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Biodiversity Development Assessment Report

Proposed Caravan Park

Lot 110 DP 1091944, 3540 The Lakes Way, Charlotte Bay

Prepared for: Blueys Estate Pty Ltd

c/-Lands Advisory Service

November 2024

Ref: 3284

BOAMS Ref: 00042731/BAAS19076/23/00042732

Revision: 01

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Document Control

Document Name	Biodiversity Development Assessment Report for Proposed Caravan Park at 3540 The Lakes Way (Lot 110 DP 1091944), Charlotte Bay.
Project Number	3284
Client Name	Blueys Estate Pty Ltd c/o Lands Advisory Service

Revision

Revision	Date	Author	BAAS No.	Details
01	07/11/2024	Natalie Black	19076	Final issued with development applicant for submission

Distribution

Revision	Date	Name	Organisation
01	07/11/2024	Brett Phillips	Lands Advisory Service

EXECUTIVE SUMMARY

Anderson Environment & Planning (AEP) was commissioned by Blueys Estate Pty Ltd (the proponent) to undertake a Biodiversity Development Assessment Report (BDAR) over land identified as 3540 The Lakes Way, Charlotte Bay NSW, located within the MidCoast Local Government Area (LGA) in the Mid North Coast region of New South Wales.

The proposal involves the construction of a holiday park on a north-western portion of the property with development including: Minor bulk earthworks, 200 sites, comprising; 70 camping sites, 130 short term sites, Community facilities, Roads and drainage, and Other associated infrastructure.

This report has been prepared to meet the requirements of the Biodiversity Assessment Method 2020 (BAM) established under Section 6.7 of the Biodiversity Conservation Act 2016 (NSW). This assessment utilises methods detailed within the BAM Order 2020 to identify biodiversity values inherent within the site, including known and potentially occurring threatened species and ecological communities, and quantifies impacts of the proposal upon these values.

The Study Area comprises of approximately 306.40 ha of land which is utilised for residential, agricultural and recreational purposes. The Subject Site totalling approximately 13.57 ha is position on a portion of land in the south-east and comprises of 12.46 ha of native vegetation and 1.11 ha of cleared/exotic land. This area consists of disturbed remnant vegetation that has been subject to previous clearing, management, and grazing pressure from livestock.

The native vegetation within the Subject Site has been ground-truthed and broken down into various vegetation zones based on Plant Community Type (PCT) determination and vegetation condition;

The native vegetation within the Subject Site contains two (2) plant community types (PCTs), which are present in varying condition. The PCTs and associated zones comprise:

- PCT *3435 - Hunter Coast Lowland Flats Damp Forest*:
    - Zone 1 Moderate (7.04 ha)
    - Zone 2 Degraded (0.19 ha)
    - Zone 3 Highly Degraded (0.17 ha)
    - Zone 4 Severely Degraded (1.11 ha)
- PCT *4020 - Coastal Creekflat Layered Grass-Sedge Swamp Forest,* associated with BC Act listed EEC *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast*:
    - Zone 1 Moderate (3.79 ha)
    - Zone 2 Severely Degraded (0.17 ha)

Further assessment (see **Appendix** H) determined that the community within the Subject Site is commensurate with the BC Act listed Critically Endangered Community *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.*

No listed flora species were identified within Subject Site. The following threatened fauna were identified within the Study Area during field surveys and include:

- *Corybas dowlingii*;
- *Rhodamnia rubescens*;
- *Rhodomyrtus psidioides,* and
- A potential *Syzygium paniculatum.*

No threatened flora species were detected within the Subject Site and as such no credits will apply for threatened flora species.

Fauna species recorded were typical of those expected in this locality and in this type of remnant habitat with existing connection to larger patches of habitat offsite.

No listed fauna species were identified within the Subject Site. The following threatened fauna were identified within the Study Area during field surveys and include:

- Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*);
- White-bellied Sea-Eagle (*Haliaeetus leucogaster*);
- Powerful Owl (*Ninox strenua*);
- Southern Myotis (*Myotis macropus*); and
- Koala (*Phascolarctos cinereus*).

Glossy Black-Cockatoo and White-bellied Sea-Eagle were observed flying over the site but were not observed utilising the site during survey efforts, including targeted surveys. As such, these species will not incur credits.

Powerful Owl was observed within the Study Area during incidental and targeted surveys, with the location of detection occurring within less than 800m of the Subject Site. Four (4) HBTs that would be suitable for Forest Owls occurs within associated PCTs. As such, the species incur credits.

Southern Myotis was recorded on site at the dams located within the existing golf course.

Koalas were not observed during targeted and incidental surveys; however, presence has been assumed using the precautionary principal due to local records and evidence of occupation (tree scratches and scat) within the Study Area and wider area.

Southern Myotis, Powerful Owl and Koala are species credit species, and will generate the following species credits due to the presence of suitable habitat in close proximity to the Subject Site and availability of native vegetation and suitable hollows on site for roosting / breeding.

No breeding habitat was identified for other Microbat species, nor were there any sticks nests identified on site that would be considered suitable breeding habitat for avifauna. All other threatened species listed within the site will generate ecosystem credits due to their association with the PCTs identified on site.

Avoid and minimise principles were considered through the planning stage of the proposed development, as well as the location within the Study Area. Moreover, the proposal has undergone an iterative process to further allow for the principles of Avoid and Minimise by actively avoiding areas where threatened species were recorded and utilising the lower quality land. This land offers lesser biodiversity value and continues to be managed and grazed, whilst the majority of areas containing higher quality vegetation are excluded from the Subject Site, illustrating that the development is located within the most suitable, disturbed part of the site.

Approximately 12.46 ha of native vegetation and 1.11 ha of exotic vegetation within the Subject Site will be cleared as part of the development with 2.79 ha of area of higher biodiversity value vegetation within the Study Area to be retained and managed under a Biodiversity Management Plan. The BMP will provide protection and regeneration of PCTs increasing biodiversity values and potential habitat for threatened species. Wildlife corridors in moderate to good vegetation are also avoided by the final plan.

Furthermore, landscaping and construction will contribute to the minimisation of impacts through:

- Environmentally-friendly lighting design that avoids light-spill into surrounding areas of native vegetation;
- Landscaping using trees endemic to the area; and

- Fencing where relevant, to reduce the likelihood of edge effects and prevent fauna incursions into active industrial land where they could be harmed.

Biodiversity values were assessed for the development footprint, resulting in the calculation of Biodiversity Offsets being determined for the Subject Site. The proposal will require the following Ecosystem and Species Credits to offset the residual impact of the proposed development:

- PCT *3435 - Hunter Coast Lowland Flats Damp Forest*;
    - 146 x Ecosystem Credits - Zone 1 Moderate;
    - 2 x Ecosystem Credits - Zone 2 Degraded;
    - 1 x Ecosystem Credits - Zone 3 Highly Degraded; and
    - 0 x Ecosystem Credits - Zone 4 Severely Degraded.
- PCT *4020 - Coastal Creekflat Layered Grass-Sedge Swamp Forest;*
    - 121 x Ecosystem Credits - Zone 1 Moderate; and
    - 0 x Ecosystem Credits - Zone 2 Severely Degraded.

Assessments of the proposal under other relevant environmental policy instruments including Chapter 4 – Koala Habitat Protection of *State Environmental Planning Policy* (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP) which do apply within the MidCoast LGA, resulting in the development of a Koala Plan of Management for the Subject Site. Assessment was undertaken against the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

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Study Certification and Licensing

This report was written and certified by Natalie Black BSc (Hons), MPL & Cert IV TAE & MSc (BAAS:19076) of Anderson Environment & Planning.

The below table acknowledges the Contributing Ecologists who undertook, fieldwork, research or investigations, data analysis, and mapping that are relied on in preparing the report.

Staff	BAAS No	Title/Qualification	Tasks
Craig Anderson	18002	Managing Director BAppSc (EAM)	Contributor, conducting research or investigations that are relied on in preparing the report.
Ian Benson	18147	Director & Principal Ecologist BEng (Civil) GradDipSc (Ecology)	Contributor, conducting research or investigations that are relied on in preparing the report. Equipment data review.
Natalie Black	19076	Senior Environmental Manager / Works Coordinator BSc (Hons), Master Planning, Cert IV (TA)	Scientific Advice – Project Manager. Accredited person preparing and certifying the report.
Frances O'Brien	20013	Senior Ecologist (Lead Botanist) BEnv LLB GDLP MEL	Contributor to conduct research or investigations that are relied on in preparing the report. Vegetation Assessment, BAM Plots, Spotlight, Stag Watch, Diurnal Bird Census, and PCT determination.
Yann Buissiere		B. Resources & Env Mgnt Diploma Cnsv Land Mgnt	Contributor to conduct research or investigations that are relied on in preparing the report. Flora surveys, BAM plots and PCT determination.
Chris Wark		GIS & Technology Manager / Senior Ecologist BSc (EcoHons); DipCALM	Contributor to conduct research or investigations that are relied on in preparing the report.
Warwick Muir		Senior Ecologist / Project Manager BSc (Biology); DipArb (AQF5)	Contributor, conducting research or investigations that are relied on in preparing the report. Targeted Flora surveys.
Thomas Stephens		Ecologist / Project Manager B.EvnSc & Mmgt; DipArb (AQF5)	Contributor, conducting research or investigations that are relied on in preparing the report.
Kathleen Bushell		Ecologist BSc. (Marine Biology)	Contributor, conducting research or investigations that are relied on in preparing the report. Vegetation Assessment, Habitat Assessment, Hollow-bearing Tree Assessment, Targeted Flora Transects, Spotlighting, Stag Watch, Call Play Back, Forest Owl Nocturnal Surveys, Diurnal Bird Census, contributing author, GIS.
Naomi Stackhouse		Ecologist B.Sc Eco/ Con & Biodiversity Mmgt	Contributor, conducting research or investigations that are relied on in preparing the report. Habitat Assessment, Hollow-bearing Tree Assessment, Targeted Flora Transects, Spotlighting, Stag Watch, and Diurnal Bird Census.

Staff	BAAS No	Title/Qualification	Tasks
Kieran Giffen		Ecologist Cert II Conservation and Eco Systems	Contributor, conducting research or investigations that are relied on in preparing the report. Equipment Deployment, Habitat Assessment, Hollow-bearing Tree Assessment, Targeted Flora Transects, Spotlighting, Stag Watch.
Alana Guest		Ecologist B.Sc (Biology) & BA	Contributor, conducting research or investigations that are relied on in preparing the report. Habitat Assessment, Hollow-bearing Tree Assessment, Targeted Flora Transects, Spotlighting, Stag Watch, and Diurnal Bird Census.
Byron de Jager		Ecologist B. SC (Sustainable Resourse Mgt) Cert III Conservation and Land Mgt	Contributor, conducting research or investigations that are relied on in preparing the report. Habitat Assessment, Hollow-bearing Tree Assessment, Targeted Flora Transects, Spotlighting, Stag Watch.
Callum Reedman		Ecologist Cert III CALM Dip Cons & Land Mmgt (2022)	Contributor, conducting research or investigations that are relied on in preparing the report. Vegetation Assessment, BAM Plots, PCT determination (assist), Diurnal Bird Census.
Kara Dunn		Ecologist BSc. (Zoology)	Contributor, conducting research or investigations that are relied on in preparing the report. Vegetation Assessment, BAM Plots, Diurnal Bird Census.
Eamon McEntee		Ecologist B.Env Sc & Mmgt	Contributor, conducting research or investigations that are relied on in preparing the report. Equipment Deployment, Targeted Flora Transects, Spotlighting, Stag Watch, Pitfall Trapping, Elliot Trapping.
Oscar Anderson		Ecologist B.Env Sc & Mmgt	Contributor, conducting research or investigations that are relied on in preparing the report. Equipment Deployment, Targeted Flora Transects, Spotlighting, Stag Watch, Pitfall Trapping, Elliot Trapping.
Magnus Minnaar		Ecologist B.Env Sc & Mmgt	Contributor, conducting research or investigations that are relied on in preparing the report. Vegetation Assessment, Targeted Flora Transects, Nocturnal Frog Survey.
Dennis Neader		Ecologist B.Env Sc & Mmgt	Contributor, conducting research or investigations that are relied on in preparing the report. Vegetation Assessment, Targeted Flora Transects, Nocturnal Frog Survey.

Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL101313;
- Animal Research Authority (Trim File No: 14/600(2)) issued by NSW Agriculture; and
- Animal Research Establishment Accreditation Number 53724.

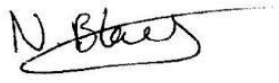
Certification:

As the principal author and certifier, I, Natalie Black (BAAS: 19076), make the following certification:

- This report has been written to comply with the requirements of the BAM 2020 and obligations outlined within the BAM Assessor Code of Conduct and includes, in the opinion of the writer, a true and accurate account of the species recorded, or considered likely to occur within the Survey Area, and inferences of such for biodiversity credit calculations;
- Anderson Environment and Planning have no actual, potential or perceived conflicts of interest with Blueys Estate Pty Ltd or Lands Advisory Services. Anderson Environment and Planning has received commercial payment for consulting services and assessment by Blueys Estate Pty Ltd for this project;
- BAM Assessment methodology, as well as Commonwealth, state and local government policies and guidelines formed the basis of project surveying methodology, unless specified departures from industry standard guidelines are justified for scientific and/or animal ethics reasons;
- All research workers have complied with relevant laws and codes relating to the conduct of flora and fauna research, including the Animal Research Act 1995, Biodiversity Conservation Act 2016 and the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes; and
- This report has been written to comply with the requirements of the *Biodiversity Conservation Act, 2016* and *Biodiversity Conservation Regulation, 2017* as outlined in the below Table.

Biodiversity Conservation Act, 2016 (BC, Act) Section 6.15 Currency of biodiversity assessment report	
(1) A biodiversity assessment report cannot be submitted in connection with a relevant application unless the accredited person certifies in the report that the report has been prepared on the basis of the requirements of (and information provided under) the biodiversity assessment method as at a specified date and that date is within 14 days of the date the report is so submitted.	I, Natalie Black (BAAS: 19076) declare that I prepared the BDAR and all BDAR amendments for the relevant application on the basis of the requirements within BAM 2020 as at the specified date (below).
(2) A relevant application is an application for planning approval, for vegetation clearing approval, for biodiversity certification or in respect of a biodiversity stewardship agreement.	Not applicable to this application.
Biodiversity Conservation Regulation, 2017 (BC Regulations) Clause 6.8 Content of biodiversity development assessment reports (section 6.16)	
A biodiversity development assessment report must include—	
1. the number and classes of biodiversity credits required to be retired in accordance with the like-for-like requirements of the offset rules, and	Addressed within Section 2.4.5 of this BDAR
2. the number and classes of biodiversity credits that could be retired in accordance with the variation rules (in any case in which the proponent of the development proposes to use the variation rules), and	Addressed within Section 2.4.5 of this BDAR
3. details of any proposal to fund a biodiversity conservation action in accordance with the offset rules, and	Not applicable to this application.
4. details of any ecological rehabilitation of a site impacted by mining under a mining lease that is proposed as a measure to offset or compensate for those impacts, and	Not applicable to this application
5. the date of the report and the requisite certification under section 6.15 of the Act, and	As below.
6. details of the accreditation of the person preparing the report and of the qualifications and experience of any other person commissioned to conduct research or investigations that are relied on in preparing the report, and	As above and Appendix K
7. any other information required by the biodiversity assessment method or ancillary rules to be included in the report.	Refer Appendices for contributing investigations, results and contributing reports prepared by other Professional consultants

Principal Author and Certifier:



Natalie Black

Senior Environmental Manager

Anderson Environment & Planning

BAAS no. 19076

Calculator Ref: 00042731/BAAS19076/23/00042732

7 November 2024

Glossary of Terms

Assessment Area	Land occurring within a 1500m buffer around the Subject Site boundary.
BAM	Biodiversity Assessment Method Order (2020) that determines: • Methodology applicable to quantifying biodiversity values inherent within a development site; • Avoid and minimise efforts required to be employed as part of any development proposal; and • Number and class of credits required to offset residual impacts of the proposal upon the biodiversity values therein.
BC Act	Biodiversity Conservation Act 2016
Biodiversity Credit Report	Specifies the number and type of biodiversity credits required to offset the impacts of a development.
BAM Calculator (BAM-C)	The online tool used to interpret site survey data and regional location information to quantify ecosystem and Species Credits required / generated at a development / stewardship site.
Biodiversity credits	Ecosystem or Species Credits required to offset the loss of biodiversity values on a development site.
Biodiversity offsets	Specific measures that are put in place to compensate for impacts on biodiversity values.
Biodiversity values	The composition, structure and function of ecosystems, and threatened species, populations and ecological communities, and their habitats.
BRW	Biodiversity Risk Weighting
CEEC	Critically Endangered Ecological Community
Council	MidCoast Council
DAWE	The former Commonwealth Department of Agricultural, Water and Environment
DCCEEW	The Commonwealth Department of Climate Change, Energy, the Environment and Water
DoEE	The former Commonwealth Department of the Environment and Energy
DPI	The NSW Department of Primary Industries
DPE	The NSW Department of Planning and Environment
DPIE	The former NSW Department of Planning, Industry and Environment
Ecosystem credit	The class of biodiversity credits created or required for the impact on EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur within a vegetation type.
EEC	Endangered Ecological Community
EPBC Act	The Commonwealth Environment Protection and Biodiversity Conservation Act 1999.
IBRA	Interim Biogeographic Regionalisation for Australia
OEH	The former NSW Office of Environment and Heritage
PFC	Percentage Foliage Cover
Subject Site	Land upon which the development is proposed, and within which residual impacts upon biodiversity are required to be offset, as shown in **Figure 1**
Species credit	Class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area based on habitat surrogates.
Study Area	The area under ownership by the Client, within Lot 110 DP 1091944. The Study Area is shown on **Figure 1**.

TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
VIS	Vegetation Integrity Score

1.0 Stage 1 – Biodiversity Assessment

1.1 Introduction

Anderson Environment & Planning (AEP) was commissioned at the request of Blueys Estate Pty Ltd (the Proponent) to undertake necessary investigations to inform a Biodiversity Development Assessment Report (BDAR) over land identified as Lot 110 DP109194, 3540 The Lakes Way, Charlotte Bay NSW. The site is located within the MidCoast Council Local Government Area (LGA).

The proposal involves the construction of a holiday park on a north-western portion of the property with development including: Minor bulk earthworks, 200 sites, comprising; 70 camping sites, 130 short term sites, Community facilities, Roads and drainage, and Other associated infrastructure.

This BDAR undertaken adheres to the approach outlined in the Biodiversity Assessment Methodology (DPIE 2020a) (the BAM) and the BAM Calculator User Guide (DPIE 2020b).

1.1.1 Biodiversity Offset Scheme Threshold Trigger

This BDAR has been triggered as required by Clause 7.1 *Biodiversity Conservation Regulation 2017* by the following threshold:

- (1)(a) the clearing of native vegetation of an area declared by clause 7.2 as exceeding the threshold, and
- (1)(b) the clearing of native vegetation, or other action prescribed by clause 6.1, on land included on the *Biodiversity Values Map* published under clause 7.3.

Therefore, a BDAR is required. An assessment under Appendix C, Table 12 within Biodiversity Assessment Method Order 2020 (BAM Order).

1.1.2 Assessment Scope

The BDAR presented herewith aims to quantify impacts of the proposal upon biodiversity values based upon the methods described within the BAM, including threatened entities listed under the BC Act.

This report includes:

- **Stage 1 – Biodiversity Assessment** – including the mapping of remnant vegetation communities including Endangered Ecological Communities (EECs) within the site, the location of previously identified threatened species and their habitats, and potential contemporary occurrence of threatened species identified within the BAM Calculator; and
- **Stage 2 – Impact Assessment** – identification of impact avoidance and mitigation measures, and the quantifying of offset requirements in the form of biodiversity credits based upon residual impacts of the proposal.

1.1.3 The Proposal

The proposed development involves a caravan park and associated services which requires the clearance/impact of approx. 13.57 ha.

The proposed caravan park and associated services are included in **Appendix A**.

1.1.4 General Description of the Subject Site

The Subject Site is located east of The Lakes Way on the eastern boundaries of MidCoast Local Government Area (LGA) in the Mid North Coast Region of NSW. The Study Area is bound by similar vegetation to the north, east and south-east. Cleared paddocks adjoin the site to the south. The Study Area is made up of the Parent Lot. Between these two areas is a golf course and multiple waterways.

The Subject Site was previously used as part of the current golf course but now contains vegetation varying from a poor to moderate condition and an intersection of derived grasslands and regrowth. Patches of the site still contain exotic vegetation.

1.1.5 Site Particulars

Table 1 – Site Particulars

Detail	Comments
Client	Blueys Estate Pty Ltd c/o Lands Advisory Services Pty Ltd
Address	3540 The Lakes Way, Charlottes Bay NSW
Title(s)	Lot 110 DP 1091944
Study Area	Consists of the entirety of the above lots totalling an area of approximately 306.40 ha.
Subject Site	Consists of the area within the above-mentioned lot identified as the development footprint and covers approx. 13.57 ha total 12.46 ha of native vegetation and 1.11 ha of cleared / exotic.
LGA	MidCoast Council
Zoning	RU2 – Rural Landscape
Current Land Use	Current land use is a golf course that separates the Study Area. The Subject Site which previously was used as part of the course, now comprises of a variety of the vegetation conditions from degraded grasslands to a moderate condition. Two dams are located to the north.
Surrounding Land Use	Areas surrounding the Study Area to the north, north-west and west is zoned RU2 – Rural Landscapes. Land to the east and north-east is zoned C2 – Environmental Conservation and a small area adjoining the boundary to the south-east is SP2 – Sewerage System.

Figure 1 depicts the extent of the Subject Site and Study Area. **Figure 2** depicts native vegetation occurring within the Assessment Area.

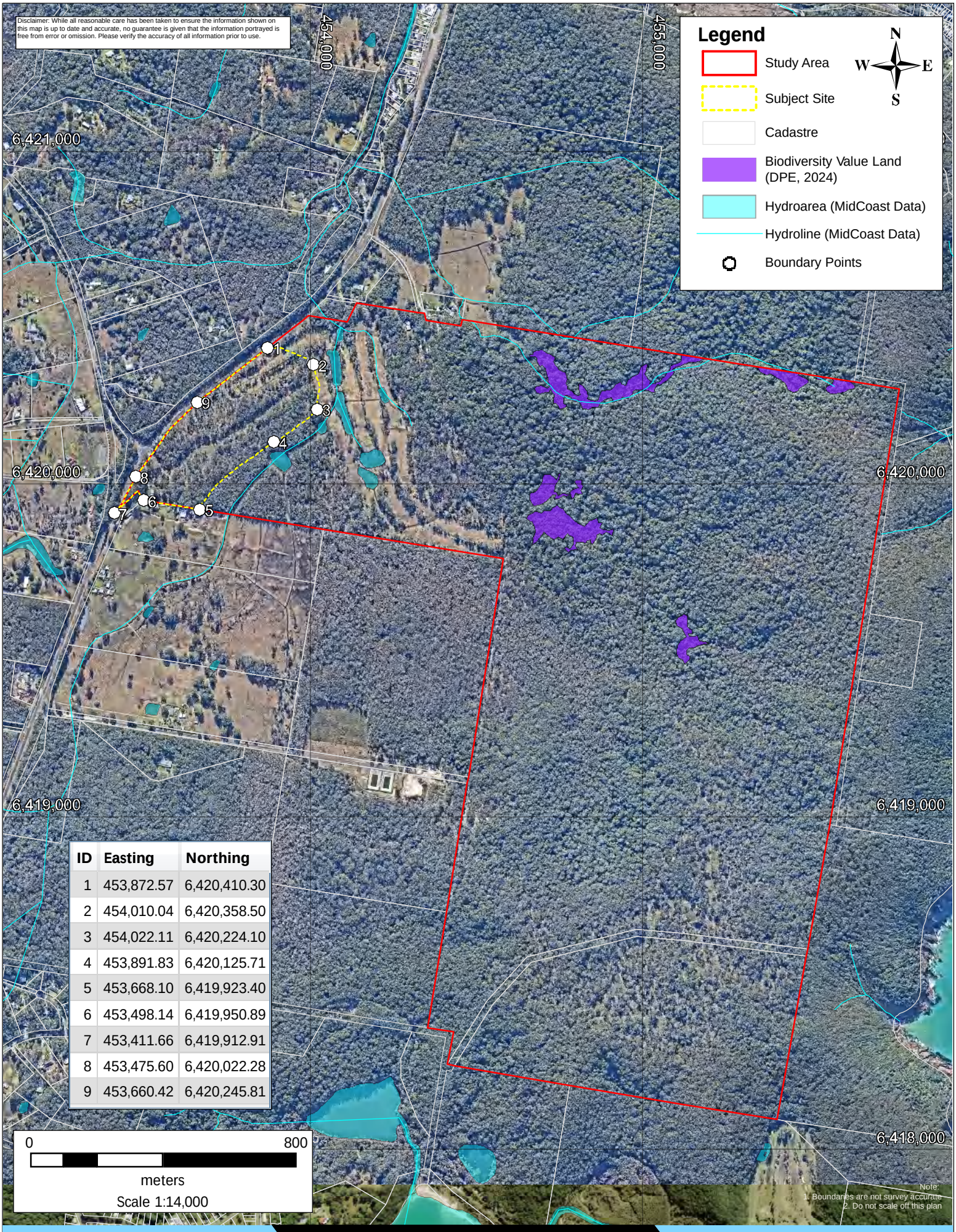
1.1.6 Geology and Soils

Reference to the 1:100,000 Sheet Soil Landscapes of The Lakes Way (Murphy, 1993) suggests that the Bulahdelah Soil Landscape underlies the site. The Bulahdelah Soil Landscape rises under woodland grass understorey and used for improved pasture. Relief >9m, slope 2.0%. Soils include Quaternary eroded sediments, composed predominantly of silts and clays, deposited by alluvial and colluvial processes as drainage plains and alluvial and colluvial fans.

1.1.7 Information Sources

Information and spatial data provided within this BDAR have been compiled from various sources including:

- Field surveys conducted within the site and surrounding areas by AEP (2022, 2023 and 2024);
- State survey guidelines (DEC 2004; DECC 2009; OEH 2018, DPIE 2020c; DPE 2022);
- PlantNET NSW (https://plantnet.rbgsyd.nsw.gov.au/);
- Aerial Photograph Interpretation (API) of the site and surrounding locality (Google 2024; Bing 2024; NearMap 2024);
- DPE Threatened Biodiversity Profiles (https://www.environment.nsw.gov.au/threatenedSpeciesApp/);
- Search and review of flora and fauna sighting records in the DPE BioNet Atlas within 10km of the site (https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet);
- Murphy, B.W. 1993, Soil Landscapes of The Lakes Way 1:100 000 Sheet - Department of Land & Water Conservation;
- Protected Matters Search within a 5km radius of the site held by DAWE, summarising Matters of National Environmental Significance that may occur in, or may relate to the Subject Site;
- DPE *BAM – Important Areas Map* to determine whether the site is mapped as *Swift Parrot, Regent Honeyeater, Migratory Shorebird and Plains-wanderer Important Areas;*
- Collective knowledge gained from previous ecological survey and assessment in the Mid-Coast Council area over the past 25 years; and
- Anecdotal records.



ID	Easting	Northing
1	453,872.57	6,420,410.30
2	454,010.04	6,420,358.50
3	454,022.11	6,420,224.10
4	453,891.83	6,420,125.71
5	453,668.10	6,419,923.40
6	453,498.14	6,419,950.89
7	453,411.66	6,419,912.91
8	453,475.60	6,420,022.28
9	453,660.42	6,420,245.81

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Figure 1 - Site Location

Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW

BOAMS: 42732

Client: Lands Advisory Services

AEP Ref: 3284

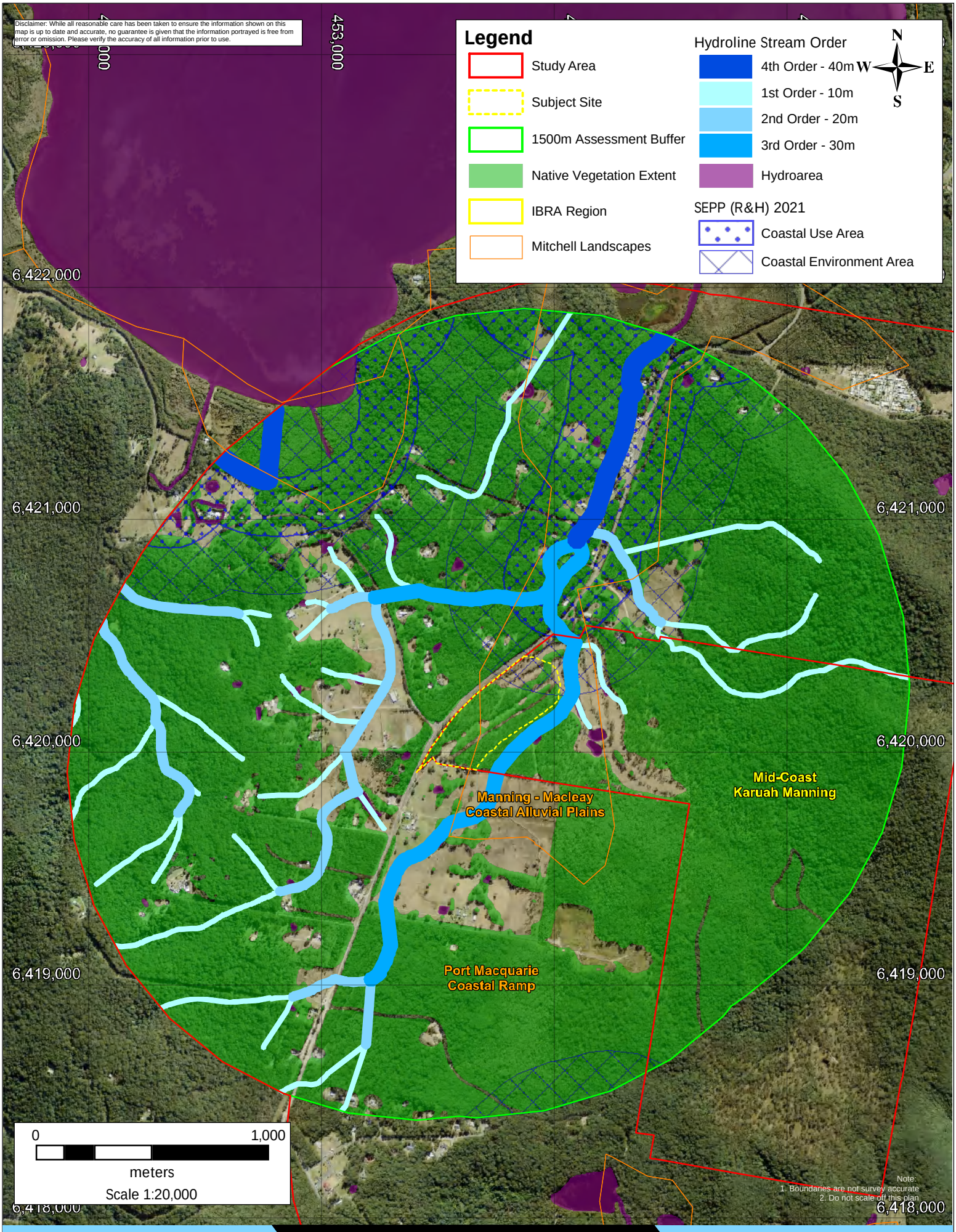

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Figure 2 - Location Map

Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW

BOAMS: 42732

Client: Lands Advisory Services

AEP Ref: 3284

1.2 Landscape Features

1.2.1 Regional Landscapes

The development site was identified as occurring within the following landscape areas:

- **IBRA Bioregio**n: NSW North Coast.
- **IBRA Subregion:** Karuah Manning.
- **NSW Landscape:** The Subject Site occurs mostly on Port Macquarie Coastal Ramp, with a small section of land occurring on Manning – Macleay Coastal Alluvial Plains. Delineation of NSW Landscape areas are shown in Location Map (**Figure 2**).

1.2.2 Identified Landscape Features

The BAM Calculator identifies nine (9) landscape features that require assessment for their relevance to the Subject Site. These features are outlined in **Table 2**.

Table 2 – Landscape Feature Assessment

Landscape Feature	Assessment
Rivers and Streams	No hydrolines are mapped on the Subject Site. There are however multiple mapped within the Study Area.
Wetlands	No mapped wetlands present within Subject site.
Native Vegetation Extent	Approximately 12.46 ha of native vegetation occurs in the Subject Site, consisting of the following ground-truthed PCTs: • PCT *3435 - Hunter Coast Lowland Flats Damp Forest*: - Zone 1 Moderate (7.04 ha) - Zone 2 Degraded (0.19 ha) - Zone 3 Highly Degraded (0.17 ha) - Zone 4 Severely Degraded (1.11 ha) • PCT *4020 - Coastal Creekflat Layered Grass-Sedge Swamp Forest*: - Zone 1 Moderate (3.79 ha) - Zone 2 Severely Degraded (0.17 ha) The remainder of the Subject Site comprises of 1.11 ha of exotic vegetation, cleared grassland and non-vegetated areas including tracks and dams.
Connectivity Features	The site is connected to larger tracks of bushland in all cardinal direction. Development to the site will not significantly impact connectivity through the locality as adequate vegetation will remain in the vicinity.
Karst, Caves, Crevices, Cliffs, Rock and other Geological Features of Significance	There are no identified karst, caves, crevices, cliffs, rock and other geological features of significance within the Subject Site.
NSW Landscape	Two (2) NSW Landscapes are mapped within the Subject Site: • Dominant: Manning – Macleay Coastal Alluvial Plains • Port Macquarie Coastal Ramp The most dominant was noted within the BAM-C. Delineation of NSW Landscape areas are shown in the Location Map (**Figure 2**).
Soil hazard features	None known on site.
Features identified in SEARs for major projects	Proposal is not a major project.
Areas of Outstanding Biodiversity Value (AOBV) under the BC Act:	Areas intersecting the Subject Site from the north are mapped as AOBV. Large portions of land adjoining the Subject Site to the north is mapped as AOBV.

1.3 Site Context Components

1.3.1 Method

Site layout allowed for the landscape values to be determined based upon a site-based method, rather than that of a linear method.

1.3.2 Landscape Native Vegetation Cover

The Assessment Area, consists of a 1500m buffer placed around the Study Area, covering approximately 970.90 ha. Approximately 806.30 ha comprises native vegetation as per Section 4.3.2 of the BAM. This equates to approximately 83.05% native vegetation cover and an integer of 83% was entered into the BAM Calculator.

1.4 Native Vegetation

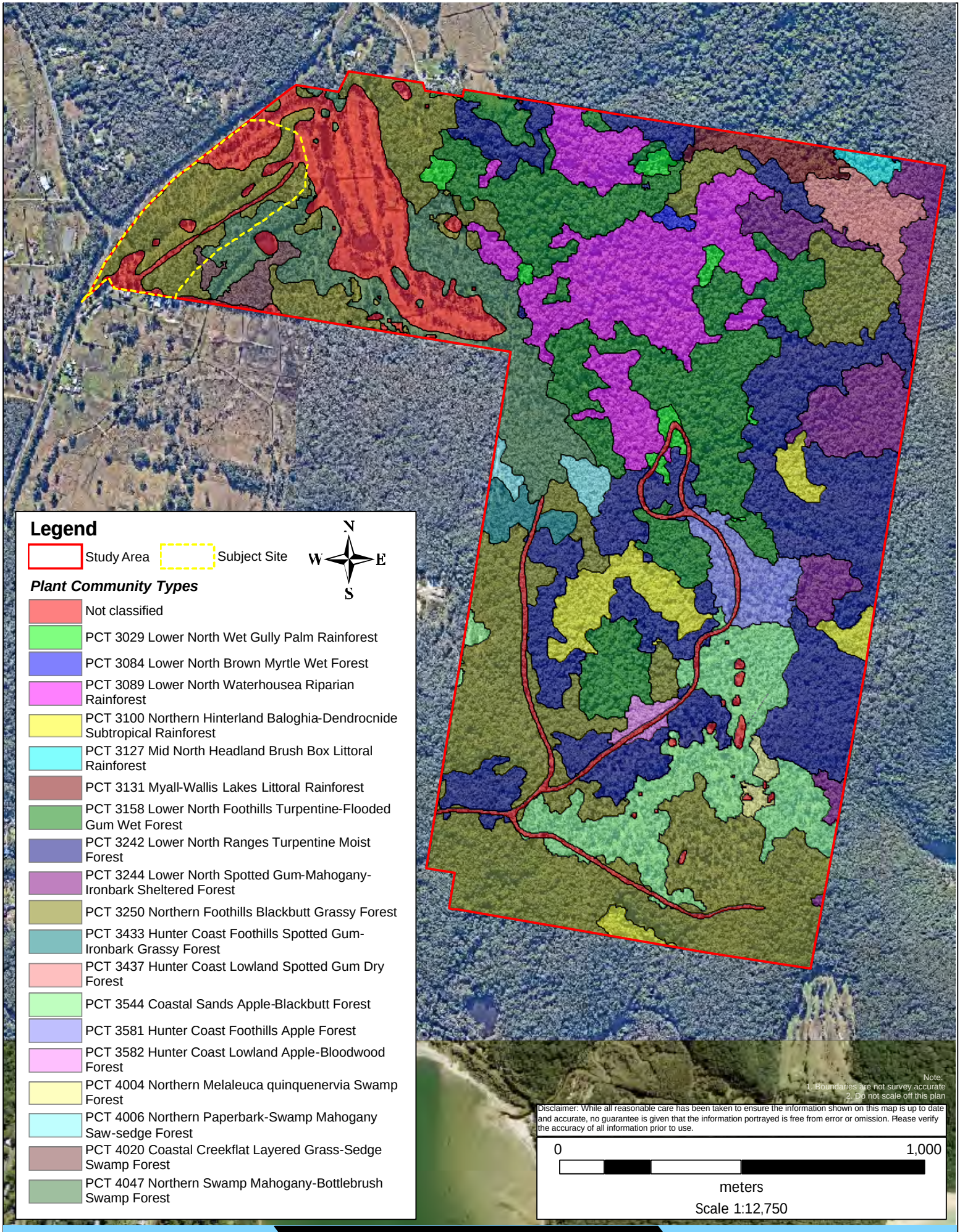
1.4.1 State Vegetation Type Mapping

State Vegetation Type Mapping (SVTM 2.0) was utilised for the Study Area (DPE, 2023). The vegetation communities mapped therein, and their extent, within the Subject Site are provided in **Table 3** and **Figure 3.**

Table 3 – State Vegetation Type Mapping Results

NSW State Vegetation Type Map 2.0 (DCCEEW, 2024).	Study Area (ha)	Subject Site (ha)
PCT 3029 Lower North Wet Gully Palm Rainforest	2.71	0
PCT 3084 Lower North Brown Myrtle Wet Forest	0.46	0
PCT 3089 Lower North Waterhousea Riparian Rainforest	27.57	0
PCT 3100 Northern Hinterland Baloghia-Dendrocnide Subtropical Rainforest	9.03	0
PCT 3127 Mid North Headland Brush Box Littoral Rainforest	0.95	0
PCT 3131 Myall-Wallis Lakes Littoral Rainforest	2.98	0
PCT 3158 Lower North Foothills Turpentine-Flooded Gum Wet Forest	39.82	0
PCT 3242 Lower North Ranges Turpentine Moist Forest	51.63	0
PCT 3244 Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest	15.65	0
PCT 3250 Northern Foothills Blackbutt Grassy Forest	73.04	8.73
PCT 3433 Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest	2.37	0
PCT 3437 Hunter Coast Lowland Spotted Gum Dry Forest	4.71	0
PCT 3544 Coastal Sands Apple-Blackbutt Forest	20.34	0
PCT 3581 Hunter Coast Foothills Apple Forest	5.11	0
PCT 3582 Hunter Coast Lowland Apple-Bloodwood Forest	1.12	0
PCT 4004 Northern Melaleuca quinquenervia Swamp Forest	1.02	0
PCT 4006 Northern Paperbark-Swamp Mahogany Saw-sedge Forest	1.98	0

PCT 4020 Coastal Creekflat Layered Grass-Sedge Swamp Forest	1.92	0.11
PCT 4047 Northern Swamp Mahogany-Bottlebrush Swamp Forest	19.20	0.90
Not classified	4.71	0
Total	**306.38**	**13.57**



AEP

Figure 3 - State Vegetation Type Mapping (DPE, 2023) Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW BOAMS: 42732

Client: Lands Advisory Services AEP Ref: 3284

1.4.2 Plot Based Floristics Surveys

Flora surveys were undertaken by AEP from July 2023 to August 2024 to produce a flora species list for the Subject Site, to search specifically for threatened flora and fauna species known to occur within the wider area, and to gather data necessary information to both derive vegetation community type(s) and to meet relevant survey guidelines. Such works included:

- Desktop assessment of the SVTM was utilised to undertake systematic coverage of the site using the Random Meander Technique (Cropper 1993) and BAM Plots by AEPs Lead Botanist to determine the vegetation communities present.
- Eleven (11) BAM plots were undertaken by AEP within the vegetation present within the Subject Site. Plots were located randomly within each vegetation zone. Minor modifications to plot locations were made on site due to factors such as ecotones, proximity to disturbed edges, and waterbodies.
- Bam plot data is provided in **Appendix D**. The location of BAM plots is depicted in **Figure 4**, **Figure 6, and Figure 7**. A summary of the flora encountered on site is provided in **Appendix B**.

1.4.3 AEP Plot Location and Assessment Process

In accordance with the section 3.3.1 of the BAM,2020, Operational Manual, AEP undertook the below assessment:

- *Review existing information for the subject land (e.g. past survey data, vegetation maps or previous reports). Mapping products often include vegetation communities based on statistical analysis (e.g. PATN), and as such include useful fidelity tables that describe diagnostic and characteristic taxa, which may be useful in assigning a PCT. Any existing information used to identify PCTs in the subject land should be reported in the BAR.*

AEP undertook the following assessment at a desktop level to gain an understanding of the Subject Site and the past conditions of plant communities and their habitat:

- Local Environmental Plan Cessnock, 2011;
- Site Specific Development Control Plan;
- Review of mapped communities; and
- Review of aerial imagery; and
- Personal communication with current landowner:

The assessment above showed a high level of disturbance over time changing uses from agricultural activities.

1- *Determine survey design and number of plots required to confidently identify the PCT/s on the subject land. Use the outcomes of 1 above, the level of environmental variation on the subject land, gaps in existing mapping and information, and the vegetation extent to inform this determination.*

AEP vegetation mapping process to determine BAM Plot numbers and location acknowledges the limits and ability to establish clear clean boundaries between PCTs, as outlined in Section 3.3.1 of the BAM, 2020, Operational Manual, hence AEP strives for line of best fit.

AEP also acknowledges that when producing vegetation maps some communities don't strictly meet the definition of a PCT, as per the BioNet Vegetation Classification, however strives to ensure the mapping and plot allocation is matched to the one which it most closely aligns.

AEP also provided guidance to the client for suitable times to undertake assessment of ground cover in spring and summer months to best reflect the growth / flowering periods of he assumed native vegetation.

Using the above AEP commenced preliminary surveys to determine vegetation boundaries and location for plots meeting the requirements, private lands.

The above information and preliminary vegetation mapping allowed for the plot locations and numbers to be determined as shown in **Figure 6 and Figure 7** AEP implements the requirements in Section 4.3.4 of the BAM, 2020, placing a plot within a Subject Site

2- *Undertake plot-based floristic vegetation survey in a 20 m x 20 m plot.*

As stated above significant areas have been impacted by agricultural activities, hence ground-truthed plots locations were modified to best fit BAM, 2020 and align with the communities onsite. Modified plots were undertaken to best fit for the communities.

1.4.3.1 Plant Community Types (PCTs) and Vegetation Zones

Vegetation within the Subject Site consists of remnant vegetation in varying conditions. Modification of vegetation has occurred as a result of historic land use, namely under scrubbing and livestock grazing pressure.

Vegetation located on slightly higher and drier grounds were dominated by native canopy species including *Eucalyptus globoidea*, *Eucalyptus microcorys* and *Angophora costata*; and lower areas prone to intermittent water logging were dominated by *Eucalyptus robusta* and *Melaleuca quinquenervia*. Mid-stratum vegetation was sparse across the Subject Site with scattered native species occurring in low densities (cover less than 3%). The ground stratum saw high densities of native species *Cynodon dactylon* and *Themeda triandra*; and high densities of non-native species including pasture grasses such as *Paspalum urvillei*, *Cynodon dactylon* and *Axonopus fissifolius*, likely introduced for pasture improvement practices.

Due to past disturbance associated with the historical management of the Subject site and current management practices as well as low variation in elevation, broad ecotones exist between the two communities, and they intergrade over large areas.

Analysis of the floristic composition and landscape position of the BAM plots in the community against the Vegetation Information System (VIS) classification provided a conclusive identification of two (2) PCTs within the Subject Site:

- PCT *3435 - Hunter Coast Lowland Flats Damp Forest*:
    - Zone 1 Moderate (7.04 ha)
    - Zone 2 Degraded (0.19 ha)
    - Zone 3 Highly Degraded (0.17 ha)
    - Zone 4 Severely Degraded (1.11 ha)
- PCT *4020 - Coastal Creekflat Layered Grass-Sedge Swamp Forest,* associated with BC Act listed EEC *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast*:
    - Zone 1 Moderate (3.79 ha)
    - Zone 2 Severely Degraded (0.17 ha)

Further assessment (see **Appendix** H) determined that the community within the Subject Site is commensurate with the BC Act listed Critically Endangered Community *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.*

In addition to remnant vegetation, the northern portion of the Subject Site contains golf course fairways in which the non-native vegetation is highly modified and consistently managed.

Fifty-five (55) exotic flora species were recorded within the Study Area. There are areas within the Subject Site that are dominated by exotic species; these areas required assignment to a PCT due to the assemblage of native species present within the zones, with the exception of the golf course fairways.

In NSW, all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise biosecurity risk they may pose. Any person who deals with any plant, who knows of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practical as per the NSW *Biosecurity Act 2015* (BA Act).

1.4.3.2 PCT Determination and Vegetation Zones Process

The BAM's assessment module requires the identification of the PCT or the most likely PCTs, and all TECs, on the Subject Land. The identification must be in accordance with the NSW PCT classification as described in the BioNet Vegetation Classification. The identification of TECs must be consistent with the Threatened Species Scientific Committee Final Determination for the TEC.

Plant community types identify and describe recurring patterns of native plant species assemblages in relation to environmental conditions such as soil, temperature, moisture and other factors. Their floristic composition is characterised by frequently co-occurring species, including combinations of trees, shrubs and/or ground cover plants.

AEP utilises the NSW Government BioNet Vegetation Classification, 2023 webpage including the PCT Data and Bulk Export data spreadsheet to determine the most likely PCTs. The following outlines the process:

1. Determine the State Vegetation Type Mapping Extent based on most recent mapping tools.
2. Determine the IBRA and Sub IBRA zone, this step assist in removing PCTs that are not located within Subject Site.
3. Determine the NSW Landscapes, a map needs to be generated for this step as there may be multiply landscapes within the Subject Site.
4. Use the florist results from the BAM Plots, filtering from canopy species through to other ground stratum. Using the BioNet Vegetation Classification is critical in this stage where the frequency of the species present is the leading contributor to refining the PCT as confirmation of presence and absence is identified within this step.

The above steps allow the narrowing of the potential PCTs as shown in **Table 4** with further assessment required.

5. Using the BioNet Vegetation Classification and details collected in the field to assess both the vegetation formation and class must be undertaken to ensure the species present are a representation of the community at the Subject Site. For example, some species such as *Eucalyptus robusta,* can be found in both Dry Sclerophyll Forests and Forested Wetlands, which will significantly alter the PCT if not assessed accurately.
6. Determination of LGA, as there are particular plant communities that are restricted to or excluded from LGAs.
7. Geographical Restrictions and elevation are researched, these factors play a significant role in soil types and climatic conditions which impacts the location of flora within NSW.
8. AEP uses E-Spade to determine the local soil types to assist with refining the PCTs.
9. Other habitat restrictions such as rainfall, tidal, riparian zones, etc are also researched against the BioNet Vegetation Classification results and data collect on site.

The above steps are generally undertaken in order to ensure the PCTs within the Subject Site are an accurate reflection of the vegetation communities occurring within the areas.

Diagnostic species recorded on site during field work that support the determination of PCTs are shown in **Table 4**. This is further supported by Vegetation Mapping community designation. **Appendix E** provides the detailed assessment for PCT Determination for each plot. Detailed assessment of vegetation zones, where AEP utilises, the data collected in the field and the Vegetation Integrity Scores to determine the conditions are shown in **Tables 5 – 8**.

PCT mapping for the Subject Site is shown in **Figure 4**. BAM data is included in **Appendix D,** PCT determination is included in **Appendix E.**

Table 4 – Species Data for Potential PCT Determination

Plot ID	Dominant Native Species	Key species present	Potential PCTs
1	*Cynodon dactylon, Eucalyptus robusta*	*Eucalyptus robusta, Melaleuca linariifolia, Melaleuca sieberi* and *Gahnia clarkei*	3250, 3435, 4020
2	*Cynodon dactylon, Melaleuca quinquenervia, Eucalyptus robusta*	*Eucalyptus robusta, Melaleuca quinquenervia, Livistona Australis*	3250, 3435, 4020
3	*Themeda triandra, Ptilothrix deusta, Eucalyptus piperita*	*Eucalyptus globoidea, Eucalyptus piperita, Eucalyptus resinifera* and *Lomandra longifolia*	3250, 3435, 4020
4	*Themeda triandra, Eucalyptus pilularis, Angophora costata*	*Eucalyptus globoidea, Eucalyptus microcorys* and *Eucalyptus pilularis*	3250, 3435, 4020
5	*Cynodon dactylon, Goodenia paniculata, Gahnia clarkei*	*Gahnia clarkei, Goodenia paniculate, Eucalyptus globoidea* and *Eucalyptus piperita*	3250, 3435, 4020
6	*Themeda triandra, Poa labillardierei var. labillardierei*	*Glochidion ferdinandi var. ferdinandi, Lomandra longifolia and Melaleuca quinquenervia*	3250, 3435, 4020
7	*Cynodon dactylon*, *Fimbristylis dichotoma*	*Cynodon dactylon*, *Fimbristylis dichotoma*	3250, 3435, 4020
8	*Themeda triandra, Eucalyptus globoidea, Eucalyptus microcorys*	*Eucalyptus globoidea, Eucalyptus microcorys* and *Imperata cylindrica*	3250, 3435, 4020
9	*Cynodon dactylon, Ozothamnus diosmifolius*	*Eucalyptus globoidea, Eucalyptus robusta*	3250, 3435, 4020
10	*Eucalyptus robusta, Melaleuca quinquenervia, Themeda triandra, Livistona Australis*	*Eucalyptus robusta, Melaleuca quinquenervia, Livistona Australis*	3250, 3435, 4020
11	*Themeda triandra, Eragrostis brownii, Imperata cylindrica*	*Eucalyptus robusta, Melaleuca quinquenervia, Themeda triandra, Imperata cylindrica*	3250, 3435, 4020

1.4.4 PCT 3435 - Hunter Coast Lowland Flats Damp Forest

The community determined to be PCT 3435 *Hunter Coast Lowland Flats Damp Forest*, varied in condition throughout the Subject Site from sclerophyll open forest with a layered understorey of Melaleucas and dry shrubs with a grassy ground cover associated with low-lying alluvial soils on the coastal plain between Wyong and Wallis Lake on the Central, Hunter and lower north coasts.

The degraded nature of the Subject Site has resulted in this community being present in four (4) separate vegetation zones based on structure and condition.

- Zone 1 Moderate (7.04 ha)
- Zone 2 Degraded (0.19 ha)
- Zone 3 Highly Degraded (0.17 ha)
- Zone 4 Severely Degraded (1.11 ha)

Appendix E provides the detailed assessment for PCT Determination for each plot. **Table 5** describes the vegetation within each zone.

Table 5 – Vegetation Zones in PCT 3435

PCT 3453 - Vegetation Zones	
Vegetation Zones of this PCT within Subject Site	• Zone 1 – Moderate (7.04 ha) • Zone 2 – Degraded (0.19 ha) • Zone 3 – Highly Degraded (0.17 ha) • Zone 4 – Severely Degraded (1.11 ha)
PCT 3453 Zone 1 – Moderate: Plots 3, 4 and 8	
Description of Vegetation Zone	This vegetation zone covers the vast majority of the Subject Site and possesses an intact native canopy. Due to underscrubbing, the mid-stratum is sparse and restricted to the vicinity of canopy trees and areas where slashing is occasional allowing regrowth to occur. The ground stratum is mostly native with a minor component of exotic species. **Canopy stratum:** The canopy layer is dominated by *Angophora costata, Eucalyptus piperita, Eucalyptus resinifera and Eucalyptus globoidea* with *Eucalyptus pilularis* and *Eucalyptus microcorys* occurring in lower densities throughout the site but become locally abundant in some areas. **Mid-stratum:** This stratum is quite diverse and include numerous species of shrubs and small trees including *Glochidion ferdinandi var. ferdinandi, Breynia oblongifolia, Acacia longifolia subsp. Longifolia, Ceratopetalum apetalum, Leptospermum polygalifolium subsp. Polygalifolium* and *Acacia ulicifolia*. **Ground stratum:** The ground stratum is mostly composed of native grasses, forbs and groundcovers and also includes some vines and twiners such as *Smilax glyciphylla, Hibbertia dentata, Hibbertia scandens and Eustrephus latifolius* Dominant species include the grasses *Imperata cylindrica, Themeda triandra and Cymbopogon refractus.* Exotic species can be locally abundant within this vegetation zone especially along the interface with the exotic grassland and ecotone with PCT 4020. Common weeds include *Paspalum dilatatum, Cynodon dactylon* and *Axonopus fissifolius.*
Area of Vegetation Zone (ha)	7.04 ha
Vegetation Condition Result	**VIS 55.2 – Moderate**

PCT 3453 - Vegetation Zones	
	
Plate 1: Start of BAM Plot 3	**Plate 2: End of BAM Plot 3**
	
Plate 3: Start of BAM Plot 4	**Plate 4: End of BAM Plot 4**

PCT 3453 - Vegetation Zones	
	
Plate 5: Start of BAM Plot 8	**Plate 6: End of BAM Plot 8**

PCT 3453 Zone 2 – Degraded: Plot 9	
Description of Vegetation Zone	This vegetation zone occurs as scattered patches throughout the cleared easement present in the southern portion of the Subject Site. Several piles of rubbles occur within this easement where soil and rocks have been gathered. These areas are composed of a mix of exotic species and regrowth of native trees and shrubs with a minor component of native groundcovers. **Mid-stratum:** The mid-stratum is composed of an assemblage of regrowth of trees and shrubs including *Angophora costata, Eucalyptus globoidea, Eucalyptus robusta, Ozothamnus diosmifolius, Acacia longifolia subsp. Longifolia* and *Pultenaea retusa*. It also includes exotic species such as *Acacia saligna* and *Gomphocarpus fruticosus*. **Ground stratum:** The ground stratum is dominated by exotic species such as *Paspalum urvillei, Andropogon virginicus, Stenotaphrum secundatum* and the non-endemic native grass *Cynodon dactylon*. Native species are also present within this stratum but occur in lower density and include *Grona varians*, *Goodenia paniculata, Polymeria calycina, Centella asiatica, Lomandra longifolia, Dianella caerulea var. producta* and *Lobelia purpurascens*.
Area of Vegetation Zone (ha)	0.19 ha
Vegetation Condition Result	**VIS 27.5 – Degraded**

<table>
<tr><th colspan="2">PCT 3453 - Vegetation Zones</th></tr>
<tr><td colspan="2"> 
Plate 7: Start of BAM Plot 9</td><td colspan="2"> 
Plate 8: End of BAM Plot 9</td></tr>
<tr><th colspan="4">PCT 3453 Zone 3 – Highly Degraded: Plots 5 and 6</th></tr>
<tr><td>Description of Vegetation Zone</td><td colspan="3">This vegetation zone is located in the northern section of the cleared easement and is managed through regular slashing. The canopy and mid-stratum are absent and the ground stratum is composed of a mix of native and exotic species.
Ground-stratum: The ground stratum is composed of a number of native grasses and ground covers. The dominant species are the grasses Themeda triandra and Poa labillardierei var. labillardierei with other species occurring at lower densities including Panicum simile, Entolasia stricta, Paspalidium distans, Goodenia paniculata, Centella asiatica and Polymeria calcyna.
Common weeds: Exotic grasses present include Axonopus fissifolius, Paspalum dilatatum and Sporobolus africanus. They are more prominent along the interface with the exotic grassland where they occur at higher densities.
Regrowth of trees and shrubs is evident within this vegetation zone and include species such as Eucalyptus globoidea, Angophora costata, Epacris pulchella and Dodonaea triquetra.
Note that other species present are diagnostic of PCT 4020 including Melaleuca quinquenervia, Gahnia clarkei and Juncus usitatus; however, overall, more species present including the dominant ones are diagnostic of PCT 3435. Left unmanaged, this area is likely to regenerate into PCT 3435.</td></tr>
<tr><td>Area of Vegetation Zone (ha)</td><td colspan="3">0.17 ha</td></tr>
<tr><td>Vegetation Condition Result</td><td colspan="3">VIS 23.2 – Highly Degraded</td></tr>
</table>

<table>
<tr><th colspan="2">PCT 3453 - Vegetation Zones</th></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Plate 9: Start of BAM Plot 5</td><td>Plate 10: End of BAM Plot 5</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Plate 11: Start of BAM Plot 6</td><td>Plate 12: End of BAM Plot 6</td></tr>
<tr><th colspan="2">PCT 3435 Zone 4 – Severely Degraded: Plot 7</th></tr>
<tr><td>Description of Vegetation Zone</td><td>This vegetation zone is located in the southern portion of the site and is currently managed via regular slashing and grazing by horses. It is dominated by exotic and non-endemic native pasture grasses including Cynodon dactylon, Paspalum</td></tr>
</table>

PCT 3453 - Vegetation Zones	
	dilatatum and *Axonopus fissifolius*. Other exotic species present include *Hypochaeris radicata,* and *Sporobolus africanus*. The golf course fairways are dominated by *Axonopus fissifolius,* and *Andropogon virginicus*. Other exotic species present include *Paspalum urvillei, Sporobolus africanus, Hypochaeris radicata, Plantago lanceolata,* and *Senecio madagascariensis*.
Area of Vegetation Zone (ha)	1.11 ha
Vegetation Condition Result	**VIS 8.6 – Severely Degraded**

Plate 13: Start of BAM Plot 7

Plate 14: End of BAM Plot 7

1.4.5 PCT 4020 – Coastal Creekflat Layered Grass-Sedge Swamp Forest

The community determined to be PCT 4020 *Coastal Creekflat Layered Grass-Sedge Swamp Forest*, varied in condition throughout the Subject Site from sclerophyll open forest with a sub-canopy of Melaleuca trees and a dense ground layer of sedges and grasses found on low-lying coastal silty alluvial soils between the Shoalhaven and the mid north coast.

The degraded nature of the Subject Site has resulted in this community being present in two (2) separate vegetation zones based on structure and condition.

- Zone 1 (3.79 ha).
- Zone 2 (0.17 ha).

Appendix E provides the detailed assessment for PCT Determination for each plot. **Table 6** describes the vegetation within each zone. Assessment of association with BC Act Listed TEC is included within **Appendix H**.

Table 6 – Vegetation Zones in PCT 4020

Vegetation Zones	
Vegetation Zones of this PCT within Subject Site	• Zone 1 (3.79 ha). • Zone 2 (0.17 ha).
PCT 4020 Zone 1 – Moderate: Plot 1, 2, and 10	
Description of Vegetation Zone	This vegetation zone is located in the north west of the Subject Site; at the interface with the golf course as well as along the south eastern boundary of the site. It possesses a native canopy and midstorey. The ground stratum is mostly composed of exotic species. **Canopy stratum:** The canopy layer is composed entirely of *Eucalyptus robusta*. Note that some level of dieback is present within the canopy layer. **Mid-stratum:** the mid-stratum is also sparse and composed of paperbarks including *Melaleuca quinquenervia, melaleuca linearifolia* and *Melaleuca sieberi*. The palm *Livistona australis* is also common within this zone. Note that the mid-stratum also suffers from high level of dieback in some areas. **Ground-stratum:** The ground stratum is dominated by non-native grasses including *Paspalum urvellei, Axonopus fissifolius* and *Andropogon virginicus*. Native species occur in lower density and include the sedges *Gahnia clarkei, Leptocarpus tenax* and *Lepyrodia muelleri* as well as the grasses Cynodon dactylon, *Themeda triandra and Entoloasia marginata*.
Area of Vegetation Zone (ha)	3.79 ha
Vegetation Condition Result	**VIS 63.7 – Moderate**

Plate 15: Start of BAM plot 1

Plate 16: End of BAM plot 1

Vegetation Zones	
	
Plate 17: Start of BAM plot 2	**Plate 18: End of BAM plot 2**
	
Plate 19: Start of BAM plot 10	**Plate 20: End of BAM plot 10**
PCT 4020 Zone 2 – Severely Degraded: Plot 11	

Vegetation Zones	
Description of Vegetation Zone	This vegetation zone is located in the north east of the Subject Site at the interface with the golf course. It consists of a cleared area managed via regular slashing. The upper and mid-stratum are absent and the ground stratum is mostly composed of exotic species with a minor component of native regrowth of trees and shrubs as well as grasses and forbs. **Ground-stratum:** The ground stratum is dominated by non-native pasture grasses including *Paspalum urvillei, Axonopus fissifolius* and *Andropogon virginicus*. Native species occur in very low density and include seedlings of *Eucalyptus robusta* and *Melaleuca quinquenervia* as well as the native grasses *Themeda triandra, Imperata cylindrica* and *Eragrostis brownii*. Native forbs are also present such as *Centella asiatica, Hydrocotyle sibthorpioides* and *Goodenia paniculata*.
Area of Vegetation Zone (ha)	0.17 ha
Vegetation Condition Result	**VIS 8.8 – Severely Degraded**

Plate 21: Start of BAM Plot 11

Plate 22: End of BAM Plot 11

1.4.6 Cleared / Exotic Grassland

The northern section of the site contains golf course fairways which are currently managed via regular slashing. The fairways are composed entirely of exotic grasses. The vegetation was ground-truthed along with the other vegetation zones via random meander and Rapid Data Points to confirm its status as non-native. This area (approx. 1.11 ha) was not included in the PCT determination as it contains is dominated by exotic species and no PCT could be allocated to.

Plate 23: Golf course fairway – Exotic grassland

Note that the two dominant species within this vegetation zone, *Paspalum dilatatum* and *Axonopus fissifolius* are both listed as High Threat Weed - not manageable.

Additional site photographs are included in **Appendix G**, and BAM field sheets are included in **Appendix D**.

Table 7 – Summary of Vegetation Zones Areas (Subject Site)

Vegetation Zone Condition	Vegetation Integrity Score (VIS)	Vegetation within Subject Site (ha)
PCT 3435 Hunter Coast Lowland Flats Damp Forest		
Zone 1 – Moderate	55.2	7.04
Zone 2 – Degraded	27.5	0.19
Zone 3 – Highly Degraded	23.2	0.17
Zone 3 – Severely Degraded	8.6	1.11
PCT 4020 - Coastal Creekflat Layered Grass-Sedge Swamp Forest		
Zone 1 – Moderate	63.7	3.79

Zone 2 – Severely Degraded	8.8	0.17
	Total Native Vegetation (ha)	**12.46**
	Total Exotics (ha)	**1.11**
	TOTAL (ha)	**13.57**

Discrepancies in numbers are due to rounding.

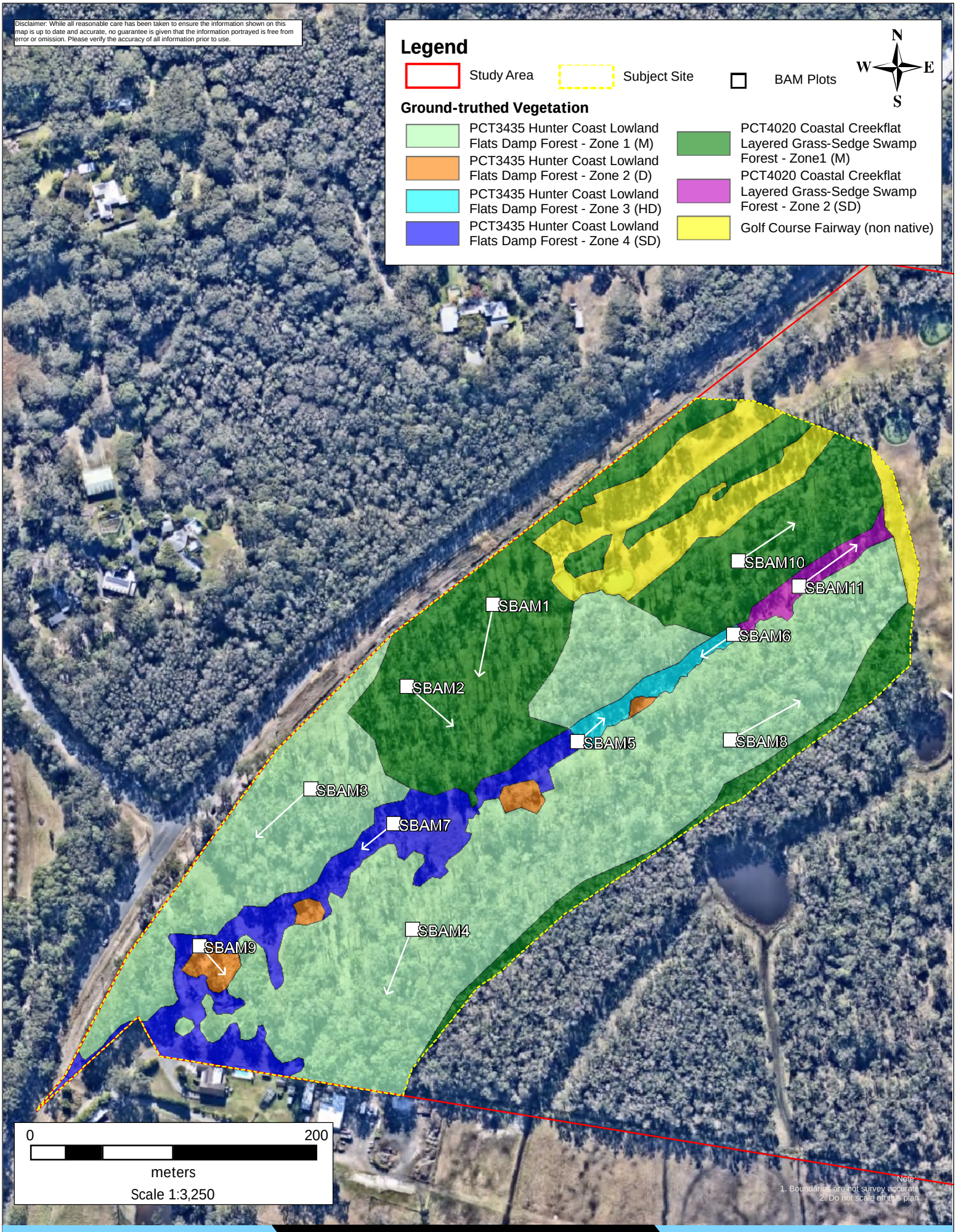


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Figure 4 - Ground-truthed Vegetation | Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW | BOAMS: 42732

Client: Lands Advisory Services | AEP Ref: 3284

1.4.7 Vegetation Integrity Assessment

1.4.5.1 Patch Size

The native vegetation that exists within the Subject Site is connected to vegetation to the south, east and north that, as defined by the BAM, extends as a patch of more than 100ha. The maximum patch size of '≥100ha' is therefore appropriate for each vegetation zone and was entered as such within the Calculator.

1.4.8 Vegetation Integrity Score

Plot data was used to determine the composition, structure and function condition score of the vegetation zones within the Subject Site, which informed the vegetation integrity score. Plot data has been tabulated (refer **Tables 8**) and includes corresponding condition scores along with the overall vegetation integrity score. Vegetation Condition Class has been rated using the following percentage bands associated with the Vegetation Integrity Scores:

- 70 - 100 Good;
- 50 - 69 Moderate;
- 35 - 49 Poor;
- 25 - 34 Degraded;
- 16 - 24 Highly Degraded; and
- <15 Severely Degraded.

Table 8 – Vegetation Integrity Score Table

Site Attribute	PCT 3435 Z1 – M			PCT 3435 Z2 – D	PCT 3435 Z3 – HD		PCT 3435 Z4 – SD	PCT 4020 Z1 – M			PCT 4020 Z2 – SD
Plot #	**3**	**4**	**8**	**9**	**5**	**6**	**7**	**1**	**2**	**10**	**11**
Location	453604E 6420139N	453675E 6420040N	453896E 6420172N	453526E 6420028N	453790E 6420171N	453899E 6420246N	453660E 6420113N	453730E 6420266N	453670E 6420209N	453902E 6420297N	4453945E 66420279N
Bearing	233°	205°	056°	131°	038°	237°	235	186°	130°	54°	052°
Tree	5	7	5	3	4	3	0	4	5	4	2
Shrub	8	6	10	3	4	1	0	3	2	2	1
Grass & Grass-like	11	8	9	3	5	9	2	7	4	15	7
Forb	10	9	11	5	7	1	0	1	2	9	8
Fern	0	1	2	0	0	0	0	0	0	0	0
Other	5	8	11	2	1	0	0	1	1	5	1
Total Composition Score	**94.2**			**28.5**	**36.2**		**1.4**	**67.3**			**55.5**
Tree	22.3	1.4	1.2	1.2	0.5	0.3	0	7.3	41.6	45.2	0.1
Shrub	1.8	38.3	48.1	60.3	0.7	0.1	60.1	6.3	0.2	0.2	4.5
Grass & Grass-like	64.7	1.4	2.6	0.6	5.9	63.8	0	60.7	51.6	16.9	1.1
Forb	2.1	0.1	0.6	0	1.5	0.1	0	0.2	0.3	2.3	0
Fern	0	0.8	1.2	0.2	0	0	0	0	0	0	0.1
Other	0.9				0.3	0		0.3	3	10.5	
Total Structure Score	**48.8**			**37.4**	**14.9**		**37.2**	**51**			**0.8**
Regenerating Stems	Present	Not Present	Present	Present	Present	Present	Not Present	Present	Present	Present	Present

Site Attribute	PCT 3435 Z1 – M			PCT 3435 Z2 – D	PCT 3435 Z3 – HD		PCT 3435 Z4 – SD	PCT 4020 Z1 – M			PCT 4020 Z2 – SD
Plot #	**3**	**4**	**8**	**9**	**5**	**6**	**7**	**1**	**2**	**10**	**11**
(<5cm DBH)											
Stem Classes (cm DBH)	20-29cm; 30-49cm; 50-79cm	10-19cm; 30-49cm; 50-79cm	20-29cm; 30-49cm; 50-79cm	5-9cm	-	-	-	10-19cm; 20-29cm; 30-49cm; 50-79cm	20-29cm; 30-49cm; 50-79cm	20-29cm; 30-49cm; 50-79cm	-
# Large Trees	16	20	0	0	0	0	0	5	0	7	0
Hollow-bearing Trees	1	5	0	0	0	0	0	1	2	0	0
Litter Cover (%)	96	41	100	18	12	54	46	15	38	46	3
Coarse Woody Debris (m)	1	10	0	0	0	0	0	0	0	0	0
High Threat Weed Cover	0.7	32.5	0.3	31	17.5	11.5	25	27.5	27.3	60.7	92.1
Total Function Score	**36.7**			**19.5**	**23.1**		**12.5**	**75.4**			**15.1**
Overall Vegetation Integrity Score	**55.2**			**27.5**	**23.2**		**8.6**	**63.7**			**8.8**

1.5 Threatened Species

Under the BAM, threatened species are classified into two types: 'Ecosystem Credit' and 'Species Credit' type species, as detailed within the BioNet Atlas Threatened Species Profile Database (DPE).

A predicted Ecosystem Credit Species assessment is presented in **Table 9** and a Species Credit Species assessment is presented in **Table 8**.

Field surveys were undertaken on site from July 2023 through till August 2024. A summary of survey effort within the Study Area is included in **Section 1.4** and **Table 12**, with flora species found on site presented in **Appendix B** and fauna species observed on site and with potential to use the area presented in **Appendix C.**

Figure 5 shows the location of NSW BioNet Atlas records of threatened species in the locality.

1.5.1 Ecosystem Credit Species

Ecosystem Credit species are associated with PCTs and other habitat surrogates that are used to predict their occurrence on a particular site.

The 'biodiversity risk weighting' (BRW) for a species is based on the 'sensitivity to loss' and 'sensitivity to potential gain' score using criteria listed in Appendix I of the BAM (DPIE 2020a). This is used in credit calculations to assess impacts of the proposal on a threatened species. The sensitivity to gain class is listed within the BAM calculator for Ecosystem Credit Species.

Those Ecosystem Credit Species predicted to occur within the site are provided in **Table 9**.

Table 9 – Predicted Ecosystem Credit Species

Scientific Name	Common Name	Sensitivity to Gain Class	Recorded within 10km (BioNet Atlas 2024) Y/N	Recorded by AEP within site or nearby surrounds Y/N
Anthochaera phyrgia	Regent Honeyeater	High	N	N
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Moderate	Y	N
Botaurus poiciloptilus	Australasian Bittern	Moderate	N	N
Calidris alba	Sanderling	High	N	N
Calidris canutus	Red Knot	High	N	N
Calidris tenuirostris	Great Knot	High	N	N
Callocephalon fimbriatum	Gang-gang Cockatoo	Moderate	N	N
Calyptorhynchus lathami	Glossy Black-Cockatoo	High	Y	Y
Charadrius leschenaultia	Greater Sand-plover	High	N	N
Charadrius mongolus	Lesser Sand-plover	High	N	N
Chthonicola sagittata	Speckled Warbler	High	N	N
Circis assimilis	Spotted Harrier	Moderate	N	N

Scientific Name	Common Name	Sensitivity to Gain Class	Recorded within 10km (BioNet Atlas 2024) Y/N	Recorded by AEP within site or nearby surrounds Y/N
Climacteria picumnus victoriae	Brwon Treecreeper (Eastern Subspecies)	High	N	N
Coracina lineata	Barred Cickoo-shrike	Moderate	N	N
Daphoenositta chrysoptera	Varied Sittella	Moderate	Y	N
Dasyurus maculatus	Spotted-tailed Quoll	High	Y	N
Ephippiorhynchus asiaticus	Black-necked stork	Moderate	N	N
Falsistrellus tasmaniensis	Eastern False Pipistrelle	High	Y	N
Glossopsitta pusilla	Little Lorikeet	High	Y	N
Haliaeetus leucogaster	White-bellied Sea-Eagle	High	Y	Y
Haliaeetus morphnoides	Little Eagle	Moderate	Y	N
Hirundapus caudacutus	White-throated Needletail	High	Y	N
Ixobrychus flavicollis	Black Bittern	Moderate	N	N
Lathamus discolor	Swift Parrot	Moderate	N	N
Limicola falcinellus	Broad-billed Sandpiper	High	N	N
Limosa lapponica baureri	Bar-tailed Godwit	High	N	N
Lophoictinia isura	Square-tailed Kite	Moderate	Y	N
Melithreptus gularis gilaris	Black-chineed Honeyeater	Moderate	N	N
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	High	Y	N
Miniopterus australis	Little Bent-winged Bat	High	Y	N
Miniopterus orianae oceanensis	Large Bent-winged Bat	High	Y	N
Neophema pulchella	Turquoise Parrot	High	Y	N
Numenius madagascariensis	Eastern Curlew	High	Y	N
Pandion cristatus	Eastern Osprey	Moderate	Y	N
Petaurus australis	Yellow-bellied Glider	High	Y	N
Petroica boodang	Scarlet Robin	Moderate	Y	N
Petroica phoenicea	Flame Robin	Moderate	N	N

Scientific Name	Common Name	Sensitivity to Gain Class	Recorded within 10km (BioNet Atlas 2024) Y/N	Recorded by AEP within site or nearby surrounds Y/N
Phoniscus papuensis	Golden-tipped Bat	High	N	N
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Moderate	N	N
Pseudomys gracilicaudatus	Eastern Chestnut Mouse	High	Y	N
Pteropus poliocephalus	Grey-headed Flying Fox	High	Y	N
Ptilinopus regina	Rose-crowned Fruit-Dove	Moderate	N	N
Rostratila australis	Australian Painted Snipe	Moderate	N	N
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	High	Y	N
Scoteanax rueppellii	Greater Broad-nosed Bat	High	Y	N
Syconycteris australis	Common Blossom-bat	High	N	N
Xenus cinereus	Terek Sandpiper	High	N	N

1.5.2 Species Credit Species

Additional threatened fauna species determined by the BAM calculator that have the potential to use the Subject Site as suitable habitat are identified in **Table 10**.

The flora and fauna species lists for the site are included in **Appendix B** and **Appendix C.**

Table 10 – Potential Species Credit Species

Scientific Name	Common Name	Risk Weighting (BRW)	Candidate for SAII (Y/N)	BioNet Records (10km)	Details of BioNet Record	Habitat Requirements
Flora						
Allocasuarina simulans	Nabiac Casuarina	3	Y	0	N/A	The Nabiac Casuarina grows in heathland on coastal sands.
Angophora inopina	Charmhaven Apple	2	N	0	N/A	This species is a member of the *A. bakeri* complex, which also includes *A. crassifolia*, *A. paludosa* and *A. exul*. It is most similar to *A. crassifolia* from which it is distinguished by the broader leaves with shorter petioles. None of these related species are known from the same area as *A. inopina*, although *A. bakeri* does occur sporadically in the ranges to the west, and near Kurri Kurri. Occurs most frequently in four main vegetation communities: (i) *Eucalyptus haemastoma–Corymbia gummifera–Angophora inopina* woodland/forest; (ii) *Hakea teretifolia–Banksia oblongifolia* wet heath; (iii) *Eucalyptus resinifera–Melaleuca sieberi–Angophora inopina* sedge woodland; (iv) *Eucalyptus capitellata–Corymbia gummifera–Angophora inopina* woodland/forest.
Callistemon linearifolius	Nettled Bottle Brush	1.5	N	0	N/A	Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. Recorded in 2000 at Coalcliff in the northern Illawarra. The species was more widespread in the past, and there are currently only 5-6 populations remaining from the 22 populations historically recorded in the Sydney area. Three of the remaining populations are reserved in Ku-ring-gai Chase National Park, Lion Island Nature Reserve and Spectacle Island Nature Reserve. The species has also been recorded from Yengo National Park. Grows in dry sclerophyll forest on the coast and adjacent ranges.
Commersonia prostrata	Dwarf Kerrawang	2	N	0	N/A	Occurs on sandy, sometimes peaty soils in a wide variety of habitats: Snow Gum (*Eucalyptus pauciflora*) Woodland and Ephemeral Wetland floor at Rowes Lagoon; Blue leaved Stringybark (*E. agglomerata*) Open Forest at Tallong; and in Brittle Gum (*E. mannifera*) Low Open Woodland at Penrose; Scribbly Gum (*E. haemostoma*)/ Swamp Mahogany (*E.*

Scientific Name	Common Name	Risk Weighting (BRW)	Candidate for SAII (Y/N)	BioNet Records (10km)	Details of BioNet Record	Habitat Requirements
						robusta) Ecotonal Forest at Tomago. Associated native species may include *Imperata cylindrica, Empodisma minus* and *Leptospermum continentale*.
Corybas dowlingii	Red Helmet Orchid	2	N	0	N/A	Sheltered areas such as gullies and southerly slopes in tall open forest on well-drained gravelly soil at elevations of 10-200 m; though the species has been recorded from sandy soils in swamp forest areas (e.g., Medowie, Anna Bay, Wauchope and Port Macquarie).
Eucalyptus parramattensis subsp. decadens	Eucalyptus parramattensis subsp. decadens	2	N	0	N/A	Generally, occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high. It occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant.
Eucalyptus seeana – endangered population	Eucalyptus seeana population in the Greater Taree local government area	2	N	0	N/A	Occurs as scattered individuals in woodlands and open forests on low, often swampy, sandy soils.
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	2	N	0	N/A	Grows in sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules. Sydney region occurrences are usually on Tertiary sands and alluvium, and soils derived from the Mittagong Formation. Occurs in a range of vegetation types from heath and shrubby woodland to open forest.
Lindernia alsinoides	Noah's False Chickweed	2	N	89	The closest sighting was approx. 565m from the Subject Site in 2009, with the most recent was approx. 830m in 2016.	Known from Bulahdelah to Coopernook, including populations at Forster. Occurrences further north at Shannon Creek west of Coutts Crossing, also at Bungawalbyn. Grows in swamp forests and wetlands along coastal and hinterland creeks. Note: Species included due to BioNet records and was not generated by BAM-C.
Maundia triglochinoides		2	N	0	N/A	Restricted to coastal NSW and extending into southern Queensland. The current southern limit is Wyong; former sites around Sydney are now extinct. Grows in swamps, lagoons,

Scientific Name	Common Name	Risk Weighting (BRW)	Candidate for SAII (Y/N)	BioNet Records (10km)	Details of BioNet Record	Habitat Requirements
						dams, channels, creeks or shallow freshwater 30 - 60 cm deep on heavy clay, low nutrients.
Melaleuca biconvexa	Biconvex Paperbark	2	N	0	N/A	Biconvex Paperbark is only found in NSW, with scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.
Persicaria elatior	Tall Knotweed	2	N	0	N/A	Species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.
Pterostylis chaetophora	Pterostylis chaetophora	2	N	0	N/A	The preferred habitat is seasonally moist, dry sclerophyll forest with a grass and shrub understorey. The most commonly observed habitat is vegetation characterised by grassy open forests or derived native grasslands of *Eucalyptus amplifolia* and *Eucalyptus moluccana* on gentle flats, or that are dominated by *Corymbia maculata* with any of *Eucalyptus fibrosa*, *Eucalyptus sideroploia* or *Eucalyptus crebra*.
Rhizanthella slateri - endangered population	Eastern Australian Underground Orchid	3	Y	0	The closest was sighted approximately 3.1km from the Subject Site, whilst the most recent was 3.4km in 2018.	Highly cryptic - grows almost completely below the soil surface, with fleshy flower heads which may mature below the surface or extend no more than 20mm, and usually located only when the soil is disturbed. Grows in sclerophyll forest in shallow to deep loams. Recorded Blue Mtns, Bulahdelah & Dharug NP.
Rhodamnia rubescens	Scrub Turpentine	3	Y	15	The closest sighting was located within the Subject Site in 2012. The most recent sighting is approx 4.5km from the site in 2021.	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.
Rhodomyrtus psidioides	Native Guava	3	Y	3	The closest was sighted approximately 3.1km from the Subject Site in 2018, whilst the most recent was 4.5km in 2021.	Currently known from a few localised occurrences in the area bounded by the towns of Wyong, Warnervale and Wyongah on the New South Wales Central Coast, within the Wyong Local Government Area. Occurs from 10-40 m a.s.l. in grassy woodland or occasionally derived grassland in well-drained clay loam or shale derived soils. The vegetation type in which

Scientific Name	Common Name	Risk Weighting (BRW)	Candidate for SAII (Y/N)	BioNet Records (10km)	Details of BioNet Record	Habitat Requirements
						the majority of populations occur (including the largest colony) is a Spotted Gum - Ironbark Forest with a diverse grassy understorey and occasional scattered shrubs.
Solanum sulphureum	Manning Yellow Solanum	2	N	0	N/A	Inhabits sunlit breaks in rainforest, rainforest regrowth on pasture land or eucalypt forest with rainforest understorey. Grows on shallow or deep loams or clay loams.
Syzygium paniculatum	Magenta Lilly Pilly	2	N	12	The closest was sighted approximately 2.9km from the Subject Site in 2016, whilst the most recent was 3.4km in 2019.	The Magenta Lilly Pilly is found only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.
Fauna						
Anthochaera phrygia	Regent Honeyeater	3	Y	0	N/A	The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.
Burhinus grallarius	Bush Stone-curlew	2	N	0	N/A	The species has a strong preference for habitats with extensive fallen/standing dead timber including logs. The species is mainly found in western slopes and plains and the Riverina, smaller numbers on Central and North Coast with increasing numbers in Tweed Valley.
Calidris alba	Sanderling	2	N	0	N/A	Often found in coastal areas on low beaches of firm sand, near reefs and inlets, along tidal mudflats and bare open coastal lagoons; individuals are rarely recorded in near-coastal wetlands. Generally occurs in small flocks, however may associate freely with other waders. Roosts on bare sand, behind clumps of beach-cast kelp or in coastal dunes.

Scientific Name	Common Name	Risk Weighting (BRW)	Candidate for SAII (Y/N)	BioNet Records (10km)	Details of BioNet Record	Habitat Requirements
Calidris canutus	Red Knot	2	N	0	N/A	In NSW the Red Knot mainly occurs in small numbers on intertidal mudflats, estuaries, bays, inlets, lagoons, harbours and sandflats and sandy beaches of sheltered coasts. It is occasionally found on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms and is a rare visitor to terrestrial saline wetlands and freshwater swamps. The birds roost on sandy beaches, spits, islets and mudflats close to feeding grounds, usually in open areas. It is rarely found on inland lakes or swamps.
Calidris tenuirostris	Great Knot	2	N	0	N/A	Occurs within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. Often recorded on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms.
Callocephalon fimbriatum	Gang-gang Cockatoo	2	N	0	N/A	Gang-gang Cockatoos are one of the more distinctive and charismatic members of Australia's avifauna. In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. May also occur in sub-alpine Snow Gum (*Eucalyptus pauciflora*) woodland and occasionally in temperate rainforests. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger in eucalypts.
Calyptorhynchus lathami	Glossy Black-Cockatoo	2	N	20	The closest was sighted approximately 250m from the Subject Site in 2019, whilst the most recent was 2.6km in 2024.	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of Sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. Moderate to Good: A range of habitat and well-structured vegetation offers suitable habitat for this species. *Allocasuarina littoralis* identified on Subject Site and

Scientific Name	Common Name	Risk Weighting (BRW)	Candidate for SAII (Y/N)	BioNet Records (10km)	Details of BioNet Record	Habitat Requirements
						suitable HBTs in SW corner potential for this species to provide breeding habitat.
Cercartetus nanus	Eastern Pygmy-possum	2	N	0	N/A	The species can be found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (*Pseudocheirus peregrinus*) drays or thickets of vegetation, (e.g., grass-tree skirts); nest-building appears to be restricted to breeding females; tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks.
Chalinolobus dwyeri	Large- eared Pied Bat	3	Y	0	N/A	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in 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.
Charadrius leschenaultii	Greater Sand-plover	2	N	0	N/A	Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Roosts during high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders.
Charadrius mongolus	Lesser Sand-plover	2	N	0	N/A	Almost entirely coastal in NSW, favouring the beaches of sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats; occasionally occurs on sandy beaches, coral reefs and rock platforms. Roosts during high tide on sandy beaches, spits and rocky shores; forage individually or in scattered flocks on wet ground at low tide, usually away from the water's edge.
Crinia tinnula	Wallum Froglet	1.5	N	23	The closest was sighted approximately 2.6km from the Subject Site in 2020, whilst the most	Wallum Froglets are found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgelands and wet heathlands. They can also be found along drainage lines within other vegetation

Scientific Name	Common Name	Risk Weighting (BRW)	Candidate for SAII (Y/N)	BioNet Records (10km)	Details of BioNet Record	Habitat Requirements
					recent was 5.5km in 2022.	communities and disturbed areas, and occasionally in swamp sclerophyll forests. The species breeds in swamps with permanent water as well as shallow ephemeral pools and drainage ditches. Breeding is thought to peak in the colder months, but can occur throughout the year following rain. Wallum Froglets shelter under leaf litter, vegetation, other debris or in burrows of other species. Shelter sites are wet or very damp and often located near the water's edge. Males may call throughout the year and at any time of day, peaking following rain.
Dromaius novaehollandiae – endangered population	Emu population in the New South Wales North Coast Bioregion	2	N	0	N/A	In the NSW north coast, Emus occur in a range of predominantly open lowland habitats, including grasslands, heathland, shrubland, open and shrubby woodlands, forest, and swamp and sedgeland communities, as well as the ecotones between these habitats. They also occur in plantations of tea-tree and open farmland, and occasionally in littoral rainforest.
Haliaeetus leucogaster	White-bellied Sea-Eagle	2	N	51	The closest was sighted approximately 560m from the Subject Site in 2019, whilst the most recent was 930m in 2023.	Terrestrial habitat includes coastal dunes, tidal flats, grassland, heathland, woodland and forest. Requires large emergent eucalypts for nesting. Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines.
Hieraaetus morphnoides	Little Eagle	1.5	N	1	One sighting approximately 2.2km from site in 2005.	The species nest in live (occasionally dead) large old trees within vegetation. Paddock trees can provide important breeding habitat (there are examples of nest trees in ACT). Breeding habitat is live (occasionally dead) large old trees within suitable vegetation AND 1. the presence of a male and female; or 2. female with nesting material; or 3. an individual on a large stick nest in the top half of the tree canopy.
Hoplocephalus stephensii	Stephens' Banded Snake	2	N	6	The closest was sighted approximately 1.3km from the Subject Site in 2009, whilst the most	Rainforest and eucalypt forests and rocky areas up to 950 m in altitude. Stephens' Banded Snake is nocturnal, and shelters between loose bark and tree trunks, amongst vines, or in hollow trunks limbs, rock crevices or under slabs during the day.

Scientific Name	Common Name	Risk Weighting (BRW)	Candidate for SAII (Y/N)	BioNet Records (10km)	Details of BioNet Record	Habitat Requirements
					recent was 3.4km in 2018.	
Lathamus discolor	Swift Parrot	3	Y	0	N/A	On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*.
Limicola falcinellus	Broad-billed Sandpiper	2	N	0	N/A	Broad-billed Sandpipers favour sheltered parts of the coast such as estuarine sandflats and mudflats, harbours, embayments, lagoons, saltmarshes and reefs as feeding and roosting habitat. Occasionally, individuals may be recorded in sewage farms or within shallow freshwater lagoons. Broad-billed Sandpipers roost on banks on sheltered sand, shell or shingle beaches. The species is an active forager, typically feeding by rapidly and repeatedly jabbing its bill into soft wet mud. Feeding also occurs while wading, often in water so deep that they have to submerge their heads and necks in order to probe the underlying mud.
Limosa lapponica baueri	Bar-tailed Godwit	2	N	0	N/A	It is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. Less frequently it occurs in salt lakes and brackish wetlands, sandy ocean beaches and rock platforms. It often occurs around beds of seagrass, and sometimes in nearby saltmarsh or the outer margins of mangrove areas. It forages at low to mid tide in shallow water or along the water's edge on sandy substrates on intertidal flats, banks and beaches or on soft mud substrates.
Litoria aurea	Green and Golden Bell Frog	2	N	0	N/A	Habitat for the species includes semipermanent/ephemeral wet areas, within 1km of swamps, waterbodies or wet areas. In high altitude populations calling seasons are restricted to summer months. While chytrid is a potential threat to some populations of the species, other populations are subject to manageable threats. Inhabits marshes, dams and stream-sides, particularly

Scientific Name	Common Name	Risk Weighting (BRW)	Candidate for SAII (Y/N)	BioNet Records (10km)	Details of BioNet Record	Habitat Requirements
						those containing bullrushes (*Typha spp*.) or spikerushes (*Eleocharis spp*.).
Litoria brevipalmata	Green-thighed Frog	1.5	N	0	N/A	The species was allocated to species credit species because presence cannot be predicted from vegetation or landscape surrogates. Experts noted that it is difficult to detect from survey, detection could be optimised by detailed/strict survey guidelines.
Lophoictinia isura	Square-tailed Kite	1.5	N	2	The closest was sighted approximately 195m from the Subject Site in 2015, whilst the most recent was 5.0km in 2019.	Found in a variety of timbered habitats including dry woodlands and open forests. Nesting sites generally located along or near water courses, in a fork or on large horizontal limbs. The species is allocated to dual credit because they tend to be sensitive to disturbance around nests. It will be difficult to identify a Kite nest (there are lots of comparable sized stick nests built by other species), especially given Kites have large territories and other stick nesters will undoubtedly also be nesting where Kites might be recorded.
Miniopterus australis	Little Bent-winged Bat	3	Y	74	The closest was sighted approximately 560m from the Subject Site in 2019, whilst the most recent was 5.2km in 2024.	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.
Miniopterus orianae oceansis	Large Bent-winged Bat	3	Y	1	One sighting was recorded approximately 1.7km from the Subject Site in 2016.	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young.
Mixophyes balbus	Stuttering Frog	3	Y	0	N/A	The Stuttering Frog is typically found in association with permanent streams through temperate and sub-tropical rainforest and wet sclerophyll forest, rarely in dry open tableland riparian vegetation, and also in moist gullies in dry forest.

Scientific Name	Common Name	Risk Weighting (BRW)	Candidate for SAII (Y/N)	BioNet Records (10km)	Details of BioNet Record	Habitat Requirements
Mixophyes iteratus	Giant Barred Frog	2	N	0	N/A	Giant Barred Frogs are found along freshwater streams with permanent or semi-permanent water, generally (but not always) at lower elevation. Moist riparian habitats such as rainforest or wet sclerophyll forest are favoured for the deep leaf litter that they provide for shelter and foraging, as well as open perching sites on the forest floor. However, Giant Barred Frogs will also sometimes occur in other riparian habitats, such as those in drier forest or degraded riparian remnants, and even occasionally around dams.
Myotis macropus	Southern Myotis	2	N	16	The closest was sighted approximately 4.9km from the Subject Site in 2023, whilst the most recent was 5.6km in 2024.	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, wharves, bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.
Ninox connivens	Barking Owl	2	N	1	The single record was sighted approximately 3.2km from the Subject Site in 2007.	Primarily inhabits woodland areas but can also occur in forests and partially cleared areas, including well-treed suburbs and rural towns
Ninox strenua	Powerful Owl	2	N	8	The closest was sighted approximately 935m from the Subject Site in 2023, whilst the most recent was 2.2km in 2024.	Inhabits a range of vegetation types including eucalypt forests and woodlands, gallery rainforests, and inland riverine woodlands. Roosting and nesting often occur in dense gullies within eucalypts forests.
Notamacropus parma	Parma Wallaby	2	N	0	N/A	Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. Typically feed at night on grasses and herbs in more open eucalypt forest and the edges of nearby grassy areas.
Numenius madagascariensis	Eastern Curlew	3	Y	2	Both sightings are approximately 3.7km from the Subject Site with the most recent recorded in 2020.	It generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. It forages in or at the edge of shallow water, occasionally on

Scientific Name	Common Name	Risk Weighting (BRW)	Candidate for SAII (Y/N)	BioNet Records (10km)	Details of BioNet Record	Habitat Requirements
						exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on sandy spits and islets, especially on dry beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. May also roost on wooden oyster leases or other similar structures.
Pandion cristatus	Eastern Osprey	1.5	N	24	The closest was sighted approximately 2.2km from the Subject Site in 2005, whilst the most recent was 3.1km in 2020.	Foraging occurs throughout clear estuaries, inshore marine waters, and coastal rivers, with nesting primarily occurring in dead or dead-topped trees found within open woodlands or open forests 1-2km from water.
Petauroides Volans	Southern Greater Glider	2	N	2	The closest and most recent sighting is approximately 1.4km from the Subject Site in 2024.	Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up to 18 hollows in their home range. Occupy a relatively small home range with an average size of 1 to 3 ha.
Petaurus norfolcensis	Squirrel Glider	2	N	3	The closest was sighted approximately 2.9km from the Subject Site in 2015, whilst the most recent was 5.3km in 2020.	Inhabits Blackbutt-Bloodwood Forest with heath understorey in coastal areas. Lives in family groups. Requires abundant tree hollows for refuge and nesting. Survey year round but sites with bi-pinnate acacia, autumn winter flowering trees and shrubs such as Eucalyptus robusta and Banksia sp. (integrifolia etc.) should be subject to a more retracted survey period of between March-August. Relies on large old trees with hollows for breeding and nesting. These trees are also critical for movement and typically need to be closely-connected (i.e., no more than 50 m apart). Important known food plants – *Eucalyptus siderophloia/tereticornis/pilularis/robusta, Corymbia maculata/gummifera, Melaleuca quinquenervia, Acacia irrorata/longifolia, Banksia spp.*
Petrogale penicillata	Brush-tailed Rock-wallaby	3	Y	0	N/A	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night when foraging. Browse on vegetation in and adjacent to

Scientific Name	Common Name	Risk Weighting (BRW)	Candidate for SAII (Y/N)	BioNet Records (10km)	Details of BioNet Record	Habitat Requirements
						rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees.
Phascogale tapoatafa	Brush-tailed Phascogale	2	N	1	The single sighting was approximately 5.3km from the Subject Site in 2019.	The species preferred habitat includes hollow logs, under bark, rocks, cracks in soil, grass tussocks or building debris. The species prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter; however, they can also inhabit heath, swamps, rainforest and wet sclerophyll forest. Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater. They feed mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates. They nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and can use many different hollows over a short time span.
Phascolarctos cinereus	Koala	2	N	91	The closest was sighted approximately 560m from the Subject Site in 2019, whilst the most recent was 1.5km in 2024.	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. Spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.
Planigale maculata	Common Plannigale	2	N	0	N/A	Inhabit rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas where there is surface cover, and usually close to water. They are active at night and during the day shelter in saucer-shaped nests built in crevices, hollow logs, beneath bark or under rocks.
Potorous tridactylus	Long – nosed Potoroo	2	N	0	N/A	Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature.
Pteropus poliocephalus	Grey-headed Flying-fox	2	N	30	The closest sighting was located within the Subject Site in 2016.	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are

Scientific Name	Common Name	Risk Weighting (BRW)	Candidate for SAII (Y/N)	BioNet Records (10km)	Details of BioNet Record	Habitat Requirements
					The most recent sighting is approx 935m from the site in 2023.	commonly found in gullies, close to water, in vegetation with a dense canopy.
Tyto novaehollandiae	Masked Owl	2	N	3	The closest sighting was located within the Subject Site in 2016. The most recent sighting is approx 2.2km from the site in 2023.	This ground-dwelling species inhabits grasslands, sedgelands, woodlands and cropped lands of warm temperate areas that receive a minimum of 400mm of summer rainfall annually. They require a relatively dense ground cover for breeding and nesting.
Tyto tenebricosa	Sooty Owl	3	Y	1	The single record was sighted approximately 5.5km from the Subject Site in 2012..	Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Roosts by day in the hollow of a tall forest tree or in heavy vegetation; hunts by night for small ground mammals or tree-dwelling mammals such as the Common Ringtail Possum (*Pseudocheirus peregrinus*) or Sugar Glider (*Petaurus breviceps*). Nests in very large tree-hollows.
Uperoleia mahonyi	Mahony's Toadlet	2	N	1	The single record was sighted 6.7km from Subject Site in 2020.	Current observations indicate Mahony's Toadlet inhabits ephemeral and semi-permanent swamps and swales on the coastal fringe of its range. Known records occur in heath or wallum habitats almost exclusively associated with leached (highly nutrient impoverished) white sand. Commonly associated with acid paperbark swamps, Mahony's Toadlet also is known to occur in wallum heath, swamp mahogany-paperbark swamp forest, heath shrubland and Sydney red gum woodland. Recent studies suggest intact vegetation adjacent to and within water bodies is an important habitat feature for this species.
Vespadelus troughtoni	Eastern Cave Bat	3	Y	1	The single record from 2002 was found within the Study Area.	A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals. Occasionally found along cliff-lines in wet eucalypt forest and rainforest.
Xenus cinereus	Terek Sandpiper	2	N	0	N/A	In Australia, has been recorded on coastal mudflats, lagoons, creeks and estuaries. Favours mudbanks and sandbanks located near mangroves, but may also be observed on rocky

Scientific Name	Common Name	Risk Weighting (BRW)	Candidate for SAII (Y/N)	BioNet Records (10km)	Details of BioNet Record	Habitat Requirements
						pools and reefs, and occasionally up to 10 km inland around brackish pools. Generally roosts communally amongst mangroves or dead trees, often with related wader species.

The following Ecosystem Species Credits and Potential Credit Species have been excluded from the Species Credits species list in accordance with *Section 5.2.1.2 (a, b, c, d, e and f) or 5.2.2.2 (a, b or c)* of BAM 2020 (refer to **Table 11**) for the Subject Site.

Table 11 –Excluded Species

Scientific Name	Common Name	Habitat Constraints (Y / N)	Habitat Degraded (Y / N)	Geographic Limitations (Y / N)	Species is Vagrant (Y / N)	Comments
Flora						
Angophora inopina	Charmhaven Apple	N	N	Y	N	In accordance with Section *5.2.1.2 (b) the* Subject Site is not located south of Wootton, as a result the species has been removed from further assessment due to Geographic limitations. .
Eucalyptus seeana – endangered population	Eucalyptus seeana population in the Greater Taree local government area	N	N	Y	N	In accordance with Section *5.2.1.2 (b) the* Subject Site is not located within the Greater Taree LGA, as a result the species has been removed from further assessment due to Geographic limitations. .
Fauna						
Anthochaera phtygia	Regent Honeyeater	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site is not mapped as per important habitat. Therefore, the species has been removed from further assessment due to habitat constraints.
Calidris alba	Sanderling	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site is not mapped as per important habitat. Therefore, the species has been removed from further assessment due to habitat constraints.
Calidris canutus	Red Knot	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site is not mapped as per

Scientific Name	Common Name	Habitat Constraints (Y / N)	Habitat Degraded (Y / N)	Geographic Limitations (Y / N)	Species is Vagrant (Y / N)	Comments
						important habitat. Therefore, the species has been removed from further assessment due to habitat constraints.
Calidris tenuirostris	Great Knot	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site is not mapped as per important habitat. Therefore, the species has been removed from further assessment due to habitat constraints.
Chalinolobus dwyeri	Large- eared Pied Bat	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site not located within 2km of required habitat. Therefore, the species has been removed from further assessment due to habitat constraints.
Charadrius leschenaultia	Greater Sand-plover	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site is not mapped as per important habitat. Therefore, the species has been removed from further assessment due to habitat constraints.
Charadrius mongoluss	Lesser Sand-plover	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site is not mapped as per important habitat. Therefore, the species has been removed from further assessment due to habitat constraints.
Lathamus discolor	Swift Parrot	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site is not mapped as per important habitat. Therefore, the species has been

Scientific Name	Common Name	Habitat Constraints (Y / N)	Habitat Degraded (Y / N)	Geographic Limitations (Y / N)	Species is Vagrant (Y / N)	Comments
						removed from further assessment due to habitat constraints.
Limicola falcinellus	Broad-billed Sandpiper	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site is not mapped as per important habitat. Therefore, the species has been removed from further assessment due to habitat constraints.
Limosa lapponica baueri	Bar-tailed Godwit	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site is not mapped as per important habitat. Therefore, the species has been removed from further assessment due to habitat constraints.
Miniopterus australis	Little Bent-winged Bat	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site does not contain required habitat. Therefore, the species has been removed from further assessment due to habitat constraints.
Miniopterus orianae oceansis	Large Bent-winged Bat	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site does not contain required habitat. Therefore, the species has been removed from further assessment due to habitat constraints.
Numenius madagascariensis	Eastern Curlew	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site is not mapped as per important habitat. Therefore the species has been removed from further

Scientific Name	Common Name	Habitat Constraints (Y / N)	Habitat Degraded (Y / N)	Geographic Limitations (Y / N)	Species is Vagrant (Y / N)	Comments
						assessment due to habitat constraints.
Petrogale penicillata	Brush-tailed Rock-wallaby	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site does not contain required habitat. Therefore, the species has been removed from further assessment due to habitat constraints.
Pteropus poliocephalus	Grey-headed Flying-fox	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site does not contain required habitat. Therefore, the species has been removed from further assessment due to habitat constraints.
Vespadelus troughtoni	Eastern Cave Bat	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site does not contain required habitat. Therefore, the species has been removed from further assessment due to habitat constraints.
Xenus cinereus	Terek Sandpiper	Y	N	N	N	In accordance with Section *5.2.2.2 (a) the* Subject Site is not mapped as per important habitat. Therefore, the species has been removed from further assessment due to habitat constraints.

1.5.3 Field Survey Methods

The survey effort for species undertaken by AEP is deemed to fulfill minimum survey requirement. Details of the flora and fauna survey are presented in **Tables 12** and **14** and were conducted using relevant guidelines, in particular DPE survey guidelines for threatened plants (2020), fauna (2018, 2004) and amphibians (2009). Flora and Fauna Survey Effort, and Threatened Species Sightings are shown in **Figures 6** to **9**.

Field sheets are provided in **Appendix D**, and flora and fauna species list for those species recorded during field surveys are provided in **Appendix B** and **Appendix C**.

1.5.3.1 Habitat Features Surveys

An assessment of the relative habitat values present within the Study Area was undertaken. This assessment focused primarily on the identification of specific habitat types and resources within the Study Area favoured by known threatened listed in **Section 1.4.2**. The assessment also considered the potential value of the Subject Site (and surrounding areas) for all major guilds of native flora and fauna. The assessment was based on the specific habitat requirements of each threatened fauna species in regard to home range, feeding, roosting, breeding, movement patterns and corridor requirements.

Consideration was given to contributing factors including topography, soil, light and hydrology for threatened flora and assemblages. In particular, focus was put on documenting the presence of key habitat features such as tree hollows. Hollows are an important resource utilised by a variety of forest fauna, and are particularly relevant for several of the likely key threatened species in this locality.

1.5.3.2 Flora Field Survey

All required flora survey techniques were utilised for targeted survey of the species listed in **Table 14** above and guided by the *Threatened Species Survey and Assessment Guidelines* (2004) and the BAM (2020).

The following survey methods were undertaken to record the presence of threatened species on site:

- Ground-truthing of vegetation mapping to identify all vegetation communities present onsite as well as segregate vegetation zones according to condition and current management practices.
    - To determine the Vegetation Integrity Scores (VIS) of the PCTs within the Subject Site, eleven (11) BAM plots were subsequently undertaken (locations depicted in **Figure 4.** Results are within **Appendix D**).
- Seasonal threatened flora surveys utilising Parallel walking transects, ranging from 5m to 20m depending on species and vegetation formation and condition for example for shrubs species maximum distance between transects 20m in open, 10m in dense vegetation. **Table 14** outlines the required survey requirements for flora Species Credit Species.
- Some intersects were not surveyed due to dense weed infestation (mainly *Lantana camara*), agricultural infrastructure, waterbodies, etc, which prevented access.
- Identification of all vascular plant species encountered during fieldwork. Subject Site coverage was both systematic to ensure all key points of the site were checked, and therein the Random Meander Technique (Cropper 1993) was utilised to maximise species encountered.

1.5.3.3 Fauna Field Surveys

All required fauna survey techniques were utilised for targeted survey of the species listed in **Table 14** and guided by the *Threatened Species Survey and Assessment Guidelines* (2004) and *Threatened species survey and assessment guidelines: field survey methods for fauna – Amphibians* (2009). All Survey effort is shown in **Figures 6** to **9**.

1.5.3.4 Incidental Observations

Incidental records of any fauna species observed during fieldwork were noted. This included opportunistic sightings of secondary indications (scratches, scats, diggings, tracks etc.) of any resident or migratory species. Searches were also conducted for whitewash, regurgitation pellets and prey remain from Owls, chewed Casuarina cones from Black-Cockatoos, chewed fruit remains from frugivorous birds etc.

1.6 Survey Effort

The survey methods above were utilised across the Study Area commencing in July 2023 to September 2024. Surveys conducted within the Subject Site are highlighted. **Table 12** outlines a summary of field surveys.

Table 12 – Field Survey Periods

Date	Time	Hours	Field activity	No. of Persons on Site	Staff	Rainfall
19/7/2023	12:00 – 17:30	5:30	General site and habitat assessment.	3	KG, FOB, NS	0mm
			Equipment – Deploy Song meter (x2). Bush Stone-curlew, Glossy Black-Cockatoo, Emu, White-bellied Sea Eagle, Little Eagle, Forest Owls (Barking Owl, Powerful Owl, Sooty Owl, Masked Owl), Eastern Osprey, Koala			
			20m Hollow-bearing Tree Transects.			
			10m Flora Transects: *Melaleuca biconvexa, Melaleuca groveana, Rhodamnia rubescens, Rhodomyrtus psidioides, Syzygium paniculatum*			
	21:00 – 22:30	1:30	Nocturnal Survey – Spotlighting: Forest Owls (Masked, Barking, Powerful and Sooty), Bush Stone-curlew, Gliders, Long-nosed Potoroo, Parma Wallaby, Koala, Common Planigale			
			Call Playback: Forest Owls (Masked, Barking, Powerful and Sooty), Koala, Bush Stone-curlew.			
20/7/2023	09:30 – 17:15	07:45	Habitat Assessment.	3	KG, FOB, NS	0mm
			5m Flora Transects: *Commersonia prostrata, Corybas dowlingii*			
			10m Flora Transects: *Melaleuca biconvexa, Melaleuca groveana, Rhodamnia rubescens, Rhodomyrtus psidioides, Syzygium paniculatum*			
			20m Flora Transects:			

Date	Time	Hours	Field activity	No. of Persons on Site	Staff	Rainfall
			Allocasuarina defungens, Allocasuarina simulans, Angophora inopina, Eucalyptus parramattensis subsp. Decadens, Dendrobium melaleucaphilum			
	17:30 – 18:30	01:00	Nocturnal Survey – Spotlighting Forest Owls (Masked, Barking, Powerful and Sooty), Bush Stone-curlew, Gliders, Long-nosed Potoroo, Parma Wallaby, Koala, Common Planigale			
			Call Playback - Forest Owls (Masked, Barking, Powerful and Sooty), - Koala, Bush Stone-curlew.			
21/7/2023	6:45– 14:30	07:45	Habitat Assessment	3	KG, FOB, NS	0mm
			5m Flora Transects: *Corybas dowlingii*			
			10m Flora Transects: *Melaleuca biconvexa, Melaleuca groveana, Rhodamnia rubescens, Rhodomyrtus psidioides, Syzygium paniculatum*			
			Diurnal Bird Survey (AM): Bush Stone-curlew, Glossy Black-Cockatoo, Emu, White-bellied Sea-Eagle, Eastern Osprey.			
8/8/2023	11:15 – 15:30	04:15	Population Check at Soldiers Point for *Corybas dowlingii*	2	AG, BD	0mm
			Equipment: Collect Songmeters (x2).			
			5m Flora Transects: *Corybas dowlingii, Diuris praecox*			
	17:00 – 18:00	01:00	Nocturnal Survey – Stagwatch:			

Date	Time	Hours	Field activity	No. of Persons on Site	Staff	Rainfall
			Forest Owls (Masked, Barking, Powerful and Sooty), Southern Greater Glider, Squirrel Glider			
9/08/2023	08:15 – 16:00	07:45	20m HBT Transects.	2	AG, BD	0.2mm
			20m Flora Transects: *Allocasuarina defungens, Allocasuarina simulans, Angophora inopina, Eucalyptus parramattensis subsp. Decadens, Dendrobium melaleucaphilum*			
	17:00 – 18:30	01:30	Nocturnal Survey – Spotlight & Stagwatch: Forest Owls (Masked, Barking, Powerful and Sooty), Bush Stone-curlew, Southern Greater Glider, Squirrel Glider, Long-nosed Potoroo, Parma Wallaby, Common Planigale, Koala.			
10/08/2023	08:00 – 16:30	08:30	20m HBT Transects.	2	AG, BD	0mm
			20m Flora Transects: *Allocasuarina defungens, Allocasuarina simulans, Angophora inopina, Eucalyptus parramattensis subsp. Decadens, Dendrobium melaleucaphilum*			
	17:00 – 18:00	01:00	Nocturnal Survey – Spotlight & Stagwatch: Forest Owls (Masked, Barking, Powerful and Sooty), Bush Stone-curlew, Southern Greater Glider, Squirrel Glider, Long-nosed Potoroo, Parma Wallaby, Common Planigale, Koala.			
11/08/2023	08:00 – 12:30	04:30	5m Flora Transects: *Corybas dowlingii, Diuris praecox*	2	AG, BD	0mm
15/08/2023	11:15-16:45	05:30	Population Check within Study Area for *Corybas dowlingii*	2	FOB, KB	3mm
			Vegetation Assessment			

Date	Time	Hours	Field activity	No. of Persons on Site	Staff	Rainfall
			5m Flora Transects: *Corybas dowlingii, Diuris praecox*			
	18:00 – 19:00	01:00	Nocturnal Survey – Stagwatch: Forest Owls (Masked, Barking, Powerful and Sooty), Southern Greater Glider, Squirrel Glider			
16/08/2023	08:30 – 16:00	07:30	Vegetation and Habitat Assessment	2	FOB, KB	12.2mm
	16:45 – 18:30	01:45	Nocturnal Survey – Stagwatch: Forest Owls (Masked, Barking, Powerful and Sooty), Southern Greater Glider, Squirrel Glider			
17/08/2023	09:00 – 16:30	07:30	Vegetation and Habitat Assessment	2	FOB, KB	0.2mm
	17:00 – 19:00	02:00	Nocturnal Survey – Stagwatch: Forest Owls (Masked, Barking, Powerful and Sooty), Southern Greater Glider, Squirrel Glider			
18/08/2023	09:00 – 10:00	01:00	Vegetation and Habitat Assessment	2	FOB, KB	8.4mm
29/08/2023	10:15 – 16:30	06:15	Vegetation and Habitat Assessment	2	CR, KD	1mm
			5m Flora Transects: *Corybas dowlingii, Diuris praecox*	2	AG, KB	
	16:30 – 18:00	01:30	Diurnal Survey (PM): Bush Stone-curlew, Glossy Black-Cockatoo, Emu, Little Eagle, White-bellied Sea-Eagle, Eastern Osprey	4	AG, KB, KD, CR	
30/08/2023	07:00 – 16:30	09:30	Vegetation and Habitat Assessment	2	CR, KD	0mm
			5m Flora Transects:	2	AG, KB	

Date	Time	Hours	Field activity	No. of Persons on Site	Staff	Rainfall
			Corybas dowlingii, Diuris praecox			
			20m Flora Transects: *Allocasuarina defungens, Allocasuarina simulans, Angophora inopina, Eucalyptus parramattensis subsp. Decadens, Dendrobium melaleucaphilum*	2	AG, KB	
	05:30 – 07:00 16:30 – 18:00	01;30 01:30	Diurnal Survey (AM & PM): Bush Stone-curlew, Glossy Black-Cockatoo, Emu, Little Eagle, White-bellied Sea-Eagle, Eastern Osprey	4	AG, KB, KD, CR	
31/08/2023	07:00 – 17:45	10:45	Vegetation and Habitat Assessment	2	CR, KD	0mm
			20m HBT Transects.	2	AG, KB	
			20m Flora Transects: *Allocasuarina defungens, Allocasuarina simulans, Angophora inopina, Eucalyptus parramattensis subsp. Decadens, Dendrobium melaleucaphilum*	2	AG, KB	
	05:45 – 07:00	01:15	Diurnal Survey (AM): Bush Stone-curlew, Glossy Black-Cockatoo, Emu, Little Eagle, White-bellied Sea-Eagle, Eastern Osprey	4	AG, KB, KD, CR	
12/09/2023	10:00 – 16:45	04:45	5m Flora Transects: *Grammitis stenophylla, Pterostylis chaetophora, Tetratheca juncea, Thesium australe*	2	BD, KB	0mm
	12:15 – 16:00	3:45	Targeted Flora Search for *Rhizanthella slateri*	1	WM	
13/09/2023	08:00 – 16:45	08:45	5m Flora Transects: *Grammitis stenophylla, Pterostylis chaetophora, Tetratheca juncea, Thesium australe*	2	BD, KB	0mm

Date	Time	Hours	Field activity	No. of Persons on Site	Staff	Rainfall
			Targeted Flora Search for *Rhizanthella slateri*	1	WM	
	17:30 – 18:30	01:00	Nocturnal Survey – Spotlight & Stagwatch: Forest Owls (Masked, Barking, Powerful and Sooty), Bush Stone-curlew, Glossy Black-Cockatoo, Parma Wallaby, Southern Greater Glider, Squirrel Glider, Koala, Common Planigale, Long-nosed Potoroo.	3	BD, KB, WM	
14/09/2023	08:15 – 16:45	08:30	5m Flora Transects: *Grammitis stenophylla, Pterostylis chaetophora, Tetratheca juncea, Thesium australe*	2	BD, KB	0mm
			Targeted Flora Search for *Rhizanthella slateri*	1	WM	
	17:30 – 18:00	01:30	Nocturnal Survey – Spotlight & Stagwatch: Forest Owls (Masked, Barking, Powerful and Sooty), Bush Stone-curlew, Glossy Black-Cockatoo, Parma Wallaby, Southern Greater Glider, Squirrel Glider, Koala, Common Planigale, Long-nosed Potoroo.	2	BD, KB	
15/09/2023	07:30 – 14:30	07:00	5m Flora Transects: *Grammitis stenophylla, Pterostylis chaetophora, Tetratheca juncea, Thesium australe*	2	BD, KB	0mm
20/11/2023	08:45 – 16:45	08:00	Equipment: Deploy Fauna Trapping – 10x Pitfall trap, 20x Elliots trap, 20x Funnel trap: Common Planigale and Pale-headed Snake.	2	EM, OA	0mm
21/11/2023	08:00 – 14:30	06:30	Fauna trap check and reset	2	EM, OA	0.8mm
			5m Flora Transects: *Lindernia alsinoides, Pterostylis chaetophora, Grammitis stennophylla, Cryptostylis hunteriana, Thesium austral.*			
22/11/2023	08:00 – 12:45	04:45	Fauna trap check and reset	2	EM, OA	1.6mm

Date	Time	Hours	Field activity	No. of Persons on Site	Staff	Rainfall
			10m Flora Transects: *Pomaderris queenslandica, Grevillea parviflora subsp. parviflora, Solanum sulphureum, Calliston linearifolius, Sophora tomentosa.*			
23/11/2023	08:00 – 11:00	03:00	Fauna trap check and reset	2	EM, OA	0mm
			20m Flora Transects: *Eucalyptus largeana, Eucalyptus seeana*			
			Targeted Flora Search: Maundia triglochinoides			
24/11/2023	08:00 – 10:00	02:00	Fauna trap check and traps collection.	2	EM, OA	0mm
08/01/2024	10:00 – 14:30	04:30	Equipment: Deployment Cameras (x20): Eastern Pygmy-Possum, Southern Greater Glider, Squirrel Glider, Parma Wallaby, Brush-tailed Phascogale, Koala, Common Planigale, Long-nosed Potoroo.	2	EM, OA	0mm
	18:30 – 20:00	01:30	Diurnal Survey (PM): Bush Stone-curlew, Gang-gang Cockatoo, Glossy Black-Cockatoo, Emu, Square-tailed Kite			
	20:00 – 21:30	01:30	Nocturnal Survey – Spotlight: Bush Stone-curlew, Eastern Pygmy-possum, Long-nosed Potoroo, Stephens' Banded Snake, Brush-tailed Phascogale, Parma Wallaby, Southern Greater Glider, Squirrel Glider, Brush-tailed Phascogale, Koala, Common Planigale.			
09/01/2024	08:00 – 11:30	03:30	Koala SATs	2	EM, OA	0mm
	07:00 – 08:00 19:00 – 20:00	01:00 01:00	Diurnal Survey (AM & PM): Bush Stone-curlew, Gang-gang Cockatoo, Glossy Black-Cockatoo, Emu, Square-tailed Kite			

Date	Time	Hours	Field activity	No. of Persons on Site	Staff	Rainfall
	20:00 – 21:30	01:30	Nocturnal Survey – Spotlight: Bush Stone-curlew, Eastern Pygmy-possum, Long-nosed Potoroo, Stephens' Banded Snake, Brush-tailed Phascogale, Parma Wallaby, Southern Greater Glider, Squirrel Glider, Brush-tailed Phascogale, Koala, Common Planigale.			
10/01/2024	07:00 - 08:00	01:00	Diurnal Survey (AM): Bush Stone-curlew, Gang-gang Cockatoo, Glossy Black-Cockatoo, Emu, Square-tailed Kite	1	EM	43.4mm
	07:00 - 08:00	01:00	Sticknest Survey: Square-tailed Kite	1	OA	
22/01/2024	08:30 – 11:30	02:00	Equipment: Rebait Cameras (x20)	2	OA/MM	0mm
09/02/2024	08:30 – 12:45	4:15	Equipment: Collect Cameras (x20)	1	MB	0.2mm
19/02/2024	20:00 – 22:45	2:45	Frog Aural-Visual Survey: Wallum Froglet, Green and Golden Bell Frog, Green-thighed Frog, Stuttering Frog, Giant Barred Frog, Mahony's Toadlet	2	DN, MM	2.4mm
20/02/2024	12:30 - 14:00	01:30	Aquatic Flora Survey for *Persicaria elatior*	2	DN, MM	35.2mm (52mm on Study Area rain gauge)
	18:00 – 22:00	04:00	Frog Aural-Visual Survey: Wallum Froglet, Green and Golden Bell Frog, Green-thighed Frog, Stuttering Frog, Giant Barred Frog, Mahony's Toadlet			
21/02/2024	08:00 – 10:30	2:30	Vegetation Assessment	2	DN, MM	17mm
			Aquatic Flora Survey for *Persicaria elatior*			
22/02/2024	8:45 – 3:00	6:15	Vegetation Assessment: BAM Plots (x7)	2	YB, CR	0mm
26/02/2024	8:30 – 10:30	2:00	Vegetation Assessment: BAM Plots (x2)	1	YB	0mm

Date	Time	Hours	Field activity	No. of Persons on Site	Staff	Rainfall
11/07/2024	09:00 – 15:30	06:30	Vegetation Assessment: RDPs	1	SC	0mm
			Habitat Assessment: HBTs	1	BD	
16/08/2024	08:30 – 15:30	07:00	Vegetation Assessment: BAM Plots (x2)	1	YB	0.2mm
			Vegetation Assessment: RDPs			
			Habitat Assessment: HBTs	1	EO	
	08:30 – 14:15	05:45	5m Flora Transects: *Commersonia prostrata, Corybas dowlingii*	1	TA	
			10m Flora Transects: *Melaleuca biconvexa, Rhodamnia rubescens, Rhodomyrtus psidioides, Solanum sulphureum, Grevillea parviflora subsp. parviflora*			
			20m Flora Transects: Allocasuarina simulans, Eucalyptus parramattensis subsp. decadens, Eucalyptus seeana			
25/08/2024	17:30 – 20:30	03:00	Forest Owl Surveys: Masked, Barking, Powerful and Sooty	1	KB	0.8mm
26/08/2024	17:30 – 21:15	03:45	Forest Owl Surveys: Masked, Barking, Powerful and Sooty	1	KB	3.6mm
27/08/2024	17:30 – 21:15	03:45	Forest Owl Surveys: Masked, Barking, Powerful and Sooty	1	KB	0mm
28/08/2024	17:30 – 21:15	03:45	Forest Owl Surveys: Masked, Barking, Powerful and Sooty	1	KB	0mm

1.7 Survey Effort Results

1.7.1 Habitat Trees

A total 187 HBTs and stags were identified across the Study Area; of which 51 are located within the Subject Site and four (4) within the proposed BMP Land. An addition 30 were recorded outside the Study Area. Details of HBTs within the Subject Site are provided in **Table 13**. The details of all HBTs recorded across the Study Area are provided in **Appendix I**, and locations are presented in **Figure 10.**

Table 13 – Subject Site Habitat Tree Detail

ID	Species	DBH (cm)	XS	S	M	L	XL
22	*Melaleuca quinquenervia*	86	0	3	0	0	0
46	*Stag*	93	0	1	1	1	2
47	*Angophora costata*	95	2	3	2	2	4
49	*Stringy sp*	58	0	1	1	1	1
118	*Eucalyptus spp*	70	0	1	0	0	0
119	*Stag*	120	1	2	0	0	0
120	*Roughbark spp*	90	0	0	0	0	1
121	*Roughbark spp*	100	0	1	2	1	0
123	*Eucalyptus robusta*	70	0	0	1	0	0
124	*Eucalyptus robusta*	30	0	0	1	0	0
125	*Stag*	60	0	0	0	1	0
126	*Roughbark spp*	60	0	0	0	1	0
127	*Eucalyptus robusta*	60	0	0	3	0	0
128	*Stag*	45	0	0	1	0	0
129	*Roughbark spp*	80	0	0	1	1	0
130	*Eucalyptus spp*	86	0	2	0	0	0
131	*Roughbark spp*	87	0	1	0	0	0
132	*Eucalyptus spp*	70	0	0	1	0	0
133		0	0	1	1	0	0
134	*Stringybark spp*	80	0	0	1	0	0
135	*Eucalyptus spp*	40	0	1	1	0	0
136	*Eucalyptus spp*	50	0	0	0	1	0
137	*Roughbark spp*	120	0	1	1	1	0
138	*Angophora costata*	60	0	0	2	0	0
139	*Melaleuca quinquenervia*	75	0	0	1	0	0
140	*Roughbark spp*	95	0	0	1	0	0
141	*Eucalyptus spp*	45	0	0	0	0	1
142	*Stringybark spp*	100	0	2	1	0	0
143	*Stringybark*	75	0	0	2	0	1
144	*Angophora floribunda*	106	0	2	2	0	0
145	*Angophora costata*	55	1	2	0	1	0

146	*Stringybark spp*	95	0	0	2	0	0
147	*Eucalyptus spp*	50	0	0	1	1	0
148	*Stringybark spp*	60	0	1	0	0	0
149	*Stringybark spp*	35	0	0	0	1	0
150	*Stringybark spp*	120	0	2	0	0	0
151	*Eucalyptus spp*	90	0	0	2	0	0
152	*Stringybark spp*	120	0	0	0	0	1
153	*Stag*	85	0	0	1	0	0
154	*Eucalyptus spp*	90	0	0	2	2	0
155	*Stringybark spp*	55	0	1	1	0	0
156	*Roughbark spp*	100	0	1	2	0	0
157	*Stringybark spp*	75	0	5	0	0	0
158	*Stringybark spp*	80	1	1	1	0	0
159	*Eucalyptus spp*	80	0	0	1	1	0
160	*Stringybark spp*	85	0	0	2	0	0
184	*Eucalyptus robusta*	30	0	1	0	0	0
185	*Eucalyptus robusta*	77	0	0	1	0	0
186	*Eucalyptus robusta*	82	0	1	0	0	0
187	*Eucalyptus robusta*	64	0	0	1	0	0
188	*Eucalyptus robusta*	62	0	1	0	0	0
Total			5	38	44	16	11
Grand Total			114				

1.7.2 Water Features and Hydrology

No underground sources of water or aquifers feeding streams or wetlands occur on the Subject Site that would likely be affected by the Project. Above ground sources of water within the Subject Site include two man-made dams that intersect the boundary with the Study Area to the north. All dams are devoid of aquatic vegetation and likely offer only marginal habitat values for resident fauna. Further assessment and consultation with Department of Planning Industry and Environment (Water) (DPIE Water) is required to determine if *Section 91* of the *Water Management Act, 2000 (*WM Act*)* is triggered.

1.7.3 Other habitat features

The Subject Site possesses additional habitat features, including piles of logs and fallen trees and two dams, which may provide potential habitat. Located 750m north of the Subject Site is Walllis Creek and 2.2kms to the east lies the Tasman Sea.

No caves, karsts or rocky outcrops occurred on site and are considered a habitat constraint for cave-dwelling microbats. No artificial structures are in the Subject Site.

1.7.4 Species Credit Species Survey Results

Overall survey effort within the Subject Site (from past surveys, including plots, targeted searches, habitat assessments, song meters) is detailed in **Table 14** and was conducted using relevant guidelines, in particular DPIE survey guidelines for threatened plants (2020) and amphibians (2020), along with applicable EPBC Act guidelines (2010; 2011). Survey periods are shown in **Table 14** and survey effort in **Figures 6 to 9. Table 14** presents the results of targeted surveys.

Table 14 – Species Credit Species Survey Results

Species	Specified Survey Period (BAM – C)	Surveyed in Season (Y/N)	Survey Method Undertaken	Records on Deployed Equipment	Habitat (Present / Condition)	Assessment	Observed Within Study Area (Y/N)	Observed within Subject Site (Y/N)	Assumed Present (Y / N)	Species Credits Apply (Y /N)
Flora										
Nabiac Casuarina *Allocasuarina simulans*	All Year	Y	Parallel walking transects – Maximum distance between transects 20m in open, 10m in dense vegetation.	NA	The Nabiac Casuarina grows in heathland on coastal sands. This community was not present within the Subject Site.	The species was not detected during targeted surveys.	N	N	N	N
Netted Bottle Brush *Callistemon linearifolius*	Oct to Jan.	Y	Parallel walking transects – Maximum distance between transects 20m in open, 10m in dense vegetation.	NA	Grows in dry sclerophyll forest on the coast and adjacent ranges. The habitat is present in a degraded managed condition within the Subject Site.	The species was not detected during targeted surveys.	N	N	N	N
Dwarf Kerrawang *Commersonia prostrata*	All Year	Y	Parallel walking transects – Maximum distance between transects 10m in open, 5m in dense vegetation.	NA	Occurs on sandy, sometimes peaty soils in a wide variety of habitats. Many of the *Eucalypt sp.* that are associated with this species are not present. The habitat is present in a degraded managed condition within the Subject Site.	The species was not detected during targeted surveys.	N	N	N	N
Red Helmet Orchid *Corybas dowlingii*	Jan-July	Y	Parallel walking transects – Maximum distance between transects 10m in open, 5m in dense vegetation.	NA	Sheltered areas such as gullies and southerly slopes in tall open forest on well-drained gravelly soil at elevations of 10-200m. The habitat is present in a degraded managed condition within the Subject Site.	The species was not detected during targeted surveys.	Y	N	N	N
Eucalyptus parramattensis subsp. decadens	All Year	Y	Parallel walking transects - Maximum distance between transects 40m in open vegetation, 20m in dense vegetation.	NA	Occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. The habitat is present in a degraded managed condition within the Subject Site.	The species was not detected during targeted surveys.	N	N	N	N
Small-flower Grevillea *Grevillea parviflora subsp. parviflora*	Aug-Nov	Y	Parallel walking transects – Maximum distance between transects 20m in open, 10m in dense vegetation.	NA	Grows in a range of vegetation types from heath and shrubby woodland to open forest on sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules. The habitat is present in a degraded managed condition within the Subject Site.	There are no known records of this species within 10km of the Subject Site. The species was not detected during targeted surveys.	N	N	N	N
Maundia triglochinoides	Nov-March	Y	Parallel walking transects - Maximum distance between transects 40m in open vegetation, 20m in dense vegetation.	NA	Two dams are located within the Study Area, surveys were conducted to assess for indirect impacts if present. Given the dams are used for the golf course and agricultural the degraded nature is likely to impact the presence of the species.	Surveys were conducted to assess for indirect impacts. The species was not detected during targeted surveys.	N	N	N	N
Biconvex Paperbark *Melaleuca biconvexa*	All Year	Y	Parallel walking transects – Maximum distance between transects 40m in open	NA	Only found in NSW, with scattered and dispersed populations generally growing in damp places, often near streams or low-	The species was not detected during targeted surveys.	N	N	N	N

Species	Specified Survey Period (BAM – C)	Surveyed in Season (Y/N)	Survey Method Undertaken	Records on Deployed Equipment	Habitat (Present / Condition)	Assessment	Observed Within Study Area (Y/N)	Observed within Subject Site (Y/N)	Assumed Present (Y / N)	Species Credits Apply (Y /N)
			vegetation, 20m in dense vegetation.		lying areas on alluvial soils of low slopes or sheltered aspects. The habitat is present in a degraded managed condition within the Subject Site.					
Tall Knotweed *Persicaria elatior*	Dec-May	Y	Targeted survey in suitable habitat including damp places, especially beside streams and lakes.	NA	Two dams are located within the Study Area, surveys were conducted to assess for indirect impacts if present. Given the dams are used for the golf course and agricultural the degraded nature is likely to impact the presence of the species.	Surveys were conducted to assess for indirect impacts. The species was not detected during targeted surveys.	N	N	N	N
Pterostylis chaetophora	Sept-Nov	Y	Parallel walking transects – Maximum distance between transects 10m in open, 5m in dense vegetation.	NA	The species prefers seasonally moist, dry sclerophyll forest with a grass and shrub understorey. The most commonly observed habitat is vegetation characterised by grassy open forests or derived native grasslands of *Eucalyptus amplifolia* and *Eucalyptus moluccana* on gentle flats, or that are dominated by *Corymbia maculata* with any of *Eucalyptus fibrosa*, *Eucalyptus sideroploia* or *Eucalyptus crebra*. This habitat is present however the associated species are not dominate within the Subject Site.	The species was not detected during targeted surveys.	N	N	N	N
Rhizanthella slateri	Sept-Nov	Y	Hand searches should target a suitable host tree as *Rhizanthella* populations are often at highest densities around the base of the tree. From the base of the tree search outwards where leaf litter is present in all directions for at least 3m. In vegetation that has formed a thicket, such as within patches of *Backhousia myrtifolia*, the search would be conducted around several potential smaller host trees. In this instance, a search plot of at least 3m x 3m can be chosen. Search by carefully scooping, lifting and dragging the leaf litter towards the body. The boundary between the leaf litter layer and the soil layer is often distinct. It is important to not push down when dragging the leaves as this might disturb the soil surface or break orchid flowerheads. The use of tools, such as rakes and shovels is not recommended. Use close fitting and flexible gloves.	NA	Highly cryptic - grows almost completely below the soil surface, in sclerophyll forest in shallow to deep loams. This habitat is present however the associated species are not dominate within the Subject Site.	The species was not detected during targeted surveys.	N	N	N	N

Species	Specified Survey Period (BAM – C)	Surveyed in Season (Y/N)	Survey Method Undertaken	Records on Deployed Equipment	Habitat (Present / Condition)	Assessment	Observed Within Study Area (Y/N)	Observed within Subject Site (Y/N)	Assumed Present (Y / N)	Species Credits Apply (Y /N)
Scrub Turpentine *Rhodamnia rubescens*	All Year	Y	Parallel walking transects – Maximum distance between transects 10m in open, 5m in dense vegetation.	NA	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. The habitat is present in a degraded managed condition within the Subject Site.	Specimens were observed in the wider Study Area. No specimens were recorded in the Subject Site during surveys. As vegetation within the Subject Site is largely in a poor condition, it is unlikely the species occurs.	Y	N	N	N
Rhodomyrtus psidioides Native Guava		Y	Parallel walking transects – Maximum distance between transects 10m in open, 5m in dense vegetation.	N/A	The species occurs in in grassy woodland or occasionally derived grassland in well-drained clay loam or shale derived soils. This habitat is provided on the Study Area.	Specimens were observed in the wider Study Area. No specimens were recorded in the Subject Site during surveys. As vegetation within the Subject Site is largely in a poor condition, it is unlikely the species occurs.	Y	N	N	N
Manning Yellow Solanum *Solanum sulphureum*	All Year	Y	Parallel walking transects – Maximum distance between transects 20m in open, 10m in dense vegetation.	NA	Inhabits sunlit breaks in rainforest, rainforest regrowth on pasture land or eucalypt forest with rainforest understorey. Grows on shallow or deep loams or clay loams. Habitat is not present within the Subject Site.	The species was not detected during targeted surveys.	N	N	N	N
Magenta Lilly Pilly *Syzygium paniculatum*	Apr-Jun	N	Parallel walking transects – Maximum distance between transects 20m in open, 10m in dense vegetation.	NA	The species is found only in NSW, in a narrow, linear coastal strip on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities. The habitat is present in a degraded managed condition within the Subject Site.	No *Syzygium sp.* were recorded in any BAM plots within the Subject Site as well as targeted flora surveys. Habitat on site is degraded and impacts to site vegetation are unlikely to be significant for this species. The species was potentially identified within the Study Area.	Y	N	N	N
Fauna										
Bush Stone-curlew *Burhinus grallarius*	All Year	Y	Camera Trapping, Nocturnal Surveys, Diurnal surveys, Songmeter, Incidental surveys	N	The habitat is limited to not present within the Subject Site. High levels of clearing and under scrubbing reduces likelihood of species presence.	There are no records of this species within 10km of the Subject Site. Species was not observed during diurnal bird and nocturnal surveys.	N	N	N	N
Gang-gang Cockatoo *Callocephalon fimbriatum*	Nov-Jan	Y	Diurnal Surveys, Songmeter, Incidental surveys	N	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages. The habitat is not present within the Subject Site.	The species was not detected during targeted surveys. There are no known records of this species within 10km of the Subject Site.	N	N	N	N

Species	Specified Survey Period (BAM – C)	Surveyed in Season (Y/N)	Survey Method Undertaken	Records on Deployed Equipment	Habitat (Present / Condition)	Assessment	Observed Within Study Area (Y/N)	Observed within Subject Site (Y/N)	Assumed Present (Y / N)	Species Credits Apply (Y /N)
Glossy Black-Cockatoo *Calyptorhynchus lathami*	Jan - Oct	Y	Diurnal Surveys, Songmeter, Incidental surveys	N	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of Sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. The habitat is present in a degraded managed condition within the Subject Site.	Species were observed flying over the Study Area. However, no evidence of foraging or roosting was observed during all site visits.	N	N	N	N
Eastern Pygmy Possum *Cercartetus nanus*	Nov-March	Y	Habitat assessment, Nocturnal surveys and spotlighting on foot, Camera trapping, Incidental surveys	N	The species can be found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath. The habitat is present in a degraded managed condition within the Subject Site	The species was not detected during targeted surveys. There are no known records of this species within 10km of the Subject Site.	N	N	N	N
Wallum Froglet *Crinia tinnula*	All Year	Y	Songmeter, Nocturnal surveys, Aural-visual surveys and spotlighting on foot, Incidental surveys	N	Two dams are located within the Study Area, surveys were conducted to assess for indirect impacts if present. Given the dams are used for the golf course and agricultural the degraded nature is likely to impact the presence of the species.	The species was not detected during targeted surveys.	N	N	N	N
Emu population in the new South Wales North Coast Bioregion and Port Stephens local government area *Dromaius novaehollandiae – endangered population*	All Year	Y	Songmeter, Diurnal Bird Census, Nocturnal surveys and spotlighting on foot, Incidental surveys	N	Occurs in a range of predominantly open lowland habitats, including grasslands, heathland, shrubland, open and shrubby woodlands, forest, and swamp and sedgeland communities, as well as the ecotones between these habitats. They also occur in plantations of tea-tree and open farmland, and occasionally in littoral rainforest.	There are no known records of this species within 10km of the Subject Site.	N	N	N	N
White-bellied Sea-Eagle *Haliaeetus leucogaster*	July-Dec	Y	Diurnal Bird Census, Habitat Assessment, Incidental surveys	N	Terrestrial habitat includes coastal dunes, tidal flats, grassland, heathland, woodland and forest. Requires large emergent eucalypts for nesting. Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines.	No stick nest was observed in the entirety of the site and no evidence of foraging in the Subject Site. This species was observed along the connected corridor in the Study Area.	Y	N	N	N
Little Eagle *Hieraaetus morphnoides*	Aug-Oct	Y	Diurnal Bird Census, Habitat Assessment, Incidental surveys	N	The species nest in live (occasionally dead) large old trees within vegetation. Paddock trees can provide important breeding habitat.	No nests or potential nesting trees were sighted within the Subject Site. This species could potentially utilise the area for foraging however there is no evidence of breeding.	N	N	N	N
Stephens' Banded Snake *Hoplocephalus stephensi*	Oct-march	Y	Nocturnal surveys and spotlighting on foot, Funnel Traps, Incidental surveys	N	Rainforest and eucalypt forests and rocky areas up to 950 m in altitude. Stephens' Banded Snake is nocturnal, and shelters between loose bark and tree trunks, amongst vines, or in hollow trunks limbs, rock crevices or under slabs during the day.	Species was not observed during nocturnal surveys and funnel traps. There are no records of this species within 10km of the Subject Site. It is considered unlikely that this species will be present.	N	N	N	N

Species	Specified Survey Period (BAM – C)	Surveyed in Season (Y/N)	Survey Method Undertaken	Records on Deployed Equipment	Habitat (Present / Condition)	Assessment	Observed Within Study Area (Y/N)	Observed within Subject Site (Y/N)	Assumed Present (Y / N)	Species Credits Apply (Y /N)
Green and Golden Bell Frog *Litoria aurea*	Nov-March	Y	Songmeter, Nocturnal surveys, Aural-visual surveys and spotlighting on foot, Incidental surveys	N	Habitat for the species includes semipermanent/ephemeral wet areas, within 1km of swamps, waterbodies or wet areas. Given the dams are used for the golf course and agricultural the degraded nature is likely to impact the presence of the species.	This species was not observed after significant rainfall during targeted surveys. Preferred habitat is located at the northern boundary but is segregated from the most suitable habitat in the wider Study Area.	N	N	N	N
Green-thighed Frog *Litoria brevipalmata*	Sept-March	Y	Songmeter, Nocturnal surveys, Aural-visual surveys and spotlighting on foot, Incidental surveys	N	The species was allocated to species credit species because presence cannot be predicted from vegetation or landscape surrogates. Therefore, surveys were undertaken.	This species was not observed after significant rainfall during targeted surveys. Preferred habitat is located at the northern boundary but is segregated from the most suitable habitat in the wider Study Area.	N	N	N	N
Square-tailed Kite *Lophoictinia isura*	Sept-Jan	Y	Diurnal Bird Census, Habitat Assessment, Incidental surveys	N	While several water bodies exist on the site, there is a lack of suitable aquatic vegetation thus the site is not suitable for breeding. No nests were observed.	The species was not detected during targeted surveys.	N	N	N	N
Stuttering Frog *Mixophyes balbus*	Sep-Mar	Y	Songmeter, Nocturnal surveys, Aural-visual surveys and spotlighting on foot, Incidental surveys	N	The Stuttering Frog is typically found in association with permanent streams through temperate and sub-tropical rainforest and wet sclerophyll forest, rarely in dry open tableland riparian vegetation, and also in moist gullies in dry forest. The habitat is present in a degraded managed condition within the Subject Site	This species was not observed after significant rainfall during targeted surveys. Preferred habitat is located at the northern boundary but is segregated from the most suitable habitat in the wider Study Area.	N	N	N	N
Giant Barred Frog *Mixophyes iteratus*	Oct-March	Y	Songmeter, Nocturnal surveys, Aural-visual surveys and spotlighting on foot, Incidental surveys	N	Habitat Constraint: Land within 50m of semipermanent and permanent drainages.	This species was not observed after significant rainfall during targeted surveys. Preferred habitat is located at the northern boundary but is segregated from the most suitable habitat in the wider Study Area.	N	N	N	N
Southern Myotis ***Myotis macropus***	**Oct-March**	**Y**	**Nocturnal Survey, Habitat Assessment, Acoustic Detectors**	**N**	Suitable habitat is present.	Nocturnal surveys were completed observing the 2 waterbodies that are located in the Subject Site. Due to the suitability of habitat onsite and the BioNet sightings, this species is assumed present.	**N**	**N**	**Y**	**Y**
Barking Owl *Ninox connivens*	May-Dec	Y	Habitat Assessment (HBTs), Nocturnal Survey, Call Playback, Stagwatch (of suitable hollows), Incidental Surveys, Forest Owl Surveys	N	Primarily inhabits woodland areas but can also occur in forests and partially cleared areas, including well-treed suburbs and rural towns	This species was not observed during the multiple targeted surveys, stag watching and call-playbacks. Only one BioNet sighting has been recorded in the 10km radius of the site. It is unlikely that the proposal will have any effect on the species.	N	N	N	N

Species	Specified Survey Period (BAM – C)	Surveyed in Season (Y/N)	Survey Method Undertaken	Records on Deployed Equipment	Habitat (Present / Condition)	Assessment	Observed Within Study Area (Y/N)	Observed within Subject Site (Y/N)	Assumed Present (Y / N)	Species Credits Apply (Y /N)
Powerful Owl ***Ninox strenua***	**May-Aug**	**Y**	**Habitat Assessment (HBTs), Nocturnal Survey, Call Playback, Stagwatch (of suitable hollows), Incidental Surveys, Forest Owl Surveys**	**Y**	Inhabits a range of vegetation types including eucalypt forests and woodlands, gallery rainforests, and inland riverine woodlands. Roosting and nesting often occur in dense gullies within eucalypts forests.	This species has been sighted within the Study Are with the roosting tree of the individual being close by. There is also evidence on the eastern periphery of the Study Area of pellets from the species. However, no observations of use from the species have been seen during the surveys conducted in the Subject Site. There is a possibility that the species may utilise the habitat within the Development Footprint for foraging. But due to the area of intact vegetation to the east, it is unlikely that the proposal will impact the species.	**Y**	**N**	**N**	**Y**
Parma Wallaby *Notamacropus parma*		Y	Songmeter, Nocturnal Survey, Habitat Assessment, Camera Traps, Incidental Surveys	N	Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. The habitat is present in a degraded managed condition within the Subject Site	The species was not detected during targeted surveys. There are no known records of this species within 10km of the Subject Site. It is unlikely that this species is present in the Study Area.	N	N	N	N
Eastern Osprey *Pandion cristatus*	April-Nov	Y	Diurnal Bird Census, Habitat Assessment, Camera Trapping, Songmeter, Incidental Survey	N	Habitat is not present.	Species was not observed during surveys. This species is considered sensitive to disturbance and pollution, considering the level of degradation, including weed presence water bodies, and this site may be too disturbed for this species.	N	N	N	N
Southern Greater Glider *Petauroides Volans*	Jan-Dec	Y	Songmeter, Camera Traps, Diurnal surveys, Nocturnal Surveys, Incidental Survey, Habitat Assessment, Stagwatch	N	Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. While nesting in HBTs. The habitat is present in a degraded managed condition within the Subject Site.	There is potential habitat for the species. However, due to more suitable habitat being located in the east and the species not recorded during the survey efforts, impact to the species is unlikely.	N	N	N	N
Squirrel Glider *Petaurus norfolcensis*	Jan-Dec	Y	Songmeter, Camera Traps, Diurnal surveys, Nocturnal Surveys, Incidental Survey, Habitat Assessment, Stagwatch	N	Inhabits Blackbutt-Bloodwood Forest with heath understorey in coastal areas. The habitat is present in a degraded managed condition within the Subject Site.	There is potential habitat for the species. However, due to more suitable habitat being located in the east and the species not recorded during the survey efforts, impact to the species is unlikely.	N	N	N	N
Brush-tailed Phascogale *Phascogale tapoatafa*	Dec-Jun	Y	Songmeter, Camera Traps, Diurnal surveys, Nocturnal Surveys, Incidental Survey, Habitat Assessment, Stagwatch	N	The species preferred habitat includes hollow logs, under bark, rocks, cracks in soil, grass tussocks or building debris. The species prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter; however, they can also inhabit heath, swamps, rainforest and wet sclerophyll forest. Agile climber foraging	There is potential habitat for the species. However, due to more suitable habitat being located in the east and the species not recorded during the survey efforts, impact to the species is unlikely.	N	N	N	N

Species	Specified Survey Period (BAM – C)	Surveyed in Season (Y/N)	Survey Method Undertaken	Records on Deployed Equipment	Habitat (Present / Condition)	Assessment	Observed Within Study Area (Y/N)	Observed within Subject Site (Y/N)	Assumed Present (Y / N)	Species Credits Apply (Y /N)
					preferentially in rough barked trees of 25 cm DBH or greater. The habitat is present in a degraded managed condition within the Subject Site					
Koala ***Phascolarctos cinereus***	**All Year**	**Y**	**Habitat assessment, Songmeter, Camera trapping for 25 nights, Nocturnal surveys and spotlighting on foot, SAT survey, Call Play Back, Incidental Surveys.**	**Y**	Koala Use Trees are present on site. See full assessment in Appendix H.		**N**	**N**	**Y**	**Y**
Common Planigale *Planigale maculata*	All Year	Y	Pitfall installation and Daily Inspections, Camera Trapping, Nocturnal Surveys, Incidental Surveys	N	Inhabit rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas where there is surface cover, and usually close to water. The habitat is present in a degraded managed condition within the Subject Site.	This species was not observed during the multiple targeted surveys, stag watching and call-playbacks. Only one BioNet sighting has been recorded in the 10km radius of the site. It is unlikely that the proposal will have any effect on the species.	N	N	N	N
Long-nosed Potoroo *Potorous tridactylus*	All Year	Y	Songmeter, Camera Traps, Diurnal Surveys, Noctuirnal surveys, Incidental Surveys	N	Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature	This species was not observed during the multiple targeted surveys, It is unlikely that the proposal will have any effect on the species.	N	N	N	N
Masked Owl *Tyto novaehollandiae*	June-Aug	Y	Habitat Assessment (HBTs), Nocturnal Survey, Call Playback, Stagwatch (of suitable hollows), Incidental Surveys, Forest Owl Surveys	N	This species Lives in dry eucalypt forests and woodlands. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. The habitat is present in a degraded managed condition within the Subject Site	This species was not observed during the multiple targeted surveys, stag watching. Due to the habitat that is retained having greater suitability to the species, it is unlikely that the proposal will have any effect on the species.	N	N	N	N
Sooty Owl *Tyto tenebricosa*	All Year	Y	Habitat Assessment (HBTs), Nocturnal Survey, Call Playback, Stagwatch (of suitable hollows), Incidental Surveys, Forest Owl Surveys	N	This species inhabits rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. The habitat is present in a degraded managed condition within the Subject Site	This species was not observed during the multiple targeted surveys, stag watching. Due to the habitat that is retained having greater suitability to the species, it is unlikely that the proposal will have any effect on the species.	N	N	N	N
Mahony's Toadlet *Uperoleia mahonyi*	Oct-March	Y	Songmeter, Nocturnal surveys, Aural-visual surveys and spotlighting on foot, Incidental surveys	N	Inhabits ephemeral and semi-permanent waterbodies. The habitat is present in a degraded managed condition within the Subject Site	This species was not observed after significant rainfall during targeted surveys. Preferred habitat is located at the northern boundary but is segregated from the most suitable habitat in the wider Study Area.	N	N	N	N

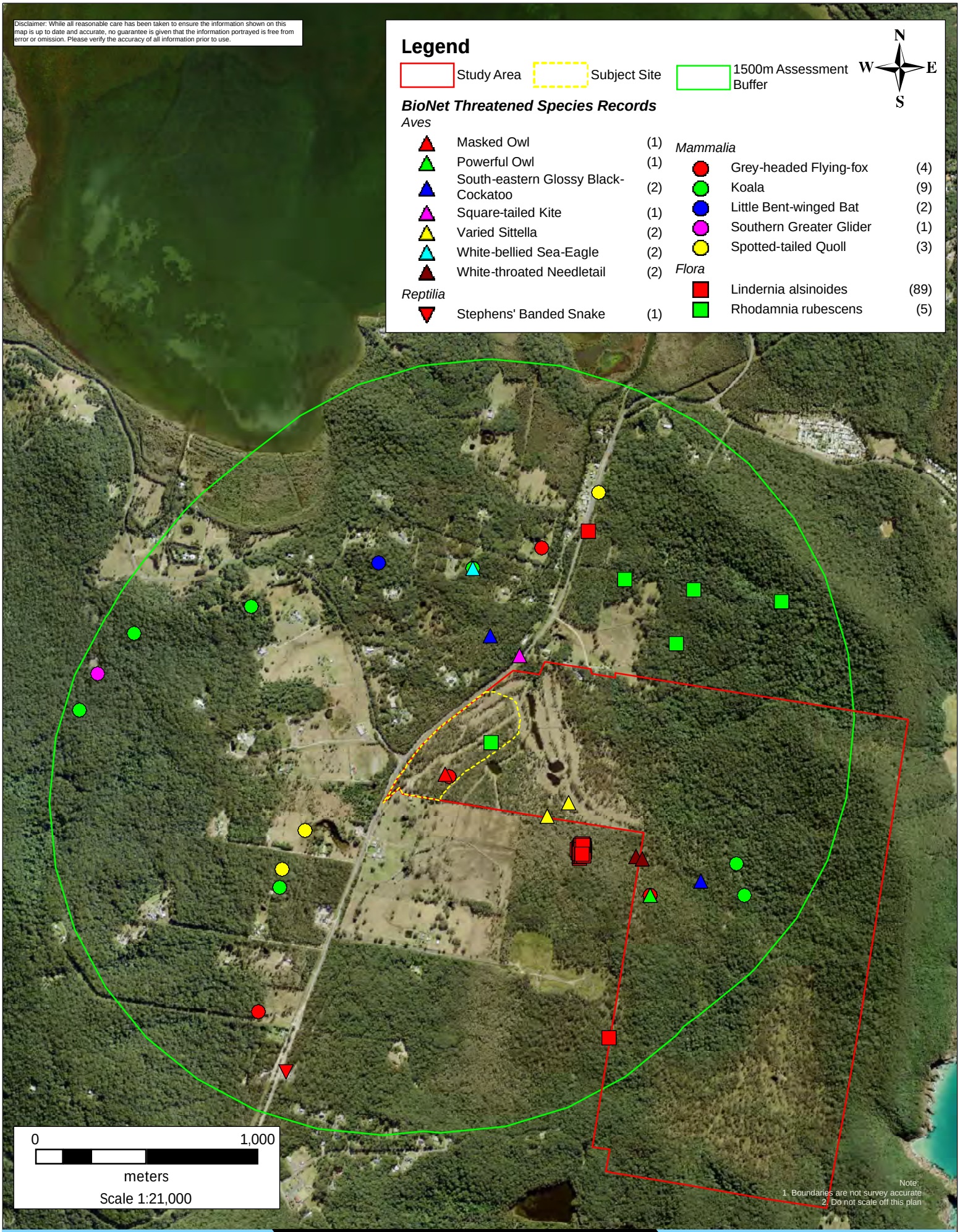

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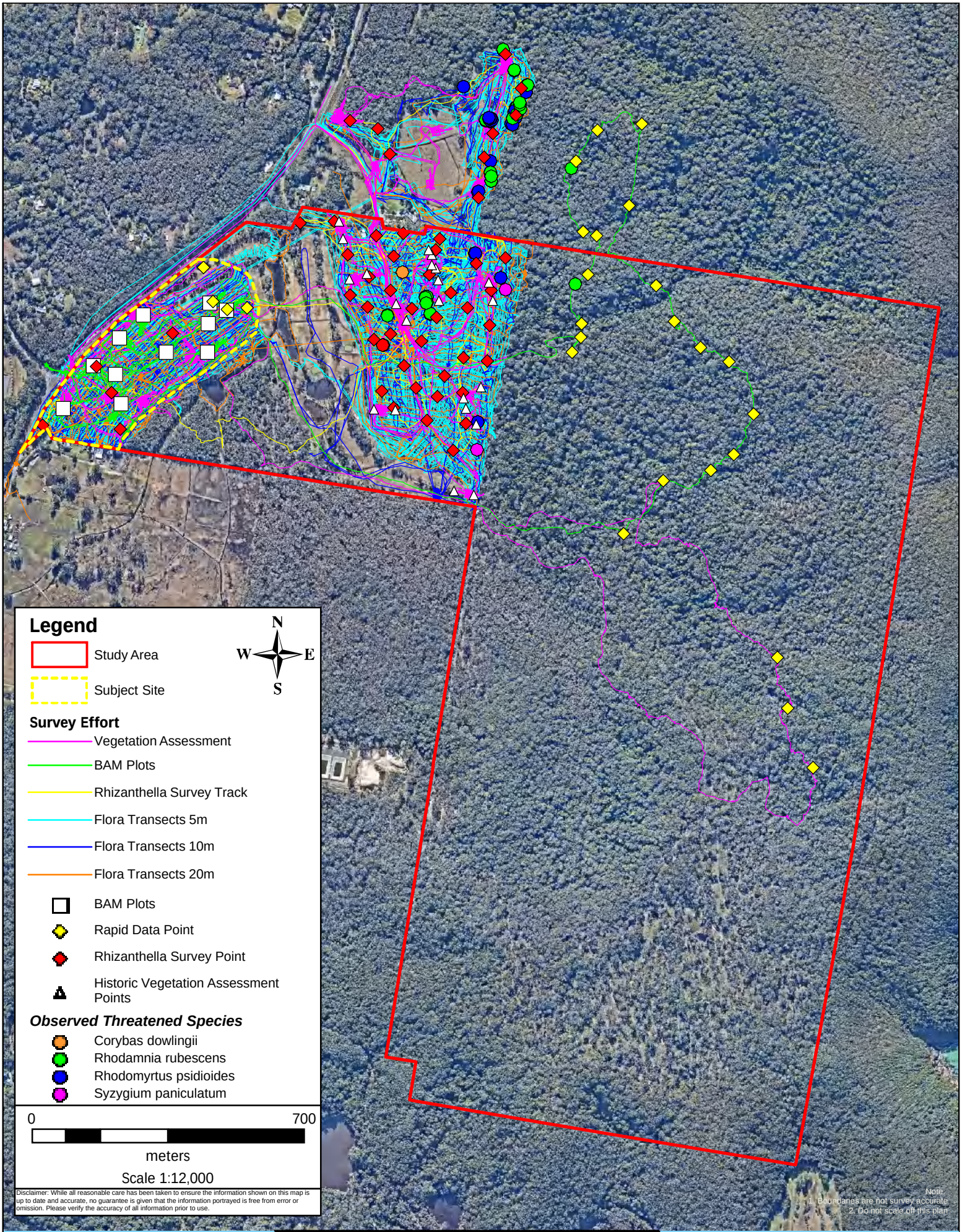
Figure 5 - BioNet Atlas Records | Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW | BOAMS: 42732

Client: Lands Advisory Services | AEP Ref: 3284

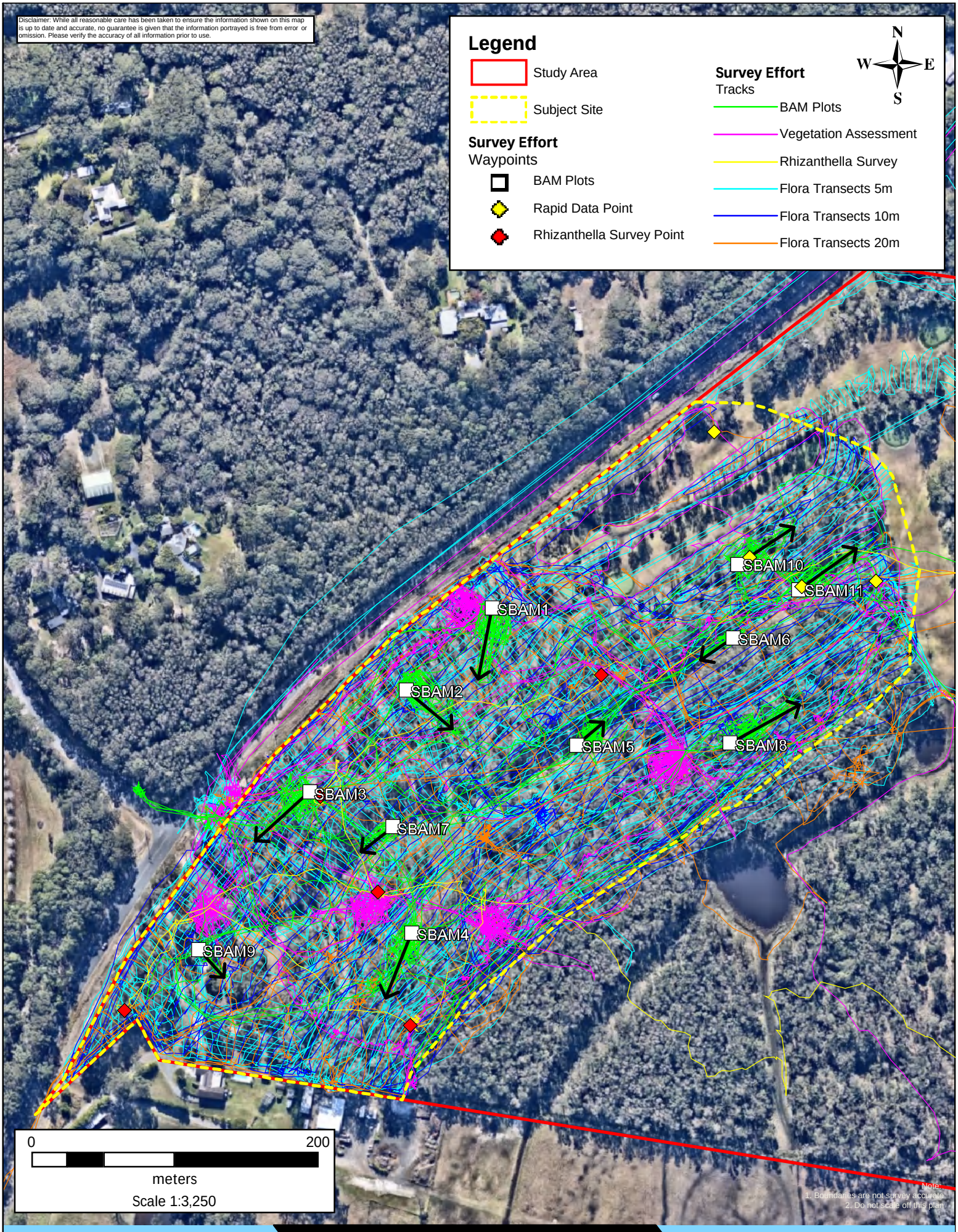


AEP

Figure 6 - Survey Effort Flora (Study Area) | Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW | BOAMS: 42732

Client: Lands Advisory Services | AEP Ref: 3284



AEP

Figure 7 - Survey Effort Flora (Subject Site)

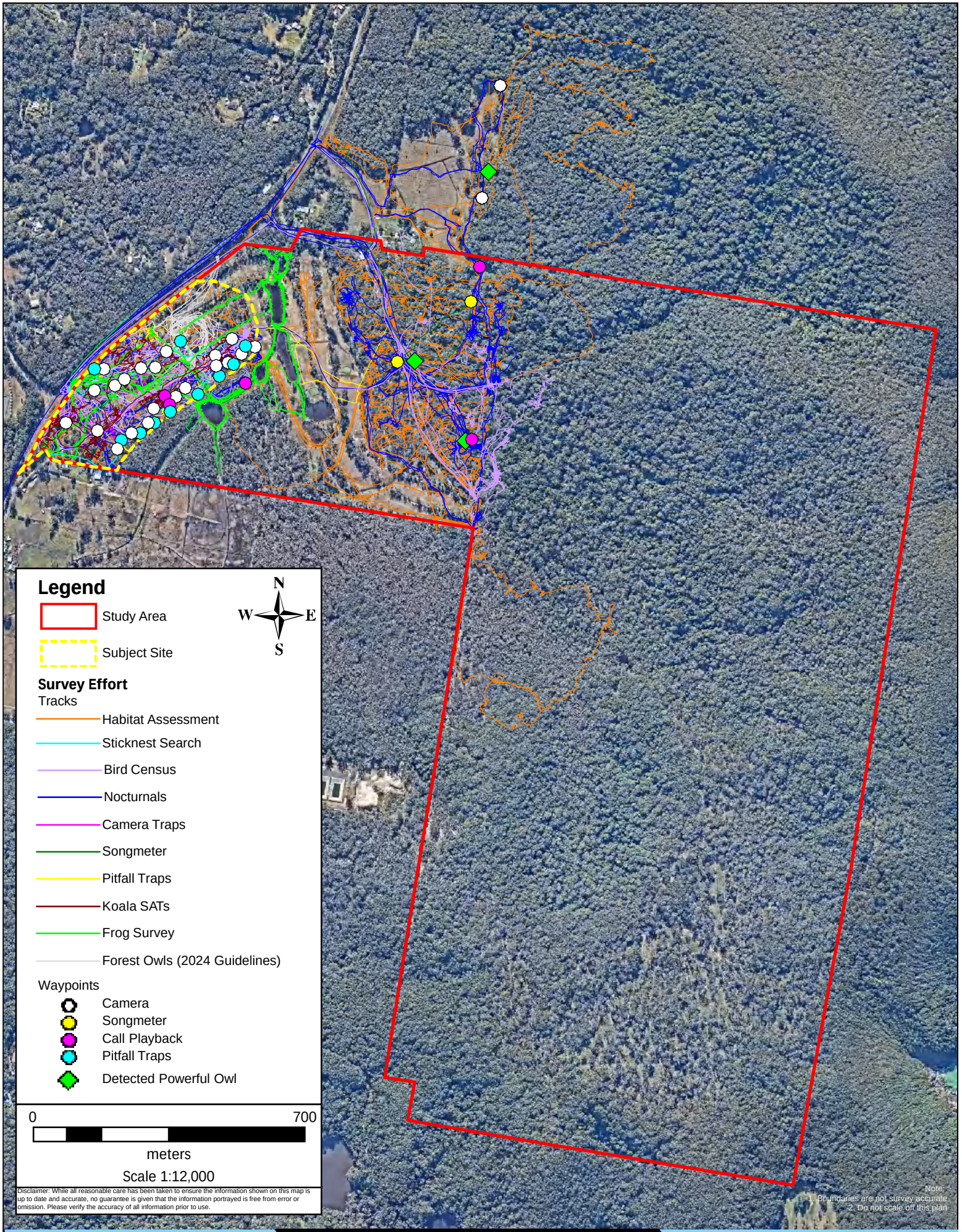
Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW

BOAMS: 42732

Client: Lands Advisory Services

AEP Ref: 3284



AEP

Figure 8 - Survey Effort Fauna (Study Area) | Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW | BOAMS: 42732

Client: Lands Advisory Services | AEP Ref: 3284

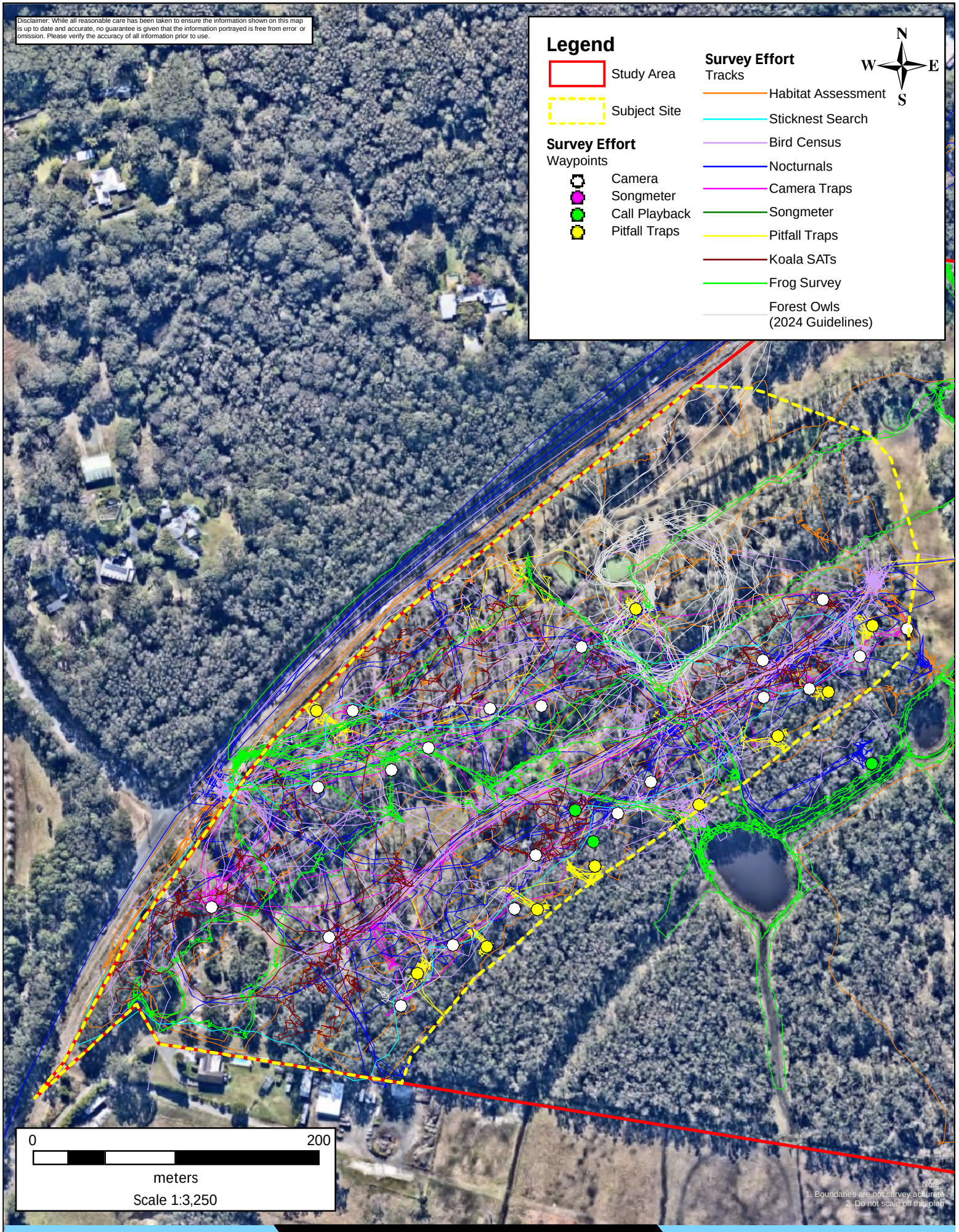


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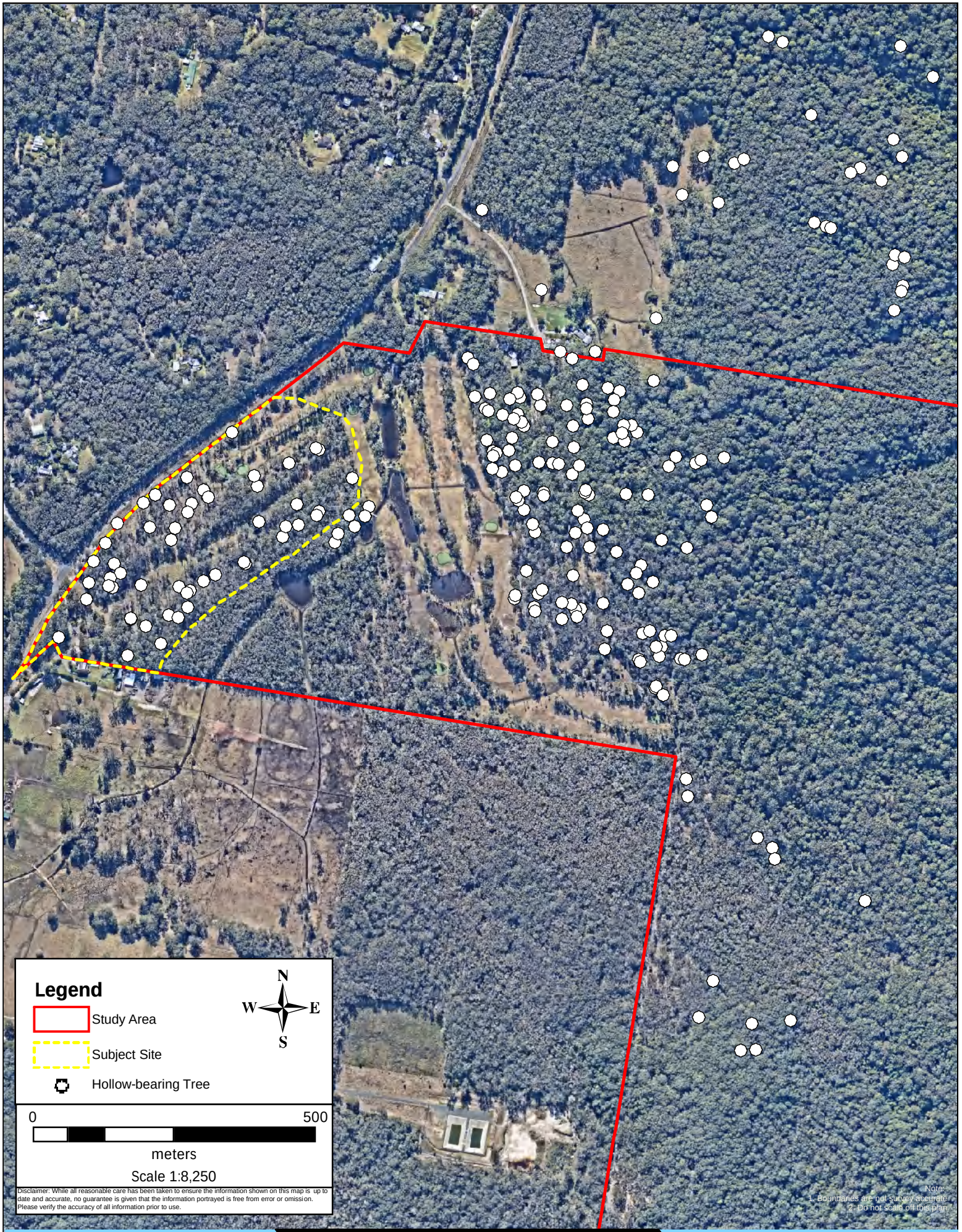
Figure 9 - Survey Effort Fauna (Subject Site) | Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW | BOAMS: 42732

Client: Lands Advisory Services | AEP Ref: 3284



AEP

Figure 10 - Hollow-bearing Trees (Study Area) Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW BOAMS: 42732

Client: Lands Advisory Services AEP Ref: 3284

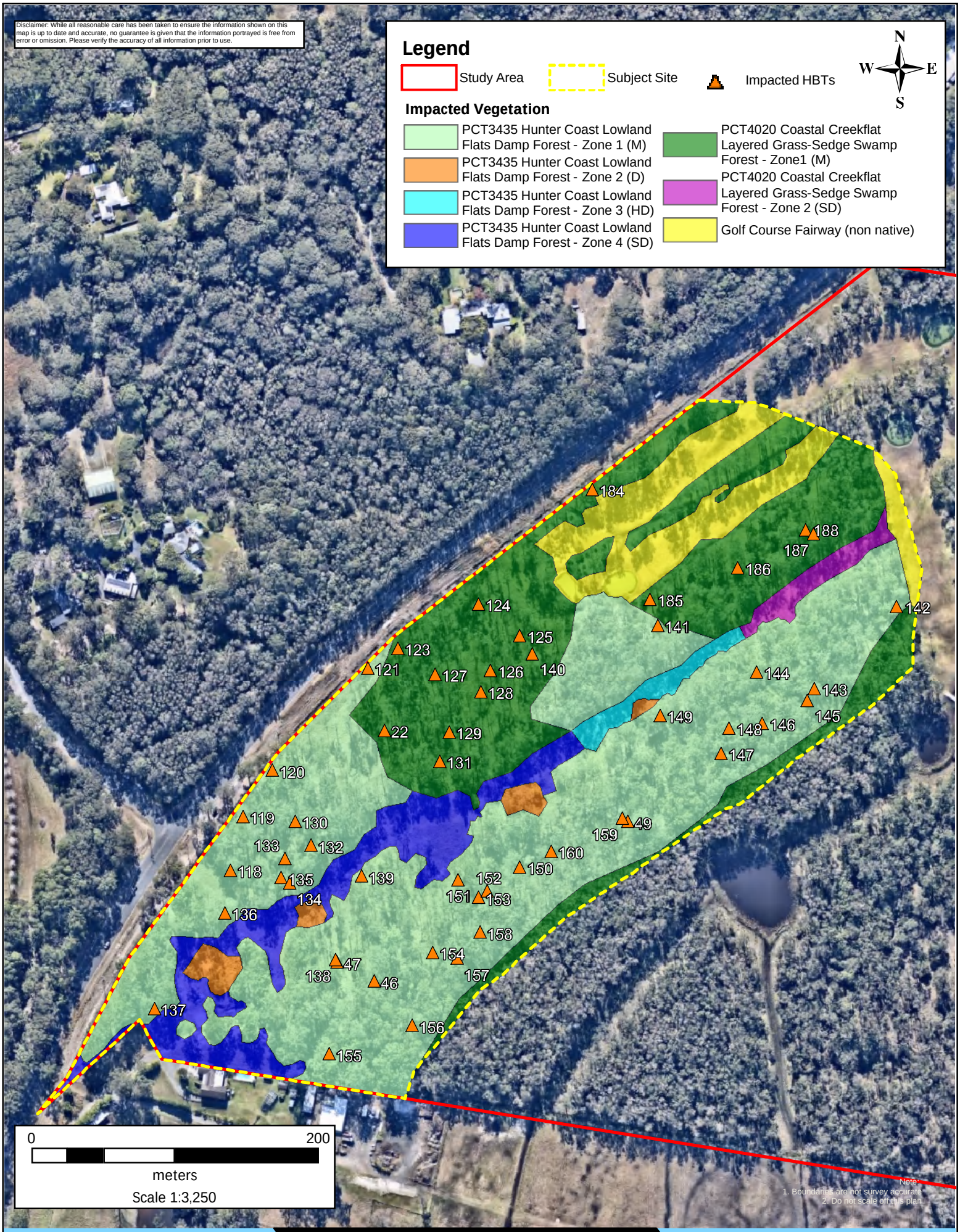


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Figure 11 - Impact Area

Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW

BOAMS: 42732

Client: Lands Advisory Services

AEP Ref: 3284

2.0 Stage 2 – Impact Assessment (Biodiversity Values)

2.1 Avoid and Minimise Summary

Section 8 of the BAM provides a list of measures that need to be taken into consideration during project planning and design, to minimise impacts upon native vegetation, habitat and other prescribed biodiversity values. Applicable measures taken as part of this project to minimise impacts are provided below.

The Avoid and Minimise strategy for the development (in accordance with Section 8 of the BAM), is discussed in greater detail in **Table 15** below.

The prescribed impact risk assessment and mitigation measures (in accordance with Section 9 of the BAM) are included in **Tables 15** to **22** below.

The following measures in **Section 2.2** have been provided to help mitigate the impacts of construction and the ongoing operation of the proposed development on the biodiversity values identified within the Subject Site and surrounds.

2.2 Impact Avoidance Measures

2.2.1 Project Design

The Development Footprint is the result of a design process which has sought to incorporate natural constraints and existing location in proximity to the Charlotte's Bay township. It is located in an area which has had previous disturbance.

The original scope of works included the full development of the Study Area, AEP commenced survey in mid-2023 across the entire Study Area. Survey results showed that the area identified for development within the east had high numbers of listed flora and fauna species. This led to a complete redesign and a significantly reduced footprint.

In early 2024 a new design was prepared for the Study Area, this included the vegetation south of the current proposal area. AEP surveys showed that this vegetation is a higher biodiversity value. This was determined for the following reasons: it provides protection and filtration of sediments and pollutants loads into the dam, which is utilised by Myotis. It also provides connectivity to south and south west areas of native vegetation. As a result AEP guided the design team to reduce the footprint to ensure the dams are protected and to retain a suitable wildlife corridor to the south.

The reduction in proposed development footprint ensure that existing wildlife corridors and higher biodiversity valued land are excluded from the Subject Site thus posing less risk to mobile fauna from vehicle strike. The change in development footprint reduces the number of HBTs subject to removal noting one is likely to be a nest tree for a Powerful Owl as the roost tree was identified.

Furthermore, reiterations ensure the avoidance of the following listed flora species identified within the Study Area *Corybas dowlingii, Rhodamnia rubescens, Rhodomyrtus psidioides, Syzygium paniculatum* (potential) (as shown in **Figure 6**).

2.2.2 Biodiversity Management Plan

A Biodiversity Management Plan (BMP) along the southern boundary of the Subject Site will be prepared to manage Koalas (as part of Koala Plan of Management for the Subject Site), Forest Owls, Southern Myotis and native vegetation communities. While performing filtration and infiltration of runoff from the proposed development.

The objectives of the BMP should be but not limited to

- Community knowledge and appreciation the vegetation and wildlife protection;

- Improving water quality;
- Provide safe corridor, habitat and foraging opportunities for Powerful Owl and Koalas;
- To provide foraging opportunities for Myotis through improving water quality and species diversity within the dam;
- To eradicate priority weeds;
- To Increase native seed load
- A long-term environmental conservation area;

The BMP will provide protection and regeneration of PCTs increasing biodiversity values and potential habitat for threatened species.

2.2.3 Water quality and Hydrology

- The Proposed BMP Lands will provide filtration, reduction in sediment for the dams in south of the proposal.
- An Erosion and Sedimentation Control Plan (ESCP) should be prepared for the proposal following guidelines from *Landcom* (2004), as well as a Stormwater Management Plan (SMP);
- Best practice erosion and sedimentation controls should be put in place to limit offsite movement of materials into the adjacent vegetation; and
- Erosion and sedimentation controls should be checked daily and maintained in working order especially after rain events.

2.2.4 Tree Management

- Tree Protection Zones need to be determined for any trees identified for retention within the development footprint to ensure suitable protection measures are in place.
- Landscape tree plantings should use species that are commensurate with the surrounding vegetation community where practical.

2.2.5 Fencing

No barbed wire is to be used within the Subject Site. Fencing within the Subject Site is to prevent incursions by fauna into the construction site and, following completion, the industrial area of the development.

2.2.6 General Construction & Operation

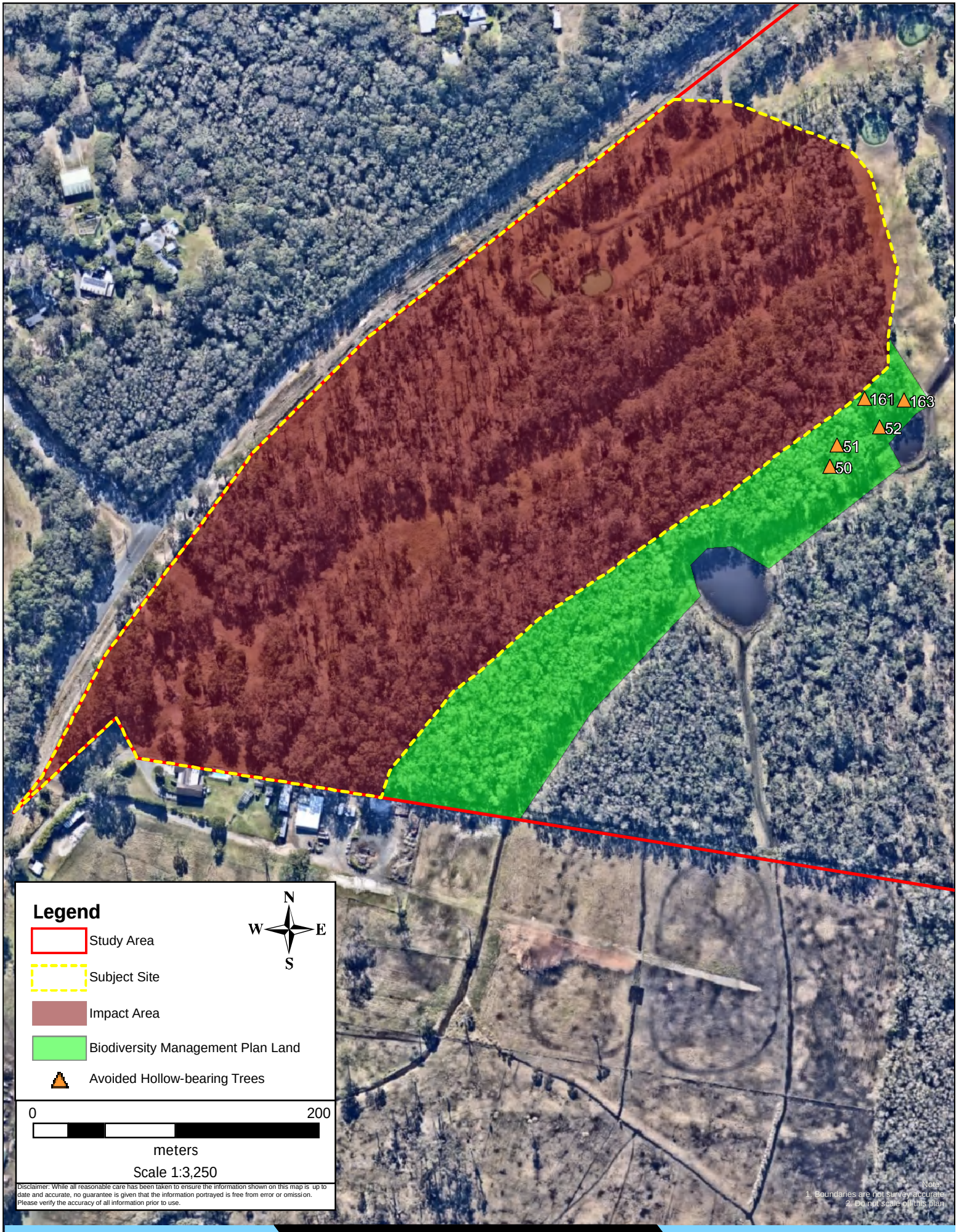
Site-specific Avoid and Minimise measures are discussed in **Table 15** and **Table 16**, while **Table 17** and **Table 18** outline the direct and indirect impacts associated with the development and how they are to be mitigated. The development's Avoid and Minimise strategy (in accordance with Section 8 of the BAM), is discussed in greater detail in **Table 15** below.

The following measures are provided to help mitigate impacts of the construction and ongoing operation of the proposed development on the biodiversity values on adjoining land:

- For the clearing phase, retained vegetation located in the Study Area will be delineated by flagging tape, fencing and signage indicating an environmental protection zone. This will allow fauna to egress the development area as needed. Following the completion of clearing works, permanent delineation features such as logs should be installed to protect the retained vegetation during operational phase of the development.

- Vegetation clearing is to be timed to avoid cold weather periods where overnight temperatures are forecast to be less than 12°C. Cold weather is likely to make it difficult for resident hollow dependent fauna to successfully relocate. This is particularly relevant for low body-weight species.
- A staged approach to clearing is to be undertaken to provide fauna the opportunity to disperse outside the area of impact. Staging to include Phase 1 Clearing: Underscrubbing, Phase 2 Clearing: Removal of non-habitat trees, and Phase 3 Clearing: Removal of habitat and connecting trees.
- All clearing works are to be undertaken under the supervision of the Project Ecologist.
- Clearing should occur in a direction from previously disturbed lands towards retained lands.
- Implement clearing protocols, including pre-clearance surveys, to identify habitat and vegetation to be retained.
- All clearing works are to be attended by a suitably equipped and experienced ecologist to deal appropriately with any displaced fauna species.
- All hollow-bearing features will be sectionally lowered by tree climbers (where safe to do so).
- Any fauna rescued during vegetation clearing is to be assessed for injuries and subsequently released to a suitable nearby location. This may require holding fauna until dusk for release in accordance with relevant animal ethics licencing and standards.
- If any fauna is injured during vegetation clearing, they are to be taken promptly to a nearby veterinarian or suitable wildlife carer contact.
- In addition, prior to clearing of any vegetation, an ecologist is to inspect the area for any signs of resident fauna requiring attention, particularly nesting birds. Where such is identified, appropriate strategies are to be developed and instigated to minimise impacts. Pre-clearance surveys are to include diurnal surveys, stag watching and nocturnal surveys.
- Civil construction staff are to be inducted into pre-clearing and clearing protocols to identify environmental features for protection;
- Installation of nest boxes within the retained lands prior to construction to mitigate the removal of HBTs within the development footprint and provide supplementary roosting / nesting habitat for resident fauna species that utilise such features;
- Any suitable hollows recovered during clearing works should be reconditioned into suitable hollows and installed in retained lands in addition to the manufactured nest boxes;
- All manufactured boxes are to be industry best-practice including either marine or hardwood plywood with a minimum thickness of 15mm;
- Boxes will have hinged lids to enable maintenance of the boxes;
- Installation methods are to be used that will not inhibit growth of the host tree;
- All cleared vegetation is to be mulched on site and spread to help stabilise any exposed soil and minimise offsite movement of biomass. Fallen timber and hollow logs identified to be retained to be relocated into the retained lands;
- Live mulch and topsoil of local provenance is an ideal way to begin rehabilitation of conservation lands;
- Plantings will be incorporated in the landscape design of the proposed development site to provide future resources for native fauna in the area;

- Implement hygiene protocols for machinery to prevent the spread of weeds outside the development site;
- Best practice erosion and sedimentation (ERSED) and dust suppression control methods are to be adopted, monitored and maintained throughout any vegetation clearing works, particularly for downstream areas. Such are to be in accordance with “Soils and Construction – Managing Urban Stormwater” published by Landcom;
- Incorporation of Water Sensitive Urban Design (WSUD) principles within stormwater infrastructure is to occur to minimise downstream hydrology changes; and
- Any bushfire protection measures in the form of Asset Protection Zones (APZs) or defendable space are to be incorporated within the development footprint to avoid requirements for additional vegetation removal in surrounding areas.



Legend

N
W E
S

- Study Area
- Subject Site
- Impact Area
- Biodiversity Management Plan Land
- Avoided Hollow-bearing Trees

0 200

meters

Scale 1:3,250

Disclaimer: While all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

Note:
1. Boundaries are not survey accurate
2. Do not scale off this plan

AEP

Figure 12 - Avoid and Minimise

Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW

BOAMS: 42732

Client: Lands Advisory Services

AEP Ref: 3284

Table 15 – Avoid and Minimise Impacts on Biodiversity Values

Objectives/Requirements	Evidence of compliance
Locate the proposal to avoid or minimise direct and indirect impacts on native vegetation, threatened species, threatened ecological communities and their habitat.	
Knowledge of biodiversity values should inform decisions about the location of the proposal. The initial assessment of biodiversity values from Stage 1 may be used to inform the early planning of the route or location of a proposal.	The proposed subdivision design is the result of an iterative process which has sought to avoid impacts to biodiversity values by preferring a location with lower biodiversity value. The proposed design avoids areas of higher biodiversity value within the clusters of cleared and derived native grasslands in the Study Area.
Selecting a final proposal location may be an iterative process. Decisions may need to be revisited after all field surveys have been completed.	Surveys were undertaken on the basis of the proposed development design as shown in **Appendix A.** Once surveys were completed, it was confirmed that the proposed location to be developed was optimal considering the avoidance of upper stratum vegetation, water features and hollow-bearing trees being retained.
Impacts from clearing native vegetation and threatened species habitat can be avoided or minimised by locating the proposal in areas: *a) lacking biodiversity values* *b) where the native vegetation or threatened species, habitat is in the poorest condition (i.e. areas that have a low vegetation integrity score)* *c) that avoid habitat for species with a high biodiversity risk weighting or land mapped on the important habitat map, or native vegetation that is a TEC or a highly cleared PCT.* d) *outside of the buffer area around breeding habitat features such as nest trees or caves.*	a) The location of the proposed development was chosen on the basis of its adjacency to the existing corridors and features that are located in the Study Area. The proposed location of the development was chosen in relation to the area of exotic vegetation, and allows for the avoidance of HBTs, areas of higher biodiversity value, and observed threatened species (refer to **Figures 6 to 10**). b) The proposal is located on areas primarily consisting of highly disturbed and modified vegetation. This ensures that a comparatively larger portion of higher valued vegetation is not located within the Subject Site, and 2.79 ha of native vegetation will be retained and managed under a Biodiversity Management Plan. c) The Subject Site does not impact upon any habitat for species that have the highest biodiversity risk weighting as listed within the Guidance to assist a decision-maker to determine a serious and irreversible impact. The Subject DA Footprint does impact upon managed *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*. However, the proposal will retain approximately 2.79 ha of native vegetation within the Study Area that will be managed under a Biodiversity Management Plan. d) No habitat features being used for breeding by known threatened species on site were identified. There is no area of important habitat mapped for the Regent Honeyeater, Swift Parrot, Plains-wanderer or migratory shorebirds identified within the site. No nest trees for threatened species were identified during the current assessment. Vegetation in the eastern portion of the Study Area was observed to be utilised by Powerful Owl is being avoided, noting that extensive surveys did not record occupancy within the reduced proposed footprint.

Objectives/Requirements	Evidence of compliance
When selecting a proposal's location, all of the following should be analysed. Justification for the decisions in determining the final location must be based on consideration of: *a) alternative modes or technologies that would avoid or minimise impacts on biodiversity values* *b) alternative routes that would avoid or minimise impacts on biodiversity values* *c) alternative locations that would avoid or minimise impacts on biodiversity values* *d) alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values.*	a) Water Sensitive Urban Design will be implemented to minimise impacts on biodiversity values linked to hydrology and water quality. b) The location of the proposed routes when considering the existing road network and avoidance of areas of higher biodiversity value are considered to be optimal. c) The proposal is located on areas primarily consisting of highly disturbed and modified vegetation. This ensures that a comparatively larger portion of higher valued vegetation is not located within the Subject Site, and 2.79 ha of native vegetation will be retained and managed under a Biodiversity Management Plan. d) As mentioned previously, most areas within the site of higher biodiversity value are being avoided the proposed Subject Site is located in an area which contains the lowest level of biodiversity values throughout the site.
The proposal may also list and map site constraints, such as: *a) bushfire protection requirements, including clearing for asset protection zones* *b) flood planning levels* *c) servicing constraints.*	a) Bushfire protection zones have been provided within the development where required in accordance with bushfire protection requirements. b) Parts of the development footprint are impacted by the 1% flood level, and all permanent community facilities should have floor levels at or above the 5.2m FPL. The camping sites and short-term sites located below the 1% flood level are allowable under the Local Government (Manufactured Home Estates, Caravan Parks, Camping Grounds and Moveable Dwellings) Regulation with Council approval. c) Servicing constraints have been considered and the proposal has met the required standards.
In the BDAR or BCAR, the assessor must document and justify any actions taken to avoid or minimise impacts through careful location of the proposal.	As detailed above, the final development footprint is the only feasible option to enable the project to progress. Considering the location of the development footprint in the context of the site, it has the least impact to biodiversity values, native vegetation, connectivity routes and fauna movements whilst still being located on appropriately zoned land which has access to services.
Designing a Project to Avoid and Minimise Impacts on Native Vegetation and Habitat	
The BDAR or BCAR must document the reasonable measures taken by the proponent to avoid or minimise clearing of native vegetation and threatened species habitat during proposal design, including placement of temporary and permanent ancillary construction and maintenance facilities. The types of measures that can be used to demonstrate this include: *a) Reducing the proposal's clearing footprint by minimising the number and type of facilities*	a) The proposal has been designed to follow the principles of Avoid and Minimise by utilising the lower quality cleared land that continues to be managed and grazed. b - d) All infrastructure required for the Subject Site has been designed either within areas that are highly disturbed, allowing for the retention of vegetation and habitat that provides higher biodiversity values. e) Appropriate protection measures during and after construction, including fencing will be implemented to avoid any impacts to adjacent areas of higher biodiversity value.

Objectives/Requirements	Evidence of compliance
b) Locating ancillary facilities in areas that have no biodiversity values *c) Locating ancillary facilities in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas with the lowest vegetation integrity scores)* *d) Locating ancillary facilities in areas that avoid habitat for species and vegetation that has a high threat status (e.g. an endangered ecological community (EEC) or critically endangered ecological community (CEEC) or is an entity at risk of a serious and irreversible impact (SAII)* *e) Actions and activities that provide for rehabilitation, ecological restoration and/or ongoing maintenance of retained areas of native vegetation, threatened species, threatened ecological communities and their habitat on the subject land.*	
The BDAR or BCAR must document and justify efforts to avoid or minimise impacts through design.	Details of proposed avoidance and minimisation measures are provided in **Tables 20-24**.

Table 16 – Prescribed Impact Avoidance and Minimisation

Objectives/Requirements	Evidence of compliance
Avoiding and Minimising Prescribed Biodiversity Impacts during Project Planning	
The timing and extent of a prescribed impact on the habitat of threatened entities can be difficult to assess and adequately offset through the provision of biodiversity credits. Prescribed impacts may occur on habitat features that are not native vegetation, e.g., caves, rocky outcrops and flyways. Because these types of features cannot be readily replaced or offset, it is important that measures to avoid or minimise impacts are undertaken and are clearly documented in the BDAR or BCAR.	No biodiversity values in addition to those noted in the BDAR i.e., direct and indirect impacts to biodiversity were identified for the Subject Site. Direct and indirect impacts are considered in **Tables 18 – 20** of the BDAR.
Locating a Project to Avoid and Minimise Prescribed Biodiversity Impacts	
To avoid or minimise prescribed biodiversity impacts, the proponent must consider how to: *a) Locate surface works to avoid direct impacts on the habitat features identified in Chapter 6* *b) Locate subsurface works, in both the horizontal and vertical planes, to avoid and minimise operations beneath the habitat features identified in Chapter 6. For example, locating longwall panels away from geological features of significance, groundwater-dependent plant communities and their supporting aquifers* *c) Locate the proposal to avoid severing or interfering with corridors connecting different areas of habitat and migratory flight paths, to important habitat or local movement pathways* *d) Optimise the proposal layout to minimise interactions with threatened entities; for example, design a wind farm that has:* *i. 100 m turbine-free buffers around features that attract and support aerial species, such as forest edges, riparian corridors, wetlands, ridgetops and gullies* *ii. turbine-free corridors in zones of regular movement for species of concern, to avoid a barrier effect* *e) locate the proposal to avoid impacts on water bodies or hydrological processes*	a) The Subject Site: i. Does not contain karsts, caves, crevices, cliffs, abundant small rocks and boulders and boulder piles. No other features of geological significance supporting threatened species and ecological communities are present; ii. Does not contain rocks as discussed above, which may support habitat for threatened species; iii. Contains human made structures within the Subject Site. iv. Does not contain non-native vegetation supporting threatened species but threatened ecological communities present; v. Wind turbines are not a feature of the development proposed. Given that the development will be for local roads with a maximum speed limit of 50km/hr, the likelihood of vehicle strike is considered much lower than higher speed roads. The proposed location of the development was chosen on the basis of its adjacency to the existing corridors and water features that are located in the Study Area. The proposed location of the development was chosen in relation to the area of highly disturbed vegetation, and lack of listed species present. Ensuring retention of *the Corybas dowlingii, Rhodamnia rubescens, Rhodomyrtus psidioides, Syzygium paniculatum* (potential) identified within the Study Area (refer **Figure 6 to 10**). This also ensures avoidance of 167 HBTs and areas of vegetation within the eastern portion of the Study Area where Powerful Owl was observed. b) No sub-surface work is expected as a result of the proposed development.

Objectives/Requirements	Evidence of compliance
	c) The land on which the development is proposed is comprised of highly disturbed vegetation in which mid-story is sparse and provides limited biodiversity value compared to vegetation being retained. Removal of vegetation within the Subject Site would not reduce or severe connectivity when considering the comparatively larger area of vegetation outside of the Subject Site that provides necessary corridors and connectivity to the broader locality. d) Discussed above. e) The Subject DA Footprint avoids mapped hydrolines and hydroareas, however may have an indirect upon agricultural dams.
When locating a proposal, the following need to be analysed and justification should be provided for each alternative selected: *a) alternative modes or technologies that would avoid or minimise prescribed impacts* *b) alternative routes that would avoid or minimise prescribed impacts* *c) alternative locations that would avoid or minimise prescribed impacts* d) *alternative sites within a property on which the proposal is located that would avoid or minimise prescribed impacts.*	a) Water Sensitive Urban Design will be implemented to minimise prescribed impacts on biodiversity values linked to hydrology and water quality. b) The proposed development will ensure all infrastructure have been located in cleared areas outside the development footprint or within proposed road reserves. c) The development footprint was considered to be the most appropriate due to the location and quality of areas of remnant native vegetation. Alternative locations would have led to higher impacts on biodiversity and as such, the current location is considered to be optimal in the context of the parent lot. d) Discussed above.
Justifications for a proposal's location should identify any other site constraints that the proponent has considered in determining the location and design of the proposal, such as: *a) bushfire protection requirements, including clearing for asset protection zones* *b) flood planning levels* *c) servicing constraints.*	a) AEP are given to understand that all required asset protection zones (APZs) and defendable spaces are contained within the proposed Subject Site. b) AEP is given to understand that flood planning levels and servicing constraints have been considered and the proposal has met the required standards. c) Access and services will be provided via existing carriageways and infrastructure.
The assessor must document and justify in the BDAR or BCAR all efforts to avoid, or the reasonable measures proposed to minimise, prescribed impacts when choosing the proposal's location.	Discussed above.
Designing a Project to Avoid and Minimise Prescribed Biodiversity Impacts	

Objectives/Requirements	Evidence of compliance
Design measures that can avoid or minimise prescribed impacts include: *a) Engineering solutions, such as proven techniques to:* *i. Minimise fracturing of bedrock underlying features of geological significance, or groundwater-dependent communities and their supporting aquifers* *ii. Restore connectivity and movement corridors* *b) Design elements that minimise interactions with threatened entities, such as:* *i. Designing turbines to dissuade perching and minimise the diameter of the rotor swept area* *ii. Designing fencing to prevent animal entry to transport corridors* *iii. Providing vegetated buffers rehabilitated with native species* *c) Maintaining environmental processes that are critical to the formation and persistence of habitat features not associated with native vegetation* *d) Maintaining hydrological processes that sustain threatened entities* *e) Controlling the quality of water released from the site, to avoid or minimise downstream impacts on threatened entities.*	a) i. It is not envisaged that any works will impact on features of geological significance, groundwater dependent communities or supporting aquifers. iii. The Subject Site is positioned as to exclude areas of higher biodiversity value which should ensure that current connectivity is maintained and potentially improved north/south. Furthermore, 2.79 ha of native vegetation will be retained and managed under a Biodiversity Management Plan along the eastern boundary of the Subject Site. b) It is recommended that powerlines be buried rather than overhead so that flight paths for threatened fauna in the locality are maintained and avoid impacts such as powerline strike. A rural style 'post and rail' fence placed at the edge of the proposed development is recommended along with a low-speed limit within the development will mean that even if animals enter the Subject Site, they are unlikely to be struck by vehicles. c) The project has been designed to reduce filling as much as feasible land in order to minimize downstream impacts. Implementation of WSUD will be incorporated into the project design. d) As per point a i. e) The project design process incorporates MUSIC (Model for Urban Stormwater Improvement Conceptualisation) water quality modelling to determine stormwater treatments to ensure post-development water quality at least maintains pre-development conditions.
The proposed measures must be evidence-based and directed towards the threatened entities identified in Chapter 6. The BDAR or BCAR must document the designs that are proposed to avoid or minimise prescribed impacts	Field surveys have been carried out to identify threatened species within the area or presence has been assumed. The development has been designed to follow the principles of Avoid and Minimise by utilising cleared and degraded land where possible. Due to loss of native vegetation and hollow-bearing trees, nest boxes may need to be installed in retained vegetation to provide suitable habitat for arboreal fauna to further mitigate any impacts of the development. Approximately 12.46 ha of native vegetation and 1.11 ha of exotic vegetation within the Subject Site will be cleared as part of the development with 2.79 ha of area of higher biodiversity value vegetation within the Study Area to be retained and managed under a Biodiversity Management Plan. The BMP will provide protection and regeneration of PCTs increasing biodiversity values and potential habitat for threatened species. Wildlife corridors in moderate to good vegetation are also avoided by the final plan.

2.3 Assessment of Impacts

Section 8 of the BAM states that the BDAR "must assess the impacts of the project on native vegetation and habitat". In addition to this, Sections 9.1.4 and 9.2 require that further assessment be produced for any impact, including biodiversity impacts, expected in land surrounding the Subject Site. **Tables 17** to **20** provide a summary of measures proposed to avoid and minimise direct, indirect, prescribed and residual impacts on biodiversity.

Table 17 – Direct Impact Assessment

Aspect	Project Phase	Potential Impact	Mitigation	Timing	Responsibility	Risk before mitigation	Risk after mitigation
Native vegetation	Construction and Operation	Removal of 12.46 ha of native vegetation including potential habitat for ecosystem credit species.	The location of the proposed subdivision is such that extensive areas of remnant native vegetation will be avoided in the remaining Study Area Where relevant, compensatory habitat in the form of nest boxes will be installed to compensate for the loss of hollow-bearing trees.	Operation and post-operation	Council Project coordinator	HR	MR
Habitat in the form of tree hollows	Pre-Construction and Construction	Removal of 51 hollows bearing trees providing habitat for native birds and mammals.	All hollows removed during the clearing process will be replaced at a ratio of 1:1 with salvaged hollows and/or nest boxes in order to ensure no net loss of hollow resources. Nest boxes are to be installed in retained habitat within the site. Nest boxes are to be installed by qualified ecologists and according to the Habisure system (Franks & Franks 2006) or similar.	Pre-Construction	Project coordinator Project Ecologist	HR	MR
Fauna home range and connectivity	Pre-Construction and Construction	Disturbance to fauna habitat during pre-operation clearing and construction.	Installation of a fauna-protecting fence, including relevant signage, to create a fauna protection zone which coincides with the tree protection zone. A permanent fence should be installed once construction of the new development is complete.	Pre-, during and post-operation	Project coordinator Construction staff Site manager Project Ecologist	HR	LR
Fauna home range and connectivity	Operation	Reduction in connectivity	No additional reduction in connectivity is proposed within the development due to the extensive connectivity to the east of the Subject Site. It is recommended that landscaping include native species commensurate with the local vegetation communities.	Pre-, during and post-operation	Council Project coordinator Ecologists	MR	LR
Reduction of biodiversity values	Pre-Construction, Construction and Operation	Damage to retained trees	Installation of a fence as per the item above, including relevant signage, to create a tree protection zone where relevant. Communication of fence location and mapping to all staff involved in clearing and construction operations. Regular inspection of fence by Project Ecologist to monitor and fix if and where necessary.	Pre- and during-operation	Project coordinator Construction staff Site manager Project Ecologist	HR	LR
	Construction	Sediment run-off into retained vegetation area	Best practice erosion and sedimentation (ERSED) control methods to be adopted, enforced and maintained throughout vegetation works, so as to avoid any movement of sediment resulting from clearing and construction into the retained vegetation lands. Where practical, clearing and excavation will be restricted to drier periods.	During development	Project coordinator Construction staff Site manager Project Ecologist	MR	LR
		Change in stream flow and structure	Incorporation of Water Sensitive Urban Design (WSUD) principles within stormwater infrastructure is to occur to minimise hydrology changes.	During development and Operational	Project coordinator Construction staff Site manager Project Ecologist	MR	LR

Table 18 – Prescribed Impact Assessment

Subject of Prescribed Impact	Project Phase	Mitigation	Timing	Responsibility	Risk before mitigation	Risk after mitigation
Habitat of threatened species or ecological communities associated with: (i) Karst, caves, crevices, cliffs and other geological features of significance or (ii) rocks, or (iii) human made structures, or (iv) non-native vegetation	No features of geological significance supporting threatened species and ecological communities are present. No habitat associated with threatened species or ecological communities are present within the Subject Site.					
Connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	Construction and operation	No additional reduction in connectivity is proposed within the development due to the extensive connectivity present to the east. The Study Area includes retained vegetation that will continue to provide connectivity to highly mobile species post development.	Pre-operation and operation	Council Project coordinator Project Ecologist	MR	LR
Movement of threatened species that maintains their lifecycle	Construction and operation	Vegetation clearing and resulting habitat clearing are unlikely to affect movement of threatened species due to the absence of evidence of site use by such species. Retention of native vegetation will continue to support connectivity for highly mobile species	Pre-operation and operation	Council Project coordinator Project Ecologist	MR	LR
Water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities	Construction and operation	Incorporation of Water Sensitive Urban Design (WSUD) principles within stormwater infrastructure is to occur to minimise hydrology changes. Best practice erosion and sedimentation (ERSED) control methods to be adopted, enforced and maintained throughout vegetation works, so as to avoid any movement of sediments resulting from clearing and construction into the retained vegetation lands.	Pre-operation and operation	Project coordinator Project Ecologist	MR	LR
Wind turbine strikes on protected animals	No wind turbines will be installed on site. Not applicable.					
Vehicle strikes on threatened species or on animals that are part of a TEC	Construction and operation	Civil Construction staff to be inducted into pre-clearing and clearing protocols, and to identify environmental features for protection. During operation, such impacts will be mitigated through the introduction of low-speed limits as well as speed limiting devices on the precinct's roads.	Pre-operation and operation	Project coordinator Construction staff Site manager Project Ecologist	HR	MR

Table 19 – Indirect Impact Assessment

Aspect	Project Phase	Potential Impact	Mitigation	Timing	Responsibility	Risk before mitigation	Risk after mitigation
Noise	Pre-operation and Construction	Noise during construction due to clearing works and related vehicular traffic. Potential disturbance to threatened species or reduced viability of adjacent retained habitat zone.	Timing of construction operations will be optimised as per an approved Construction Environmental Management Plan (CEMP) which will include a Noise Mitigation Plan.	Pre-operation and Operation	Project coordinator Construction staff Site manager	HR	MR
	Operation	Noise due to traffic. Potential disturbance to threatened species within the surrounding area.	Suitable fencing to be installed and maintained between development, BMP lands and residual land to prevent access and reduce potential interaction with threatened species. Standard local speed limits should apply which would limit traffic noise.	During operations and Operational	Civil Contractor	MR	LR
Vibration	Construction	Disturbance to fauna which may lead to displacement to adjacent areas.	Conditions of construction operations will be optimised as per an approved Construction Environmental Management Plan (CEMP).	During construction	Project coordinator Site manager Construction staff	HR	MR
Dust	Construction	Dust deposits on native flora and fauna habitat, resulting in disturbance to and reduced viability of adjacent habitat.	Dust levels during operations managed according to an approved CEMP: • Daily monitoring of dust generated by construction activities; and • Dust suppression measures (setting maximum speed limits and application of dust suppressants) will be implemented during construction works to limit dust on site.	During construction	Project coordinator Site manager Construction staff	LR	LR
Light spill	Construction	Disturbance to nocturnal fauna, thus reducing viability of the adjacent habitat.	Optimal construction methods as per an approved CEMP will reduce instances of light spill. Such measures will include limiting use of lights where necessary and directing lights in such a way as to limit impact on adjacent vegetated lands. Light-sensitive threatened species are unlikely to occur on site.	During construction	Project coordinator Site manager Construction staff	LR	LR
	Operation	Disturbance to nocturnal fauna, thus reducing viability of adjacent retained habitat zone.	Provision of lighting will be in accordance with an approved CEMP. Permanent lighting shall be designed to minimise light spill into surrounding vegetation.	During operations	Civil Contractor	MR	LR
Non-native vegetation	Construction	Soil disturbance may lead to proliferation of exotic flora (including invasive weeds) through seeds and vegetation fragments.	As per an approved CEMP: • Appropriate handling of mulch created from the removal of exotic vegetation; • Appropriate cleaning of all construction equipment to limit the risk of weed seed and fragments to adjacent retained areas; and • Chemical and manual treatment of weeds where applicable.	During construction	Project coordinator Site manager Construction staff	MR	LR
Visual amenity	Construction	Rubbish and waste retained onsite attracting native fauna.	Activities on the Site will be managed in accordance with an approved CEMP and designed to limit the amount of rubbish and waste onsite through good housekeeping practices.	During construction	Project coordinator Site manager Construction staff	LR	LR
	Operation	Rubbish and waste retained onsite attracting native fauna.	Suitable fencing to be installed and maintained between development and surrounding natural areas to deter access and degradation of retained lands.	During operations	Civil Contractor	LR	LR

Table 20 – Residual Impact Assessment

Aspect	Project Phase	Potential Impact	Mitigation / Minimisation	Residual Impact Description	Impact to be offset (see Section 2.3.2)
Reduction of biodiversity values	Construction Operation	Clearing of 12.46 ha of native vegetation	The Subject Site has been located so as to avoid most areas of higher biodiversity values. It is therefore considered to be situated in an optimal part of the parent lot.	PCT 3435 Z1 – 7.04 ha PCT 3435 Z2 – 0.19 ha PCT 3435 Z3 – 0.17 ha PCT 3435 Z4 – 1.11 ha PCT 4020 Z1 – 3.79 ha PCT 4020 Z2 – 0.17 ha	Yes
		Removal of 51 HBTs with potential for use by fauna	Installation of nest boxes, as well as any recovered hollows in the Subject Site. To be installed within the BMP Land that will facilitate the protection and regeneration of 2.79 ha of native vegetation.		Yes
Noise, dust, light spill	Pre-operation and Operation	Disturbance to local fauna	Application of CEMP as mentioned above.	Noise, dust and light spill will still occur but a low magnitude, thus keeping the impact on local fauna to a low level	No

Table 21 – Risk Matrix

Maximum reasonable consequence	Probability A	B	C	D	E
1	CR	CR	HR	HR	MR
2	CR	HR	HR	MR	LR
3	HR	HR	MR	LR	LR
4	HR	MR	LR	LR	LR
5	MR	LR	LR	LR	LR

CRITICAL	CR
HIGH RISK	HR
MEDIUM RISK	MR
LOW RISK	LR

Table 22 – Assessment Criteria

Consequence criteria: Impacts on threatened species and/or threatened species habitat
1. CRITICAL Impact – Severe; Spatial scale – Widespread; Time scale – Long-term. Requires consideration of whether impacts may result in a Serious and Irreversible Impact that may lead to local extinction. **2. MAJOR** Impact – Moderate; Spatial scale – Moderate to widespread; Time scale – Mid- to long-term. May result in temporary or long-term damage. **3. MODERATE** Impact – Moderate; Spatial scale – Local to moderate; Time scale – Short- to mid-term. May result in a moderate, temporary impact. However, it may be difficult to rehabilitate impact and may have negative implications on the ecosystem **4. MINOR** Impact – Minor; Spatial scale – Local; Time scale – Short-term. May result in minor impacts that are relatively easily rehabilitated. Not likely to have negative implications on the ecosystem. **5. NEGLIGIBLE** Impact – Minor; Time scale – Short-term with no lasting effect.
Likelihood criteria
A. ALMOST CERTAIN Very high or certain probability that impact will occur, or event is of a continuous nature. **B. LIKELY** Likely probability that impact will occur, or event is frequent (frequency 1-5 years). **C. MODERATE** Moderate probability that impact will occur, or event is infrequent (frequency 5-20 years). **D. UNLIKELY** Low probability that impact will occur, or event is very infrequent (frequency 100 years). **E. REMOTE** Very low probability that impact will occur or may occur under extenuating circumstances. Event is very rare or stochastic in nature (frequency 1000 years)

2.4 Summary of Potential Impacts on Biodiversity

2.4.1 Prescribed Impacts Requiring Offsetting

No prescribed impacts are relevant to the Subject Site.

2.4.2 Vegetation Clearance Requiring Offsetting

The development would result in the loss of approx. 12.46 ha of native vegetation. The future Vegetation Integrity Scores will be zero for all areas.

2.4.3 Species Credit Species

If a Species Credit Species is either identified on the site during survey, assumed to be present, or confirmed present within an expert report, a 'species polygon' is required to be produced for the area of suitable habitat within the site for the species. The size of this polygon is entered into the BAM Calculator, which determines the number of credits required to offset the removal of suitable habitat based upon the quality of habitat and biodiversity risk weighting of the species.

Myotis Macropus was detected within the Study Area, a total of 233 species credits are required to offset the proposed development. Impact areas requiring offset are shown in **Figure 13** (refer to **Table 24**).

Powerful Owl was detected within the Study Area, a total of 120 species credits are required to offset the proposed development. Impact areas requiring offset are shown in **Figure 14** (refer to **Table 24**).

Koala was assumed present due to local records, a total of 326 species credits are required to offset the proposed development. Impact areas requiring offset are shown in **Figure 15** (refer to **Table 24**).

2.4.4 Vegetation Clearance Not Requiring Offsetting

Vegetation clearance not requiring offsetting includes 1.11 ha of exotic vegetation.

2.4.5 Impacts requiring offset

2.4.5.1 Ecosystem Credits

As per Section 10.3 of the BAM, the removal of native vegetation within the site will require offsetting to achieve the 'no net loss standard' detailed within Section 11 of the BAM. To calculate the required offsets in the form of Ecosystem Credits, the BAM Calculator has taken into consideration the impact area and the projected loss in vegetation integrity score along with the biodiversity risk weighting of the PCT. Details of each along with the required credit outputs is provided in **Table 23**. A total of 270 Ecosystem Credits are required to offset the proposed development. Impact areas requiring offset are shown in **Figure 11**.

Table 23 – Ecosystem Credit Requirements

Vegetation Zone	Condition	Impact Area (ha)	Future VIS	Vegetation Integrity Score Loss	Biodiversity Risk Weighting	Credit Requirements
PCT 3435	Z1 – moderate	7.04ha	0	55.2	2	146
PCT 3435	Z2 – degraded	0.19ha	0	27.5	2	2
PCT 3435	Z3 - highly degraded	0.17ha	0	23.2	2	1
PCT 3435	Z4 – Severely degraded	1.11ha	0	8.6	2	0
Subtotal		**8.51**				**149**
PCT 4020	Z1 - moderate	3.79ha	0	63.7	1.5	121
PCT 4020	Z2 - Severely degraded	0.17ha	0	9.4	1.5	0
Subtotal		**3.96**				**121**
Total		**12.47**				**270**

2.4.5.2 Species Credits

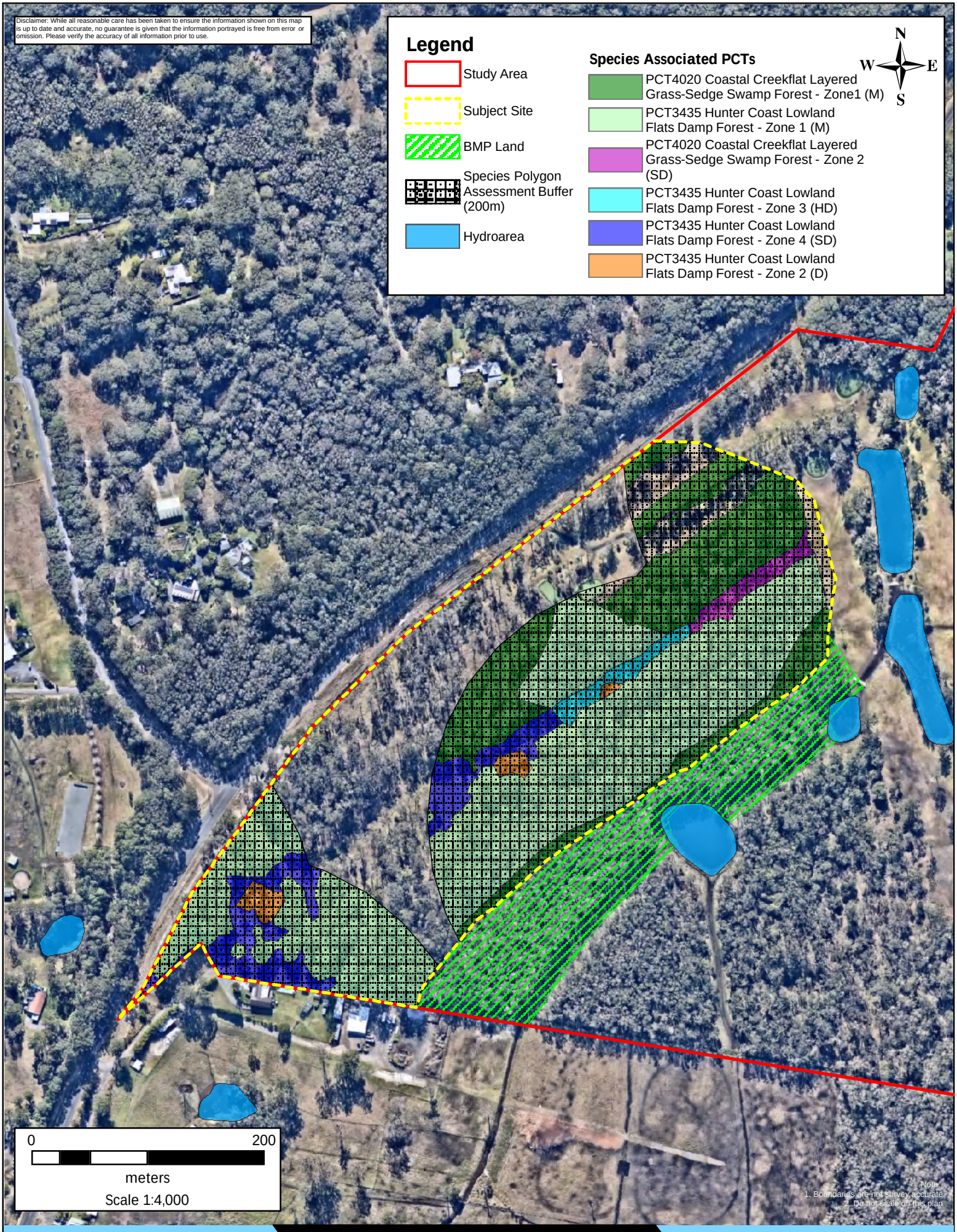
If a Species Credit species is either identified on the site during survey, assumed to be present, or confirmed present within an expert report, a 'species polygon' is required to be produced for the area of suitable habitat within the site for the species. The size of this polygon is entered into the BAM Calculator, which determines the number of credits required to offset the removal of suitable habitat based upon the quality of habitat and biodiversity risk weighting of the species.

Table 24 –Species Credit Requirements

PCT	Impact Area (ha)/count	Biodiversity Risk Weighting	Credit Requirements
Southern Myotis			
PCT 3435 Z1	5.4	2	148
PCT 3435 Z2	0.15	2	2
PCT 3435 Z3	0.17	2	2
PCT 3435 Z4	0.84	2	4
PCT 4020 Z1	2.4	2	76
PCT 4020 Z2	0.17	2	1
Powerful Owl			
PCT 4020 Z1	4.3	2	120
Koala			
PCT 3435 Z1	7	2	194
PCT 3435 Z2	0.19	2	3
PCT 3435 Z3	0.17	2	2
PCT 3435 Z4	1.1	2	5
PCT 4020 Z1	3.8	2	121
PCT 4020 Z2	0.17	2	1

2.5 Biodiversity Credit Report

The Biodiversity Credit Report generated within the BAM Calculator is provided in **Appendix F** and includes potential offset variations that are applicable to the proposal.



AEP

Figure 13 - Species Polygon Southern Myotis

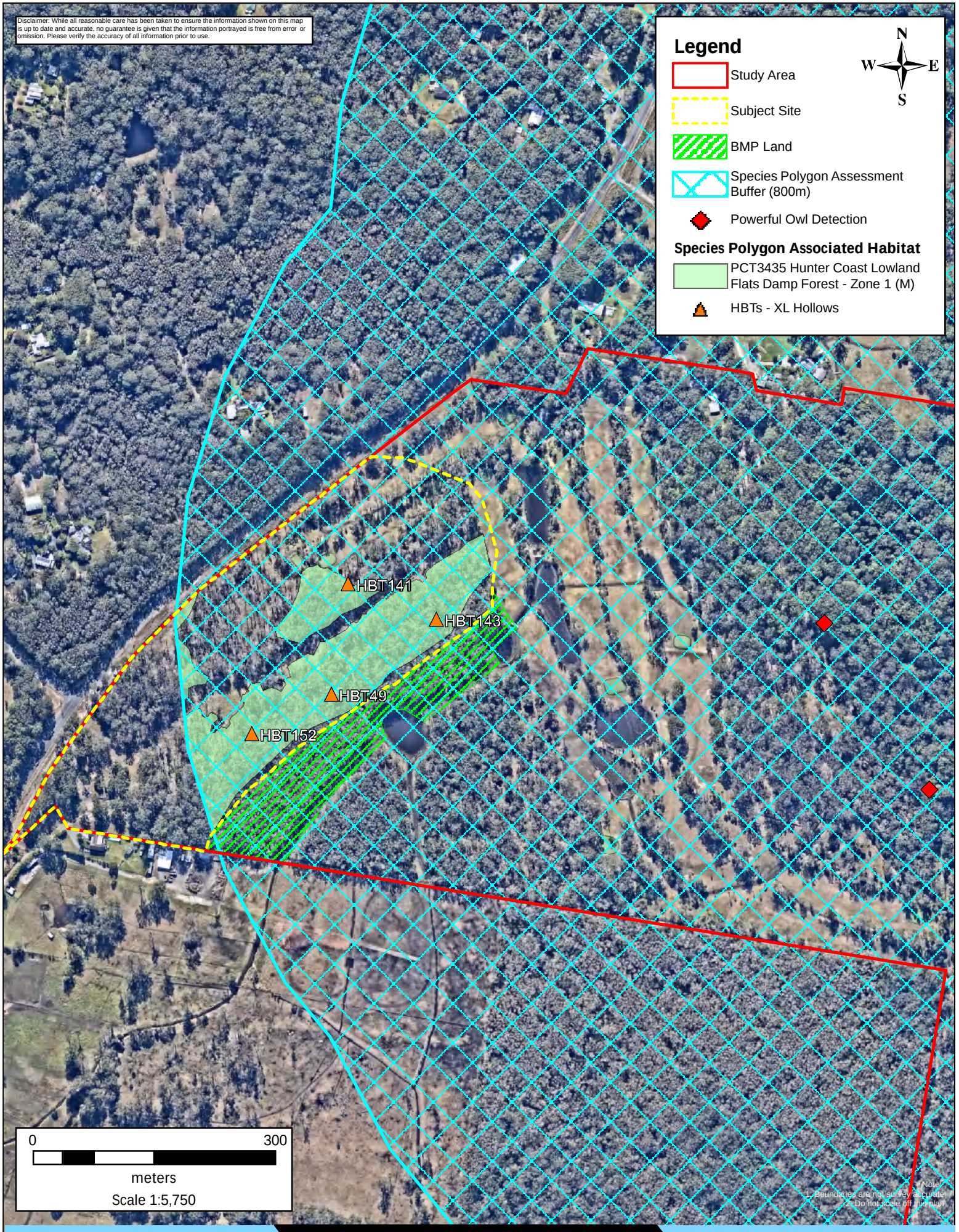
Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW

BOAMS: 42732

Client: Lands Advisory Services

AEP Ref: 3284



AEP

Figure 14 - Species Polygon Powerful Owl

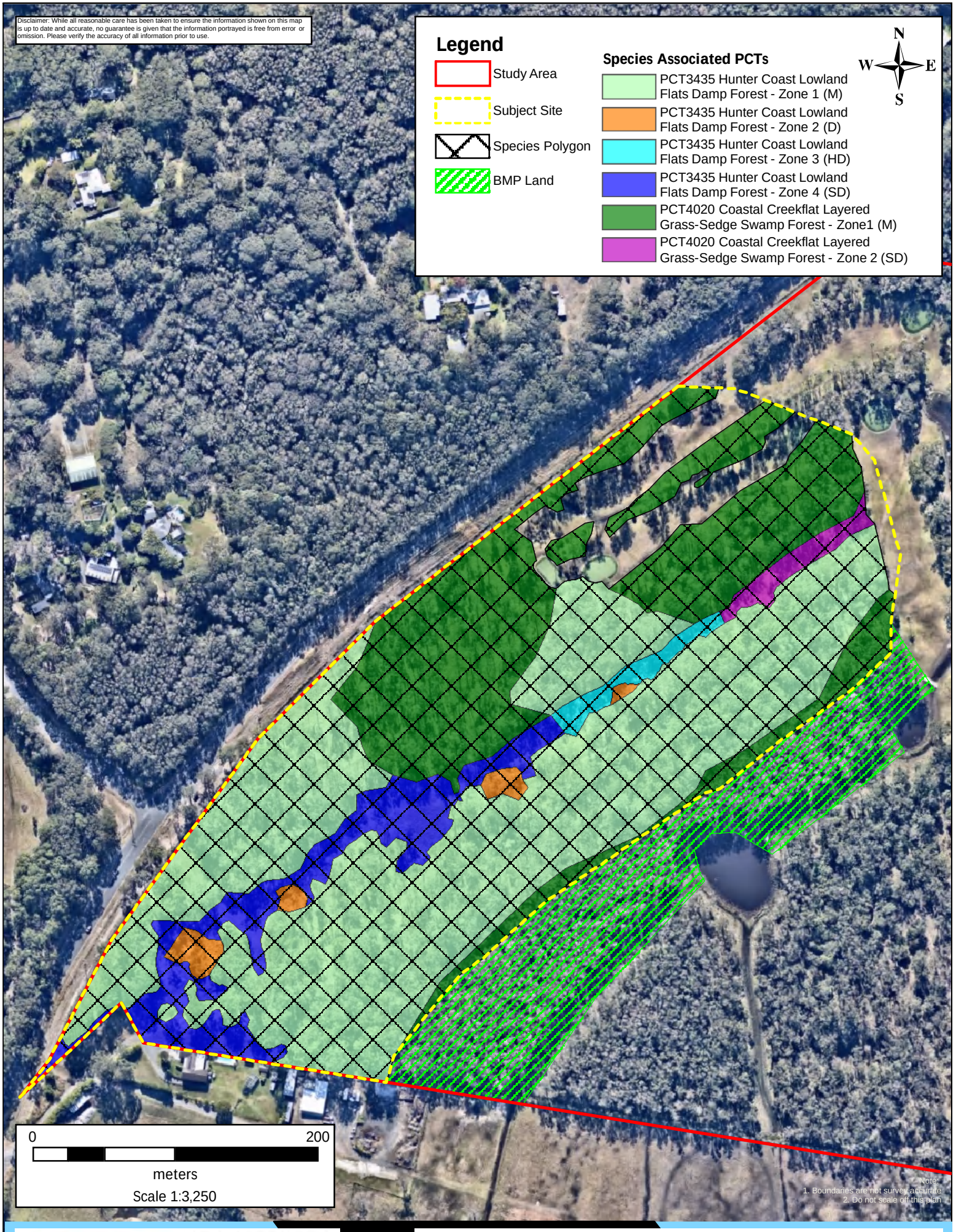
Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW

BOAMS: 42732

Client: Lands Advisory Services

AEP Ref: 3284



AEP

Figure 15 - Species Polygon Koala

Date: Oct 2024

Location: 3540 The Lakes Way, Charlotte Bay, NSW

BOAMS: 42732

Client: Lands Advisory Services

AEP Ref: 3284

3.0 Conclusion

Application of the BAM against the proposal has quantified current biodiversity values within the site and calculated offset requirements for residual impacts following avoid and mitigation efforts.

The vegetation within the site was found to be commensurate with PCT 3435 and PCT 4020. The remainder of the site comprised non-native vegetation golf course fairways.

The proposal will require impact to 12.46 ha of native vegetation described as PCT 3435 and 8.50 3.96 ha of PCT 4020. As a result, a total of 270 Ecosystem Credits will be required to be retired to offset the residual impacts to native vegetation and achieve a no net loss standard. With an additional 326 Species Credits for Koala, 120 Credits for Powerful Owl, and 233 Credits for Myotis.

4.0 References

Atlas of Living Australia (2022). *Search the Atlas of Living Australia*. Web address: https://www.ala.org.au/. Accessed October 2024.

Bureau of Meteorology (2022). *Climate Data sourced from BOM Website* http://www.bom.gov.au/climate/data/stations/. Accessed October 2024.

Cropper, S. (1993). *Management of endangered plants*. CSIRO Publications, Melbourne.

Department of Agriculture, Water and the Environment (2022). *Protected Matters Search Tool. Website: https://www.environment.gov.au/epbc/protected-matters-search-tool.* Accessed October 2024. Commonwealth Department of Agriculture, Water and the Environment, Canberra.

Department of Agriculture, Water and the Environment (2021b). *Species Profile and Threats Database. Website: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl*. Accessed October 2024. Commonwealth Department of Agriculture, Water and the Environment, Canberra.

Department of Environment and Climate Change (2002). *Description of NSW (BioNet NSW) Landscapes. Version 2 (2002)*. Webpage: http://www.environment.nsw.gov.au/resources/conservation/landscapesdescriptions.pdf Accessed October 2024.

Department of Planning, Industry and Environment (n.d.). *BioNet Threatened Biodiversity Data Collection.*

Webpage: https://www.environment.nsw.gov.au/asmslightprofileapp/account/login?ForceLogin=1. Accessed October 2024.

Department of Planning, Industry and Environment (2020a). *Biodiversity Assessment Method 2020*. NSW Department of Planning, Industry and Environment, Sydney.

Department of Planning, Industry and Environment (2021b). *BioNet Vegetation Classification.*

Webpage: https://www.environment.nsw.gov.au/research/Visclassification.htm. Accessed October 2024.

Department of Planning, Industry and Environment (2021*d). Threatened Biodiversity Profile Search*. Webpage: https://www.environment.nsw.gov.au/threatenedspeciesapp/. Accessed October 2024.

Department of Planning and Environment (2022) *Koala (Phascolarctos cinereus) Biodiversity Assessment Method Survey Guide*, June 2022

Harden, G (ed.) (2000) *Flora of New South Wales, Volume 1 (rev. ed.)*. UNSW, Kensington NSW.

Harden, G (ed.) (2002) *Flora of New South Wales, Volume 2 (rev. ed.)*. UNSW, Kensington NSW.

Harden, G (ed.) (1992) *Flora of New South Wales, Volume 3.* UNSW, Kensington NSW.

Harden, G (ed.) (1993) *Flora of New South Wales, Volume 4*. UNSW, Kensington NSW.

Keith D (2004) *Ocean Shores to Desert Dunes*. DEC, Sydney NSW.

Landcom (2004) *Managing Urban Stormwater: Soils and Construction* 4th edition. New South Wales Government, Parramatta, NSW.

Mitchell, P. (2002). *Descriptions for NSW Landscapes*. Web address: https://www.environment.nsw.gov.au/resources/conservation/landscapesdescriptions.pdf. Accessed October 2024. Department of Environment and Climate Change, NSW.

Murphy, B.W. (1994). *Soil Landscapes of The Great Lakes 1:100 000 sheet.* Department of Land & Water Conservation.

NSW Department of Environment and Conservation (2004) *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (working draft, November 2004). DEC, Sydney NSW

NSW Government (n.d.). *Species Sightings Search*. Webpage: https://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx. Accessed October 2024.

NSW Government (n.d.2). *BioNet Vegetation Classification*. Webpage: https://www.environment.nsw.gov.au/NSWVCA20PRapp/LoginPR.aspx. Accessed October 2024.

NSW Government (2021b). *BAM Calculator.* Webpage: https://www.lmbc.nsw.gov.au/bamcalc. Accessed October 2024.

NSW Department of Planning and Environment (2022). *State Vegetation Type Map. Edition C1.1.M1*. Unique Identifier 95437fbd-2ef7-44df-8579-d7a64402d42d

Raymond O.L., Warren A.Y.E. and Henderson G.A.M., (2000). *Dubbo 1:100 000 Geological Sheet 8633*. 1st edition. Geological Survey of New South Wales, Sydney & Geoscience Australia, Canberra

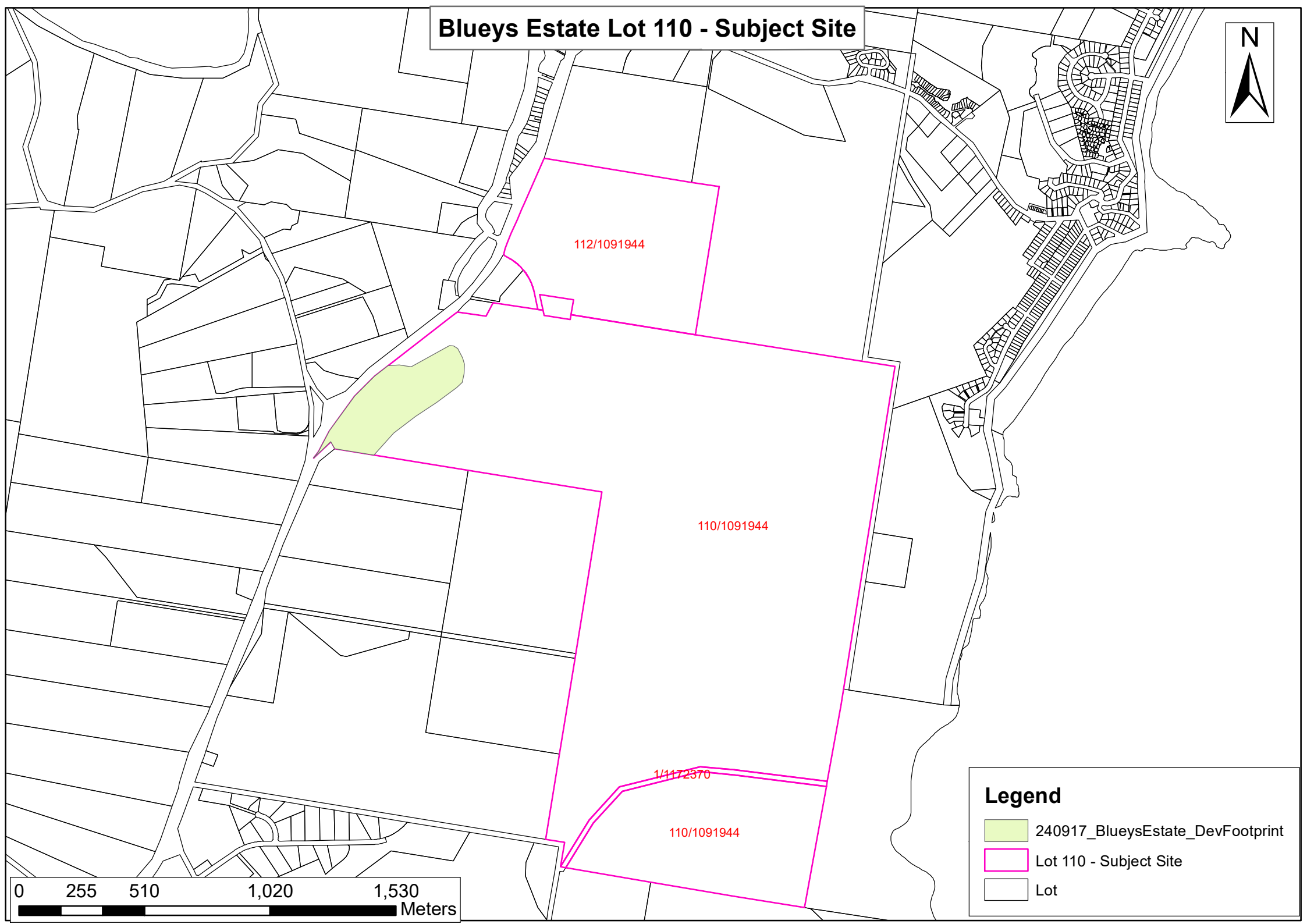
Robinson, L (1991) *Field Guide to the Native Plants of Sydney* (rev. 2nd ed.). Kangaroo Press.

Strahan, R (2004) *The Mammals of Australia*. New Holland Publishers, Chatswood NSW.

Wilson, S and Swan, G (2003) *A Complete Guide to Reptiles of Australia*. Reed New Holland Publishers, Chatswood NSW.

Thackway, R. and Cresswell, I.D. (eds) (1995). *An Interim Biogeographic Regionalisation for Australia: a framework for establishing the national system of reserves. Version 4.0*. Australian Nature Conservation Agency: Canberra.

Appendix A – Development Plan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Appendix B – Flora Species List

Flora List for Study Area

Family	Scientific Name	Common Name
Acanthaceae	*Brunoniella australis*	Blue Trumpet
Acanthaceae	*Pseuderanthemum variabile*	Pastel Flower
Adiantaceae	*Adiantum hispidulum*	Rough Maidenhair
Amaranthaceae	*Nyssanthes diffusa*	Barbwire Weed
Apiaceae	*Centella asiatica*	Indian Pennywort
Apiaceae	*Cyclospermum leptophyllum**	Slender Celery
Apiaceae	*Hydrocotyle bonariensis**	
Apiaceae	*Hydrocotyle sibthorpioides*	
Apiaceae	*Hydrocotyle tripartita*	Pennywort
Apocynaceae	*Gomphocarpus fruticosus**	Narrow-leaved Cotton Bush
Apocynaceae	*Parsonsia straminea*	Common Silkpod
Araceae	*Gymnostachys anceps*	Settlers Flax
Araliaceae	*Polyscias sambucifolia*	Elderberry Panax
Araliaceae	*Schefflera actinophylla**	Umbrella Tree
Arecaceae	*Archontophoenix cunninghamiana*	Bangalow Palm
Arecaceae	*Livistona australis*	Cabbage Palm
Asparagaceae	*Cordyline petiolaris*	Broad-leaved Palm Lily
Asphodelaceae	*Dianella caerulea*	Blue Flax-lily
Asphodelaceae	*Dianella caerulea var. producta*	
Aspleniaceae	*Asplenium spp.*	
Asteliaceae	*Cordyline stricta*	Narrow-leaf Palm Lily
Asteraceae	*Aster subulatus**	Wild Aster
Asteraceae	*Bidens pilosa**	Cobbler's Pegs
Asteraceae	*Cassinia aculeata*	Dolly Bush
Asteraceae	*Conyza bonariensis**	Flax-leaf Fleabane
Asteraceae	*Conyza spp.**	A Fleabane
Asteraceae	*Cyanthillium cinereum var. cinereum**	
Asteraceae	*Cyanthillium cinereum var. lanatum**	
Asteraceae	*Euchiton involucratus*	Star Cudweed
Asteraceae	*Euchiton sphaericus*	
Asteraceae	*Gamochaeta pensylvanica**	Cudweed
Asteraceae	*Gamochaeta spp.**	
Asteraceae	*Gazania linearis**	
Asteraceae	*Hypochaeris glabra**	Smooth Catsear
Asteraceae	*Hypochaeris radicata**	Catsear
Asteraceae	*Lagenophora stipitata*	Common Lagenophora
Asteraceae	*Olearia viscidula*	Wallaby Weed
Asteraceae	*Ozothamnus diosmifolius*	White Dogwood

Family	Scientific Name	Common Name
Asteraceae	*Senecio madagascariensis**	Fireweed
Asteraceae	*Senecio spp.**	Groundsel
Bignoniaceae	*Pandorea pandorana*	Wonga Wonga Vine
Blechnaceae	*Blechnum cartilagineum*	Gristle Fern
Blechnaceae	*Blechnum neohollandicum*	Prickly Rasp Fern
Blechnaceae	*Blechnum wattsii*	Hard Water Fern
Blechnaceae	*Doodia spp.*	
Blechnaceae	*Telmatoblechnum indicum*	Swamp Water Fern
Campanulaceae	*Lobelia purpurascens*	whiteroot
Campanulaceae	*Wahlenbergia gracilis*	Australian Bluebell
Casuarinaceae	*Allocasuarina littoralis*	Black She-oak
Casuarinaceae	*Allocasuarina torulosa*	Forest Oak
Casuarinaceae	*Casuarina glauca*	Swamp Oak
Clusiaceae	*Hypericum gramineum*	Small St John's Wort
Clusiaceae	*Hypericum spp.**	
Colchicaceae	*Burchardia umbellata*	Milkmaids
Commelinaceae	*Aneilema acuminatum*	
Commelinaceae	*Aneilema biflorum*	
Commelinaceae	*Commelina cyanea*	Scurvy Weed
Convolvulaceae	*Calystegia soldanella*	
Convolvulaceae	*Calystegia spp.**	
Convolvulaceae	*Dichondra repens*	Kidney Weed
Convolvulaceae	*Polymeria calycina*	
Cunoniaceae	*Callicoma serratifolia*	Black Wattle
Cunoniaceae	*Ceratopetalum apetalum*	Coachwood
Cunoniaceae	*Ceratopetalum gummiferum*	NSW Christmas Bush
Cyperaceae	*Baumea teretifolia*	Wrinkle-nut Twig Rush
Cyperaceae	*Carex appressa*	Tall Sedge
Cyperaceae	*Carex breviculmis*	
Cyperaceae	*Carex inversa*	Knob Sedge
Cyperaceae	*Carex longebrachiata*	
Cyperaceae	*Chorizandra cymbaria*	
Cyperaceae	*Cyperus brevifolius**	
Cyperaceae	*Cyperus eragrostis**	Umbrella Sedge
Cyperaceae	*Cyperus imbecillis*	
Cyperaceae	*Cyperus polystachyos*	
Cyperaceae	*Cyperus sanguinolentus*	
Cyperaceae	*Cyperus spp.*	
Cyperaceae	*Eleocharis cylindrostachys*	
Cyperaceae	*Fimbristylis dichotoma*	Common Fringe-sedge

Family	Scientific Name	Common Name
Cyperaceae	*Gahnia aspera*	Saw Sedge
Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge
Cyperaceae	*Isolepis inundata*	Swamp Club-rush
Cyperaceae	*Lepidosperma filiforme*	
Cyperaceae	*Lepidosperma laterale*	Variable Sword-sedge
Cyperaceae	*Lepidosperma spp.*	
Cyperaceae	*Lepidosperma tortuosum*	
Cyperaceae	*Ptilothrix deusta*	
Cyperaceae	*Schoenus apogon*	Fluke Bogrush
Cyperaceae	*Schoenus brevifolius*	
Davalliaceae	*Davallia solida var. pyxidata*	Hare's Foot Fern
Dennstaedtiaceae	*Hypolepis muelleri*	Harsh Ground Fern
Dennstaedtiaceae	*Pteridium esculentum*	Bracken
Dicksoniaceae	*Calochlaena dubia*	Rainbow Fern
Dilleniaceae	*Hibbertia aspera*	Rough Guinea Flower
Dilleniaceae	*Hibbertia aspera subsp. aspera*	
Dilleniaceae	*Hibbertia dentata*	Twining Guinea Flower
Dilleniaceae	*Hibbertia obtusifolia*	Grey Guinea Flower
Dilleniaceae	*Hibbertia scandens*	Climbing Guinea Flower
Dioscoreaceae	*Dioscorea transversa*	Native Yam
Droseraceae	*Drosera auriculata*	Sundew
Droseraceae	*Drosera spatulata*	
Dryopteridaceae	*Cyrtomium falcatum cv. 'Rochfordii'**	Holly Fern
Ebenaceae	*Diospyros australis*	Black Plum
Elaeocarpaceae	*Elaeocarpus reticulatus*	Blueberry Ash
Ericaceae	*Epacris microphylla*	Coral Heath
Ericaceae	*Epacris pulchella*	Wallum Heath
Ericaceae	*Leucopogon ericoides*	Pink Beard-heath
Ericaceae	*Leucopogon lanceolatus*	Lance-leaf Beard-heath
Ericaceae	*Monotoca scoparia*	
Ericaceae	*Trochocarpa laurina*	Tree Heath
Euphorbiaceae	*Breynia oblongifolia*	Coffee Bush
Euphorbiaceae	*Homalanthus populifolius*	Bleeding Heart
Eupomatiaceae	*Eupomatia laurina*	
Fabaceae	*Abarema spp.**	Abarema
Fabaceae	*Acacia binervata*	Two-veined Hickory
Fabaceae	*Acacia falcata*	Sickle Wattle
Fabaceae	*Acacia fimbriata*	Fringed Wattle
Fabaceae	*Acacia floribunda*	White Sally
Fabaceae	*Acacia longifolia*	

Family	Scientific Name	Common Name
Fabaceae	*Acacia longifolia subsp. longifolia*	Sydney Golden Wattle
Fabaceae	*Acacia maidenii*	Maiden's Wattle
Fabaceae	*Acacia myrtifolia*	Red Stem Wattle
Fabaceae	*Acacia saligna**	Golden Wreath Wattle
Fabaceae	*Acacia spp.*	
Fabaceae	*Acacia stricta*	Straight Wattle
Fabaceae	*Acacia ulicifolia*	Prickly Moses
Fabaceae	*Bossiaea heterophylla*	Variable Bossiaea
Fabaceae	*Daviesia ulicifolia*	Gorse Bitter Pea
Fabaceae	*Desmodium rhytidophyllum*	
Fabaceae	*Desmodium varians*	Slender Tick-trefoil
Fabaceae	*Glycine clandestina*	Twining Glycine
Fabaceae	*Glycine microphylla*	Small-leaf Glycine
Fabaceae	*Glycine tabacina*	Twining Glycine
Fabaceae	*Gompholobium pinnatum*	Pinnate Wedge-pea
Fabaceae	*Grona varians*	
Fabaceae	*Hardenbergia violacea*	False Sarsparilla
Fabaceae	*Indigofera australis*	Australian indigo
Fabaceae	*Kennedia rubicunda*	Dusky Coral Pea
Fabaceae	*Lotus subbiflorus**	
Fabaceae	*Maekawaea rhytidophylla*	
Fabaceae	*Medicago spp.**	
Fabaceae	*Platylobium formosum*	Handsome Flat-pea
Fabaceae	*Platylobium parviflorum*	Handsome Flat-pea
Fabaceae	*Pultenaea blakelyi*	
Fabaceae	*Pultenaea daphnoides*	Large-leaf Bush Pea
Fabaceae	*Pultenaea paleacea*	Chaffy Bush-pea
Fabaceae	*Pultenaea retusa*	
Fabaceae	*Senna pendula var. glabrata**	
Fabaceae	*Senna pendula**	
Fabaceae	*Swainsona galegifolia*	Smooth Darling Pea
Fabaceae	*Trifolium repens**	White Clover
Flagellariaceae	*Flagellaria indica*	Whip Vine
Gentianaceae	*Centaurium tenuiflorum**	Branched Centaury
Goodeniaceae	*Brunonia australis*	Blue Pincushion
Goodeniaceae	*Goodenia bellidifolia*	
Goodeniaceae	*Goodenia heterophylla*	
Goodeniaceae	*Goodenia heterophylla subsp. eglandulosa*	
Goodeniaceae	*Goodenia paniculata*	

Family	Scientific Name	Common Name
Goodeniaceae	*Goodenia spp.*	
Haloragaceae	*Gonocarpus micranthus*	
Haloragaceae	*Gonocarpus tetragynus*	Poverty Raspwort
Haloragaceae	*Gonocarpus teucrioides*	Germander Raspwort
Icacinaceae	*Citronella moorei*	Churnwood
Iridaceae	*Patersonia glabrata*	Leafy Purple-flag
Iridaceae	*Patersonia sericea*	Wild Iris
Juncaceae	*Juncus cognatus**	
Juncaceae	*Juncus continuus*	
Juncaceae	*Juncus holoschoenus*	
Juncaceae	*Juncus planifolius*	Broad Rush
Juncaceae	*Juncus spp.*	
Juncaceae	*Juncus subsecundus*	Finger Rush
Juncaceae	*Juncus usitatus*	
Lamiaceae	*Clerodendrum tomentosum*	Hairy Clerodendrum
Lauraceae	*Cassytha glabella*	
Lauraceae	*Cryptocarya glaucescens*	Jackwood
Lauraceae	*Endiandra discolor*	Rose Walnut
Lindsaeaceae	*Lindsaea linearis*	Screw Fern
Lobeliaceae	*Lobelia anceps*	
Loganiaceae	*Logania albiflora*	
Lomandraceae	*Lomandra brevis*	
Lomandraceae	*Lomandra filiformis*	Wattle Matt-rush
Lomandraceae	*Lomandra glauca*	Pale Mat-rush
Lomandraceae	*Lomandra hystrix*	
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush
Lomandraceae	*Lomandra multiflora subsp. multiflora*	Many-flowered Mat-rush
Lomandraceae	*Lomandra spicata*	
Luzuriagaceae	*Eustrephus latifolius*	Wombat Berry
Luzuriagaceae	*Geitonoplesium cymosum*	Scrambling Lily
Malvaceae	*Sida rhombifolia**	Paddy's Lucerne
Meliaceae	*Synoum glandulosum subsp.glandulosum*	Scentless Rosewood
Menispermaceae	*Stephania japonica*	Snake vine
Menispermaceae	*Sarcopetalum harveyanum*	Pearl Vine
Monimiaceae	*Daphnandra apatela*	
Monimiaceae	*Wilkiea huegeliana*	Wilkiea
Moraceae	*Ficus coronata*	Sandpaper Fig
Moraceae	*Ficus obliqua*	Small-leaved Fig
Moraceae	*Trophis scandens*	Burny Vine

Family	Scientific Name	Common Name
Myrsinaceae	*Myrsine variabilis*	Muttonwood
Myrtaceae	*Acmena smithii*	Lillypilly
Myrtaceae	*Angophora costata*	Sydney Red Gum
Myrtaceae	*Angophora floribunda*	Rough-barked Apple
Myrtaceae	*Backhousia myrtifolia*	Grey Myrtle
Myrtaceae	*Callistemon citrinus*	Crimson Bottlebrush
Myrtaceae	*Callistemon salignus*	Willow Bottlebrush
Myrtaceae	*Corymbia maculata*	Spotted Gum
Myrtaceae	*Eucalyptus acmenoides*	White Mahogany
Myrtaceae	*Eucalyptus globoidea*	White Stringybark
Myrtaceae	*Eucalyptus grandis*	Flooded gum
Myrtaceae	*Eucalyptus microcorys*	Tallowwood
Myrtaceae	*Eucalyptus pilularis*	Blackbutt
Myrtaceae	*Eucalyptus piperita*	Sydney Peppermint
Myrtaceae	*Eucalyptus propinqua*	Small Fruited Grey Gum
Myrtaceae	*Eucalyptus punctata*	Grey Gum
Myrtaceae	*Eucalyptus resinifera*	Red Mahogany
Myrtaceae	*Eucalyptus robusta*	Swamp Mahogany
Myrtaceae	*Eucalyptus siderophloia*	Grey Ironbark
Myrtaceae	*Eucalyptus spp.*	
Myrtaceae	*Eucalyptus tereticornis*	Forest Red Gum
Myrtaceae	*Leptospermum polygalifolium*	Tantoon
Myrtaceae	*Leptospermum polygalifolium subsp. polygalifolium*	
Myrtaceae	*Lophostemon confertus*	Brush Box
Myrtaceae	*Lophostemon suaveolens*	Swamp Mahogany
Myrtaceae	*Melaleuca linariifolia*	Flax-leaved Paperbark
Myrtaceae	*Melaleuca quinquenervia*	Broad-leaved Paperbark
Myrtaceae	*Melaleuca sieberi*	
Myrtaceae	*Rhodamnia rubescens*	Scrub Turpentine
Myrtaceae	*Rhodomyrtus psidioides*	Native Guava
Myrtaceae	*Syncarpia glomulifera*	Turpentine
Myrtaceae	*Syzygium australe*	Brush Cherry
Ochnaceae	*Ochna serrulata**	Mickey Mouse Plant
Oleaceae	*Notelaea longifolia*	Large Mock-olive
Oleaceae	*Notelaea longifolia f. longifolia*	
Oleaceae	*Notelaea ovata*	Mock Olive
Orchidaceae	*Caladenia carnea*	Pink Finger Orchid
Orchidaceae	*Caladenia catenata*	White Finger Orchid
Orchidaceae	*Calanthe triplicata*	Christmas Orchid

Family	Scientific Name	Common Name
Orchidaceae	*Cryptostylis erecta*	Tartan Tongue Orchid
Orchidaceae	*Cryptostylis spp.*	
Orchidaceae	*Cryptostylis subulata*	Large Tongue Orchid
Orchidaceae	*Cymbidium suave*	Snake Orchid
Orchidaceae	*Pterostylis baptistii*	King Greenhood
Orchidaceae	*Pterostylis spp.*	Greenhood
Orchidaceae	*Thelymitra spp.*	
Oxalidaceae	*Oxalis exilis*	
Oxalidaceae	*Oxalis perennans*	Yellow-flowered Wood Sorrel
Oxalidaceae	*Oxalis spp.*	
Philydraceae	*Philydrum lanuginosum*	Woolly Frogmouth
Phyllanthaceae	*Glochidion ferdinandi*	Cheese Tree
Phyllanthaceae	*Glochidion ferdinandi var. ferdinandi*	Cheese Tree
Pinaceae	*Pinus radiata**	Radiata Pine
Pittosporaceae	*Billardiera scandens*	Hairy Apple Berry
Pittosporaceae	*Pittosporum revolutum*	Yellow Pittosporum
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum
Plantaginaceae	*Plantago lanceolata**	Lamb's Tongues
Poaceae	*Andropogon virginicus**	Whisky Grass
Poaceae	*Axonopus fissifolius**	Narrow-leafed Carpet Grass
Poaceae	*Cenchrus clandestinus**	Kikuyu Grass
Poaceae	*Cymbopogon refractus*	Barbed Wire Grass
Poaceae	*Cynodon dactylon*	Common Couch
Poaceae	*Cynodon spp.*	
Poaceae	*Deyeuxia quadriseta*	Reed Bent Grass
Poaceae	*Digitaria parviflora*	Small-flowered Finger Grass
Poaceae	*Echinopogon caespitosus*	Bushy Hedgehog-grass
Poaceae	*Echinopogon ovatus*	Forest Hedgehog Grass
Poaceae	*Ehrharta erecta**	Panic Veldgrass
Poaceae	*Entolasia marginata*	Bordered Panic
Poaceae	*Entolasia stricta*	Wiry Panic
Poaceae	*Eragrostis brownii*	Brown's Lovegrass
Poaceae	*Hemarthria uncinata*	Matgrass
Poaceae	*Holcus spp.**	
Poaceae	*Imperata cylindrica*	Blady Grass
Poaceae	*Microlaena stipoides*	Weeping Grass
Poaceae	*Microlaena stipoides var. stipoides*	Weeping Grass
Poaceae	*Oplismenus aemulus*	Basket Grass
Poaceae	*Oplismenus imbecillis*	
Poaceae	*Panicum simile*	Two-colour Panic

Family	Scientific Name	Common Name
Poaceae	*Paspalidium distans*	
Poaceae	*Paspalum dilatatum**	Paspalum
Poaceae	*Paspalum distichum*	Water Couch
Poaceae	*Paspalum mandiocanum**	Broadleaf Paspalum
Poaceae	*Paspalum urvillei**	Vasey Grass
Poaceae	*Poa affinis*	
Poaceae	*Poa labillardierei var. labillardierei*	Tussock
Poaceae	*Rytidosperma sp.*	A Wallaby Grass
Poaceae	*Rytidosperma tenuius*	
Poaceae	*Setaria pumila**	Pale Pigeon Grass
Poaceae	*Setaria sphacelata**	South African Pigeon Grass
Poaceae	*Sporobolus africanus**	Parramatta Grass
Poaceae	*Sporobolus creber*	Slender Rat's Tail Grass
Poaceae	*Stenotaphrum secundatum**	Buffalo Grass
Poaceae	*Themeda triandra*	
Polygalaceae	*Comesperma ericinum*	Pyramid Flower
Polygalaceae	*Comesperma spp.*	
Polypodiaceae	*Platycerium bifurcatum*	Elkhorn
Proteaceae	*Lomatia silaifolia*	Crinkle Bush
Proteaceae	*Persoonia levis*	Broad-leaved Geebung
Proteaceae	*Persoonia linearis*	Narrow-leaved Geebung
Ranunculaceae	*Clematis aristata*	Old Man's Beard
Ranunculaceae	*Clematis glycinoides var. glycinoides*	Headache Vine
Ranunculaceae	*Ranunculus inundatus*	River Buttercup
Ranunculaceae	*Ranunculus lappaceus*	Glossy Buttercup
Restionaceae	*Empodisma minus*	Spreading Rope-rush
Restionaceae	*Leptocarpus tenax*	
Restionaceae	*Lepyrodia muelleri*	
Restionaceae	*Lepyrodia scariosa*	Scale Rush
Rhamnaceae	*Alphitonia excelsa*	Red Ash
Rosaceae	*Malus domestica**	Apple
Rosaceae	*Rubus anglocandicans**	Blackberry
Rosaceae	*Rubus fruticosus sp. agg**	Blackberry complex
Rosaceae	*Rubus moluccanus*	Broad-leaf Bramble
Rosaceae	*Rubus moluccanus var. moluccanus*	
Rubiaceae	*Gynochthodes jasminoides*	Sweet Morinda
Rubiaceae	*Opercularia diphylla*	
Rubiaceae	*Opercularia spp.*	
Rubiaceae	*Pomax umbellata*	Pomax
Rubiaceae	*Richardia humistrata**	

Family	Scientific Name	Common Name
Rutaceae	*Zieria smithii*	
Santalaceae	*Exocarpos cupressiformis*	Native Cherry
Santalaceae	*Exocarpos strictus*	Pale-fruit Ballart
Sapindaceae	*Cupaniopsis anacardioides*	Tuckeroo
Sapindaceae	*Dodonaea triquetra*	Large-leaf Hop-bush
Sapindaceae	*Dodonaea viscosa*	Sticky Hop-bush
Sapindaceae	*Guioa semiglauca*	Guioa
Sapindaceae	*Rhysotoechia bifoliolata subsp. bifoliolata*	Two-leaved Tuckeroo
Sinopteridaceae	*Pellaea falcata*	Sickle Fern
Sinopteridaceae	*Pellaea paradoxa*	
Smilacaceae	*Ripogonum album*	White Supplejack
Smilacaceae	*Smilax australis*	Lawyer Vine
Smilacaceae	*Smilax glyciphylla*	Sweet Sarsparilla
Solanaceae	*Solanum nigrum**	Black Nightshade
Stylidiaceae	*Stylidium graminifolium*	Grass Trigger Plant
Symplocaceae	*Symplocos thwaitsii*	Buff Hazelwood
Thymelaeaceae	*Pimelea linifolia*	Slender Rice Flower
Tremandraceae	*Tetratheca thymifolia*	Black-eyed Susan
Uvulariaceae	*Tripladenia cunninghamii*	
Verbenaceae	*Lantana camara**	Lantana
Verbenaceae	*Verbena bonariensis**	Purpletop
Verbenaceae	*Verbena spp.**	
Violaceae	*Viola betonicifolia*	Native Violet
Violaceae	*Viola hederacea*	Ivy-leaved Violet
Vitaceae	*Cissus antarctica*	Kangaroo Vine
Vitaceae	*Cissus hypoglauca*	Water Vine
Xanthorrhoeaceae	*Xanthorrhoea spp.*	
Zingiberaceae	*Alpinia caerulea*	Native Ginger

* Denotes an exotic species

Appendix C – Fauna Species List

OBSERVED FAUNA SPECIES LIST

The following list includes fauna species that could be reasonably expected to occur on the Subject Site at some point, given site attributes and location.

“Threatened species listed under the BC Act or the EPBC Act are indicated in bold font.

Surveyed Observations used within Site:

- Observed (O);
- Heard (W);
- Scat (P);
- Miscellaneous (M);
- Track/scratchings (F); and
- Nest (E), Burrow (FB).

Bat Records used within Site:

- Observed (O);
- Definitely (D);
- Possible or within Species Group (P); and
- Likely (L).

Survey Equipment used to observe fauna within the Subject Site:

- Anabat (A);
- Songmeter (SM);
- Camera Trap (CT); and
- Harp Trap (HT).

Scientific Name	Common Name	NSW status	Comm. status	BioNet Atlas Records	Surveyed Observations	Survey Equipment
Amphibia						
Crinia signifera	Common Eastern Froglet	P	-	45	W	
Limnodynastes peronii	Brown-striped Frog	P	-	51	W	
Litoria fallax	Eastern Sedge-frog	P	-	78	W	
Pseudophryne coriacea	Red-backed Toadlet	P	-	47	O	
Aves						
Acanthiza lineata	Striated Thornbill	P	-	15	W	
Acanthiza nana	Yellow Thornbill	P	-	22	W	
Acanthiza pusilla	Brown Thornbill	P	-	46	W	
Acanthorhynchus tenuirostris	Eastern Spinebill	P	-	43	W	
Accipiter novaehollandiae	Grey Goshawk	P	-	7	O	
Ailuroedus crassirostris	Green Catbird	P	-	14	W	
Alisterus scapularis	Australian King Parrot	P	-	17	W	
Anas superciliosa	Pacific Black Duck	P	-	11	OW	
Anthochaera carunculata	Red Wattlebird	P	-	33	W	
Anthochaera chrysoptera	Little Wattlebird	P	-	70	OW	
Aquila audax	Wedge-tailed Eagle	P	-	5	O	
Ardea pacifica	White-necked Heron	P	-	3	O	
Cacatua sanguinea	Little Corella	P	-	4	W	
Cacomantis flabelliformis	Fan-tailed Cuckoo	P	-	19	W	
Cacomantis variolosus	Brush Cuckoo	P	-	4	W	
Caligavis chrysops	Yellow-faced Honeyeater	P	-	58	OW	

Scientific Name	Common Name	NSW status	Comm. status	BioNet Atlas Records	Surveyed Observations	Survey Equipment
Calyptorhynchus lathami	**South-eastern Glossy Black-Cockatoo**	**V**	**V**	**21**	**OW**	
Ceyx azureus	Azure Kingfisher	P	-	3	O	
Chenonetta jubata	Australian Wood Duck	P	-	14	OW	
Circus approximans	Swamp Harrier	P	-	1	O	
Colluricincla harmonica	Grey Shrike-thrush	P	-	33	OW	
Columba leucomela	White-headed Pigeon	P	-	11	O	
Coracina novaehollandiae	Black-faced Cuckoo-shrike	P	-	20	O	
Cormobates leucophaea	White-throated Treecreeper	P	-	50	OW	
Corvus coronoides	Australian Raven	P	-	25	OW	
Corvus orru	Torresian Crow	P	-	25	OW	
Cracticus nigrogularis	Pied Butcherbird	P	-	27	OW	
Cracticus torquatus	Grey Butcherbird	P	-	19	O	
Dacelo novaeguineae	Laughing Kookaburra	P	-	148	OW	CT
Dicaeum hirundinaceum	Mistletoebird	P	-	13	O	
Egretta novaehollandiae	White-faced Heron	P	-	27	O	
Elanus axillaris	Black-shouldered Kite	P	-	3	O	
Entomyzon cyanotis	Blue-faced Honeyeater	P	-	1	O	
Eolophus roseicapilla	Galah	P	-	32	OW	
Eopsaltria australis	Eastern Yellow Robin	P	-	75	OW	CT
Glossopsitta concinna	Musk Lorikeet	P	-	10	W	
Grallina cyanoleuca	Magpie-lark	P	-	12	OW	

Scientific Name	Common Name	NSW status	Comm. status	BioNet Atlas Records	Surveyed Observations	Survey Equipment
Gymnorhina tibicen	Australian Magpie	P	-	86	OW	CT
Haliaeetus leucogaster	White-bellied Sea-Eagle	V, P	-	51	O	
Leucosarcia melanoleuca	Wonga Pigeon	P	-	20	OW	
Lopholaimus antarcticus	Topknot Pigeon	P	-	7	O	
Malurus cyaneus	Superb Fairy-wren	P	-	51	OW	
Malurus lamberti	Variegated Fairy-wren	P	-	35	OW	
Meliphaga lewinii	Lewin's Honeyeater	P	-	113	OW	
Myzomela sanguinolenta	Scarlet Honeyeater	P	-	23	OW	
Neochmia temporalis	Red-browed Finch	P	-	46	OW	
Ninox novaeseelandiae	Southern Boobook	P	-	13	W	
Ninox strenua	**Powerful Owl**	**V, P, 3**	**-**	**8**	**OW**	
Oriolus sagittatus	Olive-backed Oriole	P	-	24	W	
Pachycephala pectoralis	Golden Whistler	P	-	53	OW	
Pachycephala rufiventris	Rufous Whistler	P	-	22	OW	CT
Pardalotus punctatus	Spotted Pardalote	P	-	24	W	
Pardalotus striatus	Striated Pardalote	P	-	4	W	
Pelecanus conspicillatus	Australian Pelican	P	-	59	O	
Philemon corniculatus	Noisy Friarbird	P	-	60	OW	
Platycercus eximius	Eastern Rosella	P	-	19	OW	
Porphyrio porphyrio	Purple Swamphen	P	-	2	OW	
Psophodes olivaceus	Eastern Whipbird	P	-	53	W	
Ptilonorhynchus violaceus	Satin Bowerbird	P	-	31	W	
Rhipidura albiscapa	Grey Fantail	P	-	64	OW	CT

Scientific Name	Common Name	NSW status	Comm. status	BioNet Atlas Records	Surveyed Observations	Survey Equipment
Rhipidura leucophrys	Willie Wagtail	P	-	45	OW	
Sericornis frontalis	White-browed Scrubwren	P	-	38	W	
Sphecotheres vieilloti	Australasian Figbird	P	-	28	W	
Strepera graculina	Pied Currawong	P	-	49	W	
Todiramphus sanctus	Sacred Kingfisher	P	-	21	O	
Trichoglossus chlorolepidotus	Scaly-breasted Lorikeet	P	-	50	OW	
Trichoglossus haematodus	Rainbow Lorikeet	P	-	128	OW	
Vanellus miles	Masked Lapwing	P	-	47	OW	
Zanda funereus	Yellow-tailed Black-Cockatoo	P	-	20	OW	
Mammalia						
Acrobates pygmaeus	Feathertail Glider	P	-	27	O	CT
Antechinus stuartii	Brown Antechinus	P	-	66	O	CT
Austronomus australis	White-striped Freetail-bat	P	-	3	W	
Canis lupus dingo	Dingo	P	-	2	O	
Isoodon sp.	Unidentified Bandicoot	P	-	3	F	
Macropus giganteus	Eastern Grey Kangaroo	P	-	11	O	CT
Macropus sp.	Kangaroo / wallaby	P	-	23	W	
Myotis macropus	Southern Myotis	V, P	-	16	O	
Perameles nasuta	Long-nosed Bandicoot	P	-	8	F	
Petaurus breviceps	Sugar Glider	P	-	22	O	CT
Phascolarctos cinereus	Koala	E1, P	E	**91**	**P**	
Pseudocheirus peregrinus	Common Ringtail Possum	P	-	9	O	

Scientific Name	Common Name	NSW status	Comm. status	BioNet Atlas Records	Surveyed Observations	Survey Equipment
Pteropus poliocephalus	Grey-headed Flying-fox	V, P	V	**21**	**OW**	
Trichosurus vulpecula	Common Brushtail Possum	P	-	74	O	CT
Vulpes vulpes	Fox	P	-	8	O	
Reptilia						
Dendrelaphis punctulatus	Common Tree Snake	P	-	6	O	
Lampropholis delicata	Dark-flecked Garden Sunskink	P	-	9	O	
Pseudechis porphyriacus	Red-bellied Black Snake	P	-	12	O	
Varanus varius	Lace Monitor	P	-	17	O	CT

Appendix D – BAM Plot Data

Plot no: 1 **Job:** blueys **Job no:** 3824.01 **Date:** 22/02/24 **Observers:** CR & YB

Upper stratum	Unknown (Comment)	C	Ab	Mid stratum	(Comment)	C	Ab	Lower stratum	(Comment)	C	Ab
Eucalyptus robusta	Eucalyptus robusta	6	4	Parsonsia straminea	Parsonsia straminea	0.3	1	Paspalum dilatatum	Paspalum dilatatum	10	300
Melaleuca linariifolia	Melaleuca linifolia	3	3	Callistemon salignus	Callistemon salignus	0.3	1	Axonopus fissifolius	Axonopus fissifolius	15	600
Glochidion ferdinandi	Glochidion ferdinandi	0.3	3					Cynodon dactylon	Cynodon sp	55	1000
Melaleuca sieberi	Melaleuca seiberi	3	6					Senecio madagascariensis	Fireweed	0.1	5
Melaleuca quinquenervia	Melaleuca quinquinervia	0.5	1					Sporobolus africanus	Sporobolus africanus	1	100
Eucalyptus resinifera	Eucalyptus sp	0.5	1					Cyperus eragrostis	Cyperus sample	0.4	20
								Cyperus brevifolius	Mullumbimby couch	0.3	50
								Lepyrodia muelleri	Lepyrodia sp	1	3
								Juncus usitatus	Juncus sp	0.3	30
								Themeda triandra	Kangaroo grass	0.2	2
								Fimbristylis dichotoma	Fimbristylis dichotoma	0.2	10
								Juncus cognatus	Juncus cognatus	0.1	3
								Verbena bonariensis	Verbena bon	0.1	2
								Gahnia clarkei	Gahnia	3	10
								Paspalum urvillei	Paspalum urvellei	2	30
								Aster subulatus	Aster subulatus	0.1	3
								Leptocarpus tenax	Rush 2 seed head	1	4
								Centella asiatica	Centella asiatica	0.2	10
								Hypochaeris radicata	Hypochaeris radicata	0.1	1
Total Cover		13.3				0.6				90.1	

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

Arrival time:	9.55		**Departure time:**	11.15	**Weather:**	overcast	**photos (one landscape, one portrait) taken**	Done	**Transect GPS points taken**	Done
Start	453,730	6420266		**End**	453,721	6420217	**Zone:**	56	**Bearing:**	186
Tree Stem Size Class	**Presence(TRUE)/Absence(F**	**Number**	**Count of**	**Leaf Litter Cover within 5 x 1m2 sub-plots**						
< 5 cm	TRUE	[redacted]	0		**Leaf litter**	**Live**	**Bare ground**	**Rocks**	**Other**	**Total**
5 - 9 cm	FALSE	[redacted]	[redacted]	**1**	10	70	20	0	0	**100**
10 – 19 cm	TRUE	[redacted]	[redacted]	**2**	10	80	10	0	0	**100**
20 – 29 cm	TRUE	[redacted]	**Length of logs**	**3**	5	85	10	0	0	**100**
30 – 49cm	TRUE	1	0	**4**	20	75	5	0	0	**100**
50 -79cm	TRUE	4	[redacted]	**5**	30	60	10	0	0	**100**
>80cm	FALSE	0	[redacted]	**Average**	15	74	11	0	0	**100**
Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)										
weedy ground layer.										
Habitat features, comments and incidental fauna observations:										
no hbt										

Plot no:	2	Job:	blueys	Job no:	3284.01	Date:	22/02/24	Observers:	YB & CR

Upper stratum	(Comment)	C	Ab	Mid stratum	(Comment)	C	Ab	Lower stratum	Unknown (Comment)	C	Ab
Eucalyptus robusta	eucalyptus robusta	15	4	Melaleuca sieberi	Melaleuca sieberi	0.1	2	Paspalum urvillei	paspalum urvelei	15	100
Melaleuca quinquenervia	Melaleuca	25	6	Glochidion ferdinandi	glochidion	0.1	2	Cynodon dactylon	cynodon dactylon	50	1000
Livistona australis	livistona australis	3	1					Gahnia clarkei	gahnia clarkei	1	5
Angophora costata	angophora Costa	1	1					Sporobolus africanus	sporobolus	5	50
Eucalyptus resinifera	eucalyptus resinifera	0.5	1					Lepyrodia muelleri	lepyrodia scariosa	0.5	5
								Centella asiatica	centella Asiatics	0.2	50
								Senecio madagascariensis	senecio mad	0.1	5
								Hypochaeris radicata	hypochaeris radicata	0.1	20
								Cyperus eragrostis	cyperus eragrostis	1	50
								Axonopus fissifolius	axonopus fissifolius	10	100
								Juncus usitatus	juncus sp	0.1	10
								Andropogon virginicus	andropogon virginicus	0.1	5
								Sida rhombifolia	sida rhombifolia	0.1	10
								Rubus moluccanus var.	rubus mollucanus	0.1	1
								Cyclospermum leptophyllum	slender celery	0.1	1
								Cyanthillium cinereum var.	aster subulatus	0.1	1
								Pinus radiata	pinus radiata	0.1	1
								Cyperus brevifolius	cyperus brevifolius	0.1	10
								Medicago spp.	medicago sp	0.1	1
								Paspalum dilatatum	paspalum dilatatum	1	20
								Juncus cognatus	juncus cognatus	0.1	5
								Cryptostylis erecta	cryptostylis	0.1	1
								Hydrocotyle bonariensis	hydrocotyle bonariensis	0.1	5
Total Cover		44.5				0.2				85.1	

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

Arrival time:	10.1		**Departure time:**	11.25	**Weather:**	overcast humid	**photos (one landscape, one portrait) taken**	Done	**Transect GPS points taken**	Done
Start	453,670	6420209		**End**	453,702	6420182	**Zone:**	56	**Bearing:**	130
Tree Stem Size Class	**Presence(TRUE)/Absence(F**	**Number**	**Count of**	**Leaf Litter Cover within 5 x 1m2 sub-plots**						
< 5 cm	TRUE	[redacted]	2		**Leaf litter**	**Live**	**Bare ground**	**Rocks**	**Other**	**Total**
5 - 9 cm	FALSE	[redacted]	[redacted]	**1**	20	55	15	0	10	**100**
10 – 19 cm	FALSE	[redacted]		**2**	20	70	10	0	0	**100**
20 – 29 cm	TRUE	[redacted]	**Length of logs**	**3**	60	30	10	0	0	**100**
30 – 49cm	TRUE	13	0	**4**	30	70	0	0	0	**100**
50 -79cm	TRUE	10	[redacted]	**5**	60	40	0	0	0	**100**
>80cm	TRUE	1		**Average**	38	53	7	0	2	**100**
Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)										
Plot wet area										
Habitat features, comments and incidental fauna observations:										
Nil										

Plot no:	3	Job:	Charlottes way blueys	Job no:	3284.01	Date:	22/02/24	Observers:	CR & YB

Upper stratum	(Comment)	C	Ab	Mid stratum	(Comment)	C	Ab	Lower stratum	Unknown (Comment)	C	Ab
Angophora costata	Angophora costata	5	5	Senna pendula var.	Senna pendula	0.1	2	Goodenia heterophylla	Goodenia heterophylla	0.5	100
Glochidion ferdinandi	Glochidion ferdinandi	0.3	10	Pultenaea retusa	Pultanea refusal	0.1	3	Paspalidium distans	Paspalidium distans	0.3	25
Eucalyptus piperita	Eucalyptus piperita	10	4	Polyscias sambucifolia	Polyscias Sam	0.2	1	Entolasia stricta	Entiloasia stricta	0.5	50
Eucalyptus resinifera	Eucalyptus resinifera	3	2	Pittosporum undulatum	Pittosporum und	0.3	4	Imperata cylindrica	Imperata cylindrica	1	40
Eucalyptus globoidea	Eucalyptus globoidea	4	2	Acacia floribunda	acacia sp	0.3	2	Cryptostylis erecta	Cryptostylis erecta purple undersife	0.3	30
				Acacia ulicifolia	Acacia ulicifolia	0.3	3	Dianella caerulea	Dianella caerulea	0.4	10
				Maekawaea rhytidophylla	Kennedia rubicunda	0.2	4	Themeda triandra	Kangaroo grass	40	
				Lomandra longifolia	Lomandra long	2	25	Poa labillardierei var.	Poa sp.	5	30
								Ptilothrix deusta	Ptilotrix desuta	15	200
								Brunoniella australis	Brunoniella australis	0.1	2
								Comesperma ericinum	Comes per a	0.1	2
								Gahnia clarkei	Gahnia sp	0.3	5
								Gonocarpus teucrioides	Gonocarpus teucriodies	0.1	2
								Epacris pulchella	Epacris sp	0.3	10
								Centella asiatica	Centella asiatica	0.2	5
								Hibbertia scandens	Hinbbertia scandens	0.3	6
								Lepidosperma laterale	Lepidosperma laterale	0.3	3
								Hardenbergia violacea	Purple flower climber	0.2	5
								Lobelia purpurascens	Lobelia purp	0.1	3
								Hypochaeris radicata	Hypochaeris rad	0.2	5
								Viola betonicifolia	Viola bentonicifolia	0.1	3
								Hibbertia aspera	Hibbertia so	0.2	10
								Glycine clandestina	Glycine sp	0.1	2
								Oxalis exilis	Oxalis sp	0.1	1
								Paspalum dilatatum	Paspalum dil	0.3	10
								Rytidosperma tenuius	Rytidosperma	0.1	5
								Axonopus fissifolius	Axonopus fis	0.3	15
								Grona varians	Desmodium	0.1	1
								Billardiera scandens	Billardiera scandens	0.2	5
								Echinopogon ovatus	Eichonopgon ovatus	0.2	5
								Gamochaeta pensylvanica	Gamnochata	0.2	6
Total Cover		22.3				3.5				67.1	

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

Arrival time:	11.35	**1**	**Departure time:**	1	**Weather:**	overcast	**photos (one landscape, one portrait) taken**	Done	**Transect GPS points taken**	Done
Start	453,604	6420139		**End**	453,565	6420104	**Zone:**	56	**Bearing:**	233
Tree Stem Size Class	**Presence(TRUE)/Absence(F**	**Number**	**Count of**	**Leaf Litter Cover within 5 x 1m2 sub-plots**						
< 5 cm	TRUE	[redacted]	1		**Leaf litter**	**Live**	**Bare ground**	**Rocks**	**Other**	**Total**
5 - 9 cm	FALSE	[redacted]	[redacted]	**1**	90	10	0	0	0	**100**
10 – 19 cm	FALSE	[redacted]		**2**	95	20	0	0	0	**115**
20 – 29 cm	TRUE	[redacted]	**Length of logs**	**3**	95	20	0	0	0	**115**
30 – 49cm	TRUE	6	1	**4**	100	10	0	0	0	**110**
50 -79cm	TRUE	7	[redacted]	**5**	100	10	0	0	0	**110**
>80cm	TRUE	3		**Average**	96	14	0	0	0	**110**
Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)										
grazing										
Habitat features, comments and incidental fauna observations:										
1hbt										

Plot no:		4		Job:	blueys		Job no:	3284.01	Date:		22.2.24	Observers:	YB CR
Upper stratum	**Unknown (Comment)**	**C**	**Ab**	**Mid stratum**	**(Comment)**	**C**	**Ab**		**Lower stratum**	**Unknown (Comment)**	**C**	**Ab**	
Angophora costata	angophora Costa	10	3	Hibbertia dentata	hibbertia dentata	0.1	5		Cynodon dactylon	cynodon dactylon	5	100	
Eucalyptus globoidea	eucalyptus globoidea	8	2	Hibbertia aspera	hibbertia aspera	0.1	2		Imperata cylindrica	imperata cylindrica	1	50	
Eucalyptus piperita	eucalyptus piperita	1	1	Acacia longifolia subsp.	acacia longifolia	0.5	10		Cymbopogon refractus	cymbopogon refractus	1	50	
Eucalyptus pilularis	eucalyptus pilularis	10	1	Smilax glyciphylla	smilax glyciphylla	0.1	2		Lomandra longifolia	lomandra longifolia	1	20	
Eucalyptus microcorys	eucalyptus microcorys	5	1	Glochidion ferdinandi	glochidion	0.5	5		Axonopus fissifolius	axonopus fissifolius	30	200	
				Leptospermum	leptospermum poly	0.5	1		Pteridium esculentum	pteridium esculentum	0.1	10	
				Acacia ulicifolia	acacia ilicifolia	0.1	1		Dichondra repens	dichondra repens	0.2	20	
				Monotoca scoparia	monotoca	0.1	2		Dianella caerulea var. producta	dianella caerulea	0.1	10	
				Breynia oblongifolia	breynia oblongifolia	0.1	2		Sporobolus africanus	sporobolus africanus	0.5	20	
				Notelaea longifolia	notelaea lohgifolia	0.1	1		Hydrocotyle bonariensis	hydrocotyle bonariensis	0.1	20	
									Paspalum dilatatum	paspalum dilatatum	2	50	
									Sida rhombifolia	sida rhombifolia	0.1	10	
									Grona varians	desmodim Varians	0.1	5	
									Hardenbergia violacea	hardenbergia violacea	0.1	2	
									Hypochaeris radicata	hypochaeris radicata	0.1	20	
									Centella asiatica	centella Asiatica	0.5	50	
									Hypericum gramineum	hypericum	0.1	5	
									Cyanthillium cinereum var.	vernonia	0.1	1	
									Cryptostylis erecta	cryptostylis	0.1	15	
									Glycine clandestina	glycine clandestina	0.1	2	
									Hibbertia scandens	hibbertia scandens	0.1	2	
									Pomax umbellata	pomax umbellata	0.1	10	
									Lobelia purpurascens	lobelia purpura	0.1	1	
									Polymeria calycina	polymeria calcina	0.1	5	
									Plantago lanceolata	plantago lanceolata	0.1	20	
									Goodenia paniculata	goodenia hederacea	0.1	5	
									Themeda triandra	themeda triandra	30	200	
									Cyperus eragrostis	cyperus eragrostis	0.5	20	
									Hydrocotyle sibthorpioides	hydrocotyle sib	0.1	2	
									Calochlaena dubia	calochlaena dubia	0.1	5	
									Poa labillardierei var.	poa SP	0.1	1	
									Entolasia stricta	entolasia stricta	0.1	2	
									Entolasia marginata	entolasia marginata	0.1	5	
Total Cover		34				2.2					73.9		

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

Arrival time:	12.3		**Departure time:**	1.3	**Weather:**	sunny humid overcast	**photos (one landscape, one portrait) taken**	Done	**Transect GPS points taken**	Done
Start	453,675	6420040		**End**	453,657	6419994	**Zone:**	56	**Bearing:**	205
Tree Stem Size Class	**Presence(TRUE)/Absence(F**	**Number**	**Count of**	**Leaf Litter Cover within 5 x 1m2 sub-plots**						
< 5 cm	FALSE	[redacted]	5		**Leaf litter**	**Live**	**Bare ground**	**Rocks**	**Other**	**Total**
5 - 9 cm	FALSE	[redacted]	[redacted]	**1**	40	15	45	0	0	**100**
10 – 19 cm	TRUE	[redacted]	[redacted]	**2**	55	20	25	0	0	**100**
20 – 29 cm	FALSE	[redacted]	**Length of logs**	**3**	30	65	5	0	0	**100**
30 – 49cm	TRUE	11	10	**4**	25	70	5	0	0	**100**
50 -79cm	TRUE	5	[redacted]	**5**	55	5	40	0	0	**100**
>80cm	TRUE	4	[redacted]	**Average**	41	35	24	0	0	**100**
Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)										
Plot underscrunbed										
Habitat features, comments and incidental fauna observations:										

Plot no:	5	Job:	blueys	Job no:	3284.01	Date:	22/02/24	Observers:	CR

Upper stratum	(Comment)	C	Ab	Mid stratum	Unknown (Comment)	C	Ab	Lower stratum	(Comment)	C	Ab
Melaleuca quinquenervia	Mel quin	0.2	5	Hibbertia aspera	Hibbertia aspera	0.2	3	Cynodon spp.	Cynodon sp	5	200
Eucalyptus globoidea	Eucalyptus globoidea	0.1	3	Epacris pulchella	Epacris sp	0.2	4	Sporobolus africanus	Sporobolus africanus	5	100
Angophora costata	Angophora cost	0.1	2	Dodonaea triquetra	Dodonea tri	0.1	1	Hydrocotyle bonariensis	Hydrocotyle	0.2	10
Eucalyptus piperita	Eucalyptus piperita	0.1	5	Callistemon salignus	Callistemon sal	0.2	4	Axonopus fissifolius	Axonopus fis	10	100
				Swainsona galegifolia	swainsonia	0.1	1	Andropogon virginicus	Whiskey grass	3	50
								Gonocarpus micranthus	Gonocarpus	0.3	16
								Hypericum gramineum	Hypericum sp	0.2	25
								Goodenia paniculata	Goodenia belidiflora	0.4	100
								Hypochaeris radicata	Hypochaeris alblifpra	0.2	6
								Gamochaeta	Gamnochaeta sp	0.2	6
								Centella asiatica	Centella asiatica	0.2	5
								Lobelia purpurascens	Lobelia purp	0.1	4
								Cenchrus clandestinus	Buffalo	0.5	20
								Paspalum dilatatum	Paspalum dil	4	100
								Juncus usitatus	Juncus sp	0.2	3
								Polymeria calycina	Polymeric sp	0.3	9
								Lomandra longifolia	Lomandra long	0.2	4
								Dianella caerulea	Dianella caerulea	0.2	2
								Richardia humistrata	Richardia humifusa	0.2	4
								Gahnia clarkei	Gahnia sp	0.4	2
								Eragrostis brownii	Eragrostis	0.1	2
Total Cover		0.5				0.8				30.9	

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

Arrival time:	1.45		**Departure time:**	2.4	**Weather:**	Overcast sunny	**photos (one landscape, one portrait) taken**	Done	**Transect GPS points taken**	Done
Start	453,790	6420171		**End**	453,809	6420187	**Zone:**	56	**Bearing:**	38
Tree Stem Size Class	**Presence(TRUE)/Absence(F**	**Number**	**Count of**	**Leaf Litter Cover within 5 x 1m2 sub-plots**						
< 5 cm	TRUE	[redacted]	0		**Leaf litter**	**Live**	**Bare ground**	**Rocks**	**Other**	**Total**
5 - 9 cm	FALSE	[redacted]	[redacted]	**1**	10	55	30	5	0	**100**
10 – 19 cm	FALSE	[redacted]	[redacted]	**2**	10	30	60	0	0	**100**
20 – 29 cm	FALSE	[redacted]	**Length of logs**	**3**	10	35	55	0	0	**100**
30 – 49cm	FALSE	0	0	**4**	15	45	40	0	0	**100**
50 -79cm	FALSE	0	[redacted]	**5**	15	30	55	0	0	**100**
>80cm	FALSE	0	[redacted]	**Average**	12	39	48	1	0	**100**
Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)										
Eroded bare area										
Habitat features, comments and incidental fauna observations:										
mini BAM										

Plot no:	6	Job:	Charlottes way blueys	Job no:	3284.01	Date:	22.2.24	Observers:	YB CR

Upper stratum	(Comment)	C	Ab	Mid stratum	Unknown (Comment)	C	Ab	Lower stratum	Unknown (Comment)	C	Ab
				Melaleuca quinquenervia	Melaleuca quinquenervia	0.1	10	Themeda triandra	themeda triandra	30	200
				Eucalyptus spp.	eucalyptus SP	0.1	1	Cynodon dactylon	cynodon dactylon	1	50
				Epacris pulchella	epacris pulchella	0.1	2	Axonopus fissifolius	axonopus fissifolius	10	100
				Glochidion ferdinandi var.	glochidion	0.1	1	Hypochaeris radicata	hypochaeris radicata	0.1	5
								Goodenia paniculata	goodenia bellidifolia	0.1	5
								Paspalidium distans	paspalidium distans	0.1	10
								Juncus spp.	juncus SP	1	50
								Paspalum dilatatum	paspalum dilatatum	0.5	20
								Poa labillardierei var.	poa SP	30	200
								Andropogon virginicus	andropogon virginicus	1	20
								Lepidosperma spp.	lepidosperma SP	1	100
								Panicum simile	panicum simile	0.5	20
								Entolasia stricta	entolasia stricta	0.1	10
								Lomandra longifolia	lomandra longifolia	0.1	5
Total Cover		0				0.4				75.5	

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

Arrival time:	1.5		**Departure time:**	14.25	**Weather:**	overcast	**photos (one landscape, one portrait) taken**	Done	**Transect GPS points taken**	Done
Start	453,899	6420246		**End**	453,876	6420230	**Zone:**	56	**Bearing:**	237
Tree Stem Size Class	**Presence(TRUE)/Absence(F**	**Number**	**Count of**	**Leaf Litter Cover within 5 x 1m2 sub-plots**						
< 5 cm	TRUE	[redacted]	0		**Leaf litter**	**Live**	**Bare ground**	**Rocks**	**Other**	**Total**
5 - 9 cm	FALSE	[redacted]	[redacted]	**1**	60	40	0	0	0	**100**
10 – 19 cm	FALSE	[redacted]	[redacted]	**2**	70	30	0	0	0	**100**
20 – 29 cm	FALSE	[redacted]	**Length of logs**	**3**	40	60	0	0	0	**100**
30 – 49cm	FALSE	0	0	**4**	40	60	0	0	0	**100**
50 -79cm	FALSE	0	[redacted]	**5**	60	30	10	0	0	**100**
>80cm	FALSE	0	[redacted]	**Average**	54	44	2	0	0	**100**
Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)										
grazed light weed										
Habitat features, comments and incidental fauna observations:										
mini bam 10x25										

Plot no:	7	Job:	blueys	Job no:	3284.01	Date:	22.2.24	Observers:	YB CR

Upper stratum	(Comment)	C	Ab	Mid stratum	(Comment)	C	Ab	Lower stratum	(Comment)	C	Ab
								Cynodon dactylon	cynodon dactylon	60	500
								Paspalum dilatatum	paspalum dilatatum	20	100
								Axonopus fissifolius	axonopus fissifolius	5	50
								Hypochaeris radicata	hypochaeris radicata	0.1	5
								Sporobolus africanus	sporobolus africanus	0.1	5
								Fimbristylis dichotoma	fimbristylis dichotoma	0.1	5
Total Cover		0				0				85.3	

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

Arrival time:	2.3		**Departure time:**	3	**Weather:**	Overcast	**photos (one landscape, one portrait) taken**	Done	**Transect GPS points taken**	Done
Start	453,660	6420113		**End**	453,640	6420096	**Zone:**	56	**Bearing:**	235
Tree Stem Size Class	**Presence(TRUE)/Absence(F**	**Number**	**Count of**	**Leaf Litter Cover within 5 x 1m2 sub-plots**						
< 5 cm	FALSE	[redacted]	0		**Leaf litter**	**Live**	**Bare ground**	**Rocks**	**Other**	**Total**
5 - 9 cm	FALSE	[redacted]	[redacted]	**1**	60	40	0	0	0	**100**
10 – 19 cm	FALSE	[redacted]	[redacted]	**2**	40	40	0	0	20	**100**
20 – 29 cm	FALSE	[redacted]	**Length of logs**	**3**	40	50	10	0	0	**100**
30 – 49cm	FALSE	0	0	**4**	30	50	0	0	20	**100**
50 -79cm	FALSE	0	[redacted]	**5**	60	40	0	0	0	**100**
>80cm	FALSE	0	[redacted]	**Average**	46	44	2	0	8	**100**
Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)										
grazing exotic										
Habitat features, comments and incidental fauna observations:										
mini bam										

Plot no:		8		Job:	blueys		Job no:	3284.01	Date:	26/02/24	Observers:	YB
Upper stratum	**(Comment)**	**C**	**Ab**	**Mid stratum**	**(Comment)**	**C**	**Ab**		**Lower stratum**	**(Comment)**	**C**	**Ab**
Eucalyptus microcorys	eucalyptus	15	3	Glochidion ferdinandi	glochidion	0.5	10		Themeda triandra	themeda triandra	40	200
Eucalyptus globoidea	eucalyptus globoidea	20	5	Breynia oblongifolia	breynia	0.2	10		Imperata cylindrica	imperata cylindrica	5	100
Angophora costata	angophora Costa	5	1	Smilax glyciphylla	smilax glyciphylla	0.1	55		Pteridium esculentum	pteridium	0.5	20
				Acacia myrtifolia	acacia myrtifolia	0.1	1		Lomandra longifolia	lomandra longifolia	0.1	5
				Hibbertia scandens	hibbertia scandens	0.1	2		Axonopus fissifolius	axonopus fissifolius	0.2	20
				Ceratopetalum	ceratopetalum	0.5	5		Oplismenus imbecillis	oplismenus imbecilis	0.2	20
				Dodonaea triquetra	dodenaea triquetra	0.1	1		Dianella caerulea var. producta	dianella caerulea	0.1	10
				Eustrephus latifolius	eustrephus	0.1	5		Poa labillardierei var.	poa	0.5	20
				Gahnia clarkei	gahnia clarkei	0.2	5		Glycine clandestina	glycine clandestina	0.1	5
				Acacia floribunda	acacia sp	0.2	10		Lobelia purpurascens	lobelia purpura	0.1	2
				Leptospermum	leptospermum poly	0.1	2		Centella asiatica	centella	1	100
				Hardenbergia violacea	hardenbergia	0.2	5		Dichondra repens	dichondra	0.5	50
				Hibbertia aspera	hibbertia aspera	0.1	5		Lindsaea linearis	lindsaea linearis	0.1	10
				Epacris pulchella	epacris pulchella	0.1	2		Grona varians	grona Varians	0.1	5
				Livistona australis	livistona australis	0.1	2		Rubus moluccanus var.	rubus mollucanus	0.1	4
				Stephania japonica	Stephania	0.1	1		Cymbopogon refractus	cymbopogon	1	50
				Geitonoplesium	geitonoplesium	0.1	2		Entolasia stricta	entolasia stricta	0.1	5
				Pittosporum	pittosporum undulatum	0.1	1		Cyanthillium cinereum var.	vernonia	0.1	20
				Pandorea pandorana	pandorea	0.1	1		Brunoniella australis	brunoniella	0.1	5
				Polyscias sambucifolia	polyscias sambu	0.1	2		Billardiera scandens	billardiera	0.1	5
									Paspalum dilatatum	paspalum dilatatum	0.1	10
									Lagenophora stipitata	small aster	0.1	20
									Goodenia heterophylla subsp.	goodenia hetero	0.1	5
									Entolasia marginata	entolasia marginata	1	100
									Goodenia paniculata	goodenia panic	0.1	5
									Gonocarpus teucrioides	gonocarpus teuc	0.1	10
									Maekawaea rhytidophylla	desmodium ryt	0.2	10
									Hydrocotyle sibthorpioides	hydrocotyle sib	0.2	100
Total Cover		40				3.2					51.9	

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

Arrival time:	8.45		**Departure time:**	10.4	**Weather:**	Hot and humid	**photos (one landscape, one portrait) taken**	Done	**Transect GPS points taken**	Done
Start	453,896	6420172		**End**	453,945	6420199	**Zone:**	56	**Bearing:**	56
Tree Stem Size Class	**Presence(TRUE)/Absence(F**	**Number**	**Count of**	**Leaf Litter Cover within 5 x 1m2 sub-plots**						
< 5 cm	TRUE	[redacted]	0		**Leaf litter**	**Live**	**Bare ground**	**Rocks**	**Other**	**Total**
5 - 9 cm	FALSE	[redacted]	[redacted]	**1**	100	20	0	0	0	**120**
10 – 19 cm	FALSE	[redacted]		**2**	100	30	0	0	0	**130**
20 – 29 cm	TRUE	[redacted]	**Length of logs**	**3**	100	30	0	0	0	**130**
30 – 49cm	TRUE	7	0	**4**	100	40	0	0	0	**140**
50 -79cm	TRUE	8	[redacted]	**5**	100	10	0	0	0	**110**
>80cm	FALSE	0		**Average**	100	26	0	0	0	**126**
Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)										
light weed cover,										
Habitat features, comments and incidental fauna observations:										
nil										

Plot no:	9	Job:	blueys	Job no:	3284.01	Date:	26/02/24	Observers:	YB

Upper stratum	(Comment)	C	Ab	Mid stratum	(Comment)	C	Ab	Lower stratum	(Comment)	C	Ab
Angophora costata	angophora Costa	0.5	3	Ozothamnus	ozothamnus	1	10	Cynodon dactylon	cynodon	60	1000
Eucalyptus globoidea	eucalyptus globoidea	0.5	1	Swainsona galegifolia	swainsonia	0.2	5	Paspalum urvillei	paspalum urvelei	25	500
Eucalyptus robusta	eucalyptus SP	0.5	3	Acacia longifolia subsp.	acacia longifolia	0.1	1	Andropogon	andropogon virginicus	5	100
				Acacia saligna	acacia saligna	0.1	1	Stenotaphrum	buffalo grass	1	100
				Gomphocarpus	gomphocarpus	0.1	1	Juncus usitatus	juncus usi	0.2	2
				Pultenaea retusa	pultenaea retusa	0.1	1	Hypochaeris	hypochaeris radicata	0.1	2
								Grona varians	grona varians	0.1	5
								Goodenia paniculata	goodenia panic	0.1	20
								Polymeria calycina	polymeria calcina	0.1	1
								Centella asiatica	centella	0.1	5
								Lomandra longifolia	lomandra long	0.1	1
								Dianella caerulea	dianella caerulea	0.1	1
								Lobelia	lobelia purpura	0.1	1
Total Cover		1.5				1.6				92	

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

Arrival time:	10		**Departure time:**	10.4	**Weather:**	Hot and humid	**photos (one landscape, one portrait) taken**	Done	**Transect GPS points taken**	Done
Start	453,526	6420028		**End**	453,544	6420008	**Zone:**	56	**Bearing:**	131
Tree Stem Size Class	**Presence(TRUE)/Absence(F**	**Number**	**Count of**	**Leaf Litter Cover within 5 x 1m2 sub-plots**						
< 5 cm	TRUE	[redacted]	0		**Leaf litter**	**Live**	**Bare ground**	**Rocks**	**Other**	**Total**
5 - 9 cm	TRUE	[redacted]	[redacted]	**1**	20	50	10	20	0	**100**
10 – 19 cm	FALSE	[redacted]		**2**	20	60	20	0	0	**100**
20 – 29 cm	FALSE	[redacted]	**Length of logs**	**3**	10	50	20	20	0	**100**
30 – 49cm	FALSE	0	0	**4**	30	40	10	20	0	**100**
50 -79cm	FALSE	0	[redacted]	**5**	10	60	20	10	0	**100**
>80cm	FALSE	0		**Average**	18	52	16	14	0	**100**
Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)										
Regrowth, pile of			mini BAM							
Habitat features, comments and incidental fauna observations:										
high number of rocks										

Plot no: 10 **Job:** Blueys Estate **Job no:** 3284.01 **Date:** 16/08/24 **Observers:** YB

Mapped Regional Vegetation community:

Upper stratum	(Comment)	C	Ab	Mid stratum	(Comment)	C	Ab	Lower stratum	Unknown (Comment)	C	Ab
Eucalyptus robusta	eucalyptus robusta	25	3	Livistona australis	livistona australis	10	10	Axonopus fissifolius	axonopus fissifolius	40	200
Melaleuca quinquenervia	Melaleuca	20	8	Notelaea longifolia f.	notelaea longifolia	0.1	1	Juncus continuus	Juncus uninterrupted pith	1	100
				Pittosporum undulatum	Pittosporum undulatum	0.1	1	Themeda triandra	themeda triandra	10	100
				Glochidion ferdinandi var.	glochidion ferdinandii	0.1	2	Andropogon virginicus	andropogon virginicus	20	200
				Pultenaea retusa	pultenaea retusa	0.1	1	Lomandra longifolia	lomandra longifolia	1	10
								Hibbertia scandens	hibbertia scandens	0.2	5
								Eustrephus latifolius	eustrephus latifolius	0.1	1
								Pandorea pandorana	pandorea pandorana	0.1	1
								Dianella caerulea var.	dianella caerulea var producta	0.5	20
								Hypochaeris radicata	hypochaeris radicata	0.1	20
								Lobelia purpurascens	lobelia purpurascens	0.5	50
								Goodenia paniculata	goodenia belidifolia	0.1	20
								Microlaena stipoides var.	microlaena stipoides	0.1	10
								Oxalis exilis	oxalis exilis	0.1	1
								Imperata cylindrica	imperata cylindrica	0.1	20
								Gonocarpus tetragynus	gonocarpus teucrioides	0.1	10
								Hemarthria uncinata	grass 1	0.2	20
								Paspalum urvillei	paspalum dilatatum	0.5	20
								Hydrocotyle sibthorpioides	hydrocotyle sibthorpoides	0.5	100
								Entolasia marginata	entolasia marginata	2	100
								Viola hederacea	viola hederacea	0.2	50
								Sporobolus africanus	sporobolus africanus	0.2	20
								Carex longebrachiata	carex sp	0.2	20
								Dichondra repens	dichondra repens	0.2	50
								Centella asiatica	centella asiatica	0.1	20
								Gahnia clarkei	gahnia	0.5	5
								Cynodon dactylon	cynodon dactylon	0.5	20
								Schoenus apogon	schoenus small	0.5	50
								Schoenus brevifolius	schoenus tall	0.1	10
								Rubus fruticosus sp. agg.	rubis fruticosus	0.1	1
								Cyanthillium cinereum var.	purple flower aster	0.1	1
								Senecio madagascariensis	senecio mad	0.1	5
								Lepidosperma filiforme	lepidosperma sp	0.1	2
								Chorizandra cymbaria	chorizandra	0.1	20
								Billardiera scandens	billardiera scandens	0.1	1
								Juncus subsecundus	interrupted pith	0.5	50
Total Cover		45				10.4				80.3	

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

Arrival time:	9.25		**Departure time:**	10.45	**Weather:**	sunny	**photos (one landscape, one portrait) taken**	Done	**Transect GPS points taken**	Done
Start	453,902	6420297		**End**	453,941	6420323	**Zone:**	56	**Bearing:**	54
Tree Stem Size Class	**Presence(TRUE)/Absence(F**	**Number**	**Count of**	**Leaf Litter Cover within 5 x 1m2 sub-plots**						
< 5 cm	TRUE	[redacted]	0		**Leaf litter**	**Live**	**Bare ground**	**Rocks**	**Other**	**Total**
5 - 9 cm	FALSE	[redacted]	[redacted]	**1**	40	50	10	0	0	**100**
10 – 19 cm	FALSE	[redacted]		**2**	80	20	0	0	0	**100**
20 – 29 cm	TRUE	[redacted]	**Length of logs**	**3**	20	70	0	0	10	**100**
30 – 49cm	TRUE	20	0	**4**	50	50	0	0	0	**100**
50 -79cm	TRUE	6	[redacted]	**5**	40	60	0	0	0	**100**
>80cm	TRUE	1		**Average**	46	50	2	0	2	**100**
Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)										
moderate weed cover										
Habitat features, comments and incidental fauna observations:										
nil										

Plot no: 11 **Job:** Blueys Estate **Job no:** 3284.01 **Date:** 16/08/24 **Observers:** YB

Mapped Regional Vegetation community:

Upper stratum	Unknown (Comment)	C	Ab	Mid stratum	(Comment)	C	Ab	Lower stratum	Unknown (Comment)	C	Ab
Eucalyptus robusta	eucalyptus robusta	0.1	5	Acacia ulicifolia	acacia ulicifolia	0.1	1	Axonopus fissifolius	axonopus fissifolius	60	200
Melaleuca	Melaleuca quinquenervia	0.1	10					Andropogon	andropogon virginicus	30	500
								Paspalum urvillei	paspalum dilatatum	2	50
								Imperata cylindrica	imperata cylindrica	1	100
								Eragrostis brownii	eragrostis brownii	1	100
								Gonocarpus	gonocarpus teucrioides	0.1	5
								Goodenia paniculata	goodenia belidifolia	0.1	20
								Polymeria calycina	polymeria calcyna	0.1	5
								Lobelia purpurascens	lobelia purpurascens	0.2	50
								Centella asiatica	centella asiatica	0.2	100
								Hypochaeris radicata	hypochaeris radicata	0.21	100
								Cyanthillium	purple aster	0.1	5
								Sporobolus africanus	sporobolus africanus	0.5	20
								Plantago lanceolata	plantago lanceolata	0.1	5
								Hydrocotyle	hydrocotyle sibthorpoides	0.1	20
								Senecio	senecio mad	0.1	2
								Themeda triandra	themeda triandra	2	100
								Cyperus	cyperus sanguinolentus	0.1	1
								Schoenus apogon	small sedge. same as last	0.2	20
								Drosera spatulata	drosera spatulata	0.1	5
								Thelymitra spp.	calochilus SP	0.1	1
								Cynodon dactylon	cynodon dactylon	0.1	5
								Dianella caerulea	dianella caerulea var	0.2	10
								Lomandra longifolia	lomandra longifolia	0.1	1
Total Cover		0.2				0.1				98.71	

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

Arrival time:	10.55		**Departure time:**	11.3	**Weather:**	overcast	**photos (one landscape, one portrait) taken**	Done	**Transect GPS points taken**	Done
Start	453,945	6420279		**End**	453,985	6420308	**Zone:**	56	**Bearing:**	52
Tree Stem Size Class	**Presence(TRUE)/Absence(F**	**Number**	**Count of**	**Leaf Litter Cover within 5 x 1m2 sub-plots**						
< 5 cm	TRUE	[redacted]	0		**Leaf litter**	**Live**	**Bare ground**	**Rocks**	**Other**	**Total**
5 - 9 cm	FALSE	[redacted]	[redacted]	**1**	5	90	5	0	0	**100**
10 – 19 cm	FALSE	[redacted]		**2**	5	70	25	0	0	**100**
20 – 29 cm	FALSE	[redacted]	**Length of logs**	**3**	5	85	10	0	0	**100**
30 – 49cm	FALSE	0	0	**4**	0	90	10	0	0	**100**
50 -79cm	FALSE	0	[redacted]	**5**	0	85	15	0	0	**100**
>80cm	FALSE	0		**Average**	3	84	13	0	0	**100**
Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)										
high weed load										
Habitat features, comments and incidental fauna observations:										
nil										

Plot no: 10 **Job:** Blueys Estate **Job no:** 3284.01 **Date:** 16/08/24 **Observers:** YB

Mapped Regional Vegetation community:

Upper stratum	(Comment)	C	Ab	Mid stratum	(Comment)	C	Ab	Lower stratum	Unknown (Comment)	C	Ab
Eucalyptus robusta	eucalyptus robusta	25	3	Livistona australis	livistona australis	10	10	Axonopus fissifolius	axonopus fissifolius	40	200
Melaleuca quinquenervia	Melaleuca	20	8	Notelaea longifolia f.	notelaea longifolia	0.1	1	Juncus continuus	Juncus uninterrupted pith	1	100
				Pittosporum undulatum	Pittosporum undulatum	0.1	1	Themeda triandra	themeda triandra	10	100
				Glochidion ferdinandi var.	glochidion ferdinandii	0.1	2	Andropogon virginicus	andropogon virginicus	20	200
				Pultenaea retusa	pultenaea retusa	0.1	1	Lomandra longifolia	lomandra longifolia	1	10
								Hibbertia scandens	hibbertia scandens	0.2	5
								Eustrephus latifolius	eustrephus latifolius	0.1	1
								Pandorea pandorana	pandorea pandorana	0.1	1
								Dianella caerulea var.	dianella caerulea var producta	0.5	20
								Hypochaeris radicata	hypochaeris radicata	0.1	20
								Lobelia purpurascens	lobelia purpurascens	0.5	50
								Goodenia paniculata	goodenia belidifolia	0.1	20
								Microlaena stipoides var.	microlaena stipoides	0.1	10
								Oxalis exilis	oxalis exilis	0.1	1
								Imperata cylindrica	imperata cylindrica	0.1	20
								Gonocarpus tetragynus	gonocarpus teucrioides	0.1	10
								Hemarthria uncinata	grass 1	0.2	20
								Paspalum urvillei	paspalum dilatatum	0.5	20
								Hydrocotyle sibthorpioides	hydrocotyle sibthorpoides	0.5	100
								Entolasia marginata	entolasia marginata	2	100
								Viola hederacea	viola hederacea	0.2	50
								Sporobolus africanus	sporobolus africanus	0.2	20
								Carex longebrachiata	carex sp	0.2	20
								Dichondra repens	dichondra repens	0.2	50
								Centella asiatica	centella asiatica	0.1	20
								Gahnia clarkei	gahnia	0.5	5
								Cynodon dactylon	cynodon dactylon	0.5	20
								Schoenus apogon	schoenus small	0.5	50
								Schoenus brevifolius	schoenus tall	0.1	10
								Rubus fruticosus sp. agg.	rubis fruticosus	0.1	1
								Cyanthillium cinereum var.	purple flower aster	0.1	1
								Senecio madagascariensis	senecio mad	0.1	5
								Lepidosperma filiforme	lepidosperma sp	0.1	2
								Chorizandra cymbaria	chorizandra	0.1	20
								Billardiera scandens	billardiera scandens	0.1	1
								Juncus subsecundus	interrupted pith	0.5	50
Total Cover		45				10.4				80.3	

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

Arrival time:	9.25		**Departure time:**	10.45	**Weather:**	sunny	**photos (one landscape, one portrait) taken**	Done	**Transect GPS points taken**	Done
Start	453,902	6420297		**End**	453,941	6420323	**Zone:**	56	**Bearing:**	54
Tree Stem Size Class	**Presence(TRUE)/Absence(F**	**Number**	**Count of**	**Leaf Litter Cover within 5 x 1m2 sub-plots**						
< 5 cm	TRUE	[redacted]	0		**Leaf litter**	**Live**	**Bare ground**	**Rocks**	**Other**	**Total**
5 - 9 cm	FALSE	[redacted]	[redacted]	**1**	40	50	10	0	0	**100**
10 – 19 cm	FALSE	[redacted]	[redacted]	**2**	80	20	0	0	0	**100**
20 – 29 cm	TRUE	[redacted]	**Length of logs**	**3**	20	70	0	0	10	**100**
30 – 49cm	TRUE	20	0	**4**	50	50	0	0	0	**100**
50 -79cm	TRUE	6	[redacted]	**5**	40	60	0	0	0	**100**
>80cm	TRUE	1	[redacted]	**Average**	46	50	2	0	2	**100**
Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)										
moderate weed										
Habitat features, comments and incidental fauna observations:										
nil										

Plot no: 11 **Job:** Blueys Estate **Job no:** 3284.01 **Date:** 16/08/24 **Observers:** YB

Mapped Regional Vegetation community:

Upper stratum	Unknown (Comment)	C	Ab	Mid stratum	(Comment)	C	Ab	Lower stratum	Unknown (Comment)	C	Ab
Eucalyptus robusta	eucalyptus robusta	0.1	5	Acacia ulicifolia	acacia	0.1	1	Axonopus fissifolius	axonopus fissifolius	60	200
Melaleuca	Melaleuca quinquenervia	0.1	10					Andropogon	andropogon virginicus	30	500
								Paspalum urvillei	paspalum dilatatum	2	50
								Imperata cylindrica	imperata cylindrica	1	100
								Eragrostis brownii	eragrostis brownii	1	100
								Gonocarpus	gonocarpus teucrioides	0.1	5
								Goodenia	goodenia belidifolia	0.1	20
								Polymeria calycina	polymeria calcyna	0.1	5
								Lobelia	lobelia purpurascens	0.2	50
								Centella asiatica	centella asiatica	0.2	100
								Hypochaeris	hypochaeris radicata	0.21	100
								Cyanthillium	purple aster	0.1	5
								Sporobolus	sporobolus africanus	0.5	20
								Plantago lanceolata	plantago lanceolata	0.1	5
								Hydrocotyle	hydrocotyle sibthorpoides	0.1	20
								Senecio	senecio mad	0.1	2
								Themeda triandra	themeda triandra	2	100
								Cyperus	cyperus sanguinolentus	0.1	1
								Schoenus apogon	small sedge. same as last	0.2	20
								Drosera spatulata	drosera spatulata	0.1	5
								Thelymitra spp.	calochilus SP	0.1	1
								Cynodon dactylon	cynodon dactylon	0.1	5
								Dianella caerulea	dianella caerulea var	0.2	10
								Lomandra longifolia	lomandra longifolia	0.1	1
Total Cover		0.2				0.1				98.71	

20mx20m plot = 400m2 Note: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

Arrival time:	10.55		**Departure time:**	11.3	**Weather:**	overcast	**photos (one landscape, one portrait) taken**	Done	**Transect GPS points taken**	Done
Start	453,945	6420279		**End**	453,985	6420308	**Zone:**	56	**Bearing:**	52
Tree Stem Size Class	**Presence(TRUE)/Absence(F**	**Number**	**Count of**	**Leaf Litter Cover within 5 x 1m2 sub-plots**						
< 5 cm	TRUE	[redacted]	0		**Leaf litter**	**Live**	**Bare ground**	**Rocks**	**Other**	**Total**
5 - 9 cm	FALSE	[redacted]	[redacted]	**1**	5	90	5	0	0	**100**
10 – 19 cm	FALSE	[redacted]	[redacted]	**2**	5	70	25	0	0	**100**
20 – 29 cm	FALSE	[redacted]	**Length of logs**	**3**	5	85	10	0	0	**100**
30 – 49cm	FALSE	0	0	**4**	0	90	10	0	0	**100**
50 -79cm	FALSE	0	[redacted]	**5**	0	85	15	0	0	**100**
>80cm	FALSE	0		**Average**	3	84	13	0	0	**100**
Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)										
high weed load										
Habitat features, comments and incidental fauna observations:										
nil										

Appendix E – PCT Determination Tables

Table – Determination of PCT for Plots 1, 2, and 10

Plot No		Plots 1, 2, and 10		
Potential PCTs		**4020**	**3250**	**3242**
Regional Vegetation		**Yes**	**Yes**	No
IBRA Region		**NSW North Coast**; Sydney Basin;	**NSW North Coast**; South Eastern Queensland; Sydney Basin;	**NSW North Coast**; Sydney Basin;
IBRA Subregion		**Karuah Manning**; Macleay Hastings; Hunter; Illawarra; Jervis; Wyong;	Chaelundi; Coffs Coast and Escarpment; Comboyne Plateau; Dalmorton; **Karuah Manning**; Macleay Hastings; Yuraygir; Clarence Lowlands; Clarence Sandstones; Hunter; Sydney Cataract; Wyong;	**Karuah Manning**; Mummel Escarpment; Upper Hunter; Hunter; Pittwater; Wyong; Yengo;
IBRA Comments		Not specified	Not specified	Not specified
NSW Landscapes		Not specified	Not specified	Not specified
LGA		Central Coast; Kempsey; Lake Macquarie; Maitland; **Mid-Coast**; Port Macquarie-Hastings; Port Stephens; Shoalhaven;	Bellingen; Cntral Coast; Cessnock; Clarence Valley; Coffs arbour; Kempsey; Lake Macquarie; **Mid-Coast**; Nambucca; Port Macquarie-Hastings; Port Stephens; Richmond Valley; Wollongong;	Central Coast; Cessnock; Dungog; Hawkesbury; Lake Macquarie; **Mid-Coast**; Newcastle; Port Stephens;
Key Species within Vegetation Zone	**Tree**	*Eucalyptus robusta, Melaleuca quinquenervia, Angophora costata, Eucalyptus resinifera, Notelaea longifolia, Glochidion ferdinandi.*	*Eucalyptus robusta, Melaleuca quinquenervia, Angophora costata, Eucalyptus resinifera, Notelaea longifolia, Glochidion ferdinandi*	*Angophora costata, Eucalyptus resinifera, Notelaea longifolia, Glochidion ferdinandi.*
	Shrub	*Melaleuca linariifolia, Melaleuca sieberi, Callistemon salignus, Pittosporum undulatum, Pultenaea retusa, Rubus moluccanus.*	*Melaleuca linariifolia, Melaleuca sieberi, Callistemon salignus, Pittosporum undulatum, Pultenaea retusa, Rubus moluccanus.*	*Melaleuca linariifolia, Melaleuca sieberi, Callistemon salignus, Pittosporum undulatum, Pultenaea retusa, Rubus moluccanus.*
	Grass	*Cynodon dactylon, Themeda triandra, Gahnia clarkei, Entolasia marginata, Juncus continuus, Leptocarpus tenax, Lepyrodia muelleri, Lomandra longifolia, Juncus subsecundus, Schoenus apogon, Juncus usitatus, Carex longebrachiata, Hemarthria uncinata,*	*Themeda triandra, Gahnia clarkei, Entolasia marginata, Lomandra longifolia, Leptocarpus tenax, Schoenus apogon, Juncus usitatus, Hemarthria uncinata, Chorizandra cymbaria,*	*Cynodon dactylon, Themeda triandra, Gahnia clarkei, Entolasia marginata, Lomandra longifolia, Juncus usitatus, Carex longebrachiata, Imperata cylindrica, Microlaena stipoides, Schoenus brevifolius.*

Plot No		Plots 1, 2, and 10		
Potential PCTs		**4020**	**3250**	**3242**
		Chorizandra cymbaria, Fimbristylis dichotoma, Imperata cylindrica, Lepidosperma filiforme, Microlaena stipoides, Schoenus brevifolius.	*Fimbristylis dichotoma, Imperata cylindrica, Microlaena stipoides, Schoenus brevifolius.*	
	Forb	*Dianella caerulea, Hydrocotyle sibthorpioides, Lobelia purpurascens, Centella asiatica, Dichondra repens, Viola hederacea, Gonocarpus tetragynus, Goodenia paniculata, Oxalis exilis.*	*Dianella caerulea, Hydrocotyle sibthorpioides, Lobelia purpurascens, Centella asiatica, Dichondra repens, Viola hederacea, Cryptostylis erecta, Gonocarpus tetragynus, Oxalis exilis.*	*Dianella caerulea, Hydrocotyle sibthorpioides, Lobelia purpurascens, Centella asiatica, Dichondra repens, Viola hederacea, Gonocarpus tetragynus, Oxalis exilis.*
	Fern	None.	None.	None.
	Other	*Livistona australis, Parsonsia straminea, Hibbertia scandens, Billardiera scandens, Eustrephus latifolius, Pandorea pandorana.*	*Livistona australis, Parsonsia straminea, Hibbertia scandens, Billardiera scandens, Eustrephus latifolius, Pandorea pandorana.*	*Livistona australis, Parsonsia straminea, Hibbertia scandens, Billardiera scandens, Eustrephus latifolius, Pandorea pandorana.*
PCT Description		A tall to very tall sclerophyll open forest with a sub-canopy of Melaleuca trees and a dense ground layer of sedges and grasses found on low-lying coastal silty alluvial soils between the Shoalhaven and the mid North Coast. The tree canopy is variable, however commonly includes *Eucalyptus robusta*, and may be accompanied or replaced by *Eucalyptus tereticornis* or *Eucalyptus amplifolia*, or rarely *Angophora floribunda, Eucalyptus resinifera* and in the Shoalhaven*, Eucalyptus longifolia*. Sometimes a sparse cover of tall Melaleuca species is included amongst the eucalypt canopy. The mid-stratum is characterised by a mid-dense cover of smaller trees that almost always includes a patchy cover of *Melaleuca linariifolia*, occasionally or rarely with other Melaleuca species depending on location. North of the Hawkesbury River these may include *Melaleuca quinquenervia* or *Melaleuca sieberi*, while in the Shoalhaven it may include *Melaleuca ericifolia, Melaleuca decora or Melaleuca biconvexa*. The climber *Parsonsia*	A very tall to extremely tall, grassy or occasionally shrub-grass sclerophyll open forest, which occurs extensively on the coast, coastal ranges and foothills ranges between Grafton and Gosford, with limited outlying occurrences near Woodburn and Wollongong. The canopy very frequently includes *Eucalyptus pilularis* dominating with the highest cover and commonly *Eucalyptus microcorys*, sometimes with locally high cover. Other canopy species occasionally include *Corymbia intermedia and Syncarpia glomulifera*, rarely with *Angophora costata, Eucalyptus resinifera* and *Eucalyptus propinqua. Allocasuarina torulosa* occurs very frequently and occasionally forms a mid-dense sub-canopy. The shrub *Polyscias sambucifolia* is very frequently present, commonly with vine *Billardiera scandens*, usually as scattered individuals. *Polyscias sambucifolia* is sometimes locally abundant and forms thickets in less frequently burnt	A very tall to extremely tall sclerophyll open forest with a mesophyll shrub layer and moist ground layer of ferns, climbers and grasses. This PCT is found on the sheltered slopes of coastal hills and ranges between Gosford and Taree, Hunter and lower North Coasts. The tree canopy is variable in composition, however very frequently includes a high cover of *Syncarpia glomulifera* however is rarely dominant. There is very frequently a high cover of a suite of other eucalypt species, commonly from one or more of the mahogany, blue gum and ironbark eucalypt groups. The most frequent species in each of these groups are *Eucalyptus acmenoides, Eucalyptus saligna* and *Eucalyptus paniculata* however there may be up to three or four species recorded in each group. Other distinctive members of the canopy can *include Corymbia maculata* and *Eucalyptus pilularis* however are rare. The mid-stratum is layered, with a taller sparse cover of small trees very frequently dominated by *Allocasuarina*

Plot No	Plots 1, 2, and 10		
Potential PCTs	**4020**	**3250**	**3242**
	straminea is commonly recorded on the trunks of the sub-canopy trees. Other small trees that are occasionally recorded include a sparse cover of *Glochidion ferdinandi* and *Callistemon salignus* or soft-leaved small shrubs such as *Breynia oblongifolia.* The ground layer is mid-dense to dense and very frequently includes clumps of the tall sedge *Gahnia clarkei, graminoid Lomandra longifolia*, together with grasses *Entolasia marginata, Imperata cylindrica* and *Oplismenus imbecillis.* Other common grasses include *Microlaena stipoides* and a patchy cover of *Hemarthria uncinata*, very frequently with small forbs including *Centella asiatica* and *Lobelia purpurascens.* This PCT is widespread across coastal lowlands, however is restricted to alluvial flats at elevations below 30 metres asl that are likely to be subject to periodic inundation from floodwaters. It occurs on soils which are clay-rich rather than sandy loams, and in wet areas where rainfall generally exceeds 1000 mm of rainfall per annum. This community only weakly overlaps floristically with other PCTs in NSW. It does however, have extensive spatial overlap with other coastal alluvial forests including PCT 4042, which occurs in drier less frequently inundated alluviums, and has a low frequency of Eucalyptus robusta; and PCT 4021, which includes a higher proportion of sclerophyll shrubs on sandy loams. Small areas of PCT 4020 are included in coastal reserves, however it is more extensive on private lands, some of which has been subject to past clearing.	sites. The grassy ground layer almost always includes a high cover of *Imperata cylindrica*, very frequently *with Pteridium esculentum, Lomandra longifolia, Entolasia stricta* and *Themeda triandra*, all usually with low cover. This PCT occurs mainly in warm, wet locations receiving 1200-1580 mm mean annual rainfall, at low to mid elevations of 10-370 metres asl. It occurs mainly on clay-rich sedimentary or meta-sedimentary substrates, occasionally higher-quartz sediments, on ridge to mid-slope sites which are frequently burnt. Its range overlaps with that of PCT 3248, which has a similar canopy composition however a more mesic shrub mid-stratum. It may grade into that PCT in some areas, however PCT 3248 occurs in more sheltered, less frequently burnt sites or on more fertile soils.	*torulosa* and *Syncarpia glomulifera*, occasionally with *Angophora floribunda* and tall Acacia species such as *Acacia maidenii.* A lower mid-dense layer of shrubs very frequently includes *Breynia oblongifolia*, commonly with *Synoum glandulosum subsp. glandulosum, Rhodamnia rubescens, Denhamia silvestris* and *Persoonia linearis*, occasionally with *Glochidion ferdinandi* and a sparse cover of *Livistona australis*. The mid-dense ground stratum is layered and has a diversity of mesic climbers that very frequently include *Smilax australis, Geitonoplesium cymosum, Pandorea pandorana subsp. pandorana, Eustrephus latifolius* and *Dioscorea transversa*. These occur with ferns and graminoids, that very frequently *include Lomandra longifolia, Blechnum neohollandicum* and *Gymnostachys anceps*, commonly *Pteridium esculentum*, occasionally with *Adiantum aethiopicum* and *Calochlaena dubia*. South of the Hunter River this PCT is common on low to mid-elevation Narrabeen sediments throughout the Watagan Range between Gosford and Mount Sugarloaf, all of which receive high coastal rainfall. West of Kulnura, where mean annual rainfall is lower, the distribution is restricted to incised gullies and the community grades into gully forest PCT 3237. North of the Hunter River it extends across the Carboniferous sediments south-east of Gloucester on the mid-elevations of the Myall Ranges. In coastal districts it grades into moist forest PCT 3241 on drier aspects or in lower rainfall zones.
Other Diagnostic Features	Not specified	Not specified	Not specified

Plot No	Plots 1, 2, and 10		
Potential PCTs	**4020**	**3250**	**3242**
Vegetation Formation	Forested Wetlands;	Wet Sclerophyll Forests (Grassy sub-formation);	Wet Sclerophyll Forests (Grassy sub-formation);
Vegetation Class	Coastal Floodplain Wetlands;	Northern Hinterland Wet Sclerophyll Forests;	Northern Hinterland Wet Sclerophyll Forests;
Landscape Position	Coastal Floodplain Wetlands;	Northern Hinterland Wet Sclerophyll Forests;	Northern Hinterland Wet Sclerophyll Forests;
Elevation	10.6	47.3	110.5
Lithology	Not specified	Not specified	Not specified
PCT Determination	This PCT has a canopy dominated by *Eucalyptus robusta* and *Melaleuca quinquenervia* which are the most abundant trees present within this vegetation zone. While found onsite in a highly disturbed state, it has a high number of key diagnostic species present within the vegetation zone and as such, was deemed to be the best fit PCT.	This PCT has a canopy dominated by *Eucalyptus pilularis* and *Eucalyptus microcorys* which are present onsite only as scattered individuals and mostly outside of this vegetation zone. In addition, a dominant shrub species for this PCT *Polyscias sambucifolia* was not detected onsite. As such, this PCT was not deemed to be an accurate depiction of this vegetation Zone.	While a number of diagnostic species for this PCT were present within this vegetation zone, the dominant canopy species listed are *Eucalyptus acmenoides, Eucalyptus saligna* and *Eucalyptus paniculata* which were not detected within this vegetation zone. In addition, from the PCT description provided in the VIS, PCT 3242 is not considered to be an accurate depiction of this vegetation zone.
Result	**Yes**	**No**	**No**
	PCT 4020 - Coastal Creekflat Layered Grass-Sedge Swamp Forest		
Estimated Cleared Value of PCT (%)	65.28		
EEC	Listed BC Act, E: *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*		

Table – Determination of PCT for Plots 3, 4 ,5, 6, 8, and 9

Plot No		3, 4, 5, 6, 8, and 9		
Potential PCTs		**3435**	**3250**	**4020**
Regional Vegetation		No	**Yes**	**Yes**
IBRA Region		NSW North Coast; Sydney Basin;	NSW North Coast; South Eastern Queensland; Sydney Basin;	NSW North Coast; Sydney Basin;
IBRA Subregion		Karuah Manning; Hunter; Wyong;	Chaelundi; Coffs Coast and Escarpment; Comboyne Plateau; Dalmorton; Karuah Manning; Macleay Hastings; Yuraygir; Clarence Lowlands; Clarence Sandstones; Hunter; Sydney Cataract; Wyong;	Karuah Manning; Macleay Hastings; Hunter; Illawarra; Jervis; Wyong;
IBRA Comments		Not specified	Not specified	Not specified
NSW Landscapes		Not specified	Not specified	Not specified
LGA		Central Coast; Dungog; Lake Macquarie; Mid-Coast; Port Stephens;	Bellingen; Central Coast; Cessnock; Clarence Valley; Coffs Harbour; Kempsey; Lake Macquarie; Mid-Coast; Nambucca; Port Macquarie-Hastings; Port Stephens; Richmond Valley; Wollongong;	central coast; kempsey; lake macquarie; maitland; mid-coast; port macquarie-hastings; port stephens; shoalhaven;
Key Species within Vegetation Zone	**Tree**	*Eucalyptus globoidea, Eucalyptus microcorys, Angophora costata, Eucalyptus pilularis, Eucalyptus piperita, Eucalyptus resinifera, Eucalyptus robusta, Glochidion ferdinandi, Notelaea longifolia.*	*Eucalyptus globoidea, Eucalyptus microcorys, Angophora costata, Eucalyptus pilularis, Eucalyptus piperita, Eucalyptus resinifera, Ceratopetalum apetalum, Eucalyptus robusta, Glochidion ferdinandi, Melaleuca quinquenervia, Notelaea longifolia.*	*Eucalyptus microcorys, Angophora costata, Eucalyptus resinifera, Eucalyptus robusta, Glochidion ferdinandi, Melaleuca quinquenervia, Notelaea longifolia.*
	Shrub	*Ozothamnus diosmifolius, Acacia longifolia, Leptospermum polygalifolium, Acacia ulicifolia, Epacris pulchella, Pittosporum undulatum, Polyscias sambucifolia, Breynia oblongifolia, Callistemon salignus, Hibbertia aspera, Acacia myrtifolia, Comesperma ericinum, Dodonaea triquetra, Leptospermum polygalifolium, Monotoca scoparia, Pultenaea retusa, Rubus moluccanus.*	*Ozothamnus diosmifolius, Acacia longifolia, Leptospermum polygalifolium, Acacia floribunda, Acacia ulicifolia, Pittosporum undulatum, Polyscias sambucifolia, Breynia oblongifolia, Callistemon salignus, Hibbertia aspera, Acacia myrtifolia, Dodonaea triquetra, Leptospermum polygalifolium, Monotoca scoparia, Pultenaea retusa, Rubus moluccanus.*	*Ozothamnus diosmifolius, Acacia longifolia, Leptospermum polygalifolium, Acacia floribunda, Pittosporum undulatum, Polyscias sambucifolia, Breynia oblongifolia, Callistemon salignus, Hibbertia aspera, Comesperma ericinum, Dodonaea triquetra, Leptospermum polygalifolium, Pultenaea retusa, Rubus moluccanus.*

Plot No		3, 4, 5, 6, 8, and 9		
Potential PCTs		**3435**	**3250**	**4020**
	Grass	*Cynodon dactylon, Themeda triandra, Poa labillardierei var. labillardierei, Ptilothrix deusta, Imperata cylindrica, Lomandra longifolia, Cymbopogon refractus, Entolasia marginata, Entolasia stricta, Panicum simile, Gahnia clarkei, Lepidosperma laterale, Paspalidium distans, Echinopogon ovatus, Juncus usitatus, Oplismenus imbecillis, Eragrostis brownii, Rytidosperma tenuius.*	*Themeda triandra, Poa labillardierei var. labillardierei, Ptilothrix deusta, Imperata cylindrica, Lomandra longifolia, Cymbopogon refractus, Entolasia marginata, Entolasia stricta, Panicum simile, Gahnia clarkei, Lepidosperma laterale, Paspalidium distans, Echinopogon ovatus, Juncus usitatus, Oplismenus imbecillis, Eragrostis brownii.*	*Cynodon dactylon, Themeda triandra, Poa labillardierei var. labillardierei, Ptilothrix deusta, Imperata cylindrica, Imperata cylindrica, Entolasia marginata, Entolasia stricta, Panicum simile, Gahnia clarkei, Paspalidium distans, Echinopogon ovatus, Juncus usitatus, Oplismenus imbecillis, Eragrostis brownii.*
	Forb	*Centella asiatica, Dichondra repens, Goodenia heterophylla, Dianella caerulea, Goodenia paniculata, Cryptostylis erecta, Gonocarpus micranthus, Hydrocotyle sibthorpioides, Hypericum gramineum, Pomax umbellata, Brunoniella australis, Dianella caerulea, Gonocarpus teucrioides, Goodenia heterophylla, Lagenophora stipitata, Lobelia purpurascens, Oxalis exilis, Viola betonicifolia.*	*Centella asiatica, Dichondra repens, Goodenia heterophylla, Dianella caerulea, Cryptostylis erecta, Gonocarpus micranthus, Hydrocotyle sibthorpioides, Hypericum gramineum, Pomax umbellata, Swainsona galegifolia, Brunoniella australis, Dianella caerulea, Gonocarpus teucrioides, Goodenia heterophylla, Lagenophora stipitata, Lobelia purpurascens, Oxalis exilis, Viola betonicifolia.*	*Centella asiatica, Dichondra repens, Goodenia heterophylla, Dianella caerulea, Goodenia paniculata, Gonocarpus micranthus, Hydrocotyle sibthorpioides, Hypericum gramineum, Pomax umbellata, Brunoniella australis, Dianella caerulea, Gonocarpus teucrioides, Goodenia heterophylla, Lagenophora stipitata, Lobelia purpurascens, Oxalis exilis, Viola betonicifolia.*
	Fern	*Pteridium esculentum, Lindsaea linearis*	*Pteridium esculentum, Lindsaea linearis.*	*Pteridium esculentum.*
	Other	*Hibbertia scandens, Polymeria calycina, Billardiera scandens, Hardenbergia violacea, Eustrephus latifolius, Geitonoplesium cymosum, Glycine clandestina.*	*Hibbertia scandens, Polymeria calycina, Billardiera scandens, Hardenbergia violacea, Calochlaena dubia, Eustrephus latifolius, Geitonoplesium cymosum, Glycine clandestina, Hibbertia dentata, Livistona australis, Smilax glyciphylla.*	*Hibbertia scandens, Polymeria calycina, Billardiera scandens, Hardenbergia violacea, Calochlaena dubia, Eustrephus latifolius, Geitonoplesium cymosum, Glycine clandestina, Livistona australis, Smilax glyciphylla.*
PCT Description		A mid-high to very tall sclerophyll open forest with a layered understorey of Melaleucas and dry shrubs with a grassy ground cover associated with low-lying alluvial soils on the coastal plain between Wyong and Wallis Lake on the Central, Hunter and Lower North Coasts. The tree canopy has a mid-dense cover however no single species dominates. *Angophora costata, Eucalyptus resinifera* and *Eucalyptus globoidea* are common and have	A very tall to extremely tall, grassy or occasionally shrub-grass sclerophyll open forest, which occurs extensively on the coast, coastal ranges and foothills ranges between Grafton and Gosford, with limited outlying occurrences near Woodburn and Wollongong. The canopy very frequently includes *Eucalyptus pilularis* dominating with the highest cover and commonly *Eucalyptus microcorys,* sometimes with locally high cover. Other	A tall to very tall sclerophyll open forest with a sub-canopy of Melaleuca trees and a dense ground layer of sedges and grasses found on low-lying coastal silty alluvial soils between the Shoalhaven and the mid North Coast. The tree canopy is variable, however commonly includes *Eucalyptus robusta*, and may be accompanied or replaced by *Eucalyptus tereticornis or Eucalyptus amplifolia,* or rarely *Angophora floribunda*, *Eucalyptus resinifera* and in the

Plot No	3, 4, 5, 6, 8, and 9		
Potential PCTs	**3435**	**3250**	**4020**
	high foliage cover however are also occasionally absent and replaced by other coastal species such as *Corymbia maculata, Eucalyptus fibrosa, Eucalyptus umbra* or *Eucalyptus tereticornis* amongst others. The mid-stratum has some elements of forested wetland communities with *Melaleuca sieberi* and *Melaleuca nodosa* common as a taller sparse cover of smaller trees, along with occasional *Melaleuca linariifolia, Melaleuca decora* or *Callistemon salignus*. Other members of the mid-stratum are sclerophyll species, commonly *Pultenaea villosa, Leptospermum polygalifolium and Persoonia linearis.* The ground layer is characterised by an even cover of grasses, forbs, graminoids and sedges. *Entolasia stricta, Imperata cylindrica, Lomandra longifolia, Dianella caerulea* are almost always present, very frequently with *Themeda australis.* The sedge *Ptilothrix deusta* is locally common and where present is abundant and occasionally associated *with Gahnia clarkei*. This PCT is typically recorded below 50 metres asl on flats and depressions and occasionally on adjoining gentle gradient hill slopes that retain soil moisture from subsurface water. It has been recorded on alluviums, fine grained Permo-Triassic and Carboniferous sediments. This community may adjoin areas of PCT 3436 which occupy damper soils on lower elevations. These are occasionally sites previously disturbed and since regenerated by profuse *Melaleuca nodosa*.	canopy species occasionally include *Corymbia intermedia* and *Syncarpia glomulifera*, rarely with *Angophora costata*, *Eucalyptus resinifera* and *Eucalyptus propinqua. Allocasuarina torulosa* occurs very frequently and occasionally forms a mid-dense sub-canopy. The shrub *Polyscias sambucifolia* is very frequently present, commonly with vine *Billardiera scandens*, usually as scattered individuals. *Polyscias sambucifolia* is sometimes locally abundant and forms thickets in less frequently burnt sites. The grassy ground layer almost always includes a high cover of *Imperata cylindrica*, very frequently with *Pteridium esculentum, Lomandra longifolia, Entolasia stricta* and *Themeda triandra,* all usually with low cover. This PCT occurs mainly in warm, wet locations receiving 1200-1580 mm mean annual rainfall, at low to mid elevations of 10-370 metres asl. It occurs mainly on clay-rich sedimentary or meta-sedimentary substrates, occasionally higher-quartz sediments, on ridge to mid-slope sites which are frequently burnt. Its range overlaps with that of PCT 3248, which has a similar canopy composition however a more mesic shrub mid-stratum. It may grade into that PCT in some areas, however PCT 3248 occurs in more sheltered, less frequently burnt sites or on more fertile soils.	Shoalhaven, *Eucalyptus longifolia*. Sometimes a sparse cover of tall Melaleuca species is included amongst the eucalypt canopy. The mid-stratum is characterised by a mid-dense cover of smaller trees that almost always includes a patchy cover of *Melaleuca linariifolia*, occasionally or rarely with other Melaleuca species depending on location. North of the Hawkesbury River these may include *Melaleuca quinquenervia* or *Melaleuca sieberi*, while in the Shoalhaven it may include *Melaleuca ericifolia*, *Melaleuca decora* or *Melaleuca biconvexa*. The climber *Parsonsia straminea* is commonly recorded on the trunks of the sub-canopy trees. Other small trees that are occasionally recorded include a sparse cover of *Glochidion ferdinandi* and *Callistemon salignus* or soft-leaved small shrubs such as *Breynia oblongifolia*. The ground layer is mid-dense to dense and very frequently includes clumps of the tall sedge *Gahnia clarkei, graminoid Lomandra longifolia*, together with grasses *Entolasia marginata*, *Imperata cylindrica* and *Oplismenus imbecillis*. Other common grasses include *Microlaena stipoides* and a patchy cover of *Hemarthria uncinata*, very frequently with small forbs including *Centella asiatica* and *Lobelia purpurascens.* This PCT is widespread across coastal lowlands, however, is restricted to alluvial flats at elevations below 30 metres asl that are likely to be subject to periodic inundation from floodwaters. It occurs on soils which are clay-rich rather than sandy loams, and in wet areas where rainfall generally exceeds 1000 mm of rainfall per annum. This community only weakly overlaps floristically with other PCTs in NSW. It does however, have extensive spatial overlap with other coastal

Plot No	3, 4, 5, 6, 8, and 9		
Potential PCTs	**3435**	**3250**	**4020**
			alluvial forests including PCT 4042, which occurs in drier less frequently inundated alluviums, and has a low frequency of *Eucalyptus robusta*; and PCT 4021, which includes a higher proportion of sclerophyll shrubs on sandy loams. Small areas of PCT 4020 are included in coastal reserves, however it is more extensive on private lands, some of which has been subject to past clearing.
Other Diagnostic Features	Not specified	Not specified	Not specified
Vegetation Formation	Dry Sclerophyll Forests (Shrub/grass sub-formation);	Wet Sclerophyll Forests (Grassy sub-formation);	Forested Wetlands;
Vegetation Class	Hunter-Macleay Dry Sclerophyll Forests;	Northern Hinterland Wet Sclerophyll Forests;	Coastal Floodplain Wetlands;
Landscape Position	Hunter-Macleay Dry Sclerophyll Forests;	Northern Hinterland Wet Sclerophyll Forests;	Coastal Floodplain Wetlands;
Elevation	22.1	47.3	10.6
Lithology	Not specified	Not specified	Not specified
PCT Determination	This PCT is described as having a canopy layer dominated by *Angophora costata, Eucalyptus resinifera* and *Eucalyptus globoidea* which are the dominant canopy species present within this vegetation zone. This PCT also has the highest number of diagnostic species present within this vegetation zone. While the mid stratum of Melaleuca was mostly missing, it may be due to historical underscrubbing and ongoing	This PCT is described as being dominated by *Eucalyptus pilularis.* While *Eucalyptus pilularis* was present within this vegetation zone; it only occurred as scattered individuals and did not dominate the canopy stratum. Other diagnostic species for this PCT were present onsite but *sambucifolia* which dominate the shrub layer of this PCT was not detected onsite. As such,	This PCT is present onsite and integrade with this vegetation zone. However, *Eucalyptus robusta* which dominate the canopy layer of this PCT was not present within the vegetation zone and overall, the description of this PCT does not represent accurately this vegetation zone. In addition, this PCT had a lower number of diagnostic species present within this vegetation zone and as such, it not

Plot No	3, 4, 5, 6, 8, and 9		
Potential PCTs	**3435**	**3250**	**4020**
	slashing of the site. Nonetheless. This PCT is the most accurate description of the vegetation present.	this PCT was not deemed to accurately represent this vegetation zone.	considered to accurately represent the vegetation present within this zone.
Result	**Yes**	**No**	**No**
	PCT 3435 - Hunter Coast Lowland Flats Damp Forest		
Estimated Cleared Value of PCT (%)	46.33		
EEC	Nil		

Appendix F – Biodiversity Credit Report

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00042731/BAAS19076/23/00042732

Proposal Name
3284 Blueys Estate BDAR

BAM data last updated *
28/10/2024

Assessor Name
Natalie S Black

Assessor Number
BAAS19076

BAM Data version *
Current classification (live - default) (80)

Proponent Names

Report Created
07/11/2024

BAM Case Status
Finalised

Assessment Revision
0

BOS entry trigger
BOS Threshold: Area clearing threshold

Assessment Type
Part 4 Developments (General)

Date Finalised
07/11/2024

* 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.

Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

BAM Biodiversity Credit Report (Like for like)

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
3435-Hunter Coast Lowland Flats Damp Forest	Not a TEC	8.5	146	3	149
4020-Coastal Creekflat Layered Grass-Sedge Swamp Forest	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	4.0	121	0	121

3435-Hunter Coast Lowland Flats Damp Forest	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region

	Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1608, 1612, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 4157, 4158	Hunter-Macleay Dry Sclerophyll Forests <50%	3435_Severely_degraded	No	0	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1608, 1612, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 4157, 4158	Hunter-Macleay Dry Sclerophyll Forests <50%	3435_Highly_Degraded	No	1	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1608, 1612, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 4157, 4158	Hunter-Macleay Dry Sclerophyll Forests <50%	3435_Degraded	No	2	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1608, 1612, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 4157, 4158	Hunter-Macleay Dry Sclerophyll Forests <50%	3435_Moderate	Yes	146	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
4020-Coastal Creekflat Layered Grass-Sedge Swamp Forest	**Like-for-like credit retirement options**					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region

	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	4020_Severely_degraded	No	0	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	4020_Moderate	Yes	121	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

BAM Biodiversity Credit Report (Like for like)

Species	Vegetation Zone/s	Area / Count	Credits
Myotis macropus / Southern Myotis	**3435_Severely_degraded, 3435_Highly_Degraded, 3435_Degraded, 3435_Moderate, 4020_Severely_degraded, 4020_Moderate**	9.1	233.00
Ninox strenua / Powerful Owl	**3435_Moderate**	4.3	120.00
Phascolarctos cinereus / Koala	**3435_Severely_degraded, 3435_Highly_Degraded, 3435_Degraded, 3435_Moderate, 4020_Severely_degraded, 4020_Moderate**	12.5	326.00

Credit Retirement Options

Like-for-like credit retirement options

Myotis macropus / Southern Myotis	Spp	IBRA subregion
	Myotis macropus / Southern Myotis	Any in NSW
Ninox strenua / Powerful Owl	Spp	IBRA subregion
	Ninox strenua / Powerful Owl	Any in NSW

Phascolarctos cinereus / Koala	Spp	IBRA subregion
	Phascolarctos cinereus / Koala	Any in NSW

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id

00042731/BAAS19076/23/00042732

Proposal Name

3284 Blueys Estate BDAR

BAM data last updated *

28/10/2024

Assessor Name

Natalie S Black

Assessor Number

BAAS19076

BAM Data version *

Current classification (live - default) (80)

Proponent Name(s)

Report Created

07/11/2024

BAM Case Status

Finalised

Assessment Revision

0

BOS entry trigger

BOS Threshold: Area clearing threshold

Assessment Type

Part 4 Developments (General)

Date Finalised

07/11/2024

* 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.

Potential Serious and Irreversible Impacts

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

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
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
3435-Hunter Coast Lowland Flats Damp Forest	Not a TEC	8.5	146	3	149.00
4020-Coastal Creekflat Layered Grass-Sedge Swamp Forest	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	4.0	121	0	121.00

3435-Hunter Coast Lowland Flats Damp Forest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1608, 1612, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 4157, 4158	Hunter-Macleay Dry Sclerophyll Forests <50%	3435_Severely_degraded	No	0	Karuah Manning,Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1608, 1612, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 4157, 4158	Hunter-Macleay Dry Sclerophyll Forests <50%	3435_Highly_Degraded	No	1	Karuah Manning,Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1608, 1612, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 4157, 4158	Hunter-Macleay Dry Sclerophyll Forests <50%	3435_Degraded	No	2	Karuah Manning,Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1608, 1612, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 4157, 4158	Hunter-Macleay Dry Sclerophyll Forests <50%	3435_Moderate	Yes	146	Karuah Manning,Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region

	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	3435_Severely_degraded	No	0	IBRA Region: NSW North Coast, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	3435_Highly_Degraded	No	1	IBRA Region: NSW North Coast, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	3435_Degraded	No	2	IBRA Region: NSW North Coast, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher threat status	3435_Moderate	Yes (including artificial)	146	IBRA Region: NSW North Coast, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

4020-Coastal Creekflat Layered Grass-Sedge Swamp Forest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	4020_Severely_degraded	No	0	Karuah Manning,Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	4020_Moderate	Yes	121	Karuah Manning,Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region

	Forested Wetlands	Tier 3 or higher threat status	4020_Severely_degraded	No	0	IBRA Region: NSW North Coast, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Forested Wetlands	Tier 3 or higher threat status	4020_Moderate	Yes (including artificial)	121	IBRA Region: NSW North Coast, 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
Myotis macropus / Southern Myotis	**3435_Severely_degraded, 3435_Highly_Degraded, 3435_Degraded, 3435_Moderate, 4020_Severely_degraded, 4020_Moderate**	9.1	233.00
Ninox strenua / Powerful Owl	**3435_Moderate**	4.3	120.00
Phascolarctos cinereus / Koala	**3435_Severely_degraded, 3435_Highly_Degraded, 3435_Degraded, 3435_Moderate, 4020_Severely_degraded, 4020_Moderate**	12.5	326.00

Credit Retirement Options

Like-for-like options

Myotis macropus/ Southern Myotis	Spp		IBRA region
	Myotis macropus/Southern Myotis		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox strenua/ Powerful Owl	Spp		IBRA region
	Ninox strenua/Powerful Owl		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

	Fauna	Vulnerable	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Phascolarctos cinereus/ Koala	Spp	IBRA region	
	Phascolarctos cinereus/Koala	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Endangered	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Appendix G – Site Photographs

Above: Golf course fairways in the north portion of the Subject Site

Below: Vegetation within the Subject Site

Above: Eastern side of the Subject Site

Below: Area of grassland within the Subject

Above: PCT 3435 (Moderate) within the Subject Site

Below: Powerful Owl observed in the Study Area

Appendix H – Other Legislation

BC Act TEC Assessment

The communities present within the Subject Site are associated with listed Threatened Ecological Communities. The **Table** below assess the vegetation communities within the Subject Site to determine if the communities present meet the State criteria for the listed communities. Please refer **Figure 4** later in this report for a map of the associated TECs.

PCT 4020 Assessment of Association with EEC: *Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions*

Characteristics	**Assessment of Vegetation Community – Subject Site**
Definition of EEC: *Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions* is the name given to the ecological community associated with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. Floodplains are level landform patterns on which there may be active erosion and aggradation by channelled and overbank stream flow with an average recurrence interval of 100 years or less. It generally occurs below 20 m (though sometimes up to 50 m) elevation, often on small floodplains or where the larger floodplains adjoin lithic substrates or coastal sand plains in the NSW North Coast, Sydney Basin and South East Corner bioregions. The structure of the community is typically open forest, although partial clearing may have reduced the canopy to scattered trees. In some areas the tree stratum is low and dense, so that the community takes on the structure of scrub. The community also includes some areas of fernland and tall reedland or sedgeland, where trees are very sparse or absent. Typically, these forests, scrubs, fernlands, reedlands and sedgelands form mosaics with other floodplain forest communities and treeless wetlands, and often they fringe treeless floodplain lagoons or wetlands with semi-permanent standing water. The composition of S*wamp Sclerophyll Forest on Coastal Floodplains* is primarily determined by the frequency and duration of waterlogging and the texture, salinity nutrient and moisture content of the soil. Composition also varies with latitude.	The Australian Soil Classification Type sandy loam Kurosols (soils) in the Blueys Beach Region. The Subject Site is at approx. 10m elevation. Due to past landuse the community has a sparse understorey. **Yes – characteristic met.**
EEC specific assemblage of species: - *Acacia irrorata* - *Acacia longifolia* - *Acmena smithii* - *Adiantum aethiopicum* - *Allocasuarina littoralis* - *Banksia oblongifolia* - *Banksia spinulosa* - *Baumea articulata* - *Baumea juncea* - *Blechnum camfieldii* - *Blechnum indicum* - *Breynia oblongifolia* - *Glycine clandestina* - *Gonocarpus tetragynus* - *Hydrocotyle peduncularis* - *Hypolepis muelleri* - *Imperata cylindrica var. major* - *Isachne globosa* - *Leptospermum polygalifolium subsp. polygalifolium* - *Livistona australis* - *Lomandra longifolia* - *Lophostemon suaveolens*	**Tree** - *Eucalyptus resinifera* - *Eucalyptus robusta* - *Glochidion ferdinandi* - *Melaleuca quinquenervia* **Shrub** - *Callistemon salignus* - *Melaleuca linariifolia* - *Melaleuca quinquenervia* - *Melaleuca sieberi* **Grass** - *Entolasia marginata* - *Gahnia clarkei* - *Imperata cylindrica* - *Lomandra longifolia* - *Themeda triandra*

Characteristics	Assessment of Vegetation Community – Subject Site
- *Callistemon salignus* - *Calochlaena dubia* - *Carex appressa* - *Casuarina glauca* - *Centella asiatica* - *Dianella caerulea* - *Dodonaea triquetra* - *Elaeocarpus reticulatus* - *Entolasia marginata* - *Entolasia stricta* - *Eucalyptus botryoides* - *Eucalyptus longifolia* - *Eucalyptus resinifera subsp. hemilampra* - *Eucalyptus robusta* - *Ficus coronata* - *Gahnia clarkei* - *Gahnia sieberiana* - *Glochidion ferdinandi* - *Melaeuca ericifolia* - *Melaleuca linariifolia* - *Melaleuca quinquenervia* - *Melaleuca sieberi* - *Melaleuca styphelioides* - *Morinda jasminoides* - *Homalanthus populifolius* - *Oplismenus aemulus* - *Oplismenus imbecillis* - *Parsonsia straminea* - *Phragmites australis* - *Polyscias sambucifolia* - *Pratia purpurascens* - *Pteridium esculentum* - *Stephania japonica var. discolor* - *Themeda australis* - *Villarsia exaltata* - *Viola banksii* - *Viola hederacea*	**Forb** - *Centella asiatica* - *Dianella caerulea* - *Viola hederacea* **Other** - *Parsonsia straminea* - *Livistona australis* **Yes – characteristic met.**
Local Government Area Distribution: This EEC is known from parts of the Local Government Areas of Tweed, Byron, Lismore, Ballina, Richmond Valley, Clarence Valley, Coffs Harbour, Bellingen, Nambucca, Kempsey, Hastings, Greater Taree, Great Lakes and Port Stephens, Lake Macquarie, Wyong, Gosford, Hornsby, Pittwater, Warringah, Manly, Liverpool, Rockdale, Botany Bay, Randwick, Sutherland, Wollongong, Shellharbour, Kiama and Shoalhaven but may occur elsewhere in these bioregions. Major examples once occurred on the floodplains of the Tweed, Richmond, Clarence, Macleay, Hastings and Manning Rivers, although smaller floodplains would have also supported considerable areas of this community. Small areas of this EEC are contained within existing conservation reserves, including Bungawalbin, Tuckean and Moonee Beach Nature Reserves, and Hat Head, Crowdy Bay, Wallingat, Myall Lakes and Garigal National Parks. These occurrences are unevenly distributed throughout the range and unlikely to represent the full diversity of the community.	The Subject Site is located within Mid-Coast Council LGA, this was previously known as Gret Lakes LGA. **Yes – characteristic met.**
This EEC forms part of a complex of forested and treeless wetland communities found throughout the coastal floodplains of NSW. The combination of features that distinguish *Swamp Sclerophyll Forest on Coastal Floodplains* from other EECs on the coastal floodplains include: • Its relatively dense tree canopy dominated by *Eucalyptus robusta*, *Melaleuca quinquenervia* or *E. botryoides, t*he relatively infrequent occurrence of other eucalypts, *Casuarina glauca* or *Lophostemon suaveolens*; • The occasional presence of rainforest elements as scattered trees or understorey plants; and	**Yes – characteristic met.**

Characteristics	Assessment of Vegetation Community – Subject Site
• The prominence of large sedges and ferns in the groundcover. It generally occupies small alluvial flats and peripheral parts of floodplains where they adjoin lithic substrates or coastal sandplains. The soils are usually waterlogged, stained black or dark grey with humus, and show little influence of saline ground water. *Swamp Sclerophyll Forest on Coastal Floodplains* includes and replaces *Sydney Coastal Estuary Swamp Forest in the Sydney Basin bioregion*. It may adjoin or intergrade with several other EECs, which collectively cover all remaining native vegetation on the coastal floodplains of New South Wales. These include: • *Lowland Rainforest on Floodplain in the NSW North Coast bioregion;* • *River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions* (including the formerly listed *Sydney Coastal River-Flat Forest in the Sydney Basin bioregion*); • *Subtropical Floodplain Forest, Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions*; and • *Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions*. For example, as soils become less waterlogged, this EEC may adjoin or intergrade with *River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions*. As soil salinity increases it may intergrade with, and be replaced by, *Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions*. The boundaries between these communities are dynamic and may shift in response to changes in hydrological regimes, fire regimes or land management practices. The Determinations for these communities collectively encompass the full range of intermediate assemblages in transitional habitats.	
Is the PCT associated with this EEC (Yes or No)?	Yes.
Is the PCT EPBC listed under a different CEEC or EEC name (Yes or No)?	No.
Detailed Justification of Assessment: Enough attributes are evident to conclude that the vegetation onsite identified as PCT 4020 is commensurate with the Listed BC Act: *Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions*. As such it was noted as such within the BAM-C.	
Referral Requirements: EPBC Act Listing Status: Not Listed **Action:** There is no EPBC Act listed TEC associated with the above community. No further assessment was therefore required.	

EPBC Act Assessment

A Protected Matters Search of an area of 5km radius of the Study Area was conducted in November 2024 for Matters of National Environmental Significance as relevant to the Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act). The following Matters of National Significance are considered in this assessment.

World Heritage Properties:

The site is not a World Heritage area and is not in close proximity to any such area.

National Heritage Places:

The site is not a National Heritage place, and it is not in close proximity to any such place.

Wetlands of International Significance (declared Ramsar wetlands):

The site is within the buffer area of one (1) declared Ramsar wetlands;

- Myall Lakes (3.9km downstream);

While downstream from this wetland areas it is not expected that the development would have significant negative impacts upon these areas given the distances involved and the type of development proposed.

Great Barrier Reef Marine Park:

The site is not part of, or within close proximity to, the Great Barrier Reef Marine Park.

Commonwealth Marine Areas:

The site is not part of, or within close proximity to, any Commonwealth Marine Area.

Threatened Ecological Communities:

From a search of the EPBC Act Protected Matters website (01/11/2024), six (6) listed Threatened Ecological Communities (TECs) were considered likely to occur within a 5km radius of the Study Area.

Two (2) Critically Endangered Ecological Communities;

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

Three (3) Endangered Ecological Communities:

- Coastal Swamp Oak (Casuarina glauca0 Forest of New South Wales South East Queensland ecological community;
- Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland; and
- Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions.

One (1) Vulnerable Ecological Community;

- Subtropical and Temperate Coastal Saltmarsh

Ground-truthing during field surveys found that PCT 4020 – *Coastal Creekflat Layered Grass-Sedge Swamp Forest,* which is present onsite is associated with the EPBC Act listed EEC; *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland*.

Key Diagnostics	AEP Assessment
Occurs on the mainland and islands near to the coast (within 20 km) from South East Queensland to south-eastern NSW specifically within these IBRA Bioregions: South Eastern Queensland (SEQ); NSW North Coast (NNC); Sydney Basin (SYB) and the Bateman sub-region of the South East Corner (SEC).	Yes
Occurs in coastal catchments typically below 20m ASL, but occasionally up to 220m ASL.	Yes approximately 10m
Occurs on hydric soils with inundation patterns ranging from intermittent to episodic.	Yes soils are formed under conditions saturation
The vegetation structure varies from tall closed to open forest to woodland, to dense (closed) shrubland or scrub forest. Minimum crown cover is at least 10%, but it is more typically in the range 50% to 70%.	Yes minimum canopy greater than 10% in moderate condition, where the community is in poor condition the crown cover is less than 10%.
From South East Queensland to the Sydney Basin Bioregion, the canopy is typically dominated or co-dominated by *Melaleuca quinquenervia* and/or *Eucalyptus robusta.* In some areas, the canopy may be locally dominated by other melaleuca species including M. dealbata (SEQ bioregion) (rarely); M. biconvexa (mid-NSW coast to south of Sydney); M. decora (north of Shoalhaven), frequently with Parsonsia straminea climbing on the trunks of canopy species. In the SEC bioregion, M. ericifolia may occur as a dominant canopy or sub-canopy species.	Yes - where present canopy is dominated by *Melaleuca quinquenervia* and/or *Eucalyptus robusta*
Other tree species may occur in the canopy (or sub-canopy) in some areas, but they are not dominant across a patch, including *Casuarina glauca, Banksia spp., Callistemon salignus, Corymbia intermedia* (Pink Bloodwood*), E. tereticornis, (Forest Red Gum/Queensland Blue Gum), E. longifolia (Woollybutt), E. botryoides (Southern Mahogany/Bangalay), E. ovata (Swamp Gum), Livistona australis* and/or *Lophostemon spp.*	No - these species are not located within the Community in the Subject Site, with the exception of 0.3% coverage in Plot 2 for *Callistemon salignus.*
The understorey typically includes a variable ground layer, depending on the canopy cover and inundation rate/period. Tall sedges (typically *Gahnia spp.*) and/or ferns often dominate the ground layer, mixed with graminoids and other herbs, especially *Imperata cylindrica* (Blady Grass).	Yes – dominated by *Gahnia clarkei* in moderate condition vegetation zone.
While they can occur regularly in the ground layer, the ecological community is not present if halophytic species, more typically associated with estuarine/saltmarsh areas, dominate the ground layer of a patch, for example, *Appium prostratum, Atriplex cineria, Chenopodium glaucum, Rhagodia candolleaus* and *Samolus repens.*	Not present
A patch is a discrete and mostly continuous area of the ecological community, as defined by the key diagnostic characteristics, but can include small-scale (<30 m) variations, gaps, and disturbances within this area. The smallest patch size that can be identified is 0.25 ha. Where a larger forest or woodland area has been classified as a different vegetation type localised areas of the ecological community greater than 0.25 ha may be present within this larger area.	Not protected (as per assessment below).
Result – PCT 4020 within the Subject Site is not protect under the EPBC Act as the described below the patch size is a medium. Therefore no referral is required.	

Patch Size Assessment				
Patch size thresholds **Biotic thresholds**	**Large patch** **The patch is at least 5 ha. It may or may not be contiguous with other native vegetation.**	**Medium patch** **The patch is at least 2 ha and less than 5 ha. It may or may not be contiguous with other native vegetation**	**Small contiguous patch** **The patch is at least 0.25 ha and less than 2 ha and is part of a larger area of native vegetation of at least 5 ha.**	**Small patch The patch is at least 0.5 ha and less than 2 ha which is isolated or part of a small native vegetation remnant less than 5 ha in total.**
HIGH CONDITION Non-native species comprise < 20% of total ground layer vegetation cover*	CLASS A A large patch that meets key diagnostics AND has a predominantly native ground layer.	CLASS B1 A medium patch that meets key diagnostics AND has a predominantly native ground layer. **Yes**	CLASS B2 A small patch that meets key diagnostics AND has a predominantly native ground layer AND is contiguous** with another large area of native vegetation.	CLASS C1 A small patch which meets key diagnostics AND has a predominantly native ground layer.
GOOD CONDITION Non-native species comprise 20% to 50% of total ground layer vegetation cover*	CLASS B1 A large patch that meets key diagnostics AND the ground layer is mostly native.	CLASS C1 A medium patch that meets key diagnostics AND the ground layer is mostly native. **Yes**	CLASS C2 A small patch that meets key diagnostics AND has a mostly native ground layer AND is contiguous** with another large area of native vegetation.	CLASS C2 A small patch that meets key diagnostics AND has a mostly native ground layer.
MODERATE CONDITION Non-native species comprise 50% - 80% of total ground layer vegetation cover*	CLASS C1 A large patch which meets key diagnostics AND the ground layer has at least 20% native vegetation cover.	CLASS C2 A medium patch that meets key diagnostics AND the ground layer has at least 20% native vegetation cover. **Yes**	Not protected	Not protected
LOW CONDITION Non-native species comprise more than 80% of total ground layer vegetation cover*	CLASS C2 A large patch which meets key diagnostics, but the ground layer has low native vegetation cover.	Not protected	Not protected	Not protected
Result	**Not Protected**			

The assessment above shows that PCT 4020 present on site does not meet the definition required within the Scientific determination to be considered commensurate with the EEC and no further assessment is required.

Given the above the vegetation communities present on site are not commensurate with any of the aforementioned Threatened Ecological Communities and no further assessment is required.

Threatened Species:

Threatened species listed under the EPBC Act considered likely to occur on site were assessed from field inspections/surveys, Bird Data and using the BioNet Atlas search tool within a 10km search radius to the Study Area with most recent records assessed, no threatened species were identified within the Subject Site.

Migratory Species:

A number of EPBC listed migratory species have potential to utilise the site on an irregular basis. The limited number and sporadic nature of records close to the Study Area appear to reflect opportunistic rather than regular use of any habitat considered of importance to any threatened species.

It is not considered that the development of this land is likely to significantly affect the availability of potential habitat for such mobile species, or disrupt migratory patterns.

EPBC Act Assessment Conclusion:

No Matters of National Environmental Significance (specifically in this instance threatened species, threatened ecological communities or listed migratory species) are expected to be impacted upon significantly as a result of the proposal, therefore, an EPBC Act Referral is considered unlikely to be required, due to the extent of the proposed development an application is being prepared.

Water Management Act 2000

The DPIE (Water) administers the WM Act and is required to assess activities carried out on waterfront land. An object of The Water Management Act 2000 is to provide for the sustainable and integrated management of the water sources of the State for the benefit of both past and future generations in particular-

- to protect, enhance and restore water sources, their associated ecosystems, ecological processes and biological diversity and their water quality,
- to recognise the role of the community, as a partner with government, in resolving issues relating to the management of water sources,
- to encourage best practice in the management of use of water.

Under the Water Management Act 2000, an approval is required to undertake controlled activities on waterfront land, unless that activity is exempt (section 91E) which this development is not. Waterfront land includes the bed and bank of any river, lake or estuary and all land within 40 meters of the highest bank of the river, lake or estuary. Certain activities within this land are defined as a 'controlled activity' and requires approval from the Office of Water. Controlled activities include the carrying out of building work, such as erecting buildings and other structures, and the installation of infrastructure. They also include excavating or depositing material.

The Subject Site does not contain any mapped hydrolines, nor were any unmapped ones observed during surveys.

Works within 40m of waterfront land require a Controlled Activity Approval (CAA). As the development does not involve works within 40m of waterfront land no CAA is required.

Fisheries Management Act 1994

The *Fisheries Management Act*, *1994* (FM Act) objectives are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations.

The Subject Site does not contain any mapped hydrolines, nor were any unmapped hydrolines observed during surveys. There is no Key Fish Habitat (KFH) mapped on site.

As no natural streams or waterways are to be impacted by this development, no further assessment under the *Fisheries Management Act 1994* is required.

SEPP (Biodiversity and Conservation) 2021 Assessment

State Environmental Planning Policy (Biodiversity and Conservation) 2021 (hereafter the Biodiversity and Conservation SEPP) came into force on 1 March 2022, repealing several existing SEPPs including State Environmental Planning Policy (Koala Habitat Protection) 2020 and State Environmental Planning Policy (Koala Habitat Protection) 2021. This Policy aims to consolidate matters of biodiversity and conservation in NSW, including vegetation management, issues of drinking water catchments and koala habitat protection.

In relation to koalas, this SEPP contains the following assessment:

Where land is zoned other than RU1, RU2 and RU3, where there is no approved koala plan of management for the land, and where the site is at least 1ha in size, it must be determined whether there will be any impact upon koalas or koala habitat, and the degree of any such impact. Matters to be considered are:

- Presence of any Schedule 3 Koala Use Tree Species,
- Presence of core koala habitat,
- Presence of trees with a DBH more than 10cm, or
- Presence of only horticultural or agricultural plantations.

The following Schedule 3 Koala Use Tree Species are present on the Subject Site:

- *Eucalyptus globoidea*
- *Eucalyptus microcorys*
- *Eucalyptus pilularis*
- *Eucalyptus resinifera*
- *Eucalyptus robusta*
- *Melaleuca quinquenervia*

“Core koala habitat” is defined as the following:

(a) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas are recorded as being present at the time of assessment of the land as highly suitable koala habitat, or

(b) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas have been recorded as being present in the previous 18 years.

In January 2024, AEP undertook SAT Surveys (per Phillips and Callaghan 2011). In July and August 2023, AEP undertook two consecutive nights of nocturnal surveys with call playback on both nights (refer **Figure 8 and 9**). A Songmeter was deployed in July 2023 and retrieved during January surveys. Results from the Songmeter showed no evidence of Koala presence within the site. During SAT surveys, relevant scratches and scats were found in the Study Area but not within the Subject Site.

Examination of the Atlas and a search of BioNet revealed that there have been two separate sighting of the species within the Study Area in 2004 and 2006. A total of 91 sightings have been recorded within 10km of the Study Area. These sightings have been recorded in all directions. there are no records in the Subject Site.

The vegetation within the Study Area and the Subject Site both contain suitable habitat for the species. Site vegetation is not of a standard to constitute “highly suitable” koala habitat.

Therefore, the Subject Site does constitute Core Koala Habitat and will assume presence of the species. A detailed Koala Plan of Management (KPoM) will be drafted with the BMP.

SEPP (Resilience and Hazards) 2021 Assessment

State Environmental Planning Policy (Resilience and Hazards) 2021 (hereafter the Resilience and Hazards SEPP) came into force on 1 March 2022, repealing several existing SEPPs including State Environmental Planning Policy (Coastal Management) 2018 and State Environmental Planning Policy 55 - Remediation of Land. This Policy aims to minimise risks and harm from environmental hazards.

In relation to Coastal Management, this SEPP states that development consent must not be granted where land is identified as “proximity area for littoral rainforest” unless the proposed development will not significantly impact upon:

(a) the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment,

(b) coastal environmental values and natural coastal processes

(c) the water quality of the marine estate (within the meaning of the Marine Estate Management Act 2014), in particular, the cumulative impacts of the proposed development on any of the sensitive coastal lakes identified in Schedule 1,

(d) marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms,

(e) existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,

(f) Aboriginal cultural heritage, practices and places,

(g) the use of the surf zone.

Coastal Management Areas are mapped in the north portion of the Subject Site (**See Figure 2**). The land within this mapped area consists of golf course fairways and contains predominately non-native vegetation in a poor condition. No watercourses will be impacted due to the proposal.

Given the lack of high-quality vegetation within the mapped area, it is highly unlikely that the proposal will cause significant impact upon the mapped Coastal Management Area.

Appendix I – All HBTs Details

ID	Species	DBH (cm)	XS	S	M	L	XL
0	*Angophora costata*	0	0	0	1	0	0
1	*Melaleuca Quin*	65	1	0	2	0	0
2	*Eucalyptus robusta*	75	0	0	1	0	0
3	*Eucalyptus Grandis*	105	0	0	1	1	0
4	*Eucalyptus robusta*	80	0	1	0	1	1
5	*Eucalyptus robusta*	110	0	1	0	2	2
6	*Melaleuca quin*	110	1	1	2	1	0
7	*Stag*	35	0	0	0	0	1
8	*Angophora costata*	105	0	0	1	1	0
9	*Stag*	95	0	0	2	1	1
10	*Angophora costata*	98	0	1	0	1	0
11	*Angophora costata*	110	0	0	0	0	1
12	*Eucalyptus robusta*	95	0	1	0	1	1
13	*Eucalyptus robusta*	95	0	1	0	1	0
14	*Stringy bark sp*	90	0	0	0	1	1
15	*Eucalyptus pilularis*	150	0	1	0	1	1
16	*Eucalyptus robusta*	82	0	1	1	0	0
17	*Angophora costata*	40	1	0	1	0	0
18	*Eucalyptus stringy so*	103	0	0	1	1	2
19	*Stringy sp*	101	0	0	2	1	1
20	*stringy sp*	97	1	0	0	2	1
21	*Stringy sp*	180	0	0	0	1	2
22	*Melaleuca quin*	86	0	3	0	0	0
23	*Eucalyptus Piperita*	79	0	0	1	1	1
24	*Peppermint*	115	1	0	0	1	1
25	*Stag*	96	0	0	1	1	0
26	*Peppermint*	89	0	1	0	1	2
27	*peppermint*	118	1	2	0	1	1
28	*peppermint*	79	0	1	1	0	0
29	*Stringy sp*	83	0	1	1	0	0
30	*Angophora costata*	95	0	0	3	1	1
31	*Angophora costata*	60	1	0	0	0	1
32	*Peppermint*	73	0	0	0	0	1
33	*Angophora costata*	68	0	0	2	0	1
34	*Peppermint*	94	0	0	1	1	1
35	*Peppermint*	135	2	1	2	2	3
36	*Peppermint*	150	1	3	1	1	6
37	*Angophora costata*	0	0	0	0	0	2
38	*Stringy so*	37	0	0	0	1	0
39	*Eucalyptus pilularis*	94	0	0	2	0	1
40	*Peppermint*	70	1	1	2	1	2
41	*Angophora costata*	59	0	0	1	1	0
42	*Peppermint*	71	0	1	0	1	0
43	*Peppermint*	79	0	1	0	2	2
44	*Angophora costata*	65	1	2	1	0	0
45	*Angophora costata*	130	0	1	1	0	1
46	*Stag*	93	0	1	1	1	2
47	*Angophora costata*	95	2	3	2	2	4
48	*Stringy sp*	103	1	5	0	2	3
49	*Stringy sp*	58	0	1	1	1	1
50	*Eucalyptus robusta*	145	0	3	0	2	2
51	*Eucalyptus robusta*	91	1	0	0	1	0
52	*Eucalyptus robusta*	85	0	0	0	1	1
53	*Angophora costata*	100	0	5	2	0	0
54	*Eucalyptus spp*	110	0	0	1	0	0

55	*Roughbark spp*	40	0	2	2	0	0
56	*Angophora costata*	90	0	1	3	0	0
57	*Roughbark spp*	60	0	2	0	1	1
58	*Corymbia maculata*	89	0	2	1	1	0
59	*Eucalyptus spp*	50	0	2	1	1	0
60	*Eucalyptus spp*	0	0	3	3	2	0
61	*Eucalyptus spp*	40	0	3	1	0	0
62	*Eucalyptus spp*	70	0	0	1	1	0
63	*Roughbark spp*	90	0	0	1	0	0
64	*Eucalyptus spp*	90	0	3	0	0	0
65	*Roughbark spp*	60	0	0	0	1	0
66	*Eucalyptus spp*	80	0	2	1	1	0
67	*Roughbark spp*	110	0	2	3	1	0
68	*Angophora costata*	95	0	0	2	5	0
69	*Stag*	70	0	0	0	0	0
70	*Eucalyptus spp*	85	0	0	0	1	0
71	*Stag*	55	0	0	0	0	0
72	*Eucalyptus spp*	115	0	0	1	0	0
73	*Smoothbark spp*	80	0	2	2	2	0
74	*Eucalyptus spp*	140	0	0	0	4	0
75	*Roughbark spp*	45	0	0	1	0	0
76	*Eucalyptus spp*	90	0	0	1	0	1
77	*Stringybark spp*	80	0	0	1	0	0
78	*Eucalyptus spp*	0	0	0	0	0	1
79	*Roughbark spp*	65	0	0	1	0	0
80	*Eucalyptus spp*	150	0	0	0	4	0
81	*Roughbark spp*	110	0	1	1	0	0
82	*Angophora costata*	150	0	0	1	2	1
83	*Angophora costata*	65	1	0	1	2	0
84	*Eucalyptus spp*	120	0	2	0	0	0
85	*Angophora costata*	0	0	0	0	0	1
86	*Eucalyptus saligna*	165	0	0	0	2	1
87	*Roughbark spp*	60	0	0	0	0	1
88	*Eucalyptus spp*	110	0	0	0	0	1
89	*Angophora costata*	130	0	1	1	0	1
90	*Eucalyptus microcorys*	60	0	0	2	1	0
91	*Roughbark spp*	70	0	0	0	1	0
92	*Eucalyptus spp*	70	0	2	0	0	0
93	*Eucalyptus spp*	120	0	0	1	1	0
94	*Eucalyptus spp*	90	0	0	0	2	1
95	*Ficus spp*	40	0	0	1	0	0
96	*Roughbark spp*	60	0	0	1	0	0
97	*Roughbark spp*	115	0	0	1	0	0
98	*Angophora costata*	84	0	0	1	1	0
99	*Roughbark spp*	65	0	0	3	0	0
100	*Eucalyptus spp*	70	0	2	0	0	0
101	*Roughbark spp*	93	0	2	4	0	0
102	*Roughbark spp*	107	0	0	3	0	0
103	*Angophora costata*	84	0	0	0	0	1
104	*Eucalyptus spp*	116	0	2	0	3	0
105	*Stringybark spp*	57	0	2	1	1	1
106	*Eucalyptus spp*	100	0	0	0	0	1
107	*Eucalyptus spp*	120	0	0	0	1	1
108	*Roughbark spp*	100	0	0	0	0	1
109	*Eucalyptus spp*	50	0	0	1	0	0
110	*Eucalyptus punctata*	80	0	1	0	0	1
111	*Eucalyptus spp*	45	0	0	1	0	0
112	*Eucalyptus punctata*	70	0	0	1	0	0

113		0	0	0	0	0	1
114	*Eucalyptus punctata*	35	1	2	0	0	0
115	*Eucalyptus punctata*	30	1	2	0	0	0
116	*Eucalyptus saligna*	60	0	0	1	0	0
117	*Eucalyptus punctata*	50	0	1	0	0	0
118	*Eucalyptus spp*	70	0	1	0	0	0
119	*Stag*	120	1	2	0	0	0
120	*Roughbark spp*	90	0	0	0	0	1
121	*Roughbark spp*	100	0	1	2	1	0
123	*Eucalyptus robusta*	70	0	0	1	0	0
124	*Eucalyptus robusta*	30	0	0	1	0	0
125	*Stag*	60	0	0	0	1	0
126	*Roughbark spp*	60	0	0	0	1	0
127	*Eucalyptus robusta*	60	0	0	3	0	0
128	*Stag*	45	0	0	1	0	0
129	*Roughbark spp*	80	0	0	1	1	0
130	*Eucalyptus spp*	86	0	2	0	0	0
131	*Roughbark spp*	87	0	1	0	0	0
132	*Eucalyptus spp*	70	0	0	1	0	0
133		0	0	1	1	0	0
134	*Stringybark spp*	80	0	0	1	0	0
135	*Eucalyptus spp*	40	0	1	1	0	0
136	*Eucalyptus spp*	50	0	0	0	1	0
137	*Roughbark spp*	120	0	1	1	1	0
138	*Angophora costata*	60	0	0	2	0	0
139	*Melaleuca quinquenervia*	75	0	0	1	0	0
140	*Roughbark spp*	95	0	0	1	0	0
141	*Eucalyptus spp*	45	0	0	0	0	1
142	*Stringybark spp*	100	0	2	1	0	0
143	*Stringybark*	75	0	0	2	0	1
144	*Angophora floribunda*	106	0	2	2	0	0
145	*Angophora costata*	55	1	2	0	1	0
146	*Stringybark spp*	95	0	0	2	0	0
147	*Eucalyptus spp*	50	0	0	1	1	0
148	*Stringybark spp*	60	0	1	0	0	0
149	*Stringybark spp*	35	0	0	0	1	0
150	*Stringybark spp*	120	0	2	0	0	0
151	*Eucalyptus spp*	90	0	0	2	0	0
152	*Stringybark spp*	120	0	0	0	0	1
153	*Stag*	85	0	0	1	0	0
154	*Eucalyptus spp*	90	0	0	2	2	0
155	*Stringybark spp*	55	0	1	1	0	0
156	*Roughbark spp*	100	0	1	2	0	0
157	*Stringybark spp*	75	0	5	0	0	0
158	*Stringybark spp*	80	1	1	1	0	0
159	*Eucalyptus spp*	80	0	0	1	1	0
160	*Stringybark spp*	85	0	0	2	0	0
161	*Roughbark spp*	75	0	0	1	0	0
162	*Melaleuca linariifolia*	50	0	0	0	0	1
163	*Eucalyptus robusta*	45	0	1	0	0	0
165	*Stringy sp*	83	0	0	0	0	3
167	*Angophora costata*	70	1	0	1	0	0
167	*Roughbark spp*	120	0	0	1	1	0
168	*Native*	60	0	4	0	0	0
169	*Blackbutt*	84	0	2	0	0	0
170	*Other*	0	1	2	0	0	0
171	*Other*	40	0	1	1	0	0
172	*Roughbark*	80	0	0	0	0	1

173	*Roughbark spp*	72	0	1	0	0	0
174	*Roughbark spp*	90	0	1	2	0	0
175	*Roughbark spp*	60	0	1	0	0	1
176	*Roughbark spp*	56	0	1	0	0	0
177	*Other*	30	1	2	0	0	0
178	*Roughbark spp*	70	0	0	1	0	0
179	*Roughbark spp*	92	1	1	1	0	0
180	*Melaleuca quinquenervia*	90	0	0	0	0	1
181	*Melaleuca quinquenervia*	70	0	1	1	0	0
182	*Corymbia maculata*	125	0	0	0	0	3
183	*Angophora costata*	96	0	0	0	1	0
184	*Eucalyptus robusta*	30	0	1	0	0	0
185	*Eucalyptus robusta*	77	0	0	1	0	0
186	*Eucalyptus robusta*	82	0	1	0	0	0
187	*Eucalyptus robusta*	64	0	0	1	0	0
188	*Eucalyptus robusta*	62	0	1	0	0	0
189	*Eucalyptus botryoides*	129	0	1	2	0	1
190	*Eucalyptus botryoides*	85	0	0	1	1	0
191	*Eucalyptus botryoides*	73	0	0	0	0	1
192	*Angophora costata*	64	0	0	0	0	1
193	*Eucalyptus robusta*	83	0	0	0	0	1
194	*Angophora costata*	144	0	0	0	0	1
195	*Eucalyptus robusta*	81	0	0	0	1	0
196	*Angophora floribunda*	136	1	1	2	0	0
197	*Stag*	74	0	0	0	0	1
198	*Stag*	48	0	0	1	0	0
199	*Stag*	146	0	0	0	0	1
200	*Eucalyptus*	76	0	0	0	0	1
201	*Eucalyptus punctata*	91	0	0	3	2	1
202	*Syncarpia glomulifera*	110	0	0	0	0	1
203	*Lophostemon confertus*	98	0	0	0	0	1
204	*Eucalyptus robusta*	160	0	0	0	0	2
205	*Eucalyptus punctata*	168	0	0	1	1	1
206	*Eucalyptus punctata*	72	0	2	1	1	0
207	*Eucalyptus grandis*	65	0	1	2	1	0
208	*Eucalyptus spp*	52	0	0	0	1	0
209	*Eucalyptus punctata*	95	0	0	1	0	1
210	*Eucalyptus punctata*	56	4	2	3	0	1
211	*Eucalyptus punctata*	61	0	0	1	0	1
212	*Syncarpia glomulifera*	96	0	0	0	0	1
213	*Eucalyptus spp*	200	0	0	0	0	0
214	*Eucalyptus punctata*	91	5	3	1	1	2
215	*Eucalyptus spp*	120	0	3	3	4	2
216	*Syncarpia glomulifera*	150	0	0	0	1	0
217	*Eucalyptus punctata*	98	0	1	1	1	0
218	*Eucalyptus robusta*	120	0	0	0	0	1
219	*Eucalyptus spp*	200	0	0	0	1	2
Total			36	150	166	115	11
Grand Total			578				

Appendix J – BDAR Checklist

BAM Reference	Information	BDAR Section	Completed
Report			
Introduction - Chapters 2 and 3	Introduction to the biodiversity assessment including: ● brief description of the proposal ● identification of subject land boundary, including: - operational footprint (if BDAR) - construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure (if BDAR) - land proposed for biodiversity certification (if BCAR) ● general description of the subject land ● sources of information used in the assessment, including reports and spatial data	1.1 Introduction 1.1.1 Biodiversity Offset Scheme Threshold Trigger 1.1.2 Assessment Scope 1.1.3 The Proposal 1.1.4 General Description of the Subject Site 1.1.5 Site Particulars 1.1.6 Geology and Soils 1.1.7 Information Sources Figure 1 Site Map Figure 2 Location Map Appendix A Development Plan Appendix H Other Legislation	Completed
Landscape - Section 3.1, 3.2 and Appendix E	Identification of site context components and landscape features, including; General description of subject land topographic and hydrological setting, geology and soils	1.2 Landscape Features 1.2.1 Regional Landscapes 1.2.2 Identified Landscape Features Figure 2 Location Map	Completed

BAM Reference	Information	BDAR Section	Completed
	Percent native vegetation cover in the assessment area (as described in BAM Subsection 3.2).	1.2.2 Identified Landscape Features 1.3.2 Landscape Native Vegetation Cover	Completed
	IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))	1.2.1 Regional Landscapes	Completed
	Rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E)	1.2.2 Identified Landscape Features Table 2 Landscape Feature Assessment	
	Wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.))	1.2.2 Identified Landscape Features Table 2 Landscape Feature Assessment	
	Connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))	1.2.2 Identified Landscape Features Table 2 Landscape Feature Assessment	
	Karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(12.)	1.2.2 Identified Landscape Features Table 2 Landscape Feature Assessment	
	Areas of geological significance and soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(8-9.))	1.2.2 Identified Landscape Features Table 2 Landscape Feature Assessment	
	Any additional landscape features identified in any SEARs for the proposal	1.2.2 Identified Landscape Features Table 2 Landscape Feature Assessment	
	NSW (Mitchell) landscape on which the subject land occurs	1.2.1 Regional Landscapes	Completed

BAM Reference	Information	BDAR Section	Completed
Native vegetation, Chapter 4, Appendix A and Appendix H	Identify native vegetation extent within the subject land, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery (as described in BAM Section 4.1(1–3.) and Subsection 4.1.1)	1.4 Native Vegetation 1.4.1 State Vegetation Type Mapping Figure 3 State Vegetation Type Mapping Figure 4 Ground-truthed Vegetation Map Appendix G Site Photographs	Completed
	Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM Subsection 4.1.2)	1.4 Native Vegetation 1.4.3 Plot Location and Assessment Process Figure 3 State Vegetation Type Mapping Table 3 State Vegetation Type Mapping Results Table 4 Species Data for Potential PCT Determination Appendix E PCT Determination Tables	Completed
	Review of existing information on native vegetation including references to previous vegetation maps of the subject land and assessment area (described in BAM Section 4.1(3.) and Subsection 4.1.1)	1.4.1 State Vegetation Type Mapping	Completed
	Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	1.4 Native Vegetation 1.4.1 State Vegetation Type Mapping 1.4.2 Plot Based Floristics Surveys Figure 6 AEP Survey Effort 1 Figure 7 AEP Survey Effort 2 Figure 8 AEP Survey Effort 3	Completed

BAM Reference	Information	BDAR Section	Completed
		Figure 9 AEP Survey Effort 4 1.4.7 Vegetation Integrity Assessment 1.4.7.1 Patch Size 1.4.8 Vegetation Integrity Score Table 8 Vegetation Integrity Score Appendix D BAM Plot Data Appendix G Site Photographs	
	Where relevant, describe the use of more appropriate local data, provide reasons that support the use of more appropriate local data and include the written confirmation from the decision-maker that they support the use of more appropriate local data (as described in BAM Subsection 1.4.2 and Appendix A)	N/A	
	For each PCT within the subject land, describe: ● vegetation class ● extent (ha) within subject land ● evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.)) ● plant species relied upon for identification of the PCT and relative abundance of each species ● if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.)) ● estimate of percent cleared value of PCT (BAM Subsection 4.2.1(5.))	1.4.3.1 Plant Community Types (PCTs) and Vegetation Zones 1.4.3 PCT Selection Justification Table 4 Species Data for Potential PCT Determination Figure 3 State Vegetation Type Mapping Appendix E PCT Determination	Completed
	Describe the vegetation integrity assessment of the subject land, including:	1.3.1 Method 1.4.7 Vegetation Integrity Assessment	Completed

BAM Reference	Information	BDAR Section	Completed
	• identification and mapping of vegetation zones (as described in BAM Subsection 4.3.1) • assessment of patch size (as described in BAM Subsection 4.3.2) • survey effort (i.e., number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1–2.) • use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.))	1.4.7.1 Patch Size 1.4.8 Vegetation Integrity Score Table 7 – Summary of Vegetation Zones Areas Table 8 – Vegetation Integrity Score 1.4.2 Plot Based Floristics Surveys Figure 4 Ground-truthed Vegetation Map Figure 6 AEP Survey Effort 1 Figure 7 AEP Survey Effort 2 Figure 8 AEP Survey Effort 3 Figure 9 AEP Survey Effort 4	
	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) • provide justification for use of local data rather than BioNet Vegetation Classification benchmark values • provide written confirmation from the decision-maker that they support the use of local benchmark data	Figure 3 State Vegetation Type Mapping Figure 4 Ground truthed Vegetation Figure 6 AEP Survey Effort 1 Figure 7 AEP Survey Effort 2 Figure 8 AEP Survey Effort 3 Figure 9 AEP Survey Effort 4 Figures 6, 7 Flora survey and threatened Flora Locations 1.7 Survey Effort Results 1.7.1 Habitat Trees	Completed

BAM Reference	Information	BDAR Section	Completed
		Table 13 Habitat Tree Detail 1.5.3 Field Survey Methods Appendix D BAM Plot Data Appendix I All HBT Details	
Threatened Species, Chapter 5	Identify ecosystem credit species likely to occur on the subject land, including: ● list of ecosystem credit species derived from the BAM-C (as described in BAM Subsection 5.1.1 and Section 5.2(1.)) ● justification and supporting evidence for exclusion of any ecosystem credit species based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2) ● justification for addition of any ecosystem credit species to the list	1.5 Threatened Species 1.5.1 Ecosystem Credit Species Table 9 Predicted Ecosystem Credit Species Figure 5 NSW BioNet Atlas Records Appendix F Biodiversity Credit Report	Completed
	Identify species credit species likely to occur on the subject land, including: ● list of species credit species derived from the BAM-C (as described in BAM Subsection 5.1.1) ● justification and supporting evidence for exclusions based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2) ● justification and supporting evidence for exclusions based on degraded habitat constraints and/or microhabitats on which the species depends (as described in BAM Subsection 5.2.2) ● justification for addition of any species credit species to the list	1.5 Threatened Species 1.5.2 Species Credit Species Figure 5 NSW BioNet Atlas Records Table 10 Potential Species Credit Species Table 14 Species Credit Species 1.5.3 Field Survey Methods Appendix C Fauna Species List	Completed
	From the list of candidate species credit species, identify: ● species assumed present within the subject land (if relevant) (as described in BAM Subsection 5.2.4(2. a.))	Table 9 Predicted Ecosystem Credit Species Table 10 Potential Species Credit Species	Completed

BAM Reference	Information	BDAR Section	Completed
	• species present within the subject land on the basis of being identified on an important habitat map for a species (as described in BAM Subsection 5.2.4(2. d.)) • species for which targeted surveys are to be completed to determine species presence (Subsection 5.2.4(2. b.)) • species for which an expert report is to be used to determine species presence (Subsection 5.2.4(2. c.))	Table 14 Species Credit Species Appendix E PCT Determination Appendix H Other Legislation	
	Present the outcomes of species credit species assessments from: • threatened species survey (as described in BAM Section 5.2.4) • expert reports (if relevant) including justification for presence of the species and information used to make this determination (as described in BAM Section 5.2.4 and 5.3, Box 3)	Table 10 Potential Species Credit Species Figure 6 AEP Survey Effort 1 Figure 7 AEP Survey Effort 2 Figure 8 AEP Survey Effort 3 Figure 9 AEP Survey Effort 4 Appendix B Flora Species List Appendix C Fauna Species List Appendix F Biodiversity Credit Report Appendix G Site Photographs	Completed
	Where survey has been undertaken include detailed information on: • survey method and effort, (as described in BAM Section 5.3) • justification of survey method and effort (e.g., citation of peer-reviewed literature) if approach differs from the Department's taxa-specific survey guides or where no relevant guideline has been published • timing of survey in relation to requirements in the TBDC or the Department's taxa-specific survey guides. Where survey was undertaken outside these guides include justification for the timing of surveys • survey personnel and relevant experience	1.5.3 Field Survey Methods 1.6 Survey Effort 1.7 Survey Effort Results 1.7.4 Species Credit Species Survey Results Table 10 Species Credit Species Figure 6 AEP Survey Effort 1 Figure 7 AEP Survey Effort 2	Completed

BAM Reference	Information	BDAR Section	Completed
	• describe any limitations to surveys and how these were addressed/overcome	Figure 8 AEP Survey Effort 3 Figure 9 AEP Survey Effort 4 Appendix D – BAM Plot Data Appendix K CVs	
	Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include: • justification of the use of an expert report • identify the expert, provide evidence of their expert credentials and Departmental approval of expert status • all requirements of Box 3 have been addressed in the expert report	N/A	
	Where use of local data is proposed (BAM Subsection 1.4.2): • identify relevant species • identify data to be amended • identify source of information for local data, e.g., published literature, additional survey data, etc. • justify use of local data in preference to VIS Classification or TBDC data • provide written confirmation from the decision-maker that they support the use of local data	N/A	
	Species polygon completed for species credit species present within the subject land (assumed present or determined on the basis of survey, expert report or important habitat map) ensuring that: • the unit of measure for each species is documented for species assessed by area: • the polygon includes the extent of suitable habitat for the target species within the subject land (as described in BAM Subsection 5.2.5)	Figure 13 Specie Polygon 1 Figure 14 Specie Polygon 2 Figure 15 Specie Polygon 3 Table 10 – Potential Species Credit Species	

BAM Reference	Information	BDAR Section	Completed
	• a description of, and evidence-based justification for, the habitat constraints, features or microhabitats used to map the species polygon including reference to information in the TBDC for that species and any buffers applied for species assessed by counts of individuals: • the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(3.)) • the method used to derive this number (i.e., threatened species survey or expert report) and evidence-based justification for the approach taken • the polygon includes all individuals located on the subject land with a buffer of 30 m around the individuals or groups of individuals on the subject land Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4)		
Prescribed impacts - Chapter 6	Identify potential prescribed biodiversity impacts on threatened entities, including: • karst, caves, crevices, cliffs, rocks and other geological features of significance (as described in BAM Subsection 6.1.1) • occurrences of human-made structures and non-native vegetation (as described in BAM Subsection 6.1.2) • corridors or other areas of connectivity linking habitat for threatened entities (as described in BAM Subsection 6.1.3) • water bodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4) • protected animals that may use the proposed wind farm development site as a flyway or migration route (as described in BAM Subsection 6.1.5) • where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community (as described in BAM Subsection 6.1.6)	1.2.2 Identified Landscape Features 2.1 Avoid and Minimise Summary Table 16 Prescribed Impact Avoidance and Minimisation Table 17 Direct Impact Assessment Table 18 Prescribed Impact Assessment Table 19 Indirect Impact Assessment Table 20 Residual Impact Assessment	Completed

BAM Reference	Information	BDAR Section	Completed
	Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts	Table 10 Potential Species Credit	Completed
	Describe the importance of habitat features to the species including, where relevant, impacts on life-cycle or movement patterns (e.g., Subsection 6.1.3)	1.2 Landscape Features 1.7.1 Habitat Trees Table 10 Potential Species Credit Table 13 Habitat Tree Detail Table 15 Impact Avoidance and Minimisation Table 16 Impact Avoidance and Minimisation Appendix I All HBT Details	Completed
	Where the proposed development is for a wind farm: ● identify a candidate list of protected animals that may use the development site as a flyway or migration route, including: resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the proposal area (as described in BAM Subsection 6.1.5) ● provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.) ● predict the habitual flight paths for nomadic and migratory species likely to fly over the subject land and map the likely habitat for resident threatened aerial and raptor species (BAM Subsection 6.1.5(4.))	N/A	
Maps			

BAM Reference	Information	BDAR Section	Completed
Introduction – Chapters 2 and 3	Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure (if BDAR)	Figure 1 Site Location Figure 2 Location Map Appendix A - Development Plan	Completed
Landscape - Section 3.1, 3.2 and Appendix E	Site Map ● Boundary of subject land ● Cadastre of subject land ● Landscape features identified in BAM Subsection 3.1.3	Figure 1 Site Location Figure 2 Location Map	Completed
	Location Map ● Digital aerial photography at 1:1,000 scale or finer ● Boundary of subject land ● Assessment area (i.e., the subject land and either 1500 m buffer area or 500 m buffer for linear development) ● Landscape features identified in BAM Subsection 3.1.3 ● Additional detail (e.g., local government area boundaries) relevant at this scale	Figure 1 Site Location Figure 2 Location Map	Completed
	Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or r Location map include: ● IBRA bioregions and subregions ● rivers, streams and estuaries ● wetlands and important wetlands ● connectivity of different areas of habitat ● karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features ● areas of outstanding biodiversity value occurring on the subject land and assessment area ● any additional landscape features identified in any SEARs for the proposal	Figure 1 Site Location Figure 2 Location Map	Completed

BAM Reference	Information	BDAR Section	Completed
	• NSW (Mitchell) landscape on which the subject land occurs		
Native vegetation, Chapter 4, Appendix A and Appendix H	Map of native vegetation extent within the subject land at scale not greater than 1:10,000 including identification of cleared areas (as described in BAM Section 4.1(1–3.)) and all parts of the subject land that do not contain native vegetation (BAM Subsection 4.1.2)	Figure 1 Site Location Figure 2 Subject Site Figure 3 State Vegetation Type Mapping	Completed
	Map of PCTs within the subject land (as described in BAM Section 4.2(1.))	Figure 3 State Vegetation Type Mapping Figure 4 Ground-truthed Vegetation	Completed
	Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCTs boundaries	Figure 3 State Vegetation Type Mapping Figure 4 Ground-truthed Vegetation Figure 6 AEP Survey Effort 1 Figure 7 AEP Survey Effort 2 Figure 8 AEP Survey Effort 3 Figure 9 AEP Survey Effort 4	Completed
	Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)	Figure 3 State Vegetation Type Mapping	Completed
	Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM Subsection 4.3.2)	1.4 Native Vegetation Figure 2 Location Map Table 7 Summary of Vegetation Zones Areas Appendix E PCT Determination Tables	Completed

BAM Reference	Information	BDAR Section	Completed
Prescribed impacts Chapter 6	Map showing location of any prescribed impact features (i.e., karst, caves, crevices, cliffs, rocks, human-made structures, etc.)	N/A	
	Maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site (for wind farm developments only)	N/A	
Tables			
Native vegetation, Chapter 4, Appendix A and Appendix H	Table of current vegetation integrity scores for each vegetation zone within the site and including: ● composition condition score ● structure condition score ● function condition score ● presence of hollow bearing trees	Table 3 State Vegetation Type Mapping Results Table 7 Summary of Vegetation Zones Areas Table 8 Vegetation Integrity Score Table 13 Habitat Tree Detail	Completed
Threatened Species, Chapter 5	Table showing ecosystem credit species in accordance with BAM Section 5.1.1, and identifying: ● the ecosystem credit species removed from the list ● the sensitivity to gain class of each species	Table 9 Predicted Ecosystem Credit Species Table 10 Potential Species Credit Species Table 14 Species Credit Species Table 17 Direct Impact Assessment Table 20 Residual Impact Assessment Table 23 Ecosystem Credit Requirements Table 24 Species Credit Requirements	Completed

BAM Reference	Information	BDAR Section	Completed
	Table detailing species credit species in accordance with BAM section 5.2 and identifying: • the species credit species removed from the list of species because the species is considered vagrant, out of geographic range or the habitat or micro habitat features are not present • the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	Table 10 Potential Species Credit Species Table 15 Avoid and Minimise Impacts on Biodiversity Values Table 16 Prescribed Impact Avoidance and Minimisation	Completed
	Table detailing species credit species recorded or assumed as present within the subject land, habitat constraints or microhabitats associated with the species, counts of individuals (flora)/extent of suitable habitat (flora and fauna) (as described in BAM Subsection 5.2.6) and biodiversity risk weighting (BAM Section 5.4)	Table 9 Predicted Ecosystem Credit Species Table 14 Species Credit Species Table 23 Ecosystem Credit Requirements Table 24 Species Credit Requirements	Completed
Prescribed impacts Chapter 6	No table		
Data			
Landscape - Section 3.1, 3.2 and Appendix E	All report maps as separate jpeg files / Individual digital shape files of: • subject land boundary • assessment area ((i.e., subject land and 1500 m buffer area) boundary • cadastral boundary of subject land • areas of native vegetation cover • landscape features	Attached files	Completed
Native vegetation, Chapter 4, Appendix A and Appendix H	All report maps as separate jpeg files • Plot field data (MS Excel format) • Plot field data sheets		

BAM Reference	Information	BDAR Section	Completed
	Digital shape files of: ● PCT boundaries within subject land ● TEC boundaries within subject land ● vegetation zone boundaries within subject land ● floristic vegetation survey and vegetation integrity plot locations		Completed
Threatened Species, Chapter 5	Digital shape files of suitable habitat identified for survey for each candidate species credit species		Completed
	Survey locations including GPS coordinates of any plots, transects, grids		Completed
	Digital shape files of each species polygon including GPS coordinates of located individuals		Completed
	Species polygon map in jpeg format		Completed
	Expert reports and any supporting data used to support conclusions of the expert report		N/A
	Field data sheets detailing survey information including prevailing conditions, date, time, equipment used, etc		Completed
Prescribed impacts Chapter 6	● Digital shape files of prescribed impact feature locations ● Prescribed impact features map in jpeg format		N/A

Appendix K – CVs

NATALIE BLACK

Senior Ecologist

Profile Summary

Natalie works with AEP in the role of Senior Environmental Manager. She has extensive knowledge in environmental management, environmental planning, fisheries, aquatic and riparian environments, and report writing and assessment. With a detail understanding of planning, catchment management, coastal management and rehabilitation. Natalie has had a successful career with both state and local government in conservation, planning and field investigation roles. Natalie has also gained extensive communication skills and project management through her previous career in lecturing in a range of course with a focus on environmental management and environmental legislation. Her background and experience in the ecological and planning fields is utilised in a diverse array of application in her current role.

Natalie Black is a conservation detection dog handler and is currently working with his purpose breed working English Springer Spaniel "Gus" who is currently trained to detect Koala scat, Forest Owl pellets and Cane Toads.

Academic Qualifications

- B.Sc (Hons) Sustainable Resource Management and Marine Science – University of Newcastle, 2001
- Master Planning – University of Technology Sydney, 2007
- Certificate IV Training and Assessment – TAFE, 2012
- BAM Assessor; accreditation number: BAAS19076

Training, Licences and Professional Memberships

- NSW Class C Driver's Licence
- Provide First Aid HLTAID011
- Evidence Gathering and Legal Process, Australian Institute of Environmental Health
- Conflict Resolution Course (LGSA)
- Report Writing Course (LGSA).
- Powerful Presentation (LGSA)
- NSW Rural Fire Services Bush Fire Assessment
- Relocation of Threatened Species, Botanical Gardens Sydney
- Sustainable Home Assessment Reduction Revolution
- Flora and Fauna Survey Assessments Niche Environment and Heritage

Professional Experience

Senior Environmental Manager / Works Coordinator 2019 – Present

Anderson Environment & Planning

Newcastle NSW

Principal Environmental Planner 2010 - 2019

Black Earth

Newcastle NSW

Senior Lecture 2010 - 2019

Hunter TAFE

Range of Hunter Campuses

Natural Resource Manager and Development Assessment Officer 2003 - 2010

Lismore City Council

Lismore NSW

Fish Passage Expert 2002 - 2003

NSW Department of Primary Industries

Ballina NSW

Conservation Officer 2000 - 2002

NSW Department of Primary Industries

Crows Nest, NSW

Volunteer NSW Fisheries 1998 - 2000

Varied Roles

Port Stephens, NSW

Relevant Project Experience

Ecological Survey examples

- Target surveys for *Thelymitra adorata* Halloran; Wyee, Wadalba;
- Target surveys for *Melaleuca biconvexa* Mardi, , Halloran; Wyee, Wadalba
- Target surveys for *Tetratheca juncea* Hillsborough, Mardi, Thornton, Warners Bay;
- Target surveys for *Rhodamnia rubescens* Hillsborough, Mardi, Thornton, Stuarts Point, South West Rocks,
- Target Survesy for Cumberpalin Snail and Dural Snail, Rouse Hill
- Target Search for seagrass and threatened marine fauna, Stuarts Point, South West Rocks, Lake Macquarie, Peat Island,
- Powerful Owl nest locating and monitoring: Salamander Bay
- Spot Analysis Techniques surveys: Lismore, Wallsend, Salamander Bay, North Arm Cove, Warnervale, Hamlyn Terrace, Wyee, Charlestown, Chisholm, Gillieston Heights, Mount Vincent, Hillsborough;
- Surveys for Squirrel Glider (*Petaurus norfolcensis*) Wadalba, Rouse Hill, Claremount Meadows, Wyee, Hillsobourgh, South West Rocks, Stuart Point;
- Frog Surveys: Lismore, Wallsend, Salamander Bay, North Arm Cove, Warnervale, Hamlyn Terrace, Wyee, Charlestown, Chisholm, Hillsborough Rouse Hill, Kariong, Wadalba,

Ecological Assessment examples

- Accredited Assessor for approved Biodiversity Development Assessment Reports:
  - Teraglin Village, Chain Valley Bay;
  - Railway Road, Warnervale;
  - McFarlane's Road, Chisholm;

- Fairlands Road, Medowie;
- Raymond Terrace Road Chishlm,
- Annangrove Road, Rouse Hill
- Richmond Road, Marsden Park,
- Claremount Meadows,
- Newcastle Golf Course, Fern Bay,
- Newell Highway, Gilgandra
- Narromine Road, Dubbo

- Ecological Assessment Report for Proposed Modification to Approved Western Rail Coal Unloader At Pipers Flat;
- Infrastructure Ecology Reports;
  - Wyee Water Main;
  - Mardi Water Main;
  - Wyee Rising Main;
  - Mardi Rising Main;
- Summerhill Waste Facility Recycling Plant

Ecological Offsets and Monitoring

- Biodiversity Stewardship Agreements including:
  - Hillsborough
  - Blueys Beach,
  - Allandale,
  - South-West Rocks.
- Biodiversity Management Plans / Vegetation Management Plan / Wildlife Management Strategies
  - VMP for Proposed Modification to Approved Western Rail Coal Unloader At Pipers Flat;
  - VMP / WMS / Dewatering Plan for Wyee for 23ha Offset lands
  - VMP Rouse Hill Commercial Development.
  - BMP – Claremount Meadows Commercial Development.

Planning – Approved Review of Environmental Factors

- South West Rocks Installation of Seawall,
- Lake Macquarie upgrade of carpark, boat ramp and jetty,
- Demolition of two (2) jetties Peat Island,
- Stuart Point upgrades to caravan park including boat ramp.
- Wyee Rising Main
- Anambah Recycling Facility

Bushfire Threat Assessments

- Kempsey Correctional Facility for upgrade
- Stuarts Point Caravan Park for upgrades
- Claremount Meadows for a Commercial development included Daycare, and service station
- Batlow for a Service Station
- Lovedale for a change of use to Brewery

KATHLEEN BUSHELL

Ecologist

Profile Summary

Kathleen has worked with AEP in the role of Ecologist since 2022. She graduated with a Bachelor of Science (Hons) majoring in Marine Biology, and Environmental Management. At the University of Newcastle, Kathleen was a research assistant working with threatened species (i.e., Green and Golden Bell Frog) in various projects, and was a casual academic involved in researching Indigenous Conservation Management, predator-prey dynamics, and marine ecology. Kathleen has assisted with teaching at the University of Newcastle, and was an educator with Take 3 for the Sea.

Kathleen's interests and experience includes flora, fauna and fungi survey requirements, ultrasonic survey and call identifications, research, and reporting (including the implementation of the NSW Biodiversity Assessment Method and other legislation).

With these skills and interest Kathleen is involved in a diverse range of projects across AEP including Biodiversity Assessments, Ecological Assessments, Data Analysis and Mapping, Bushfire Threat Assessments, and general implementation and understanding of guidelines and legislations.

Academic Qualifications

- Bachelor of Science (Hons), University of Newcastle, NSW. Marine Biology, and Environmental Science & Management.

Training, Licences and Professional Memberships

- NSW Class C Driver's Licence. Experienced manual and 4WD operator
- WHS NSW Construction Induction White Card
- First Aid (Provide First Aid HLTAID011)
- Geographic Information Systems ArcGIS, QGIS various providers
- SSI Open Water Scuba Licence
- Microchipping fauna
- MMO (Marine Mammal Observer Course)
- Australian Marine Sciences Association (AMSA): Member
- FungiMap: Member

Professional Experience

Ecologist Anderson Environment & Planning Newcastle NSW	2022 – Present
Casual Academic The University of Newcastle Newcastle	2022
Research Assistant - GGBF Surveys & Monitoring The University of Newcastle Newcastle	2017 - 2021
LiDAR Data Quality Analysist Anditi Newcastle	2020 - 2021
Educator Take 3 for the Sea Central Coast	2018 - 2021

Relevant Project Experience

Ecological Surveys

- Surveys for fauna species including visual and auditory frog surveys, harp-net and ultrasonic call surveys for microbats, nocturnal surveys for amphibians, mammals and aves;
- Surveys for flora species including targeted hand searches and transects;
- Surveys for fungi including targeted transects;
- Trapping and translocation work with amphibians, mammals, and reptiles;
- Camera trapping, acoustic detection and call playback surveys;
- Habitat assessments for flora, fauna, and fungi species;
- Mark-Recapture Studies (including microchipping) for amphibians and mammals;
- Genetic Surveys (including skin swaps and tissue clipping) for amphibians;
- Behavioural Studies (including breeding behaviour, movement, predator-prey interactions and responses to environmental changes);
- Community Surveys (including assessing species richness, relocation and movement across large scale habitats); and
- Restoration of habitat (including planting and building of habitats).

Ecological Assessment

- Fauna survey and identification utilising camera traps and audio technology;
- Fungi survey and identification;
- Call analysis and identification for threatened microbats and frogs;

- Habitat Quality Assessment (including assessment of vegetation, functions, water quality, weather components);
- Vegetation Surveys (including assessing vegetation composition, diversity and structure);
- Predator and Prey Surveys (including assessing for Gambusia, and incidental observations of predatory species);
- Disease Monitoring (including skin swabs for chytridiomycosis); and
- Anthropogenic Disturbance Assessment (including impacts of human activities such as habitat destruction and reconstruction).

Ecological Monitoring

- Restoration Ecology of the Green and Golden Bell Frog (UoN, Michael Mahony);
- Status of Green and Golden Bell Frogs in Port of Newcastle managed zones of Kooragang Island (UoN, Alex Callen and John Gould);
- Marine ecology surveys to inform the production of Ecological Reports within NSW, and internationally;
- Ecological field survey, covering terrestrial flora and fauna, to inform the production of Ecological Reports within NSW;
- Assessment of sites using the Biodiversity Assessment Method (BAM) for the production of Biodiversity Assessment Reports (BDAR);
- Assessment of development proposals against the provisions of the EPBC Act, Koala Plans of Management, SEPP 44 and SEPP Koala Habitat Protection, Coastal Management SEPP and other associated legislative requirements; and
- Analysis and reporting of frog species relating to conservation and development within Australia.

Additional Project Experience

- GIS analysis and mapping for ecological reports, bushfire threat assessments, stewardship reporting and monitoring, management planning and development pathway planning and constraints assessment.