



Biodiversity Impact Assessment

Temporary coastal protection works & infrastructure repair - Clarkes Beach, Byron Bay.

Client:	Hydrosphere Consulting
Prepared by:	Biodiversity Assessments & Solutions Pty Ltd
Date:	9 th June 2021

Project Control

Project name: Biodiversity Impact Assessment
Temporary coastal protection works & infrastructure repair -
Clarkes Beach, Byron Bay.

Job number: 210212

Client: Hydrosphere Consulting

Prepared by: Biodiversity Assessments & Solutions Pty Ltd

Lennox Head, NSW, 2478

adam@biodiversityassessments.com.au

Date:	Revision:	Prepared by:	Reviewed by:	Distributed to:
14.05.2021	A - Draft	Adam Gosling	AG	Robyn Campbell
25.05.2021	B – Final	Adam Gosling	AG	Robyn Campbell
09.06.2021	B – Final Rv2	Adam Gosling	AG	Robyn Campbell



© Biodiversity Assessments & Solutions Pty Ltd 2021

Contents

1.	Introduction and Background.....	1
1.1	Subject land.....	1
1.2	The proposal	1
2.	Methods and results.....	6
2.1	Desktop assessment	6
2.2	BioNet Atlas records.....	6
2.3	Subject land assessment.....	9
2.4	Discussion	9
3.	Impact assessment	42
3.1	Habitat Loss.....	42
3.2	Disturbance	44
4.	Statutory assessment of the proposal.....	47
4.1	Biodiversity Conservation Act 2016.....	47
4.1.1	Biodiversity Conservation Regulation 2017	48
4.2	State Environmental Planning Policy (Koala Habitat Protection) 2021.....	49
4.3	State Environmental Planning Policy (Coastal Management) 2018.....	50
4.4	Environment Protection & Biodiversity Conservation Act 1999 (Cth)	51
5.	Management strategy to minimise development impacts	53
5.1	Mitigation measures.....	53
6.	Summary and Conclusion	55
	References.....	56
	Appendix A – Test of Significance.....	58
	Sooty Oystercatcher (<i>Haematopus fuliginosus</i>)	58
	Pied Oystercatcher (<i>Haematopus longirostris</i>)	59
	Little Tern (<i>Sternula albifrons</i>)	61
	Great Knot (<i>Calidris tenuirostris</i>)	63
	Koala (<i>Phascolarctos cinereus</i>).....	64
	Common Blossom-bat (<i>Syconycteris australis</i>)	66
	Loggerhead Turtle (<i>Caretta caretta</i>).....	67

Green Turtle (<i>Chelonia mydas</i>).....	69
Appendix B – BOSET Report.....	74

List of Figures

Figure 1: Subject land and location.	4
Figure 2: Proposal elements and statutory mapping applicable to the proposal.....	5
Figure 3: Threatened flora species within 1.5 km, vegetation mapping, and protected areas.	12
Figure 4: Threatened fauna species within 1.5 km, protected areas and habitat corridors.....	13
Figure 5: Development footprint impact area required to accommodate the proposal.	46
Figure 6: Development footprint, NSW Govt. statutory mapping and shoreline recession since 2015...	52

List of Tables

Table 1: BioNet Atlas of NSW Wildlife records of threatened species within 1.5 km of the development footprint.....	6
Table 2: Threatened Ecological Communities known to occur in the Byron Local Government Area.	8
Table 3: Threatened species recorded within 1.5 km of the development footprint and suitability assessment of the subject land.....	14
Table 4: Area clearing thresholds as stipulated under Part 7.2 of the Biodiversity Conservation Regulation, 2017.....	49

1. Introduction and Background

Biodiversity Assessments & Solutions Pty Ltd has completed an ecological assessment including a threatened species Test of Significance (ToS) with respect to part Lot 18 DP 1269368, part Lot 410 DP 729062, and part Lot 9 DP1049827, Clarkes Beach, Byron Bay, NSW (Figure 1).

The assessment has taken into consideration any potential impacts of the identified proposal on threatened species or ecological communities in accordance with the *Biodiversity Conservation (BC) Act 2016* and identifies any provisions within the *Biodiversity Conservation Regulation 2017* that may apply to the proposal. The assessment also considers the requirements of the State Environmental Planning Policy (SEPP) (Coastal Management) 2018 and Koala SEPP 2021, and how they pertain to the proposal.

This assessment covers two associated components, with potential direct and indirect impacts assessed both individually and in combination due to the proximity and association of works required, the distinction between habitat types within the footprint, and to assess any sum of impacts as a result.

This assessment has been undertaken to accompany the lodgement of a Part 4 Development Application (DA) for temporary coastal protection and dune revegetation and fencing works on the subject land, and to accompany a Part 5 Environmental Assessment for infrastructure repair works under SEPP (Infrastructure) 2007 to support the temporary coastal protection works.

1.1 Subject land

The subject land is:

- comprised of three coastal foreshore lots (Lot 18 DP 1269368, Lot 410 DP 729062, and Lot 9 DP 1049827), covering a total area of approx. 38.8 ha. The development footprint is limited to the far eastern and western portions of the lot respectively, and covers an area of approx. 2,000 m² (Figure 1);
- foreshore lots consisting of beach, dunes, foreshore, open public space, public dining premises, tourism operations, and vehicle parking. The lots contain small areas of fragmented littoral vegetation and isolated native trees scattered throughout the site;
- generally flat and low-lying, with two distinct tiers (i.e., beach and elevated foreshore), with elevation below the 10 m Australian Height Datum (AHD) contour;
- the eastern portion of Lot 18 DP 1269368, to which the proposal applies, is bounded to the south by Lawson Street, with Lot 410 DP 729062 encompassing Reflections Holiday Park; and
- zoned DM Deferred Matter under the Byron Local Environmental Plan 2014 and zoned 7(f1) Coastal Lands and 6(a) Open Space Zone under the Byron Local Environmental Plan 1988.

1.2 The proposal

Two proposal have been identified for which approval is sought (Figure 2). These are identified as:

- Proposal A: Retention of temporary coastal protection works (sandbags and sand nourishment) for a period of (nominally) 5 years (Part 4 DA) (Plate 1), dune fencing and revegetation; and
- Proposal B: Stormwater management works (Plate 2), reinstatement of beach accessway (Plate

3) and dangerous tree removal (Plate 4) (Part 5 Environmental Assessment).



Plate 1: Proposal A would require approval to retain sandbags for an additional (nominal) 5-year period and undertake sand nourishment in front of the café.



Plate 2: Proposal B would require approval for stormwater management works including construction of a swale to the west of the café to minimise stormwater erosion.



Plate 3: Proposal B would require approval for beach access repair to replace damaged infrastructure.












Plate 4: Proposal B would require approval to remove dangerous falling trees from top of dune to the west of the café (right side of photo above).

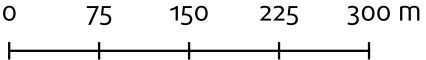
Figure 1: Subject land and location.



Legend

-  Subject Land
-  Development Footprint - Proposal A & B
-  Biodiversity Values Map
-  Road Corridor
-  Hydroline
-  Lot
-  NPWS Reserve
- SEPP (Coastal Management) 2018**
-  Littoral Rainforest
-  Littoral Rainforest Proximity Area

1:6300



ATTRIBUTION PARTIES















Aerials: © NearMap Pty Ltd [2017]
Topographic: © Land and Property Information [2017]
Cadastral: © Land and Property Information [2017]
SEPP: NSW Govt. [2018]
BVMap: NSW Govt. [2021]

BA&S makes every effort to ensure this map is free of errors, but does not warrant the map or it's features are either spatially or temporally accurate or fit for a particular use. BA&S provides this map without any warranty of any kind whatsoever, either express or implied.

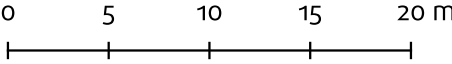
Figure 2: Proposal elements and statutory mapping applicable to the proposal.



Legend

-  Subject Land
-  Biodiversity Values Map
- Proposal A (Temp. Coastal Protection)**
 -  Sand nourishment area
 -  Sandbag Extent
 -  Dune Forming Fencing
- Proposal B (Infrastructure Repair)**
 -  Scour Protection Flow Path
 -  Pedestrian Access Ramp
 -  Curb Inlet Pit
 -  Discharge Disposal Area (Rock)
 -  Roof Runoff Underground Discharge Pipe
 -  Inlet Pipe Discharge to Swale
 -  Dangerous tree removal area
- SEPP (Coastal Management) 2018**
 -  Littoral Rainforest
 -  Littoral Rainforest Proximity Area

1:375



ATTRIBUTION PARTIES

Aerials: © NearMap Pty Ltd [2017]
Topographic: © Land and Property Information [2017]
Cadastral: © Land and Property Information [2017]
SEPP: NSW Govt. [2018]
BVMap: NSW Govt. [2021]

BA&S makes every effort to ensure this map is free of errors, but does not warrant the map or its features are either spatially or temporally accurate or fit for a particular use. BA&S provides this map without any warranty of any kind whatsoever, either express or implied.

2. Methods and results

2.1 Desktop assessment

A GIS mapping project was established to combine all relevant and available spatial information for the subject land, Byron Shire and NSW data to enable a thorough desktop assessment. Spatial data used or consulted in the assessment include:

- Cadastre (NSW Department of Finance, Services and Innovation 2019);
- Topography (NSW Department of Finance, Services and Innovation 2019);
- Byron LGA Vegetation 2017 (BSC 2017);
- Biodiversity Values Mapping (DPE 2021);
- SEPP Coastal Management (DPE 2018);
- Fauna Corridors for North East NSW (OEH 2018);
- Acid Sulfate Soils Risk map (OEH 1998);
- NSW Hydrography (Department of Finance, Services and Innovation 2018); and
- Nearmap aerial imagery (2015 to 2021).

2.2 BioNet Atlas records

A search of the BioNet Atlas of NSW Wildlife was conducted, based on an area within 1.5 km of the development footprint. This search returned a record of forty-eight ($n = 48$) threatened species listed under Schedule 1 of the BC Act 2016 (Table 1 and Figure 3). This includes thirty-two ($n = 32$) fauna species and sixteen ($n = 16$) flora species.

A search of the BioNet Atlas of NSW Wildlife returned eleven ($n = 11$) Threatened Ecological Communities (TEC) listed under Schedule 2 of the BC Act 2016 that are known to occur within the Byron Local Government Area (LGA) (Table 2).

Table 1: BioNet Atlas of NSW Wildlife records of threatened species within 1.5 km of the development footprint.

Class	Family	Scientific name	Common name	NSW Status	Cth Status
Amphibia	Hylidae	<i>Litoria olongburensis</i>	Olongburra Frog	V,P	V
Amphibia	Myobatrachidae	<i>Crinia tinnula</i>	Wallum Froglet	V,P	
Aves	Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V,P	
Aves	Accipitridae	<i>Pandion cristatus</i>	Eastern Osprey	V,P,3	
Aves	Ardeidae	<i>Ixobrychus flavicollis</i>	Black Bittern	V,P	
Aves	Burhinidae	<i>Burhinus grallarius</i>	Bush Stone-curlew	E1,P	
Aves	Columbidae	<i>Ptilinopus magnificus</i>	Wompoo Fruit-Dove	V,P	
Aves	Columbidae	<i>Ptilinopus regina</i>	Rose-crowned Fruit-Dove	V,P	

Class	Family	Scientific name	Common name	NSW Status	Cth Status
Aves	Columbidae	<i>Ptilinopus superbus</i>	Superb Fruit-Dove	V,P	
Aves	Haematopodidae	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	V,P	
Aves	Haematopodidae	<i>Haematopus longirostris</i>	Pied Oystercatcher	E1,P	
Aves	Laridae	<i>Onychoprion fuscata</i>	Sooty Tern	V,P	
Aves	Laridae	<i>Sternula albifrons</i>	Little Tern	E1,P	C,J,K
Aves	Procellariidae	<i>Macronectes giganteus</i>	Southern Giant Petrel	E1,P	E
Aves	Procellariidae	<i>Macronectes halli</i>	Northern Giant-Petrel	V,P	V
Aves	Psittacidae	<i>Glossopsitta pusilla</i>	Little Lorikeet	V,P	
Aves	Rallidae	<i>Amauornis moluccana</i>	Pale-vented Bush-hen	V,P	
Aves	Scolopacidae	<i>Calidris tenuirostris</i>	Great Knot	V,P	CE,C,J,K
Aves	Tytonidae	<i>Tyto tenebricosa</i>	Sooty Owl	V,P,3	
Gastropoda	Camaenidae	<i>Thersites mitchellae</i>	Mitchell's Rainforest Snail	E1	CE
Insecta	Nymphalidae	<i>Argynnis hyperbius</i>	Laced Fritillary	E1	CE
Mammalia	Dasyuridae	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V,P	E
Mammalia	Dasyuridae	<i>Planigale maculata</i>	Common Planigale	V,P	
Mammalia	Miniopteridae	<i>Miniopterus australis</i>	Little Bent-winged Bat	V,P	
Mammalia	Miniopteridae	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V,P	
Mammalia	Otariidae	<i>Arctocephalus forsteri</i>	New Zealand Fur-seal	V,P	
Mammalia	Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	V,P	V
Mammalia	Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V,P	V
Mammalia	Pteropodidae	<i>Syconycteris australis</i>	Common Blossom-bat	V,P	
Mammalia	Vespertilionidae	<i>Nyctophilus bifax</i>	Eastern Long-eared Bat	V,P	
Reptilia	Cheloniidae	<i>Caretta caretta</i>	Loggerhead Turtle	E1,P	E
Reptilia	Cheloniidae	<i>Chelonia mydas</i>	Green Turtle	V,P	V
Flora	Apocynaceae	<i>Marsdenia longiloba</i>	Slender Marsdenia	E1	V
Flora	Casuarinaceae	<i>Allocasuarina defungens</i>	Dwarf Heath Casuarina	E1	E
Flora	Fabaceae (Faboideae)	<i>Desmodium acanthocladum</i>	Thorny Pea	V	V
Flora	Fabaceae (Mimosoideae)	<i>Archidendron hendersonii</i>	White Lace Flower	V	
Flora	Flacourtiaceae	<i>Xylosma terrae-reginae</i>	Queensland Xylosma	E1	
Flora	Lauraceae	<i>Cryptocarya foetida</i>	Stinking Cryptocarya	V	V
Flora	Myrtaceae	<i>Rhodamnia rubescens</i>	Scrub Turpentine	E4A	

Class	Family	Scientific name	Common name	NSW Status	Cth Status
Flora	Myrtaceae	<i>Rhodomyrtus psidioides</i>	Native Guava	E4A	
Flora	Orchidaceae	<i>Diuris byronensis</i>	Byron Bay Diuris	E1,P,2	
Flora	Orchidaceae	<i>Geodorum densiflorum</i>	Pink Nodding Orchid	E1,P,2	
Flora	Orchidaceae	<i>Oberonia complanata</i>	Yellow-flowered King of the Fairies	E1,P,2	
Flora	Orchidaceae	<i>Phaius australis</i>	Southern Swamp Orchid	E1,P,2	E
Flora	Orchidaceae	<i>Pterostylis nigricans</i>	Dark Greenhood	V,P,2	
Flora	Polypodiaceae	<i>Drynaria rigidula</i>	Basket Fern	E1,3	
Notes NSW Status: V = Vulnerable; E1 = Endangered; P = Protected; 3 = Category 3 sensitive species. Commonwealth (Cth) Status: V = Vulnerable; C = China-Australia Migratory Bird Agreement (CAMBA).					

Table 2: Threatened Ecological Communities known to occur in the Byron Local Government Area.

Threatened ecological community	NSW status	Cth status
Byron Bay Dwarf Graminoid Clay Heath Community	E3	
Coastal Cypress Pine Forest in the NSW North Coast Bioregion	E3	
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3	V
Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3	
Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3	CE
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E3	CE
Lowland Rainforest on Floodplain in the NSW North Coast Bioregion	E3	CE
Subtropical Coastal Floodplain Forest of the NSW North Coast Bioregion	E3	
Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3	
Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3	
White Gum Moist Forest in the NSW North Coast Bioregion	E3	
Notes NSW Status: V = Vulnerable; E1 = Endangered; P = Protected; 3 = Category 3 sensitive species. Commonwealth (Cth) Status: V = Vulnerable; CE = Critically endangered.		

2.3 Subject land assessment

The on-ground assessment involved a meandering habitat field survey concentrated on the development footprint and the immediate surrounding buffer, with regard for the suitability of the habitat for threatened species, particularly those recorded within 1.5 km of the development footprint (see section 2.2), and others that have the potential to occur.

2.4 Discussion

As a result of significant historical land use impacts (e.g., sand mining followed by urban expansion), the dynamic nature of the foreshore, and the high public use of the subject land in general, the site represents limited potential habitat for native fauna, particularly for threatened species with the potential to occur in the locality. The development footprint however does include an area of Clarkes Beach, which represents potential habitat for a small suite of threatened species, particularly marine species such as marine turtles and shorebirds. The development footprint also contains a small area of fragmented littoral rainforest vegetation currently impacted by coastal erosion and land use pressures.

As the entire development footprint comprises two separate proposals, and as the habitat present in each of the proposal areas provide differing habitat features suitable for different animal classes, the two proposal areas have been discussed separately below.

Proposal A: The development footprint for works prescribed for Proposal A is currently the upper tidal extent and north facing dune of Clarkes Beach, an area significantly eroded by storms in recent years. The area is a heavily trafficked and dynamic stretch of beach in Byron Bay. It offers habitat potential for predominantly marine and coastal species, however, the specific value provided is variable in that precise location, depending on the position of the foreshore and dune system in relation to the development footprint at any given time.



Plate 5: The Proposal A footprint is a small section of upper tidal beach and dune along Clarkes Beach.

The value of habitat within the development footprint for Proposal A, with respect to threatened species with the potential to occur, is of most relevance to shorebirds and marine turtles. The beach and dune system provides potential nesting habitat for marine turtles and provides potential foraging and temporary resting habitat for shorebirds. Minimal works are required for Proposal A, with the objective of works to leave existing sandbags in their current location for an additional nominal 5 years, which were initially installed as part of temporary coastal protection works. After the nominal 5-year period, the sandbags would be removed. The development footprint for Proposal A covers an area of approx. 1,500 m² (Figure 2).

Proposal B: The development footprint for works prescribed for Proposal B is a small area (approx. 500 m²) within young age class littoral rainforest and dune vegetation adjacent to the café. Tree and shrub species present in the area include Tuckeroo (*Cupaniopsis anacardioides*), Three-veined Cryptocarya (*Cryptocarya triplinervis*), Beach Alectryon (*Alectryon coriaceus*), Screw Pine (*Pandanus tectorius*) and Coast Banksia (*Banksia integrifolia*). The development footprint contains one ($n = 1$) Koala food tree (Forest Red Gum (*Eucalyptus tereticornis*)), with other species, particularly Broad-leaved Paperbark (*Melaleuca quinquenervia*) also occurring in the vicinity. However, the development footprint is not considered to contain Koala habitat. Exotic species* within the development footprint are generally limited to exotic grasses (e.g., *Durban Grass (*Dactyloctenium australe*)) herbs (e.g., *Blackberry Nightshade (*Solanum nigrum*)) and vines (e.g., *Coastal Morning Glory (*Ipomoea indica*)).



Plate 6: Proposal B would include construction of a stormwater swale on the western side of the cafe.

Works prescribed for Proposal B consists of the installation of scour protection and other stormwater management devices adjacent to the café, to reduce damage to temporary coastal protection

* Denotes exotic species

infrastructure (erosion of dune) caused by stormwater to the littoral rainforest area. Works would also require the repair of the damaged beach access path on the western side of the café (Figure 2), which requires a minor reconfiguration through an open area of forest edge. Works have been designed to avoid and minimise impacts, with the location of the scour flow path and access path identified such that it is able to wind through the area of vegetation with negligible clearing required.

In addition, several small trees (predominantly Coast Banksia (*Banksia integrifolia*) and Screw Pine (*Pandanus tectorius*)), which have already fallen onto the beach from the top of dune (Plate 5), or whose collapse is likely and imminent, require pruning or removal. These represent a danger to the public.

Vegetation on the terrestrial component of subject land in the proximity of the proposal is analagous with the vegetation community listed in Schedule 2 of the BC Act as threatened ecological communities (TEC), namely the endangered ecological community (EEC) *Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*. Potential direct and indirect impacts have been further assessed for the EEC by way of the ToS in Appendix A.

Extensive high-quality habitat for native fauna occurs in the wider locality, particularly to the south east and south west of the subject land, including within protected areas such as Arakwal National Park and Cumbebin Nature Reserve. Cape Byron Marine Park also provides protected marine habitat within the 1.5 km assessment circle and beyond. This abundance of high-quality habitat is likely to further mitigate any potential indirect impacts that may occur from this development proposal by providing significant alternative resources for threatened species with a likelihood of occurring on the subject land.

The suitability of the subject land for threatened flora and fauna species previously recorded within a 1.5 km assessment circle of the development footprint, and their likelihood of occurrence, is included in Table 3. This suitability assessment has been undertaken following a desktop spatial analysis, subject land habitat assessment and review of the Office of Environment and Heritage (OEH) Threatened Species Profiles.

A *Test of Significance* (ToS) was undertaken for those threatened fauna species with the potential to occur within the development footprint and/or considered to have some potential to be impacted by the proposal. The following eight ($n = 8$) fauna species were identified for further assessment:

- Sooty Oystercatcher (*Haematopus fuliginosus*)
- Pied Oystercatcher (*Haematopus longirostris*)
- Little Tern (*Sternula albifrons*)
- Great Knot (*Calidris tenuirostris*)
- Koala (*Phascolarctos cinereus*)
- Common Blossom-bat (*Syconycteris australis*)
- Loggerhead Turtle (*Caretta caretta*)
- Green Turtle (*Chelonia mydas*)

The ToS concluded that the proposal would not result in a significant impact (Appendix A).

Figure 3: Threatened flora species within 1.5 km, vegetation mapping, and protected



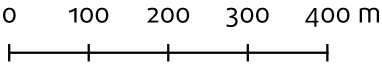
Legend

- Subject Land
- Development Footprint - Proposal A & B
- 1.5km Assessment Circle
- Road Corridor
- Hydroline
- Lot
- NPWS Reserve
- Threatened Flora_BioNet 1.5km

Byron Veg 2017_clipped 1.5km

- Camphor Laurel 51-80%
- Coastal Dune Dry Sclerophyll Forests
- Coastal Heath Swamps
- Coastal Swamp Forests
- Exotic
- Littoral Rainforests
- Maritime Grassland
- North Coast Clay Heathlands
- North Coast Dry Sclerophyll Forests
- North Coast Wet Sclerophyll Forests
- Northern Hinterland Wet Sclerophyll
- Subtropical Rainforests
- Wallum Sand Heaths

1:9500



ATtribution PARTIES











Aerials: © NearMap Pty Ltd [2017]
Topographic: © Land and Property Information [2017]
Cadastral: © Land and Property Information [2017]
Vegetation: © BSC [2017]

BA&S makes every effort to ensure this map is free of errors, but does not warrant the map or it's features are either spatially or temporally accurate or fit for a particular use. BA&S provides this map without any warranty of any kind whatsoever, either express or implied.

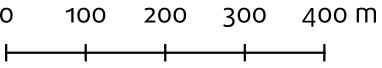
Figure 4: Threatened fauna species within 1.5 km, protected areas and habitat corridors.



Legend

-  Subject Land
 -  Development Footprint - Proposal A & B
 -  1.5km Assessment Circle
 -  Road Corridor
 -  Hydroline
 -  Lot
 -  NPWS Reserve
 -  Threatened Fauna_BioNet 1.5km
- FaunaCorridors_NE_NSW**
-  regional
 -  subregional

1:9500



Attribution Parties

Aerials: © NearMap Pty Ltd [2017]
Topographic: © Land and Property Information [2017]
Cadastral: © Land and Property Information [2017]

BA&S makes every effort to ensure this map is free of errors, but does not warrant the map or it's features are either spatially or temporally accurate or fit for a particular use. BA&S provides this map without any warranty of any kind whatsoever, either express or implied.

Table 3: Threatened species recorded within 1.5 km of the development footprint and suitability assessment of the subject land.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
Amphibia				
Olongburra Frog (<i>Litoria olongburensis</i>)	<p>Found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgeland & wet heathlands but can also be found along drainage lines within other vegetation communities & disturbed areas, & occasionally in swamp sclerophyll forests.</p> <p>The species breeds in swamps with permanent water as well as shallow ephemeral pools & drainage ditches. Breeding is thought to peak in the colder months but can occur throughout the year following rain. Eggs of 1.1-1.2mm are deposited in water with a pH of <6 & tadpoles take 2-6 months to develop into frogs.</p> <p>Shelters under leaf litter, vegetation, other debris or in burrows of other species. Shelter sites are wet or very damp & often located near the water's edge. Males may call throughout the year & at any time of day, peaking following rain.</p>	Very Unlikely	No	<p>The development footprint for both components (i.e., Proposal A and Proposal B) does not contain freshwater wetland habitat potentially able to support the Olongburra Frog, and the site does not contain typically preferred specific habitat requirements of 'acid' frogs.</p> <p>Four ($n = 4$) records have been identified within the 1.5 km assessment circle, with the most recent of those records being from May 2003. These have all been recorded within the Arakwal National Park to the south, south-east. These records are located within an area of relatively undisturbed & preferred wet heath habitat suitable for the Olongburra Frog.</p> <p>The small scale of the proposal, the minimal disturbance, the lack of identified preferred habitat for this species, and the lack of records within close proximity to the site, provides a level of confidence that the proposal would not significantly impact on potential food or habitat resources for the Olongburra Frog.</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
Wallum Froglet (<i>Crinia tinnula</i>)	<p>Wallum Froglets are found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgelands and wet heathlands. They can also be found along drainage lines within other vegetation communities and disturbed areas, and occasionally in swamp sclerophyll forests.</p> <p>The species breeds in swamps with permanent water as well as shallow ephemeral pools and drainage ditches. Breeding is thought to peak in the colder months, but can occur throughout the year following rain. Eggs of 1.1-1.2mm are deposited in water with a pH of <6 and tadpoles take 2-6 months to develop into frogs.</p> <p>Wallum Froglets shelter under leaf litter, vegetation, other debris or in burrows of other species. Shelter sites are wet or very damp and often located near the water's edge. Males may call throughout the year and at any time of day, peaking following rain.</p>	Very Unlikely	No	<p>The development footprint for both components does not contain freshwater wetland habitat potentially able to support the Wallum Froglet, and the site does not contain typically preferred specific habitat requirements of 'acid' frogs.</p> <p>Twelve ($n = 12$) records have been identified within the 1.5 km assessment circle between 1993 and June 2018. These have all been recorded within the Arakwal National Park to the south, south-east. These records are located within an area of relatively undisturbed & preferred habitat suitable for the Wallum Froglet.</p> <p>The small scale of the proposal, the minimal disturbance, the lack of identified preferred habitat for this species, and the lack of records within close proximity to the site, provides a level of confidence that the proposal would not significantly impact on potential food or habitat resources for the Wallum Froglet.</p>
Aves				
White-bellied Sea Eagle (<i>Haliaeetus leucogaster</i>)	The habitats of this species are characterised by the presence of large areas of open water including rivers, swamps, lakes, and the sea. White-bellied Sea Eagles occur at sites near the sea or seashore, such as around	Unlikely	No	Potential to occur overhead of the development footprint in association with general foraging flight patterns in the area and may seek prey items or carrion from

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	<p>bays and inlets, beaches, reefs, lagoons, estuaries and mangroves, and at, or in the vicinity of, freshwater swamps, lakes, reservoirs, billabongs and saltmarsh.</p> <p>Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest).</p> <p>Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.</p> <p>Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion.</p>			<p>surrounding beaches or open areas. Although it is considered unlikely due to the 'busyness' of the area, with preferable less trafficked areas available in the locality.</p> <p>No suitable roosting habitat features occur within the development footprint or in the immediate vicinity.</p> <p>The proposal would not result in any impacts on potential habitat or food resources for this species.</p>
Eastern Osprey (<i>Pandion cristatus</i>)	<p>Favour coastal areas, especially the mouths of large rivers, lagoons and lakes.</p> <p>Feed on fish over clear, open water.</p> <p>Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.</p> <p>Incubation of 2-3 eggs, usually by the female, is about 40 days. Female remains with young almost until they fly, usually after about nine weeks in the nest.</p>	Unlikely	No	<p>Potential to occur overhead of the development footprint in association with general foraging flight patterns and may seek prey items or carrion from surrounding beaches or open areas. Although it is considered unlikely due to the 'busyness' of the area, with preferable less trafficked areas available in the locality.</p> <p>No suitable roosting habitat features occur within the development footprint or in the immediate vicinity.</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				The proposal would not result in any impacts on potential habitat or food resources for this species.
Black Bittern (<i>Ixobrychus flavicollis</i>)	<p>The Black Bittern inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.</p> <p>Black Bitterns feed on frogs, reptiles, fish and invertebrates, including snails, dragonflies, shrimps and crayfish, with most feeding done at dusk and at night.</p> <p>During the day, roosts in trees or on the ground amongst dense reeds. When disturbed, freezes in a characteristic bittern posture (stretched tall, bill pointing up, so that shape and streaked pattern blend with upright stems of reeds), or will fly up to a branch or flush for cover where it will freeze again.</p> <p>Like other bitterns, but unlike most herons, nesting is solitary. Nests, built in spring are located on a branch overhanging water and consist of a bed of sticks and reeds on a base of larger sticks.</p>	Very Unlikely	No	<p>The development footprint does not contain areas of shallow wetland suitable for this species and generally lacks adequate dense understorey vegetation preferred by this species. This shy and cryptic species is also unlikely to occupy habitat in the vicinity of the proposal due to the 'busyness' of the location.</p> <p>Two ($n = 2$) records occur within the 1.5 km assessment circle; however, both of these records are from 1974.</p> <p>Suitable habitat occurs beyond the development footprint within the assessment circle and beyond; however, these areas would not be impacted.</p> <p>The proposal would not result in any impacts on potential habitat or food resources for this species.</p>
Bush Stone-curlew (<i>Burhinus grallarius</i>)	<p>Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber.</p> <p>Largely nocturnal, being especially active on moonlit nights.</p>	Unlikely	No	The 1.5 km assessment circles contain two ($n = 2$) records, with the most recent being from May 2010, approx. 600 m from the development footprint.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	<p>Feed on insects and small vertebrates, such as frogs, lizards and snakes.</p> <p>Nest on the ground in a scrape or small bare patch.</p> <p>Two eggs are laid in spring and early summer.</p>			<p>Although the site does not contain habitat considered to be preferred habitat, this species is known to venture into suburban areas from time to time, and even nest in urban areas.</p> <p>However, with consideration of the general lack of subsequent records from the 1.5 km assessment circle of this distinctive species, absence of records from the immediate area, and the presence of more recent records from preferred protected habitat in the wider locality, it is considered unlikely that the species would occur within or adjacent to the development footprint.</p> <p>The proposal would not result in any impacts on potential habitat or food resources for this species.</p>
Wompoo Fruit-Dove (<i>Ptilinopus magnificus</i>)	<p>Occurs in, or near rainforest, low elevation moist eucalypt forest & brush box forests.</p> <p>Feeds on a diverse range of tree & vine fruits & is locally nomadic - following ripening fruit. Thought to be an effective medium to long-distance vector for seed dispersal.</p> <p>The nest is a typical pigeon nest - a flimsy platform of sticks on a thin branch or a palm frond, often over water, usually 3 - 10 m above the ground. Breeds in spring & early summer; a single white egg is laid.</p>	Unlikely	No	<p>Two ($n = 2$) records occur within the 1.5 km assessment circle, within areas of expansive and consolidated vegetation, approx. 900m from the development footprint.</p> <p>The development footprint for Proposal A does not contain any suitable habitat, with the entirety of the development footprint being located on a tidal beach and exposed dune.</p> <p>The development footprint for Proposal B provides marginal potential foraging habitat. The subject land in general is unlikely to</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	Most often seen in mature forests, but also found in remnant & regenerating rainforest.			provide suitable nesting habitat, due to the young age class of vegetation generally, and the 'busyness' of the site is likely to discourage significant usage of the area for this very shy & cryptic species. The proposal would not result in any impacts on resources at the site or in the locality, & likely suitable habitat for this species would not be impacted. Therefore, the proposal is unlikely to impact on this mobile species.
Rose-crowned Fruit-dove (<i>Ptilinopus regina</i>)	Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful. They are shy pigeons, not easy to see amongst the foliage, and are more often heard than seen. They feed entirely on fruit from vines, shrubs, large trees and palms, and are thought to be locally nomadic as they follow the ripening of fruits. Some populations are migratory in response to food availability - numbers in north-east NSW increase during spring and summer then decline in April or May.	Very Unlikely	No	One ($n = 1$) record occurs within the 1.5 km assessment circle from January 1975 and attributed in BioNet to the Australian Bird & Bat Banding Scheme. The development footprint for Proposal A does not contain any suitable habitat, with the entirety of the development footprint being located on a tidal beach and exposed dune. The development footprint for Proposal B provides marginal potential foraging habitat. The subject land in general is unlikely to provide suitable nesting habitat, due to the young age class of vegetation generally, and the 'busyness' of the site is likely to discourage significant usage of the area for this very shy & cryptic species.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				The proposal would not result in any impacts on resources at the site or in the locality, & likely suitable habitat for this species would not be impacted. Therefore, the proposal is unlikely to impact on this mobile species.
Superb Fruit-Dove (<i>Ptilinopus superbus</i>)	<p>Inhabits rainforest & similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs & palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees.</p> <p>Part of the population is migratory or nomadic. There are records of single birds flying into lighted windows & lighthouses, indicating that birds travel at night. At least some of the population, particularly young birds, moves south through Sydney, especially in autumn.</p> <p>Breeding takes place from September to January. The nest is a structure of fine interlocked forked twigs, giving a stronger structure than its flimsy appearance would suggest, & is usually 5-30 metres up in rainforest & rainforest edge tree & shrub species.</p>	Very Unlikely	No	<p>One ($n = 1$) record occurs within the 1.5 km assessment circle from December 1957, and although several records occur for this species from within the Shire, recent records are generally scarce.</p> <p>The development footprint for Proposal A does not contain any suitable habitat, with the entirety of the development footprint being located on a tidal beach and exposed dune.</p> <p>The development footprint for Proposal B provides marginal potential foraging habitat. The subject land in general is unlikely to provide suitable nesting habitat, due to the young age class of vegetation generally, and the 'busyness' of the site is likely to discourage significant usage of the area for this very shy & cryptic species.</p> <p>The proposal would not result in any impacts on resources at the site or in the locality, & likely suitable habitat for this species would not be impacted. Therefore, the proposal is unlikely to impact on this mobile species.</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
Sooty Oystercatcher (<i>Haematopus fuliginosus</i>)	<p>Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches, and muddy estuaries.</p> <p>Forages on exposed rock or coral at low tide for foods such as limpets and mussels.</p> <p>Breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells, or seaweed when nesting among rocks.</p>	Potential	Yes	<p>Two ($n = 2$) records occur from within the 1.5 km assessment circle, both from Tallow Beach, > 1 km to the south east.</p> <p>The Proposal A development footprint is located on Clarkes Beach, and represents potential foraging habitat for this species. Works for Proposal A are limited to the retention of the existing configuration of sandbags and sand nourishment and their removal in a nominal period of 5 years. This represents both a potential impact on a small area of this species foraging habitat, and a disturbance impact when removal of sandbags is undertaken.</p> <p>The proposal B development footprint does not occur within an area likely to be utilised by this species, however, activity associated with the proposal represents a potential disturbance impact to this species.</p> <p>This species has been selected for further assessment by way of a Test of Significance (Appendix A).</p>
Pied Oystercatcher (<i>Haematopus longirostris</i>)	<p>The Pied Oystercatcher favours intertidal flats of inlets and bays, open beaches and sandbanks.</p> <p>Foraging occurs on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. The chisel-</p>	Potential	Yes	<p>Five ($n = 5$) records occur from within the 1.5 km assessment circle, including from Clarkes Beach. All records from within the assessment</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	<p>like bill is used to pry open or break into shells of oysters and other shellfish.</p> <p>This species nests mostly on coastal or estuarine beaches, although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones.</p> <p>Two to three eggs are laid between August and January. The female is the primary incubator and the young leave the nest within several days.</p>			<p>circle occur since 2015, and this species is likely to be an occasional visitor to the beach.</p> <p>The Proposal A development footprint is located on Clarkes Beach, and represents potential foraging habitat for this species. Works for Proposal A are limited to the retention of the existing configuration of sandbags and their removal in 5 years, as well as dune nourishment. This represents both a potential impact on a small area of this species foraging habitat, and a disturbance impact when removal of sandbags is undertaken.</p> <p>The proposal B development footprint does not occur within an area likely to be utilised by this species, however, activity associated with the proposal represents a potential disturbance impact to this species.</p> <p>This species has been selected for further assessment by way of a Test of Significance (Appendix A).</p>
Sooty Tern (<i>Onychoprion fuscata</i>)	<p>Large flocks can be seen soaring, skimming and dipping but seldom plunging in offshore waters.</p> <p>Breeds in large colonies in sand or coral scrapes on offshore islands and cays including Lord Howe and Norfolk Islands.</p>	Very Unlikely	No	<p>Only one ($n = 1$) record occurs within the 1.5 km assessment circle, with it being from Tallows Beach in 1989.</p> <p>This marine species is seldom seen on the coast and is usually only encountered following</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				<p>severe storms interrupting usual flight pathways.</p> <p>Although Proposal A does occur on an area which is currently a tidal beach, it is unlikely that this area would represent typical known habitat for this species, and the low impact nature of the proposal itself would further reduce any potential for impact.</p> <p>The proposal would not result in any impacts on potential habitat or food resources for this species.</p>
<p>Little Tern (<i>Sternula albifrons</i>)</p>	<p>Almost exclusively coastal, preferring sheltered environments; however, may occur several km from the sea in harbours, inlets & rivers (with occasional offshore islands or coral cay records).</p> <p>Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes & islands.</p> <p>The nest is a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles.</p> <p>Often seen feeding in flocks, foraging for small fish, crustaceans, insects, worms & molluscs by plunging in the shallow water of channels & estuaries, & in the surf on beaches, or skipping over the water surface with a swallow-like flight.</p>	Unlikely	Yes	<p>Two ($n = 2$) records occur from within the 1.5 km assessment circle, from 1974 and 1981. The scarcity of recent records from within the assessment circle indicate that this species is likely to be a rare visitor to Clarkes Beach, potentially as a result of regular and increasing disturbance impacts in this part of Byron Bay.</p> <p>Despite the scarcity of records from within the vicinity of the Proposal A development footprint, its location on Clarkes Beach represents potential foraging and resting habitat for this species. Works for Proposal A are limited to the retention of the existing configuration of sandbags and their removal in 5 years. This represents both a potential impact on a small area of this species potential resting</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				<p>habitat, and a disturbance impact when removal of sandbags is undertaken.</p> <p>The proposal B development footprint does not occur within an area likely to be utilised by this species, however, activity associated with the proposal represents a potential disturbance impact to this species.</p> <p>This species has been selected for further assessment by way of a Test of Significance (Appendix A).</p>
<p>Southern Giant Petrel (<i>Macronectes giganteus</i>)</p>	<p>Over summer, the species nests in small colonies amongst open vegetation on Antarctic and subantarctic islands, including Macquarie and Heard Islands and in Australian Antarctic territory.</p> <p>A single chick is raised and although breeding occurs annually, approximately 30% of the potential breeding population does not nest.</p> <p>It is an opportunistic scavenger and predator and scavenges from fishing vessels and animal carcasses on land.</p> <p>It is also an active predator of cephalopods and euphausiids, as well as smaller birds (particularly penguins) both at land and at sea.</p> <p>Birds will desert their nests if disturbed at the breeding colony.</p>	Very Unlikely	No	<p>Numerous records occur within the 1.5 km assessment circle; however, these records all occur within the period of between 1974 and 1976, with records relating to the Australian Bird & Bat Banding Scheme.</p> <p>This species is an infrequent visitor to the coastline, however, is occasionally encountered when interruptions such as storms occur to their usual flight voyages.</p> <p>The proposal would not result in any impacts on potential habitat or food resources for this species.</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
Northern Giant Petrel (<i>Macronectes halli</i>)	<p>Breeding in Australian territory is limited to Macquarie Island and occurs during spring and summer.</p> <p>Adults usually remain near the breeding colonies throughout the year (though some do travel widely) while immature birds make long and poorly known circumpolar and trans-oceanic movements. Hence most birds recorded in NSW coastal waters are immature birds.</p> <p>Northern Giant-Petrels seldom breed in colonies but rather as dispersed pairs, often amidst tussocks in dense vegetation and areas of broken terrain.</p> <p>A single chick is raised and although breeding occurs annually, approximately 30% of the potential breeding population do not nest.</p> <p>There are marked differences in diet between the sexes. Females obtain most of their prey live from the sea, while males also scavenge from the carcasses of penguins and seals on land.</p> <p>At sea, both sexes are aggressive opportunists, feeding on fish, cephalopods, birds and crustaceans, including euphausiids or krill, and regularly scavenge on fishing vessels.</p> <p>During the vulnerable early chick phase adult birds utilise land-based carrion resources (e.g., seals) extensively.</p>	Very Unlikely	No	<p>Six ($n = 6$) records occur within the 1.5 km assessment circle; however, these records all occur within the period of between 1975 and 1987, with records relating to the Australian Bird & Bat Banding Scheme.</p> <p>This species is an infrequent visitor to the coastline, however, is occasionally encountered when interruptions such as storms occur to their usual flight voyages.</p> <p>The proposal would not result in any impacts on potential habitat or food resources for this species.</p>
Little Lorikeet (<i>Glossopsitta pusilla</i>)	Forages primarily in the canopy of open Eucalyptus forest & woodland, yet also finds food in Angophora, Melaleuca & other tree species. Riparian habitats are particularly	Unlikely	No	One ($n = 1$) records occur within the 1.5 km assessment circle. This is a recent record (April 2019) from Cape Byron Lighthouse. This is the

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	<p>used, due to higher soil fertility & hence greater productivity.</p> <p>Isolated flowering trees in open country, e.g., paddocks, roadside remnants & urban trees also help sustain viable populations of the species.</p> <p>Feeds mostly on nectar & pollen, occasionally on native fruits such as mistletoe, & only rarely in orchards.</p> <p>Gregarious, travelling & feeding in small flocks (<10), though often with other lorikeets. Flocks numbering hundreds are still occasionally observed & may have been the norm in past centuries.</p> <p>Roosts in treetops, often distant from feeding areas.</p> <p>Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) & generally high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like <i>Allocasuarina</i>.</p> <p>Nesting season extends from May to September. In years when flowering is prolific, Little Lorikeet pairs can breed twice, producing 3-4 young per attempt. However, the survival rate of fledglings is unknown.</p>			<p>most recent record for this species within the Shire, with only one ($n = 1$) other record occurring within the last decade, and most records occurring before the year 2000.</p> <p>The development footprint for Proposal A does not contain any suitable habitat, with the entirety of the development footprint being located on a tidal beach and exposed dune.</p> <p>The development footprint for Proposal B provides marginal potential foraging habitat with some flowering plant species present, however, the scarcity of records indicates that this would be unlikely. The ‘busyness’ of the site is likely to discourage significant usage of the area for this very shy & cryptic species.</p> <p>No suitable hollows were recorded from the subject land, & as such the site is unlikely to offer suitable roosting habitat for Little Lorikeet.</p> <p>The proposal would not result in any impacts on potential habitat or food resources, & therefore the proposal is unlikely to impact on this mobile species.</p>
Pale-vented Bush-hen (<i>Amaurornis moluccana</i>)	The Pale-vented Bush-hen inhabits tall dense understorey or ground-layer vegetation on the margins of freshwater streams and natural or artificial wetlands,	Unlikely	No	The development footprint does not contain preferred wetland habitat for this species, and the “busyness” of the location is likely to

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	<p>usually within or bordering rainforest, rainforest remnants or forests.</p> <p>Also occur in secondary forest growth, rank grass or reeds, thickets of weeds, such as Lantana (<i>Lantana camara</i>), and pastures, crops or other farmland, such as crops of sugar cane, and grassy or weedy fields, or urban gardens where they border forest and streams or wetlands, such as farm dams. Can also occur in and around mangroves, though rarely do so, if at all, in NSW.</p> <p>Key elements of their habitat are dense undergrowth 2 to 4 metres tall and within 300 metres of water.</p> <p>The diet consists of seeds, plant matter, earthworms, insects and some frogs, taken from ground cover or by wading at edges of streams or wetlands.</p> <p>The breeding season is from spring to early autumn, October to April.</p> <p>The nest is a shallow bowl or cup of grass stems, often partly hooded, built close to water in thick ground vegetation such as dense Blady Grass (<i>Imperata cylindrica</i>), mat rush (<i>Lomandra</i>) or reeds, often under or growing through shrubs or vine or beneath a tree.</p> <p>Birds lay 4 to 7 eggs in a clutch and will re-lay after a successful breeding attempt and make multiple attempts after nesting failures.</p>			<p>generally deter this species from utilising any vegetation at or adjacent to the site, even on a temporary foraging basis. Three ($n = 3$) records occur within the 1.5km assessment circle, with the most recent being from February 2014.</p> <p>Preferred habitat of this species occurs in the locality and beyond, which would not be impacted either directly or indirectly by the proposal.</p> <p>The proposal would not result in any impacts on potential habitat or food resources for this species.</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	The incubation period is about 3 weeks. The hatchlings are precocial and can run soon after hatching; they are probably dependent on their parents for 4 to 5 weeks after hatching.			
Great Knot (<i>Calidris tenuirostris</i>)	Occurs within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. Often recorded on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms. Migrates to Australia from late August to early September, although juveniles may not arrive until October-November. Most birds return north in March and April, however, some individuals may stay over winter in Australia. Forages for food by methodically thrusting its bill deep into the mud to search for invertebrates, such as bivalve molluscs, gastropods, polychaete worms and crustaceans.	Unlikely	Yes	One ($n = 1$) solitary record occurs within the 1.5 km assessment circle from November 1994, with only two ($n = 2$) additional records, from the same period, occurring in the remainder of the Shire. This species is therefore likely to be an irregular visitor to this part of the coast, and unlikely to occur within the development footprint or surrounding potential habitat. Reasons for non-utilisation could potentially include the regular disturbance likely in and around the subject land. This species has been selected for further assessment by way of a Test of Significance (Appendix A).
Sooty Owl (<i>Tyto tenebricosa</i>)	Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Roosts by day in the hollow of a tall forest tree or in heavy vegetation; hunts by night for small ground mammals or tree-dwelling mammals such as the Common Ringtail Possum (<i>Pseudocheirus peregrinus</i>) or Sugar Glider (<i>Petaurus breviceps</i>).	Very Unlikely	No	The development footprint does not contain preferred forest habitat for this species, and the “busyness” of the location is likely to deter this species from utilising any vegetation at the site, even on a temporary foraging basis. Significant preferred habitat occurs in the locality and beyond, which would not be

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	Nests in very large tree-hollows.			impacted either directly or indirectly by the proposal. The proposal would not result in any impacts on potential habitat or food resources for this species.
Gastropoda				
Mitchell's Rainforest Snail (<i>Thersites mitchellae</i>)	<p>The Mitchell's Rainforest Snail occurs in remnant areas of lowland subtropical rainforest and swamp forest on alluvial soils. Slightly higher ground around the edges of wetlands with palms and fig trees are particularly favoured habitat.</p> <p>This snail is typically found amongst leaf litter on the forest floor, and occasionally under bark in trees.</p> <p>Active at night and feeds on leaf litter, fungi and lichen.</p>	Unlikely	No	<p>Two ($n = 2$) records occur from within the 1.5 km assessment circle, in an area of Swamp Sclerophyll Forest. The development footprint does not represent preferred habitat for this species, with the development footprint for Proposal A being beach and dune, and the development footprint for Proposal B being littoral rainforest. Other forms of forest, such as subtropical rainforest and swamp sclerophyll forest generally preferred. The species preference for wetter sites, generally in association with coastal wetlands also likely reduces the likelihood of occurrence of this species within the development footprint.</p> <p>Significant preferred habitat occurs in the wider locality and beyond, which would not be impacted either directly or indirectly by the proposal.</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				The proposal would not result in any impacts on potential habitat or food resources for this species.
Insecta				
Laced Fritillary (<i>Argynnis hyperbius</i>)	<p>The Australian Fritillary is found in open swampy coastal habitat.</p> <p>Eggs are laid singly on a leaf of the caterpillar's food plant, the Arrowhead Violet (<i>Viola betonicifolia</i>).</p> <p>The food plant occurs in the vegetation ground layer beneath grasses and mat-rushes (<i>Lomandra</i> spp.).</p> <p>Many former sites have been destroyed and very few populations are currently known to be extant.</p> <p>Adults feed from flowers of various plants in, and surrounding breeding habitat (possibly up to 1km).</p>	Very Unlikely	No	<p>The development footprint does not represent preferred habitat for this species, with swampy coastal habitat preferred, and the caterpillar's food plant was not recorded within the development footprint.</p> <p>Significant preferred habitat occurs in the wider locality and beyond, which would not be impacted either directly or indirectly by the proposal.</p> <p>The proposal would not result in any impacts on potential habitat or food resources for this species.</p>
Mammalia				
Spotted-tailed Quoll (<i>Dasyurus maculatus</i>)	<p>Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.</p> <p>Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites.</p> <p>Mostly nocturnal, although will hunt during the day; spend most of the time on the ground, although also an</p>	Very Unlikely	No	<p>One ($n = 1$) solitary record from July 2004 occurs from within the 1.5 km assessment circle, with records in and surrounding the Byron Bay township being rare.</p> <p>The small patchy area of littoral vegetation within and surrounding the development footprint is unlikely to provide suitable habitat for this species. A lack of habitat requirements</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	<p>excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds.</p> <p>Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals.</p> <p>A generalist predator with a preference for medium-sized (500g-5kg) mammals. Consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits, reptiles and insects. Also eats carrion and takes domestic fowl.</p> <p>Females occupy home ranges of 200-500 hectares, while males occupy very large home ranges from 500 to over 4000 hectares. Are known to traverse their home ranges along densely vegetated creeklines.</p> <p>Average litter size is five; both sexes mature at about one year of age. Life expectancy in the wild is about 3-4 years.</p>			<p>such as large hollows for dens or for prey items is further likely to reduce the suitability of the development footprint and surrounding areas for this species.</p> <p>The proposal would not result in any impacts on potential habitat or food resources for this species.</p>
Common Planigale (<i>Planigale maculata</i>)	<p>Common Planigales inhabit rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas where there is surface cover, and usually close to water.</p> <p>They are active at night and during the day shelter in saucer-shaped nests built in crevices, hollow logs, beneath bark or under rocks.</p>	Unlikely	No	<p>Two ($n = 2$) records from Arakwal National Park in May 2018 occur within the 1.5 km assessment circle in heathland.</p> <p>Proposal A development footprint is located on a tidal beach and exposed dune system and</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	<p>They are fierce carnivorous hunters and agile climbers, preying on insects and small vertebrates, some nearly their own size.</p> <p>They breed from October to January.</p> <p>The female builds a nest lined with grass, eucalypt leaves or shredded bark.</p>			<p>does not represent preferred or suitable habitat.</p> <p>Proposal B development footprint contains marginal potential habitat, however, is largely devoid of identified habitat features (e.g., hollow logs, rocky outcrops, vegetative groundcover). The littoral rainforest vegetation in and adjacent to the Proposal B footprint is small, patchy, and relatively open. It is also bordered by roads, paths and carparking areas, which are located between the subject land and other preferred potential habitat in the locality. As this species is highly sensitive to crossing open spaces, for fear of exposure to predators, it is unlikely that individuals would venture from another habitat area in the locality.</p> <p>Significant preferred habitat occurs in the locality and beyond, which would not be impacted either directly or indirectly by the proposal.</p> <p>The proposal would not result in any impacts on potential habitat or food resources for this species.</p>
Little Bentwing-bat (<i>Miniopterus australis</i>)	These bats inhabit moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca	Potential	No	The development footprint does not contain any suitable roosting habitat and does not necessarily represent typical habitat for this

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	<p>swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas.</p> <p>Roost locations include caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day. At night they forage for small insects beneath the canopy of densely vegetated habitats.</p> <p>In NSW the largest maternity colony is in close association with a large maternity colony of Eastern Bentwing-bats (<i>Miniopterus schreibersii</i>) and appears to depend on the large colony to provide the high temperatures needed to rear its young.</p> <p>Maternity colonies form in spring and birthing occurs in early summer. Males and juveniles disperse in summer.</p> <p>Only five nursery sites / maternity colonies are known in Australia.</p>			<p>species. However, this species forages widely where present and therefore the subject land offers potential foraging habitat, which it would continue to provide.</p> <p>Significant areas of potential roosting and foraging habitat occur in association with mature forested wetlands and other vegetation types in the local area.</p> <p>The proposal would not result in any significant impacts on potential habitat or food resources, and therefore the proposal is unlikely to impact on this mobile species.</p>
Large Bent-winged Bat (<i>Miniopterus orianae oceanensis</i>)	<p>Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.</p> <p>Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young.</p> <p>Maternity caves have specific temperature and humidity regimes.</p> <p>At other times of the year, populations disperse within about 300 km range of maternity caves.</p>	Potential	No	<p>The development footprint does not contain any suitable roosting habitat and does not necessarily represent typical habitat for this species. However, this species forages widely where present and therefore the subject land offers potential foraging habitat, which it would continue to provide.</p> <p>Significant areas of potential roosting and foraging habitat occur in association with</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	<p>Cold caves are used for hibernation in southern Australia.</p> <p>Breeding or roosting colonies can number from 100 to 150,000 individuals.</p> <p>Hunt in forested areas, catching moths and other flying insects above the treetops.</p>			mature forested wetlands and other vegetation types in the local area.
New Zealand Fur-seal (<i>Arctocephalus forsteri</i>)	<p>Prefers rocky parts of islands with jumbled terrain and boulders.</p> <p>Feeds principally on cephalopods and fish, but also seabirds and occasionally penguins.</p>	Very Unlikely	No	<p>One ($n = 1$) solitary record occurs from within the 1.5 km assessment circle, identified as being from The Pass. This is the only record from within the Byron Shire, and the accuracy of the record is 4,700 m from the mapping location.</p> <p>The development footprint does not represent preferred habitat, nor is it likely that this species would occur.</p> <p>The proposal would not result in any impacts on potential habitat or food resources for this species.</p>
Koala (<i>Phascolarctos cinereus</i>)	<p>Koalas inhabit eucalypt woodlands and forests.</p> <p>Koalas feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.</p> <p>Inactive for most of the day, Koalas feed and move mostly at night.</p> <p>They spend most of their time in trees but will descend and traverse open ground to move between trees.</p>	Potential	Yes	<p>The development footprint contains one ($n = 1$) Koala feed tree, <i>Eucalyptus tereticornis</i>, listed in Schedule 2 of Koala SEPP 2021. Other species including <i>Melaleuca quinquenervia</i> occur in adjacent areas.</p> <p>Records for the Koala occur scattered throughout the 1.5 km assessment circle, and the species can wander widely. However, the small scale of the proposal in general, the lack</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	<p>Home range size varies with quality of habitat, ranging from less than two ha to several hundred ha in size.</p> <p>Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery.</p> <p>Females breed at two years of age and produce one young per year.</p>			<p>of suitable habitat, and the busy nature of the development footprint area would be likely to reduce the potential occurrence of this species within or adjacent to the development footprint.</p> <p>The general busyness of the area and highly visible nature of the proposal area, also means that any occurrence of this species in the area would be readily noted, and able to be mitigated for.</p> <p>The proposal would not result in any impacts on potential habitat or food resources for this species.</p>
Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>)	<p>Grey-headed Flying-foxes occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.</p> <p>Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.</p> <p>Individual camps may have tens of thousands of animals and are used for mating, giving birth and rearing young. Can travel up to 50 km from the camp to forage though commuting distances are more often <20 km.</p> <p>Feed on the nectar and pollen of native trees, in particular <i>Eucalyptus</i>, <i>Melaleuca</i> and <i>Banksia</i> spp., and fruits of</p>	Potential	No	<p>The development footprint does not contain preferred habitat for either roosting or foraging.</p> <p>The subject land contains some marginal opportunistic foraging resources; however, resources are generally limited due to the types of vegetation present, with limited availability of resources in general.</p> <p>Preferred habitat occurs within the locality, with significant potential habitat available to the south east and south west of the subject land.</p> <p>The proposal would not result in any significant impacts on potential habitat or food resources,</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	rainforest trees and vines. Also forage in cultivated gardens and on fruit crops.			and therefore the proposal is unlikely to impact on this mobile species.
Common Blossom-bat (<i>Syconycteris australis</i>)	<p>Common Blossom-bats often roost in littoral rainforest and feed on nectar and pollen from flowers in adjacent heathland and paperbark swamps. They have also been recorded in a range of other vegetation communities, such as subtropical rainforest, wet sclerophyll forest and other coastal forests.</p> <p>They generally roost individually in dense foliage and vine thickets of the sub-canopy, staying in the same general area for a season. They change roost sites daily, but each roost site is generally only 50m or so away from other recent roosts.</p> <p>Favoured feeding sites are repeatedly visited on consecutive nights within a flowering season and revisited over several years.</p> <p>They require a year-round supply of nectar and pollen that is gathered from a mosaic of complex coastal vegetation types. When these vegetation types are in short supply of nectar and pollen (Nov/Dec in northern NSW), Common Blossom-bats have been known to utilise riverine areas containing Black Bean, Silky Oak and Weeping Bottlebrush.</p>	Potential	Yes	<p>The development footprint does not contain any suitable roosting habitat, but the area surrounding the Proposal B development footprint contains potential foraging habitat, with the presence of both littoral rainforest and banksia species present. Additionally, several small trees collapsing onto the beach, such as Coast Banksia, would require pruning/removal to reduce public risk. While the subject land offers potential foraging habitat, the high level of regular and sustained disturbance surrounding the subject land is likely to significantly reduce the potential occurrence of this shy species.</p> <p>Significant areas of potential roosting and foraging habitat occur in association with mature forested wetlands and other vegetation types in the local area.</p> <p>The proposal would not result in any significant impacts on potential habitat or food resources; however, some potential foraging habitat would temporarily be impacted, and disturbance would occur within potential foraging habitat.</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				This species has been selected for additional assessment by way of a Test of Significance.
Eastern Long-eared Bat (<i>Nyctophilus bifax</i>)	<p>The Eastern Long-eared Bat inhabits lowland subtropical rainforest and wet and swamp eucalypt forest, extending into adjacent moist eucalypt forest. Coastal rainforest and patches of coastal scrub are particularly favoured.</p> <p>This bat species roosts in tree hollows, the hanging foliage of palms, in dense clumps of foliage of rainforest trees, under bark and in shallow depressions on trunks and branches, among epiphytes, in the roots of strangler figs, among dead fronds of tree ferns and less often in buildings.</p>	Potential	No	<p>The development footprint does not contain any suitable roosting habitat and does not necessarily represent typical habitat for this species. However, this species forages widely where present and therefore the subject land offers potential foraging habitat.</p> <p>Significant areas of potential roosting and foraging habitat occur in association with mature forested wetlands and other vegetation types in the local area.</p> <p>The proposal would not result in any significant impacts on potential habitat or food resources, and therefore the proposal is unlikely to impact on this mobile species.</p>
Reptilia				
Loggerhead Turtle (<i>Caretta caretta</i>)	<p>Loggerhead Turtles are ocean-dwellers, foraging in deeper water for fish, jellyfish & bottom-dwelling animals. The female comes ashore to lay her eggs in a hole dug on the beach in tropical regions during the warmer months.</p>	Potential	Yes	<p>Multiple records occur for this species within the 1.5 km assessment circle, with most occurring along Tallow Beach to the east of the subject land, which likely offers preferred nesting habitat. However, a record from August 2015 occurs west of the development footprint, along Main Beach.</p> <p>The location of the existing sandbags represents a potential barrier to nesting</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				<p>attempts should this species come ashore along this stretch of beach. This is likely only relevant if and when sandbags are exposed. If the sandbags are covered by sand, this barrier no longer exists.</p> <p>Sandbag removal would be required at the completion of the nominal 5-year protection period, which represents a short-term potential disturbance.</p> <p>This species has been selected for additional assessment by way of a Test of Significance.</p>
Green Turtle (<i>Chelonia mydas</i>)	<p>Ocean-dwelling species spending most of its life at sea.</p> <p>Carnivorous when young but as adults they feed only on marine plant material.</p> <p>Eggs laid in holes dug in beaches throughout their range.</p> <p>Scattered nesting records along the NSW coast.</p>	Potential	Yes	<p>Five ($n = 5$) records occur for this species within the 1.5 km assessment circle, with most occurring along or adjacent to Clarkes Beach, Main Beach and The Pass. An additional anecdotal record of an aborted nesting attempt on Clarkes Beach is noted from early 2021 also exists.</p> <p>The location of the existing sandbags represents a potential barrier to nesting attempts should this species come ashore along this stretch of beach. This is likely only relevant if and when sandbags are exposed. If the sandbags are covered by sand, this barrier no longer exists.</p> <p>Sandbag removal would be required at the completion of the nominal 5-year protection</p>

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				period, which represents a temporary short-term potential disturbance. This species has been selected for additional assessment by way of a Test of Significance.
Flora				
Slender Marsdenia (<i>Marsdenia longiloba</i>)	Subtropical and warm temperate rainforest, lowland moist or open eucalypt forest adjoining rainforest and, sometimes, in areas with rock outcrops. Associated species include <i>Eucalyptus crebra</i> , <i>E. microcorys</i> , <i>E. acmenoides</i> , <i>E. saligna</i> , <i>E. propinqua</i> , <i>Corymbia intermedia</i> and <i>Lophostemon confertus</i> . Flowering occurs in summer.	Does not occur	No	The habitat requirements identified in the species profile do not match those that occur at the subject land. This species was not recorded during the site survey.
Dwarf Heath Casuarina (<i>Allocasuarina defungens</i>)	Dwarf Heath Casuarina grows mainly in tall heath on sand, but can also occur on clay soils and sandstone. The species also extends onto exposed nearby-coastal hills or headlands adjacent to sandplains.	Does not occur	No	The habitat requirements identified in the species profile do not match those that occur at the subject land. This species was not recorded during the site survey.
Thorny Pea (<i>Desmodium acanthocladum</i>)	Dry rainforest and fringes of riverine subtropical rainforest. On basalt-derived soils at low elevations. Much of its habitat has been cleared for agriculture.	Does not occur	No	The habitat requirements identified in the species profile do not match those that occur at the subject land. This species was not recorded during the site survey.
White Lace Flower (<i>Archidendron hendersonii</i>)	White Lace Flower occurs in riverine and lowland subtropical rainforest, littoral rainforest, coastal cypress pine forest and their ecotones.	Does not occur	No	This species was not recorded during the site survey.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	It is found on a variety of soils including coastal sands and those derived from basalt and metasediments.			
Queensland Xylosma (<i>Xylosma terrae-reginae</i>)	Littoral and subtropical rainforest on coastal sands or soils derived from metasediments.	Does not occur	No	This species was not recorded during the site survey.
Stinking Cryptocarya (<i>Cryptocarya foetida</i>)	Found in littoral, warm temperate and subtropical rainforest, wet sclerophyll forest and Camphor Laurel forest usually on sandy soils, but mature trees are also known on basalt soils. The seeds are readily dispersed by fruit-eating birds, and seedlings and saplings have been recorded from other habitats where they are unlikely to develop to maturity. Though seedlings can be fairly numerous, few mature trees are known.	Does not occur	No	This species was not recorded during the site survey.
Scrub Turpentine (<i>Rhodamnia rubescens</i>)	Scrub Turpentine is found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	Does not occur	No	This species was not recorded during the site survey.
Native Guava (<i>Rhodomyrtus psidioides</i>)	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. This species is characterised being extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	Does not occur	No	This species was not recorded during the site survey.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
Byron Bay Diuris (<i>Diuris byronensis</i>)	Occurs in low-growing grassy heath on clay soil.	Does not occur	No	The habitat requirements identified in the species profile do not match those that occur at the subject land. This species was not recorded during the site survey.
Pink Nodding Orchid (<i>Geodorum densiflorum</i>)	Dry eucalypt forest and coastal swamp forest at lower altitudes, often on sand.	Does not occur	No	The habitat requirements identified in the species profile do not match those that occur at the subject land. This species was not recorded during the site survey.
Yellow-flowered King of the Fairies (<i>Oberonia complanata</i>)	This species 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.	Does not occur	No	This species was not recorded during the site survey.
Southern Swamp Orchid (<i>Phaius australis</i>)	Southern Swamp Orchid occurs in swampy grassland or swampy forest including rainforest, eucalypt or paperbark forest, mostly in coastal areas.	Does not occur	No	The habitat requirements identified in the species profile do not match those that occur at the subject land. This species was not recorded during the site survey.
Dark Greenhood (<i>Pterostylis nigricans</i>)	Coastal heathland with Heath Banksia (<i>Banksia ericifolia</i>), and lower-growing heath with lichen-encrusted and relatively undisturbed soil surfaces, on sandy soils.	Does not occur	No	The habitat requirements identified in the species profile do not match those that occur at the subject land. This species was not recorded during the site survey.
Basket Fern (<i>Drynaria rigidula</i>)	It occurs on poorer soils in areas below 600 metres above sea level.	Does not occur	No	The habitat requirements identified in the species profile do not match those that occur at the subject land. This species was not recorded during the site survey.

3. Impact assessment

The proposal is comprised of several different elements, belonging to two specific proposals, which make up the development footprint. The principle of avoid and minimise has been incorporated into the proposal where possible. However, it is recognised that Proposal A is necessary works required to enable temporary foreshore and infrastructure protection. Proposal B also entails works considered important to (i) repair infrastructure (beach access) damaged because of coastal erosion to best manage public access, (ii) better manage and ameliorate for impacts (e.g., erosion) to littoral rainforest and temporary coastal protection works because of stormwater runoff at the location, and (iii) to minimise safety risks to the public from dangerous vegetation caused by dune erosion. Significant valuable habitat exists in the locality and beyond, with areas of significant habitat value to remain unimpacted.

Potential development impacts associated with the proposal are summarised below. A comprehensive suite of management strategies and mitigation measures are provided in Section 5, which would further reduce any potential impacts of the development to flora, fauna, and ecological communities.

3.1 Habitat Loss

Habitat loss within the development footprint is considered below for each separate proposal.

Proposal A: Sandbags are currently in place, having been installed as part of emergency works, and will remain in place for a further nominal period of 5-years. The sandbag wall was almost entirely covered by sand at the time of the assessment, with only a small portion exposed. Habitat loss from the placement of sandbags is likely of most relevance whilst sandbags are exposed, with ensuing beach replenishment (currently evident), covering the sandbag wall and allowing for some beach infauna to begin recolonizing the upper sand column. The total area of the sandbag wall is estimated to be approx. 600 m², which is unlikely to represent a significant loss of habitat in the local context.

Habitat loss has also been considered in the context of the sandbag wall acting as a barrier to fauna movement, of most relevance when considering the importance of the beach habitat for nesting marine turtles. Again, this is likely to result in more pronounced impacts whilst the sandbag wall is exposed, with minimal impact likely with ensuing beach replenishment. The sandbag wall covers a length of < 100 m (on the subject land assessed for this proposal). Even in the instance of sufficient exposure of the sandbag wall to a level which would constitute a barrier to movement, the small scale of the temporary structure is unlikely to represent significant loss of habitat in the local context.

Habitat loss because of potential additional sand nourishment required to maintain the dune between the sandbag wall and café, is also highly unlikely to represent a significant loss of habitat, with little significant habitat currently present at the time of the assessment. This is unlikely to represent a significant loss in the local context.

Proposal B: Habitat loss attributable to Proposal B is likely to be minimal, with works occurring immediately adjacent and westward of the café, in an area of young age fragmented littoral rainforest and dune vegetation. The total development footprint for Proposal B is approx. 500 m². Habitat within this area is generally sparse, with little ground layer or mid layer vegetation present within the development footprint (Plate 3). Flexibility with regards to design of certain elements (e.g., scour flow path), such that avoidance of main trees particularly can be achieved during implementation. The repair and reconfiguration of the beach access path will utilise the existing damaged track to a point, then

meander through relatively open vegetation to achieve final positioning. The installation of other stormwater management elements such as pipes and pits can be achieved with minimal impact.



Plate 5: Several small to medium sized native trees and shrubs require pruning/removal to ensure public safety.

Vegetation loss would also occur as a result of tree pruning/removal to mitigate vegetation collapsing onto Clarkes Beach (Plate 5) over a maximum area of < 350 m². This would likely result in impacts to several small to medium sized native trees including Coast Banksia (*Banksia integrifolia*) and Screw Pine (*Pandanus tectorius*). It is likely that this vegetation would be lost due to natural processes if not removed as a component of the proposal.

The sum of habitat loss, which would be limited to impacts to compromised top of dune vegetation, and native and exotic understorey vegetation, would occur over a maximum area of approx. 500 m². Vegetation is not present within much of this area, so disturbance to habitat would be significantly lower than the total footprint area, and the loss of habitat would be negligible. Much of the disturbance would be limited to disturbance of leaf litter, ground layer vegetation and falling or fallen trees.

Vegetation loss would include small native seedlings and saplings (< 1 m height) of common local species such as Blush Macaranga (*Macaranga tanarius*), Coast Banksia (*Banksia integrifolia*) and Tuckeroo (*Cupaniopsis anacardioides*). Other species present include weeds such as *Durban Grass (*Dactyloctenium australe*) and *Blackberry Nightshade (*Solanum nigrum*), with additional native species potentially impacted including Snake Vine (*Stephania japonica*), Slender Flat-sedge (*Cyperus gracilis*) and Scurvy Weed (*Commelina cyanea*).

There are no threatened flora species located in the impacted areas and no significant habitat vegetation (e.g., those with hollows) would require removal or be impacted by the development. The loss of a small area of young age class top of dune vegetation is unlikely to represent a significant loss in the local context.

3.2 Disturbance

The level of potential disturbance attributed to the proposal because of activities within the identified development footprint are considered relatively minor. This is attributed to the small footprint, minimal vegetation clearing or disturbance, and in the context of existing land use, current impacted condition (i.e., from coastal erosion) and public activity at the site (i.e., human traffic).

Proposal A: With regard to threatened species with the potential to occur within the development footprint, the threat of disturbance is considered most applicable to marine or coastal species, and most applicable to shorebirds and marine turtles with the potential to occur.

The potential disturbance from the sandbag wall currently in place is considered as a potential risk for marine turtles for the reason that the sandbag wall, when exposed, poses a potential barrier for marine turtles coming ashore to nest in the dunes on Clarkes Beach. The level of disturbance attributed to the sandbag wall barrier is likely to vary substantially with the level of exposure at the time. I.e., the sandbag wall is likely to represent a potential barrier when the sandbag wall is exposed, and there is potential that nesting marine turtles may abort attempts to come ashore at that location if unable to traverse the location of the sandbag wall. The level of threat is significantly reduced, and potentially removed, if sand has been redeposited on the beach and covered the sandbag wall. At the time of the assessment the sandbag wall was only partially visible, with the majority situated below the current beach surface.

Disturbance to shorebirds is likely more attributable to activities undertaken within the development footprint to accommodate the proposal, which is likely to represent minor short term impacts, and in the context of the regular disturbances at the site due to the 'busyness' of the area, it is unlikely that these disturbance events would be significant, as shorebirds are likely to generally favour more isolated and less trafficked beaches and sandflats within the local area over busy locations.



Plate 6: Significant areas of marine habitat are contained within the Cape Byron Marine Park.

Proposal B: Due to the small scale of Proposal B, over a small area of approx. 500 m², in a busy tourism location, it is considered that the level of disturbance to threatened species with the potential to occur is likely to be negligible. Common native species generally occurring in the area (e.g., Brush Turkey), are acclimatized to regular disturbance, and the likelihood of threatened fauna species occurring in this location is limited. No areas of habitat significance would be impacted, and the significant areas of vegetation in adjacent areas, which provide the most valuable habitat in association with the subject land, would not be disturbed nor indirectly impacted.






Plate 7: View encompassing the entirety of the development footprint for both proposals.

Figure 5: Development footprint impact area and Byron Shire vegetation mapping.





Legend

-  Subject Land
-  Proposal A - Development Footprint
-  Proposal B - Development Footprint

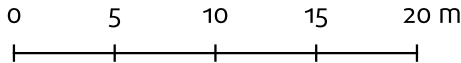
Byron Veg 2017_clipped

-  Coastal Swamp Forests
-  Littoral Rainforests
-  North Coast Clay Heathlands
-  Subtropical Rainforests
-  Wallum Sand Heaths

SEPP (Coastal Management) 2018

-  Littoral Rainforest
-  Littoral Rainforest Proximity Area

1:375



ATtribution PARTIES

Aerials: © NearMap Pty Ltd [2017]
Topographic: © Land and Property Information [2017]
Cadastral: © Land and Property Information [2017]
Vegetation: © BSC [2017]
SEPP: NSW Govt. [2018]
BVMap: NSW Govt. [2021]

BA&S makes every effort to ensure this map is free of errors, but does not warrant the map or it's features are either spatially or temporally accurate or fit for a particular use. BA&S provides this map without any warranty of any kind whatsoever, either express or implied.

4. Statutory assessment of the proposal

The proposal has been (i) examined in the context of the most relevant environmental legislation and planning instruments; and (ii) assessed based on the subject land attributes, threatened species records, vegetation condition and habitat potential.

Key legislation and planning instruments assessed and of most relevance include the:

- Biodiversity Conservation (BC) Act 2016;
- Biodiversity Conservation (BC) Regulation 2017;
- State Environmental Planning Policy (SEPP) (Koala Habitat Protection) 2021;
- State Environmental Planning Policy (SEPP) (Coastal Management) 2018; and
- Environment Protection and Biodiversity Conservation (EPBC) Act 1999.

Other applicable legislation relating to the proposals are assessed within the relevant submission documents accompanying the proposal.

4.1 Biodiversity Conservation Act 2016

Section 7.2 of the BC Act 2016 provides that development under the EP&A Act 1979 is likely to significantly affect threatened species if:

- (a) It is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in Section 7.3, or
- (b) The development exceeds the biodiversity offsets scheme (BOS) threshold if the BOS applies to the impacts of the development on biodiversity values, or
- (c) It is carried out in a declared Area of Outstanding Biodiversity Value (AOBV).

No threatened flora species listed under the BC Act 2016 were recorded at the subject land or in the immediate vicinity. Therefore, it is considered that no threatened flora species would be likely to be impacted by the proposal.

Vegetation on the subject land contains tree species commonly found within the vegetation community listed in Schedule 2 of the BC Act 2016 as a threatened ecological community (TEC), namely the endangered ecological community (EEC) *Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*. It is considered that despite a sparse understorey or midstorey, vegetation in this location, vegetation is analogous with the EEC as described in the final Scientific Committee determination.

No threatened fauna species were recorded, although extensive targeted surveys for all fauna classes were not undertaken. The subject land contains little valuable habitat for threatened fauna species listed under the BC Act 2016; however, valuable habitat does occur proximal to the site to the east and south particularly, which would not be impacted by the proposal.

A subject land suitability assessment was undertaken for those species recorded within 1.5 km of the development footprint (Table 3). This identified the following eight ($n = 8$) species as having some potential to occur at the subject land and to be impacted by the proposal which were further assessed by way of a *Test of Significance* (ToS):

- Sooty Oystercatcher (*Haematopus fuliginosus*)
- Pied Oystercatcher (*Haematopus longirostris*)
- Little Tern (*Sternula albifrons*)
- Great Knot (*Calidris tenuirostris*)
- Koala (*Phascolarctos cinereus*)
- Common Blossom-bat (*Syconycteris australis*)
- Loggerhead Turtle (*Caretta caretta*)
- Green Turtle (*Chelonia mydas*)

The ToS set out in Section 7.3 of the BC Act 2016 is based on the footprint and design of the development. Measures that offset or otherwise compensate for the development have not been considered in determining the degree of the developments effect on threatened species or ecological communities.

In determining the nature and magnitude of an impact, the following factors have been considered:

- pre-construction, construction and occupation/maintenance phases;
- all on-site and off-site impacts, including location, installation, operation and maintenance of auxiliary infrastructure and fire management zones;
- all direct and indirect impacts;
- the frequency and duration of each known or likely impact/action;
- the total impact which can be attributed to that action over the entire geographic area affected, and over time;
- the sensitivity of the receiving environment; and,
- the degree of confidence with which the impacts of the action are known and understood.

A ToS under Section 7.3 of the BC Act was undertaken for those species considered likely to occur and with some potential to be directly or indirectly impacted by the proposal (Appendix A). The ToS concluded that the proposal for (i) temporary coastal protection works (i.e., Proposal A) and (ii) infrastructure repair and improvement to prevent damage to coastal land (i.e., Proposal B) is not likely to result in any direct or indirect impacts to threatened species, populations, ecological communities, or their habitats either on the subject land or beyond.

4.1.1 Biodiversity Conservation Regulation 2017

Part 7 of the BC Regulation 2017 prescribes the biodiversity assessment and approvals under the EP&A Act 1979, and details when an activity exceeds a threshold and therefore requires assessment under the Biodiversity Offsets Scheme (BOS). The following three main threshold triggers apply: (i) Area clearing threshold; (ii) Biodiversity Values Map threshold; and (iii) a threatened species ToS.

- (i) Area clearing thresholds (Clause 7.2) depend on the minimum lot size under the relevant LEP, as defined in Table 4. The proposal is to occur on land zoned DM Deferred Matter under the Byron Local Environmental Plan 2014 and zoned 7(f1) Coastal Land Zone under the Byron Local Environmental Plan 1988. The 'Minimum Lot Size Method' identified in the Biodiversity Values

Map and Threshold Report (Appendix B) is the actual lot size of the smallest lot included within the subject land. The corresponding area threshold of entry into the scheme is therefore considered to be 0.5 ha (Table 4). Given the entire development proposal footprint covers an area approx. 2,000 m², and vegetation impacts have been calculated as being < 500 m² as a result of the proposal, the area clearing threshold is not exceeded and does not apply.

- (ii) The Biodiversity Values Map threshold (Clause 7.3) is triggered when clearing of native vegetation or additional biodiversity impacts (Clause 6.1) within the Biodiversity Values Map exceeds a threshold. Proposal A (current sandbag location) marginally intersects an area mapped on the Biodiversity Values Map (Figure 6). This area is currently an intertidal beach, having experienced severe erosion since 2015, with the seaward extent of vegetation from aerial mapping retreating approx. 25 m in the area adjacent to and in front of the café. As a result, vegetation which had been mapped as Littoral Rainforest in circa 2017, no longer exists in this area. No other vegetation occurs within the development footprint for Proposal A, and the proposal would not impact any remaining native vegetation within the mapped polygon. Therefore, no clearing of native vegetation or additional biodiversity impacts would occur within the area mapped on the Biodiversity Values Map. It follows that this threshold does not apply.
- (iii) A threatened species ToS is triggered for all local developments that do not exceed the BOS threshold. If the ToS assessment indicates that there will be a significant impact, this exceeds the threshold, and the proponent must carry-out a BAM assessment. No threatened flora species were identified from the development footprint, and following a detailed desktop assessment, site habitat assessment and threatened species review, a ToS was undertaken for eight ($n = 8$) species recorded within 1.5 km of the development footprint with the potential to occur and potential to be impacted by the proposal (Appendix A). The ToS concluded that the proposal is not likely to result in any direct or indirect impacts to threatened species, populations, ecological communities or their habitats. Therefore, the BOS threshold has not been exceeded and the BOS will not apply.

Table 4: Area clearing thresholds as stipulated under Part 7.2 of the Biodiversity Conservation Regulation, 2017.

Minimum lot size of land (ha)	Area of clearing (ha)
Less than 1	0.25 or more
Less than 40 but not less than 1	0.5 or more
Less than 1,000 but not less than 40	1 or more
1,000 or more	2 or more

4.2 State Environmental Planning Policy (Koala Habitat Protection) 2021

The SEPP (Koala Habitat Protection) 2021 applies to local government areas (LGA) listed in Schedule 1. Byron is listed as an LGA to which the SEPP applies.

The Byron Coast Comprehensive Koala Plan of Management (KPoM) was approved under the SEPP (Koala Habitat Protection) 2021 in March 2021; therefore Part 2 (cl. 10) of this SEPP applies. Clause 10 (2) states that “The council’s determination of the development application must be consistent with the approved koala plan of management that applies to the land”. The flow chart in the Byron Coast

Comprehensive KPOM, indicates that the KPOM applies to the land as the subject land is > 1 hectare in size and is within the Koala planning area.

No Koala habitat has been mapped on the subject land, and the development footprint contains one ($n = 1$) tree listed in Schedule 2 of Koala SEPP 2021. This tree would not be impacted by the proposal. Therefore, neither the SEPP (Koala Habitat Protection) 2021 nor the Byron Coast Comprehensive KPOM prevent granting consent to the development application.

4.3 State Environmental Planning Policy (Coastal Management) 2018

The SEPP (Coastal Management) 2018 updates and consolidates into one integrated policy SEPP 14 (Coastal Wetlands), SEPP 26 (Littoral Rainforests) and SEPP 71 (Coastal Protection), including clause 5.5. of the Standard Instrument – Principal Local Environmental Plan. These policies are now repealed.

The SEPP (Coastal Management) 2018 gives effect to the objectives of the Coastal Management Act 2016 from a land use planning perspective, by specifying how development proposals are to be assessed if they fall within the coastal zone.

- Part 2, Division 1, Clause 10 of SEPP (Coastal Management) 2018 reads as:

Development on certain land within coastal wetlands and littoral rainforests area

(1) The following may be carried out on land identified as “coastal wetlands” or “littoral rainforest” on the Coastal Wetlands and Littoral Rainforests Area Map only with development consent:

(a) the clearing of native vegetation within the meaning of Part 5A of the Local Land Services Act 2013,

(b) the harm of marine vegetation within the meaning of Division 4 of Part 7 of the Fisheries Management Act 1994,

(c) the carrying out of any of the following:

(i) earthworks (including the depositing of material on land),

(ii) constructing a levee,

(iii) draining the land,

(iv) environmental protection works,

(d) any other development.

(2) Development for which consent is required by subclause (1), other than development for the purpose of environmental protection works, is declared to be designated development for the purposes of the Act.

(3) Despite subclause (1), development for the purpose of environmental protection works on land identified as “coastal wetlands” or “littoral rainforest” on the Coastal Wetlands and Littoral Rainforests Area Map may be carried out by or on behalf of a public authority without development consent if the development is identified in:

(a) the relevant certified coastal management program, or

(b) a plan of management prepared and adopted under Division 2 of Part 2 of Chapter 6 of the Local Government Act 1993, or

(c) a plan of management approved and in force under Division 6 of Part 5 of the Crown Lands Act 1989.

(4) A consent authority must not grant consent for development referred to in subclause (1) unless the consent authority is satisfied that sufficient measures have been, or will be, taken to protect, and where possible enhance, the biophysical, hydrological and ecological integrity of the coastal wetland or littoral rainforest.

The development footprint for Proposal A falls within an area mapped under The SEPP (Coastal Management) 2018 as Littoral Rainforest. However, as a result of significant shoreline recession since the mapping was undertaken, no littoral rainforest vegetation remains within the intersection of the Proposal A development footprint and the area of mapped littoral rainforest (Figure 6) applicable to the proposal. No vegetation impacts would occur within the mapped littoral rainforest.

In addition to Clause 10, which is applicable to mapped littoral rainforest under SEPP (Coastal Management) 2018, the remainder of the development footprint falls within the proximity area for littoral rainforest and as such the following applies.

- Part 2, Division 1, Clause 11 of SEPP (Coastal Management) 2018 reads as:

Development on land in proximity to coastal wetlands or littoral rainforest

(1) Development consent must not be granted to development on land identified as “proximity area for coastal wetlands” or “proximity area for littoral rainforest” on the Coastal Wetlands and Littoral Rainforests Area Map unless the consent authority is satisfied that the proposed development will not significantly impact on—

(a) the biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest, or

(b) the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest.

As works required for the proposal are minimal, with no significant excavation or disturbance required, it is highly unlikely that the proposal would impact the biophysical, hydrological or ecological integrity of the adjacent littoral rainforest or surface and groundwater flows required to sustain it. Moreover, the detailed management strategy to minimize development impacts (see section 5 herein) would also help to negate any impacts on the adjacent littoral rainforest.

4.4 Environment Protection & Biodiversity Conservation Act 1999 (Cth)

No flora or fauna species listed under the EPBC Act (1999) were recorded at the subject land during site surveys. Moreover, a habitat suitability assessment concluded that no fauna species listed under the EPBC Act would likely be impacted by the proposal.

Therefore, the proposal would not impact on any Matters of National Environmental Significance (MNES) and assessment under the EPBC Act would not be required.







May 2015

January 2021

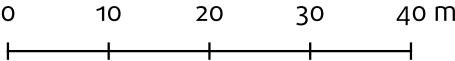
Figure 6: Development footprint, NSW Govt. statutory mapping and shoreline recession since 2015.



Legend

-  Subject Land
-  Biodiversity Values Map
-  Proposal A - Development Footprint
-  Proposal B - Development Footprint
- SEPP (Coastal Management) 2018**
-  Littoral Rainforest
-  Littoral Rainforest Proximity Area

1:750



ATtribution PARTIES

Aerials: © NearMap Pty Ltd [2017]
Topographic: © Land and Property Information [2017]
Cadastral: © Land and Property Information [2017]
SEPP: NSW Govt. [2018]
BVMap: NSW Govt. [2021]

BA&S makes every effort to ensure this map is free of errors, but does not warrant the map or it's features are either spatially or temporally accurate or fit for a particular use. BA&S provides this map without any warranty of any kind whatsoever, either express or implied.

5. Management strategy to minimise development impacts

The sum of deleterious ecological impacts from this proposal (i.e., coastal protection works and infrastructure repair and improvement) is minor, with the works also necessary to protect coastal infrastructure, to reduce current impacts of stormwater runoff, and allow for safe pedestrian access to Clarkes Beach. The potential direct and indirect environmental impacts of the proposal through both construction and operational phases have been taken into consideration for this assessment, with key mitigation measures detailed in section 5.1 to ensure minimisation of potential impacts.

5.1 Mitigation measures

The following environmental safeguards and mitigation measures are proposed to promote beneficial ecological and biodiversity outcomes:

- an assessment by a qualified arborist would be undertaken prior to construction to ensure adequate measures are provided for tree protection in the vicinity of the proposal footprint;
- tree protection zones (TPZs) would be established and maintained around trees to be retained which are immediately adjacent to the proposal where excavation and/or construction are required;
- if present, fallen logs and large woody debris in the proposal area would be relocated into adjacent areas of habitat;
- ensure all machinery/vehicles/personnel enter and exit along main entry routes so additional impacts or disturbance do not occur to native vegetation or marine habitat;
- machinery would be cleaned prior to entering the subject land to ensure that weed seeds and propagules are not imported;
- delineation of the proposal footprint as designated work sites so that no machinery/vehicles/personnel impact on vegetation or habitat outside of each works area;
- if unexpected protected or threatened fauna are encountered, then work would stop immediately, and a qualified ecologist or wildlife carer would be contacted;
- if a Koala is present within 30 metres of an area to be cleared/disturbed, then 24 hours must be provided for the animal to disperse of its own volition;
- contingencies would be required to address the risk of bushfire, including spark arrestors and suspending works in high bushfire danger periods; and
- dune revegetation would be undertaken using species endemic to the location and local seed provenance.

The following environmental safeguards and mitigation measures are proposed to promote beneficial water quality, hydrology and drainage outcomes:

- appropriate sedimentation and erosion controls must be installed and maintained at all times during construction and operations to limit impacts on adjacent vegetation and waterways;
- all proposed works would be undertaken during periods of dry weather;

- all areas where excavation is required and/or vegetation is removed would be stabilised with the most appropriate method;
- fuels and oils would be stored more than 40m away from waterways and flood zones where practical;
- refueling and maintenance of machinery would be undertaken at least 40m away from waterways or drainage lines where practical;
- disturbed surfaces would be compacted and stabilised in anticipation of a rain event to reduce the potential for erosion; and
- erosion and sediment controls would be monitored for effectiveness and maintained until the site is remediated and the soil profile re-stabilised.

The following environmental safeguards and mitigation measures are proposed to promote beneficial Aboriginal and non-Aboriginal heritage outcomes:

- If any Aboriginal items or cultural heritage objects (including human remains) are located during the works, all work would cease near the artefact and the Tweed Byron Local Aboriginal Land Council (TBLALC) Aboriginal Sites Officer would be notified on (07) 5536 1763. The find is also required to be reported to the Heritage NSW; and
- all staff and contractors would be made aware of their responsibilities under the National Parks and Wildlife (NPW) Act 1974 and would be informed of the procedures in the event of unearthing an object.

The following environmental safeguards and mitigation measures are proposed to promote best practice dangerous goods/chemical and waste management:

- waste destined for recycling or reuse would be stored separately and in a suitable location to avoid mixing with other materials/wastes;
- all residual waste material would be disposed of at a suitably licensed landfill or waste management facility;
- all working areas would be monitored to ensure they are kept free of rubbish and cleaned at the end of each working shift;
- storage and handling of any dangerous goods must be undertaken in accordance with *The Storage and Handling of Dangerous Goods Code of Practice 2005*;
- sufficient spill kits would always be kept on site; and
- any excavated natural material would be treated in accordance with the requirements of the Protection of the Environment Operations (POEO) Act 1997.

6. Summary and Conclusion

This assessment has been undertaken to accompany the lodgement of a Part 4 Development Application (DA) for temporary coastal protection and foreshore improvement works on the subject land, and to accompany a Part 5 Environmental Assessment for infrastructure repair works under State Environmental Planning Policy (Infrastructure) 2007 on land zoned 7(f1) - Coastal Lands Zone.

Following assessment of all available ecological information, threatened species records, habitat assessment of the subject land and potential impacts, as well as key relevant legislation, the following conclusions are provided:

- the proposal has environmental benefits by way of protecting mapped SEPP (Coastal Management) 2018 littoral rainforest and other areas of coastal habitat from further loss, as well as reducing damage and pollution to the understorey of coastal vegetation, mapped by Byron Shire Council as littoral rainforest;
- the proposal footprint is not considered to be of significant biodiversity value in the local context, nor is it considered to have any significant ecological value or to provide any significant wildlife habitat;
- accommodating the proposal requires the removal of some ground and lower layer vegetation, both common local native and exotic species, and the removal of several dead, dying, dangerous trees from the top of dune which have been subject to storm damage;
- the total area of the development footprint has been calculated as having an area of approx. 2,000 m², with vegetation occurring sparsely across an area of < 500 m²;
- the development footprint contains one ($n = 1$) tree species listed in Schedule 2 of the SEPP (Koala Habitat Protection) 2021 as a feed tree, with others occurring on the subject land. However, the development footprint is not representative of preferred Koala habitat, and no Schedule 2 trees or other Koala habitat would be impacted to accommodate the proposal;
- potential impacts of the construction and occupation phases of the proposal would be negligible and be able to be mitigated sufficiently to ensure that direct and indirect impacts on biodiversity values would be avoided and minimised; and
- the proposal would not cause significant impacts to species or ecological communities listed in the NSW BC Act 2016 or the EPBC Act 1999, nor would the development proposal be likely to result in a significant impact for any threatened fauna listed under these Acts.

Based on these key summary points, it is considered that the subject land and identified proposal footprint is suitable for the proposal and subsequent activities, and that the proposal has, within all reasonable expectations, avoided and minimised impacts to the biodiversity values of the subject land.

References

- Biolink (2012). Byron Coast Koala Habitat Study. A report to Byron Shire Council March 2012. Biolink Ecological Consultants.
- BMT WBM (2013). Byron Shire Coastline Hazards Assessment Update, Final report for Byron Shire Council, September.
- Byron Shire Council (1988). Byron Local Environmental Plan 1988. Byron Shire Council, Mullumbimby, NSW.
- Byron Shire Council (2010). Byron Development Control Plan 2010. Byron Shire Council, Mullumbimby, NSW.
- Byron Shire Council (2014). Byron Local Environmental Plan 2014. Byron Shire Council, Mullumbimby, NSW.
- Byron Shire Council (2014). Byron Development Control Plan 2014. Byron Shire Council, Mullumbimby, NSW.
- Byron Shire Council (2015). Byron Coast Comprehensive Plan of Management. Byron Shire Council, Mullumbimby, NSW. Accessed online 30.04.21 from: <https://www.byron.nsw.gov.au/Services/Environment/Native-animals-and-plants/Koalas-in-Byron-Shire/Byron-Coast-Comprehensive-Koala-Plan-of-Management>
- Department of the Environment (Cth) (2016). *Protected Matters Search Tool*. [Accessed 25/03/2021]. <http://www.environment.gov.au/epbc/pmst/index.html>
- Morand, D.T. (1994). Soil Landscapes of the Lismore-Ballina: 100 000 Sheet. Department of Land and Water Conservation, Sydney, NSW.
- NSW government (2021). *State Environmental Planning Policy (Koala Habitat Protection) 2021*. Accessed online 30.04.21 from: <https://legacy.legislation.nsw.gov.au/EPLs/2021-115.pdf>
- NSW DEC (2004). *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities. Working Draft*. Department of Environment and Conservation (NSW).c
- NSW DECCW (2009). *Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians*. Department of Environment, Climate Change and Water.
- NSW Government (2001), Coastal dune management: a manual of coastal dune management and rehabilitation techniques, by R. Kidd Published 2001
- NSW OEH (2018). *A review of Koala tree use across New South Wales*. NSW Office of Environment and Heritage, Sydney< NSW.
- NSW OEH (2017). *NSW BioNet Database Search Tool*. [Accessed 25/03/2021]. <http://www.bionet.nsw.gov.au/>
- NSW OEH (2017). *Threatened Species Profiles*. [Accessed 25/03/2021].

<http://www.environment.nsw.gov.au/threatenedSpeciesApp/>

NSW OEH (2017). *Threatened Species Survey and Assessment Guidelines*. [Accessed 07/06/2019].

<http://www.environment.nsw.gov.au/threatenedspecies/surveyassessmentgdlns.htm>

NSW OEH (2018). *Threatened Species Test of Significance Guidelines*. Office of Environment and Heritage, Sydney, NSW.

NSW OEH (2017). *Field Survey Methods for Threatened Species, Populations or Ecological Communities*. [Accessed 20/05/2018].

<http://www.environment.nsw.gov.au/threatenedspecies/surveymethodsfauna.htm>

Witherington, B., Hiram, S. and Mosier, A. (2011). *Sea turtle responses to barriers on their nesting beach*. Journal of Experimental Marine Biology and Ecology, Volume 401, Issues 1-2, pgs 1-6.

Appendix A – Test of Significance

In accordance with Section 7.3 of the *Biodiversity Conservation Act 2016*, a *Test of Significance* (ToS) has been completed for the following eight ($n = 8$) threatened fauna species identified as having the potential to occur on the subject land (i.e., Lot 10 DP 1049827 and Lot 410 DP 729062, Byron Bay, NSW) and with the potential to be impacted:

- Sooty Oystercatcher (*Haematopus fuliginosus*)
- Pied Oystercatcher (*Haematopus longirostris*)
- Little Tern (*Sternula albifrons*)
- Great Knot (*Calidris tenuirostris*)
- Koala (*Phascolarctos cinereus*)
- Common Blossom-bat (*Syconycteris australis*)
- Loggerhead Turtle (*Caretta caretta*)
- Green Turtle (*Chelonia mydas*)

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

Sooty Oystercatcher (*Haematopus fuliginosus*)

Species information

The Sooty Oystercatcher is an unmistakable, large wader, reaching 50 cm in length. Like the Pied Oystercatcher, the Sooty Oystercatcher has a bright orange-red bill, eye-ring and iris, and coral pink legs and feet. However, the Sooty Oystercatcher has entirely black plumage. Sexes are separable when together, with the female having a longer, slenderer bill. The call is similar to the Pied Oystercatcher's, although sharper and more piercing. Gives a loud whistling call before taking flight, and a piercing call if an intruder approaches the nest.

Sooty Oystercatchers are found around the entire Australian coast, including offshore islands, being most common in Bass Strait. Small numbers of the species are evenly distributed along the NSW coast. The availability of suitable nesting sites may limit populations.

Habitat and ecology of the species

Key details of the Sooty Oystercatcher's habitat and ecology include that they:

- Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries.
- Forages on exposed rock or coral at low tide for foods such as limpets and mussels.
- Breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks.

Threats to the species

Threats to the Sooty Oystercatcher are identified as being:

- Disturbance to coastal feeding, nesting and roosting areas through beach-combing, fishing, dog-walking, horse-riding and 4WD vehicles.
- Predation of eggs and chicks by foxes, dogs, cats, rats and raptors.
- Habitat destruction as a result of residential, agricultural and tourism developments.
- Hydrological changes to estuaries and similar water bodies causing modification or removal of important areas of suitable habitat.

Potential impacts (if any) of the proposal on the species

Proposal A seeks approval to retain currently installed sandbags for a further 5-year period. The retention of sandbags is part of coastal protection works to prevent further erosion occurring along this stretch of Clarkes Beach, which threatens remaining littoral rainforest vegetation, dining facilities and public space. The sandbags would be removed following the 5-year period.

The level of direct or indirect impact because of Proposal A does depend to an extent on if the sandbags are visible and extruding from the beach, or if beach accretion has substantially covered the sandbags. Impacts are likely to be greater if sandbags are on the beach surface, likely preventing feeding on worms and crustaceans within the beach sand profile. If beach accretion is sufficient such that foraging resources can burrow into the sand profile, impacts are likely reduced.

Should, the unlikely event of the sandbags remaining exposed, and subsequently preventing feeding on this part of the beach by shorebirds, it will reduce the value of feeding habitat over an area of approx. 600 m² for a nominal period of 5-years. In the context of the foraging habitat available in the locality, this is considered to represent a negligible loss of foraging habitat, and unlikely to have a significant impact.

The removal of the sandbags at the end of the 5-year period would represent a short-term disturbance within the development footprint for Proposal A. The level of disturbance required to access sandbags, split bags and empty sand, and then re-profile surface, would be expected to be minimal, particularly considering the level of regular background disturbance occurring at Clarkes Beach.

Proposal B, being located on the upper dunes and within an area of littoral rainforest would not be expected to result in any impacts likely to significantly impact this species. Works required to remove dead, dangerous, dying trees at the top of dune, and prevent further collapse onto Clarkes Beach is not expected to result in any significant disturbance to this species.

Therefore, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Sooty Oystercatcher such that a viable local population of the species is likely to be placed at risk of extinction.

Pied Oystercatcher (*Haematopus longirostris*)

Species information

The Pied Oystercatcher is an unmistakable, large, black and white wader, reaching 50 cm in length. The sexes are similar yet may be separable when together with the female having a slightly longer,

slenderer bill. When not in flight, the Pied Oystercatcher appears entirely black above, with white underparts. The back, head and breast are black, and the belly, rump and tail are white. The tail is tipped black. The wings are black with a narrow white bar on the upperwing and white underwing coverts. The eye-ring, iris and bill of the Pied Oystercatcher are brilliant scarlet, and its legs are stout and coral pink. The most often heard call is a loud, sharp, high-pitched 'kurvee-kurvee-kurvee', usually given in alarm, which increases in pitch and rapidity when a nest site is approached. The South Island Pied Oystercatcher (*H. finschi*) has recently been recorded as a vagrant in NSW. This New Zealand native can be distinguished by a combination of subtle differences, including a shorter bill and legs and differences in the extent of white on the back and wings.

The species is distributed around the entire Australian coastline, although it is most common in coastal Tasmania and parts of Victoria, such as Corner Inlet. In NSW the species is thinly scattered along the entire coast, with fewer than 200 breeding pairs estimated to occur in the State. 'Pied' Oystercatchers are occasionally recorded on Lord Howe island, but it is uncertain which species is involved.

Habitat and ecology of the species

Key details of the Pied Oystercatcher's habitat and ecology include that they:

- Favours intertidal flats of inlets and bays, open beaches and sandbanks.
- Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. The chisel-like bill is used to pry open or break into shells of oysters and other shellfish.
- Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones.
- Two to three eggs are laid between August and January. The female is the primary incubator, and the young leave the nest within several days.

Threats to the species

Threats to the Pied Oystercatcher are identified as being:

- Predation of eggs and chicks by foxes.
- Disturbance of nesting shorebirds and direct mortality of eggs and chicks by trampling or removal by humans. 4WDs are a threat at some sites.
- Disturbance of nesting shorebirds and direct predation of eggs and chicks by domestic dogs.
- Inundation of nests by high tides, storms and other flooding.
- Predation of eggs and chicks by avian predators (mostly corvids and gulls).
- Loss or degradation of habitat (e.g., nesting areas and foraging areas) due to hydrological changes in estuaries.
- Degradation of habitat due to contamination of estuaries by urban and agricultural run-off, sediment re-suspension and oil-spills.
- Reduction of nesting area due to encroachment of vegetation.
- Entanglement in or ingestion of marine debris.

- Long-term declines of a key food source, the Pipi, as a result of over-harvesting.

Potential impacts (if any) of the proposal on the species

Proposal A seeks approval to retain currently installed sandbags for a further 5-year period. The retention of sandbags is part of coastal protection works to prevent further erosion occurring along this stretch of Clarkes Beach. The sandbags would be removed following the 5-year period.

The level of direct or indirect impact because of Proposal A does depend to an extent on if the sandbags are visible and extruding from the beach, or if beach accretion has substantially covered the sandbags. Impacts are likely to be greater if sandbags are on the beach surface, likely preventing feeding on worms and crustaceans within the beach sand profile. If beach accretion is sufficient such that foraging resources can burrow into the sand profile, impacts are likely reduced.

Should, the unlikely event of the sandbags remaining exposed, and subsequently preventing feeding on this part of the beach by shorebirds, it will reduce the value of feeding habitat over an area of approx. 600 m² for a nominal period of 5-years. In the context of the foraging habitat available in the locality, this is considered to represent a negligible loss of foraging habitat, and unlikely to have a significant impact.

The removal of the sandbags at the end of the 5-year period would represent a short-term disturbance within the development footprint for Proposal A. The level of disturbance required to access sandbags, split bags and empty sand, and then re-profile surface, would be expected to be minimal, particularly considering the level of regular background disturbance occurring at Clarkes Beach.

Proposal B, being located on the upper dunes and within an area of littoral rainforest would not be expected to result in any impacts likely to significantly impact this species. Works required to remove dead, dangerous, dying trees at the top of dune, and prevent further collapse onto Clarkes Beach is not expected to result in any significant disturbance to this species.

Therefore, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Pied Oystercatcher such that a viable local population of the species is likely to be placed at risk of extinction.

Little Tern (*Sternula albifrons*)

Species information

The Little Tern is a small, slender, migratory or partly migratory seabird. At less than 25 cm long it is two-thirds to half the size of any other south-eastern tern. Pale grey upperparts contrast with the white chest, underbelly and the moderately long, deeply forked tail (80 - 110 mm). The Little Tern has a black cap and black outer wing-edges. During breeding the bill (26 - 32 mm) and legs change from black to yellow, and a black wedge appears from the bill to the eye. During non-breeding, the Little Tern's black cap shrinks to a black nape and its bill becomes black.

Migrating from eastern Asia, the Little Tern is found on the north, east and south-east Australian coasts, from Shark Bay in Western Australia to the Gulf of St Vincent in South Australia. In NSW, it arrives from September to November, occurring mainly north of Sydney, with smaller numbers found south to Victoria. It breeds in spring and summer along the entire east coast from Tasmania to northern Queensland, and is seen until May, with only occasional birds seen in winter months.

Habitat and ecology of the species

Key details of the Little Tern habitat and ecology include that they:

- Almost exclusively coastal, preferring sheltered environments; however, may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records).
- Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands.
- The nest is a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles.
- Both parents incubate up to three well-camouflaged eggs for up to 22 days, aggressively defending the nest against intruders until the young fledge at 17 - 19 days.
- Often seen feeding in flocks, foraging for small fish, crustaceans, insects, worms and molluscs by plunging in the shallow water of channels and estuaries, and in the surf on beaches, or skipping over the water surface with a swallow-like flight.

Threats to the species

Threats to the Little Tern habitat are identified as being:

- Predation of eggs and chicks by foxes.
- Disturbance of nesting shorebirds and direct mortality of eggs and chicks by trampling or removal by humans. 4WDs are a threat at some sites.
- Disturbance of nesting shorebirds and direct predation of eggs and chicks by domestic dogs.
- Inundation of nests by high tides, storms and other flooding.
- Predation of eggs and chicks by avian predators (mostly corvids and gulls).
- Loss or degradation of habitat (e.g., nesting areas and foraging areas) due to hydrological changes in estuaries.
- Degradation of habitat due to contamination of estuaries by urban and agricultural run-off, sediment re-suspension and oil-spills.
- Reduction of nesting area due to encroachment of vegetation.
- Entanglement in or ingestion of marine debris.
- Low survival of fledged birds outside nesting areas due to unknown causes.

Potential impacts (if any) of the proposal on the species

Proposal A seeks approval to retain currently installed sandbags for a further 5-year period. The retention of sandbags is part of coastal protection works to prevent further erosion occurring along this stretch of Clarkes Beach. The sandbags would be removed following the 5-year period.

The level of direct or indirect impact because of Proposal A does depend to an extent on if the sandbags are visible and extruding from the beach, or if beach accretion has substantially covered the sandbags. Impacts are likely to be greater if sandbags are on the beach surface, likely preventing feeding on worms and crustaceans within the beach sand profile. If beach accretion is sufficient such that foraging

resources can burrow into the sand profile, impacts are likely reduced.

Should, the unlikely event of the sandbags remaining exposed, and subsequently preventing feeding on this part of the beach by shorebirds, it will reduce the value of feeding habitat over an area of approx. 600 m² for a nominal period of 5-years. In the context of the foraging habitat available in the locality, this is considered to represent a negligible loss of foraging habitat, and unlikely to have a significant impact.

The removal of the sandbags at the end of the 5-year period would represent a short-term disturbance within the development footprint for Proposal A. The level of disturbance required to access sandbags, split bags and empty sand, and then re-profile surface, would be expected to be minimal, particularly considering the level of regular background disturbance occurring at Clarkes Beach.

Proposal B, being located on the upper dunes and within an area of littoral rainforest would not be expected to result in any impacts likely to significantly impact this species. Works required to remove dead, dangerous, dying trees at the top of dune, and prevent further collapse onto Clarkes Beach is not expected to result in any significant disturbance to this species.

Therefore, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Little Tern such that a viable local population of the species is likely to be placed at risk of extinction.

Great Knot (*Calidris tenuirostris*)

Species information

The Great Knot is a medium-sized bulky wader with a straight, dark-brown bill and yellowish-brown legs. It has a striped crown with an indistinct white eyebrow. Its upperparts are grey, with dark feather tips; its underparts are white. The rump is pure white, the tail is tipped with grey. Breeding plumage consists of darker upperparts with black and chestnut markings.

In NSW, the species has been recorded at scattered sites along the coast down to about Narooma. It has also been observed inland at Tullakool, Armidale, Gilgandra and Griffith.

Habitat and ecology of the species

Key details of the Great Knots' habitat and ecology include that they:

- Occurs within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons.
- Often recorded on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms.
- Migrates to Australia from late August to early September, although juveniles may not arrive until October-November.
- Most birds return north in March and April; however, some individuals may stay over winter in Australia.
- Forages for food by methodically thrusting its bill deep into the mud to search for invertebrates, such as bivalve molluscs, gastropods, polychaete worms and crustaceans.

Threats to the species

Threats to the Great Knot habitat are identified as being:

- Hydrological changes to inland lakes may modify or remove important areas of suitable habitat for those individuals that overwinter in Australia.
- Habitat loss due to development.
- Human disturbance at roosting and foraging sites (e.g., walking, fishing, baiting, pets, boating, horses, 4WD, biking, surfing).
- Mangrove incursion into saltmarsh habitat.
- Weed invasion of key habitat.
- Groundwater pollution impacting foraging habitat and resources.
- Habitat loss from erosion, climate change inundation and sea-level rise.

Potential impacts (if any) of the proposal on the species

Proposal A seeks approval to retain currently installed sandbags for a further 5-year period. The retention of sandbags is part of coastal protection works to prevent further erosion occurring along this stretch of Clarkes Beach. The sandbags would be removed following the 5-year period.

The level of direct or indirect impact because of Proposal A does depend to an extent on if the sandbags are visible and extruding from the beach, or if beach accretion has substantially covered the sandbags. Impacts are likely to be greater if sandbags are on the beach surface, likely preventing feeding on worms and crustaceans within the beach sand profile. If beach accretion is sufficient such that foraging resources can burrow into the sand profile, impacts are likely reduced.

Should, the unlikely event of the sandbags remaining exposed, and subsequently preventing feeding on this part of the beach by shorebirds, it will reduce the value of feeding habitat over an area of approx. 600 m² for a nominal period of 5-years. In the context of the foraging habitat available in the locality, this is considered to represent a negligible loss of foraging habitat, and unlikely to have a significant impact.

The removal of the sandbags at the end of the 5-year period would represent a short-term disturbance within the development footprint for Proposal A. The level of disturbance required to access sandbags, split bags and empty sand, and then re-profile surface, would be expected to be minimal, particularly considering the level of regular background disturbance occurring at Clarkes Beach.

Proposal B, being located on the upper dunes and within an area of littoral rainforest would not be expected to result in any impacts likely to significantly impact this species. Works required to remove dead, dangerous, dying trees at the top of dune, and prevent further collapse onto Clarkes Beach is not expected to result in any significant disturbance to this species.

Therefore, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Great Knot such that a viable local population of the species is likely to be placed at risk of extinction.

Koala (*Phascolarctos cinereus*)

Species information

The Koala is an arboreal marsupial with fur ranging from grey to brown above, and white below. It has

large furry ears, a prominent black nose and no tail. It spends most of its time in trees and has long, sharp claws, adapted for climbing. Adult males weigh 6 - 12 kg and adult females weigh 5 - 8 kg. During breeding, males advertise with loud snarling coughs and bellows.

The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range.

Habitat and ecology of the species

Key details of the Koalas habitat and ecology include that they:

- Inhabit eucalypt woodlands and forests.
- Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.
- Inactive for most of the day, feeding and moving mostly at night.
- Spend most of their time in trees, but will descend and traverse open ground to move between trees.
- Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.
- Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery.
- Females breed at two years of age and produce one young per year.

Threats to the species

Threats to the Koala are identified as being:

- Loss, modification and fragmentation of habitat.
- Vehicle strike.
- Predation by roaming or domestic dogs.
- Intense prescribed burns or wildfires that scorch or burn the tree canopy.
- Koala disease.
- Heat stress through drought and heatwaves.
- Human-induced climate change.
- Inadequate support for fauna rehabilitation.
- Poor understanding of sources of trauma and mortality.
- Poor understanding of population distribution and trend.

Potential impacts (if any) of the proposal on the species

Proposal A seeks approval to retain currently installed sandbags for a further nominal 5-year period and undertake dune sand replenishment works. The retention of sandbags is part of coastal protection

works to prevent further erosion occurring along this stretch of Clarkes Beach. The sandbags would be removed following the 5-year period. No Koala feed trees, or Koala habitat occurs within the development footprint for Proposal A, and no impacts would be anticipated.

The Proposal B development footprint contains one ($n = 1$) Koala feed tree, Forest Red Gum (*Eucalyptus tereticornis*), listed in Schedule 2 of Koala SEPP 2021. Other species such as Broad-leaved Paperbark (*Melaleuca quinquenervia*) occur beyond the development footprint in proximal areas. No Koala feed trees would require removal to accommodate the proposal. The proposed scour flow path would be constructed to a shallow depth within the APZ area of the Forest Red Gum, and care would be required to ensure no impacts to the root system during construction. However, it is anticipated that this would be able to be achieved with little to no impact to the tree. Proposal B also requires the removal or pruning of several small to medium native trees, none of which are Koala feed trees.

The potential impacts of the proposal are likely to be limited to short term disturbance impacts as a result of construction. However, it would be expected that because of the small scale of the proposal, and existing public use of the area in general, the likelihood of occurrence of this species is low, and any potential impacts would be able to be minimised sufficiently.

Therefore, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Koala such that a viable local population of the species is likely to be placed at risk of extinction.

Common Blossom-bat (*Syconycteris australis*)

Species information

The Common Blossom-bat is a small nectar-eating bats with large eyes. They are around 6 cm long and have very soft fawn to reddish fur. They are highly specialised for a diet of nectar and pollen, having very pointed muzzles and long, thin brush-like tongues.

Coastal areas of eastern Australia from Hawks Nest in NSW to Cape York peninsula in Queensland. In areas, the distribution extends inland to coastal foothills.

Habitat and ecology of the species

Key details of the Common Blossom-bats' habitat and ecology include that they:

- Common Blossom-bats often roost in littoral rainforest and feed on nectar and pollen from flowers in adjacent heathland and paperbark swamps. They have also been recorded in a range of other vegetation communities, such as subtropical rainforest, wet sclerophyll forest and other coastal forests.
- They generally roost individually in dense foliage and vine thickets of the sub-canopy, staying in the same general area for a season. They change roost sites daily, but each roost site is generally only 50m or so away from other recent roosts.
- Favoured feeding sites are repeatedly visited on consecutive nights within a flowering season and revisited over several years.
- They require a year-round supply of nectar and pollen which is gathered from a mosaic of coastal complex vegetation types. When these vegetation types are in short supply of nectar and pollen (Nov/Dec in northern NSW) Common Blossom-bats have been known to utilise riverine areas containing Black Bean, Silky Oak and Weeping Bottlebrush.

Threats to the species

Threats to the Common Blossom-bat habitat are identified as being:

- Clearing of coastal habitat for development resulting in habitat degradation, fragmentation, and edge effects.
- Weeds, such as Bitou Bush, that suppress the regeneration of key food trees, such as Coastal Banksia.
- Predation by foxes and feral cats may occur whilst the bat is feeding on low hanging flowers and fruit.
- Inappropriate fire regimes applied in heathland habitats leading to reduced flowering of Banksia, Callistemon and Melaleuca species.
- Loss of habitat from climate change including inundation of lowland (wallum) habitat, coastal erosion, influx of saline water, as well as drying of littoral forests from temperature rise and increased drought.
- Limited viable habitat for the species reducing NSW population viability.
- Lack of knowledge of threats.
- Impacts from light associated with coastal development affecting behaviour (e.g., reduced foraging), particularly in small reserves where there are edge effects.

Potential impacts (if any) of the proposal on the species

Proposal A seeks approval to retain currently installed sandbags for a further nominal 5-year period and undertake dune sand replenishment works. The retention of sandbags is part of coastal protection works to prevent further erosion occurring along this stretch of Clarkes Beach. The sandbags would be removed following the 5-year period.

The development footprint for Proposal B, being located on the upper dunes within an area of littoral rainforest, would be expected to represent potential foraging habitat, although it is likely seldom visited by this species. Proposal B would mainly involve disturbance of the ground layer, but also requires the removal or pruning of several small to medium native trees, including Coast Banksia, which represents a potential foraging resource for this species. All trees to be removed have either perished, are stressed, or are likely to fall because of foreshore erosion. It is considered therefore that little meaningful foraging resources would be impacted as a result of the small loss of marginal habitat.

Therefore, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Common Blossom-bat such that a viable local population of the species is likely to be placed at risk of extinction.

Loggerhead Turtle (*Caretta caretta*)

Species information

The Loggerhead Turtle is a large sea turtle to 1.5 m in length. The shell is an elongated heart-shape, dark brown above and white, cream or yellowish below. The large head is dark brown on top becoming pale at the sides, with darker blotches.

Loggerhead Turtles are found in tropical and temperate waters off the Australian coast. In NSW they are seen as far south as Jervis Bay and have been recorded nesting on the NSW north coast and feeding around Sydney.

Habitat and ecology of the species

Key details of the Loggerhead Turtle's habitat and ecology include that they:

- Loggerhead Turtles are ocean-dwellers, foraging in deeper water for fish, jellyfish and bottom-dwelling animals. The female comes ashore to lay her eggs in a hole dug on the beach in tropical regions during the warmer months.

Threats to the species

Threats to the Loggerhead Turtle are identified as being:

- Collision with boats and other marine traffic causing injury or mortality.
- Entanglement and bycatch in shark nets, traps, lines and other fishing gear causing injury or mortality.
- Entanglement in or ingestion of marine debris.
- Recreational disturbance (e.g., 4WD, people, dogs) impacting turtle nests by trampling, crushing, or vandalism.
- Lack of knowledge of important habitat areas in NSW including nesting beaches.
- Lack of successful nests.
- Lack of knowledge of the species and its threats in NSW to inform management.
- Increases in temperatures, sea level, and extreme weather events from climate change impacting the species distribution and breeding success.
- Artificial light impacting hatchling behaviour and survival.
- Predation of nests by foxes, cats, pigs, or dogs.

Potential impacts (if any) of the proposal on the species

Multiple records occur for Loggerhead Turtle within the 1.5 km assessment circle, with the nearest record from August 2015 occurring west of the development footprint, along Main Beach. Notably, this record occurred when a substantial wider dune system was present (Figure 6). Most BioNet records occur along Tallow Beach to the east of the subject land, which suggests this stretch offers preferred nesting habitat. A wider dune system on this more easterly facing beach is likely to be more suitable. Most records for the Byron Shire are identified as being from Tallow Beach.

Proposal A seeks approval to retain currently installed sandbags for a further nominal 5-year period and undertake dune sand replenishment works. The retention of sandbags is part of temporary coastal protection works to prevent further erosion occurring along this stretch of Clarkes Beach. The sandbags would be removed following the 5-year period.

The potential impact to nesting marine turtles increases with the height of the obstacle, in this case the sandbag wall design. A significant obstacle may cause a pregnant female to abort that nesting attempt. At the time of assessment for this proposal, the sandbag wall was partially buried, with sand accretion

since installation reducing the height of the obstacle substantially and reducing the threat of an aborted nesting attempt.

If the sandbag wall is re-exposed, the length of the obstacle (subject to this proposal) of < 100 m, represents a minor temporary risk of resulting in an unsuccessful nesting event by this species whilst the sandbags are in place.

Therefore, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Loggerhead Turtle such that a viable local population of the species is likely to be placed at risk of extinction.

Green Turtle (*Chelonia mydas*)

Species information

A large sea-turtle that grows up to 1 m in length. Its heart-shaped shell is olive-green, brown and black, and the scales on the side of the face and limbs have distinctive pale edges.

Widely distributed in tropical and sub-tropical seas. Usually found in tropical waters around Australia but also occurs in coastal waters of NSW, where it is generally seen on the north or central coast, with occasional records from the south coast.

Habitat and ecology of the species

Key details of the Green Turtle's habitat and ecology include that they:

- Ocean-dwelling species spending most of its life at sea.
- Carnivorous when young but as adults they feed only on marine plant material.
- Eggs laid in holes dug in beaches throughout their range.
- Scattered nesting records along the NSW coast.

Threats to the species

Threats to the Green Turtle are identified as being:

- Collision with boats and other marine traffic causing injury or mortality.
- Entanglement and bycatch in shark nets, traps, lines and other fishing gear causing injury or mortality.
- Entanglement in or ingestion of marine debris.
- Predation of nests by foxes, cats, pigs, or dogs.
- Recreational disturbance (e.g., 4WD, people, dogs) impacting turtle nests by trampling, crushing, or vandalism.
- Lack of knowledge of important habitat areas in NSW including nesting beaches.
- Lack of successful nests.
- Lack of knowledge of species populations and threats impacting the species in NSW.

- Increased temperatures, sea level, and extreme weather events from climate change impacting the species distribution and breeding success.
- Artificial light impacting hatchling behaviour and survival.

Potential impacts (if any) of the proposal on the species

Five ($n = 5$) records occur for this species within the 1.5 km assessment circle, with most occurring along or adjacent to Clarkes Beach, Main Beach and The Pass. However, only eleven ($n = 11$) records occur for the Byron Shire, with only one of those attributed to a nesting event, in 1999. Most records from the Byron Shire are from deceased or sick specimens. It is also reported that a Green Turtle left the ocean in a nesting attempt on Clarkes Beach in front of the geotextile bags, and returned to the ocean without nesting.

Proposal A seeks approval to retain currently installed sandbags for a further nominal 5-year period and potentially undertake dune sand replenishment works if required. The retention of sandbags is part of temporary coastal protection works to prevent further erosion occurring along this stretch of Clarkes Beach. The sandbags would be removed following the 5-year period.

The potential impact to nesting marine turtles increases with the height of the obstacle, in this case the sandbag wall design. A significant obstacle may cause a pregnant female to abort that nesting attempt. At the time of assessment for this proposal, the sandbag wall was partially buried, with sand accretion since installation reducing the height of the obstacle substantially and reducing the threat of an aborted nesting attempt.

If the sandbag wall is re-exposed, the length of the obstacle (subject to this proposal) of < 100 m, represents a minor temporary risk of resulting in an unsuccessful nesting event by this species whilst the sandbags are in place.

Therefore, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Green Turtle such that a viable local population of the species is likely to be placed at risk of extinction.

b) in the case of an endangered ecological community or critically endangered ecological community, whether the 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.*

The development footprint occurs in an area of vegetation which contains tree species commonly found within the endangered ecological community (EEC) *Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*, listed in Schedule 2 of the BC Act 2016. However, the area potentially impacted contains a sparse ground and mid layer generally and is substantially impacted by high use. It has not been considered for inclusion under the Coastal Management SEPP 2018. The area to the east of the café, mapped as littoral rainforest under Coastal Management SEPP 2018, no longer contains any vegetation.

Beyond the subject land, vegetation communities within the locality share geographical and floristic characteristics of EEC vegetation communities; however, none of these vegetation communities would

be either directly or indirectly impacted by the proposed development.

The relatively small and low impact scale of the proposal and resultant direct or indirect impacts are such that the proposal would not have an adverse effect on the extent of any ecological community such that its local occurrence is likely to be placed at risk of extinction. Nor would any proposed action substantially and adversely modify the composition of any ecological community such that its local occurrence is likely to be placed at risk of extinction.

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

- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.*

When applying this factor, consideration has been given to all short-term and long-term impacts (direct and indirect) the proposal may have on habitat which is likely to support threatened species and ecological communities, regardless of whether the habitat occurs on the subject land.

With respect to (i), the proposal would occur on impacted land in a high use coastal zone. The area of land within the development footprint is generally of low conservation significance in the local context, with regard to the value of habitat it provides. Works within the 2,000 m² development footprint comprises of several components, with a low level of impact overall. While habitat of conservation value does occur beyond the development proposal on adjacent offsite land, these areas would not be impacted directly or indirectly as a result of the proposal. It is therefore considered that the extent to which habitat is likely to be removed or modified as a result of the action proposed is minimal.

With respect to (ii), vegetation to be removed to accommodate the proposal occurs as a small patch already partially separated from other areas of habitat significance. The proposal would not impact on any areas of habitat value, would not result in areas of habitat becoming fragmented or isolated from other areas, nor impact on the functionality of the foreshore corridor.

With respect to (iii), habitat to be removed for the proposal is either is generally in poor condition due to storm damage and exposure, and its biodiversity value in the local context is minimal and unlikely to represent significant habitat for any threatened species with the potential to occur. The actions of the proposal would not significantly affect the long-term survival of any species, populations or ecological communities in the locality.

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

This applies to declared areas of outstanding biodiversity value (“AOBVs”) under Part 3 of the BC Act 2016 and is aimed at assessing whether a development or activity is likely to affect such areas.

The subject land does not contain any area which has been identified and declared as an AOV. Therefore, AOBVs would not be affected by the proposed development.

e) *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*

The proposal is not characteristic of any listed Key Threatening Processes (KTP) gazetted pursuant to Schedule 4 of the BC Act 2016 (Table A.1). The degree that the proposal would contribute to any threatening process is not considered likely to place the local population of any of the subject species or communities at significant risk of extinction. The minor impacts to a small area of native vegetation to accommodate the proposal is not likely to represent a KTP due to the low level of disturbance of vegetation at the site.

It is considered unlikely that the local population of any of the subject species/communities would be placed at significant risk of extinction because of the proposal.

Table A.1: Key Threatening Processes gazetted pursuant to Schedule 4 of the Biodiversity Conservation Act, 2016.

<i>Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)</i>	<i>Is the development or activity proposed of a class of development or activity that is recognised as a key threatening process?</i>		
	<i>Likely</i>	<i>Possible</i>	<i>Unlikely</i>
Alteration of habitat following subsidence due to longwall mining			✓
Aggressive exclusion of birds by noisy miners			✓
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			✓
Competition and habitat degradation by feral goats			✓
Competition from feral honeybees			✓
Death or injury to marine species following capture in shark control programs on ocean beaches			✓
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments			✓
Forest Eucalypt dieback associated with over-abundant psyllids and bell miners			✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition			✓
Herbivory and environmental degradation caused by feral deer			✓
Importation of red imported fire ants			✓
Infection by <i>Psittacine circoviral</i> (beak and feather) disease affecting endangered psittacine species and populations			✓

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	Is the development or activity proposed of a class of development or activity that is recognised as a key threatening process?		
	Likely	Possible	Unlikely
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis			✓
Infection of native plants by <i>Phytophthora cinnamomi</i>			✓
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae			✓
Introduction of the large earth bumblebee			✓
Invasion and establishment of exotic vines and scramblers			✓
Invasion and establishment of Scotch broom			✓
Invasion and establishment of the Cane Toad			✓
Invasion, establishment and spread of <i>Lantana camara</i>			✓
Invasion of native plant communities by African Olive			✓
Invasion of native plant communities by <i>Chrysanthemoides monilifera</i> (bitou bush and boneseed)			✓
Invasion of native plant communities by exotic perennial grasses			✓
Invasion of the yellow crazy ant into NSW			✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants			✓
Loss of hollow-bearing trees			✓
Loss or degradation (or both) of sites used for hill-topping by butterflies			✓
Predation and hybridisation of feral dogs			✓
Predation by the European red fox			✓
Predation by the feral cat			✓
Predation by <i>Gambusia holbrooki</i>			✓
Predation by the Ship Rat on Lord Howe Island			✓
Predation, habitat degradation, competition and disease transmission by feral pigs			✓
Removal of dead wood and dead trees			✓

Appendix B – BOSET Report

Biodiversity Offset Scheme (BOS) Entry Threshold Map



244.7 0 122.33 244.7 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

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

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

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

Notes

© Office of Environment and Heritage |
NSW Environment & Heritage

Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	25/05/2021 3:20 PM	BDAR Required*
Total Digitised Area	0.21 ha	
Minimum Lot Size Method	Lot size	
Minimum Lot Size	3.93 ha	
Area Clearing Threshold	0.5 ha	
Area clearing trigger Area of native vegetation cleared	no	no
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	yes	yes
Date of the 90 day Expiry	N/A	

*If BDAR required has:

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

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

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

Disclaimer

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

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

Acknowledgement

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

Signature _____ Date: 25/05/2021 03:20 PM