

# Ecological Assessment

Proposed Roundabout  
Intersection of The Coast Road  
& Skennars Head Road

A Report to Ballina Shire Council  
September 2016

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A handwritten signature in black ink, appearing to read 'Mark Free', with a stylized, flowing script.

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# 1 INTRODUCTION

## 1.1 Background

Blackwood Ecological Services have been engaged by Ballina Shire Council to complete an Ecological Assessment of a proposed roundabout at the intersection of Skennars Head Road and the Coast Road at Lennox Head. The proponent for the project is Ballina Shire Council.

## 1.2 The Subject site

The Subject site refers to the area directly affected by the proposal. The Subject site for this study consists of land within Lot 12 DP 1181479 and the road reserves of Skennars Head Road and the Coast Road in this location as well as adjacent land to the north-east of the existing intersection.

**FIGURE 1** shows the location of the Subject site. **FIGURE 2** shows the proposed roundabout design.

## 1.3 The Study area

The Study area refers to the Subject site together with any additional areas which are likely to be affected by the proposal, either directly or indirectly. The Study area in this case includes adjacent areas of land that have the potential to be affected by the proposed works.

Areas of SEPP 14 Coastal wetland and SEPP 26 Littoral rainforest occur in the vicinity of the site and are shown in **FIGURE 3**. An area of SEPP 14 Coastal wetland is located in the north-western corner of Lot 12 DP 1181479.

## 1.4 Proposed development

The Proposed development involves the construction of a new roundabout located a short distance to the north-west of the existing intersection of Skennars Head Road and the Coast Road. The Proposed development includes raising and realignment of approach roads and construction of a stormwater detention basin on the southern side of the roundabout.

The roundabout location will require filling to raise the road surface higher than the level of the existing road. Batters are to be constructed on the north-western and north-eastern side of the proposed roundabout.

Sight lines will need to be maintained to ensure vegetation does not obscure views for vehicles approaching the roundabout. This will require vegetation to be managed on the western side of The Coast Road north of the roundabout for a distance of about 60m.

The Pat Morton Lookout to Angels Beach Shared Path passes through this area and will be located on the north-eastern side of the Coast Road in this area. The proposed roundabout design incorporates a section of the Shared Path.

## 1.5 Previous studies

Several ecological assessments, survey reports and other relevant studies have been reviewed in the course of this assessment. These studies include:

Blackwood Ecological Services (2012b) **Ecological Assessment. Ballina to Lennox Shared Path. Lennox Head NSW.** A Report to NSW Public Works. This report includes details of an Ecological assessment for the remainder of the proposed Shared path route from Amber Drive to the north to Silver Gull Drive to the south.

Blackwood Ecological Services (2012) **Ecological Assessment. Ballina to Lennox Coastal Recreational Path.** A Report to NSW Public Works. This report includes details of an Ecological assessment for the Coastal Recreational Path study corridor from Pat Morton Lookout in the north to Angels Beach in the south. Fauna survey methodology employed included Elliot traps, cage traps, harp nets, Anabat recording, spotlighting, call playback, pitfall traps, habitat assessment, amphibian surveys, diurnal bird surveys and reptile surveys. The survey recorded a total of nine Threatened fauna species including the Common planigale which was recorded in planted rainforest vegetation around Pat Morton Lookout. The flora component of the project required Blackwood ES to assist Ballina Shire Council identify the most suitable location and design for the path through a number of endangered vegetation communities including Littoral rainforest, Swamp sclerophyll forest, *Themeda australis* grasslands, Coastal cypress pine forest and Freshwater wetlands. A number of Threatened and ROTAP flora species were also identified during the survey.

Parker, P. (2009) **Ballina wastewater reclamation and augmentation program. Flora and Fauna Assessment.** Prepared for the NSW Department of Commerce and Ballina Shire Council. This study involved a walkover of the proposed rising main route about 5km to the west of the current Study area, on the western side of North Creek and Ballina Nature Reserve. The study recorded five Endangered Ecological Communities. The Study did not record any Threatened flora or fauna species, but considered some potential occurrences along the rising main route.

Geolink (2009) **Lennox Head and Ballina Cycleways/Shared Paths. Environmental Assessment and Route Selection.** Prepared for Ballina Shire Council. This Study examined several options for the coastal path. It relied on database records for the fauna survey. The flora survey recorded three Threatened plant species, Stinking cryptocarya, Scented acronychia and Davidson's plum.

Landmark Ecological Services (2008) **Lennox Head District, Hairy jointgrass distribution survey.** This study included an extensive survey of the distribution of Hairy jointgrass in a study area from north of Lake Ainsworth south to Angels Beach Road. The current Study area is located within the area surveyed by Landmark. Extracts from this targeted Hairy jointgrass survey are included in this study where appropriate.

GHD (2010) **Report on Coastline Shared Pathway Project - Pat Morton Lookout to Lennox Head. Ecological Assessment.** A Report to Ballina Shire Council. This study recorded one Threatened flora species, Hairy jointgrass (*Arthraxon hispidus*). Several Threatened fauna species are considered possible occurrences based on database records and habitat analysis. This study also recorded the Endangered Ecological Community *Themeda grasslands on seaciffs and coastal headlands in the NSW North Coast*.

Envite (2004) **Angels Beach Pedestrian/Cycleway. Revegetation, Rehabilitation and Weed Control Plan.** This study recorded an area of Littoral rainforest EEC and discusses several significant plant species known from the Angels Beach area, including Stinking cryptocarya, Coastal cordyline, Plectranthus, Laceflower and Scented acronychia.

## 2 FLORA

### 2.1 Introduction

This section discusses the methods used in the vegetation assessment and presents the results of the assessment. Relevant databases and reports were reviewed to identify records of locally occurring Threatened and Rare plant species, populations and communities. Site assessments were completed on the 2<sup>nd</sup> of August 2016 by Mark Free of Blackwood Ecological Services and David Fell of David Fell Environmental. Vegetation communities within the survey area were categorised and located with the aid of aerial photography and handheld GPS (Garmin Map 78). The objectives of the site assessment were:

- To identify vegetation communities and flora species present in the area subject to the proposed development.
- To complete targeted searches for Hairy jointgrass, Square-stemmed spike-rush and other significant flora species known from the locality and considered possible occurrences based on an assessment of site habitats.

### 2.2 Database searches

#### 2.2.1 NPWS Database search

A search of the NPWS Database revealed records of 17 Threatened flora species within 5km of the Subject site. These species are shown in **TABLE 1**.

**TABLE 1**  
**NPWS DATABASE RECORDS OF THREATENED FLORA**  
**SPECIES WITHIN 5 KM OF THE SUBJECT SITE**

Botanical name	Common name	NSW Status	Comm Status
<i>Davidsonia jerseyana</i>	Davidson's Plum	E1	E
<i>Fontainea oraria</i>	Coastal Fontainea	E4	E
<i>Archidendron hendersonii</i>	White Lace Flower	V	
<i>Xylosma terrae-reginae</i>	Queensland Xylosma	E1	
<i>Cryptocarya foetida</i>	Stinking Cryptocarya	V	V
<i>Tinospora tinosporoides</i>	Arrow-head Vine	V	
<i>Myrsine richmondensis</i>	Ripple-leaf Muttonwood	E1	E
<i>Syzygium hodgekinsoniae</i>	Red Lilly Pilly	V	V
<i>Dendrobium melaleucaphilum</i>	Spider orchid	E1	
<i>Oberonia titania</i>	Red-flowered King of the Fairies	V	
<i>Peristeranthus hillii</i>	Brown Fairy-chain Orchid	V	
<i>Phaius australis</i>	Southern Swamp Orchid	E1	E
<i>Pterostylis nigricans</i>	Dark Greenhood	V	
<i>Arthraxon hispidus</i>	Hairy Jointgrass	V	V
<i>Macadamia tetraphylla</i>	Rough-shelled Bush Nut	V	V
<i>Psilotum complanatum</i>	Flat Fork Fern	E1	
<i>Acronychia littoralis</i>	Scented Acronychia	E1	E

KEY  
E1 or E      Endangered  
E4A      Critically endangered  
V      Vulnerable

## 2.2.2 Commonwealth EPBC Act (1999) Database search

A search of the Commonwealth EPBC Act (1999) Database revealed records of 19 Threatened flora species within 5km of the Subject site. These species are shown in **TABLE 2**.

The Commonwealth EPBC Act Protected Matters Report is included in full in **APPENDIX A**.

**TABLE 2**  
**COMMONWEALTH EPBC ACT (1999) DATABASE RECORDS OF THREATENED FLORA SPECIES WITHIN 5 KM OF THE SUBJECT SITE**

Botanical name	Common Name	Status
<i>Acronychia littoralis</i>	Scented acronychia	E
<i>Allocasuarina defungens</i>	Dwarf heath casuarina	E
<i>Davidsonia johnsonii</i>	Smooth Davidson's plum	E
<i>Diploglottis campbellii</i>	Small-leaved tamarind	E
<i>Fontainea oraria</i>	Coastal fontainea	E
<i>Gossia fragrantissima</i>	Sweet Myrtle	E
<i>Phaius australis</i>	Lesser swamp orchid	E
<i>Randia moorei</i>	Spiny Gardenia	E
<i>Baloghia marmorata</i>	Jointed baloghia	V
<i>Cryptocarya foetida</i>	Stinkning cryptocarya	V
<i>Desmodium acanthocladum</i>	Thorny Pea	V
<i>Floydia praealta</i>	Ball Nut	V
<i>Macadamia tetraphylla</i>	Rough-shelled bush nut	V
<i>Owenia cepiodora</i>	Onionwood	V
<i>Syzygium hodgkinsoniae</i>	Red Lilly Pilly	V
<i>Syzygium moorei</i>	Durobby	V
<i>Taeniophyllum muelleri</i>	Minute orchid	V
<i>Tinospora tinosporoides</i>	Arrow-head Vine	V

KEY

E Endangered  
V Vulnerable

## 2.3 Site assessment

### 2.3.1 Introduction

This section discusses vegetation communities in the Study area and the ecological significance of these communities.

### 2.3.2 Vegetation communities

Seven main vegetation types were identified within the Study area. These vegetation communities are shown in TABLE 3. A plant species list for Subject site is included as **APPENDIX B**.



**TABLE 3**  
**VEGETATION COMMUNITIES ON THE SUBJECT SITE**

Community	Description
1	Mid-high Swamp sclerophyll woodland/forest (Broad-leaved paperbark)
2	Closed sedgeland/fernland/grassland
3	Mid-high closed forest (Tuckeroo with mixed rainforest species)
4	Mid-high open forest (Coast banksia)
5	Low fernland (Harsh ground fern)
6	Tall mixed grassland & fernland with Lantana
7	Tall reedland (Phragmites)

The location and extent of these vegetation communities on the Subject site is shown in **FIGURE 4**. Vegetation communities are described in detail below.

#### 2.3.2.1 Community 1 Mid-high Swamp sclerophyll woodland/forest (Broad-leaved paperbark)

##### **Description and location**

This community type describes vegetation in the western part of the Subject site where a relatively small patch of Broad-leaved paperbark forest occurs between the playing fields to the west and the area in which the roundabout is to be located. The canopy consists almost exclusively of Broad-leaved paperbark with some Bangalow palm, Umbrella cheese tree and Narrow-leaved palm lily present in the sub-canopy. The groundlayer includes Binung and Swamp water fern. Occasional weeds are present including Camphor laurel and Umbrella tree.



**PLATE 1**  
Area of closed Paperbark forest in the western part of the site.

##### **Conservation status**

A Comprehensive Regional Assessment (CRA) was completed for NSW Forest and Non-forest ecosystems as part of the Regional Forestry Agreement (RFA) process (CRA Unit 1999). The RFA establishes the framework for the management forests in NSW. As part of the CRA, the percentage reservation status of forest and non-forest Ecosystems in the CAR Reserve System was estimated based on vegetation modelling designed to establish the pre-1750 extent of forest ecosystems in the region.

This community is best described by Forest Ecosystem 112 (Paperbark). The Regional Forestry Agreement document provides the following data on these ecosystems:



#### FE 112 Paperbark

- 28577 hectares of this ecosystem type remains within the upper north east section of the NSW North Coast Bioregion. The original extent (ie. Pre 1750) has not been calculated.
- The ecosystem is considered to be Vulnerable.
- The extent present in the Comprehensive, Adequate and Representative (CAR) reserve system has not been determined. However, NPWS (1995) note that analogous communities have been reserved in a number of conservation areas in upper North East NSW.
- Paperbark communities have been identified as a priority for conservation on private land.

This community is consistent with the description of the EEC *Swamp sclerophyll forest on coastal floodplain*.

#### 2.3.2.2 Community 2 Closed sedgeland/fernland/grassland

##### Description and location

This community occurs in the low lying swale between Community 1 and more elevated land closer to the intersection of The Coast Road and Skennars Head Road. It consists of wetland vegetation including Swamp rice grass, Swamp water fern, *Eleocharis* sp., *Ranunculus* and *Rhynchospora*. This community also includes some weed species that are more prevalent in adjacent areas of Community 6, including *Paspalum* and *Para grass*. The eastern boundary of this community was identified on site by handheld GPS (Garmin Map 78).



**PLATE 2**  
Area of  
wetland  
vegetation  
within  
Community  
3.

##### Conservation status

Under the CRA classification, this community type is best described by Non-forest ecosystem 141 Swamp. The Regional Forestry Agreement document provides the following data on this ecosystem:

#### Non-forest Ecosystem 141 Swamp

- The Pre 1750 extent of this ecosystem type in the upper north east section of the NSW North Coast Bioregion has not been estimated. 24118 hectares remains.
- The ecosystem is considered endangered.

This community is consistent with the description of the EEC *Freshwater wetlands on coastal floodplains*.

### 2.3.2.3 Community 3 Mid-high closed forest (Tuckeroo with mixed rainforest species)

#### Description and location

This community describes regrowth vegetation in the south-eastern corner of the Subject site where littoral rainforest species including Tuckeroo, Guioa, Macaranga, Three-veined cryptocarya, Yellow pearfruit and Bleeding heart have established and formed a patchy closed canopy to about 6-8m tall. Lantana and tall grassland occur amongst patches of this community.



**PLATE 3**  
Area of  
regenerating  
littoral  
rainforest in  
Community 3.



**PLATE 4**  
The same area  
in 2010 in the  
early stages of  
development  
of Community  
3 .

#### Conservation status

Although in a regrowth state, vegetation in Community type 3 is generally consistent with the description of the EEC *Littoral rainforest* which is listed under the TSC Act 1995 for the North Coast bioregion. This community does not meet the condition criteria of the TEC Littoral Rainforest and Coastal Vine Thickets of Eastern Australia listed under the EPBC Act.



Under the state-wide classification, this community type is best described by Vegetation class Littoral Rainforest. Keith (2006) provides the following data on this ecosystem:

- The estimated area at present day is approximately 12-20km<sup>2</sup>
- The estimated percentage cleared since settlement is 60-90%

Under the CRA classification this community is best described by Forest Ecosystem 168 (Rainforest). The Regional Forestry Agreement document provides the following data on these ecosystems:

#### FE 168 Rainforest

- 159211 hectares of this ecosystem type remains within the upper north east section of the NSW North Coast Bioregion. The original extent (i.e. Pre 1750) has not been calculated.
- This ecosystem is classified as Rare.

#### 2.3.2.4 Community 4 Open forest (Coast banksia)

##### **Description and location**

This community consists of clumps of Coast banksia that occur between Community 3 and wetland vegetation in the western part of the site.



##### **PLATE 5**

Patches of Coast banksia occur in the central part of the site and close to The Coast Road.

##### **Conservation status**

This community type is not listed as an EEC under the TSC or EPBC Acts. Under the CRA classification this community is best described by Forest Ecosystem 5 (Banksia). The Regional Forestry Agreement document provides the following data on this ecosystem:

#### FE 5 Banksia

- The original extent (i.e. Pre 1750) was 7598 hectares and approximately 2046 hectares of this ecosystem type remains within the upper north east section of the NSW North Coast Bioregion.
- Approximately 73% of this ecosystem type within the upper northeast section of the

NSW North Coast Bioregion has been cleared.

- The ecosystem is considered to be Rare.

#### 2.3.2.5 Community 5 Low fernland (Harsh ground fern)

##### **Description and location**

Areas dominated by dense growth of Harsh ground fern occur upslope of wetland vegetation in Community three and in patches amongst exotic dominated grassland. Closer to the wetland vegetation some Swamp rice grass and Swamp water fern occurs.



##### **PLATE 6**

Patch of dense fernland dominated by Harsh ground fern

##### **Conservation status**

Community 5 is not well described by any of the CRA communities. Fernland communities are patchily but widely distributed in the locality and typically occur as transitional communities in response to fire or other disturbance. This community does not form part of any listed EEC.

#### 2.3.2.6 Tall mixed grassland & fernland with Lantana

##### **Description and location**

This community dominates the eastern part of the Subject site and includes areas of Setaria, Para grass, Lantana thickets and other exotic vegetation types. Some Rhyncospora occurs amongst grassland and this community grades into fernland, Coast banksia forest and, in the eastern corner, Tuckeroo dominated closed forest.

Closer to the existing intersection, this community consists of low mown grassland.





**PLATE 7**  
Grassland  
and  
Lantana in  
Community  
6

#### **Conservation status**

Community 1 is highly modified and is not well described by any of the CRA communities. Grassland communities dominated by exotic pasture grasses are widely distributed in the locality and have negligible conservation value.

#### **2.3.2.7 Community 7 Very tall rushland in drains (Phragmites)**

##### **Description and Location**

As is typical of many low lying roadside drains in the locality, a dense growth of Phragmites occurs in a section of the road verge on the south-western side of The Coast Road. A more extensive area of Phragmites occurs on the eastern side of The Coast Road in this location.

##### **Conservation Status**

Phragmites is a widespread species in the locality characteristic of Freshwater wetland habitats as well as irrigation drains, dams and other modified environments. Based upon the disturbed nature of this community within the boundaries of the site and its location on the roadside verge, it is considered that this vegetation does not constitute Freshwater wetland EEC. However, areas of Freshwater wetland do occur on site and areas of Freshwater wetland dominated by Phragmites do occur to the east of the Subject site.



**PLATE 8**  
Phragmites  
growth on the  
road verge

### 2.3.3 Endangered and Threatened Ecological Communities

Vegetation communities on the Subject site were compared with descriptions of vegetation communities listed as Endangered Ecological Communities (EECs) under the Threatened Species Conservation Act (1995) and Threatened Ecological Communities under the EPBC Act (1999).

On the coastal floodplain of NSW, all the remaining native vegetation has been identified to be threatened and each distinct ecological community has been listed as endangered under the *Threatened Species Conservation Act* 1995. The NSW Scientific Committee's Final Determinations describe the various listed EECs in detail. Vegetation in Community 1 is consistent with the description of the EEC *Swamp sclerophyll forest on coastal floodplains*. Vegetation in Community 2 is consistent with the description of the EEC *Freshwater wetland on coastal floodplains*. Although in a regrowth state, vegetation in Community type 3 is generally consistent with the description of the EEC *Littoral rainforest*. According to the Final Determination, prior clearing and disturbance of these communities and/or the presence of weed species does not preclude areas from being classified as these EECs.

### 2.3.4 Significant species

No Threatened (TSC Act 1995, EPBC Act 1999) flora species were recorded in the Study area. No Hairy jointgrass (*Arthraxon hispidus*) was recorded, although this species does not generally become readily detectable until later in the year. The Subject site does not provide highly suitable habitat for this species.



## 3 FAUNA

### 3.1 Introduction

This section discusses the methods used in the fauna assessment and presents the results of the assessment. Relevant databases and reports were reviewed to identify records of locally occurring Threatened fauna species, populations and communities.

### 3.2 Site assessment

Site habitats were assessed in terms of their value for native fauna species. Site assessments were completed in conjunction with the flora assessment on the 2<sup>nd</sup> of August 2016. The assessment focused on identifying habitat features associated with Threatened species known from the locality. Particular attention was paid to habitat features such as:

- The presence of mature trees with hollows, fissures and/or other suitable roosting/nesting places.
- Presence of hollow logs/debris and areas of dense leaf litter.
- The presence of preferred Koala food tree species.
- The presence of preferred Glossy black cockatoo feed trees.
- Condition, flow and water quality of drainage lines and bodies of water.
- Areas of dense vegetation.
- Presence of fruiting flora species and blossoming flora species, particularly winter-flowering species.
- Vegetation connectivity and proximity to neighbouring areas of vegetation.
- Presence of caves, hollow trees and/or man-made structures suitable as microchiropteran bat roost sites.

### 3.3 Database searches

#### 3.3.1 NPWS Database search

A search of the NPWS Database revealed records of a large number of Threatened fauna species within 5km of the Subject site. These species are shown in **TABLE 4**.

**TABLE 4**  
**NPWS DATABASE RECORDS OF THREATENED FAUNA**  
**SPECIES WITHIN 5 KM OF THE SUBJECT SITE**

Scientific name	Common name	Status
<i>Amaurornis olivaceus</i>	Bush-hen	V
<i>Anseranas semipalmata</i>	Magpie goose	V
<i>Botaurus poiciloptilus</i>	Australasian bittern	E1
<i>Burhinus grallarius</i>	Bush stone-curlew	E1
<i>Calidris alba</i>	Sanderling	V
<i>Calidris tenuirostris</i>	Great Knot	V
<i>Caretta caretta</i>	Loggerhead turtle	E1
<i>Charadrius leschenaultii</i>	Greater Sand Plover	V
<i>Charadrius mongolus</i>	Lesser Sand Plover	V
<i>Chelonia mydas</i>	Green Turtle	V
<i>Circus assimilis</i>	Spotted harrier	V

Scientific name	Common name	Status
<i>Coracina lineata</i>	Barred Cuckoo-shrike	V
<i>Crinia tinnula</i>	Wallum froglet	V
<i>Daphoenositta chrysoptera</i>	Varied sitella	V
<i>Dasyurus maculatus</i>	Spotted-tailed quoll	V
<i>Dermochelys coriacea</i>	Leathery turtle	V
<i>Ephippiorhynchus asiaticus</i>	Black-necked stork	E1
<i>Erythrotriorchis radiatus</i>	Red goshawk	E4A
<i>Esacus neglectus</i>	Beach Stone-curlew	E4A
<i>Grus rubicunda</i>	Brolga	V
<i>Gygis alba</i>	White Tern	V
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	V
<i>Haematopus longirostris</i>	Pied Oystercatcher	E1
<i>Hieraaetus morphnoides</i>	Little eagle	V
<i>Irediparra gallinacea</i>	Comb-crested jacana	V
<i>Ixobrychus flavicollis</i>	Black bittern	V
<i>Lichenostomus fasciularis</i>	Mangrove Honeyeater	V
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	V
<i>Limosa limosa</i>	Black-tailed Godwit	V
<i>Litoria aurea</i>	Green and golden bell frog	E1
<i>Litoria olongburensis</i>	Wallum sedge frog	V
<i>Megaptera novaeangliae</i>	Humpback whale	V
<i>Miniopterus australis</i>	Little bent-wing bat	V
<i>Miniopterus schreibersii oceanensis</i>	Eastern bentwing-bat	V
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V
<i>Myotis macropus</i>	Large-footed myotis	V
<i>Nyctophilus bifax</i>	Eastern long-eared bat	V
<i>Pandion haliaetus</i>	Osprey	V
<i>Phascolarctos cinereus</i>	Koala	V
<i>Phoebastria fusca</i>	Sooty albatross	V
<i>Planigale maculata</i>	Common planigale	V
<i>Podargus ocellatus</i>	Marbled frogmouth	V
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V
<i>Procelsterna cerulea</i>	Grey Ternlet	V
<i>Pterodroma leucoptera leucoptera</i>	Gould's Petrel	V
<i>Pterodroma nigripennis</i>	Black-winged Petrel	V
<i>Pterodroma solandri</i>	Providence Petrel	V
<i>Pteropus poliocephalus</i>	Grey-headed flying fox	V
<i>Ptilinopus regina</i>	Rose-crowned fruit dove	V
<i>Ptilinopus superbus</i>	Superb fruit dove	V
<i>Puffinus assimilis</i>	Little Shearwater	V
<i>Puffinus carneipes</i>	Flesh-footed Shearwater	V
<i>Rostratula benghalensis</i>	Painted Snipe	E1
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V
<i>Sterna albifrons</i>	Little Tern	E1
<i>Sterna fuscata</i>	Sooty Tern	V

Scientific name	Common name	Status
<i>Stictonetta naevosa</i>	Freckled duck	V
<i>Sula dactylatra</i>	Masked Booby	V
<i>Syconycteris australis</i>	Common blossom bat	V
<i>Thersites mitchellae</i>	Mitchell's rainforest snail	E1
<i>Todiramphus chloris</i>	Collared kingfisher	V
<i>Tyto capensis</i>	Grass Owl	V
<i>Tyto novaehollandiae</i>	Masked owl	V
<i>Xenus cinereus</i>	Terek Sandpiper	V

KEY	
E1	Endangered
E4A	Critically endangered
V	Vulnerable

### 3.3.2 Commonwealth EPBC Act (1999) Database search

A search of the Commonwealth EPBC Act (1999) Database revealed records of 14 Threatened fauna species within 5km of the Subject site. These species are shown in **TABLE 5**. Marine species are not included in this table.

The Commonwealth EPBC Act Protected Matters Report is included in full in **APPENDIX A**.

**TABLE 5**  
**COMMONWEALTH EPBC ACT (1999) DATABASE RECORDS OF THREATENED FAUNA SPECIES WITHIN 10 KM OF THE SUBJECT SITE**

Common Name	Scientific name	Status
Mitchell's Rainforest snail	<i>Thersites mitchellae</i>	CE
Coxen's Fig-Parrot	<i>Cyclopsitta diophthalma coxeni</i>	E
Swift Parrot	<i>Lathamus discolor</i>	E
Black-throated Finch (southern)	<i>Poephila cincta cincta</i>	E
Regent Honeyeater	<i>Xanthomyza phrygia</i>	E
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	V
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V
Green and golden bell frog	<i>Litoria aurea</i>	V
Wallum Sedge Frog	<i>Litoria olongburensis</i>	V
Long-nosed Potoroo (SE mainland)	<i>Potorous tridactylus tridactylus</i>	V
New Holland mouse	<i>Pseudomys novaehollandiae</i>	V
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V
Australian Painted Snipe	<i>Rostratula australis</i>	V
Water mouse	<i>Xeromys myoides</i>	V

KEY	
CE	Critically endangered
E	Endangered
V	Vulnerable

## 3.4 Fauna survey program for the Shared Path/Coastal Recreational Path

A comprehensive fauna survey program was completed by Blackwood Ecological Services for the Shared Path/Coastal Recreational Path project in April 2011. Some elements of the fauna

survey were completed in late April and May 2011. The fauna surveys were completed by Mark Free and Dr. Justin Watson of Gondwana Environmental. The current Subject site is located within the study area for this project and the results of this survey are referred to where appropriate.

### **3.5 Fauna habitats, wildlife corridors and habitat connectivity**

Movement opportunities for fauna through this highly disturbed landscape are generally limited and existing roads provide a partial barrier to movement for many species. Paperbark and wetland vegetation to the north-west of the proposed roundabout location provide some connection to roadside vegetation along Skennars Head Road that provides a tenuous connection between SEPP 14 wetland vegetation south of Skennars Head Road and habitats behind Boulder Beach.

Ballina Nature Reserve to the west provides an extensive area of habitat for fauna adapted to swamp sclerophyll and intertidal habitats.

No Threatened fauna species were recorded during the site assessment.

### **3.6 Potential occurrence of Threatened fauna**

**TABLE 6** lists the threatened fauna species known from the locality and considers the likelihood of these species occurring on the site. This Table includes species from the NPWS and EPBC databases as well as several other species known from other sources. Some of these species, particularly birds and bats, may be occasional or regular visitors to the site depending on seasonal migrations, availability of forage resources and other factors.

Marine and oceanic species are not included in this table.

### 3.7 Likelihood of occurrence

**TABLE 6**  
**LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES**

Species	Notes	Likelihood of occurrence in the Study area
<b>Amphibians</b>		
Wallum froglet	The Wallum froglet is found in Wallum habitats such as Paperbark swamps and coastal heath as well as adjacent grassland and drains with low pH waters. It is known from several locations in the Lennox Head area, including heathland at the intersection of Ross Lane and the Coast Road.	Unlikely, suitable habitat is not present.
Green and Golden bell frog	The species is associated with semi-permanent or permanent water including marshes, dams and stream-sides as well as disturbed sites such as disused industrial sites, brick pits, mines, recently cleared bushland or council tips. There are no recent records of this species in the Study area.	Unlikely.
Wallum sedge frog	The Wallum sedge frog occurs in permanent or semi-permanent ponds and pools in Wallum habitats such as Paperbark swamps and coastal heath.	Unlikely.
<b>Reptiles</b>		
Green turtle Loggerhead turtle Leathery turtle	These marine turtles occasionally nest on beaches in the locality or occur in offshore waters. No suitable habitat occurs on site or will be impacted by the proposed development.	Unlikely
<b>Forest and woodland birds</b>		
Bush stone-curlew	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Largely nocturnal, being especially active on moonlit nights.	Unlikely
Black-throated finch (southern)	The few recent records of this species in NSW are all from the southern New England Tableland. Not recorded in the DECCW database or Birds Australia Atlas.	Unlikely
Double-eyed fig parrot	This very rare species occurs in the canopy of rainforests, including dry rainforest and cool subtropical rainforest.	Unlikely
Grass owl	The Grass owl occupies coastal heath and grassland habitats. There are suitable areas of habitat in the wider Study area but it is unlikely to occur within the study corridor.	Possible.
Grey-crowned babbler	Grey-crowned Babblers occupy open woodlands dominated by mature eucalypts, with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs.	Unlikely

Species	Notes	Likelihood of occurrence in the Study area
Little eagle	Occupies open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	Possible occurrence
Marbled frogmouth	On the east coast of NSW, this species is restricted to lower altitude sub-tropical rainforests.	Unlikely
Masked owl	The Masked owl was recorded in the Study area during the recent survey.	Unlikely
Varied sitella	Varied Sitellas are found in eucalypt woodlands and forests throughout their range. They prefer rough-barked trees like stringybarks and ironbarks or mature trees with hollows or dead branches.	Unlikely
Regent honeyeater	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. In NSW the distribution is very patchy and mainly confined to the two main breeding areas (at Capertee Valley and the Bundarra-Barraba region) and surrounding fragmented woodlands. In some years non-breeding flocks converge on flowering coastal woodlands and forests where they prefer Swamp mahogany and Spotted gum forests.	Unlikely
Rose-crowned dove	fruit- The Rose-crowned fruit dove prefers tall tropical and subtropical evergreen or semi-deciduous rainforest, especially with a dense regrowth of vines. The Atlas of NSW Wildlife shows several records of this species in the surrounding area.	Possible occurrence
Superb fruit dove	This species is nomadic and often travels long distances in search of rainforest fruits.	Unlikely
Spotted harrier	Occurs in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. Builds a stick nest in a tree.	Possible occurrence foraging throughout Study area.
Swift parrot	This migratory species is very rarely recorded in the locality.	Unlikely
Yellow-eyed cuckoo-shrike	This species lives in the canopy of rainforests and rainforest margins and wanders nomadically in search of fruit.	Unlikely
Red goshawk	This unique Australian endemic raptor is distributed sparsely through northern and eastern Australia. The species is very rare in NSW, extending south to about 30°S, with most records north of this, in the Clarence River Catchment, and a few around the lower Richmond and Tweed Rivers.	Unlikely
<b>Oceanic and coastal birds</b>		



Species	Notes	Likelihood of occurrence in the Study area
Collared kingfisher	This bird prefers estuarine and mangrove habitats. They are often seen perched on rock walls, jetties, piles or on the ground on tidal flats. They also sometimes occur in parks and gardens along foreshores.	Unlikely
Mangrove honeyeater	The primary habitat of the species is mangrove woodlands and shrublands but Mangrove Honeyeaters also range into adjacent forests, woodlands and shrublands, including casuarina and paperbark swamp forests and associations dominated by eucalypts or banksias.	Unlikely
Osprey	Ospreys forage in coastal rivers and streams. They prefer to nest closer to coastal waterbodies.	Unlikely
Sanderling Great knot Greater sand plover Lesser sand plover Beach stone-curlew White tern Sooty oystercatcher Pied oystercatcher Broad-billed sandpiper Black-tailed godwit Grey ternlet Little tern Sooty tern Terek sandpiper	These birds occur on open beaches, estuarine mudflats and sandflats and/or rocky shore habitats. There are no suitable areas of habitat along the study corridor.	Unlikely
<b>Wetland birds</b>		
Australasian bittern	The Australasian bittern generally prefers freshwater habitats although it may also use dense saltmarsh vegetation in estuaries and flooded grasslands.	Unlikely
Australian painted snipe	This species prefers the fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	Unlikely
Black bittern	This species occupies forested fresh rivers, tidal creeks and coastal inlets.	Possible

Species	Notes	Likelihood of occurrence in the Study area
Black-necked stork	The Black-necked stork is an occasional visitor to the area and uses grassland and wetland habitats in the locality during periods of inundation.	Unlikely
Bush hen	The Bush hen is normally associated with moist stands of deep rank grass along permanent running streams.	Unlikely
Comb-crested jacana	Found in dams, still or slow-flowing wetlands and other waterbodies with floating waterlilies or other floating or dense fringing vegetation.	Unlikely
Magpie goose	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges.	Unlikely
Freckled duck	The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. The duck is forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. The species may also occur as far as coastal NSW and Victoria during such times. Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds.	Unlikely
Brolga	Found in shallow swamps, dry grassland or ploughed paddocks and desert claypans.	Unlikely
<b>Terrestrial mammals</b>		
Common planigale	This species occupies a wide range of habitats including rainforest, sclerophyll forest, grasslands, marshlands, rocky areas and even some suburban areas.	Possible
Koala	Koalas are not common in the Study area and the Study area contains no preferred Koala food trees. Koalas may move through the area occasionally.	Unlikely
Long-nosed potoroo	This species occurs in coastal heathland habitats at several locations along the Far North Coast. Suitable habitat is not present within the study corridor	Unlikely
New Holland Mouse	Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey and vegetated sand dunes. This species was not recorded on the NSW Wildlife Atlas search and is not known from the locality.	Unlikely
Spotted-tail quoll	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Quolls are rarely recorded in the locality.	Unlikely

Species	Notes	Likelihood of occurrence in the Study area
Water mouse	It is found in coastal wetlands such as lagoons, swamps and sedged lakes close to fore dunes. It forages amongst the mangroves at night when the tide is low, and when the tide rises it returns to the adjacent sedgeland for shelter. This species was not recorded on the NSW Wildlife Atlas search and is not known from the locality.	Unlikely
<b>Bats</b>		
Common blossom bat	Common Blossom Bats roost in areas of dense littoral rainforest or swamp forest, typically within Cabbage palms. They forage on banksias and other flowering plants. They may use the site for foraging.	Possible
Eastern (common) bentwing bat	This species generally occupies caves and tunnels during the day and, at night, forages for small insects beneath the canopy of well timbered habitats. The Eastern bent-wing bat may utilise the site as forage habitat.	Possible Recorded during 2011 site survey
Eastern long-eared bat	This species typically roosts in old growth trees with hollows. It may occasionally roost in dense forested vegetation and dead rainforest foliage. The Study area may be used for foraging by this species.	Possible
East coast free-tailed bat	This bat occurs in dry sclerophyll forest and woodland east of the Great Dividing Range.	Unlikely
Grey-headed flying fox	This species occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Urban gardens and cultivated fruit crops also provide habitat for this species.	Possible
Greater broad-nosed bat	This species forages over a range of habitats, including rainforest and moist forests.	Possible
Large-eared pied bat	This species is found in well-timbered areas containing gullies. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin, frequenting low to mid-elevation dry open forest and woodland close to these features.	Unlikely. This species was not recorded on the Atlas of NSW Wildlife and the site contains no roost sites and only marginal forage habitat.
Little bent-wing bat	This species generally roosts in caves and tunnels during the day and forages for insects beneath the canopy of forested habitats at night.	Possible
Southern myotis	This species forages over fresh and saline waterbodies and roosts in caves, tree hollows, culverts, tunnels and other man-made structures.	Unlikely

Species	Notes	Likelihood of occurrence in the Study area
<b>Invertebrates</b>		
Mitchell's snail	rainforest This snail is restricted to remnant areas of lowland subtropical rainforest and swamp sclerophyll forest with a rainforest understorey on alluvial soils with a basaltic influence on the coastal plain between the Richmond and Tweed Rivers.	Unlikely

## 4 IMPACTS AND AMELIORATION

### 4.1 Introduction

The Proposed development involves the construction of a new roundabout located a short distance to the north-west of the existing intersection of Skennars Head Road and the Coast Road. The Proposed development includes raising and realignment of approach roads and construction of a stormwater detention basin on the southern side of the roundabout. The roundabout location will require filling to raise the road surface higher than the level of the existing road. Batters are to be constructed on the north-western and north-eastern side of the proposed roundabout.

Sight lines will need to be maintained to ensure vegetation does not obscure views for vehicles approaching the roundabout. This will require vegetation to be managed on the western side of The Coast Road north of the roundabout for a distance of about 60m.

**FIGURE 4** shows potential impacts associated with the proposed development, including the extent of filling and clearing required.

This section discusses potential impacts associated with the construction and operation of the proposed roundabout. Impacts may occur as a result of various site activities, including:

- Clearing of vegetation for the roundabout and batters.
- Loss of habitat within the development footprint.
- Disturbance of adjacent areas of vegetation as a result of providing access, operating machinery, accidental damage etc.
- Transport of materials and personnel to the site.
- Disturbance of soils, including increased potential for erosion and sedimentation.
- Short-term impacts associated with construction noise, vibration and activity.
- Accidental spill of fuel or chemicals.
- Alteration to surface hydrology in adjacent areas due to change to site surface levels, flow paths, permeability and compaction.
- Weed incursion due to importation from fill, construction machinery or edge effects.
- Light pollution from additional streetlighting.

### 4.2 Discussion of potential ecological impacts

#### 4.2.1 Flora

The various activities associated with the construction and operation of the proposed roundabout have the potential to result in a number of impacts on site vegetation. These are detailed in this section.

##### 4.2.1.1 Direct removal of native vegetation

In general, site vegetation consists of highly modified ecosystems, primarily grassland which is regularly slashed. The construction of the roundabout – including filling of the area and forming of batters – will require the clearing of areas of Tuckeroo dominated closed forest and Coast banksia patches as well as a small area on the edge of the wetland. **TABLE 7** shows the area of each community type that will require clearing based on the layout shown in **FIGURE 4**.

**TABLE 7**

**VEGETATION TO BE REMOVED FOR THE PROPOSED DEVELOPMENT**

Vegetation Community		Area within roundabout footprint
1	Mid-high Swamp sclerophyll woodland/forest (Broad-leaved paperbark)	0m <sup>2</sup>
2	Tall closed sedgeland/fernland/grassland	302 m <sup>2</sup>
3	Mid-high closed forest (Tuckeroo with mixed rainforest species)	819 m <sup>2</sup>
4	Mid-high open forest (Coast banksia)	706 m <sup>2</sup>
5	Low fernland (Harsh ground fern)	1810 m <sup>2</sup>
6	Tall mixed grassland & fernland with Lantana	2297 m <sup>2</sup>
7	Tall reedland (Phragmites)	240 m <sup>2</sup>

Roadside vegetation on the north-eastern side of The Coast Road will require clearing for the construction of batters with disturbance to extend westward as far as the boundary of the road reserve. Vegetation in this area consists of weedy pasture grassland with Phragmites.

Construction of the stormwater detention basin will only impact upon an existing area of mown grassland.

#### 4.2.1.2 Indirect physical effects on vegetation adjacent to the clearing area

Trees close to the proposed route may be affected by the need to lop limbs from trees and shrubs to enable machinery to access the area, damage to root systems, accidental damage from machinery, compaction, or by the stockpiling of spoil or other materials in these areas.

There is potential for vegetation within low-lying wetland areas to be affected by sedimentation from loss of soils from adjacent disturbed areas, alteration to hydrological conditions and other factors.

#### 4.2.1.3 Creation of edge effects and introduction of weed species to the Study area.

The construction of the proposed roundabout has limited potential to expose adjacent retained areas of vegetation to increased light and exposure or weed infestation as these areas are already affected by edge effects caused by the existing roads. The study area is already highly modified and contains a variety of exotic species, including invasive weeds. The movement of machinery and site personnel within the site and the importation of fill has some potential to result in additional invasive weeds colonising disturbed areas or new weeds being introduced to the Study area.

#### 4.2.1.4 Impacts on EECs

Clearing for the roundabout will not result in the removal of any areas of *Swamp sclerophyll forest* EEC and construction activities are unlikely to result in any accidental direct impacts to this community. Clearing will result in the loss of an estimated 302m<sup>2</sup> of *Freshwater wetland* EEC and 819m<sup>2</sup> of *Littoral rainforest* EEC.

### 4.2.2 Fauna

#### 4.2.2.1 Loss of fauna habitat and degradation of neighbouring areas of habitat

The potential loss of a number of trees and some isolated native saplings represents a negligible loss of habitat for native fauna. Areas to be directly affected are generally highly modified and



have only marginal habitat value for the majority of native fauna. These areas will generally be used by more common disturbance-adapted species, although significant fauna species including microchiropteran bats and the Grey-headed flying-fox are known to occur in the Study area.

There will be no loss of forage habitat for Koalas and trees are not of sufficient maturity to provide tree hollows suitable for hollow-dwelling fauna.

The construction of the roundabout has the potential to push edge effects further into the wetland or to result in the degradation of wetland habitats from sedimentation, physical impacts during construction, alteration to hydrological conditions and other factors.

#### 4.2.2.2 Direct impacts on fauna

There is little potential for native fauna to be killed or injured as a result of site clearing activities or other construction works.

#### 4.2.2.3 Impacts on corridor values

Within the wider Study area, fauna movement opportunities are provided by patches of littoral rainforest, swamp forest and wetland, isolated trees and clumps of regrowth vegetation and fragmented wildlife corridors along roadways and some fencelines. The Study area also forms part of a discontinuous link of vegetation between Ballina Nature Reserve to the west and heathland and coastal scrub along the coastline to the east.

The proposed works are unlikely to have any significant impact on fauna movement opportunities or sever any important wildlife corridors.

#### 4.2.2.4 Disturbance from construction noise, vibration and activity

The Study area is typically subject to a high degree of disturbance from busy roads and residential areas. Disturbance from construction noise and activity will result in a minor short term localised increase in disturbance.

#### 4.2.2.5 Light pollution

Nocturnal fauna can be impacted by artificial light from sources such as streetlights. Additional lighting will be introduced for the roundabout. The Subject site itself does not provide high value habitat for native fauna but some nocturnal fauna are likely to occur in neighbouring areas of habitat, including Threatened species. Roundabout lighting will not be visible from any beaches providing potential turtle nesting habitat as the shoreline at Iron Peg consists of exposed rock.

### 4.2.3 Impacts on the SEPP 14 Coastal wetland

No works are proposed within the SEPP 14 wetland area and associated activities such as provision of site access and storage of materials are unlikely to have any direct impact on this area. There is some potential for this area to be affected as a result of sedimentation, weed infestation and/or changes in hydrology.

## 4.3 Proposed mitigation measures

### 4.3.1 Vegetation management

- Trees to be removed or trimmed as a result of the proposed development should be clearly marked prior to construction. The extent of clearing should be clearly marked and sediment controls be in place.
- Best practice weed management practices should be in place to prevent transfer of weed seeds and vegetative materials, including sourcing of fill from weed free areas, washdown of vehicles entering or leaving the worksite.
- Contractor to minimise roadside vegetation disturbance along The Coast Road to the extent required to establish sightlines.
- Vegetation removed from the construction area should be taken to an appropriate green waste facility.
- Ongoing weed control should be undertaken during and following construction with the aim of minimising potential weed incursion into adjacent wetland areas.

### 4.3.2 Management of soils and disturbed areas

- Disturbed soils should be contained using sediment fencing and geotextile controls and backfilled as soon as possible.
- Disturbed areas would be stabilised during maintenance works, where necessary and revegetation should be undertaken after works are complete. Erosion and sedimentation control measures should not be removed until disturbed areas have stabilised.

### 4.3.3 Additional management measures

- The final design of the roundabout should aim to ensure that there is minimal change to the hydrological regime in the area of SEPP 14 Coastal wetland and adjacent wetland vegetation.
- All reasonable practical steps shall be undertaken to reduce noise and vibration from the site.
- Streetlighting should be designed/directed to the minimum required for lighting the roundabout adequately to minimise light pollution impacts on wildlife.

## 4.4 Offset recommendations

Native vegetation to be removed for roundabout construction should be compensated for at a ratio of 10:1 for EEC vegetation and 5:1 for non-EEC native vegetation communities.

The proposed development will result in the loss of 302m<sup>2</sup> of wetland vegetation and 819 m<sup>2</sup> of rainforest regrowth comprising EEC vegetation and an additional 706 m<sup>2</sup> of Coast banksia which is not part of an EEC. This loss of 1827m<sup>2</sup> will be compensated for by the restoration and/or rehabilitation of 1.47ha of native vegetation consisting of similar vegetation types.

A Vegetation Management Plan should be prepared to guide the implementation of offset works. The Vegetation Management Plan is to discuss:

- Weed control works within the wetland area and the SEPP 14 fringe.
- Establishment of 1600m<sup>2</sup> and 500m<sup>2</sup> restoration plantings of a Littoral rainforest/Swamp sclerophyll community on newly established batters on the western side of the roundabout and eastern side of The Coast Road following construction.



These plantings are to act as buffers to the SEPP 14 area and eastern wetland area respectively.

- Implementation of a restoration/rehabilitation strategy for a minimum additional area of 1.31ha of Swamp sclerophyll, wetland and/or Littoral rainforest habitat.

## 5 STATUTORY CONSIDERATIONS

### 5.1 Introduction

This section includes assessments of the impacts of the Proposed development with regard to:

- Section 5A of the Environment Protection & Assessment Act (1979) (7 part test);
- the Commonwealth Environment Protection and Biodiversity Conservation Act (1999).

### 5.2 Section 5A Assessment of Significance

Section 5A of the NSW Environmental Planning and Assessment Act (1979) requires a number of factors to be taken into account in determining the significance of impact of a development on threatened species, populations or ecological communities, or their habitats. The seven factors to be taken into account under the Assessment of Significance are known as the Seven Part Test.

An Assessment of Significance has been completed for the EECs *Swamp sclerophyll forest on coastal floodplains*, *Littoral rainforest* and *Freshwater wetlands on Coastal floodplains*.

The Assessment of Significance for this study includes consideration of the following Threatened fauna species recorded during the site survey or considered possible occurrences in the Study area. These species are:

- Black bittern
- Little eagle
- Spotted harrier
- Rose-crowned fruit-dove
- Bush-hen
- Grass owl
- Common planigale
- Common blossom bat
- Grey-headed flying-fox
- Little bentwing bat
- Eastern bentwing bat
- Eastern long-eared bat
- Greater broad-nosed bat

a) *in the case of a threatened species, whether the action proposed 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,*

#### Black bittern

##### Background information

The Black Bittern has a wide distribution, from southern NSW north to Cape York and along the north coast to the Kimberley region. In NSW, records of the species are scattered along the east coast, with individuals rarely being recorded south of Sydney or inland. Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.

Feeds on frogs, reptiles, fish and invertebrates, including snails, dragonflies, shrimps and crayfish, with most feeding done at dusk and at night. During the day, roosts in trees or on the ground amongst dense reeds.

##### Threats to the Black bittern include:

- Predation by foxes and feral cats on eggs and juveniles.
- Grazing and trampling of riparian vegetation by stock.
- Clearing of riparian vegetation.

Recovery actions for the Black bittern include:

- Control of feral animals, in particular foxes and cats.
- Protect and manage habitat, including fencing of riparian vegetation to prevent trampling and grazing by cattle.

Source: Department of Environment & Conservation 2007

The Study area supports areas of marginal habitat for the Black bittern. Superior areas of wetland habitat for this species are unlikely to be affected.

With the adoption of the amelioration measures discussed in this report, the Proposed development is likely to have a negligible impact on the local population of this species and on areas of suitable habitat in the Study area.

### Grass owl.

Grass Owls have been recorded occasionally in all mainland states of Australia but appear to be more commonly recorded in northern and north-eastern Australia. In NSW they are more likely to be found in the north-east. Grass Owl numbers often increase when rodent numbers increase. Grass Owls are found in areas of tall grass, including grass tussocks in swampy areas, grassy plains, swampy heath, and cane grass, or sedges on flood plains. They rest by day in a 'form' - a trampled platform in a large tussock or other heavy growth. They also nest in trodden-down grass.

Threats to the Grass owl include:

- Loss of suitable habitat due to grazing, agriculture and development.
- Disturbance and habitat degradation by stock.
- Use of pesticides in agriculture to control rodent populations thereby reducing seasonal food sources for owls, and potentially poisoning owls.
- Frequent burning, which reduces ground cover.

Recovery actions for the Grass owl include:

- Protect habitat from fire where possible.
- Reduce use of pesticides where owls are known to be present.
- Retain and protect suitable habitat.
- Fence off areas of suitable habitat to prevent disturbance by stock.

Source: Department of Environment & Conservation 2007

Areas of taller grassland, sedgeland and Phragmites within the Study area may provide suitable habitat. The Subject site itself is unlikely to be used as roosting or nesting habitat although the grassland/wetland area east of The Coast Road may provide habitat.

The Proposed development is likely to have a negligible impact on the local population of this species and on areas of suitable habitat in the Study area.

### Rose-crowned fruit-dove

Background information

Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful. They feed entirely on fruit from vines, shrubs, large trees and palms, and are thought to be locally nomadic as they follow the ripening of fruits. Some populations are migratory in response to food availability - numbers in

north-east NSW increase during spring and summer then decline in April or May.

Threats to the Rose-crowned fruit-dove include:

- Clearing and fragmentation of low to mid-elevation rainforest.
- Logging and roading in moist eucalypt forest with well-developed rainforest understorey.
- Burning of remnant rainforest habitat.
- Invasion of habitat by introduced weed species
- Removal of Camphor Laurel food source without appropriate mitigation measures.

Recovery actions for the Rose-crowned fruit-dove include:

- Support local Landcare groups.
- Protect remnant rainforest patches during burning off activities.
- Retain forested corridors that link north-south and east-west migration routes.
- Encourage and initiate weed control programs.
- Ensure Camphor Laurel removal is accompanied by replacement with local native laurel species.
- Protect known and potential food trees.
- Protect remnant stands of rainforest and moist forest from clearing or development.
- Initiate and support rainforest regeneration projects.

Source: Department of Environment & Conservation 2007

This fruit-dove is likely to be an irregular visitor to rainforest patches and possibly patches of denser swamp sclerophyll forest in the Study area. If this species does occur from time to time in the Study area, Swamp sclerophyll forest in the western part of the Subject site and Littoral rainforest behind Boulder Beach represent the best habitat. The proposed development is highly unlikely to have a significant impact on the local population of this species.

## Little eagle

### Background

The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW where it occupies open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. This raptor nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.

Threats to the Little eagle include:

- Rural-residential subdivision and associated land uses (e.g. horse and goat grazing).
- Clearing and degradation of foraging and breeding habitat
- Urban expansion.
- Secondary poisoning from rabbit baiting.

Recovery actions for the Little eagle include:

- Buffer habitat areas from the impacts of other activities.
- Protect known populations and areas of potential habitat from clearing, fragmentation or disturbance.
- Rehabilitate known and potential habitat.
- Retain and protect nesting and foraging habitat
- Report cases of illegal shooting to the DECCW.

Source: Department of Environment & Conservation 2007



This raptor may forage in the locality. The Subject site would represent only a very small proportion of the range. The proposed development will result in a negligible loss of habitat but the majority of potential foraging habitat in the Study area will be unaffected and there is unlikely to be a significant impact on this species.

### Spotted harrier

#### Background

The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges. Individuals disperse widely in NSW and comprise a single population. Occurs in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.

Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months.

#### Threats to the Spotted Harrier include:

- Clearing and degradation of foraging and breeding habitat, particularly that which affects prey densities.
- Secondary poisoning from rodenticides.
- Secondary poisoning from rabbit baiting.

#### Recovery actions for the Spotted Harrier include:

- Protect areas of habitat from overgrazing.
- Protect areas of habitat from development.
- Retain and protect nesting and foraging habitat

Source: Department of Environment & Conservation 2007

This raptor may forage in the locality. The Subject site would represent only a very small proportion of the range. The proposed development will result in a negligible loss of habitat but the majority of potential foraging habitat in the Study area will be unaffected and there is unlikely to be a significant impact on this species.

### Bush hen

#### Background information

The Bush hen is found in a variety of coastal wetland types from mangroves, lagoons and swamps, to river margins and creeks running through rainforest. It has also been recorded away from water in dense low vegetation, including Bladey Grass and the introduced Lantana.

#### Threats to the Bush hen include:

- Clearing, filling and draining of wetlands for agricultural, residential and industrial development.
- Pollution of wetlands from agricultural, urban and industrial run-off.
- Changes to wetlands caused by weed invasions, often associated with sedimentation or grazing.
- Predation by introduced, feral and domestic predators, particularly the foxes and feral cats.
- Use of herbicides and pesticides in agriculture and residential areas.

#### Recovery actions for the Bush hen include

- Assist with control of introduced predators and restrain domestic cats, particularly at

night.

- Protect wetlands from clearing, filling, draining, sedimentation and pollution.
- Avoid use of herbicides and pesticides near wetlands.
- Fence wetlands to exclude grazing.
- Control weeds in and next to wetlands.
- Rehabilitate and restore wetland vegetation.
- Report records south of the Clarence River to the DEC.

Source: Department of Environment & Conservation 2007

Areas of dense sedgeland and grassland on the fringes of the Paperbark forest represent potential habitat for this species. These areas are unlikely to be significantly affected by the proposed development. The Proposed development is likely to have a negligible impact on the local population of this species and on areas of suitable habitat in the Study area.

### Common planigale.

Common Planigales inhabit rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas where there is sufficient surface cover. They usually occur close to water. They are active at night and shelter during the day in saucer-shaped nests built in crevices, hollow logs, beneath bark or under rocks. They breed from October to January, the female building a nest lined with grass, eucalypt leaves or shredded bark.

Threats to the Common planigale include:

- Predation by foxes, cats and cane toads.
- Loss and fragmentation of habitat through clearing for agriculture and development in coastal areas.
- Frequent burning and grazing that reduces ground cover such as hollow logs and bark.
- Disturbance of vegetation surrounding water bodies.

Recovery actions for the Common planigale include:

- Control of foxes, feral cats and cane toads.
- Reduce the impact of burning to retain diverse understorey species and cover, such as hollow logs and bark.
- Maintain adequate ground cover, especially near water.
- Control cattle access to reduce grazing and trampling of waterside vegetation.
- Protect areas of habitat from clearing and development.

Source: Department of Environment & Conservation 2007

The Common planigale has been recorded in recent years at Pat Morton Lookout and behind Boulders Beach (Blackwood ES 2013). These areas east of The Coast Road will not be affected and, should this species occur west of The Coast Road, habitat disturbance will be minimal and connectivity will not be significantly affected. There is highly unlikely to be a significant impact on the local population of this species.

### Common blossom bat.

Common Blossom-bats often roost in littoral rainforest and feed on flowers in adjacent heathland and paperbark swamps. They roost individually in foliage of the sub-canopy, changing roost sites daily, and return to favoured feeding sites on consecutive nights.

Threats to the Common blossom bat include:

- Clearing of coastal habitat for urban development or sandmining.
- Weeds, such as Bitou Bush, that suppress the regeneration of key food trees, such as

#### Coastal Banksia.

Recovery actions for the Common blossom bat include:

- Control of serious coastal weed species such as Bitou Bush.
- Protect areas of littoral rainforest, coastal heath and paperbark swamp.
- Plant Common Blossom-bat feed trees such as local species of banksia, bottlebrush and paperbark.
- Initiate and support rainforest and heath regeneration projects.

Source: Department of Environment & Conservation 2007

Breeding and sheltering sites for the Common blossom bat occur within subtropical and littoral rainforest (Environment Australia 1999). The Common blossom bat forages in a diverse range of nectar producing plant communities year round and forages occasionally on rainforest fruits. The Common blossom bat requires a diverse array of nectivorous plant communities close to roost sites.

Common blossom bats occur along the coastal strip in the region. The Subject site does not provide suitable roost habitat. Coast banksia trees to be removed represent a potential forage resource for this bat. Habitat loss will be minimal and there is highly unlikely to be a significant impact on the local population of this species. Restoration plantings will provide forage habitat for this bat.

#### Greater broad-nosed bat.

The Greater Broad-nosed Bat utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. It forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest best suits the direct flight of this species as it searches for beetles and other large, slow-flying insects.

Threats to the Greater Broad-nosed Bat include:

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

Recovery actions for the Greater Broad-nosed Bat include:

- Raise landowners' awareness of the presence of this species, and provide information on how their management actions will affect the species' survival.
- Actively encourage the conservation of the riparian vegetation and water quality of streams and rivers.
- DEC should be consulted when planning development/s to minimise impact/s on populations.
- Conduct searches for the species in suitable habitat in proposed development areas.
- Retain stands of native vegetation, especially those with hollow-bearing trees (including dead trees), and retain other structures containing bats.
- Retain a buffer of vegetation around roost sites in vegetated areas.

- Protect hollow-bearing trees for breeding sites, including those on farmland; younger mature trees should also be retained to provide replacements for the older trees as they die and fall over.
- Reduce the use of pesticides in the environment and enter known sites of this species and its potential habitat onto maps used for planned poison spraying activities.
- Encourage regeneration and replanting of local flora species to maintain bat foraging habitat.
- Assess the site's importance to the species' survival, including linkages provided between ecological resources across the broader landscape.

Source: Department of Environment & Conservation 2007

The Study area does not provide suitable roost sites for this bat. It may forage throughout the Study area at times. Habitat disturbance will be minimal and there is highly unlikely to be a significant impact on the local population of this species.

### Grey-headed flying-fox.

#### Background information

Grey-headed flying-foxes occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, birth and the rearing of young. Site fidelity to camps is high with some camps being used for over a century. These bats travel up to 50 km to forage, feeding on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. They also forage in cultivated gardens and fruit crops and can inflict severe crop damage.

#### Threats to the Grey-headed flying-fox include:

- Loss of foraging habitat.
- Disturbance of roosting sites.
- Unregulated shooting.
- Electrocution on powerlines.

#### Recovery actions for the Grey-headed flying-fox include:

- Protect roost sites, particularly avoid disturbance September through November.
- Identify and protect key foraging areas.
- Manage and enforce licensed shooting.
- Investigate and promote alternative non-lethal crop protection mechanisms.
- Identify powerline blackspots and implement measures to reduce deaths.

Source: Department of Environment & Conservation 2007

This species occurs throughout the Study area at times, particularly during peak fruiting and flowering times of site vegetation. This species may roost in Community 1 and superior roosting habitat is provided within Ballina Nature Reserve, a short distance to the south-west. The proposed development may result in the minor loss of forage habitat in the short term but the majority of potential foraging habitat in the Study area will be unaffected and there is unlikely to be a significant impact on this species.

### Eastern bentwing bat.

Caves are the primary roosting habitat for the Eastern (or Common) bent-wing bat, but they also use derelict mines, storm-water tunnels, buildings and other man-made structures. These bats form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes.

At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the tree tops.

Threats to the Eastern bent-wing bat include:

- Damage to or disturbance of roosting caves, particularly during winter or breeding.
- Loss of foraging habitat.
- Application of pesticides in or adjacent to foraging areas.
- Predation by feral cats and foxes.

Recovery actions for the Eastern bent-wing bat include:

- Control foxes and feral cats around roosting sites, particularly maternity caves.
- Retain native vegetation around roost sites, particularly within 300 m of maternity caves.
- Minimise the use of pesticides in foraging areas.
- Protect roosting sites from damage or disturbance.

Source: Department of Environment & Conservation 2007

The proposed development will result in the negligible loss of a small amount of open grassland and forested areas that represent marginal foraging habitat for this species. The Subject site does not contain suitable roosting habitat for this species. There is highly unlikely to be a significant impact on the local population of this species.

### Little bentwing bat.

The Little bentwing bat prefers moist eucalypt forest, rainforest or dense coastal banksia scrub. It roosts in caves, tunnels and sometimes tree hollows during the day, and at night forages for small insects beneath the canopy of densely vegetated habitats. The Little bentwing bat often shares roosting sites with the Common Bentwing-bat and, in winter, the two species may form mixed clusters.

Threats to the Little bent-wing bat include:

- Disturbance of colonies, especially in nursery or hibernating caves may be catastrophic.
- Destruction of caves that provide seasonal or potential roosting sites.
- Changes to habitat, especially surrounding maternity caves.
- Use of pesticides.

Recovery actions for the Little bent-wing bat include:

- Retain stands of native vegetation.
- Reduce use of pesticides.
- Protect known roosting and nursery sites and surrounding forest.
- Check with DEC before undertaking recreational caving activities.

Source: Department of Environment & Conservation 2007

The proposed development will result in the negligible loss of a small amount of open grassland and forested areas that represent marginal foraging habitat for this species. The Subject site does not contain suitable roosting habitat for this species. There is highly unlikely to be a significant impact on the local population of this species.

### Eastern long-eared bat

This bat occurs in lowland subtropical rainforest and wet and swamp eucalypt forest, extending into adjacent areas of moist eucalypt forest. Coastal rainforest and patches of coastal scrub are particularly favoured. It roosts in hollows in trees and also in the hanging foliage of palms, in dense clumps of foliage amongst rainforest trees and under bark..

Threats to the Eastern long-eared bat include:

- Clearing, fragmentation and isolation of lowland subtropical rainforest, wet and swamp eucalypt forest and coastal scrub, particularly forest and scrub close to the coast, for agricultural, residential and other development.
- Loss of hollow-bearing trees and stands of palms and rainforest trees used for roosting and maternity sites.
- Invasion of habitat by weeds, particularly by Bitou Bush on the coast.
- Use of pesticides.

Recovery actions for the Eastern long-eared bat include:

- Protect hollow-bearing trees and patches of rainforest and other dense vegetation.
- Reduce the use of pesticides and consider alternatives where available.
- Assist with removal of weeds, particularly with Bitou Bush control in coastal areas.
- Protect known and potential habitat, particularly low elevation rainforest and coastal scrub from clearing, fragmentation and isolation.
- Reconnect and rehabilitate patches of known and potential habitat.

Source: Department of Environment & Conservation 2007

The proposed development will result in the negligible loss of a small amount of open grassland areas that represent marginal foraging habitat for this species. The Subject site does not contain suitable roosting habitat for this species. There is highly unlikely to be a significant impact on the local population of this species.

*(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,*

There are no listed endangered populations in the Study area.

*(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*

- (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,*

A number of listed Endangered Ecological Communities occur in the North Coast bioregion, including:

- Byron Bay Dwarf Graminoid Clay Heath Community



- Coastal Saltmarsh in the NSW North Coast, Sydney Basin and SE Corner bioregions
- Freshwater wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and SE Corner bioregions
- Littoral rainforest in the NSW North Coast, Sydney Basin and SE Corner bioregions
- Lowland Rainforest in the NSW North Coast and Sydney Basin bioregions
- Lowland Rainforest on Floodplain in the NSW North Coast bioregion
- Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, SE Corner, SE Highlands and Australian Alps bioregions
- Subtropical Coastal Floodplain Forest of the NSW North Coast bioregion
- Swamp oak Floodplain Forest of the NSW North Coast, Sydney Basin and SE Corner bioregions
- Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and SE Corner bioregions
- *Themeda* grassland on seaciffs and coastal headlands in the NSW North Coast, Sydney Basin and SE Corner bioregions
- Coastal Cypress Pine Forest in the NSW North Coast Bioregion

Three EECs are considered to occur in the Study area, *Swamp sclerophyll forest on coastal floodplains*, *Littoral rainforest* and *Freshwater wetlands on Coastal floodplains*.

Vegetation in community 1 is consistent with the description of the EEC *Swamp sclerophyll forest on coastal floodplains*. No direct impact on this community is proposed. There is some possibility that filling to allow for construction of the roundabout will impact on adjacent areas of Swamp sclerophyll/Swamp oak forest.

Vegetation within Community 2 conforms to the description of the *Freshwater wetlands* EEC. There will be minor loss of freshwater wetland as a result of batter construction and there is some possibility that filling of adjacent areas will impact on hydrological conditions within these wetlands.

Regrowth littoral rainforest vegetation in Community 3 will be removed as it occurs within the roundabout footprint.

Amelioration measures have been recommended to ensure that hydrological conditions are maintained and that potential impacts from sedimentation, introduction of exotic species and other factors are managed. The proposed development is unlikely to result in the local extinction of any of these EECs or the long-term modification of the composition of these ecological communities.

An offset strategy has been developed to compensate for the loss of EEC vegetation at a ratio of 10:1.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

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



The proposed development will result in the clearance of vegetation for the roundabout and associated batters. Vegetation is primarily grassland, although areas of Coastal banksia, regrowth littoral rainforest species and wetland will be affected. Estimated vegetation loss is shown in **TABLE 8**.

**TABLE 7**  
**VEGETATION TO BE REMOVED FOR THE PROPOSED DEVELOPMENT**

Vegetation Community		Area within roundabout footprint
1	Mid-high Swamp sclerophyll woodland/forest (Broad-leaved paperbark)	0m <sup>2</sup>
2	Tall closed sedgeland/fernland/grassland	302 m <sup>2</sup>
3	Mid-high closed forest (Tuckeroo with mixed rainforest species)	819 m <sup>2</sup>
4	Mid-high open forest (Coast banksia)	706 m <sup>2</sup>
5	Low fernland (Harsh ground fern)	1810 m <sup>2</sup>
6	Tall mixed grassland & fernland with Lantana	2297 m <sup>2</sup>
7	Tall reedland (Phragmites)	240 m <sup>2</sup>

The proposed development is unlikely to fragment areas of habitat or isolate any areas of habitat for the flora and fauna species and EECs considered in this assessment.

*(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),*

Recommended and declared areas of critical habitat are listed on the Critical Habitat Register. The North Coast bioregion contains one area of declared Critical Habitat. Stott's Island (in the Tweed River) has been declared as critical habitat for the Mitchell's Rainforest Snail.

There are no areas of critical habitat in the Study area.

*(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,*

Priority actions have been set out for several of the species considered in this assessment. The proposed development is not inconsistent with these priority actions.

*(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

A "threatening process" means a process that threatens, or may have the capability to threaten, the survival or evolutionary development of a species, population or ecological community. Key Threatening Processes have been listed in Schedule 3 of the TSC Act (1995).

30 Key threatening processes have been listed on the schedules of the TSC Act (1995).

- Invasion of native plant communities by bitou bush & boneseed
- Invasion of native plant communities by exotic perennial grasses
- Invasion, establishment and spread of *Lantana camara*
- Competition and grazing by the feral European rabbit
- Competition and habitat degradation by feral goats

- Competition from feral honeybees
- Herbivory and environmental degradation caused by feral deer
- Importation of red imported fire ants into NSW
- Introduction of the large earth bumblebee
- Invasion and establishment of the Cane Toad
- Invasion and establishment of exotic vines and scramblers
- Invasion of the yellow crazy ant
- Predation by feral cats
- Predation by the European Red Fox
- Predation by the Plague Minnow
- Predation by the ship rat (*Rattus rattus*) on Lord Howe Island
- Predation, habitat degradation, competition and disease transmission by Feral
- Alteration of habitat following subsidence due to longwall mining
- Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands.
- Bushrock Removal
- Clearing of native vegetation
- Ecological consequences of high frequency fires
- Human-caused Climate Change
- Loss and/or degradation of sites used for hill-topping by butterflies
- Removal of dead wood and dead trees
- Infection by Psittacine circoviral (beak & feather) disease affecting endangered psittacine species
- Infection of frogs by amphibian chytrid fungus
- Infection of native plants by *Phytophthora cinnamomi*
- Death or injury to marine species following capture in shark control programs on ocean beaches
- Entanglement in, or ingestion of anthropogenic debris in marine and estuarine environments

The proposed development will make a negligible contribution toward the clearing of native vegetation and human-caused climate change. The effect of the proposed development on the overall impact of these threatening processes will be negligible.

### Conclusion

With the adoption of the amelioration measures discussed in this report, the proposed development is unlikely to result in a significant impact on any Threatened (TSC Act 1995) species, population or ecological community. A Species Impact Statement is not required.

## 5.3 Commonwealth EPBC Act (1999)

### 5.3.1 Introduction

Under the environmental assessment provisions of the EPBC Act, actions that are likely to have a significant impact on a matter of National Environmental Significance are subject to a rigorous assessment and approval process. An action includes a project, development, undertaking, activity, or series of activities. An action will require approval from the Minister if the action has,

will have, or is likely to have, a significant impact on a matter of national environmental significance.

The Act identifies seven matters of national environmental significance:

- World Heritage properties
- National heritage places
- Wetlands of international importance (Ramsar wetlands)
- Threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- Nuclear actions (including uranium mining)

The EPBC Act Policy Statement 1.1 Significant Impact Guidelines (DEH 2006) outline an assessment process, including detailed criteria, to assist in deciding whether or not referral to the Minister is required. These guidelines replace the EPBC Act Administrative Guidelines of July 2000.

The following assessment follows the guidelines and definitions set out in the EPBC Act Policy Statement 1.1.

### **5.3.2 Assessment of proposed action**

*Are there any matters of national environmental significance located in the area of the proposed action?*

#### **Threatened species and ecological communities.**

The EPBC Protected Matters Report generated for the Subject site shows 50 Threatened species as possible occurrences within 10km of the Subject site. No Threatened Ecological Communities occur. Of the Threatened fauna species included in the Protected Matters Report, the Vulnerable Grey-headed flying-fox is considered a likely occurrence in the Study area.

#### **Migratory species**

The EPBC Protected Matters Report generated for the Subject site shows 30 Migratory species as possible occurrences within 10km of the Subject site. Several of these species, including the White-throated needletail and Rainbow bee-eater, were recorded during the site survey or may occur in the Study area at times.

#### **Ramsar Wetlands of International Significance**

There are no Wetlands of International Significance within 10km of the Subject site.

#### **Commonwealth marine areas**

Generally, the Commonwealth marine area stretches from three miles to two hundred nautical miles from the coast. The Proposed development will not affect any Commonwealth marine areas.

#### **World Heritage properties**

The EPBC Protected Matters Report generated for the Subject site shows no World Heritage properties within 10km of the Subject site.

#### **National heritage places**

The EPBC Protected Matters Report generated for the Subject site shows no National Heritage places within 10km of the Subject site.

*Considering the proposed action at its broadest scope, is there potential for impacts on matters of national environmental significance?*

An action is likely to have a significant impact on a critically endangered or endangered species 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.

No Endangered or Critically endangered species are considered likely to occur.

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, or
- reduce the area of occupancy of an important population, or
- fragment an existing important population into two or more populations, or
- adversely affect habitat critical to the survival of a species, or
- disrupt the breeding cycle of an important population, or
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- 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 one 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.

The Vulnerable Grey-headed flying-fox is considered a likely occurrence. The proposed development may result in a negligible loss of marginal forage habitat for this species. The proposed development is unlikely to have any significant impact on the local population of this species.

An action has, will have, or is likely to have a significant impact on a migratory species if it does, will, or is likely to:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of *important habitat* of the migratory species;
- result in an invasive species that is harmful to the migratory species becoming established in an area of *important habitat* of the migratory species; or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an *ecologically significant proportion* of the population of the species.

An area of important habitat is:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an *ecologically significant proportion* of the population of the species; and/or
- habitat that is of critical importance to the species at particular life-cycle stages; and/or
- habitat utilised by a migratory species which is at the limit of the species range; and/or
- habitat within an area where the species is declining.

The Study area may be used at times by a range of migratory species. The Subject site does not represent an area of important habitat for any migratory species and will not seriously disrupt the lifecycle of an ecologically significant proportion of any migratory species.

*Are there any proposed measures to avoid or reduce impacts on matters of national environmental significance?*

Amelioration measures have been recommended to reduce overall site impacts and potential impacts on areas of retained habitat.

*Are any impacts of the proposed action on matters of national environmental significance likely to be significant impacts?* No.

## 6 SUMMARY & CONCLUSIONS

Blackwood Ecological Services have been engaged by Ballina Shire Council to complete an Ecological Assessment of a proposed roundabout at the intersection of Skennars Head Road and the Coast Road at Lennox Head. The Subject site for this study consists of land within Lot 12 DP 1181479 and the road reserves of Skennars Head Road and the Coast Road in this location as well as adjacent land to the north-east of the existing intersection. An area of SEPP 14 Coastal wetland is located in the north-western corner of Lot 12 DP 1181479.

The Proposed development involves the construction of a new roundabout located a short distance to the north-west of the existing intersection of Skennars Head Road and the Coast Road. The Proposed development includes raising and realignment of approach roads and construction of a stormwater detention basin on the southern side of the roundabout.

The roundabout location will require filling to raise the road surface higher than the level of the existing road. Batters are to be constructed on the north-western and north-eastern side of the proposed roundabout.

Site assessments were completed on the 2<sup>nd</sup> of August 2016 by Mark Free of Blackwood Ecological Services and David Fell of David Fell Environmental. Seven main vegetation types were identified within the Study area. Broad-leaved paperbark forest occurs in the western part of the Subject site where a relatively small patch occurs between the playing fields to the west and the area in which the roundabout is to be located. A wetland community dominated by Swamp rice grass, Swamp water fern and Rhyncospora occurs in the low lying swale between Community 1 and more elevated land closer to the intersection of The Coast Road and Skennars Head Road. Regrowth littoral rainforest vegetation occurs in the south-eastern corner of the Subject site where species including Tuckeroo, Guioa, Macaranga, Three-veined cryptocarya, Yellow pearfruit and Bleeding heart have established and formed a patchy closed canopy to about 6-8m tall. Clumps of Coast banksia occur between Community 3 and wetland vegetation in the western part of the site.

On the coastal floodplain of NSW, all the remaining native vegetation has been identified to be threatened and each distinct ecological community has been listed as endangered under the *Threatened Species Conservation Act* 1995. Vegetation in Community 1 is consistent with the description of the EEC *Swamp sclerophyll forest on coastal floodplains*. Vegetation in Community 2 is consistent with the description of the EEC *Freshwater wetland on coastal floodplains*. Although in a regrowth state, vegetation in Community type 3 is generally consistent with the description of the EEC *Littoral rainforest*. No Threatened (TSC Act 1995, EPBC Act 1999) flora species were recorded in the Study area. No Hairy jointgrass (*Arthraxon hispidus*) was recorded, although this species does not generally become readily detectable until later in the year. The Subject site does not provide highly suitable habitat for this species.

No Threatened fauna species were recorded during the site assessment, although the site does provide marginal habitat for some Threatened fauna. Movement opportunities for fauna through this highly disturbed landscape are generally limited and existing roads provide a partial barrier to movement for many species. Paperbark and wetland vegetation to the north-west of the proposed roundabout location provide some connection to roadside vegetation along Skennars Head Road that provides a tenuous connection between SEPP 14 wetland vegetation south of Skennars Head Road and habitats behind Boulder Beach.

The impact assessment considered that impacts may occur as a result of various site activities, including:

- Clearing of vegetation for the roundabout and batters.
- Loss of habitat within the development footprint.
- Disturbance of adjacent areas of vegetation as a result of providing access, operating machinery, accidental damage etc.
- Transport of materials and personnel to the site.
- Disturbance of soils, including increased potential for erosion and sedimentation.
- Short-term impacts associated with construction noise, vibration and activity.
- Accidental spill of fuel or chemicals.
- Alteration to surface hydrology in adjacent areas due to change to site surface levels, flow paths, permeability and compaction.
- Weed incursion due to importation from fill, construction machinery or edge effects.
- Light pollution from additional streetlighting.

The construction of the roundabout – including filling of the area and forming of batters – will require the clearing of areas of Tuckeroo dominated closed forest and Coast banksia patches as well as a small area on the edge of the wetland. Roadside vegetation on the north-eastern side of The Coast Road will require clearing for the construction of batters with disturbance to extend westward as far as the boundary of the road reserve. Construction of the stormwater detention basin will only impact upon an existing area of mown grassland.

Clearing for the roundabout will not result in the removal of any areas of *Swamp sclerophyll forest* EEC and construction activities are unlikely to result in any accidental direct impacts to this community. Clearing will result in the loss of an estimated 302m<sup>2</sup> of *Freshwater wetland* EEC and 819m<sup>2</sup> of *Littoral rainforest* EEC. No works are proposed within the SEPP 14 wetland area and associated activities such as provision of site access and storage of materials are unlikely to have any direct impact on this area. There is some potential for this area to be affected as a result of sedimentation, weed infestation and/or changes in hydrology.

A number of amelioration measures have been recommended as part of this assessment, including:

- Trees to be removed or trimmed as a result of the proposed development should be clearly marked prior to construction. The extent of clearing should be clearly marked and sediment controls be in place.
- Best practice weed management practices should be in place to prevent transfer of weed seeds and vegetative materials, including sourcing of fill from weed free areas, washdown of vehicles entering or leaving the worksite.
- Ongoing weed control should be undertaken during and following construction with the aim of minimising potential weed incursion into adjacent wetland areas.
- Disturbed soils should be contained using sediment fencing and geotextile controls and backfilled as soon as possible. Erosion and sedimentation control measures should not be removed until disturbed areas have stabilised.
- The final design of the roundabout should aim to ensure that there is minimal change to the hydrological regime in the area of SEPP 14 Coastal wetland and adjacent wetland vegetation.
- Streetlighting should be designed/directed to the minimum required for lighting the roundabout adequately to minimise light pollution impacts on wildlife.



Native vegetation to be removed for roundabout construction is to be compensated for at a ratio of 10:1 for EEC vegetation and 5:1 for non-EEC native vegetation communities. The proposed development will result in the loss of 302m<sup>2</sup> of wetland vegetation and 819 m<sup>2</sup> of rainforest regrowth comprising EEC vegetation and an additional 706 m<sup>2</sup> of Coast banksia which is not part of an EEC. This loss of 1827m<sup>2</sup> will be compensated for by the restoration and/or rehabilitation of 1.47ha of native vegetation consisting of similar vegetation types.

A Vegetation Management Plan should be prepared to guide the implementation of offset works. The Vegetation Management Plan is to discuss:

- Weed control works within the wetland area and the SEPP 14 fringe.
- Establishment of 1600m<sup>2</sup> and 500m<sup>2</sup> restoration plantings of a Littoral rainforest/Swamp sclerophyll community on newly established batters on the western side of the roundabout and eastern side of The Coast Road following construction. These plantings are to act as buffers to the SEPP 14 area and eastern wetland area respectively.
- Implementation of a restoration/rehabilitation strategy for a minimum additional area of 1.31ha of Swamp sclerophyll, wetland and/or Littoral rainforest habitat.

Assessments of significance (7 part tests) were completed for a number of species of Threatened flora, fauna and ecological communities recorded on the site or considered possible occurrences on the site over time. The proposed development is unlikely to result in a significant impact on any Threatened (TSC Act 1995) species, populations or ecological community. A Species Impact Statement is not required. The proposed development is unlikely to result in a significant impact on any matters of National Environmental Significance as defined under the Commonwealth EPBC Act 1999.

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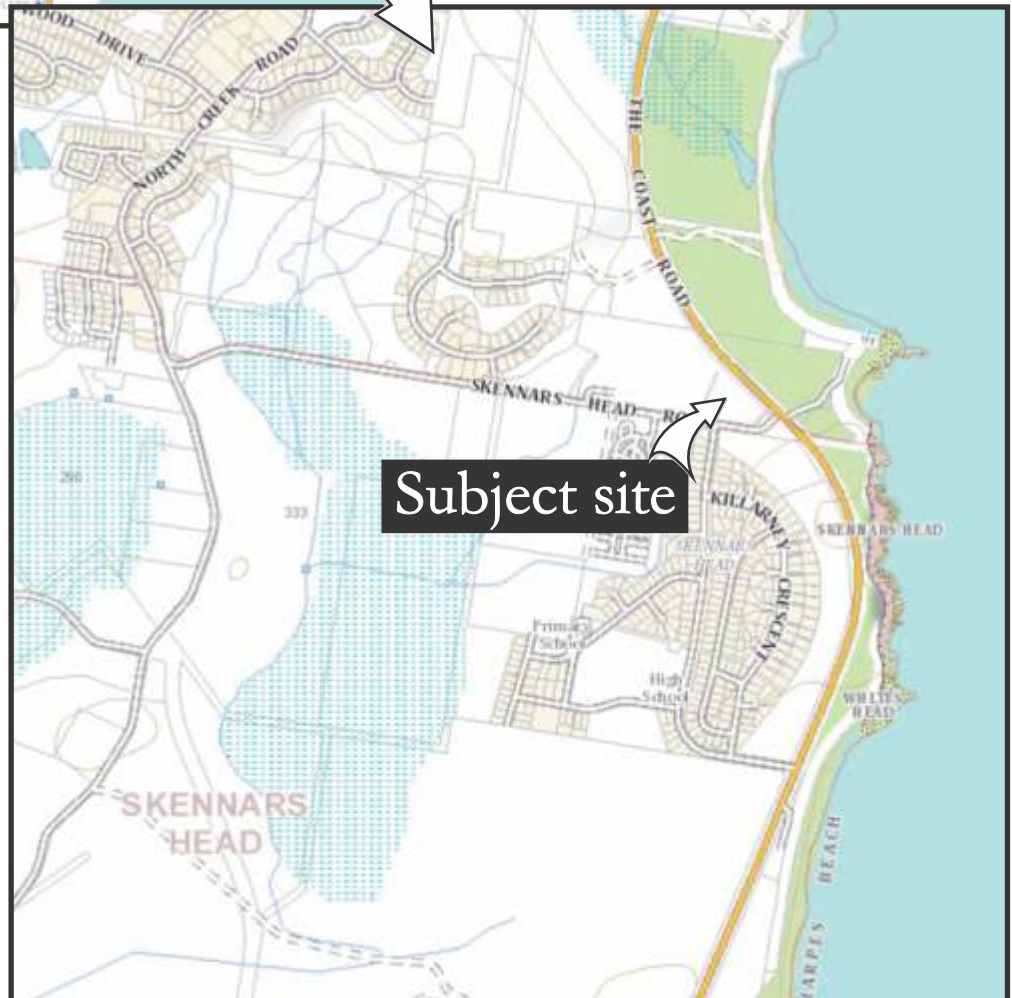
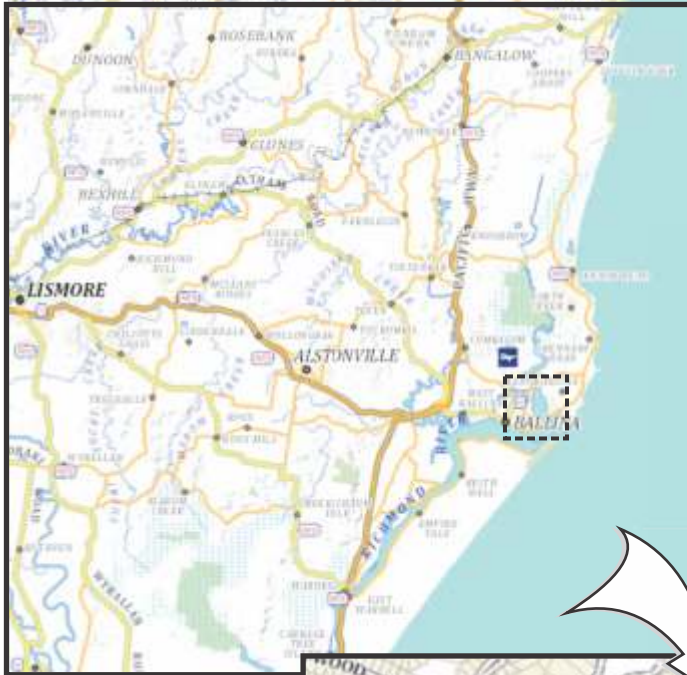
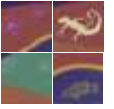
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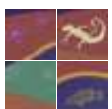
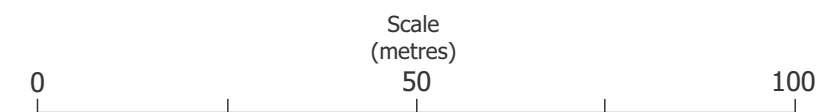
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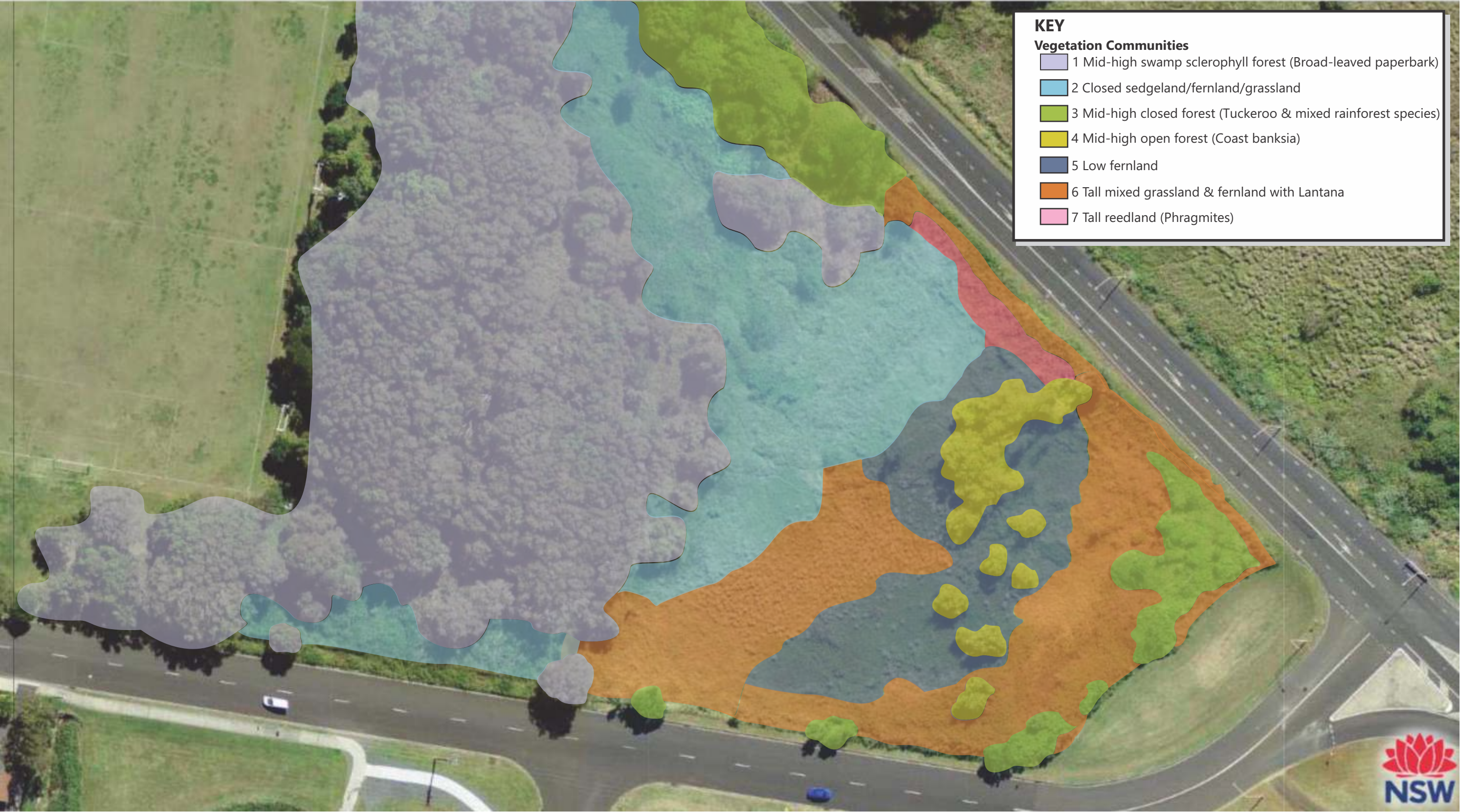
## Figures











KEY

Vegetation Communities

1

Mid-high swamp sclerophyll forest (Broad-leaved paperbark)

2

Closed sedgeland/fernland/grassland

3

Mid-high closed forest (Tuckeroo & mixed rainforest species)

4

Mid-high open forest (Coast banksia)

5

Low fernland

6


Tall mixed grassland & fernland with Lantana

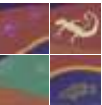
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Tall reedland (Phragmites)

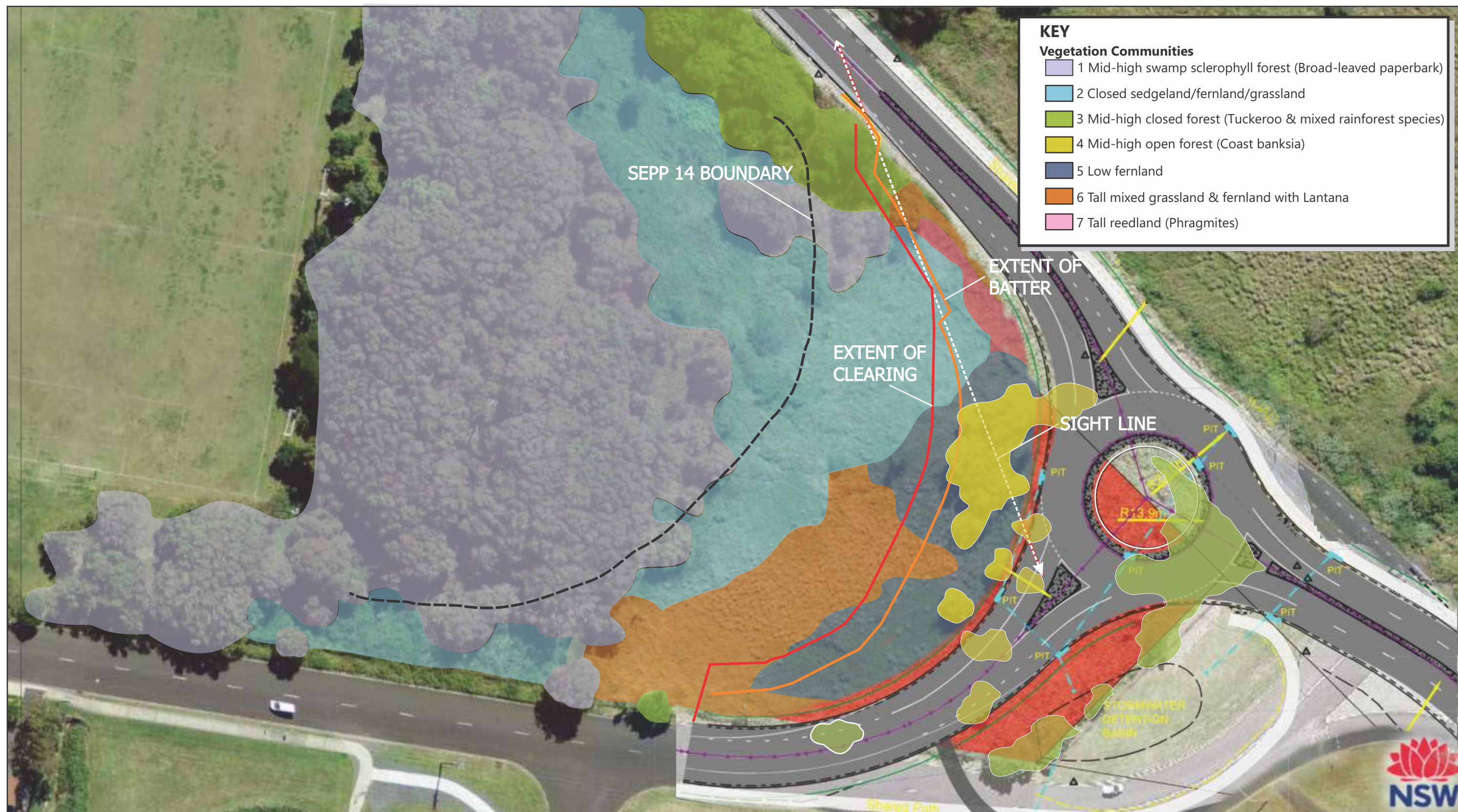
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## **Appendix A**

### **Commonwealth EPBC Database Protected Matters search results**



# EPBC Act Protected Matters Report

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

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

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

Report created: 20/09/16 08:35:40

## [Summary](#)

### [Details](#)

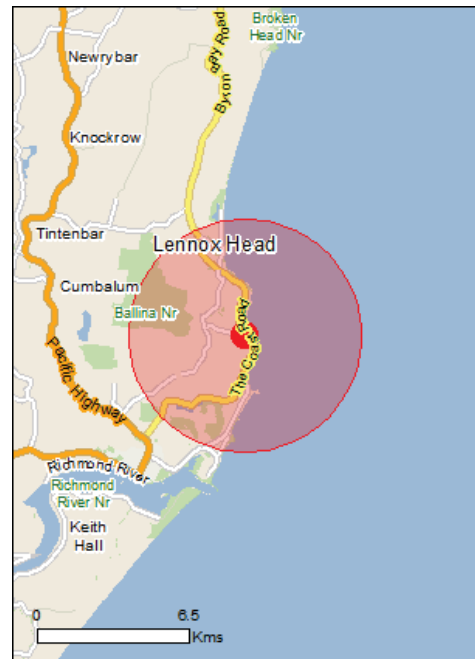
[Matters of NES](#)

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

[Extra Information](#)

### [Caveat](#)

### [Acknowledgements](#)



This map may contain data which are  
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[Coordinates](#)

Buffer: 5.0Km



# Summary

## Matters of National Environmental Significance

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

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	2
<a href="#">Listed Threatened Species:</a>	76
<a href="#">Listed Migratory Species:</a>	77

## Other Matters Protected by the EPBC Act

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

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

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

<a href="#">Commonwealth Land:</a>	1
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	107
<a href="#">Whales and Other Cetaceans:</a>	15
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Commonwealth Reserves Marine:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	1
<a href="#">Regional Forest Agreements:</a>	1
<a href="#">Invasive Species:</a>	37
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

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

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

Name	Status	Type of Presence
<a href="#">Littoral Rainforest and Coastal Vine Thickets of Eastern Australia</a>	Critically Endangered	Community likely to occur within area
<a href="#">Lowland Rainforest of Subtropical Australia</a>	Critically Endangered	Community may occur within area

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

Name	Status	Type of Presence
<b>Birds</b>		
<a href="#">Anthochaera phrygia</a> Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Botaurus poiciloptilus</a> Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Roosting known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Calidris tenuirostris</a> Great Knot [862]	Critically Endangered	Roosting known to occur within area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
<a href="#">Charadrius mongolus</a> Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
<a href="#">Cyclopsitta diophthalma coxeni</a> Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area
<a href="#">Diomedea antipodensis</a> Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diomedea antipodensis gibsoni</a> Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diomedea epomophora (sensu stricto)</a> Southern Royal Albatross [1072]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
<a href="#">Diomedea exulans (sensu lato)</a> Wandering Albatross [1073]	Vulnerable	Species or species habitat may occur within area
<a href="#">Erythroriorchis radiatus</a> Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Fregetta grallaria grallaria</a> White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Lathamus discolor</a> Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Limosa lapponica baueri</a> Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Limosa lapponica menzbieri</a> Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Pachyptila turtur subantarctica</a> Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Phoebastria fusca</a> Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
<a href="#">Pterodroma leucoptera leucoptera</a> Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
<a href="#">Pterodroma neglecta neglecta</a> Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
<a href="#">Thalassarche cauta cauta</a> Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche cauta steadi</a> White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Thalassarche eremita</a> Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area



Name	Status	Type of Presence
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche salvini</a> Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
<a href="#">Turnix melanogaster</a> Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area
Fish		
<a href="#">Epinephelus daemeli</a> Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
<a href="#">Litoria olongburensis</a> Wallum Sedge Frog [1821]	Vulnerable	Species or species habitat known to occur within area
Insects		
<a href="#">Phyllodes imperialis smithersi</a> Pink Underwing Moth [86084]	Endangered	Species or species habitat may occur within area
Mammals		
<a href="#">Balaenoptera borealis</a> Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat may occur within area
<a href="#">Balaenoptera physalus</a> Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Chalinolobus dwyeri</a> Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Dasyurus maculatus maculatus (SE mainland population)</a> Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Petauroides volans</a> Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
<a href="#">Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</a> Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Potorous tridactylus tridactylus</a> Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Pseudomys novaehollandiae</a> New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
<a href="#">Pteropus poliocephalus</a> Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Xeromys myoides</a> Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat may occur within area
Other		
<a href="#">Thersites mitchellae</a> Mitchell's Rainforest Snail [66774]	Critically Endangered	Species or species habitat known to occur within area
Plants		
<a href="#">Acronychia littoralis</a> Scented Acronychia [8582]	Endangered	Species or species habitat likely to occur within area
<a href="#">Allocasuarina defungens</a> Dwarf Heath Casuarina [21924]	Endangered	Species or species habitat likely to occur within area
<a href="#">Arthraxon hispidus</a> Hairy-joint Grass [9338]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Baloghia marmorata</a> Marbled Baloghia, Jointed Baloghia [8463]	Vulnerable	Species or species habitat may occur within area
<a href="#">Cryptocarya foetida</a> Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Cryptostylis hunteriana</a> Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
<a href="#">Davidsonia jerseyana</a> Davidson's Plum [67219]	Endangered	Species or species habitat may occur within area
<a href="#">Davidsonia johnsonii</a> Smooth Davidsonia, Smooth Davidson's Plum, Small-leaved Davidson's Plum [67178]	Endangered	Species or species habitat likely to occur within area
<a href="#">Desmodium acanthocladum</a> Thorny Pea [17972]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Floydia praealta</a> Ball Nut, Possum Nut, Big Nut, Beefwood [15762]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Fontainea oraria</a> Coastal Fontainea [24038]	Endangered	Species or species habitat likely to occur within area
<a href="#">Macadamia integrifolia</a> Macadamia Nut, Queensland Nut, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area
<a href="#">Macadamia tetraphylla</a> Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Owenia cepiodora</a> Onionwood, Bog Onion, Onion Cedar [11344]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Phaius australis</a> Lesser Swamp-orchid [5872]	Endangered	Species or species habitat known to occur

Name	Status	Type of Presence
<a href="#">Randia moorei</a>		within area
Spiny Gardenia [10577]	Endangered	Species or species habitat likely to occur within area
<a href="#">Syzygium hodgkinsoniae</a>		
Smooth-bark Rose Apple, Red Lilly Pilly [3539]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Syzygium moorei</a>		
Rose Apple, Coolamon, Robby, Durobby, Watermelon Tree, Coolamon Rose Apple [12284]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Thesium australe</a>		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area

#### Reptiles

<a href="#">Caretta caretta</a>		
Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
<a href="#">Chelonia mydas</a>		
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Dermochelys coriacea</a>		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding known to occur within area
<a href="#">Eretmochelys imbricata</a>		
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Natator depressus</a>		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

#### Sharks

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

#### Listed Migratory Species [ Resource Information ]

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
<a href="#">Apus pacificus</a>		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Calonectris leucomelas</a>		
Streaked Shearwater [1077]		Species or species habitat may occur within area
<a href="#">Diomedea antipodensis</a>		
Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diomedea epomophora (sensu stricto)</a>		
Southern Royal Albatross [1072]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diomedea exulans (sensu lato)</a>		
Wandering Albatross [1073]	Vulnerable	Species or species

Name	Threatened	Type of Presence
<a href="#">Diomedea gibsoni</a> Gibson's Albatross [64466]	Vulnerable*	habitat may occur within area  Species or species habitat may occur within area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
<a href="#">Phoebastria fusca</a> Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
<a href="#">Puffinus carneipes</a> Flesh-footed Shearwater, Flesh-footed Shearwater [1043]		Species or species habitat likely to occur within area
<a href="#">Sterna albifrons</a> Little Tern [813]		Species or species habitat may occur within area
<a href="#">Thalassarche cauta (sensu stricto)</a> Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
<a href="#">Thalassarche eremita</a> Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche salvini</a> Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
<a href="#">Balaenoptera borealis</a> Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat may occur within area
<a href="#">Balaenoptera physalus</a> Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Carcharodon carcharias</a> Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Breeding known to occur

Name	Threatened	Type of Presence
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	within area Foraging, feeding or related behaviour known to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding known to occur within area
<a href="#">Dugong dugon</a> Dugong [28]		Species or species habitat may occur within area
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
<a href="#">Lagenorhynchus obscurus</a> Dusky Dolphin [43]		Species or species habitat may occur within area
<a href="#">Lamna nasus</a> Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
<a href="#">Manta alfredi</a> Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat known to occur within area
<a href="#">Manta birostris</a> Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
<a href="#">Sousa chinensis</a> Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
<b>Migratory Terrestrial Species</b>		
<a href="#">Cuculus optatus</a> Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]		Species or species habitat known to occur within area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat known to occur within area
<a href="#">Monarcha trivirgatus</a> Spectacled Monarch [610]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat known to occur within area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat known to occur within area
<b>Migratory Wetlands Species</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Roosting known to occur within area
<a href="#">Arenaria interpres</a> Ruddy Turnstone [872]		Roosting known to occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Roosting known to occur within area
<a href="#">Calidris alba</a> Sanderling [875]		Roosting known to occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Roosting known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Roosting known to occur within area
<a href="#">Calidris ruficollis</a> Red-necked Stint [860]		Roosting known to occur within area
<a href="#">Calidris subminuta</a> Long-toed Stint [861]		Roosting known to occur within area
<a href="#">Calidris tenuirostris</a> Great Knot [862]	Critically Endangered	Roosting known to occur within area
<a href="#">Charadrius bicinctus</a> Double-banded Plover [895]		Roosting known to occur within area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
<a href="#">Charadrius mongolus</a> Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
<a href="#">Charadrius veredus</a> Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Roosting known to occur within area
<a href="#">Gallinago megala</a> Swinhoe's Snipe [864]		Roosting likely to occur within area
<a href="#">Gallinago stenura</a> Pin-tailed Snipe [841]		Roosting likely to occur within area
<a href="#">Heteroscelus brevipes</a> Grey-tailed Tattler [59311]		Roosting known to occur within area
<a href="#">Heteroscelus incanus</a> Wandering Tattler [59547]		Roosting known to occur within area



Name	Threatened	Type of Presence
<a href="#">Limicola falcinellus</a> Broad-billed Sandpiper [842]		Roosting known to occur within area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area
<a href="#">Limosa limosa</a> Black-tailed Godwit [845]		Roosting known to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Numenius minutus</a> Little Curlew, Little Whimbrel [848]		Roosting known to occur within area
<a href="#">Numenius phaeopus</a> Whimbrel [849]		Roosting known to occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area
<a href="#">Philomachus pugnax</a> Ruff (Reeve) [850]		Roosting known to occur within area
<a href="#">Pluvialis fulva</a> Pacific Golden Plover [25545]		Roosting known to occur within area
<a href="#">Pluvialis squatarola</a> Grey Plover [865]		Roosting known to occur within area
<a href="#">Tringa glareola</a> Wood Sandpiper [829]		Roosting known to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
<a href="#">Tringa stagnatilis</a> Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
<a href="#">Xenus cinereus</a> Terek Sandpiper [59300]		Roosting known to occur within area

## Other Matters Protected by the EPBC Act

### Commonwealth Land [\[ Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Telecommunications Commission

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

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
<b>Birds</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Roosting known to occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Breeding known to occur

Name	Threatened	Type of Presence
<a href="#">Ardea ibis</a> Cattle Egret [59542]		within area  Species or species habitat may occur within area
<a href="#">Arenaria interpres</a> Ruddy Turnstone [872]		Roosting known to occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Roosting known to occur within area
<a href="#">Calidris alba</a> Sanderling [875]		Roosting known to occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Roosting known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Roosting known to occur within area
<a href="#">Calidris ruficollis</a> Red-necked Stint [860]		Roosting known to occur within area
<a href="#">Calidris subminuta</a> Long-toed Stint [861]		Roosting known to occur within area
<a href="#">Calidris tenuirostris</a> Great Knot [862]	Critically Endangered	Roosting known to occur within area
<a href="#">Calonectris leucomelas</a> Streaked Shearwater [1077]		Species or species habitat may occur within area
<a href="#">Catharacta skua</a> Great Skua [59472]		Species or species habitat may occur within area
<a href="#">Charadrius bicinctus</a> Double-banded Plover [895]		Roosting known to occur within area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
<a href="#">Charadrius mongolus</a> Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
<a href="#">Charadrius ruficapillus</a> Red-capped Plover [881]		Roosting known to occur within area
<a href="#">Charadrius veredus</a> Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area
<a href="#">Cuculus saturatus</a> Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area
<a href="#">Diomedea antipodensis</a> Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diomedea epomophora (sensu stricto)</a> Southern Royal Albatross [1072]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diomedea exulans (sensu lato)</a> Wandering Albatross [1073]	Vulnerable	Species or species habitat may occur within area

Name	Threatened	Type of Presence
<a href="#">Diomedea gibsoni</a> Gibson's Albatross [64466]	Vulnerable*	Species or species habitat may occur within area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Roosting known to occur within area
<a href="#">Gallinago megala</a> Swinhoe's Snipe [864]		Roosting likely to occur within area
<a href="#">Gallinago stenura</a> Pin-tailed Snipe [841]		Roosting likely to occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
<a href="#">Heteroscelus brevipes</a> Grey-tailed Tattler [59311]		Roosting known to occur within area
<a href="#">Heteroscelus incanus</a> Wandering Tattler [59547]		Roosting known to occur within area
<a href="#">Himantopus himantopus</a> Black-winged Stilt [870]		Roosting known to occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]		Species or species habitat known to occur within area
<a href="#">Lathamus discolor</a> Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Limicola falcinellus</a> Broad-billed Sandpiper [842]		Roosting known to occur within area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area
<a href="#">Limosa limosa</a> Black-tailed Godwit [845]		Roosting known to occur within area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat known to occur within area
<a href="#">Monarcha trivirgatus</a> Spectacled Monarch [610]		Species or species habitat known to occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Numenius minutus</a> Little Curlew, Little Whimbrel [848]		Roosting known to occur within area
<a href="#">Numenius phaeopus</a> Whimbrel [849]		Roosting known to occur within area
<a href="#">Pachyptila turtur</a> Fairy Prion [1066]		Species or species habitat known to occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area
<a href="#">Philomachus pugnax</a> Ruff (Reeve) [850]		Roosting known to occur within area
<a href="#">Phoebastria fusca</a> Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
<a href="#">Pluvialis fulva</a> Pacific Golden Plover [25545]		Roosting known to occur within area
<a href="#">Pluvialis squatarola</a> Grey Plover [865]		Roosting known to occur within area
<a href="#">Puffinus carneipes</a> Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat known to occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
<a href="#">Sterna albifrons</a> Little Tern [813]		Species or species habitat may occur within area
<a href="#">Thalassarche cauta (sensu stricto)</a> Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
<a href="#">Thalassarche eremita</a> Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche salvini</a> Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Tringa glareola</a> Wood Sandpiper [829]		Roosting known to occur within area

Name	Threatened	Type of Presence
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
<a href="#">Tringa stagnatilis</a> Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
<a href="#">Xenus cinereus</a> Terek Sandpiper [59300]		Roosting known to occur within area
Fish		
<a href="#">Acentronura tentaculata</a> Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
<a href="#">Campichthys tryoni</a> Tryon's Pipefish [66193]		Species or species habitat may occur within area
<a href="#">Corythoichthys amplexus</a> Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
<a href="#">Corythoichthys ocellatus</a> Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area
<a href="#">Festucalex cinctus</a> Girdled Pipefish [66214]		Species or species habitat may occur within area
<a href="#">Filicampus tigris</a> Tiger Pipefish [66217]		Species or species habitat may occur within area
<a href="#">Halicampus grayi</a> Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
<a href="#">Hippichthys cyanospilos</a> Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area
<a href="#">Hippichthys heptagonus</a> Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
<a href="#">Hippichthys penicillus</a> Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
<a href="#">Hippocampus kelloggi</a> Kellogg's Seahorse, Great Seahorse [66723]		Species or species habitat may occur within area
<a href="#">Hippocampus kuda</a> Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
<a href="#">Hippocampus planifrons</a> Flat-face Seahorse [66238]		Species or species habitat may occur within area
<a href="#">Hippocampus trimaculatus</a> Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
<a href="#">Hippocampus whitei</a> White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat may occur within area
<a href="#">Lissocampus runa</a> Javelin Pipefish [66251]		Species or species

Name	Threatened	Type of Presence
<a href="#">Maroubra perserrata</a> Sawtooth Pipefish [66252]		habitat may occur within area  Species or species habitat may occur within area
<a href="#">Micrognathus andersonii</a> Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area
<a href="#">Micrognathus brevirostris</a> thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area
<a href="#">Microphis manadensis</a> Manado Pipefish, Manado River Pipefish [66258]		Species or species habitat may occur within area
<a href="#">Solegnathus dunckeri</a> Duncker's Pipehorse [66271]		Species or species habitat may occur within area
<a href="#">Solegnathus hardwickii</a> Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
<a href="#">Solegnathus spinosissimus</a> Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
<a href="#">Solenostomus cyanopterus</a> Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
<a href="#">Solenostomus paegnius</a> Rough-snout Ghost Pipefish [68425]		Species or species habitat may occur within area
<a href="#">Solenostomus paradoxus</a> Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
<a href="#">Stigmatopora nigra</a> Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
<a href="#">Syngnathoides biaculeatus</a> Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
<a href="#">Trachyrhamphus bicoarctatus</a> Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
<a href="#">Urocampus carinirostris</a> Hairy Pipefish [66282]		Species or species habitat may occur within area
<a href="#">Vanacampus margaritifer</a> Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
<b>Mammals</b>		
<a href="#">Dugong dugon</a> Dugong [28]		Species or species habitat may occur within area
<b>Reptiles</b>		
<a href="#">Astrotia stokesii</a> Stokes' Seasnake [1122]		Species or species habitat may occur within area



Name	Threatened	Type of Presence
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding known to occur within area
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Hydrophis elegans</a> Elegant Seasnake [1104]		Species or species habitat may occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Pelamis platurus</a> Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans		[ Resource Information ]
Name	Status	Type of Presence
<b>Mammals</b>		
<a href="#">Balaenoptera acutorostrata</a> Minke Whale [33]		Species or species habitat may occur within area
<a href="#">Balaenoptera borealis</a> Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat may occur within area
<a href="#">Balaenoptera physalus</a> Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Delphinus delphis</a> Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
<a href="#">Grampus griseus</a> Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
<a href="#">Lagenorhynchus obscurus</a> Dusky Dolphin [43]		Species or species habitat may occur within area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within

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

## Extra Information

State and Territory Reserves	[ Resource Information ]
Name	State
Ballina	NSW

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

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

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

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

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

Name	Status	Type of Presence
Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171] <i>Chrysanthemoides monilifera</i> Bitou Bush, Boneseed [18983]		habitat likely to occur within area  Species or species habitat likely to occur within area
<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> Bitou Bush [16332]		Species or species habitat likely to occur within area
<i>Eichhornia crassipes</i> Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
<i>Genista</i> sp. X <i>Genista monspessulana</i> Broom [67538]		Species or species habitat may occur within area
<i>Lantana camara</i> Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] <i>Opuntia</i> spp. Prickly Pears [82753]		Species or species habitat likely to occur within area  Species or species habitat likely to occur within area
<i>Pinus radiata</i> Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
<i>Protasparagus densiflorus</i> Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area
<i>Protasparagus plumosus</i> Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
<i>Salvinia molesta</i> Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
<i>Senecio madagascariensis</i> Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
<b>Reptiles</b>		
<i>Hemidactylus frenatus</i> Asian House Gecko [1708]		Species or species habitat likely to occur within area

# Caveat

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

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

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

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

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

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

- migratory and
- marine

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

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

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

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

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

## Coordinates

-28.82357 153.6031

# Acknowledgements

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

- [Office of Environment and Heritage, New South Wales](#)
- [Department of Environment and Primary Industries, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment, Water and Natural Resources, South Australia](#)
- [Parks and Wildlife Commission NT, Northern Territory Government](#)
- [Department of Environmental and Heritage Protection, Queensland](#)
- [Department of Parks and Wildlife, Western Australia](#)
- [Environment and Planning Directorate, ACT](#)
- [Birdlife Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Museum Victoria](#)
- [Australian Museum](#)
- [South Australian Museum](#)
- [Queensland Museum](#)
- [Online Zoological Collections of Australian Museums](#)
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Atherton and Canberra](#)
- [University of New England](#)
- [Ocean Biogeographic Information System](#)
- [Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [Geoscience Australia](#)
- [CSIRO](#)
- Other groups and individuals

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

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

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**Appendix B**  
**Plant species list**

**Proposed Roundabout The Coast Road & Skennars Head Road**

Grouping and Family	Botanical Name	Common Name
<b>Ferns and Fern Allies</b>		
Blechnaceae	<i>Blechnum indicum</i>	Swamp water fern
Davalliaceae	<i>Nephrolepis cordifolia</i> *	Fishbone fern
Dennstaedtiaceae	<i>Hypolepis muelleri</i>	Harsh ground fern
Lygodiaceae	<i>Lygodium microphyllum</i>	Climbing fern
Thelypteridaceae	<i>Christella dentata</i>	Binung
<b>Monocotyledons</b>		
Asparagaceae	<i>Asparagus aethiopicus</i> *	Ground asparagus fern
Asteliaceae	<i>Cordylina stricta</i>	Narrow-leaved palm lily
Cyperaceae	<i>Rhyncospora corymbosa</i>	Rhyncospora
	<i>Eleocharis sp.</i>	
Haloragaceae	<i>Haloragis sp.</i>	
Poaceae	<i>Chloris virgata</i> *	Feathertop rhodes grass
	<i>Cynodon dactylon</i>	Couch grass
	<i>Digitaria ciliaris</i> *	Summer grass
	<i>Leersia hexandra</i>	Swamp ricegrass
	<i>Paspalum sp.*</i>	
	<i>Pennisetum clandestinum</i> *	Kikuyu
	<i>Phragmites australis</i>	Phragmites
	<i>Setaria sphacelata</i> *	Setaria
	<i>Sorghum halepense</i> *	Johnson Grass
	<i>Stenotaphrum secundatum</i> *	Buffalo grass
	<i>Urochloa mutica</i> *	Para grass
Smilacaceae	<i>Smilax australis</i>	Austral sarsparilla
<b>Dicotyledons</b>		
Apiaceae	<i>Centella asiatica</i>	Centella
Apocynaceae	<i>Parsonsia straminea</i>	Common silkpod
Araliaceae	<i>Schefflera actinophylla</i> *	Umbrella tree
Arecaceae	<i>Archontophoenix alexandrae</i> *	Alexander palm
	<i>Archontophoenix cunninghamiana</i>	Bangalow palm
Asclepiadaceae	<i>Gomphocarpus physocarpus</i> *	Balloon cotton bush
	<i>Marsdenia rostrata</i>	Milk vine
Asteraceae	<i>Ageratina adenophora</i> *	Crofton weed
	<i>Ageratum houstonianum</i> *	Blue billygoat weed
	<i>Baccharis halimifolia</i> *	Groundsel
	<i>Bidens pilosa</i> *	Cobblers pegs
	<i>Chrysanthemoides monilifera</i> *	Bitou bush
	<i>Cirsium vulgare</i> *	Spear Thistle
	<i>Conyza sumatrensis</i> *	Tall Fleabane
	<i>Eclipta prostrata</i>	White eclipta
Caesalpinioideae	<i>Senna pendula</i> var. <i>glabrata</i> *	Senna
Convolvulaceae	<i>Ipomoea cairica</i> *	Coastal morning glory
Dilleniaceae	<i>Hibbertia scandens</i>	Climbing guinea flower
Euphorbiaceae	<i>Euphorbia heterophylla</i> *	Poinsettia
	<i>Glochidion sumatranum</i>	Umbrella cheese tree
	<i>Homalanthus populifolius</i>	Bleeding heart
	<i>Macaranga tanarius</i>	Macaranga

Grouping and Family	Botanical Name	Common Name
Fabaceae	<i>Indigofera hirsuta</i>	Hairy indigo
	<i>Macroptilium atropurpureum</i> *	Siratro
	<i>Trifolium repens</i> *	White clover
Lauraceae	<i>Cinnamomum camphora</i> *	Camphor laurel
	<i>Cryptocarya triplinervis</i> var <i>pubens</i>	Three-veined cryptocarya
	<i>Litsea australis</i>	Brown bolly gum
Luzuriagaceae	<i>Geitonoplesium cymosum</i>	Scrambling lily
Malvaceae	<i>Hibiscus diversifolius</i>	Swamp hibiscus
Menispermaceae	<i>Stephania japonica</i> var. <i>discolor</i>	Snake vine
Mimosaceae	<i>Acacia longifolia</i> subsp. <i>sophorae</i>	Coastal wattle
Myrtaceae	<i>Austromyrtus dulcis</i>	Midgenberry
	<i>Melaleuca quinquenervia</i>	Broad-leaved paperbark
Passifloraceae	<i>Passiflora foetida</i> *	Stinking passionfruit
	<i>Passiflora subpeltata</i> *	White passionflower
Pittosporaceae	<i>Pittosporum undulatum</i>	Sweet pittosporum
Polygonaceae	<i>Persicaria strigosa</i>	Smartweed
Proteaceae	<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>	Coast banksia
Ranunculaceae	<i>Ranunculus inundatus</i>	
Rutaceae	<i>Melicope elleryana</i>	Pink-flowered doughwood
	<i>Murraya paniculata</i> *	Mock orange
Sapindaceae	<i>Cupaniopsis anacardioides</i>	Tuckeroo
	<i>Guioa semiglauca</i>	Guioa
	<i>Mischocarpus pyramidalis</i>	Yellow pear fruit
Thymelaeaceae	<i>Wikstroemia indica</i>	Wikstromeia
Verbenaceae	<i>Lantana camara</i> *	Lantana
Vitaceae	<i>Cissus antarctica</i>	Water vine

\*Introduced species