Area Map*. The Policy states that: *development consent must not be granted to development on land identified as “proximity area for coastal wetlands” or “proximity area for littoral rainforest” on the Coastal Wetlands and Littoral Rainforests Area Map unless the consent authority is satisfied that the proposed development will not significantly impact on:*

- a) *the biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest, or*
- b) *the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest.*

While the Proposal will not affect adjacent coastal wetlands or littoral rainforest, it occurs within the proximity area to both communities. The Proposal is unlikely to affect the biophysical, hydrological or ecological integrity of adjacent coastal wetlands due to the restricted project footprint which does not affect significant wetland vegetation. The Proposal would be unlikely to alter surface water or ground water flows which would negatively affect adjacent coastal wetlands or littoral rainforest. On this basis, the Policy does not require further consideration.

### **7.4 State Environmental Planning Policy (SEPP) Koala Habitat Protection 2020**

State Environmental Planning Policy (Koala Habitat Protection) 2020 ('Koala SEPP 2020') commenced 30 November 2020 to replace and repeal the State Environmental Planning Policy (Koala Habitat protection) 2019 (2019 Koala SEPP). The Koala SEPP 2020 replicates the objectives and provisions of SEPP 44, which was in force from 1995 through to 2019. The SEPP:

- Provides a framework for councils to prepare a strategic koala plan of management that would apply to the whole or part of a local government area.
- Applies to development applications on land over one hectare in a relevant LGA.



- Requires development applications to be consistent with a council strategic koala plan of management that applies to the land, or, if there is no strategic plan, sets out a two-step process to determine if the land is core koala habitat and if it is, produce an Individual Koala Plan of Management before council can grant consent to a development application.
- Exempts clearing of vegetation from the application of the SEPP if the purpose of the clearing is to maintain an Asset Protection Zone as part of rebuilding a dwelling destroyed or damaged by bushfire and allows the dwelling to be sited anywhere on the lot.
- Saves all Koala Plans of Management approved under SEPP 44 and 2019 Koala SEPP<sup>1</sup>.

Circular B35 (Department of Urban Affairs and Planning, 1995) underpins SEPP 44 and sets out the framework for SEPP 44 assessments over several steps as indicated in **Figure 7.1** (overleaf).

Based on the above, the following assessment has been completed.

### Is the Land Potential Koala Habitat?

The Koala SEPP 2020 defines potential Koala habitat as “*areas of native vegetation where Schedule 2 trees constitute at least 15% of the total number of trees in the upper or lower strata of the tree component*”. With regard to potential and core Koala habitat assessment, Section 1.5 of Circular B35 states that:

*In relation to affected DAs it is the intention of the policy that investigations for ‘potential’ and ‘core’ koala habitats be limited to those areas which it is proposed to disturb habitat.*

On this basis, this Koala SEPP 2020 assessment pertains to the Proposal footprint and associated adjacent vegetation within a 100 m radius, hence allowing for disturbance during construction and operation of the Proposal. Within this area, one Schedule 2 tree species occurs – a single planted Swamp Mahogany (refer to **Illustration 4.2**). This single tree occurs in isolation and does not constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.

An additional five other Swamp Mahogany at the site (refer to **Section 4.2.5**) occur within paperbark dominated swamp forest and similarly do not comprise > 15% of the total number of trees in the upper or lower strata of the tree component.

On this basis, potential Koala habitat does not occur and in accordance with Circular B35, the Policy requires no further consideration.

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<sup>1</sup> While the *Byron Coast Comprehensive Koala Plan of Management* (BCKPoM) (Byron Shire Council 2015) was adopted by Byron Shire Council on 4 August 2016 it has not yet been approved by the Department of Planning, Industry and Environment (the relevant approval authority).



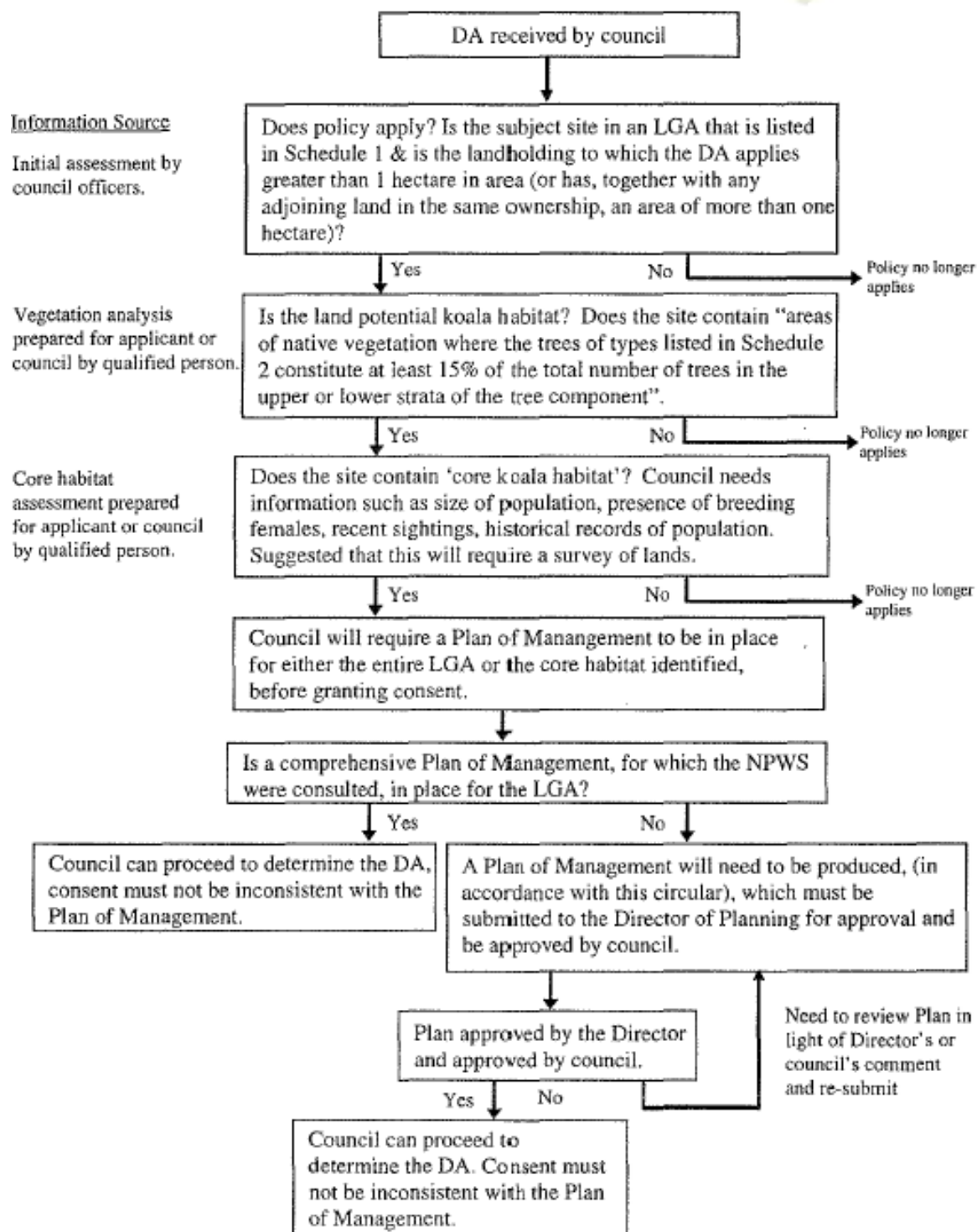


Figure 7.1 Koala SEPP 2020 Policy Guideline (as per Circular B35)





## 7.5 Biodiversity Conservation Act 2016 (BC Act)

The BC Act requires a test of significance (five-part test) when assessing whether an action, development or Proposal is likely to significantly affect threatened species, ecological communities or their habitats. Based on the occurrence of a number of threatened flora species at the site, a TEC and potential for several threatened fauna species to occur, tests of significance have been completed based on the concept plans provided (refer to **Appendix K**). The tests concluded that the Proposal would be unlikely to significantly increase the risk of extinction for any threatened species or TEC.

## 7.6 Fisheries Management Act 1994 (FM Act)

The FM Act requires a test of significance when there may be potential to impact on any species, populations and communities listed in the FM Act. Based on the habitat at the site and records within the locality, it is unlikely that the Proposal would impact on any species, populations or communities listed in the FM Act; as such a test of significance is not required.

The Proposal does not require the removal of any marine vegetation for the works and hence a 'permit to harm marine vegetation' is not required.

## 7.7 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

Under the EPBC Act, actions that have, or are likely to have, a significant impact on a matter of national environmental significance (MNES) require approval from the Australian Government Minister for the Environment (the Minister).

On 24 March 2020 the Australian Government entered into a new agreement ('Amending Agreement No. 1') with the New South Wales Government to amend the bilateral agreement signed in 2015 relating to environmental assessment. The Amending Agreement declares that an action does not require assessment under part 8 of the EPBC Act if it is listed in the declared classes of actions in Schedule 1 of the Amending Agreement.

In accordance with declared class of action (vii), the proposal is not classified as State significant development or complying development or designated development and is assessed as development that can be carried out with development consent under Part 4 of the EP&A Act, and does not include a species impact statement prepared in accordance with the BC Act or FM Act.

The proposal is characteristic of declared class action (vii) and hence does not require assessment under part 8 of the EPBC Act.

## 7.8 Permits and Approvals

Statutory assessment has considered potential impacts of the Proposal with regard to impacts on biodiversity. Based on the statutory assessments completed no approvals or permits are required for any impacts to flora, fauna, fish and their habitats.






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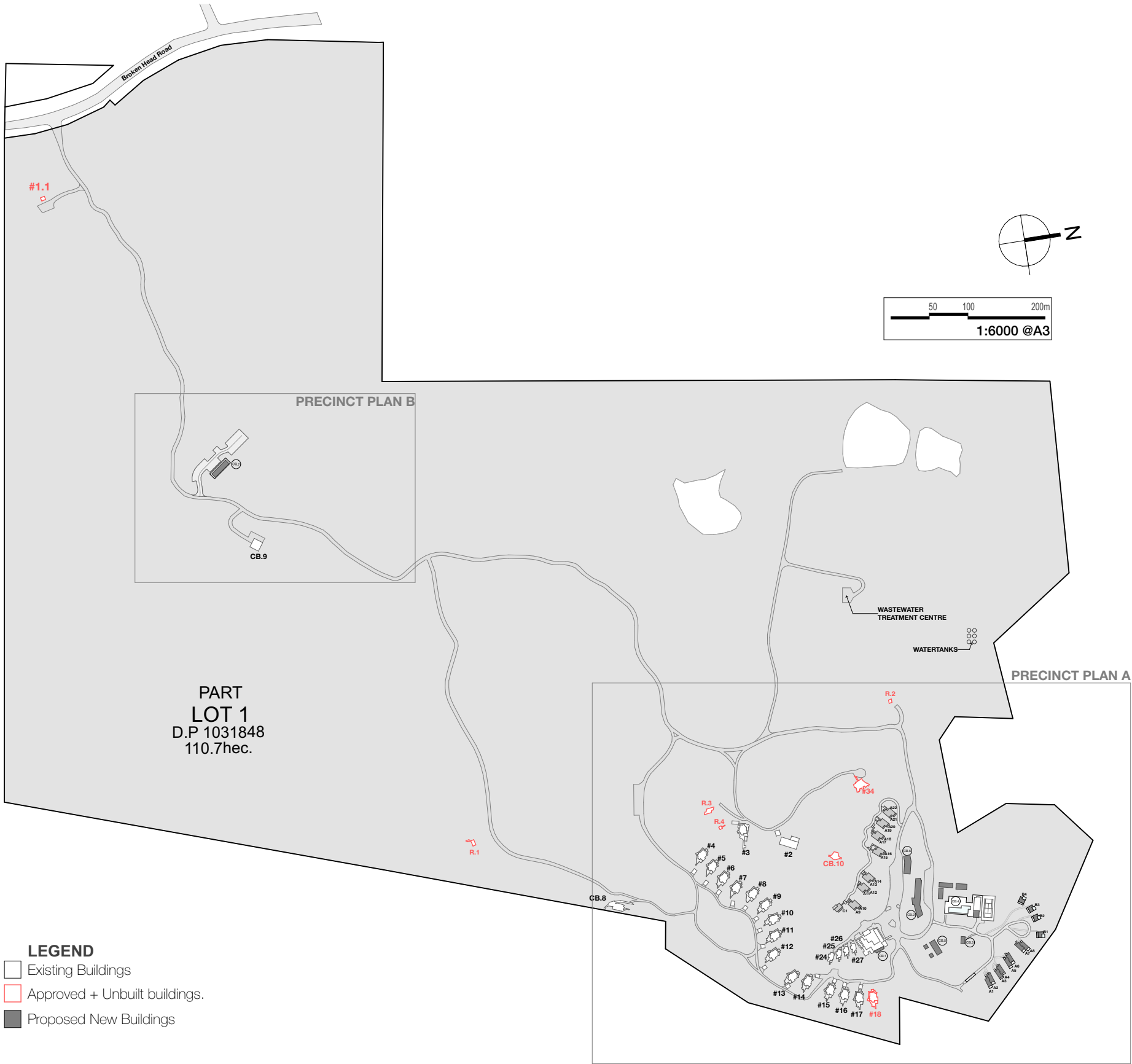
## Appendix A

# Development Plan



951 BROKEN HEAD RD  
DEVELOPMENT APPLICATION

DRAWING SCHEDULE	
No	NAME
DA 00	Location Plan
DA 01	Precinct Plan (Existing Approvals)
DA 02	Precinct Plan A + B + (Existing + Proposed)
DA 03	Accessibility Plan
DA 04	CB.01 - Centre Additions
DA 05	CB.02 - Onsite Evacuation Building 1
DA 06	CB.02 - Onsite Evacuation Building 1
DA 07	CB.03 - Onsite Evacuation Building 2
DA 08	CB.04 - Wellness + Pool Facilities
DA 09	CB.04 - Wellness + Pool Facilities
DA 10	CB.04 - Wellness + Pool Facilities
DA 11	CB.04 - Wellness + Pool Facilities
DA 12	CB.05 - Shed/Barn
DA 13	CB.06 - Bins and Store
DA 14	CB.07 - Depot
DA 15	TYPE A - Cabins
DA 16	TYBE A - Cabins
DA 17	TYPE B - Rainforest Retreat
DA 18	TYBE C - Treehouse Retreat
DA 19	Material Schedule



- LEGEND**
- Existing Buildings
  - Approved + Unbuilt buildings.
  - Proposed New Buildings

HARLEY GRAHAM ARCHITECTS

LEVEL 1/144 JONSON STREET BYRON BAY | PO BOX 1285 NSW 2481

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ABN: 85158246003 NSW 7892

- All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.
- Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication.
- Figured dimensions take precedence - do not scale.

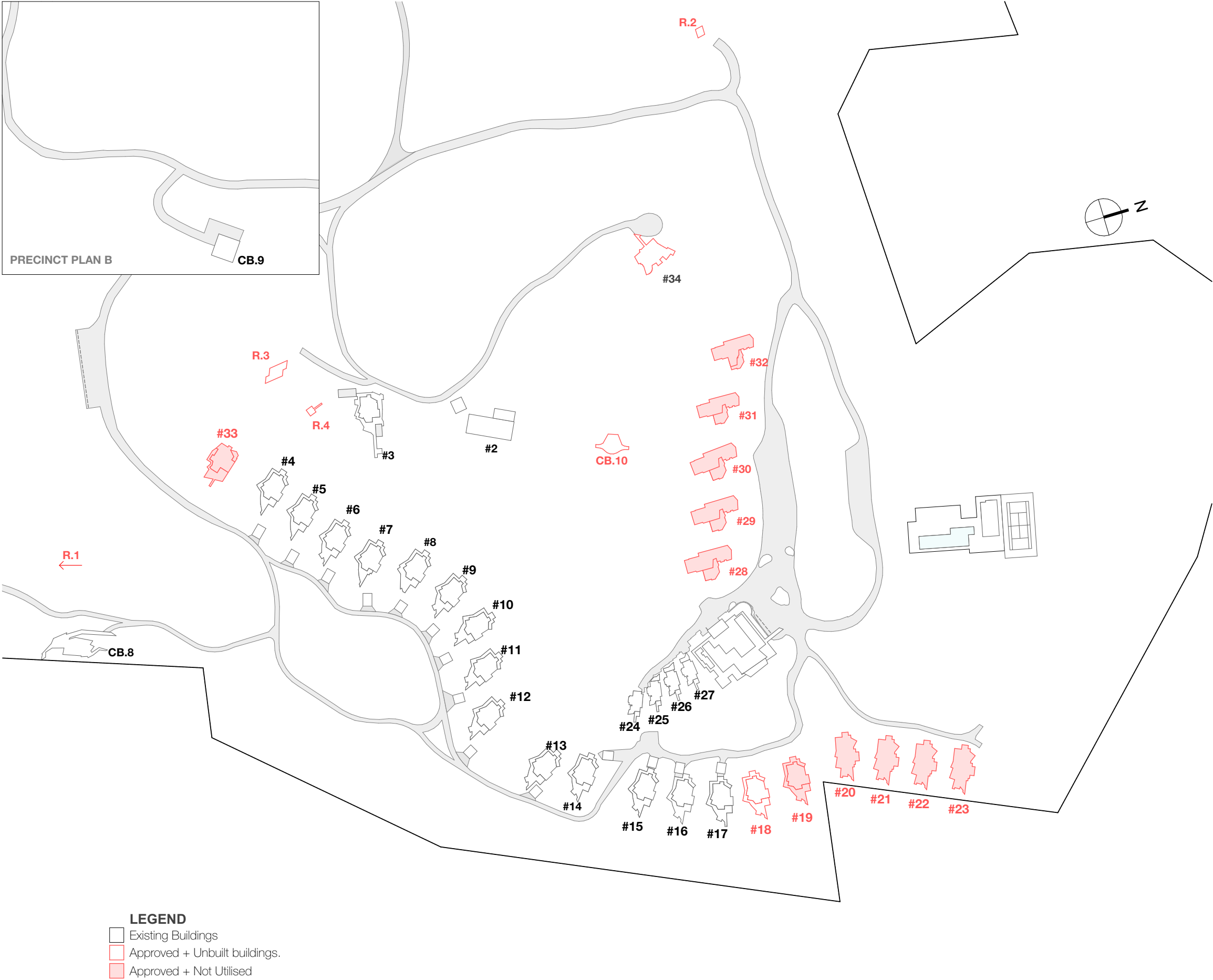
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REV	ISSUE NAME	DATE	CLIENT	ADDRESS	REVISION	SCALE
01	DEVELOPMENT APPLICATION	24/3/20	Linnaeus Property Trust	951 BROKEN HEAD RD	DA	1:6000
02	REVISED DA	2/6/20				
03	REVISED DA	24/7/20	JOB NAME	LOT + DP	PAPER	SHEET N#
04	REVISED DA - AS PER RFS RESPONSE	17/9/20	HGA 206 - ECO TOURISM	LOT 1 DP 1031848	A3	DA 00
			DRAWING	Location Plan		DATE
					DRAWN: H.P CHECKED: H.G	17/9/20



BUILDING CLASSIFICATION LIST

DA Buildings - Existing					
N#	Name	Area	Occupancy	Category	I.D
2	Hill House	220	4	Residence	Existing
3	Accommodation (Hill)	184	3	Accommodation Type A	Existing
4	Accommodation	184	3	Accommodation Type A	Existing
5	Accommodation	184	3	Accommodation Type A	Existing
6	Accommodation	184	3	Accommodation Type A	Existing
7	Accommodation	184	3	Accommodation Type A	Existing
8	Accommodation	184	3	Accommodation Type A	Existing
9	Accommodation	184	3	Accommodation Type A	Existing
10	Accommodation	184	3	Accommodation Type A	Existing
11	Accommodation	184	3	Accommodation Type A	Existing
12	Accommodation	184	3	Accommodation Type A	Existing
13	Accommodation	184	3	Accommodation Type A	Existing
14	Accommodation	184	3	Accommodation Type A	Existing
15	Accommodation	184	3	Accommodation Type A	Existing
16	Accommodation	184	3	Accommodation Type A	Existing
17	Accommodation	184	3	Accommodation Type A	Existing
24	Centre Accom	55	2	Accommodation Type B	Existing
25	Centre Accom	55	2	Accommodation Type B	Existing
26	Centre Accom	55	2	Accommodation Type B	Existing
27	Centre Accom	55	2	Accommodation Type B	Existing
CB.1	Centre	368	-	Community Building	Existing
CB.4	Pool	65	-	Community Building	Existing
CB.8	Crab	60	-	Community Building	Existing
CB.9	Interpretive Centre	150	-	Community Building	Existing
	TOTAL	3,843 m²	57		
DA Buildings - Approved/Unbuilt					
N#	Name	Area	Occupancy	Category	I.D
1.1	Refuse Building	36	-	Community Building	Approved/Unbuilt
18	Accommodation	184	3	Accommodation Type A	Approved/Unbuilt
34	Hill House	205	4	Residence	Approved/Unbuilt
CB.10	Underground Chapel	41	-	Community Building	Approved/Unbuilt
R.1	Retreat A	39	-	Retreats	Approved/Unbuilt
R.2	Retreat B	32	-	Retreats	Approved/Unbuilt
R.3	Retreat C	68	-	Retreats	Approved/Unbuilt
R.4	Retreat D	9	-	Retreats	Approved/Unbuilt
	TOTAL	614 m²	7		
Buildings - Approved (Not Utilised)					
N#	Zone Name	Area	Occupancy	Category	ID
19	Accommodation	184	3.5	Accommodation Type A	Unbuilt (Not Utilised)
20	Accommodation	184	3.5	Accommodation Type A	Unbuilt (Not Utilised)
21	Accommodation	184	3.5	Accommodation Type A	Unbuilt (Not Utilised)
22	Accommodation	184	3.5	Accommodation Type A	Unbuilt (Not Utilised)
23	Accommodation	184	3.5	Accommodation Type A	Unbuilt (Not Utilised)
28	Ridge House	206	3.5	Accommodation Type D	Unbuilt (Not Utilised)
29	Ridge House	206	3.5	Accommodation Type D	Unbuilt (Not Utilised)
30	Ridge House	206	3.5	Accommodation Type D	Unbuilt (Not Utilised)
31	Ridge House	206	3.5	Accommodation Type D	Unbuilt (Not Utilised)
32	Ridge House	206	3.5	Accommodation Type D	Unbuilt (Not Utilised)
33	Accommodation	213	3.5	Accommodation Type C	Unbuilt (Not Utilised)
	TOTAL	2,163 m²	38.5		
	Unallocated		9.5		
APPROVED OCCUAPANCY			112		





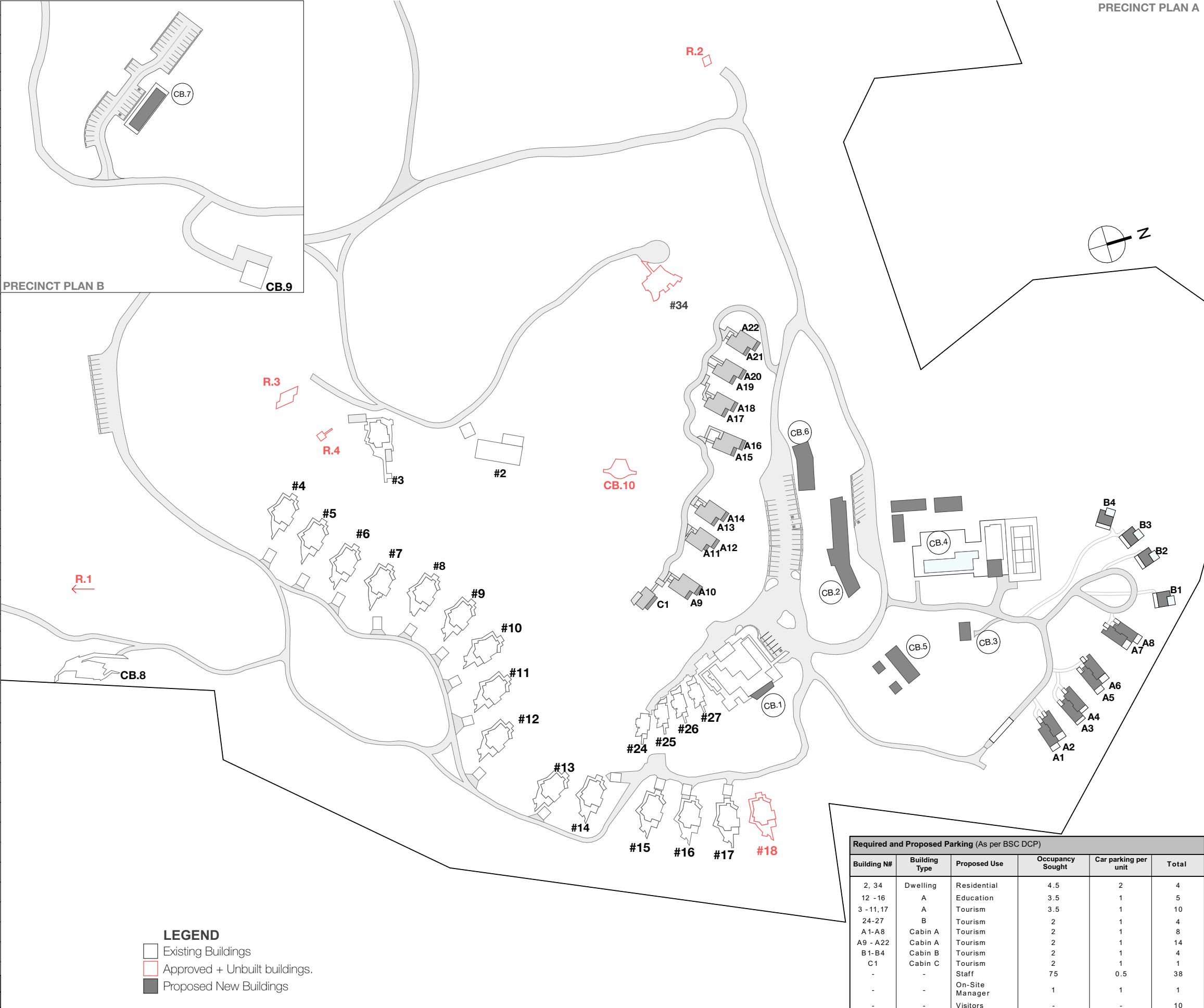
BUILDING CLASSIFICATION LIST

DA Buildings - Existing					
N#	Name	Area	Proposed Occupancy	Category	I.D
2	Hill House	220	4.5	Residence	Existing
3	Accommodation (Hill)	184	3.5	Accommodation Type A	Existing
4	Accommodation	184	3.5	Accommodation Type A	Existing
5	Accommodation	184	3.5	Accommodation Type A	Existing
6	Accommodation	184	3.5	Accommodation Type A	Existing
7	Accommodation	184	3.5	Accommodation Type A	Existing
8	Accommodation	184	3.5	Accommodation Type A	Existing
9	Accommodation	184	3.5	Accommodation Type A	Existing
10	Accommodation	184	3.5	Accommodation Type A	Existing
11	Accommodation	184	3.5	Accommodation Type A	Existing
12	Accommodation	184	3.5	Accommodation Type A	Existing
13	Accommodation	184	3.5	Accommodation Type A	Existing
14	Accommodation	184	3.5	Accommodation Type A	Existing
15	Accommodation	184	3.5	Accommodation Type A	Existing
16	Accommodation	184	3.5	Accommodation Type A	Existing
17	Accommodation	184	3.5	Accommodation Type A	Existing
24	Centre Accom	55	2	Accommodation Type B	Existing
25	Centre Accom	55	2	Accommodation Type B	Existing
26	Centre Accom	55	2	Accommodation Type B	Existing
27	Centre Accom	55	2	Accommodation Type B	Existing
CB.1	Centre	368	-	Community Building	Existing
CB.4	Pool	65	-	Community Building	Existing
CB.8	Crab	60	-	Community Building	Existing
CB.9	Interpretive Centre	150	-	Community Building	Existing
		3,843 m²	65		

DA Buildings - Approved/Unbuilt					
N#	Name	Area	Proposed Occupancy	Category	I.D
1.1	Refuse Building	36	-	Community Building	Approved/Unbuilt
18	Accommodation	184	3.5	Accommodation Type A	Approved/Unbuilt
34	Hill House	205	4.5	Residence	Approved/Unbuilt
CB.10	Underground Chapel	41	-	Community Building	Approved/Unbuilt
R.1	Retreat A	39	-	Retreats	Approved/Unbuilt
R.2	Retreat B	32	-	Retreats	Approved/Unbuilt
R.3	Retreat C	68	-	Retreats	Approved/Unbuilt
R.4	Retreat D	9	-	Retreats	Approved/Unbuilt
	TOTAL	614 m²	8		

DA Buildings - Proposed					
N#	Name	Area	Occupancy	Category	I.D
A	Cabin (9-22)	630	28	Cabin Type A	Proposed
A	Cabin (1-8)	360	16	Cabin Type A	Proposed
B	Rainforest Retreat (1-4)	176	8	Cabin Type B	Proposed
C	Treehouse Retreat	55	2	Cabin Type C	Proposed
CB.1	Centre Additions	41	-	Community Building	Proposed
CB.2	Refuge Building 1	370	-	Community Building	Proposed
CB.3	Refuge Building 2	50	-	Community Building	Proposed
CB.4	Food Offering (Pool)	64	-	Community Building	Proposed
CB.4	Wellness Facilities	313	-	Community Building	Proposed
CB.5	Shed	186	-	Community Building	Proposed
CB.6	Bin + Store Building	135	-	Community Building	Proposed
CB.7	Depot Building	164	-	Community Building	Proposed
	TOTAL	2,544 m²	54		
	Unallocated		21.5		

PROPOSED OCCUPANCY 148.5





DA Buildings - Accessibility			
Category	Name	Cabin	Type
Cabin Type A	Cabin (1-8)	01	Standard
Cabin Type A	Cabin (1-8)	02	Standard
Cabin Type A	Cabin (1-8)	03	Accessible
Cabin Type A	Cabin (1-8)	04	Accessible
Cabin Type A	Cabin (1-8)	05	Accessible
Cabin Type A	Cabin (1-8)	06	Accessible
Cabin Type A	Cabin (1-8)	07	Standard
Cabin Type A	Cabin (1-8)	08	Standard
Cabin Type A	Cabin (9-22)	09	Standard
Cabin Type A	Cabin (9-22)	10	Standard
Cabin Type A	Cabin (9-22)	11	Standard
Cabin Type A	Cabin (9-22)	12	Standard
Cabin Type A	Cabin (9-22)	13	Standard
Cabin Type A	Cabin (9-22)	14	Standard
Cabin Type A	Cabin (9-22)	15	Standard
Cabin Type A	Cabin (9-22)	16	Standard
Cabin Type A	Cabin (9-22)	17	Standard
Cabin Type A	Cabin (9-22)	18	Standard
Cabin Type A	Cabin (9-22)	19	Standard
Cabin Type A	Cabin (9-22)	20	Standard
Cabin Type A	Cabin (9-22)	21	Standard
Cabin Type A	Cabin (9-22)	22	Standard
Cabin Type B	Rainforest Retreat (1-4)	1	Standard
Cabin Type B	Rainforest Retreat (1-4)	2	Standard
Cabin Type B	Rainforest Retreat (1-4)	3	Standard
Cabin Type B	Rainforest Retreat (1-4)	4	Standard
Cabin Type C	Treehouse Retreat	1	Standard
	TOTAL	27	

Accessible Compliant Buildings

Accessible Path of Travel

REFER TO BCA TABLE D3.1 & BCA TABLE D3.5

ACCESSIBILITY ASSESSMENT

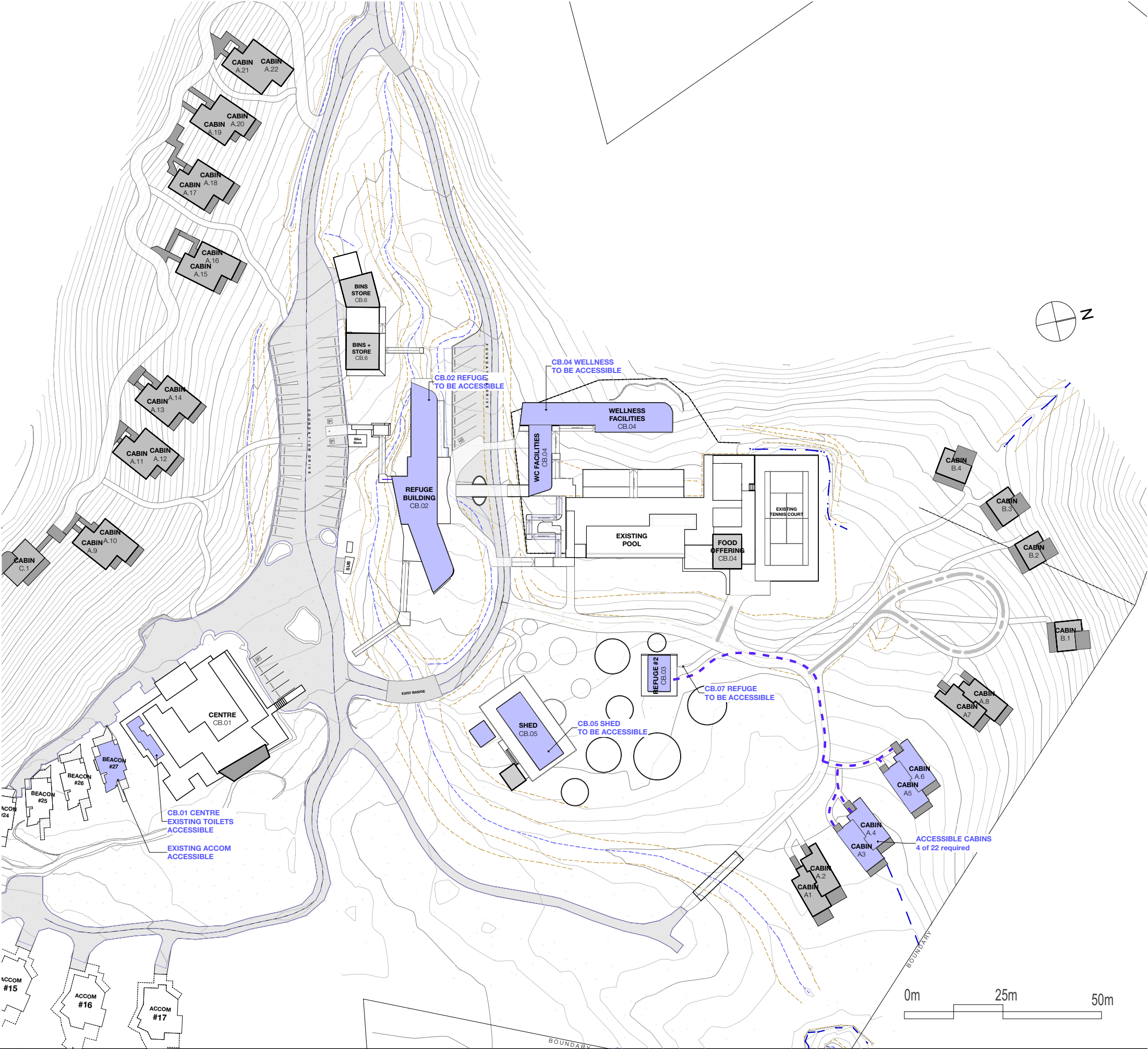
Completed by Francis Lenny @ DDA Consult.

ACCESSIBILITY

- 4 x Type A Cabins

PARKING

- Distances to car parks to be minimum requirement for Class 3 Buildings.
- All Accessible Cabins to have accessible car spaces as per BCA requirements.
- Detail to be provided with Construction Certificate Drawings
- Performance solution required for Pedestrian Access



<div>HARLEY GRAHAM ARCHITECTS</div> <div>LEVEL 1/144 JONSON STREET BYRON BAY   PO BOX 1285 NSW 2481</div> <div>F: 02 66809820   T: 02 66809690   E: office@harleygraham.com</div> <div>ABN: 85158246003 NSW 7892</div>	<div>• All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.</div> <div>• Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication.</div> <div>• Figured dimensions take precedence - do not scale.</div> <div>© COPYRIGHT HARLEY GRAHAM ARCHITECTS</div>		REV	ISSUE NAME	DATE	CLIENT	ADDRESS	REVISION	SCALE
			01	DEVELOPMENT APPLICATION	24/3/20	Linnaeus Property Trust	951 BROKEN HEAD RD	DA	1:1000
			02	REVISED DA	2/6/20				
			03	REVISED DA	24/7/20				
			04	REVISED DA - AS PER RFS RESPONSE	17/8/20				





## **Appendix B**

## **Database Searches**



Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016) Plants in selected area [North: -28.68 West: 153.55 East: 153.65 South: -28.78] returned a total of 745 records of 33 species.

Report generated on 19/01/2021 12:58 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Plantae	Flora	Apocynaceae	1233	<i>Marsdenia longiloba</i>		Slender Marsdenia	E1	V	1	
Plantae	Flora	Cunoniaceae	10943	^ <i>Davidsonia jerseyana</i>		Davidson's Plum	E1,2	E	2	
Plantae	Flora	Cunoniaceae	10944	<i>Davidsonia johnsonii</i>		Smooth Davidson's Plum	E1	E	18	
Plantae	Flora	Elaeocarpaceae	2575	^^ <i>Elaeocarpus williamsianus</i>		Hairy Quandong	E1,3	E	5	
Plantae	Flora	Euphorbiaceae	9851	<i>Chamaesyce psammogeton</i>		Sand Spurge	E1		1	
Plantae	Flora	Fabaceae (Caesalpinioideae)	1877	<i>Caesalpinia bonduc</i>		Knicker Nut	E1		1	
Plantae	Flora	Fabaceae (Caesalpinioideae)	8772	<i>Senna acclinis</i>		Rainforest Cassia	E1		8	
Plantae	Flora	Fabaceae (Mimosoideae)	7757	<i>Archidendron hendersonii</i>		White Lace Flower	V		50	
Plantae	Flora	Flacourtiaceae	3114	<i>Xylosma terrae-reginae</i>		Queensland Xylosma	E1		6	
Plantae	Flora	Lauraceae	3477	<i>Cryptocarya foetida</i>		Stinking Cryptocarya	V	V	126	
Plantae	Flora	Lauraceae	8948	<i>Endiandra floydii</i>		Crystal Creek Walnut	E1	E	37	
Plantae	Flora	Lauraceae	3491	<i>Endiandra hayesii</i>		Rusty Rose Walnut	V	V	11	
Plantae	Flora	Lauraceae	8480	<i>Endiandra muelleri</i> <i>subsp. bracteata</i>		Green-leaved Rose Walnut	E1		83	
Plantae	Flora	Menispermaceae	3691	<i>Tinospora tinosporoides</i>		Arrow-head Vine	V		8	
Plantae	Flora	Myrtaceae	11894	<i>Gossia fragrantissima</i>		Sweet Myrtle	E1	E	2	
Plantae	Flora	Myrtaceae	4283	<i>Rhodamnia rubescens</i>		Scrub Turpentine	E4A		37	
Plantae	Flora	Myrtaceae	4284	<i>Rhodomyrtus psidioides</i>		Native Guava	E4A		9	








Plantae	Flora	Myrtaceae	4290	<i>Syzygium hodgkinsoniae</i>	Red Lilly Pilly	V	V	30	
Plantae	Flora	Myrtaceae	4292	<i>Syzygium moorei</i>	Durobby	V	V	40	
Plantae	Flora	Orchidaceae	14732	<i>^Diuris byronensis</i>	Byron Bay Diuris	E1,P,2		1	
Plantae	Flora	Orchidaceae	6672	<i>^Geodorum densiflorum</i>	Pink Nodding Orchid	E1,P,2		69	
Plantae	Flora	Orchidaceae	4479	<i>^Peristeranthus hillii</i>	Brown Fairy-chain Orchid	V,P,2		5	
Plantae	Flora	Orchidaceae	4480	<i>^Phaius australis</i>	Southern Swamp Orchid	E1,P,2	E	12	
Plantae	Flora	Poaceae	4776	<i>Arthraxon hispidus</i>	Hairy Jointgrass	V	V	26	
Plantae	Flora	Polypodiaceae	8156	<i>^Drynaria rigidula</i>	Basket Fern	E1,3		1	
Plantae	Flora	Proteaceae	5354	<i>Floydia praealta</i>	Ball Nut	V	V	3	
Plantae	Flora	Proteaceae	5446	<i>Macadamia tetraphylla</i>	Rough-shelled Bush Nut	V	V	30	
Plantae	Flora	Psilotaceae	8164	<i>^Psilotum complanatum</i>	Flat Fork Fern	E1,3		1	
Plantae	Flora	Rubiaceae	8297	<i>Randia moorei</i>	Spiny Gardenia	E1	E	4	
Plantae	Flora	Rutaceae	6457	<i>Acronychia littoralis</i>	Scented Acronychia	E1	E	38	
Plantae	Flora	Rutaceae	8658	<i>Melicope vitiflora</i>	Coast Euodia	E1		2	
Plantae	Flora	Sapindaceae	5889	<i>^Diploglottis campbellii</i>	Small-leaved Tamarind	E1,2	E	13	
Plantae	Flora	Sapotaceae	11957	<i>Niemeyera whitei</i>	Rusty Plum, Plum Boxwood	V		65	








Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016) Communities in selected area [North: -28.68 West: 153.55 East: 153.65 South: -28.78] returned 0 records for 10 entities.

Report generated on 19/01/2021 1:05 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Community				<i>Coastal Cypress Pine Forest in the New South Wales North Coast Bioregion</i>		Coastal Cypress Pine Forest in the New South Wales North Coast Bioregion	E3		K	
Community				<i>Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i>		Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	V	K	
Community				<i>Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i>		Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K	
Community				<i>Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i>		Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	CE	K	
Community				<i>Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions</i>		Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E3	CE	K	




















Community	<i>Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion</i>	Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	E3	CE	K	
Community	<i>Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion</i>	Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	E3		K	
Community	<i>Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i>	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K	
Community	<i>Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions</i>	Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3		K	
Community	<i>White Gum Moist Forest in the NSW North Coast Bioregion</i>	White Gum Moist Forest in the NSW North Coast Bioregion	E3		K	



Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016) Animals in selected area [North: -28.68 West: 153.55 East: 153.65 South: -28.78] returned a total of 805 records of 49 species.

Report generated on 19/01/2021 1:02 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	3137	<i>Crinia tinnula</i>		Wallum Froglet	V,P		81	
Animalia	Amphibia	Hylidae	3202	<i>Litoria olongburensis</i>		Olongburra Frog	V,P	V	16	
Animalia	Reptilia	Cheloniidae	2004	<i>Caretta caretta</i>		Loggerhead Turtle	E1,P	E	4	
Animalia	Reptilia	Cheloniidae	2007	<i>Chelonia mydas</i>		Green Turtle	V,P	V	2	
Animalia	Reptilia	Elapidae	2677	<i>Hoplocephalus stephensii</i>		Stephens' Banded Snake	V,P		1	
Animalia	Aves	Anseranatidae	0199	<i>Anseranas semipalmata</i>		Magpie Goose	V,P		1	
Animalia	Aves	Columbidae	0025	<i>Ptilinopus magnificus</i>		Wompoo Fruit-Dove	V,P		8	
Animalia	Aves	Columbidae	0021	<i>Ptilinopus regina</i>		Rose-crowned Fruit-Dove	V,P		29	
Animalia	Aves	Columbidae	0023	<i>Ptilinopus superbus</i>		Superb Fruit-Dove	V,P		1	
Animalia	Aves	Podargidae	0314	<i>Podargus ocellatus</i>		Marbled Frogmouth	V,P		4	
Animalia	Aves	Ciconiidae	0183	<i>Ephippiorhynchus asiaticus</i>		Black-necked Stork	E1,P		2	
Animalia	Aves	Ardeidae	0197	<i>Botaurus poeciloptilus</i>		Australasian Bittern	E1,P	E	4	
Animalia	Aves	Ardeidae	0196	<i>Ixobrychus flavicollis</i>		Black Bittern	V,P		7	
Animalia	Aves	Accipitridae	0218	<i>Circus assimilis</i>		Spotted Harrier	V,P		6	
Animalia	Aves	Accipitridae	0226	<i>Haliaeetus leucogaster</i>		White-bellied Sea-Eagle	V,P		54	
Animalia	Aves	Accipitridae	0225	<i>Hieraaetus morphnoides</i>		Little Eagle	V,P		2	
Animalia	Aves	Accipitridae	0230	^Lophoictinia isura		Square-tailed Kite	V,P,3		27	
Animalia	Aves	Accipitridae	8739	^Pandion cristatus		Eastern Osprey	V,P,3		43	
Animalia	Aves	Gruidae	0177	<i>Grus rubicunda</i>		Brolga	V,P		3	
Animalia	Aves	Rallidae	0053	<i>Amaurornis moluccana</i>		Pale-vented Bush-hen	V,P		43	



Animalia	Aves	Haematopodidae	0131	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	V,P		4	
Animalia	Aves	Haematopodidae	0130	<i>Haematopus longirostris</i>	Pied Oystercatcher	E1,P		8	
Animalia	Aves	Laridae	9926	<i>Procelsterna cerulea</i>	Grey Ternlet	V,P		1	
Animalia	Aves	Laridae	0117	<i>Sternula albifrons</i>	Little Tern	E1,P	C,J,K	1	
Animalia	Aves	Cacatuidae	0265	<i>^Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V,P,2		11	
Animalia	Aves	Psittacidae	0260	<i>Glossopsitta pusilla</i>	Little Lorikeet	V,P		1	
Animalia	Aves	Psittacidae	8913	<i>^^Pezoporus wallicus wallicus</i>	Eastern Ground Parrot	V,P,3		3	
Animalia	Aves	Strigidae	0248	<i>^^Ninox strenua</i>	Powerful Owl	V,P,3		1	
Animalia	Aves	Tytonidae	0252	<i>^^Tyto longimembris</i>	Eastern Grass Owl	V,P,3		11	
Animalia	Aves	Tytonidae	0250	<i>^^Tyto novaehollandiae</i>	Masked Owl	V,P,3		4	
Animalia	Aves	Tytonidae	9924	<i>^^Tyto tenebricosa</i>	Sooty Owl	V,P,3		3	
Animalia	Aves	Pomatostomidae	8388	<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V,P		1	
Animalia	Aves	Neosittidae	0549	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V,P		1	
Animalia	Aves	Artamidae	8519	<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V,P		1	
Animalia	Aves	Monarchidae	0376	<i>Carterornis leucotis</i>	White-eared Monarch	V,P		44	
Animalia	Mammalia	Dasyuridae	1008	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V,P	E	2	
Animalia	Mammalia	Dasyuridae	1045	<i>Planigale maculata</i>	Common Planigale	V,P		16	
Animalia	Mammalia	Phascolarctidae	1162	<i>Phascolarctos cinereus</i>	Koala	V,P	V	69	
Animalia	Mammalia	Potoroidae	1175	<i>Potorous tridactylus</i>	Long-nosed Potoroo	V,P	V	2	
Animalia	Mammalia	Pteropodidae	1280	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V,P	V	156	
Animalia	Mammalia	Pteropodidae	1294	<i>Syconycteris australis</i>	Common Blossom-bat	V,P		15	
Animalia	Mammalia	Molossidae	1329	<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V,P		1	
Animalia	Mammalia	Vespertilionidae	1357	<i>Myotis macropus</i>	Southern Myotis	V,P		3	
Animalia	Mammalia	Vespertilionidae	1336	<i>Nyctophilus bifax</i>	Eastern Long-eared Bat	V,P		76	
Animalia	Mammalia	Miniopteridae	1346	<i>Miniopterus australis</i>	Little Bent-winged Bat	V,P		12	



Animalia	Mammalia	Miniopteridae	3330	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V,P		2	
Animalia	Insecta	Petaluridae	I007	<i>Petalura gigantea</i>	Giant Dragonfly	E1		2	
Animalia	Insecta	Petaluridae	I138	<i>Petalura litorea</i>	Coastal Petaltail	E1		8	
Animalia	Gastropoda	Camaenidae	I002	<i>Thersites mitchellae</i>	Mitchell's Rainforest Snail	E1	CE	8	





# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 19/01/21 17:01:58

[Summary](#)

[Details](#)

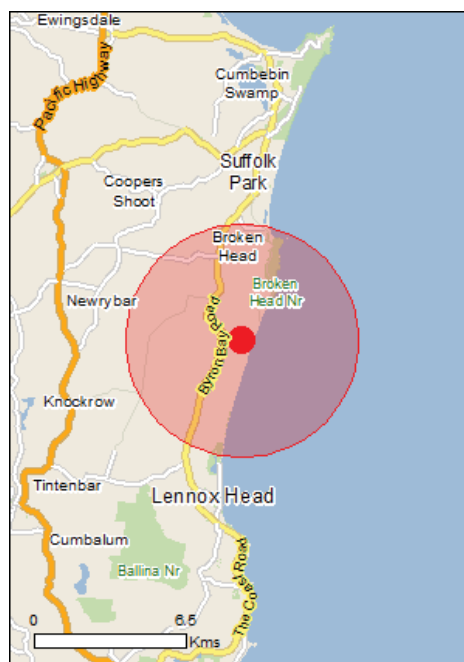
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

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Buffer: 5.0Km





# Summary

## Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	3
<a href="#">Listed Threatened Species:</a>	91
<a href="#">Listed Migratory Species:</a>	56

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

<a href="#">Commonwealth Land:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	86
<a href="#">Whales and Other Cetaceans:</a>	12
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None

## Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

<a href="#">State and Territory Reserves:</a>	1
<a href="#">Regional Forest Agreements:</a>	1
<a href="#">Invasive Species:</a>	36
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">Key Ecological Features (Marine)</a>	None



# Details

## Matters of National Environmental Significance

### Listed Threatened Ecological Communities [\[ Resource Information \]](#)

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
<a href="#">Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community</a>	Endangered	Community likely to occur within area
<a href="#">Littoral Rainforest and Coastal Vine Thickets of Eastern Australia</a>	Critically Endangered	Community likely to occur within area
<a href="#">Lowland Rainforest of Subtropical Australia</a>	Critically Endangered	Community likely to occur within area

### Listed Threatened Species [\[ Resource Information \]](#)

Name	Status	Type of Presence
<b>Birds</b>		
<a href="#">Anthochaera phrygia</a>		
Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Botaurus poiciloptilus</a>		
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
<a href="#">Calidris canutus</a>		
Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
<a href="#">Calidris ferruginea</a>		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Cyclopsitta diophthalma coxeni</a>		
Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area
<a href="#">Diomedea antipodensis</a>		
Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diomedea antipodensis gibsoni</a>		
Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diomedea epomophora</a>		
Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diomedea exulans</a>		
Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
<a href="#">Erythrorhynchus radiatus</a>		
Red Goshawk [942]	Vulnerable	Species or species



Name	Status	Type of Presence
<a href="#">Falco hypoleucos</a> Grey Falcon [929]	Vulnerable	habitat likely to occur within area  Species or species habitat may occur within area
<a href="#">Fregetta grallaria grallaria</a> White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Lathamus discolor</a> Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Limosa lapponica baueri</a> Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Pachyptila turtur subantarctica</a> Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Phoebastria fusca</a> Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
<a href="#">Pterodroma leucoptera leucoptera</a> Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
<a href="#">Pterodroma neglecta neglecta</a> Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
<a href="#">Sternula nereis nereis</a> Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche cauta</a> Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
<a href="#">Thalassarche eremita</a> Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within



Name	Status	Type of Presence area
<a href="#">Thalassarche salvini</a> Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Thinornis cucullatus cucullatus</a> Hooded Plover (eastern), Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within area
<a href="#">Turnix melanogaster</a> Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area
<b>Fish</b>		
<a href="#">Epinephelus daemeli</a> Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Hippocampus whitei</a> White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area
<b>Frogs</b>		
<a href="#">Litoria olongburensis</a> Wallum Sedge Frog [1821]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Mixophyes fleayi</a> Fleay's Frog [25960]	Endangered	Species or species habitat may occur within area
<b>Insects</b>		
<a href="#">Argynnis hyperbius inconstans</a> Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Phyllodes imperialis smithersi</a> Pink Underwing Moth [86084]	Endangered	Species or species habitat may occur within area
<b>Mammals</b>		
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat may occur within area
<a href="#">Chalinolobus dwyeri</a> Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Dasyurus maculatus maculatus (SE mainland population)</a> Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Petauroides volans</a> Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</a> Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area



Name	Status	Type of Presence
<a href="#">Potorous tridactylus tridactylus</a> Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Pseudomys novaehollandiae</a> New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Pteropus poliocephalus</a> Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Xeromys myoides</a> Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area
Other		
<a href="#">Thersites mitchellae</a> Mitchell's Rainforest Snail [66774]	Critically Endangered	Species or species habitat known to occur within area
Plants		
<a href="#">Acronychia littoralis</a> Scented Acronychia [8582]	Endangered	Species or species habitat known to occur within area
<a href="#">Allocasuarina thalassoscopica</a> [21927]	Endangered	Species or species habitat likely to occur within area
<a href="#">Arthraxon hispidus</a> Hairy-joint Grass [9338]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Baloghia marmorata</a> Marbled Baloghia, Jointed Baloghia [8463]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Bulbophyllum globuliforme</a> Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat may occur within area
<a href="#">Cryptocarya foetida</a> Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Cryptostylis hunteriana</a> Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
<a href="#">Cynanchum elegans</a> White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
<a href="#">Davidsonia jerseyana</a> Davidson's Plum [67219]	Endangered	Species or species habitat likely to occur within area
<a href="#">Davidsonia johnsonii</a> Smooth Davidsonia, Smooth Davidson's Plum, Small-leaved Davidson's Plum [67178]	Endangered	Species or species habitat known to occur within area
<a href="#">Diploglottis campbellii</a> Small-leaved Tamarind [21484]	Endangered	Species or species habitat known to occur within area
<a href="#">Elaeocarpus williamsianus</a> Hairy Quandong [8956]	Endangered	Species or species habitat known to occur within area
<a href="#">Endiandra floydii</a> Floyd's Walnut [52955]	Endangered	Species or species habitat known to occur



Name	Status	Type of Presence
<a href="#">Endiandra hayesii</a>		within area
Rusty Rose Walnut, Velvet Laurel [13866]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Floydia praealta</a>		
Ball Nut, Possum Nut, Big Nut, Beefwood [15762]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Fontainea australis</a>		
Southern Fontainea [24037]	Vulnerable	Species or species habitat may occur within area
<a href="#">Gossia fragrantissima</a>		
Sweet Myrtle, Small-leaved Myrtle [78867]	Endangered	Species or species habitat may occur within area
<a href="#">Hicksbeachia pinnatifolia</a>		
Monkey Nut, Bopple Nut, Red Bopple, Red Bopple Nut, Red Nut, Beef Nut, Red Apple Nut, Red Boppel Nut, Ivory Silky Oak [21189]	Vulnerable	Species or species habitat may occur within area
<a href="#">Macadamia integrifolia</a>		
Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area
<a href="#">Macadamia tetraphylla</a>		
Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Marsdenia longiloba</a>		
Clear Milkvine [2794]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Ochrosia moorei</a>		
Southern Ochrosia [11350]	Endangered	Species or species habitat likely to occur within area
<a href="#">Owenia cepiodora</a>		
Onionwood, Bog Onion, Onion Cedar [11344]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Phaius australis</a>		
Lesser Swamp-orchid [5872]	Endangered	Species or species habitat known to occur within area
<a href="#">Randia moorei</a>		
Spiny Gardenia [10577]	Endangered	Species or species habitat known to occur within area
<a href="#">Rhodamnia rubescens</a>		
Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Rhodomyrtus psidioides</a>		
Native Guava [19162]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Syzygium hodgkinsoniae</a>		
Smooth-bark Rose Apple, Red Lilly Pilly [3539]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Syzygium moorei</a>		
Rose Apple, Coolamon, Robby, Durobby, Watermelon Tree, Coolamon Rose Apple [12284]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Thesium australe</a>		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Tylophora woollsi</a>		
[20503]	Endangered	Species or species habitat may occur within area



Name	Status	Type of Presence
<b>Reptiles</b>		
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Coeranoscincus reticulatus</a> Three-toed Snake-tooth Skink [59628]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding known to occur within area
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Lepidochelys olivacea</a> Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

<b>Sharks</b>		
<a href="#">Carcharias taurus (east coast population)</a> Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species	[ Resource Information ]	
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
<a href="#">Anous stolidus</a>		
Common Noddy [825]		Species or species habitat likely to occur within area
<a href="#">Apus pacificus</a>		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardenna carneipes</a>		
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
<a href="#">Ardenna grisea</a>		
Sooty Shearwater [82651]		Species or species habitat likely to occur within area
<a href="#">Calonectris leucomelas</a>		
Streaked Shearwater [1077]		Species or species habitat known to occur within area
<a href="#">Diomedea antipodensis</a>		
Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diomedea epomophora</a>		
Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area



Name	Threatened	Type of Presence
<a href="#">Diomedea exulans</a> Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
<a href="#">Fregata ariel</a> Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
<a href="#">Fregata minor</a> Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
<a href="#">Phoebastria fusca</a> Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
<a href="#">Sternula albifrons</a> Little Tern [82849]		Species or species habitat may occur within area
<a href="#">Thalassarche cauta</a> Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
<a href="#">Thalassarche eremita</a> Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche salvini</a> Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<b>Migratory Marine Species</b>		
<a href="#">Balaena glacialis australis</a> Southern Right Whale [75529]	Endangered*	Species or species habitat likely to occur within area
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat may occur within area
<a href="#">Carcharhinus longimanus</a> Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area



Name	Threatened	Type of Presence
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding known to occur within area
<a href="#">Dugong dugon</a> Dugong [28]		Species or species habitat may occur within area
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Lamna nasus</a> Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
<a href="#">Lepidochelys olivacea</a> Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area
<a href="#">Manta alfredi</a> Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat known to occur within area
<a href="#">Manta birostris</a> Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
<a href="#">Sousa chinensis</a> Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
<b>Migratory Terrestrial Species</b>		
<a href="#">Cuculus optatus</a> Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat known to occur within area
<a href="#">Monarcha trivirgatus</a> Spectacled Monarch [610]		Species or species habitat known to occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat likely to occur



Name	Threatened	Type of Presence
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		within area  Species or species habitat known to occur within area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat known to occur within area
<b>Migratory Wetlands Species</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat likely to occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

## Other Matters Protected by the EPBC Act

Listed Marine Species		[ <a href="#">Resource Information</a> ]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
<a href="#">Actitis hypoleucos</a>		
Common Sandpiper [59309]		Species or species habitat likely to occur within area
<a href="#">Anous stolidus</a>		
Common Noddy [825]		Species or species habitat likely to occur within area
<a href="#">Apus pacificus</a>		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area



Name	Threatened	Type of Presence
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Breeding known to occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
<a href="#">Calonectris leucomelas</a> Streaked Shearwater [1077]		Species or species habitat known to occur within area
<a href="#">Catharacta skua</a> Great Skua [59472]		Species or species habitat may occur within area
<a href="#">Diomedea antipodensis</a> Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diomedea epomophora</a> Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diomedea exulans</a> Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diomedea gibsoni</a> Gibson's Albatross [64466]	Vulnerable*	Species or species habitat may occur within area
<a href="#">Fregata ariel</a> Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
<a href="#">Fregata minor</a> Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Lathamus discolor</a> Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species



Name	Threatened	Type of Presence
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	habitat known to occur within area  Species or species habitat may occur within area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat known to occur within area
<a href="#">Monarcha trivirgatus</a> Spectacled Monarch [610]		Species or species habitat known to occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat likely to occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Pachyptila turtur</a> Fairy Prion [1066]		Species or species habitat known to occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area
<a href="#">Phoebastria fusca</a> Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
<a href="#">Puffinus carneipes</a> Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
<a href="#">Puffinus griseus</a> Sooty Shearwater [1024]		Species or species habitat likely to occur within area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat known to occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
<a href="#">Sterna albifrons</a> Little Tern [813]		Species or species habitat may occur within area
<a href="#">Thalassarche cauta</a> Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
<a href="#">Thalassarche eremita</a> Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area



Name	Threatened	Type of Presence
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche salvini</a> Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Thinornis rubricollis rubricollis</a> Hooded Plover (eastern) [66726]	Vulnerable*	Species or species habitat may occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
<b>Fish</b>		
<a href="#">Acentronura tentaculata</a> Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
<a href="#">Campichthys tryoni</a> Tryon's Pipefish [66193]		Species or species habitat may occur within area
<a href="#">Corythoichthys amplexus</a> Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
<a href="#">Corythoichthys ocellatus</a> Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area
<a href="#">Festucalex cinctus</a> Girdled Pipefish [66214]		Species or species habitat may occur within area
<a href="#">Filicampus tigris</a> Tiger Pipefish [66217]		Species or species habitat may occur within area
<a href="#">Halicampus grayi</a> Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
<a href="#">Hippichthys cyanospilos</a> Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area
<a href="#">Hippichthys heptagonus</a> Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
<a href="#">Hippichthys penicillus</a> Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
<a href="#">Hippocampus kelloggi</a> Kellogg's Seahorse, Great Seahorse [66723]		Species or species habitat may occur within area
<a href="#">Hippocampus kuda</a> Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area



Name	Threatened	Type of Presence
<a href="#">Hippocampus planifrons</a> Flat-face Seahorse [66238]		Species or species habitat may occur within area
<a href="#">Hippocampus trimaculatus</a> Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
<a href="#">Hippocampus whitei</a> White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area
<a href="#">Lissocampus runa</a> Javelin Pipefish [66251]		Species or species habitat may occur within area
<a href="#">Maroubra perserrata</a> Sawtooth Pipefish [66252]		Species or species habitat may occur within area
<a href="#">Micrognathus andersonii</a> Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area
<a href="#">Micrognathus brevirostris</a> thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area
<a href="#">Microphis manadensis</a> Manado Pipefish, Manado River Pipefish [66258]		Species or species habitat may occur within area
<a href="#">Solegnathus dunckeri</a> Duncker's Pipehorse [66271]		Species or species habitat may occur within area
<a href="#">Solegnathus hardwickii</a> Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
<a href="#">Solegnathus spinosissimus</a> Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
<a href="#">Solenostomus cyanopterus</a> Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
<a href="#">Solenostomus paradoxus</a> Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
<a href="#">Stigmatopora nigra</a> Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
<a href="#">Syngnathoides biaculeatus</a> Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
<a href="#">Trachyrhamphus bicoarctatus</a> Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
<a href="#">Urocampus carinirostris</a> Hairy Pipefish [66282]		Species or species habitat may occur within area
<a href="#">Vanacampus margaritifer</a> Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area

## Mammals



Name	Threatened	Type of Presence
<a href="#">Dugong dugon</a> Dugong [28]		Species or species habitat may occur within area
<b>Reptiles</b>		
<a href="#">Astrotia stokesii</a> Stokes' Seasnake [1122]		Species or species habitat may occur within area
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding known to occur within area
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Hydrophis elegans</a> Elegant Seasnake [1104]		Species or species habitat may occur within area
<a href="#">Lepidochelys olivacea</a> Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Pelamis platurus</a> Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans		[ Resource Information ]
Name	Status	Type of Presence
<b>Mammals</b>		
<a href="#">Balaenoptera acutorostrata</a> Minke Whale [33]		Species or species habitat may occur within area
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat may occur within area
<a href="#">Delphinus delphis</a> Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
<a href="#">Grampus griseus</a> Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species



Name	Status	Type of Presence
<a href="#">Sousa chinensis</a> Indo-Pacific Humpback Dolphin [50]		habitat may occur within area  Species or species habitat likely to occur within area
<a href="#">Stenella attenuata</a> Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
<a href="#">Tursiops aduncus</a> Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
<a href="#">Tursiops truncatus s. str.</a> Bottlenose Dolphin [68417]		Species or species habitat may occur within area

## Extra Information

State and Territory Reserves	[ Resource Information ]
Name	State
Broken Head	NSW

Regional Forest Agreements	[ Resource Information ]
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Note that all areas with completed RFAs have been included.

Name	State
<a href="#">North East NSW RFA</a>	New South Wales

Invasive Species	[ Resource Information ]
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Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
<b>Birds</b>		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur



Name	Status	Type of Presence within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
<b>Frogs</b>		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
<b>Mammals</b>		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
<b>Plants</b>		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area



Name	Status	Type of Presence
Cabomba caroliniana		
Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera		
Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata		
Bitou Bush [16332]		Species or species habitat likely to occur within area
Eichhornia crassipes		
Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana		
Broom [67538]		Species or species habitat may occur within area
Lantana camara		
Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp.		
Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata		
Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Sagittaria platyphylla		
Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis		
Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
<b>Reptiles</b>		
Hemidactylus frenatus		
Asian House Gecko [1708]		Species or species habitat likely to occur within area



# Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

## Coordinates

-28.73987 153.60282



# Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.





## Appendix C

# BSC Vegetation Mapping





# Linnaeus Estate



## Legend

- Land Parcels (Corrected)
- Locality Names
- Road Names
- Council Owned Public Road Reserve (E2016/73688)
- Vegetation 2017
  - Camphor Laurel 51-80%
  - Camphor Laurel >80%
  - Coastal Dune Dry Sclerophyll Forests
  - Coastal Floodplain Wetlands
  - Coastal Freshwater Lagoons
  - Coastal Heath Swamps
  - Coastal Swamp Forests
  - Dry Rainforests
  - Eastern Riverine Forests
  - Exotic
  - Littoral Rainforests
  - Mangrove Swamps
  - Maritime Grassland
  - North Coast Clay Heathlands
  - North Coast Dry Sclerophyll Forests
  - North Coast Wet Sclerophyll Forests
  - Northern Hinterland Wet Sclerophyll Forests
  - Northern Warm Temperate Rainforests
  - Planted Exotic Pine
  - Planted Hoop Pine
  - Planted Landscaping, Mixed
  - Planted Orchard
  - Planted Rainforest
  - Planted Sclerophyll
  - Saltmarshes
  - Seagrass Meadows
  - Subtropical Rainforests
  - Wallum Sand Heaths

685

Meters (Scale @ A4 Size)

Disclaimer : While all reasonable care has been taken to ensure the information contained on this map is up to date, no warranty is given that the information contained on this map is free from error or omission. Any reliance placed on such information shall be at the sole risk of the user. Please verify the accuracy of the information prior to using it. Note : The information shown on this map is a copyright of the Byron Shire Council and the NSW Department of Lands.



1 : 10,000

## Notes

06-May-2020





# Linnaeus Estate south



## Legend

- Land Parcels (Corrected)
- Locality Names
- Road Names
- Council Owned Public Road Reserve (E2016/73688)
- Vegetation 2017
  - Camphor Laurel 51-80%
  - Camphor Laurel >80%
  - Coastal Dune Dry Sclerophyll Forests
  - Coastal Floodplain Wetlands
  - Coastal Freshwater Lagoons
  - Coastal Heath Swamps
  - Coastal Swamp Forests
  - Dry Rainforests
  - Eastern Riverine Forests
  - Exotic
  - Littoral Rainforests
  - Mangrove Swamps
  - Maritime Grassland
  - North Coast Clay Heathlands
  - North Coast Dry Sclerophyll Forests
  - North Coast Wet Sclerophyll Forests
  - Northern Hinterland Wet Sclerophyll Forests
  - Northern Warm Temperate Rainforests
  - Planted Exotic Pine
  - Planted Hoop Pine
  - Planted Landscaping, Mixed
  - Planted Orchard
  - Planted Rainforest
  - Planted Sclerophyll
  - Saltmarshes
  - Seagrass Meadows
  - Subtropical Rainforests
  - Wallum Sand Heaths

Disclaimer : While all reasonable care has been taken to ensure the information contained on this map is up to date, no warranty is given that the information contained on this map is free from error or omission. Any reliance placed on such information shall be at the sole risk of the user. Please verify the accuracy of the information prior to using it. Note : The information shown on this map is a copyright of the Byron Shire Council and the NSW Department of Lands.

685

Meters

( Scale @ A4 Size )



1 : 10,000

07-May-2020

## Notes

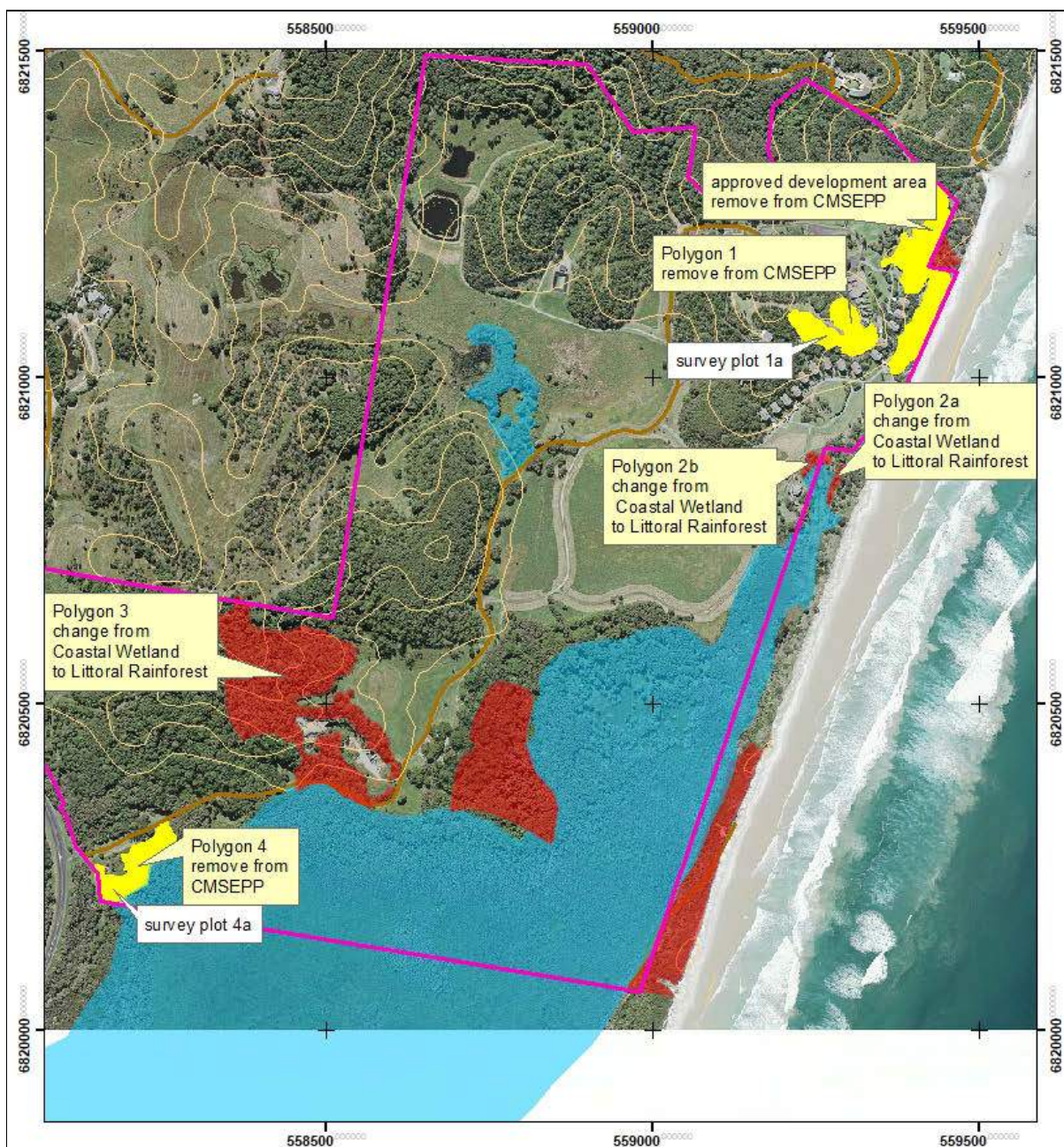




## Appendix D

# SEPP Mapping Amendments (Landmark 2019)





Map 2 Proposed changes - Coastal Management SEPP

**Legend**

- |   |  |
|---|--|
| <span style="display: inline-block; width: 20px; height: 10px; background-color: #00BFFF; border: 1px solid black;"></span> CM SEPP Coastal Wetland     | <span style="display: inline-block; width: 20px; height: 10px; background-color: #FFFF00; border: 1px solid black;"></span> remove |
| <span style="display: inline-block; width: 20px; height: 10px; background-color: #FF0000; border: 1px solid black;"></span> CM SEPP Littoral Rainforest | <span style="display: inline-block; width: 20px; height: 10px; border-bottom: 1px solid brown;"></span> contour                    |
| <span style="display: inline-block; width: 20px; height: 10px; border: 2px solid magenta;"></span> property boundary                                    | <span style="display: inline-block; width: 20px; height: 10px; border-bottom: 2px solid brown;"></span> road                       |











## **Appendix E**

# **Site Photographs**





Plate 1. Modified (underscrubbed and mown) Coast Banksia dominated littoral rainforest in north west of Precinct A where 4 x 'B group' cabins are proposed



Plate 2. Detail from Plate 1



Plate 3. Modified (underscrubbed and mown) Coast Banksia dominated littoral rainforest where the treehouse ('A group') cabins are proposed





Plate 4. Vegetation flanking the watercourse behind the refuge building, which requires removal for the APZ



Plate 5. Patch of littoral rainforest (one of several 'island' patches within mown grassland) in the north-east of Precinct A. Habitat for White Lace Flower, Stinking Cryptocarya, Native Guava. No development proposed



Plate 6. Planted trees at the quarry (Precinct B) entrance. The two trees circled in red will be removed





## **Appendix F**

### **Floristics Data**



Plot 1							
Date	25/09/2019						
Zone	Datum	Survey Name	Zone ID				
56	MGA94	Linnaeus	1				
Easting	Northing	Recorders	IBRA region	Plot dimensions	Photo #	Midline bearing from 0 m (magnetic °)	
559288	6821192	ILC/DGH	SEQ	10 x 100	1, 2	277	

		Confidence	
Vegetation Class	Rainforest	High	
Plant Community Type	1275	High	EEC? Yes
Plant Community Name	Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion		

BAM Attribute (400 m² plot)		Sum values	Codes for formulas
Count of Native Richness	Trees	15	
	Shrubs	4	
	Grasses etc.	2	
	Forbs	2	
	Ferns	1	
	Other	10	
Sum of Cover of native vascular plants by growth form group	Trees	44.8	
	Shrubs	6.8	
	Grasses etc.	10.5	
	Forbs	0.4	
	Ferns	0.1	
	Other	9	
High Threat Exotic cover		82.1	
			Tree (TG)
			Shrub (SG)
			Grass & grasslike (GG)
			Forb (FG)
			Fern (EG)
			Other (OG)
			N
			E
			HTE

BAM Attribute (1000 m² plot)			
DBH	# Tree Stems Count	# Stems with Hollows	
80 + cm	0		0
50 - 79 cm	1		0
30 - 49 cm	Absent		0
20 - 29 cm	Present		0
10 - 19 cm	Present		0
5 - 9 cm	Present		0
< 5 cm	Present	n/a	
Length of logs (m) (≥ 10 cm in diameter, >50cm in length)			7

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogram cover (%)					Rock cover (%)				
Subplot score (% in each)	10	45	65	45	75															
Average of the 5 subplots	48					#DIV/0!					#DIV/0!					#DIV/0!				

GF Code	Species name	N,E or HTE	Cover	Abund	stratum	voucher
Natives below this line (see row 89 for exotics). NB search for species in "Native Species by Growth Form" sheet and copy/paste exact spelling of species name.						
Tree (TG)	Commersonia bartramia	N	12	4	U	
Tree (TG)	Banksia integrifolia	N	15	10	U	
Tree (TG)	Cupaniopsis anacardioides	N	7	10	U	
Shrub (SG)	Acronychia imperforata	N	1.6	3	M	
Tree (TG)	Acacia melanoxylon	N	0.5	5	M	
Forb (FG)	Centella asiatica	N	0.3	100	G	
Grass & grasslike (GG)	Cynodon dactylon	N	10	200	G	
Other (OG)	Smilax australis	N	5	30	M	
Shrub (SG)	Austromyrtus dulcis	N	0.1	1	G	
Other (OG)	Hibbertia scandens	N	0.1	1	G	
Forb (FG)	Pratia purpurascens	N	0.1	5	G	
Other (OG)	Geitonoplesium cymosum	N	0.1	5	G	
Other (OG)	Muellerina celastroides	N	1	2	M	
Fern (EG)	Platynerium bifurcatum	N	0.1	2	M	
Other (OG)	Stephania japonica	N	0.1	1	G	
Tree (TG)	Cryptocarya triplinervis	N	1	10	M	
Other (OG)	Cissus antarctica	N	2	5	M	
Tree (TG)	Guioa semiglauc	N	5.3	3	M	
Tree (TG)	Litsea australis	N	0.1	1	M	
Grass & grasslike (GG)	Oplismenus undulatifolius	N	0.5	100	G	
Shrub (SG)	Ficus coronata	N	5	1	M	
Tree (TG)	Sterculia quadrifida	N	0.1	1	G	
Tree (TG)	Glochidion sumatranum	N	1	1	U	
Tree (TG)	Mallotus philippensis	N	0.1	1	M	
Tree (TG)	Polyscias elegans	N	1	2	M	
Other (OG)	Cyathea cooperi	N	0.1	1	M	
Tree (TG)	Tristania laurina	N	1	1	M	
Other (OG)	Glycine clandestina	N	0.1	1	G	
Shrub (SG)	Synoum glandulosum subsp. glandulosu	N	0.1	1	M	
Tree (TG)	Cryptocarya obovata	N	0.1	1	M	
Other (OG)	Archontophoenix cunninghamiana	N	0.4	2	M	
Other (OG)	Parsonia straminea	N	0.1	1	M	
Tree (TG)	Syzygium luehmannii	N	0.1	1	M	
Tree (TG)	Euroschinus falcatus var. falcatus	N	0.5	1	M	
GF Code	Species name	N,E or HTE	Cover	Abund	stratum	voucher
Exotics (both E and HTE) below this line. NB search for species in "High Threat Weeds" sheet and if a match, copy/paste exact spelling of species name.						
	Setaria sphacelata	E	1	20	G	
	Hypochaeris radicata	E	0.1	10	G	
	Ageratina riparia	HTE	0.1	50	G	



	Paspalum mandiocanum	HTE	70	500	G	
	Cenchrus clandestinum	HTE	10	200	G	
	Solanum capsicoides	E	0.1	2	G	
	Solanum mauritianum	E	0.1	1	G	
	Gomphocarpus physocarpus	E	0.1	5	G	
	Bromus catharticus	E	0.1	1	G	
	Cinnamomum camphora	HTE	0.5	1	M	
	Lantana camara	HTE	1	10	M	
	Passiflora suberosa	HTE	0.1	3	G	
	Ageratina adenophora	HTE	0.1	1	G	
	Asparagus aethiopicus	HTE	0.1	1	G	
	Bidens spp.	HTE	0.1	5	G	
	Ageratum houstonianum	E	0.1	5	G	
	Macroptilium atropurpureum	E	0.1	5	G	
	Senna pendula	HTE	0.1	5	G	
	Sida rhombifolia	E	0.1	1	G	
	Ficus benjamina	E	2.5	1	U	
		E				



Plot 2						
Date 25/09/2019						
Zone 56	Datum MGA94	Survey Name Linnaeus	Zone ID 2			
Easting 559215	Northing 6821131	Recorders ILC & DGH	IBRA region SEQ	Plot dimensions 20 x 50	Photo # 1, 2	Midline bearing from 0 m (magnetic °) 265

Vegetation Class		Confidence	EEC? Yes
Rainforest		High	
Plant Community Type 1275		High	
Plant Community Name Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion			

BAM Attribute (400 m <sup>2</sup> plot)		Sum values	Codes for formulas
Count of Native Richness	Trees	11	
	Shrubs	9	
	Grasses etc.	4	
	Forbs	1	
	Ferns	2	
	Other	6	
Sum of Cover of native vascular plants by growth form group	Trees	23.4	
	Shrubs	12.6	
	Grasses etc.	3.7	
	Forbs	0.2	
	Ferns	2.7	
	Other	4.3	
High Threat Exotic cover		42.2	
			N
			E
			HTE

BAM Attribute (1000 m <sup>2</sup> plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm	0	0
50 - 79 cm	0	0
30 - 49 cm	Present	0
20 - 29 cm	Present	0
10 - 19 cm	Present	0
5 - 9 cm	Present	0
< 5 cm	Present	n/a
Length of logs (m) (≥ 10 cm in diameter, >50cm in length)		8.6

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogram cover (%)					Rock cover (%)				
Subplot score (% in each)	90	95	95	95	90															
Average of the 5 subplots	93					#DIV/0!					#DIV/0!					#DIV/0!				

GF Code	Species name	N,E or HTE	Cover	Abund	stratum	voucher
Natives below this line (see row 89 for exotics). NB search for species in "Native Species by Growth Form" sheet and copy/paste exact spelling of species name.						
Tree (TG)	Banksia integrifolia	N	8	6	U	
Shrub (SG)	Duboisia myoporoides	N	3.5	7	U	
Grass & grasslike (GG)	Lomandra longifolia	N	2	25	G	
Forb (FG)	Dianella caerulea	N	0.2	5	G	
Tree (TG)	Cupaniopsis anacardioides	N	11	20	U	
Shrub (SG)	Acronychia imperforata	N	3	5	M	
Shrub (SG)	Zieria smithii	N	0.7	20	G	
Tree (TG)	Acacia melanoxylon	N	0.1	2	M	
Other (OG)	Smilax australis	N	3	10	M	
Grass & grasslike (GG)	Oplismenus undulatifolius	N	0.5	20	G	
Tree (TG)	Commersonia bartramia	N	0.5	1	U	
Fern (EG)	Pteridium esculentum	N	2.2	20	G	
Other (OG)	Geitonoplesium cymosum	N	0.2	20	G	
Other (OG)	Marsdenia lloydii	N	0.4	5	M	
Shrub (SG)	Austromyrtus dulcis	N	0.3	20	G	
Grass & grasslike (GG)	Entolasia stricta	N	0.2	2	G	
Grass & grasslike (GG)	Gahnia aspera	N	1	10	G	
Fern (EG)	Blechnum cartilagineum	N	0.5	20	G	
Tree (TG)	Guioa semiglaucula	N	2	2	U	
Shrub (SG)	Exocarpos latifolius	N	3	5	M	
Tree (TG)	Glochidion sumatranum	N	0.2	1	M	
Shrub (SG)	Rhodomyrtus psidioides	N	0.3	50	G	
Shrub (SG)	Pittosporum revolutum	N	0.1	1	M	
Other (OG)	Hibbertia scandens	N	0.5	10	G	
Shrub (SG)	Persoonia stradbrokeensis	N	1.5	1	M	
Tree (TG)	Cryptocarya foetida	N	0.1	1	G	
Shrub (SG)	Plidlostigma glabrum	N	0.2	1	M	
Other (OG)	Dioscorea transversa	N	0.1	1	M	
Tree (TG)	Melicope elleryana	N	1	1	M	
Other (OG)	Stephania japonica	N	0.1	1	G	
Tree (TG)	Bridelia exaltata	N	0.2	1	U	
Tree (TG)	Polyscias elegans	N	0.2	1	U	
Tree (TG)	Mallotus discolor	N	0.1	1	M	
GF Code	Species name	N,E or HTE	Cover	Abund	stratum	voucher
Exotics (both E and HTE) below this line. NB search for species in "HighThreatWeeds" sheet and if a match, copy/paste exact spelling						
	Paspalum mandiocanum	HTE	40	100	G	
	Lantana camara	HTE	2	10	G	
	Ageratina adenophora	HTE	0.1	10	G	
	Setaria sphacelata	E	1.5	30	G	
	Ochna serrulata	HTE	0.1	1	G	
	Gomphocarpus physocarpus	E	0.1	1	G	



Plot 3					
Date28/11/2019					
Zone56	DatumMGA94	Survey NameLinnaeus	Zone ID3		
Easting5605512	Northing6821172	RecordersILC & DGH	IBRA region (SEQ	Plot dimensions20 x 50	Photo #1, 2
				Midline bearing from 0 m (magnetic °)	97

		Confidence	
Vegetation Class	Rainforest	Medium	
Plant Community Type	1275 (derived)	Medium	EEC? Yes
Plant Community Name	Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion		

BAM Attribute (400 m² plot)		Sum values	Codes for formulas Tree (TG) Shrub (SG) Grass & grasslike (GG) Forb (FG) Fern (EG) Other (OG) N E HTE
Count of Native Richness	Trees	4	
	Shrubs	1	
	Grasses etc.	0	
	Forbs	1	
	Ferns	0	
	Other	2	
Sum of Cover of native vascular plants by growth form group	Trees	46.1	
	Shrubs	5	
	Grasses etc.	0	
	Forbs	0.1	
	Ferns	0	
	Other	0.3	
High Threat Exotic cover		60.2	

BAM Attribute (1000 m² plot)		
	# Tree Stems Count	# Stems with Hollows
DBH		
80 + cm	0	0
50 - 79 cm	0	0
30 - 49 cm	Present	0
20 - 29 cm	Present	1
10 - 19 cm	Present	0
5 - 9 cm	Present	0
< 5 cm	Present	n/a
Length of logs (m) (≥ 10 cm in diameter, >50cm in length)		0.6

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogram cover (%)					Rock cover (%)				
Subplot score (% in each)	10	8	85	20	15															
Average of the 5 subplots	27.6					#DIV/0!					#DIV/0!					#DIV/0!				

GF Code	Species name	N,E or HTE	Cover	Abund	stratum	voucher
Natives below this line (see row 89 for exotics). NB search for species in "Native Species by Growth Form" sheet and copy/paste exact spelling of species name.						
Shrub (SG)	Duboisia myoporoides	N	5	2	U	
Tree (TG)	Cupaniopsis anacardioides	N	0.1	1	M	
Tree (TG)	Banksia integrifolia	N	35	20	U	
Other (OG)	Smilax australis	N	0.1	1	G	
Other (OG)	Muellerina celastroides	N	0.2	2	M	
Tree (TG)	Commersonia bartramia	N	10	3	U	
Forb (FG)	Centella asiatica	N	0.1	20	G	
Tree (TG)	Melicope elleryana	N	1	1	U	
GF Code	Species name	N,E or HTE	Cover	Abund	stratum	voucher
Exotics (both E and HTE) below this line. NB search for species in "HighThreatWeeds" sheet and if a match, copy/paste exact spelling of species name						
	Setaria sphacelata	E	35	100	G	
	Cenchrus clandestinum	HTE	50	200	G	
	Paspalum mandiocanum	HTE	10	50	G	
	Bidens spp.	HTE	0.1	20	G	
	Ageratum houstonianum	E	0.1	20	G	
	Gomphocarpus physocarpus	E	0.1	20	G	
	Emilia sonchifolia	E	0.1	10	G	
	Sida rhombifolia	E	0.1	1	G	
	Cinnamomum camphora	HTE	0.1	1	G	
	Solanum mauritianum	E	0.1	1	G	
	Conyza bonariensis	E	0.1	1	G	



Plot 4						
Date 28/11/2019						
Zone 56	Datum MGA94	Survey Name Linnaeus	Zone ID 4			
Easting 559358	Northing 6821168	Recorders ILC & DGH	IBRA region SEQ	Plot dimensions 20 x 50	Photo # 1, 2	Midline bearing from 0 m (magnetic <sup>0</sup> ) 32

		Confidence	
Vegetation Class	Rainforest	High	
Plant Community Type	1275	High	EEC? Yes
Plant Community Name	Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion		

BAM Attribute (400 m <sup>2</sup> plot)		Sum values	Codes for formulas Tree (TG) Shrub (SG) Grass & grasslike (GG) Forb (FG) Fern (EG) Other (OG) N E HTE
Count of Native Richness	Trees	8	
	Shrubs	9	
	Grasses etc.	1	
	Forbs	1	
	Ferns	0	
	Other	5	
Sum of <b>Cover</b> of native vascular plants by growth form group	Trees	20.5	
	Shrubs	33	
	Grasses etc.	45	
	Forbs	0.5	
	Ferns	0	
	Other	0.6	
High Threat Exotic cover		5.9	

BAM Attribute (1000 m <sup>2</sup> plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm	0	0
50 - 79 cm	0	0
30 - 49 cm	Present	0
20 - 29 cm	Present	0
10 - 19 cm	Present	0
5 - 9 cm	Present	0
< 5 cm	Present	n/a
Length of logs (m) (≥ 10 cm in diameter, >50cm in length)		10.7

BAM Attribute (1 x 1 m plots)	Litter cover (%)				Bare ground cover (%)				Cryptogram cover (%)				Rock cover (%)			
Subplot score (% in each)	98	2	100	4	95											
Average of the 5 subplots	59.8				#DIV/0!				#DIV/0!				#DIV/0!			

GF Code	Species name	N,E or HTE	Cover	Abund	stratum	voucher
Natives below this line (see row 89 for exotics). NB search for species in "Native Species by Growth Form" sheet and copy/paste exact spelling of species name.						
Grass & grasslike (GG)	Cynodon dactylon	N	45	220	G	
Shrub (SG)	Duboisia myoporoides	N	2	2	M	
Tree (TG)	Banksia integrifolia	N	0.2	10	U	
Tree (TG)	Cupaniopsis anacardioides	N	3.5	5	U	
Shrub (SG)	Acacia longifolia subsp. sophorae	N	0.5	2	M	
Shrub (SG)	Monotoca elliptica	N	0.1	1	M	
Shrub (SG)	Rhodomyrtus psidioides	N	0.1	10	G	
Tree (TG)	Flindersia bennettiana	N	7	4	U	
Other (OG)	Hibbertia scandens	N	0.1	5	G	
Forb (FG)	Dianella caerulea	N	0.5	5	G	
Tree (TG)	Cryptocarya triplinervis	N	0.6	5	M	
Other (OG)	Smilax australis	N	0.2	5	G	
Tree (TG)	Arytera divaricata	N	4	1	U	
Tree (TG)	Cryptocarya foetida	N	0.1	3	G	
Shrub (SG)	Syzygium oleosum	N	10	1	U	
Other (OG)	Geltonoplesium cymosum	N	0.1	1	G	
Shrub (SG)	Acronychia imperforata	N	20	10	U	
Other (OG)	Archontophoenix cunninghamiana	N	0.1	1	G	
Shrub (SG)	Exocarpos latifolius	N	0.1	1	M	
Tree (TG)	Notelaea longifolia	N	0.1	2	M	
Shrub (SG)	Myrsine variabilis	N	0.1	1	M	
Tree (TG)	Archidendron hendersonii	N	5	1	U	
Shrub (SG)	Alectryon coriaceus	N	0.1	1	G	
Other (OG)	Parsonsia straminea	N	0.1	1	M	
GF Code	Species name	N,E or HTE	Cover	Abund	stratum	voucher
Exotics (both E and HTE) below this line. NB search for species in "HighThreatWeeds" sheet and if a match, copy/paste exact spelling of species name						
	Asparagus aethiopicus	HTE	0.1	5	G	
	Cenchrus clandestinum	HTE	0.5	10	G	
	Lantana camara	HTE	0.1	10	M	
	Stenotaphrum secundatum	HTE	5	50	G	
	Paspalum mandiocanum	HTE	0.2	10	G	
	Sida rhombifolia	E	0.1	1	G	
	Solanum mauritianum	E	0.1	1	G	
	Bromus catharticus	E	0.1	1	G	



Plot 5							
Date	29/11/2019						
Zone	Datum	Survey Name	Zone ID				
56	MGA94	Linnaeus	5				
Easting	Northing	Recorders	IBRA region	Plot dimensions	Photo #	Midline bearing from 0 m (magnetic <sup>0</sup> )	
559085	6821205	ILC & DGH	SEQ	20 x 50	1, 2	84	

		Confidence	
Vegetation Class	Rainforest	High	
Plant Community Type	1275	High	EEC? Yes
Plant Community Name	Tuckeroo - Riberry - Yellow Tulipwood littoral rainforest of the NSW North Coast Bioregion		

BAM Attribute (400 m <sup>2</sup> plot)		Sum values	Codes for formulas
Count of Native Richness	Trees	9	
	Shrubs	6	
	Grasses etc.	4	
	Forbs	1	
	Ferns	1	
	Other	8	
Sum of Cover of native vascular plants by growth form group	Trees	42.5	
	Shrubs	2.5	
	Grasses etc.	0.9	
	Forbs	0.1	
	Ferns	0.1	
	Other	3.4	
High Threat Exotic cover		85.5	
			Tree (TG)
			Shrub (SG)
			Grass & grasslike (GG)
			Forb (FG)
			Fern (EG)
			Other (OG)
			N
			E
			HTE

BAM Attribute (1000 m <sup>2</sup> plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm	0	0
50 - 79 cm	0	0
30 - 49 cm	Absent	0
20 - 29 cm	Present	0
10 - 19 cm	Present	0
5 - 9 cm	Present	0
< 5 cm	Present	n/a
Length of logs (m) (≥ 10 cm in diameter, >50cm in length)		28.6

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogram cover (%)					Rock cover (%)				
Subplot score (% in each)	75	15	5	70	20															
Average of the 5 subplots	37					#DIV/0!					#DIV/0!					#DIV/0!				

GF Code	Species name	N,E or HTE	Cover	Abund	stratum	voucher
Natives below this line (see row 89 for exotics). NB search for species in "Native Species by Growth Form" sheet and copy/paste exact spelling of species name.						
Fern (EG)	Pteridium esculentum	N	0.1	10	G	
Tree (TG)	Cupaniopsis anacardioides	N	30	20	U	
Shrub (SG)	Austromyrtus dulcis	N	0.2	20	G	
Other (OG)	Smilax australis	N	0.2	20	G	
Tree (TG)	Guioa semiglauc	N	0.1	1	M	
Other (OG)	Hibbertia scandens	N	2	20	M	
Tree (TG)	Mallotus philippensis	N	0.1	1	M	
Tree (TG)	Banksia integrifolia	N	4	5	M	
Shrub (SG)	Zieria smithii	N	1	50	G	
Other (OG)	Cassytha glabella	N	0.2	20	M	
Tree (TG)	Commersonia bartramia	N	0.2	5	M	
Other (OG)	Maclura cochinchinensis	N	0.5	5	M	
Other (OG)	Eustrephus latifolius	N	0.1	10	G	
Grass & grasslike (GG)	Lomandra longifolia	N	0.5	5	G	
Grass & grasslike (GG)	Cynodon dactylon	N	0.1	1	G	
Grass & grasslike (GG)	Gahnia aspera	N	0.2	2	G	
Other (OG)	Marsdenia lloydii	N	0.2	5	M	
Other (OG)	Muellerina celastroides	N	0.1	1	M	
Shrub (SG)	Pittosporum undulatum	N	0.1	3	G	
Tree (TG)	Polyscias elegans	N	1.1	3	U	
Grass & grasslike (GG)	Entolasia stricta	N	0.1	1	G	
Tree (TG)	Alphitonia excelsa	N	4	1	U	
Other (OG)	Geitonoplesium cymosum	N	0.1	10	G	
Tree (TG)	Melicope elleryana	N	1	1	U	
Shrub (SG)	Exocarpos latifolius	N	0.1	1	M	
Shrub (SG)	Duboisia myoporoides	N	1	2	M	
Forb (FG)	Dianella caerulea	N	0.1	2	G	
Tree (TG)	Cyclophyllum longipetalum	N	2	3	G	
Shrub (SG)	Rhodamnia rubescens	N	0.1	1	M	
GF Code	Species name	N,E or HTE	Cover	Abund	stratum	voucher
Exotics (both E and HTE) below this line. NB search for species in "HighThreatWeeds" sheet and if a match, copy/paste exact spelling of species name						
	Melinis minutiflora	HTE	65	300	G	
	Setaria sphacelata	E	7	20	G	
	Gomphocarpus physocarpus	E	0.1	5	G	
	Ageratina adenophora	HTE	5	100	G	
	Paspalum mandiocanum	HTE	15	100	G	
	Lantana camara	HTE	0.1	3	G	
	Senna pendula	HTE	0.1	1	G	
	Ageratum houstonianum	E	0.1	20	G	
	Andropogon virginicus	HTE	0.2	2	G	
	Chrysanthemoides monilifera subsp. rotundifolia	HTE	0.1	1	G	





## Appendix G

# Vegetation Integrity Scores



A summary of plot data is provided at **Tables G.1 to G.3.**

**Table G.1 Plot Data Summary – Native Species Richness**

<i>Plot</i>	<i>PCT</i>	<i>Trees</i>	<i>Shrubs</i>	<i>Grasses etc</i>	<i>Forbs</i>	<i>Ferns</i>	<i>Other</i>
1	1275	15	4	2	2	1	10
2	1275	11	9	4	1	2	6
3	1275	4	1	0	1	0	2
4	1275	8	9	1	1	0	5
5	1275	9	6	4	1	1	8

**Table G.2 Plot Data Summary – Native Species Cover**

<i>Plot</i>	<i>PCT</i>	<i>Trees</i>	<i>Shrubs</i>	<i>Grasses etc</i>	<i>Forbs</i>	<i>Ferns</i>	<i>Other</i>	<i>THE*</i>
1	1275	44.8	6.8	10.5	0.4	0.1	9	82.1
2	1275	23.4	12.6	3.7	0.2	2.7	4.3	42.2
3	1275	46.1	5	0	0.1	0	0.3	60.2
4	1275	20.5	33	45	0.5	0	0.6	5.9
5	1275	42.5	2.5	0.9	0.1	0.1	3.4	85.5

\*THE = High Threat Exotic

**Table G.3 Plot Data Summary – Structural Attributes**

<i>Plot</i>	<i>PCT</i>	<i>No. large trees</i>	<i>Hollow-bearing trees</i>	<i>Litter cover</i>	<i>Total log length</i>
1	1275	1	0	48	7
2	1275	0	0	93	8.6
3	1275	0	1	27.6	0.6
4	1275	0	0	59.8	10.7
5	1275	0	0	37	28.6

Data from all plots was entered into the BAM-Calculator; Vegetation Integrity Scores were determined as shown at **Table G.4.**

**Table G.4 Vegetation Integrity Scores**

<i>Plot</i>	<i>PCT</i>	<i>Vegetation Integrity Score</i>
1	1275 – Zone 1	45.9
2	1275 – Zone 2	37.4
3	1275 – Zone 3	19
4	1275 – Zone 4	40.9
5	1275 – Zone 5	41.1





## **Appendix H**

# **Fauna Inventory**



**Table H1. Fauna Inventory**

Scientific Name	Common Name	Record
<b>Amphibians</b>		
<i>Bufo marinus</i> *	Cane Toad	O
<i>Crinia signifera</i>	Common Eastern Froglet	C
<i>Limnodynastes peroni</i>	Striped Marsh Frog	C
<b>Reptiles</b>		
<i>Cryptoblepharus virgatus</i>	Striped Wall Skink	O
<i>Hemidactylus frenatus</i> *	Asian House Gecko	C
<i>Lampropholis delicata</i>	Grass Skink	O
<i>Morelia spilota</i>	Carpet Python	O
<i>Pogona barbata</i>	Bearded Dragon	O
<b>Birds</b>		
<i>Acanthiza pusilla</i>	Brown Thornbill	C
<i>Acridotheres tristis</i> *	Common Myna	O
<i>Acrocephalus australis</i>	Australian Reed-Warbler	O
<i>Alectura lathamii</i>	Australian Brush-turkey	O
<i>Anas superciliosa</i>	Pacific Black Duck	O
<i>Anthochaera chrysoptera</i>	Little Wattlebird	O
<i>Anthus novaeseelandiae</i>	Australasian Pipit	O
<i>Artamus leucorhynchus</i>	White-breasted Woodswallow	O
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	O
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	C
<i>Calyptrorhynchus funereus</i>	Yellow-tailed Black-cockatoo	O
<i>Calyptrorhynchus lathamii</i> ^	Glossy Black-cockatoo	O
<i>Centropus phasianinus</i>	Pheasant Coucal	C
<i>Chenonetta jubata</i>	Australian Wood Duck	O
<i>Chroicocephalus novaehollandiae</i>	Silver Gull	O
<i>Chrysococcyx lucidus</i>	Shining Bronze-cuckoo	C
<i>Cisticola exilis</i>	Golden-headed Cisticola	C
<i>Colluricincla harmonica</i>	Grey Shrike-Thrush	C
<i>Columba leucomela</i>	White-headed Pigeon	O
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	C
<i>Corvus orru</i>	Torresian Crow	O
<i>Cracticus nigrogularis</i>	Pied Butcherbird	O
<i>Cracticus tibicen</i>	Australian Magpie	O
<i>Cracticus torquatus</i>	Grey Butcherbird	O
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	O
<i>Dicaeum hirundinaceum</i>	Mistletoe Bird	C
<i>Dicrurus bracteatus</i>	Spangled Drongo	O
<i>Egretta novaehollandiae</i>	White-faced Heron	O
<i>Eolophus roseicapilla</i>	Galah	O
<i>Eopsaltria australis</i>	Eastern Yellow Robin	C
<i>Eurystomus orientalis</i>	Dollarbird	O
<i>Geopelia humeralis</i>	Bar-shouldered Dove	O
<i>Gerygone olivacea</i>	White-throated Gerygone	C
<i>Glossopsitta concinna</i>	Musk Lorikeet	C
<i>Grallina cyanoleuca</i>	Magpie Lark	O



Scientific Name	Common Name	Record
<i>Haliaeetus leucogaster</i> ^	White-bellied Sea-eagle	O
<i>Haliastur indus</i>	Brahminy Kite	O
<i>Hirundo neoxena</i>	Welcome Swallow	O
<i>Lalage leucomela</i>	Varied Triller	O
<i>Lichmera indistincta</i>	Brown Honeyeater	O
<i>Lopholaimus antarcticus</i>	Topknot Pigeon	O
<i>Manorina melanocephala</i>	Noisy Miner	O
<i>Megalurus timoriensis</i>	Tawny Grassbird	C
<i>Meliphaga lewinii</i>	Lewin's Honeyeater	O
<i>Merops ornatus</i>	Rainbow Bee-eater	O
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	C
<i>Myzomela sanguinolenta</i>	Scarlet Honeyeater	O
<i>Neochmia temporalis</i>	Red-browed Finch	O
<i>Ocyphaps lophotes</i>	Crested Pigeon	O
<i>Oriolus sagittatus</i>	Olive-backed Oriole	C
<i>Pachycephala pectoralis</i>	Golden Whistler	O
<i>Pardalotus striatus</i>	Striated Pardalote	C
<i>Philemon corniculatus</i>	Noisy Friarbird	O
<i>Phylidonyris niger</i>	White-cheeked Honeyeater	C
<i>Platycercus eximius</i>	Eastern Rosella	O
<i>Psophodes olivaceus</i>	Eastern Whipbird	C
<i>Rhipidura albiscapa</i>	Grey Fantail	O
<i>Rhipidura leucophrys</i>	Willie Wagtail	O
<i>Rhipidura rufifrons</i>	Rufous Fantail	O
<i>Sericornis frontalis</i>	White-browed Scrubwren	O
<i>Sphecotheres vieilloti</i>	Australasian Figbird	O
<i>Strepera graculina</i>	Pied Currawong	O
<i>Symposiachrus trivirgatus</i>	Spectacled Monarch	C
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	O
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	O
<i>Vanellus miles</i>	Masked Lapwing	O
<i>Zosterops lateralis</i>	Eastern Silvereye	C
<b>Mammals</b>		
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	A
<i>Miniopterus australis</i> ^	Little Bent-winged Bat	A
<i>Perameles nasuta</i>	Long-nosed Bandicoot	O
<i>Pteropus poliocephalus</i> ^	Grey-headed Flying-fox	O
<i>Rhinolophus megaphyllus</i>	Eastern Horseshoe Bat	A
<i>Saccolaimus flaviventris</i> ^	Yellow-bellied Sheath-tail-Bat	A
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	O
<i>Trichosurus vulpecula</i>	Common Brushtail Possum	O
<i>Vulpes 13ulrus</i> *	Red Fox	S
<i>Wallabia bicolor</i>	Swamp Wallaby	O

C= Call; O = Observed; A = Anabat; S = Scat

\*Introduced species

^ Threatened species (BC Act)





## **Appendix I**

# **Anabat Analysis**





## Microbat Call Identification Report

<b>Prepared for ("Client"):</b>	Geolink
<b>Survey location/project name:</b>	Linnaeus (Broken Head)
<b>Survey dates:</b>	16-22 April 2020
<b>Client project reference:</b>	3080
<b>Job no.:</b>	GEO-2001
<b>Report date:</b>	5 May 2020

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## Methods

### Data received & post processing

Balance environmental received five raw ZCA files and associated LOG files recorded by an Anabat Express bat-detector (Titley Scientific, Brisbane) on the nights of 16<sup>th</sup>, 17<sup>th</sup>, 20<sup>th</sup> and 22<sup>nd</sup> April 2020. *Anabat Insight* (version 1.9.2; Titley Scientific) was used to convert the raw ZCA files to call sequence files (ZC files) and filter out non-bat background noise.

### Call analysis and species identification

All ZC files that passed the noise filter were processed manually in *Anabat Insight*. Calls were identified by reviewing call spectrograms and derived metrics and comparing them with a set of regionally relevant reference calls and published call descriptions (Reinhold *et al.* 2001; Pennay *et al.* 2004).

### Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003), available on-line at <http://www.ausbats.org.au/>.

Species nomenclature follows Reardon *et al.* (2015).

## Results & Discussion

The detector deployment summary (**Table 1**) was derived from metadata recorded in the LOG files. No positional data were recorded by the detector on the night of 16<sup>th</sup> April, so it was not possible to determine if the calls recorded that night were from the same general survey location as those recorded on subsequent nights. Time-stamps indicate the detector was set to record continuously for short periods in the early evening of the 17<sup>th</sup> and 20<sup>th</sup> April; whereas detection occurred throughout the night from dusk until dawn on the night of 16<sup>th</sup> April. On the night of 22<sup>nd</sup> April, detection appears to have been undertaken at two locations, the first of which involved continuous detection between 6:45PM and 8:04PM, after which the unit was moved to a different location where it was left to record for the remainder of the night.

**Table 1** Summary of detector deployment based on metadata derived from LOG files in.

Date	Time		Recording mode	Position	
	Start	End		Latitude	Longitude
16/04/2020	4:56:15 PM	6:34:38 AM	night		
17/04/2020	7:33:04 PM	7:45:00 PM	continuous	-28.68727	153.44112
20/04/2020	5:58:04 PM	7:16:50 PM	continuous	-28.74236	153.5998
22/04/2020	6:45:00 PM	8:04:33 PM	continuous	-28.73504	153.60673
22/04/2020	8:05:02 PM	6:38:06 AM	night	-28.74262	153.60012



The ZCA conversion process yielded 2246 ZC sequence files; however, only 27 of those files contained identifiable bat calls. Eighteen of those calls were positively identified to species level, while the other nine “unresolved” calls had characteristics potentially attributable to two or more species.

Four species were reliably identified (see **Table 2**), two of which (*Miniopterus australis* and *Saccolaimus flaviventris*) are listed threatened species under the NSW *Biodiversity Conservation Act 2016* (BCA).

Most of the “unresolved” calls had characteristic frequency (Fc) around 28-30 kHz and probably belonged to *Chalinolobus gouldii*, but the poor recording quality (brief and/or noisy and/or fragmented sequences) meant that *Ozimops ridei* could not be excluded as a possible contributor of those calls.

Two “unresolved” calls had steep, almost linear pulses terminating around 35-40 kHz. Such calls are often difficult to identify reliably and are typical of both *Nyctophilus* species and *Myotis macropus*. It is highly probable that both calls were from *M. macropus*, based on variable pulse shapes and slopes, as well as the low terminal frequencies of most pulses.

Sample call spectrograms of all recorded call types are shown in **Appendix 1**. Technical terms used in the above call descriptions are explained in the Glossary.

**Table 2** Bats recorded during the Linnaeus survey, 16-22 April 2020.  
Number of calls identified per species per night

Night:	16/4	20/4	22/4 early	22/4 overnight	Species total
<b>Positively identified calls</b>					
<i>Chalinolobus gouldii</i>	4	1	1		6
<i>Miniopterus australis</i>				8	8
<i>Rhinolophus megaphyllus</i>				2	2
<i>Saccolaimus flaviventris</i>	2				2
<b>Unresolved calls</b>					
<i>C. gouldii</i> or <i>Ozimops ridei</i>	5		2		7
<i>Myotis macropus</i> or <i>Nyctophilus</i> sp.	2				2
Detector-night total	13	1	3	10	27

## References

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- Pennay, M., Law, B., and Reinhold, L. (2004). Bat calls of New South Wales: Region based guide to echolocation calls of Microchiropteran bats. NSW Department of Environment and Conservation, Hurstville.
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- van Dyck, S., Gynther, I. and Baker, A. (ed.) (2013). Field Companion to the Mammals of Australia. New Holland; Sydney.

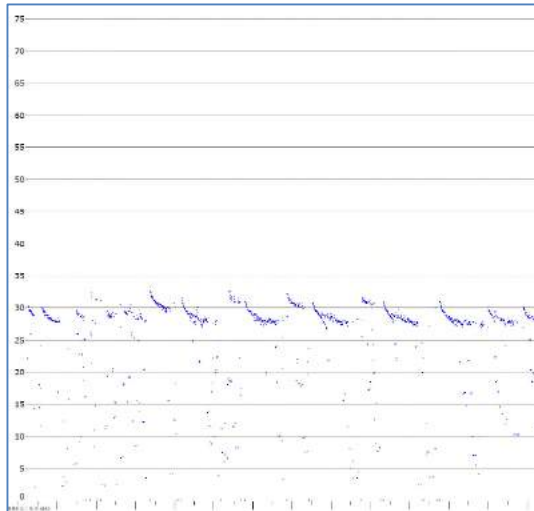


## Glossary

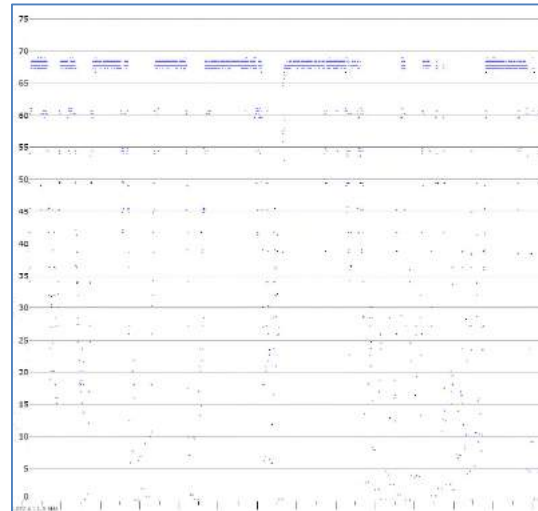
Approach phase	The part of a bat <i>call</i> emitted as the bat starts to home in on a detected prey item; a transitional series of <i>pulses</i> between the <i>search phase</i> and <i>feeding buzz</i> , that become progressively steeper and shorter in duration.
Call	Refers to a single bat call, made up of a series of individual sound <i>pulses</i> in one or more <i>phases</i> ( <i>search, approach, feeding buzz</i> ).
CF (=Constant Frequency)	A type of <i>pulse</i> in which the dominant component consists of a more-or-less 'pure tone' of sound at a Constant Frequency; with <i>shape</i> appearing flat on the sonogram. Often also contains a brief <i>FM</i> component at the beginning and/or end of the CF component ( <i>viz.</i> FM-CF-FM).
Characteristic frequency (Fc)	The frequency of the flattest part of a <i>pulse</i> ; usually the lowest frequency reached in the <i>qCF</i> component of a pulse. This is often the primary diagnostic feature for species identification.
Duration	The time period from the beginning of a <i>pulse</i> to the end of the pulse.
Feeding buzz	The terminal part of a <i>call</i> , following the <i>approach phase</i> , emitted as the bat catches a prey item; a distinctive, rapid series of very steep, very short-duration pulses.
FM (=Frequency Modulated)	A type of <i>pulse</i> in which there is substantial change in frequency from beginning to end; <i>shape</i> ranges from almost vertical and linear through varying degrees of curvature.
FC range	Refers to the range of frequencies occupied by the <i>characteristic frequency</i> section of <i>pulses</i> within a call or set of calls.
Frequency sweep or "band-width"	The range of frequencies through which a <i>pulse</i> sweeps from beginning to end; Maximum frequency (Fmax) – minimum frequency (Fmin).
Knee	The transitional part of a <i>pulse</i> between the initial (usually steeper) frequency sweep and the <i>characteristic frequency</i> section (usually flatter); time to knee (Tk) and frequency of knee (Fk) can be diagnostic for some species.
Pulse	An individual pulse of sound within a bat <i>call</i> ; the <i>shape, duration</i> and <i>characteristic frequency</i> of a pulse are the key diagnostic features used to differentiate species.
Pulse body	The part of the <i>pulse</i> between the <i>knee</i> and <i>tail</i> and containing the <i>characteristic frequency</i> section.
Pulse shape	The general appearance of a <i>pulse</i> on the sonogram, described using relative terms related to features such as slope and degree of curvature. See also <i>CF, qCF</i> and <i>FM</i> .
qCF (=quasi Constant Frequency)	A type of <i>pulse</i> in which there is very little change in frequency from beginning to end; <i>shape</i> appears to be almost flat. Some pulses also contain an <i>FM</i> component at the beginning and/or end of the qCF component ( <i>viz.</i> FM-qCF).
Search phase	The part of a bat <i>call</i> generally required for reliable species diagnosis. A consistent series of <i>pulses</i> emitted by a bat that is searching for prey or and/or navigating through its habitat. Search phase pulses generally have longer duration, flatter slope and more consistent shape than <i>approach phase</i> and <i>feeding buzz</i> pulses.
Sequence	Literally, a sequence of <i>pulses</i> that may be from one or more bats; but generally refers to a <i>call</i> or part (e.g. <i>phase</i> ) of a call.
Tail	The final component of a <i>pulse</i> , following the <i>characteristic frequency</i> section; may consist of a short or long sweep of frequencies either upward or downward from the Fc; or may be absent.



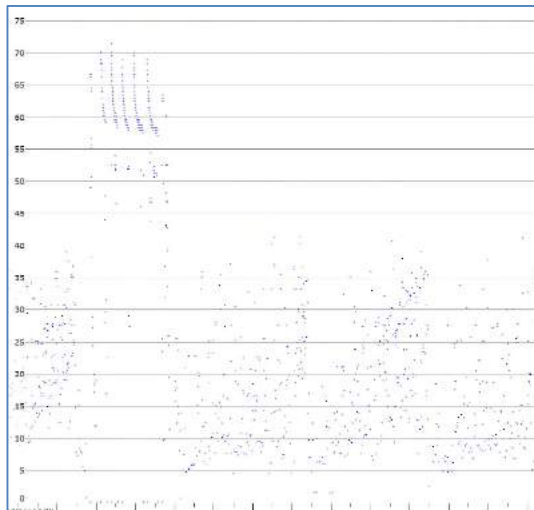
**Appendix 1** Representative sonograms from the Linnaeus dataset.  
X-axis (time)=10 msec per tick; time between pulses removed



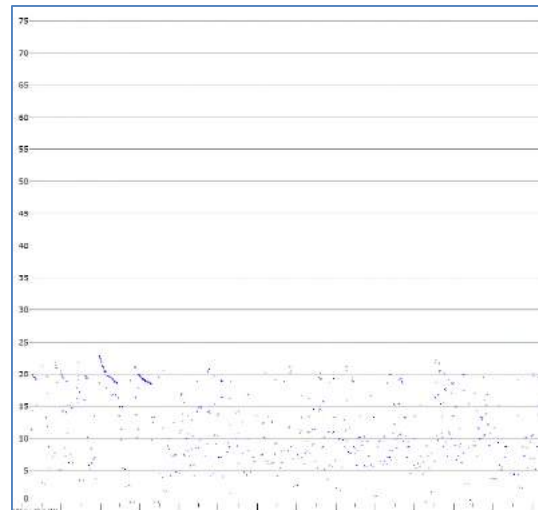
*Chalinolobus gouldii*



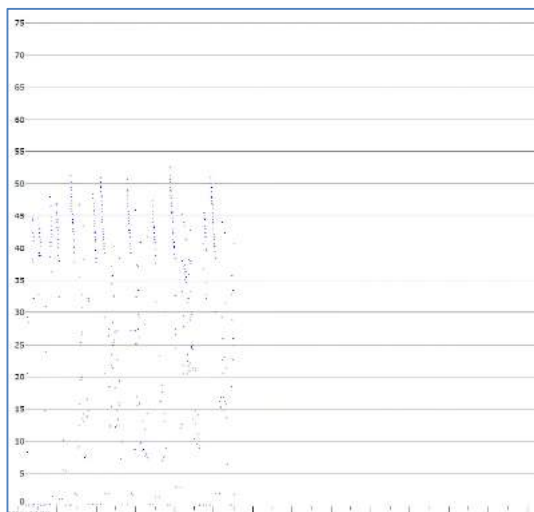
*Rhinolophus megaphyllus*



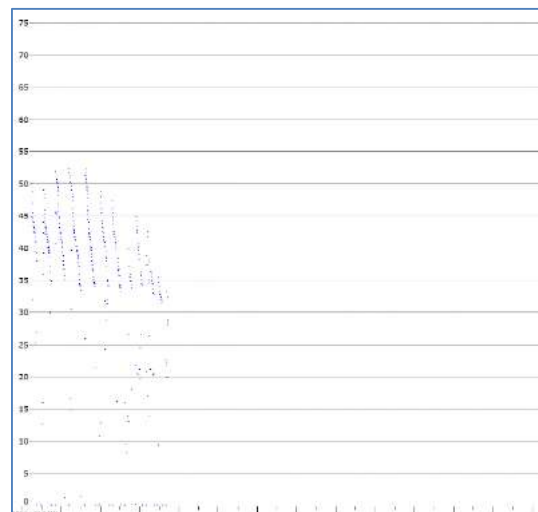
*Miniopterus australis*



*Saccolaimus flaviventris*

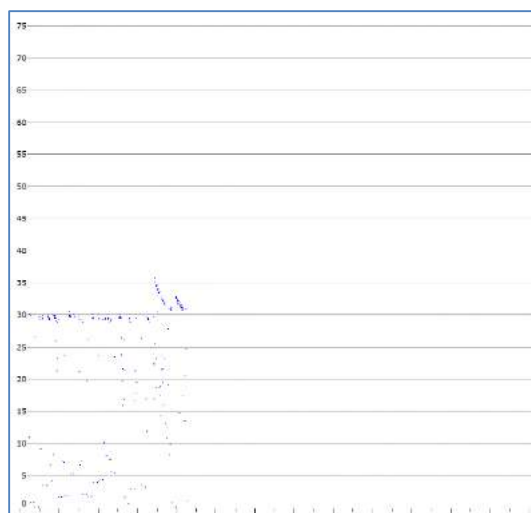


*M. macropus/Nyctophilus sp.*



*M. macropus/Nyctophilus sp.*





*C. gouldii* or *Ozimops ridei*





## Appendix J

# Potential for Threatened Fauna Occurrence





**Table J.1** assesses the potential for threatened fauna listed in the BC Act and EPBC Act to occur within the Proposal area and immediate surrounds.

**Table J.1 Threatened Fauna Potential Occurrence Assessment**

Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/or EES Threatened Species Profiles websites)	Potential Occurrence	Test of Significance?
		BC Act	EPBC Act			
Invertebrates						
<i>Argynnis hyperbius</i>	Australian Fritillary	E	CE	Open swampy coastal habitat where the caterpillar's food plant, Arrowhead Violet ( <i>Viola betonicifolia</i> ) occurs.	Low. No BioNet records within locality.	Unlikely. Test of significance not required.
<i>Petalura gigantea</i>	Giant Dragonfly	E	-	Permanent swamps and bogs with some free water and open vegetation.	Low	Unlikely. Test of Significance not required.
<i>Petalura litorea</i>	Coastal Petaltail	E	-	Occupies a variety of permanent to semi-permanent coastal freshwater wetlands.	Low	Unlikely. Test of Significance not required.
<i>Phyllodes imperialis smithersi</i>	Pink Underwing Moth	E	E	Undisturbed subtropical rainforest below 600 m. Breeding habitat is restricted to areas where the caterpillar's food plant, the native rainforest vine <i>Carronia multisejala</i> grows in a collapsed shrub-like form.	Low. No BioNet records within locality.	Unlikely. Test of significance not required.
<i>Thersites mitchellae</i>	Mitchell's Rainforest Snail	E	CE	Remnant areas of lowland subtropical rainforest and swamp forest on alluvial soils, found amongst leaf litter on the forest floor.	Low	Unlikely. Test of Significance not required.
Amphibians						
<i>Crinia tinnula</i>	Wallum Froglet	V	-	Acid paperbark and sedge swamps known as 'wallum', this is a banksia-dominated lowland heath ecosystem characterised by acidic waterbodies.	Low	Unlikely. Test of significance not required.
<i>Litoria olongburensis</i>	Olongburra Frog	V	V	Amongst vegetation in and around permanent swamps, lagoons, farm dams and on flood-prone river flats, particularly where there are 1ulrushes or spikerushes.	Known records from southern entrance; no habitat within Proposal area.	Unlikely. Test of significance not required.
<i>Mixophyes fleayi</i>	Fleay's Frog	E	E	Associated with montane rainforest and open forest communities adjoining rainforest.	Low. No BioNet records within locality.	Unlikely. Test of significance not required.





Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/or EES Threatened Species Profiles websites)	Potential Occurrence	Test of Significance?
		BC Act	EPBC Act			
Reptiles						
<i>Caretta caretta</i>	Loggerhead Turtle	E	E	Ocean-dwelling species, females come ashore to lay eggs during warmer months.	Low	Unlikely. Test of Significance not required.
<i>Chelonia mydas</i>	Green Turtle	V	V	Ocean-dwelling species spending most of its life at sea, scattered nesting records along the NSW coast.	Low	Unlikely. Test of Significance not required.
<i>Coeranoscincus reticulatus</i>	Three-toed Snake-tooth Skink	V	V	Rainforest and occasionally moist eucalypt forest, on loamy or sandy soils. Also recorded from garden beds and urban yards under leaf litter on alluvial soils.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Hoplocephalus stephensii</i>	Stephens' Banded Snake	V	-	Rainforest and eucalypt forests and rocky areas up to 950 m.	Low	Unlikely. Test of Significance not required.
<i>Dermochelys coriacea</i>	Leatherback Turtle	E	E	Inshore and offshore marine waters; rarely breeds in Australia.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	-	V	Tidal and sub-tidal coral and rocky reef habitats throughout tropical waters. No nesting occurs in NSW.	Low. No BioNet records within locality.	Unlikely. Refer EPBC Assessment ( <b>Section 7.7</b> ).
<i>Lepidochelys olivacea</i>	Olive Ridley Turtle	-	E	Soft bottomed habits of northern Australian continental shelf waters.	Low. No BioNet records within locality.	Unlikely. Refer EPBC Assessment ( <b>Section 7.7</b> ).
<i>Natator depressus</i>	Flatback Turtle	-	V	Shallow, soft-bottomed sea bed habitats away from reefs. No nesting occurs in NSW.	Low. No BioNet records within locality.	Unlikely. Refer EPBC Assessment ( <b>Section 7.7</b> ).





Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/or EES Threatened Species Profiles websites)	Potential Occurrence	Test of Significance?
		BC Act	EPBC Act			
Aves						
<i>Amauornis molucanna</i>	Pale-vented Bush-hen	V	-	Variety of coastal wetlands from wetlands, mangroves, lagoons and swamps to river margins and creeks running through rainforest.	Low	Unlikely. Test of Significance not required.
<i>Anseranas semipalmata</i>	Magpie Goose	V	-	Shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges.	Low	Unlikely. Test of Significance not required.
<i>Anthochaera 3ulrush</i>	Regent Honeyeater	CE	CE	Dry open forest and woodland with an abundance of nectar-producing eucalypts, particularly box-ironbark woodland, swamp mahogany forests, and riverine sheoak woodlands.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow			Woodlands and dry open sclerophyll forests, usually dominated by eucalypts.	Low	Unlikely. Test of Significance not required.
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E	Permanent freshwater wetlands with tall dense vegetation, particularly 3ulrushes and spikerushes.	Low	Unlikely. Test of Significance not required.
<i>Calidris canutis</i>	Red Knot	-	E	Sandy estuaries with tidal mudflats.	Low. No BioNet records within locality.	Unlikely. Refer EPBC Assessment (Section 7.7).
<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE	Tidal mudflats, sandy ocean shores and occasionally inland freshwater or salt-lakes.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Calyptorhynchus lathamii</i>	Glossy Black-Cockatoo	V	-	Sheoaks in coastal forests and woodlands, timbered watercourses, and moist and dry eucalypt forests of the coast and the Great Divide up to 1,000 m.	Recorded	Test of Significance required.
<i>Carterornis leucotis</i>	White-eared Monarch	V	-	Coastal rainforest, swamp forest and wet eucalypt forest, prefers edges where trees frequently covered with vines.	Previously recorded (Parker 1997).	Low quality habitat occurs. Test of Significance required.





Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/or EES Threatened Species Profiles websites)	Potential Occurrence	Test of Significance?
		BC Act	EPBC Act			
<i>Circus assimilis</i>	Spotted Harrier	V	-	Grassy open woodland, inland riparian woodland, grassland and shrub steppe.	Low	Unlikely. Test of Significance not required.
<i>Cyclopsitta diophthalma coxeni</i>	Coxen's Fig-Parrot	CE	E	Drier rainforests and adjacent wet eucalypt forest, wetter lowland also wetter lowland rainforests.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Low	Unlikely. Test of Significance not required.
<i>Diomedea antipodensis</i>	Antipodean Albatross	V	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Diomedea antipodensis gibsoni</i>	Gibson's Albatross	V	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Diomedea epomophora</i>	Southern Royal Albatross	-	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Refer EPBC Assessment ( <b>Section 7.7</b> ).
<i>Diomedea exulans</i>	Wandering Albatross	V	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E	-	Swamps, mangroves, mudflats, dry floodplains.	Low. Habitat unsuitable.	Unlikely. Test of Significance not required.
<i>Erythrotriorchis radiatus</i>	Red Goshawk	CE	V	In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Falco hypoleucos</i>	Grey Falcon	E	V	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions; occasionally recorded in open woodlands near the coast.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.





Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/or EES Threatened Species Profiles websites)	Potential Occurrence	Test of Significance?
		BC Act	EPBC Act			
<i>Fregetta grallaria grallaria</i>	White-bellied Storm-Petrel	V	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Glossopsitta pusilla</i>	Little Lorikeet	V	-	Distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri.	Moderate	Potential foraging habitat. <b>Test of Significance required.</b>
<i>Grus rubicunda</i>	Brolga	V	-	Wetlands (especially shallow swamps) and dry grassland, ploughed paddocks or even desert claypans.	Low	Unlikely. Test of Significance not required.
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	V	-	Intertidal rocky and coral reefs, mostly ocean shores.	Low	Unlikely. Test of Significance not required.
<i>Haematopus longirostris</i>	Pied Oystercatcher	E	-	Sandy beaches and mudflats.	Low	Unlikely. Test of Significance not required.
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	-	Coastal seas, rivers, fresh and saline lakes, lagoons, reservoirs and terrestrial habitats such as grasslands.	Recorded	<b>Test of Significance required.</b>
<i>Hieraetus morphnoides</i>	Little Eagle	V	-	Open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used.	Low	Unlikely. Test of Significance not required.
<i>Hirundapus caudacutus</i>	White-throated Needle-tail	-	V	Occur over most types of habitat; recorded most often above wooded areas, including open forest and rainforest.	Low	Refer EPBC Assessment ( <b>Section 7.7</b> ).
<i>Ixobrychus flavicollis</i>	Black Bittern	V	-	Dense vegetation fringing and in streams, swamps, tidal creeks and mudflats, particularly amongst swamp sheoaks and mangroves.	Low	Unlikely. Test of Significance not required.
<i>Lathamus discolor</i>	Swift Parrot	E	CE	Forests, woodlands, plantations, and banksias.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.





Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/or EES Threatened Species Profiles websites)	Potential Occurrence	Test of Significance?
		BC Act	EPBC Act			
<i>Limosa lapponica baueri</i>	Bar-tailed Godwit	-	V	Coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays.	Low. No BioNet records within locality.	Unlikely. Refer EPBC Assessment (Section 7.7).
<i>Lophoictinia isura</i>	Square-tailed Kite	V	-	Dry woodland and open forest, particularly along major rivers and belts of trees in urban or semi-urban areas. Home range can extend over at least 100 km <sup>2</sup> .	Low	Unlikely. Test of Significance not required.
<i>Macronectes giganteus</i>	Southern Giant Petrel	E	E	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Macronectes halli</i>	Northern Giant Petrel	V	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Ninox strenua</i>	Powerful Owl	V	-	Woodland and open forest to tall moist forest and rainforest, common along drainage lines.	Low	Unlikely. Test of Significance not required.
<i>Numenius madagascariensis</i>	Eastern Curlew	CE	CE	Estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Pachyptila turtur subantarctica</i>	Fairy Prion	V	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Pandion cristatus</i>	Eastern Osprey	V	-	Forages for fish in fresh, brackish or saline waters of rivers, lakes, estuaries with suitable nesting sites nearby.	Low	Unlikely. Test of Significance not required.
<i>Pezoporus wallicus wallicus</i>	Eastern Ground Parrot	V	-	Heathland and sedgeland within or adjacent to swamps.	Low	Unlikely. Test of Significance not required.
<i>Phoebastria fusca</i>	Sooty Albatross	V	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.





Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/or EES Threatened Species Profiles websites)	Potential Occurrence	Test of Significance?
		BC Act	EPBC Act			
<i>Podargus ocellatus</i>	Marbled Frogmouth	V	-	Subtropical rainforest, particularly in deep, wet, sheltered gullies along creeklines and often containing stands of Bangalow Palms.	Low	Unlikely. Test of Significance not required.
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler	V	-	Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains.	Low	Unlikely. Test of Significance not required.
<i>Procelsterna cerulea</i>	Grey Ternlet	V	-	Marine seabird. Breeds on Lord Howe Island.	Low	Unlikely. Test of Significance not required.
<i>Pterodroma leucoptera leucoptera</i>	Gould's Petrel	E	E	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Pterodroma neglecta neglecta</i>	Kermadec Petrel	V	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Ptilinopus magnificus</i>	Wompoo Fruit-dove	V	-	Rainforests, low-elevation moist eucalypt forest, and Brush Box forests.	Low, but potential foraging habitat occurs.	<b>Test of Significance required.</b>
<i>Ptilinopus regina</i>	Rose-crowned Fruit-Dove	V	-	Subtropical and dry rainforest, moist eucalypt forest and swamp forest.	Low, but potential foraging habitat occurs.	<b>Test of Significance required.</b>
<i>Ptilinopus superbus</i>	Superb Fruit-dove	V	-	Subtropical and dry rainforest, moist eucalypt forest and swamp forest.	Low, but potential foraging habitat occurs.	<b>Test of Significance required.</b>
<i>Rostratula australis</i>	Australian Painted Snipe	E	V	Well-vegetated shallows and margins of wetlands, dams, sewage ponds, wet pastures, marshy areas, irrigation systems, lignum, tea-tree scrub, and open timber.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Sternula albifrons</i>	Little Tern	E	-	Coastal waters, bays, shallow inlets, salt or brackish lakes.	Low	Unlikely. Test of Significance not required.





Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/or EES Threatened Species Profiles websites)	Potential Occurrence	Test of Significance?
		BC Act	EPBC Act			
<i>Sternula nereis nereis</i>	Australian Fairy Tern	-	V	Embayment of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline.	Low	Unlikely. Refer EPBC Assessment (Section 7.7).
<i>Thalassarche cauta cauta</i>	Shy Albatross	V	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Thalassarche cauta steadi</i>	White-capped Albatross	V	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Thalassarche eremita</i>	Chatham Albatross	-	E	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Refer EPBC Assessment (Section 7.7).
<i>Thalassarche impavida</i>	Campbell Albatross	-	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Refer EPBC Assessment (Section 7.7).
<i>Thalassarche melanophrys</i>	Black-browed Albatross	V	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Thalassarche salvini</i>	Salvin's Albatross	-	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Refer EPBC Assessment (Section 7.7).
<i>Thalassarche steadi</i>	White-capped Albatross	-	V	Marine seabird.	Low. No BioNet records within locality.	Unlikely. Refer EPBC Assessment (Section 7.7)..
<i>Thinornis rubricollis rubricollis</i>	Hooded Plover (eastern)	-	V	Wide beaches backed by dunes with large amounts of seaweed and jetsam, creek mouths and inlet entrances.	Low. No BioNet records within locality.	Unlikely. Refer EPBC Assessment (Section 7.7).





Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/or EES Threatened Species Profiles websites)	Potential Occurrence	Test of Significance?
		BC Act	EPBC Act			
<i>Turnix melanogaster</i>	Black-breasted Button-quail	V	V	Drier rainforests and vine scrubs, often in association with Hoop Pine and a deep moist leaf litter layer.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Tyto longimembris</i>	Eastern Grass Owl	V	-	Areas of tall grass, including tussocks in swampy areas, grassy plains, swampy heath, cane grass, sedges on flood plains.	Low	Unlikely within Proposal area. Test of Significance not required.
<i>Tyto novaehollandiae</i>	Masked Owl	V	-	Dry eucalypt forest and woodlands.	Low	Unlikely within Proposal area. Test of Significance not required.
<i>Tyto tenebricosa</i>	Sooty Owl	V	-	Rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests.	Low	Unlikely. Test of Significance not required.
<b>Mammalia</b>						
<i>Balaenoptera musculus</i>	Blue Whale	E	E	Marine mammal.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	Sandstone cliffs and fertile woodland valley habitat within close proximity	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	Dry and moist eucalypt forests and rainforests, fallen hollow logs, large rocky outcrops.	Low	Unlikely. Test of Significance not required.
<i>Eubalaena australis</i>	Southern Right Whale	E	E	Marine mammal.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.
<i>Megaptera novaeangliae</i>	Humpback Whale	V	V	Marine mammal.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.





Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/or EES Threatened Species Profiles websites)	Potential Occurrence	Test of Significance?
		BC Act	EPBC Act			
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V	-	Occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range.	Low	Unlikely. Test of Significance not required.
<i>Miniopterus australis</i>	Little Bent-winged Bat	V	-	Moist eucalypt forest, rainforest and dense coastal scrub.	Recorded	<b>Test of Significance required.</b>
<i>Miniopterus schreibersii oceanensis</i>	Large Bent-winged Bat	V	-	Forest or woodland, roost in caves, old mines and stormwater channels.	Moderate. Potential foraging habitat occurs	<b>Test of Significance required.</b>
<i>Myotis macropus</i>	Southern Myotis	V	-	Bodies of water, rainforest streams, large lakes, reservoirs.	Possibly recorded (unconfirmed call).	<b>Test of Significance required.</b>
<i>Nyctophilus bifax</i>	Eastern Long-eared Bat	V	-	Lowland subtropical rainforest and wet and swamp eucalypt forest, extending to adjacent moist eucalypt forest.	Previously recorded (Parker 1997). Possibly recorded (unconfirmed call).	<b>Test of Significance required.</b>
<i>Petauroides volans</i>	Greater Glider	-	V	Ranges and coastal plains of eastern Australia, where it inhabits a variety of eucalypt forests and woodlands.	Low. No BioNet records within locality.	Unlikely. Refer EPBC Assessment ( <b>Section 7.7</b> ).
<i>Phascolarctos cinereus</i>	Koala	V	-	Appropriate food trees in forests and woodlands, and treed urban areas.	Low; no feed trees in Proposal area.	Unlikely. Test of Significance not required.
<i>Planigale maculata</i>	Common Planigale	V	-	Rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas with surface cover close to water.	Low	Unlikely. Test of Significance not required.
<i>Potorous tridactylus</i>	Long-nosed Potoroo	V	V	Cool temperate rainforest, moist and dry forests, and wet heathland, inhabiting dense layers of grass, ferns, vines and shrubs.	Low	Unlikely. Test of Significance not required.
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	-	V	Occurs in open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes.	Low. No BioNet records within locality.	Unlikely. Test of Significance not required.





Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/or EES Threatened Species Profiles websites)	Potential Occurrence	Test of Significance?
		BC Act	EPBC Act			
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	Recorded	<b>Test of Significance required.</b>
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V	-	Woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest.	Previously recorded (Parker 1997).	<b>Test of Significance required.</b>
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail-Bat	V	-	Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	Recorded	<b>Test of Significance required.</b>
<i>Syconycteris australis</i>	Common Blossom-bat	V	-	Roosts in littoral rainforest and feeds on flowers in adjacent heathland and paperbark swamps.	Previously recorded (Parker 1997).	<b>Test of Significance required.</b>
<i>Xeromys myoides</i>	Water Mouse	-	V	Occurs in mangroves and the associated saltmarsh, sedgeland, clay pans, heathlands and freshwater wetlands in SEQ, central south Qld and the Northern Territory.	Nil; not recorded in NSW.	Refer EPBC Assessment (Section 7.7).

V = Vulnerable; E = Endangered; CE = Critically Endangered






## Appendix K

### Five-part Tests of Significance (BC Act)





Tests of significance ('five-part tests') under Section 7.3 of the BC Act have been completed for the following threatened species/ communities:

**TECs:**

- Littoral rainforest
- Lowland rainforest

**Flora:**

- Coolamon
- Native Guava
- Scrub Turpentine
- Small-leaved Tamarind
- Stinking Cryptocarya
- Queensland Xylosma
- White Lace Flower

**Fauna:**

Forest birds:

- Glossy Black-Cockatoo
- Little Lorikeet
- Rose-crowned, Superb and Wompoo Fruit-dove
- White-eared Monarch

Raptors:

- White-bellied Sea-Eagle

Microbats:

- Eastern Long-eared Bat
- Greater Broad-nosed Bat
- Large and Little Bentwing-bat
- Yellow-bellied Sheath-tail-Bat

Nectarivorous bats:

- Common Blossom-bat
- Grey-headed Flying-fox

**a) *in the case of a threatened species, whether the proposed development or Proposal is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***





## **FLORA**

### **Coolamon**

Coolamon is a tree growing up to 40 m tall, with dense dark foliage. The bark is red-brown, light grey or pinkish grey with soft papery scales. Its paired leaves are thick, oval-shaped or slightly elongated, 8 - 20 cm long, and usually rounded at the tips. Flowers occur November - March and are showy, pink to red, fluffy, and clustered directly on older leafless branches and the trunk of the tree. The white fleshy fruits have a diameter of up to 6 cm and enclose a single seed. Typically found in subtropical and riverine rainforest at low altitude.

Threatening processes for this species include:

- Clearing and fragmentation of habitat for agriculture.
- Clearing and fragmentation of habitat for rural and residential development and roadworks.
- Weed infestation of rainforest habitats.
- Grazing and trampling of seedlings and saplings by domestic stock, particularly around remnant paddock trees.
- Illegal collection for horticulture.
- Risk of local extinction due to small population sizes

#### *Potential Impacts from the Proposal*

The two planted Coolamon will be retained in-situ within the APZ to the refuge building in Precinct A. The Proposal would be unlikely to have an adverse effect on the life cycle of Coolamon such that a viable local population of the species is placed at risk of extinction.

### **Native Guava**

A shrub or small tree to 12 m high with brown scaly bark; young branchlets and inflorescences pubescent with pale hairs. Leaves with lamina narrow-ovate to elliptic or oblong, 5–25 cm long, 2.5–6.5 cm wide, apex shortly acuminate, base cuneate, upper surface glabrous and glossy, lower surface paler; lateral veins conspicuous, intramarginal vein absent; oil glands numerous and conspicuous; petiole 15–20 mm long. Flowers 5-merous, in cymes or raceme-like inflorescences; peduncles 10–25 mm long. Petals elliptic, 7–10 mm long, white or pink. Stamens up to 5 mm long. Ovary 4-locular. Berry globose or ovoid, 15–25 mm long, 10–15 mm wide, yellow and fleshy; persistent sepals reflexed near summit (PlantNET 2018).


Native Guava s flowers in late spring to early summer, producing fruits in summer and is known is known to occur in rainforest and adjoining margins of sclerophyll vegetation, often near creeks and drainage lines. The species has been described as a pioneer species in disturbed environments (Williams and Adam 2010) and is locally common in disturbed areas, such as regrowth and rainforest margins.

The key threat to Native Guava is mortality caused by infection by Myrtle Rust (*Austropuccinia psidii*).

#### *Potential Impacts from the Proposal*

All Native Guava will be retained in-situ and no trees require removal for the Proposal. Existing trees are in poor health and existing suckers are not expected to survive in the long term. Based on current evidence, myrtle rust infection has occurred at the site over some years with deleterious outcomes to the species. Appropriate hygiene procedures will be developed and implemented during construction and monitoring and treatment of affected trees is proposed.





On the basis that no trees will be directly affected, it is considered that the Proposal would be unlikely to have an adverse effect on the life cycle of Native Guava such that a viable local population of the species is placed at risk of extinction. This is particularly relevant as the local population at the site may already be unviable (widespread tree death, only one semi-mature tree observed [in very poor health]), and that the one mature tree most capable of reproducing occurs in the far north-east of the site and is separate to the Proposal and occurs within relatively undisturbed littoral rainforest which is not accessible to patrons.

### **Queensland Xylosma**

A tall shrub or small tree growing to 15 m tall; trunk crooked with low branches, and with smooth grey bark with fine vertical lines. The leaves are oval-shaped, 8 – 15 cm long, tapering to a short point at the tips. The leaf is glossy, dark green above and paler below. Flowers are small and white and held in clusters, and are followed by round red berries, 8 – 10 mm in diameter in clusters of up to four. Associated with littoral and subtropical rainforest on coastal sands or soils derived from metasediments.

Threatening processes for this species include:

- Clearing and fragmentation of habitat for coastal and agricultural development.
- Species has not been known to recruit at any location.
- Clearing and fragmentation of habitat from road construction and maintenance.
- Fire.
- Infestation of habitat by weeds.
- Trampling of seedlings and saplings by visitors.
- Risk of local extinction due to small population size.

#### *Potential Impacts from the Proposal*

The Proposal does not require any vegetation/ habitat removal or disturbance within proximity to Queensland Xylosma habitat. On this basis, the Proposal would be unlikely to have an adverse effect on the life cycle of Queensland Xylosma such that a viable local population of the species is placed at risk of extinction.

### **Scrub Turpentine**


Scrub Turpentine is a shrub or small tree to 25 m high which occurs in a range of forest communities including Subtropical Rainforests, Northern Warm Temperate Rainforests, Littoral Rainforest and Wet Sclerophyll Forests. Populations and individuals of Scrub Turpentine are often found in wet sclerophyll associations in rainforest transition zones and creekside riparian vegetation. The species may also occur as a pioneer in adjacent areas of dry sclerophyll and grassy woodland associations. Flowering occurs in late winter through to spring, with a peak in October, and fruits typically begin to appear in December.

The key threat to Scrub Turpentine is mortality caused by infection by Myrtle Rust (*Austropuccinia psidii*).

#### *Potential Impacts from the Proposal*

All Scrub Turpentine will be retained in-situ and no trees require removal for the Proposal. Existing trees are generally in poor health and it is likely that myrtle rust infection has occurred at the site over some years with deleterious outcomes to the species (canopy dieback, likely reduction in reproduction). Appropriate hygiene procedures will be developed and implemented during construction and monitoring and treatment of affected trees is proposed.





On the basis that no trees will be directly affected, it is considered that the Proposal would be unlikely to have an adverse effect on the life cycle of Scrub Turpentine such that a viable local population of the species is placed at risk of extinction.

### **Small-leaved Tamarind**

A large straight tree to 30 m tall with greyish-brown bark with vertical cracks. New leaves are at first softly-hairy, but soon become more or less hairless. The leaves are 10 - 35 cm long and are divided into four to eight leaflets. Small clusters of greenish-white flowers are borne amongst the leaves. The fruits are creamy-brown and in crowded clusters about 10 cm long. The capsules, usually three-lobed, enclose one seed per lobe. Flowering times vary across its range depending on latitude and to some extent annual seasonal variations. Ripe fruits are generally present from January to early April, with peak fruiting during the last week of February and early March. Seed dispersal mechanisms are unclear.

Confined to the warm subtropical rainforests of the NSW-Queensland border lowlands and adjacent low ranges. The forest types in which the species occurs vary from lowland subtropical rainforest to drier subtropical rainforest with a Brush Box open overstorey. Occurs on basalt-derived soils and also on poorer soils such as those derived from quartz monzonite.

Threatening processes for this species include:

- Clearing and fragmentation of habitat is believed to be the primary reason for decline.
- Risk of local extinction because populations are small.
- Loss of, or physical damage to plants from roadways and road maintenance.
- Physical damage to plants and compaction of soils from grazing and trampling by stock.
- Infestation of habitat by weeds.

#### *Potential Impacts from the Proposal*

The planted Small-leaved Tamarind will be retained in-situ within entry to Precinct B. The Proposal would be unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is placed at risk of extinction.


### **Stinking Cryptocarya**

A small to medium-sized tree growing to 20 m tall, with a dark green crown, and brown, slightly fissured bark. The leaves are oval-shaped with a bluntly pointed tip, 5 – 12 cm long and 2 – 6 cm wide, dark green on the upper surface and paler below. The main leaf vein is prominent, yellow and characteristically crooked. The species is named from the offensive odour of the small creamy flowers, which are borne in small clusters. The purplish to black, fleshy, globular fruits are about 1 cm in diameter and enclose a single round seed. Found in littoral, warm temperate and subtropical rainforest, wet sclerophyll forest and Camphor Laurel forest usually on sandy soils, but mature trees are also known on basalt soils.

Threatening processes for this species include:

- Risk of local extinction because populations are small.
- Clearing and fragmentation of habitat for development.
- Clearing and fragmentation of habitat for agriculture.
- Infestation of habitat by weeds.
- Clearing and disturbance as a result of roadworks and track maintenance.
- Inappropriate fire regime.
- Trampling by visitors when accessing beach areas through littoral rainforest.
- Trampling by domestic stock.
- Inappropriate fire regime altering habitat and destroying individuals.





### *Potential Impacts from the Proposal*

The Proposal does not require any vegetation/ habitat removal or disturbance within proximity to Stinking Cryptocarya habitat. On this basis, the Proposal would be unlikely to have an adverse effect on the life cycle of Stinking Cryptocarya such that a viable local population of the species is placed at risk of extinction.

### **White Lace Flower**

A tree to 18 m tall, with light-brown bark. Its leaves are divided twice, into glossy hairless leaflets separated unequally by the midvein. Up to ten fragrant, fluffy creamy-white flowers are bunched in heads. Woody orange pods develop, splitting and curling to reveal glossy black seeds displayed against the red or yellow interior of the pod. Typically occurs in riverine and lowland subtropical rainforest, littoral rainforest, coastal cypress pine forest and their ecotones. It is found on a variety of soils including coastal sands and those derived from basalt and metasediments.

Threatening processes for this species include:

- Fragmentation and loss of habitat.
- Habitat degradation through weed invasion and disturbance.
- Illegal collection of seeds for horticulture.
- Trampling by domestic stock.
- Coastal locations are likely to be exposed to saltwater intrusion, and increased intensity of storms/winds.
- Current or potential future land management practices do not support conservation.
- Disturbance from road and track maintenance activities.
- Inappropriate fire regimes.

### *Potential Impacts from the Proposal*

The Proposal does not require any vegetation/ habitat removal or disturbance within proximity to White Lace Flower habitat. Mowing and maintenance activities have occurred over many years in proximity to the two mature trees in Precinct A and both remain in good condition. No changes in management will occur to this portion of the site. On this basis, the Proposal would be unlikely to have an adverse effect on the life cycle of White Lace Flower such that a viable local population of the species is placed at risk of extinction.





## **FAUNA**

### **Forest birds:**

#### **Glossy Black-Cockatoo (GBC)**

GBC inhabit coastal woodland, dry open forests, open inland woodland or along timbered watercourses where Casuarina and Allocasuarina species commonly occur. In Northern NSW their key food trees belong to the genus Allocasuarina and include Forest Oak (*A. torulosa*) and Black Oak (*A. littoralis*). This species is dependent on large hollow bearing Eucalypts for breeding where nests are located within large hollows where single egg is laid between March and May. The female predominantly feeds the chick however and both parents have been observed to feed the young.

Threatening processes for this species include:

- Habitat loss via clearing of woodland areas containing Allocasuarina (food) trees or large eucalyptus (hollow bearing) trees.
- Habitat fragmentation of food resources in relation to nesting trees sites.
- Changing patterns of bushfires in eastern Australia. Casuarina and Allocasuarina trees are very fire sensitive and are easily killed in an intense fire. Large dead trees where the bird's nest may also be destroyed by fire.
- Threats from other animals such as feral cats and possums, which raid bird nests.
- Competition with Galah and feral honeybees for hollow resources.
- Climate change and reduction in resources due to drought.

#### ***Potential Impacts from the Proposal***

The Proposal would not result in any loss of potential foraging or nesting resources for the Glossy Black Cockatoo. On this basis it would be highly unlikely that an adverse effect on the life cycle of the Glossy Black-cockatoo would occur such that a viable local population of the species is likely to be placed at risk of extinction.

#### **Little Lorikeet**

Forages primarily in the canopy of open Eucalyptus forest and woodland, in addition to Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards

Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like *Allocasuarina* sp. Nesting season extends from May to September. In years when flowering is prolific, Little Lorikeet pairs can breed twice, producing 3-4 young per attempt.

Threatening processes for this species include:

- Clearing of woodlands for agriculture.
- Small scale clearing (e.g. roadworks and fence construction).
- The loss of old hollow bearing trees.
- Competition with the introduced Honeybee for both nectar and hollows exacerbates these resource limitations.
- Infestation of habitat by invasive weeds.
- Inappropriate fire regimes.
- Aggressive exclusion from forest and woodland habitat by over abundant Noisy Miners.



- Climate change impacts including reduction in resources due to drought.
- Degradation of woodland habitat and vegetation structure due to overgrazing

#### *Potential Impacts from the Proposal*

The Proposal would result in the loss of up to ~ 0.44 ha of potential foraging habitat (Coast Banksia) for the Little Lorikeet. The loss of this habitat is negligible in a local context where this resource occurs extensively, and is a secondary resource to preferred species such as Swamp Mahogany, Bloodwoods, Blackbutt etc. No hollow-bearing trees suitable for nesting would be affected. On this basis it would be highly unlikely that an adverse effect on the life cycle of the Little Lorikeet would occur such that a viable local population of the species is likely to be placed at risk of extinction.

#### **Rose-crowned, Superb and Wompoo Fruit-dove**

The Rose-crowned, Superb and Wompoo Fruit-dove occupy similar habitat niches in moist sclerophyll and rainforests, predominantly along the east coast of NSW. All species feed on ripe fruits from a diverse range of fruit bearing species including figs, palms, trees, shrubs and vines. These birds are thought to be effective medium to long distance vectors for seed dispersal due their locally nomadic behavior. Breeding usually takes place from spring to summer within a stick nest where typically a single egg is laid. Both parent birds take turns to incubate the egg.

Threatening processes for these species include:

- Clearing and fragmentation of low to mid-elevation rainforest due to coastal development and grazing.
- Logging and roading in moist eucalypt forest with well-developed rainforest understorey.
- Burning, which reduces remnant rainforest habitat patches.
- Infestation of rainforest habitat by invasive weeds.
- Removal of Camphor Laurel food source without appropriate mitigation measures.

#### *Potential Impacts of the Proposal*

The Proposal would result in the loss of up to ~ 0.44 ha of potential foraging habitat (Coast Banksia) for the Rose-crowned, Superb and Wompoo Fruit-dove. The loss of this habitat is negligible in a local context where this resource occurs extensively and is a secondary resource to preferred species such as mature figs, rainforest and swamp forest communities. Given the occurrence of extensive forested habitat within the locality, the proposal represents a negligible reduction of secondary foraging resources which may be utilised by either species. On this basis it would be highly unlikely that an adverse effect on the life cycle of the Rose-crowned, Superb or Wompoo Fruit-dove could occur such that a viable local population of the species is likely to be placed at risk of extinction.

#### **White-eared Monarch**

In NSW, White-eared Monarchs occurs in rainforest, especially drier types, such as littoral rainforest, as well as wet and dry sclerophyll forests, swamp forest and regrowth forest. They appear to prefer the ecotone between rainforest and other open vegetation types or the edges of rainforest, such as along roads. White-eared Monarchs eat insects, but their diet is not well studied. They breed from about September to March, usually nesting high in the canopy, and often at the edge of patches of rainforest.

Threatening processes for this species include:

- Clearing and increasing fragmentation and isolation of habitat, especially low-elevation subtropical rainforest, littoral rainforest and wet sclerophyll forest, through agricultural, tourist and residential development or forestry activities.
- Forest management that results in conversion of multi-aged forests to young, even-aged stands.
- Invasion of forests by weeds.
- Inappropriate fire regimes that degrade habitat or allow invasion by weeds.



- Degradation or loss of habitat through grazing of stock.
- Changes to rainforest habitat with climate change including drying and increased fire frequency.
- Lack of information on the species habitat requirements in NSW, particularly breeding habitat.
- Easily disturbed by the presence of people.

#### *Potential Impacts from the Proposal*

The Proposal would not result in any loss of potential foraging or nesting resources for the White-eared Monarch. On this basis it would be highly unlikely that an adverse effect on the life cycle of the White-eared Monarch would occur such that a viable local population of the species is likely to be placed at risk of extinction.

#### Raptors:

##### **White-bellied Sea-eagle**

White-bellied Sea-eagles may be solitary or live in pairs or small family groups consisting of a pair of adults and dependent young. Resident pairs are territorial and occupy nesting territories of hundreds of hectares. Foraging habitat consists of coastal seas, rivers, fresh and saline lakes, lagoons, reservoirs and terrestrial habitats such as grasslands. The diet of the White-bellied Sea-eagle consists mainly of waterbirds, freshwater turtles and fish.

Breeding habitat consists of large trees, usually living or less often dead, within mature open forest, gallery forest or woodland. In subtropical eastern NSW White-bellied Sea-eagles nest at least 220 m from human settlements; nests may be abandoned if disturbed. The breeding period extends from June to January, eggs are typically laid in June to September and young birds remain in the nest for 65–70 days. After fledging, young birds may associate with their parents for a few years before dispersing, potentially over large distances.

Threatening processes for this species include:

- Clearing, degradation or reclamation of saltmarsh, mangroves, sea grass and other riparian or shallow water vegetation.
- Increased mortality.
- Decreased nesting success.
- Reduced foraging resources.

#### *Potential Impacts from the Proposal*


The Proposal would not result in any loss of potential foraging or nesting resources for the White-bellied Sea-eagle. On this basis it would be highly unlikely that an adverse effect on the life cycle of the White-bellied Sea-eagle would occur such that a viable local population of the species is likely to be placed at risk of extinction.

#### Microbats:

##### **Eastern Long-eared Bat**

Occurs in lowland subtropical rainforest and wet and swamp eucalypt forest, extending into adjacent moist eucalypt forest. Coastal rainforest and patches of coastal scrub are particularly favoured. Roosts in tree hollows, the hanging foliage of palms, in dense clumps of foliage of rainforest trees, under bark and in shallow depressions on trunks and branches, among epiphytes, in the roots of strangler figs, among dead fronds of tree ferns and less often in buildings.





Threatening processes for this species include:

- Development pressures in or near swamp, wet sclerophyll and rainforests resulting in habitat degradation, alterations to moisture regimes, and edge effects, and loss of connectivity
- Loss of hollow-bearing trees and stands of palms and rainforest trees used for roosting and maternity sites.
- Invasion of habitat by weeds, particularly by Bitou Bush on the coast.
- High frequency fire.
- Climate change resulting in degradation of habitat from forest drying and increasing likelihood of fire.
- Limited known sites for the species reducing NSW population viability.
- Predation from cats.
- Vehicle strike.
- Light pollution in and near habitat areas impacting species behaviour.

#### *Potential Impacts from the Proposal*

The Proposal would result in the loss of minor foraging resources for the Eastern Long-eared Bat, which is negligible in the context of the site and locality. No roosting or breeding habitat would be affected. On this basis it would be highly unlikely that the Proposal would result in an adverse effect on the life cycle of the Eastern Long-eared Bat such that a viable local population of the species is likely to be placed at risk of extinction.

#### **Greater Broad-nosed Bat**

Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species.

Although the Greater Broad-nosed Bat usually roosts in tree hollows, it has also been found in buildings. Little is known of its reproductive cycle, however a single young is born in January; prior to birth, females congregate at maternity sites located in suitable trees, where they appear to exclude males during the birth and raising of the single young.

Threatening processes for this species include:

- Disturbance to roosting and summer breeding sites.
- Foraging habitats are being cleared for residential and agricultural developments, including clearing by residents within rural subdivisions.
- Loss of hollow-bearing trees.
- Pesticides and herbicides may reduce the availability of insects or result in the accumulation of toxic residues in individuals' fat stores.
- Changes to water regimes are likely to impact food resources, as is the use of pesticides and herbicides near waterways.

#### *Potential Impacts from the Proposal*

The Proposal would result in the loss of minor foraging resources for the Greater Broad-nosed Bat, which is negligible in the context of the site and locality. No roosting or breeding habitat would be affected. On this basis it would be highly unlikely that the Proposal would result in an adverse effect on the life cycle of the Greater Broad-nosed Bat such that a viable local population of the species is likely to be placed at risk of extinction.





## Large and Little Bent-winged Bat

Bentwing-bats occur in moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Roosting occurs in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. Little Bentwing-bats often share roosting sites with the Large Bentwing-bat and in winter, the two species may form mixed clusters.

In NSW, the largest maternity colony is in close association with a large maternity colony of Large Bentwing-bats and appears to depend on the large colony to provide the high temperatures needed to rear its young. Maternity colonies form in spring and birthing occurs in early summer. Males and juveniles disperse in summer. Only five nursery sites/ maternity colonies are known in Australia.

Threatening processes for these species include:

- Disturbance of colonies, especially in nursery or hibernating caves, may be catastrophic.
- Destruction of caves that provide seasonal or potential roosting sites.
- Changes to habitat, especially surrounding maternity/ nursery caves and winter roosts.
- Pesticides on insects and in water consumed by bats bio accumulates, resulting in poisoning of individuals.
- Predation from foxes, particularly around maternity caves, winter roosts and roosts within culverts, tunnels and under bridges.
- Predation from feral cats, particularly around maternity caves, winter roosts and roosts within culverts, tunnels and under bridges.
- Introduction of exotic pathogens such as the White-nosed fungus.
- Hazard reduction and wildfire fires during the breeding season.
- Large scale wildfire or hazard reduction can impact on foraging resources.
- Poor knowledge of reproductive success and population dynamics.
- Climate change and reduction in resources due to drought.

### *Potential Impacts from the Proposal*

The Proposal would result in the loss of minor foraging resources for the Large or Little Bentwing-bat, which is negligible in the context of the site and locality. No roosting habitat would be affected. On this basis it would be highly unlikely that the Proposal would result in an adverse effect on the life cycle of the Large or Little Bentwing-bat such that a viable local population of the species is likely to be placed at risk of extinction.

## Southern Myotis

Forage over streams and pools catching insects and small fish by raking their feet across the water surface. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. In NSW females have one young each year usually in November or December.


Threatening processes for this species include:

- Loss or disturbance of roosting sites.
- Clearing adjacent to foraging areas.
- Application of pesticides in or adjacent to foraging areas.
- Reduction in stream water quality affecting food resources.

### *Potential Impacts from the Proposal*

The Proposal would result in the loss of minor foraging resources for the Southern Myotis, which is negligible in the context of the site and locality. No roosting or breeding habitat would be affected. On





this basis it would be highly unlikely that the Proposal would result in an adverse effect on the life cycle of the Southern Myotis such that a viable local population of the species is likely to be placed at risk of extinction.

### **Yellow-bellied Sheath-tail-Bat**

Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.

Threatening processes for this species include:

- Disturbance to roosting and summer breeding sites.
- Foraging habitats are being cleared for residential and agricultural developments, including clearing by residents within rural subdivisions.
- Loss of hollow-bearing trees; clearing and fragmentation of forest and woodland habitat.
- Pesticides and herbicides may reduce the availability of insects or result in the accumulation of toxic residues in individuals' fat stores.

#### *Potential Impacts from the Proposal*

The Proposal would result in the loss of minor foraging resources for the Yellow-bellied Sheath-tail-Bat, which is negligible in the context of the site and locality. No roosting or breeding habitat would be affected. On this basis it would be highly unlikely that the Proposal would result in an adverse effect on the life cycle of the Yellow-bellied Sheath-tail-Bat such that a viable local population of the species is likely to be placed at risk of extinction.

#### Nectivorous bats:

### **Common Blossom-bat**

Common Blossom-bats typically roost in littoral rainforest and feed on nectar and pollen from flowers in adjacent heathland and paperbark swamps. They have also been recorded in a range of other vegetation communities, such as subtropical rainforest, wet sclerophyll forest and other coastal forests. They generally roost individually in dense foliage and vine thickets of the sub-canopy, staying in the same general area for a season. They change roost sites daily, but each roost site is generally only 50m or so away from other recent roosts.

Favoured feeding sites are repeatedly visited on consecutive nights within a flowering season and revisited over several years. Blossom-bats require a year-round supply of nectar and pollen which is gathered from a mosaic of coastal complex vegetation types. When these vegetation types are in short supply of nectar and pollen (Nov/Dec in northern NSW) Common Blossom-bats have been known to utilise riverine areas containing Black Bean, Silky Oak and Weeping Bottlebrush.

Threatening processes for this species include:

- Clearing of coastal habitat for urban development or sandmining.
- Weeds, such as Bitou Bush, that suppress the regeneration of key food trees, such as Coastal Banksia.
- Predation by foxes and feral cats may occur whilst the bat is feeding on low hanging flowers and fruit.



- Inappropriate fire regimes applied in heathland habitats leading to reduced flowering of *Banksia*, *Callistemon* and *Melaleuca* species.

#### *Potential Impacts from the Proposal*

The Proposal would result in the loss of up to ~ 0.44 ha of potential foraging habitat (Coast *Banksia*) for the Common Blossom-bat. The loss of this habitat is negligible in a local context where this resource occurs extensively. No potential roost habitat would be affected. Given the occurrence of extensive forested habitat within the locality, the proposal represents a negligible reduction of foraging resources. On this basis it would be highly unlikely that the Proposal would result in an adverse effect on the life cycle of the Common Blossom-bat such that a viable local population of the species is likely to be placed at risk of extinction.

#### **Grey-headed Flying-fox**

Grey-headed Flying-foxes (GHFF) foraging areas include subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. GHFF feed on the nectar and pollen of native trees, in particular *Eucalyptus*, *Melaleuca* and *Banksia*, and fruits of rainforest trees and vines, as well as from cultivated gardens and orchards. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November. Site fidelity to camps is high; some camps have been used for over a century. GHFF may travel up to 50 km from the camp to forage; commuting distances are more often <20 km.

Threatening processes for this species include:

- Clearing of woodlands for agriculture.
- Loss of roosting and foraging sites.
- Electrocution on powerlines, entanglement in netting and on barbed-wire.
- Heat stress.
- Conflict with humans.
- Incomplete knowledge of abundance and distribution across the species' range.

#### *Potential Impacts from the Proposal*


The Proposal would result in the loss of up to ~ 0.44 ha of potential foraging habitat (Coast *Banksia*) for the GHFF. The loss of this habitat is negligible in a local context where this resource occurs extensively, in addition to extensive areas of paperbark dominated swamp forest. No potential roost habitat would be affected. Given the occurrence of extensive forested habitat within the locality, the proposal represents a negligible reduction of foraging resources. On this basis it would be highly unlikely that the Proposal would result in an adverse effect on the life cycle of the Common Blossom-bat such that a viable local population of the species is likely to be placed at risk of extinction.

***b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or Proposal:***

***(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or***

***(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,***





Littoral rainforest: ~ 0.44 ha of poor quality littoral rainforest (underscrubbed Coast Banksia) will be removed. The removal of this compromised forest is unlikely to have an adverse effect on the extent of littoral rainforest on or adjacent to the site. Nor is the proposal likely to adversely modify the composition of littoral rainforest on or adjacent to the site such that its local occurrence is placed at risk of extinction.

Lowland rainforest: no habitat will be removed; existing walking trail will continue to provide limited access to patrons.

**c) in relation to the habitat of a threatened species or ecological community:**

**(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or Proposal, and**

**TECs:**

- Littoral rainforest (LRF): ~ 0.44 ha of modified habitat removed.
- Lowland rainforest: No habitat removed; existing walking trail will continue to provide limited access to patrons.

**Flora:**

- Coolamon: Planted trees retained in situ.
- Native Guava: Lowland rainforest
- Scrub Turpentine: No habitat removed.
- Small-leaved Tamarind: Planted tree retained in situ.
- Stinking Cryptocarya: No habitat removed.
- Queensland Xylosma: No habitat removed.
- White Lace Flower: No habitat removed.

**Fauna:**

Forest birds (Glossy Black-Cockatoo, Little Lorikeet, Rose-crowned, Superb and Wompoo Fruit-dove, White-eared Monarch): minor loss of secondary resources (~ 0.44 ha) for Little Lorikeet and Fruit-doves.

Raptors (White-bellied Sea-Eagle): No loss of foraging or nesting habitat.

Microbats (Eastern Long-eared Bat, Greater Broad-nosed Bat, Large and Little Bentwing-bat, Southern Myotis, Yellow-bellied Sheath-tail-Bat): minor loss of foraging resources (~ 0.44 ha); no loss of roosting or breeding habitat.

Nectivorous bats (Common Blossom-bat, Grey-headed Flying-fox): minor loss (~ 0.44 ha) of foraging resources; no loss of roosting habitat.

**(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or Proposal, and**

**TECs:**

- Littoral rainforest (LRF): LRF is already highly fragmented at the site from historic clearing and thinning/modification. The Proposal would not result in any further substantial fragmentation of this community.
- Lowland rainforest: No habitat will be removed or isolated.





## Flora:

- Coolamon: No naturally occurring habitat occurs.
- Native Guava: Habitat already highly fragmented; no impacts to known habitat.
- Scrub Turpentine: Habitat already highly fragmented; no impacts to known habitat.
- Small-leaved Tamarind: No naturally occurring habitat occurs.
- Stinking Cryptocarya: Habitat already highly fragmented; no impacts to known habitat.
- Queensland Xylosma: Habitat already highly fragmented; no impacts to known habitat.
- White Lace Flower: Habitat already highly fragmented; no impacts to known habitat.

## Fauna:

Forest birds (Glossy Black-Cockatoo, Little Lorikeet, Rose-crowned, Superb and Wompoo Fruit-dove, White-eared Monarch): vegetation loss would not create any barriers to dispersal for any forest bird species.

Raptors (White-bellied Sea-Eagle): not relevant.

Microbats (Eastern Long-eared Bat, Greater Broad-nosed Bat, Large and Little Bentwing-bat, Southern Myotis, Yellow-bellied Sheath-tail-Bat): The Proposal would not hinder the foraging or dispersal requirements of any of the subject species.

Nectivorous bats (Common Blossom-bat, Grey-headed Flying-fox): The Proposal would not hinder the foraging or dispersal requirements of either of the subject species.

***(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,***

## TECs:

- Littoral rainforest (LRF): the habitat to be removed has been significantly thinned and modified and is maintained by mowing. The affected vegetation is of poor quality when compared to intact and regenerating littoral rainforest which occurs extensively over much of the site.
- Lowland rainforest: No habitat will be removed, fragmented or isolated

## Flora:

- Coolamon: No naturally occurring habitat occurs or will be affected.
- Native Guava: The affected habitat is of poor quality due to historic clearing, thinning and modification.
- Scrub Turpentine: The affected habitat is of poor quality due to historic clearing, thinning and modification.
- Small-leaved Tamarind: No naturally occurring habitat occurs or will be affected.
- Stinking Cryptocarya: The affected habitat is of poor quality due to historic clearing, thinning and modification.
- Queensland Xylosma: The affected habitat is of poor quality due to historic clearing, thinning and modification.
- White Lace Flower: The affected habitat is of poor quality due to historic clearing, thinning and modification.



## Fauna:

Forest birds (Glossy Black-Cockatoo, Little Lorikeet, Rose-crowned, Superb and Wompoo Fruit-dove, White-eared Monarch): The habitat to be removed is of low importance to any of the subject species in the context of the extensive high quality habitat which the site provides.

Raptors (White-bellied Sea-Eagle): No habitat removed.

Microbats (Eastern Long-eared Bat, Greater Broad-nosed Bat, Large and Little Bentwing-bat, Southern Myotis, Yellow-bellied Sheath-tail-Bat): The habitat to be removed is of low importance to any of the subject species in the context of the extensive high quality habitat which the site provides.

Nectivorous bats (Common Blossom-bat, Grey-headed Flying-fox): The habitat to be removed is of low importance to any of the subject species in the context of the extensive high quality habitat which the site provides.

**d) whether the proposed development or Proposal is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),**

No areas of outstanding biodiversity value have been declared in Byron LGA.

**e) whether the proposed development or Proposal is or is part of a key threatening process or is likely to increase the impact of a key threatening process.**

A key threatening process (KTP) is as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species or ecological communities. KTPs listed in the BC Act, and whether the Proposal is recognised as a KTP is shown in **Table K.1**.

**Table K.1 Key Threatening Processes**

Key Threatening Process (as per Schedule 4 of the BC Act)	Is the development or Proposal proposed of a class of development or Proposal that is recognised as a threatening process?		
	Likely	Possible	Unlikely
Aggressive exclusion of birds by noisy miners ( <i>Manorina melanoccephala</i> )			✓
Alteration of habitat following subsidence due to longwall mining			✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands			✓
Anthropogenic climate change			✓
Bushrock removal			✓
Clearing of native vegetation	✓		
Competition and grazing by the feral European Rabbit ( <i>Oryctolagus cuniculus</i> )			✓
Competition and habitat degradation by feral goats ( <i>Capra hircus</i> )			✓
Competition from feral honeybees ( <i>Apis mellifera</i> )			✓
Death or injury to marine species following capture in shark control programs on ocean beaches			✓
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments			✓
Forest eucalypt dieback associated with over-abundant psyllids and bell miners			✓
Habitat degradation and loss by Feral Horses, <i>Equus caballus</i>			✓
Herbivory and environmental degradation caused by feral deer			✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition			✓



Key Threatening Process (as per Schedule 4 of the BC Act)	Is the development or Proposal proposed of a class of development or Proposal that is recognised as a threatening process?		
	Likely	Possible	Unlikely
Importation of red imported fire ants ( <i>Solenopsis invicta</i> )			✓
Infection by <i>Psittacine circoviral</i> (beak and feather) disease affecting endangered psittacine species and populations			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis			✓
Infection of native plants by <i>Phytophthora cinnamomi</i>			✓
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae		✓	✓
Introduction of the large earth bumblebee ( <i>Bombus terrestris</i> )			✓
Invasion and establishment of exotic vines and scramblers			✓
Invasion and establishment of Scotch Broom ( <i>Cytisus scoparius</i> )			✓
Invasion and establishment of the Cane Toad ( <i>Bufo marinus</i> )			✓
Invasion, establishment and spread of Lantana ( <i>Lantana camara</i> )			✓
Invasion of native plant communities by African Olive ( <i>Olea europaea</i> L. subsp. <i>cuspidata</i> )			✓
Invasion of native plant communities by <i>Chrysanthemoides monilifera</i> (bitou bush and boneseed)			✓
Invasion of native plant communities by exotic perennial grasses			✓
Invasion of the Yellow Crazy Ant ( <i>Anoplolepis gracilipes</i> ) into NSW			✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants			✓
Loss of hollow-bearing trees			✓
Loss or degradation (or both) of sites used for hill-topping by butterflies			✓
Predation and hybridisation by feral dogs ( <i>Canis lupus familiaris</i> )			✓
Predation by the European Red Fox ( <i>Vulpes vulpes</i> )			✓
Predation by the feral cat ( <i>Felis catus</i> )			✓
Predation by <i>Gambusia holbrooki</i> (Plague Minnow or Mosquito Fish)			✓
Predation by the Ship Rat ( <i>Rattus rattus</i> ) on Lord Howe Island			✓
Predation, habitat degradation, competition and disease transmission by feral pigs ( <i>Sus scrofa</i> )			✓
Removal of dead wood and dead trees	✓		

The Proposal is characteristic of two KTPs:

- Clearing of native vegetation (~ 0.44 ha of modified littoral rainforest)
- Removal of dead wood and dead trees (removal of minor dead branches and small limbs cleared as part of the works).

Site assessment indicates the pathogen Myrtle Rust has been present at the site (based on death and dieback of Scrub Turpentine and Native Guava) and is likely to have been present for several years. The Proposal may potentially increase the incidence of Myrtle Rust at the site, with human and vehicle movements representing an increase in one vector of dispersal.

The degree that the Proposal would contribute to any threatening process is not considered likely to place the local population of any of the subject species or communities at significant risk of extinction.

## Conclusion

It is considered unlikely that the local population of any of the subject species/ communities would be placed at significant risk of extinction as a result of the Proposal.





## Appendix L

# Native Tree Impacts





GENERAL NOTES

All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority. Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication. Figured dimensions take precedence - do not scale.

SITE LEGEND

THIS DRAWING IS INDICATIVE ONLY. REFER TO RELEVANT CONSULTANT DRAWINGS FOR ACCURATE DETAIL.

BOUNDARY

EXISTING CONTOURS

EXISTING DRAIN

TOP OF BANK

BOTTOM OF BANK

ASSET PROTECTION ZONE

38m AHD CONTOUR

EXISTING FENCE

CM SEPP - Coastal Wetlands

CM SEPP - Littoral Rainforest

EXISTING TREE

SPECIES TO BE REMOVED

THREATENED SPECIES

EXISTING BUILDINGS

APPROVED+UNBUILT BUILDINGS

PROPOSED AND NEW BUILDINGS

REV	ISSUE NAME	DATE
04	REVISED DA (APPENDICES)	25/1/21

JOB NAME

HGA 206 - ECO TOURISM RETREAT

CLIENT

Linnaeus Property Trust

ADDRESS

951 Broken Head Road, BROKEN HEAD

LOT + DP

LOT. 1 DP: 1031848

DRAWING:

PRECINCT PLAN A

DWG Number	ISSUE
D.00	REVISED DA (APPENDICES)

SCALE	PAPER	Revision
1:500	A1	04

APPROVED:

Harley Graham

DATE

25/1/21

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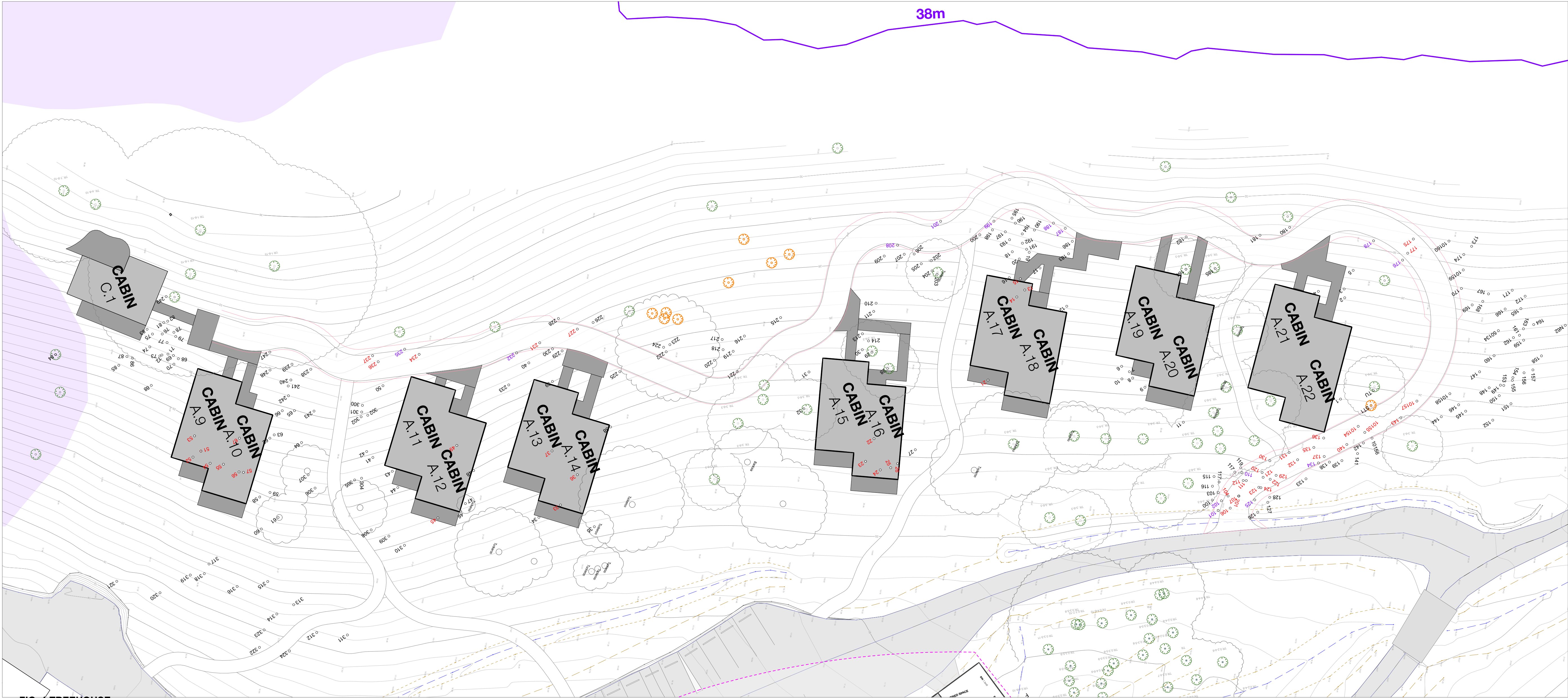


FIG. 1 TREEHOUSE  
Scale 1:250

VEGETATION ANALYSIS				
Cabin A.9 + A.10	Cabin A.15 + A.16	Boardwalk	Boardwalk	Boardwalk
51 - Coastal Banksia 52 - Coastal Banksia 53 - Coastal Banksia 54 - Coastal Banksia 55 - Coastal Banksia 56 - Coastal Banksia 57 - Coastal Banksia 67 - Tuckeroo	22 - Coastal Banksia 23 - Coastal Banksia 24 - Coastal Banksia 25 - Coastal Banksia 26 - Coastal Banksia  Cabin A.17 + A.18 13 - Coastal Banksia 14 - Coastal Banksia 15 - Coastal Banksia 21 -  Cabin A.19 + A.20 ~ No Tree Removal Cabin A.21 + A.22 ~ No Tree Removal	104 - Coastal Banksia 106 - Coastal Banksia 107 - Coastal Banksia 111 - Coastal Banksia 112 - Coastal Banksia 120 - Coastal Banksia 121 - Coastal Banksia 122 - Coastal Banksia 123 - Coastal Banksia 124 - Coastal Banksia 129 - Coastal Banksia 130 - Coastal Banksia 131 - Coastal Banksia 132 - Coastal Banksia 135 - Coastal Banksia 136 - Coastal Banksia 137 - Coastal Banksia	140 - Coastal Banksia 143 - Coastal Banksia 154 - Coastal Banksia 155 - Yellow Kamala 157 - Yellow Kamala 175 - Coastal Banksia 177 - Coastal Banksia 201 - Tuckeroo 227 - Coastal Banksia 231 - Tuckeroo 234 - Tuckeroo 236 - Corkwood 237 - Tuckeroo	101 - Coastal Banksia 102 - Coastal Banksia 110 - Tuckeroo 119 - Coastal Banksia 125 - Coastal Banksia 134 - Coastal Banksia 176 - Mock Olive 178 - Brown Kurrajong 187 - Tuckeroo 188 - Tuckeroo 199 - Tuckeroo 201 - Tuckeroo 208 - Tuckeroo 221 - Corkwood 230 - Coastal Banksia 232 - Tuckeroo

GENERAL NOTES

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SITE LEGEND

THIS DRAWING IS INDICATIVE ONLY. REFER TO RELEVANT CONSULTANT DRAWINGS FOR ACCURATE DETAIL.

BOUNDARY

EXISTING CONTOURS

EXISTING DRAIN

TOP OF BANK

BOTTOM OF BANK

ASSET PROTECTION ZONE

38m AHD CONTOUR

EXISTING FENCE

CM SEPP - Coastal Wetlands

CM SEPP - Littoral Rainforest

EXISTING TREE

SPECIES TO BE REMOVED

THREATENED SPECIES

POTENTIAL LOSS

BOARDWALK LIMIT OF WORKS

PROPOSED BUILDINGS

REV	ISSUE NAME	DATE
04	REVISED DA (APPENDICIES)	25/1/21

JOB NAME

HGA 206 - ECO TOURISM RETREAT

CLIENT

Linnaeus Property Trust

ADDRESS

951 Broken Head Road, BROKEN HEAD

LOT + DP

LOT. 1    DP. 1031848

DRAWING:

Vegetation Analysis - Fig 1

DWG Number

D.01

ISSUE

REVISED DA (APPENDICIES)

SCALE

1:250

PAPER

A1

Revision

04

APPROVED:

Harley Graham

DATE

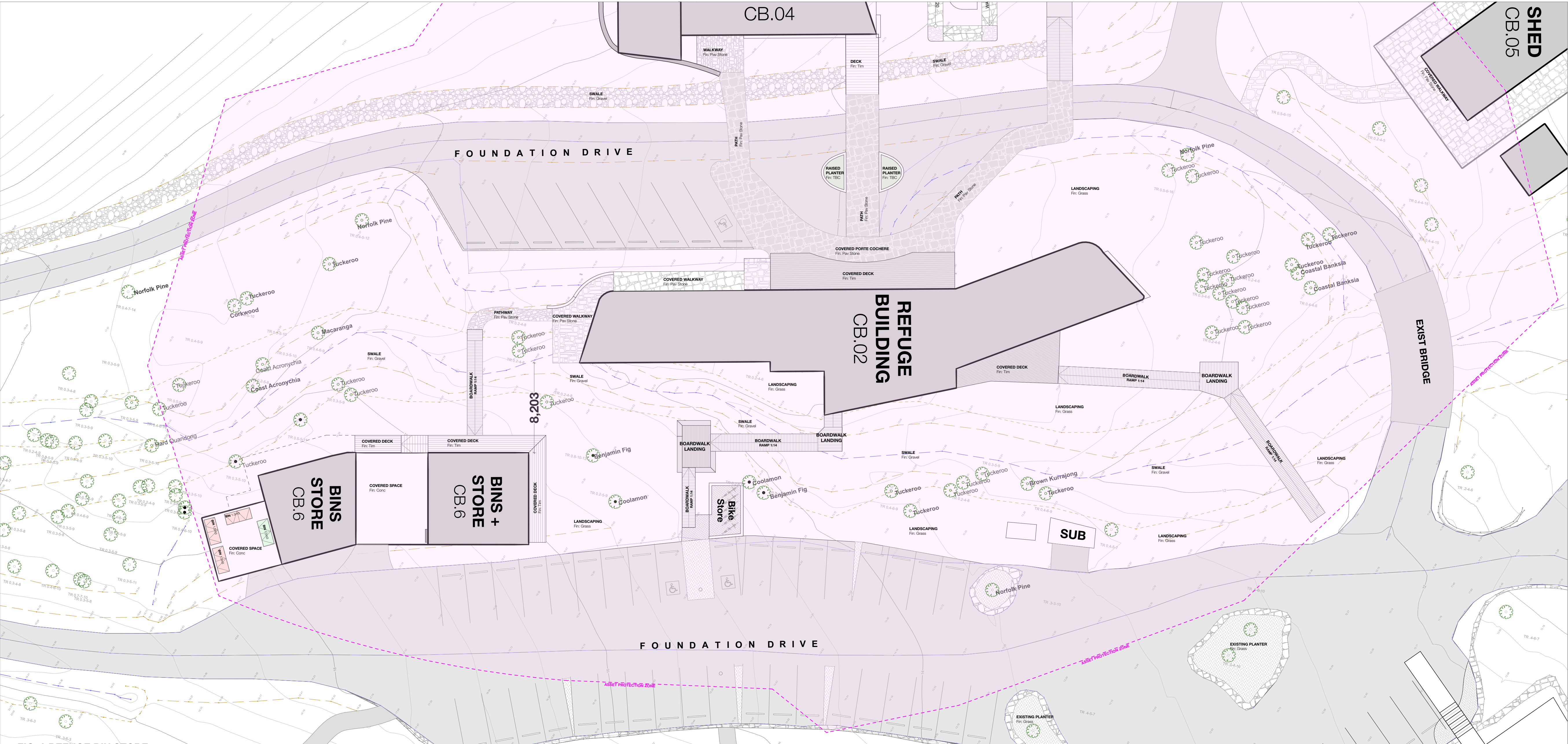
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1 FIG. 2 REFUGE BIN STORE  
Scale 1:200



2 FIG. 3 RAINFOREST RETREAT  
Scale 1:200

VEGETATION ANALYSIS	
Cabin B.4 - To be removed	
402 - Coastal Banksia	
403 - Coastal Banksia	

GENERAL NOTES  
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#### SITE LEGEND

THIS DRAWING IS INDICATIVE ONLY. REFER TO RELEVANT CONSULTANT DRAWINGS FOR ACCURATE DETAIL.

- BOUNDARY
- EXISTING CONTOURS
- EXISTING DRAIN
- TOP OF BANK
- BOTTOM OF BANK
- ASSET PROTECTION ZONE
- 38m AHD CONTOUR
- EXISTING FENCE
- EXISTING TREE

REV	ISSUE NAME	DATE
04	REVISED DA (APPENDICES)	25/1/21

JOB NAME	HGA 206 - ECO TOURISM RETREAT		
CLIENT	Linnaeus Property Trust		
ADDRESS	951 Broken Head Road, BROKEN HEAD		
LOT + DP	LOT. 1 DP. 1031848		

DRAWING: Vegetation Analysis - Fig 2 + 3			
DWG Number	D.02		
SCALE	PAPER	ISSUE	
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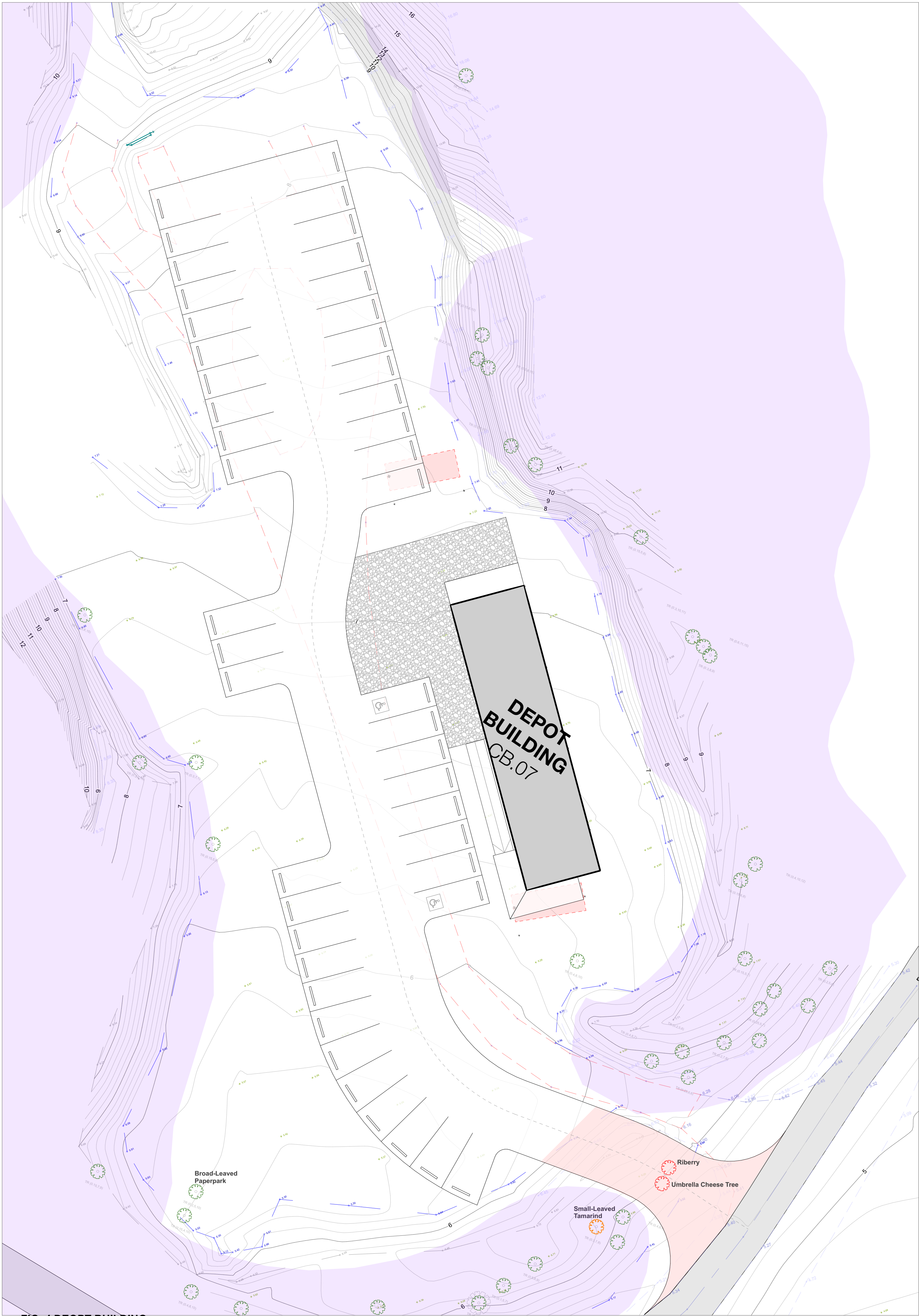


FIG. 4 DEOPT BUILDING

Scale 1:200

GENERAL NOTES  
All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority. Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication. Figured dimensions take precedence - do not scale.

#### SITE LEGEND

THIS DRAWING IS INDICATIVE ONLY.  
REFER TO RELEVANT CONSULTANT  
DRAWINGS FOR ACCURATE DETAIL.

- BOUNDARY
- EXISTING CONTOURS
- EXISTING DRAIN
- TOP OF BANK
- BOTTOM OF BANK
- ASSET PROTECTION ZONE
- 38m AHD CONTOUR
- EXISTING FENCE
- CM SEPP - Coastal Wetlands
- CM SEPP - Littoral Rainforest
- EXISTING TREE
- SPECIES TO BE REMOVED
- THREATENED SPECIES
- EXISTING BUILDINGS
- APPROVED+UNBUILT BUILDINGS
- PROPOSED AND NEW BUILDINGS

REV	ISSUE NAME	DATE
04	REVISED DA (APPENDICES)	25/1/21

JOB NAME  
**HGA 206 - ECO TOURISM RETREAT**

CLIENT  
**Linnaeus Property Trust**

ADDRESS  
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LOT + DP  
**LOT. 1 DP. 1031848**

DRAWING:  
**PRECINCT PLAN B**

DWG Number		ISSUE
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