Appendix B

Ecological Assessment

Ecological Assessment

Coffs Harbour Health Campus Carpark

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Executive Summary

The proposal is to establish a new car park at the Coffs Harbour Health Campus (the Health Campus) to alleviate a current car parking shortage. The proposal is in the planning stage and GeoLINK has been engaged to provide planning services and produce a Statement of Environmental Effects and associated DA documents for the proposal.

The site comprises mostly cleared/ managed land and no remnant native trees are present on the site. The vegetation at the site consists of the modified vegetation community: Exotic-dominated Grassland. An area of remnant swamp forest vegetation of approximately 12.6 ha is present immediately to the west of the site within the study area and a narrow corridor planting of native trees to provide Koala habitat is present within the northern boundary of the site.

The proposal would not require clearing of native vegetation. The footprint of the car park extends across an area that has been historically cleared of vegetation. The main components of the proposal include:

- staged construction of a car park and associated infrastructure, consisting of 816 spaces; and
- upgrading/ establishing access roads to the car park along the eastern edge of the site (off Phil Hawthorn Drive) and from the Health Campus immediately to the north of the site. This access from the Health Campus dissects an existing planted Koala corridor.

Key findings in relation to the ecological values of the Proposal footprint include:

- no threatened flora species or Endangered Ecological Communities (EECs) occur or are considered likely occurrences at the site;
- swamp forest vegetation in the study area is consistent with the EEC *Swamp Sclerophyll Forest on Coastal Floodplains*;
- the study area contains potential habitat for the *Threatened Species Conservation Act 1995* (TSC Act) listed threatened flora species Slender Screw Fern (*Lindsaea incisa*);
- the site was found to provide known habitat or potential habitat as part of a core range or potentially utilised regularly for the Koala (*Phascolarctos cinereus*), a threatened fauna species listed under the TSC Act and *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). Several other species were considered irregular potential occurrences, with the site forming a minor part of a significantly larger foraging range (e.g. Square-tailed Kite);
- several EPBC Act listed migratory species are considered potential occurrences, however the site does not comprise significant habitat for these species; and
- the study area includes land mapped as primary Koala habitat in the Coffs Harbour City Koala Plan of Management (CHCKPoM (Lunney *et al.* 1999). Overall, the proposal has only minor conflicts with the CHCKPoM Primary Koala Habitat management objectives.

The main potential impacts of the proposal include:

- a minor loss of connectivity for mobile fauna species (particularly the Koala) between adjacent vegetated areas; and
- potential indirect erosion and sedimentation, on adjacent parts of the study area supporting native vegetation, including Swamp Sclerophyll Forest on Coastal Floodplains EEC and potential habitat for Slender Screw Fern in ephemeral aquatic habitats.

Five safeguards were identified to help reduce the impacts of the proposal on local biodiversity. The key safeguard is the enhancement of the existing planted Koala corridor to minimise potential impacts of the proposal on local Koala movement. Additional safeguards have also been proposed to minimise the risk of traffic collision with Koalas at the site.

Assessment of the impacts of the proposal found the proposal is unlikely to have a significant impact on any threatened species, population or community or listed migratory species.

1 Introduction

1.1 Background and Description of the Proposal

The proposal is to establish a new car park at the Coffs Harbour Health Campus (the Health Campus) to alleviate a current car parking shortage. The proposal is in the planning stage and GeoLINK has been engaged to provide planning services and produce a Statement of Environmental Effects and associated DA documents for the proposal.

This ecological assessment aims to address the impacts of the proposal on biodiversity in relation to the *Environmental Planning and Assessment Act 1979* (EP&A Act), *Threatened Species Conservation Act 1995* (TSC Act), *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and The Coffs Harbour City Koala Plan of Management (CHCKPoM) (Lunney *et al*. 1999).

The proposal would not require clearing of native vegetation, as the footprint of the car park extends across an area that has been cleared of native vegetation. The main components of the proposal include:

- staged construction of a car park and associated infrastructure, consisting of 816 spaces at the site; and
- upgrading/ establishing access roads to the car park along the eastern edge of the site (off Phil Hawthorn Drive) and from the Health Campus immediately to the north of the site.

Refer to Appendix A which shows the proposal design.

This access from the Health Campus crosses an existing planted Koala corridor that was zoned as 7A environmental protection habitat after expansion of the Mental Health Care Unit to replace an existing ineffective mapped Koala corridor that extended across the Health Campus (Sandpiper Environmental 2005a.)

For the purposes of this assessment:

- '*the site*' refers to the development footprint which covers an area of approximately 3.95 ha;
- '*the study area*' refers to a broader area including the drain/ swale to the west of the site and parts of the adjacent swamp forest vegetation. In total the study area covers approximately 4.96 ha; and
- '*the locality*' refers to land within a 10 km radius of the site.

1.2 Site Context

The site is located next to the Health Campus, approximately 3.0 km south-west of the Coffs Harbour central business district, within the Coffs Harbour City Council (CHCC) local government area (LGA - refer to Illustrations 1.1 and 1.2). The site is mostly flat with an elevation of less than 10 m AHD (Australian Height Datum).

The site comprises mostly cleared/ managed land. No remnant native trees are present on the site. A planting of native trees (intended to function as a Koala corridor) is present along the northern boundary of the site. An area of remnant vegetation of approximately 12.6 ha is present immediately to the west of the site, partly incorporated within the western edge of the study area.

The site is surrounded to the north by developed land, consisting of the facilities of the Health Campus to the north, a Go-Kart track to the east and sporting fields to the south. As mentioned previously, immediately to the west of the site is a small area of remnant vegetation. More extensive areas of native vegetation occur within 60 m of the northeast corner of the site and are associated with the riparian zone of Newports Creek.

Information shown is for illustrative purposes only

Drawn by: TJP Checked by: MVE Reviewed by: DSA Date: February 2014
Source of base data: Coffs Harbour City Council

LEGEND

Study Area

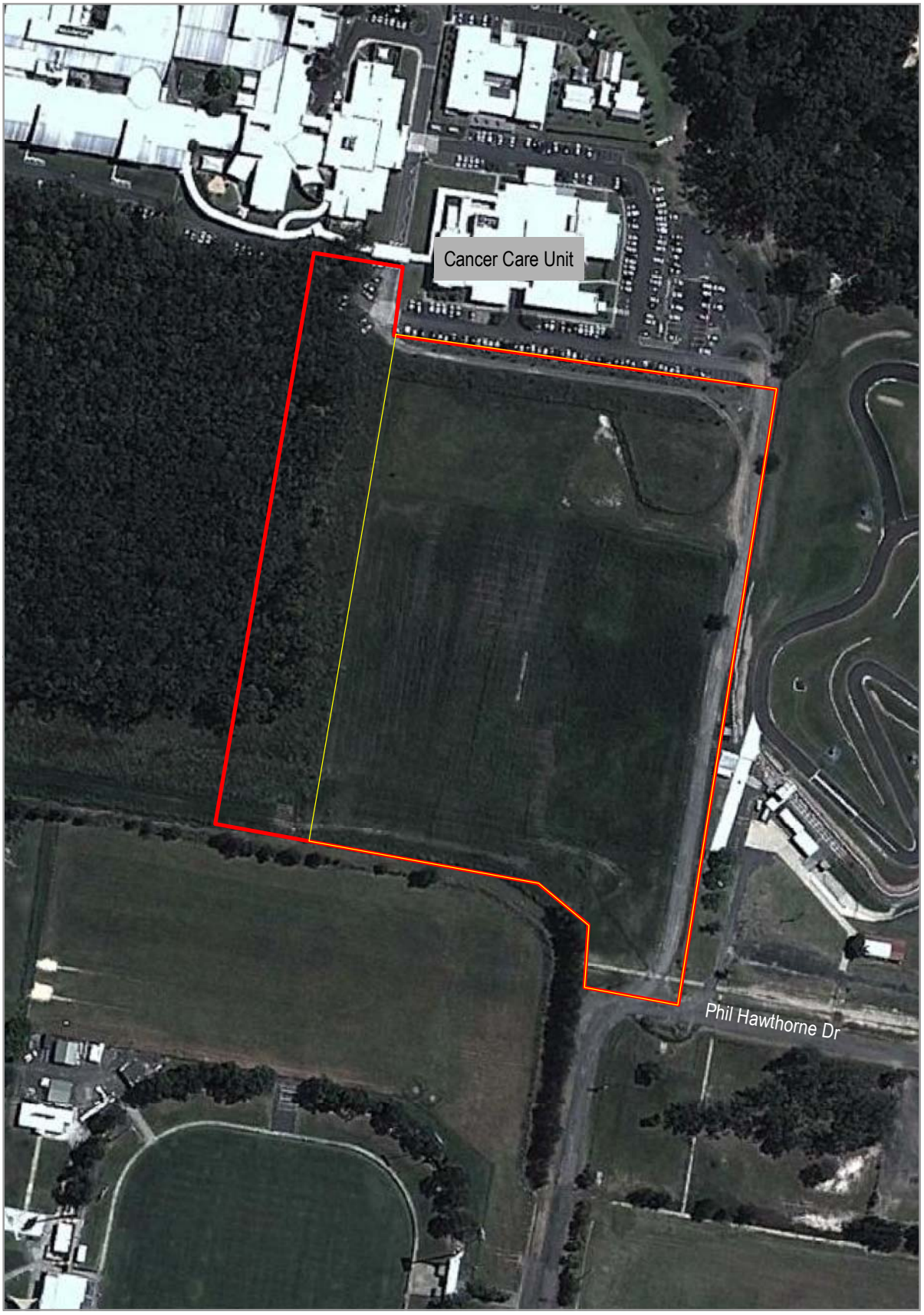
0 1 km

North

Site Locality

Information shown is for illustrative purposes only

Drawn by: TJP Checked by: MVE Reviewed by: DSA Date: February 2014
Source of base data: Google Earth Imagery (2013)



LEGEND

The Site

Study Area

0 50

North

The Site

2 Method

2.1 Overview

The methodology for this ecological survey and assessment has been formulated based on a review of the NSW Department of Environment and Conservation (DEC, now Office of Environment and Heritage - OEH) *Threatened Species Biodiversity Survey and Assessment: Guidelines for Developments and Activities – Working Draft, November 2004* (DEC 2004). The broad methodology is as follows:

- undertake desktop review;
- undertake flora and fauna field surveys;
- assess the habitat value;
- assess the ecological impacts; and
- outline mitigation measures to be implemented to reduce potential biodiversity impacts.

Specific flora and fauna survey methodologies are provided in the Section 2.3.

2.2 Desktop Review

A desktop review was undertaken to determine the flora and fauna species and vegetation communities of conservation significance recorded previously or potentially occurring in the local area. The results of the desktop review were used to assist with consideration of species to be targeted during field surveys.

The desktop review included:

- previous ecological assessments undertaken at the Health Campus including expansion of the Mental Health Care Unit (Sandpiper 2005a) and proposed Cancer Care Unit (Sandpiper 2005b), extension of the a Local Environment Study (LES) for the Campus (GeoLINK 2007); and the CHCKPoM (Lunney *et al.* 1999);
- CHCC online maps (http://maps.coffsharbour.nsw.gov.au/eview-html/index.html, accessed 20/01/2014);
- a search of the OEH BioNET database for threatened flora and fauna species and endangered populations recorded within 10 km of the site (i.e. a 20 km x 20 km area of ~400 km^2) (search undertaken on 20 January 2014; refer to Appendix B);
- a search of EPBC Act listed threatened plant species, communities or species habitat likely to occur within a 10 km radius (i.e. an area of ~315 km^2) of the site using the Department of Environment (DoE) Protected Matters Online Search Tool (search undertaken on 20 January 2014; refer to Appendix B);
- a search of the OEH NSW Critical Habitat Register (search undertaken on 20 January 2014);
- OEH Key Habitats and Corridors mapping (Scotts 2003); and
- NSW Department of Planning's (DoP) *State Environmental Planning Policy* (SEPP) *14 – Coastal Wetlands* and *SEPP 26 – Littoral Rainforest* mapping.

2.3 Field Surveys

An ecological survey of the study area was undertaken by GeoLINK ecologist Tom Pollard on 20 January and 26 January 2014. The field survey primarily focused on the site itself and was undertaken in general accordance with the *Threatened Species Biodiversity Survey and Assessment: Guidelines for Developments and Activities – Working Draft November 2004* methodologies (DEC 2004).

2.3.1 Flora Survey

Flora surveys were conducted to meet the following aims:

- provide a list of species present at the site;
- identify vegetation communities; and
- determine the occurrence of threatened species.

A total survey effort of two person hours was dedicated to flora surveys using the 'meander' survey method. Flora species were recorded in the field and those that required further clarification were collected and keyed-out using relevant literature.

As Slender Screw Fern (*Lindsaea incisa*) has previously been recorded in proximity to the site, this species was the main threatened flora species targeted in the flora species. The area in which random meanders were undertaken to search for this species is shown in Illustration 2.1.

As it is recognised that not all species can be detected during a single seasonal period or survey event, habitat assessments were undertaken to identify any potential habitats (especially for threatened species) present within the study area.

2.3.2 Fauna Survey

Fauna habitat assessment was undertaken across the site identifying potential habitats/ habitat features (especially for threatened species). The 'meander' method, as explained within the DEC (2004), was undertaken to assess the habitat present. The following features were recorded:

- level of disturbance;
- presence of scats, tracks, scratches and pock marks, etc.;
- key foraging resources;
- tree hollows and spouts;
- connectivity;
- rocky outcrops or caves; and
- aquatic habitats.

During the habitat assessment, the following additional surveying was undertaken:

- as the study area is known to support Koalas (GeoLINK 2007), all trees on the site were inspected for Koalas and/ or evidence of Koala usage (scat searches). As the site is primarily devoid of treed vegetation, this consisting of inspection of the small trees in the planted Koala habitat corridor; and
- two SAT plots were investigated within the study area in the swamp forest in order to provide context for potential movement of Koalas across the site (refer to Illustration 2.1).

Additional information on Koala usage in adjacent parts of the study area (particularly the swamp forest) is contained within previous assessments including Sandpiper Environmental (2005a) and (2005b), and GeoLINK (2007). Findings of the previous studies were used as a basis for establishing a broader context for the likely usage of the study area by Koalas.

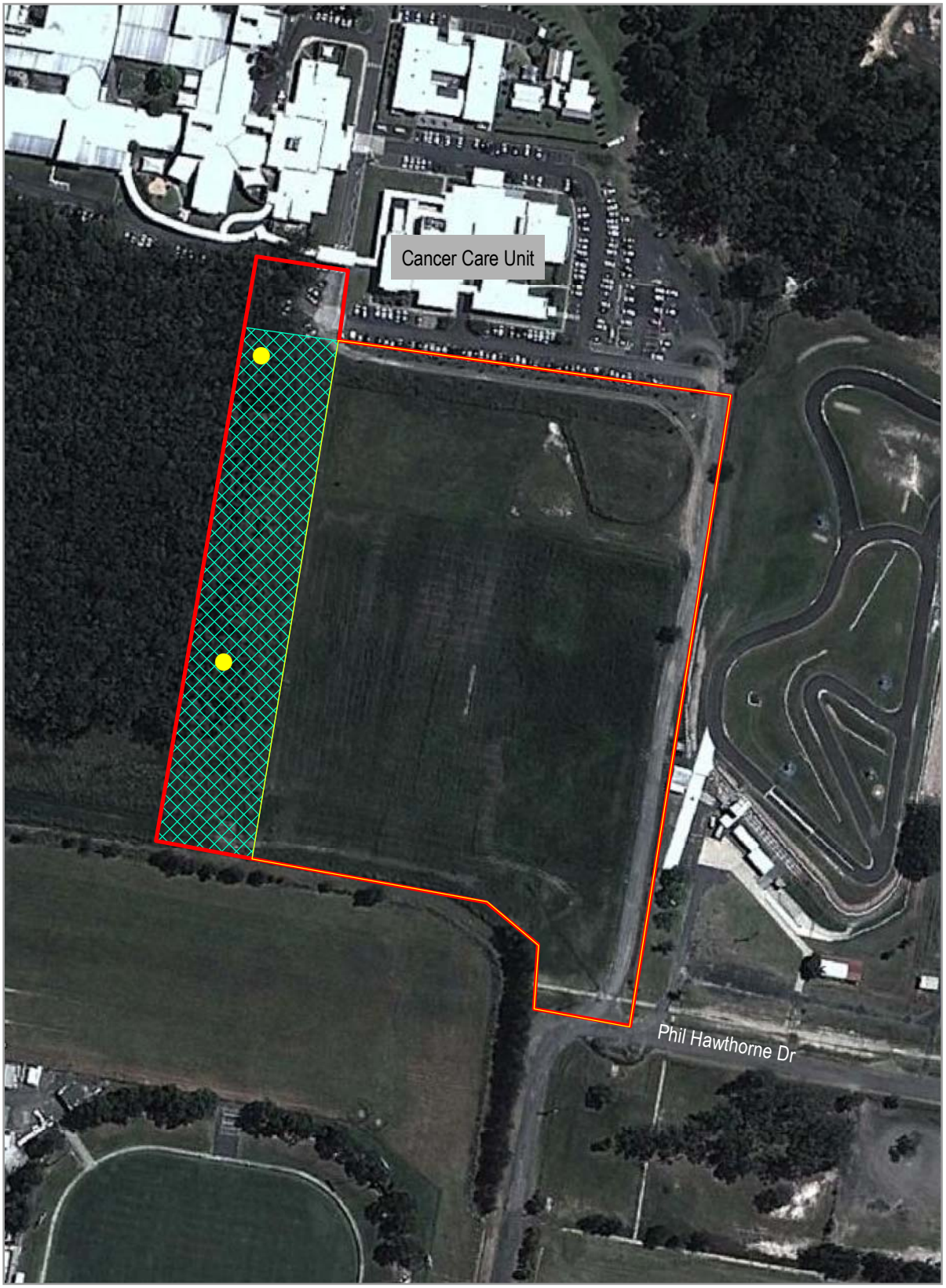
Opportunistic fauna observations were also recorded.

2.3.3 Survey Limitations

Some species that may utilise the site may have avoided detection due to their rarity, cryptic nature or the sporadic utilisation of the site. Notwithstanding, given the relatively small size and disturbed nature of the site, the survey effort was considered adequate in determining the habitat values present. In addition, the precautionary approach has been applied in determining those threatened species not detected during the survey but considered to have potential to occur at the site based on the habitat present and local records.

Information shown is for illustrative purposes only

Drawn by: TJP Checked by: MVE Reviewed by: DSA Date: February 2014
Source of base data: Google Earth Imagery (2013)



LEGEND

- The Site
- Study Area
- Spot Assessment Technique (SAT) plot
- Slender Screw Fern meander search area

0 50

North

Survey Locations

3 Results

3.1 Desktop Review

3.1.1 Previous Ecological Studies

A review of relevant ecological studies conducted in proximity to the site was undertaken and a summary is provided in Table 3.1 below

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Table 3.1 Literature Review of relevant Ecological Studies

Author	*Year*	*Results*
Clancy, Greg	1991	No threatened flora species recorded. Fauna survey recorded 29 birds, 3 mammals (including threatened Koala *Phascolarctos cinereus*, Eastern Bentwing-bat *Miniopterus schreibersii* and Eastern Freetail-bat *Mormopterus norfolkensis*), 1 reptile, 1 frog (Wallum Froglet *Crinnia tinnula*).
Moon, Chris	1998	No threatened flora species recorded. Recorded a male and female Koala during surveys.
Clancy, Greg	1998	No threatened flora species recorded. Recorded 4 threatened fauna species including the Koala, Eastern Bentwing-bat and Eastern Freetail-bat and Wallum Froglet.
Coffs Harbour City Council	2001	South Coffs Harbour Local Environmental Study gathers information from a range of sources and includes records within the study area of the threatened Wallum Froglet, Eastern Freetail-bat and Eastern Bentwing-bat
Sandpiper	2005a	Surveys were undertaken for the proposed extension to the mental health care unit. Recorded threatened Swamp Sclerophyll Forest on Coastal Floodplain EEC and *Lindsaea incisa* within the study area. Two patches of *Lindsaea incisa* are identified for removal and relocation. Mitigation measures are recommended to avoid impacts on Koala. Also recommended that a replacement corridor to the south of the Health Campus through to Newports Creek be dedicated as 7A environmental protection habitat and catchment zone to replace the ineffective existing corridor.
Sandpiper	2005b	Surveys were undertaken for the vacant land adjacent to the Health Campus. Recorded threatened Swamp Sclerophyll Forest on Coastal Floodplain EEC and *Lindsaea incisa* within the study area. Two patches of *Lindsaea incisa* are identified for removal and relocation. Mitigation measures are recommended to avoid impacts on Koala.
RDM	2006	RDM propose to rezone a section of 7A environmental protection habitat and catchment zone to special use 5A community purpose zone. The section proposed for rezoning was ineffective in its purpose as a Koala corridor. RDM propose to dedicate a replacement corridor to the south of the Health Campus through to Newports Creek

Author	*Year*	*Results*
GeoLINK	2007	Relevant findings of this ecological assessment are: ▪ two records of *Lindsaea incisa*. These records are located within the swamp forest vegetation and are in addition to the records from Sandpiper Environmental (2005a). The nearest of these records is within 20 m of the western boundary of the study area; and ▪ the presence of Swamp Sclerophyll Forest on Coastal Floodplains EEC vegetation (consisting of the area of swamp forest to the west of the site).

3.1.2 Coffs Harbour City Koala Plan of Management and Coffs Harbour City Council's Online Mapping

No part of the site is mapped as Primary Koala Habitat under the Coffs Harbour City Koala Plan of Management (CHCKPoM) (Lunney *et al*., 1999). However, the swamp forest to the immediate west of the site within the study area and the riparian zone along Newports Creek are identified by the CHCKPoM and Coffs Harbour City Council (CHCC) Online Mapping as Primary Koala Habitat (refer to 0).

The CHCKPoM states that:

- the management objective for primary Koala habitat is: '*To prevent further clearing, disturbance, fragmentation or isolation of existing primary Koala habitat, where appropriate, restore habitat and encourage sympathetic management to ensure the maintenance of Koalas*'; and
- the management objective for lands adjoining primary Koala habitat is: '*To minimise impacts on Primary Koala Habitat from development proposed on adjoining lands, particularly where such areas may contain scattered preferred koala trees, and to maintain opportunities for free movement of koalas between areas of habitat*'.

The CHCC Online Mapping also identifies the swamp forest vegetation to the immediate west of the site as the TSC Act listed EEC '*Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions'* (NSW Scientific Committee 2005).

Plate 3.1 Koala Habitat Mapping

(Source: Coffs Harbour City Council online map tool – accessed 04/02/2014)

3.1.3 Threatened Species Database Searches

NSW BioNet Search

The NSW BioNet search identified records of 76 threatened fauna species and 39 threatened flora species, listed under the TSC Act, within the search area (400 km^2 area centred on the site) (refer to Appendix B). A potential occurrence assessment for these species is provided in Appendix C. This assessment excludes obligate marine species, for which potential habitat does not occur in the study area.

EPBC Protected Matters Report

The Protected Matters Search Tool identified 79 threatened species (28 flora and 51 fauna species) listed under the EPBC Act, consisting of 'species or species habitat likely to occur within area' or 'species or species habitat may occur within area' (10 km radius search area (~315 km^2)) (refer to Appendix B). Of these species (excluding obligate marine species), eight flora species and eight fauna species were not identified in the NSW BioNet search and are included in the potential occurrence assessment in Appendix C.

A total of 53 migratory species listed by the EPBC Act were identified for the search area by the Protected Matters Search Tool (refer to Appendix B). Eight are listed as migratory terrestrial species, four are listed as migratory wetland species and the remainder are listed as marine species.

Two threatened ecological communities listed under the EPBC Act were identified within the search area by the Protected Matters Search Tool. These communities are:

- Littoral Rainforest and Coastal Vine Thickets of Eastern Australia; and
- Lowland Rainforest of Subtropical Australia.

Critical Habitat

A search of the Register of Critical Habitat (undertaken on 20/01/2014) indicated that the site does not contain or adjoin any areas of listed Critical Habitat.

Key Habitats and Corridors in North Eastern NSW

The north-western half of the study area falls within the OEH-mapped Newports Creek sub-regional corridor which runs east-west (refer to Illustration 3.1). Several other mapped sub-regional corridors are within 5 km to the north and south of the study area and the Coffs-Bongil Creek regional corridor is situated approximately 1.5 km to the east. The focal fauna species for all of these corridors is the Koala. It is likely that these vegetation corridors have the potential to facilitate the movement of other threatened forest fauna species.

The swamp forest vegetation within the study area may provide resources or refuge for fauna traversing these corridors. However, this swamp forest vegetation is situated within a small extension of the corridor and does not join to other vegetated areas to the west.

Infrastructure and cleared land associated with the Health Campus and the Pacific Highway (with its associated traffic) effectively fragment and reduce the movement capacity of the mapped Newports Creek corridor, particularly for non-flying fauna.

SEPP 14 Coastal Wetland and SEPP 26 Littoral Rainforest

The closest mapped areas of SEPP 14 - Coastal Wetland and SEPP 26 – Littoral Rainforest are greater than 1 km from the site. Therefore no SEPP 14 - Coastal Wetland and SEPP 26 – Littoral Rainforest are likely to be affected by the proposal.

Information shown is for illustrative purposes only

Drawn by: TJP Checked by: MVE Reviewed by: DSA Date: February 2014
Source of base data: Coffs Harbour City Council and OEH

LEGEND

- Study Area
- Key habitats
- Fauna corridors

0 390

North

OEH Key Habitats and Corridors

3.2 Flora Surveys

Vegetation at the site consists of highly-modified exotic-dominated grassland. This vegetation also extends into the broader study area along the periphery of the swamp forest vegetation to the west of the site.

One native plant community occurs within the study area; Swamp Mahogany Swamp Forest. The location of this community is shown in Illustration 3.2.

A description of these vegetated areas is provided in the following sections. The planted Koala corridor, located along the southern boundary of the existing car park within the northern boundary of the site, is also described in this section.

A list of flora species at the site is provided in Appendix D. In total 38 species were recorded within the study area (including exotic species). Due to regular mowing/ slashing, some groundcover species were unable to be identified in the exotic grassland.

3.2.1 Site Vegetation

3.2.1.1 Modified Community - Exotic-dominated Grassland

Structure and Floristic Composition

Vegetation in this area consists of highly modified exotic grassland with no midstorey or overstorey vegetation present (refer to Plate 3.2).

Dominant plant species in this vegetation include exotic grasses such as Setaria (*Setaria sphacelata*), *Paspalum* spp., Narrow-leaved Carpet Grass (*Axonopus affinis*) and Whisky Grass (*Andropogon virginicus*).

The area alongside the swamp forest lies at a slightly lower elevation, and the species composition reflects the moister soil conditions in this area. Common species include Kangaroo Grass (*Themeda australis*), Blady Grass (*Imperata cylindrica*), Tall saw-sedge (*Gahnia clarkei*), Spiny-headed Mat-rush (*Lomandra longifolia*), Sedges (*Carex* spp) and Soft Bracken (*Calochlaena dubia*). Very occasional regenerating shrubs and trees are present where slashing has not occurred recently, including species such as Sieber's Paperbark (*Melaleuca sieberi*), Swamp Box (*Lophostemon suaveolens*) and Swamp Mahogany (*Eucalyptus robusta*). These species have dispersed from the adjacent swamp forest.

Distribution and Variation of Community within the Site

This community covers the entire site and also extends along the periphery of the site adjacent to the swamp forest vegetation in the study area. The site is primarily maintained in a mown state and consists only of groundcover species. The area alongside the swamp forest is maintained on a less frequent basis and includes some regenerating shrubs.

Condition of Vegetation

This vegetation is highly modified and generally in poor condition, reflecting the regular slashing regime.

Conservation Significance

This vegetation is not of any particular conservation significance and is not consistent with any TEC listed under the TSC Act or EPBC Act.

Plate 3.2 Exotic-dominated Grassland at the Site

3.2.2 Study Area Vegetation

3.2.2.1 Swamp Mahogany Swamp Forest

Structure and Floristic Composition

This structure of this community is a tall open forest. The midstorey is generally sparse and the understorey dense in parts.

The dominant canopy species is Swamp Mahogany, with lesser occurrences of Swamp Box and Red Mahogany (*Eucalyptus resinifera*). Midstorey species include the exotic species Camphor Laurel (*Cinnamomum camphora*) and native species such as Willow Bottlebrush (*Callistemon salignus*) and Large Mock Olive (*Notelaea longifolia*). The understorey vegetation is relatively dense and is dominated by Tall Saw-sedge and Spiny-headed Mat-rush.

Distribution and Variation of Community within the Site

This community occurs on a seasonally wet low-lying part of the study area and extends to the west of the study area in a patch of approximately 13 ha in total.

Condition of Vegetation

This vegetation is generally in moderate condition, with reasonable structure and species diversity and limited weed infestation. Minor weed infiltration is evident (e.g. Camphor Laurel), particularly around the exposed edges of this isolated patch of vegetation. Also, the area may have been previously logged approximately 20-30 years ago and experienced a fire of low intensity as recently as 2000 (Sandpiper Environmental 2005a). No adverse effects from this fire were noted at the time of the current survey.

Conservation Significance

This vegetation is consistent with the determination for the EEC *Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions* (NSW Scientific Committee 2005).

Due to a minor risk of indirect impacts on this community resulting from the proposal, a seven-part test of significance for this EEC has been undertaken as required under Section 5A of the *Environment Planning and Assessment Act 1979* (EPA Act) as a precaution (refer to Appendix E).

Plate 3.3 Swamp Mahogany Swamp Forest within the Study Area

3.2.3 Revegetated Koala Corridor

This Koala corridor is located along the northern edge of the site, adjacent to the existing car park area (refer to Illustration 3.2). Growth of trees in this corridor has been of limited success, and the area is significantly infested by exotic grasses.

At the time of the survey the corridor consisted of widely spaced (6-8 m) planting of two rows of several tree species up to 5 m in height, but mostly 2-4 m high. Species recorded included Broad-leaved Paperbark (*Melaleuca quinquenervia*), Spotted Gum (*Corymbia variegata*), Swamp Box and Red Mahogany (probable – the small size of the trees and lack of identifying reproductive features made identification difficult). Exotic grasses, particularly Setaria, were prominent in the understorey of the corridor at the time of the survey and were likely adversely impacting the growth of the planted trees.

Plate 3.4 Planted Koala Corridor

Information shown is for illustrative purposes only

Drawn by: TJP Checked by: MVE Reviewed by: DSA Date: February 2014
Source of base data: Google Earth Imagery (2013)

LEGEND

- The Site
- Study Area
- Koala Corridor
- Swamp Mahogany Swamp Forest (EEC)

North

0 40

Plant Communities and Koala Corridor

3.2.4 Threatened Flora Species

The survey did not identify the presence of any threatened flora species listed in the TSC Act or EPBC Act.

The results of the threatened flora potential occurrence assessment (Appendix C) indicate that none of the threatened flora species are considered potential occurrences at the site. However, it is possible that Slender Screw Fern may occur within the study area adjacent to, and within, the swamp forest vegetation. Consequently, a seven-part test of significance for this species has been undertaken as required under Section 5A of the *Environment Planning and Assessment Act 1979* (EPA Act) (refer to Appendix E).

Previous ecological assessments have identified the presence of Slender Screw Fern within 500 m of the site Forest (GeoLINK 2007, Sandpiper Environmental 2005a, 2005b). However, despite an extensive targeted search within suitable areas of habitat in the study area (refer to Illustration 2.1), this species was not located. Slender Screw Fern has previously been located just outside of the current area within the core area of the swamp forest (GeoLINK 2007) and adjacent to the swamp forest in modified grassland to the north of the site (Sandpiper Environmental 2005a, 2005b). These latter patches adjacent to the swamp forest were subsequently removed as part of the expansion of the Mental Health Care Unit at the Health Campus.

3.2.5 Threatened Ecological Communities

One EEC was mapped as occurring within the study area; *Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions* (NSW Scientific Committee 2005). This community corresponds with the swamp forest described in Section 3.2.2.1. This finding concurs with the results of previous assessments (GeoLINK 2007; Sandpiper Environmental 2005a, 2005b). As there is a risk of potential indirect impacts relating to the proposal on this adjacent EEC within the study area, a seven-part test of significance for this vegetation has been undertaken as required under Section 5A of the *Environment Planning and Assessment Act 1979* (EPA Act) (refer to refer to Appendix E).

No Threatened Ecological Communities (TECs) listed under the EPBC Act occur on the site or within the study area.

3.2.6 Noxious Weeds

No noxious weeds listed under the *Noxious Weeds Act 1993* (NW Act) within the Coffs Harbour Local Government Area (LGA) were recorded at the site. Crofton Weed (*Ageratina adenophora)* was recorded in the study area in exotic grassland vegetation adjacent to the swamp forest. This species is a N4 listed species meaning 'the growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority'.

3.3 Fauna Surveys

3.3.1 Fauna Habitat Assessment

The site contains two broad habitat types: swamp forest and modified grassland. These habitats were assessed to determine their value for native fauna species. Presence of these habitats indicates the possible occurrence of fauna (particularly threatened fauna) at the site.

Assessments were completed in conjunction with the flora surveys and focused on identifying habitat features known to be associated with threatened species and other native fauna groups. Observations made of these habitat features are listed in Table 3.2. This habitat assessment was used to help determine the occurrence potential of threatened fauna species in Appendix C.

Overall, the site is located within a modified developed area and has a disturbance history including vegetation clearing and maintenance (mowing/ slashing). Consequently, the habitat value of the site is relatively low.

Table 3.2 Fauna Habitat Features

Habitat Feature	*Indicator*	*Site Score*	*Comment*
Claw marks on trees	Claw marks on trees indicate the presence of arboreal mammals such as Possums, Gliders and Koalas and reptiles such as the Lace Monitor	0	No evidence of arboreal fauna activity was indicated by tracks on the trunk of trees within the swamp forest.
Scats	Animal scats with distinctive characteristics that can be indicative of the presence of particular animals	1	Koala scat searches were undertaken within two SAT plots established in swamp forest within the study area. This involved searches beneath a total of 60 trees 0.10 m DBH and greater on site (refer to Appendix F and Illustration 2.1). Koala scats were detected below a small number of trees within the assessed areas indicating a low level of Koala usage of this area. The presence of Koalas in the study area has also been recorded in previous studies (Sandpiper Environmental 2005a; 2005b; GeoLINK 2007). Ground disturbance associated with mowing and slashing was considered a potential limitation on the detection of scats of species likely to utilise the modified grassland (e.g. macropods etc.).
Allocasuarina sp.	*Allocasuarina spp.* provide key foraging sources for the Glossy Black Cockatoo	0	No Forest Oak or other preferred food trees for the Glossy Black Cockatoo were recorded either on the site or within the broader study area.
Tracks	A range of animal tracks on the ground surface may be recorded indicating the presence of particular animals.	0	No obvious fauna runways were present.
Tree hollows and stags	Tree hollows and stags providing shelter and roosting areas for a variety of birds, reptiles and arboreal mammals	0	No tree hollows were detected on any trees at the site or in the broader study area.
Rocky outcrops	Rocky outcrops are preferred by certain fauna	0	No rocky outcrops or similar features were present.
Animal diggings	A range of animal diggings in the soil may be recorded indicating the presence of certain animals	0	No fauna diggings were detected.
Burrows	Fauna can be identified by the types of burrows present	0	No burrows were detected on site.
Leaf litter	Large amount of leaf litter often indicates ample invertebrate activity and shelter for small animals.	0	No leaf litter is present within the site. Moderate litter accumulation is present in the understorey of the patch of swamp forest within the study area. Due to the relative isolation and disturbance history of the area this is unlikely to provide a significant fauna resource.
Bones	Bones can be used to identify fauna	0	No bones were detected on the site.

Habitat Feature	*Indicator*	*Site Score*	*Comment*
Aquatic habitat	Fauna are often attracted to water bodies to drink, spawn or forage	0	No aquatic habitats occur on site. However, based on topography, it is expected that ephemerally inundated areas occur in the broader study area, particularly within low-lying areas within the swamp forest and the adjacent drainage swale. These areas would provide potential habitat for aquatic fauna, including common amphibians. Due to the relative isolation and disturbance history of the area this is considered unlikely that these areas of aquatic habitat would provide a significant fauna resource for any threatened amphibian species.
Fallen timber and hollow logs	Fallen timber and hollow logs often provide shelter for a variety of fauna, as well as provide prey (including invertebrate prey) habitat.	0	No fallen timber or hollow logs are present within the site. Occasional fallen timber is present within the swamp forest. However, these features are relatively small in diameter with poor shelter potential, reflecting the generally young age of this forest and small size of canopy trees.
Extent of vegetation with well-developed structure	Areas with a well-developed vegetation structure encourage a diverse fauna assemblage.	0	The site comprises an area of modified grassland. Remnant vegetation in the broader study area has a history of disturbance but nonetheless has retained a degree of structural coherence and therefore providing habitat for a range of fauna.
Sap sources	Specific *Angophora*, *Eucalyptus* and *Corymbia* species may provide potential sap sources for Gliders *Petaurus spp.* (Van Dyck and Strahan 2008).	1	No mature trees are present at the site that could currently provide a potential sap source for gliders. When the immature *Eucalyptus* and *Corymbia* spp. that have been planted in the Koala corridor mature, this resource will be available to gliders in the future.
Diversity of flora species	A diverse flora provides a large range of food sources and habitat available for fauna.	0	The site has a relatively low floristic diversity, consisting of highly modified grassland. The diversity within the swamp forest in the broader study area is higher, reflecting the less disturbed nature of this vegetation.
Understorey, shrub layer and ground cover	Dense understorey or ground cover such as thick grass provides shelter for small ground dwelling fauna.	1	The majority of the site is regularly mown and therefore consists of a short groundcover of grasses and herbs. Those parts of the site that are currently not intensively managed by way of slashing and have relatively dense grass growth (e.g. within the Koala corridor) may provide foraging habitat for small ground-dwelling fauna. This is not expected to provide habitat for any significant species and is most likely limited to supporting relatively common species such as rodents and bandicoots.

Habitat Feature	*Indicator*	*Site Score*	*Comment*
Connectivity and corridors	Vegetation connectivity between areas can provide a corridor for fauna movement and enhance fauna numbers utilising smaller patches of vegetation.	0	The site and study area are located within a modified environment surrounded by developed lands. The area of swamp forest adjacent to the study area is poorly connected with other areas of remnant vegetation to the east along Newports Creek. The Koala corridor that has been established in the northern section of the site was intended to provide connectivity between these areas, particularly to assist the movement of Koalas. However, as the planting in this area is relatively young the potential connectivity function is not being achieved yet. To improve the function of this corridor in the future it is recommended that additional planting and enhanced weed maintenance is undertaken in this area (refer to Section 5.1). Flying fauna capable of dispersing and inhabiting urban environments may occur in the swamp forest adjacent to the site on occasion (e.g. Grey-headed Flying-fox *Pteropus poliocephalus*, Swift Parrot (*Lathamus discolor*) etc.) but due to the poor connectivity between remnant vegetation across the site, the presence of less mobile species such as small mammals is unlikely.
Koala browse species	Koalas are typically associated with preferred food tree species.	1	The main value of the site for Koalas is as transitory habitat when moving between adjacent areas of habitat in the swamp forest to the west and Newports Creek to the east. This is an important ecological function for local resident Koalas. At present, while Koalas may move across the site, they are vulnerable to predation/ attack (e.g. by dogs) due to the limited refuge at the site. Within the Koala corridor on the northern boundary of the site, the only Koala food tree as listed in the CHCKPoM present is Broad-leaved Paperbark (*Melaleuca quinquenervia*). More recent data suggests this species is not a preferred Koala food tree, though may provide other have values such as dispersal refuge and shade tree values (Dr Stephen Phillips, pers. comm.). Broad-leaved Paperbark is not listed as a preferred food tree in the *Recovery Plan for the Koala (Phascolarctos cinereus)* (DECC 2008) for the region. Of the species listed as Koala food trees (including primary, secondary and supplementary listed species) for the NSW north coast in the approved Recovery Plan for the Koala (*Phascolarctos cinereus*) (DECC 2008), one species, Red Mahogany (*Eucalyptus resinifera* secondary Koala food tree), is present within the Koala corridor (potential occurrence). No evidence of Koala usage of the site was recorded in the current survey. It is recommended that future enhancement of this Koala corridor would include replanting/ replacement of non-preferred Koala food trees with this or other preferred Koala food tree species.

Habitat Feature	*Indicator*	*Site Score*	*Comment*
			As discussed in Section 3.1.2, the swamp forest, part of which is within the study area, is mapped as primary Koala habitat in the CHCKPoM. Within this area, Swamp Mahogany comprises a dominant canopy species. Swamp Mahogany comprises a primary Koala food tree and is dominant in the swamp forest within the study area. Red Mahogany is also present within this community. However, a low level of usage was recorded within the study area in the adjacent swamp forest (refer to Appendix F and Illustration 2.1). This is typically associated with transitory Koala activity (Phillips & Callaghan 2011). Other parts of the swamp forest to the west of the study area may still be occupied as core Koala habitat.
Raptor roost and/or nest trees	Most raptors are very selective in choosing both the type of tree and the location used for roosting / nest building	0	No large stick nests indicative of potential roosting of locally recorded threatened raptors were present.

0 Nil
1 Low Occurrence
2 Medium Occurrence
3 High Occurrence

3.3.2 Opportunistic Fauna Recordings

A list of fauna opportunistically recorded during the survey is provided in Appendix G. Species recorded were typical of modified urban areas. No threatened fauna were directly recorded. However, a small number of Koala scats were detected beneath Swamp Mahogany in the study area (refer to Appendix F). This is a lower level of Koala activity than that detected during the Sandpiper Environmental (2005a) survey in this area of swamp forest. This discrepancy may result from the SAT plots in the current survey being located near the edge of this area of vegetation, where usage may be infrequent.

3.3.3 Threatened Fauna

A threatened fauna potential occurrence assessment is provided in Appendix C. This assessment was based on species results from the desktop assessment, habitat evaluation and field survey recordings. The site was found to provide either known habitat or potential habitat as part of a core range or an area that is potentially utilised regularly for the Koala (*Phascolarctos cinereus*).

The Koala is the 'subject species' of the impact assessment for threatened fauna (Section 4.3.2). The habitat value of the site and extent of the local population for this species is provided in the introduction to the Seven-part Test (Section 5A) Assessments in Appendix E. The Koala was also assessed under the EPBC Act Significant Impact Criteria Assessment (Appendix H).

The study area was found to provide potential habitat for several other threatened species as part of a larger range or irregular opportunistic transient usage, though lacked significant habitat features such as breeding habitat features or significant foraging resources). These species are:

- Regent Honeyeater (Anthochaera phrygia);
- Little Lorikeet (Glossopsitta pusilla);
- Little Eagle (Aquila morphnoides);
- Swift Parrot (Lathamus discolor);
- Square-tailed Kite (Lophoictinia isura);
- Barking Owl (Ninox connivens);
- Powerful Owl (Ninox strenua);
- Eastern Freetail-bat (Mormopterus norfolkensis);
- Little Bentwing-bat (Miniopterus australis);
- Eastern Bentwing-bat (Miniopterus schreibersii oceanensis);
- Grey-headed Flying-fox (Pteropus poliocephalus);
- Yellow-bellied Sheathtail-bat (Saccolaimus flaviventris);
- Greater Broad-nosed Bat (Scoteanax rueppellii); and
- Eastern Blossom-bat (Syconycteris australis).

The nature of the Proposal is such that the habitat values of the study area for these species would not be affected by the Proposal. It is unlikely that the proposal would result in a significant impact on these species and therefore, they are not included as 'subject species' in the impact assessment.

3.3.4 EPBC Act-listed Migratory Species

No EPBC Act-listed migratory species were recorded during the survey. However, searches on the EPBC Act Protected Matters Search Tool identified potential habitat for 53 migratory listed species within a 10 km of the study area. Based on the habitats present, the survey results and local knowledge, six of these migratory species listed by the database search are considered potential occurrences in the study area. These species are listed below.

Potential to utilise the study area as seasonal foraging habitat only:

- Fork-tailed Swift (Apus pacificus);
- Rainbow Bee-eater (Merops ornatus);
- Rufous Fantail (Rhipidura rufifrons); and
- White-throated Needletail (Hirundapus caudacutus).

Potential to utilise the study area for seasonal foraging and breeding habitat:

- Satin Flycatcher (Myiagra cyanoleuca); and
- Black-faced Monarch (Monarcha melanopsis).

The site does not comprise important habitat for any of these species. The potential impact of the Proposal on migratory species has been assessed under the Administrative Guidelines (Appendix H) for significant impact.

4 Discussion of Potential Impacts

4.1 Direct Impacts

The primary direct impact resulting from the proposal relates to the potential for reduced connectivity and habitat fragmentation for Koalas.

4.1.1 Fauna Connectivity and Habitat Fragmentation

This section is applicable to all mobile fauna that may utilise the site on occasion, but specific emphasis is placed on the Koala.

The site is surrounded by cleared and/ or developed land to the north and south, and by already fragmented vegetation to the west and east (the most intact vegetation being to the east along Newports Creek). As the proposal does not require clearing of native vegetation, no additional fragmentation of this vegetated habitat would result.

The connectivity between these vegetated areas is currently poor, although recent efforts have been made to enhance the capacity of the site to support the movement of Koalas by establishing a planted Koala corridor (Sandpiper Environmental 2005a). The proposal would result in the establishment of additional developed infrastructure between existing remnant vegetation to the west and east of the site, including a security fence around the car park. This fence would not extend across the planted Koala corridor, and consequently the potential for movement of Koalas through this corridor would be retained post construction of the car park, particularly if the corridor was enhanced.

Trees in this planted Koala corridor are relatively young, the area is currently weed infested, and the planting consisted of only a limited suite of preferred Koala food tree species. Consequently, the function of this corridor has not yet been realised. As the proposal includes the construction of a northern access from the existing Health Campus, the Koala corridor would be crossed. This would have potential impacts on the capacity of this corridor to facilitate the movement of Koalas.

4.2 Indirect Impacts

Potential indirect impacts on biodiversity include:

- Erosion and sedimentation. Adjacent parts of the study area support the EEC Swamp Sclerophyll Forest on Coastal Floodplains, and this area also potentially supports unidentified populations of the threatened flora species, Slender Screw Fern (refer to Section 3.2.4) in ephemeral aquatic habitats. These risks would be minimised through implementation of appropriate safeguards (refer to Section 5.1).
- Hydrology: Flood modelling indicates that there is likely to be a small local impact of up to 0.02 m adjacent to the site and a local increase in water velocity in the low-lying drainage feature on the western boundary of the site adjacent to the swamp sclerophyll forest (Cardno 2012). Rain infiltration is also likely to decrease at the site following the construction of a largely impervious surface for the car park. However, considering the size of the Newports Creek catchment and the relatively small scale of the proposal in relation to existing adjacent building infrastructure, roading and other paved areas within the Health Campus, any potential impacts on groundwater relating to these changes to the local hydrology are likely to be minor.
- Spread of weeds and pathogens (e.g. myrtle rust). Given the location of the site in modified urban landscape, it is unlikely that the proposal would significantly increase the risk of these threats.

- Anthropogenic disturbances (noise, artificial light and human presence). These disturbances may deter some species from utilising adjacent habitat / habitat features. Considering the pre and post construction modified nature of the study area, anthropogenic disturbances contributed by the proposal are unlikely to significantly affect the value of adjacent habitats within the study area.
- Traffic collision. The new car park would be located in an area largely free of native vegetation post establishment of the proposed development. Current traffic usage is limited to the periphery of the site. Post-construction, traffic volumes at the site would be increased by the proposal as traffic is funnelled into the new carpark. This risk would be minimised through implementation of appropriate safeguards (refer to Section 5.1).

4.3 Threatened Species and Ecological Communities

4.3.1 Threatened Flora and Threatened Ecological Communities

No EECs or threatened flora occur or are likely occurrences on the site. However, Swamp Sclerophyll Forest EEC occurs within the study area adjacent to the site, and Slender Screw Fern is a potential occurrence within and adjacent to this area. As mentioned above, there is a minor risk of indirect impacts on this EEC/ threatened species, primarily relating to sedimentation and water quality. Consequently, suitable erosion and sediment controls should be implemented to ensure that the risk of off-site impacts on this community/ species are minimised (refer to Section 5.1).

4.3.2 Threatened Fauna

As discussed in Section 3.3.3, a single threatened fauna species, the Koala, listed under the TSC Act and EPBC ACt, was identified as the subject species for the impact assessment for fauna (refer to Appendix C) and subject to a Section 5A Assessment in accordance with Section 5A of the EP&A Act (Appendix E) and assessed under the EPBC Act Significant Impact Criteria Assessment (Appendix H). In relation to this species the assessment found the proposal would result in a minor contribution to threats associated with the decline of these species (e.g. fragmentation and isolation) and would also have a small contribution to a number of listed key threatening processes.

The outcome of the assessments found that with consideration to the small scale of the proposal and limited degree of direct and indirect impacts, significant impacts on the local population of Koalas in the locality are unlikely, particularly with effective implementation of the safeguards of this report (Section 5.1).

4.3.3 Migratory Species

The potential impacts of the proposal on migratory species listed under the EPBC Act were assessed under the EPBC Act Administrative Guidelines (Appendix H). The results of the assessment indicate that the site does not comprise important habitat for any EPBC Act listed migratory species and the proposal is unlikely to result in a significant impact to migratory species. Therefore, referral to the Commonwealth Minister is not required.

4.4 Coffs Harbour City Koala Plan of Management

The CHCKPoM (Lunney *et al.,* 1999) sets out a strategic planning framework for conserving Koalas in Coffs Harbour LGA. This includes a list of management actions that the consent authority must take into consideration before granting consent. In relation to this plan and the considerations required, the proposal affects both land identified as *Primary Koala Habitat* and *Lands Adjoining Primary Koala Habitat*.

4.4.1 Primary Koala Habitat

The CHCKPoM (Lunney *et al.*, 1999) states: '*The consent authority shall not grant consent to the carrying out of development on areas identified as Primary Koala Habitat, whether zoned 7(A) or otherwise, which will remove the following tree species: Tallowwood Eucalyptus microcorys, Swamp Mahogany E. robusta, Broad-leaved Paperbark Melaleuca quinquenervia, Flooded Gum E. grandis, Blackbutt E. pilularis, Forest Red Gum E. tereticornis, Small-fruited Grey Gum E. propinqua, or Forest Oak Allocasuarina torulosa, unless the development will not destroy, damage or compromise the values of the land as koala habitat. In assessing an application the consent authority shall take into consideration*:

- *that there should be zero net loss of Primary Koala Habitat*;

The proposal will not result in the loss of any mapped primary Koala habitat from within the proposal footprint.

- *the threats to koalas which may result from the development.*

Threats to the local Koala population in relation to the proposal are discussed below:

- Traffic collision – the new carpark would be located in an area largely free of native vegetation post establishment of the proposed development. Current traffic usage is limited to the periphery of the site. Post-construction, traffic volumes at the site would be increased by the proposal as traffic is funnelled into the new carpark. However, installation of traffic calming devices, low speed limits, and Koala signage, particularly where the northern access road crossed the Koala corridor, would reduce the risk of traffic collision with Koalas (refer to safeguards in Section 5.1).
- Dog attack – the nature of the proposal is such that the risk of dog attack locally would not be increased as a result of the proposal. Furthermore, the establishment and enhancement of the planted Koala corridor on the northern boundary of the site is intended to provide shelter for Koalas. This would provide a shelter point midway between the swamp forest and the vegetation along Newports Creek and reduce the overall distance required to be travelled on the ground in one movement.
- Disease – the adjacent area of swamp forest in the study area shows evidence of only low Koala usage, indicative of transitory usage. Considering this and existing threats to the local Koala population, it is unlikely that the proposal would significantly increase the occurrence or magnitude of disease in the local Koala population.
- Habitat fragmentation and barriers –the proposal would result in the establishment of an additional barrier to movement of the Koalas between swamp forest habitat to the west of the site and vegetation along Newports Creek to the east. However, considering the current connectivity between alternative habitat locally, the relatively low usage levels surrounding the site, and the retention and enhancement of the planted Koala corridor at the site, the degree that the proposal would contribute to habitat fragmentation or barriers to existing Koala movement patterns locally is not considered to be significant to the survival of the local Koala population.

- *the likely impacts to adjacent or nearby Primary Koala Habitat and existing or potential Koala movement corridors;*

As mentioned previously, the proposal would not require clearing vegetation, including Primary Koala habitat.

Areas of Primary Koala Habitat have been mapped to the immediate west of the site in the swamp forest and to the east of the site along Newports Creek (refer to Plate 3.1). These areas are separated by approximately 175 m at their narrowest point. Connectivity between these areas of habitat is currently poor, although an attempt has been made to establish a planted Koala corridor, as mentioned previously.

As the proposal includes the construction of a northern access from the existing Health Campus, the Koala corridor would be crossed. This would have potential impacts on the capacity of this corridor to facilitate the movement of Koalas. The proposal would retain all trees within this Koala corridor and it is recommended that additional safeguards be implemented (refer to Section 5.1) to encourage potential Koala usage of the corridor in the future.

Additional safeguards are also recommended to reduce the risk of traffic collision with Koalas (refer to safeguards in Section 5.1).

- *all other options for preventing or ameliorating impacts from the development on koalas;*

This report identifies a number of safeguards to ameliorate potential impacts on Koalas (refer to Section 5.1), including:

  - enhancement of the current planted Koala corridor to facilitate shelter and movement potential for Koalas; and
  - incorporating traffic calming devices, low speed limits, and Koala signage into the design of the car park (particularly at the northern access where the Koala corridor is crossed) to minimise traffic speed and thereby limit the potential risk of traffic collision with Koalas.

- *whether the land is accredited under the Timber Plantation (Harvest Guarantee) Act 1995*.'

The study area is not accredited under the *Timber Plantation (Harvest Guarantee) Act 1995*.

4.4.2 Lands Adjoining Primary Koala Habitat

The CHCKPoM (Lunney *et al., 1999*) states: *The consent authority shall not grant consent to the carrying out of development on lands adjoining areas identified as Primary Koala Habitat unless it is satisfied that:*

- *the proposal will not result in barriers to koala movement;*

The site does not currently provide any established vegetated habitat linkages or form part of any CHCKPoM identified Koala corridors. However, the planted Koala corridor that was established in recent years on the northern boundary of the site in association with the extension of the Mental Health Care Unit (Sandpiper 2005b) was intended to facilitate Koala movement between adjacent areas of Primary Koala Habitat.

As mentioned previously, the proposal would not require clearing vegetation, and therefore Koala habitat would not be fragmented. The proposal includes the construction of a northern access from the existing Health Campus, which crosses a Koala corridor zoned 7A environmental protection habitat. This would have potential impacts on the capacity of this corridor to facilitate the movement of Koalas in the future by creating a further impediment to movement.

It is recommended that further enhancement of this previously planted Koala corridor is undertaken by planting additional Koala food trees in this area (refer to Section 5.1) to improve the habitat value for Koalas that may traverse the site.

- *boundary fencing does not prevent the free movement of koalas;*

The proposal includes security fencing around the car park. However, no fencing would be installed that impede the movement of Koalas through the planted Koala corridor and therefore the free movement of Koalas across the site is not prevented.

- *lighting and koala exclusion fencing is provided where appropriate on roadways adjacent to koala habitat;*

Lighting would be provided in associated with the car park. This, and the design of the car park including the recommended installation of traffic calming devices, low speed limits, and Koala signage (refer to Section 5.1), would reduce the risk of significant traffic collision threat to the Koala. Consequently Koala exclusion fencing is not required.

- *tree species listed above are retained, where possible;*

All immature Koala tree species (consisting of Broad-leaved Paperpark) that are present within the planted Koala corridor would be retained and not be affected by the proposal.

- *new local roads are designed to reduce traffic speed to 40 kph in potential koala "blackspots";*

Access roads to the car park are proposed. It is recommended that these roads are speed limited to less than 40 kph to minimise the potential for traffic collision threat to the Koalas (refer to Section 5.1).

- *preferred koala trees are used in landscaping where suitable;*

It is recommended that further enhancement of the previously planted Koala corridor is undertaken by planting additional Koala food trees in this area (refer to Section 5.1) to improve the habitat value for Koalas that may traverse the site.

- *threats to koalas by dogs have been minimised (i.e. banning of dogs or confining dogs to koala proof yards);*

The nature of the proposal is such that the threats to Koalas by dogs would not be increased as part of the proposal.

- *fire protection zones, including fuel reduced zones and radiation zones, are provided outside the area of Primary Koala Habitat.*

Due to the generally disturbed nature of the site and surrounding areas, adequate non-treed land would exist post-development to provide fuel-reduced zones outside the adjacent area of Primary Koala Habitat that occurs in the swamp forest to the west of the site.

Conclusion

Overall, the proposal has only minor conflicts with the CHCKPoM Primary Koala Habitat management objectives. Provided that the safeguards in this report are implemented (refer to Section 5.1), (in particular enhancement of the planted Koala corridor), any potential impacts on Koalas as a result of the proposal would be minimised.

5

Mitigation Measures

5.1 Safeguards

The following safeguards would be implemented to reduce the impact of the proposal on local biodiversity:

1. Prior to the commencement of construction works, the extent of the construction footprint would be clearly marked and communicated to the clearing personnel.
2. Protection of adjacent vegetation and retained trees would be in accordance with the Australian Standard (AS4970-2009) for Protection of Trees.
3. Erosion and sediment controls would be established on the periphery of the site to minimise the risk of water quality and sedimentation impacts on the adjacent area of Swamp Sclerophyll Forest EEC and potential habitat for Slender Screw Fern (*Lindsaea incisa*).
4. Enhancement of the previously planted Koala corridor would be undertaken. This would involve weed control to free existing trees from exotic grass competition and planting additional Koala feed trees within the corridor and/ or replacing some of the non-Koala food tree species. Species to be planted would be from the list of preferred Koala food trees from the DECC (2008). Given the landscape position of the corridor and existing dominance of Broad-leaved Paperbark in this planting, it is recommended that additional Swamp Mahogany be planted at a spacing of no less than 6 m, giving due consideration to any bushfire safety requirements. To achieve this spacing some non-Koala food tree species (e.g. *Corymbia variegata*) in the corridor may need to be replaced.
5. To minimise the risk of traffic collision with Koalas, the design of the car park would include:
    - incorporation of traffic calming devices on access roads to the car park at the Koala corridor;
    - speed limits on access roads of less than 40 kph; and
    - installation of Koala signage to alert motorists.

6

Summary and Conclusions

6.1 Conclusion

The proposal is to establish a new car park at the Health Campus to alleviate a current car parking shortage within the Campus.

Key findings in relation to the ecological values of the Proposal footprint include:

- no threatened flora species or EECs occur or are considered likely occurrences at the site;
- Swamp forest vegetation in the study area is consistent with the EEC *Swamp Sclerophyll Forest on Coastal Floodplains*;
- the study area contains potential habitat for the threatened flora species Slender Screw Fern (*Lindsaea incisa*), listed under the TSC Act;
- the subject site was found to provide known habitat or potential habitat as part of a core range or potentially utilised regularly for the Koala (*Phascolarctos cinereus*), a listed threatened fauna species listed under the TSC Act and EPBC Act. Several other species were considered irregular potential occurrences, with the site forming a minor part of a significantly larger foraging range (e.g. Square-tailed Kite);
- several EPBC Act listed migratory species are considered potential occurrences, however the site does not comprise significant habitat for these species; and
- the study area includes land mapped as primary Koala habitat in the CHCKPoM. Overall, the proposal has only minor conflicts with the CHCKPoM Primary Koala Habitat management objectives.

Assessment of the impacts of the proposal found the proposal is unlikely to have a significant impact on any threatened species, population or community or listed migratory species.

It is recommended that the existing planted Koala corridor be enhanced by way of weed control and the additional planting of Koala Food Trees to facilitate the potential movement of Koalas across the site. Additional safeguards have also been proposed to minimise the risk of traffic collision with Koalas at the site.

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Appendix A

Proposal Design

A1

SITE KEY
NOT TO SCALE

PACIFIC HIGHWAY
PHIL HAWTHORNE DRV
STADIUM DRIVE

PROPOSED CARPARK
816 SPACES

PROPOSED ACCESS ROAD

PHIL HAWTHORNE DRIVE

DISCHARGE STORMWATER VIA HEADWALL WITH SCOUR PROTECTION

COVERED PEDESTRIAN PATH SHOWN DASHED

BIO-RETENTION SWALE

GRASS LINED SWALE (TYP.)

WHEELSTOPS (TYP.)

GRASS LINED SWALE

SECURITY FENCING

WIDENED PAVEMENT AT BEND

COVERED PEDESTRIAN PATH

MAKE SMOOTH CONNECTION TO EXISTING PATH

MAKE SMOOTH CONNECTION TO EXISTING PAVEMENT

PROPOSED ACCESS ROAD

BOOM GATE ENTRY/EXIT

6.5m WIDE PAVEMENT

GRASS LINED SWALE

WIDENED PAVEMENT AT BEND

EXISTING BITUMEN CARPARK

TRACED UNDERGROUND ELECTRICAL MAIN FOR LIGHT POLES. TYPICALLY 0.6 DEEP

PROPOSED EASEMENT TO DRAIN WATER (17 WIDE DP 1127790)

(T) BENEFITED BY RIGHT OF CARRIAGEWAY VAR. WIDTH (DP 1058199)
BENEFITED BY EASEMENT FOR SEWAGE 3 WIDE & VAR WIDTH (DP 1058199)
BENEFITED BY EASEMENT FOR SERVICES 3 WIDE (DP 1058199)
RESTRICTION AS TO USER 1348589
LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)

(W) PROPOSED EASEMENT FOR ASSET PROTECTION ZONE 30 WIDE

(X) BENEFITED BY RIGHT OF WAY 6 WIDE DP 1062544

CAD FILENAME Q:\C&M\Projects\01001-01100\PN-01094 - Coffs Harbour Health Campus - Car Park Project\ACAD\SK\01094_SK012.dwg

REV.	DES.	DATE	VER.	DATE	DESCRIPTION
A	T.T.	17.02.14	A.M.	17.02.14	PRELIMINARY ISSUE FOR REVIEW/COMMENT

CLIENT: NSW GOVERNMENT Health Infrastructure

PROJECT MANAGER: APP

SCP CONSULTING PTY LTD
CIVIL AND STRUCTURAL ENGINEERS
www.scpconsult.com.au ABN 80 003 974 024
LEVEL 2 - DANCHEN HOUSE, 507 KENT STREET SYDNEY
PO BOX A2002 SYDNEY SOUTH NSW 1235 AUSTRALIA
EMAIL ADDRESS - mail@scpconsult.com.au
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DESIGNED	T.TOMIC	DATE	05.02.14
VERIFIED	A.MANCONE	DATE	05.02.14
DRAWN	T.TOMIC	SCALE @ A1	1:500

COFFS HARBOUR HEALTH CAMPUS

PROPOSED CARPARK ULTIMATE DEVELOPMENT OPTION

STATUS	DRAWING No.	REVISION
SKETCH / INFORMATION	01094_SK012	A

Appendix B

NSW BioNet and Protected Matter Search Tool Results

Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodians. The data are only indicative and cannot be considered comprehensive inventory, and may contain errors and omissions.
Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°; ^^ rounded to 0.01°).

Search criteria : Public Report of all Valid Records of Threatened (listed on TSC Act 1995) or Commonwealth listed Plants in selected area [North: -30.21 West: 152.99 East: 153.19 South: -30.41] returned a total of 566 records of 39 species.
Report generated on 21/01/2014 1:14 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records
Plantae	Flora	Apocynaceae	1233	*Marsdenia longiloba*		Slender Marsdenia	E1,P	V	34
Plantae	Flora	Apocynaceae	1245	*Tylophora woollsii*		Cryptic Forest Twiner	E1,P	E	2
Plantae	Flora	Araceae	10749	*^^Typhonium sp. aff. brownii*		Stinky Lily	E1,P,3		1
Plantae	Flora	Casuarinaceae	8980	*Allocasuarina defungens*		Dwarf Heath Casuarina	E1,P	E	77
Plantae	Flora	Corynocarpaceae	6662	*Corynocarpus rupestris subsp. rupestris*		Glenugie Karaka	V,P	V	2
Plantae	Flora	Cyperaceae	2423	*Eleocharis tetraquetra*		Square-stemmed Spike-rush	E1,P		7
Plantae	Flora	Ebenaceae	2564	*Diospyros mabacea*		Red-fruited Ebony	E1,P	E	1
Plantae	Flora	Fabaceae (Caesalpinioideae)	8772	*Senna acclinis*		Rainforest Cassia	E1,P		3
Plantae	Flora	Fabaceae (Faboideae)	2897	*Kennedia retrorsa*			V,P	V	2
Plantae	Flora	Fabaceae (Faboideae)	11644	*Pultenaea maritima*		Coast Headland Pea	V,P		11
Plantae	Flora	Fabaceae (Faboideae)	3032	*Sophora tomentosa*		Silverbush	E1,P		5

Plantae	Flora	Lauraceae	8948	*Endiandra floydii*	Crystal Creek Walnut	E1,P	E	1
Plantae	Flora	Lauraceae	3491	*Endiandra hayesii*	Rusty Rose Walnut	V,P	V	1
Plantae	Flora	Lindsaeaceae	8128	*^^Lindsaea incisa*	Slender Screw Fern	E1,P,3		9
Plantae	Flora	Myrtaceae	4298	*Uromyrtus australis*	Peach Myrtle	E1,P	E	2
Plantae	Flora	Orchidaceae	9027	*^Diuris praecox*	Rough Doubletail	V,P,2	V	3
Plantae	Flora	Orchidaceae	10936	*^Diuris sp. aff. chrysantha*	Byron Bay Diuris	E1,P,2		1
Plantae	Flora	Orchidaceae	6990	*^Oberonia complanata*	Yellow-flowered King of the Fairies	E1,P,2		2
Plantae	Flora	Orchidaceae	7077	*^Oberonia titania*	Red-flowered King of the Fairies	V,P,2		1
Plantae	Flora	Orchidaceae	4479	*^Peristeranthus hillii*	Brown Fairy-chain Orchid	V,P,2		2
Plantae	Flora	Orchidaceae	4480	*^Phaius australis*	Southern Swamp Orchid	E1,P,2	E	5
Plantae	Flora	Orchidaceae	4481	*^Phaius tancarvilleae*	Lady Tankerville's Swamp Orchid	E1,P,2	E	1
Plantae	Flora	Orchidaceae	4583	*^Sarcochilus fitzgeraldii*	Ravine Orchid	V,P,2	V	2
Plantae	Flora	Orchidaceae	4584	*^Sarcochilus hartmannii*	Hartman's Sarcochilus	V,P,2	V	1
Plantae	Flora	Poaceae	8979	*Alexfloydia repens*	Floyd's Grass	E1,P		46
Plantae	Flora	Poaceae	4776	*Arthraxon hispidus*	Hairy Jointgrass	V,P	V	1
Plantae	Flora	Polygonaceae	5280	*Persicaria elatior*	Tall Knotweed	V,P	V	2
Plantae	Flora	Proteaceae	11365	*^Eidothea hardeniana*	Nightcap Oak	E1,P,2	CE	1
Plantae	Flora	Proteaceae	10801	*^^Hakea archaeoides*	Big Nellie Hakea	V,P,3	V	1
Plantae	Flora	Proteaceae	9680	*Macadamia integrifolia* *	Macadamia Nut	P	V	1
Plantae	Flora	Proteaceae	5446	*Macadamia tetraphylla*	Rough-shelled Bush Nut	V,P	V	1
Plantae	Flora	Rutaceae	6457	*Acronychia littoralis*	Scented Acronychia	E1,P	E	14
Plantae	Flora	Rutaceae	9099	*Boronia umbellata*	Orara Boronia	V,P	V	4
Plantae	Flora	Rutaceae	9496	*Zieria prostrata*	Headland Zieria	E1,P	E	3

Plantae	Flora	Rutaceae	5847	*Zieria smithii*	Low growing form of Z. smithii, Diggers Head	E2		2
Plantae	Flora	Santalaceae	5871	*Thesium australe*	Austral Toadflax	V,P	V	11
Plantae	Flora	Sapindaceae	5889	*Diploglottis campbellii*	Small-leaved Tamarind	E1,P	E	1
Plantae	Flora	Sapotaceae	11957	*Niemeyera whitei*	Rusty Plum, Plum Boxwood	V,P		277
Plantae	Flora	Simaroubaceae	9497	*Quassia sp. Mooney Creek*	Moonee Quassia	E1,P	E	25

Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodians. The data are only indicative and cannot be considered comprehensive inventory, and may contain errors and omissions.
Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°; ^^ rounded to 0.01°).

Search criteria : Public Report of all Valid Records of Threatened (listed on TSC Act 1995) or Commonwealth listed Animals in selected area [North: -30.21 Wes
152.99 East: 153.19 South: -30.41] returned a total of 2,726 records of 76 species.
Report generated on 21/01/2014 1:13 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records
Animalia	Amphibia	Myobatrachidae	3137	*Crinia tinnula*		Wallum Froglet	V,P		47
Animalia	Amphibia	Myobatrachidae	3073	*^Mixophyes balbus*		Stuttering Frog	E1,P,2	V	1
Animalia	Amphibia	Myobatrachidae	3075	*^Mixophyes iteratus*		Giant Barred Frog	E1,P,2	E	78
Animalia	Amphibia	Myobatrachidae	3109	*Philoria sphagnicolus*		Sphagnum Frog	V,P		8
Animalia	Amphibia	Hylidae	3166	*Litoria aurea*		Green and Golden Bell Frog	E1,P	V	1
Animalia	Amphibia	Hylidae	3169	*Litoria brevipalmata*		Green-thighed Frog	V,P		3
Animalia	Reptilia	Cheloniidae	2004	*Caretta caretta*		Loggerhead Turtle	E1,P	E	3
Animalia	Reptilia	Cheloniidae	2007	*Chelonia mydas*		Green Turtle	V,P	V	14
Animalia	Reptilia	Elapidae	2675	*Hoplocephalus bitorquatus*		Pale-headed Snake	V,P		1
Animalia	Reptilia	Elapidae	2677	*Hoplocephalus stephensii*		Stephens' Banded Snake	V,P		16
Animalia	Aves	Phaethontidae	0107	*Phaethon rubricauda*		Red-tailed Tropicbird	V,P		1
Animalia	Aves	Columbidae	0025	*Ptilinopus magnificus*		Wompoo Fruit-Dove	V,P		142
Animalia	Aves	Columbidae	0021	*Ptilinopus regina*		Rose-crowned Fruit-Dove	V,P		33

Animalia	Aves	Diomedeidae	0086	*Diomedea exulans*	Wandering Albatross	E1,P	E,J	1
Animalia	Aves	Diomedeidae	0091	*Thalassarche cauta*	Shy Albatross	V,P	V	1
Animalia	Aves	Procellariidae	0072	*Ardenna carneipes*	Flesh-footed Shearwater	V,P	J,K	2
Animalia	Aves	Procellariidae	0937	*Macronectes halli*	Northern Giant-Petrel	V,P	V	1
Animalia	Aves	Procellariidae	8684	*Pterodroma leucoptera leucoptera*	Gould's Petrel	V,P	E	1
Animalia	Aves	Procellariidae	0955	*Pterodroma nigripennis*	Black-winged Petrel	V,P		15
Animalia	Aves	Procellariidae	0971	*Pterodroma solandri*	Providence Petrel	V,P	J	1
Animalia	Aves	Sulidae	0105	*Sula dactylatra*	Masked Booby	V,P	J,K	1
Animalia	Aves	Ciconiidae	0183	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P		31
Animalia	Aves	Ardeidae	0196	*Ixobrychus flavicollis*	Black Bittern	V,P		12
Animalia	Aves	Accipitridae	0225	*Hieraaetus morphnoides*	Little Eagle	V,P		9
Animalia	Aves	Accipitridae	0230	*^^Lophoictinia isura*	Square-tailed Kite	V,P,3		19
Animalia	Aves	Accipitridae	8739	*^^Pandion cristatus*	Eastern Osprey	V,P,3		96
Animalia	Aves	Burhinidae	0174	*Burhinus grallarius*	Bush Stone-curlew	E1,P		1
Animalia	Aves	Burhinidae	0175	*Esacus magnirostris*	Beach Stone-curlew	E4A,P		7
Animalia	Aves	Haematopodidae	0131	*Haematopus fuliginosus*	Sooty Oystercatcher	V,P		70
Animalia	Aves	Haematopodidae	0130	*Haematopus longirostris*	Pied Oystercatcher	E1,P		43
Animalia	Aves	Jacanidae	0171	*Irediparra gallinacea*	Comb-crested Jacana	V,P		2
Animalia	Aves	Scolopacidae	0161	*Calidris ferruginea*	Curlew Sandpiper	E1,P	C,J,K	1
Animalia	Aves	Laridae	0120	*Onychoprion fuscata*	Sooty Tern	V,P		4
Animalia	Aves	Laridae	0117	*Sternula albifrons*	Little Tern	E1,P	C,J,K	110
Animalia	Aves	Cacatuidae	0265	*^Calyptorhynchus lathami*	Glossy Black-Cockatoo	V,P,2		134
Animalia	Aves	Psittacidae	8028	*^Cyclopsitta diopthalma coxeni*	Coxen's Fig-Parrot	E4A,P,2	E	3

Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*	Little Lorikeet	V,P		45
Animalia	Aves	Psittacidae	0309	*^^Lathamus discolor*	Swift Parrot	E1,P,3	E	20
Animalia	Aves	Strigidae	0246	*^^Ninox connivens*	Barking Owl	V,P,3		3
Animalia	Aves	Strigidae	0248	*^^Ninox strenua*	Powerful Owl	V,P,3		30
Animalia	Aves	Tytonidae	0252	*^^Tyto longimembris*	Eastern Grass Owl	V,P,3		7
Animalia	Aves	Tytonidae	0250	*^^Tyto novaehollandiae*	Masked Owl	V,P,3		28
Animalia	Aves	Tytonidae	9924	*^^Tyto tenebricosa*	Sooty Owl	V,P,3		44
Animalia	Aves	Alcedinidae	0327	*Todiramphus chloris*	Collared Kingfisher	V,P		8
Animalia	Aves	Climacteridae	8127	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P		1
Animalia	Aves	Meliphagidae	0603	*Anthochaera phrygia*	Regent Honeyeater	E4A,P	E	7
Animalia	Aves	Meliphagidae	0598	*Grantiella picta*	Painted Honeyeater	V,P		1
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*	Varied Sittella	V,P		28
Animalia	Aves	Campephagidae	0428	*Coracina lineata*	Barred Cuckoo-shrike	V,P		9
Animalia	Mammalia	Dasyuridae	1008	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	27
Animalia	Mammalia	Dasyuridae	1017	*Phascogale tapoatafa*	Brush-tailed Phascogale	V,P		3
Animalia	Mammalia	Dasyuridae	1045	*Planigale maculata*	Common Planigale	V,P		3
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*	Koala	V,P	V	980
Animalia	Mammalia	Burramyidae	1150	*Cercartetus nanus*	Eastern Pygmy-possum	V,P		1
Animalia	Mammalia	Petauridae	1136	*Petaurus australis*	Yellow-bellied Glider	V,P		38
Animalia	Mammalia	Petauridae	1137	*Petaurus norfolcensis*	Squirrel Glider	V,P		8
Animalia	Mammalia	Potoroidae	1187	*Aepyprymnus rufescens*	Rufous Bettong	V,P		1
Animalia	Mammalia	Potoroidae	1175	*Potorous tridactylus*	Long-nosed Potoroo	V,P	V	2
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	82
Animalia	Mammalia	Pteropodidae	1294	*Syconycteris australis*	Common Blossom-bat	V,P		12

Animalia	Mammalia	Emballonuridae	1321	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		2
Animalia	Mammalia	Molossidae	1329	*Mormopterus norfolkensis*	Eastern Freetail-bat	V,P		4
Animalia	Mammalia	Vespertilionidae	1372	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P		1
Animalia	Mammalia	Vespertilionidae	1369	*Kerivoula papuensis*	Golden-tipped Bat	V,P		15
Animalia	Mammalia	Vespertilionidae	1346	*Miniopterus australis*	Little Bentwing-bat	V,P		57
Animalia	Mammalia	Vespertilionidae	1834	*Miniopterus schreibersii oceanensis*	Eastern Bentwing-bat	V,P		19
Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*	Southern Myotis	V,P		11
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		2
Animalia	Mammalia	Muridae	1455	*Pseudomys novaehollandiae*	New Holland Mouse	P	V	1
Animalia	Mammalia	Dugongidae	1558	*Dugong dugon*	Dugong	E1,P		1
Animalia	Mammalia	Otariidae	1882	*Arctocephalus pusillus doriferus*	Australian Fur-seal	V,P		3
Animalia	Mammalia	Balaenidae	1561	*Eubalaena australis*	Southern Right Whale	E1,P	E	2
Animalia	Mammalia	Balaenopteridae	1567	*Balaenoptera musculus*	Blue Whale	E1,P	E	1
Animalia	Mammalia	Balaenopteridae	1575	*Megaptera novaeangliae*	Humpback Whale	V,P	V	16
Animalia	Insecta	Hesperiidae	I023	*Ocybadistes knightorum*	Black Grass-dart Butterfly	E1		287
Animalia	Insecta	Petaluridae	I138	*Petalura litorea*	Coastal Petaltail	E1		3

Australian Government

Department of the Environment

EPBC Act Protected Matters Report

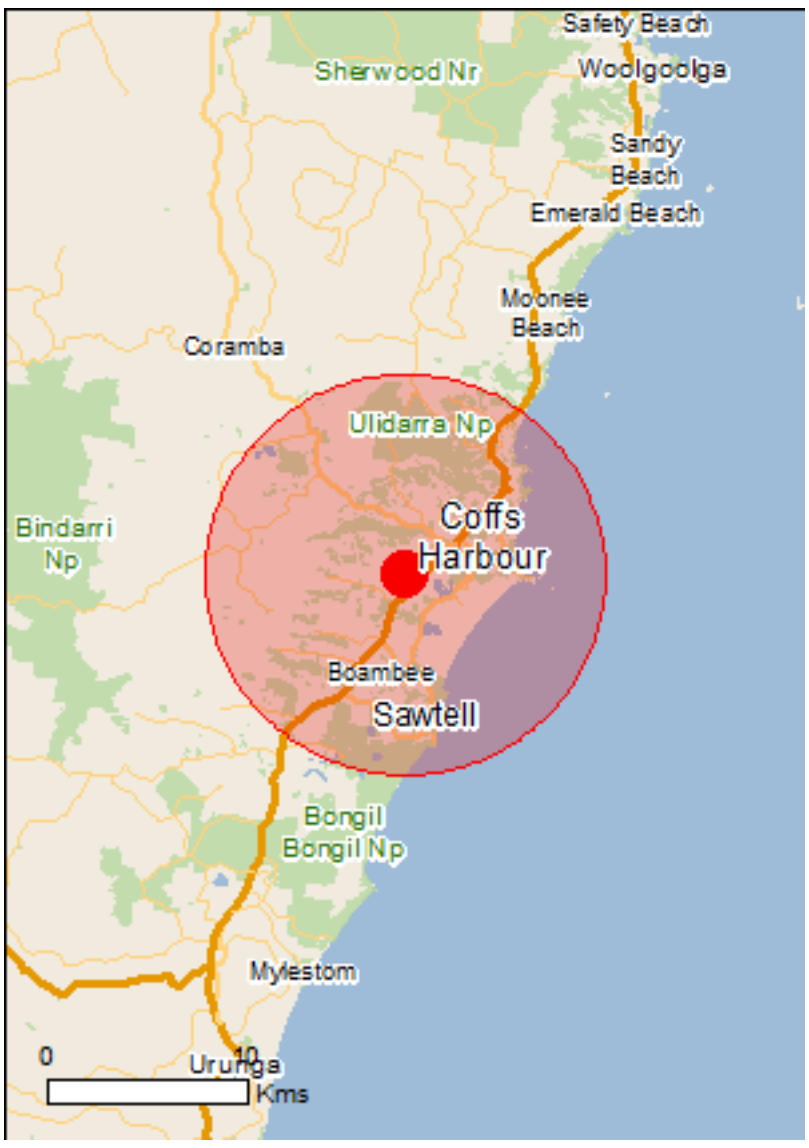
This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

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: 21/01/14 13:10:21

Summary
Details
Matters of NES
Other Matters Protected by the EPBC Act
Extra Information
Caveat
Acknowledgements



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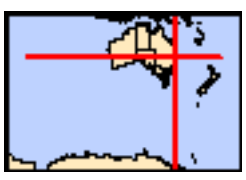
Coordinates

Buffer: 10.0Km



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.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	79
Listed Migratory Species:	53

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 and the heritage values of a place on the Register of the National Estate.

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.

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.

Commonwealth Land:	6
Commonwealth Heritage Places:	None
Listed Marine Species:	80
Whales and Other Cetaceans:	14
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine	None

Extra Information

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

Place on the RNE:	6
State and Territory Reserves:	7
Regional Forest Agreements:	1
Invasive Species:	43
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	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
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea epomophora epomophora Southern Royal Albatross [25996]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora sanfordi Northern Royal Albatross [82331]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans exulans Tristan Albatross [82337]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Diomedea exulans gibsoni Gibson's Albatross [82271]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta salvini Salvin's Albatross [82343]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris impavida Campbell Albatross [82449]	Vulnerable	Species or species habitat may occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area
Fish		

Name	Status	Type of Presence
Epinephelus daemelii		
Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat may occur within area
Litoria booroolongensis		
Booroolong Frog [1844]	Endangered	Species or species habitat may occur within area
Mixophyes balbus		
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes iteratus		
Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat known to occur within area
Insects		
Phyllodes imperialis smithersi		
Pink Underwing Moth [86084]	Endangered	Species or species habitat likely to occur within area
Mammals		
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat may occur within area
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae		
Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Acronychia littoralis		
Scented Acronychia [8582]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Allocasuarina defungens Dwarf Heath Casuarina [21924]	Endangered	Species or species habitat known to occur within area
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat known to occur within area
Boronia umbellata Orara Boronia [56301]	Vulnerable	Species or species habitat likely to occur within area
Corynocarpus rupestris subsp. rupestris Glenugie Karaka [19303]	Vulnerable	Species or species habitat known to occur within area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Diospyros mabacea Red-fruited Ebony, Silky Persimmon, Ebony [18548]	Endangered	Species or species habitat may occur within area
Diploglottis campbellii Small-leaved Tamarind [21484]	Endangered	Species or species habitat may occur within area
Endiandra floydii Floyd's Walnut [52955]	Endangered	Species or species habitat may occur within area
Endiandra hayesii Rusty Rose Walnut, Velvet Laurel [13866]	Vulnerable	Species or species habitat may occur within area
Haloragis exalata subsp. velutina Tall Velvet Sea-berry [16839]	Vulnerable	Species or species habitat may occur within area
Marsdenia longiloba Clear Milkvine [2794]	Vulnerable	Species or species habitat likely to occur within area
Myrsine richmondensis Purple-leaf Muttonwood, Lismore Muttonwood [83888]	Endangered	Species or species habitat may occur within area
Parsonsia dorrigoensis Milky Silkpod [64684]	Endangered	Species or species habitat likely to occur within area
Persicaria elatior Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat known to occur within area
Samadera sp. Moonee Creek (J.King s.n. 1949) [84091]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Sarcochilus fitzgeraldii Ravine Orchid [19131]	Vulnerable	Species or species habitat likely to occur within area
Sarcochilus hartmannii Waxy Sarcochilus, Blue Knob Orchid [4124]	Vulnerable	Species or species habitat likely to occur within area
Streblus pendulinus Siah's Backbone, Sia's Backbone, Isaac Wood [21618]	Endangered	Species or species habitat known to occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Pocket-less Brush Cherry, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Taeniophyllum muelleri Minute Orchid, Ribbon-root Orchid [10771]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Tinospora tinosporoides Arrow-head Vine [5128]	Vulnerable	Species or species habitat may occur within area
Tylophora woollsii [20503]	Endangered	Species or species habitat likely to occur within area
Zieria prostrata [56782]	Endangered	Species or species habitat known to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Emydura macquarii signata (Bellinger River, NSW) Bellinger River Emydura [1785]	Vulnerable	Species or species habitat likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area
Sharks		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat may occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species

Name	Status	Type of Presence
		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		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Puffinus griseus Sooty Shearwater [1024]		Breeding known to occur within area
Puffinus leucomelas Streaked Shearwater [66541]		Species or species habitat may occur within area
Puffinus pacificus Wedge-tailed Shearwater [1027]		Breeding known to occur within area
Puffinus tenuirostris Short-tailed Shearwater [1029]		Breeding known to occur within area
Sterna albifrons Little Tern [813]		Breeding likely to occur within area

Name	Threatened	Type of Presence
Thalassarche bulleri Buller's Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
[Megaptera novaeangliae](#) Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat may occur within area
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
[Sousa chinensis](#) Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
[Hirundapus caudacutus](#) White-throated Needletail [682]		Species or species habitat known to occur within area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area
[Monarcha trivirgatus](#) Spectacled Monarch [610]		Species or species habitat known to occur within area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area
[Xanthomyza phrygia](#) Regent Honeyeater [430]	Endangered*	Species or species habitat known to occur within area
Migratory Wetlands Species		
[Ardea alba](#) Great Egret, White Egret [59541]		Breeding known to occur within area
[Ardea ibis](#) Cattle Egret [59542]		Breeding likely to occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
[Rostratula benghalensis (sensu lato)](#) Painted Snipe [889]	Endangered*	Species or species habitat may 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 -
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Australian Telecommunications Corporation
Commonwealth Land - Telstra Corporation Limited
Defence - Training Depot

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
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Breeding likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Larus novaehollandiae Silver Gull [810]		Breeding known to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Pelagodroma marina White-faced Storm-Petrel [1016]		Breeding known to occur within area
Pterodroma nigripennis Black-winged Petrel [1038]		Breeding known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Puffinus griseus Sooty Shearwater [1024]		Breeding known to occur within area
Puffinus pacificus Wedge-tailed Shearwater [1027]		Breeding known to occur within area
Puffinus tenuirostris Short-tailed Shearwater [1029]		Breeding known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Sterna albifrons Little Tern [813]		Breeding likely to occur within area
Sterna bergii Crested Tern [816]		Breeding known to occur within area

Name	Threatened	Type of Presence
Thalassarche bulleri Buller's Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Campichthys tryoni Tryon's Pipefish [66193]		Species or species habitat may occur within area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
Corythoichthys ocellatus Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Hippocampus kelloggi Kellogg's Seahorse, Great Seahorse [66723]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Micrognathus andersonii Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area
Micrognathus brevirostris thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area
Microphis manadensis Manado Pipefish, Manado River Pipefish [66258]		Species or species habitat may occur within area
Solegnathus dunckeri Duncker's Pipehorse [66271]		Species or species habitat may occur within area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paegnius Rough-snout Ghost Pipefish [68425]		Species or species habitat may occur within area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
[Trachyrhamphus bicoarctatus](#)		
Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
[Urocampus carinirostris](#)		
Hairy Pipefish [66282]		Species or species habitat may occur within area
[Vanacampus margaritifer](#)		
Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
[Dugong dugon](#)		
Dugong [28]		Species or species habitat may occur within area
Reptiles		
[Caretta caretta](#)		
Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
[Chelonia mydas](#)		
Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
[Dermochelys coriacea](#)		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
[Eretmochelys imbricata](#)		
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
[Hydrophis elegans](#)		
Elegant Seasnake [1104]		Species or species habitat may occur within area
[Natator depressus](#)		
Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area
[Pelamis platurus](#)		
Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans [Resource Information]

Name	Status	Type of Presence
Mammals		
[Balaenoptera acutorostrata](#)		
Minke Whale [33]		Species or species habitat may occur within area
[Balaenoptera edeni](#)		
Bryde's Whale [35]		Species or species habitat may occur within area
[Balaenoptera musculus](#)		
Blue Whale [36]	Endangered	Species or species habitat may occur within area
[Caperea marginata](#)		
Pygmy Right Whale [39]		Species or species habitat may occur within area
[Delphinus delphis](#)		
Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
[Eubalaena australis](#)		
Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

Places on the RNE [Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
Orara Ornithological Area	NSW	Indicative Place
Bongil Bongil Area	NSW	Registered
Kororo Nature Reserve	NSW	Registered
Mutton Bird Island Nature Reserve	NSW	Registered
Solitary Islands Marine Area	NSW	Registered
Historic		
Coffs Harbour Jetty	NSW	Indicative Place

State and Territory Reserves [Resource Information]

Name	State
Bongil Bongil	NSW
Bruxner Park	NSW
Coffs Coast	NSW
Kororo	NSW
Muttonbird Island	NSW
Ulidarra	NSW
Unnamed FMZ2	NSW

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species

[Resource Information]

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 Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
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
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Bufo marinus Cane Toad [1772]		Species or species habitat likely to occur within area
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
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

Name	Status	Type of Presence
		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
Plants		
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 Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red		Species or species habitat likely to occur

Name	Status	Type of Presence
Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Coordinates

-30.31 153.09

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 Heritage and Register of National Estate properties, Wetlands of International 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.

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:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA 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
-State Forests of 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 C

Threatened Species Potential Occurrence Assessment

Table C1 Threatened Fauna Species Identified by the Database Searches

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local BioNet (2014) Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Crinia tinnula	Wallum Froglet	V	-	Acid paperbark and sedge swamps known as 'wallum', this is a banksia-dominated lowland heath ecosystem characterised by acidic waterbodies.	▪ a single record within 1 km of the site. ▪ eighteen records within 5 km of the site.	Although, previously recorded adjacent to study area by Clancy (1998), no potential habitat occurs at the site.	Low	Low – No significant impact likely. Seven-part Test not required
Litoria aurea	Green and Golden Bell Frog	E	V	Amongst vegetation in and around permanent swamps, lagoons, farm dams and on flood-prone river flats, particularly where there are bullrushes or spikerushes.	▪ no records within 5 km of the site.	No potential habitat at the site.	Low	Low – No significant impact likely. Seven-part Test not required
Litoria booroolongensis	Booroolong Frog	E	-	Permanent streams with some fringing vegetation cover such as ferns, sedges or grasses.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Litoria brevipalmata	Green-thighed Frog	V	-	Rainforest, moist to dry eucalpyt forest and heath, typically where surface water gathers after rain.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Mixophyes balbus	Stuttering Frog	V	V	Cool rainforest, moist eucalypt forest and occasionally along creeks in dry eucalypt forest.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Mixophyes iteratus	Giant Barred Frog	E	E	Deep, damp leaf litter in rainforests, moist eucalypt forest and near dry eucalypt forest.	▪ no records within 1 km of the site; and ▪ two records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local BioNet (2014) Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Philoria sphagnicola	Sphagnum Frog	V	-	Rainforests including Antarctic Beech forest, moist eucalypt forest and sphagnum moss beds.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Anthochaera phrygia (formerly Xanthomyza phrygia)	Regent Honeyeater	CE	E	Dry open forest and woodland with an abundance of nectar-producing eucalypts, particularly box-ironbark woodland, swamp mahogany forests, and riverine sheoak woodlands.	▪ no records within 1 km of the site. ▪ five records within 5 km of the site.	No suitable habitat at the site. However, suitable seasonal foraging habitat is present in adjacent study area.	Unlikely at site. Possible seasonal opportunistic foraging use of adjacent swamp forest.	Low – No significant impact likely. Seven-part Test not required
Botaurus poiciloptilus	Australasian Bittern	E	E	Permanent freshwater wetlands with tall dense vegetation, particularly bullrushes and spikerushes.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Burhinus grallarius	Bush Stone-curlew	E	-	Lightly timbered open forest and woodland, and partly cleared farmland with woodland remnants, preferring areas with dry leaf-litter, fallen timber and sparse ground cover.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	Sheoaks in coastal forests and woodlands, timbered watercourses, and moist and dry eucalypt forests of the coast and the Great Divide up to 1,000 m.	▪ no records within 1 km of the site. ▪ thirty-two records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local BioNet (2014) Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Climacteris picumnus	Brown Treecreeper	V	-	Eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range, and less commonly on coastal plains and ranges.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Coracina lineata	Barred Cuckoo-shrike	V	-	Rainforest, eucalypt woodlands, swamp woodlands and timber along watercourses.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat at the site. However, suitable habitat is present within swamp forest vegetation in study area.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Cyclopsitta diophthalma coxeni	Coxen's Fig-parrot	CE	E	Drier rainforests and adjacent wet eucalypt forest, wetter lowland also wetter lowland rainforests.	▪ no records within 5 km of the site.	No potential habitat at the site. However, suitable habitat is present within swamp forest vegetation in study area.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Dasyornis brachypterus	Eastern Bristlebird	E	E	High elevation open forest, woodland with dense tussock or sedge understorey adjacent to rainforest or wet eucalypt forest.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Daphoenositta chrysoptera	Varied Sittella	V	-	Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	▪ a single record within 1 km of the site. ▪ eighteen records within 5 km of the site.	No potential habitat at the site. However, suitable habitat is present within swamp forest vegetation in study area.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Ephippiorhynchus asiaticus	Black-necked Stork	E	-	Swamps, mangroves, mudflats, dry floodplains.	▪ a single record within 1 km of the site. ▪ fourteen records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local BioNet (2014) Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Erythrotriorchis radiatus	Red Goshawk	CE	V	Along or near watercourses, swamp forest and woodlands on the coastal plain.	▪ no records within 5 km of the site.	No potential habitat at the site. However, broadly suitable habitat is present within swamp forest vegetation in study area.	Low – at best as transient / rare opportunistic forager in the general area.	Low – No significant impact likely. Seven-part Test not required
Glossopsitta pusilla	Little Lorikeet	V	V	Distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri.	▪ no records within 1 km of the site. ▪ fifteen records within 5 km of the site.	No suitable habitat at the site. However, suitable seasonal foraging habitat is present in adjacent study area.	Unlikely at site. Possible seasonal opportunistic foraging use of adjacent swamp forest.	Low – No significant impact likely. Seven-part Test not required
Grantiella picta	Painted Honeyeater	V	-	Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. Specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Hieraaetus morphnoides	Little Eagle	V	-	Open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat at the site. However, broadly suitable habitat is present within swamp forest vegetation in study area.	Marginally possible when opportunistically foraging in the general area.	Low – No significant impact likely. Seven-part Test not required
Irediparra gallinacea	Comb-crested Jacana	V	-	Among vegetation floating on slow-moving rivers and permanent lagoons, swamps, lakes and dams.	▪ no records within 1 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local BioNet (2014) Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Ixobrychus flavicollis	Black Bittern	V	-	Dense vegetation fringing and in streams, swamps, tidal creeks and mudflats, particularly amongst swamp sheoaks and mangroves.	▪ no records within 1 km of the site. ▪ two records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Lathamus discolor	Swift Parrot	E	E	Forests, woodlands, plantations, and banksias.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No suitable habitat at the site. However, suitable seasonal foraging habitat is present in adjacent study area.	Unlikely at site. Possible seasonal opportunistic foraging use of adjacent swamp forest.	Low – No significant impact likely. Seven-part Test not required
Lophoictinia isura	Square-tailed Kite	V	-	Dry woodland and open forest, particularly along major rivers and belts of trees in urban or semi-urban areas. Home range can extend over at least 100 km^2.	▪ no records within 1 km of the site. ▪ eight records within 5 km of the site.	No potential habitat at the site. However, broadly suitable habitat is present within swamp forest vegetation in study area.	Marginally possible when opportunistically foraging in the general area.	Low – No significant impact likely. Seven-part Test not required
Ninox connivens	Barking Owl	V	-	Eucalypt woodland, open forest, swamp woodlands and timber along watercourses.	▪ no records within 5 km of the site.	No potential habitat at the site. However, broadly suitable habitat is present within swamp forest vegetation in study area.	Marginally possible when opportunistically foraging in the general area.	Low – No significant impact likely. Seven-part Test not required
Ninox strenua	Powerful Owl	V	-	Woodland and open forest to tall moist forest and rainforest, common along drainage lines.	▪ no records within 1 km of the site. ▪ nine records within 5 km of the site.	No potential habitat at the site. However, broadly suitable habitat is present within swamp forest vegetation in study area.	Marginally possible when opportunistically foraging in the general area.	Low – No significant impact likely. Seven-part Test not required
*Pandion cristatus (*formerly *Pandion haliaetus)*	Eastern Osprey	V	-	Forage for fish in fresh, brackish or saline waters of rivers, lakes, estuaries with suitable nesting sites nearby.	▪ two records within 1 km of the site. ▪ fifty-three records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local BioNet (2014) Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Ptilinopus magnificus	Wompoo Fruit-dove	V	-	Rainforests, low-elevation moist eucalypt forest, and Brush Box forests.	▪ no records within 1 km of the site. ▪ four records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Ptilinopus regina	Rose-crowned Fruit-dove	V	-	Subtropical and dry rainforest, moist eucalypt forest and swamp forest.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Rostratula benghalensis australis	Australian Painted Snipe	E	V	Well-vegetated shallows and margins of wetlands, dams, sewage ponds, wet pastures, marshy areas, irrigation systems, lignum, tea-tree scrub, and open timber.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Todiramphus chloris	Collared Kingfisher	V	-	Restricted to mangroves and other estuarine habitats, occur about mouths of larger coastal rivers.	▪ no records within 1 km of the site. ▪ eight records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Turnix melanogaster	Black-breasted Button-quail	E	V	Drier rainforests and viney scrubs, often in association with Hoop Pine and a deep moist leaf litter layer. During drought it may move to adjacent wetter rainforests.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Tyto longimembris	Eastern Grass Owl	V	-	Areas of tall grass, including tussocks in swampy areas, grassy plains, swampy heath, cane grass, sedges on flood plains.	▪ no records within 1 km of the site. ▪ six records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local BioNet (2014) Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Tyto novaehollandiae	Masked Owl	V	-	Dry eucalypt forest and woodlands.	▪ no records within 1 km of the site. ▪ five records within 5 km of the site.	No potential habitat at the site. Low suitability in the study area.	Low.	Low – No significant impact likely. Seven-part Test not required
Tyto tenebricosa	Sooty Owl	V	-	Dry, subtropical and warm temperate rainforests and wet eucalypt forests. Nest in large tree hollows.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Aepyprymnus rufescens	Rufous Bettong	V	-	Tall moist eucalypt forest to open woodland with tussock grass understorey.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Near cave entrances and crevices in cliffs.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Dasyurus maculatus maculatus	Spotted-tailed Quoll	V	E	Dry and moist eucalypt forests and rainforests, fallen hollow logs, large rocky outcrops.	▪ a single record within 1 km of the site. ▪ eight records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	Moist and dry eucalypt forest and rainforest, particularly at high elevations.	▪ no records within 5 km of the site.	No potential habitat at the site. Prefers higher elevation habitats in this region.	Low	Low – No significant impact likely. Seven-part Test not required
Miniopterus australis	Little Bentwing-bat	V	-	Moist eucalypt forest, rainforest and dense coastal scrub.	▪ a single record within 1 km of the site. ▪ ten records within 5 km of the site.	Recorded at locality in previous studies (GeoLINK 2007). Potential aerial foraging habitat in and on the periphery of to study area, including the site. No roosting habitat present.	Possible as opportunistic foraging habitat.	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local BioNet (2014) Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V	-	Forest or woodland, roost in caves, old mines and stormwater channels.	▪ a single record within 1 km of the site. ▪ four records within 5 km of the site.	Recorded at locality in previous studies (GeoLINK 2007). Potential aerial foraging habitat in and on the periphery of to study area, including the site. No roosting habitat present.	Possible as opportunistic foraging habitat.	Low – No significant impact likely. Seven-part Test not required
Mormopterus norfolkensis	Eastern Freetail-bat	V	-	Occurs in dry sclerophyll forest and woodland east of the Great Dividing Range. Roosts in tree hollows.	▪ a single record within 1 km of the site. ▪ a single record within 5 km of the site.	Potential aerial foraging habitat in and on the periphery of to study area, including the site. No roosting habitat present.	Possible.	Low – No significant impact likely. Seven-part Test not required
Myotis macropus	Large-footed Myotis	V	-	Bodies of water, rainforest streams, large lakes, reservoirs.	▪ no records within 1 km of the site. ▪ two records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Petaurus australis	Yellow-bellied Glider	V	-	Tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Dens in tree hollows of large trees, often in family groups. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south.	▪ no records within 1 km of the site. ▪ one record within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local BioNet (2014) Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Petaurus norfolcensis	Squirrel Glider	V	-	Blackbutt, bloodwood and ironbark eucalypt forest with heath understorey in coastal areas, and box-ironbark woodlands and River Red Gum forest inland.	▪ one record within 1 km of the site. ▪ six records within 5 km of the site.	No potential habitat at the site. Marginally suitable habitat in adjacent swamp forest vegetation within study area.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Petrogale penicillata	Brush-tailed Rock Wallaby	V	V	North-facing cliffs and dry eucalypt forest and woodland, inhabiting rock crevices, caves, overhangs during the day, and foraging in grassy areas nearby at night.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	Drier forests and woodlands with hollow-bearing trees and sparse ground cover.	▪ no records within 1 km of the site. ▪ two records within 5 km of the site.	No potential habitat at the site. Marginally suitable habitat in adjacent swamp forest vegetation within study area.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Phascolarctos cinereus	Koala	V	V	Appropriate food trees in forests and woodlands, and treed urban areas.	▪ thirty records within 1 km of the site. ▪ four hundred and eighty-two records within 5 km of the site.	No suitable habitat at the site. Adjacent swamp forest, including within study area, is preferred habitat.	Possible occurrence at the site (when moving between areas of habitat). Known presence in study area from previous surveys and records. Presence confirmed (scats) in current survey.	Low-Medium (risk of impacts on movement). Seven-part Test undertaken as a precaution.

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local BioNet (2014) Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Phoniscus papuensis (formerly Kerivoula papuensis)	Golden-tipped Bat	V	-	Rainforest and adjacent sclerophyll forest. Roost in abandoned hanging Yellow-throated Scrubwren and Brown Gerygone nests.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Planigale maculata	Common Planigale	V	-	Rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas with surface cover close to water.	▪ a single record within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat at the site. Potential habitat in swamp forest.	Unlikely. Low moderate in swamp forest	Low – No significant impact likely. Seven-part Test not required
Potorous tridactylus tridactylus	Long-nosed Potoroo	V	V	Cool temperate rainforest, moist and dry forests, and wet heathland, inhabiting dense layers of grass, ferns, vines and shrubs.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Pseudomys novaehollandiae	New Holland Mouse	-	V	Occurs in open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	▪ no records within 1 km of the site. ▪ twenty-four records within 5 km of the site.	Suitable foraging habitat in adjacent swamp forest vegetation within study area. No proximate camp sites present.	Likely – passing over the site when foraging.	Low – No significant impact likely. Seven-part Test not required
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	Forages in a variety of habitats, roosts in tree hollows and buildings.	▪ no records within 5 km of the site.	Potential aerial foraging habitat in and on the periphery of to study area, including the site. No roosting habitat present.	Possible.	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local BioNet (2014) Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest.	▪ no records within 5 km of the site.	Potential aerial foraging habitat in and on the periphery of to study area, including the site. No roosting habitat present.	Possible.	Low – No significant impact likely. Seven-part Test not required
Syconycteris australis	Eastern Blossom-bat	V	-	Littoral rainforest and feed on flowers in adjacent heathland and paperbark swamps.	▪ no records within 1 km of the site. ▪ six records within 5 km of the site.	No potential habitat at the site. Potential foraging habitat in the swamp forest within the study area.	Low on site. Possible within the study area.	Low – No significant impact likely. Seven-part Test not required
Hoplocephalus bitorquatus	Pale-headed Snake	V	-	Dry eucalypt forests and woodlands, cypress woodland and occasionally in rainforest or moist eucalypt forest. Favours streamside areas, particularly in drier habitats.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Hoplocephalus stephensii	Stephens' Banded Snake	V	-	Rainforest and eucalypt forests and rocky areas up to 950 m.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Ocybadistes knightorum	Black Grass-dart Butterfly	E	-	Confined to coastal stands of Swamp Oak and Paperbark where Floyd's Grass grows edging the upper tidal areas of mangroves.	▪ no records within 1 km of the site. ▪ one-hundred and twenty eight records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local BioNet (2014) Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Petalura litorea	Giant Dragonfly	E	-	Permanent wetlands, swamps and bogs with some free water and open vegetation. Restricted to coastal and near coastal lowlands between Coffs Harbour and Ballina. Live in permanent swamps and bogs with some free water and open vegetation.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Phyllodes imperialis (southern subspecies)	Pink Underwing Moth	E	E	Found in undisturbed subtropical rainforest below 600 m. Breeding habitat is restricted to areas where the caterpillar's food plant, a native rainforest vine, Carronia multisepalea, grows in a collapsed shrub-like form.	▪ no records within 5 km of the site.	No potential habitat at the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required

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

Table C.2 Threatened Flora Species Identified by the Database Searches

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
*Acronychia littoralis**	Scented Acronychia	E	E	Littoral rainforest on sand.	▪ no records within 1 km of the site. ▪ two records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
*Alexfloydia repens**	Floyd's Grass	E	-	Understorey of Swamp Oak (*Casuarina glauca)* forest and along the uppermost fringe of mangroves.	▪ no records within 1 km of the site. ▪ eighteen records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
*Allocasuarina defungens**	Dwarf Heath Casuarina	E	E	Tall heath on sand, also on clay and sandstone.	▪ no records within 1 km of the site. ▪ seventy-seven records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Arthraxon hispidus	Hairy-joint Grass	V	V	Moist shady places in or on the edges of rainforest and wet eucalypt forest, often near creeks or swamps.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
*Boronia umbellata**	Orara Boronia	V	V	Understorey shrub near gullies in wet open forest. Regenerates well after disturbance.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Corynocarpus rupestris rupestris*	Glenugie Karaka	V	V	Dry rainforest on steep volcanic screes on the peak, in well drained nutrient rich soils.	▪ no records within 1 km of the site. ▪ two records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Cryptocarya foetida	Stinking Cryptocarya	V	V	Littoral rainforest in sandy soils, mature trees known on basalt soils.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Cryptostylis hunteriana	Leafless Tongue-orchid	V	V	Does not have well defined habitat and is known from a range of communities, including swamp-heath and woodland.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Cynanchum elegans	White-flowered Wax Plant	E	E	Dry, littoral or subtropical rainforest, and occasionally in scrub or woodland.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Diospyros mabacea	Red-fruited Ebony	E	E	Usually grows as an understorey tree in lowland subtropical rainforest, often close to rivers. Soils are generally basalt-derived or alluvial.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Diploglottis campbellii	Small-leaved Tamarind	E	E	Riverine and subtropical rainforest and Brush Box forest, some trees isolated in paddocks and roadsides.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Diuris praecox	Rough Double Tail	V	V	Grows on hills and slopes of near-coastal districts in open forests which have a grassy to fairly dense understorey. Exists as subterranean tubers most of the year. It produces leaves and flowering stems in winter. Occurs between Ourimbah and Nelson Bay.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Diuris sp. aff. chrysantha	Byron Bay Diuris	E	-	Only known at a single location in Byron Bay, 20 plants recorded.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely. Outside of known range of this species.	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
*Eidothea hardeniana**	Nightcap Oak	E	CE	Known only in the Nightcap Range north of Lismore in upland warm temperate rainforest, usually near creeks.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely. Outside of known range of this species.	Low – No significant impact likely. Seven-part Test not required
*Eleocharis tetraquetra**	Square-stemmed Spike-rush	E	-	Damp locations on stream edges and in and on the margins of freshwater swamps.	▪ a single record within 1 km of the site. ▪ seven records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No Significant impact likely. Seven-part Test not required
Endiandra floydii	Crystal Creek Walnut	E	E	Warm temperate or subtropical rainforest with Brush Box overstorey, and in regrowth rainforest and Camphor Laurel forest.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Endiandra hayesii	Rusty Rose Walnut	V		Sheltered moist gullies in subtropical and warm temperate rainforest on alluvium or basalt.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Hakea archaeoides	Big Nellie Hakea	V	V	Found on steep, rocky, sheltered slopes and in deep gullies in open eucalypt forest.	▪ no records within 1 km of the site. ▪ a single record is within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Haloragis exalata subsp. velutina	Tall Velvet Sea-berry	V	V	Damp places near watercourses, also in woodland and steep rocky slopes of gorges.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Kennedia retrorsa	-	V	V	Found in a variety of habitats from mountain sides to riparian zones, from sheltered forest to steep, exposed rocky ridgelines.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
*Lindsaea incisa**	Slender Screw Fern	E	-	Dry eucalypt forest on sandstone and moist shrubby eucalypt forest on metasediments. Waterlogged or poorly drained sites along creeks, where ferns, sedges and shrubs grow thickly.	▪ three records within 1 km of the site. ▪ eight records within 5 km of the site. ▪ previously recorded in close proximity to the site (Sandpiper Environmental 2005a; 2005b; GeoLINK 2007).	Swamp forest and adjacent drain/ swale provide suitable habitat.	Possible.	Low-Medium (risk of indirect impacts on adjacent habitat). Seven-part Test undertaken as a precaution.
Macadamia tetraphylla	Rough-leaved Queensland Nut	V	V	Subtropical rainforest usually near the coast.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Marsdenia longiloba*	Slender Milkvine	E	V	Subtropical and warm temperate rainforest, lowland moist eucalypt forest adjoining rainforest and, sometimes, in areas with rock outcrops.	▪ no records within 1 km of the site. ▪ two records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Myrsine richmondensis	Ripple-leaf Muttonwood	E	E	Subtropical and dry rainforest and swamp forest on creek flats and slopes on basalt derived soil.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Niemeyera whitei (formerly *Amorphospermum whitei)**	Rusty Plum	V	-	Rainforest and adjoining moist eucalypt forest.	▪ no records within 1 km of the site. ▪ seventeen records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
*Oberonia complanata**	Yellow-flowered King of the Fairies	V	-	Grows on trees and rocks in littoral rainforest, subtropical rainforest, dry rainforest, wet or dry eucalypt forests, dunes (including stabilised sands), stream-side areas, swampy forests and mangroves.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	In a broad sense marginal potential habitat occurs in the swamp forest adjacent to the site.	Unlikely No records of this species in the Coffs Harbour area since 1961.	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
*Oberonia titania**	Red-flowered King of the Fairies	V	-	Occurs in littoral and subtropical rainforest and paperbark swamps, but it can also occur in eucalypt-forested gorges and in mangroves.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Parsonsia dorrigoensis	Milky Silkpod	V	E	Subtropical and warm temperate rainforest, on rainforest margins, and in moist eucalypt forest up to 800 m, on brown clay soils.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Peristeranthus hillii	Brown Fairy-chain Orchid	V	-	Restricted to coastal and near-coastal environments, particularly Littoral Rainforest and Lowland Rainforest on Floodplain. The species is an epiphyte, growing in clumps on tree trunks and thick vines. Flowers appear during September and October.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat on or adjacent to the site	Unlikely	Low – No significant impact likely. Seven-part Test not required
*Persicaria elatior**	Tall Knot-weed	V	V	Damp or swampy situations and sometimes with *Melaleuca linarifolia*.	▪ no records within 1 km of the site. ▪ two records within 5 km of the site.	Swamp forest habitat adjacent to the site is suitable.	Unlikely No records of this species in the Coffs Harbour area since 1957.	Low – No significant impact likely. Seven-part Test not required
Phaius australis	Southern Swamp Orchid	E	E	Swampy grassland or swampy forest including rainforest, eucalypt or paperbark forest mostly in coastal areas.	▪ no records within 1 km of the site. ▪ five records within 5 km of the site.	Swamp forest habitat adjacent to the site is suitable.	Unlikely. Not recorded from the site or adjacent swamp forest during previous assessments and not recorded in the targeted search of the current assessment.	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Phaius tankervilliae	Lady Tankarville's Swamp Orchid	E	-	Swampy grassland or swampy forest including rainforest, eucalypt and paperbark forest.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	Swamp forest habitat adjacent to the site is suitable.	Unlikely. Not recorded from the site or adjacent swamp forest during previous assessments and not recorded in the targeted search of the current assessment.	Low – No significant impact likely. Seven-part Test not required
Pultenaea maritima	Coast Headland Pea	V	-	Grasslands on exposed coastal headlands.	▪ no records within 1 km of the site. ▪ seven records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Samadera sp. Moonee Creek (J.King s.n. 1949)(formerly Quassia sp. Mooney Creek)	Moonee Quassia	E	E	Shrubby layer below tall moist and dry eucalypt forest, including forest edges, generally at low altitudes.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
*Sarcochilus fitzgeraldii**	Ravine Orchid	V	V	Grows mainly on rocks, amongst organic matter, in cool, moist, shady ravines, gorges and on cliff faces in dense subtropical rainforest at altitudes between 500 and 700 m.	▪ no records within 1 km of the site. ▪ a single record within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Sarcochilus hartmannii	Hartman's Orchid	V	V	Cliff faces on steep narrow ridges supporting eucalypt forest.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Senna acclinis	Rainforest Cassia	E	-	Edges of subtropical and dry rainforest.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
*Sophora tomentosa subsp. australis**	Silverbush	E	-	Occurs on coastal dunes in Queensland and northern NSW.	▪ no records within 1 km of the site. ▪ one record within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Streblus pendulinus	Siah's Backbone	-	E	Found in warmer rainforests, chiefly along watercourses at altitudinal range is from near sea level to 800 m above sea level. Grows in well-developed rainforest, gallery forest and drier, more seasonal rainforest. On Norfolk Island, the species is found in a variety of forest types, though it is rare.	▪ an Australian National Herbarium record within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Syzygium paniculatum	Magenta Lilly Pilly	E	V	Occurs in lowland and littoral rainforest.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
*Thesium australe**	Austral Toadflax	V	V	Grassland or grassy eucalypt woodland where *Themeda australis* is predominant, on grassy headlands.	▪ no records within 1 km of the site. ▪ two records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Tinospora tinosporoides	Arrow-head Vine	V	V	Wetter subtropical rainforest, including littoral rainforest, on fertile, basalt-derived soils.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Tylophora woollsii	Cryptic Forest Twiner	E	E	Moist eucalypt forest, moist sites in dry eucalypt forest and rainforest margins.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Local Records*	*Suitability of Site Habitat*	*Potential Occurrence*	*Proposal Impact Risk and requirement for Seven-part Test*
		TSC Act	*EPBC Act*					
Typhonium sp. aff. *brownii*	Stinky Lily	E	-	Moist eucalypt forest and moist eucalypt -subtropical rainforest interface. Only known from four locations west of Coffs Harbour; Kangaroo River, Bruxner Park, Bindarri National Park and Upper Corindi.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Uromyrtus australis	Peach Myrtle	E	E	Warm temperate rainforest associated with less fertile soils derived from rhyolite, often found with Coachwood *(Ceratopetalum apetalum).*	▪ no records within 1 km of the site. ▪ two records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
*Zieria prostrata**	Headland Zieria	E	E	Low grassy heath on exposed sites and wind-pruned open to sparse shrubland in more sheltered aspects.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required
Zieria smithii	Low growing form of *Z. smithii*, Diggers Head	E	-	Low heath with *Themeda australis* on a coastal headland.	▪ no records within 5 km of the site.	No potential habitat on or adjacent to the site.	Unlikely	Low – No significant impact likely. Seven-part Test not required

V = Vulnerable; E = Endangered; * indicates RoTAP listed species recorded in the Coffs Harbour City Council LGA

Appendix D

Flora Species Recorded on Site

Table D.1 Flora Species Recorded in Survey

Family	*Species*	*Common Name*
Recorded within Site		
Apocynaceae	*Gomphocarpus sp**	-
Apocynaceae	*Parsonsia straminea*	Common Silkpod
Asteraceae	*Ageratina adenophora**	Crofton Weed
Asteraceae	*Ageratum houstonianum**	Blue Billygoat Weed
Cyperaceae	*Cyperus polystachyos*	A Sedge
Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge
Cyperaceae	*Juncus sp.*	A Rush
Dicksoniaceae	*Calochlaena dubia*	Soft Bracken
Dilleniaceae	*Hibbertia scandens*	Climbing Guinea Flower
Fabaceae (Faboideae)	*Pultenaea retusa*	-
Haloragaceae	*Gonocarpus tetragynus*	-
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush
Melastomataceae	*Tibouchina 'Alstonville'**	Tibouchina
Myrtaceae	*Corymbia variegata*	Spotted Gum
Myrtaceae	*Eucalyptus resinifera*	Red Mahogany
Myrtaceae	*Melaleuca quinquenervia*	Broad-leaved Paperbark
Myrtaceae	*Melaleuca sieberi*	Sieber's Paperbark
Poaceae	*Setaria sphacelata**	South African Pigeon Grass
Poaceae	*Cynodon dactylon*	Common Couch
Poaceae	*Paspalum dilatatum**	Paspalum
Poaceae	*Paspalum urvillei**	Vasey Grass
Poaceae	*Andropogon virginicus**	Whisky Grass
Poaceae	*Themeda australis*	Kangaroo Grass
Ranunculaceae	*Rananculus inundatus*	River Buttercup
Restionaceae	*Baloskion pallens*	Didgery Sticks
Thymelaeaceae	*Pimelea linifolia* subsp. *linifolia*	Slender Rice-flower
Additional Species Recorded within the Broader Study Area		
Anthericaceae	*Thysanotus tuberosus*	Common Fringe-lily
Lauraceae	*Cinnamomum camphora**	Camphor Laurel
Myrtaceae	*Callistemon salignus*	Willow Bottlebrush
Myrtaceae	*Eucalyptus robusta*	Swamp Mahogany
Myrtaceae	*Lophostemon suaveolens*	Swamp Box
Myrtaceae	*Melaleuca styphelioides*	Prickly-leaved Tea Tree
Oleaceae	*Notelaea longifolia*	Large Mock-olive
Poaceae	*Entolasia stricta*	Wiry Panic
Poaceae	*Imperata cylindrica var. major*	Blady Grass
Polygonaceae	*Persicaria decipiens*	Slender Knotweed
Polypodiaceae	*Pyrrosia rupestris*	Rock Felt Fern
Rubiaceae	*Morinda jasminoides*	Sweet Morinda

Notes:

* Denotes exotic species

\# Within broader study area but not within site

Appendix E

Section 5A Assessment of Significance

Seven-part Test of Significance for Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregion

The Scientific Committee, established by the TSC Act, has made Final Determinations to list *Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregion*, as EEC in Part 3 of Schedule 1 of the Act.

Swamp Sclerophyll Forest

The key features of Swamp Sclerophyll Forest is the association with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains.

The NSW Scientific Committee (2004) generally describes Swamp Sclerophyll Forest as having an open structure, although partial clearing may have reduced the canopy to scattered trees. In some areas the tree stratum is low and dense, so that the community takes on the structure of scrub. The community also includes some areas of fernland and tall reedland or sedgeland, where trees are very sparse or absent. Typically these forests, scrubs, fernlands, reedlands and sedgelands form mosaics with other floodplain forest communities and treeless wetlands, and often they fringe treeless floodplain lagoons or wetlands with semi-permanent standing water.

According to the Final Determination (NSW Scientific Committee 2004) he main recognised threats to this community are:

- clearing for urban and rural development, and the subsequent impacts from fragmentation;
- flood mitigation and drainage works;
- management of water and tidal flows;
- landfilling and earthworks associated with urban and industrial development;
- grazing and trampling by stock and feral animals (particularly pigs);
- changes in water quality, particularly increased nutrients and sedimentation;
- weed invasion;
- climate change;
- activation of ASS;
- removal of dead wood;
- rubbish dumping; and
- frequent burning which reduces the diversity of woody plant species

Site and Local Occurrence

The swamp forest within the study area to the immediate west of the site is consistent with the final determination for the EEC Swamp Sclerophyll Forest on Coastal Floodplains. This isolated remnant of vegetation also extends outside of the study area and occupies a total area of approximately 12.2 ha. In the broader locality (5 km radius from the site), swamp sclerophyll forest vegetation (likely to constitute this EEC) has been mapped over an area of approximately 450 ha (CRAFTI mapping for upper north east NSW, NPWS 1998), including substantial remnants in the lower reaches of Newports Creek east of the site.

(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,

No consideration under this part of the assessment is required.

(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,

No consideration under this part of the assessment is required.

(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,

No swamp sclerophyll forest EEC occurs at the site and therefore none of this EEC would require direct removal as part of the proposal.

The proposal imposes a risk of a range of indirect impacts the adjacent area of swamp sclerophyll forest EEC, including sedimentation and erosion, water quality and weed invasion impacts (e.g. from edge effects, changes to runoff patterns and/or nutrient loads, etc.). However, the incremental extent to which the proposal may contribute to such impacts would not be significant given:

- the existing occurrence or risk of indirect impacts locally from past disturbances and land use practices in the general area (e.g. habitat loss and fragmentation creating edge effects, soil disturbances and associated erosion and sedimentation impacts associated with the study area etc.);
- effective implementation of the mitigation methods detailed in Section 5 would ensure the extent to which the proposal may contribute to such impacts is not substantial; and
- effects of the proposal relating to hydrology are unlikely to significantly impact on this EEC. Flood modelling indicates that there is likely to be a small local impact of up to 0.02 m adjacent to the site and a local increase in water velocity in the low-lying drainage feature on the western boundary of the site adjacent to the swamp sclerophyll forest (Cardno 2012). Rain infiltration is also likely to decrease at the site following the construction of a largely impervious surface for the car park. However, considering the size of the Newports Creek catchment and the relatively small scale of the proposal in relation to existing adjacent building infrastructure, roading and other paved areas within the Health Campus, any impacts on groundwater relating to these changes to the local hydrology are considered unlikely to place the local occurrence of this EEC at risk of extinction.

Overall, the incremental impacts of the proposal is not considered likely to adversely affect the extent or adversely modify the composition of swamp sclerophyll forest EEC such that its local occurrence is likely to be placed at significant risk of extinction.

(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

As mentioned in response to *(c),* no swamp sclerophyll forest EEC occurs at the site and therefore none of this EEC would require direct removal as part of the proposal. Other local areas of this community would not be directly affected and would not be substantially indirectly affected with effective implementation of the mitigation measures detailed in Section 5.

(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

Habitats (including swamp sclerophyll forest EEC) in the general locality surrounding the site have previously been fragmented by establishment of infrastructure such as the Pacific Highway, residential development and the Health Campus. As mentioned previously, no swamp sclerophyll forest EEC occurs at the site and therefore none of this EEC would require direct removal as part of the proposal. Therefore, the subject area of EEC within the study area would not experience additional fragmented or isolation relating to the proposal.

Overall the Proposal would not result in any significant fragmentation or isolation of any EECs.

(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,

As mentioned previously, no swamp sclerophyll forest EEC occurs at the site and therefore none of this EEC would require direct removal as part of the proposal. In additional to this, the proposal is not expected to substantially indirectly affect other EEC areas located outside the proposal footprint with effective implementation of the mitigation measures provided in Section 5, particularly erosion and sediment controls.

With consideration of the above; the extent of swamp sclerophyll forest locally that would not be impacted by the proposal, and the existing extent of habitat fragmentation and modification locally, it is highly unlikely that the proposal would modify, fragment or isolate any habitat significant to the long-term survival of any EECs locally.

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

No areas of critical habitat are listed under the TSC Act within the site nor are there any areas of critical habitat for swamp sclerophyll forest EEC listed under the TSC Act.

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

No recovery plan or threat abatement plan has been prepared for swamp sclerophyll forest EEC. The recovery planning process has now been incorporated into the Save Our Species program. The proposed development would not create barriers to the implementation of the Save Our Species program for swamp sclerophyll forest EEC.

(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 key threatening process (KTP) is defined under the TSC Act as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities. The current list of KTPs under TSC Act, and whether the proposed development is recognised as a threatening process is shown in Table E.1.

Table E.1 Key Threatening Processes

Listed Key Threatening Processes (as described in the final determination of the Scientific Committee to list the threatening process)	*Does the Proposal constitute or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatened process?*		
	Likely	*Possible*	*Unlikely*
Alteration of habitat following subsidence due to longwall mining			✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands		✓	
Anthropogenic Climate Change	✓		
Bush rock removal			✓
Clearing of native vegetation			✓
Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus* (L.)			✓
Competition and habitat degradation by feral goats, *Capra hircus*			✓
Competition from feral honeybee, *Apis mellifera*			✓
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			✓

Listed Key Threatening Processes (as described in the final determination of the Scientific Committee to list the threatening process)	*Does the Proposal constitute or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatened process?*		
	Likely	*Possible*	*Unlikely*
Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners			✓
Herbivory and environmental degradation caused by feral deer			✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition			✓
Importation of Red Imported Fire Ants (*Solenopsis invicta)*			✓
Infection by *Psittacine circoviral* (beak and feather) disease affecting endangered psittacine species and populations			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis			✓
Infection of native plants by *Phytophthora cinnamomi*			✓
Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae			✓
Introduction of the Large Earth Bumblebee (*Bombus terrestris)*			✓
Invasion and establishment of exotic vines and scramblers			✓
Invasion and establishment of Scotch Broom (*Cytisus scoparius*)			✓
Invasion and establishment of the Cane Toad (*Bufo marinus)*			✓
Invasion, establishment and spread of Lantana (*Lantana camara*)			✓
Invasion of native plant communities by African Olive (*Olea europaea*)			✓
Invasion of native plant communities by *Chrysanthemoides monilifera*			✓
Invasion of native plant communities by exotic perennial grasses		✓	
Invasion of the Yellow Crazy Ant (*Anoplolepis gracilipes)*			✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants			✓
Loss of hollow-bearing trees			✓
Loss or degradation (or both) of sites used for hill-topping by butterflies			✓
Predation and Hybridisation by Feral Dogs (*Canis lupus familiaris*)			✓
Predation by (*Gambusia holbrooki*) (Plague Minnow or Mosquito Fish)			✓
Predation by the European Red Fox (*Vulpes vulpes*)			✓
Predation by the Feral Cat (*Felis catus*)			✓
Predation by the Ship Rat *Rattus rattus* on Lord Howe Island			✓
Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*)			✓
Removal of dead wood and dead trees			✓

The proposal is likely to increase the impact of Anthropogenic Climate Change through the construction phase (although this is only a very small incremental effect).

Anthropogenic Climate Change is evidence that modification of the environment by humans may result in future climate change. Human induced activities as a result of energy use, industrial processes, solvent and

other product use, agriculture, land use change and forestry, and waste cause greenhouse gas emissions (NSW Scientific Committee 2000). The incremental extent to which the proposed works may contribute to anthropogenic climate change is unlikely to be significant.

It is possible that the proposal would also increase the impact relating to two other listed KTP's: '*Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands'* and '*Invasion of native plant communities by exotic perennial grasses'*. However, any impacts of the proposal relating to these KTP's are likely to be very minor and insignificant.

Overall, the Proposal is not considered likely to contribute significantly towards any listed KTP.

Conclusion

It is considered highly unlikely that the proposal would significantly affect the local occurrence of swamp sclerophyll forest EEC.

Seven-part Test of Significance for Threatened Flora

From Appendix C, the Slender Screw Fern (*Lindsaea incisa*) was identified as requiring a Seven-part Test assessment.

Site Habitat Values and Local Population Extent

Slender Screw Fern (the subject species) is a small ground fern that grows within a narrow distribution in the North Coast region of NSW, from west of Evans Head to just south of Coffs Harbour. The subject species also occurs in Queensland. The typical habitat of the subject species is dry eucalypt forest on sandstone and moist shrubby eucalypt forest on meta-sediments. It is usually found in waterlogged or poorly drained sites along creeks, with ferns, sedges and shrubs (OEH 2013).

Study Area Habitat Values and Local Population Extent

Although individuals of the subject species were not found during the current survey, the swamp forest and existing shallow drainage channel to the immediate west of the site provide suitable potential habitat.

Local OEH BioNet records (refer to Appendix B) for this species include:

- three records within 1 km of the site; and
- eight records within 5 km of the site.

Individuals of the subject species have also been previously recorded in close proximity to the site, both within the drainage channel Sandpiper Environmental 2005a, 2005b) and the swamp forest (GeoLINK 2007).

Slender Screw Fern pollination is likely achieved abiotically via the wind as is dispersal. Consequently, the local population of the subject species is considered to be all individuals that are capable of wind-assisted cross pollination with one another. As fern spores can be blown considerable distances on the wind, the population of the subject species would include individuals occurring both on site and in the broader locality.

(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,

OEH (2014) lists the following threats to the subject species:

- land development and clearing;
- frequent fire;
- alterations to drainage of creeks;
- recreation, including camping, near creeks;
- grazing and trampling by domestic stock;
- risk of local extinction because numbers are low; and
- broad leaved Paspalum, Crofton weed and soil nutrification (from agriculture and urban run-off).

As the proposal does not include removal of a population of the subject species or its habitat, all associated risks to the subject species would be via indirect impacts (e.g. through potential increase in weed introduction/ spread, water quality and sedimentation. However, these indirect impacts are not expected to be significant with the effective implementation of the mitigation measures provided in Section 5.

In conclusion, it is not considered likely that impacts of the Proposal will to have an adverse effect on the life cycle of the subject species such that a viable local population of the species is likely to be placed at risk of extinction.

(b) in the case of an endangered 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,

No consideration under this part of the assessment is required.

(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,

No consideration under this part of the assessment is required.

(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,

As mentioned in response to (a), the proposal does not include removal of habitat for the subject species. Other local occurrences of the subject species not identified in the current survey would not be directly affected and would not be substantially indirectly affected with effective implementation of the mitigation measures detailed in Section 5.

(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

Habitats (including swamp forest and adjacent areas suitable for the subject species) in the general locality surrounding the site have previously been fragmented by establishment of infrastructure such as the Pacific Highway, residential development and the Health Campus. As mentioned previously, the proposal does not require vegetation clearing (except for modified grassland). Therefore, no local area of habitat for the subject species is likely to experience additional fragmented or isolation relating to the proposal.

Overall the Proposal would not result in any significant fragmentation or isolation of for the subject species.

(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,

As mentioned previously, no habitat for the subject species occurs at the site. Furthermore, no individuals of the subject species, or its habitat, would be removed for the proposal. In additional to this, the proposal is not expected to substantially indirectly affect potential habitat for this species located outside the proposal footprint with effective implementation of the mitigation measures provided in Section 5, particularly erosion and sediment controls.

With consideration of the above and the existing extent of habitat fragmentation and modification locally, it is highly unlikely that the proposal would modify, fragment or isolate any habitat significant to the long-term survival of the subject species locally.

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

No areas of critical habitat are listed under the TSC Act within the site nor are there any areas of critical habitat for the subject species listed under the TSC Act.

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

No recovery plan or threat abatement plan has been prepared for the subject species. The recovery planning process has now been incorporated into Save Our Species program. The proposed development would not create barriers to the implementation of the Save Our Species program for the subject species.

(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.

Refer to Table E.1 listing KTP's and associated response in Seven-part test for Swamp Sclerophyll Forest EEC.

Overall, the Proposal is not considered likely to contribute significantly towards any listed KTP.

Conclusion

The proposal is considered unlikely to result in a significant impact on the local occurrence of Slender Screw Fern.

Seven-part Test of Significance for Threatened Fauna

From Appendix C, the Koala (*Phascolarctos cinereus*) (the subject species) was identified as requiring a Seven-part Test assessment.

Site Habitat Values and Local Population Extent for Subject Species

As discussed in Section 4, the swamp forest within the study area consists of land mapped as primary Koala habitat in CHCKPoM (Lunney, *et al.,* 1999). The site itself is not mapped as primary Koala habitat.

The main value of the site for Koalas is as transitory habitat when moving between adjacent areas of habitat in the swamp forest to the west and Newports Creek to the east. At present, the value of the site in this regard is relatively low.

For this assessment, all sub-populations based in habitat interconnected with the forest within the lower Newports Creek catchment are considered to collectively form the local population for this assessment. Overall, the site provides a small portion of the Koala habitat available locally.

(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,

The proposal does not require the removal/ modification of any foraging or shelter habitat for the subject species. Values of the study area as habitat for the subject species has been reduced through previous development locally.

Additionally:

- any Koala inhabiting the site forms a small portion of a broader population that extends east and south into the larger areas of habitat in the lower reaches of Newports Creek.
- Koalas are highly mobile and, provided that implementation of mitigation measures detailed in Section 5 is undertaken, in particular enhancement of this corridor and the installation of traffic calming devices, low speed limits, and Koala signage in association with the proposed carpark, the ongoing movement across the site for the subject species would be retained post construction.

Overall, while the proposal would impose some negative effects (in particular relating to movement), considering the current usage levels within the study area, and alternative habitat available locally, it is considered unlikely to have an adverse effect on the life cycle of the subject species such that a viable local population is likely to be placed at significant risk of extinction.

(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,

No consideration under this part of the assessment is required.

(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,

No consideration under this part of the assessment is required.

(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,

As mentioned in response to (a), the proposal does not include removal of habitat for the subject species. Other local habitat for the subject species would not be directly affected and would not be substantially indirectly affected with effective implementation of the mitigation measures detailed in Section 5.

(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

Habitats for the subject species in the general locality surrounding the site have previously been fragmented by establishment of infrastructure such as the Pacific Highway, residential development and the Health Campus. No habitat for the subject species would be directly impacted by the proposal. The proposal would impose an additional barrier to movement for the subject species when moving between the swamp forest to the west of the site and Newports Creek, including construction of a security fence around the car park. Establishment of the Koala corridor was intended to facilitate the movement of the subject species between these areas, but as mentioned is Section 3.2.3, the effectiveness of this corridor is not yet realised. Implementation of mitigation measures detailed in Section 5, in particular enhancement of this corridor and the installation of traffic calming devices, low speed limits and Koala signage in association with the proposed car park would ensure ongoing movement across the site for the subject species and minimise potential impacts.

With consideration of the above and that the proposal is unlikely to have an adverse effect on the life cycle of the subject species such that a viable local population is likely to be placed at risk of extinction (refer to response to *(a)*), the degree of additional fragmented or isolation of habitat for the subject species relating to the proposal is not likely to be significant.

(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,

As mentioned previously, no habitat for the subject species would be directly removed for the proposal.

With consideration of the above; the extent of alternative habitat available locally that would not be impacted by the proposal, and the existing extent of habitat fragmentation and modification locally, it is unlikely that the proposal would modify, fragment or isolate any habitat significant to the long-term survival of the subject species locally.

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

No areas of critical habitat are listed under the TSC Act within the site nor are there any areas of critical habitat for the subject species listed under the TSC Act.

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

An approved recovery plan currently exists for the Koala (DECC 2008), however the specific objectives of this recovery plan are not relevant to the proposal. The proposal would not have a significant negative effect on any of the priority actions associated with the Koala (OEH website: www.environment.nsw.gov.au/threatenedspeciesapp/profile).

Overall the proposal is not considered significantly inconsistent with the specific objectives or actions of the relevant recovery plan or 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.

Refer to Table E.1 listing KTP's and associated response in Seven-part test for Swamp Sclerophyll Forest EEC.

Overall, the Proposal is not considered likely to contribute significantly towards any listed KTP.

Conclusion

It is considered unlikely that the proposal would significantly affect the local occurrence of the Koala.

References for Appendix E

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Phillips, S., and Callaghan, J. (2011). The Spot Assessment Technique: a tool for determining localised levels of habitat use by koalas *Phascolarctos cinereus*. *Australian Zoologist* 35, 774–780.

Sandpiper Environmental (2005a). Proposed Cancer Care Unit: Ecological Assessment, prepared for RDM Pty. Ltd, Coffs Harbour;

Sandpiper Environmental (2005b). Proposed Extension to the Mental Health Care Unit: Ecological Assessment. Prepared for RDM Pty Ltd In Resource Design and Management Pty Ltd, (2006). Planning Report Proposed Rezoning Mental Health Care Unit Lot 2 DP 1092544 Coffs Harbour Health Campus;

Appendix F

Koala SAT Results

Table F.1 Koala SAT plot results

SAT plot 1 (approximate GPS location: 509181, 6645738)		
Tree	*Number searched*	*Number with scats*
Swamp Mahogany (*Eucalyptus robusta*)	16	2
Red Mahogany (*Eucalyptus resinifera*)	5	0
Swamp Box (*Lophostemon suaveolens*)	5	0
Camphor Laurel (*Cinnamomum camphora*)	4	0
Total	30	2
SAT plot 2 (approximate GPS location: 509197, 6645868)		
Tree	*Number searched*	*Number with scats*
Swamp Mahogany (*Eucalyptus robusta*)	18	0
Red Mahogany (*Eucalyptus resinifera*)	10	0
Swamp Box (*Lophostemon suaveolens*)	1	0
Pink Bloodwood (*Corymbia intermedia*)	1	0
Total	30	0

Appendix G

Fauna Species Recorded within the Study Area

Table G.1 Fauna Species Recorded Within the Study Area

Scientific Name	*Common Name*	*Comments*
Avifauna		
Egretta novaehollandiae	White-faced Heron	Observed
Manorina melanocephala	Noisy Miner	Observed and heard
Ocyphaps lophotes	Crested Pigeon	Observed
Threskiornis molucca	Australian White Ibis	Observed
Amphibia		
Litoria dentata	Bleating Treefrog	Calling from swamp forest

Appendix H

EPBC Act Threatened and Migratory Species: Significant Impact Criteria Assessments

EPBC Act Matters of National Significance: Significant Impact Criteria Assessment

Under the EPBC Act, an action would require approval from the Federal Environment Minister (the Minister) if the action has, would have, or is likely to have, a significant impact on a matter of national environmental significance (DEH 2006). DEH (2006) provides a number of significant impact criteria guidelines to assess whether a proposed activity is likely to have a significant impact on a matter of national significance, and consequently whether or not to submit a referral to the Federal Department of Environment (DoE).

An assessment of the Proposal using the relevant significant impact criteria is provided below for relevant matters of national significance that are known or potential occurrences at the site; this includes the Koala and a range of migratory species.

Koala – habitat value of study area and proposal

The proposal is to establish a new car park at the Health Campus to alleviate a current car parking shortage. The proposal would not require clearing of native vegetation, as the footprint of the car park extends across an area that has been cleared of native vegetation. The main components of the proposal include:

- staged construction of a car park and associated infrastructure, consisting of 816 spaces at the site; and
- upgrading / establishing access roads to the car park along the eastern edge of the site (off Phil Hawthorn Drive) and from the Health Campus immediately to the north of the site.

The main value of the site for Koalas is as transitory habitat when moving between adjacent areas of habitat in the swamp forest to the west and Newports Creek to the east. At present, the value of the site in this regard is relatively low having been reduced through previous development locally.

Koala - Significant Impact Criteria Assessment

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;*

DEH (2006) defines an 'important population' as "*a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:*

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

The 'important population' of the Koala for this assessment comprises those individuals in the broader Coffs Harbour locality.

As discussed in Section 4, the swamp forest within the study area consists of land mapped as primary Koala habitat in CHCKPoM (Lunney, et al., 1999). The site itself is not mapped as primary Koala habitat.

Koalas are highly mobile and, provided that implementation of mitigation measures detailed in Section 5 is undertaken, in particular enhancement of the planted Koala corridor and the installation of traffic calming devices, low speed limits, and Koala signage in association with the proposed carpark, the ongoing movement across the site for the subject species would be retained post construction.

Overall, while the proposal would impose some negative effects (in particular relating to creating an impediment to Koala movement), considering the current usage levels within the study area, and alternative habitat available in proximity to the site, it is considered unlikely that the proposal would have an adverse effect on the life cycle of the 'important population' that occurs in the broader Coffs Harbour locality.

- *reduce the area of occupancy of an important population;*

The study area was found to be subject to a low level of Koala usage, as part of the resident (core) range of a local Koala subpopulation that has previously been recorded at the location.

As the proposal would not involve clearing of native vegetation, the proposal would not impact on any areas of Koala Habitat within the broader locality. Therefore, the proposal would not directly affect the habitat available to Koalas that would directly influence the area of occupancy for this species.

As mentioned above, Koalas are highly mobile and, provided that implementation of mitigation measures detailed in Section 5 is undertaken, in particular enhancement of the planted Koala corridor and the installation of traffic calming devices, low speed limits, and Koala signage in association with the proposed carpark, the ongoing movement across the site for the subject species would be retained post construction. This would ensure that movement of individuals would be possible from the isolated remnant swamp forest to the west of the site

Overall, it is considered unlikely that the proposal would significantly reduce the area of occupancy of the subject important population.

- *fragment an existing important population into two or more populations;*

Koala habitat in the general locality surrounding the site has previously been fragmented by establishment of infrastructure such as the Pacific Highway, residential development and the Health Campus. As mentioned previously, no Koala habitat would be directly impacted by the proposal. The proposal would impose an additional barrier to movement for the subject species when moving between the swamp forest to the west of the site and Newports Creek, including construction of a security fence around the car park. Establishment of the Koala corridor was intended to facilitate the movement of the subject species between these areas, but as mentioned is Section 3.2.3, the effectiveness of this corridor is not yet realised. Implementation of mitigation measures detailed in Section 5, in particular enhancement of this corridor and the installation of traffic calming devices, low speed limits and Koala signage in association with the proposed car park would ensure ongoing movement across the site for the subject species and minimise potential impacts.

Overall the Proposal is considered unlikely to result in the fragmentation of an existing important population of the Koala.

- *adversely affect habitat critical to the survival of a species;*

DEH (2006) states '*Habitat critical to the survival of a species or ecological community*' refers to areas that are necessary:

- *"for activities such as foraging, breeding, roosting, or dispersal;*
- *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);*
- *to maintain genetic diversity and long term evolutionary development; or*
- *for the reintroduction of populations or recovery of the species or ecological community*."

As mentioned previously, the proposal would not involve clearing of native vegetation. No Koala habitat would be impacted by the proposal.

Consequently, the proposal is not considered likely to significantly affect habitat critical to the survival of the Koala.

- *disrupt the breeding cycle of an important population;*

It is considered unlikely that the breeding cycle of an important population of the Koala would be significantly affected by the proposal as:

- the site lacks foraging habitat;

- the results of the current survey suggest that usage of the site by Koalas is likely to be transitory, consisting of movement across the site between adjacent areas of Primary Koala Habitat;
- alternative areas of Primary Koala habitat occur offsite that would not be affected by the proposal, including the remnant of swamp forest to the west, and more extensive areas associated with Newports Creek to the east and south of the site.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;*

As mentioned previously, the proposal would not involve clearing of native vegetation. No Koala habitat would be impacted by the proposal. In addition to this, a recommended safeguard identified in this report (refer to Section 5.1) is to enhance the value of the planted Koala corridor by planting additional Koala food trees on the site.

Therefore, the proposal is not considered likely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the Koala is likely to significantly decline.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;*

DEH (2006) states "*an 'invasive species' is an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources or which is a predator of native species. Introducing an invasive species into an area may result in that species becoming established. An invasive species may harm listed threatened species or ecological communities by direct competition, modification of habitat or predation*."

No invasive species that is harmful to the Koala, or the habitat of this species, is considered likely to become established or dispersed as a result of the Proposal.

- *introduce disease that may cause the species to decline; or*

Considering the minor nature of the proposal, no diseases that may affect the Koala, or the habitat of this species, is considered likely to become introduced or spread as a result of the proposal. The risk of increasing the occurrence or severity of existing disease in the subject important Koala population through stresses associated with the proposal to the point of resulting in population decline is low.

- *interfere substantially with the recovery of the species.*

While the Proposal may impose some minor negative impacts to the subject species, the minor nature of the proposal (which would be undertaken in accordance with the safeguards of this report) is such that the recovery of this species is unlikely to be substantially interfered with.

Conclusion

The Proposal is considered unlikely to result in a significant impact on the Koala. Consequently referral to the DoE and approval by the Minister is not required.

Migratory Species

A search of the EPBC Act Protected Matters Search Tool identified potential habitat for 53 migratory listed species within a 10 km of the study area. Based on the habitats present, previous records, the survey results and local knowledge, six of these migratory species listed by the database search are considered potential occurrences at the site. These species are listed below.

Potential to utilise the study area as seasonal foraging habitat only:

- Fork-tailed Swift (*Apus pacificus*);
- Rainbow Bee-eater (*Merops ornatus*);
- White-throated Needletail (*Hirundapus caudacutus*); and
- Regent Honeyeater (*Anthochaera phrygia*).

Potential to utilise the study area for seasonal foraging and breeding habitat:

- Satin Flycatcher *(Myiagra cyanoleuca*); and
- Rufous Fantail (*Rhipidura rufifrons*).

The sites only provide a small area of foraging for four of the species, and possibly roosting and nesting habitat for a further two species. These species are somewhat habitat generalist EPBC Act listed migratory species and this foraging/ potential breeding habitat represents a small portion of an extensive area of similar and better quality habitat throughout the general locality and beyond. The site does not provide any significant foraging, roosting or nesting habitat for any migratory species populations.

The potential impact of the Proposal on migratory species has been assessed under the Administrative Guidelines for significant impact for the species listed above.

The site does not provide any significant foraging, roosting or nesting habitat for any migratory species populations.

DEH (2006) states that "*an area of 'important habitat' for a migratory species is:*
a) 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
b) habitat that is of critical importance to the species at particular life-cycle stages; and/or
c) habitat utilised by a migratory species which is at the limit of the species range; and/or
d) habitat within an area where the species is declining."

The site is not considered to be an 'important habitat' for migratory species, as defined by DEH (2006). Given the limited extent of available habitat at the sites for these migratory species, availability of similar and better quality habitat locally, and low impact risk of the Proposal, the site is not considered important habitat for any migratory species populations.

Migratory Species Significant Impact Criteria Assessment

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- *substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;*

The proposal does not affect habitat that constitutes important habitat for any migratory species population. Consequently the proposal is not considered 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 for a migratory species.

- *result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or*

The proposal does not affect habitat that constitutes important habitat for any migratory species population. Additionally, the nature of the Proposal is such that no invasive species are considered likely to be introduced.

- *seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.*

The site only provides a small area of foraging and possibly roosting and nesting habitat for a number of somewhat habitat generalist EPBC Act listed migratory species as part of an extensive area of similar and better quality habitat throughout the general locality and beyond. The site does not provide any significant foraging, roosting or nesting habitat for any migratory species populations. Consequently, the proposal is not considered likely to seriously disrupt the lifecycle (breeding, feeding, migration or nesting behaviour) of an ecologically significant proportion of the population of a migratory species.

Conclusion

The Proposal is considered unlikely to result in a significant impact on any migratory listed species. Consequently referral to DoE and approval by the Minister is not required.

References for Appendix H

DEH (2006). *EPBC Act Policy Statement 1.1: Significant Impact Guidelines - Matters of National Environmental Significance*. Australian Government Department of the Environment and Heritage.

SEWPAC (2012). *Interim koala referral advice for proponents*. Department of Sustainability, Environment, Water, Population and Communities, Canberra.