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BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT (BDAR)

ST PETERS ANGLICAN COLLEGE,61 TRAIN STREET, BROULEE

PREPARED FOR
ANGLICAN DIOCESES OF CANBERRA AND GOULBURN

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EXECUTIVE SUMMARY

Lodge Environmental were commissioned by Colliers on behalf of Anglican Dioceses of Canberra and Goulburn to prepare this Biodiversity Development Assessment Report (BDAR) to submit with a Development Application (DA) to support elements of the St Peters Anglican College Community Hub, Sports and Recreation Centre Project (herein referred to as the proposal).

Impacts to native vegetation will total a maximum of 0.31 ha for thinning and clearance to prepare footprints and maintain Asset Protection Zones (APZs).

The proposal will impact vegetation consistent with Plant Community Type (PCT) 659 – Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion. This vegetation is associated with a Threatened Ecological Community (TEC), being Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions, listed as Endangered under the Biodiversity Conservation Act (BC Act).

Biodiversity conservation and ecological considerations have been made throughout project planning. Key to the design of the proposal has been the implementation of the avoidance and minimise principles, which resulted in arrival at a lower impact layout.

Biodiversity Assessment Method (BAM) plots were completed to assess the vegetation and habitat values affected by the proposal. The data gathered was input into the BAM Credit Calculator by an accredited assessor. A total of 9 Ecosystem Credits for PCT 659 are required for the proposal.

Habitat survey and targeted survey was undertaken via a program of transects and random meander for a suite of potentially occurring Species Credit Species. Survey was not undertaken for other candidate species of concern, which have therefore been assumed to be present. The results require 23 Species Credits.

While the impacts are to be offset in accordance with the Biodiversity Offset Scheme (BOS), additional measures will be implemented to further increase the sensitive approach to land use. These measures include a site ecologist pre-clearance survey to identify no go zones, as well as trees to retain and remove, with the APZ to implement a Retention Preference Value system. Hollows removed will be replaced with nest boxes. A Construction and Environmental Management Plan will also be prepared to ensure no further impact during the construction phase.

This BDAR has been prepared by an Accredited Assessor in accordance with the BC Reg and through application of the BAM – case 00033331/BAAS18140/22/00033332/Revision 3.

1.0 INTRODUCTION

Lodge Environmental were commissioned by Colliers on behalf of Anglican Dioceses of Canberra and Goulburn to prepare this Biodiversity Development Assessment Report (BDAR) to submit with a Development Application (DA) to support elements of the St Peters Anglican College Community Hub, Sports and Recreation Centre Project (herein referred to as the proposal).

This BDAR has been prepared by Accredited Assessor Jack Talbert (BAAS18140) in accordance with the Biodiversity Conservation Regulation 2017 (BC Reg) and through application of the Biodiversity Assessment Methodology 2020 (BAM).

This report documents the results of the biodiversity assessment on the Subject Land, defined as the area to be impacted by the proposal, and how the proponents propose to avoid, minimise and offset impacts from the proposal upon native vegetation or biodiversity listed under the State Biodiversity Conservation Act 2016 (BC Act) and the BC Reg. This report is based on information obtained through data searches and comprehensive field survey. The legislative context, methods used, and recommendations are included within this report.

1.1 SITE AND PROJECT DESCRIPTION

The Study Area is located at 61 Train Street, Broulee NSW 2537 (Lot 1/-/DP1037342) within the Eurobodalla Shire Council (ESC) Local Government Area (LGA), with the ESC being the consenting authority. The impact assessment contained within this report is conducted for areas requiring direct clearing for building footprints as well as impacts associated with thinning and management for APZs. The areas directly impacted are herein referred to as the Subject Land (**Figure 1**). The property currently functions as a school campus and has been developed with a range of permanent and temporary structures, a carpark and bus drop zone to the south, as well as sporting and recreational areas. It is understood that a number of structures, as well as areas of native vegetation, sustained damage during the 2019-20 bushfire season. The proposed scope of work is understood to involve:

- Construction of three (3) new buildings.
- Extensions to an existing building.
- Construction and relocation of temporary accommodation, including demolition of existing, temporary classrooms.
- Upgrades to existing carpark and school bus drop off.

The Subject Land is bound by Train Street to the south, George Bass Drive and Illawong Nature Reserve beyond to the west, and residential development to the north and east.

The Subject Land lot is 10.9 ha and zoned R2 - Low Density Residential. The proposal is the result of numerous design evolutions taken to ensure that the final proposed footprint layout reduces bushfire risk and impact to areas of higher biodiversity value.

The impact imposed by the proposal on native vegetation is above the Biodiversity Offset Scheme (BOS) threshold of 0.25 ha of native vegetation and within areas on the Biodiversity Values (BV)

map. A BDAR must therefore be prepared in accordance with the BAM by an accredited assessor. This BDAR will accompany the Development Application (DA) as a Part 4 local development in accordance with the Environmental Planning and Assessment Act 1979 (EP&A Act).

Figure 1: Subject Land Locality

1.2 PERSONNEL AND QUALIFICATIONS

This BDAR has been prepared through the compilation of field data, desktop analysis and reporting by the following technical professionals:

- Jack Talbert – Environmental Planner and Ecologist.

  BEnvSci (Hons), Accredited BAM Assessor (No: BAAS 18140).

  Jack was the project director for this assessment and completed or closely supervised all surveys, data entry, GIS mapping, review, BAM credit calculations and BDAR preparation.

- Erin Leslie – Environmental Consultant and Ecologist.

  BEnvEng (Hons).

  Erin was the project manager and was involved throughout all surveys, data entry, data analysis, GIS mapping, preparation of the BDAR and review.

- Olivia Gobran – Junior Ecologist

  BSci (BioCon)

  Olivia assisted with the field survey.

All surveys were undertaken in accordance with the following:

- Animal Research Authority (ARA) granted under the NSW Animal Research Act 1985 by the NSW Department of Primary Industries Secretary' s Animal Care and Ethics Committee.
- NSW Scientific License issued by the NSW Office of Environment and Heritage under s132C of the NSW National Parks and Wildlife Act 1974 (SL102041).

2.0 LANDSCAPE CONTEXT

2.1 LANDSCAPE FEATURES

In accordance with Chapter 4 of the BAM, a range of landscape features must be identified where they occur on the Subject Land. These features may contain biodiversity values that are important for the site context of the Subject Land, or for informing the likely habitat suitability of the Subject Land. The below subsections and **Figure 2** to **Figure 4** details these features, including Interim Biogeographic Regionalisation Australia (IBRA) regions, landscape regions (Mitchell Landscapes) and other features such as rivers, streams, wetlands, habitat connectivity, karts topography and areas of outstanding biodiversity value that have been identified under the BC Act.

2.1.1 IBRA BIOREGIONS AND IBRA SUBREGIONS

IBRA regions is a nationally endorsed classification system for mapping large, geographically distinct bioregions based on the following aspects; climate, geology, landform, native vegetation and species information. The Subject Land occurs entirely within the Bateman IBRA subregion (version 7) and within the South East Corner IBRA region (version 7) (**Figure 2**) South East Corner IBRA region is characterised by folded and metamorphosed Ordovician to Devonian sedimentary rocks that have been intruded by several granite bodies with varied soils. The Bateman IBRA subregion is characterised by mostly texture contrast soils, with red clay subsoils on metamorphic rocks, deeper coarse grained profiles on granite, red brown structured loams on basalt and deep siliceous sands with some podsol development on Tertiary sands and coastal dunes.

2.1.2 MITCHELL LANDSCAPES

Mitchell Landscapes are areas of land with relatively homogenous geomorphology, soils and broad vegetation. The Subject Land occurs on entirely within the 'Moruya Barrier' Landscape version 3.1). The Moruya Barrier Landscape was input into the BAM calculator.

2.1.3 OTHER FEATURES AND BIODIVERSITY VALUES MAP

Review of the NSW Biodiversity Values Map (BVM) show areas of mapped BVM land within the Subject Land along the western boundary (**Figure 3**). This is understood to be associated with occurrence of a TEC in this area.

The Subject Land does not contain any watercourses, karst topography, caves, crevices, cliffs or other areas features of geological significance. Riparian corridors within the locality are depicted in **Figure 2** using the Strahler Stream Order classification system.

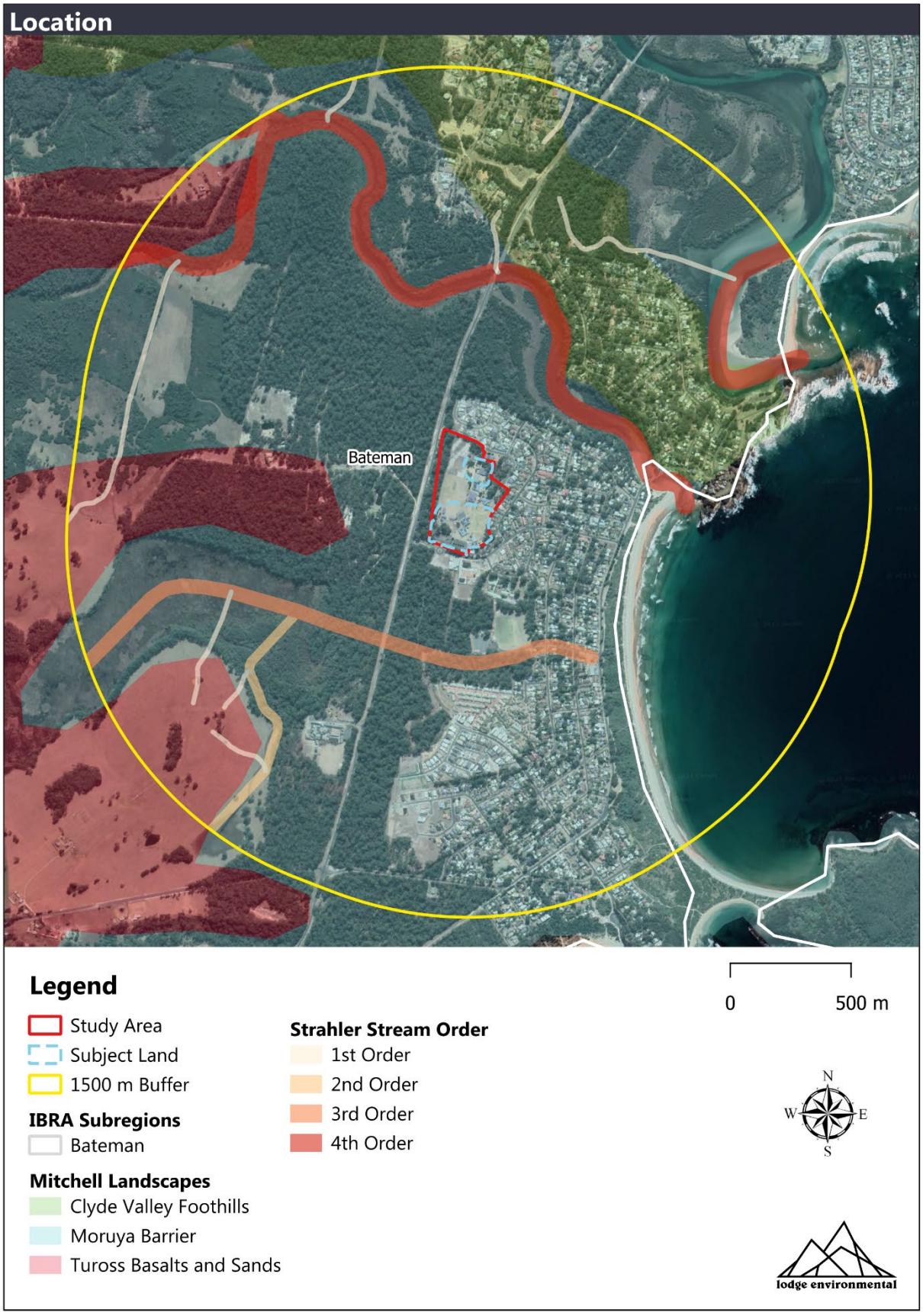

Figure 2: Location, Mitchell Landscapes and Strahler Stream Order (LPI Dataset)

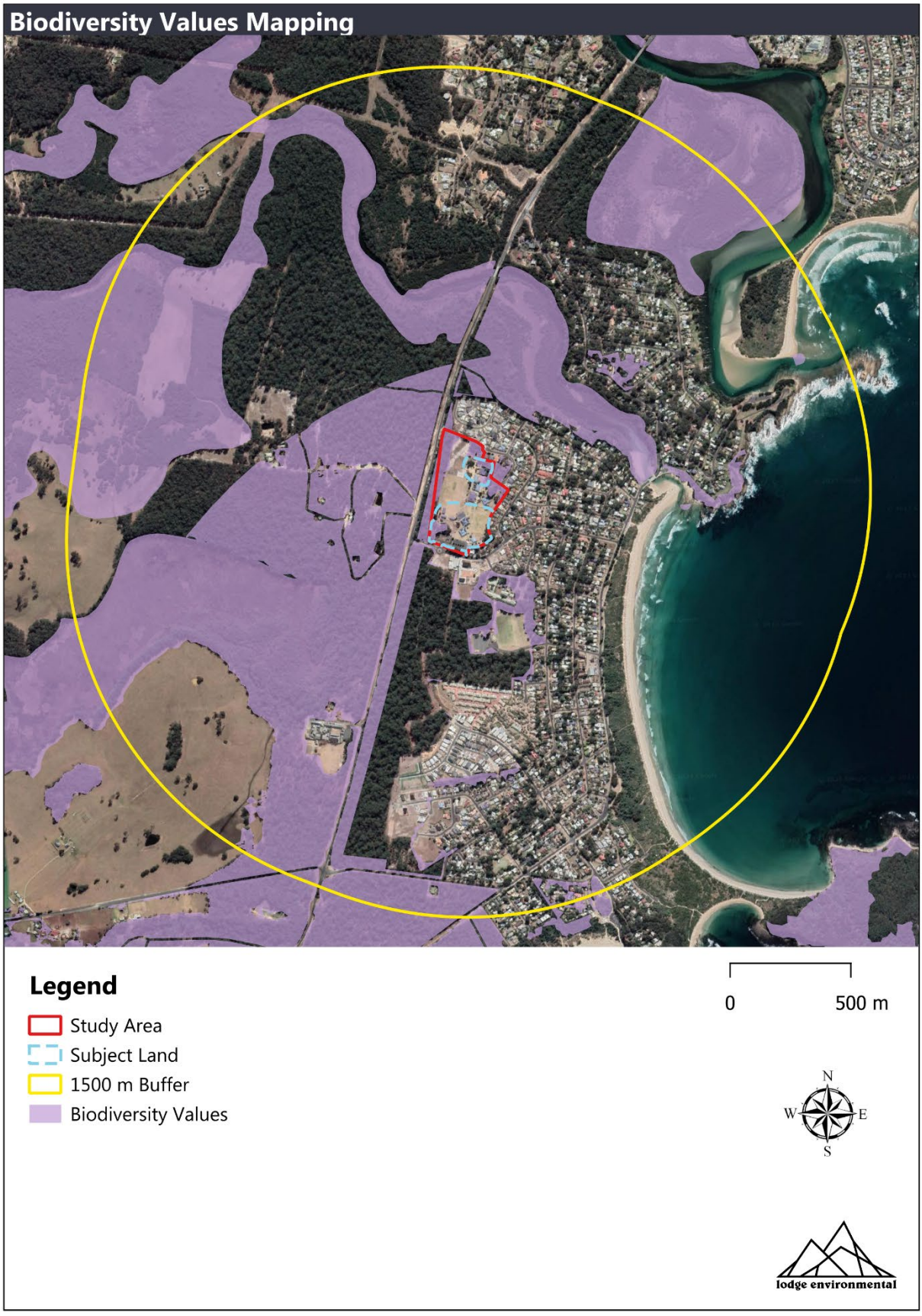

Figure 3: Biodiversity Values mapping

2.2 SITE CONTEXT

2.2.1 Native Vegetation Cover

Vegetation Mapping was used to determine the site context of the Subject Land within a 1,500 metre radius (**Figure 4**). Edits were made where necessary based on current aerial imagery to reflect any relevant changes in vegetation extent. The presence of remnant canopy trees, understanding of garden landscaping and agricultural patterns and differentiation between groundcover colour were considered during the aerial image interpretation.

Table 1 displays the relevant site context values. The native vegetation cover class used in the BAM calculator is 55%.

Table 1: Native Vegetation Cover

1,500 m buffer area	Native Vegetation Cover	Percent Vegetation Cover
922	504	54.66

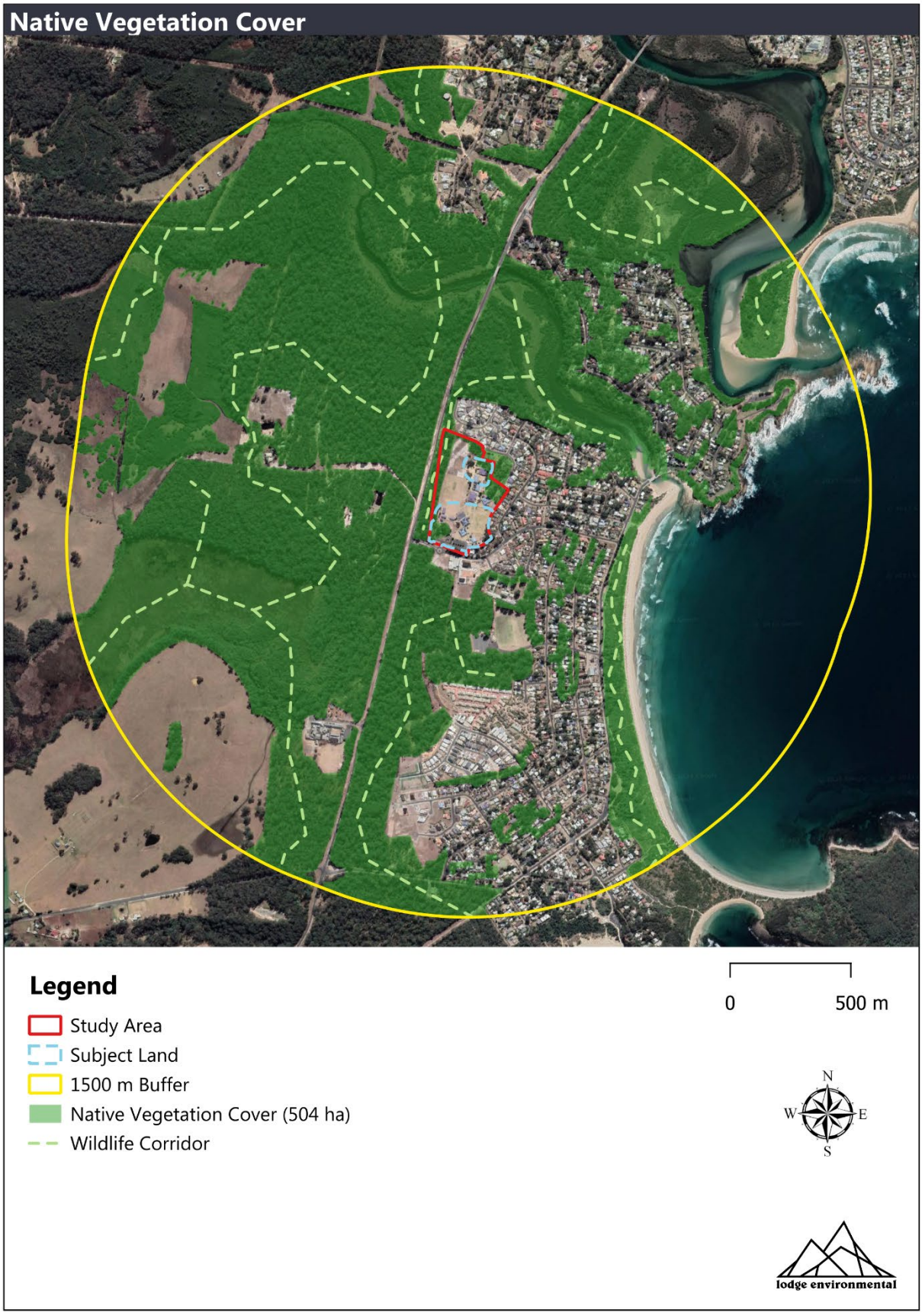

Figure 4: Native vegetation cover within 1,500m of the Subject Land

2.2.2 PATCH SIZE

Patch size for each vegetation zone within the Subject Land was calculated and assigned to a vegetation class, being either <5ha, 5-24 ha, 25-100 ha or ≥100 ha.

Patch size is defined within the BAM as an area of intact vegetation that:

a) occurs on the development site or biodiversity stewardship site, and
b) includes native vegetation that has a gap of less than 100 m from the next area of moderate to good condition native vegetation (or ≤30 m from non-woody ecosystems).

Intact vegetation is defined as "vegetation where all tree, shrub, grass and/or forb structural growth form groups expected for a plant community type are present".

Patch size may extend onto adjoining land that is not part of the development site or biodiversity stewardship site. The patch size class is used to assess the habitat suitability of the Subject Land for threatened species.

The patch size class used to assess the habitat suitability for vegetation patches within the Subject Land is **≥100 ha** as there is well connected vegetation within the Subject Land and beyond in all directions. The patch size class is used to assess the habitat suitability of the Subject Land for threatened species. **1,500 ha** was input into the BAM calculator.

3.0 NATIVE VEGETATION

The native vegetation within the Subject Land includes all areas of native vegetation including native ground cover and the canopy area of trees. The native vegetation was mapped, in accordance with the BAM, into Plant Community Types (PCTs) within the Subject Land, using the following methods:

- Review of previous vegetation mapping – Plant Community Types (DPE 2013)
- Review of Protected Matters Search Tool (Commonwealth of Australia 2022).
- Review of NSW Bionet Atlas of NSW Wildlife (2022).
- Site assessment by ecologists Erin Leslie and Olivia Gobran on 7 June 2022.
- The Subject Land was traversed to identify plant species present as well as dominance of species per native vegetation patch. Initial survey focussed on traversing the entirety of the Subject Land to confirm the sites stratification into vegetation zones reflecting the broad condition state of vegetation.
- Plot based vegetation survey was then undertaken in accordance with the BAM – i.e. a 20 m x 50 m plot. Table 3 of the BAM was reviewed and used to inform the required number of plots. The 20 m x 50 m plots also included the vegetation integrity plots. Each plot was randomly located within each vegetation zone while, where possible, also avoiding ecotones, vehicle tracks and their edges, or other disturbed areas that were readily distinguishable from the broad condition state of the vegetation zone.
- A review of the BioNet Vegetation Classification database (https://www.environment.nsw.gov.au/research/Vegetationinformationsystem.html) was utilised to determine the most suitable PCT for the vegetation communities within the Subject Land. This is in accordance with the NSW PCT classification (BioNet Vegetation Classification (OEH 2018)).
- Consideration was given to the geographic distribution (based upon IBRA subregions), vegetation formation and floristics of vegetation within the Subject Land. The data for each potential PCT including vegetation stratum floristics and formation, descriptive attributes and distribution information were then reviewed and compared to the observations made during field survey. A final determination was then made to establish the most suitable PCTs.

3.1 PLANT COMMUNITY TYPE MAPPING

3.1.1 Desktop Review

A review of the vegetation mapping that covers the Study Area (DPE 2013) identified one vegetation type within the Study Area (**Figure 5**)– being:

- PCT 659 – Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion

There is currently one Threatened Ecological Community (TEC) that can be associated with PCT 659, being:

- Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions, listed as Endangered under the BC Act

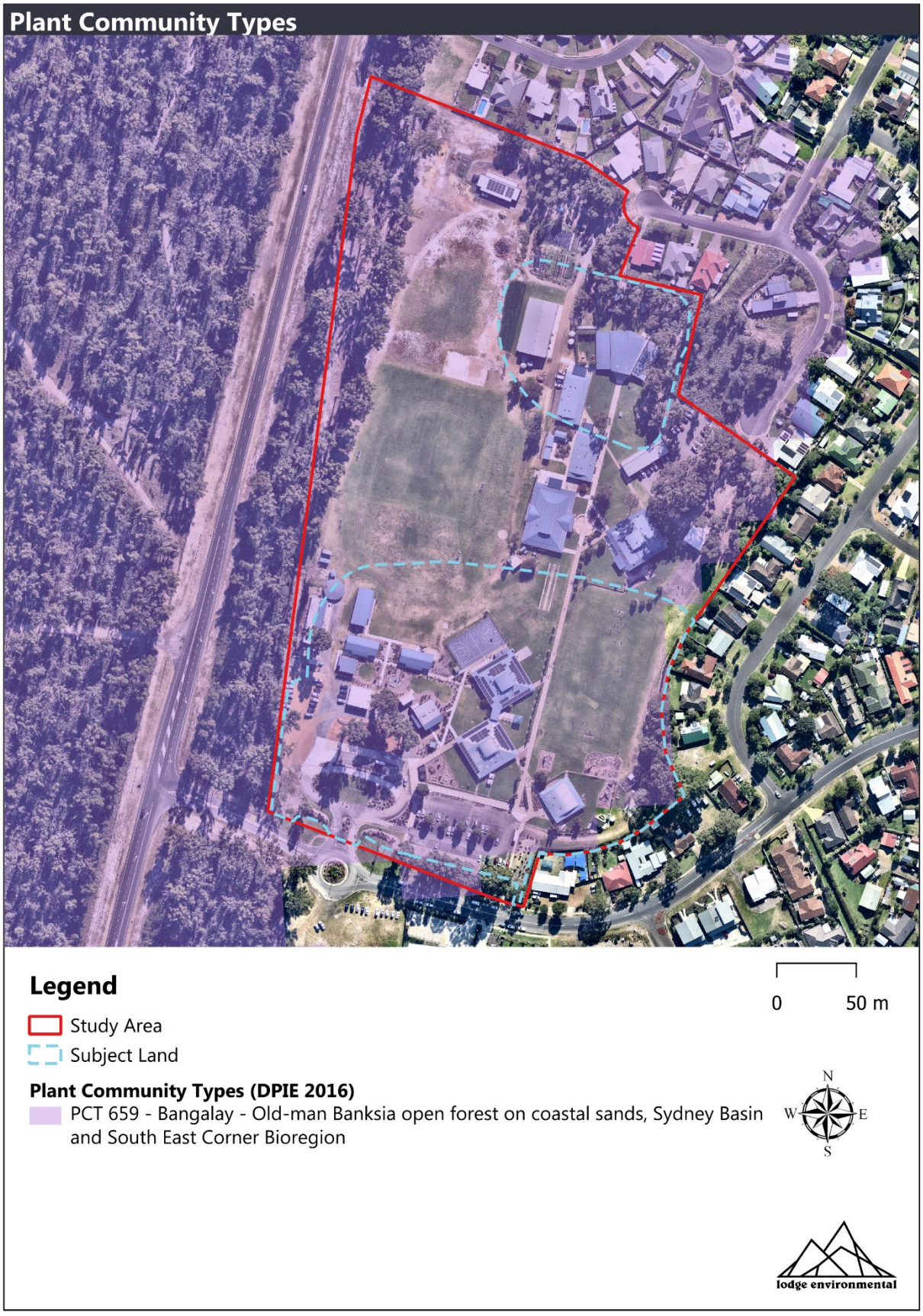

Figure 5: Vegetation Mapping (DPIE 2016)

3.1.2 FIELD VALIDATED PCTS

The PCTs within the Subject Land were field validated by Lodge Environmental ecologists.

On-site vegetation community assessment was based on analysis of site location, geology, aspect, condition and validated against Bionet Vegetation Classification (https://www.environment.nsw.gov.au/NSWVCA20PRapp/search/pctsearch.aspx).

One distinct Plant Community Type (PCT) was observed within the Subject Land (**Figure 11**), being:

- PCT 659 – Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion (2.36 ha)
- No PCT - cleared/exotic

PCT 659 – Bangalay – Old-man Banksia open forest on coastal sands

This vegetation community is a dry sclerophyll forest with a shrubby sub-formation occurring on deep coastal sands along the south and central coasts.

There were two conditions of PCT 659 within the Subject Site – Condition A and Condition B.

Throughout both condition types, PCT 659 diagnostic canopy species recorded included *Eucalyptus botryoides*, *Corymbia gummifera*, *Eucalyptus pilularis*, *Banksia serrata* and *Banksia integrifolia*. Several of these individuals contained hollows and other habitat features such as peeling bark while epicormic growth was significant on others.

The mid-stratum of PCT 659 was largely absent within Condition A, expect for occurrence of the diagnostic species *Macrozamia communis*. Scattered *Acacia species* and *Personia linearis* were also recorded. The ground-stratum within Condition A included five of the six diagnostic species for PCT 659. Evidence of slashing and management were evident in this layer.

The mid-stratum of PCT 659 was more developed in Condition B. The diagnostic species *Platysace lanceolata* was recorded in addition to *Macrozamia communis*. Several juvenile *Acacia species* were recorded throughout. The ground-stratum within Condition B included five of the six diagnostic species for PCT 659. Higher coverage and abundance of *Bossiaea heterophylla*, *Gonocarpus teucrioides* and *Glycine clandestina* was recorded in Condition B relative to Condition A. Patches of *Themeda australis* were also recorded in Condition B. It is noted that a number of management tracks have been established within Condition B.

VI Plots were undertaken in both Condition A and Condition B areas. The resulting scores were considered homogenous and herein the areas of PCT 659 are considered as a single, moderate condition vegetation zone.

PCT 659 can be associated with Bangalay Sand Forest of the Sydney Basin and Southeast Corner bioregions, which is endangered at the state level.

Figure 6: PCT 659 – thinned example along western boundary

Figure 7 PCT 659 – moderate condition example near gardens

Figure 8: PCT 659 – thinned example in north-east corner

Figure 9: PCT 659 – replanted garden area

No PCT – Cleared/Exotic

Areas that were cleared or dominant with weeds and/or non-native species were grouped and validated as not being assigned to a PCT. Many of these areas were grassed, with identification hindered by maintenance. The dominant species is likely to have been *Pennisetum clandestinum* (Kikuyu) and/or *Cenchrus ciliaris* (Buffle Grass). Landscaped areas not representative of PCT 659 were also grouped into this vegetation type.

Figure 10: No PCT example – cleared soils facing south east towards the oval

Figure 11: Validated Plant Community Types (LE 2022)

The following table provides a detailed description of the PCT recorded within the Subject Land.

Table 2: PCT 659 – Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion

PCT 659 – Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion			
PCT ID	659		
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)		
Vegetation class	South Coast Sands Dry Sclerophyll Forests		
General Descriptor	Occurs on deep coastal sands, near coastal areas on the Central and South Coasts.		
Condition and extent within Subject Land	2.36 ha in Moderate Condition within Study Area. Approximately 0.48 ha within APZs and footprints (Subject Land).		
Survey effort	Two VI plots were established in this PCT.		
PCT Justification: Expected Species by Stratum (Bold denotes species present within Subject Land patch)	**Upper Stratum Species:** ***Eucalyptus botryoides*** ***Banksia serrata*** ***Banksia integrifolia subsp. Integrifolia*** ***Eucalyptus pilularis*** *Angophora floribunda* ***Corymbia gummifera*** *Eucalyptus robusta*	**Mid Stratum Species:** *Allocasuarina littoralis* *Breynia oblongifolia* *Glochidion ferdinandi* ***Macrozamia communis*** ***Platysace lanceolata***	**Ground Stratum Species:** ***Dianella caerulea*** ***Hardenbergia violacea*** ***Lomandra longifolia*** *Pomax umbellate* ***Pteridium esculentum*** ***Imperata cylindrica var. major***
TEC Status	PCT 659 can be associated with Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions, listed as Endangered under the BC Act		
Estimate of percent cleared value of PCT in the major catchment area	50%		

3.2 VEGETATION INTEGRITY ASSESSMENT (SITE CONDITION)

Vegetation Integrity (VI) plots were undertaken in accordance with the BAM. The number of plots were informed by Table 4 within the BAM. One plot was completed during field work (**Appendix B**) as shown in **Figure 11**.

Table 3 below details the area of each native vegetation zone, associated impacts, number of plots undertaken and VI score.

Table 3: PCTs, associated impacts and plots undertaken per BAM Table 4 requirement

PCT	Condition class	Total impact (ha)	VI plots undertaken per required	VI Score
PCT 659 – Bangalay - Old-man Banksia open	Moderate	0.31	2/1	53.7

forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion				
No PCT - cleared/exotic	-	4.68	0	NA

The VI plot allowed for calculation of a vegetation integrity score for each vegetation zone at the current condition. Direct impact to the ecological values of the Subject Land is expected due to thinning for APZs and complete clearing for footprints. This was combined and taken to be complete clearing for input into the BAM-C to calculate future vegetation integrity scores.

Accordingly, future VI scores are 0/100.

4.0 THREATENED BIODIVERSITY – FLORA AND FAUNA

4.1 ECOSYSTEM CREDIT SPECIES

The ecosystem credit species predicted to utilise the site are provided in **Table 4**. No surveys are required for these species as they are reliably predicted to occur. **Table 4** lists the species which have been removed as Ecosystem Credit Species based on the site-specific habitat associations and local distribution of these species.

Table 4: Species to which Ecosystem credits apply

Species	BC Act Listing	EPBC Act Listing	Retained
Anthochaera phrygia Regent Honeyeater (Foraging)	Critically Endangered	Critically Endangered	Yes – this species is a generalist forager and may opportunistically utilise the Subject Land
Artamus cyanopterus cyanopterus Dusky Woodswallow	Vulnerable	Not listed	Yes
Callocephalon fimbriatum Gang-gang Cockatoo (Foraging)	Vulnerable	Not listed	Yes – this species forages on berries, fruits, nuts and insects and their larvae, which may be available within the Subject Land.
Calyptorhynchus lathami Glossy Black-Cockatoo (Foraging)	Vulnerable	Not listed	Removed – Allocasuarina and casuarina species were not present within the Subject Land
Daphoenositta chrysoptera Varied Sittella	Vulnerable	Not listed	Yes
Dasyurus maculatus Spotted-tailed Quoll	Vulnerable	Endangered	Removed – habitat is too degraded and fragmented for this species, which is elusive, and occupies large ranges (from 200 up to 4,000 hectares).
Glossopsitta pusilla Little Lorikeet	Vulnerable	Not listed	Yes
Hieraaetus morphnoides Little Eagle (Foraging)	Vulnerable	Not listed	Yes
Hirundapus caudacutus White-throated Needletail	Not listed	Vulnerable	Yes
Lathamus discolor Swift Parrot (Foraging)	Endangered	Critically endangered	Yes
Lophoictinia isura Square-tailed Kite	Vulnerable	Not listed	Yes

Species	BC Act Listing	EPBC Act Listing	Retained
(Foraging)			
Micronomus norfolkensis Eastern Coastal Free-tailed Bat	Vulnerable	Not listed	Yes
Miniopterus orianae oceanensis Large Bent-winged Bat (Foraging)	Vulnerable	Not listed	Yes
Ninox connivens Barking Owl (Foraging)	Vulnerable	Not listed	Yes
Petaurus australis Yellow-bellied Glider	Vulnerable	Vulnerable	Yes – large hollows were present and gnaw marks were observed.
Pteropus poliocephalus Grey-headed Flying-fox (Foraging)	Vulnerable	Vulnerable	Yes
Saccolaimus flaviventris Yellow-bellied Sheathtail-bat	Vulnerable	Not listed	Yes
Scoteanax rueppellii Greater Broad-nosed Bat	Vulnerable	Not listed	Yes
Tyto novaehollandiae Masked Owl (Foraging)	Vulnerable	Not listed	Yes

4.2 SPECIES CREDIT SPECIES

Species credit species are predicted within the BAM calculator based on an assessment of the Subject Lands specific habitat attributes and geography. Some of the species predicted within the BAM calculator may be incorrectly predicted and require further review prior to confirming the final candidate species list.

A predicted candidate species may be considered unlikely to utilise the Subject Land if the habitat is considerably degraded to a degree that the species is not expected to utilise the area, or otherwise an expert report has provided an assessment that identified the species is not likely to be present. A predicted candidate species that does not have suitable habitat within the Subject Land is then excluded from further assessment.

The understanding of the Subject Lands habitat condition was combined with a review of threatened species, populations and migratory species within a 10 km radius of the Subject Land using BioNet Atlas of NSW Wildlife Search (OEH 2022). A final assessment of the likelihood of occurrence was then made based on; habitat condition, years since sighting of any nearby records, number and proximity of nearby records, review of species habitat requirements and experience.

Any species determined as not suitable for inclusion as candidate species, in accordance with section 5.2 of the BAM, were then removed from any further consideration. **Table 5** provides a

justification of each candidate species including those removed from further assessment in accordance with section 5.2 of the BAM.

A total of 27 candidate species were identified from the BAM calculator. Of these the Subject Land is confirmed to have suitable habitat for 4 candidate species. These species are listed below:

- Gang-gang Cockatoo *Callocephalon fimbriatum* Vulnerable BC Act
- Glossy Black-Cockatoo *Calyptorhynchus lathami* Vulnerable BC Act
- Greater Glider (*Petauroides volans*) – Endangered BC Act
- Greater Glider (*Petauroides volans*) population in the Eurobodalla LGA – Endangered BC Act

Table 5: Assessment of the habitat and geographic constraints on the Subject Land

Species	Habitat Constraints	BAM question input	Final candidate species determination	Evidence for removal
Anthochaera phrygia Regent Honeyeater (Breeding)	Other As per mapped areas	No	No	There are three known key breeding areas for this species, two of them in NSW being – Capertee Valley and Bundarra-Barraba regions. The Regent Honeyeater breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak. This vegetation is not present the Subject Land. The Subject Land does not have any breeding habitat. No further consideration is required for this species.
Caladenia tessellata Thick Lip Spider Orchid	-	-	No	The Thick Lip Spider Orchid is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Populations in Kiama and Queanbeyan are presumed extinct. The species occurs on the coast in Victoria from east of Melbourne to almost the NSW border. The species is generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. The Subject Land contains a patch of PCT 649 in moderate condition that is likely too disturbed and degraded to support this species. Furthermore, there are no records of this species within a 10 km radius from the Subject Land. This species is not considered for further assessment.
Callocephalon fimbriatum **Gang-gang Cockatoo** **(Breeding)**	**1. Hollow bearing trees** **2. Eucalypt species with hollows greater than 9cm in diameter**	**1. Yes** **2. Yes**	**Yes**	**The Subject Land does contain hollows suitable for the species. Consequently, the Gang-gang Cockatoo is considered likely to occur within the Subject Land and has been considered further in Section 4.3.1.1.**
Calyptorhynchus lathami **Glossy Black-Cockatoo** **(Breeding)**	**1. Hollow bearing trees with hollows greater than 15 cm and greater than 5m above ground**	**1. Yes**	**Yes**	**Dependent on medium to large hollow-bearing eucalypts for nest sites. A number of hollow bearing trees suitable for the species were present within the Subject Land.** **The Subject Land does have potential breeding habitat and suitable foraging trees. The Glossy Black-Cockatoo is considered likely to**

Species	Habitat Constraints	BAM question input	Final candidate species determination	Evidence for removal
				occur within the Subject Land and has been considered further in Section 4.3.1.1.
Cercartetus nanus Eastern Pygmy-possum	-	-	No	In accordance with section 5.2, after carrying out field assessment of the habitats and microhabitats, the habitat is considered to have a low potential of occurrence for the species. Review of locally occurring records suggest that the species is unlikely to exist within the Subject Land. The closest record of the species is approximately 6 km to the north-east with unsuitable connectivity, particularly noting the species home ranges of about 0.35-0.68 ha. The species has a low likelihood of presence within the Subject Land. The species is removed from further assessment in accordance with section 5.2 of the BAM.
Chalinolobus dwyeri Large-eared Pied Bat	1. Cliffs 2. Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels	1.No 2. No	Yes	The Subject Land does not contain suitable habitat and the nearest record is approximately 12 km north of the Subject Land. The species is considered unlikely to occur within the Subject Land. No further assessment is on the Large-eared Pied Bat is required.
Correa baeuerlenii Chef's Cap Correa	-	-		The Subject Land does not contain suitable habitat (riparian sites with particular eucalypt species or she-oak woodland), nor are there records of this species within a 10 km radius from the Subject Land. The species has a low likelihood of presence within the Subject Land. The species is removed from further assessment.
Cryptostylis hunteriana Leafless Tongue Orchid	-	-		There are no records of this species within a 10 km radius from the Subject Land. No evidence of any other species from this genus was recorded during survey. The species has a low likelihood of presence within the Subject Land. The species is removed from further assessment.

Species	Habitat Constraints	BAM question input	Final candidate species determination	Evidence for removal
Galium australe Tangled Bedstraw	-	-	No	There are no records of this species within a 10 km radius from the Subject Land and it was not recorded during survey. The species has a low likelihood of presence within the Subject Land. The species is removed from further assessment.
Heleioporus australiacus Giant Burrowing Frog	-	-	No	There are no records of the Giant Burrowing Frog within 10 km of the Subject Land. There are no riparian areas with marginal habitat for the species are present within the Study Area. The species is removed from further assessment in accordance with section 5.2 of the BAM.
Hieraaetus morphnoides Little Eagle (Breeding)	1. Nest trees i.e. large old trees within vegetation	1. No	No	No nests or evidence of nests were recorded during site inspection within the Subject Land. The species is removed from further assessment in accordance with section 5.2 of the BAM.
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern)	1. Requires dense ground cover in a variety of habitats	1, No	No.	No suitable habitat within the Subject Land. The species is removed from further assessment in accordance with section 5.2 of the BAM.
Lathamus discolor Swift Parrot (Breeding)	1. Other or as per mapped areas	1. No	No	Breeds in Tasmania during spring and summer. Has never been recorded as nesting in NSW. The Subject Land does not have any breeding habitat. The species is removed from further assessment in accordance with section 5.2 of the BAM
Litoria aurea Green and Golden Bell Frog	1. Within 1km of wet areas|/swamps 2. Within 1km of swamp/waterbodies 3. Within 1km of waterbody	1. No 2. No 3. No	No	No suitable habitat within the Subject Land. The species is removed from further assessment in accordance with section 5.2 of the BAM.
Lophoictinia isura	1. Nest trees	1. No	No	No nests or evidence of nests were recorded during site inspection within the Subject Land.

Species	Habitat Constraints	BAM question input	Final candidate species determination	Evidence for removal
Square-tailed Kite (Breeding)				The species is removed from further assessment in accordance with section 5.2 of the BAM
Miniopterus orianae oceanensis Large Bent-winged Bat (Breeding)	1. Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code "IC - in cave" observation type code E "Nest roost" (wth numbers of individuals more than 500	1. No	No	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. No potential breeding habitat was recorded across the Subject Land. The species is removed from further assessment in accordance with section 5.2 of the BAM.
Myotis macropus Southern Myotis	1. Hollow bearing trees 2. Within 200 m of riparian zone 3. Bridges, caves or artificial structures within 200 m of riparian zone this includes rivers, creeks, billabongs, lagoons, dams and other waterbodies. On or within 200m of the site.	1. Yes 2. No 3. No	No	The Subject Land does: 1) Contain any hollow bearing trees. The Subject Land does not: 2) Come within 200m of a riparian zone 3) Contain bridges, caves or artificial structures within 200m of the riparian zone. The nearest record of this species is over 6 km from the Subject Site. There are less disturbed hollow bearing trees nearer to riparian zones and known habitat for this species. It is unlikely to occur within the Subject Land and removed from further assessment in accordance with section 5.2 of the BAM.
Ninox connivens Barking Owl (Breeding)	1. Living or dead trees with hollow greater than 20cm	1. Yes	No	Barking Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. The Subject Land does not contain hollows suitable for the

Species	Habitat Constraints	BAM question input	Final candidate species determination	Evidence for removal
	diameter and above 4m from the ground.			species. It is unlikely to occur within the Subject Land and removed from further assessment in accordance with section 5.2 of the BAM.
Petauroides volans **Greater Glider**	**1. Hollow bearing trees**	**1. Yes**	**Yes**	**Records exist within the Subject Land and locality.** **Species was not recorded during site assessment but is assumed present.**
Petaurus norfolcensis Squirrel Glider	-	-	No	In accordance with section 5.2, after carrying out field assessment of the habitats and microhabitats, the habitat is considered to have a low potential of occurrence for the species. Review of locally occurring records suggest that the species is unlikely to exist within the Subject Land. The closest record of the species is approximately 10 km to the north-east with unsuitable connectivity, The species has a low likelihood of presence within the Subject Land. The species is removed from further assessment in accordance with section 5.2 of the BAM.
Phascogale tapoatafa Brush-tailed Phascogale	-	-	No	There are no records of this species within a 10 km radius from the Subject Land. The species has a low likelihood of presence within the Subject Land. The species is removed from further assessment.
Phascolarctos cinereus Koala (Breeding)	1. Areas identified by survey as important habitat.	1. Yes	No	No evidence of Koalas were recorded during survey (e.g. claw marks and scats). Feed trees were identified across the Subject Lan, however, there are no records of the species within a 2.5 km radius. The Subject Land does not meet the definition of *core Koala habitat* under the Koala Habitat Protection SEPP. The species is removed from further assessment.
Potorous tridactylus *Long-nosed Potoroo*	1. Dense shrub layer or alternatively high canopy cover exceeding 70% (i.e. to capture populations inhabiting wet sclerophyll and rainforest))	1. No	No	There are no records of the Long-nosed Potoroo within 10 km of the Subject Land. The Subject Land does not include suitable habitat. The species is removed from further assessment in accordance with section 5.2 of the BAM.

Species	Habitat Constraints	BAM question input	Final candidate species determination	Evidence for removal
Pteropus poliocephalus Grey-headed Flying-fox (Breeding)	1. Breeding Camps	1. No	No	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. There is no breeding habitat within the Subject Land. The nearest camp is approximately 14 km to the north near Batemans Bay with reference to the National Flying-fox monitoring viewer (DotEE 2022). The species is removed from further assessment in accordance with section 5.2 of the BAM.
Senecio spathulatus Coast Groundsel	1. Headlands within 500 m of the coast	1. No	No	There are no records of this species within a 10 km radius from the Subject Land. The species has a low likelihood of presence within the Subject Land. The species is removed from further assessment.
Tyto novaehollandiae Masked Owl (Breeding)	1. Hollow bearing trees 2. Living or dead trees with hollows greater than 20cm diameter	1. Yes 2. Yes	No	The species prefers hollows in moist eucalypt forested gullies. The Subject Land does not contain habitat suitable for the species. It is unlikely to occur within the Subject Land and removed from further assessment in accordance with section 5.2 of the BAM.

*species habitat associations informed by OEH (2022) species profiles

4.3 PRESENCE/ABSENCE OF CANDIDATE SPECIES CREDIT SPECIES

Survey was conducted for required candidate species to confirm the occurrence and/or habitat potential for the species. Targeted surveys for species credit species were undertaken in accordance with section 5.3 of the BAM. Where necessary, survey was conducted during the nominated survey period specified for each candidate species and in accordance with guidance from the DPIE threatened species survey guidelines or on advice from DPIE. Additionally, where available, the below listed BAM guidelines were followed:

- Threatened Biodiversity Database Collection
- 2020 DPIE Surveying threatened plants and their habitats NSW survey guide for the BAM

4.3.1 FIELD SURVEYS

One day of field survey have been conducted to date. Generally, the survey was conducted to:

- Compile a list of flora and fauna across the Study Area to better understand the biodiversity of the site.
- Confirm the vegetation communities of the Study Area and Subject Land.
- Search for signs of threatened species, observe and record significant fauna, threatened and migratory species and other incidental observations.
- Identify potential habitat for threatened species (e.g. hollow bearing trees, exfoliating bark, pooled water, boulders creeks, geology etc).
- Undertake various targeted surveys for candidate species that were determined to have potential habitat within the Subject Land.

The findings of various field surveys are summarised in **Table 6**.

Table 6: Summary of field survey conducted on the property to date

Survey/Feature	Effort (Number/Person Hours)	Results
Vegetation Integrity (VI) Plots	2 VI plots across the Study Area	34 flora species and 1 vegetation community type identified
Habitat Bearing Trees (HBTs)	16 person hours, total coverage of the Study Area.	30 HBTs, including nest boxes, within the Study Area.
Targeted Survey: Birds	16 person hours	7 non-threatened species
Targeted Survey: Flora	16 person hours	0 threatened species identified

General habitat

Following the initial habitat assessment and analysis of data collected. The Study Area was considered suitable for a total of three candidate fauna species and one population.

The Study Area was observed to provide:

- Habitat-bearing trees:
    - A total of 30, including nest boxes, identified within the Study Area.

- Evidence of the threatened Yellow-bellied Glider, in the form of gnaw marks, was recorded during the surveys.

4.3.1.1 BIRDS

Threatened bird surveys were guided by the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), 2010, Survey Guidelines for Australia' s Threatened Birds and involved:

- Identifying areas of suitable habitat for each threatened species.
- Identifying the appropriate survey techniques based on the threatened species biology.
- Identifying optimum survey times (based off the BAM calculator results) for each threatened species.
- Conducting searches along linear / meander transects through the Study Area on one occasion.
- Two formal meanders were undertaken throughout the Subject Land.

The transects focussed on locating any nesting birds and species recorded through sound and sight. Particular attention was paid to hollow bearing trees for signs of use**.**

Appendix C lists the species recorded. A total of 7 birds were recorded throughout the survey period.

A total of 30 hollows were recorded within the Study Area. The trees, hollows present, and their fate are listed in the below **Table 7**.

Table 7: Habitat Bearing Tree within the Subject Land

Tree Identity	Features	Total features	Tree Fate
1	1 x Nest box	1	Retain
2	1 x Nest box	1	Remove
8	Yellow-bellied Glider feed marks	1	Remove
9	2x Small hollow	2	Remove
17	1x Large hollow 2x Small hollow	3	Remove
22	1x Large hollow 1x Fissured branch	2	Remove
23	1x Nest box	1	Retain
	Total	**10**	

4.3.2 TARGETED FIELD SURVEYS – FLORA

The following general survey methods were undertaken during survey:

- Identification of plant species and vegetation communities present within the site with comparison made to the available modelled vegetation mapping.
- Searching for signs of threatened flora species, observing and recording significant flora, threatened species and other incidental observations
- Observing and recording current disturbance and threats (e.g. Bushfire, weeds, grazing, trampling, litter).
- Identifying potential habitat for threatened flora species (e.g. creeks, geology etc).
- Recording presence of environmental weeds.

A total of 34 flora species were recorded (30 native, 4 exotic). No threatened flora was recorded on the Subject Land.

Following vegetation and habitat assessment, the Subject Land was not considered suitable for any candidate flora species.

4.3.3 SURVEY WEATHER

The weather during throughout each survey is summarised in **Table 8** below.

Table 8 Weather Conditions during surveys

Survey	Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Wind
VI Plots, General Habitat Assessment and Habitat Bearing Tree Mapping	7/5/22	11	16.2	0.4	15 SW – 17 SSW

Observations were drawn from Moruya Airport {station 069148}.

4.3.4 SURVEY LIMITATIONS

A combination of targeted survey and habitat assessments were conducted to predict the occurrence and likelihood of species occurrence at the site. A conservative approach was applied in the assumption of the presence of species that could potentially occur within the Subject Land. In this regard, the survey is considered adequate for the purposes of this report. The aim of the survey was to record as many species as possible within the timing and budgetary constraints of the project. A definitive list is not considered possible (i.e. multiple seasons over longer periods) however the survey carried out is suitable to accurately define the vegetation communities and condition and threatened flora and fauna presence or likelihood.

4.4 DETERMINE THE AREA OR COUNT, AND LOCATION OF SUITABLE HABITAT FOR A SPECIES CREDIT SPECIES

The area of suitable habitat (Species Polygons) for species credits species is outlined in **Table 9**. Species polygons have been calculated for the impacts to the species credit species based on their habitat associations to be impacted, as mapped in **Figure 12**. Trees within the Subject Land that are detailed for retention on the DA site plan have not been included in the polygons.

Although the site contains hollows of suitable size for the relevant Candidate Species breeding habitat for Gang-gang Cockatoo and Glossy-black Cockatoo, these trees are detailed for retention. The Vegetation Management Plan (Harris 2023) states that "all trees within the south APZ can be retained" however all trees in the north must be removed. Accordingly, two habitat bearing trees suitable for these species are being removed. The relevant impact and retention has been considered in the calculation of the Species Polygons.

Table 9: Candidate species and associated species polygons

Species name	Area of habitat (ha)	Associated Polygon
Gang-gang Cockatoo *Callocephalon fimbriatum* BREEDING HABITAT	0.25	Polygon 1 Medium to large tree hollows to be removed, buffered by canopy coverage defined for each tree in a 200 m radius. Vegetation within the northern APZ is covered by Polygon 1. As per the Vegetation Management Plan (Harris 2023) "all trees within the south APZ can be retained" and the vegetation to be removed for the carpark are outside the 200 m radius of medium to large tree hollows, accordingly, this vegetation is not considered impacted or included within the area calculation for Polygon 1.
Glossy Black-Cockatoo *Callocephalon fimbriatum* BREEDING HABITAT	0.25	Polygon 1 Medium to large tree hollows to be removed, buffered by canopy coverage defined for each tree in a 200 m radius. Vegetation within the northern APZ is covered by Polygon 1. As per the Vegetation Management Plan (Harris 2023) "all trees within the south APZ can be retained" and the vegetation to be removed for the carpark are outside the 200 m radius of medium to large tree hollows, accordingly, this vegetation is not considered impacted or included within the area calculation for Polygon 1.
Greater Glider *Petauroides volans*	0.31	Polygon 2 Vegetation within the northern APZ and vegetation impacted by the carpark is covered by Polygon 2. As per the Vegetation Management Plan (Harris 2023) "all trees within the south APZ can be retained", accordingly, this vegetation is not considered impacted or included within the area calculation for Polygon 1.

Figure 12: Species polygons for candidate fauna species

5.0 AVOIDING AND MINIMISING IMPACTS ON BIODIVERSITY VALUES

5.1 NATIVE VEGETATION AND HABITAT DURING PROJECT PLANNING

The Subject Land is the result of numerous iterations aimed at reducing the impact of the layout while balancing other design and disciplines requirements. This planning has seen the layout shift further east from the western boundary, near the oval, to avoid and minimise APZ encroachment into BV mapped areas. Original plans required removal of the entire roadside vegetated corridor. Footprints have been sited primarily in cleared areas. Mapping and avoidance of several Habitat Bearing Trees within the APZ has further reduced the impacts. It is understood that complete avoidance was not possible due to APZ and safety requirements.

In total, 0.31 ha of native vegetation has been assessed as impacted by the proposed development. The majority of the impact is associated with the management of vegetation for bushfire protection. Small areas to be cleared entirely have been sited within locations that are either mostly cleared already or are slightly lower condition**.**

5.2 PRESCRIBED BIODIVERISTY IMPACTS

Prescribed impacts have also been avoided, or kept to a minimum. **Table 10** details the prescribed impacts relevant to the proposal and the planning that has been part of the proposal to minimise these impacts.

Table 10: Prescribed biodiversity impacts

Prescribed Impact	Assessment of impact	Measures taken to avoid and minimise the impacts
Impacts on non-native vegetation	Exotic vegetation will be cleared as part of the development. The exotic vegetation is not considered to provide habitat for any threatened species. The removal of the environmental weed will benefit the local ecology.	The exotic vegetation provides lower habitat value compared to native vegetation. Removing the weeds will free up resources (sunlight, space, nutrients and water) for native species which may then grow and provide habitat for native fauna.
Connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	Connectivity of different areas of habitat will not be significantly impacted.	The Subject Land has been sited to avoid clearing along the western boundary, which forms a movement corridor.
Movement of threatened species that maintains their lifecycle	Threatened and non-threatened species associated with the Subject Land may utilise the tree hollows for roosting, as well as the connecting vegetation to move between.	The HBTs within the APZ are to be retained unless unavoidable. This reduces the impact on potential roost hollows. Many more HBTs exist within the retained vegetation surrounding the APZ. Regardless of the ample habitat remaining, any loss will be offset at a ratio of 2:1 for suitable nest boxes installed to hollows removed.
Vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community	Residential and main roads, including George Bass Drive, are already in place around the Study Area. Additional vehicle movement at low speeds presents only a small risk to local fauna, which is negligible in context.	Residential speed limits will apply. Land for Wildlife signage should be present to advise drivers of fauna presence.

5.3 AVOIDANCE AND MITIGATION

5.3.1 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

To avoid potential indirect impacts during construction, an appropriate erosion and sedimentation control plan should be in place following best practice protocols such as Landcom (2004). It is recommended that sediment and erosion measures are included in a site CEMP, prior to any construction works taking place.

The CEMP will be required to span the pre, during and post-construction period, and will include sediment fencing and erosion control measures. The aim is to remove the potential for any sediment mobilising into downslope environments during construction.

All measures must comply with relevant industry guidelines such as the Blue Book (Landcom).

5.3.2 REMOVAL OF ENVIRONMENTAL WEEDS

Environmental weeds are plants that represent a threat to the conservation values of natural ecosystems. They invade and out-compete native plant communities causing a reduction in plant diversity and resulting loss of habitat for native flora and fauna. Council can supply a list of environmental weeds on request. While Council does not have the authority to require property owners to appropriately manage environmental weeds, it should be encouraged and it is in the long term interests of the property owner to learn to recognise such weeds and to deal with them in an expeditious manner. The landowners will ensure environmental weeds are controlled as needed.

5.3.3 RETENTION PREFERENCE VALUE (RPV)

Establishing an APZ can often lead to competition between bushfire protection and the preservation of biodiversity. The purpose of an APZ is to manage the fuel load so it is progressively reduced, with a decreased amount of fuel closest to habitable structures. This approach aims to reduce the potential radiant heat levels, flame contact, ember and smoke attack on life and property. Vegetation surrounding the proposed building footprints will be managed as an APZ.

Current Biodiversity legislation is aimed at slowing the rate of extinction to threatened species listed under the State BC Act and Commonwealth EPBC Act. Preservation of key resources utilised by listed species is an essential part of this objective. A particular focus is given to the value of hollows within the natural landscape as it is well known that a wide variety of threatened and non-threatened fauna rely on hollows for shelter, roosting and nesting (DPIE 2020; DoECC 2007). As the sheltering, roosting and nesting requirements for different threatened and non-threatened fauna varies across NSW, the definition of what represents a 'hollow' becomes increasingly ambiguous. This can create a scenario where during assessments, potential habitat resources for local fauna can be overlooked.

To ameliorate this, assessment within this BDAR has focused on Habitat-bearing Trees rather than Hollow-bearing trees. Habitat-bearing trees can be alive or dead (stag) and unlike Hollow-bearing trees, HBTs are taken to include any additional sheltering, roosting or nesting features that may

be relied upon by native fauna, but are not captured within the traditional definition of a Hollow-bearing tree. This assessment also considers large trees as ecologically important resources. Large trees are defined as a tree with trunk diameter greater than 500mm measured at 1.4m above ground (based on Bionet Vegetation Classification for the current PCT). In most cases large trees will be captured within the Habitat-bearing tree category as they are mostly likely to present the features. **Appendix F** defines each habitat feature that can be considered habitat for threatened or non-threatened fauna.

A Retention Preference Value Plan (RPV) was provided to guide any required native tree removal within the APZs. This RPV is ranks trees based on their general and specific habitat features relating to threatened and non-threatened fauna that may utilise each tree.

In summary:

- All trees within the footprints have been assumed to be removed.
- All dangerous trees are proposed to be removed (to be confirmed by arborist).
- Within the APZs, the hierarchy of removal followed:
    - First, remove any low-quality trees without hollows.
    - Remove any moderate quality trees without hollows.
    - Finally, remove any moderate quality trees with hollows to the minimum extent required to achieve the APZ requirements.

A Project Ecologist must survey the area immediately prior to vegetation clearance to determine the no-go zones and identify the trees to be removed and retained.

The site VMP (Harris Consulting 2023) states:

- All trees within the south APZ can be retained;
- All trees within north APZ are to be removed. All trees are to retain a trunk of 20-30 cm to limit ground disturbance.

5.3.4 VEGETATION REMOVAL

The following procedure for felling of the HBTs should be undertaken in accordance with the below.

- A suitably licensed ecologist (who is vaccinated for Australian Bat Lyssavirus) is to be engaged to supervise removal of the native vegetation in order to minimise the chance of harm to fauna, and to rescue or relocate any fauna displaced during the clearing process. This is to ensure protection to any fauna residing within the identified HBTs.
- Check the HBT disturbance area for fauna before clearing and scare off or remove (guided by the on-site ecologist) any fauna before commencing clearance.
- Remove the non-HBTs prior to removal of the HBTs.
- Leave the HBTs standing for at least one night after other non-HBT clearing to allow any fauna the opportunity to remove themselves after site disturbance.
- After clearing, re-check the site to ensure no fauna have become trapped or injured during clearing operations. Any fauna found should be moved to adjacent habitat.

- Before felling the HBTs, tap trunk using heavy machinery to scare fauna from the hollows. Repeat several times. The aim is to 'substantially' shake the tree and encourage fauna to exit.
- The preferential method of removal is to utilise qualified tree surgeons to fell the HBT using chainsaws and pulleys. If unavailable carefully fell the HBT by gently lowering the tree to the ground using an excavator arm fitted with grapples.
- After felling the tree, thoroughly check the tree for fauna in the case that any have become trapped or injured during clearing operations. Any fauna should be safely moved into adjacent habitat.
- If taking the tree down in stages, the non-hollow bearing branches should be removed before the hollow bearing branches are removed.
- Fell trees into the already disturbed areas to avoid damaging adjacent vegetation.
- Take care when moving equipment near vegetation to be retained.
- Where possible, logs from felled trees should be distributed into areas of vegetation so that they can continue to provide habitat for fauna such as terrestrial reptiles and mammals.
- Relocate woody debris to areas where they will not contribute a fire hazard.
- Provide written evident to Council in order to document that a suitable qualified person was engaged for the tasks listed above.

Furthermore, where tree removal is to occur in the Heritage Feature 5 area, ground disturbance must be avoided by the following measures:

- Use of hand tools only, no mechanical plant or equipment in the feature zone.
- Tree limb removal by arborist using pullies/ropes, stump to remain inground permanently.
- Shrubs and ground covers to be maintained at a level roughly 100mm above ground

5.3.5 NEST-BOX INSTALLATION

Nest boxes are to be installed on a one for one basis for any natural hollow or habitat feature equivalent removed by the development. This aims to compensate for the removal of the HBTs within and adjacent to the building envelopes. A total of 5 HBTs, including 4 small hollows, 2 large hollow, a large fissured branch, one nest box and a gnawed feed tree will be impacted by the proposal. It is assumed that HBTs 12, 13, 15 and 19 will be retained. A Nest Box Management Plan should be prepared prior to the release of a Construcation Certificate. This Plan will detail the number and type of nest boxes required along with the monitoring and maintenance schedules for each nest box.

The installation method recommended for the nest boxes is the is the Habisure© system illustrated below (**Figure 13**). This method allows for tree growth and minimises damage to the tree. **Figure 14** illustrates a method for installing nest boxes where there is no opposite branch to support it. Nest boxes installed using this method would need to be checked and loosened more often than nest boxes installed using the method in **Figure 13**. Bolting nest boxes to trees

is not recommended as this can damage the tree and bolts rust quickly requiring maintenance or replacement.

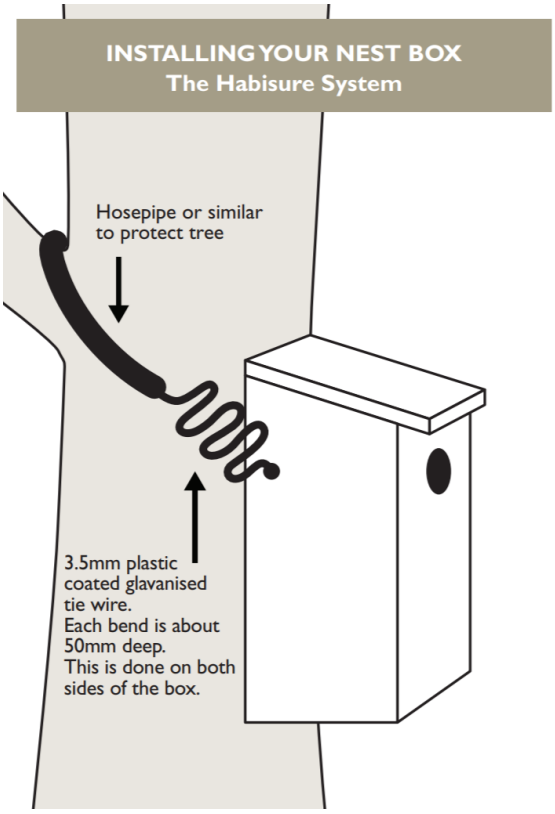

Figure 13: The Habisure System (Roads and Maritime 2011)

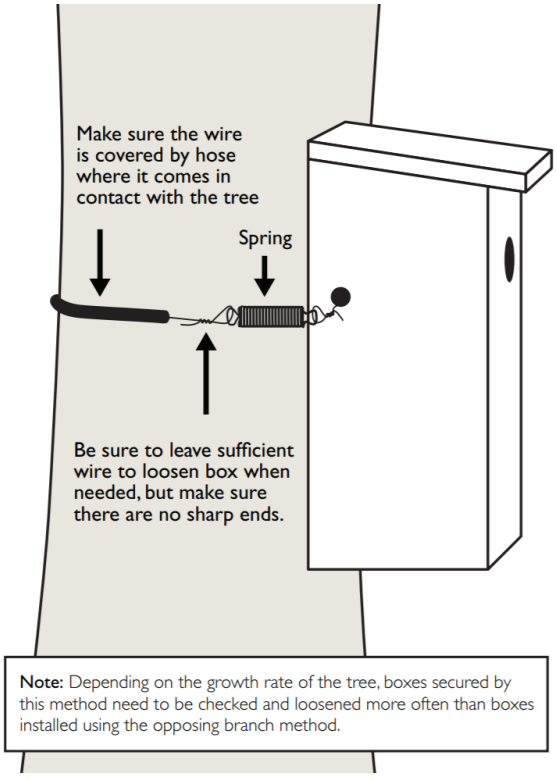

Figure 14: The Alternate Habisure System (Roads and Maritime 2011)

5.4 SUMMARY OF MITIGATION MEASURES

The below **Table 11** summariess all mitigation measures proposed above.

Table 11: Mitigation measures summary

Mitigation Measure	Details
CEMP	CEMP required to: • prepared prior to issue of construction certificate. • Span pre, during and post construction period • Responsibility of DA holder
Weed Removal	Environmental Weeds will be managed by the land manager on an ongoing basis.
Tree Retention	Tree Retention has been inform by the Retention Preference Value rating system. Accordingly, HBTs and trees considered to proved a higher value to the surrounding fauna have been prioritied for retention. Felling Superivion by a suitably qualified ecologist will ensure tree removal occurs only as approved.
Vegetation Removal – felling supervision	Any HBTs to be removed will be supervised by a suitably qualified ecologist.
Nest-box Installation	Nest-boxes will be installed to offset any hollows removed by the development.

5.5 ADDITIONAL LEGISLATIVE CONSIDERATIONS

5.5.1 Eurobodalla LEP 2012

The below Eurobodalla LEP clause is relevant to the proposal:

- 6.6 Biodiversity

This clause applies to land identified as "Endangered Ecological Community", "Extant Native Vegetation" or "Biocorridor" on the Terrestrial Biodiversity Map. The Subject Land is mapped as 'Endangered Ecological Community'.

Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:

(a) the development is designed, sited and will be managed to avoid any adverse environmental impact, or

(b) if that impact cannot be avoided—the development is designed, sited and will be managed to minimise that impact, or

(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.

The proposed layout includes APZs within mapped areas, however, due to other constraints including aboriginal heritage, this area will be managed as follows:

- Limit ground disturbance (root uplift) by;
    - Hand tools only, no mechanical plant or equipment in the feature zone.
    - Tree limb removal by arborist using pullies/ropes, stump to remain inground permanently;
    - Shrubs and ground covers to be maintained at a level roughly 100mm above ground
    - Use of existing fire break path around the perimeter of CC.

This effectively minimises and mitigates impacts in addition to other recommendations herein.

5.5.2 KOALA HABITAT PROTECTION SEPP

The Koala Habitat Protection SEPP 2021 aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for *Phascolarctos cinereus* (Koala) to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline.

An assessment of whether the Subject Land meets the definition of Core Koala Habitat under the Koala Habitat Protection SEPP (2021) was undertaken. The Subject Land contains known feed trees, however, does not have recent (within the past 18 years) within 2.5km of the Subject Land.

A KAR is therefore not required.

5.5.3 EPBC ACT SIGNIFICANT IMPACT GUIDELINES

The Commonwealth EPBC Act aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. Under this Act an action will require approval from the Minister for the Environment if the action has, will have, or is likely to have, a significant impact on a Matters of National Environmental Significance (MNES). MNES include listed threatened species and ecological communities, migratory species and wetlands of international importance protected under international agreements. Where applicable, the assessment criteria relevant to this Act must be drawn upon to determine whether there would be a significant impact on these species and hence whether referral to the Federal Environmental Minister is required.

Two MNES have been identified within the subject land including the:

- *Petauroides Volans* / Greater Glider, and
- *Callocephalon fimbriatum* / Gang-gang Cockatoo

Impacts of the proposed development on these MNES have been assessed in accordance with the Significant Impact Guidelines (DotE 2013).

The Significant Impact Criteria was applied and is provided in **Appendix E**. It is determined that the proposed subdivision will not result in a significant impact to MNES (threatened and migratory species).

6.0 IMPACT SUMMARY AND OFFSET ASSESSMENT

6.1 DIRECT IMPACT

The direct impact imposed by the proposal relates to clearance of native vegetation to make way for building envelopes and vegetation thinning to achieve APZ requirements. The total impact areas are shown in **Figure 15**. A small amount of vegetation is detailed for retention and has not been included in the impact assessment.

The total impact on native vegetation or habitat is 0.31 ha (**Table 12**) and has been assessed within this report. This will occur to PCT 659 in a moderate condition.

Table 12: Areas of vegetation to be impacted

PCT	Impact Type	Total impact (ha)
659 - Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions, listed as Endangered under the BC Act	Direct and APZ	0.31
	Total	**0.31**

Figure 15: Impact to Native Vegetation

6.2 INDIRECT IMPACTS

Indirect impacts occur when project-related activities affect species or ecological communities in a manner other than direct loss within the Subject Land. Indirect impacts may sterilise or reduce the habitability of adjacent or connected habitats.

The proposal is not considered to impact any fauna through indirect impacts such as starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, reduction in viability of adjacent habitat due to edge effects, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, noise, light spill, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas.

The vegetation to be retained is already bounded by residential dwellings, and George Bass Drive. There is existing pressure in the form of weed invasion, rubbish, domestic animals, night lights, roadkills, and edge-effect damage.

6.3 ADAPTIVE MANAGEMENT FOR UNCERTAIN IMPACTS

No adaptive management measures are proposed additional to those listed above.

6.4 THRESHOLDS FOR THE ASSESSMENT AND OFFSETTING OF IMPACTS OF DEVELOPMENT

6.4.1 SERIOUS AND IRRIVERSIBLE IMPACTS

There are no potential Serious and Irreversible Impact (SAII) entities to be impacted by the proposal.

6.4.2 IMPACTS REQUIRING OFFSETTING

All impacts on native vegetation from the proposal require offsetting as they are associated with either:

- a vegetation zone that has a vegetation integrity score ≥15 where the PCT is representative of an endangered or critically endangered ecological community, or
- a vegetation zone that has a vegetation integrity score of ≥17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits) or is a vulnerable ecological community, or
- a vegetation zone that has a vegetation integrity score ≥20 where the PCT is not representative of a TEC or associated with threatened species habitat.

The impacts assessed within this report that require offsetting are detailed above in **Table 12**.

6.4.3 IMPACTS THAT DO NOT REQUIRE FURTHER ASSESSMENT

An offset or further assessment is not required for the cleared / access areas (i.e. non-native vegetation) within the Subject Land.

7.0 FINAL CREDIT CALCULATIONS

7.1.1 ECOSYSTEM CREDITS

The ecosystem credits calculated as a requirement for the proposal impact are outlined in **Table 13**. In total, 9 ecosystem credits are required.

Table 13: Ecosystem credit requirement

PCT	Total impact (ha)	Ecosystem Credit Requirement
659 - Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions, listed as Endangered under the BC Act	0.31	9

7.1.2 SPECIES CREDITS

The species credits calculated as a requirement for the proposal impact are outlined in **Table 14**. In total, 23 species credits are required.

Table 14: Species credit requirement

Species	Total impact (ha)	Species Credit Requirement
Callocephalon fimbriatum / Gang-gang Cockatoo	0.25	7
Calyptorhynchus lathami / Glossy Black-Cockatoo	0.25	7
Petauroides volans / Greater Glider population in the ESC	NA – captured below	NA
Petauroides volans / Greater Glider population in the ESC	0.31	9

7.2 CREDIT COSTS

The Biodiversity Offsets Payment Calculator (BOPC) was replaced by the Biodiversity Charge Fund (BCF) Charge System on 17 October 2022. The new BCF Charge System will now be used to determine the amount a proponent may pay into the BCF to meet a biodiversity offset obligation.

The Biodiversity Conservation Trust (BCT) is responsible for administering the new charge system. More information about the new charge system, including how to request a quote from the BCT, is available on the BCT website, available through https://www.bct.nsw.gov.au/info/biodiversity-conservation-fund-charge-system.

The NSW Biodiversity Conservation Trust (BCT) offers a paid biodiversity credits price estimation service. This service can be used to understand the potential future payments in to the BCF. It is important to note, the biodiversity credits price estimation service offers guidance only, and not an actual market price. Information on prices being paid for credits can be found through the NSW DPE Market Sales Dashboard.

Alternatively, the proponent may source the credits on the market. The following offset rules must be followed if this option is pursued.

Credit classes for PCT 659, like for like options:

- Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions. This includes PCT's: 659, 1793, 1794
- With HBTs.
- Bateman, Bungonia, Ettrema, Jervis and South East Coastal Ranges or any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.

8.0 CONCLUSION

This BDAR has been prepared by an Accredited Assessor in accordance with the BC Reg and through application of the BAM – case 00033331/BAAS18140/22/00033332/Revision 3.

After all avoidance and mitigation measures, the proposal will result in the maximum impact to 0.31 ha of native vegetation associated with 659 – Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion which is associated with 3 candidate species habitat.

Application of the BAM requires 9 Ecosystem Credits for PCT 659 and 23 Species Credits to be discharged by the proponent.

It is understood that minor amendments may occur to the layout following submission. The BAM-C and this BDAR would need to be updated and finalised accordingly.

9.0 REFERENCES

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10.0 LIMITATIONS

This report and the associated services performed by Lodge Environmental are in accordance with the scope of services set out in the contract between Lodge Environmental and the Client. The scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to Site.

Lodge Environmental derived the data in this report primarily from visual inspections, and, limited survey and analysis made on the dates indicated. In preparing this report, Lodge Environmental has relied upon, and presumed accurate, certain information provided by government authorities, the Client and others identified herein. The report has been prepared on the basis that while Lodge Environmental believes all the information in it is deemed reliable and accurate at the time of preparing the report, it does not warrant its accuracy or completeness and to the full extent allowed by law excludes liability in contract, tort or otherwise, for any loss or damage sustained by the Client arising from or in connection with the supply or use of the whole or any part of the information in the report through any cause whatsoever.

The data, findings, observations, conclusions and recommendations in the report are based solely upon the state of the Site at the time of the investigation. The passage of time, manifestation of latent conditions or impacts of future events (e.g. changes in legislation, scientific knowledge, land uses, etc) may render the report inaccurate. In those circumstances, Lodge Environmental shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of the report.

This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between Lodge Environmental and the Client. Lodge Environmental accepts no liability or responsibility whatsoever and expressly disclaims any responsibility for or in respect of any use of or reliance upon this report by any third party or parties.

It is the responsibility of the Client to accept if the Client so chooses any recommendations contained within and implement them in an appropriate, suitable and timely manner.

Appendices

Appendix A: Vegetation Plot Data

Plot ID	Count of Native Richness						Sum of Cover (%)						
	Tree	Shrub	Grass	Forb	Fern	Other	Tree	Shrub	Grass	Forb	Fern	Other	High threat exotic
Plot 1	2	7	4	2	1	3	11	0.9	20.4	0.2	0.1	12.2	0
Plot 2	2	9	5	2	1	4	7	15.7	20.8	25.1	1.0	0.5	0

Plot ID	Function										
	Hollow trees	Litter cover	Tree stem <5	Tree stem 5-9	Tree stem 10-19	Tree stem 20-29	Tree stem 30-49	Tree stem 50-79	Large trees >80 cm	Tree regen	Length of logs (m)
Plot 1	3	64	0	0	0	1	4	5	3	Absent	0
Plot 2	5	71	1	6	8	5	4	3	0	Absent	0

Appendix B: Flora Species List

Scientific name	Common name	Native	Exotic
Acacia falcata	Hickory Wattle	x	
Acacia floribunda	White Sally Wattle	x	
Acacia longifolia	Long-leaved Wattle	x	
Acacia spp.	Wattle	x	
Acacia suaveolens	Sweet Wattle	x	
Acacia terminalis	Sunshine Wattle	x	
Amperea xiphoclada	Brrom Spurge	x	
Austrostipa spp.	Speargrass	x	
Banksia seratta	Old Man Banksia	x	
Bossiaea heterophylla	Variable Bossiaea	x	
Conzya spp.	Fleabane		x
Corymbia gummifera	Red Bloodwood	x	
Crepis capillaris	Smooth Hawksbeard		x
Desmodium varians	Slender Tick-trefoil	x	
Dianella caerulea	Blue Flax-lily	x	
Eucalyptus botryoides	Southern Mahogany	x	
Eucalyptus pilularis	Blackbutt	x	
Glycine clandestina	Twining Glycine	x	
Gonocarpus teucrioides	Raspwort	x	
Hakea eriantha		x	
Hardenbergia violacea	Purple Coral Pea	x	
Hibbertia spp.	Guinea Flower	x	
Imperata cylindrica	Blady Grass	x	
Lomandra longifolia	Basket Grass	x	
Lomandra obliqua	Fish Bones	x	
Macrozamia communis	Burrawang	x	
Persoonia linearis	Narrow-leaved Geebung	x	
Plantago lanceolata	Lamb's Tongues		x

Platysace lanceolata	Shrubby Platysace	x	
Pteridium esculentum	Bracken	x	
Setaria parviflora	Slender Pigeon Grass		x
Sporobolus creber	Western Rat-tail Grass	x	
Taraxacum officinale	Dandelion		x
Themeda australis	Kangaroo Grass	x	

Appendix C: Fauna Species List

Class Name	Scientific Name	Common Name
Sightings during field investigations		
Aves	Australian Magpie	*Gymnorhina tibicen*
	King Parrot	*Alisterus scapularis*
	Laughing Kookaburra	*Dacelo novaeguineae*
	Little Wattle Bird	*Anthochaera chrysoptera*
	Noisy Miner	*Manorina melanocephala*
	Rainbow Lorikeet	*Trichoglossus moluccanus*
	Sulfer Crested Cockatoo	*Cacatua galerita*

Appendix D: Biodiversity Offset Payment Calculator (BOPC) Reports

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00033331/BAAS18140/22/00033332	LE1481 Train St Broulee	22/06/2023
Assessor Name	Report Created	BAM Data version *
Jack Talbert	19/09/2023	61
Assessor Number	BAM Case Status	Date Finalised
BAAS18140	Finalised	19/09/2023
Assessment Revision	Assessment Type	BOS entry trigger
3	Part 4 Developments (General)	BOS Threshold: Biodiversity Values Map

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion												
1	659_NotThinned	Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions	57.3	57.3	0.31	PCT Cleared - 50%	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		9
											Subtotal	**9**
											Total	**9**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Callocephalon fimbriatum / Gang-gang Cockatoo (Fauna)									
659_NotThinned	57.3	57.3	0.25			Vulnerable	Endangered	False	7
								Subtotal	**7**
Calyptorhynchus lathami / Glossy Black-Cockatoo (Fauna)									
659_NotThinned	57.3	57.3	0.25			Vulnerable	Vulnerable	False	7
								Subtotal	**7**

Petauroides volans / Southern Greater Glider (Fauna)									
659_NotThinned	57.3	57.3	0.31			Endangered	Endangered	False	9
								Subtotal	**9**

BAM Candidate Species Report

Proposal Details

Assessment Id 00033331/BAAS18140/22/00033332	Proposal Name LE1481 Train St Broulee	BAM data last updated * 22/06/2023
Assessor Name Jack Talbert	Report Created 19/09/2023	BAM Data version * 61
Assessor Number BAAS18140	Assessment Type Part 4 Developments (General)	BAM Case Status Finalised
Assessment Revision 3	Date Finalised 19/09/2023	BOS entry trigger BOS Threshold: Biodiversity Values Map

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months
Callocephalon fimbriatum Gang-gang Cockatoo	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Calyptorhynchus lathami Glossy Black-Cockatoo	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petauroides volans Southern Greater Glider	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Barking Owl	Ninox connivens	Refer to BAR
Brush-tailed Phascogale	Phascogale tapoatafa	Refer to BAR
Chef's Cap Correa	Correa baeuerlenii	Refer to BAR
Coast Groundsel	Senecio spathulatus	Refer to BAR
Eastern Pygmy-possum	Cercartetus nanus	Refer to BAR
Giant Burrowing Frog	Heleioporus australiacus	Refer to BAR
Green and Golden Bell Frog	Litoria aurea	Habitat constraints
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints
Koala	Phascolarctos cinereus	Refer to BAR
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Large-eared Pied Bat	Chalinolobus dwyeri	Habitat constraints
Leafless Tongue Orchid	Cryptostylis hunteriana	Refer to BAR
Little Eagle	Hieraaetus morphnoides	Habitat constraints
Long-nosed Potoroo	Potorous tridactylus	Habitat constraints
Masked Owl	Tyto novaehollandiae	Refer to BAR
Regent Honeyeater	Anthochaera phrygia	Refer to BAR
Southern Brown Bandicoot (eastern)	Isoodon obesulus obesulus	Habitat constraints
Southern Myotis	Myotis macropus	Refer to BAR
Square-tailed Kite	Lophoictinia isura	Habitat constraints
Squirrel Glider	Petaurus norfolcensis	Refer to BAR
Swift Parrot	Lathamus discolor	Refer to BAR
Tangled Bedstraw	Galium australe	Refer to BAR
Thick Lip Spider Orchid	Caladenia tessellata	Refer to BAR

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00033331/BAAS18140/22/00033332	LE1481 Train St Broulee	22/06/2023
Assessor Name	Report Created	BAM Data version *
Jack Talbert	19/09/2023	61
Assessor Number	Assessment Type	BAM Case Status
BAAS18140	Part 4 Developments (General)	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
3	BOS Threshold: Biodiversity Values Map	19/09/2023

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
Gang-gang Cockatoo	Callocephalon fimbriatum	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
Greater Broad-nosed Bat	Scoteanax rueppellii	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion

Little Eagle	Hieraaetus morphnoides	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
Little Lorikeet	Glossopsitta pusilla	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
Masked Owl	Tyto novaehollandiae	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
Regent Honeyeater	Anthochaera phrygia	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
Square-tailed Kite	Lophoictinia isura	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
Swift Parrot	Lathamus discolor	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
Varied Sittella	Daphoenositta chrysoptera	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
White-throated Needletail	Hirundapus caudacutus	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
Yellow-bellied Glider	Petaurus australis	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Common Name	Scientific Name	Plant Community Type(s)
Glossy Black-Cockatoo	Calyptorhynchus lathami	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion

Spotted-tailed Quoll	Dasyurus maculatus	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Glossy Black-Cockatoo	Calyptorhynchus lathami	Habitat constraints
Spotted-tailed Quoll	Dasyurus maculatus	Refer to BAR

BAM Vegetation Zones Report

Proposal Details

Assessment Id	Assessment name	BAM data last updated *
00033331/BAAS18140/22/00033332	LE1481 Train St Broulee	22/06/2023
Assessor Name	**Report Created**	**BAM Data version ***
Jack Talbert	19/09/2023	61
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS18140	Part 4 Developments (General)	Finalised
Assessment Revision	**Date Finalised**	**BOS entry trigger**
3	19/09/2023	BOS Threshold: Biodiversity Values Map

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones

1	659_NotThinned	659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion	NotThinned	0.31	1	

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00033331/BAAS18140/22/00033332

Assessor Name
Jack Talbert

Proponent Names
Michael Taurasi, Darren McPartland

Assessment Revision
3

BOS entry trigger
BOS Threshold: Biodiversity Values Map

Proposal Name
LE1481 Train St Broulee

Assessor Number
BAAS18140

Report Created
19/09/2023

Assessment Type
Part 4 Developments (General)

BAM data last updated *
22/06/2023

BAM Data version *
61

BAM Case Status
Finalised

Date Finalised
19/09/2023

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Calyptorhynchus lathami / Glossy Black-Cockatoo
Dasyurus maculatus / Spotted-tailed Quoll

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion	Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions	0.3	9	0	9

BAM Biodiversity Credit Report (Like for like)

659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions This includes PCT's: 659, 1793, 1794, 3546, 3638, 3639, 3640	-	659_NotThinned	Yes	9	Bateman, Bungonia, Ettrema, Jervis and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Callocephalon fimbriatum / Gang-gang Cockatoo	**659_NotThinned**	0.3	7.00
Calyptorhynchus lathami / Glossy Black-Cockatoo	**659_NotThinned**	0.3	7.00
Petauroides volans / Southern Greater Glider	**659_NotThinned**	0.3	9.00

Credit Retirement Options

Like-for-like credit retirement options

Callocephalon fimbriatum / Gang-gang Cockatoo

Spp	IBRA subregion

	Callocephalon fimbriatum / Gang-gang Cockatoo	Any in NSW
Calyptorhynchus lathami / Glossy Black-Cockatoo	Spp	IBRA subregion
	Calyptorhynchus lathami / Glossy Black-Cockatoo	Any in NSW
Petauroides volans / Southern Greater Glider	Spp	IBRA subregion
	Petauroides volans / Southern Greater Glider	Any in NSW

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00033331/BAAS18140/22/00033332

Proposal Name
LE1481 Train St Broulee

BAM data last updated *
22/06/2023

Assessor Name
Jack Talbert

Assessor Number
BAAS18140

BAM Data version *
61

Proponent Name(s)
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19/09/2023

BAM Case Status
Finalised

Assessment Revision
3

Assessment Type
Part 4 Developments (General)

Date Finalised
19/09/2023

BOS entry trigger
BOS Threshold: Biodiversity Values Map

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

BAM Biodiversity Credit Report (Variations)

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Calyptorhynchus lathami / Glossy Black-Cockatoo
Dasyurus maculatus / Spotted-tailed Quoll

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion	Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions	0.3	9	0	9.00

659-Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions This includes PCT's: 659, 1793, 1794, 3546, 3638, 3639, 3640	-	659_NotThinned	Yes	9	Bateman,Bungonia, Ettrema, Jervis and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region

	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 3 or higher threat status	659_NotThinned	Yes (including artificial)	9	IBRA Region: South East Corner, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Callocephalon fimbriatum / Gang-gang Cockatoo	**659_NotThinned**	0.3	7.00
Calyptorhynchus lathami / Glossy Black-Cockatoo	**659_NotThinned**	0.3	7.00
Petauroides volans / Southern Greater Glider	**659_NotThinned**	0.3	9.00

Credit Retirement Options

Like-for-like options

Callocephalon fimbriatum/ Gang-gang Cockatoo	Spp	IBRA region	
	Callocephalon fimbriatum/Gang-gang Cockatoo	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Bateman, Bungonia, Ettrema, Jervis and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Calyptorhynchus lathami/ Glossy Black-Cockatoo	Spp		IBRA region
	Calyptorhynchus lathami/Glossy Black-Cockatoo		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Bateman, Bungonia, Ettrema, Jervis and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Petauroides volans/ Southern Greater Glider	Spp		IBRA region
	Petauroides volans/Southern Greater Glider		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Endangered	Bateman, Bungonia, Ettrema, Jervis and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Appendix E: Habitat-Bearing Tree Feature Definitions

Habitat Feature	Description	Species that may utilise the feature
Hollow	Cavities formed in the trunk or branches of living or dead trees. Hollows are a result of wind breakage, lightning strikes, fire or decay. Primarily, hollows are more common in older trees (>60 years) as they have a high likelihood of developing hollows overtime. Hollows can be small (<15 cm), medium (15-30 cm) or large (>30 cm)	A wide variety of threatened and non-threatened fauna are well known to utilise hollows across NSW. Many species are known to select hollows based of specific characteristics i.e. size, shape, depth and orientation.
Crevices and cracks	Crevices and cracks, much like hollows can be found across many areas of a living or dead trees. In most cases crevices and cracks are located on major portions of a tree such as the trunk or large branches. Crevices and cracks are more common on dead trees (stags).	A variety of fauna have the potential to utilise crevices and cracks but a notable group that utilise these features are microchiropteran bats. Due to the unique shape of cracks and crevices, microchiropteran bats are able take advantage of these features as sheltering or nesting resources.
Fissured branches	Fissured branches are similar to crevices and cracks but are more often found along younger portions of living or dead trees.	Similar to crevices and cracks, fissured branches are favoured by microchiropteran bats due to the fissures unique shape.
Exfoliating bark	Exfoliating bark is a unique habitat feature occurring only on particular tree species.	Microchiropteran bats, being versatile in their roosting capabilities, are able to utilise exfoliating bark for temporary sheltering purposes.
Nests and dreys	Although nests and dreys are built by the occupants initially, once abandoned they can be a valuable habitat feature for a variety of fauna.	A wide variety of threatened and non-threatened fauna are known to utilise nests depending on the characteristics of each nest. For example, Eastern Pygmy Possums are known to utilise old possum dreys or birds nests within the midstorey of a dense forest while large predatory nest in the canopy can be utilised by a number of other threatened predatory bird species.
Ground hollows	Ground hollows are found at the base of trees. They are a valuable resource for a number of threatened and non - threatened ground dwelling fauna	Notable species that can utilise ground hollows for sheltering, roosting or nesting purposes include; Spotted-tailed Quoll, Southern Brown Bandicoot and New Holland Mouse.
Arboreal termite mounds	Arboreal termite mounds have the potential to provide a unique habitat feature for threatened and non-threatened fauna. Similar to hollows, arboreal termite mounds can hollow out and be utilised in much the same way.	A variety of species have the potential to utilise arboreal termite mounds for sheltering, roosting and nesting. Laughing Kookaburras and Lace Monitors are well-known occupiers of these habitat features.

Appendix F: Significant Impact Criteria

Threatened Arboreal Mammals

Greater Glider *(Petauroides volans)* – Vulnerable (EPBC Act)

A total of 0. 31 ha of Greater Glider habitat has been considered for removal or modification within the Subject Land.

Criterion a: lead to a long-term decrease in the size of a population

The development is not likely to lead to a long-term decrease in a size of the Eurobodalla LGA Greater Glider population. Higher quality habitat is considered to exist within the adjacent vegetation to be retained. The impact area totals to only 0.31 ha – i.e. 0.02% of the habitat within the locality.

Criterion b: reduce the area of occupancy of the species

The development is not likely to reduce the area of occupancy of the species. Extensive suitable habitat exists, and will be retained surrounding the Subject Land, and is connected to more consolidated woodland and potential movement corridors.

Criterion c: fragment an existing population into two or more populations

The proposed works are considered unlikely to fragment any existing populations into two or more populations. The Subject Land is currently bound by George Bass Drive to the west and residential development to the east. The current proposed footprint layout is considered unlikely to reduce habitat connectivity, increase habitat fragmentation or isolation within wider locality.

Criterion d: adversely affect habitat critical to the survival of a species

The development will not adversely affect habitat critical to the survival of the species. Preferential habitat for the Greater Glider exists and is retained within the locality. Habitat to be modified is not considered critical for the species. The vegetation to be impacted is not considered to represent habitat of a condition that the species would be reliant upon.

Criterion e: disrupt the breeding cycle of a population

A total of 2 large hollows potentially suitable for the Greater Glider fall within the 0.31 ha of impact.

The development is not considered likely to disrupt the breeding cycle of the population.

Removal of 2 large hollows within the current proposed footprint layout is not considered likely to disrupt the breeding cycle of the population as the adjacent woodland is likely to contain an abundance of higher quality hollows with less competition from common, non-threatened species.

Criterion f: modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The development is not considered likely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. Preferential habitat exists and will be retained within the wider locality.

Criterion g: result in invasive species that are harmful to the species becoming established in species' habitat

The project will not result in an increase to any invasive species that may already have access throughout the site.

Criterion h: Introduce disease that may cause the species to decline, or

It is not considered likely that the development will introduce a disease that would cause the species to decline.

Criterion i: interfere with the recovery of the species

The development is not considered likely to interfere with the recovery of the species. The impact is expected to be very minimal with the impact area totalling to modification of 0.31 ha – i.e. 0.002% of the habitat within the surrounding area and is not considered important to the recovery of the Greater Glider.

Conclusion

The proposed action is considered unlikely to constitute a significant impact on the Greater Glider and therefore a referral to the Commonwealth is not recommended.

Threatened Woodland Birds

Gang-Gang Cockatoo (*Callocephalon fimbriatum*) – endangered (EPBC Act)

Criterion a: lead to a long-term decrease in the size of a population

The development is not likely to lead to a long-term decrease in a size of the above listed species populations. None of the species were recorded during the field survey. Suitable habitat exists within the surrounding area with over 16,000 ha within a 10 km radius, with the impact area totalling to only 0.31 ha – i.e. 0.002% of the existing similar habitat within the surrounding area.

Criterion b: reduce the area of occupancy of the species

The development is not likely to reduce the area of occupancy of the species. Considering the impact area is small when compared the range of the species, it is not considered preferential habitat and would be used, at most, as a potential passageway throughout the landscape. Extensive suitable habitat exists, and will be retained surrounding the site, including over 16,000 ha within the surrounding 10 km radius.

Criterion c: fragment an existing population into two or more populations

The proposed works are unlikely to fragment any existing populations into two or more populations. The proposed impact is restricted to an already modified locality which is in an isolated condition due to the historic clearance and urbanisation to make way for the existing roads and dwellings. There will be no impact or change to habitat connectivity, and no increase in habitat fragmentation or isolation within wider study area.

Criterion d: adversely affect habitat critical to the survival of a species

The development will not adversely affect habitat critical to the survival of the species. The vegetation to be impacted is not considered to represent habitat of a condition that the species would depend upon.

Criterion e: disrupt the breeding cycle of a population

The development will not disrupt the breeding cycle of a population as the impact is restricted to an area that is unlikely to be used for breeding, with an expansive amount of foraging habitat to remain within 10 km.

Criterion f: modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The development is not considered likely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. The proposed clearance is restricted to an area with minimal clearance of Gang-Gang Cockatoo habitat. Extensive suitable habitat exists, and will be retained surrounding the site, including over 16,000 ha within the surrounding 10 km radius.

Criterion g: result in invasive species that are harmful to the species becoming established in species' habitat

The development is not likely to result in an increase in any invasive species that are harmful to the species becoming established in Gang-Gang Cockatoo habitat as invasive predators such as Myna birds already have access throughout the site.

Criterion h: Introduce disease that may cause the species to decline, or

It is not considered likely that the development will introduce a disease that would cause the species to decline.

Criterion i: interfere with the recovery of the species

The development is not considered likely to interfere with the recovery of the species. The impact is restricted to a primarily disturbed areas and one potential roosting hollow that is not considered important to the recovery of the above listed species.

Conclusion

The proposed action is not considered to constitute a significant impact on the Gang-Gang Cockatoo and therefore a referral to the Commonwealth is not recommended.