Biodiversity Assessment, proposed subdivision of 54 Pullen Street, Woolgoolga

Prepared for

Precise Planning, Northbridge

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Introduction

Background

Mr Jeff Bulfin of Precise Planning has engaged Greg Elks of Idyll Spaces Environmental Consultants to undertake an assessment of the biodiversity impacts of subdivision and associated works at 54 Pullen Street, Woolgoolga.

The aim of the assessment is to identify impacts on flora and fauna that may be constraints to the proposal. The objectives are to:

- undertake a Bionet search of records in the locality to identify potentially occurring threatened biodiversity;
- undertake a site transect survey to identify vegetation composition and structure, fauna habitat attributes and any threatened flora or community present;
- Review and report on:
    - vegetation classification and mapping;
    - NSW Biodiversity values mapping;
    - key habitat features such as watercourses, large trees, old trees, large woody debris, Koala feed tree species, dens, roosts, nests, dense ground layer vegetation, nectar sources, fruit-bearing trees etc. likely to be utilised by threatened species known to occur in the locality;
    - Coffs Harbour Koala Plan of Management (KPoM), and
    - Biodiversity Offset Scheme threshold triggers.

Description of the proposal

The proposal seeks to subdivide the land to create vacant Torrens Title lots suitable for residential dwelling, a detention basin and an area dedicated to environmental restoration and management.

Subject site, study area and locality

For the purposes of this assessment the **locality** is defined as the area within a square of approximately 10kmx10km centred on the study area. The locality includes roughly equal parts of coastal rural and residential areas, forested National Park and State Forests and the Tasman Sea **(Figure 1)**.

The **study area** is the property at 54 Pullen Street Sandy Beach (Lot 12 DP 1059040) **(Figure 2)** plus a buffer of approximately 10 metres to native vegetation. The Subject Site (**the site**) is the area of native vegetation likely to be impacted by the proposal and consists of the vegetated parts of the study area (**Figures 2, 9**)

Methods

Map and data review

A search of Bionet Wildlife Atlas records was undertaken on 30 April 2024. Aerial orthophotographs and maps were inspected online to identify vegetation communities and other mapped features of interest at https://www.coffsharbour.nsw.gov.au/Building-and-planning/Online-mapping-tool ,

https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap, https://geo.seed.nsw.gov.au, Spatial Information Exchange https://maps.six.nsw.gov.au/ and Google Earth Pro.

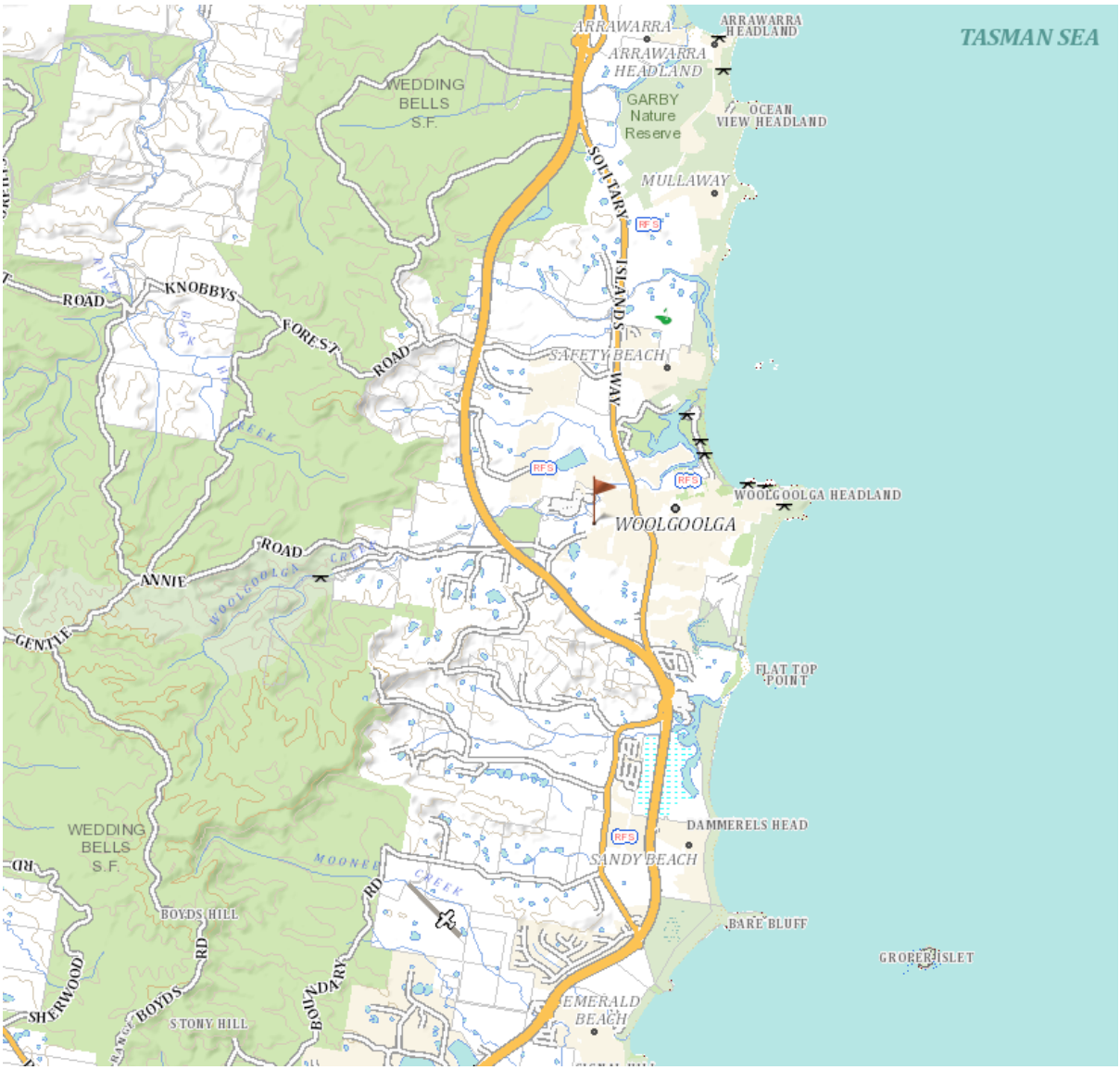

Figure 1. Study area locality (DPI NSW Topographic Map)

Field survey

All parts of the study area supporting native vegetation were searched by means of a 3 hour meander transect on 30 April 2024 to examine flora and fauna habitats, identify vegetation communities and search for threatened flora and evidence of threatened fauna known to occur in the locality.

The Spot Assessment Technique (SAT)(DPE 2022) was undertaken on 15 May 2024 to assess Koala use.

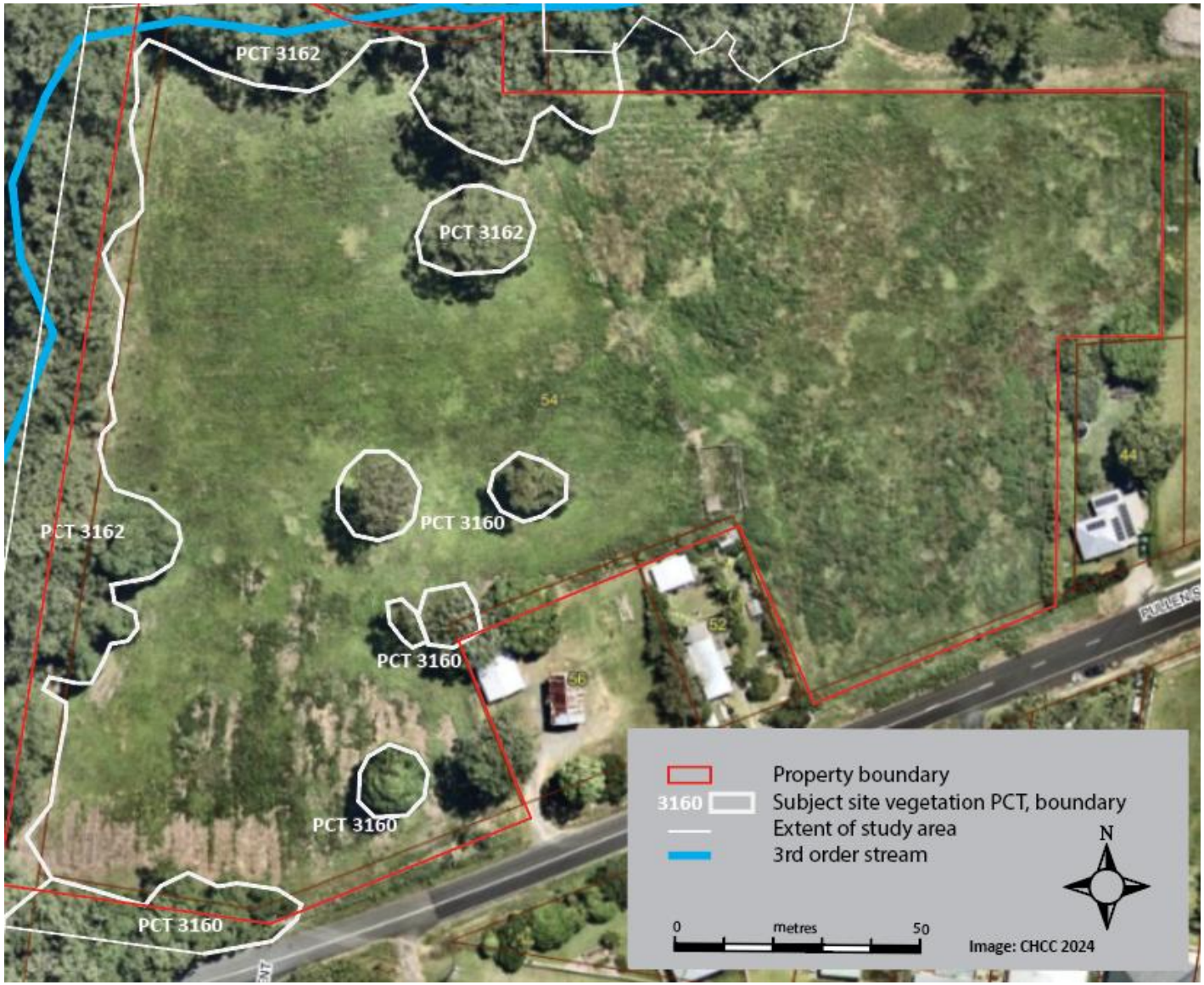

Figure 2. Aerial image (CHCC 2024) showing study area and existing native vegetation on the property

Description of the study area

Landscape and soils

Most remnant vegetation is mapped as occurring on the Coffs Creek soil landscape, a landscape of level to gently undulating floodplains and terraces formed from unconsolidated gravels, sands, silts and clays of Quaternary age and generally in excess of 3 m deep. Soils are deep, moderately to poorly drained Alluvial Soils, Yellow Podzolic soils and Yellow Earths.

Isolated trees on more elevated parts of the site are located on the Megan soil landscape of rolling hills that have developed on the metasediments of the Late Carboniferous Coffs Harbour association. Soils are moderately deep to deep, well drained Red and Brown Earths and Podzols, with well-drained Krasnozems in moister positions.

LEP 2013 Landuse Zone

The property is zoned R2 Low Density Residential (**Figure 3**). R5 large Lot residential and a small area of C2 Environmental Conservation associated with riparian vegetation of Woolgoolga Creek adjoin the western boundary. W2 Waterway adjoins part of the northern boundary along Woolgoolga Creek.

Prescribed Vegetation

On the northern boundary of the property a 20 metre wide buffer to Woolgoolga Creek is mapped as Prescribed Vegetation under the Coffs Harbour DCP 2015 (**Figure 4**).

CHCC 2012 Class 5 vegetation mapping

Mapped native vegetation on the property occurs as minor intrusions of forest vegetation from forested areas on adjoining properties along the western and northern boundaries. This vegetation is mapped as *WSF01 Coast and Hinterland Riparian Flooded Gum Bangalow Wet Forest*, described (CHCC 2012) as

"A wet forest of riparian areas with a canopy usually dominated by Flooded Gum (*Eucalyptus grandis*). Other species of Eucalypt may be present in lower abundances or rarely as co-dominants including Turpentine (*Syncarpia glomulifera*), Tallowwood (*Eucalyptus microcorys*) and Blackbutt (*Eucalyptus pilularis*).
The mid layer is composed of a diverse array of species including Bangalow Palm (*Archontophoenix cunninghamiana*), Forest Oak (*Allocasuarina torulosa*), Scentless Rosewood (*Synoum glandulosum* subsp. *glandulosum*), Forest Maple (*Cryptocarya rigida*), Tree Heath (*Trochocarpa laurina*), Black Wattle (*Callicoma serratifolia*), Wilkiea (*Wilkiea huegeliana*) and Banana Bush (*Tabernaemontana pandacaqui*). There are several epiphytes and climbers including Small Supplejack (*Ripogonum fawcettianum)*, Elkhorn (*Platycerium bifurcatum)* and Layer Vine (*Smilax australis)*.
The ground layer consists of Pastel Flower (*Pseuderanthemum variabile*), Palm Lily (*Cordyline stricta*), Gristle Fern (*Blechnum cartilagineum*), Native Violet (*Viola banksii*) and Creeping Beard Grass (*Oplismenus imbecillis)*. This community was recorded commonly along riparian areas and lower slopes on floodplains on the coastal lowlands, foothill gullies and river flats throughout the study area."

Isolated remnant trees on and near 56 Pullen Street (**Figure 5**) are mapped as *NRV01 Native Remnant vegetation / EX03 Exotic Vegetation* indicating the mixed nature of the vegetation and uncertainty as to its classification.

Figure 3 CHCC LEP 2013 landuse zones

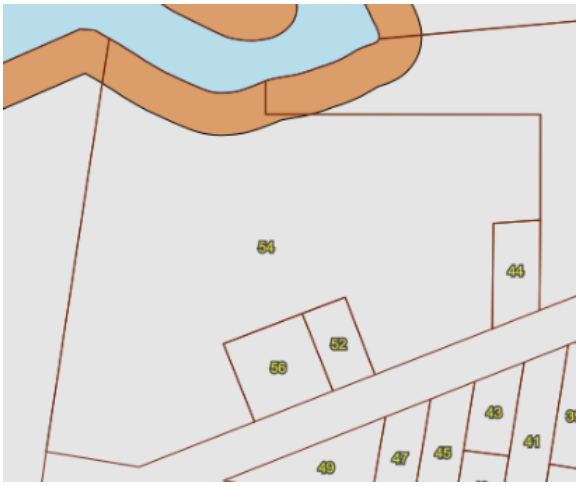

Figure 4 CHCC DCP 2015 Prescribed Vegetation

Figure 5 CHCC 2012 Class 5 vegetation map

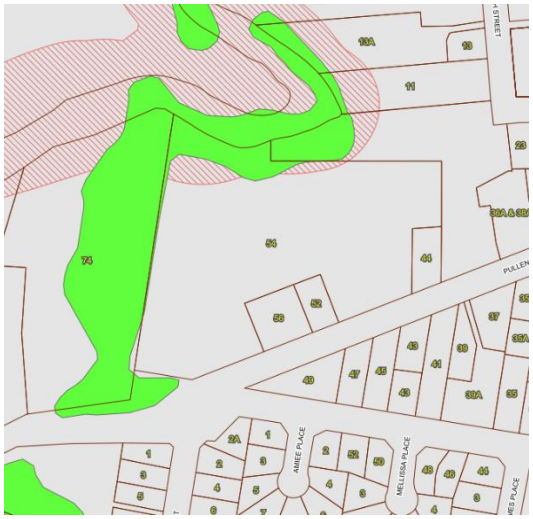

Figure 6CHCC 1995 Tertiary Koala habitat; Urban Links landscape corridor

Figure 7 DPIE 2024 Biodiversity Values map

Figure 8 OEH 2024 PCT map

Koala habitat mapping, Landscape corridor

Tertiary Koala habitat is mapped on properties adjoining to the west and north, extending to the subject property along the northern boundary. (**Figure 6**).

An urban Links landscape corridor is mapped along Woolgoolga Creek (**Figure 6**); this corridor has not been formally adopted by Council.

DPIE Biodiversity Values mapping

An area of High Biodiversity Value is mapped along the northern bank of Woolgoolga Creek but does not extend to the subject property (**Figure 7**).

OEH Statewide Vegetation Type Mapping (SVTM)

The SVTM maps most of the vegetation on and adjoining the property as Plant Community Type (PCT) *3162 - Mid North Lowland Flooded Gum-Palm Wet Forest* (**Figure 8**). All vegetation along the flats and lower slopes associated with Woolgoolga Creek clearly fall within this PCT, described as

"Extremely tall, sclerophyll open forest with a dense, tall to very tall mesic sub-canopy. This PCT occurs on sheltered lower slopes and along creeks, in coastal lowland valleys between Woolgoolga and Macksville, North Coast. The canopy very frequently includes *Eucalyptus grandis*, often with a high cover and sometimes the only canopy species at a local scale. Occasional canopy species include *Corymbia intermedia* and *Lophostemon confertus,* with the palm *Archontophoenix cunninghamiana* almost always present in the sub-canopy or sometimes the canopy and often with a high foliage cover. The sub-canopy or mid-stratum includes trees, very frequently *Wilkiea huegeliana, Synoum glandulosum, Cryptocarya microneura* and *Acmena smithii*; and very frequently the climbing palm *Calamus muelleri*. The shrub *Cordyline stricta* occurs very frequently and occasionally with high cover in the lower mid-stratum, along with palm *Linospadix monostachyos* which occurs commonly. The sparse to mid-dense ground cover very frequently includes the graminoid *Lomandra spicata*, the fern *Blechnum cartilagineum*, commonly the forb *Pseuderanthemum variabile*, and occasionally in poorly drained sites, the sedge *Gahnia clarkei*. This PCT occurs on clay-rich sediments and metasediments, mainly in warm, very wet locations receiving 1560-1730 mm mean annual rainfall, at very low to low elevations of mostly less than 70 metres asl".

Isolated remnants on elevated parts of the study area are mapped as *PCT 3250 - Northern Foothills Blackbutt Grassy Forest,* which is likely to have occurred on upper slopes and ridgelines nearby but is not represented on the property. Extensive areas of PCT 3160 are mapped for nearby areas to the south and west and it appears to be a better fit. PCT 3160 **-** *Lower North Turpentine-Tallowwood-Grey Gum Forest* occupies elevated parts of the study area and is described as

"A tall to extremely tall sclerophyll open forest with a mid-stratum of small trees and a ground layer of forbs and vines, typically found on the margins of rainforests. This PCT occurs on the near coastal hills of the lower and mid North Coast from Myall Lakes to Woolgoolga. The tree canopy almost always includes *Syncarpia glomulifera* and *Eucalyptus propinqua*, very frequently associated with *Eucalyptus microcorys*. Other canopy species commonly include *Eucalyptus siderophloia* and occasionally *Lophostemon confertus, Eucalyptus acmenoides* and *Corymbia maculata*. The mid-stratum is layered and contains small trees of varying stature and scattered shrubs. Species very frequently include *Allocasuarina torulosa, Guioa semiglauca, Breynia oblongifolia* and *Notelaea longifolia,* commonly *Rhodamnia rubescens* and *Trochocarpa laurina,* occasionally with *Acacia maidenii*. The ground layer mainly comprises soft-leaved forbs, ferns, twiners, graminoids and vines, some of which scramble into the upper strata. Ground cover species almost always include *Smilax australis,* very frequently *Pseuderanthemum variabile, Lomandra longifolia* and *Blechnum neohollandicum,* and commonly *Cissus antarctica, Dianella caerulea, Dioscorea transversa, Geitonoplesium cymosum, Gymnostachys*

anceps and *Eustrephus latifolius*. This PCT occurs on coarse and fine-grained sediments, typically at elevations below 230 metres asl in hot, wet environments."

Small patches of PCT 4045 - *Northern Lowland Swamp Turpentine-Paperbark Forest* are mapped in the western part of the study area however the indicative species and their habitats are not present in the study area.

Description of existing vegetation

Riparian Flooded Gum Bangalow Wet Forest

Existing native vegetation in the study area consists predominantly of narrow areas of remnant forest vegetation on low-lying land along the Woolgoolga Creek riparian buffer (**Photo 1**).

Structure and floristics

The vegetation in wider parts of the riparian buffer consists of a Very Tall Open Forest clearly dominated by Flooded gum *Eucalyptus grandis* (**Photo 2**) but a range of other eucalypt tree species occur occasionally (Grey ironbark *E. siderophloia*, Grey gum *E. propinqua*, Narrow-leaved white mahogany *E. acmenoides* and Brush box *Lophostemon confertus*), especially on elevated stream banks. The largest trees are approaching the late mature growth stage (eg: **Photo 2**) and may be entering the hollow-bearing stage (**Photo 3**).

There is a very sparse to mid-dense midstratum of rainforest trees and shrubs to around 15 metres tall, commonly including Bangalow palm *Archontophoenix cunninghamiana* and the small trees *Glochidion ferdinandi, Ficus coronata, Elaeocarpus spp, Cryptocarya spp, Guioa semiglauca, Syzygium spp* and *Acacia spp.* Occasional vines include *Gynochthodes jasminoides, Cissus antactica* and *Austrocallerya australis*.

Ground layer vegetation is also sparse to mid-dense and is often dominated by the exotic grass *Paspalum mandiocanum*. Other common species include *Doodia aspera, Adiantum hispidulum, Dioscorea transversa* and *Dichondra repens,* with *Lomandra hystrix* the dominant species on stream banks

Disturbance Impacts

The original forest cover has obviously been heavily logged or cleared and burnt within the past century or so. Vegetation includes trees in the young, early mature and mature growth a stage, indicating that tree cover has established episodically.

Numerous invasive plant species including L*antana camara, Cestrum spp, Passiflora suberosa, Senna pendula, Solanum seaforthianum, Cinnamomum camphora, Schefflera actinophylla, Ochna serrulata and Murraya paniculata* occur in the ground layer and midstratum, often at high densities. Old plantings of *Cupressus* spp and *Eucalyptus torrelliana* occur on the margin of the forest remnant along the western boundary.

There is no evidence of recent fire and the vegetation appears long unburnt.

Classification & conservation status

The mapped *PCT 3162 - Mid North Lowland Flooded Gum-Palm Wet Forest* and *WSF01 Coast and Hinterland Riparian Flooded Gum Bangalow Wet Forest* are good representations of the site vegetation community. Neither map category is classified as a community of conservation concern.

Isolated remnant trees and patches

A small patch of forest vegetation in the adjoining the road reserve and several isolated remnant trees on elevated land elsewhere on the property are a minor part of the study area vegetation.

Structure and floristics

Isolated trees (numbered 1 – 6 in Figure 9) are *Eucalyptus grandis, E. propinqua, E siderophloia, Corymbia intermedia, E. propinqua* and *Lophostemon confertus*. There is no associated native understorey vegetation.

The small patch of vegetation in the road reserve is a Very Tall Open Forest of mixed dominance by Narrow-leaved white mahogany *E. acmenoides*, Grey gum *E. propinqua*, Pink bloodwood *Corymbia intermedia*, Tallowwood *E. microcorys* and Grey ironbark *E. siderophloia*. It has a sparse midstratum of Turpentine *Syncarpia glomulifera* and rainforest trees including *Cryptocarya microneura, Jagera pseudorhus* and *Rapanea variabilis.* Ground layer vegetation is dominated by a mix of weeds such as *Asparagus aethiopicus, Desmodium uncinatum* and *Senna pendula* and the native ferns *Blechnum cartilagineum* and *Calochlaena dubia*.

Disturbance Impacts

The original forest cover has obviously been heavily logged or cleared and burnt within the past century or so. Remnant trees occur in a range of growth stages, indicating that tree cover has established episodically. Some isolated trees show significant injury from machinery damage, loss of limbs etc and are likely to be unsuitable for retention (**Photo 4**).

Classification & conservation status

The small patch of forest in the road reserve and isolated trees 2-6 are most likely classified as part of *PCT 3160* **-** *Lower North Turpentine-Tallowwood-Grey Gum Forest*. The category is not classified as a community of conservation concern.

Broadleaved paspalum – Farmers friends weedy grassland

The remainder of the study area is occupied by a dense low cover of broadleaf weeds and exotic grasses following close mowing and cultivation (in part). Typically the most common plant species are Farmers friends *Bidens pilosa* and Broadleaved paspalum *P. mandiocanum*, although there are numerous other species of exotic grasses and broadleaf weeds, together with occasional vegetable seedlings, indicating recent use of the land for vegetable production.

Fauna habitat Elements

- A third order watercourse traverses the adjoining property to the west, joining the fourth order Woolgoolga Creek near the north-western corner of the property
- Mature fleshy-fruit-bearing trees (and palms) of local rainforest species occur along Woolgoolga Creek.
- KPoM listed Koala feed tree species are mostly Flooded gum, with occasional Tallowwood and Small-fruited grey gum.

- The study area vegetation has minor wildlife corridor potential along the western boundary and an identified Local wildlife corridor along part of the northern boundary.
- Hollow trees occur occasionally, with hollows detected in isolated tree number 1 (a massive hollow at 4 metres height, **Photo 5**), tree number 5 (minor fissure at about 4 metres, **Photo 6**).
- Large trees and old trees occur occasionally, with the largest tree, a flooded gum, measured at 1.1 metres diameter at breast height (DBH)(**Photo 2**).
- Large woody debris is absent.
- A litter layer is sparse to absent.
- No winter nectar sources were detected.
- No fruiting Allocasuarina trees were detected.
- No dens, roosts, nests, dense ground layer vegetation or nectar sources were detected.
- No latrine or den sites for spotted-tailed quolls were detected.
- No flying-fox camps occur in the study area.
- No other potential bat roosts (culverts, bridges, fairy martin nests, staghorns) were detected.

Likelihood of occurrence of threatened biodiversity

The likelihood of occurrence on the site of threatened biodiversity known to occur in the locality was assessed on the basis of the occurrence and condition of vegetation types and habitat elements on the subject site (**Table 1, Table 2**).

Assessment considered the presence, number and currency of species records in the locality, the species habitat requirements and habitat elements present in the study area, survey effort, the detectability of the species and its occurrence in plant community types as outlined in the relevant Threatened Species profiles.

Table 1. Likelihood of fauna occurrence in study area

Class	*Scientific Name*	Common Name	NSW status	Comm. status	Records	Breeding habitat	Foraging habitat	Likelihood of occurrence
Amphibia	*Crinia tinnula*	Wallum Froglet	V,P		5	Moist microhabitats in swamps, or wet or dry heaths, or sedge grasslands or swamps	As per breeding habitat	Nil
Amphibia	*Mixophyes iteratus*	Giant Barred Frog	V,P,2	V	53	Second order or higher streams with some riparian vegetation present.	Streamside vegetation mostly in subtropical or cool temperate forests, or wet sclerophyll forests.	Possible
Reptilia	*Caretta caretta*	Loggerhead Turtle	E1,P	E	14	littoral	marine	Nil
Reptilia	*Chelonia mydas*	Green Turtle	V,P	V	52	littoral	marine	Nil
Reptilia	*Eretmochelys imbricata*	Hawksbill Turtle	P	V	13	littoral	marine	Nil
Reptilia	*Cacophis harriettae*	White-crowned Snake	V,P		1	Mid-elevation dry eucalypt forest and woodland, sometimes moist eucalypt forest and coastal heathland, with a varied and well-developed litter layer	As per breeding habitat, with abundant small lizards	Unlikely
Reptilia	*Hoplocephalus stephensii*	Stephens' Banded Snake	V,P		2	Between loose bark and tree trunks, amongst vines, or in hollow trunks, limbs, rock crevices or under slabs	Rainforest and eucalypt forests and rocky areas up to 950 m in altitude	Unlikely
Aves	*Anthochaera phrygia*	Regent Honeyeater	E4A,P,2	CE	3	Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak	nectar from a wide range of eucalypts and mistletoes. Key eucalypt species include Swamp Mahogany	Unlikely
Aves	*Ardenna carneipes*	Flesh-footed Shearwater	V,P	J,K	1	Lord Howe island	marine	Nil
Aves	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		1	In shrubs or low trees in dry, open eucalypt forests, woodlands with an open understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris	As for breeding habitat	Unlikely
Aves	*Botaurus poiciloptilus*	Australasian Bittern	E1,P	E	1	Nests in secluded places in densely-vegetated wetlands on a platform of reeds	permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes and spikerushes	Unlikely
Aves	*Burhinus grallarius*	Bush Stone-curlew	E1,P		2	Open forests and woodlands with a sparse grassy groundlayer and fallen timber	As for breeding habitat	Unlikely
Aves	*Calidris ferruginea*	Curlew Sandpiper	E1,P	CE,C,J,K	2	Siberia	littoral and estuarine	Nil
Aves	*Calidris tenuirostris*	Great Knot	V,P	V,C,J,K	1	Siberia	sheltered, coastal habitats containing large, intertidal mudflats or sandflats	Nil

Class	*Scientific Name*	Common Name	NSW status	Comm. status	Records	Breeding habitat	Foraging habitat	Likelihood of occurrence
Aves	*Calyptorhynchus lathami lathami*	South-eastern Glossy Black-Cockatoo	V,P,2	V	65	large hollow-bearing eucalypts	open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of She-oak species occur	Nil
Aves	*Charadrius mongolus*	Lesser Sand-plover	V,P	E,C,J,K	1	Asia	sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats	Nil
Aves	*Coracina lineata*	Barred Cuckoo-shrike	V,P		4	Unknown	Fruiting tree species in rainforest, wet sclerophyll forest, vegetation remnants or isolated trees	Unlikely
Aves	*Daphoenositta chrysoptera*	Varied Sittella	V,P		13	cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy	eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches	Possible
Aves	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P		22	Live or dead tree within or near foraging habitat. Usually isolated, live, paddock trees in NSW, but also in paperbarks and occasionally low shrubs within wetlands.	Shallow open freshwater or saline wetlands and estuarine habitats, including swamps, floodplains, watercourses, wet heathland, wet meadows, farm dams, saltmarsh, mud- and sand-flats, mangroves	Unlikely
Aves	*Esacus magnirostris*	Beach Stone-curlew	E4A,P		2	sand or gravel, above the tidal zone at the backs of beaches, or on sandbanks and islands	beaches, islands, reefs and in estuaries	Nil
Aves	*Glossopsitta pusilla*	Little Lorikeet	V,P		6	Hollow-bearing trees. Typically but not solely large old Eucalyptus, often smooth barked species.	Tree canopies. Typically nectar and pollen from Eucalyptus but also other tree species such as Angophora and Melaleuca plus native fruits such as mistletoe	Possible
Aves	*Grantiella picta*	Painted Honeyeater	V,P	V	1	Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests with greater than 5 mistletoes per hectare	As for breeding habitat	Unlikely
Aves	*Grus rubicunda*	Brolga	V,P		1	Shallow (< 50 cm) wetlands and margins of deeper waterbodies with emergent vegetation	wetlands, mudflats, grasslands, cultivated areas or stubble	Unlikely
Aves	*Haematopus fuliginosus*	Sooty Oystercatcher	V,P		48	offshore islands	exposed rock or coral at low tide	Nil
Aves	*Haematopus longirostris*	Pied Oystercatcher	E1,P		18	coastal or estuarine beaches	exposed sand, mud and rock at low tide	Nil

Class	*Scientific Name*	Common Name	NSW status	Comm. status	Records	Breeding habitat	Foraging habitat	Likelihood of occurrence
Aves	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P		55	mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat; nest trees are large emergent eucalypts often with emergent dead branches or large dead trees nearby	bays and inlets, beaches, reefs, lagoons, estuaries and mangroves, saltmarsh, freshwater swamps, lakes, reservoirs, billabongs	Unlikely
Aves	*Hieraaetus morphnoides*	Little Eagle	V,P		1	a large stick nest in tall living trees within a remnant patch	eucalypt forest, woodland or open woodland	Unlikely
Aves	*Hirundapus caudacutus*	White-throated Needletail	V,P	V,C,J,K	33	None in Australia	Aerial	Nil
Aves	*Irediparra gallinacea*	Comb-crested Jacana	V,P		25	Floating aquatic vegetation, or fringing vegetation, of permanent, slow-moving or still freshwater wetlands.	Floating aquatic vegetation, or fringing vegetation, of permanent, slow-moving or still freshwater wetlands.	Unlikely
Aves	*Ixobrychus flavicollis*	Black Bittern	V,P		2	on a branch overhanging water	terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation	Unlikely
Aves	*Lathamus discolor*	Swift Parrot	E1,P	CE	5	Nil in NSW	where winter flowering species are flowering profusely or where there are abundant lerp infestations	Unlikely
Aves	*Lophoictinia isura*	Square-tailed Kite	V,P,3		16	generally located along or near watercourses, in a fork or on large horizontal limbs	variety of timbered habitats including dry woodlands and open forests	Unlikely
Aves	*Ninox connivens*	Barking Owl	V,P,3		1	hollows of large, old trees	woodland and open forest	Unlikely
Aves	*Ninox strenua*	Powerful Owl	V,P,3		11	Hollows >45 cm diameter that are 6 m or more above the ground in living or dead trees	range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest	Unlikely
Aves	*Numenius madagascariensis*	Eastern Curlew	P	CE,C,J,K	2	Russia, China	intertidal mudflats and sometimes saltmarsh of sheltered coasts	Nil
Aves	*Oxyura australis*	Blue-billed Duck	V,P		1	Wetlands with emergent aquatic vegetation (e.g. with dense Typha, Phragmites or Lignum)	Deep open waterbodies > 1 metre	Unlikely
Aves	*Pandion cristatus*	Eastern Osprey	V,P,3		81	Emergent living or dead trees or artificial towers within 3 km of foraging habitat	Open protected water	Unlikely
Aves	*Ptilinopus magnificus*	Wompoo Fruit-Dove	V,P		102	Rainforests or wet sclerophyll forest with foraging habitat nearby	Fruiting plants, including introduced species, within vegetation types. Fruit between 5-30 mm diameter	Possible

Class	*Scientific Name*	Common Name	NSW status	Comm. status	Records	Breeding habitat	Foraging habitat	Likelihood of occurrence
Aves	*Ptilinopus regina*	Rose-crowned Fruit-Dove	V,P		26	Wet sclerophyll forest or rainforest including remnants dominated by camphor laurel. Requires foraging habitat nearby.	Plants with fleshy fruits 5-25mm in size, including introduced species	Possible
Aves	*Ptilinopus superbus*	Superb Fruit-Dove	V,P		8	Wet sclerophyll forest or rainforest including remnants dominated by camphor laurel. Requires foraging habitat nearby.	Plants with fleshy fruits 5-25mm in size, including introduced species	Possible
Aves	*Sternula albifrons*	Little Tern	E1,P	C,J,K	24	low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands	small fish, crustaceans, insects, worms and molluscs in the shallow water of channels and estuaries, and in the surf on beaches	Nil
Aves	*Stictonetta naevosa*	Freckled Duck	V,P		1	ephemeral swamps and more permanent waters such as lakes, reservoirs, farm dams and sewage ponds	dense vegetation at or near water level in ephemeral swamps	Nil
Aves	*Sula dactylatra*	Masked Booby	V,P	J,K	1	Lord Howe island	marine	Nil
Aves	*Todiramphus chloris*	Collared Kingfisher	V,P		1	Large, live or dead mangrove trees, or in hollows in arboreal termite nests or large eucalypts or paperbarks adjacent to estuarine foraging habitats	mangrove associations of estuaries, inlets, sheltered bays and islands, and the tidal flats and littoral zone bordering mangroves	Unlikely
Aves	*Tyto novaehollandiae*	Masked Owl	V,P,3		3	Living or dead trees with hollows >40 cm diameter, cliffs or caves	Most	Unlikely
Aves	*Tyto tenebricosa*	Sooty Owl	V,P,3		3	Hollows >30 cm diameter that are >10 m above the ground in live or dead trees, or in caves	Most forests	Unlikely
Mammalia	*Arctocephalus forsteri*	New Zealand Fur-seal	V,P		2	New Zealand and Subantarctic islands	rocky coastlines	Nil
Mammalia	*Chalinolobus nigrogriseus*	Hoary Wattled Bat	V,P		7	Hollows in dead or alive trees	dry open eucalypt forests with naturally sparse understorey layers	Unlikely
Mammalia	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	7	Hollow-bearing trees, fallen logs, small caves, rock crevices, boulder piles, rocky-cliff faces or animal burrows	most habitat types from the sub-alpine zone to the coastline	Possible
Mammalia	*Dugong dugon*	Dugong	E1,P		5	wide shallow protected bays, wide shallow mangrove channels and in the lee of large inshore islands	as per breeding habitat	Nil
Mammalia	*Eubalaena australis*	Southern Right Whale	E1,P	E	1	marine	marine	Nil
Mammalia	*Micronomus norfolkensis*	Eastern Coastal Free-	V,P		1	Hollows in dead or alive trees	Most	Unlikely

Class	*Scientific Name*	Common Name	NSW status	Comm. status	Records	Breeding habitat	Foraging habitat	Likelihood of occurrence
		tailed Bat						
Mammalia	*Miniopterus australis*	Little Bent-winged Bat	V,P		22	Caves	Moist eucalypt forest, rainforest or dense coastal banksia scrub	Possible
Mammalia	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P		7	Maternity caves with very specific temperature and humidity regimes.	Forested areas, catching moths and other flying insects above the tree tops	Unlikely
Mammalia	*Myotis macropus*	Southern Myotis	V,P		2	close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage	waterbodies (including streams, or lakes or reservoirs) and fringing areas of vegetation	Possible
Mammalia	*Petauroides volans*	Southern Greater Glider	E1,P	E	1	Large trees with hollows > 10cm diameter	tall moist eucalypt forests with relatively old trees and abundant hollows	Unlikely
Mammalia	*Petaurus australis*	Yellow-bellied Glider	V,P	V	17	Large trees with hollows > 10cm diameter	favoured food trees intall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils	Unlikely
Mammalia	*Petaurus norfolcensis*	Squirrel Glider	V,P		41	Tree hollows or fissures >2 cm diameter/width in eucalypt forests and woodlands	Blackbutt-Bloodwood forest with heath understorey and abundant hollows	Unlikely
Mammalia	*Phascogale tapoatafa*	Brush-tailed Phascogale	V,P		1	Tree hollows, logs or stumps with entrances > 2.5 cm wide	Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter.	Unlikely
Mammalia	*Phascolarctos cinereus*	Koala	E1,P	E	37	eucalypt woodlands and forests	Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species; in any one area will select preferred browse species	Possible
Mammalia	*Phoniscus papuensis*	Golden-tipped Bat	V,P		2	Tree hollows or nests of Yellow-throated Scrubwren or Brown Gerygone	Rainforest gullies or sclerophyll forest on mid to upper slopes, within 2km radius of roost	Unlikely
Mammalia	*Planigale maculata*	Common Planigale	V,P		2	Hollow logs, under bark, rocks, cracks in soil, grass tussocks or building debris	Coastal heaths, scrubs, woodlands, open forests and rainforests providing cover in the form of dense ground layers	Unlikely
Mammalia	*Potorous tridactylus*	Long-nosed Potoroo	V,P	V	1	coastal heaths and dry and wet sclerophyll forests with dense understorey with occasional open areas, sandy soils	as per breeding habitat	Unlikely
Mammalia	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	138	Canopy trees associated with rainforest, or coastal scrub or riparian or estuarine communities and with sufficient forage resources available within 40km.	Most	Likely

Class	*Scientific Name*	Common Name	NSW status	Comm. status	Records	Breeding habitat	Foraging habitat	Likelihood of occurrence
Mammalia	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		1	Live and dead hollow-bearing trees	Most	Unlikely
Mammalia	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		6	Live or dead hollow-bearing trees, under exfoliating bark, or in buildings	Forests woodlands and wetlands	Possible
Mammalia	*Vespadelus troughtoni*	Eastern Cave Bat	V,P		1	caves	usually found in dry open forest and woodland, near cliffs or rocky overhangs	Unlikely

Table 2. Likelihood of occurrence of flora species

Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat	Likelihood of occurrence
Acronychia littoralis	Scented Acronychia	E1	E	1	transition zones between littoral rainforest and adjoining forest communities, on sandy soils	Unlikely
Allocasuarina thalassoscopica			E	1	In clay heaths north of Forster	Unlikely
Boronia umbellata	Orara Boronia	V,P	V	1	in and around gullies in wet open forest between Glenreagh and Lower Bucca	Unlikely
Chamaesyce psammogeton	Sand Spurge	E1		1	Foredunes and exposed headlands	Nil
Hicksbeachia pinnatifolia	Red Boppel Nut	V	V	1	subtropical rainforest, regrowth rainforest and moist eucalypt or Brush Box forest, can persist in disturbed areas including roadsides	Unlikely
Lindsaea incisa	Slender Screw Fern	E1,3		8	Waterlogged or poorly drained sites in dryclerophyll forest or heathland	Unlikely
Macadamia tetraphylla	Rough-shelled Bush Nut	V	V	2	subtropical rainforest, regrowth rainforest or remnant rainforest, north of Coraki	Nil
Marsdenia longiloba	Slender Marsdenia	E1	V	34	Subtropical and warm temperate rainforest, moist eucalypt forest adjoining rainforest, and rock outcrops	Possible
Niemeyera whitei	Rusty Plum, Plum Boxwood	V		164	Rainforest and the adjacent understorey of moist eucalypt forest	Unlikely
Phaius australis	Southern Swamp Orchid	E1,P,2	E	1	Swampy grassland or swampy forest including rainforest, eucalypt or paperbark forest, mostly in coastal areas	Unlikely
Pultenaea maritima	Coast Headland Pea	V		16	Exposed coastal headlands	Nil

Scientific Name	**Common Name**	**NSW status**	**Comm. status**	**Records**	**Habitat**	**Likelihood of occurrence**
Quassia sp. Moonee Creek	Moonee Quassia	E1	E	93	Shrubby layer below tall moist eucalypt forest and tall dry eucalypt forest	Unlikely
Rhodamnia rubescens	Scrub Turpentine	E4A	CE	22	littoral, warm temperate and subtropical rainforest and wet sclerophyll forest	Unlikely
Rhodomyrtus psidioides	Native Guava	E4A	CE	10	littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines	Unlikely
Senna acclinis	Rainforest Cassia	E1		3	In or on the edges of subtropical and dry rainforest	Unlikely
Sophora tomentosa	Silverbush	E1		9	Coastal sand dunes	Nil
Thesium australe	Austral Toadflax	V	V	10	Grassland, grassy open forest or woodland on fertile or moderately fertile soils and coastal headlands, often in association with Kangaroo Grass	Unlikely
Zieria prostrata	Headland Zieria	E1	E	7	Exposed coastal headlands	Nil

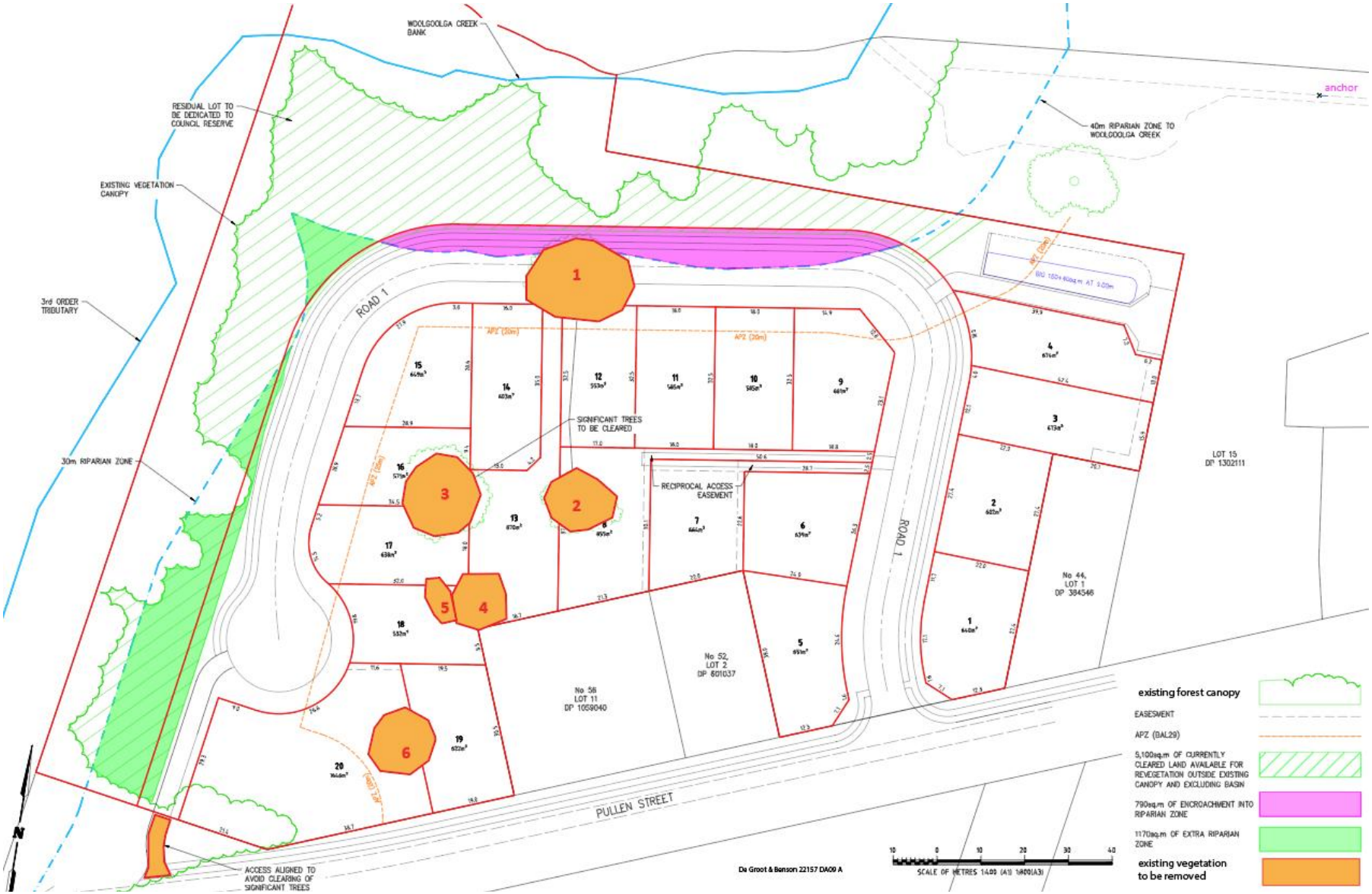

Figure 9. Proposed subdivision showing existing vegetation, extent of vegetation removal and area to be revegetated

Discussion

Potential Impacts of the proposal

The direct impacts are:

- Removal of six isolated trees, including
  - one massive hollow at 4 metres above ground level;
  - one tree with a minor fissure (possible small hollow) only;
  - three trees identified as preferred Koala browse species in the CHKPoM.
- Removal of approximately 50m2 of understorey vegetation from a small patch of roadside forest vegetation for a bicycle/pedestrian path.

The total extent of vegetation removal is approximately 1,375m^2 (**Table 3**).

Table 3. Nature and extent of vegetation removal

#	Vegetation Removal	Area (m^2)
1	*Eucalyptus grandis*	400
2	*Eucalyptus propinqua*	250
3	*E siderophloia*	175
4	*Corymbia intermedia*	150
5	*Eucalyptus propinqua*	75
6	*Lophostemon confertus*	250
Path	understorey vegetation	75
	TOTAL	1375

Indirect impacts are likely to be limited to those associated with occupation of the proposed lots, although these impacts would be avoided or minimised by the provision of a perimeter road and reforestation between the remnant vegetation to be retained and the area of occupation.

Biodiversity Offsets

Requirements

Biodiversity offsets for proposed vegetation removal required under the provisions of E 1.2 of Coffs Harbour DCP (2015) are outlined in **Table 4.**

Table 4. DCP Biodiversity Offset requirements

Tree #	DCP Category	Ratio	No of trees	Area of u/storey (m2)
1	Hollow-bearing tree (very large hollow)	20:1	20	0
2	Other	2:1	1	0
3	Other	2:1	1	0
4	Other	2:1	1	0
5	Hollow-bearing tree (possible small hollow)	20:1	20	0
6	Other	2:1	1	0
Path	Other	2:1	0	150

The DCP also will also require 4 artificial hollow replacements for removal of the Large Hollow in Tree #1.

Proposed Offsets

The current proposal includes:

- Planting the required number of appropriate trees in an area of 5,100m^2 of cleared land outside of the existing tree canopy in proposed Lot 29;
- Undertaking weed control in approximately 3,150m^2 of forest remnants in the remainder of proposed Lot 29 (excluding the proposed detention basin), and
- Installing 4 large artificial hollows in forest remnants in the remainder of proposed Lot 29.

Planting and weed control measures will be specified and a Vegetation Management Plan to be prepared for proposed Lot 29.

BC Act Assessment of impacts

Biodiversity Offset Clearing Threshold

- The maximum likely area of clearing is 1375m^2 (0.14ha), which is less than the 0.25ha required for entry to the biodiversity offset scheme (BOS).
- No vegetation would be cleared or disturbed in an area mapped as High Biodiversity Value.

Subject species

One threatened flora species and 12 threatened fauna species are identified as having potential habitat in the study area and are therefore subject species for the *Biodiversity Conservation Act* (*BC Act*) 5-part test (**Table 5**).

Table 5. BC Act subject species and nature of impacts

Common name	Habitat type present in study area	Impact
Slender marsdenia	Moist eucalypt forest	No direct impact
Giant Barred Frog	Breeding (Woolgoolga Creek) and foraging (streamside vegetation)	No direct impact
Varied Sittella	Foraging only (eucalypt forest)	No direct impact
Little Lorikeet	Breeding (small hollow) and foraging (nectar)	1x small hollow, 6 isolated trees
Wompoo Fruit-Dove	Breeding (wet forest, rainforest) and foraging (fleshy fruit)	No direct impact
Rose-crowned Fruit-Dove	Breeding (wet forest, rainforest) and foraging (fleshy fruit)	No direct impact
Superb Fruit-Dove	Breeding (wet forest, rainforest) and foraging (fleshy fruit)	No direct impact
Spotted-tailed Quoll	Foraging only (most habitats)	No direct impact
Little Bent-winged Bat	Foraging only(forest)	No direct impact
Southern Myotis	Breeding (small hollow), foraging (Woolgoolga Creek)	1x small hollow
Koala	Foraging (Flooded gum, Grey gum)	3x preferred Koala feed tree
Grey-headed Flying-fox	Foraging (tree canopies)	6x eucalypts
Greater Broad-nosed Bat	Foraging (tree canopies)	6x eucalypts

Habitat for the threatened plant species Slender marsdenia and 7 of the fauna species does not extend to the subject site and there is the potential for indirect impacts only on these species.

5-part tests

(a) in the case of a threatened species, whether the proposed development or activity 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,

Slender marsdenia

The subject site is not potential habitat for the species. Activities associated with the proposed development are unlikely to adversely impact habitat for the species in the study area or have an adverse effect on the life cycle of the species.

Giant Barred Frog

The subject site does not contain potential breeding habitat, nor is it foraging habitat for the species, which is usually within 20 metres of the stream, or up to 50 metres in forested areas. The proposed development is therefore unlikely to adversely impact habitat for the species in the study area or have an adverse effect on the life cycle of the species.

Varied Sittella

Varied sittellas were not resident in the study area at the time of survey. There are no records in the locality within the past decade. Impact on breeding habitat is unlikely and on foraging habitat is limited to removal of a 6 isolated trees of species very common in the locality. The proposed development is therefore unlikely to have an adverse effect on the life cycle of the species.

Little Lorikeet

Records are sparse in the locality and predominantly in large forested areas. The impact of the proposal on foraging habitat is limited to removal of a 6 isolated trees of species very common in the locality. The impact on breeding habitat is limited to removal of an isolated tree with a minor fissure potentially associated with a small hollow. The impacts of the proposal are assessed as unlikely to be of sufficient magnitude or extent 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.

Wompoo Fruit-Dove, Rose-crowned Fruit-Dove, Superb Fruit-Dove

The subject site is not potential habitat for the species. Activities associated with the proposed development are unlikely to adversely impact habitat for the species in the study area, which is confined to fruit-bearing rainforest trees of the understorey along Woolgoolga Creek, or have an adverse effect on the life cycle of the species.

Spotted-tailed Quoll

The entire study area is potential foraging habitat for the species, which is a terrestrial carnivorous marsupial with a home range of at least 200ha that is capable of utilising most habitats, including those made by humans. No breeding habitat was detected in the study area. The proposed

development is therefore unlikely to adversely impact habitat for the species in the study area or have an adverse effect on the life cycle of the species.

Little Bent-winged Bat

The subject site is not potential breeding or foraging habitat for the species, which generally prefers well-forested areas. The isolated tree with a minor fissure is potential roosting habitat, although the species also utilises caves, tunnels, abandoned mines, stormwater drains, culverts, bridges and buildings. The proposed development is therefore unlikely to have an adverse effect on the life cycle of the species.

Southern Myotis

The subject site is not potential foraging habitat for the species, which forages over streams and pools catching insects and small fish. The species roosts in groups of 10 - 15 close to water in caves, mine shafts, storm water channels, buildings, wharves, bridges and in dense foliage as well as in hollow-bearing trees. The proposed development is therefore unlikely to have an adverse effect on the life cycle of the species.

Koala

The frequency of records in the locality and the absence of evidence of use indicates that the study area is potential foraging habitat for the species and likely to support dispersing Koalas from time to time, but is unlikely to support a breeding population, consistent with its mapping as Tertiary Koala habitat.

The impacts of the proposal are assessed as unlikely to be of sufficient magnitude or extent 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.

Grey-headed Flying-fox

All eucalypts and fleshy-fruited rainforest trees in the study area are potential foraging habitat for the Grey-headed Flying fox. The impact of the proposal on foraging habitat is limited to removal of a 6 isolated trees of species very common in the locality. There would be no impact on breeding habitat. The proposed development is therefore unlikely to have an adverse effect on the life cycle of the species.

Greater Broad-nosed Bat

Vegetated parts of the study area are potential foraging habitat for the species, and the isolated tree with a minor fissure is potential roosting habitat. Breeding habitat is unlikely in the subject site. Local records are sparse and at least 15 years ago. The proposed development is therefore unlikely to adversely impact habitat for the species in the study area or have an adverse effect on the life cycle of the species.

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

(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,

Not applicable – threatened ecological communities do not occur in or adjoining the study area.

(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 activity, and

(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 activity, and

(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,

Slender marsdenia

Habitatfor the species is not likely to be removed, modified or fragmented as a result of the proposed development.

Giant Barred Frog

Habitat for the species is not likely to be removed, modified or fragmented as a result of the proposed development.

Varied Sittella

Potential habitat for the species consisting of six isolated trees would be removed by the proposal. Their removal would not fragment existing habitat, they are not in an identified corridor and they are of species characteristic of extensive areas of forested land in the locality. Their removal is therefore unlikely to be important to the long-term survival of the species in the locality.

Little Lorikeet

Potential habitat for the species consisting of six isolated trees would be removed by the proposal. Their removal would not fragment existing habitat, they are not in an identified corridor and they are of species characteristic of extensive areas of forested land in the locality. Their removal is therefore unlikely to be important to the long-term survival of the species in the locality.

Wompoo Fruit-Dove, Rose-crowned Fruit-Dove, Superb Fruit-Dove

Habitat for the species is not likely to be removed, modified or fragmented as a result of the proposed development.

Spotted-tailed Quoll

Habitat is not likely to be removed, modified or fragmented as a result of the proposed development.

Little Bent-winged Bat

Potential roosting habitat in the form of one fissure with possible small hollow would be removed by the proposal. Similar fissures and small hollows are likely to be reasonable common elsewhere in the locality. Its removal would not fragment existing habitat, is not in an identified corridor and is unlikely to be important to the long-term survival of the species in the locality.

Southern Myotis

Potential roosting habitat in the form of one fissure with possible small hollow would be removed by the proposal. Similar fissures and small hollows are likely to be reasonable common elsewhere in the locality. Its removal would not fragment existing habitat, is not in an identified corridor and is unlikely to be important to the long-term survival of the species in the locality.

Koala

Five of the six trees in the subject site are listed as priority trees (DPIE 2019): Rank 1 High preferred Use - *Eucalyptus propinqua* (2 trees); Rank 2 High Use *E, grandis* (one tree); Rank 3 Significant Use *E. siderophloia* (one tree), and Rank 4 Low Use *Corymbia intermedia* (one tree).

These tree species are all common in the study area, together with *E microcorys* (Rank 1) *and E. acmenoides* (Rank 3).

The location of these trees is such that their removal would be unlikely to impede Koala movement, fragment existing habitat or significantly reduce foliage resources in the study area and they are therefore unlikely to be important to the long-term survival of the species in the locality.

Grey-headed Flying-fox

Potential foraging habitat for the species consisting of six isolated trees would be removed by the proposal. Their removal would not fragment existing habitat, they are not in an identified corridor and they are of species characteristic of extensive areas of forested land in the locality. Their removal is therefore unlikely to be important to the long-term survival of the species in the locality.

Greater Broad-nosed Bat

Potential roosting habitat in the form of one fissure with possible small hollow would be removed by the proposal. Similar fissures and small hollows are likely to be reasonable common elsewhere in the locality. Its removal would not fragment existing habitat, is not in an identified corridor and is unlikely to be important to the long-term survival of the species in the locality.

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

No declared area of outstanding biodiversity value occurs in the region.

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

The proposal may possibly contribute to the impact of the key threatening processes *Clearing of native vegetation* and *Anthropogenic Climate Change*. The degree to which the Proposal would increase the impact of any key threatening process is small and not considered likely to place the local population of any of the subject species at increased risk of extinction.

EPBC Act significant impacts.

The following species are identified as having habitat in the study area and are therefore subject species for the *EPBC Act.*

Vulnerable Flora:	Slender marsdenia
Vulnerable fauna:	Giant Barred Frog Grey-headed Flying-fox
Endangered fauna:	Spotted-tailed Quoll Koala

There are no other matters of National Environmental Significance relevant to the study area.

Vulnerable species

EPBC Act Significant Impact Guidelines indicate that, for Vulnerable species, an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of an important population of a species
- reduce the area of occupancy of an important population
- fragment an existing important population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of an important population
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
- introduce disease that may cause the species to decline, or
- interfere substantially with the recovery of the species.

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

Important populations of Vulnerable species do not occur in the study area.

The proposal is unlikely to adversely affect habitat critical to the survival of a species, modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat, introduce disease that may cause the species to decline, or interfere substantially with the recovery of the species

Endangered species

EPBC Act Significant Impact Guidelines indicate that, for critically endangered and endangered species, an action is likely to have a significant impact if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of a population
- reduce the area of occupancy of the species
- fragment an existing population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of a population
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
- introduce disease that may cause the species to decline, or
- interfere with the recovery of the species.

In the local context of extensive areas of similar habitat nearby, the habitat to be removed is foraging habitat only, the 1375m^2 of vegetation that would be removed by the proposal is general foraging habitat that represents a very small part of the home range of the species and is not critical to the survival of the species. The proposal would therefore be unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that it would reduce the area of occupancy of a species or the size of a population. Nor would the proposal be likely to result in invasive species that are harmful to a critically endangered or endangered species becoming established, or introduce disease, or by any other means lead to a long-term decrease in the size of a population, reduce its area of occupancy, fragment the population, adversely affect critical habitat or disrupt its breeding cycle.

Coffs Harbour Koala Plan of Management (1999)

The requirements of the Coffs Harbour Koala Plan of Management (1999) at https://www.coffsharbour.nsw.gov.au/environment/Plants-and-Animals/Documents/KPOM_a.pdf state that:

The consent authority shall not grant consent to the carrying out of development in areas identified as Tertiary Koala Habitat unless it can be shown that the activity will not destroy, damage or compromise the values of the land as koala habitat in the locality. In assessing an application the consent authority shall take into consideration:

- the impacts of any development on Tertiary Koala Habitat;

- the number of trees proposed to be removed in relationship to the extent and quality of
- adjacent or nearby Tertiary Koala Habitat;
- the impacts to existing or potential koala movement corridors; and,
- the threats to koalas which may result from the development.

The consent authority shall not grant consent to the carrying out of development in areas identified as Tertiary Koala Habitat unless the proposal demonstrates that appropriate measures are taken to:

- minimise barriers to koala movement;
- reduce the risk of koala mortality by road kill by appropriate road design, lighting and traffic speed limits;
- minimise the removal of koala tree species listed above under Tertiary Koala Habitat (Tallowwood, Swamp Mahogany, Flooded Gum, Forest Red Gum, or Small-fruited Grey Gum);
- provide preferred koala trees in landscaping where suitable;
- minimise threats to koalas by dogs ie. banning of dogs or confining of dogs to koala proof yards;
- minimise removal or disturbance of Tertiary Koala Habitat in fire protection zones including fuel reduced zones and radiation zones.

The proposal has the potential to be a barrier to Koala movement but this issue can be addressed by requiring that any boundary fencing of proposed Lot 29 be Koala-permeable as a condition of consent.

Tree removal has been minimised but one Flooded gum and two Small-fruited grey gums would be removed for the proposal, two of which are damaged and likely unsuitable for retention on safety grounds.

Remaining measures are appropriately addressed under existing CHCC guidelines.

Recommendations & Conclusions

It is recommended that any proposed boundary fencing of proposed Lot 29 be Koala-permeable to meet the requirements of the KPoM (1999).

The direct impact of the proposal on native vegetation includes the removal of six isolated native trees and approximately 50m2 of understorey vegetation, total area approximately 1,375m^2.

Indirect impacts are limited to those associated with occupation of the proposed lots.

Impacts have been avoided by retention of approximately 3,150m^2 of forest remnants, which would be restored, minimised by the provision of a perimeter road, and offset by revegetation and restoration of 5,100m^2 of cleared land in proposed Lot 29;.

BC Act assessment of impacts found that significant impacts on Threatened fauna or their habitat are unlikely. The proposal does not exceed the Biodiversity Offset Clearing Threshold, or occur in an area mapped as High Biodiversity Value. Significant impact on threatened species or ecological

communities or their habitats is unlikely. Entry to the Biodiversity Offsets Scheme would not therefore be required.

The EPBC Act Significant Impact Guidelines indicate that the proposal is unlikely to have a significant impact and referral to the Minister is not required.

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Appendices

Flora species inventory

Scientific name	common name	status	3162	3160
Tall trees				
Corymbia intermedia	pink bloodwood	n	r	r
Corymbia torelliana	cadagi	in,W	o	
Eucalyptus acmenoides	narrow-leaved white mahogany	n	o	c
Eucalyptus grandis	flooded gum	n	vc	
Eucalyptus microcorys	tallowwood	n	r	o
Eucalyptus propinqua	small-fruited grey gum	n	o	o
Eucalyptus siderophloia	grey ironbark	n	o	o
Lophostemon confertus	brush box	n	c	r
Syncarpia glomulifera	turpentine	n		o
Midstratum trees and vines				
Acacia binervata	two-veined hickory	n	o	
Acacia melanoxylon	blackwood wattle	n	o	
Acronychia oblongifolia	white aspen	n	o	
Alectryon subcinereus	native quince	n	o	
Alphitonia excelsa	red ash	n	o	
Archidendron grandiflorum	fairy's paintbrush	n	r	
Archontophoenix cunninghamiana	Bangalow palm	n	c	
Austrocallerya australis	native wisteria	n	o	
Cinnamomum camphora	camphor laurel	e,A	o	o
Cissus antarctica	kangaroo vine	n	o	
Clerodendrum floribundum	smooth clerodendrum	n	o	
Cryptocarya microneura	murrogun	n	c	o
Cupaniopsis anacardioides	tuckeroo	n	c	
Cupressus spp	a cypress	e	o	
Elaeocarpus obovatus	hard quandong	n	o	r
Eleocarpus reticulatus	blueberry ash	n	o	
Endiandra muelleri subsp muelleri	Rose walnut	n	r	
Erythrina x sykesii	coral tree	e,A	o	
Eupomatia laurina	bolwarra	n	c	
Ficus coronata	sandpaper fig	n	c	
Ficus rubiginosa	rusty fig	n	r	
Glochidion ferdinandi	cheese tree	n	c	
Guioa semiglauca	guioa	n	c	o
Jagera pseudorhus	foambark	n	o	o
Murraya paniculata	mock orange	e,A	c	c
Notelea longifolia	large mock-olive	n	c	o
Pittosporum undulatum	sweet pittosporum	n	o	r
Psychotria spp	psychotria	n	r	
Quintinia spp	possumwood	n	r	
Rapanea variabilis	muttonwood	n	o	
Schefflera actinophylla	umbrella tree	in,A	o	o
Syagrus romanzoffiana	cocos palm	e,A	o	o
Synoum glandulosum	scentless rosewood	n	c	
Syzygium australe	woolgoolga lillypilly	n	o	
Syzygium spp	a lillypilly	n	r	
Trophis scandens	burny vine	n	o	
Wilkiea hugeliana	veiny wilkiea	n	o	

Ground layer ferns, herbs grasses, shrubs				
Adiantum hispidulum	harsh maidenhair fern	n	o	
Aneilema acuminata		n	c	
Ardisia crenata	ardisia	e	o	o
Asparagus aethiopicus	asparagus fern	n	o	c
Blechnum cartilagineum	gristle fern	n	o	c
Calochlaena dubia	rainbow fern	n		c
Cestrum nocturnum	white cestrum	e,W	o	
Desmodium uncinatum	silverleaf desmodium	e,A	o	c
Dichondra repens	kidney weed	n	c	
Dioscorea transversa	native yam	n	c	o
Doodia aspera	rasp fern	n	c	c
Entolasia stricta	wire grass	n		c
Eustrephus latifolius	wombat berry	n	o	c
Gynochthodes jasminoides	sweet morinda	n	c	
Imperata cylindrica	blady grass	n		c
Lantana camara	lantana	e,A	c	o
Ligustrum lucidum	broadleaved privet	E,A	o	
Lomandra hystrix	stream lomandra	n	c	
Ochna serrulata	mickey mouse bush	e,A	vc	c
Paspalum mandiocanum	broadleaf paspalum	e	vc	c
Passiflora suberosa	corky passionflower	e,A	o	o
Passiflora subpeltata	white passionflower	e,A	o	o
Plectranthus verticillatus	plectranthus	e	c	
Pseuderanthemum variabile	pastel flower	n	c	c
Rhaphiolepis indica	Indian hawthorn	e,W	o	o
Senna pendula	winter senna	e,W	o	o
Smilax australis	prickly smilax	n	c	c
Solanum seaforthianum	climbing nightshade	e,A	o	
Tylophora paniculata	thin-leaved tylophora	n	r	
Viola hederacea	Native violet	n	c	

Status: n native
in introduced native
e exotic

Biosecurity obigation: A Asset protection
C Control
W Watch

Frequency: r rare
o occasional
c common
vc very common

Koala scat search results

WP (Tree)#	Tree species	diam at breast height (cm)	Scats
605 (6)	Lophostemon confertus	98	Grey kangaroo, Brushtail possum
606 (5)	Eucalyptus propinqua	50	0
607 (4)	Corymbia intermedia	73	0
608 (3)	Eucalyptus siderophloia	81	Grey kangaroo
609 (2)	Eucalyptus propinqua	86	0
610 (1)	Eucalyptus grandis	96	Grey kangaroo
611	Eucalyptus grandis	83	0
613	Eucalyptus grandis x 2 stems	50 & 30	0
614	Eucalyptus grandis x 2 stems	110 & 82	0
615	Eucalyptus grandis	120	0
616	Eucalyptus acmenoides	40	0
617	Eucalyptus acmenoides	80	0
618	Eucalyptus microcorys	30	0
619	Eucalyptus acmenoides	65	0
620	Lophostemon confertus	60	0
622	Eucalyptus siderophloia	46	0
625	Eucalyptus grandis	78	0
626	Eucalyptus propinqua	56	0
627	Eucalyptus siderophloia	69	0
628	Corymbia intermedia	45	0
629	Eucalyptus grandis	53	0
630	Lophostemon confertus	63	0
631	Eucalyptus grandis	63	0
632	Eucalyptus grandis	79	0
633	Eucalyptus siderophloia	70	0
634	Jagera pseudorhus	42	0
635	Lophostemon confertus	90	0
636	Eucalyptus propinqua	57	0
637	Eucalyptus microcorys	47	0
638	Eucalyptus microcorys	49	0
639	Eucalyptus microcorys	33	0

Scat search locations

Photographs

Photo 1. Streamside vegetation, Woolgoolga Creek.

Photo 2. Riparian zone vegetation dominated by tall flooded gum.

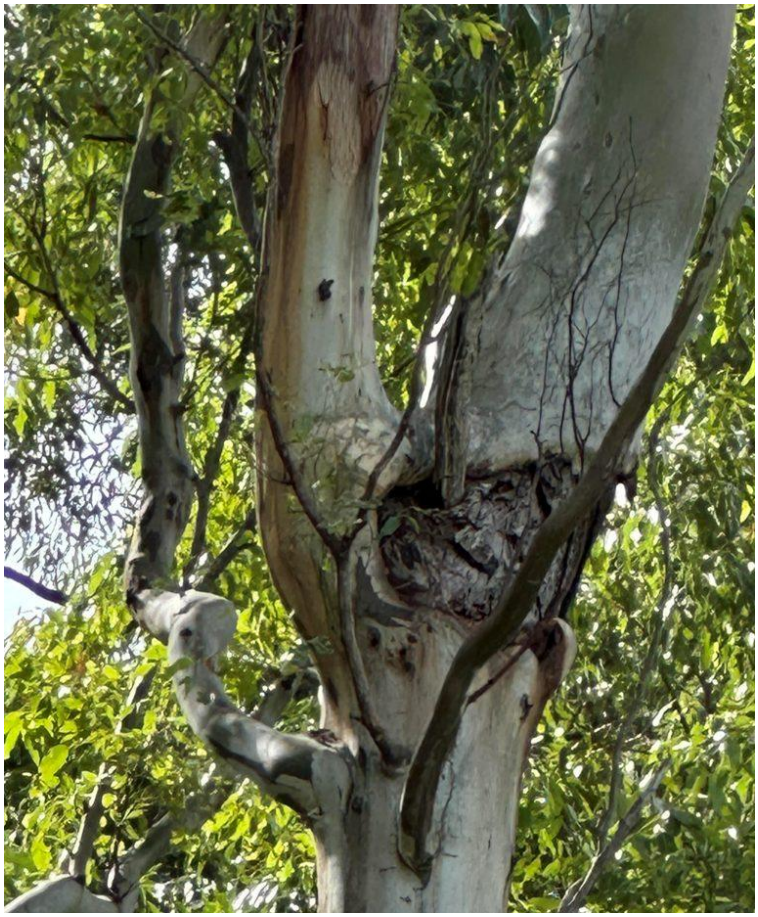

Photo 3.Developing trunk hollow in RHS tree, Photo 2

Photo 4. Isolated tree (Tree 1) with very large hollow.

Photo 5. Close-up of very large hollow showing extensive decay

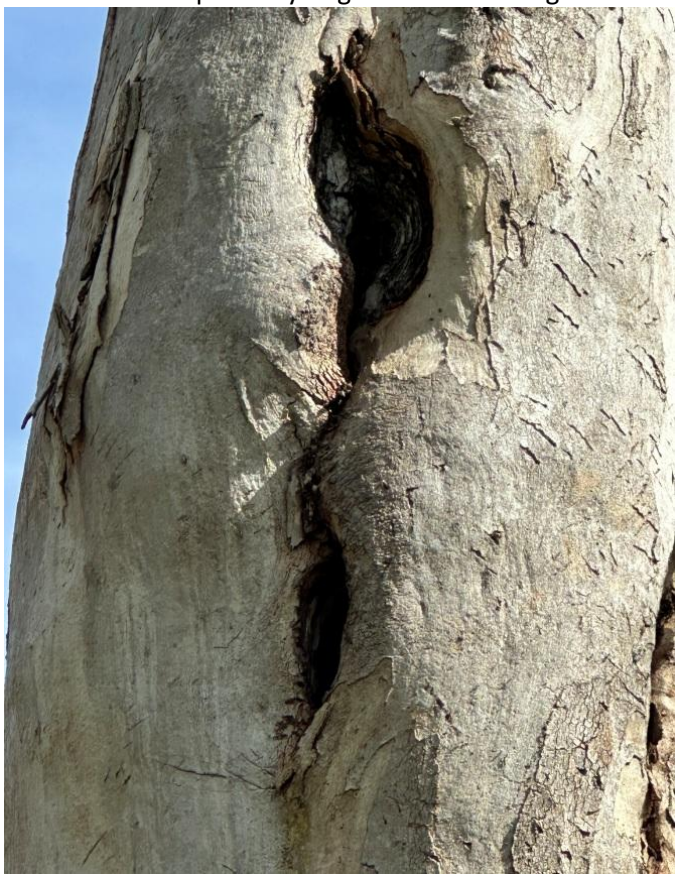

Photo 6. Fissure with possible small hollow (Tree 5).