Biodiversity Development Assessment Report

37 Bakers Road, Church Point

Prepared by Ecological Consultants Australia Pty Ltd TA Kingfisher Urban Ecology and Wetlands

February 2024



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Document control

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1	24/11/2023	Geraldene Dalby-Ball, Brooke Thompson	Final for DA submission	Client
2	13/02/2024	Geraldene Dalby-Ball, Brooke Thompson	Final for Certification	Client

Declarations

i. Certification under clause 6.15 Biodiversity Conservation Act 2016

I, KATHRYN DUCHATEL, certify that this report has been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method and clause 6.15 of the Biodiversity Conservation Act 2016 (BC Act). Geraldene Dalby-Ball (Assessor number BAAS19008 mid reaccreditation) and Kat Duchatel (BAAS17054)

Signature:

Date: 13th February 2024

BAM Assessor Accreditation no: BAAS17054

This BDAR has been prepared to meet the requirements of BAM 2020. Appendix IV provides an assessment of compliance with the minimum information requirements outlined in BAM Appendix K.

ii. Details and experience of author/s and contributors

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iii. Conflict of interest

I, KATHRYN DUCHATEL, declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest.

This declaration has been made in the interests of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

Signature:

Date: 13th February 2024

BAM Assessor Accreditation no: BAAS17054

Summary

Ecological Consultants Australia trading as Kingfisher Urban Ecology and Wetlands has been commissioned by Gartner Trovato Architects to prepare a **Biodiversity Development Assessment Report** (BDAR) to accompany a development application for a standalone small dwelling (granny flat see Figures 1.2a-c).

Legislative pathway for the proposed development or activity to be considered:

• development that requires consent under Part 4 of the EP&A Act.

Reason for entering the BOS

Clearing of native vegetation (removal of 2 trees) and other biodiversity impacts prescribed by clause 6.1 of the Biodiversity Regulation 2017 on land identified on the Biodiversity Values Map.

PCTs and TECs

The development footprint contains limited area of Pittwater Wagstaff Spotted Gum Forest and this is listed as a (EEC) under the BC Act 2016 and EPBC Act 1999. The PCT on site corresponds to the mapped PCT.

Avoid and Minimise

The layout has been designed to retain trees and adequately avoid and minimise impacts to native vegetation by being small in size and designed to retain all but 1 tree. The location is not able to be further altered as the other parts of the site are too steep.

Vegetation on the site in the proposed build area and between the build and existing dwelling is dominated in the ground and mid story by exotics including species hat are invasive in bushland. As part of the proposed works these areas are to be managed and restored in accordance with a Vegetation Management Plan (VMP). The VMP is to include the restoration of native vegetation that has degraded overtime as a result of weeds from the catchment and historical landscaping.

Threatened Species

No threatened flora species were recorded during the surveys; Specific searches were done for Scrub Turpentine, Native Guava and Underground Orchid (details provided in later in this report).

Direct Impacts

The proposal requires the removal of 1 Turpentine tree, the transplanting of 1 small (1m tall Cabbage Tree Palm) and removal of exotic species in ground/mid story.

Ecosystem Impacts

The proposal in its current form includes the removal of one tree that are within the Biodiversity Values Map. This is the only trigger into the BOS.

Species Impacts

• The removal of one tree in Vegetation Zone 1 contributes to the loss of potential microbat foraging habitat (insects over flowering Eucalypts) the loss of foraging habitat is 0.01 ha. It is noted that other Turpentine trees in the immediate area result in no overall loss of canopy habitat in this location as there is a group of Turpentines growing closely together.

• Microbats including listed threatened species have been assumed present on the subject land due habitat within the local area. No hollows, tunnels or breeding / roosting habitat on-site.

Likewise, The Large-eared Pied Bat has been assumed present on the subject land in the absence of targeted species surveys (to detect their absence of presence). While there are no caves on the site there are caves and cave like structures within 2km.

• Grey-headed Flying Foxes are assumed to use the site at some time for foraging (directly on blossoms).

Table E1 Impacts that require an offset – ecosystem credits

Vegetation zone	РСТ	TEC/EC	Impact area (ha)	Number of ecosystem credits required
1 (Proposed clearing for construction)	3234	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	0.03	1

Table E2 Impacts that require an offsets – species credits

Common name	Scientific name	Loss of habitat (ha) or individuals	Number of species credits required
Large-eared Pied Bat	Chalinolobus dwyeri	0.01	1

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Stage 1: Biodiversity assessment

1 Introduction

1.1 Proposed development

1.1.1 Development overview

Ecological Consultants Australia trading as Kingfisher Urban Ecology and Wetlands has been commissioned by Gartner Trovato Architects to prepare a **Biodiversity Development Assessment Report** (BDAR) to accompany a development application for the construction of a granny flat at Lot 2 in DP 222279 known as 37 Bakers Road, Church Point.

Legislative pathway for the proposed development or activity to be considered:

• development that requires consent under Part 4 of the EP&A Act.

The site has been assessed in the Biodiversity Assessment Method Calculator (BAM-C) from which offset credits have been generated.

1.1.2 Location

The site which is the subject of this report includes Lot 2 in DP 222279 known as 37 Bakers Road, Church Point, hereafter referred to as the 'subject land' (see Figure 1.1). The study area includes the subject land, as well as any additional land traversed during the field survey.

Table 1.1. Site information.

Title (Lot/DP)	Lot 2 DP 222279
Area (ha)	720 m ²
Address	37 Bakers Road, Church Point NSW 2105
LGA	Northern Beaches
Land Zoning	C4 Environmental Living



1.1.3 Proposed development and the subject land

The proposal is for the construction of a granny flat (see Figures 1.2a-c).

The proposal requires the clearing of 1 tree, *Syncarpia glomulifera* (Turpentine), located within land identified on the Biodiversity Values Map (see Figure 1.4).

The following is a summary of the Arboricultural Impact Assessment report and the findings and details on the tree to be removed. This also includes the summary of confidence of retention without impact on the other trees. The Turpentine is one of a group and though one is being removed the remaining will be retained.

Summary of the Arboricultural Impact Assessment report:

- Trees 2, 6, 15 and 16 are located on the boundary of the subject site and neighbouring property
- Trees 1, 3, 4, 5, 7, 8, 9, 20, 21 and 22 are located on neighbouring property
- Trees 10-14, 16A, 17, 18, 19 and 23 are located wholly within the subject site
- Tree 23 is considered non-prescribed/exempt under P21 DCP.
- Tree 20 is an introduced native species.
- Tree 1-19, 21 and 22 are locally native species.

Table of Tree Numbers and Tree Location Plan shown below. Tree 11 to be removed.





Source: Arboricultural Impact Assessment (Treeism Arboricultural Services)



Tree 11 is proposed for removal all others are being retained. Photos above shows the high number of Turpentine trees present and being retained.

Arborist conclusions

4 Conclusions

- 4.1.1 A total of twenty-four trees (24) are included in this Arboricultural Impact Assessment.
- 4.1.2 No assessed tree has been identified as endangered or threatened under State or Federal Government legislation.
- 4.1.3 The site is identified on the Department of Planning and Environments Biodiversity Values Map (BV).
- 4.1.4 One (1) *high* RV tree (Tree 11) will be required to be removed to facilitate the proposed works.
- 4.1.5 Eleven (11) assessed trees (Tree 3, 5-9, 15, 16, 16A, 17 and 22) will incur no/nil encroachment into the calculated TPZ, impacts to tree health and condition are unlikely.
- 4.1.6 Five (5) assessed trees (Tree 1, 2, 4, 14, and 19) will incur minor encroachment into the calculated TPZ, impacts to tree health and condition are not foreseen.
- 4.1.7 Six (6) trees (Tree 10, 12, 13, 18, 20 and 21) will incur technically *major* encroachment as the works fall within the SRZ or over the 10% TPZ threshold. The design methods have been considered, tree retention and viability are considered achievable in the long term provided pier locations are flexible to avoid woody root severance in excess off 40mm in diametre (or as deemed achievable for tree retention and viability by the Project Arborist/Council).
- 4.1.8 Provided the recommendations of this report are adhered to, all trees proposed for retention shall remain viable.

Source: Arborist Report 2023





Source: Gartner Trovato Architects. Issue A. 12.05.2023. Tree proposed for removal (red circle).



Figure 1.2b. Landscape Plan.

Source: Gartner Trovato Architects. Issue A. 12.05.2023.



Figure 1.2c. Granny Flat Plan. Source: Gartner Trovato Architects. Issue A. 12.05.2023.

1.2 Information sources

Databases reviewed in the assessment:

- BioNet Vegetation Classification
- BioNet Threatened Biodiversity Data Collection
- NSW BioNet Atlas
- Directory of Important Wetlands in Australia
- Biodiversity Values Map and Threshold tool
- BAM Important Areas Viewer
- Protected Matters Search Tool
- NSW Planning Portal Spatial Viewer
- SEED
- eSPADE v2.2

Spatial data used in the assessment:

- NSW Imagery (DCS 2014)
- NSW Base Map (DCS 2015)
- NSW Cadastre Web Service (DCS 2016)
- NSW Hydrography (DCS 2016)
- Biodiversity Values Map Edition 15.5 (DPE 2023)
- IBRA Version 7 (Regions) (DCCEEW 2016)
- NSW (Mitchell) Landscapes Version 3.1 (DPE 2017)
- NSW State Vegetation Type Map Edition C1.1.M1.1 (DPE 2022)

Key Development Documents

- Architectural Plan, Project no. 2308. Drawing no's. A-00 to A-08, Revision A, dated 12 May 2023, authored by Gartner Trovato Architecs
- Survey plan, Reference E60001-84017. Dated 27 September 2023, authored by Burton & Field Surveying and Land Development
- Arboricultural Impact Assessment (Treeism Arboricultural Services)

1.3 Biodiversity Offsets Scheme

The Biodiversity Offsets Scheme applies to local development (assessed under Part 4 of the Environmental Planning and Assessment Act 1979) that triggers the Biodiversity Offsets Scheme threshold (see section 1.6) or is likely to significantly affect threatened species based on the test of significance in section 7.3 of the Biodiversity Conservation Act 2016.

The Biodiversity Conservation Regulation 2017 sets out the threshold level for when the BOS will be trigger. The threshold has two elements:

- whether the amount of native vegetation being cleared exceeds an area threshold
- whether the impacts occur on an area mapped on the Biodiversity Values Map published by the Environment Agency Head

1.3.1 Area Clearing Threshold

Area clearing threshold

The area threshold varies depending on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan [LEP]), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP).

Minimum lot size associated with the property	Threshold for clearing, above which the BAM and offsets scheme apply
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.5 ha or more
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

Figure 1.3. Area clearing threshold as per the BOS entry requirements.

Source: <u>https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/about-the-biodiversity-offsets-scheme/when-does-bos-apply</u>

Table 1.2 provides an application of the area clearing threshold to the subject land. The proposal does not trigger the area clearing threshold, as the clearing proposed does not exceed the threshold.

Table 1.2. Minimum lot size and threshold trigger.

Minimum lot size associated with the property	700 m ²	
Threshold for clearing, above which the BAM and offsets scheme apply	0.25 ha or more	
Impact area	0.03 ha	

1.3.2 Biodiversity Values Map threshold

The Biodiversity Values Map identifies land of high biodiversity value, as defined by clause 7.3(3) of the Biodiversity Conservation Regulation 2017. The Biodiversity Offsets Scheme applies to the clearing of native vegetation and other biodiversity impacts prescribed by clause 6.1 of the Biodiversity Regulation 2017 on land identified on the Biodiversity Values Map.

The proposal requires the clearing of 1 tree located on land identified on the Biodiversity Values Map (see Figure 1.4) and therefore, triggers entry into the BOS.



Figure 1.4. Biodiversity Values Map.

Source: Biodiversity Values Map and Threshold Tool.

Red circle is the area of tree removal. The whole footprint of the proposed dwelling has been included in the calculations of impact. The tree canopy loss has been included as the polygon area (with buffer) for microbat and Grey Headed Flying Fox foraging. No hollow or microbat habitat are in this tree (mid-aged tree).

1.4 Application of the BAM

The proposal has been assessed under the Streamlined assessment module – Small area (Appendix C of the BAM 2020), which may be used for small area developments in accordance with the area clearing threshold shown in Table 12 of the BAM 2020 (which in this case is a lot size less than 1 ha and clearing of <1 ha), and where the biodiversity values of land that is located within an area on the Biodiversity Values Map, except where the biodiversity value included on the Biodiversity Values Map is core koala habitat identified in a plan of management under the *State Environmental Planning Policy (Koala Habitat Protection) 2019**.

*The SEPP (Koala Habitat Protection) 2019 has since been repealed and replaced by the State Environmental Planning Policy (Biodiversity and Conservation) 2021. Koala habitat protection applies to each local government area listed in Schedule 2 of the SEPP (Biodiversity and Conservation) 2021. The Northern Beaches Council is listed in Schedule 2 of the SEPP.

The assessment type used in the BAM-C is Part 4 Developments (Small Area).

2 Site context

2.1 Assessment area

The assessment area includes the subject land and the area of land within the 1500 metre buffer zone surrounding the subject land.

2.2 Landscape features

Landscape features identified within the subject land and assessment area are shown on Figure 2.1 and Figure 2.2, respectively. A discussion of relevant landscape features is provided below in Table 2.1.

IBRA bioregion	Sydney Basin
IBRA subregion	Pittwater
NSW (Mitchell) landscape	Belrose Coastal Slopes
Rivers, streams and estuaries	A number of 1 st order and 2 nd order streams occur within the assessment area. All draining into Pittwater estuary. No streams occur on the site or within close proximity to construction works.
Wetlands	Nil
Habitat connectivity	Vegetation forms part of the greater native vegetation patch surrounding the subject land it is connected by canopy trees through private property to Kuringai Chase National Parks. The entire linked vegetation includes a diverse array of PCTs that hold suitable habitat for many threatened and species and ecological communities.
Geological features	No karst, caves, crevices, cliffs, rocks or other geological features of significance are located on the subject land. Assumed to be within 2km.
Areas of outstanding biodiversity values	Nil

Table 2.1	Landscane	features
	Lanuscape	reatures.

2.3 Native vegetation cover

Table 2.2 summarises the extent of native vegetation cover within the assessment area. Figure 2.2 Location Map shows native vegetation cover within the assessment area.

Table 2.2. Native vegetation cover in the assessment area.

Assessment area (ha)	713.82
Total area of native vegetation cover (ha)	257.14
Percentage of native vegetation cover (%)	36%
Class (0-10, >10-30, >30-70 or >70%)	>30-70



3 Native vegetation, threatened ecological communities and vegetation integrity

3.1 Native vegetation extent

3.1.1 Changes to the mapped native vegetation extent

Native vegetation to the west of the subject land is identified on the NSW State Vegetation Type Map (DPE 2022) as Hunter Coast Lowland Spotted Gum Moist Forest (PCT 3234).

The NSW State Vegetation Type Map indicates less than approximately 1 m² of PCT 3234 located along the rear boundary of the subject land.

As shown in **Error! Reference source not found.**, the existing extent of PCT 3234 within the subject land is substantially more, being measured at approximately 0.03 ha in extent.

3.1.2 Areas that are not native vegetation

Areas that are not native vegetation are shown in Figure 3.1 as areas of cleared land. These areas have been subject to a history of vegetation removal / landscaping and weed dominance. This disturbance has resulted in the site being mostly modified vegetation with the rear containing native canopy trees – most of which will be retained.

3.2 Plant community types

Field survey and collection of BAM plot data from within the subject land's vegetation validated the presence of PCT 3234 - as mapped by DPE (2022) and as described in the BioNet Vegetation Classification Database. Table 3.1 outlines the attributes and features used to justify the allocation of PCT 3234 to the native vegetation within the subject land.

PCT 3234 relates to the NSW Pittwater and Wagstaffe Spotted Gum Forest TEC where it occurs in the LGAs of Gosford or Pittwater.

Table 3.1. PCT allocation.

PCT ID	3234
PCT Name	Hunter Coast Lowland Spotted Gum Moist Forest
IBRA Bioregion / Subregion	Sydney Basin / Pittwater
Vegetation Formation / Class	Wet Sclerophyll Forests / Northern Hinterland Wet Sclerophyll Forests
Percent cleared value (%)	27.64%
Associated TEC	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion (Endangered under BC Act)
Extent within the subject land (ha)	0.03ha
Location	Pittwater Spotted Gum Forest occurs on shale-derived soils with high rainfall on lower hillslopes on the Narrabeen group - Newport Formation, on the Barrenjoey Peninsula and western Pittwater foreshores.
	Pittwater Spotted Gum Forest has been reported from the Local Government Area of Pittwater. The area is within the County of Cumberland entirely within the Sydney Basin Bioregion.
Constituent species present in the subject land	The tree canopy of the PCT almost always includes <i>Corymbia</i> <i>maculata</i> (Spotted Gum). Other constituent canopy species recorded included <i>Syncarpia glomulifera</i> (Turpentine) and <i>Angophora floribunda</i> (Rough-barked Apple).
	The middle stratum species recorded that are found in the PCT included <i>Livistona australis</i> (Cabbage Tree Palm), <i>Allocasuarina torulosa</i> (Forest Oak) and <i>Glochidion</i> <i>ferdinandi</i> (Cheese Tree).
	Ground layer species very frequently recorded in the PCT included mesic climbers with <i>Eustrephus latifolius</i> (Wombat Berry) present. Other ground layer species included <i>Entolasia stricta</i> (Wiry Panic), <i>Dianella caerulea</i> (Blue Flax- lily), <i>Hydrocotyle peduncularis</i> and <i>Pteridium esculentum</i> (Common Bracken).
	We note that the property has Spotted Gums on the lower section and Turpentine in the proposed development area. Mid and Understory species in patches with native vegetation (mostly off-site) are indicative of PSGF.

Figure 3.1. Native Vegetation Extent.

Figure 3.2. Vegetation Zones and Plot Location.

3.3 Vegetation zones

See Figure 3.2 for Vegetation zones. Table 3.4 identifies vegetation zones and patch sizes on the subject land. Detailed descriptions of each vegetation zone are provided in the following subsections.

Vegetation zone ID	PCT ID	Area (ha)	Patch size	Plot ID	No. plots used in assessment
1	3234	0.03	>100 ha	1	1

Table 3.2. Vegetation zones and patch sizes.

3.3.1 Vegetation Zone 1

The site has zones. One is vegetation and the other is cleared and landscaped.

Vegetation Zone 1 (green) is located along the southwest boundary of the subject land. This area contains the most native canopy. The ground stratum is highly disturbed and dominated by exotic species; however, a limited number of native forbs and grasses are persisting beneath the canopy and have been included in the Species count in the plot.

3.3.2 Vegetation Zone 2

Zone 2 (orange) is the existing built upon area. This is not changing and has a start and end VIS of zero (0). Only Zone 1 has been included in the calculations.

3.4 Vegetation integrity (vegetation condition)

3.4.1 Vegetation integrity survey plots

Vegetation integrity survey plots were conducted as per the BAM 2020 around a central 50 m midline with a 400 m² plot (standard 20 m x 20 m) for assessing structure and composition inside a 1000 m² plot (standard 20 m x 50 m) for assessing function (Biodiversity Assessment Method 2020 Operation Manual – Stage 1). A total of 1 plot was sampled for each vegetation zone in accordance with subsection 4.3.4 of the BAM 2020.

3.4.2 Vegetation integrity scores

Table 3.5 identifies each vegetation within the subject land and associated vegetation integrity score.

Vegetation zone ID	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score	Hollow bearing trees present?
1	25.4	38.3	14.6	24.2	No

Table 3.3. Vegetation integrity scores.

4 Assessing habitat suitability for threatened species

4.1 Desktop

4.1.1 Threatened flora

BioNet records within a 10 km radius of the site returned a total of 19 threatened flora species out of a total of 1,745 species. These species are currently listed as Critically Endangered, Endangered or Vulnerable under state and/or Commonwealth legislation (Table 4.1).

Family	Scientific Name	Common Name	NSW Status	Comm. Status	Records
Elaeocarpaceae	Tetratheca glandulosa		v		52
Ericaceae	Epacris purpurascens var. purpurascens		V		1
Euphorbiaceae	Chamaesyce psammogeton	Sand Spurge	E		5
Grammitidaceae	Grammitis stenophylla	Narrow-leaf Finger Fern	E		1
Malvaceae	Lasiopetalum joyceae		v	V	2
Myrtaceae	Callistemon linearifolius	Netted Bottle Brush	v		4
Myrtaceae	Eucalyptus camfieldii	Camfield's Stringybark	V	v	11
Myrtaceae	Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	V	4
Myrtaceae	Kunzea rupestris		v	V	1
Myrtaceae	Melaleuca deanei	Deane's Paperbark	v	v	1
Myrtaceae	Rhodamnia rubescens	Scrub Turpentine	CE	CE	32
Myrtaceae	Syzygium paniculatum	Magenta Lilly Pilly	E	v	18
Orchidaceae	Cryptostylis hunteriana	Leafless Tongue Orchid	v	v	1
Orchidaceae	Genoplesium baueri	Bauer's Midge Orchid	E	E	1
Orchidaceae	Microtis angusii	Angus's Onion Orchid	E	E	165
Proteaceae	Grevillea caleyi	Caley's Grevillea	CE	CE	1560
Proteaceae	Persoonia hirsuta	Hairy Geebung	E	E	5
Rutaceae	Boronia umbellata	Orara Boronia	v	v	1
Thymelaeaceae	Pimelea curviflora var. curviflora		V	V	4

Table 4.1. BioNet records of threatened flora observed within a 10 km radius of the subject land.

CE = Critically Endangered, E = Endangered, V = Vulnerable

4.1.2 Threatened fauna

BioNet records within a 10 km radius of the site returned a total of 45 threatened fauna species out of a total of 466 species. These species are currently listed as Critically Endangered, Endangered or Vulnerable under state and/or Commonwealth legislation (Table 4.2).

Note species from the families Cheloniidae, Dermochelyidae, Diomedeidae, Dugongidae, Otariidae, Balaenidae and Physeteridae have been omitted from the list due to habitat constraints.

Class	Scientific Name	Common Namo	NICIAL	Comm	Pacard	
Table 4.2. BioNet records of threatened fauna observed within a 10 km radius of the subject land.						

Class	Scientific Name	Common Name	NSW Status	Comm. Status	Records
Amphibia	Pseudophryne australis	Red-crowned Toadlet	V		98
Amphibia	Heleioporus australiacus	Giant Burrowing Frog	v	v	53
Amphibia	Litoria aurea	Green and Golden Bell Frog	E	V	3
Reptilia	Varanus rosenbergi	Rosenberg's Goanna	v		47
Aves	Stictonetta naevosa	Freckled Duck	V		1
Aves	Ptilinopus regina	Rose-crowned Fruit-Dove	v		3
Aves	Ptilinopus superbus	Superb Fruit-Dove	V		3
Aves	Ixobrychus flavicollis	Black Bittern	v		7
Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	v		45
Aves	Hieraaetus morphnoides	Little Eagle	v		5
Aves	Lophoictinia isura	Square-tailed Kite	V		5
Aves	Pandion cristatus	Eastern Osprey	v		18
Aves	Burhinus grallarius	Bush Stone-curlew	E		36
Aves	Esacus magnirostris	Beach Stone-curlew	CE		1
Aves	Haematopus fuliginosus	Sooty Oystercatcher	v		4
Aves	Rostratula australis	Australian Painted Snipe	E	E	3
Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	v	E	2
Aves	Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	V	90
Aves	Glossopsitta pusilla	Little Lorikeet	V		9
Aves	Lathamus discolor	Swift Parrot	E	CE	27
Aves	Neophema pulchella	Turquoise Parrot	v		2
Aves	Ninox connivens	Barking Owl	V		28
Aves	Ninox strenua	Powerful Owl	v		469
Aves	Tyto novaehollandiae	Masked Owl	v		6

Class	Scientific Name	Common Name	NSW Status	Comm. Status	Records
Aves	Anthochaera phrygia	Regent Honeyeater	CE	CE	39
Aves	Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V		1
Aves	Daphoenositta chrysoptera	Varied Sittella	V		3
Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		5
Aves	Petroica boodang	Scarlet Robin	V		2
Mammalia	Dasyurus maculatus	Spotted-tailed Quoll	V	E	9
Mammalia	Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E	E	61
Mammalia	Phascolarctos cinereus	Koala	E	E	80
Mammalia	Cercartetus nanus	Eastern Pygmy-possum	V		452
Mammalia	Petaurus norfolcensis	Squirrel Glider	V		8
Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	V	v	134
Mammalia	Saccolaimus flaviventris	Yellow-bellied Sheathtail- bat	V		1
Mammalia	Micronomus norfolkensis	Eastern Coastal Free- tailed Bat	V		20
Mammalia	Chalinolobus dwyeri	Large-eared Pied Bat	V	v	19
Mammalia	Falsistrellus tasmaniensis	Eastern False Pipistrelle	v		3
Mammalia	Myotis macropus	Southern Myotis	v		28
Mammalia	Scoteanax rueppellii	Greater Broad-nosed Bat	v		7
Mammalia	Vespadelus troughtoni	Eastern Cave Bat	v		2
Mammalia	Miniopterus australis	Little Bent-winged Bat	V		45
Mammalia	Miniopterus orianae oceanensis	Large Bent-winged Bat	V		79
Insecta	Petalura gigantea	Giant Dragonfly	E		2

CE = Critically Endangered, E = Endangered, V = Vulnerable

4.1.3 Endangered populations

BioNet records within a 10 km radius of the site returned a total of 1 endangered population (Table 4.3).

Table 4.3. BioNet records of endangered populations observed within a 10 km radius of the subject land.

Scientific Name	Common Name	NSW Status	Comm. Status	Records
Petaurus norfolcensis	Squirrel Glider on Barrenjoey Peninsula, north of Bushrangers Hill	E2,V		1

E2 = Endangered Population, V = Vulnerable

4.2 Identifying threatened species for assessment

4.2.1 Ecosystem credit species

Ecosystem credit species are threatened species whose likelihood of occurrence can be predicted by vegetation surrogates and landscape features, or that have a low probability of detection using targeted surveys. A targeted survey is not required to identify or confirm the presence of ecosystem credit species.

All ecosystem credit species were maintained in the BAM-C. The predicted species list generated from the BAM-C has been included in Appendix II.

4.2.2 Species credit species

Species credit species are threatened species for which vegetation surrogates and landscape features cannot reliably predict the likelihood of their occurrence or components of their habitat. A targeted survey or an expert report is required to confirm the presence of these species on the subject land. Alternatively, for a development, activity, clearing or biodiversity certification proposal only, the proponent may elect to assume the species is present.

Table 4.4 lists candidate species credit species automatically populated in the BAM-C and whether they have been retained or excluded from further assessment based on geographic limitations and/or habitat constraints.

Table 4.4. Candidate species credit species.

Scientific name	Common name Credit type Listing status		us	Species	Reason for exclusion from further assessment		
			BC Act	EPBC Act	further assessment?		
Fauna							
Anthochaera phrygia	Regent Honeyeater	Species (Breeding)	CE	CE	No	Habitat constraints: i.e., subject land not located within mapped areas of important habitat.	
Chalinolobus dwyeri	Large-eared Pied Bat	Species	V	v	Yes	-	
Lathamus discolor	Swift Parrot	Species (Breeding)	E	CE	No	Habitat constraints: i.e., subject land not located within mapped areas of important habitat.	
Miniopterus australis	Little Bent-winged Bat	Species (Breeding)	V	-	No	Habitat constraints: i.e., no caves, tunnels, mines, culverts or other structure known or suspected to be used for breeding present.	
Miniopterus orianae oceanensis	Large Bent-winged Bat	Species (Breeding)	V	-	No	Habitat constraints: i.e., no caves, tunnels, mines, culverts or other structure known or suspected to be used for breeding present.	
Flora							
Rhizanthella slateri	Eastern Australian Underground Orchid	Species	V	E	Yes		
Rhodamnia rubescens	Scrub Turpentine	Species	CE	CE	Yes	-	
Rhodomyrtus psidioides	Native Guava	Species	CE	CE	Yes		

4.3 Targeted species surveys

4.3.1 Threatened flora surveys

Targeted threatened flora surveys were undertaken for Eastern Australian Underground Orchid, Scrub Turpentine and Native Guava.

Targeted threatened flora surveys were undertaken using random meanders and parallel transects as per the <u>Surveying threatened plants and their habitats</u>: <u>NSW survey guide for the Biodiversity Assessment</u> <u>Method</u> (DPIE 2020). The site and 20 metres in each direction from the lot boundary were surveyed onground. The survey period was optimum for all species. Information on the Eastern Australian Underground Orchid (extract from Federal Government) has been included below. Ecologist concluded that the Eastern Australian Underground Orchid is not present nor is the habitat prime habitat for this species. Habitat is suitable for the Scrub Turpentine and Native Guava. The flora survey was conducted by Elaway Dalby-Ball who is very familiar with both species and a long-term local resident.

No threatened flora was recorded during the surveys.

Eastern Australian Underground Orchid (Rhizanthella slateri)

The Eastern Underground Orchid is described as a 'terrestrial saprophytic' (grows on and derives its nourishment from dead or decaying organic matter) herb with a fleshy underground stem of 15 cm long and 15 mm diameter. The stem is whitish, often branching, with prominent, fleshy, overlapping bracts (DECC 2008; 2005c; d). Flowering heads mature below the soil surface and may extend up to 2 cm above the ground. Each flower head consists of about 25 to 35 tubular, purplish flowers arranged in a flat spiral or capitulum and has been described as looking something like a glistening purple dandelion. The flower head, which is up to 20mm across, is surrounded by fleshy bracts and is supported by a thick vertical, whitish fleshy stem also covered in bracts. The stems grow from a horizontal rhizome which has no roots, only hairs (ANOS 1997; DECC 2008; 2005d; Harden 1993).

Australian Distribution

The Eastern Underground Orchid is restricted to NSW. It is currently known only from 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. The population in the Great Lakes area occurs at the known northern limit of the species' range and is disjunct from other known populations of the species. The Eastern Underground Orchid is difficult to detect. It is usually located when the soil is disturbed, and there may well be more locations of the species within its known range (ANOS 1997; DECC 2005c; d; NSW SC 2005).

A further population from the Lamington Plateau in Queensland, previously regarded as Rhizanthella slateri, is now recognised as a new, as yet unnamed, species of Rhizanthella (DECC 2008).

Based on currently available information, the Eastern Underground Orchid has a relatively large extent of occurrence, from the NSW south coast to the mid north coast. However, the species is likely to have a very restricted area of occupancy, as it is known from fewer than 10 small, isolated populations within its extent of occurrence. There are insufficient data available to adequately quantify the species' geographic distribution (TSSC 2007q).

Population Information

Since the species' discovery, approximately 90 individuals have been recorded (TSSC 2007q). Each recorded population has consisted of 'one' or 'a few' individuals, except the population at Bulahdelah which consists of approximately 60 individuals (TSSC 2007r). Due to the cryptic nature of the species, it is possible that

more individuals occur within the known range of the species. However, based on available data, the current population estimate for the species is very low (TSSC 2007q).

Since 2005, more orchids have been found at the Bulahdelah site. The largest known population of the Eastern Underground Orchid occurs on the western slopes and base of Bulahdelah Mountain (known locally as Alum Mountain) immediately adjacent to the town of Bulahdelah, NSW. The site is the location of the first discovery of the species, and the Bulahdelah Mountain population is the type population of the species (DECC 2008).

The Eastern Underground Orchid was discovered in November 1931 at Bulahdelah Mountain (Rupp 1932), and just a few plants were found at the time, all from the one site. In 1932, another nine plants were found at the same site (Rupp 1933).

Rupp first studied the orchid in situ in 1933, again at the same site, and another six plants were found. These finds were all within a single site with "a radius of about eight yards" (Rupp 1934).

Following initial discovery, apparently the species was not seen again at Bulahdelah Mountain until 52 years later, when Clements and Groves found three plants in November 1985 in an area thought likely to be the initial site of discovery (Clements & Groves 1987).

Thereafter the species was apparently again undetected on the site for another 17 years until 2002, when local residents of Bulahdelah found two sub-populations (Carroll 2002), comprising approximately 10 flowerheads in total (NSW Roads and Traffic Authority 2005).

Due to the cryptic growth form of the species, it is likely that some populations have been destroyed before they were discovered, and that currently unknown populations may be destroyed in the future before they are discovered. The known population near Bulahdelah is therefore of critical importance to the species' conservation (DECC 2008).

Habitat

The species grows in eucalypt forest but no informative assessment of the likely preferred habitat for the species is available (DECC 2005b; c).

Life Cycle

The Eastern Underground Orchid flowers during October and November (Harden 1993).

Threats

The species occurs in the Eucalyptus forests of the Great Dividing Range, which have been cleared extensively since European settlement, and therefore the species is likely to have undergone a reduction in numbers in the past. However, there are insufficient data available to quantify this reduction.

The largest known population of the Eastern Underground Orchid occurs on Bulahdelah (Alum) Mountain. The area where the species is known to occur overlaps with the preferred new route for the Pacific Highway. The Pacific Highway is being progressively upgraded over 10 years (TSSC 2007q). The proposal will result in the direct removal of 4% of the known population and other individuals as yet undetected may become exposed after clearing or excavation works. A further 34% of the known population is indirectly threatened by altered drainage and changes in soil moisture, and by weed invasion associated with the road. The proposed road will remove 9% of known habitat and 29% of potential habitat for the species, fragmenting the population and potentially disrupting pollination and seed dispersal (DECC 2005c). The Eastern Underground Orchid is threatened by clearing for housing or other developments at other known sites. The species is also threatened by weed invasion, including species of exotic perennial grass. Individuals of the species are also at risk from visitation and interference by orchid enthusiasts, as once uncovered, individuals must be recovered in a specific fashion to ensure that flowerheads are not damaged by the sun. The species may be at risk of a loss of pollinator and seed dispersal vectors, such as small mammals or birds, and could be vulnerable to changes in fire regimes (TSSC 2007q; r). The extremely small population size increases the likelihood of local extinction due the environmental and demographic uncertainty (DECC 2005d).

Threat Abatement and Recovery

Recovery strategies outline by the NSW Department of Environment and Climate Change (DECC 2005b; c; d) are as follows:

- Protect areas of known habitat from clearing.
- Investigate alternative road placement to avoid damage to this endangered population.
- Raise awareness amongst orchid collectors about the potential damage caused by removing individual plants. This could be achieved through the erection of an information sign at the population site.
- Investigate the potential construction of fencing to restrict access.

The Conservation Advice for the Eastern Underground (TSSC 2007r) outlines the following priority recovery and threat abatement actions required for this species:

- Protect known sites by keeping their exact location concealed.
- Investigate the species' numbers, biology, ecological associations, and methods of propagation and reproduction, particularly pollination biology.
- Investigate more closely the threats to the species' survival and appropriate management actions.

Management Documentation

The <u>Commonwealth Conservation Advice on Rhizanthella slateri</u> (TSSC 2007r) provides priority recovery and threat abatement actions required for the protection of the Eastern Underground Orchid.

4.3.2 Threatened fauna surveys

Threatened fauna surveys were conducted by searches during the day and in the vicinity of the development area at night. The Powerful Owl (Ninox strenua) and the Grey-headed Flying Fox (Pteropus poliocephalus) as well as Microbats (including threatened species) are known form the area.

Anabat surveys were not conducted due to the time of surveys being outside the optimum survey period.

The Large-eared Pied Bat (*Chalinolobus dwyeri*) has been assumed present on the subject land as the subject land is located within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, and crevices.

4.4 Presence of candidate species

Table 4.5 and 4.6 list the remaining candidate species credit species and whether they are present within the subject land.

Table 4.5.	Determining the	presence of	candidate flora	species	credit species.

Scientific name	Common name	Present?
Rhizanthella slateri Image ABC Science	Eastern Australian Underground Orchid	Surveys in Sep-Nov did not show this species as being present. The key survey time Sep-Nov.
Rhodamnia rubescens	Scrub Turpentine	Not present – there were specific searches for this species on site. Suitable Habitat
Rhodomyrtus psidioides	Native Guava	Not present – there were specific searches for this species on site. Suitable Habitat

Table 4.6. Determining the presence of candidate fauna species credit species.

Scientific name	Common name	Present?
Chalinolobus dwyeri	Large-eared Pied Bat	Assumed present

4.5 Species polygon

Figure 4.1 shows species polygons for the Large-eared Pied Bat (and any other potential microbats). Species polygons depict the extent of suitable habitat for target species within the subject land. The tree to be removed and the buffer zone.

Figure 4.1. Species and Ecosystem Polygon.
5 Prescribed impacts

Clause 6.1 of the Biodiversity Conservation Regulation 2017 identifies prescribed additional biodiversity impacts (prescribed impacts) to be assessed as part of the BOS. Such prescribed impacts (including direct and indirect impacts) are impacts:

- a. on the habitat of threatened entities including:
 - i. karst, caves, crevices, cliffs, rocks and other geological features of significance, or
 - ii. human-made structures, or
 - iii. non-native vegetation
- b. on areas connecting threatened species habitat, such as movement corridors
- c. that affect water quality, water bodies and hydrological processes that sustain threatened entities (including from subsidence or upsidence from underground mining)
- d. on threatened and protected animals from turbine strikes from a wind farm
- e. on threatened species or fauna that are part of a TEC from vehicle strikes.

Table 5.1 lists the prescribed impacts and whether each prescribed impact is relevant to the proposal.

Table 5.1. Prescribed impacts.

Feature	Yes/No	If yes, address assessment questions from section 6 and 8 of the BAM 2020
Karst, caves, crevices, cliffs, rocks or other geological features of significance	No	There are no karst, caves, crevices, cliffs, rocks or other geological features of significance on the subject land.
Human-made structures	No	There are no human-made structures on the subject land that are associated with a threatened entity.
Non-native vegetation	No	There is no non-native vegetation within the subject land that is likely to provide habitat for threatened entities.
Habitat connectivity	No	The proposal does not impact on movement corridors or other areas of connectivity for threatened entities.
Waterbodies, water quality and hydrological processes	No	Pittwater Estuary is close (within 500m) – not directly connected.
Wind turbine strikes (wind farm development only)	No	Not a wind farm development.
Vehicle strikes	No	The proposal is not expected to impact any threatened entity as a result of vehicle strikes.

Stage 2: Impact assessment

6 Avoid and minimise impacts

6.1 Direct impacts

The proposal has been designed to avoided, minimised, and mitigated direct impacts. The original design would see the removal of 5 trees and the proposed dwelling has been made smaller and shifted in location to avoid all but one Turpentine. Access has been planned along existing disturbance area with no tree or native plant loss. The dwelling has been designed to sit up off tree roots (see confirmation of this in the Arborist report). The cleared (weedy) section between the existing dwelling and the proposed build site is steep (very steep) and not suitable to build on. So the design and location are avoiding impact. Mitigation is via the removal of exotic species, dominant in the mid and understory in this area, and replacement with assisted natural regeneration and planting with 40 locally purchased tube stock ground species (from Indigo Native Plant Nursery). Turpentine trees will naturally germinate in this area and we do not recommended the usual requirement to replant as they are locally abundant and local seed drop and establishment are better than planting.

Direct impacts remaining are the removal of the Turpentine Tree and the relocation of the juvenile Cabbage Tree Palm. Mitigation includes the replating of the Cabbage Tree Plam in an area that is currently weed (Fish bone and Monstera) dominated.

6.2 Indirect impacts

The proposal has been designed to avoided, minimised, and mitigate indirect impacts. Indirect impacts considered include increased use of the land resulting in the possibility of suppression of regeneration of native species (trampling and the conversion lawn). This is reduced by having a limited access to the dwelling off the access inclinator coupled with the steep surrounds on the waterside. A Vegetation Mgt Plan (VMP) to be submitted prior to CC will detail the areas for regeneration, weed removal, Cabbage Tree relocation and planting with native species. Additional mitigation measures have been included in this BDAR.

7 Impact assessment

7.1 Direct impacts

7.1.1 Impacts on TECs

The proposal requires the clearing of 1 tree, *Syncarpia glomulifera* (Turpentine), located within land identified on the Biodiversity Values Map (see Figure 1.4).

The following is a summary of the Arboricultural Impact Assessment report and the findings and details on the tree to be removed. This also includes the summary of confidence of retention without impact on the other trees. The Turpentine is one of a group and though one is being removed the remaining will be retained.

Summary of the Arboricultural Impact Assessment report:

- Trees 2, 6, 15 and 16 are located on the boundary of the subject site and neighbouring property
- Trees 1, 3, 4, 5, 7, 8, 9, 20, 21 and 22 are located on neighbouring property
- Trees 10-14, 16A, 17, 18, 19 and 23 are located wholly within the subject site
- Tree 23 is considered non-prescribed/exempt under P21 DCP.
- Tree 20 is an introduced native species.
- Tree 1-19, 21 and 22 are locally native species.

Table of Tree Numbers and Tree Location Plan shown below. Tree 11 to be removed.

Table	1—Tree ID and RV, where L = Low, M = Medium	m, <mark>H</mark> = I	High, <mark>R</mark>	= proposed removal.	
Tree No.	Genus & species Common Name	RV	Tree No.	Genus & species Common Name	RV
1	Ficus rubiginosa Port Jackson Fig	м	13	Allocasuarina torulosa Forest She-oak	н
2	Allocasuarina torulosa Forest She-oak	н	14	Allocasuarina littoralis Black She-oak	н
3	Glochidion ferdinandi Cheese Tree	м	15	Syncarpia glomulifera Turpentine	н
4	Ficus rubiginosa Port Jackson Fig	н	16	Syncarpia glomulifera Turpentine	н
5	Allocasuarina torulosa Forest She-oak	н	16A	Syncarpia glomulifera Turpentine	н
6	Allocasuarina torulosa Forest She-oak	н	17	Livistona australis Cabbage Fan Palm	н
7	Allocasuarina torulosa Forest She-oak	н	18	Syncarpia glomulifera Turpentine	н
8	Allocasuarina torulosa Forest She-oak	н	19	Ceratopetalum gummiferum NSW Christmas Bush	м
9	Angophora floribunda Rough-barked Apple	н	20	Schefflera actinophylla Umbrella Tree	L
10	Syncarpia glomulifera Turpentine	н	21	Syncarpia glomulifera Turpentine	н
11	Syncarpia glomulifera Turpentine	н	22	Ficus rubiginosa Port Jackson Fig	н
12	Syncarpia glomulifera Turpentine	н			
			-		



Source: Arboricultural Impact Assessment (Treeism Arboricultural Services)



Tree 11 is proposed for removal all others are being retained. Photos above shows the high number of Turpentine trees present and being retained.

Arborist conclusions

4 Conclusions

- 4.1.1 A total of twenty-four trees (24) are included in this Arboricultural Impact Assessment.
- 4.1.2 No assessed tree has been identified as endangered or threatened under State or Federal Government legislation.
- 4.1.3 The site is identified on the Department of Planning and Environments Biodiversity Values Map (BV).
- 4.1.4 One (1) *high* RV tree (Tree 11) will be required to be removed to facilitate the proposed works.
- 4.1.5 Eleven (11) assessed trees (Tree 3, 5-9, 15, 16, 16A, 17 and 22) will incur no/nil encroachment into the calculated TPZ, impacts to tree health and condition are unlikely.
- 4.1.6 Five (5) assessed trees (Tree 1, 2, 4, 14, and 19) will incur minor encroachment into the calculated TPZ, impacts to tree health and condition are not foreseen.
- 4.1.7 Six (6) trees (Tree 10, 12, 13, 18, 20 and 21) will incur technically *major* encroachment as the works fall within the SRZ or over the 10% TPZ threshold. The design methods have been considered, tree retention and viability are considered achievable in the long term provided pier locations are flexible to avoid woody root severance in excess off 40mm in diametre (or as deemed achievable for tree retention and viability by the Project Arborist/Council).
- 4.1.8 Provided the recommendations of this report are adhered to, all trees proposed for retention shall remain viable.

7.2 Changes in vegetation integrity score

Table 7.1 provides a summary of the changes in vegetation integrity scores.

Vegetation zone ID	PCT ID	Management zone	Area (ha)	Current VI score	Future VI score	Change in VI score
1	3234	Footprint	0.03	24.2	0	-24.2

Table 7.1. Impacts to vegetation integrity.

7.3 Indirect impacts

The proposal may result in a range of minor indirect impacts affecting threatened species and communities.

7.3.1 Weeds

Short term impacts are expected during the construction phase of the project. Construction activities may introduce weeds to the subject land through machinery, tools, equipment and clothing (e.g., boots). Weeds colonise and pioneer on cleared ground and therefore, must be continually managed during construction to prevent weed infestation.

7.3.2 Pathogens

Short term impacts are expected during the construction phase of the project. Construction activities may introduce pathogens to the subject land through machinery, tools, equipment and clothing (e.g., boots). Pathogens to be aware of include Myrtle Rust (*Puccinia psidii*) (a fungal disease), Phytophthora (*Phytophthora cinnamomi*) (a root-rot fungus), and Chytrid Fungus (*Batrachochytrium dendrobatidis*) (an infectious disease affecting amphibians).

7.3.3 Soil

Short term impacts are expected during the construction phase of the project. Vegetation clearing and earthworks can expose soils, which following rainfall may erode and be transported to areas downstream, potentially smothering ground cover vegetation. Woody debris and the covering of organic matter on cleared areas can prevent soil runoff. Additional sediment controls may be required to ensure runoff does not impact adjacent vegetation.

7.3.4 Light spill

Long term impacts are expected during the operational phase of the project. Light levels are expected to increase above that which already exists. To avoid light spill (light that goes into non-target areas such as environmentally sensitive areas) Dark Sky lighting should be used to focus light on areas where needed whilst reducing light spill into the surrounding environment and thus, reducing light pollution. This form of lighting can provide the required 'safe-lighting' of areas whilst greatly reducing upward escaping light. Any lighting to be used must be shielded.

8 Serious and irreversible impacts

The following section provides details which address section 9.1 of the BAM 2020 and thus, the document *Guidance to assist a decision-maker to determine a serious and irreversible* impact (DPIE 2019) has been referenced. The document outlines the steps taken to determine whether impacts are serious and irreversible. The steps are as follows:

- Step 1: Identify relevant entities at risk of a SAII
- Step 2: Evaluate the extinction risk of the entity to be impacted
- Step 3: Detail measures taken to avoid, minimise and mitigate impacts on the entity
- Step 4: Evaluate a serious and irreversible impact
- Step 5: Decision making

An impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species (including endangered populations) or ecological community becoming extinct based on the following 4 principles:

Principle 1 – The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline.

Principle 2 – The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size.

Principle 3 – The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution.

Principle 4 – The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.

The list of SAII entities identified by the document was accessed via

<u>https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/local-government-and-other-decision-makers/serious-and-irreversible-impacts-of-development</u>

8.1 Step 1: Identify relevant entities at risk of a SAII

Table 8.1 lists species and ecological communities at risk of an SAII that are likely to be affected by the proposal. These entities were identified in the BAM-C.

Scientific Name	Common Name	Principles			
		1	2	3	4
Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion			х	
Chalinolobus dwyeri	Large-eared Pied Bat				х

Table 8.1. Entities at risk of an SAII.

8.2 Step 2: Evaluate the extinction risk of the entity to be impacted

The following reports on the factors influencing the extinction risk of the entity.

For species this is evidence of:

- rapid decline (Principle 1)
- small population size (Principle 2)
- limited geographic distribution (Principle 3)
- the species being unlikely to respond to management (Principle 4).

For TECs this is evidence of:

- reduction in geographic extent (Principle 1)
- environmental degradation or disruption of biotic processes (Principle 2)
- restricted geographic distribution (Principle 3).

8.2.1 Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion

The total extant area of Pittwater and Wagstaffe Spotted Gum Forest is c. 227 ha. This is equivalent to an area of occupancy of c. 88 km², and an extent of occurrence of c. 104 km². The geographic distribution is therefore inferred to be highly restricted.

8.2.2 Large-eared Pied Bat (Chalinolobus dwyeri)

The Large-eared Pied Bat roosts in caves (near their entrances) but may also use crevices in cliffs, old mine workings and the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Cave-roosting bats are vulnerable to disturbance to caves and subterranean tunnel roosts sites as large numbers representing significant proportions of regional populations can congregate at one roost site for protection and breeding. Disturbance to roosts including the removal of vegetation surrounding and immediately adjacent to the cave or tunnel entrance, changes to airflow within and at the cave or tunnel entrance and the alteration of waterflows and ground hydrology surrounding roosts can significantly impact populations of the Large-eared Pied Bat.

8.3 Step 3: Detail measures taken to avoid, minimise and mitigate impacts on the entity

8.3.1 Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion

Detailed measures taken to avoid, minimise and mitigate impacts on PWSGF are provided later in this BDAR.

The extent of Pittwater and Wagstaffe Spotted Gum Forest is proposed to be reduced by 0.01 ha.

8.3.2 Large-eared Pied Bat (Chalinolobus dwyeri)

The extent of habitat for the Large-eared Pied Bat on the subject land is restricted to foraging habitat. The proposal includes the clearing of <0.01 ha of potential foraging habitat for the species, this being canopy cover and insect abundance.

8.4 Additional impact assessment provisions as per Section 9.1.1 and 9.1.2 of the BAM 2020

- 8.4.1 Additional impact assessment provisions for TECs at risk of an SAII
- 1. The assessor is required to provide further information in the BDAR or BCAR regarding the impacts on each TEC at risk of an SAII. This must include the action and measures taken to avoid the direct and indirect impact on the TEC at risk of an SAII. Where these have been addressed elsewhere the assessor can refer to the relevant sections of the BDAR and BCAR.

The actions and measures taken to avoid the direct and indirect impacts on the TEC at risk of an SAII are provided in Section 6.

- 2. The assessor must consult the TBDC and/or other sources to report on the status of the TEC including:
 - a. evidence of reduction in geographic distribution (Principle 1, clause 6.7(2)(a) BC Regulation) as the current total geographic extent of the TEC in NSW AND the estimated reduction in geographic extent of the TEC since 1970 (not including impacts of the proposal).

The total reduction in geographic distribution of Pittwater and Wagstaffe Spotted Gum Forest since European settlement is estimated to be c. 75%.

- extent of reduction in ecological function for the TEC using evidence that describes the degree of environmental degradation or disruption to biotic processes (Principle 2, clause 6.7(2)(b) BC Regulation) indicated by:
 - i. change in community structure
 - ii. change in species composition
 - iii. disruption of ecological processes
 - iv. invasion and establishment of exotic species
 - v. degradation of habitat, and
 - vi. fragmentation of habitat

Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion is threatened by clearing for urban development, urban runoff, dumping of rubbish and garden refuse, weed invasion, inappropriate fire regimes, fragmentation, and demographic and environmental stochasticity due to the small size of most remaining remnants. Collectively, these threats have led to changes in community structure and species composition, habitat degradation and fragmentation, and invasion and establishment of exotic species, and are indicative of a large reduction in ecological function of the community.

- c. evidence of restricted geographic distribution (Principle 3, clause 6.7(2)(c) BC Regulation), based on the TEC's geographic range in NSW according to the:
 - a. extent of occurrence

104 km²

b. area of occupancy, and

88 km²

c. number of threat-defined locations

Unknown.

d. evidence that the TEC is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation).

No evidence that the TEC is unlikely to respond to management.

3. Where the TBDC indicates data is 'unknown' or 'data deficient' for a TEC for a criterion listed in Subsection 9.1.1(2.), the assessor must record this in the BDAR or BCAR.

TBDC does not indicate data is unknown or data deficient.

- 4. In relation to the impacts from the proposal on the TEC at risk of an SAII, the assessor must include data and information on:
 - a. the impact on the geographic extent of the TEC (Principles 1 and 3) by estimating the total area of the TEC to be impacted by the proposal:
 - i. in hectares,

0.03 ha

and

ii. as a percentage of the current geographic extent of the TEC in NSW.

PWSGF current extent: 7925 ha

0.0003%.

- b. the extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes (Principle 2) of the TEC by:
 - i. estimating the size of any remaining, but now isolated, areas of the TEC; including areas of the TEC within 500 m of the development footprint or equivalent area for other types of proposals.

The proposal does not isolate areas of the TEC. The extent of PWSGF within 500 m of the proposal footprint is 25 ha.

- ii. describing the impacts on connectivity and fragmentation of the remaining areas of TEC measured by:
 - Distance between isolated areas of the TEC, presented as the average distance if the remnant is retained AND the average distance if the remnant is removed as proposed, and
 - Estimated maximum dispersal distance for native flora species characteristic of the TEC.

No change in distance between patches of the remnant TEC. The PWSGF proposed to be impacted does not exclusively connect two patches of PWSGF and will be impacted by a reduction in canopy cover.

iii. describing the condition of the TEC according to the vegetation integrity score for the relevant vegetation zone(s) (Section 4.3). The assessor must also include the relevant composition, structure and function condition scores for each vegetation zone.

See Section 3.4.

5. The assessor may also provide new information that demonstrates that the principle identifying that the TEC is at risk of an SAII is not accurate.

PWSGF remains at risk of SAII.

- 8.4.2 Additional impact assessment provisions for threatened species at risk of an SAII
- 1. The assessor is required to provide further information in the BDAR or BCAR for any species at risk of an SAII, including the action and measures taken to avoid the direct and indirect impact on the species at risk of an SAII. Where these have been addressed elsewhere the assessor can refer to the relevant sections of the BDAR or BCAR.

The actions and measures taken to avoid the direct and indirect impacts on threatened species at risk of an SAII are provided in Section 6.

- 2. The assessor must consult the TBDC and/or other sources to report on the current population of the species including:
 - a. evidence of rapid decline (Principle 1, clause 6.7(2)(a) BC Regulation) presented by an estimate of the:
 - i. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer), or
 - decline in population of the species in NSW in the past 10 years or three generations
 (whichever is longer) as indicated by: an index of abundance appropriate to the species;
 decline in geographic distribution and/or habitat quality; exploitation; effect of
 introduced species, hybridisation, pathogens, pollutants, competitors or parasites

N/A

- b. evidence of small population size (Principle 2, clause 6.7(2)(b) BC Regulation) presented by:
 - i. an estimate of the species' current population size in NSW, and
 - ii. an estimate of the decline in the species' population size in NSW in three years or one generation (whichever is longer), and
 - iii. where such data is available, an estimate of the number of mature individuals in each subpopulation, or the percentage of mature individuals in each subpopulation, or whether the species is likely to undergo extreme fluctuations

N/A

- c. evidence of limited geographic range for the threatened species (Principle 3, clause 6.7(2)I BC Regulation) presented by:
 - i. extent of occurrence
 - ii. area of occupancy
 - iii. number of threat-defined locations (geographically or ecologically distinct areas in which a single threatening event may rapidly affect all species occurrences), and
 - iv. whether the species' population is likely to undergo extreme fluctuations

N/A

- d. evidence that the species is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation) because:
 - i. known reproductive characteristics severely limit the ability to increase the existing population on, or occupy new habitat (e.g., species is clonal) on, a biodiversity stewardship site

Large-eared Pied Bat

The behaviour and ecology of the Large-eared Pied Bat make them vulnerable to threats affecting other cave-roosting bat species. Individuals congregate to roost and raise young. This can place a reasonable proportion of a local population at a single locality. Most cave roosts observed are in shallow caves or in the outer reaches of deeper mines or caves. This places individuals at risk from factors that can impact these areas, including heat and smoke during fires as well as predators sheltering within the caves. Sandstone escarpments provide many of the known populations with diurnal roosts and sites for raising young and other associated activities. In some areas these coincide with underground coal mining operations where cliffs can be destabilised through subsidence.

ii. the species is reliant on abiotic habitats which cannot be restored or replaced (e.g., karst systems) on a biodiversity stewardship site, or

Large-eared Pied Bat

Cave-dwelling bat species are reliant on abiotic habitat which cannot be restored or replaced. Maternity caves have very specific temperature and humidity regimes.

iii. life history traits and/or ecology is known but the ability to control key threatening processes at a biodiversity stewardship site is currently negligible (e.g., frogs severely impacted by chytrid fungus)

Large-eared Pied Bat

Cave-dwelling bat species are dependent on roost sites for shelter and breeding and are particularly vulnerable to threats that impact these sites. Up to 100 individuals may be present at such roosts, possibly representing a substantial proportion of a local population.

9 Impact summary

9.1 Impacts on native vegetation and TECs (ecosystem credits)

Table 9.1 identifies impacts on native vegetation and TECs that require an offset (as per BAM Subsection 9.2.1(1.).

Table 9.1. Impacts that require an offset – ecosystem credits.

Vegetation zone ID	PCT ID	TEC	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Number of ecosystem credits required
1	3234	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	0.03	24.2	0	-24.2	1
		·				Total credits	1

9.2 Impacts on threatened species and their habitat (species credits)

Table 9.2 identifies impacts on threatened species (species credits) that require an offset (as per BAM Subsection 9.2.2(2.).

Table 9.2. Impacts that require an offset – species credits.

Scientific name	Common name	BC Act status	EPBC Act status	Loss of habitat (ha)	Number of species credits required
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	0.03	1
				Total credits	1

9.3 Impacts that do not need further assessment

The following impacts do not require further assessment for ecosystem credits as per BAM Section 9.3(1-2.).

Table 9.3. Impacts that do not require further assessment.

Impact	Location within subject land	Justification why no further assessment is required
Clearing of exotic groundcover	Cleared land	 Areas within the subject land that do not contain native vegetation do not need to be assessed for ecosystem credits. Areas within the subject land allocated to Zone 2 do not incur an offset obligation due to the associated vegetation integrity score being: a. <15, where the PCT is representative of an EEC or a CEEC (as per BAM Section 9.2.1).

10 Mitigation measures

The impacts of the proposal are to be mitigated through the implementation of the following mitigation measures.

10.1.1 Delineation of work areas

During the development, impacts to the site and the vegetation to be retained should be minimised by the delineation of work areas. Access to the site would be best restricted to the development footprint only. An exclusion zone will be established for the vegetation outside the work areas.

10.1.2 Preparation of a VMP as per a condition of consent

A Vegetation Management Plan (VMP) must be prepared by an appropriately qualified ecologist or bush regeneration contractor and implemented for a minimum period of 5 years. The VMP is to detail management actions for areas of native vegetation retained on-site. This could be submitted pre CC.

The VMP is to include eucalypt species favoured by the micro bats and locally native.

10.1.3 Erosion and sediment controls

Where required, sediment controls will be put in place. These will include but are not limited to sediment fencing. Sediment controls will be revised during the site inspection and/or after significant rainfall (more than 10 mm in 24 hours resulting in site runoff). Sediment and erosion control measures must ensure that no settlement of sediment or silt is to occur within areas of vegetation to be retained. All sediment fences should be retained for as long as practical. If removed, then monitoring is required to ensure flows do not concentrate and cause further erosion. If concentrated flows do occur and/or erosion gullies develop then coir logs baffles are required.

10.1.4 Tree protection

Tree protection as per the Arboricultural Impact Assessment.

10.1.5 Tree replacement ratio

Any trees removed should be replaced at a ratio greater than 1:1 (for trees not covered by a biodiversity offset) and consider that a tree replacement ratio of 2:1 is preferable to enhance habitat.

10.1.6 Weed management

Weeds are present on site and must be appropriately managed to ensure they do not spread. There must be continuous maintenance of the vegetation on site otherwise increased weed growth may result, exacerbated by the high abundance of weeds present pre-works. Weeds will colonize and pioneer on any cleared grounds, therefore must be managed during works as well as ongoing post-works.

All bush regeneration activities requiring the use of chemicals must be performed in accordance with the NSW Pesticides Act 1999. Herbicides must not be applied whilst exotic plants are setting seed. The weed removal program aims to be broad in approach and sustained in application to provide the best possible conditions for natural regeneration and to control weeds within the site.

Although soil-borne pathogens have not been identified as a Key Threatening Process, the accidental spread of pathogens can occur at any time. To prevent the introduction of pathogens, Bushland Hygiene Protocols outlined in Appendix II must be followed. Hydrological conditions may promote the spread of

Phytophthora (a group of fungus-like diseases affecting plants) due to moist soil and proximity to water. It is recommended that Bushland Hygiene Protocols be followed closely.

10.1.7 Pathogen prevention

To prevent the introduction of pathogens, Bushland Hygiene Protocols outlined in Appendix III should be followed. The site is considered to be an area that may promote the spread of Phytophthora (a group of fungus-like diseases affecting plants) due to its moist soil and proximity to the drainage channel. It is recommended that Bushland Hygiene Protocols be followed closely. This is very important as both Scrub Turpentine and Native Guava are impacted by Myrtle Rust.



Phytophthora infected vegetation. (Image by Rasbak, licensed under the Creative Commons Attribution-Share Alike 3.0 Unported, 2.5 Generic, 2.0 Generic and 1.0 Generic license.)



Myrtle Rust generally infects new leaf growth. (Image by John Tann, licensed under the Creative Commons Attribution 2.0 Generic license.)

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Appendices

Appendix I – Field Data

Composition

Tree	Shrub	Grass	Forb	Fern	Other
3	2	2	2	1	6

Structure

Tree	Shrub	Grass	Forb	Fern	Other
35	2	2	2	3	10

Function

Stem Classes

<5cm	5-9cm	10-19cm	20-29cm	30-49cm	50-79cm	>80cm
N	Y	Y	Y	Y	Ν	Ν

Litter Cover (%)

5m	15m	25m	35m	45m	Average
5	5	10	1	15	7.2

Hollow bearing trees	Nil
Length of fallen logs	0.2 m
High Threat Weed Cover	14

GF Code	Species	N, E or HTW	Cover	Abund	Stratum
TG	Allocasuarina torulosa	N	8	4	U
TG	Syncarpia glomulifera	N	25	7	U
TG	Ceratopetalum gummiferium	N	2	1	U
SG	Trema aspera	N	1	7	М
SG	Acacia longifolia	N	1	4	М
OG	Livistona australis	N	3	3	М
OG	Calochlaena dubia	N	3	50+	G
OG	Cissus hypoglauca	N	1	2	G
OG	Stephania japonica	N	1	1	G
OG	Eustrephus latifolius	N	1	2	G
OG	Howea forsteriana	N (not local)	1	1	U
GG	Entolasia marginata	N	1	3	G
GG	Entolasia stricta	N	1	2	G
FG	Dianella caerulea	N	1	4	G
FG	Hydrocotyle peduncularis	N	1	20+	G
EG	Pteridium esculentum	N	3	50+	G
WEEDS					
	Senna pendula	HTW	5		
	Ageratina adenophora	HTW	5		
	Nephrolepis cordifolia	E	30		
	Monstera	E	40		
	Ochna serrulata	HTW	3		
	Lantana camara	HTW	1		

GF Code	Species	N, E or HTW	Cover	Abund	Stratum
	Exotic Ginger	E	1		

Appendix II – BAM Summary Reports



Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00044218/BAAS17054/23/00044222	37 Bakers Rd Church Point	22/06/2023
Assessor Name	Report Created	BAM Data version *
Kat Duchatel	14/02/2024	61
Assessor Number	BAM Case Status	Date Finalised
BAAS17054	Finalised	14/02/2024
Assessment Revision	Assessment Type	BOS entry trigger
0	Part 4 Developments (Small Area)	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	Vegetatio	TEC name	Current	Change in	Are	Sensitivity to	Species	BC Act Listing	EPBC Act	Biodiversit	Potenti	Ecosyste
	n		Vegetatio	Vegetatio	а	loss	sensitivity to	status	listing status	y risk	al SAII	m credits
	zone		n	n integrity	(ha)	(Justification)	gain class			weighting		
	name		integrity	(loss /								
			score	gain)								



BAM Credit Summary Report

Hunte	er Coast Lov	vland Spotted Gun	n Moist Forest	t								
1	3234_Veg etationZo ne1	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	24.2	24.2	0.03	Geographic Distribution	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00	True	1
											Subtot al	1
											Total	1

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	
Chalinolobus dwyeri / Large-eared Pied Bat (Fauna)										
3234_Vegetatio nZone1	24.2	24.2	0.03	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	True	1	
								Subtotal	1	



BAM Credit Summary Report

Vespadelus troughtoni / Eastern Cave Bat (Fauna)									
3234_Vegetatio nZone1	24.2	24.2	0.03	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	1
								Subtotal	1

Assessment Id

Proposal Name



Proposal Details

Assessment Id	Proposal Name	BAM data last updated *			
00044218/BAAS17054/23/00044222	37 Bakers Rd Church Point	22/06/2023			
Assessor Name	Assessor Number	BAM Data version *			
Kat Duchatei	BAAS17054	61			
Proponent Names	Report Created	BAM Case Status			
Graeme Bruce	14/02/2024	Finalised			
Assessment Revision	Assessment Type	Date Finalised			
0	Part 4 Developments (Small Area)	14/02/2024			
BOS entry trigger	* Disclaimer: BAM data last updated may indicate eithe	* Disclaimer: BAM data last updated may indicate either complete or partial update of the			
BOS Threshold: Biodiversity Values Map	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				
Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	Endangered Ecological Community	3234-Hunter Coast Lowland Spotted Gum Moist Forest				
Species						
Chalinolobus dwyeri / Large-eared Pied Bat						
/espadelus troughtoni / Eastern Cave Bat						

Assessment Id

Proposal Name

00044218/BAAS17054/23/00044222

37 Bakers Rd Church Point



Additional Information for Approval

PCT Outside Ibra Added
None added

PCTs With Customized Benchmarks

PCT

No Changes

Predicted Threatened Species Not On Site

Name

No Changes

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
3234-Hunter Coast Lowland Spotted Gum Moist Forest	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion	0.0	0	1	1

Assessment Id

Proposal Name

00044218/BAAS17054/23/00044222



3234-Hunter Coast Lowland Spotted Gum Moist Forest	Like-for-like credit retirement options								
	Name of offset trading group	Trading group	Zone	НВТ	Credits	IBRA region			
	Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion This includes PCT's: 3234, 3437	-	3234_Vegetati onZone1	No	1	Pittwater, Cumberland, Sydney Cataract, Wyong and Yengo. 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
Chalinolobus dwyeri / Large-eared Pied Bat	3234_VegetationZone1	0.0	1.00
Vespadelus troughtoni / Eastern Cave Bat	3234_VegetationZone1	0.0	1.00

Credit Retirement Options Like-for-like credit retirement options Chalinolobus dwyeri / Large-eared Pied Bat Spp Chalinolobus dwyeri / Large-eared Pied Bat IBRA subregion Chalinolobus dwyeri / Large-eared Pied Bat Any in NSW

Assessment Id

Proposal Name

00044218/BAAS17054/23/00044222

37 Bakers Rd Church Point

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Vespadelus troughtoni / Eastern Cave Bat	Spp	IBRA subregion	
	Vespadelus troughtoni / Eastern Cave Bat	Any in NSW	

Assessment Id

Proposal Name

00044218/BAAS17054/23/00044222



BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00044218/BAAS17054/23/00044222	37 Bakers Rd Church Point	22/06/2023
Assessor Name	Report Created	BAM Data version *
Kat Duchatel	14/02/2024	61
Assessor Number	Assessment Type	BAM Case Status
BAAS17054	Part 4 Developments (Small Area)	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
0	BOS Threshold: Biodiversity Values Map	14/02/2024

* 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	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Black Bittern	Ixobrychus flavicollis	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Dusky Woodswallow	Artamus cyanopterus cyanopterus	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Eastern False Pipistrelle	Falsistrellus tasmaniensis	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Eastern Osprey	Pandion cristatus	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Flame Robin	Petroica phoenicea	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Gang-gang Cockatoo	Callocephalon fimbriatum	3234-Hunter Coast Lowland Spotted Gum Moist Forest

Assessment Id



BAM Predicted Species Report

Glossy Black- Cockatoo	Calyptorhynchus lathami	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Golden-tipped Bat	Phoniscus papuensis	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Greater Broad-nosed Bat	Scoteanax rueppellii	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Grey-headed Flying- fox	Pteropus poliocephalus	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Large Bent-winged Bat	Miniopterus orianae oceanensis	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Little Bent-winged Bat	Miniopterus australis	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Little Eagle	Hieraaetus morphnoides	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Little Lorikeet	Glossopsitta pusilla	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Masked Owl	Tyto novaehollandiae	3234-Hunter Coast Lowland Spotted Gum Moist Forest
New Holland Mouse	Pseudomys novaehollandiae	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Powerful Owl	Ninox strenua	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Regent Honeyeater	Anthochaera phrygia	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Rose-crowned Fruit- Dove	Ptilinopus regina	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Rosenberg's Goanna	Varanus rosenbergi	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Scarlet Robin	Petroica boodang	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Spotted-tailed Quoll	Dasyurus maculatus	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Square-tailed Kite	Lophoictinia isura	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Superb Fruit-Dove	Ptilinopus superbus	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Swift Parrot	Lathamus discolor	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Varied Sittella	Daphoenositta chrysoptera	3234-Hunter Coast Lowland Spotted Gum Moist Forest
White-bellied Sea- Eagle	Haliaeetus leucogaster	3234-Hunter Coast Lowland Spotted Gum Moist Forest
White-throated Needletail	Hirundapus caudacutus	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Yellow-bellied Glider	Petaurus australis	3234-Hunter Coast Lowland Spotted Gum Moist Forest
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	3234-Hunter Coast Lowland Spotted Gum Moist Forest

Threatened species Manually Added

Assessment Id



BAM Candidate Species Report

Proposal Details

Proposal Name	BAM data last updated *
37 Bakers Rd Church Point	22/06/2023
Report Created	BAM Data version *
14/02/2024	61
Assessment Type	BAM Case Status
Part 4 Developments (Small Area)	Finalised
Date Finalised	BOS entry trigger
14/02/2024	BOS Threshold: Biodiversity Values Map
	Proposal Name 37 Bakers Rd Church Point Report Created 14/02/2024 Assessment Type Part 4 Developments (Small Area) Date Finalised 14/02/2024

* 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 Surve	y	
Name	Presence	Survey Months
Chalinolobus dwyeri Large-eared Pied Bat	Yes (assumed present)	□ Jan □ Feb □ Mar □ Apr
		□ May □ Jun □ Jul □ Aug □ Sep □ Oct □ Nov □ Dec
		Survey month outside the specified months?
Rhizanthella slateri Eastern Australian Underground	No (surveyed)	🗆 Jan 🗆 Feb 🗆 Mar 🗖 Apr
Orchid		□ May □ Jun □ Jul □ Aug □ Sep ☑ Oct □ Nov □ Dec
		Survey month outside the specified months?
Rhodamnia rubescens Scrub Turpentine	No (surveyed)	🗆 Jan 🗆 Feb 🗆 Mar 🗆 Apr
		□ May □ Jun □ Jul □ Aug
		□ Sep ☐ Oct □ Nov □ Dec □ Survey month outside the specified months?

Assessment Id

Proposal Name

37 Bakers Rd Church Point



BAM Candidate Species Report

Rhodomyrtus psidioides No (surveyed) Native Guava	□ Jan□ Feb□ Mar□ Apr□ May□ Jun□ Jul□ Aug□ Sep☑ Oct□ Nov□ Dec	
		Survey month outside the specified months?
Vespadelus troughtoni Eastern Cave Bat	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
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Little Bent-winged Bat	Miniopterus australis	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Swift Parrot	Lathamus discolor	Habitat constraints

Appendix III – Bushland Hygiene Protocols

- Always assume that the area you are about to work in is free of the disease and therefore needs to be protected against infection.
- Always assume that the activity you are about to undertake has the potential to introduce the disease.
- Arrive at site with clean shoes, i.e.: no dirt encrusted on them.
- If you arrive with shoes that are encrusted with dirt, they will have to be completely soaked in metho or disinfectant and allow a few minutes to completely soak in. NEVER scrape untreated dirt off your shoes onto the ground.
- Before you move onto the site spray the bottom of your shoes with 70 % metho. Bleach solution (1% strength) or household/commercial disinfectant (as per label) are also suitable.
- Check all tools and equipment that comes in contact with soil are clean before entering the area (they should have been cleaned on site at the end of the previous work session). If there is any dirt on them, spray them with 70% metho.
- Clean all tools at the end of each work session while still on site ensuring this is done away from drainage lines and adjacent work areas. Knock or brush off encrusted dirt and completely spray with 70 % metho. Replace in storage/transport containers.
- Preferably compost all weed material on site.
- Never drag vegetation with exposed roots and soil through bushland.
- When removing weeds from site, remove as much soil as possible from them in the immediate work area and carefully place vegetative material into plastic bags.
- Try not to get the bag itself dirty; don't put it on/in a muddy area.
- Always work from the lower part of a slope to the upper part.
- Always work in areas known to be free of the pathogen before working in infected areas.
- Minimise activities wherever possible when the soil is very wet.
- Vehicles should not be driven off track or into reserves (unless vehicle decontamination is carried out before and after entering a single work site)
- Only accredited supplies of plants/mulch to be used.

Kit should contain: 1 bucket, 1 scrubbing brush, 1 spray bottle (metho 70% solution), 1 bottle tap water, 1 bottle methylated spirits.

Appendix IV – BDAR Compliance

Minimum information requirements for the Biodiversity Development Assessment Report: Streamlined assessment module – Small area

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.
Introduction	Chapters 2	INFORMATION			Section 1
	and 3	Introduction to the biodiversity asse	essment including:		
		brief description of propos	ed development		
		identification of subject lar	nd boundary, including:		
		operational footpr	int		
		construction footp facilities and infrastru	rint indicating clearing associated wit ucture	n temporary/ancillary construction	
		\Box general description of the s	subject land		
		□ Sources of information used in th	e assessment, including reports and s	patial data	
		□ Identification of assessment method applied (i.e. linear or site-based)			
		MAPS and TABLES (in document)			Section 1
		Map of the subject land boundary	y showing the final proposal footprint,	including the construction	
		footprint for any clearing associated BDAR)	with temporary/ancillary constructio	n facilities and infrastructure (if	
		DATA (to be supplied) – N/A			
Landscape	Section 3.1	INFORMATION			Section 2
	and 3.2, Identification of site context components and landscape features at the proposition			roposed site, including:	
	Appenaix E	□ general description of subject lan	general description of subject land topographic and hydrological setting, geology and soils		
		percent native vegetation cover in	n the assessment area (as described ir	BAM Subsection 3.2 (4 .)	
		□ IBRA bioregions and subregions (a	as described in BAM Subsection 3.1.3	(2 .))	

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.
		Other relevant landscape features w	hich may include:		
		□ rivers and streams classified accor Appendix E)	l rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3 (3 –4.) and ppendix E)		
		\Box wetlands within, adjacent to and] wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3 (4 .))		
		□ connectivity of different areas of	\Box connectivity of different areas of habitat (as described in BAM Subsection 3.1.3 (5 –6 .))		
		□ areas of geological significance an 3.1.3 (10 .)	\Box areas of geological significance and soil hazard features (as described in BAM Subsections 3.1.3 (7.) and 3.1.3 (10 .)		
		□ areas of outstanding biodiversity BAM Subsection 3.1.3 (8 –9 .))	value occurring on the subject land an	id assessment area (as described in	
		MAPS and TABLES (in document)	/APS and TABLES (in document)		
		□ Site Map			
		boundary of subject land			
		cadastre of subject land			
		□ landscape features identified in BAM Subsection 3.1.3			
		areas of outstanding biodiversity value within the subject land			
		Location Map			
		🗆 digital aerial photography a	at 1:1,000 scale or finer		
		boundary of subject land			
		□ 1500 m buffer area <i>or</i> 500	m buffer for linear development		
		🗆 landscape features identifi	ed in BAM Subsection 3.1.3		
		□ additional detail (e.g. local	government area boundaries) relevar	nt at this scale	
		□ areas of outstanding biodiv	versity value within the assessment ar	ea	
		Landscape features identified in BAN include:	۸ Subsection 3.1.3 and to be shown on ماله ماله ماله ماله ماله ماله ماله ماله	n the Site Map and/or Location map	

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.
		 IBRA bioregions and subregions rivers, streams and estuaries wetlands and important wetlands connectivity of different areas of habitat areas of geological significance and soil hazard features 			
	DATA (to be supplied) All report maps as separate jpeg files Individual digital shape files of: subject land boundary assessment area (i.e. buffer area) boundary cadastral boundary of subject land areas of native vegetation cover				Uploaded to BOAMs
Native vegetation, TECs and vegetation integrity	Chapter 4	INFORMATION Patch size (in accordance with BA Identification of the dominant PC (existing information or plot-based s Identification of any TEC associate Estimate of percent cleared value Identification of any TEC on site th be assessed and offset.) Equivalence with mapping units o equivalent mapping units)	M Subsection 4.3.2) F on the subject land and extent (ha) v urvey data) ed with the PCT (BAM Subsection 4.2.3 of dominant PCT (BAM Subsection 4. nat is not associated with the dominant f previous vegetation maps reviewed	with justification of method used 2) 2.1 (5 .) nt PCT (Note: This TEC is required to as part of the assessment (i.e.	Section 3

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.
		 Vegetation integrity of the PCT(s) on the subject land as individual vegetation zones Justification for how this was determined (i.e. qualitatively by observing values for the condition attributes set out in Table 2 of the BAM or quantitatively by collecting field data for the condition attributes at a plot in accordance with BAM Subsection 4.3.4) Use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsections 4.3.3 (5 .)) Where use of more appropriate local benchmark data is proposed (as described in BAM Subsection 1.4.2, BAM Subsection 4.3.3(5.) and BAM Appendix A): identify the PCT or vegetation class for which local benchmark data will be applied identify published sources of local benchmark data (if benchmarks obtained from published sources) describe methods of local benchmark data collection (if reference plots used to determine local benchmark data) 			
		values			
		 MAPS and TABLES (in document) Map of native vegetation extent for the subject land (as described in BAM Section 3.1) Map of PCT/vegetation zones within the subject land (as described in BAM Section 4.2 (1.) 			Section 3
		☐ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries			
		□ Map of TEC distribution on the subject land			
		\Box Patch size of native vegetation (as described in BAM Subsection 4.3.2)			
		Table of current vegetation integrity scores for vegetation zone within the site including:			
		composition condition score			
		□ structure condition score			
Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.		
--	--	---	---		
☐ function condition score □ Report from BAM-C (Small area module) including vegetation integrity scores (BAM Section 4.4.)					
DATA (to be supplied) □ All report maps as separate jpeg files □ Plot field data (MS Excel format) □ Digital shape files for all maps and spatial data			Uploaded to BOAMs Appendix V		
 □ Field data sheets (if relevant) for determining vegetation integrity (BAM Subsection 4.3.4) Piter 5 Section □ Describe the review of existing information and any field survey undertaken to assess habitat constraints and microhabitats for threatened species within the subject land □ Determination of the suite of threatened species likely to occur on or use the proposed site according to Steps 1 and 2 in BAM Section 5.2 including species to be assessed for ecosystem credits and the list of species to be assessed for species credits □ List of ecosystem credit species derived from the TBDC (as described in BAM Subsections 5.2.1 and 5.2.2) with justification for the exclusion of any ecosystem credit species based on habitat constraints (as described in BAM Subsection 5.2.2) □ Identification of candidate species credit species that are at risk of an SAII and therefore, must be further assessed (BAM Section 9.1) Note: Candidate species credit species that are not at risk of an SAII and not incidentally recorded on the subject land do not require further assessment. For candidate species credit species that are at risk of an SAII, a description of the species, any habitat constraints or microhabitats associated with the species on the subject land and information used to create the species polycon/s in accordance with Steps 3 to 5 of BAM Section 5.2 including: 		aken to assess habitat constraints se the proposed site according to system credits and the list of species BAM Subsections 5.2.1 and 5.2.2) on habitat constraints (as described All and therefore, must be further ot incidentally recorded on the n of the species, any habitat nd and information used to create including: ies at risk of an SAII is unlikely to	Section 4, 8		
_	☐ function condition score ☐ Report from BAM-C (Small area m DATA (to be supplied) ☐ All report maps as separate jpeg f ☐ Plot field data (MS Excel format) ☐ Digital shape files for all maps and ☐ Field data sheets (if relevant) for of INFORMATION ☐ Determination of the suite of three steps 1 and 2 in BAM Section 5.2 index to be assessed for species credits ☐ List of ecosystem credit species d with justification for the exclusion of in BAM Subsection 5.2.2) ☐ Identification of candidate species assessed (BAM Section 9.1) Note: Candidate species credit species constraints or microhabitats associa the species polygon/s in accordance	Indentified Indepset tables (in document) Import from BAM-C (Small area module) including vegetation integrity DATA (to be supplied) All report maps as separate jpeg files Plot field data (MS Excel format) Digital shape files for all maps and spatial data Field data sheets (if relevant) for determining vegetation integrity (BAM INFORMATION Describe the review of existing information and any field survey undert and microhabitats for threatened species within the subject land Determination of the suite of threatened species likely to occur on or u Steps 1 and 2 in BAM Section 5.2 including species to be assessed for ecos to be assessed for species credits List of ecosystem credit species derived from the TBDC (as described in with justification for the exclusion of any ecosystem credit species based or in BAM Subsection 5.2.2) Identification of candidate species that are not at risk of an SAII and n subject land do not require further assessment. For candidate species credit species that are at risk of an SAII, a descriptio constraints or microhabitats associated with the species on the subject land the species polygon/s in accordance with Steps 3 to 5 of BAM Section 5.2 (a) justification for determining that a candidate species credit species have suitable habitat on the subject land or specific vegetation zon	Internation Interpret values (in occurrency) Data (to be suppred) Impose values (in occurrency) Interpret values (in occurrency) Impose values (in occurrency) Data (to be suppred) Impose values (in occurrency) DATA (to be supplied) Impose values (in occurrency) Data (to be		

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.	
		the subject land and published literature or an expert report prepared in accordance with Box 3 of the BAM)				
		determination of the presence of remaining candidate species credit species at risk of an SAII (by assuming presence, conducting a threatened species survey or an expert report). Note: If the subject land is mapped on an important habitat map for a species, or for a component of its habitat, the subject land is considered to have suitable habitat for the species to be present.				
		□ species polygons identifyin species at risk of an SAII that i	□ species polygons identifying the location and area of suitable habitat for each candidate threatened species at risk of an SAII that is recorded on the subject land and is measured by area, OR			
		□ species polygons identifying the area of suitable habitat and targeted surveys identifying the count and location of individuals on the subject land for each candidate threatened flora species at risk of an SAII that is recorded on the subject land and is measured by count				
		□ species polygons for each threatened species identified on the subject land that is not at risk of an SAII (i.e. incidentally observed during site visit)				
		□ Determination of habitat condition within species polygon/s for each threatened species (measured by area) at risk of an SAII or incidentally observed during the site visit (Step 6 of BAM Section 5.2)				
		□ For flora species credit species at risk of an SAII or incidentally observed during site visit, provide a count, or an estimation, of the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5 (4 .))				
		MAPS and TABLES (in document)			Section 8, 10	
		□ Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1 , and:				
		□ identifying any ecosystem credit species removed from the list of species on the basis of further assessment in accordance with BAM Subsections 5.2.2 and 5.2.3				
		\Box identifying the sensitivity to gain class of each species (BAM Section 5.4)				
		□ Table detailing species credit species incidentally observed during the site abundance (flora)/extent of habitat	cies within the subject land at risk of a visit including any associated habitat (flora and fauna) and biodiversity risk	n SAII (BAM Section 9.1) or feature/components and its weighting (BAM Sections 5.2–5.4)		

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.	
		□ Map of species credit species records within the subject land and species polygons for flora and fauna species at risk of an SAII or incidentally observed during the site visit (as described in BAM Subsection 5.2.5 (1 –7 .))				
		DATA (to be supplied)				
		Digital shape files of species polygons				
		□ Species polygon map in jpeg form	at			
		 Expert reports and any supporting data used to support conclusions of the expert report Field data sheets (if relevant) for threatened species surveys 				
Prescribed	Chapter 6	INFORMATION			Section 9	
impacts		□ Any prescribed impacts from the small area proposal must be set out in the BDAR consistent with Appendix K				
		MAPS AND TABLES (in document)				
		□ If relevant, maps showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)				
		DATA (to be supplied)			Uploaded to	
		□ If relevant, digital shape files of p	rescribed impact feature locations		BOAMs	
		Prescribed impact features map in jpeg format				
Avoid and	Chapter 7	INFORMATION			Section 5	
minimise impacts		Demonstration of efforts to avoid ar associated with the proposal locatio	nd minimise impacts on biodiversity van n in accordance with Chapter 7, inclue	alues (including prescribed impacts) ding an analysis of alternative:		
		modes or technologies that for selecting the proposed model	t would avoid or minimise impacts on ode or technology	biodiversity values and justification		

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.	
		□ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location				
		alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site				
		Describe efforts to avoid and minit through proposal design (as describe	imise impacts (including prescribed in ed in BAM Subsections 7.1.2 and 7.2.2	npacts) to biodiversity values 2		
		Identification of any other site con and design of the proposal (as descr	nstraints that the proponent has cons ibed in BAM Subsection 7.2.1 (3 .)	idered in determining the location		
		MAPS and TABLES (in document)				
		□ Table of measures to be implemented before, during and after construction to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility				
		□ Map of final proposal footprint, including construction and operation				
		Maps demonstrating indirect impact zones where applicable				
		DATA (to be supplied)				
		Digital shape files of:				
		☐ final proposal footprint				
		 direct and indirect impact zones Maps in jpeg format 				
Assessment of impacts	Chapter 8, Section 8.1 and 8.2	INFORMATION	natation and thusaton of an acias habit	at including.	Section 6, 7, 8, 9	
or impacts		Determine the impacts on hative veg	ts of cloaring of pativo vogotation, the	at, including:	5	
		and threatened species habit	at (as described in BAM Sections 8.1)			
		 description of the nature, e (as described in BAM Subsect 	extent, frequency, duration and timing	g of indirect impacts of the proposal		

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.	
		□ Any prescribed impacts from the Appendix K	the BDAR consistent with			
		MAPS and TABLES (in document) S Image: Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts S				
		DATA (to be supplied) – N/A				
Mitigation and management of impacts	Chapter 8, Section 8.4 and 8.5	DRAY (to be supplied) = N/A er 8, 18.4 INFORMATION Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Subsections 8.4.1 and 8.4.2, including (as described in BAM Subsection 8.4.1(2.):				
	Table of measures to be implemented before, during and after construction to mitigate and manage impacts of the proposal, including action, outcome, timing and responsibility					
		DATA (to be supplied) – N/A				

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.	
Thresholds for assessing and offsetting impacts of the proposal	Chapter 9	 INFORMATION Information from the TBDC and/or other sources to report on the current status of threatened species, threatened populations at risk of an SAII and TEC/s for the proposal, and Report on impacts of the proposal on TEC/s in accordance with BAM Subsection 9.2.1 Report on impacts of the proposal on threatened species and/or threatened populations at risk of an SAII in accordance with BAM Subsection 9.2.1 				
	 Identification of impacts requiring offset in accordance with BAM Section 9.2 Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1 (3 .) Identification of areas not requiring assessment in accordance with BAM Section 9.3 					
		MAPS and TABLES (in document) Map showing the extent of TECs a Map showing the location of three Map showing location of: impacts requiring offset impacts not requiring offset 	at risk of an SAII within the subject lan atened species at risk of an SAII within et ment	d n the subject land	Appendix II	
		DATA (to be supplied) Digital shape files of: capacitor extent of TECs at risk of an capacitor threatened species at risk of capacitor boundary of impacts required capacitor boundary of impacts not required capacitor boundary of areas not required	SAII within the subject land of an SAII within the subject land ring offset equiring offset uiring assessment		Uploaded to BOAMS	

Report section	BAM ref.	Information	Maps & tables (in document)	Data (to be supplied)	BDAR ref.			
		□ Maps in jpeg format						
Applying the no net less standard	Chapter 10	INFORMATION Description of the impact on PCTs/TECs Description of the impact on threatened species at risk of an SAII or incidentally observed via site visit Number of ecosystem credits required for impacts on biodiversity values according to BAM Subsection 9 Number of species credits required for impacts on biodiversity values according to BAM Subsection 10.1.3, including any species credit species that has been incidentally observed on the subject land						
		forms the opinion that the proposed offset.	l impact is unlikely to be serious and in cosystem credits and species credits a	ccording to BAM Section 10.2 (this				
		MAPS and TABLES (in document) Table showing biodiversity risk we Table of BC Act listing status for P Table of PCTs requiring offset and Table of species at risk of an SAII of number of credits required BAM-C credit report	eightings CTs and threatened species requiring I number of ecosystem credits require or incidentally observed on site assess	offset ed (Subsection 10.2.1) sed for species credits and the	Section 10, Appendix VI			
		DATA (to be supplied) – N/A						

Appendix IV – Expertise of authors

With over 25 years wetland and urban ecology experience, a great passion for what she does, and extensive technical and onground knowledge make Geraldene a valuable contribution to any project.

Geraldene has over 8 years local government experience as manager of environment and education for Pittwater Council. Geraldene presented papers on the topic at the NSW Coastal Conference, Sydney CMA and Hawkesbury Nepean forums. Geraldene is a Technical Advisor Sydney Olympic Park Wetland Education and Training (WET) panel.

Geraldene has up to date knowledge of environmental policies and frequently provides input to such works. Geraldene was a key contributor to the recent set of Guidelines commissioned by Southeast Queensland Healthy Waterways Water Sensitive Urban Design Guidelines. Geraldene's role included significant contributions and review of the Guideline for Maintaining WSUD Assets and the Guideline for Rectifying WSUD Assets.

Geraldene is a frequent contributor to many community and professional workshops on ecological matters particularly relating to environmental management. She is an excellent Project Manager.

Geraldene is a joint author on the popular book Burnum Burnum's Wildthings published by Sainty and Associates. Author of the Saltmarsh Restoration Chapter Estuary Plants of East Coast Australia published by Sainty and Associates (2013). Geraldene's early work included 5 years with Wetland Expert Geoff Sainty of Sainty and Associates. Geraldene is an expert in creating and enhancing urban biodiversity habitat and linking People with Place.

Geraldene Dalby-Ball DIRECTOR

SPECIALISATIONS

- Urban Ecology and habitat rehabilitation and re-creation.
- Urban waterway management assessing, designing and supervising rehabilitation works
- Saltmarsh and Wetland re-creation and restoration – assessment, design and monitoring
- Engaging others in the area of environmental care and connection
- Technical Advisor environmental design, guidelines and policies
- Sound knowledge and practical application of experimental design and statistics
- Project management and supervision
- Grant writing and grant assessment
- Budget estimates and tender selection
- Expert witness in the Land and Environment Court

CAREER SUMMARY

- **Director and Ecologist**, Ecological Consultants Australia. 2014-*present*
- **Director and Ecologist**, Dragonfly Environmental. 1998-present
- Manager Natural Resources and Education, Pittwater Council 2002-2010
- Wetland Ecologist Sainty and Associates 1995-2002

QUALIFICATIONS AND MEMBERSHIPS

- Bachelor of Science with 1st Class Honors, Sydney University
- WorkCover WHS General Induction of Construction Industry NSW White Card.
- Senior First Aid Certificate.
- **Practicing member** Ecological Consultants Association of NSW
- Accredited Assessor (between reaccreditation)



Brooke is an ecologist with valuable on-ground experience working on bush regeneration projects throughout the Sydney region, including revegetation and weed management projects.

Brooke is passionate about conserving and restoring natural areas for native species to thrive.

Brooke completed her undergraduate Bachelor of Science degree majoring in Conservation Biology. Brooke has knowledge of experimental design and analysis, research and reports, geographic information systems (GIS), environmental legislation, and flora identification.

Brooke has experience working with conservation organisations, including Sea Shepherd Australia, helping to raise awareness around the destruction of habitats in the world's oceans. She has participated in the organisation and delivery of fundraising events around Sydney.

Brooke has exceptional communication and customer service skills and an extended client relations history.

Brooke Thompson ECOLOGIST

SPECIALISATIONS

- Urban and Landscape Ecology
- Fauna and Flora Assessments
- Vegetation Management
- Habitat Tree Assessment, Marking and Mapping

CAREER SUMMARY

- **Ecologist**, Ecological Consultants Australia. 2022-present
- Natural Area Specialist, Dragonfly Environmental. 2022

QUALIFICATIONS AND MEMBERSHIPS

• BSc Conservation Biology, University of Wollongong.

WorkCover WHS General Induction of Construction Industry NSW White Card.

