North Coast Ecology ABN 59 175 957 475

Phil Johnson
c/o Josh Glennon
Project Manager
Email: joshglennon22@gmail.com

10 November 2020

Dear Mr Johnson,

RE : Ecological Constraints Analysis - 43 Synotts Lane, Ocean Shores NSW

Background

This report provides an assessment of potential ecological constraints related to the proposed eco-tourism (primitive camping) facility at 43 Synotts Lane, Ocean Shores - formally described as Lot 3 DP 710680 (the "subject land"). A survey plan showing existing infrastructure and aerial photograph of the subject land is provided in **APPENDIX 1.** A site plan showing the location of proposed camping and recreational areas is provided in **APPENDIX 2.** It is understood that the proposed camping areas, car parking, internal roads, recreational areas and any associated infrastructure will utilise existing cleared areas and will not require the removal of any native vegetation.

Site Assessment

One (1) ecologist from North Coast Ecology inspected the site on 15 September 2020 to identify vegetation and habitat features, predominantly within the south-western portion of the subject land. Brief preliminary observations of adjacent areas were also completed including identification of any potential threatened ecological communities.

All trees within approximately 70m of the existing amenities (A1 shown in **APPENDIX 2**) were identified to species level and details recorded including approximate height, diameter at breast height over bark (DBHOB) and habitat features or other relevant information. Each tree was numbered, flagged with pink flagging tape and position recorded via GPS. Specific details and location of forty-nine (49) individual trees are provided in **APPENDIX 3**.

It should be noted that no targeted threatened flora or fauna surveys were completed as part of this assessment. Fauna assessment was limited to recording general habitat components and opportunistic sightings/call recognition.

Vegetation Formations on the subject land were primarily characterised by forested wetlands with some heathland elements in more elevated areas in the western and northern portions and some rainforest elements, particularly in the lower strata, in the eastern portion. Fringing mangroves occur in intertidal areas associated with the adjacent Brunswick River and Midjumbil Creek.

The majority of the south-western portion of the subject land was observed to be highly modified by historic vegetation clearing and subsequent management (e.g. mowing and track maintenance). Vegetation in this area was comprised of scattered mature trees (or clumps of trees) with midstorey and ground layer predominantly removed. There were regular occurrences of broad-leaved paperbark (*Melaleuca quinqueneriva*), swamp box (*Lophostemon suaveolens*) and flooded gum (*Eucalyptus grandis*). A small number of the primary koala food tree species swamp mahogany (*Eucalyptus robusta*) was observed generally between the existing storage shed and proposed site 5 (**APPENDIX 2**).

Although the ground layer of cleared areas was highly modified and dominated by exotic grasses, native flora species were also observed in some areas including *Pomax umbellata,* sandfly zieria (*Zieria smithii*), scrambling lily (*Geitonoplesium cymosum*), wild violet (*Viola banksii*), midgen berry (*Austromyrtus dulcis*), blue flax-lily (*Dianella caerulea*), lawyer vine (*Smilax australis*), climbing guinea flower (*Hibbertia scandens*), spiny-headed mat-rush (*Lomandra longifolia*), Australian basket grass (*Oplismenus aemulus*), slender flat sedge (*Cyperus gracilis*) and bonnet orchid (*Cryptostylis erecta*). In the vicinity of trees No. 41 – 49 some disturbed midstorey vegetation was present to a height of approximately 1.5m including *Baeckea fruitescens,* common bracken (*Pteridium esculentum*) and introduced species including lantana (*Lantana camara*), winter senna (*Senna pendula* var. *glabrata*) and bird of paradise (*Strelitzia* sp.) plantings.

Identified Ecological Constraints

- **Biodiversity Values Mapping**

The Biodiversity Values (BV) Map identifies land with high biodiversity value that is particularly sensitive to impacts from development and clearing. The BV Map and Threshold Tool was used to determine the location of any biodiversity values mapped areas under the *Biodiversity Conservation Act 2016* (BC Act). This mapping is provided in **APPENDIX 4**. Impacts on these areas would trigger the Biodiversity Offset Scheme (BOS) and require the preparation of a Biodiversity Development Assessment Report (BDAR). Native vegetation clearing that exceeds the Area Threshold of 0.5 ha would also trigger the BOS and require a BDAR.

- **State Environmental Planning Policy (Koala Habitat Protection) 2019 (Koala SEPP)**

The Koala SEPP works with the Koala Habitat Protection Guideline (KHPG) to guide councils developing Koala Plans of Management and ensure koala habitat is considered during the development assessment process where no Koala Plan of Management (KPoM) is in place. Where an approved KPoM applies to land subject to a development application (DA), the DA must be consistent with that KPoM. In the Byron Shire, the Byron Coast Comprehensive Koala Plan of Management applies to lands within the Koala Planning Area shown in **APPENDIX 5.** This area includes the subject land. For reference the Koala Development Application Map is also provided in relation to the subject land in **APPENDIX 6**.

The KHPG provides criteria for whether a development application falls into Tier 1 (low or no impact to koala habitat) or Tier 2 (impacts koalas or koala habitat). Tier 1 applications do not need further assessment under the Koala SEPP. Tier 2 applications require a suitably qualified and experienced person to conduct a survey for core koala habitat and the preparation of a Koala Assessment Report. The criteria for meeting the Tier 1 process is as follows:

1. onsite or aerial photography is sufficient evidence to demonstrate that the development

does not involve and will not result in clearing of regionally relevant trees of the species listed in Schedule 2 of the Koala SEPP, and

2. the development is below the Biodiversity Offsets Scheme threshold under the BC Act, or
3. council agrees the proposed development will have low or no impact on koalas or koala habitat on a case by case basis.

If the development cannot either meet the first two criteria OR criteria 3 above, it must progress as a Tier 2 development application.

- **Byron Shire Council Mapping and Development Control Plan 2014**

Land identified in the Byron Shire Council mapping as "Areas of High Environmental Value" are mapped across the majority of the subject land, with the exception of previously cleared areas. This mapping is provided in **APPENDIX 7** and specifically relates to vegetation types on the subject land that represent endangered ecological communities and/or threatened species habitat and/or wildlife corridors**.** Further details on determining the ecological value of native vegetation in Byron Shire are provided in the Byron Biodiversity Conservation Strategy 2004 prepared by Bryon Shire Council.

The Byron Shire Council Development Control Plan 2014 (DCP) provides that any application for vegetation removal should be supported by a Flora and Fauna assessment report as specified in Appendix B2.4 of Chapter B2 – Preservation of Trees and Other Vegetation. The report would need to be prepared in accordance with the Threatened Species Test of Significance Guidelines, prepared under section 7.3(2) of the BC Act, to determine whether the proposal is likely to significantly affect threatened species or ecological communities.

Section 7.2 of the BC Act provides that development under the *Environmental Planning and Assessment Act 1979* (EP&A) is likely to significantly affect threatened species if:

(a) it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3, or

(b) the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values, or

(c) it is carried out in a declared area of outstanding biodiversity value.

If the test of significance indicates that a significant effect on threatened species or ecological communities or their habitat is likely, the Biodiversity Offsets Scheme will apply to the proposed development and a Biodiversity Development Assessment Report will be required.

If the test of significance indicates that a significant effect on threatened species or ecological communities or their habitat is unlikely, and the BOS threshold has not been exceeded, the BOS will not apply.

As provided in Section B2.2.2 of Chapter B2 of the DCP, conditions are likely to be placed on the development consent for any approved vegetation clearing in regards to compensatory planting. A compensatory planting rate of 1:10 applies to trees of high ecological value e.g. 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 >50cm. Some vegetation on the subject land is considered to satisfy a number of these criteria, particularly the mapped "Areas of High Environmental Value".

- **Cape Byron Marine Park**

The Cape Byron Marine Park (CBMP) covers approximately 22,000 hectares, extending from Brunswick Heads in the north to Lennox Head in the south. The CBMP includes all of the seabed and extends seaward from the mean high-water mark to the three nautical mile limit of State waters. The tidal waters of the Brunswick River and its tributaries, as well as, Belongil Creek and Tallow Creek are also within the Marine Park.

The CBMP Zoning Plan is intended to enhance the conservation of marine habitats and species by providing various levels of protection. The zoning ensures that all estuaries, beaches and intertidal rocky shores that are not included within sanctuary zones, are included in habitat protection zones (HPZs) or, for management reasons, in special purpose zones.

Waterways adjacent to the subject land (i.e. Brunswick River and Midjumbil Creek) are mapped as HPZs (**APPENDIX 8**). HPZs conserve marine biodiversity by protecting habitats and reducing high impact activities. Recreational fishing, some forms of commercial fishing, tourist activities and fishing competitions are permitted in habitat protection zones. It is not expected that the proposal would be inconsistent with the adjacent CBMP zoning.

- **Threatened Ecological Communities**

Vegetation in the eastern portion of the subject land is considered to represent a matrix of the following Plant Community Types (PCTs) in accordance with the BioNet Vegetation Classification system. Varying levels of disturbance (e.g. tracks) and occurrence of camphor laurel (*Cinnamomum camphora*) and other common weed species were observed across these PCTs:

  - PCT 1064 – Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion. This PCT is associated with the Threatened Ecological Community – Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions[1]; and
  - PCT 1235 – Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion. This PCT is associated with the Threatened Ecological Community – Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions[2].

These areas broadly correspond with the Biodiversity Values mapped areas shown in **APPENDIX 3**. Impacts on these PCTs would potentially trigger BOS requirements under the BC Act. Impacts on these PCTs may also result in Tier 2 requirements in accordance with the Koala SEPP.

- **Threatened Flora and Fauna Species**

Searches of the NSW BioNet Atlas and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool revealed records of fifty-three

[1] Listed as Endangered under the BC Act
[2] Listed as Endangered under the BC Act and EPBC Act

(53) threatened fauna species (excluding marine species) and forty-two (42) threatened flora species as occurring, potentially occurring, or provided with suitable habitat within 5 km of the subject land. These are provided in **APPENDIX 9** along with an assessment of the likelihood of occurrence of each species. It should be noted that the likelihood of occurrence assessment has been made only on a preliminary assessment of site habitats and the author's local knowledge of these species. It has not involved any targeted surveys or detailed analysis.

One (1) threatened fauna species was recorded during the site inspection – white-eared monarch[3] (*Carterornis leucotis*). A single bird was identified by call recognition and subsequently directly observed within swamp sclerophyll forest approximately 50 m east of the existing site office (location of sighting at Easting 550983 Northing 6843624). One (1) threatened fauna species is considered likely to occur from time to time due to plentiful forage resources and high mobility of the species – grey-headed flying-fox[4] (*Pteropus poliocephalus*). An additional twenty-five (25) threatened fauna species are considered as possible occurrences on the subject land due to the presence of potentially suitable habitat components (refer **APPENDIX 9**).

No threatened flora species were observed during the site inspection. However, as previously mentioned, targeted surveys were not performed. On the basis of potentially suitable habitat, nine (9) threatened flora species are considered to have some potential for occurrence on the subject land (refer **APPENDIX 9**).

Summary and Recommendations

It is understood that no native vegetation removal is intended as part of the proposed primitive camping facility. Therefore, it is possible that impacts on the identified ecological constraints could be minimised to acceptable levels. Subsequently, the controls and requirements of the associated legislation, policies and plans described in this ECA may not be triggered. However, it is recommended that the proposed action be designed and completed in a manner that considers the identified constraints, in particular the above threatened flora and fauna species and their habitats at the subject land.

Disturbance and indirect impacts associated with the proposal should be minimised as far as possible by locating camping sites and associated infrastructure (e.g. driveways, car parking, walking tracks, amenities etc.) within previously cleared areas, preferably with set-backs to intact habitat areas. Visitors should also be encouraged to refrain from activities that would result in additional disturbance including vegetation trampling, inappropriate fires/fire wood collection, littering, noise and light pollution. Appropriate speed limits should also be enforced to minimise the likelihood of vehicle related fauna injury or mortality. Similarly, pet cats and dogs should not be permitted.

[3] Listed as Vulnerable under the BC Act
[4] Listed as Vulnerable under the BC Act and EPBC Act

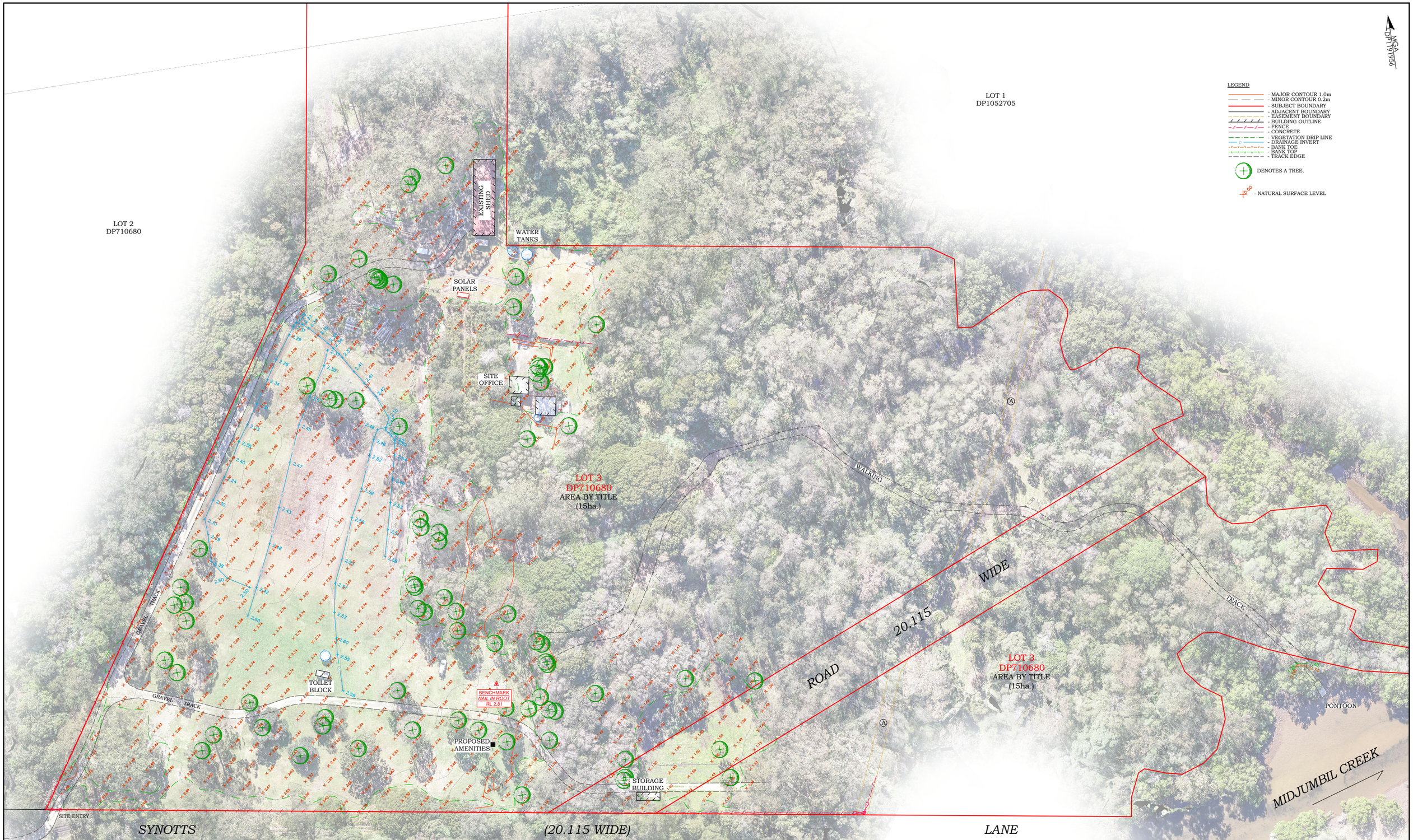
Please feel free to contact me should you have any queries or require further information.

Yours sincerely,

Matt Jenkins
Principal Ecologist

North Coast Ecology
PO Box 314, Ballina NSW 2478
Ph: 02 6687 6034
Mob: 0413 744 170
Email: matt@northcoastecology.com.au

APPENDIX 1 – Site Plan and Aerial Photograph of the Subject Land



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REV	DATE	DESCRIPTION
1	10/08/2020	ORIGINAL ISSUE

PROJECT	OSH009
SURVEYOR	WN & LF
SURVEY DATE	05/08/2020
FIELD BOOK ID	TSC3#1
PLAN BY	LF
APPROVED BY	WN

MGA GDA2020	HZ DATUM
GNSS	ORIGIN
AHD	VT DATUM
PM75849	ORIGIN
5.754	LEVEL
01/08/2020	SCIMS

0 10 20 30m
1:600 - A1

IMPORTANT NOTICE:
THIS PLAN MAY HAVE BEEN CHANGED DURING PRINTING OR REFORMATTING. THE SCALE SHOULD THEREFORE BE VERIFIED PRIOR TO USE. ANY DIMENSIONS SHOWN ON THIS PLAN OVERRULE SCALING.

PLAN OF DETAIL SURVEY
PART OF

LOT 3 IN DP710680
43 SYNOTTS LANE
OCEAN SHORES

CLIENT: BRUNS RIVER CAMP
DWG No: OSH009.DWG
SH: 1 OF 1

Ⓐ - EASEMENT FOR SEWER RISING MAIN 4 WIDE & VARIABLE (DP1191956)

DISCLAIMER

BOUNDARIES HAVE NOT BEEN INVESTIGATED IN ACCORDANCE WITH THE PROVISIONS OF THE SURVEYING & SPATIAL INFORMATION ACT, 2017 AND ARE INDICATIVE BASED ON THE LATEST SURVEY RECORDS AVAILABLE FROM LAND REGISTRY AT THE TIME OF SURVEY. NO RESPONSIBILITY CAN BE TAKEN FOR SURVEYS AT A LATER DATE WHICH MAY VARY BOUNDARY DIMENSIONS. ANY EASEMENTS WHETHER REGISTERED OR IMPLIED HAVE NOT BEEN INVESTIGATED.

THE POSITIONAL ACCURACY OF ANY CRITICAL FEATURE REQUIRES CONFIRMATION PRIOR TO ITS USE IN DESIGN OR CONSTRUCTION.

UNDERGROUND SERVICES HAVE NOT BEEN INVESTIGATED. CONSULT WITH "DIAL BEFORE YOU DIG" PRIOR TO ANY EXCAVATION WORKS.

APPENDIX 2 – Proposed Layout Site Plan

BUILDINGS LEGEND

WS	WORKSHOP
A1	AMENITIES 1
A2	AMENITIES 2
SS	STORAGE SHED
wt	WATER TANKS
⊠	6.0 x 2.5 PARKING SPACE
▒	RECREATIONAL AREAS
▨	CAMPING AREAS 1-10

WS

wt wt

wt

L0T 3
DP 710680
15ha

SITE 10
896m²

SITE 9
945m²

1256m

SITE 8
1018m²

wt

2.0m

A1

SITE 7
1405m²

SITE 6
1411m²

4201m²

SITE 1
1112m²

SITE 2
991m²

SITE 3
1087m²

SITE 4
1000m²

SITE 5
948m²

SS

ENTRY DRIVE

EXISTING / PROPOSED LAYOUT SITE PLAN

Proposed Primitive Camping
at 43 Synotts Lane, Ocean Shores

owner
c/o Josh Glennon
Project Manager

scale
1 : 1000
@ A3

date
Sept 2020

NORTH

128 Old Bangalow Rd
Byron Bay , 2481
ph : 0419 880048
email : divrobinson@gmail.com

Issue A

APPENDIX 3 – Details of Individual Trees Recorded on the Subject Land

Tree number	Scientific name	Common name	Approx. DBHOB (mm)	Approx. Height (m)	Notes
1	*Lophostemon suaveolens*	Swamp box	330	7	Multi-stemmed
2	*Lophostemon suaveolens*	Swamp box	370	8	
3	*Lophostemon suaveolens*	Swamp box	300	7	
4	*Lophostemon suaveolens*	Swamp box	250	6	
5	*Eucalyptus grandis*	Flooded gum	550	15	
6	*Lophostemon suaveolens*	Swamp box	340	7	
7	*Lophostemon suaveolens*	Swamp box	355	8	
8	*Lophostemon suaveolens*	Swamp box	280	7	
9	*Eucalyptus grandis*	Flooded gum	700	18	
10	*Melaleuca quinquenervia*	Broad-leaved paperbark	435	8	
11	*Lophostemon suaveolens*	Swamp box	260	7	
12	*Eucalyptus grandis*	Flooded gum	900	18	

Tree number	Scientific name	Common name	Approx. DBHOB (mm)	Approx. Height (m)	Notes
13	*Lophostemon suaveolens*	Swamp box	470	7	
14	*Lophostemon suaveolens*	Swamp box	410	7	
15	*Callistemon salignus*	Willow bottlebrush	240	8	Multi-stemmed
16	*Callistemon salignus*	Willow bottlebrush	660	7	Split trunk
17	*Eucalyptus grandis*	Flooded gum	780	18	Small hollow in trunk and Magpie lark nest in outer branch
18	*Lophostemon suaveolens*	Swamp box	275	5	Multi-stemmed
19	*Syzygium oleosum*	Blue lilly pilly	190	5	Multi-stemmed
20	*Syzygium oleosum*	Blue lilly pilly	275	5	Multi-stemmed
21	*Syzygium oleosum*	Blue lilly pilly	340	5	Multi-stemmed
22	*Callistemon salignus*	Willow bottlebrush	320	7	
23	*Syzygium oleosum*	Blue lilly pilly	280	8	Multi-stemmed
24	*Corymbia intermedia*	Pink bloodwood	620	12	
25	*Melaleuca quinquenervia*	Broad-leaved paperbark	440	9	Multi-stemmed
26	*Melaleuca quinquenervia*	Broad-leaved paperbark	640	10	
27	*Lophostemon suaveolens*	Swamp box	530	10	
28	*Eucalyptus resinifera*	Red mahogany	620	12	Dieback present
29	*Clerodendrum floribundum*	Lolly bush	300	7	
30	*Lophostemon suaveolens*	Swamp box	345	7	
31	*Lophostemon suaveolens*	Swamp box	450	10	
32	*Melaleuca quinquenervia*	Broad-leaved paperbark	450	11	
33	*Acacia disparrima* subsp. *disparrima*	Salwood	560	8	Multi-stemmed Senescent and split
34	*Melaleuca quinquenervia*	Broad-leaved paperbark	270	10	Multi-stemmed
35	*Melaleuca quinquenervia*	Broad-leaved paperbark	660	12	
36	*Melaleuca quinquenervia*	Broad-leaved paperbark	460	11	
37	*Melaleuca quinquenervia*	Broad-leaved paperbark	480	12	
38	*Melaleuca quinquenervia*	Broad-leaved paperbark	460	11	
39	*Melaleuca quinquenervia*	Broad-leaved paperbark	520	12	
40	*Melaleuca quinquenervia*	Broad-leaved paperbark	450 x 3	12	Multi-stemmed
41	*Melaleuca quinquenervia*	Broad-leaved paperbark	450	10	
42	*Melaleuca quinquenervia*	Broad-leaved paperbark	430	11	
43	*Melaleuca quinquenervia*	Broad-leaved paperbark	340 x 2	11	Multi-stemmed
44	*Melaleuca quinquenervia*	Broad-leaved paperbark	530	10	Multi-stemmed

Tree number	Scientific name	Common name	Approx. DBHOB (mm)	Approx. Height (m)	Notes
45	*Eucalyptus grandis*	Flooded gum	380 x 2	14	Multi-stemmed
46	*Melaleuca quinquenervia*	Broad-leaved paperbark	450	12	
47	*Melaleuca quinquenervia*	Broad-leaved paperbark	400	11	
48	*Melaleuca quinquenervia*	Broad-leaved paperbark	400	10	
49	*Melaleuca quinquenervia*	Broad-leaved paperbark	300	10	

APPENDIX 4 – BOSET Report

Biodiversity Offset Scheme (BOS) Entry Threshold Map

217.6 0 108.79 217.6 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days

Notes

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Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	11/09/2020 1:57 PM		**BDAR Required***
Total Digitised Area	1.16	ha	
Minimum Lot Size Method	Lot size		
Minimum Lot Size	16.04	ha	
Area Clearing Threshold	0.5	ha	
Area clearing trigger Area of native vegetation cleared	Unknown #		Unknown #
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no		no
Date of the 90 day Expiry	N/A		

*If BDAR required has:

- at least one 'Yes': you have exceeded the BOS threshold. You are now required to submit a Biodiversity Development Assessment Report with your development application. Go to https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor to access a list of assessors who are accredited to apply the Biodiversity Assessment Method and write a Biodiversity Development Assessment Report
- 'No': you have not exceeded the BOS threshold. You may still require a permit from local council. Review the development control plan and consult with council. You may still be required to assess whether the development is '"likely to significantly affect threatened species' as determined under the test in s. 7.3 of the Biodiversity Conservation Act 2016. You may still be required to review the area where no vegetation mapping is available.

Where the area of impact occurs on land with no vegetation mapping available, the tool cannot determine the area of native vegetation cleared and if this exceeds the Area Threshold. You will need to work out the area of native vegetation cleared - refer to the BOSET user guide for how to do this.

On and after the 90 day expiry date a BDAR will be required.

Disclaimer

This results summary and map can be used as guidance material only. This results summary and map is not guaranteed to be free from error or omission. The State of NSW and Office of Environment and Heritage and its employees disclaim liability for any act done on the information in the results summary or map and any consequences of such acts or omissions. It remains the responsibility of the proponent to ensure that their development application complies will all aspects of the *Biodiversity Conservation Act 2016.*

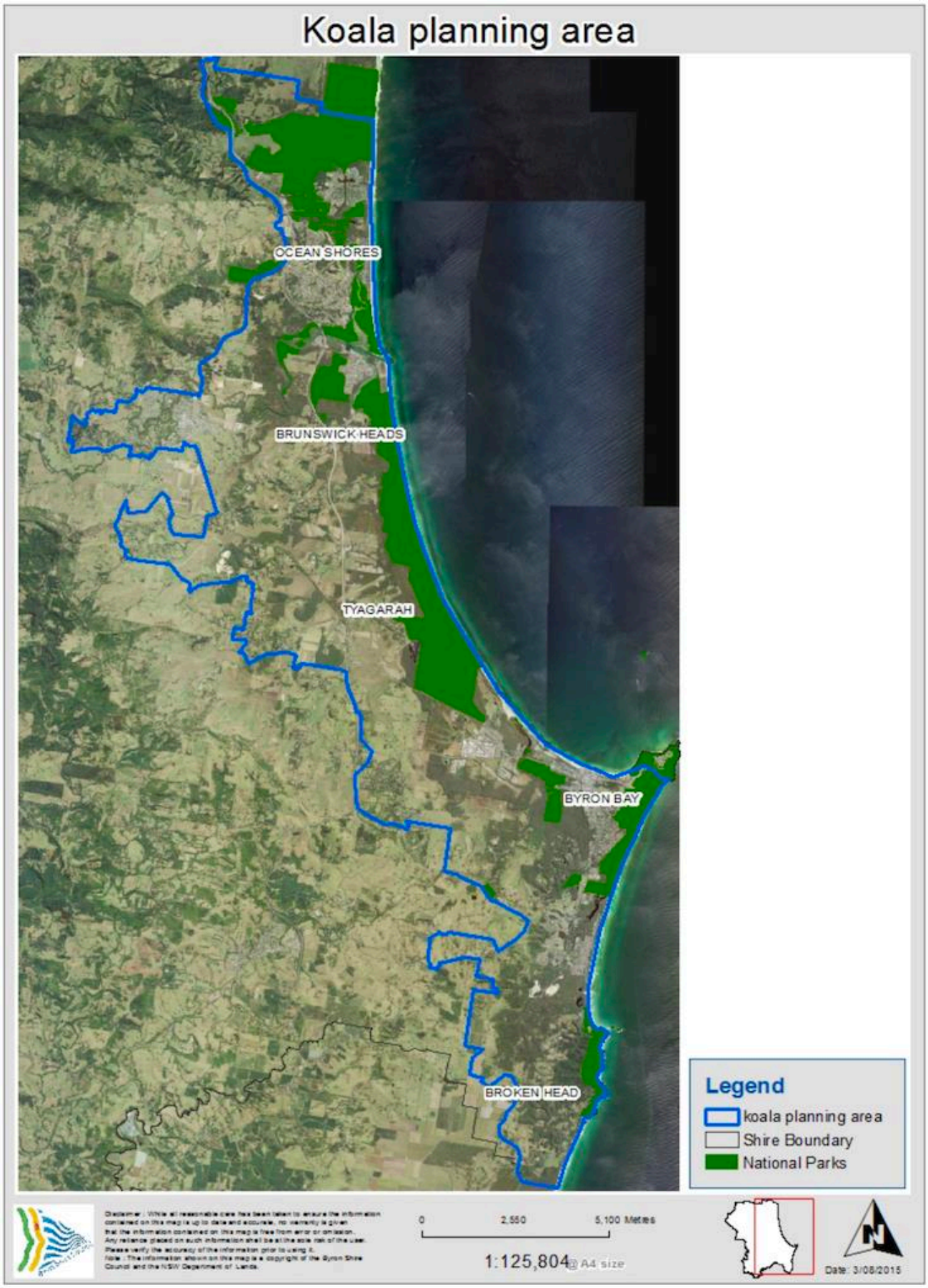
The mapping provided in this tool has been done with the best available mapping and knowledge of species habitat requirements. This map is valid for a period of 30 days from the date of calculation (above).

Acknowledgement

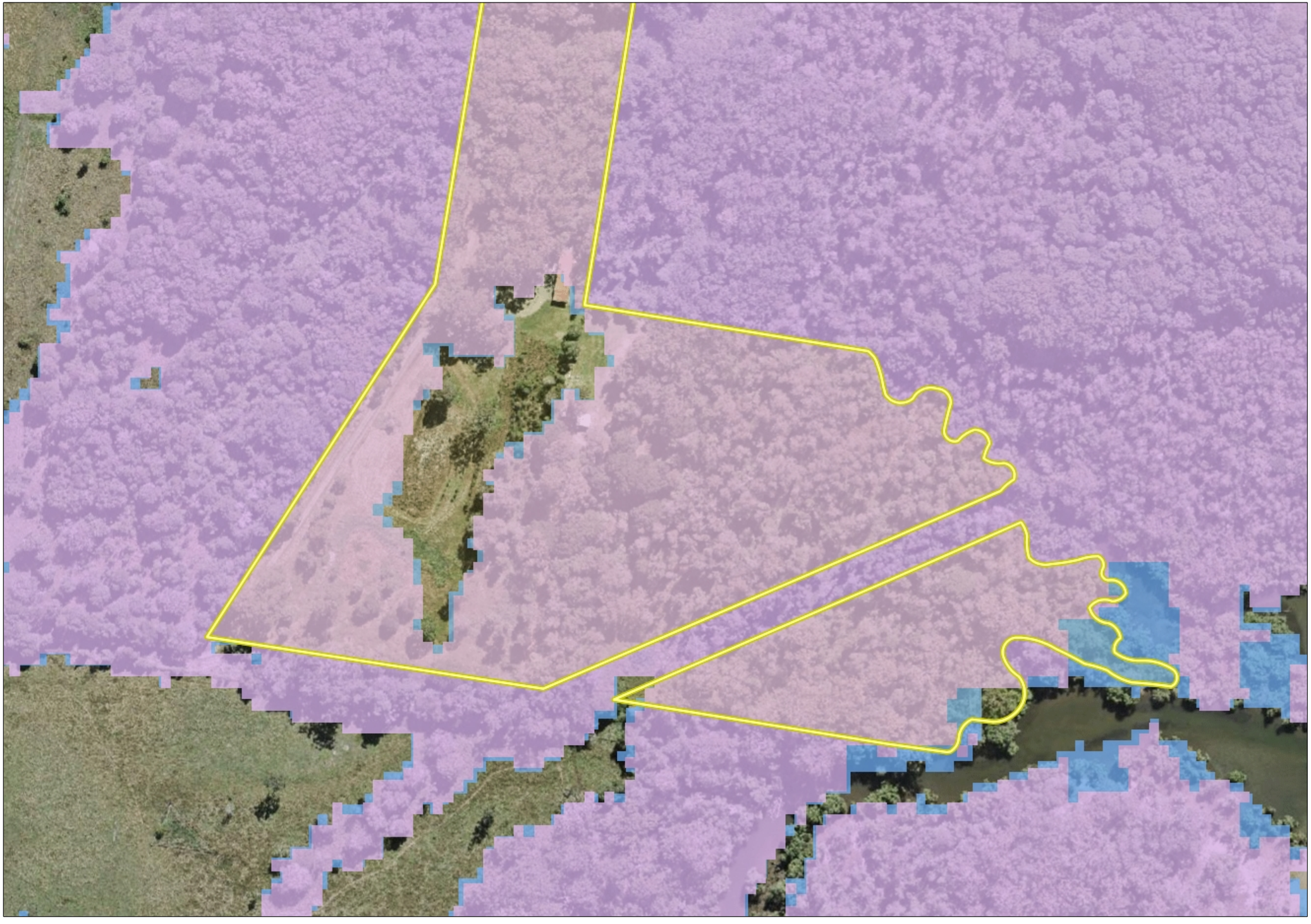
I as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature_____ Date:11/09/2020 01:57 PM

APPENDIX 5 – Byron Coast Comprehensive KPoM Koala Planning Area



APPENDIX 6 – Koala Habitat Protection SEPP Mapping



Planning, Industry & Environment

NSW GOVERNMENT

SEPP - Koala Habitat

Legend

Land Application Map

Koala Development Application Map

Site Investigation Area for Koala Plans of Management Map

Notes:

0 0.02 0.0 0.10 kilometres

Koala Habitat Protection

Map created: 21-Sep-2020

The information in this map is correct to the best of our knowledge. No warranty or guarantee is provided and no liability is accepted for any loss or damage resulting from any person relying upon or using the information contained in the map.

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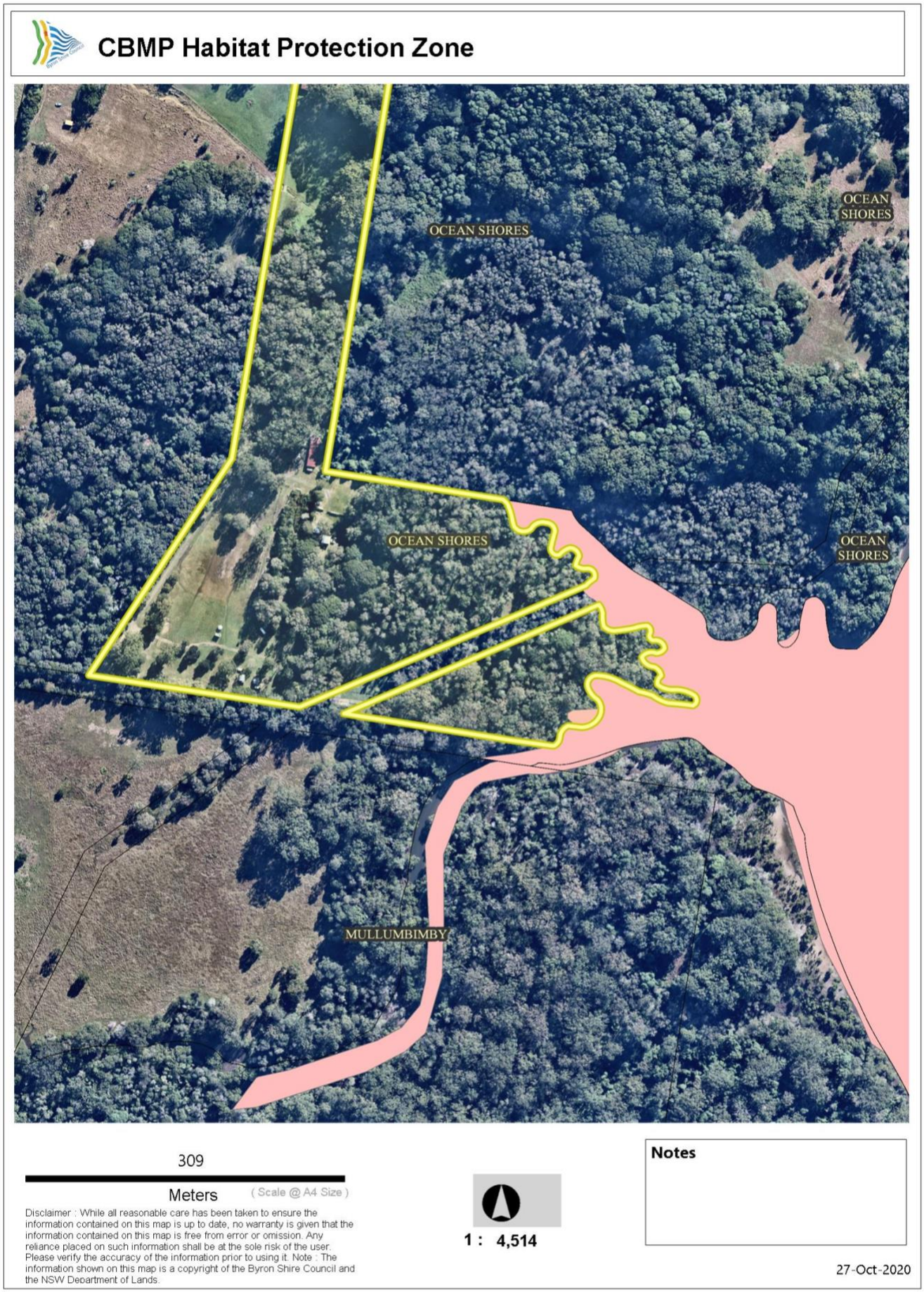
Imagery © NSW Dept Customer Services
Basemap © OpenStreetMap

APPENDIX 7 – Byron Shire Council Areas of High Environmental Value (2017)

APPENDIX 8 – Cape Byron Marine Park - Habitat Protection Zone



APPENDIX 9 – Likelihood of Occurrence of Threatened Species Previously Recorded in the Locality

Scientific Name	Common Name	BC Act	EPBC Act	Likelihood of occurrence on the subject land
Fauna				
Crinia tinnula	Wallum froglet	V	-	**Possible** – Although primary habitat is not considered to occur on the subject land (i.e. sedgelands and wet heathlands associated with acidic swamps on coastal sand plains) this species occasionally occurs in swamp sclerophyll forest
Litoria olongburensis	Olongburra frog	V	-	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. wallum swamps with emergent sedges of upright species such as *Lepironia* spp., *Baumea* spp. and *Schoenus* spp.
Anseranas semipalmata	Magpie goose	V	-	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. shallow wetlands (< 1m deep) with dense growth of rushes or sedges
Stictonetta naevosa	Freckled duck	V	-	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree
Ptilinopus magnificus	Wompoo fruit-dove	V	-	**Possible** – This species occurs in, or near rainforest, low elevation moist eucalypt forest and brush box forests. Fruit producing trees on the subject land (e.g. figs and rainforest shrubs) may provide potential foraging resources.
Ptilinopus regina	Rose-crowned fruit-dove	V	-	**Possible** – This species occurs mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful. Fruit producing trees on the subject land (e.g. figs and rainforest shrubs) may provide potential foraging resources.
Ptilinopus superbus	Superb fruit-dove	V	-	**Possible** – This species inhabits rainforest and similar closed forests where if forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. Fruit producing trees on the subject land (e.g. figs and rainforest shrubs) may provide potential foraging resources.
Hirundapus caudacutus	White-throated needletail	-	V	Unlikely – This species is almost exclusively aerial and is recorded mostly above wooded areas including open forest, rainforest, heathland and less often over treeless areas such as grassland,

				swamps, sandy beaches or mudflats
Ephippiorhynchus asiaticus	Black-necked stork	E	-	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. floodplain or coastal sandplain wetlands with shallow water. As secondary habitat for this species includes estuaries, intertidal areas of the adjacent Brunswick River may provide potential habitat.
Botaurus poiciloptilus	Australasian bittern	E	E	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. permanent freshwater wetlands with tall, dense vegetation, particularly with bullrushes (*Typha* spp.) and spikerushes (*Eleocharis* spp.)
Ixobrychus flavicollis	Black bittern	V	-	**Possible** – This species inhabits both terrestrial and estuarine wetlands with permanent water and dense vegetation. May occur in flooded grassland, forest, woodland, rainforest and mangroves where permanent water is present. Swamp sclerophyll forest and adjacent mangrove forest may provide potential habitat for this species.
Circus assimilis	Spotted harrier	V	-	Unlikely – Occurs in grassy woodland including *Acacia* and mallee remnants, inland riparian woodland, grassland and shrub steppe. Found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of wetlands.
Haliaeetus leucogaster	White-bellied sea-eagle	V	-	**Possible** – Habitat for this species is characterised by the presence of large areas of open water including larger rivers, swamps, lakes and the sea. Estuarine habitats to the east of the subject land are likely to provide suitable habitat.
Hieraaetus morphnoides	Little eagle	V	-	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. open eucalypt forest, woodland or open woodland. Sheoak or *Acacia* woodlands and riparian woodlands of interior NSW are also used.
Pandion cristatus	Eastern Osprey	V	-	**Possible** – This species favours coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. Nests are made high up in dead trees or dead crowns of live trees, usually within 1km of the sea. Nearby estuarine habitats are known to provide suitable habitat.
Falco subniger	Black falcon	V	-	Unlikely - The Black Falcon is widely, but sparsely, distributed in

				New South Wales, mostly occurring in inland regions. Some reports of 'Black Falcons' on the tablelands and coast of New South Wales are likely to be referable to the Brown Falcon.
Grus rubicunda	Brolga	V	-	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. freshwater wetlands and shallow swamps
Amaurornis moluccana	Pale-vented bush hen	V	-	**Possible** – Inhabits tall dense understorey or ground-layer vegetation on the margins of freshwater streams and natural or artificial wetlands, usually within or bordering rainforest, rainforest remnants or forests. Can also occur in and around mangroves, though rarely do so, if at all, in NSW.
Burhinus grallarius	Bush Stone-curlew	E	-	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. open forests and woodlands with a sparse grassy ground layer and fallen timber. Fallen timber has been removed from areas with managed ground layer. Other vegetated areas have dense ground layer.
Irediparra gallinacea	Comb-crested jacana	V	-	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. permanent freshwater wetlands, either still or slow-flowing, with a good surface cover of floating vegetation, especially water-lilies, or fringing and aquatic vegetation
Rostratula australis	Australian painted snipe	E	E	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. fringes of terrestrial freshwater (occasionally brackish) wetlands, swamps, dams and nearby marshy areas where there is a cover or grasses, lignum, low scrub or open timber
Calidris ferruginea	Curlew sandpiper	E	CE	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. intertidal mudflats and nearby shallow water, non-tidal swamps, lakes and lagoons. Roosts on shingle, shell or sand beaches; spits or islets or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. Intertidal areas adjacent to the subject land may provide some limited forage habitat for this species.
Numenius madagascariensis	Eastern curlew	-	CE	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. coastal lakes, inlets, bays and estuarine habitats including intertidal mudflats and sometimes saltmarsh of sheltered coasts. Occasionally occurs on

				ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. Roosts on sandy spits and islets, especially on dry beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. May also roost on wooden oyster leases or other similar structures. Intertidal areas adjacent to the subject land may provide some limited forage habitat for this species and mangrove forest may provide potential roost habitat.
Calyptorhynchus lathami	Glossy black-cockatoo	V	-	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. open forest and woodlands of the coast and the Great Dividing Range where stands of suitable sheoak species occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods and these are not present on the subject land.
Cyclopsitta diophthalma coxeni	Coxen's fig parrot	CE	E	**Possible** – Usually recorded from drier rainforests and adjacent wetter eucalypt forest but rarely seen due to its small size and cryptic habits. Also found in the wetter lowland rainforests that are now largely cleared in NSW. Shows a decided preference for fig trees, but also feeds on other fruiting rainforest species, lichen, nectar and grubs. Fruit producing trees on the subject land (e.g. figs and rainforest shrubs) may provide potential foraging resources.
Lathamus discolor	Swift parrot	E	CE	**Possible** - Migrates to the Australian south-east mainland between February and October. Following winter, they return to Tasmania where they breed from September to January. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. The favoured feed tree swamp mahogany (*Eucalyptus robusta*) is present in low numbers on the subject land. These may provide limited forage habitat during winter flowering period.
Ninox connivens	Barking owl	V	-	**Possible** - Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Nests in hollows of large, old trees. Living eucalypts are preferred though dead trees are

				also used. Subject land may form part of a much larger home range for this species.
Tyto longimembris	Eastern grass owl	V	-	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains.
Todiramphus chloris	Collared kingfisher	V	-	**Possible** – This species is virtually restricted to mangrove associations of estuaries, inlets, sheltered bays and islands, and the tidal flats and littoral zone bordering mangroves. They are sometimes seen in streets or gardens in built-up areas bordering mangrove vegetation. Nests are usually in holes in trunks of large, live or dead mangrove trees, though they sometimes nest in hollows or in arboreal termite nests in large eucalypts or paperbarks adjacent to mangroves or estuarine foraging habitats.
Anthochaera phrygia	Regent honeyeater	CE	CE	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak.
Lichenostomus fasciogularis	Mangrove honeyeater	V	-	**Possible** – This species is generally restricted to mangrove associations but also range into adjacent forests, woodlands and shrublands, including casuarina and paperbark swamp forests and associations dominated by eucalypts or banksias. Sometimes forage among flowering trees and shrubs in adjacent habitats. Nearly always nest in densely foliaged mangrove tree.
Coracina lineata	Barred cuckoo-shrike	V	-	**Possible** – Inhabits rainforest, eucalypt forests and woodlands, clearings in secondary growth, swamp woodlands and timber along watercourses. They are usually seen in pairs or small flocks foraging among foliage of trees for insects and fruit. Fruit producing trees on the subject land (e.g. figs and rainforest shrubs) may provide potential foraging resources.
Artamus cyanopterus cyanopterus	Dusky woodswallow	V	-	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris.

Carterornis leucotis	White-eared monarch	V	-	**Recorded onsite** – In NSW this species occurs in rainforest, especially drier types, such as littoral rainforest, as well as wet and dry sclerophyll forests, swamp forest and regrowth forest.
Petroica boodang	Scarlet robin	V	-	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. dry eucalypt forests and woodlands with open grassy understorey and few scattered shrubs.
Dasyurus maculatus	Spotted-tailed quoll	V	E	Unlikely – This species is known to utilise a range of habitats including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. However, the general lack of hollow-bearing trees, fallen logs, caves and rocky outcrops on the subject land is likely to preclude the occurrence of this species.
Planigale maculata	Common planigale	V	-	**Possible** – Some potentially suitable habitat is considered to occur on the subject land i.e. rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas where there is sufficient surface cover (e.g. shrubs and fallen timber). Previously cleared areas are not considered to represent suitable habitat due to lack of surface cover.
Phascolarctos cinereus	Koala	V	V	**Possible** – A small number of primary koala food trees (*Eucalyptus robusta*) were observed on the subject land generally between the existing storage shed and proposed site 5 (APPENDIX 2). However, no koalas or evidence of recent or historic koala activity (e.g. faecal pellets) was detected despite searches around the base of food trees.
Petaurus norfolcensis	Squirrel glider	V	-	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or *Acacia* midstorey. Requires abundant tree hollows for refuge and nest sites.
Potorous tridactylus	Long-nosed potoroo	V	V	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. coastal heaths and dry and wet sclerophyll forests with suitably dense understorey consisting of grass-trees, sedges, ferns or heath, or of low shrubs of

				tea-trees or melaleucas. However, vegetation to the immediate west of the subject land may provide some potential habitat.
Nyctimene robinsoni	Eastern tube-nosed bat	V	-	Unlikely – Suitable habitat is not considered to occur on the subject land i.e. streamside habitats within coastal subtropical rainforest and moist eucalypt forests with a well-developed rainforest understorey.
Pteropus poliocephalus	Grey-headed flying-fox	V	V	**Likely** – This highly mobile species is likely to occasionally forage on flowering eucalypt species and fruit producing trees (e.g. fig) occurring on subject land
Syconycteris australis	Common blossom-bat	V	-	**Possible** – Inhabits littoral rainforest, 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. Generally roost individually in dense foliage and vine thickets of the sub-canopy.
Micronomus norfolkensis	Eastern coastal free-tailed bat	V	-	**Possible** – Inhabits dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost maily in tree hollows but will also roost under bark or in man-made structures.
Myotis macropus	Southern myotis	V	-	Unlikely – The distance to water bodies is likely to preclude the occurrence of this species on the subject land. Forages over streams and pools catching insects and small fish by raking their feet across the water surface.
Nyctophilus bifax	Eastern long-eared bat	V	-	**Possible** – Inhabits lowland subtropical rainforest and wet and swamp eucalypt forest extending into moist eucalypt forest. Coastal rainforest and patches of coastal scrub are particularly favoured.
Scoteanax rueppellii	Greater broad-nosed bat	V	-	**Possible** – Inhabits woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest.
Miniopterus australis	Little bent-winged bat	V	-	**Possible** – Inhabits moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Roosts in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings.
Miniopterus orianae oceanensis	Large bent-winged bat	V	-	**Possible** – Inhabits forested areas. Caves are the primary roosting habitat of this species but also use derelict mines, stormwater tunnels, buildings and other man-made

				structures.
Pseudomys novaehollandiae	New Holland mouse	-	V	**Possible** – Inhabits open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes. Some potentially suitable habitat is considered to occur on the subject land i.e. areas with heathland understorey. Previously cleared areas are not considered to represent suitable habitat due to lack of surface cover.
Phyllodes imperialis southern subspecies	Southern pink underwing moth	E	E	Unlikely – This species is found in subtropical rainforest below about 600 m elevation. Potential breeding habitat is restricted to areas where the caterpillar's food plant, a native rainforest vine, *Carronia multisepalea*, occurs.
Argynnis hyperbius	Laced fritillary	E	CE	**Possible** – This species is found in open swampy coastal habitat. Eggs are laid singly on a leaf of the caterpillar's food plant, the Arrowhead Violet (*Viola betonicifolia*). The food plant occurs in the vegetation ground layer beneath grasses and mat-rushes (*Lomandra* spp.).
Thersites mitchellae	Mitchell's rainforest snail	E	CE	**Possible** – This species inhabits remnant areas of lowland subtropical rainforest and swamp forest on alluvial soils. Slightly higher ground around the edges of wetlands with palms and fig trees are particularly favoured habitat.
Flora				
Harnieria hygrophiloides		E	-	Unlikely – Found in the understorey of littoral rainforest, dry rainforest and wet eucalypt forest, usually in well-drained areas.
Cynanchum elegans	White-flowered Wax Plant	E	E	Unlikely – Usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; Coastal Tea-tree Leptospermum laevigatum – Coastal Banksia Banksia integrifolia subsp. integrifolia coastal scrub; Forest Red Gum Eucalyptus tereticornis aligned open forest and woodland; Spotted Gum Corymbia maculata aligned open forest and woodland; and Bracelet Honeymyrtle Melaleuca armillaris scrub to open scrub.
Marsdenia longiloba	Slender Marsdenia	E	V	Unlikely – Occurs in subtropical and warm temperate rainforest, lowland moist or open eucalypt forest adjoining rainforest and, sometimes, in areas with rock outcrops. Associated species include *Eucalyptus crebra, E. microcorys, E. acmenoides, E. saligna, E. propinqua, Corymbia*

				intermedia and *Lophostemon confertus.*
Ochrosia moorei	Southern Ochrosia	E	E	Unlikely – Southern Ochrosia is found in riverine and lowland subtropical rainforest.
Tylophora woollsii	Cryptic Forest Twiner	E	E	Unlikely – This species grows in moist eucalypt forest, moist sites in dry eucalypt forest and rainforest margins.
Corokia whiteana	Corokia	V	V	Unlikely – Grows in warm-temperate rainforest on poorer soils. Known only from the Nightcap Range.
Davidsonia jerseyana	Davidson's Plum	E	E	Unlikely – Occurs in lowland subtropical rainforest and wet eucalypt forest at low altitudes (below 300m).
Davidsonia johnsonii	Smooth Davidson's Plum	E	E	Unlikely – Occurs in lowland subtropical rainforest and wet eucalypt forest at low altitudes (below 300m).
Diospyros mabacea	Red-fruited Ebony	E	E	Unlikely – Usually grows as an understorey tree in lowland subtropical rainforest, often close to rivers.
Elaeocarpus williamsianus	Hairy Quandong	E	E	Unlikely – Occurs in subtropical to warm temperate rainforest, including regrowth areas where it has apparently regrown from root suckers after clearing.
Senna acclinis	Rainforest Cassia	E	-	Unlikely – Grows on the margins of subtropical, littoral and dry rainforests.
Acacia bakeri	Marblewood	V	-	Unlikely – Grows in or near lowland subtropical rainforest, in adjacent eucalypt forest and in regrowth of both.
Archidendron hendersonii	White Lace Flower	V	-	**Possible** – Occurs in riverine and lowland subtropical rainforest, littoral rainforest, coastal cypress pine forest and their ecotones.
Xylosma terrae-reginae	Queensland Xylosma	E	-	Unlikely – Occurs in littoral and subtropical rainforest on coastal sands or soils derived from metasediments.
Cryptocarya foetida	Stinking Cryptocarya	V	V	**Possible** – Found in littoral, warm temporate and subtropical rainforest, wet sclerophyll forest and Camphor laurel forest usually on sandy soils, but mature trees are also known on basalt soils.
Endiandra floydii	Crystal Creek Walnut	E	E	Unlikely – Occurs in warm temperate, subtropical rainforest or wet sclerophyll forest with Brush Box overstorey, and in Camphor laurel forest. The species can occur in disturbed and regrowth sites.
Endiandra hayesii	Rusty Rose Walnut	V	V	Unlikely – Occurs in sheltered moist gullies in lowland subtropical and warm temperate rainforest on alluvium or basaltic soils. The species occurs in regrowth and highly modified forms of these habitats.

Endiandra muelleri subsp. *bracteata*	Green-leaved Rose Walnut	E	-	Unlikely – Occurs in subtropical and warm temperate rainforests and Brush Box forests, including regrowth and highly modified forms of these habitats.
Lindsaea brachypoda	Short-footed Screw Fern	E	-	Unlikely – Occurs in very moist habitats in subtropical or warm-temperate rainforest or palm forest.
Tinospora tinosporoides	Arrow-head Vine	V	-	Unlikely – Occurs in wetter subtropical rainforest, including littoral rainforest, on fertile, basalt-derived soils.
Choricarpia subargentea	Giant Ironwood	E	-	Unlikely – Found in dry rainforest regrowth consisting of thickets growing in steeply sloping paddocks on basalt-derived soil as well as in sub-tropical and warm temporate rainforest.
Gossia fragrantissima	Sweet Myrtle	E	E	Unlikely – Occurs in dry subtropical and riverine rainforest.
Rhodamnia rubescens	Scrub Turpentine	CE	E	**Possible** – Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.
Rhodomyrtus psidioides	Native Guava	CE	-	**Possible** – Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines.
Syzygium hodgkinsoniae	Red Lilly Pilly	V	V	Unlikely – Usually found in riverine and subtropical rainforest on rich alluvial or basaltic soils.
Syzygium moorei	Durobby	V	V	Unlikely – Usually found in subtropical and riverine rainforest at low altitude.
Uromyrtus australis	Peach Myrtle	E	E	Unlikely – Occurs in warm temperate rainforest on less fertile soils derived from rhyolite rock. Often associated with Coachwood (Ceratopetalum apetalum).
Geodorum densiflorum	Pink Nodding Orchid	E	-	**Possible** – Occurs in dry eucalypt forest and coastal swamp forest at lower altitudes, often on sand.
Peristeranthus hillii	Brown Fairy-chain Orchid	V	-	Unlikely – Restricted to coastal and near-coastal environments, particularly Littoral Rainforest and the threatened ecological community Lowland Rainforest on Floodplain.
Phaius australis	Southern Swamp Orchid	E	E	**Possible** – Occurs in swampy grassland or swampy forest including rainforest, eucalypt or paperbark forest, mostly in coastal areas.
Phyllanthus microcladus	Brush Sauropus	E	-	Unlikely – Usually found on banks of creeks and rivers, in streamside rainforest or dry rainforest.
Arthraxon hispidus	Hairy Jointgrass	V	V	**Possible** – Moisture and shade-loving grass, found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps.

Belvisia mucronata	Needle-leaf Fern	E	-	Unlikely – Forms small clumps on trees or rocks in dry rainforest or along creeks in moist open forest.
Drynaria rigidula	Basket Fern	E	-	**Possible** – Usually found in rainforest but also in moist eucalypt and Swamp Oak forest.
Floydia praealta	Ball Nut	V	V	Unlikely – Occurs in riverine and subtropical rainforest, usually on soils derived from basalt.
Grevillea hilliana	White Yiel Yiel	E	-	Unlikely – Grows in subtropical rainforest, often on basalt-derived soils.
Hicksbeachia pinnatifolia	Red Boppel Nut	V	V	Unlikely – Occurs in subtropical rainforest, moist eucalypt forest and Brush Box forest.
Macadamia tetraphylla	Rough-shelled Bush Nut	V	V	Unlikely – Found in subtropical rainforest, usually near the coast.
Randia moorei	Spiny Gardenia	E	E	Unlikely – Occurs in subtropical, riverine, littoral and dry rainforest. In NSW, Hoop Pine and Brush Box are common canopy species.
Acronychia littoralis	Scented Acronychia	E	E	**Possible** – Occurs in transition zones between littoral rainforest and swamp sclerophyll forest; between littoral and coastal cypress pine communities; and margins of littoral forest.
Bosistoa transversa	Yellow Satinheart	V	V	Unlikely – Grows in wet sclerophyll forest, dry sclerophyll forest and rainforest including highly disturbed habitat up to 300 m in altitude.
Melicope vitiflora	Coast Euodia	E	-	Unlikely – Grows in subtropical and littoral rainforest.
Niemeyera whitei	Rusty Plum, Plum Boxwood	V	-	Unlikely – Found in gully, warm temperate or littoral rainforests and the adjacent understorey of moist eucalypt forest.

V – Vulnerable
E – Endangered
CE – Critically Endangered
EP – Endangered Population