Concept Plan Approval Modification - Bevian Road Rosedale
Biodiversity Development Assessment Report

Walker Rosedale Pty Ltd

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DOCUMENT TRACKING

Project Name	Concept Plan Approval Modification - Bevian Road Rosedale
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ACKNOWLEDGEMENTS

Executive Summary

Walker Rosedale Pty Ltd (Walker) propose a modification of the 2008 Concept Plan Approval (application number 05_0199 MOD 2 – Rosedale residential subdivision) for a residential subdivision at Bevian Road, Rosedale, NSW. The modification sought is from the Part 3A Concept Approval for a Community Title Subdivision for residential development and ancillary commercial and community facilities, and ecological conservation zones to a Torrens title development that includes residential development and ancillary commercial facilities, public roads, public open areas and residential rural lot yielding a total of 792 residential lots inclusive of the 51 Torrens title residential lots recently constructed and registered as part of Stage 1 (DA305/18). For the purposes of the modification, Stage 1 is excluded from further consideration.

The modification of 2008 Concept Plan Approval seeks to assess under this Biodiversity Development Assessment Report (BDAR) all proposed development impacts as part of the modification approval, with the subsequent detailed Development Applications to demonstrate consistency with the Concept Plan.

The modified land at Bevian Road, Rosedale (Subject Land) has been divided into three core precincts:

- Development - consisting of Lots, roads and infrastructure, asset protection zones (APZs) and community parklands. This is the Development Footprint assessed in this BDAR,
- Deferred Area –southern area north of Sewage Treatment Plant. Consistent with the 2008 Concept Plan Approval, no development is proposed in this area as part of the modification, and
- Retained Managed Land – vegetation remnants, watercourses and ecological corridors which will be retained within the Subject Land. These will be managed to enhance the native diversity and will not be used as open spaces.

The 2008 Concept Plan allowed for the development of 128.6 ha, with a deferred area of 6.08 ha and 38.9 ha of Retained Managed Lands (previously referred to as conservation areas).

This BDAR has been prepared on behalf of Walker Rosedale to assess the potential ecological impacts of the proposed modification in accordance with the NSW Biodiversity Assessment Methodology (BAM) under the *Biodiversity Conservation Act 2016* (BC Act). The BAM Calculator (BAMC) was used following field surveys and desktop assessment to calculate the total number and types of ecosystems and species credits that need to be retired to offset the modification. This report has been prepared to meet the requirements of the BAM 2020 established under Section 6.7 of the NSW BC Act by Dr. Cheryl O'Dwyer, the accredited BAM assessor (BAA18153).

An initial BDAR (Version 1) was submitted in September 2024 and reviewed by the South East Regional Delivery, Biodiversity Conservation and Science (BCS; now Conservation Programs, Heritage and Regulations – CPHR) within the NSW Government Department of Climate Change, Energy, the Environment and Water (DCCEEW). Three key comments specific to the BDAR (Ref: 1/11/2024 DOC24/833082-8) have been addressed in this updated BDAR. Additional matters relating to aquatic and riparian assessments, acid sulfate soils and flood mitigation are addressed in separate technical reports.

In response to the matters raised and outcomes of ongoing engagement with the CPHR, the Proponent amended the Project as follows:

1. Hydrological Impacts Reassessed: hydrological impacts on biodiversity values including Threatened Ecological Communities (TEC), Bevian Wetland, and threatened *Persicaria elatior* were reassessed. (See Section 7.4 of this BDAR). Approximately a 100m buffer has been applied around Bevian Wetland. Whilst there are still minor incursions into this zone for the southern entry road, road 12 and road 18, the buffer has been applied to all residential lots which is an improved outcome to the previous layout. The concept subdivision Plan shows the 100 m buffer in relation to the development. Supporting information is provided in the updated Riparian and Aquatic Assessment, Acid Sulphate Soil Review and a new Flood Risk Management Plan (FIRA).
2. TEC Extent Updated: Field validation in January 2025 resulted in the TEC (PCT 4056) increasing from 21.18 ha to 24.8 ha. Additional targeted surveys were undertaken in January 2025 for *Myotis macropus* (Southern Myotis) and *Persicaria elatior* (Tall Knotweed). No individuals of *P. elatior* were found within the Subject Land. However, there was a probable sighting of *M. macropus* and offset credits have been calculated. Additionally, a credit offset strategy has been prepared (Appendix G).
3. Impact Reduction Measures: The Development Footprint has been realigned, and the retention basin repositioned to minimise impacts to TECs. As a result, impacts to the TEC have been reduced from 13.61 ha to 11.9 ha of which 10.74 ha is in moderate (regenerating) condition representing a 16 % overall reduction in direct impacts to the TEC. Impacts to PCT 3275 were also reduced from 68.90 ha to 65.23 ha (Table E1). Overall, the Development Footprint has been reduced from 128 ha at Concept Approval, to 108 ha in the previous BDAR and now down to 102.6 ha, with 73.21 ha (12.9 ha of TEC) being retained onsite as Retained Managed Lands. Retained Managed Lands will be managed to improve biodiversity outcomes, through natural regeneration, weed control, and active planting in some areas.

Table E1: Changes made to Development Footprint

PCT ID	PCT Name	Subject Land area 2024 (ha)	Subject Land area 2025 (ha)	Development Footprint 2024 area (ha)	Development Footprint 2025 area (ha)
3045	South Coast Temperate Gully Rainforest	4.73	4.73	-	0.01
3274	South Coast Spotted Gum Moist Forest	53.68	53.72	21.73	21.84
3275	South Coast Spotted Gum Cycad Dry Forest	92.05	88.39	68.90	65.23
4056	Southern Estuarine Swamp Paperbark Creekflat Scrub	21.18	24.80	13.61	11.9
Total native Vegetation		**171.64**	**171.64**	**104.25**	**98.9**
0	Exotic and Cleared areas	12.08	12.08	3.74	3.60
TOTAL		**183.72**	**183.72**	**108**	**102.59**

E1: Development Description

The proposed development consisting of 792 lots (inclusive of the previously developed and registered Stage 1 51 Torrens title lots (refer DP 1293369) excluded from further consideration under this modification) and associated infrastructure (the Development Footprint), will impact approximately 99 ha (down from 104 ha) of native vegetation which is predominately in low to moderate condition due to historical grazing and clearing for agriculture.

E2: Native Vegetation and threatened species

Two Threatened Ecological Communities (TECs) are present within the Subject Land:

- *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* listed under the BC Act, and
- *Coastal swamp sclerophyll forests of south-eastern Australia* under the EPBC Act

Both TECs are associated with the Plant Community Type 4056 - *Southern Estuarine Swamp Paperbark Creekflat Scrub.* These TECs are in the southern section of the Subject Land and immediately surrounding the Bevian Wetland. Direct impacts through clearing of these TECs has largely been avoided due to a reduction in the Development Footprint from that approved under the 2008 Concept Plan Approval. Approximately a 100 m buffer has also been included around the wetland to mitigate prescribed impacts, which has also led to a reduction in direct impacts to the TEC. The current design will impact 11.9 ha (down from 13.61 ha of TEC (PCT 4056) of which 10.74 ha is considered in moderate condition. 12.9 ha (up from 7.57 ha) will be reserved within the Retained Managed Land and allowed to regenerate naturally.

E3: Impacts and Offset Requirements

The residual direct impacts to native vegetation are summarised below Table E2.

Table E2: Residual impacts to native vegetation

VZ	PCT ID	PCT Name	Condition	Development Footprint (ha)	VI Score	Ecosystem Credits
1	3274	South Coast Spotted Gum Moist Forest	Good	1.54	66	38
2			Low	11.96	16.5	0
3			Exotic	3.72	11.6	0
4			Regen	4.62	43.2	75
5	3275	South Coast Spotted Gum Cycad Dry Forest	Good	10.26	77.8	299
6			Moderate	8.19	47.5	146
7			Low	44.87	27.7	465
8			Regen	1.91	64	46
9	4056	Southern Estuarine Swamp Paperbark Creekflat Scrub. TEC Swamp Oak Floodplain Forest	Good	1.16	73.4	43
10			Moderate	10.74	48.4	260
11	3045	South Coast Temperate Gully Rainforest	Good	0.01	72	1
TOTAL		**Native Vegetation**		**98.9**		**1373**

Whilst a number of threatened species are associated with the Subject Land and surrounding forests only one species (*Myotis macropus*, Southern myotis) was potentially recorded within the Subject Land. Additional surveys were undertaken for Southern Myotis which confirmed presence. One threatened plant (*Persicaria elatior*, Tall Knotweed) was added to the BAMC as a late addition. It is not associated with the PCTs entered into the BAMC but a few individuals were recorded south of Bevian Wetland growing in a recently flooded drainage line. Targeted surveys for this species were undertaken in

January 2025 and no individuals were recorded. An updated credit liability has been included with this BDAR. The table below (Table E3) provides assumed habitat loss and species credits for Southern Myotis.

Two species (*Litoria watsonii*, Watson's Tree Frog; and *Potorous tridactylus*, Long-nosed Potoroo) were added to the BAMC post submission (April 2025) and surveys were not included in this updated assessment. Given that that extensive amphibian surveys and mammal trapping surveys have previously been conducted across the Subject Land, and that these species were only recently added to the BAMC, these species should be declared absent and no further assessments are required.

Table E3: Residual impacts to threatened species

Species	Common Name	BC Act listing status	EPBC Act Listing status	Loss of Habitat (ha)	Biodiversity risk rating	Species Credits
Myotis macropus	Southern Myotis	V	NL	2.89	2	105

E4: Avoid, Minimise, Mitigate

Throughout the planning process, the development layout was progressively refined to reduce impacts to native vegetation, with a particular focus on avoiding impacts to the TEC. Under the 2008 Concept Plan, 128.6 ha was approved for development, with 6.08 ha deferred area and 38.9 ha designated as Retained Managed Lands (previously referred to as conservation areas). In the original Concept Plan Retained Managed Lands included areas of open green spaces such as sporting ovals. In this proposed modification, all green spaces requiring ongoing management (including APZs) are now included within the Development Footprint. As a result, the Development Footprint has been reduced from 128.6 (Concept Approval) to 104 ha in the previous BDAR (dated 2024) and now 98.9 ha (current modification), with 73.21 ha (12.9 ha of TEC) now designated as Retained Managed Lands.

Retained Managed Lands will be actively managed through natural regeneration, weed control, and targeted planting. Although the revised layout will alter existing habitat connectivity particularly between the eastern and western forest patches, and north and south corridors, the Development Footprint has been micro-sited and realigned to avoid woodland / forest vegetation and to minimise the amount of clearing of woody vegetation, Hollow Bearing Trees (HBTs) and key habitat for arboreal mammals, threatened birds and bats.

To further enhance connectivity, 40 m revegetated buffers will be established along riparian corridors to link eucalypt forests and improve wildlife movement. A 100 m buffer will be retained around the Bevian Wetland. The Retained Managed Land surrounding the proposed development will be managed in accordance with site-specific Biodiversity Management Plans. Further mitigation measures are outlined in Section 7 with specific measures provided in the updated Riparian and Aquatic Assessment, Acid Sulphate Soil Review and a new Flood Risk Management Plan (FIRA). These mitigation measures are proposed to be adopted to manage the extent of potential impacts during construction and operation.

This BDAR considered the proposed modification against the Serious and Irreversible Impacts (SAII) criteria and confirms that no SAII entities were recorded within the Subject Land.

The retirement of credits will be carried out in accordance with the NSW BOS. An offset strategy is presented in Appendix G.

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Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BAMC	Biodiversity Assessment Method Credit Calculator
BC Act	NSW *Biodiversity Conservation Act 2016*
BCS	Biodiversity Conservation and Science (now Conservation Programs Heritage and Regulation)
BDAR	Biodiversity Development Assessment Report
BSSAR	Biodiversity Stewardship Site Assessment Report
BMP	Biodiversity Management Plan
CEEC	Critically Endangered Ecological Community
CPHR	Conservation Programs Heritage and Regulation
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DNG	Derived Native Grassland
DPIE	NSW Department of Planning, Industry and Environment
DPHI	NSW Department of Planning, Housing and Infrastructure
DCCEEW	Department of Climate change, Energy, the Environment, and Water (NSW)
EEC	Endangered Ecological Community
ELA	Eco Logical Australia Pty Ltd
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FM Act	NSW *Fisheries Management Act 1994*
GIS	Geographic Information System
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	Local Government Area
LLS	Local Land Service
NSW	New South Wales
NRAR	NSW Department of Natural Resources Access Regulator
PCT	Plant Community Type
SEARS	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSD	State Significant Development
SSI	State Significant Infrastructure
TEC	Threatened Ecological Community
VIS	Vegetation Information System
WM Act	NSW *Water Management Act 2000*

Declarations

Certification under clause 6.15 Biodiversity Conservation Act 2016

This Biodiversity Development Assessment Report (BDAR) has been prepared by Dr. Cheryl O'Dwyer, an Accredited Person (BAAS18153) to apply the Biodiversity Assessment Method (BAM) under the NSW *Biodiversity Conservation Act 2016* (BC Act). The original assessment was overseen by Nigel Cotsell (BAAS18026) and transferred to Cheryl O'Dwyer. All credit calculations have been undertaken using the BAM Calculator (BAMC) version 67 in parent case 00035044, Child case 00035045 / Revision 5.

I certify that this report has been prepared based on the requirements of, and information provided under the Biodiversity Assessment Method and clause 6.15 of the Biodiversity Conservation Act 2016 (BC Act). This BDAR has been prepared to meet the requirements of BAM2020 Appendix A which provides an assessment of compliance with the minimum information requirements outlined in BAM Appendix K

Dr. Cheryl O'Dwyer
Date: 30/04/2025
BAM Assessor Accreditation no: BAAS18153

Details and Experience of Authors and Contributors

Name	BAM Assessor Accreditation	Position / Role	Task Performed	Relevant Qualifications
Dr Cheryl O'Dwyer	BAAS18153	Lead author	Report preparation BAMC. Data entry and analysis.	PhD / MSc. Senior Ecologist
Ryan Smithers	BAAS17061	Field ecologist	Plot surveys. PCT mapping	BEnvSci (Hons)
Nigel Cotsell	BAAS18026	Field ecologist	Plot surveys. PCT mapping and targeted flora and fauna surveys	
David Coombes		Senior ecologist	Avian and Owl surveys	BAppSci
Kylie Lopes		Ecologist	Targeted flora and fauna surveys	BSc
Shirley Chia		Ecologist	Data analysis and reporting	BEnvSci (Hons)
Kristina Shingles		GIS	Mapping and GIS	BSc
Rebecca Croake	BAAS21008	Senior Ecologist	Technical Review	BEnvSci/BGeo

Conflict of Interest

I declare that I have considered the circumstances and there is no actual, perceived, or potential conflict of interest. This declaration has been made in the interests of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

Dr. Cheryl O'Dwyer
Date: 30/04/2025
BAM Assessor Accreditation no: BAAS18153

Stage 1 Biodiversity Assessment

1. Introduction

1.1. Proposed development

1.1.1. Development overview

Walker Rosedale (Proponent) proposes a modification of the 2008 Concept Plan Approval (application number 05_0199 MOD 2 – Rosedale residential subdivision) for a residential subdivision at Bevian Road, Rosedale, NSW. The modification sought is from the Part 3A Concept Plan Approval for a Community Title Subdivision for residential development and ancillary commercial and community facilities, ecological stewardship, public roads and open space areas yielding a total of 792 residential lots (reference number 05_0199), to a Torrens title development that includes residential development and ancillary commercial facilities, public roads, public open areas and residual rural lots inclusive of the 51 Torrens title residential lots recently constructed and registered as part of stage 1 (DA305/18). For the purposes of the modification, stage 1 is excluded from further consideration.

The modification of 2008 Concept Plan Approval seeks to assess under this BDAR all proposed development impacts as part of the modification approval, with the subsequent detailed Development Applications to demonstrate consistency with the Concept Plan.

The modified land at Bevian Road, Rosedale (Subject Land) has been divided into three core precincts:

- Development - consisting of Lots, roads and infrastructure, asset protection zones (APZs) and community parklands. This is the Development Footprint assessed in this BDAR.
- Deferred Area – southern area north of Sewage Treatment Plant. Consistent with the 2008 Concept Plan Approval, no development is proposed in this area as part of the modification, and
- Retained Managed Lands – conserved vegetation remnants, watercourses and ecological corridors which will be used to offset impacts of the development.

The Bevian Road Concept Plan Approval (Major Project 05-0199) was granted in October 2008 by the then Minister for Planning, the Hon. Kristina Keneally MP to the then Proponent Marsim, trading as Nature Coast Pty Ltd for approximately 174 ha subdivision (128.6 ha developed land; 6.08 ha deferred area and 38.9 ha non-development area) allowing for 792 residential lots. The approval was extended in April 2013 and confirmation of works being 'physically commenced' was provided in October 2016. The Director-General as a delegate for the Minister declared the original subdivision proposal as a Major Project under Part 3A of the Environment and Planning Act 1979 (EP&A Act).

Part 3A under the EP&A Act was repealed in 2011 and any existing Part 3A Concept Plans were transitioned to new pathways under State Significant Development (SSD). With the introduction of the *Biodiversity Assessment Act 2016* (BC Act) the Biodiversity Offset Scheme (BOS) applies to all SSD. A modification of the 2008 approved Concept Plan is now proposed to improve the layout and reduce the Development Footprint that requires a new Development Application (DA) to be lodged and a revised Biodiversity Assessment in accordance with the Biodiversity Assessment Method (BAM).

A scoping report and for Secretary Environmental Assessment Requirements (SEARs) that included an indicative modified Concept Plan (MP05_0199_Mod_2) was submitted to the Department of Planning

and Environment (formerly DPE, now DCCEEW and DPHI). SEARs were issued on 18 September 2023. These are summarised in Table 1 below.

Table 1: SEARs requirements

SEARs Requirements	Addressed
Prior to the BDAR being submitted to the consent authority, the accredited assessor should submit a proposed land categorisation method to the Biodiversity Conservation and Science (BCS) Directorate South East Planning team at rog.southeast@environment.nsw.gov.au for review.	Land was assessed and did not conform to Category 1 Land – see Appendix B
The EIS must assess biodiversity impacts related to the proposed modification to Concept Application 05_0199 in accordance with Section 7.9 of the *Biodiversity Conservation Act 2016* using the Biodiversity Assessment Method (BAM) 2020 and documented in a Biodiversity Development Assessment Report (BDAR), unless: a) a BDAR waiver is granted, or b) the site is on biodiversity certified land. The BDAR must include information in the form detailed in the Biodiversity Conservation Act 2016 (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and the BAM.	BDAR- This report
The BDAR must apply the avoid, minimise and offset hierarchy including assessing all direct, indirect, uncertain and prescribed impacts in accordance with the BAM.	Stage 2 Section 6 and 7 this report
The BDAR must be submitted with all spatial data associated with the survey and assessment as per Appendix K of the BAM.	Uploaded into BOAMs
The BDAR must include details of the measures proposed to address the offset obligation as follows: a) The total number and classes of biodiversity credits required to be retired for the development/project; b) The number and classes of like-for-like biodiversity credits proposed to be retired; c) The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules; d) Any proposal to fund a biodiversity conservation action; e) Any proposal to conduct ecological rehabilitation (if a mining project); f) Any proposal to make a payment to the Biodiversity Conservation Fund If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.	Section 13
The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the Biodiversity Conservation Act 2016.	Declaration
The EIS must contain a summary of the commitments set out in the BDAR to avoid, minimise and mitigate the biodiversity impacts of development that are to be implemented, post approval, by their inclusion in a Biodiversity Management Plan (BMP). The preparation of a BMP to fulfil the avoid and minimise requirements of the BDAR must be included as a condition of consent/approval, unless otherwise agreed with BCS. The BMP must include detailed measures to minimise impacts on biodiversity, monitoring and reporting requirements, proposed adaptive management measures, performance criteria recommended to meet stated outcomes, remedial actions to be undertaken if actions fail to achieve stated outcomes, and any additional actions relevant to the management of biodiversity.	EIS
If the development is on biodiversity certified land, provide information to identify the site (using associated mapping) and demonstrate the proposed development is consistent with the relevant biodiversity measure conferred by the biodiversity certification	NA

This BDAR assesses the impacts according to the NSW Biodiversity Assessment Methodology (BAM). Eco Logical Australia (ELA) has prepared this report on behalf of the proponent, Walker Rosedale Pty Ltd. This BDAR has been prepared to meet the requirements of the BAM 2020 established under Section 6.7 of the NSW *Biodiversity Conservation Act 2016* (BC Act) by Dr. Cheryl O'Dwyer, who is an accredited BAM assessor (BAA18153).

The following terminology has been used throughout this report for the purposes of describing the impacts of the proposal in the context of a biodiversity assessment in accordance with the NSW BAM (DPIE 2020):

- **Development Footprint** – the area of land that is directly impacted by the development proposal. This is the 102.59 ha directly impacted as per the modified Concept Plan which consists of 98.9 ha of native vegetation.
- **Subject Land** – the broader area of land that may be affected by the proposal and to which the BAM is applied. The Subject Land extends out from the Development Footprint covering 183.7 ha and for the purpose of this assessment, the Subject Land has been surveyed. The Subject Land includes the precincts of open spaces and Retained Managed Lands.
- **Assessment / Buffer area** – land extending 1500 m out from the Subject Land used to assess native vegetation extent and other landscape features.

1.1.2. Location

The proposed development is located at Bevian Road Rosedale NSW 2536 which is approximately 16 km south of Batemans Bay and 18 km north of Moruya NSW (Figure 1). The Subject Land is a former dairy farm which has been largely cleared of woody vegetation, planted with pasture species and used for grazing. It was earmarked as suitable for the expansion of the existing coastal settlements since 1987 when the Eurobodalla Rural LEP was gazetted, identifying the majority of the Subject Land as an Urban Expansion Zone.

1.1.3. Proposed development

The proposed development consists of a residential subdivision of 10 rural properties into a total of 792 Torrens title lots (inclusive of the 51 recently completed and registered residential lots in Stage 1 – ref DP1293369) located at Bevian Road Rosedale NSW. In 2006, the report of the Expert Panel on the Sensitive Urban Lands on the South Coast identified the Subject Land as suitable for residential development. This was further endorsed by the South Coast Strategy (2007). The minimal permissible lot size within the R2 Low Density Residential zoning is 450 sqm, and 4000 sqm in the C4 Environmental Living zoning on the Subject Land with the proposed modification proposing lots within these ranges and up to 8000 sqm in the C4 zoned land.

This BDAR assess areas that would be impacted by the proposed development (the Development Footprint), based on concept designs provided to ELA. The subject land boundary and final proposed footprint, including the construction footprint, are presented in Figure 2.

The Subject Land covers 10 existing parcels:

- DP623340, Lot 2
- DP627034, Lot 2
- DP1293369, Lot 52,
- DP755902, Lots 11, 29, 32, 72, 102, 119, and 213

The proposed development is confined to the Development Footprint. The Development Footprint comprises a variety of land uses, including grazed land with scattered paddock trees, areas of native regeneration and areas of more intact vegetation with both a native ground and overstorey layer.

The minimum lot size for most areas within the Lots encompassed by the proposed development is 0.045ha under the Eurobodalla Local Environmental Plan 2012. The total Development Footprint is approximately 102.59 ha.

1.1.4. Bevian Road Concept Approval

The Bevian Road Concept Plan Approval (Major Project 05-0199) was granted in October 2008 by the then Minister for Planning, the Hon. Kristina Keneally MP to the then Proponent Marsim, trading as Nature Coast Pty Ltd for approximately 180 ha subdivision allowing for 792 residential lots. The approval was extended in April 2013 and confirmation of "substantial commencement' was provided in October 2016. The concept was declared a Major Project under Part 3A of the Environment and Planning Act 1979 (EP&A Act).

At the time, the following terms of concept approval relating to biodiversity were:

- All Asset Protection Zones (APZs) to be included within the proposed development,
- A minimum riparian zone of 40 m shall be established and maintained adjacent to Bevian Wetland within the Subject Land,
- Riparian vegetation shall be restored to protect water systems and maintained for a minimum of 5 years after planting,
- No development to be undertaken in the "Deferred Area', the area in the south adjacent to the Sewage Treatment Plant,
- No structures or encroachment into the riparian buffer zone of the Bevian Wetland,
- Any removal of hollow-bearing trees required additional approval and where possible hollows retained on site or artificial nest boxes installed,
- Known Yellow-bellied Glider habitat to be protected from destruction or damage during bushfire hazard reduction,
- Weed and pest control to be implemented across the entire Subject Land,
- Threatened species habitat and Endangered Ecological Communities to be protected and the removal of low condition habitat and communities will be offset through regeneration and habitat restoration.

A Conservation Land Use Management Plan (Conacher Travers 2007) was approved as part of the Approved Concept Plan which determined that a *conservation network will be integrated within the site to* ***offset the impacts*** *of development.* Conservation areas (non-developable areas, now referred to as Retained Managed Lands) were identified within the Subject Land (previously 38.92 ha and now increased to 74.6) and will be enhanced and revegetated protecting habitat for threatened species and providing linkages.

An Ecological Site Management Plan (Conacher Travers 2007) was prepared to provide management of the ecological features of the site during pre-construction, construction and post construction phases. Its aim was/is to achieve conservation objectives, bushfire protection, maintenance of ecological processes, protection of riparian zones and the regeneration of native vegetation. A number of strategies were identified and included:

- Protection of native vegetation with conservation areas and riparian zones
- Protection and maintenance of habitat connectivity
- Natural regeneration and regrowth of local trees
- Protection and management of water quality to Bevian Wetland and Saltwater Creek

A significant revision of the approved Concept Plan is now proposed that requires a new Development Application (DA) to be lodged and a revised Biodiversity Assessment in accordance with the Biodiversity Assessment Method (BAM).

An initial BDAR (Version 1) was submitted in September 2024 and reviewed by the South East Regional Delivery, Biodiversity Conservation and Science (BCS) within the NSW Government Department of Climate Change, Energy, the Environment and Water (DCCEEW). Three key comments specific to the BDAR (Ref: 1/11/2024 DOC24/833082-8) have been addressed in this updated BDAR. Additional matters relating to aquatic and riparian assessments, acid sulfate soils and flood mitigation are addressed in separate technical reports.

In response to the matters raised and outcomes of ongoing engagement with the CPHR, the Proponent amended the Project as follows:

1. Hydrological Impacts Reassessed: hydrological impacts on biodiversity values including Threatened Ecological Communities (TEC), Bevian Wetland, and threatened *Persicaria elatior* were reassessed. (See Section 7.4 of this BDAR). Approximately a 100m buffer has been applied around Bevian Wetland. Whilst there are still minor incursions into this zone for the southern entry road, road 12 and road 18, the 100 m buffer has been applied to all residential lots and is an improved outcome to the previous layout. The concept subdivision Plan shows the 100 m buffer in relation to the development. Supporting information is provided in the updated Riparian and Aquatic Assessment, Acid Sulphate Soil Review and a new Flood Risk Management Plan (FIRA).
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Table 2: Changes in Development Footprint

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Total native Vegetation		**171.64**	**171.64**	**104.25**	**98.9**
0	Exotic and Cleared areas	12.08	12.08	3.74	3.60
TOTAL		**183.72**	**183.72**	**108**	**102.59**

1.2. Biodiversity Offsets Scheme trigger

In August 2011 Part 3A planning approvals were repealed and replaced with either the State Significant Development (SSD) Division 4.1 development consent or State Significant Infrastructure (SSI) under Part 5.1 of the Planning Act. The proposed development is a modification (Mod 2) to the approval and therefore the proposed modification is considered a SSD which triggers the Biodiversity Offset Scheme (BOS). The proposed development will impact approximately 98.9 ha of native vegetation.

1.3. Excluded impacts

There are approximately 3.6 ha of roads and cleared areas within the Subject Land that do not require assessment under the BAM (2020).

The Subject Land has been divided into three core precincts (Figure 3):

- Development – 102.59 ha consisting of Lots, roads and infrastructure, APZ and community parklands. This is the Development Footprint assessed in this BDAR.
- Deferred Area – 7.9 ha outside the Development Footprint adjacent to the Sewage Treatment Plant, and
- Retained Managed Lands – 73.21 ha of remnants, watercourses and ecological corridors

Retained Managed Lands will be enhanced.

1.4. Information source

The following data sources were reviewed as part of this report:

- Ecological reports prepared by Conacher Travers (2007a,b,c)
- Ecological reports prepared by NGH
- BioNet Vegetation Classification
- Bionet Atlas Database (accessed 12th March 2024)
- Threatened Biodiversity Data Collection
- Protected Matters Search Tool

- NSW Planning Portal
- Biodiversity Values Map (DCCEEW 2024)
- SEED Mapping (DCCEEW 2024b)
- Draft Native Vegetation Regulatory Map (SEED, NSW Environment and Heritage 2024c)
- BioNet Threatened Species to Plant Community Type Association Database (DPE, accessed March 2024)
- PCT Filter Tool (BioNet)
- Biodiversity Assessment Method (BAM 2020)

Figure 1: Location Map

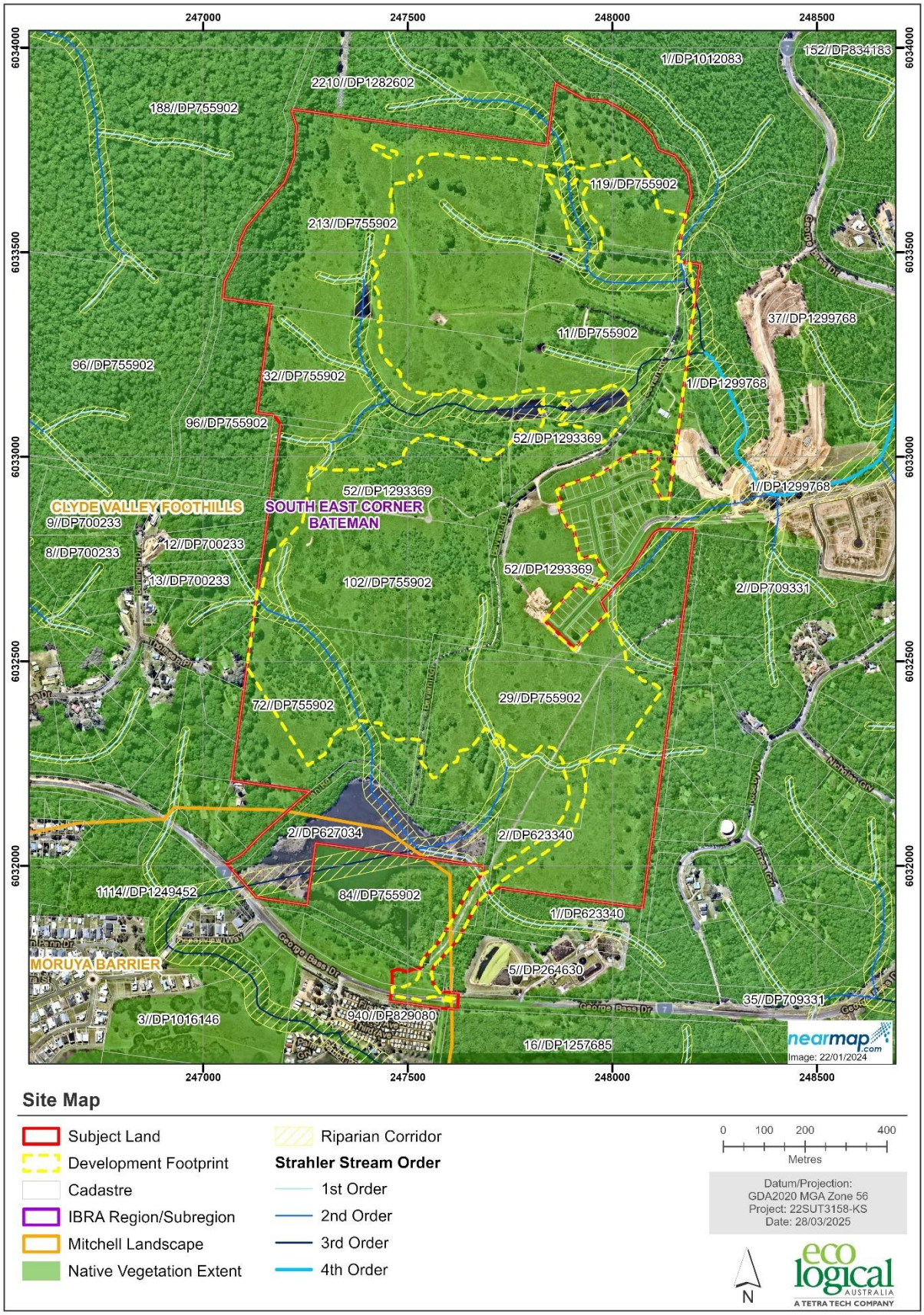


Figure 2: Site Map

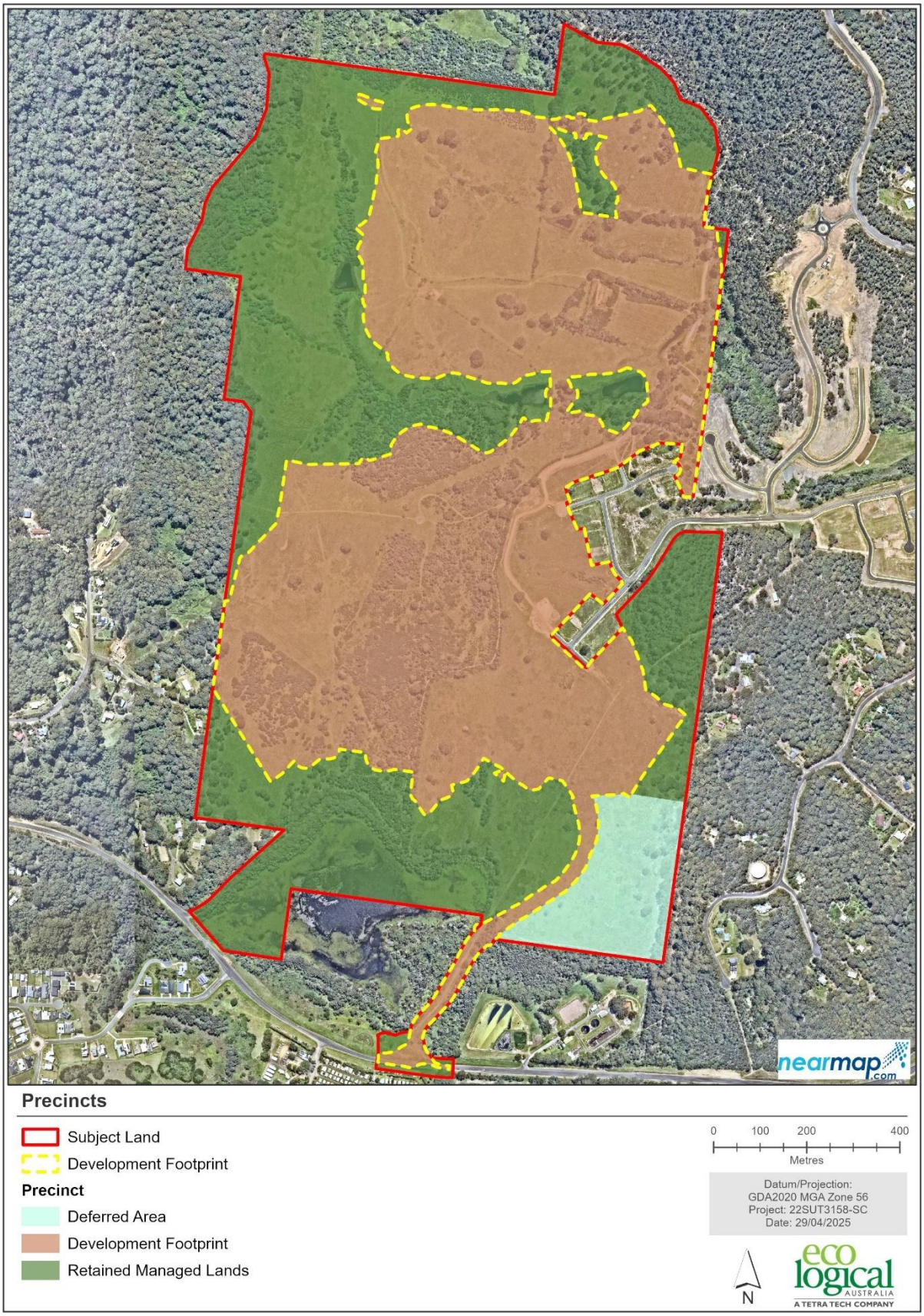


Figure 3: Precincts

1.5. Legislative context

Legislation relevant to the Subject Land is outlined in Table 3.

Table 3: Legislative context

Name	Relevance to the project	Report Section
Commonwealth		
Environmental Protection and Biodiversity Conservation Act 1999	Matters of National Environmental Significance (MNES) have been identified on or near the Development Footprint. This report assesses impacts to MNES and concludes that the development has the potential to have a significant impact on MNES: Threatened Ecological Communities • Coastal swamp sclerophyll forests of south-eastern Australia (PCT 4056_Moderate) • Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland (PCT 4056_good) A referral to the Commonwealth is recommended	Section 11
State		
Environmental Planning and Assessment Act 1979	The EP&A Act is the principal planning legislation for NSW. It provides a framework for the overall environmental planning and assessment of development proposals. The proposed development is State Significant Development and is to be assessed under Part 4.1 of the EP&A Act. Secretary's Environmental Assessment Requirements have been issued and are outlined in Table 1 above.	Section 1
Biodiversity Conservation Act 2016	*Section 34A of the BC (Savings and Transitional) Regulation 2017 provided transitional arrangements for certain concept plans approved under the repealed Part 3A of the EP&A Act 1979. The approved Rosedale concept MP 05-0199 was not certified under this section and therefore those transitional arrangements do not apply to this DA.* The proposed development is now considered a SSD triggering the BOS and therefore requires submission of a Biodiversity Development Assessment Report.	This BDAR is prepared in accordance with the BAM (2020)
Fisheries Management Act 1994	The development involves potential impacts to threatened species or their habitats listed in the FM Act and therefore assessments of significance are required in accordance with s5A of the EP&A Act. • the blockage of fish passage and, therefore, requires a permit under s219 of the FM Act (unless works are authorised via s199 consultation or another permit under Part 7 of the FM Act).	Riparian and Aquatic Management Report
Water Management Act 2000	The project involves works on waterfront land and therefore requires a Controlled Activity Approval under s91 of the WM Act.	Water Management Plan
Planning Instruments		
State Environmental Planning Policy (Coastal Management) 2018	Bevian Wetland is a freshwater wetland identified under SEPP (Coastal Management) 2018. Guidelines of this policy must be followed to minimize the impact on water quality and quantity, native flora and fauna and provisions of safeguards and rehabilitation where necessary.	Section 6
State Environmental Planning Policy (Biodiversity and Conservation) 2021	Eurobodalla Shire land has a koala recovery strategy revised edition 2021. The Subject Land is considered Low Potential Koala Habitat and no Koalas have been recorded in the local area. Koalas are present in the southern parts of the shire and have recently been recorded to the west of Bodalla and around Dignam's Creek. Surveys were undertaken for koalas as part of this assessment consistent with BAM 2020.	Section 4.4

Name	Relevance to the project	Report Section
Eurobodalla Local Environment Plan (LEP) 2012	The subject site is zoned RU1: Primary Production, RU2: Low Density Residential, C2: Environmental Conservation and C4: Environmental Living. The proposed Development Footprint is located within land zoned RU2 and the proposed development is permitted with consent. Part 6 has provisions for wetlands and development must be designed to avoid, minimise and mitigate impacts.	Section 6
Eurobodalla Shire Council Development Control Plan (DCP)	The Eurobodalla Shire Council Residential Zones DCP contains provisions relevant to this BDAR relating to site planning, landscaping, and tree preservation.	Stage 2 of this report
Eurobodalla Shire Council Policies	Yellow bellied Glider (YBG) Policy (specific to Broulee area). Development must not significantly impact on YBG or its habitat and to ensure its long-term persistence through the retention of suitable habitat.	Section 6

2. Methods

2.1. Site context methods

2.1.1. Landscape features

The Eurobodalla Local Government Area (LGA) covers approximately 340,000 ha of which 50% consists of National Parks, Public Reserves, rivers and estuaries. State Forest comprises a further 30% with the final 20% made up of freehold land. The remnant vegetation within the Shire is widely recognised for its importance for biodiversity, water quality and catchment health. Illawong and Broulee Island Nature Reserves are located approximately 5 km south, Murramarang National Park is located approximately 15 km to the north and Mogo State Forest adjoins the site in the northwest covering and area of approximately 15,500 ha.

The Subject Land is an area of approximately 183.70 ha. Most of the land has been cleared historically and was used as a dairy farm. Along the northern, western and eastern fringes of the Subject Land are areas of remnant forest. Lands adjoining the site are heavily vegetated providing connectivity to Mogo State Forest located northwest of the Subject Land, and the Bevian Wetland located in the south-western corner of the property. Vegetation within the Subject Land provides linkages to the forests to the southeast, south of Rosedale through Guerilla Bay, Burrewarra Point and around to Barlings Beach. There has been significant residential development and clearing of native vegetation adjacent to the Subject Land including the development of neighbouring "Saltwood" estate which has severely restricted connectivity between the forests to the southeast and forests to the north of Rosedale.

Bevian Wetland is a Coastal Wetland identified under SEPP (Coastal Management) and is of high regional significance due to the diversity of habitat for flora and fauna. No development is proposed in this part of the Subject Land. A 100 m buffer has been applied around Bevian Wetland to provide adequate protection from potential stormwater runoff, sedimentation and eutrophication.

Scattered trees are present within the cleared areas and remnant and regrowth forest is present patchily along the riparian areas, gullies and creek lines that intersect the Subject Land. A former cheese factory, and old water tanks are also present, although the factory was destroyed by the 2019/2020 bushfires. Eurobodalla Shire Council Sewage Treatment Plant is located between the southern boundary of the subject land and George Bass Drive. Land to the south on the opposite side of George Bass Drive includes Barlings Beach Holiday Park consisting of cabins and caravan sites.

Asset Protection Zones (APZs) are included within the Development Footprint. The site-based method was applied for this assessment, therefore the assessment area is the 1,500 m buffer surrounding the outside edge of the boundary of the Subject Land.

2.1.2. Geomorphology / topography

The Subject Land is part of the coastal hinterland northeast of Tomakin. The north-western boundary forms the crest of the watershed ridgeline between the catchment of the Tomago River that drains to the west and Saltwater Creek which drains to the east. The Subject Land is situated on gently undulating to steep land. The northwest section of the Subject Land is the steepest ranging between 15 -25% with an elevation of 120 m. Bevian Wetland is the lowest section of the Subject Land at 2 m.

The upper slopes of the Subject Land are underlain by the Wagonga and Bogola formations of the Ordovician Period. These formations consist of cherts, conglomerates, agglomerate, slate, sandstone

and phyllite (kass-hermes, 2007). These rocks are exposed in bedrock along some of the creek beds and rarely on ridgeline creeks. Gravel and cobbles derived from these rocks occur frequently in the soils.

Quaternary sediments also occur as narrow and linear valley floor deposits along most of the tributary streamlines in the study area. These have the appearance of alluvial and colluvial sediments deposited in terrace and fan formations.

2.1.3. Mitchell Landscapes

Clyde Valley Foothills are hills and ridges on the coastal ramp of the Clyde valley on folded Ordovician sandstone, siltstone, slate and chert. Elevations range from 50 to 230 m with local relief about 100 m. Thin stony red and red-yellow texture-contrast soils with sandy A horizons. These landscapes support open forest of tall Spotted Gum (*Corymbia maculata*), Grey Ironbark (*Eucalyptus paniculata*), Red Bloodwood (*Corymbia gummifera*), White Stringybark (*Eucalyptus globoidea*), Blackbutt (*Eucalyptus pilularis*) with Blady Grass (*Imperata cylindrica*), Common Bracken (*Pteridium esculentum*) and Burrawang (*Macrozamia communis*) in the understorey.

2.1.4. Soils

The southern section of the Subject Land is characterised by alluvial soils derived from quaternary sediments. The soils consist of gravel, sands and silts and are moderately deep and clayey with no rocky outcrops. The upper slopes are colluvial derived from Wagonga and Bogolo formations from the Ordovician Period consisting of slate, cherts, quartz and conglomerates (NSW Geological Survey 1971).

Soil surveys undertaken in 2002 and again in 2007 did not find any Acid Sulphate Soils within the Subject Land (Douglas Partners 2002 cited in Conacher Travers 2007b). However, reference to Mogo 1:25 000 Acid Sulphate Soil Risk Map indicates that the Bevian Wetland is assessed as having a low probability of acid sulphate materials near the surface. JCL Development solutions undertook additional soil testing in May 2007 to determine the risk of sulphate oxidation due to excavation works. Core hole testing (six test pits) confirmed that no evidence of potential sulphate oxidation exists within the test sites (Conacher Travers 2007b).

2.1.5. Rivers, Streams, and Wetlands

The Subject Land contains a network of drainage lines. The northern half of the Subject Land falls within the catchment of Saltwater Creek which drains eastward to Rosedale Beach, 1.5km downstream. The southern parts of the Subject land are drained by an unnamed watercourse which flowsinto Bevian Wetland. There are farm dams located along drainage lines in the north. A tributary of Saltwater Creek flows south and contains one farm dam, the creek turns east in which two more farm dams have been constructed. Another dam has been constructed in the south. The southern section of the Subject Land flows into Bevian Wetland. There is one small dam where the drainage line is not defined and the area becomes a floodplain.

Bevian Wetland (SEPP Coastal Management) is a permanent freshwater wetland formed behind a major Holocene sand barrier that extends to the south of George Bass Drive. It is likely that the sea would have once reached this area (>6000 years ago) with changes in sea-levels creating an off-shore coastal barrier. The basin developed through infilling of freshwater which is present today. The shoreline would have receded southward from the original basin through episodic depositional events resulting in the shoreline in its current position (kass-Hermes 2007).

126 birds have been recorded at Bevian Wetland and surrounding floodplains including the threatened *Ichthyophaga leucogaster* (White-Bellied Sea-Eagle), *Gallinago hardwickii* (Latham's Snipe), *Hirundapus*

caudacutus (White-throated Needletail), *Callocephalon fimbriatum* (Gang-gang Cockatoo), and *Calyptorhynchus lathami* (Glossy Black Cockatoo). *Persicaria elatior* (Tall Knotweed) was recorded growing along the edge of the wetland.

The landscape features considered for this assessment are presented in Table 4, Figure 1 and Figure 2.

Table 4: Landscape features

Landscape feature	Subject Land	Assessment Area	Data source
IBRA Region(s)	South East Corner	South East Corner	Interim Biogeographic Regionalisation for Australia, Version 7
IBRA subregion(s)	Bateman	Bateman	Interim Biogeographic Regionalisation for Australia, Version 7
Rivers and streams	16 x 1st order 6 x 2nd order 2 x 3rd order 1 x 4th order		refer to ELA (2024) Riparian and aquatic assessment report
Estuaries and wetlands	Coastal Wetland	Bevian Wetland	NSW directory of important wetlands
Connectivity of different areas of habitat	The Subject Land contains areas in the north and along the east and west boundaries that are vegetated and connected to the surrounding landscape including Mogo Forest. Vegetation within the Subject Land provides important linkages to the forests to the southeast, south of Rosedale through Guerilla Bay, Burrewarra Point and around to Barlings Beach. Recent development external to the Subject Land has reduced connectivity between the forests to the southeast and forests to the north of Rosedale	The Assessment Area is highly connected	Aerial Imagery
Geological features of significance and soil hazard features	There are no significant geological features.	The Assessment Area contains coastal rocky plateaus	Aerial imagery
Areas of Outstanding Biodiversity Value	The Subject Land does not contain an area of Outstanding Biodiversity Value	The Assessment Area does not contain an area of Outstanding Biodiversity Value	Register of Declared Areas of Outstanding Biodiversity Value (DPIE 2020)
NSW (Mitchell) Landscapes	Clyde Valley Foothills	Clyde Valley Foothills	NSW (Mitchell) Landscapes – version 3.1 (DPIE 2016)

Landscape feature	Subject Land	Assessment Area	Data source
Percent (%) native vegetation extent	The Subject Land is 183.7 ha. The Development Footprint is approximately 102.6 ha and contains approximately 98.9 ha of native vegetation.	The assessment area is approximately 1818 ha and contains approximately 1232 ha of native vegetation (68%). Areas of waterbodies and ocean are excluded from the calculations.	Calculated using aerial imagery and ArcGIS software

Plate 1: Riparian vegetation within the Subject Land

Plate 2: Bevian Wetland

2.1.6. Native Vegetation cover

The majority of the Subject Land has historically been cleared of woody vegetation and managed for agricultural grazing. As such, much of the Subject Land consists of both exotic dominated grasslands, and derived native grassland with scattered trees and small areas containing forest or woodland. Remnant forests occur along the eastern boundary, northwestern and northeastern corners of the Subject Land, and the southern boundary in association with Bevian Wetland. Eucalypt Forests are present within the Subject Land with patches of rainforest in the northwest and Swamp Oak Floodplain Forest and Swamp Paperbark Scrub located in the south.

The vegetation extent evident in Aerial imagery from SixMaps (2014) differed from field validated vegetation extent (Figure 4). Nearmaps was used as a basemap containing the most up to date aerial imagery of the Subject Land. Since the 2014 aerial imagery, works were approved in April 2009 and subsequently the construction of Stage 1 was commenced consisting of 51 residential lots, 1 residual lot, roadworks and associated infrastructure (Council DA reference 05-0199).

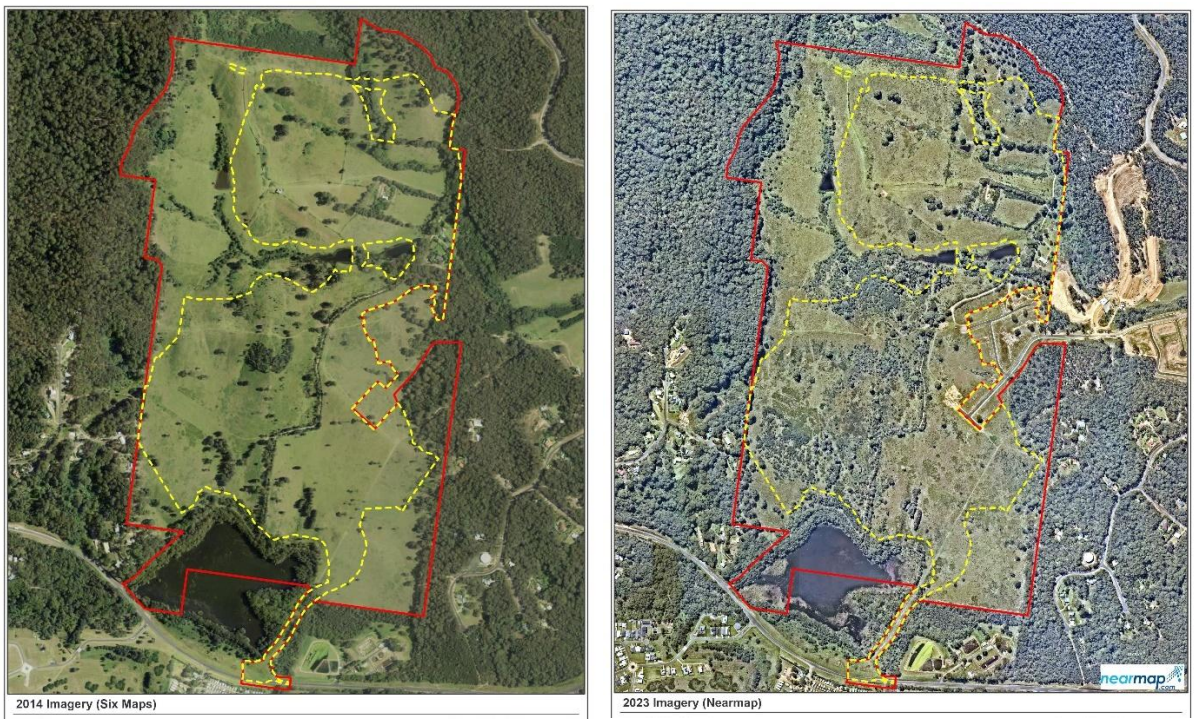


Figure 4: Aerial imagery from SixMaps (2014) and from Nearmap (Nov 2023)

A 1500m assessment buffer was applied to the Subject Land. Table 5 summaries the extent of native vegetation cover within the assessment area. Figure 2 shows the location of native vegetation within the assessment area.

There is a managed powerline easement that traverses the site from the south at George Bass Drive (10m wide) which is cleared from native vegetation and is an access track (Plate 3), this area has been excluded from assessment and is considered cleared. The powerline easements in the north have been included in the assessment of native vegetation as these areas do not have a defined access track and is predominately native grasses.

Table 5: Native Vegetation Extent

Assessment Area (ha)	1818.22 ha
Total area of native vegetation cover (ha)	1232.4 ha
Percentage of native vegetation	68%
Class (0-10, >10-30, .30-70, or >70%)	30-70%

2.1.7. Patch size

Patch size was calculated using available vegetation mapping for all patches of intact native vegetation on and adjoining the Subject Land. Patch size was assigned to one of four classes (<5 ha, 5-24 ha, 25-100 ha or ≥100 ha). A patch size 101 ha was determined for the Subject Land.

Plate 3: Cleared transmission line easement

3. Native Vegetation, TECs and Vegetation Integrity

3.1. Existing Information

Conacher Travers Pty Ltd undertook a Flora and Fauna Assessment (FFA) in 2006 across the Subject Land to support the Concept Plan Approval which was approved in 2008. They declared that the Subject Land had been subjected to extensive clearing with most native vegetation removed and areas consisting of pasture with fragmented areas of natural and disturbed vegetation throughout the Subject Land.

Three endangered ecological communities (EECs) were identified within the Subject Land;

- Swamp Oak Floodplain Forest,
- River Flat Eucalypt Forests on Coastal Floodplains, and
- Freshwater Wetland on Coastal Floodplain (Bevian Wetland SEPP Coastal Management).

All EECs were present in the southern section of the Subject Land, located just north and northwest of Bevian Wetland. It was noted by Conacher Travers (2006) that the condition of the TECs immediately surrounding Bevian Wetland was good (4.48 ha) whilst the majority was in Low (i.e. <50% native understory and <25% canopy cover) or regenerating condition (8.71ha). A total of 2.14 ha of TEC was earmarked for removal.

NGH consulting (2021) provided a preliminary BAM report for the Bevian Road Rosedale proposed subdivision. NGH recorded three Plant Community Types (PCTs) within the Subject Land:

- PCT 1212 -*Spotted Gum-Grey Ironbark- Woollybutt grassy open forest on coastal flats, southern Basin Bioregion and South East Corner Bioregion*
- PCT 1236 – *Swamp Paperbark-Swamp Oak tall shrubland on estuarine flats, Sydney Basion Bioregion and South East Corner Bioregion,*
- PCT 1326 – Woollybutt – *White Stringybark – Forest Red Gum grassy woodland on coastal lowlands, southern Sydney Basin Bioregion and South East Corner Bioregion*.

Areas of PCT 1236 in good condition were found to conform to the listed TEC Swamp Oak Floodplain Forest, and areas of PCT 1326 in good condition were associated with River-Flat Eucalypt Forest on Coastal Floodplains. NGH (2021) determined that the PCTs in low or moderate vegetation condition were not identified as the TECs. NGH did not undertake targeted surveys, however, they did note the presence of *Haliaeetus leucogaster* (White-bellied Sea-Eagle) in the southern section of the Subject Land, northwest of Bevian Wetland.

3.2. Mapping native vegetation extent

ELA completed a vegetation survey within the Subject Land (Ryan Smithers accredited assessor BAAS17061) over eight days in October and November 2022, during 21 & 23 January 2023, during 21 & 28 March 2023 and during 3 & 4 April 2023. Accredited Assessor, Cheryl O'Dwyer (BAAS18153) reviewed the vegetation mapping within the Subject Land on 7 February 2024 and established four additional VI plots.

The South East Regional Delivery CPHR Team conducted a site visit on 18 October 2024 and observed natural regeneration of the TEC, with a greater extent than originally mapped. In response, additional field surveys were undertaken by ELA in January 2025. The updated extent of the TEC has been validated and incorporated in this BDAR.

Areas that did not contain native vegetation such as access tracks and dams were excluded from the assessment.

These surveys identified four Plant Community Types within the Subject Land. Using aerial imagery and contours, the site was broadly separated into vegetation zones (Figure 5). Further justification on the selection of PCTs is provided within Section 3.4.

3.3. Plant Community Types

Four PCTs were identified within the Subject Land:

PCT ID	PCT Name	Subject Land 2025 Area (ha)	Development Footprint 2025 area (ha)
3045	*South Coast Temperate Gully Rainforest*	4.73	0.01
3274	*South Coast Spotted Gum Moist Forest*	53.72	21.84
3275	*South Coast Spotted Gum Cycad Dry Forest*	88.39	65.23
4056	*Southern Estuarine Swamp Paperbark Creekflat Scrub*	24.80	11.9
Total Native vegetation		**171.63**	**98.9**
0	Exotic and cleared areas	12.08	3.60
TOTAL		**183.72**	**102.59**

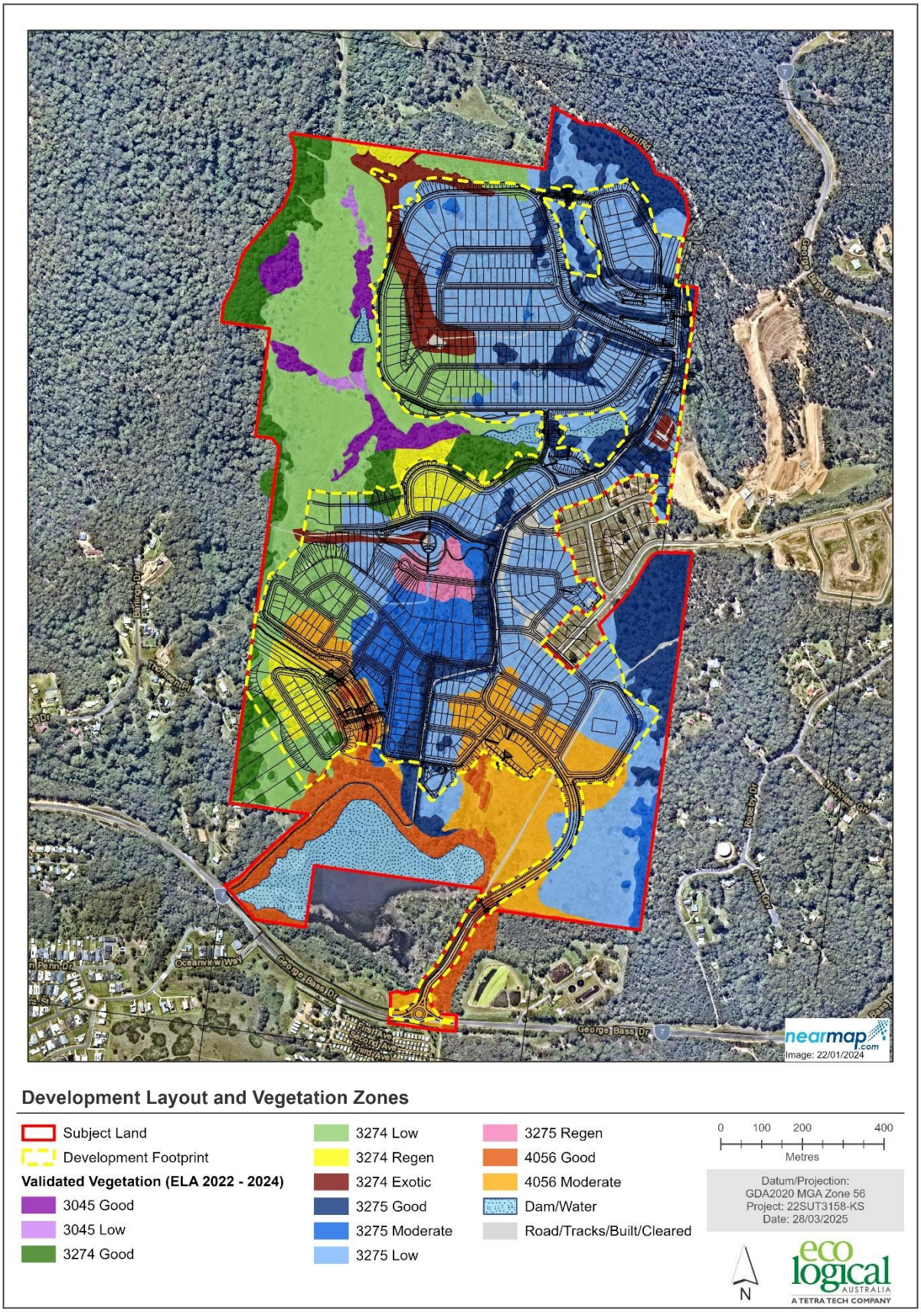


Figure 5: Development layout and Plant Community Types

3.3.1. PCT 3045- South Coast Temperate Gully Rain

PCT ID	3045
PCT Name	*South Coast Temperate Gully Rainforest*
Vegetation Formation	Southern Warm Temperate Rainforests
Vegetation Class	Rainforests
Percent cleared value (%)	12%
Extent within Development Footprint (ha)	0.01

Vegetation Description per NSW BioNet Vegetation Classification (DCCEEW 2024): Tall to very tall, dense rainforest, or occasionally very tall to extremely tall eucalypt open forest with a dense rainforest mid-stratum, which occurs along coastal and lower escarpment creeks and gullies, between Nowra and Eden, South Coast. The canopy almost always includes *Acmena smithii*, which often has the highest cover, and species either in the canopy or mid-stratum commonly include *Myrsine howittiana, Notelaea venosa* and *Ficus coronata*, occasionally with *Backhousia myrtifolia*. Where a eucalypt canopy is present, a wide range of species may occur rarely, the most frequent being *Eucalyptus botryoides*. Among the vines *Gynochthodes jasminoides* almost always occurs, and *Marsdenia rostrata*, *Smilax australis* and *Cissus hypoglauca* are very frequently present, all of which usually have low cover. There is a sparse to dense ground cover including ferns, grasses and forbs, very frequently including *Doodia aspera* and *Oplismenus imbecillis*, commonly with *Lastreopsis microsora* and *Pseuderanthemum variabile*. This PCT occurs mainly in mild, moderately wet locations receiving 960-1240 mm mean annual rainfall, at low to mid-elevations of 30-270 metres asl. It occurs on a wide range of lithologies, including sediments, metasediments and volcanics. It grades into PCT 4113 close to the coast in areas with more exposure to maritime influence, whereas this PCT occupies gullies with less exposure.

Vegetation Zones

Two (2) condition classes were identified within the Subject Land:

- PCT 3045_good. This vegetation zone contained an overstory of *Acmena smithi* with scattered *Acacia trachyphloia* and/or *A. maidenii*. The mid canopy contained *Myrsine howittiana, Notelaea venosa* and *Ficus coronata.* The ground layer was considered predominantly native with minor incursion of weeds influenced by the surrounding vegetation of PCT 3274 due to disturbance.

- PCT 3045_low. This vegetation zone was similar to the good zone but was more open containing less canopy cover. In this zone the canopy cover (*Acmena smithii* and *Acacia trachyphloia*) was patchy and as a result the ground cover was much higher and included a much higher cover of high threat weeds such as *Cenchrus clandestinus* and *Paspalum dilatatum*.

PCT 3045 occurred along the gullies and drainage lines in the northwestern parts of the subject land and would have been more widespread prior to historic clearing.

Most of this PCT has been avoided and will not be impacted.

3.3.2. PCT 3274 – South Coast Spotted Gum Moist Forest

PCT ID	3274
PCT Name	*South Coast Spotted Gum Moist Forest*
Vegetation Formation	Southern Lowland Wet Sclerophyll Forests
Vegetation Class	Wet Sclerophyll Forests (Grassy sub-formation)
Per Cent cleared value (%)	5%
Extent within Development Footprint (ha)	21.84

Vegetation Description per NSW BioNet Vegetation Classification (DCCEEW 2024): A very tall moist shrub-vine sclerophyll open forest of sheltered slopes on low coastal hills and hinterland valleys of the northern South East Corner bioregion, from Tathra north to Bawley Point and west to Buckenbowra. Plots are at elevations of 10-250 metres asl in areas receiving 900-1300 mm mean annual rainfall, predominantly on fine-grained sandstone substrates, with scattered occurrences on cherts and granodiorites. A mid-dense tree canopy is almost always dominated by *Corymbia maculata*, occasionally with *Eucalyptus paniculata*, above a layered mid-stratum that very frequently includes scattered mid-tall *Notelaea venosa* and occasional *Pittosporum undulatum* or *Pittosporum revolutum*. A lower shrub layer almost always contains *Macrozamia communis*, very frequently with *Breynia oblongifolia*, commonly *Hibbertia aspera* and occasionally *Indigofera australis*. Vines are diverse and plentiful in the sparse ground layer and climbing into shrubs, very frequently including *Eustrephus latifolius*,

Geitonoplesium cymosum and *Desmodium varians*, commonly with *Glycine clandestina, Tylophora barbata* and *Pandorea pandorana* subsp. *pandorana*. Other ground layer species include very frequent *Lepidosperma laterale* and *Dianella caerulea*, commonly with *Entolasia stricta, Lomandra longifolia, Dichondra repens, Lomandra multiflora* subsp*. multiflora, Oplismenus imbecillis* and *Lobelia purpurascens*. This community is floristically very closely related to PCT 3275, which it grades into on relatively dry exposed slopes.

This PCT is restricted to the western section of the Subject Land in the more sheltered locations. This PCT aligns to the NGH (2021) PCT 1212 which is now decommissioned.

Vegetation Zones

Four (4) condition classes were identified:

- PCT 3274_good. This vegetation zone is approaching the default benchmarks for lifeform species diversity and cover. Plots contained a minimum of three species of trees usually consisting of *Corymbia maculata* (Spotted Gum), *Eucalyptus paniculata* and *Allocasuarina littoralis*. *Clerodendrum tomentosum, E. bosistoana* and *Notelaea longifolia* were sometimes present. Canopy cover was over 30% with some plots exceeding benchmark. The composition of shrubs and grasses were high, with at least ten species of each life from. Typical shrubs included *Goodenia ovata, Notelaea venosa, Indigofera australis, Breynia oblongifolia, Pittosporum undulatum* and/or *P. revolutum*, with a variety of *Acacia* sp. Ground cover was often dominated by *Entolasia marginata, Imperata cylindrica, Gahnia meloncarpa, Anisopogon avenaceus, Poa labillardierei, with Lepidosperma laterale, Pteridium esculentum and Doodia aspera*. The cover of litter was often greater than 60% and most stem classes for trees were present.

- PCT 3274_low. In this vegetation zone trees were often absent or if present contributed little to canopy cover. A variety of native shrubs (Acacia *longifolia, A. mearnsii, A. paradoxa, Notelaea venosa* and *Rubus parvifolius*) were present and regenerating with a low cover score (6%). Grasses consisted of *Aristida vagans, Imperata cylindrica* and *Microlaena stipoides*, often contributing to more than 40% to 60% cover. Exotic species such as *Anthoxanthum odoratum, Bromus hordeaceus, Holcus lanatus* were also typically present.

- PCT 3274_Regen. This vegetation zone had a similar mid-layer and ground-cover composition as PCT 3274_good but with a much-reduced eucalypt canopy cover. The zone was characterised by a high cover of tree Acacias. In contrast to PCT 3274_low, shrubs were more diverse (including species listed above and *Hibbertia aspera*, *Homolanthus populifolius*, *Pittosporum undulatum* and *Trema tomentosa*) and had a higher cover (40%). Exotic ground-layer was low (0.3%).

- PCT 3274_exotic. This vegetation zone was dominated by exotic species and was characterised by the dominance of high threat weeds such as *Cenchrus clandestinus, Axonopus fissifolius,* and *Paspalum dilatatum*. These areas were located around the redundant farm structures in the northern section of the Subject Land.

3.3.3. PCT 3275- South Coast Spotted Gum Cycad Dry Forest

PCT ID	3275
PCT Name	*South Coast Spotted Gum Cycad Dry Forest*
Vegetation Formation	Southern Lowland Wet Sclerophyll Forests
Vegetation Class	Wet Sclerophyll Forests (Grassy sub-formation)
Per Cent cleared value (%)	14%
Extent within Development Footprint (ha)	65.23 ha

Vegetation Description per NSW BioNet Vegetation Classification (DCCEEW 2024): A tall to very tall sclerophyll open forest with a dry shrub layer and ground cover dominated by cycads and grasses on coastal lowlands between Bermagui and Nowra, South Coast. The tree canopy is very frequently dominated by *Corymbia maculata*, commonly with *Eucalyptus paniculata* and *Eucalyptus globoidea*. Occasional stands include *Eucalyptus pilularis* and rarely other eucalypt species. The mid-stratum is occasionally layered with a sparse cover of smaller trees, commonly *Allocasuarina littoralis* or tall *Acacia* species. The lower layer of dry shrubs is sparse however very frequently includes *Persoonia linearis*, commonly with *Leucopogon lanceolatus*. *Macrozamia communis* is almost always present either as a member of the shrub layer or amongst the ground layer and together may combine to a high cover. The ground layer is mid-dense and otherwise includes a mix of grasses, graminoids and climbers that very frequently include *Dianella caerulea, Entolasia stricta, Imperata cylindrica, Lomandra longifolia, Lepidosperma laterale, Microlaena stipoides, Hardenbergia violacea* and *Glycine clandestina*. This PCT is common on crests, exposed and semi sheltered upper slopes of the coastal lowland and hinterland ranges between Moruya and Batemans Bay area. It is very frequently associated with granodiorites or sandstones of the Abercrombie Formation with isolated northern outlier on the Shoalhaven sediments near Nowra. This community grades into PCT 3274 on sheltered slopes and into PCT 3276 on shallower or rocky soils on very dry and exposed locations.

This PCT is similar to PCT 3274 but is a drier community located on upper slopes and ridges in the eastern section of the Subject Land. This PCT aligns to the NGH (2021) PCT 1212 which is now decommissioned. This PCT dominates the Subject Land.

Vegetation Zones

Four (4) condition classes were identified:

- 3275-good. This vegetation zone is a woodland with an overstory cover of approximately 30% with up to five species of trees, including *Corymbia maculata* and *Eucalyptus fibrosa*. *Leucopogon juniperinus, Persoonia linearis* was often present with a short layer of dry shrubs such as *Pultenaea linophylla, P. villosa* and *Daviesia ulicifolia*. The ground layer was typically dense consisting of *Entolasia stricta, Imperata cylindrica, Lepidosperma laterale, Microlaena stipoides* and a variety of other grasses and herbs.

- 3275_moderate. This vegetation zone was similar to 3275_good but had fewer tree species and a more disturbed ground layer. Canopy cover was similar to 3275_good, however, shrub cover was generally lower (1-20%). This zone was on the edge of the woodland / grassland interface.

- 3275_low. This vegetation zone was a predominately native grassland derived from the clearing of PCT 3275. If trees were present the cover was less than 1%. Grasses and forbs dominated the area often exceeding 50% and high threat weeds such as *Senecio madagascariensis* and *Andropogon virginicus* were more prevalent.

- 3275_regen. This vegetation zone was located adjacent to 3275_moderate in the central parts of the Subject Land. Whilst the condition was similar to 3275_moderate it differed by a number of factors including the abundance of regenerating *Banksia integrifolia*.

3.3.4. PCT 4056 – Southern Estuarine Swamp Paperbark Creekflat Scrub

PCT ID	4056
PCT Name	*Southern Estuarine Swamp Paperbark Creekflat Scrub*
Vegetation Formation	Forested Wetlands
Vegetation Class	Coastal Floodplain Wetlands
Per Cent cleared value (%)	53%
Extent within Development Footprint (ha)	11.9 ha

Vegetation Description per NSW BioNet Vegetation Classification (DCCEEW 2024). A low to mid-high swampy open forest of slightly saline, near-permanently waterlogged margins of estuaries and coastal lagoons. This PCT occurs along the southern and central NSW coast, from Nadgee Lake in the far South East Corner bioregion north to Port Stephens at the southern end of the NSW North Coast bioregion. It generally occurs at elevations of below 5 metres asl on deep, organic-rich deposits of mixed estuarine and alluvial sediments. A mid-dense to closed canopy of small trees is almost always dominated by *Melaleuca ericifolia*, commonly with scattered *Casuarina glauca* and rarely *Myoporum acuminatum*. A dense to mid-dense shrub stratum includes smaller individuals of canopy species. The vine *Parsonsia straminea* is occasionally present and climbs into shrub and canopy plants. The ground layer tends to have low species richness and is very frequently dominated by *Machaerina juncea*, commonly with scattered *Phragmites australis* and occasionally *Juncus kraussii* subsp. *australiensis* or *Samolus repens*. Other rarely occurring species include *Machaerina rubiginosa*, *Cassytha pubescens, Gahnia clarkei, Gahnia sieberiana, Selliera radicans* and *Viola banksii*. This community tends to occur in complex mosaics with many other types along gradients of salinity and soil moisture. For example, slight increases in salinity may lead to replacement by PCT 4028, while on the south coast it may grade into PCT 4049 with decreasing salinity on floodplain margins.

This PCT is restricted to the southern section of the Subject Land located near Bevian Wetland. This PCT aligns to the NGH (2021) PCT 1236 which is now decommissioned.

Vegetation Zones

Two (2) condition classes were identified. Both were highly modified and disturbed.

- PCT 4056_good. This vegetation zone is immediately surrounding the Bevian Wetland and consists of *Casuarina glauca* with scattered *Eucalyptus tereticornis.* Total canopy cover often exceeding 45% cover. *Melaleuca ericifolia* is the dominant shrub.

- PCT 4056_moderate. This vegetation zones extends out from the swamp in low-lying poorly drained areas and is characterised by a very sparse canopy, which when present, comprises remnant *Eucalyptus tereticornis*. The ground layer (predominately regenerating shrubs of *Melaleuca ericifolia*) is extremely dense approaching 70% cover.

3.4. Justification of PCT selection

In determining the PCTs within the Subject Land, various attributes were considered in combination to assign vegetation to the best fit PCT using the Plot to PCT tool. The list of potential PCTs is first refined by IBRA regions and subregions prior to refinement by site specific data including dominant species in each stratum and relative abundance, community composition, soils and landscape position. Reference was made to the PCT descriptions filtered from the PCT tool using the information in the BioNet Vegetation Classification and the final scientific determinations for TECs. Possible PCT options using the PCT filter tool in the BioNet Vegetation Classification Database are provided in Table 6.

It was noted that many PCTs are closely related and multiple PCTs could fit some vegetation communities. Nevertheless, the best-fit PCT was chosen using a multitude of factors as described below.

Table 6: PCT Justification

Selected PCT	PCT Name	Potential PCTs	Justification
3045	South Coast Temperate Gully Rainforest	3036, 3106, 4113, 4112	PCTs were filtered on Formation (Rainforest), followed by IBRA and subregion. *Acmena smithii* was selected as the key tree species. Location and vegetation class excluded PCT 3013, 3028, and 3037 as these were northern warm temperate / subtropical rainforests. PCT 3036 and 3106 were excluded based on the absence or paucity of characteristic species such as *Doryphora sassafras* and *Backhousia myrtifolia*. PCT 4113 was rejected as it is located south of Tuross Head (>30 km south of the Subject Land) and PCT 4112 occurs in steep rocky gullies or on rocky slopes which were absent within the Subject Land.
3274	South Coast Spotted Gum Moist Forest	3267, 3273, 3275, 3276, 3268, 3271, 3272	PCTs were filtered on Formation (Wet sclerophyll forest), followed by IBRA and subregion. *Corymbia maculata, Eucalyptus paniculata* and *Allocasuarina littoralis* were selected as the key tree species. PCT 3267 and 3268 were excluded based on differing geology; PCT 3275 and 3272 were excluded based on landscape positioning, and PCT 3273, 3271, 3276, were excluded based on the mix of typical species within these communities.
3275	South Coast Spotted Gum Cycad Dry Forest	3270, 3273, 3276, 3271, 3272, 3274, 3267	PCTs were filtered on Formation (Wet sclerophyll forest), followed by IBRA and subregion. *Corymbia maculata, Eucalyptus fibrosa* and *Leucopogon juniperinus* were selected as the key species. PCT 3270, 3271, 3272, 3274, were excluded due to landscape positioning and 3273, 3276, and 3267 were excluded based on mix of characteristic species associated with these PCTs.
4056	Southern Estuarine Swamp Paperbark Creekflat Scrub	3985, 4009, 4019, 4035, 4049, 4026, 4028, 4050	PCTs were filtered on Formation (Forested wetlands), followed by IBRA and subregion. *Casuarina glauca* and *Melaleuca ericifolia* were selected as the key species. PCT 3985, 4050 and 4035 were excluded based on lack of dominance by *C. glauca*. PCT 4009, 4049, 4026 were excluded based on mix of species typically associated with these PCTs and 4019 was excluded based on location. Based on floristics PCT 4028 could also have also been selected however, due to landscape positioning (near tidal swamps) this PCT was excluded.

3.5. Threatened Ecological Communities (TECs)

A desktop assessment using selected PCTs and their potential association with TECs, in addition to the EPBC Protected Matter Search Tool identified vegetation communities that were likely to occur within the Subject Land (Table 7). Only PCT 4056 was listed as being associated with TECs as per the NSW BioNet Vegetation Classification Database and the BAM-C.

Table 7: Potential TECs within the Subject Land as per SEED mapping

BC Act		EPBC Act	
Listing status	**Name**	**Listing status**	**Name**
E	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	CE	River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria
E	Araluen Scarp Grassy Forest	E	Araluen Scarp Grassy Forest
E	Lowland Grassy Woodland in the South East Corner Bioregion	CE	Lowland Grassy Woodland in the South East Corner Bioregion
E	Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions		
E	Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions	CE	Littoral Rainforest and Coastal Vine Thickets of Eastern Australia
E	Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		
E	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community
E	Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions	V	Subtropical and Temperate Coastal Saltmarsh
E	Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	CE	Littoral Rainforest and Coastal Vine Thickets of Eastern Australia

Only one TEC which occurs under both the BC Act and EPBC Act listed community was considered to occur within the Development Footprint and this is described in detail below. The location of TEC within the Subject Land is shown on Figure 6.

3.5.1. BC Act Listed TECs

Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

PCT 4056 can be associated with the TEC *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* which is listed as endangered under the BC Act. To conform with the listed community the vegetation zone must be located on grey-black clay loams and sandy loams on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes, where the ground water is saline or sub-saline (NSW Scientific Committee). The final determination states that the listed community occurs below 20 m (rarely above 10 m) and the structure of the community varies from open forests to low woodlands, scrubs or reed lands with scattered trees. Due to the dominance of *Casuarina glauca* with *Melaleuca ericifolia* and inundation around the Bevian Wetland, PCT 4056_good conforms to the listed community.

The areas mapped as PCT 4056_moderate has been cleared and grazed historically and lacking reeds (*Phragmites australis*: common reed) and *Juncus* sp. but does have evidence of supporting the characteristic species, such as *Melaleuca ericifolia* with scattered *Eucalyptus tereticornis* and is located adjacent to PCT 4056_good on alluvial soils. This vegetation zone has also been included as the listed community.

3.5.2. EPBC Act Listed TECs

Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland

PCT 4056 is also associated with the EPBC Act listed Coastal Swamp Oak (*Casuarina glauca*) Forests of NSW and SE Qld. This community is also listed as an endangered community. Under this listing advice the listed community occurs in coastal catchments, mostly at elevations of less than 20 m above sea level (asl) that are typically found within 30 km of the coast. The Determination lists the community as a tall closed forest to woodland to dense shrubland or scrub forest dominated by *Casuarina glauca*. In order to be considered a MNES, areas of the ecological community must meet both:

- The key diagnostic characteristics, AND
- The minimum condition threshold

Location and landscape positioning, geology and soils are met for the area mapped PCT 4056. However, the Determination describes the community must be an *open woodland, woodland forest or closed forest structure with a tree canopy that has a total crown cover of at least 10%.* PCT 4056_good meets this criterion and is considered to conform to the listed EPBC Act Community.

PCT 4056_moderate lacks canopy cover due to historic clearing and grazing associated with the Subject Land. There is natural regeneration occurring dominated by *Melaleuca ericifolia* and *Eucalyptus* species but little indication of regeneration of *C. glauca* such that it would be a dominant element of the regenerating community under current management. However, if the area is left to regenerate it is possible that overtime *C. glauca* would be present becoming co-dominant with *Melaleuca ericifolia*. In addition, the minimum condition threshold considers patch size and vegetation quality. PCT 4056_moderate is considered a large patch (>5ha) but lacks canopy cover, is not dominated by *C. glauca*, and nor is it showing signs of being dominated by *C. glauca* due to lack of this species regenerating under current management. The understory is mostly native meeting the condition threshold however the Determination also states that areas *where C. glauca is not abundant and Melaleuca spp. dominate these areas do not meet the key diagnostics and not included as a part of the Coastal Swamp Oak Forest*,

instead conforming to the NSW-listed endangered ecological community. Therefore, PCT 4056_moderate does not conform to the EPBC Act listed community.

Coastal swamp sclerophyll forests of south-eastern Australia

Coastal Swamp Sclerophyll Forests of South-eastern Australia (Endangered) are communities associated with freshwater to brackish wetlands on low-lying coastal areas. In typically intact forests the canopy is often layered consisting of melaleucas and eucalypts found on a wide range of soils that are waterlogged or intermittently to episodic inundated. Whilst the plant species varies with latitude and frequency / duration of inundation, melaleucas (*Melaleuca ericifolia*) are locally common with an overstorey of Swamp Oak, Bloodwoods (*Corymbia intermedia*) or eucalypts (*Eucalyptus tereticornis*). Vines are typically found on the trunks and climbing into the crown. Ground layer composition is variable but can include *Gahnia* spp, *Lomandra longifolia*, ferns (*Blechnum* sp), *Entolasia marginata* and *Imperata cylindrica* (Blady grass). The Final Determination states *that the ecological community is not present if the canopy and/or ground layer is dominated by species that are more typically associated with estuarine/saltmarsh areas, eg, Coastal Swamp Oak* (*Casuarina glauca*). This criterion rules out PCT 4056_good as being part of the listed community. However, in its current state and potential for eucalypt regeneration, PCT 4056_moderate may conform to the listed community. Whilst, it is difficult to determine due to the level of disturbance history within the Subject Land, it is potential that PCT 4056 is a mosaic of TECs so erring on the side of caution PCT 4056_moderate has been considered to be part of the listed EEC.

In New South Wales, much of this ecological community corresponds to the NSW-listed '*Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* Endangered Ecological Community'. Some patches that are dominated by *Melaleuca* spp. may also correspond to the NSW-listed '*Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* Endangered Ecological Community.'

3.5.3. Other TECs Considered and excluded

River-flat eucalypt forest on coastal floodplains of southern NSW and eastern Victoria

The River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria is listed in the Critically Endangered category of the threatened ecological communities list under the EPBC Act. At the time of this advice, the ecological community corresponds closely with the NSW-listed (endangered) *River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions*.

The ecological community occurs on alluvial landforms related to coastal river floodplains and associated sites where transient water accumulates, including floodplains, river-banks, riparian zones, lake foreshores, creek lines (including the floors of tributary gullies), floodplain pockets, depressions, alluvial flats, fans, terraces, and localised colluvial fans. Floodplains may be occasionally or more often saturated, water-logged or inundated. The ecological community is typically found below 50 metres above sea-level (m ASL), although it can occur up to 250 m ASL (e.g. on floodplain pockets and plateaus above nick points). The ecological community occurs on alluvial soils of various textures, including silts, clay loams and sandy loams, gravel and cobbles. Alluvial soils are very diverse and usually reflect the properties of their parent material in the upper catchment. They may include in-situ subsoils, fluvial sediments, and colluvial fans where they overlay the alluvial floodplain. The ecological community is typically found on deep (greater than one metre) alluvial soils but may be found on shallower soils on the margins of the floodplain and in smaller narrow alluvial systems. However, the ecological community does not occur on soils that are primarily marine or aeolian sand.

The structure of the ecological community is generally a tall open forest to woodland, but there may be localised areas of closed forest and/or low forest, often associated with disturbance (including flooding). The structure tends to be lower and less dense in the wider floodplains, whereas taller denser forests occur in the more confined floodplains. The canopy is dominated by eucalypt species, often with several species present. The canopy may exceed 40 m in height, but can be considerably shorter, for example in regrowth stands or where growth is inhibited (such as on waterlogged sites or in areas with lower rainfall). When intact, the canopy typically has between 40 and 60 percent crown cover, with large trees often containing hollows; but crown cover may be as low as 20 percent. Areas of higher crown cover also occur. A mid-layer of small trees or sub-canopy may be present with scattered to dense shrubs. For example, *Melaleuca, Leptospermum* and related genera may form dense thickets beneath eucalypt canopies or in gaps between trees. The mid-layer may be sparser in lower rainfall areas, or where partially cleared, grazed or frequently burnt. The ecological community often has climbers and vines extending into the mid-storey and canopy. The ecological community generally has a more diverse and abundant groundcover than locally adjoining slopes and typically includes grasses, forbs, ferns, sedges and scramblers. The intact ecological community may also have high litter cover and fallen logs. The local expression of the ecological community is influenced by its location relative to the riparian areas of the floodplain, frequency of inundation by stream flows, local climate, latitude, and the contribution of biota from surrounding areas. Hence there is regional variation and intergradation of key species, although structure and function remain similar throughout the extent. The ecological community typically forms mosaics with other floodplain forest ecological communities, lowland woodlands and treeless wetlands.

The composition of the tree canopy varies across the extent of the ecological community. It may be dominated by a single eucalypt species, or by a mix of several eucalypt species.

Given this is a floodplain ecological community there are several understorey species adapted to the alluvial soils and comparatively higher soil moisture compared to surrounding slopes. These are mostly perennial forbs, grasses, sedges, rushes lows shrubs and ferns including: *Centella asiatica* (Pennywort), *Commelina cyanea* (Scurvy-weed), *Dichondra repens* (Kidney Weed), *Einadia hastata* (Berry Saltbush, Saloop), *Entolasia marginata* (Bordered Panic), *Gahnia* spp. (Saw-sedge), *Lobelia purpurascens* (White Root), *Lomandra longifolia* (Spiny-headed Mat-rush), *Microlaena stipoides* (Weeping Grass), *Oplismenus hirtellus* (Basket Grass), *Plectranthus parviflorus* (Cockspur Flower) and *Viola hederacea* (Ivy-leaved Violet) (Good et al. 2017; Keith & Scott 2005; NSW Scientific Committee 2011; Miles 2020). In some areas grasses that may dominate the groundcover include: *Themeda triandra* (Kangaroo Grass), *Imperata cylindrica* (Blady Grass) and *Cymbopogon refractus* (Barbed Wire Grass).

The River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria intergrades with other vegetation types and nationally-listed ecological communities. Key diagnostic characteristics are used to identify an area of native vegetation as being the River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria. They also define the features that distinguish it from other ecological communities.

Under the BC Act the listed community as per the Final Determination:

The structure of the community may vary from tall open forests to woodlands, although partial clearing may have reduced the canopy to scattered trees. Typically, these forests and woodlands form mosaics with other floodplain forest communities and treeless wetlands, and often they fringe treeless floodplain lagoons or wetlands with semi-permanent standing water.

Under the EPBC Act the listed community as per the Final Determination:

- Occurs as a tall closed-forest, tall open-forest, closed forest, open forest, tall woodland, or woodland. The canopy has a crown cover of at least 20 percent.
- Has a canopy dominated by one or a combination of the following species: *Angophora floribunda, A. subvelutina, Eucalyptus amplifolia, E. baueriana, E. benthamii, E. bosistoana, E. botryoides, E. botryoides x E. saligna, E. elata, E. grandis, E. longifolia, E. moluccana, E. ovata, E. saligna, E. tereticornis, E. viminalis*.

E. tereticornis is present as a scattered tree in the southern section of the Subject Land. However, the patch does not have a canopy cover of at least 20%, the maximum in any one plot (Plot 4) is 6%. Based on the above information from the determination, this area does not conform to the listed TEC under the EPBC Act.

The amount of EEC within the Development Footprint is shown in Table 8 below.

Table 8: TECs within the Subject Land

PCT ID	BC Act			EPBC Act		
	Listing status	Name	Area (ha)	Listing status	Name	Area (ha)
4056_ Good	EEC	*Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	1.16	EEC	*Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland*	1.16
4056_ Moderate	EEC	*Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	10.74	EEC	*Coastal Swamp Sclerophyll Forests of South-eastern Australia*	10.74
		TOTAL	**11.9**		**TOTAL**	**11.9**

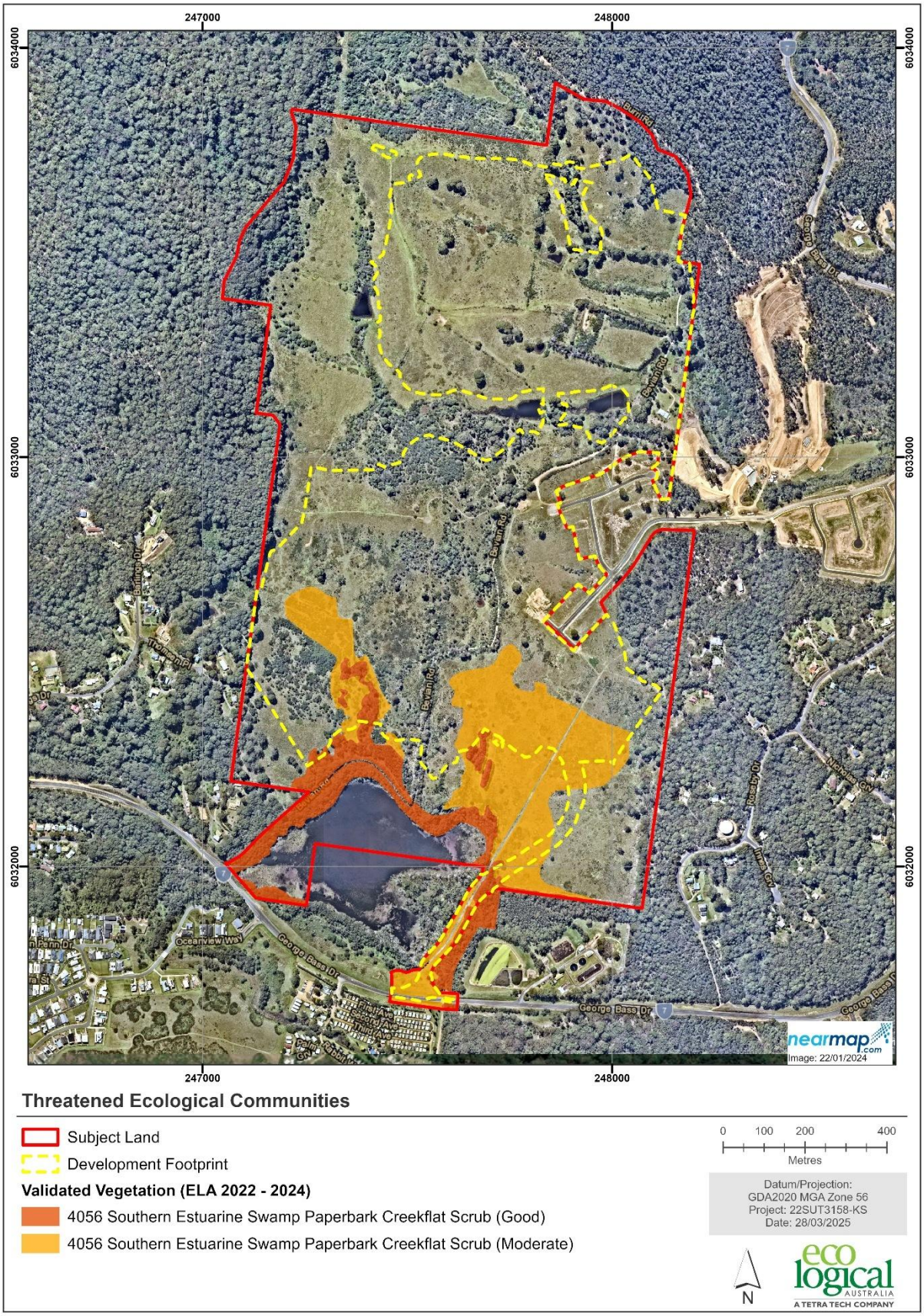


Figure 6: Threatened Ecological Communities

3.6. Vegetation Integrity Survey

A total of 46 full-floristic vegetation integrity (VI) plots were surveyed (Figure 7, Table 9) across the entire Subject Land to confirm PCTs and Threatened Ecological Communities (TECs). VI plots were undertaken to assess the composition, structure and function components of each vegetation zone within the Development Footprint and within the conservation zone in accordance with the BAM. VI plots were randomly chosen from aerial imagery to avoid ecotones and ensure representative sample for each PCT based on total area and vegetation condition class. These were micro-sited within the field to ensure that the location of plots was a true representation of the PCT condition.

Due to changes and a reduction in the Development Footprint and micro-siting boundaries to avoid impacts to TECs and as much native vegetation as possible some of the VI plots are now located outside the Development Footprint. Plots inside the Development Footprint and in areas closely adjacent to the Development Footprint were used in the BAMC to calculate VI scores for the Development Footprint.

Table 9: Vegetation Zone requirements (Subject Land)

PCT ID	PCT Name	Condition	Area within Subject Land Area ha	Area within Retained Managed Land (ha)	Area within Development Footprint ha	Number of VI plots required	Number of plots surveyed
3045	South Coast Temperate Gully Rainforest	Good	4.03	4.02	0.01	1	2
		Low	0.69	0.69	0	0	1
3274	South Coast Spotted Gum Moist Forest	Good	10	8.45	1.54	1	5
		Low	32.92	20.70	11.96	3	8
		Regen	5.79	1.17	4.62	2	2
		Exotic	5.03	1.31	3.72	1	2
3275	South Coast Spotted Gum Cycad Dry Forest	Good	21.21	10.95	10.26	3	4
		Moderate	9.58	1.34	8.19	3	4
		Low	55.74	10.87	44.87	4	9
		Regen	1.91	0	1.91	1	1
4056	Southern Estuarine Swamp Paperbark Creekflat Scrub	Good	7.44	6.18	1.16	1	4
		Moderate	17.36	6.62	10.74	3	4
Total Native Vegetation			**183.7**	**72.3**	**98.9**	**23**	**46**
Dams			**7.98**	**7.77**	**0.21**		
Total Cleared areas / roads			**4.09**	**0.69**	**3.40**		
TOTAL			**183.7**	**73.21**	**102.59**		

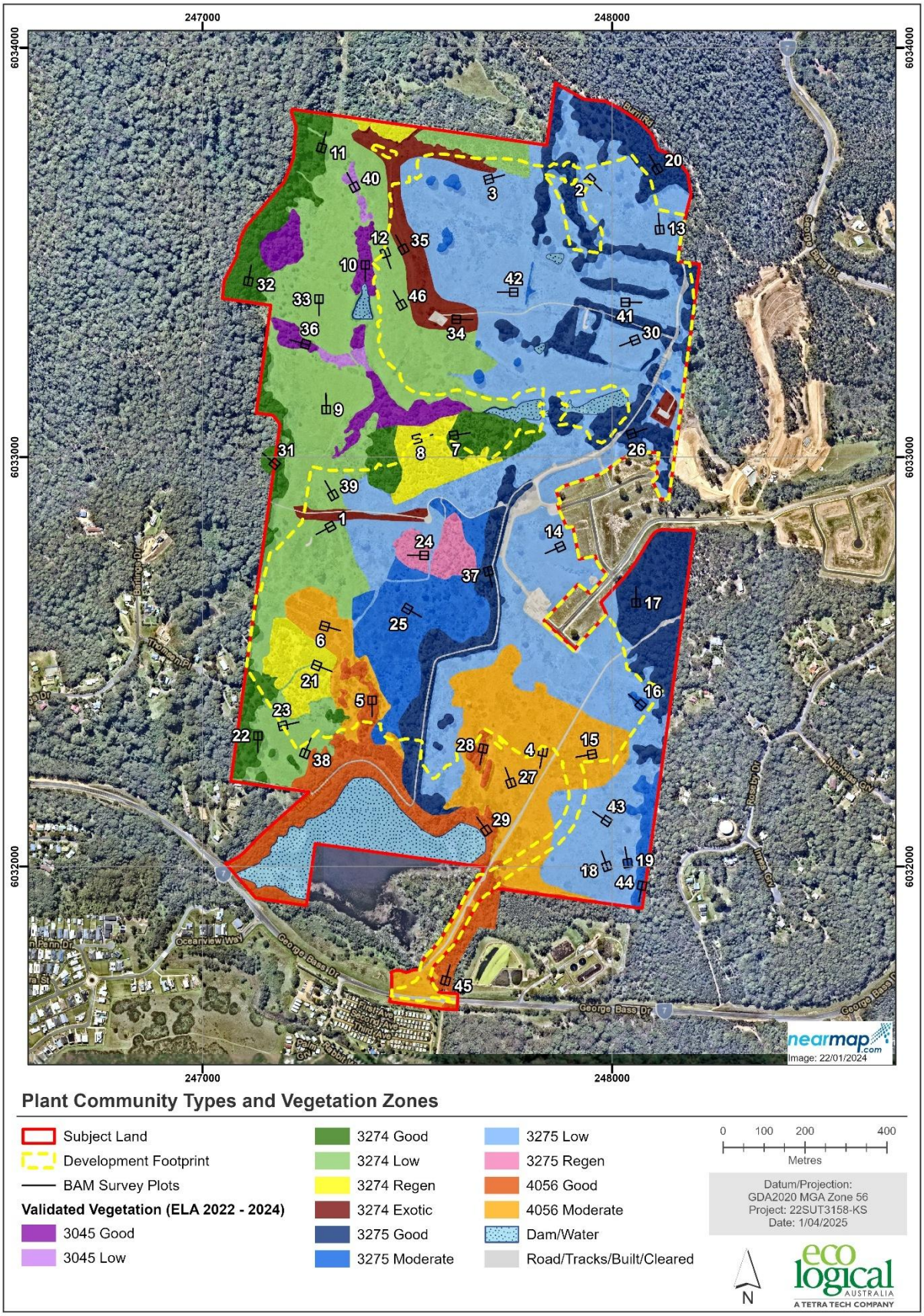


Figure 7: Plant Community Types and Vegetation Zones

3.6.1. Vegetation Integrity Scores

Plot data was uploaded into the BAMC to generate an overall Vegetation Integrity (VI) Score (Table 10). An offset is not required for vegetation zones that do not meet the VI thresholds; a vegetation zone with scores <20 where the PCT is not representative of a TEC or associated with threatened species habitat.

Table 10: Vegetation Integrity Scores

VZ ID	Vegetation Zone	Area (ha)	Composition condition score	Structure condition score	Function condition score	Hollow bearing trees present	Plot ID	Vegetation Integrity Score
	Development Footprint							
1	3274_good	1.54	90.2	71.8	44.4	No	7	**66**
2	3274_low	11.96	40.4	34.4	3.2	No	1,12,23,39,46	**16.5**
3	3274_exotic	3.72	14.5	3	35	No	34,35	**11.6**
4	3274_reg	4.62	65.3	55.9	22	No	21,8	**43.2**
5	3275_good	10.26	94.8	94.7	52.5	Yes	20,26,37	**77.8**
6	3275_moderate	8.19	93.3	40	28.6	No	16,19,25	**47.5**
7	3275_low	44.97	51.2	36	11.6	No	13,14,2,3,30,41,42,	**27.7**
8	3275_reg	1.91	91.1	62.9	45.7	Yes	24	**64**
9	4056_good	1.16	57.1	69.3	100	No	28,5	**73.4**
10	4056_moderate	10.74	61.2	93.6	19.9	No	15,27,4,6	**48.4**
11	3045_Good	0.01	92.8	61.9	65	No	10	**72**

4. Habitat Suitability for threatened species

4.1. Existing information

Conacher Travers Pty Ltd prepared the FFA (2007) and the Ecological Assessment (2008) to support the original consent approval. Targeted surveys consisting of diurnal observations and habitat searches, spotlighting, trapping, call-play back, transects and sound recorders were undertaken for threatened fauna and flora. NGH Consulting (2021) also visited the site to provide the Proponent an estimate of credits required for the modification. During these surveys, seven threatened fauna species were recorded within the Subject Land:

- *Ninox strenua* (Powerful owl)
- *Calyptorhynchus lathami* (Glossy Black Cockatoo)
- *Mormopterus norfolkensis* (Eastern Free-tail Bat)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat)
- *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat)
- *Petaurus australis* (Yellow-bellied Glider)
- *Haliaeetus leucogaster* (White-bellied Sea-Eagle)

Additionally, ebird Australia have recorded 126 species of birds within the Bevian Road Wetland including the following threatened species:

- *Hirundapus caudacutus* (White-throated Needletail)
- *Stictonetta naevosa* (Freckled Duck)

4.2. Ecosystem credit species

Ecosystem credit species predicted to occur within the Subject Land are generated by the BAMC following the input of VI data and the PCTs identified within Section 3.3. Ecosystem credit species predicted to occur at the Subject Land, are presented in Table 11. No surveys are required for these species. Several species were excluded from the assessment based on whether the PCT and / or vegetation zone provided foraging resources. PCTs and Vegetation zones removed from the BAMC and their justification are provided in Table 12.

Table 11: Ecosystem Credit Species

Ecosystem Species	Common Name	Sensitivity to gain class	BC Act Listing	EPBC Act Listing
Anthochaera phrygia	Regent Honeyeater	High	CE	CE
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Moderate	V	NL
Botaurus poiciloptilus	Australasian Bittern	Moderate	E	E
Calidris alba	Sanderling	High	V	NL
Calidris canutus	Red Knot	High	NL	E
Calidris ferruginea	Curlew Sandpiper	High	E	CE
Calidris tenuirostris	Great Knot	High	V	V
Callocephalon fimbriatum	Gang-gang Cockatoo	Moderate	V	E
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	High	V	V
Charadrius leschenaultii	Greater Sand-plover	High	V	V
Charadrius mongolus	Lesser Sand-plover	High	V	E
Circus assimilis	Spotted Harrier	Moderate	V	NL
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	High	V	V
Daphoenositta chrysoptera	Varied Sittella	Moderate	V	NL
Dasyurus maculatus	Spotted-tailed Quoll	High	V	E
Falsistrellus tasmaniensis	Eastern False Pipistrelle	High	V	NL
Glossopsitta pusilla	Little Lorikeet	High	V	NL
Haliaeetus leucogaster	White-bellied Sea-Eagle	High	V	NL
Hieraaetus morphnoides	Little Eagle	Moderate	V	NL
Hirundapus caudacutus	White-throated Needletail	High	NL	V
Ixobrychus flavicollis	Black Bittern	Moderate	V	NL
Lathamus discolor	Swift Parrot	Moderate	E	CE
Limosa lapponica baueri	Bar-tailed Godwit (baueri)	High	NL	V
Lophoictinia isura	Square-tailed Kite	Moderate	V	NL
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	High	V	NL

Ecosystem Species	Common Name	Sensitivity to gain class	BC Act Listing	EPBC Act Listing
Miniopterus orianae oceanensis	Large Bent-winged Bat	High	V	NL
Numenius madagascariensis	Eastern Curlew	High	NL	CE
Pachycephala olivacea	Olive Whistler	Moderate	V	NL
Pandion cristatus	Eastern Osprey	Moderate	V	NL
Petaurus australis	Yellow-bellied Glider	High	V	V
Petroica boodang	Scarlet Robin	Moderate	V	NL
Petroica phoenicea	Flame Robin	Moderate	V	NL
Phoniscus papuensis	Golden-tipped Bat	High	V	NL
Pteropus poliocephalus	Grey-headed Flying-fox	High	V	V
Ptilinopus superbus	Superb Fruit-Dove	Moderate	V	NL
Pysnoptilus floccosus	Pilotbird	Moderate	V	V
Scoteanax rueppellii	Greater Broad-nosed Bat	High	V	NL
Thinornis cucullatus cucullatus	Eastern Hooded Dotterel	High	CE	V
Xenus cinereus	Terek Sandpiper	High	V	V
*CE= Critically Endangered. E = Endangered. V = Vulnerable. NL = Not Listed				

Table 12: Vegetation Zones removed from BAMC for Ecosystem species

Species	Common Name	Vegetation Zone* – not confirmed as foraging habiat	Justification
Anthochaera phrygia	Regent Honeyeater	3274_low 3274_exotic 3274_reg 3275_low	These vegetation zones are devoid of trees and do not provide foraging habitat for this species.
Callocephalon fimbriatum	Gang-gang Cockatoo	3274_low 3274_exotic 3275_low	These vegetation zones are devoid of trees and shrubs. Gang-gang Cockatoos are mainly arboreal feeders feeding on berries, nuts and flowers. These VZ do not provide foraging habitat for this species.
Calyptorhynchus lathami lathami	South-eastern Glossy Black Cockatoo	3274_low 3274_exotic 3274_Reg 3275_low 3275_Reg	These vegetation zones are devoid of Allocasuarina and Casuarina trees. These VZ do not provide foraging habitat for this species.
Lathamus discolor	Swift Parrot	3274_low 3274_exotic 3275_low	Swift Parrots feed on Eucalypt nectar within open woodland and forests. These VZ are devoid of trees and do not provide foraging habitat for this species.
Pteropus poliocephalus	Grey-headed Flying Fox	3274_low 3274_exotic 3275_low	Grey-headed Flying foxes forage on the nectar and pollen of native trees and fruits of rainforest trees and vines. These VZ are devoid of trees and do not provide foraging habitat for this species.

4.3. Species credit species

A range of fauna habitat exists throughout the Subject Land and include:

- Open Forest, Rainforests, Swamps, Grassland and Woodlands,
- Nectar producing shrubs and flowering gums,
- 27 hollow bearing trees (HBTs),
- Large woody debris and leaf litter,
- Aquatic habitats characterised by dams, creeklines and drainage areas,
- Bevian Wetland.

No stick nests were recorded within the Development Footprint, nor were any noted within the Subject Land. Surveys undertaken during 2008 (Conacher Travis 2008) also failed to locate any stick nests within the Subject Land. Of the 27 trees identified as HBTs all hollows were small and were not suitable for forest owls. The quality of the HBTs within the Development Footprint has been adversely impacted by historic and recent clearing. Table 13 shows the following candidate species which were considered during the assessment.

Table 13: Species credit species

Species Name	Common Name	Listing Status		Sensitivity to gain class	Habitat /Geographical Constraints	Habitat Constraint Present?	Further Assessment Required?
		BC Act	EPBC Act				
FAUNA							
Anthochaera phrygia	Regent Honeyeater (Breeding)	CE	CE	High	Important Habitat Map	No	No
Burhinus grallarius	Bush Stone-curlew	E	NL	High	Fallen / standing dead timber	Potential	Yes
Calidris alba	Sanderling (Breeding)	V	NL	High	Important Habitat Map	No	No
Calidris canutus	Red Knot (Breeding)	NL	E	High	Important Habitat Map	No	No
Calidris ferruginea	Curlew Sandpiper (Breeding)	E	CE	High	Important Habitat Map	No	No
Calidris tenuirostris	Great Knot (Breeding)	V	V	High	Important Habitat Map	No	No
Callocephalon fimbriatum	Gang-gang Cockatoo (Breeding)	V	E	High	Hollow bearing trees. Hollow diameter of 7cm or larger	Potential	Yes
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	V	High	Hollow bearing trees. Hollow diameter of 15cm or larger	Potential	Yes
Cercartetus nanus	Eastern Pygmy Possum	V	E	High		Potential	Yes

Species Name	Common Name	Listing Status		Sensitivity to gain class	Habitat /Geographical Constraints	Habitat Constraint Present?	Further Assessment Required?
		BC Act	EPBC Act				
Chalinolobus dwyeri	Large-eared Pied Bat	V	E	Very High	Cliffs, within 2 km of rocky areas containing caves overhangs escarpments outcrops or crevices	Unlikely as there are no habitat constraints within 2 km of the Subject Land. The species is geographically limited to north of Bateman Bay	No
Charadrius leschenaultii	Greater Sand-plover	V	V	High	Important Habitat Map	No	No
Charadrius mongolus	Lesser Sand-plover	V	E	High	Important Habitat Map	No	No
Haliaeetus leucogaster	White-bellied Sea-eagle (Breeding)	V	NL	High	Living or dead trees within 1km of water	Potential	Yes
Heleioporus australiacus	Giant Burrowing Frog	V	V	Moderate		Potential	Yes
Hieraaetus morphnoides	Little Eagle (Breeding)	V	NL	Moderate	Nest trees	Potential	Yes
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E	E	High	Dense ground cover	Potential	Yes
Lathamus discolor	Swift Parrot	E	CE	Moderate	Important Habitat Mapping	Potential	Yes
Limosa lapponica baueri	Bar-tailed Godwit (Breeding)	NL	V	High	Important Habitat Mapping	No	No
Litoria aurea	Green and Golden Bell Frog	E	V	High	Within 1km of water	Potential	Yes
Lophoictinia isura	Square-tailed Kite (Breeding)	V	NL	Moderate	Nest trees	Potential	Yes
Miniopterus orianae oceanensis	Large Bent winged Bat (Breeding)	V	NL	Very High	Caves, tunnels, roosts	No – no caves or tunnels within the Subject Land	No
Mixophyes balbus	Stuttering Frog	E	V	Very High		Potential	Yes
Myotis macropus	Southern Myotis	V	NL	High	Water bodies within 200 m of the site	Potential	Yes

Species Name	Common Name	Listing Status		Sensitivity to gain class	Habitat /Geographical Constraints	Habitat Constraint Present?	Further Assessment Required?
		BC Act	EPBC Act				
Neophema chrysogaster	Orange-bellied Parrot	CE	CE	Moderate	Within 5 Km of high water mark	Potential	Yes
Ninox connivens	Barking Owl (Breeding)	V	NL	High	Hollow bearing trees. Hollow diameter > 20cm	Potential	Yes
Ninox strenua	Powerful Owl (Breeding)	V	NL	High	Hollow bearing trees. Hollow diameter > 20cm	Potential	Yes
Numenius madagascariensis	Eastern Curlew (Breeding)	NL	CE	High	Important Habitat Map	No	No
Pandion cristatus	Eastern Osprey (Breeding)	V	NL	Moderate	Presence of stick nests within 100 m of a floodplain	No – stick nests were not observed within the Development Footprint	No
Petauroides volans	Southern Greater Glider	E	E	High		Yes	Yes
Petaurus norfolcensis	Squirrel Glider	V	NL	High		Potential	Yes
Phascogale tapoatafa	Brush-tailed Phascogale	V	NL	High		Potential	Yes
Phascolarctos cinereus	Koala	E	E	High	Presence of koala use trees	Potential	Yes
Potorous tridactylus	Long-nosed Potoroo	V	V	High	Dense shrub layer or canopy >70%	Potential	Yes
Pteropus poliocephalus	Grey-headed Flying Fox (Breeding)	V	V	High	Breeding Camps	No – no breeding camps. Nearest camp is located at Bateman Bay 20km north of the Subject Land	No
Thinornis cucullatus cucullatus	Eastern Hooded Dotteral (Breeding)	CE	V	High	Breeding areas are in tidal bays and estuaries and along sandy beaches	No breeding area within the Subject Land	No
Tyto novaehollandiae	Masked Owl (Breeding)	V	NL	High	Hollow bearing trees. Hollow diameter > 20cm	Potential	Yes
FLORA							
Correa baeuerlenii	Chef's Cap Correa	V	V	High		Potential	Yes

Species Name	Common Name	Listing Status		Sensitivity to gain class	Habitat /Geographical Constraints	Habitat Constraint Present?	Further Assessment Required?
		BC Act	EPBC Act				
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	Moderate		Potential	Yes
Genoplesium vernale	East Lynne Midge Orchid	V	V	Moderate		Potential	Yes
Haloragis exalata subsp. exalata	Square Raspwort	V	V	Moderate	Waterbodies	Potential	Yes
Pomaderris bodalla	Bodalla Pomaderris	V	NL	High		Potential	Yes
*Persicaria elatior**	Tall Knotweed	V	V	High	50 m wetlands or ephemeral wet areas	Likely	Yes
Rhodamnia rubescens	Scrub Turpentine	CE	CE	Very High		Potential	Yes
Wilsonia backhousei	Narrow-leafed Wilsonia	V	NL	High	Beaches and rock platforms, saline waterbodies and salt marshes	No suitable habitat with the Subject Land.	No

***Persicaria elatior* was added to the BAMC as the species has been recorded around Bevian Wetland.**

4.4. Threatened species survey – Targeted Surveys

Targeted surveys for species credit species were undertaken at the Subject Land in accordance with the relevant guidelines for fauna and flora:

- *NSW Survey Guide for Threatened Frogs. A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method* (DPIE 2020a)
- *Koala (Phascolarctos cinereus) Biodiversity Assessment Method Survey Guide* (DPE 2022a)
- *Surveying threatened plants and their habitats. NSW survey guide for the Biodiversity Assessment Method* (DPIE 2020b)
- *Threatened biodiversity survey and assessment. Guidelines for developments and activities* (2004 working draft). NSW (DEC 2004).

Surveys were completed under scientific licence number SL100243.

The locations of targeted surveys are shown on Figure 8 (Fauna) and Figure 9 (flora), with the results of the surveys shown as individual species polygons on Figure 10 and Figure 11. Relevant experience of staff undertaking surveys are provided in Appendix E.

4.4.1. Diurnal Birds

Surveys for diurnal birds including raptors were undertake in July – August 2022 and again in October – December 2022. Additional surveys were undertaken in February 2024. Diurnal bird searches consisted of an area search method (2 ha) for 20 minutes at either early morning (7am) or at dusk (5pm). All species observed or heard were recorded. Surveyors also recorded opportunistic sightings throughout other surveys and whilst traversing the site. The field guide application Morcombe and Stewart (2024)

was used to assist with identification and calls. Table 14 outlines the species surveyed, and the techniques used.

Table 14: Birds surveyed

Scientific Name	Common Name	PCTs	Survey Period	Survey timing	Survey Technique
Burhinus grallarius	Bush Stone-curlew	3045, 3275, 4056	All Year	27 -28 Aug 2022 24-25 Sept 2022 19-20 Oct 2022 18 Nov 2022 1 Dec 2022 7 Feb 2024	20 min / 2h diurnal search Walking through vegetation with Large Woody Debris to flush birds
Callocephalon fimbriatum	Gang-gang Cockatoo (Breeding)	All PCTs with Hollow Bearing Trees	October - January	19-20 Oct 2022 18 Nov 2022 1 Dec 2022	20 min / 2h diurnal survey HBTs were assessed for size and location on the stem to ensure it was suitable for cockatoos. All suitable HBTs were watched for the presence of breeding birds.
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	All PCTs with Hollow Bearing Trees	January - September	24-25 Sept 2022 19-20 Oct 2022 18 Nov 2022 1 Dec 2022	20 min / 2h diurnal survey HBTs were assessed for size and location on the stem to ensure it was suitable for cockatoos. All suitable HBTs were watched for the presence of breeding birds.
Haliaeetus leucogaster	White-bellied Sea-eagle (Breeding)	All PCTs with large stick nests	July - December	27 -28 Aug 2022 24-25 Sept 2022 19-20 Oct 2022 18 Nov 2022 1 Dec 2022	20 min / 2h diurnal survey No stick nests were observed within the Subject Land so no further surveys were required.
Hieraaetus morphnoides	Little Eagle (Breeding)	All PCTs with large stick nests	August - October	27 -28 Aug 2022 24-25 Sept 2022 19-20 Oct 2022	20 min / 2h diurnal survey No stick nests were observed within the Subject Land so no further surveys were required.
Lathamus discolor	Swift Parrot	As per the Important Map			20 min / 2h diurnal survey Habitat within the Subject Land is present as per the

Scientific Name	Common Name	PCTs	Survey Period	Survey timing	Survey Technique
					Important Habitat Map. Survey is not required.
Lophoictinia isura	Square-tailed Kite (Breeding)	All PCTs with large stick nests	September - January	24-25 Sept 2022 19-20 Oct 2022 18 Nov 2022 1 Dec 2022	20 min / 2h diurnal survey No stick nests were observed within the Subject Land so no further surveys were required.
Neophema chrysogaster	Orange-bellied Parrot	4056	All Year	27 -28 Aug 2022 24-25 Sept 2022 19-20 Oct 2022 18 Nov 2022 1 Dec 2022 7 Feb 2024	Diurnal survey – 20 min / 2 ha within 5 km of the high water mark.

4.4.2. Nocturnal Birds

Surveys for threatened forest owls and the Bush Stone-curlew (Table 15) were undertaken during July and August 2022 for 4 nights using spotlighting combined with call-play back techniques. The focus was around areas with suitable nesting trees for forest owls. Only one location was identified, and this was outside the Subject Land located in the northwest. Calls of each species were played for 5 min followed by a 10 min listening period. No trees within the Subject Land contained hollows suitable for forest owls as determined by ELA owl specialist David Coombes, that is no trees contained hollows >20cm above 4m. Habitat constraints associated with threatened forest owls were not present within the Subject Land and no additional surveys were required.

Table 15: Nocturnal bird surveys

Scientific Name	Common Name	PCTs	Survey Period	Survey Timing	Survey Technique
Burhinus grallarius	Bush Stone-curlew	3045, 3275, 4056	All Year	27-28 Aug 2022 24-25 Sept 2022 19-20 Oct 2022 7-8 Feb 2024	Call playback and spotlighting within areas with large woody debris
Ninox connivens	Barking Owl (Breeding)	All PCTs with HBTs	January - August	27-28 Aug 2022	Call playback and spotlighting
Ninox strenua	Powerful Owl (Breeding)	All PCTs with HBTs	January - August	27-28 Aug 2022	Call playback and spotlighting
Tyto novaehollandiae	Masked Owl (Breeding)	All PCTs with HBTs	January - August	27-28 Aug 2022	Call playback and spotlighting

4.4.3. Mammals

Mammals were surveyed using a combination of techniques, including remote cameras, pitfalls, spotlighting and scat analysis (Table 16). 20 cameras were set up in trees and near logs in various locations around the Subject Land on the 18 and 19 October 2022 with most recording until 12 January 2023. Some cameras recorded until the 25 January 2023 until batteries went flat contributing to a total of 1,525 trap nights.

Three pitfall arrays consisting of three 20L buckets were dug into the ground approximately 3m apart along a transect with a drift fence running along the middle of the traps. Pits were checked each morning before 7am for four days from the 19 December 2022 and removed on the 23 December 2022 contributing to a total of 36 trap nights.

Spotlighting was undertaken on multiple occasions during July, August, October and September 2022 for six nights from a slow moving vehicle along access roads / tracks or on foot. Forested and woodland areas were the focus and areas around HBTs were surveyed. A minimum of 4 person hours per night equating to a total survey effort of 48 hours.

Surveys for koalas were undertaken in accordance with the *NSW Koala (Phascolarctos cinereus) Biodiversity Assessment Method Survey Guide* (DPE 2022). Koala feed trees (*Corymbia maculata, Eucalyptus globoidea, E. fibrosa, E. paniculata, E. pilularis and E. tereticornis*) were present across the Subject Land and associated with all PCTs. Spot Assessment Technique (SATs) and spotlighting were implemented for koala surveys to ensure a comprehensive assessment for koalas within the Subject Land. Sites for SATs were selected using grid-based sampling. Grid intersections represented the sites at which the SAT were undertaken and at each site a minimum of 30 trees (>10cm DBH) were sampled. The location of SATs shown on Figure 8 is the location of the central tree. Scat searches were completed for each tree within a 1 m radius from its base for a minimum of two person minutes per tree. SATs were undertaken during November and December 2023 and January and February 2024.

The new survey guidelines for *Phascogale tapoatafa* (Brush-tailed Phascogales) were not available when the surveys were undertaken for this species during 2022 and hence the survey procedure followed the *Threatened biodiversity survey and assessment. Guidelines for developments and activities* (2004 working draft) NSW (DEC 2004) which was deemed adequate at the time of survey.

Table 16: mammals surveyed

Scientific Name	Common Name	PCTs	Survey Period	Survey Timing	Survey Technique
Cercartetus nanus	Eastern Pygmy Possum	All PCTs	October - March	19 Oct 2022- 12 Jan 2023. 19 – 23 Dec 2022 19-20 Oct 2022 7-8 Feb 2024	Cameras, spotlighting Pitfall traps
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	All PCTs	All Year	19 Oct 2022- 12 Jan 2023 27-28 Aug 2022 24-25 Sept 2022 19-20 Oct 2022 7-8 Feb 2024	Cameras, spotlighting
Petauroides volans	Southern Greater Glider	All PCTs	All Year	19 Oct 2022- 12 Jan 2023 27-28 Aug 2022	Cameras, spotlighting

Scientific Name	Common Name	PCTs	Survey Period	Survey Timing	Survey Technique
				24-25 Sept 2022 19-20 Oct 2022 7-8 Feb 2024	
Petaurus norfolcensis	Squirrel Glider	All PCTs	All Year	19 Oct 2022- 12 Jan 2023 27-28 Aug 2022 24-25 Sept 2022 19-20 Oct 2022 7-8 Feb 2024	Cameras, spotlighting
Phascogale tapoatafa	Brush-tailed Phascogale	All PCTs	December - June	19 Oct 2022- 12 Jan 2023 7-8 Feb 2024	Cameras, spotlighting
Phascolarctos cinereus	Koala	All PCTs	All Year	19 Oct 2022- 12 Jan 2023 27-28 Aug 2022 24-25 Sept 2022 19-20 Oct 2022 7-8 Feb 2024	Cameras, spotlighting, SATs

4.4.4. Bats

Bat surveys were undertaken across 4 locations. The surveys followed *'Species credit' threatened bats and their habitats. NSW survey guide for the Biodiversity Assessment Method* which require a minimum of 4 nights of detection at each location (Table 17). Anabat Swifts were deployed between 19-23 January 2023 focusing on areas near water with calls being recorded from dusk to dawn specifically targeting Southern Myotis. There are no caves, cliffs or crevices within the Subject Land that could be used as breeding habitat for cave dwelling microbats. Data was analysed by Specialised Zoological (Appendix D).

Table 17: Bats surveyed

Scientific Name	Common Name	PCTs	Survey Period	Survey Timing	Survey Technique
Myotis macropus	Southern Myotis	3045, 3274	October - March	19-23 Jan 2023 13-17 Jan 2025	Anabat detectors Anabat detectors, active detection and harp traps

Additional surveys were conducted in January 2025 using 4 harp traps and an additional 5 Anabat detectors deployed across the Subject Land adjacent to large water bodies. Harp traps were set for 12 trap nights with traps being checked at 10-11 pm and again at 2-3 am. A storm on 15 January prevented surveys being conducted on this night. Active detection via spotlight at each harp trap location was also undertaken.

4.4.5. Amphibians

Amphibians (Table 18) were surveyed in accordance with the *NSW Survey Guide for threatened frogs. A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method (BAM)* during 7-19 February 2024 after a period of substantial rainfall (> 100mm over three days). Spotlighting was undertaken at 15 sites for a minimum of 2 hours over a period of 8 nights. Calls of the target species were played at each dam and along the creek where there was standing water. Calls were played for 1 min with 5 min listening time between each species. Tadpole searches were undertaken at one dam across the Subject Land. A long handle fine mesh net was swept through the water for a minimum of 5 minutes and emptied into a plastic tray with water to allow for tadpole identification. This was repeated at least 10 times around the perimeter of the dam. At the other dams a stick was used to gently agitate the sunken leaf litter to flush the tadpoles which were collected for identification.

Table 18: Amphibian surveys

Scientific Name	Common Name	PCTs	Survey Period	Survey Timing	Survey Technique
Heleioporus australiacus	Giant Burrowing Frog	3045, 3274, 3275	September - May	7-8 Feb 2024 13 Feb 2024 19 Feb 2024 19 Mar 2024	Spotlighting and tadpole searches
Litoria aurea	Green and Golden Bell Frog	3274, 4056	November - March	7-8 Feb 2024 13 Feb 2024 19 Feb 2024 19 Mar 2024	Spotlighting and tadpole searches
Mixophyes balbus	Stuttering Frog	3045, 3274, 3275	September - March	7-8 Feb 2024 13 Feb 2024 19 Feb 2024 19 Mar 2024	Spotlighting and tadpole searches

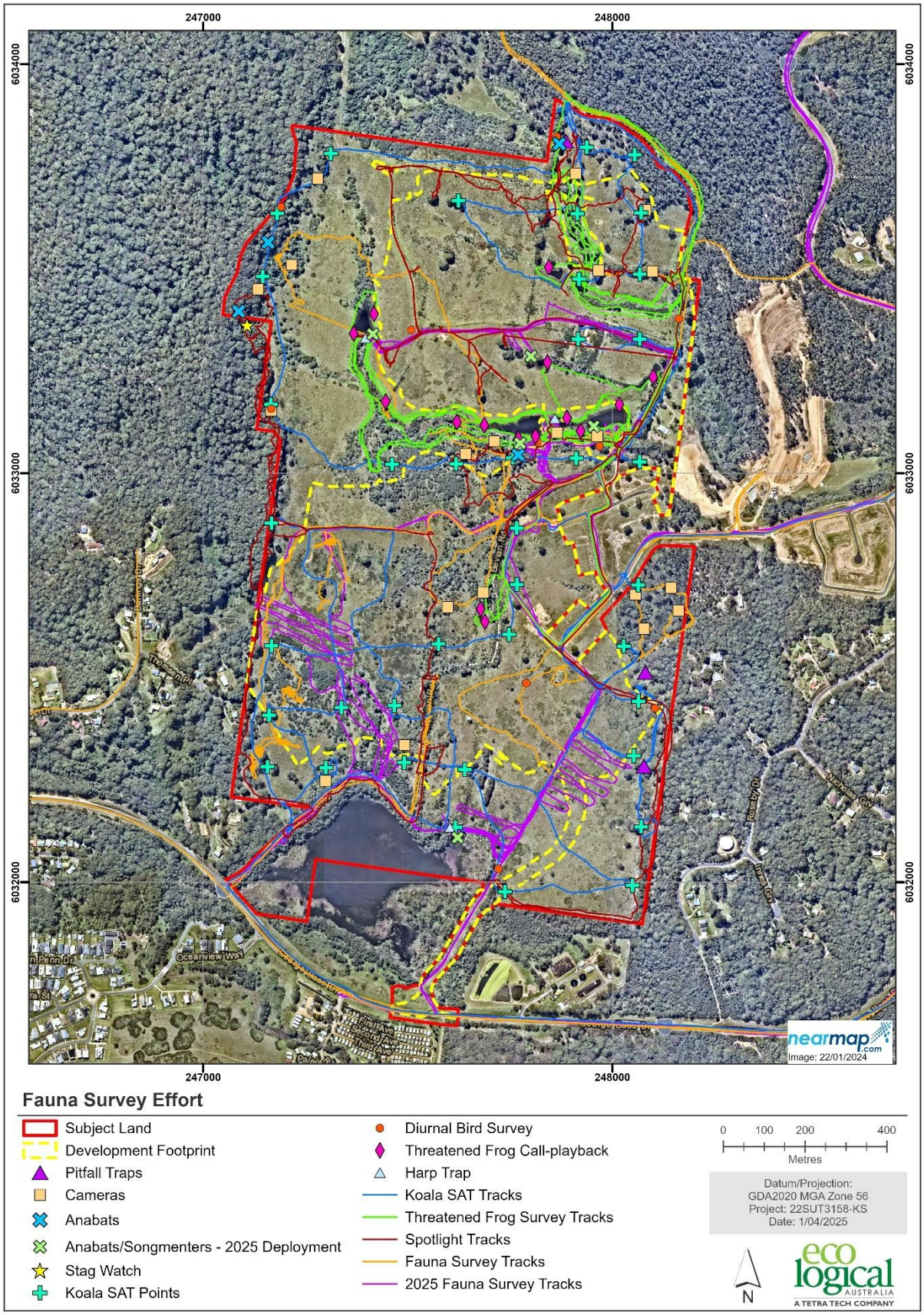


Figure 8: Fauna Survey Effort

4.4.6. Flora

The Threatened Flora Survey Guideline (DPE 2020b) prescribes two assessment methods depending on size of suitable habitat:

- Parallel transects where suitable habitat is <50 ha, or
- Two-phase grid-based systematic approach where suitable habitat is >50 ha.

The distance between parallel transects depends upon the life form of the threatened species and vegetation density. Most of the targeted species (Table 19) are shrubs associated with PCTs within the Subject Land that is considered open vegetation. These individuals would be easily seen and single transects were undertaken in addition to searches during VI plots and vegetation mapping. Parallel transects 10 m apart were undertaken for orchids and herbs. Ecologists traversed the transects making a visual sweep.

Orchids

Cryptostylis hunteriana (Leafless Tongue Orchid) is a saprophytic orchid that grows in swamp heath around coastal swamps and sedgelands on moist sandy soils and in open areas in the understory of forested woodlands (Jones et al 2006). It is typically associated with *Eucalyptus sclerophylla* (Scribbly Gum, *E. sieberi* (Silvertop Ash) and *Corymbia gummifera* (Red Bloodwood). The closest individual was found in 2008 in forest located approximately 4 km north of the Subject Land. Clark et al (2004) used a BIOCLIM bioclimatic analysis and prediction system to identify a habitat envelope within which the species can be expected to occur throughout the neighbouring Shoalhaven Local Government Area (LGA). They determined that the species is confined to coastal lowland areas which are underlain by sedimentary rocks or unconsolidated deposits typically in gently undulating terrain, on siltstone or sandstone which give rise to yellow podzolic soils. Bell (2001) consistently refers to sandy soils when describing the habitat for this species. However, south coast occurrences (Victoria) also include silt/clay loam soils developed on low silica silt /mudstone lithologies of Permian and Ordovician age. Whilst *C. hunteriana* is associated with Southern Lowland Wet Sclerophyll Forests (PCT 3274 and PCT 3275) the soils within the Subject Land are colluvial derived from slates, cherts quartz and conglomerates underlain by the Wogona and Bogolo formations (NSW Geological Survey 1971) which are not considered as the known geological units identified by Clark et al (2004). Further, Clarke et al (2004) determined that the species is 86% more likely to occur in association with *Lomandra filiformis*, and *Pimelea linifolia* and in relatively open areas within the Forest. Surveys undertaken by Conacher Travers (2008) determined that suitable for this species was not present within the Subject Land. Whilst the soils and geology are not typical for this species areas of PCT 3275_good and PCT 3274_good were surveyed using the 10 m transect approach. Areas where trees were absent (PCT 3275_low, regen, exotic and PCT 3274_moderate and low) were deemed unsuitable due to the lack of tree cover and the high density of ground cover.

Genoplesium vernale (East Lynne Midge Orchid) is a small ground dwelling orchid with dark purple-black flowers. It typically occurs within Dry Sclerophyll Forest dominated by *Eucalyptus consideniana* (yertchuck), *E. piperata* (Sydney Peppermint) and associated with *Corymbia gummifera* (Red Bloodwood) on shallow low fertility soils where the ground cover is sparse (TSSC 2016). The Subject Land is located within the species known geographical range and individuals have been located southwest of Mogo in association with *Corymbia maculata* (Spotted Gum) and *E. fibrosa* (Red Ironbark) which is characteristic of PCT 3275 located within the Subject Land. This species is difficult to survey as it will not necessarily flower every year and the proportion that flowers appear to vary from year to year. Flowering may be dependent on the previous seasonal conditions requiring frequent soaking rains

in March (SoS 2021). In 2021, Moyura Airport received above annual rainfall (1189 mm cf 848 mm) with the majority falling in March (273 mm). This was repeated in 2022; March 314 mm, Annual 1379 mm) suggesting that seasonal conditions during 2022 were ideal for survey for this species.

PCT 3275_good and moderate condition and PCT 3274_good were surveyed using the 10m transect survey method. PCT 3275_low, regen and exotic and PCT 3274_moderate and low were unsuitable due to the high density of ground cover which would outcompete individuals. Surveys were undertaken during November and December 2022 on the dates outlined in Table 19. Due to a GPS recording error not all the November surveys were recorded and are able to be shown on Figure 9. Transect surveys 10 m apart were also undertaken in PCT 3274_good and PCT 3275_moderate in the centre of the Subject Land.

Herbs

As a late addition, *Persicaria elatior* (Tall Knotweed) was added to the BAMC. It is not associated with the PCTs entered into the BAMC but a few individuals were recorded south of Bevian Wetland growing in a recently flooded drainage line. It is also known to occur within table drains and along road verges. Targeted surveys for this species were initially not undertaken as it was only recently identified as potentially occurring within the Subject Land. Target surveys were conducted in January 2025 using 10m – wide transects in all areas identified as potential species habitat.

Shrubs

Correa baeuerlenii (Chef's Cap Correa) is a shrub that grows to 2.5 m and is endemic to the NSW South Coast. It grows in association with sclerophyll forests along rivers and creeks and within coastal sites. Previous surveys undertaken by Conacher Travis (2007) within the Subject Land did not locate any individuals. Given that the species is conspicuous searches across the Subject Land were conducted during vegetation mapping and whilst collecting VI plot data.

Haloragis exalata subsp. *exalata* (Square Raspwort) is a small shrub growing to 1.5 m high that is located on the edge of coastal lakes after flooding has removed other vegetation, along creek beds within flood zones and in areas close to these features subject to human disturbances including road verges, powerline easements or within 100 m (TBDC 2024). The species can be surveyed throughout the year. Suitable habitat associated with this species within the Subject Land are waterbodies associated with PCT 3045 and around dams associated with PCT 3274. These areas are not within the Development Footprint. The species is known to occur locally just to the east of the Subject Land along Saltwater Creek. Potential habitat under the powerline easement was traversed during December 2022 and again in February 2024 with additional surveys around dams and along riparian areas being undertaken in January 2025.

Pomaderris bodalla (Bodalla Pomaderris) is a tall (2-4m) conspicuous shrub located in moist open forests along sheltered gullies or along stream banks. PCT 3274_good located along the dams in the center of the Subject Land were traversed during November 2022 (GPS failed to record tracks). Previous surveys undertaken by Conacher Travis (2007) within the Subject Land did not locate any individuals. Given that the species is conspicuous additional searches across the Subject Land were conducted during vegetation mapping and whilst collecting VI plot data.

Rhodamnia rubescens (Scrub Turpentine) is a conspicuously large shrub (25 m tall) with fissured stems and is only known to occur in coastal areas north of Bateman Bay. It is associated with wet sclerophyll forests and often found in rainforest transition zones (PCT 3045) and creek side riparian vegetation (TSSC 2019). All areas of PCT 3045 are outside the Development Footprint. Areas of PCT 3274_good in the

central section of the Subject Land was surveyed during November 2022 (GPS failed to record tracks). Previous surveys undertaken by Conacher Travis (2007) within the Subject Land did not locate any individuals. Given that the species is conspicuous additional searches across the Subject Land were conducted during vegetation mapping and whilst collecting VI plot data.

Table 19: Flora surveys

Scientific Name	Common Name	Life Form	PCTs	Survey Timing	Date Surveyed	Survey Technique
Correa baeuerlenii	Chef's Cap Correa	Shrub	3045, 3274, 3275	All Year	September 2022	Single transect and VI plots
Cryptostylis hunteriana	Leafless Tongue Orchid	Orchid	3274, 3275	November - January	20-22 December 2022	Transect – 10 m apart
Genoplesium vernale	East Lynne Midge Orchid	Orchid	3274, 3275	November - January	24 November and 21 December 2022	Transect – 10 m apart
Haloragis exalata subsp. exalata	Square Raspwort	Shrub	3045, 3274	All Year	21 December 2022 7 February 2024 13-17 January 2025	Single transect and VI plots Transects 10 m apart
Persicaria elatior	Tall Knotweed	Herb	4056 Riparian areas	Dec-May	13-17 January	Transects 10m apart
Pomaderris bodalla	Bodalla Pomaderris	Shrub	3045, 3274	September - November	21 December 2022	Single transect and VI plots
Rhodamnia rubescens	Scrub Turpentine	Shrub	3045, 3274	All Year	21 December 2022	Single transect and VI plots

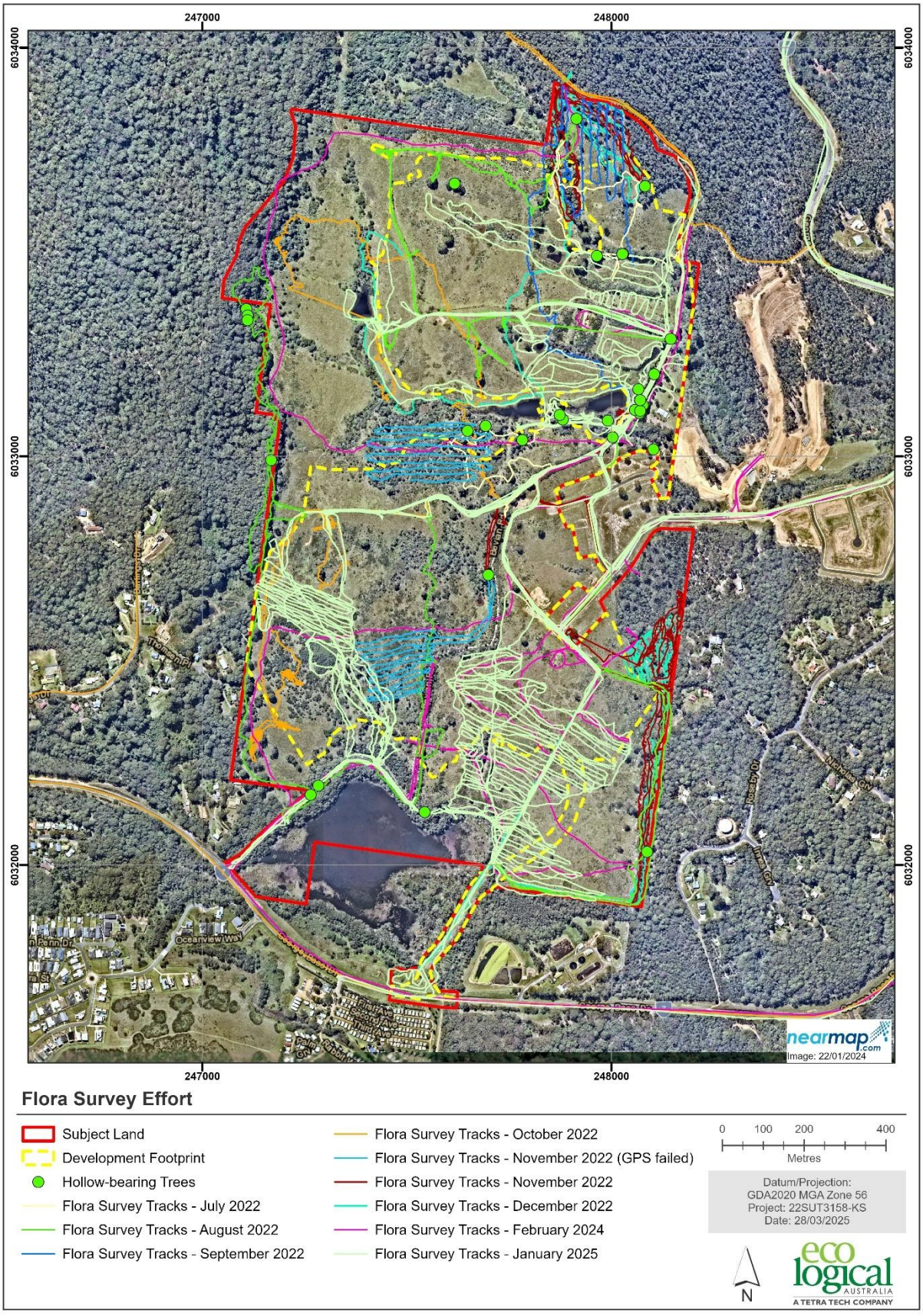


Figure 9: Flora survey effort

4.5. Weather conditions during surveys

Weather conditions during the targeted surveys are outlined in Table 19. For the last three years (2020-2023) the region experienced above average rainfalls with most falling during February to March and in October through to December providing excellent growing conditions (BOM 2024).

Table 20: Weather conditions (Moyuya Airport 069148)

Survey Undertaken	Date	Time	Temperature (Min and Max) °C	Wind (Light mod etc)	Other conditions relevant to the species
PCT mapping and VI plots	4-18 Oct 2022	7am – 5pm	4.5-25		Above average rainfalls during 2022 and 2023
	9 Nov 2022	7am – 5pm	11-23		
	23-24 Jan 2023	7am – 5pm	12-26		
	21-23 Mar 2023	7am – 5pm	15-27	Low	
	3-4 April 2023	7am – 5pm	10-25	Low	
	7 Feb 2024	7am – 5pm	10-23	Low	
Flora surveys	4-18 Oct 2022	7am – 5pm	4.5-25		Above average rainfalls during 2022 and 2023
	23-24 Jan 2023	7am – 5pm	12-26		
	24 Nov 2023	7am – 5pm	17-23		
	20-22 Dec 2023	7am – 5pm	11-23	Low -Mod	
	7 Feb 2024	7am – 5pm	10-23	Low	
Diurnal birds	27 -28 Aug 2022	5pm – 6pm	6-18		0.2 mm rainfall
	24-25 Sept 2022	5pm – 6pm	9-19		9mm rain during day -cleared
	19-20 Oct 2022	5pm - 6pm	11.5-21		
	18 Nov 2022	5pm – 6pm	8-19		
	1 Dec 2022	5pm – 6pm	14-19		0.2mm rain during day-cleared
	7 Feb 2024	7am – 5pm	10-23	Low	0.2mm rain overnight
Call Playback	27-28 Aug 2022	7pm – 11pm	6-18		0.2 mm rainfall
	24-25 Sept 2022	7pm – 11pm	9-19		9mm rain during day -cleared
Spotlighting	27-28 Aug 2022	7pm – 11pm	6-18		0.2 mm rainfall
	24-25 Sept 2022	7pm – 11pm	9-19		9mm rain during day -cleared
	19-20 Oct 2022	7pm – 11pm	11.5-21		
	7-8 Feb 2024	8pm – 10pm	10-24	Low	0.8 mm rain overnight
Camera traps	19 Oct 2022- 12 Jan 2023	84-115 nights 24 hours	Min 4.5 Max 32		
Pitfall traps	19 – 23 Dec 2022	24 hours	11-22		1.6 mm during 23 Dec during pack up.
Frog and Tadpole surveys	7-8 Feb 2024	6pm-10pm	10-24	Low	The local area received over 73mm during Feb 2024, and 100 mm rainfall over 3-day period in March 2024.
	13 Feb 2024	6pm-10pm	17-30	Mod	
	19 Feb 2024	6pm-10pm	20-23	Low	
	19 Mar 2024	7pm-10pm	17.6-25	Low	

Survey Undertaken	Date	Time	Temperature (Min and Max) °C	Wind (Light mod etc)	Other conditions relevant to the species
Anabat Detectors	19-23 Jan 2023	6pm-6am	14-25		Nights were warm
SATs	3 Aug 2023 29 Feb 2024 22 Mar 2024	8am -5pm 8am -5pm 7am – 5pm	4.6-20.4 20-28 9.8-22	Mod High High	No rain in the previous days Scattered light showers in the previous days Slight drizzle (0.6mm) in late afternoon
Threatened Flora	13-17 Jan 2025	8am-5pm			Small amount of rain fell (6.8mls) and clearing.
Southern Myotis Surveys	13-17 Jan 2025	6pm-4pm	15 – 27.5	Low to Mod wind gusts	58.6 mls fell overnight on the evening of 15 Jan and into the early morning of the 16 Jan 2025.

4.6. Expert reports

No expert reports have been used in this assessment.

4.7. Limitations

Threatened flora surveys for shrubs were conducted simultaneously during vegetation mapping and VI plot data collection. The threatened shrubs surveyed during this assessment are visible such that if present they would have been identified during the site walkover and during data collection.

Evening diurnal bird surveys were conducted at dusk prior to spotlighting for forest owls and nocturnal mammals. In addition to the 9 days when diurnal birds were targeted, birds were opportunistically recorded whilst traversing the site adding to the species list.

4.8. Results of Targeted Surveys

No breeding habitat was detected within the Subject Land for any threatened owl, Cockatoo or raptor. Hollows were small and not suitable for threatened birds or large marsupials. No large stick nests suitable for raptors were observed within the Subject Land. A small group of Glossy Black Cockatoos were observed flying over the Subject Landon the 28 Aug 2022. White Bellied Sea-Eagles were observed in the local area.

Results from Anabat detectors identified 12 and up to 14 species of bats. *Miniopterus orianae oceanensis* (Large Bent-winged bat) was confirmed on site. This species is a dual species and is included as an ecosystem species. Species credits are breeding habitat which does not occur within the Subject Land so therefore species credits for this species are not required.

A species complex call which may include *Myotis macropus* (Southern Myotis) was recorded at all the four locations. Due to the difficulties in distinguishing these calls from the *Nyctophilus* sp. and erring on the side of caution, Southern Myotis was considered to be present. Additional surveys were undertaken in January 2025 to determine whether this species is in fact present within the Subject Land and the extent of habitat impacted by the Development Footprint. Whilst no individuals were captured in harp traps there was a probable sighting of a Southern Myotis observed flying over the central dam. Offset credits have been calculated for this species.

No threatened flora was recorded within the Development Footprint nor across the entire Subject Land.

4.9. Species Polygons

Swift Parrot important Habitat Maps overlaps with the some of the Subject Land, however due to changes with the Development Footprint, this species habitat is now avoided and therefore credits have not been calculated for this species.

One candidate species, Southern Myotis, was recorded within the Subject Land, including areas overlapping with the Development Footprint. Species polygons were delineated based on habitat use (see Figure 10), and biodiversity credit liabilities have been calculated.

The Southern Myotis is a small, insectivorous bat species that roosts in close proximity to permanent water bodies such as rivers, streams, lakes, and wetlands (Churchill 2008; Pennay et al. 2011). Roosting sites include natural structures like tree hollows and caves, as well as anthropogenic features such as bridges and buildings (Churchill 2008; NSW OEH 2019). These sites provide essential shelter and are typically selected for their proximity to aquatic foraging areas.

Breeding occurs in late spring to summer, with females forming maternity colonies in warm, protected roosts, often within the same structures used for general roosting (van Dyck & Strahan 2008). A single offspring is born annually. Roost fidelity is common during the breeding season, particularly where suitable, undisturbed sites are available (Churchill 2008).

Within the Subject Land, Southern Myotis is associated with PCTs 3045, 3274, and all wetlands. A 200 m buffer has been applied to all water ways, dams, and creeks wider than 3 m wide to identify foraging and roosting habitat. It is assumed that all dams are used by Southern Myotis for foraging. In line with the TBDC, habitat surrounding the waterways is used for breeding and roosting which includes caves, tree hollows, under bridges and other constructed structures such as culverts (Gorecki et al 2020, Central Coast Council, 2023). Advice was sought from the BOS Helpdesk (18 Dec 2025; Appendix H) – "*a species can be assessed as unlikely to occur in a specific vegetation zone if microhabitats are absent*". Within the Subject Land only hollow bearing trees (HBTs) are present as potential roost and/or breeding sites. Therefore, any areas where HBTs were absent were identified as not suitable for Southern Myotis.

Areas where suitable roosting overlapped with the Development Footprint were mapped as the species polygon. A total of 2.89 ha was identified as habitat for the Southern Myotis within the Development Footprint (Figure 10).

Details are provided in Table 21 below.

Table 21: Species credits liability

Scientific Name	Common Name	Biodiversity Risk Rating	SAII entity	Habitat Constraints	TBDC species specific recommendations	BAMC Area Habitat (ha)	Habitat condition PCT
Myotis macropus	Southern Myotis	2	No	Waterbodies with permanent pools >3m within 200 m containing HBTs.	Survey from October to March	0.01 0.34 2.26 0.19 0.10	3274_exotic 3274_good 3275_good 3275_low 3275_mod
						2.89	

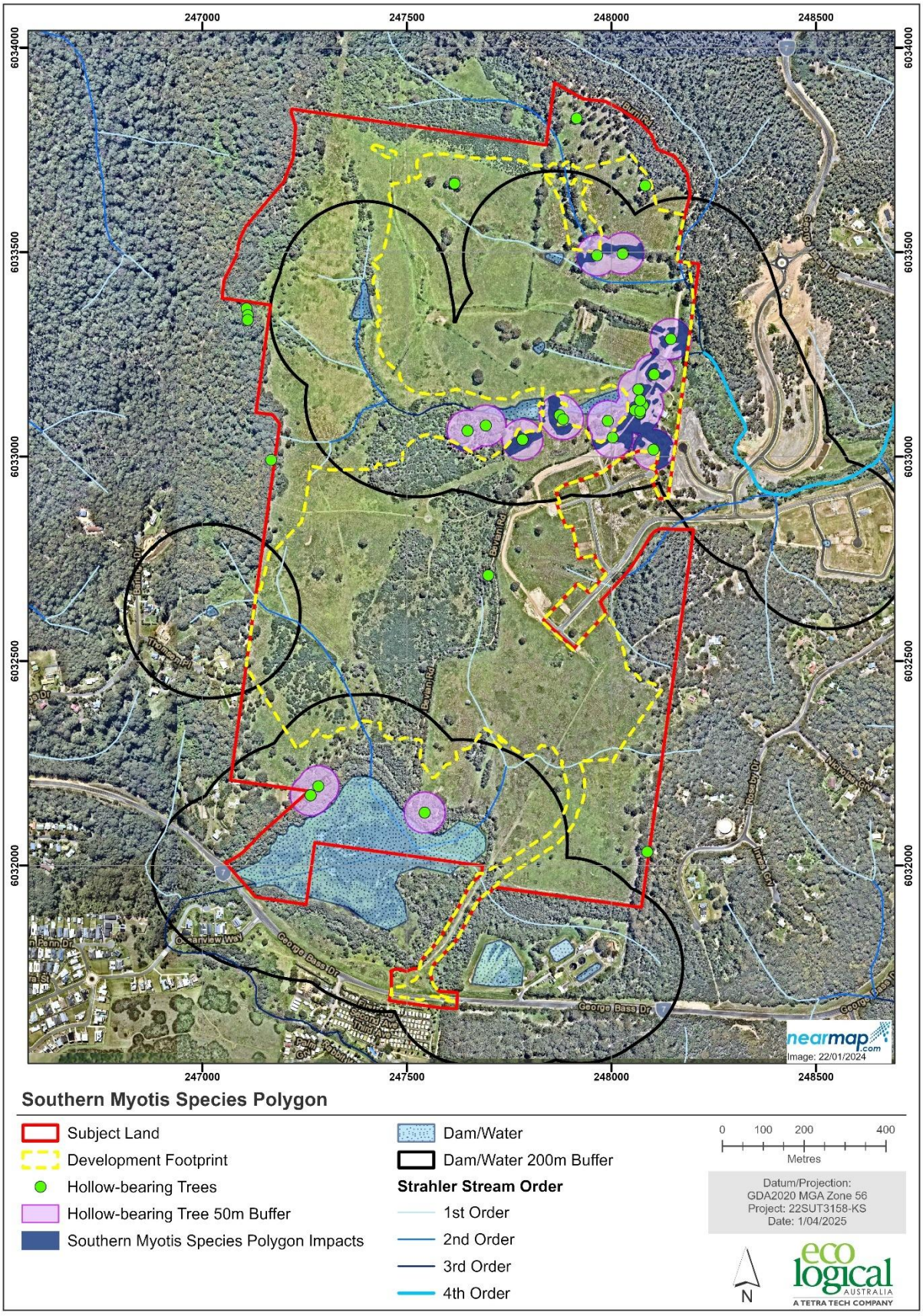


Figure 10: Polygon for Southern Myotis

5. Identifying prescribed impacts

Prescribed additional biodiversity impacts (prescribed impacts) must be assessed as part of the BOS, as per Clause 6.1 of the BC Regulation. Such prescribed impacts (including direct and indirect impacts) are impacts upon the habitat of threatened entities, on areas connecting threatened species habitat, that affect water quality and hydrological process, and on threatened species from turbine strikes or vehicle strikes. The following prescribed impacts have been identified (Table 21).

Table 22: Prescribed Impacts

Feature	Present	Description of feature and location	Threatened entities that use feature
Karst, caves, crevices, cliffs, rocks or other geological features	No	-	-
Human Made structures	Yes	There are remnants of old farming infrastructure. There is a disused concreate water tank in the northern section of the Subject Land.	-
Non-native vegetation	Yes	Sections of the cleared land contain exotic vegetation including high threat weeds such as *Axonopus fissifolius* which was likely to planted as pasture.	A variety of threatened birds, including raptors, owls and granivores may use these areas for foraging. Southern Myotis and Eastern Bent-winged Bat for foraging.
Habitat Connectivity	Yes	The Subject Land is surrounded by Eucalypt Forest with scattered trees and patches of remnant forest providing a connection to Mogo State Forest. Vegetation within the Subject Land provides important linkages to the forests to the southeast, south of Rosedale through Guerilla Bay, Burrewarra Point and around to Barlings Beach. Recent development external to the Subject Land to the east has restricted connectivity between the forests to the southeast and forests to the north of Rosedale.	*Petauroides volans* (Southern Greater Glider) *Petaurus australis* (Yellow-bellied Glider), *Ninox connivens* (Barking Owl), *Ninox strenua* (Powerful Owl), *Tyto novaehollandiae* (Masked Owl), *Petaurus norfolcensis* (Squirrel Glider). Variety of nectivorous birds.
Water bodies, water quality and hydrological processes	Yes	There are a number of drainage lines, creeks and large dams within the Subject Land. Bevian Wetland located in the southern areas of the Subject Land is a SEPP 14 Coastal Wetland.	Variety of small woodland birds. Southern Myotis and Eastern Bent-winged Bat. *Hirundapus caudacutus* (White-throated Needletail), *Stictonetta naevosa* (Freckled Duck), *Gallinago hardwickii* (Latham's Snipe). *Haliaeetus* leucogaster (White-bellied Sea Eagle), Gang-gang Cockatoo, Glossy Black Cockatoo
Climate Change	Yes	The proposed residential subdivision will increase energy consumption during construction and within each individual household once established. Climate change in coastal areas are predicted to cause a rise	Freshwater ecological communities, Shoreline breeding birds.

Feature	Present	Description of feature and location	Threatened entities that use feature
		in sea levels and cause localised flooding and intrusion of saltwater.	
Vehicle Strikes	Yes	The proposed residential subdivision will increase the amount of traffic within the Subject Land and along George Bass Drive.	*Petauroides volans* (Southern Greater Glider) *Petaurus australis* (Yellow-bellied Glider). *Ninox connivens* (Barking Owl), *Ninox strenua* (Powerful Owl), *Tyto novaehollandiae* (Masked Owl).

Stage 2 Impact assessment (biodiversity values and prescribed impacts)

6. Avoid and minimise direct impacts

The Proponent has engaged Water Quality, Terrestrial and Aquatic Ecologists to evaluate the Subject Land and inform avoidance and minimisation strategies during detailed design. As a result, the overall Development Footprint has been significantly reduced from 128 ha (as approved under the 2008 Concept Approval) to 102.59 ha of which 98.9 ha is native vegetation. This proposed modification will result in a reduction of 29 ha in impacts to native vegetation.

A Conservation Land Use Management Plan (Conacher Travers 2007b) was developed to identify environmentally sensitive areas within the Subject Land and guide appropriate land use based on visual, geophysical, social and demographic factors. Under this plan, 73.21 ha of the Subject Land has been designated as Retained Managed Lands maintaining key habitat linkages across from east to west and north to south. Retained Managed Lands will be managed to improve biodiversity outcomes, through natural regeneration, weed control, and targeted planting to establish and strengthen ecological corridors. In addition, a 7.9 ha (Deferred Area) in the southern portion of the Subject Land will be allowed to regenerate. This area contributes to habitat connectivity and provides visual and olfactory screening from the adjoining Sewage Treatment Plant.

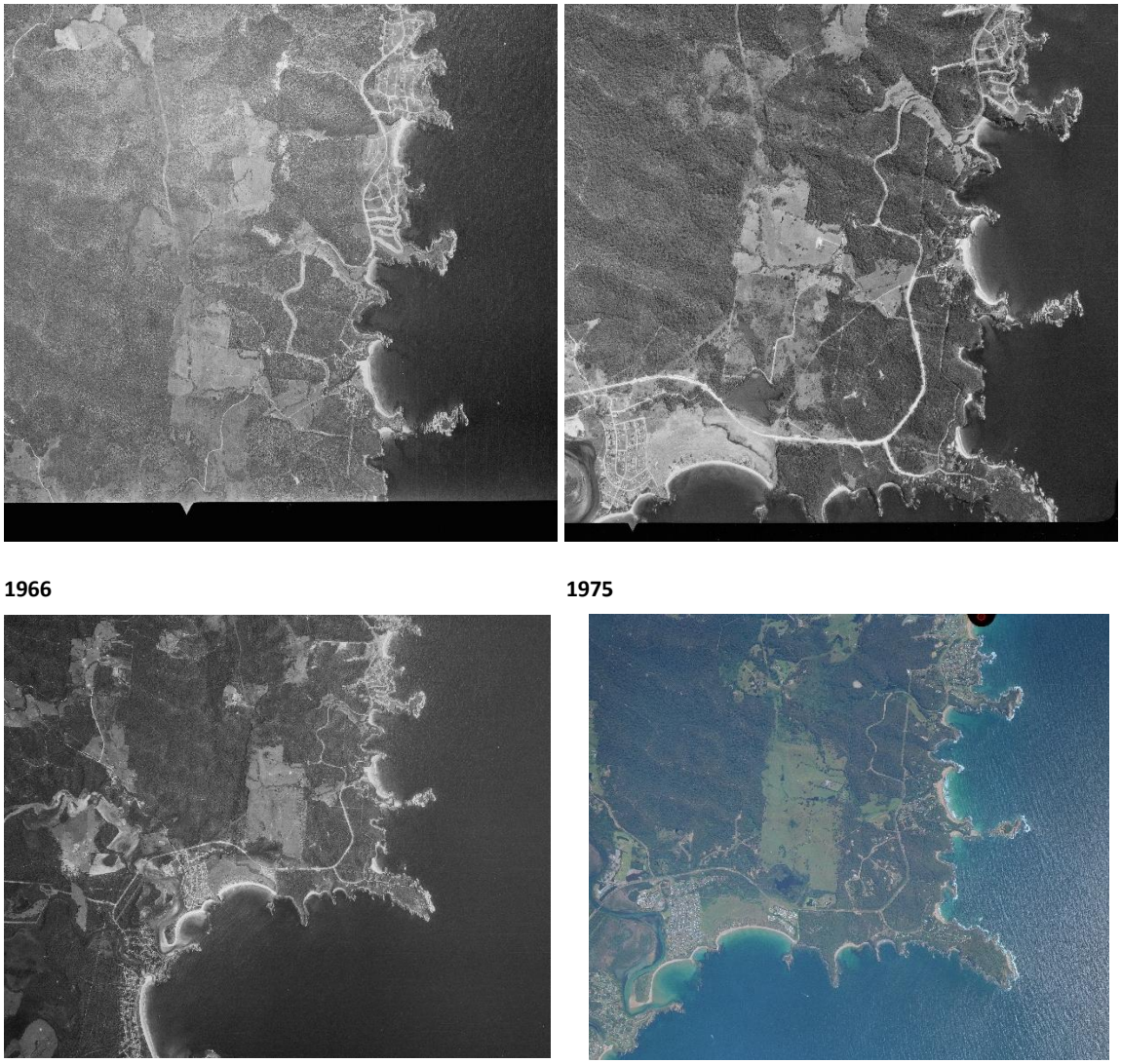
Overall, these measures are expected to improve the condition of the retained native vegetation within the Subject Land, leading to increased habitat quality and long-term biodiversity benefits.

6.1. Project Location

The Subject Land is a former dairy farm which has been largely cleared and used for grazing. Fragmented remnants of natural and disturbed vegetation form the eastern, northeastern and northwestern boundaries. Overall, the vegetation within the site is considered disturbed due to areas of woodland being partially cleared with shrubs removed, grazing and trampling pressures due to cattle, development of internal tracks, pasture and weed species. Grazing was removed and portions of the Subject Land is periodically maintained to provide access and to reduce risk of fires. Nevertheless, natural regeneration is occurring on site and there remains good diversity and recovery potential of the TEC.

The Subject Land was earmarked as suitable for the expansion of the existing coastal settlements since 1987 when the Eurobodalla Rural LEP was gazetted, identifying the majority of the Subject Land as an Urban Expansion Zone.

Historical imagery (NSW spatial services accessed 2024) shows that the northern section of the Subject Land was cleared prior to 1966 with additional clearing in the southern section in 1975 with the bulk of the Subject Land cleared by 1999.



1966 **1975**

1991 **1999**

Plate 4: Historical imagery of the Subject Land

6.2. Concept approval

Under, the original concept approval 128 ha of native vegetation was approved for clearing as part of the subdivision. In contrast, this proposed modification (as detailed in this BDAR) limits clearing to 98.9 ha, resulting in a reduction of impacts to 29 ha of native vegetation.

6.3. Project Design

The entire Subject Land was surveyed in accordance with the BAM, enabling micro-siting of the Development Footprint to avoid impacts to native vegetation and threatened species where practicable.

Field validation in 2025 revealed that the TEC associated with PCT 4056 in the southern section, extended further north than previously mapped in 2022, increasing in extent from 21 ha to 24.8 ha. Initially, 13.6 ha of the TEC was proposed to be impacted. Based on updated mapping this would have increased to 17 ha. However, the development layout was revised, reducing impacts to the TEC by 5 ha.

The original concept plan included widespread development across the Subject Land with only small retained patches of native vegetation in the north and south with a smaller patch retained on the eastern section of the Site. This revised layout retains more native vegetation along the eastern

boundary and avoids riparian areas in the northern section. The TEC surrounding Bevian Wetland has been preserved and is also protected by 100 m buffer. Nevertheless, residual impacts to the TEC will be 1.16 ha (PCT 4056_good) and 10.74 ha (moderate condition; 10.74).

This modification of the Concept Plan represents a more integrated design outcome, balancing ecological values with urban design, engineering, traffic planning, bushfire safety and public amenity. The revised modelling also provides a more accurate representation of the final development footprint, which results in minor impacts to some of the 2008 conservation areas but an overall reduction in native vegetation impacts.

Swift Parrot Important Habitat is located along the eastern section of the Subject Land and continues towards the southern section (Figure 11). Whilst the 2008 Concept Plan approval included removal of this important habitat, this area has now been avoided and will be retained on site.

Bevian Wetland is a Coastal Wetland as per SEPP (Coastal Management) 2018. Areas immediately surrounding the Wetland have been avoided (Figure 12) and will be protected by 100 m buffer zone.

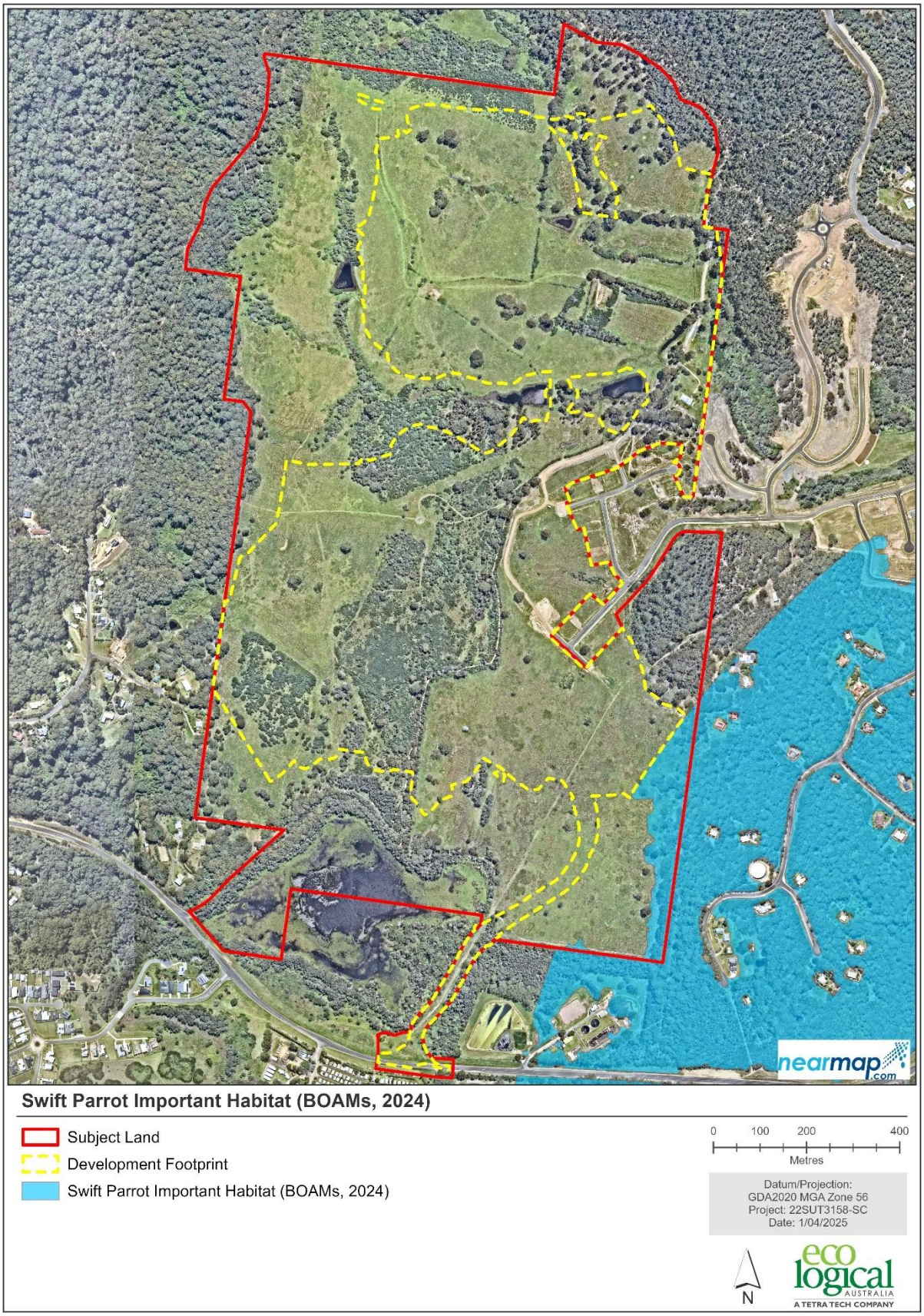


Figure 11: BAM Important Areas Swift Parrot (1/04/2025).

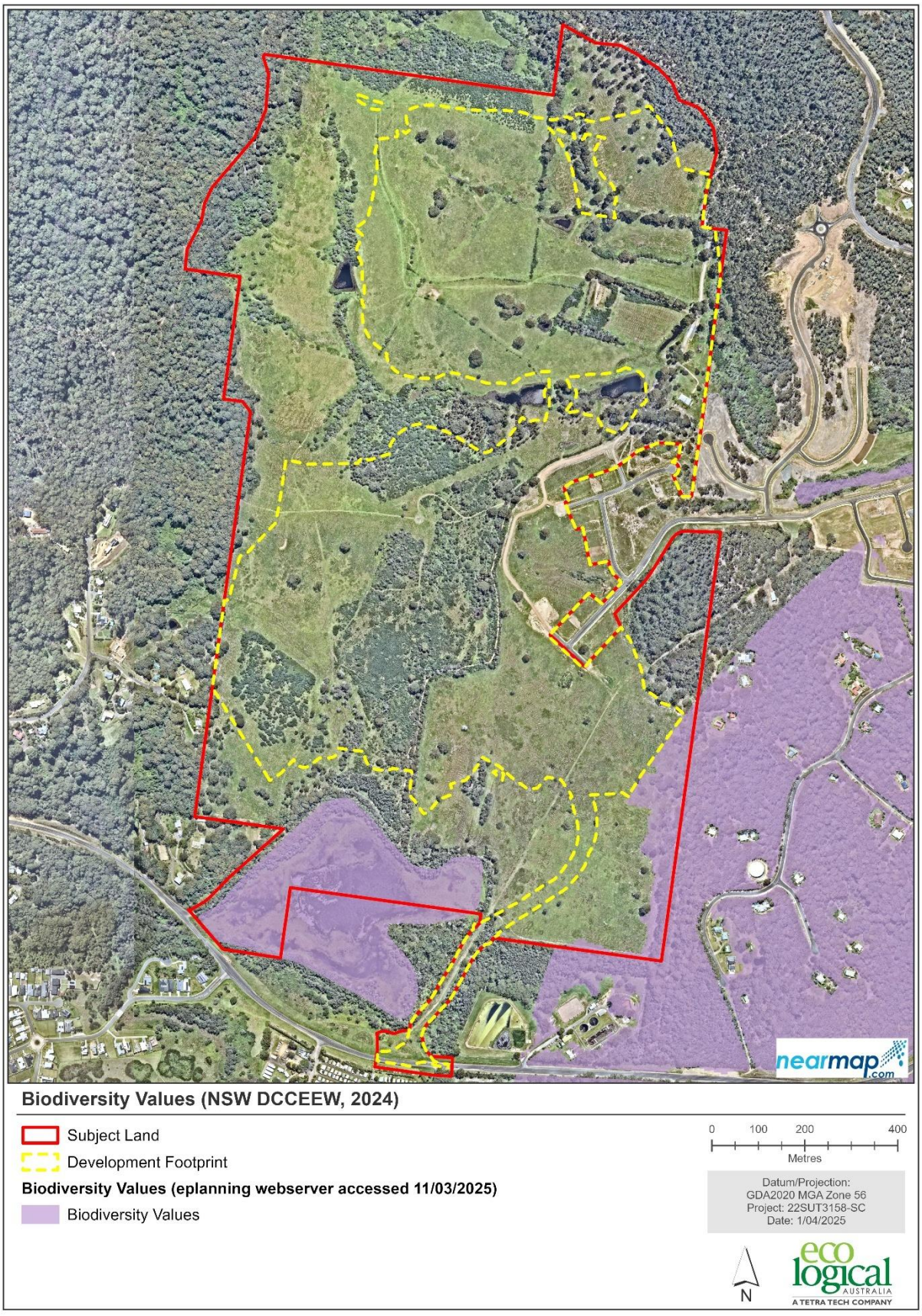


Figure 12: Biodiversity Values Map (01/04/2025).

The current Development Footprint has been micro-sited to be largely located within areas of low condition or exotic vegetation. Approximately 80% of PCT 3275_low in the northern section of the Subject Land is located within the Development Footprint. Approximately 99% of PCT 3045_good, 85% of PCT 3274_good and 76% of PCT 4056_good will be retained located outside the Development Footprint.

The proposed road access to enter the site from George Bass Drive to the south has also been micro-sited to be within the Powerline easement to minimise impacts whilst satisfying traffic and engineering requirements. Whilst this location is still identified as TEC in moderate condition this new location utilises the current access track (10m wide) and avoids impacting good quality TEC. Much of this area is maintained in accordance with powerline management procedures and will not be allowed to regenerate.

The size and location of Asset Protection Zones (APZs) have been determined in consultation with the Proponent and Bushfires Specialists, Building Code and Bushfire Hazard Solutions. APZs are included within the Development Footprint. These have been designed to ensure that clearing requirements are adequate to protect assets and to minimise impacts to high quality vegetation. The size of Lots proposed in the development have been reduced to allow for the inclusion of APZs. The current detailed design satisfies both bushfire asset protection zones and firefighting access requirements for resident safety.

The current Development Footprint has avoided impacts to:

- 4.72 ha of PCT 3045
- 31.9 ha of PCT 3274
- 23.2 ha of PCT 3275
- 13 ha of TEC 4056
- Important Mapped Habitat for Swift Parrot in the southeast corner
- Bevian Wetland

Figure 13 shows the reduction in Development Footprint overlaid with the 2008 Concept Approval Plan.

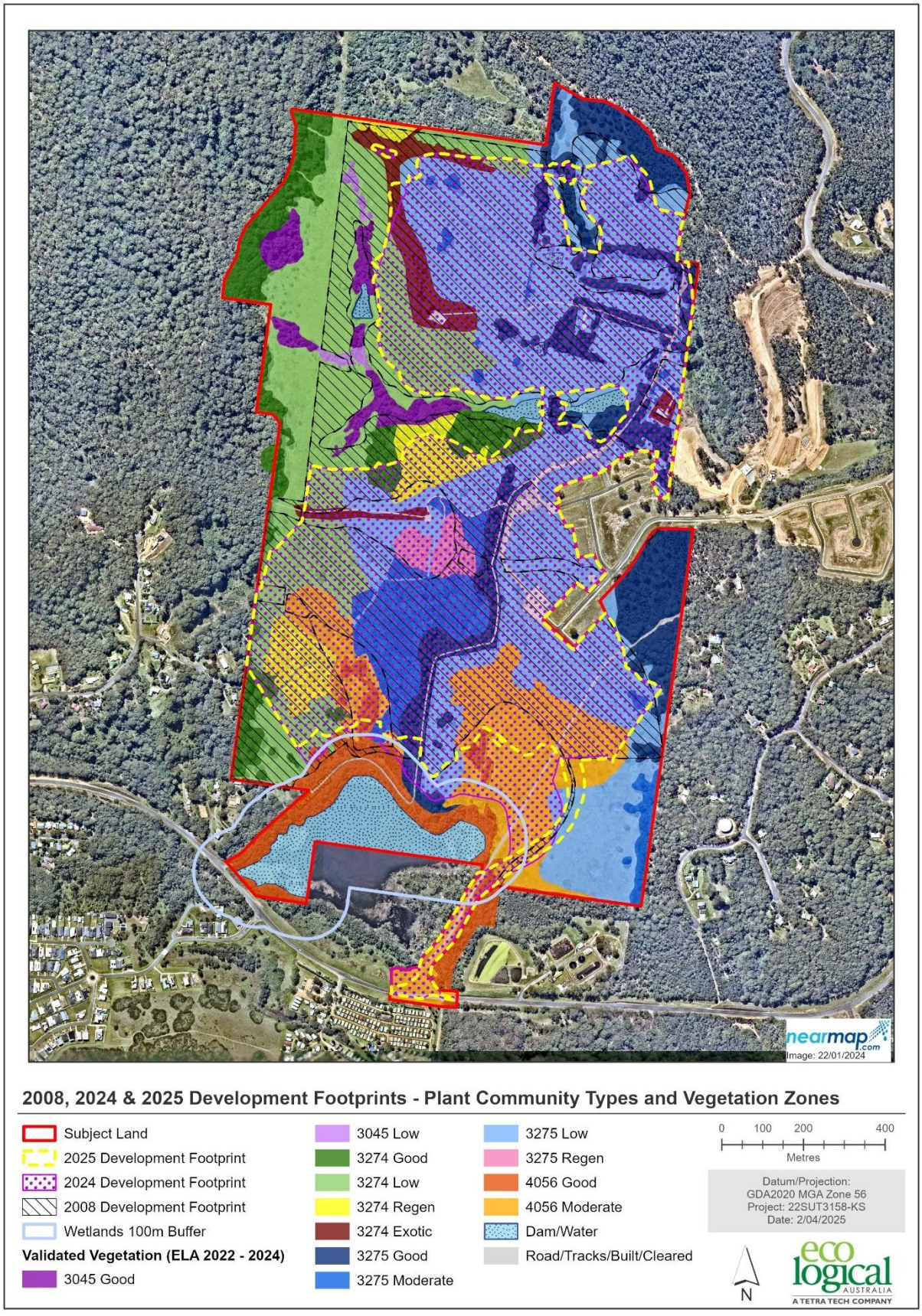


Figure 13: 2008 Concept Approval and modified Development Footprint (2024) and current (2025)

7. Avoid and minimise prescribed impacts

7.1. Karst, caves, crevices, cliffs, rocks and other geological features of significance

The Subject Land does not contain any areas of geological significance such as karsts, caves, crevices or cliffs. These features do occur within the surrounding landscape and will not be directly or indirectly impacted by the project. There are no areas of surface rocks within the Subject Land nor within the Development Footprint.

7.2. Human-made structures and non-native vegetation

The Subject Land consists of predominately cleared land. The Subject Land was an old dairy farm and grazed by cattle. These areas of native grasses, isolated paddock trees and cleared paddocks provide foraging habitat for predatory birds, bats and granivores. Open spaces will be retained with the Subject Land providing foraging opportunities.

7.3. Habitat connectivity

The proposed development will expand and enhance connectivity to the surrounding areas of native vegetation. These areas will be managed as Retained Managed Lands within the Subject Land. The Subject Land is surrounded by large tracts of contiguous forests and adjoins Mogo State Forest in the northwest. These forests are known to contain populations of Australia's largest gliding marsupials, *Petauroides volans* (Southern Greater Glider) which is listed as endangered under both the BC and EPBC Acts; and *Petaurus australis* (Yellow-bellied Glider) which is listed as vulnerable under both the BC and EPBC Acts. Both species have similar geographic distributions and occupy similar habitat. Whilst no individuals of either species were recorded within the Subject Land, individuals have been recorded both to the east, north, west and south of the Subject Land. Key features of habitat required for both species of gliders include suitably large trees (> 40cm DBH) for foraging (eucalypt leaves and nectar), connected to habitat patches and multiple hollow bearing trees for nesting (Kehl and Borsboom 1984, Kavanagh 1987a 1987b, Kavanagh and Lambert 1990, and Jessup et al 2020).

Other species also recorded within Mogo State Forest include Brush-tailed Phascogales, Glossy Black Cockatoos, Swift Parrots, Spotted-tailed Quolls and forest owls including Masked, Powerful and Sooty Owls. Brush-tailed Phascogales rely on tree canopy and shrubs to facilitate movement across the landscape and will often avoid traversing open areas as they are prone to predation. A single record has been recorded northwest of the Subject Land at Dunn's Creek Road in 1997. No individuals were found during targeted faunal surveys, and it is unlikely that they occur within the subject land. A Spotted Tailed Quoll was recorded in 2004 northeast of the Subject Land on Burri Road which bounds the Subject Land in the north. Whilst it is unlikely that suitable habitat exists within the Subject Land, Quolls may use the surrounding vegetation in the north to facilitate movement towards Mogo State Forest.

There are numerous scattered records of threatened Forest Owls in the local area. A Powerful Owl was observed within the Subject Land in 2006 and just outside the eastern boundary in 2011. Masked Owls were recorded close to Bevian Wetland in 1986 with a deceased individual located on George Bass Drive and Sooty Owls have been observed in the surrounding forest in the east as recently as 2021. There are no breeding trees within the Subject Land, however the scattered trees within provide vantage points to scan the surrounding open grasslands for food. These foraging grounds have been assessed and are included in the offset obligation for impacts of PCTs (ecosystem credits). Given the high mobility of these species, connectivity will be retained and enhanced within the Subject Land.

Swift Parrot Important habitat is located within Mogo State Forest and on the southeastern boundary of the Subject Land. Within the Subject Land the foraging trees consist of *Corymbia maculata*, *Eucalyptus tereticornis* and *E. fibrosa* which provide a winter foraging resource. Retaining and expanding the habitat corridor could potentially provide additional foraging opportunities for Swift Parrots and Regent Honeyeaters. Given the high mobility of these species' habitat will be retained within the Subject Land and connectivity maintained and enhanced to provide linkages with Mogo State Forest and therefore impacts to these species is unlikely.

Within the Eurobodalla Shire there are currently a number of development proposals which require substantial areas of native vegetation clearing. This cumulative removal of native vegetation could impact the movement of these species across the broader landscape. Scattered trees within the Subject Land may be used as a movement corridor from east to west and north to south. These scattered trees across the site will be retained where possible to maintain linkages to habitats beyond the subject lane. Locally occurring native trees will be used in landscaping works within streetscapes and open spaces to further enhance connectivity.

There are 18 HBTs within the Subject Land and where possible these trees will be retained to provide habitat and connectivity for fauna with the remainder to be removed where incompatible with the Development Footprint. The hollows assessed in these trees were all small and whilst not suitable for the larger gliders, these trees may provide important linkages facilitating movement and provide potential roosting and nesting habitat for birds, bats, such as the Southern Myotis, and small arboreal mammals. Greater Gliders, Yellow-bellied Gliders and Brush-Tailed Phascogales require tree canopy for movement as they are unable to cross large areas (>100 m) of cleared habitat (van der Rees et al 2004). The use of arboreal fauna bridges may need to be considered to facilitate movement across cleared areas.

Patches of Spotted Gum Forests in the northeast, northwest, central and central eastern section of the Subject Land will be retained (PCT 3275_good, 3274_good). Natural regeneration is likely to occur creating a habitat corridor across the top of the Subject Land linking PCT 3275_good in the northeast with PCT 3274_good in the northwest and with the Mogo State Forest. A corridor linking the southern areas of forest with the Bevian Wetland would also facilitate movement and expand the area between the Sewage Treatment Plant and the proposed development. If plantings are required, then corridors would need to be a minimum of 40 m wide to facilitate movement of fauna and are in addition to the Riparian corridors (Figure 14).

The Subject Land contains a number of creeks and dams with riparian vegetation that would be used to facilitate the movement of threatened species including migratory birds. Due to the refinement of the Development Footprint, much of the riparian areas will be avoided and riparian buffers have been included to protect these areas. Generally, the riparian corridors will be extended and buffered to provide important links from land to the east through to Bevian Wetland and on to Mogo State Forest. The 2008 Concept Plan approval has a requirement for southwest riparian corridor linkage from Bevian Wetland to Mogo State Forest to be minimum of 40 m with the proposed modification retaining this requirement. A network of habitat corridors around Saltwater Creek will also provide linkages from east to west. The location of recommended habitat corridors are shown in Figure 14). These habitat corridors are necessary to facilitate movement and improve the long-term viability of arboreal faunal populations across the landscape.

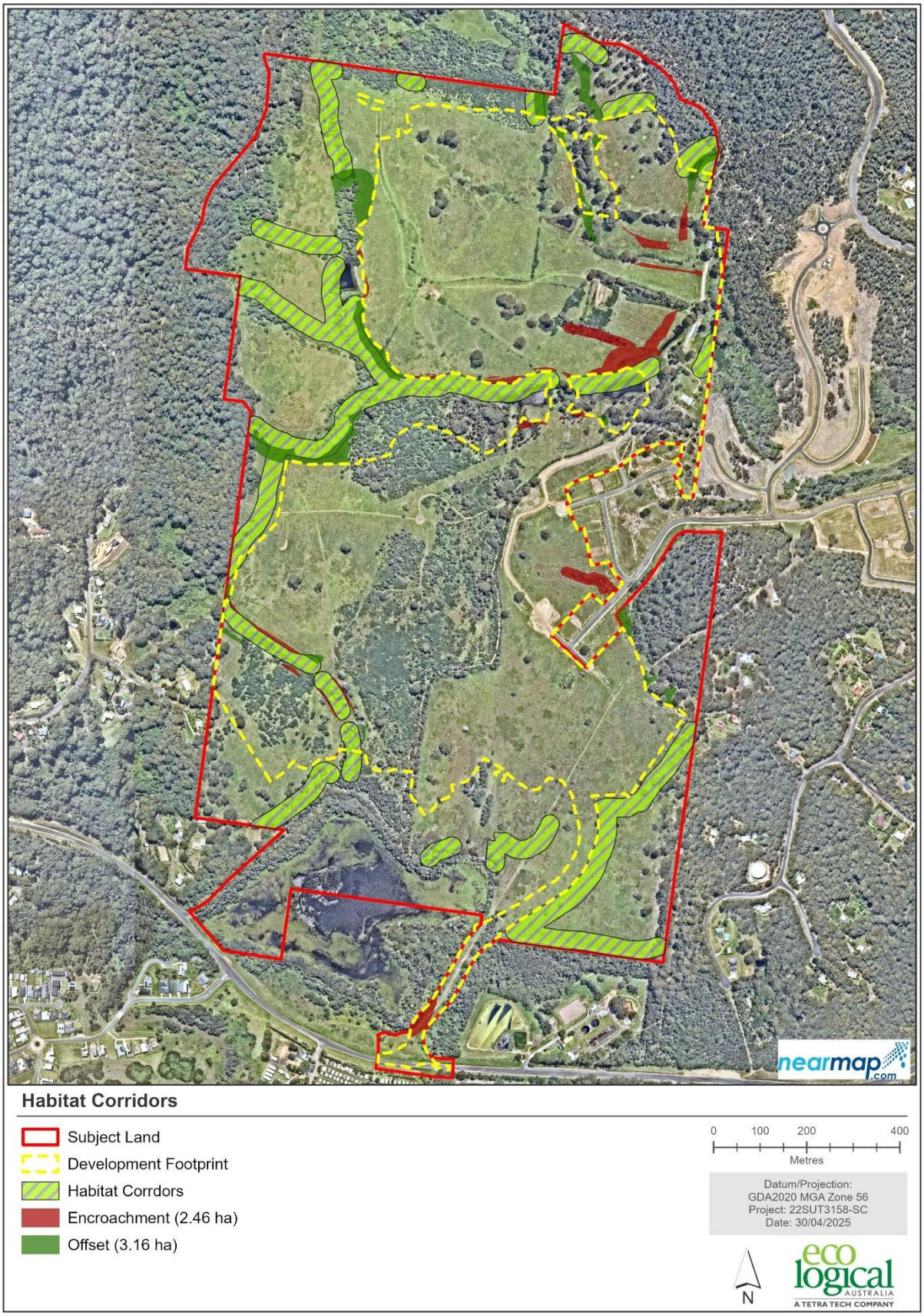


Figure 14: Location of faunal habitat corridors and Vegetated Riparian Zones (VRZ) across the Subject Land

Habitat linkages will also be provided by landscaped beds between lots and within green spaces. It is proposed that there will be no loss of connectivity across the Subject Land for arboreal mammals and it is expected that there will be a net gain in connectivity for these species. There will be a loss of open grazing areas for macropods.

7.4. Water bodies, water quality and hydrological processes

There are a number of drainage lines, creeks and large dams within the Subject Land. Bevian Wetland located in the southern areas of the Subject Land is mapped as a Coastal Wetland (SEPP Coastal Management) and zoned Environmental Conservation (C2, Environmental management). No development is proposed within this zone but the wetland is in is in close proximity to the proposed development. The removal of vegetation could result in changes to hydrology, increased sedimentation and runoff could impact water quality. Increased urban discharge, increased access, pollution and predation by pets could impact upon the ecological functioning of the wetland.

Flood mitigation, drainage works and landfill associated with the development could impact on the TEC Swamp Oak Forest that is adjacent to the Bevian Wetland. TEC (PCT 4056_moderate) is located within the floodplain extending up the hill from the Wetland.

The proposed development will retain 12.9 ha of TEC, which have the potential to be affected by acid sulphate soils, sedimentation and erosion. Mitigation measures will ensure water quality will not be impacted. Modelling (Civille 2025) has determined that there will be no increase in post development annual runoff volume. Supporting information is provided in the updated Riparian and Aquatic Assessment, Acid Sulphate Soil Review and a new Flood Risk Management Plan (FIRA).

The ecological integrity of the wetland will be protected by avoiding direct impacts through clearing and ensuring indirect impacts are managed by controlling weeds, implementing erosion and sediment control measures and maintaining water quality. A Vegetation Management Plan (VMP) will be implemented for riparian areas to ensure that these areas are retained and enhanced by planting locally provenance trees, shrubs and groundcover improving habitat linkages, foraging opportunities and improve riparian habitat values. Large riparian buffer zones (40 m and up to 100 m wide) will also ensure adequate vegetation is present to maintain water quality and stabilise drainage lines (Figure 15). In accordance with the original concept approval approximately 3.48 ha of riparian areas will be rehabilitated.

Hydrological processes within the Subject Land cover two catchments; Saltwater Creek Catchment and Bevian Wetland Catchment. A ridge passing through the center of the Subject Land forms a catchment boundary between the two catchments. It is expected that subsurface flows will be similar before and after development. A Water Cycle Management Study will be conducted to determine baseline levels of total suspended solids (TSS), and nitrogen and phosphorus levels within the water ways and ongoing to determine that these levels are not exceeded. Gross pollutant traps will be installed to remove them prior to entering waterways.

Saltwater Creek runs through the Subject Land draining eastward to Rosedale Beach. An unnamed watercourse drains the southern parts of the subject land draining into Bevian Wetland. Additional creek crossings will be constructed, and erosion and sediment controls will be installed and maintained to minimize the velocity of surface water and prevent erosion to the surrounding landscape.

Persicaria elatior has previously been recorded near Bevian Wetland; however, it was not detected during targeted surveys within the Development Footprint. This species is highly sensitive to changes in

hydrology, sedimentation, and eutrophication, and may be adversely affected by indirect impacts associated with nearby development activities.

To mitigate potential impacts, a 100-metre vegetated buffer will be maintained around Bevian Wetland and allowed to regenerate. This buffer will serve multiple functions: enhancing wetland habitat quality, reducing sediment and nutrient input, and helping maintain more stable hydrological conditions. The regeneration of this zone with native vegetation will improve filtration of surface runoff and offer long-term protection to sensitive species such as *P. elatior*.

The Department of Environment and Conservation lists one low-priority action for *P. elatior*: to *identify priority locations for this species and threats and determine appropriate recovery actions.* While *P. elatior* is not currently present within the Subject Land, it was recorded around Bevian Wetland. Indirect impacts are possible but considered low risk due to the presence of a substantial buffer and implementation of effective water quality controls.

The integrated Water Management Plan (Civille 2025) prepared for the proposed development demonstrate that the mitigation measures would not reduce water quality, nor affect with the wetland's natural wetting-drying hydrology.

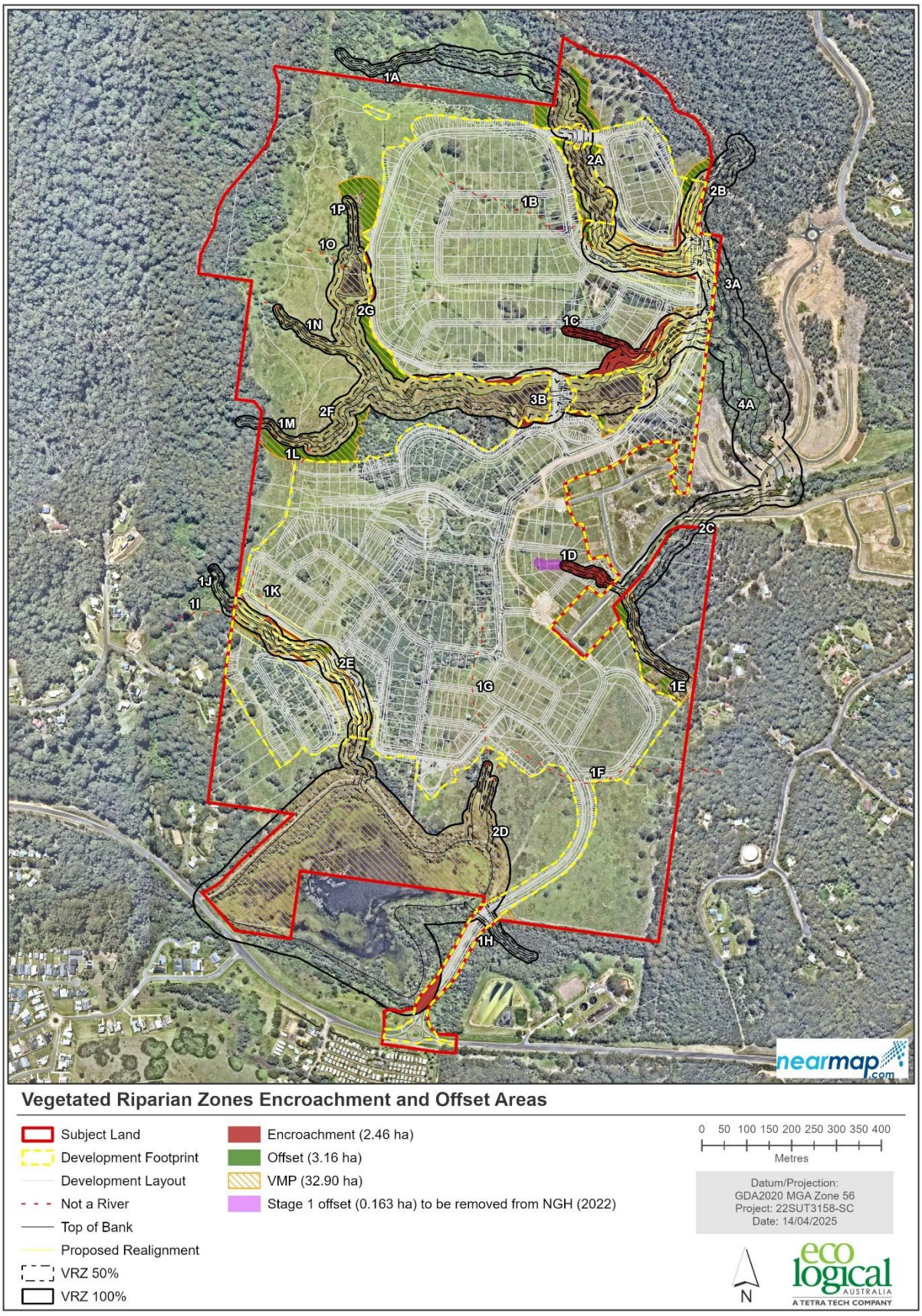


Figure 15: Areas of riparian planting (Ref to Riparian report for additional details)

Further water quality and soil protection measures will be implemented to reduce indirect impacts. These include:

- Prepare and implement a stormwater and groundwater management plan to comply with best practice to minimise urban pollutants.
- Pre-treatment of stormwater runoff using bio-retention systems to reduce sediment loads and nutrient levels before water enters the wetland.
- Installation of Gross Pollutant Traps.
- Sediment and erosion controls such as silt fences, sediment basins, and diversion drains during construction phases to minimise soil disturbance and downstream impacts.
- Stabilisation of exposed soils through short-term mulching, erosion control matting, and long-term revegetation with native wetland and riparian species to prevent sedimentation.
- Ongoing monitoring of soil and water chemistry (including pH, nutrients, and salinity) to detect and respond to any emerging risks.
- Planting riparian vegetation to reduce eutrophication in water bodies,
- Review restrictions on domestic pets, apart from companion dogs and cats, to reduce predation on native fauna and nesting shorebirds.

These combined mitigation strategies will reduce the risk of degradation to wetland ecosystems and support the persistence of *P. elatior* and associated native vegetation within the Bevian Wetland catchment.

7.5. Climate Change

The coastal zones in all areas of Australia are predicted to be affected by climate change due to rising sea levels resulting in increased flooding, higher water tables, saltwater intrusion, and changes in air temperatures. By following best practices during the development such as installation of renewable energies, water recycling, energy efficient households incorporated into building designs and public transport facilities to minimise private vehicle, these impacts can be reduced.

7.6. Vehicle strikes

Traffic will increase along George Bass Drive, Burri Road and Bevian Road due to the significant growth in urban development. This will pose a risk to threatened species occurring within or near the Subject Land. Yellow-bellied Gliders have been observed along George Bass Drive near the Subject Land and deceased Masked Owls were also retrieved from along George Bass Drive near Bevian Wetland. These species still occur in the surrounding forests and are likely to use the fringes of the Subject Land. Mitigation measures may include traffic management signs, implementation of safe driving speeds and maintaining canopy connections by strategic retention and planting of trees along the road or in the form of rope bridges, from the corner of Bevian Road and George Bass Drive into the southern remnant vegetation. These mitigation measures may alleviate impacts by vehicles along this section of the road.

Habitat Corridors within the Subject Land will provide linkages to enable fauna to move through the Subject Land into the neighbouring Mogo State Forest. The design of internal roads should consider the likely movement of fauna and avoid habitat corridors.

7.7. Summary of measures to avoid and minimise impacts

The following measures will be implemented to avoid and minimise impacts:

- No impacts to Bevian Wetland or the Swamp Oak Forest TEC (PCT 4056_good) immediately surrounding the wetland in good condition (1.16 ha will be impacted).
- Approximately a 100 m buffer has been incorporated around the wetland that will be allowed to regenerate and/or supplemented planting.
- Retained Managed Land will be managed for weeds to encourage natural regeneration
- No impacts to remnant vegetation within the Retained Managed Land areas,
- Retain and revegetate riparian vegetation in the north, centre and southwest linking remnant vegetation in Retained Managed Lands and providing habitat corridors,
- Revegetate forest areas in the north along Burri Road from east to west linking remnant vegetation with Mogo State Forest,
- Revegetate areas in the southeast to link the surrounding forests with the Swamp Oak Forest around Bevian Wetland and included in the Vegetation Management Plan (VMP)
- Plant suitable street trees to provide linkages between Lots,
- Retain Hollow Bearing Trees and large scattered trees where possible and replace HBTs with nest boxes as part of the Biodiversity Management Plan (BMP) at a ratio of 2:1,
- Develop and implement a BMP to address management of weeds, habitat corridors, riparian areas and water quality,
- Develop and implement a Vegetation Management Plan (VMP) for riparian areas and habitat corridors,
- Prepare and implement a Stormwater and Groundwater Management Plan and monitor water quality,
- Managing water quality through erosion and sediment controls such as silt barriers and soil stabilisation during construction phase,
- Adopt stormwater management to comply with best practice to minimise urban pollutants (refer to water quality engineering report for specifications).
- Plant riparian vegetation within a large 40 m buffer to reduce eutrophication in water bodies,
- Investigate restrictions on domestic pets, apart from companion dogs and cats, to reduce predation on native fauna and nesting shorebirds,
- Design fauna sensitive roadways within the Development Footprint.

8. Impact assessment

8.1. Direct impacts

8.1.1. Residual direct Impacts

The Development Footprint has been micro-sited and realigned to avoid woodland / forest vegetation to minimise the amount of clearing of woody vegetation, HBTs and habitat for arboreal mammals, threatened birds and bats. Impacts to riparian vegetation have been minimised and enhanced by creating a 40 m buffer along the edge of creeks, along drainage lines, around dams, and a 100 m buffer around Bevian Wetland. These areas will be planted out to improve the vegetation and habitat quality for frogs and other aquatic species. Table 23 and Table 24 summarize residual direct impacts to PCTs and threatened species.

Table 23: Summary of residual direct impacts

PCT ID	PCT Name	BC Act listing	EPBC Act listing	Direct impact 2024 (ha)	Direct impacts 2025 (ha)
3045		-	-	0	0.01
3274	*South Coast Spotted Gum Moist Forest*	-	-	21.73	21.84
3275	*South Coast Spotted Gum Cycad Dry Forest*	-	-	68.9	65.23
4056	*Southern Estuarine Swamp Paperbark Creekflat Scrub*	BC Act	EPCB Act	13.61	11.9
TOTAL				**104.24 ha**	**98.9**

Table 24: Direct impacts on threatened species and threatened species habitat

Species	Common Name	Direct impact number of individuals / habitat (ha)	BC Act listing status	EPBC Act Listing status
Myotis macropus	Southern Myotis	2.89 ha	Vulnerable	Not Listed

8.1.2. Change in vegetation integrity score

Changes in vegetation integrity score are shown in Table 25. Future integrity scores for composition, structure and function after development are considered 0.

Table 25: Impacts to vegetation integrity

VZ ID	Vegetation Zone	Composition condition score	Structure condition score	Function condition score	Hollow bearing trees present	Vegetation Integrity Score	Change in Vegetation Integrity Score
1	3274_good	90.2	71.8	44.4	No	**66**	**-66**
2	3274_low	40.4	34.4	3.2	No	**16.5**	**-16.5**
3	3274_exotic	14.5	3	35	No	**11.6**	**-11.6**
4	3274_reg	65.3	55.9	22	No	**43.2**	**-43.2**
5	3275_good	94.8	94.7	52.5	Yes	**77.8**	**-77.8**
6	3275_moderate	93.3	40	28.6	No	**47.5**	**-47.5**
7	3275_low	51.2	36	11.6	No	**27.7**	**-27.7**
8	3275_reg	91.1	62.9	45.7	Yes	**64**	**-64**
9	4056_good	57.1	69.3	100	No	**73.4**	**-73.4**
10	4056_moderate	61.2	93.6	19.9	No	**48.5**	**-48.4**
11	3045_Good	92.8	61.9	65	No	**72**	**-72**

8.2. Indirect impacts

The indirect impacts of the development are outlined in Table 26.

Table 26: Indirect impacts

Indirect impact	Impacted entities	Extent	Duration	Project Phase	Likelihood and consequences
inadvertent impacts on adjacent habitat or vegetation	Remnant Vegetation outside the Development Footprint. Swamp Oak TEC	26 ha of Spotted Gum Woodland 12.9 ha around Bevian Wetland	Potential long-term	During Construction and ongoing	Low if mitigation strategies are implemented. 100 m buffer around Bevian Wetland will reduce impacts.
Reduced viability of adjacent habitat due to edge effects	Remnant Vegetation outside the Development Footprint. Swamp Oak TEC	26 ha of Spotted Gum Woodland 12.9 ha around Bevian Wetland	Potential long-term	During Construction and ongoing	Low if mitigation strategies are implemented. Ie weed management and revegetation. 100 m buffer around Bevian Wetland will reduce impacts.
Reduced viability of adjacent habitat due to noise, dust or light spill	Remnant Vegetation outside the Development Footprint. Swamp Oak TEC	26 ha of Spotted Gum Woodland 12.9 ha around Bevian Wetland	Potential long-term	During Construction and ongoing	Moderate. Street lights and noise post development could disturb breeding arboreal mammals and water birds at Bevian Wetland. 100 m buffer around Bevian Wetland will reduce impacts.
transport of weeds and pathogens from the site to adjacent vegetation	Remnant and open grassland areas outside the Development Footprint. Swamp Oak TEC	26 ha of Spotted Gum Woodland 37 ha of grassland areas 12.9 ha around Bevian Wetland	Potential long-term	During Construction and ongoing	Low. Weed management strategies need to be implemented. Hygiene protocols during development. 100 m buffer around Bevian Wetland will reduce impacts.
Increased risk of starvation or exposure and loss of shade or shelter	Bats and mammals		Potential short -term	During Construction and ongoing	Low. Revegetation will enhance corridors and facilitate movement. Remnant vegetation will be retained outside the Development Footprint. Larger dams used for foraging by Southern Myotis will be retained within the Subject Land.

Indirect impact	Impacted entities	Extent	Duration	Project Phase	Likelihood and consequences
					100 m buffer around Bevian Wetland will retain vegetation.
loss of breeding habitat	No breeding habitat identified within the Subject Land			During Construction and ongoing	Low. Revegetation will enhance corridors and facilitate movement. Remnant vegetation will be retained outside the Development Footprint. HBTs will be retained where possible or nest boxes will be installed at a ratio of 2:1.
trampling of threatened flora species	Potential habitat for *Persicaria elatior* along drainage lines and around Bevian Wetland	40 m - 100 m buffer from riparian areas, wetlands	Potential short-term	During Construction but likely to be enhance with the riparian corridors	Low. Revegetation will enhance corridors and remnant vegetation will be retained outside the Development Footprint. No individuals were recorded within the Subject Land. 100 m buffer around Bevian Wetland will reduce impacts.
Inhibition of nitrogen fixation and increased soil salinity	Riparian vegetation	4.72 ha PCT 3045 7.57 ha PCT 4056	Potential long-term	During Construction and ongoing	Low. Riparian areas will be buffered by revegetation to mitigate flows and eutrophication. Mitigation strategies for stormwater quality and quantity will be implemented. 100 m buffer around Bevian Wetland will reduce impacts.
sedimentation and contaminated and/or nutrient rich run-off	Remnant Vegetation outside the Development Footprint. Riparian habitat	26 ha of Spotted Gum Woodland 37.6 ha grassland 12.9 ha	Potential long-term	During Construction and ongoing	Low if mitigation strategies are implemented. Ie sedimentation and erosion controls 100 m buffer around Bevian Wetland will reduce impacts.
rubbish dumping	All vegetation outside of the Development Footprint including dams	81 ha	Potential long-term	During Construction and ongoing	Low if mitigation strategies are implemented. Ie access to rubbish removal services, neighbourhood watch.

Indirect impact	Impacted entities	Extent	Duration	Project Phase	Likelihood and consequences
wood collection	Remnant vegetation outside the Development Footprint	26 ha Spotted Gum Woodland 12.9 ha Swamp Oak Forest TEC	Potential long-term	During Construction and ongoing	Moderate. Loss of Large woody debris for ground dwelling fauna. Identify specific areas for wood collection.
removal and disturbance of rocks including bush rock	NA. No rocks within the Development Footprint				NA
increase in predators	Water birds and small mammals	81 ha of PCTs outside the Development Footprint	Potential long-term	Post development and ongoing	Moderate. Likely to see a decrease in feral predators due to construction activity. However, predators could increase with the development of habitat corridors facilitating movement. Domestic pets could be an issue. Implement feral animal controls. Consider off lease areas or pet curfews if this becomes an issue.
increase in pest animal populations	Feral mice/ rats may be a food source for raptors and owls	81 ha of PCTs outside the Development Footprint	Potential long-term	Post development and ongoing	Moderate. Baits used to control pests could inadvertently affect raptors and owls.
changed fire regimes	Remnant Vegetation outside the Development Footprint. Swamp Oak TEC good and moderate	26 ha of Spotted Gum Woodland 37.6 ha grassland 12.9 ha around Bevian Wetland	Potential long-term	During Construction and ongoing	Low. APZs are included within the Development Footprint.
disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.	NA				

8.3. Prescribed Impacts

8.3.1. Habitat Connectivity

8.3.1.1. Nature

Remnant vegetation within the Subject Land that provide linkages to other remnants outside the Subject Land will be retained. Riparian vegetation will be buffered and revegetated enhancing connectivity from east to west and north to south.

8.3.1.2. Extent

Habitat corridors will be increased across the Subject Land. Large, scattered trees and HBTs will be retained on site where possible. See Section 7.3 for additional information.

8.3.1.3. Duration

During construction habitat corridors will be revegetated and rehabilitated to provide linkages to fragmented remnants and to Mogo State Forest. These habitat corridors will improve connectivity across the Subject Land.

8.3.1.4. Consequences

Improving and enhancing habitat corridors and providing linkages to remnant vegetation and Mogo State Forest will benefit local fauna.

8.3.2. Waterbodies, water quality and hydrological processes

8.3.2.1. Nature

Dams and wetlands will be retained within the Subject Land. Riparian vegetation will be buffered and revegetated to improve water quality and mitigate runoff. Sediment and erosion control measures will be implemented during construction and water quality and quantity will be monitored. Stormwater management procedures will be implemented to prevent impacts to Bevian Wetland or to Rosedale Beach. See Section 7.4 for additional information.

8.3.2.2. Extent

Hydrological processes within the Subject Land cover two catchments; Saltwater Creek Catchment and Bevian Wetland Catchment. A ridge passing through the center of the Subject Land forms a catchment boundary between the two catchments. Saltwater Creek runs through the Subject Land draining eastward to Rosedale Beach and into Bevian Wetland. Bevian Wetland is identified as SEPP (Coastal Management).

8.3.2.3. Duration

Management of water quality and stormwater drainage and will require on-going monitoring to ensure that impacts to Bevian Wetland are avoided.

8.3.2.4. Consequences

Impacts to water quality through urban land use, drainage, erosion, sedimentation and stormwater runoff could impact on the biodiversity and ecological integrity of Bevian Wetland reducing habitat. Ongoing monitoring will be required and mitigation measures implemented to ensure that there are no impacts to Saltwater Creek or Bevian Wetland.

Persicaria elatior has previously been recorded near Bevian Wetland, however it was not detected during targeted surveys within the Subject Land. This species is highly sensitive to changes in hydrology, sedimentation and eutrophication and may be impacted by such indirect impacts. A 100 m buffer will be maintained around Bevian Wetland and allowed to regenerate, which will enhance wetland habitat and help reduce potential impacts to *P. elatior*. Additional water quality mitigation measures will further benefit this species (see Section 7.4 for additional information).

8.3.3. Vehicle Strikes

More than 900,000 km of roads cover the Australian Landscape. Millions of native animals are injured and killed each year when they are struck by vehicles whilst trying to cross the road. The speed of the vehicle plays a major role in vehicle collision strike rates. In June 2023, the speed limit along George Bass Drive was reduced from 100 to 80 km to reflect recent development. The speed limits within the Development Footprint post construction would be 50 km.

The following Table 27 predicts impacts of vehicle strikes on threated fauna and protected fauna within the Development Footprint. Given the reduced speed and lighting within the Development Footprint the likelihood and strike rate on threatened entities is considered to be low. Impacts to possums and macropods is potential, however these rates are also expected to be low if traffic signs are obeyed.

Table 27: Predicted vehicle strike

Threatened / Protected Fauna	SAII Entity	Likelihood	Estimated Vehicle Strike Rate	Consequences
Yellow bellied Glider	No	Low	Low	Injury or death. Potential impacts to local population leading to decline
Greater Glider	No	Low	Low	Injury or death. Potential impacts to local population leading to decline
White-Bellied Sea-Eagle / Eagles	No	Low	Low	Injury or death. Potential impacts to local population leading to decline
Masked Owl	No	Low	Low	Injury or death. Potential impacts to local population leading to decline
Powerful Owl	No	Low	Low	Injury or death. Potential impacts to local population leading to decline
Spotted Tail Quoll	No	Unlikely	Low	Injury or death. Potential impacts to local population leading to decline
Gliders/ Possums	No	Potential	Low	Injury or death. Potential impacts to local population leading to decline
Macropods	No	Potential	Low	Injury or death. Potential impacts to local population leading to decline
Wombat	No	Low	Low	Injury or death. Potential impacts to local population leading to decline

8.4. Mitigating residual impacts on biodiversity values

Measures proposed to mitigate and manage impacts at the Subject Land before, during and after construction are outlined in Table 28.

Table 28: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
timing works to avoid critical life cycle events such as breeding or nursing	Moderate	Minor	Active breeding or nesting identified during pre-clearance surveys will be avoided in August, September and October which is the breeding/nesting period for most fauna species.	Impacts to fauna during nesting/nursing avoided	Construction	Site manager
instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecological or licensed wildlife handler during clearing events	Major	Minor	Pre-clearance surveys will be undertaken prior to tree clearing. A qualified ecologist/licenced wildlife handler will supervise tree removal in accordance with best practise methods.	Any fauna utilising habitat within the Project Site will be identified and managed to ensure clearing works minimise the likelihood of injuring resident fauna	Prior to construction	Site ecologist
installing artificial habitats for fauna in adjacent retained vegetation and habitat or human made structures to replace the habitat resources lost and encourage animals to move from the impacted site, e.g. nest boxes	Minor	Minor	HBTs will be retained on site as far as practicable. If any HBTs are removed beyond those considered within the Concept Plan approval modification development footprint these will require additional approval from Council. Hollow sections will be retained and used on site where possible or nest boxes installed at a ratio of 2:1.	No net loss of HBTs	Prior to construction	Site Manager
clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance; for example, removal of native vegetation by chain-saw, rather than heavy machinery, is preferable in situations where partial clearing is proposed	Moderate	Minor	Clearing protocols will be developed that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance (e.g. removal of native vegetation by chainsaw instead of heavy machinery where only partial clearing is proposed). Fencing (or other barriers as required) and signage will be placed around those areas of vegetation to be maintained to prevent any accidental construction damage and provide a permanent barrier between the development footprint and retained areas.	Vegetation to be retained outside of the Project Site boundary will not be disturbed	Construction	Site manager

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
			The type of fencing during construction may be of a temporary nature and scale that is robust enough to withstand damage during this stage of work. Use of appropriate machinery for vegetation removal adjacent to retained areas.			
sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	Minor	Negligible	Appropriate controls will be implemented to manage exposed soil surfaces and stockpiles to prevent sediment discharge into waterways. All works within proximity to the drainage lines will have adequate sediment and erosion controls (e.g. sediment barriers, sedimentation ponds). Revegetation will also commence as soon as is practicable to minimise risks of erosion. Suitable species will be used as ground cover species in any revegetation areas.	Erosion and sedimentation will be controlled	Construction and decommissioning	Site manager
noise barriers or daily/seasonal timing of construction and operational activities to reduce impacts of noise	Minor	Negligible	Construction works will only be undertaken during daylight hours.	Noise impacts associated with the development will be managed	Construction / operation /decommissioning	Site manager
light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill	Minor	Negligible	Construction works will only be undertaken during daylight hours and night lights will not be used. Lights associated with operation will be directional to avoid unnecessarily shining light into adjacent retained vegetation where possible.	Light impacts of construction will be avoided as all works will occur during daylight hours Light spill into adjacent vegetation is reduced	Construction / operation /decommissioning	Site manager
adaptive dust monitoring programs to control air quality	Minor	Negligible	Dust suppression measures will be implemented to limit dust on site. Revegetation will also be	Mitigate dust created during construction activities	Construction and decommissioning	Site manager

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
			commenced as soon as practicable to minimise areas likely to create dust. Suitable species will be used as ground cover species in any revegetation areas.			
programming construction activities to avoid impacts; for example, timing construction activities for when migratory species are absent from the site, or when particular species known to or likely to use the habitat on the site are not breeding or nesting	Moderate	Minor	Active breeding or nesting identified during pre-clearance surveys will be avoided during migration periods	Impacts to fauna during nesting/nursing avoided	Construction	Site manager
temporary fencing to protect significant environmental features such as riparian zones	Moderate	Minor	All waterway crossings will be designed in accordance with *Policy and Guidelines for Fish Friendly Waterway Crossing* (DPI, n.d.) where appropriate.	Crossing constructed with negligible impacts to aquatic habitats	Detailed design	Site manager
hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	Minor	Negligible	All machinery will be cleaned prior to entering and exiting the Project Site to minimise the transport of weeds to vegetated areas to be retained. Weeds that are present within the Project Site that are listed under the *NSW Biosecurity Act 2015* will be managed.	Weed impacts managed	Construction	Site manager
staff training and site briefing to communicate environmental features to be protected and measures to be implemented	Minor	Negligible	All personnel working on the project will undertake an environmental induction as part of their site familiarisation. This will include: • site environmental procedures (vegetation management, sediment and erosion control, exclusion fencing and noxious weeds) • what to do in case of environmental emergency (e.g. chemical spills, fire, injured fauna)	Staff trained and aware of environmental issues and responsibilities on site	Construction	Site manager

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
			• key contacts in the case of an environmental emergency.			
development control measures to regulate activity in vegetation and habitat adjacent to residential development including controls on pet ownership, rubbish disposal, wood collection, fire management and disturbance to nests and other niche habitats	Minor	Negligible	A strategy will be developed and implemented to protect vegetation and habitat adjacent to the project. This will outline the following: • rubbish disposal guidance • prohibition of wood collection • prohibition of lighting of fires • no-go-zones for native vegetation outside the development footprint • speed limits on the surrounding road network	Adjacent habitat protected	Construction	Site manager
making provision for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on or adjacent to the Subject Land	Major	Negligible	A VMP will identify management of remnant vegetation that will be retained within the Subject Land. Habitat corridors and riparian areas will planted, enhanced and managed to facilitate connectivity and maintain water quality.	Adjacent habitat protected	Construction	Site manager

8.5. Adaptive management strategy for uncertain impacts

Although numerous surveys have been undertaken across the Subject Land by various ecologists from several consultancies there is always the potential for unexpected finds, particularly for threatened species that require specific environmental conditions and may not be visible each season. Targeted surveys across the Subject Land have been undertaken in accordance with the BAM 2020 using best practice techniques at the time of survey. If an unexpected candidate species is found within the Development Footprint, then a Species Impact Statement will be undertaken and the BCS will be notified.

9. Serious and irreversible impacts

The development does not have any Serious and Irreversible Impacts (SAII). All areas mapped as Swift Parrot Important Habitat have been avoided.

10. Impact summary

10.1. Determine an offset requirement for impacts

The impacts of the development requiring offset for native vegetation are outlined in Table 29.

The impacts of the development requiring offset for species credit species are outlined in Table 30.

All impacts requiring offsets are shown on Figure 16. The retirement of species credits will be in accordance with the BAM 2020 and outlined in Appendix G. The proponent will commit to retiring credits either into the fund or will purchase available credits once this modification has been approved.

It is recommended that offset liabilities be confirmed upon approval of the modification to determine the financial obligations of the modified concept plan. It is also recommended that payment of these liabilities be apportioned based on each subsequent detailed development application (DA) relevant credit liability with payment due upon determination of each DA prior to any works commencing on the relevant DA.

Table 29: Impacts to native vegetation offset liability

VZ	PCT ID	PCT Name	Sensitivity Score	Biodiversity Risk Rating	% Cleared	Condition	Development Footprint (ha)	VI Score	Ecosystem Credits
1	3274	South Coast Spotted Gum Moist Forest	High	1.5	5%	Good	1.54	66	38
2						Low	11.96	16.5	0
3						Exotic	3.72	11.6	0
4						Regen	4.62	43.2	75
									113
5	3275	South Coast Spotted Gum Cycad Dry Forest	High	1.5	14%	Good	10.26	77.8	299
6						Moderate	8.19	47.5	146
7						Low	44.87	27.7	465
8						Regen	1.91	64	46
									956
9	4056	Southern Estuarine Swamp Paperbark Creekflat Scrub. TEC Swamp Oak Floodplain Forest	High	2	53%	Good	1.16	73.4	43
10						Low	10.74	48.5	260
									303
11	3045	South Coast Temperate Gully Rainforest	High	1.5	12%	Good	0.01	72	**1**
TOTAL		**Native Vegetation**					**98.9**		**1373**

Table 30: Impacts on threatened species and threatened species habitat that require offsets

Species	Common Name	BC Act listing status	EPBC Act Listing status	Loss of Habitat (ha)	Biodiversity risk rating	Species Credits
Myotis macropus	Southern Myotis	V	NL	2.89	2	105

10.2. Indirect and prescribed impacts

Indirect and prescribed impacts that remain after measures to avoid, minimise and mitigate have been applied, may be offset using the retained vegetation within the Subject Land and through habitat enhancement of riparian zones and habitat corridors. These are summarised in Table 31 below.

Table 31: Residual indirect and prescribed impacts

Residual Indirect / prescribed impacts	Proposed offset
Habitat Connectivity	Planting riparian zones and establishing habitat corridors providing linkages from east to west, north to south and east to south. Retain 73.21 ha of native vegetation across the Subject Land
Waterbodies / water quality and Hydrology	Planting and enhancing riparian zones
Vehicle strikes	Controlled speed limit.

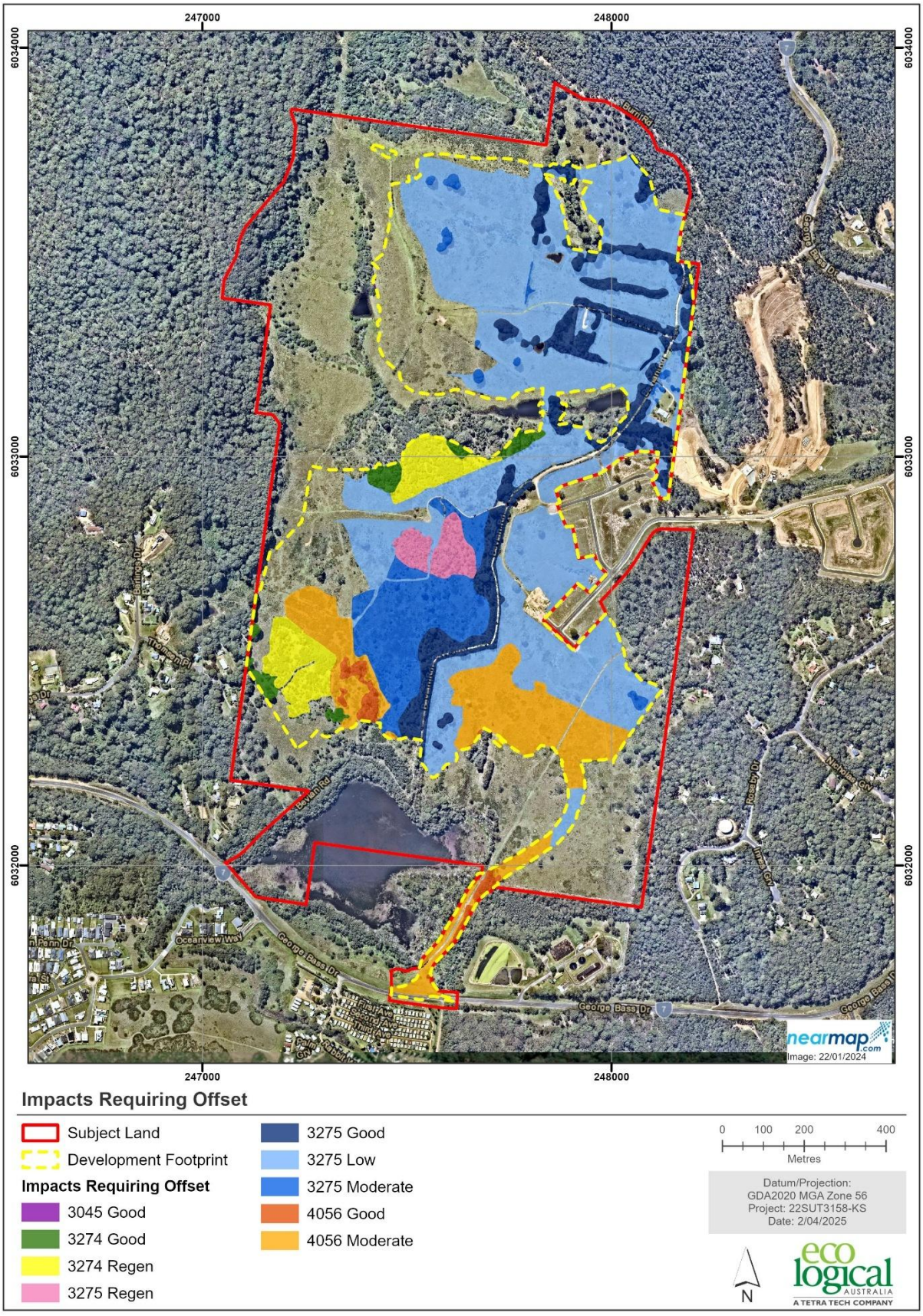


Figure 16: Impacts requiring offsets

10.3. Impacts not requiring offsets

Vegetation zones identified as PCT 3274_low and 3274_exotic are below the threshold for VI scores and no offset credits are required (Table 29). Whilst it is likely that these areas provide foraging habitat for some threatened ecosystem species these have been included in the assessment of indirect impacts. Cleared areas consisting of tracks, roads and dams do not require offsets. These areas are shown in Figure 17.

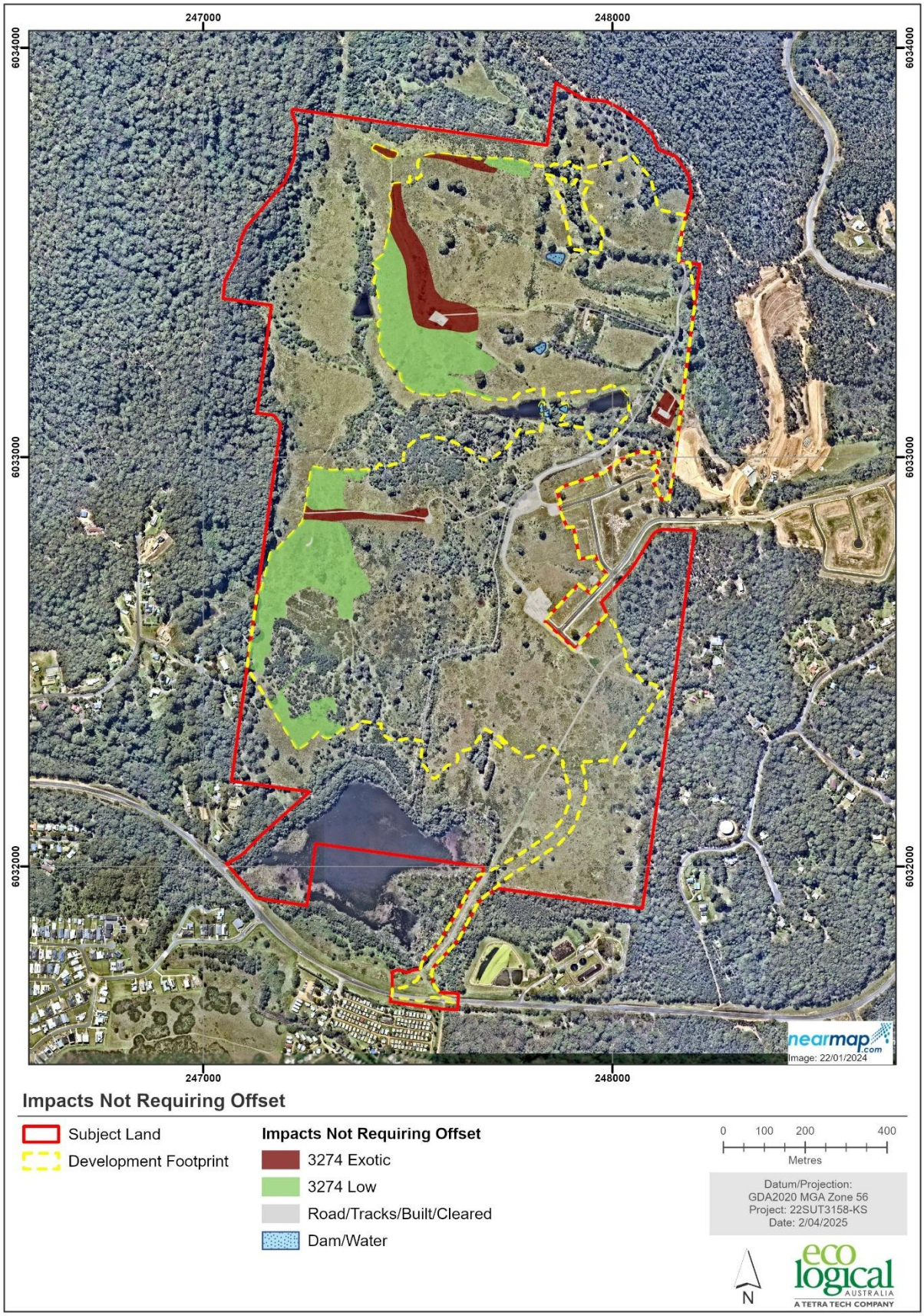


Figure 17: Impacts not requiring offsets

11. Consistency with legislation and policy

11.1.1. Environment Protection and Biodiversity Conservation Act (1999)

Under the Under the Bilateral agreement made under section 45 of the EPBC Act relating to environmental assessment (the bilateral agreement; DotE 2015), a proposed action does not require assessment under Part 8 of the EPBC Act, if the action is to be assessed under Part 4 Division 4.1 or Part 5.1 of the EP&A Act, provided the assessment:

- contains an assessment of all impacts the action has on each MNES (which will be specifically included in our Biodiversity Development Assessment Report)
- contains enough information about the controlled action and its relevant impacts to allow the Commonwealth Minister to make an informed decision whether or not to approve the action
- addresses all matters outlined in Schedule 4 of the Environment Protection and Biodiversity Conservation Regulations 2000 (EPBC Regs; DotE 2000).

Under the Amending Agreement No1 issued on 24 March 2020 between the NSW and Commonwealth Governments, the bilateral agreement will now apply to State Significant Development assessments carried out under the BAM and would apply to the assessment phase of the project. The Commonwealth government would still retain authority to issue their own approval under the bilateral agreement.

Table 32: Assessment of MNES under the EPBC Act

MNES	Occurrence	Significant assessment
Threatened ecological communities	Two TECs are present within the Project Site. • Coastal swamp sclerophyll forests of south-eastern Australia (PCT 4056_Moderate) – Endangered (10.74 ha) • Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland (PCT 4056_good) – Endangered (1.16 ha)	Potential
Threatened species	Four threatened species listed as MNES have been recorded in previous assessments • Gang-Gang Cockatoo (ebird E) • Glossy Black Cockatoo (V) • Yellow-bellied Glider (V) • White-throated Needletail (V) The following species were considered to have potential to occur: *Lathamus discolor* (Swift Parrot) CE *Chalinolobus dwyeri* (Large-eared Pied Bat) E *Petauroides volans* (Greater Glider) E *Persicaria elatior* (Tall Knotweed) V *Gallinago hardwickii* (Latham's snipe) V	Significant impact unlikely
Migratory species	Two migratory species was recorded in previous surveys: *Hirundapus caudacutus* (White-throated Needletail) (VM *Gallinago hardwickii* (Latham's snipe) VM	Significant impact unlikely

MNES	Occurrence	Significant assessment
Wetlands of International Importance	Bevian Wetland	Significant impact unlikely

11.1.1.1. Significant Impact Criteria for Vulnerable Species

The following Vulnerable species have been assessed in accordance with the Significant Impact Guidelines 1.1 EPBC Act 1999:

- Glossy Black Cockatoo,
- Yellow-bellied Glider,
- White-throated Needle-tail
- Latham's Snipe
- Tall Knotweed

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

- Lead to a long-term decrease in the size of an important population
    - An important population is a population that is necessary for a species long-term survival and recovery and is identified as such in recovery plans, or is a key source for breeding / dispersal, necessary for maintaining genetic diversity and near the limits of the species range. There is currently no recovery plan made or adopted under the EPBC Act for any of the species listed above. Nor are any of the species near the limits for their range. The Subject Land is not recognised as containing an important population of any the species listed above.
- Reduce the area of occupancy of an important population
    - No important populations of any of the above listed species have been identified within the Subject Land. The Subject Land has been cleared and grazed for agricultural purposes and whilst there are scattered trees and remnant patches of woodland it is unlikely that these areas are considered necessary to support populations. The Retained Managed Lands within the Subject Land surrounding the Development Footprint will be expanded and enhanced to facilitate movement and provide linkages across the landscape. Riparian areas will be buffered and planted to protect threatened plants thereby increasing the available habitat.
- Fragment an existing important population into two or more populations
    - No important populations of the any of the above listed species have been identified within the Subject Land. Riparian areas and habitat corridors will be planted and managed within the Retained Managed Lands to improve connectivity from east to west and from north to south.
- Adversely affect habitat critical to the survival of a species

- Critical habitat for any of the above listed species has not been identified within the Subject Land or the Development Footprint. Latham's Snipe and Tall Knotweed were observed near Bevian Wetland. Mitigation measures will be implemented to maintain the ecological integrity of the Bevian Wetland by controlling weeds, implementing erosion and sediment control measures and maintaining water quality thereby enhancing the habitat.
- A Vegetation Management Plan (VMP) will be implemented for riparian areas to ensure that these areas are retained and enhanced by planting locally provenance trees, shrubs and groundcover improving habitat linkages and foraging opportunities. Large riparian buffer zones (40 m wide) will also ensure adequate vegetation is present to maintain water quality and stabilise drainage lines.
- Planting habitat corridors and installing nest boxes will enhance connectivity for threatened species thereby improving habitat.

- Disrupt the breeding cycle of an important population

  - No important populations of any of the above listed species have been identified within the Subject Land. Vegetation will be retained within the Subject Land outside the Development Footprint as Retained Managed Lands which will enhance habitat for fauna.

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

  - The Subject Land if a former dairy farm which has been largely cleared and used for grazing. Overall the vegetation within the Development Footprint is considered disturbed due to areas of woodland being partially cleared with shrubs removed, grazing and trampling pressures due to cattle, development of internal tracks, pasture and weed species. Pockets of remnant vegetation along the boundaries will be retained and plantings will provide a corridor linking these remnants thereby increasing the quality of habitat. These areas will be further enhanced by implementing weed control measures.

- Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat

  - Invasive weeds are identified as a key threat to Tall Knotweed. A BMP will be developed to manage weeds within the Retained Managed Lands and Riparian corridors. Hygiene protocols will be implemented during development.

- Introduce disease that may cause the species to decline

  - The Subject Land is a former dairy farm which has been largely cleared and used for grazing by cattle. It is unlikely that any diseases will be introduced during construction. Mitigation strategies such as weed control and hygiene protocols will be implemented during construction.

- Interfere substantially with the recovery of the species

  - Currently the Subject Land contains scattered trees with patches of degraded woodland and whilst these areas could be used by threatened species, retaining and planting out habitat

corridors and riparian areas within the Retained Managed Lands will enhance habitat and facilitate movement of threatened species.

11.1.1.2. Significant Impact Criteria for Critically endangered and endangered species

The following Critically endangered and endangered species have been assessed in accordance with the Significant Impact Guidelines 1.1 EPBC Act 1999:

- *Lathamus discolor* (Swift Parrot) - Critically Endangered
- *Chalinolobus dwyeri* (Large-eared Pied Bat) - Endangered
- *Petauroides volans* (Greater Glider) - Endangered
- *Callocephalon fimbriatum* (Gang-gang Cockatoo) - Endangered

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

- Lead to a long-term decrease in the size of the population
    - The Subject Land contains important mapped habitat for Swift Parrot. This area has now been totally avoided. Most of the woodland habitat has also been avoided which are likely to be used for foraging by Swift Parrots, Gang-gang Cockatoos and Greater Gliders. Planting and enhancing the riparian areas and habitat corridors are likely to improve foraging opportunities for these species.
    - Large-eared Pied Bats are insectivorous, and insects are strongly influenced by lighting. Whilst there will be a reduction in foraging habitat for this species (108 ha) of which the majority is degraded grassland there is potential that artificial lighting within the Development Footprint will increase foraging opportunities for this species (Rowse, et al. 2016). Nevertheless, bat responses to lighting are species specific (Jung and Threlfall, 2016), and most studies on bats in urban environments are from Europe and North America. However, it is known that Large-eared Pied Bats are dependent upon caves, overhangs, mineshafts and abandoned Fairy Martin nests (Schulz 1998) which if present within the surrounding landscape will enable the Large-eared Pied Bat to inhabit and disperse through otherwise unsuitable areas. There are no potential roosting habitats within the Development Footprint nor within the Subject Land. There will be 73.21 ha of Retained Manage Land and 7.9 ha of Deferred Area consisting of native vegetation within the Subject Land that will be retained as habitat.
- Reduce the area of occupancy of the species
    - The Subject Land is cleared farmland with scattered trees and woodland. Approximately 14 ha of woodland will be impacted by the proposed development. 28.7 ha of woodland has been retained along the east, south and western boundary. Whilst there will be a reduction in habitat, habitat corridors and riparian areas will be planted, widened and enhanced providing linkages through the Subject Land to facilitate movement into the adjoining Mogo Forest.
- Fragment an existing population into two or more populations

- The Subject Land is cleared farmland with scattered trees and woodland. Whilst there will be a reduction in habitat, habitat corridors and riparian areas will be planted, widened and enhanced providing linkages through the Subject Land to facilitate movement into the adjoining Mogo State Forest thereby increasing and facilitating movement across the landscape. Nest boxes will be installed at a ratio of 2:1 for any Hollow bearing trees that are removed during development. No suitable sized hollows for any of the listed species were recorded within the Subject Land.

- Adversely affect habitat critical to the survival of a species

  - Critical habitat for Swift Parrot is located on south eastern boundary of the Subject Land. This area has now been removed from the approved 2008 Concept Plan. No areas within the Development Footprint were identified as habitat critical to the survival of a species and it is likely that better quality habitat for foraging, breeding and roosting are located within the Mogo State Forest.
  - Vegetation Management Plans (VMP) will be implemented for riparian and woodland habitat corridors to ensure that these areas are retained and enhanced by planting locally provenance trees, shrubs and groundcover improving habitat linkages and foraging opportunities.
  - Planting habitat corridors and installing nest boxes will enhance connectivity for gliders thereby improving habitat.

- Disrupt the breeding cycle of a population

  - Important mapped areas for Swift Parrot are now retained within the Subject Land and will not be impacted. Habitat corridors will increase foraging opportunities for Swift Parrot and facilitate movement.
  - There are no caves, rocky overhangs, cliffs or disused mines within the Development Footprint which are required by the Large-eared Pied Bat for breeding. Whilst there will be a reduction in foraging area (102.6 ha), 81 ha of native vegetation will be retained within the Subject Land (73.21 Retained Managed Land + 7.9 ha Deferred Land).

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

  - The Subject Land if a former dairy farm which has been largely cleared and used for grazing. Overall the vegetation within the Development Footprint is considered disturbed due to areas of woodland being partially cleared with shrubs removed, grazing and trampling pressures due to cattle, development of internal tracks, pasture and weed species. Pockets of remnant vegetation along the boundaries will be retained and plantings will provide a corridor linking these remnants thereby increasing the quality of habitat. These areas will be further enhanced by implementing weed control measures.

- Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species habitat

- A BMP will be developed to manage weeds within the Retained Managed Lands and Riparian corridors. Hygiene protocols will be implemented during development.

- Introduce disease that may cause the species to decline
  - The Subject Land is a former dairy farm which has been largely cleared and used for grazing by cattle. It is unlikely that any diseases will be introduced during construction. Mitigation strategies such as weed control and hygiene protocols will be implemented during construction.

- Interfere substantially with the recovery of the species
  - Currently the Subject Land contains scattered trees with patches of degraded woodland and whilst these areas could be used by threatened species, retaining and planting out habitat corridors and riparian areas within the Retained Managed Lands will enhance habitat and facilitate movement of threatened species.

11.1.1.3. Significant Impact to migratory species

The following migratory species have been assessed in accordance with the Significant Impact Guidelines 1.1 EPBC Act 1999:

- White-throated Needle-tail
- Latham's Snipe

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

- Substantially modify, destroy, or isolate an area of important habitat for migratory species
  - Latham's Snipes have been recorded within the Eurobodalla Shire around Bevian Wetland. Whilst they haven't been recorded in vast numbers Coastal swamp wetlands provide an important buffer between the land and the sea for these birds. Bevian Wetland and the area immediately surrounding the wetland (PCT 4056) is excluded from the Development Footprint and mitigation strategies will be in place to monitor and manage the water quality entering Bevian Wetland.
  - 6 White-throated Needletails were recorded at Bevian Wetland in January 2023. They spend their time in the air feeding on insects mostly above wooded area and open forests and roost in dense canopies. Whilst they have been observed flying above farmland, they are more often recorded above partly cleared pasture plantations or remnant vegetation at the edge of paddocks (TSSC 2019).

- Result in invasive species that are harmful to the migratory species becoming established in important habitat for the migratory species
  - No important areas have been mapped for migratory species. A BMP will be developed to manage weeds within the Retained Managed Lands and Riparian corridors. Hygiene protocols will be implemented during development.

- Seriously disrupt the lifecycle (breeding, feeding, resting) of an ecologically significant proportion of the population of a migratory species

    - No important areas have been mapped for migratory species and it is unlikely that the Subject Land or surrounds contains habitat that is considered ecologically significant for Latham's Snipe or White-throated Needletails. Only small numbers of Latham Snipes have been observed within the LGA, one individual was observed at Murramarang Pond, north of Bateman bay in November 2023. There have been no recent sightings at Bevian Wetlands. Six individual White-throated Needletails were observed near Bevian Wetland in January 2023 with an additional sighting of 15 individuals in January 2024 near Tomakin. White-throated Needletails roost on the edge of forest, in the tree tops and prefer to forage over woodland and large forests. The Subject land is mostly cleared of vegetation with small pockets of remnants.

11.1.1.4. Significant Impact Criteria for Critically endangered and endangered ecological communities

The following endangered ecological communities have been assessed in accordance with the Significant Impact Guidelines 1.1 EPBC Act 1999:

- Coastal swamp sclerophyll forests of south-eastern Australia (PCT 4056_Moderate) – Endangered (10.74 ha)
- Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland (PCT 4056_good) – Endangered (1.16 ha)

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- Reduce the extent of an ecological community

    - There will be a decline of 11.9 ha of PCT 4056 which is associated with the endangered TECs Coastal Swamp sclerophyll forests (PCT 4056_moderate – 10.74 ha) and Coastal Swamp Oak forests (PCT 4056_good – 1.16 ha).

- Fragment of increase fragmentation of an ecological community

    - The Subject Land is mostly cleared with pockets of remnant vegetation. Riparian and habitat corridors will be installed to facilitate linkages. Corridors in the south will increase the width of habitat north of the Sewage Treatment Plant and link to the retained habitat around Bevian Wetland. 12.9 ha of PCT 4056 will be retained within the Subject Land.

- Adversely affect habitat critical to the survival of an ecological community

    - Coastal Swamp forests have significantly declined and the proposed development will remove 11.9 ha. The habitat most critical to the survival of the TECs are those patches that are of reasonable size and in the best condition, however patches that meet minimum condition thresholds are also locally and regionally important. Changes in hydrology due to the proposed development has the potential to affect the habitat of the TECs. A water management plan will be implemented to monitor water quality and volume.

- Modify or destroy biota necessary for an ecological community's survival including ground water and drainage patterns

    - Changes in hydrology and drainage patterns as a result of the proposed development could potentially affect the survival of the TECs. A water management plan will be implemented to manage and monitor water quality including the monitoring of groundwater wells. An assessment of the Bevian Wetland determined that the wetland undergoes significant wetting and drying cycles which is independent from the groundwater (Civille 2025). The total water catchment for the wetland is approximately 154 ha of which 77 ha is in the southern section of the development site.

- Cause a substantial change in the species composition including a decline or loss of functionally important species

    - The Bevian Wetland has undergone significant wetting and drying cycles resulting in changes to plant species composition, with more vegetation covering the wetland area during a drying cycle and during the wetting cycle the open water increases, vegetation dies off and decays overtime, increasing nutrients. A reduction in water runoff into the wetland due to the proposed development has the potential to change the species composition over time.

- Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community including establishment of weeds, changes in water quality.

    - A water management plan will be implemented to monitor groundwater and surface water flowing into the Bevian Wetland and mitigation strategies will be implemented to prevent pollutants and other chemicals from entering the wetland. A Biodiversity Management Plan will be implemented to control weeds and prevent them from becoming established.

- Interfere with the recovery of an ecological community

    - There is currently no recovery plan for Coastal Swamp Forests / Coastal Swamp Oak Forests however Conservation Advice for Coastal Swamp Oak Forests and for Coastal Swamp Sclerophyll Forests describes actions to meet conservation objectives with the overarching principle to retain and restore existing areas that are relatively intact and of high quality. Whilst neither PCT 4056_good (VI score 73.4) and PCT 4056_moderate (VI score 48.5) are considered benchmark, these patches are in good condition and could naturally regenerate. The removal of 11.9 ha consists of 1.16 ha of PCT 4056_good (Coastal Swamp Oak Forest) which is fragmented (80 m away) from the retained TEC surrounding Bevian Wetlands and 10.74 ha of PCT 4056_moderate (Coastal Swamp Sclerophyll Forest) that has been significantly altered through grazing and slashing.

Based on this assessment it is probable that there is potential for the proposed development to have a significant impact on the endangered TECs and it is recommended that a referral to the Environmental Minister be submitted.

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Appendix A Definitions

The following terminology has been used throughout this report for the purposes of describing the impacts of the proposal in the context of a biodiversity assessment in accordance with the NSW Biodiversity Assessment Method 2020. This terminology may or may not align with other technical documents associated with the proposed development.

Terminology	Definition
Biodiversity credit report	The report produced by the Credit Calculator that sets out the number and class of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a Subject Land, or on land to be biodiversity certified, or that sets out the number and class of biodiversity credits that are created at a biodiversity stewardship site.
BioNet Atlas	The BioNet Atlas (formerly known as the NSW Wildlife Atlas) is the OEH database of flora and fauna records. The Atlas contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates (such as insects and snails) and some fish
Broad condition state:	Areas of the same PCT that are in relatively homogenous condition. Broad condition is used for stratifying areas of the same PCT into a vegetation zone for the purpose of determining the vegetation integrity score.
Connectivity	The measure of the degree to which an area(s) of native vegetation is linked with other areas of vegetation.
Credit Calculator	The computer program that provides decision support to assessors and proponents by applying the BAM, and which calculates the number and class of biodiversity credits required to offset the impacts of a development or created at a biodiversity stewardship site.
Development	Has the same meaning as development at section 4 of the EP&A Act, or an activity in Part 5 of the EP&A Act. It also includes development as defined in section 115T of the EP&A Act.
Development footprint	The area of land that is directly impacted on by a proposed development, including access roads, and areas used to store construction materials.
Subject Land	An area of land that is subject to a proposed development that is under the EP&A Act.
Ecosystem credits	A measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a Subject Land and the gain in biodiversity values at a biodiversity stewardship site.
Extent of occurrence (EOO)	Measures the spatial spread of a taxon to determine the degree to which risks from threatening factors could impact an entire population, and is not intended to be an estimate of the amount of occupied or potential habitat.
High threat exotic plant cover	Plant cover composed of vascular plants not native to Australia that if not controlled will invade and outcompete native plant species.
Hollow bearing tree	A living or dead tree that has at least one hollow. A tree is considered to contain a hollow if: (a) the entrance can be seen; (b) the minimum entrance width is at least 5 cm; (c) the hollow appears to have depth (i.e. you cannot see solid wood beyond the entrance); (d) the hollow is at least 1 m above the ground. Trees must be examined from all angles.
Important wetland	A wetland that is listed in the Directory of Important Wetlands of Australia (DIWA) and SEPP 14 Coastal Wetlands

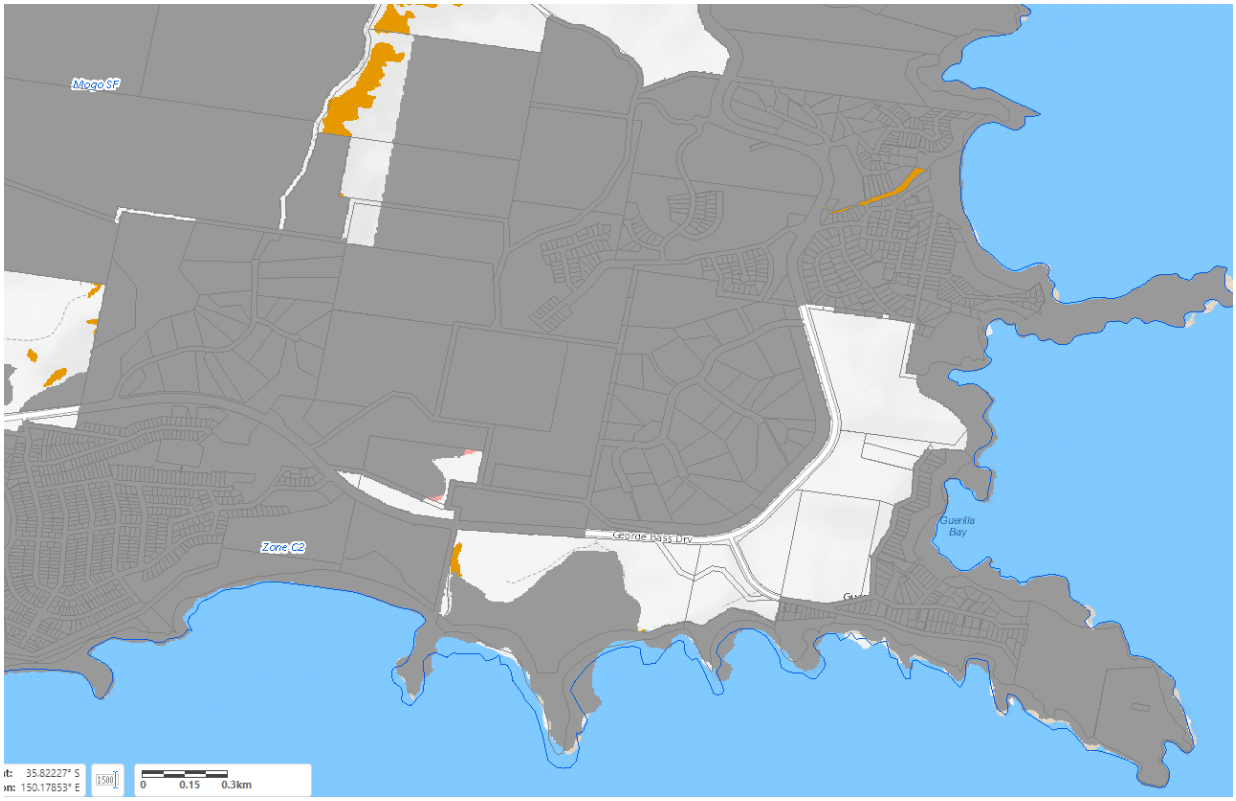
Terminology	Definition
Linear shaped development	Development that is generally narrow in width and extends across the landscape for a distance greater than 3.5 kilometres in length
Local population	The population that occurs in the study area. In cases where multiple populations occur in the study area or a population occupies part of the study area, impacts on each subpopulation must be assessed separately.
Local wetland	Any wetland that is not identified as an important wetland (refer to definition of Important wetland).
NSW (Mitchell) landscape	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.
Multiple fragmentation impact development	Developments such as wind farms and coal seam gas extraction that require multiple extraction points (wells) or turbines and a network of associated development including roads, tracks, gathering systems/flow lines, transmission lines
Operational Manual	The Operational Manual published from time to time by DPIE, which is a guide to assist assessors when using the BAM
Patch size	An area of intact native vegetation that: a) occurs on the Subject Land or biodiversity stewardship site, and b) includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤30 m for non-woody ecosystems). Patch size may extend onto adjoining land that is not part of the Subject Land or stewardship site..
Proponent	A person who intends to apply for consent to carry out development or for approval for an activity.
Reference sites	The relatively unmodified sites that are assessed to obtain local benchmark information when benchmarks in the Vegetation Benchmarks Database are too broad or otherwise incorrect for the PCT and/or local situation. Benchmarks can also be obtained from published sources.
Regeneration	The proportion of over-storey species characteristic of the PCT that are naturally regenerating and have a diameter at breast height <5 cm within a vegetation zone.
Residual impact	An impact on biodiversity values after all reasonable measures have been taken to avoid, minimise or mitigate the impacts of development. Under the BAM, an offset requirement is determined for the remaining impacts on biodiversity values.
Retirement of credits	The purchase and retirement of biodiversity credits from an already-established biobank site or a biodiversity stewardship site secured by a biodiversity stewardship agreement.
Riparian buffer	Riparian buffers applied to water bodies in accordance with the BAM
Sensitive biodiversity values land map	Development within an area identified on the map requires assessment using the BAM.
Site attributes	The matters assessed to determine vegetation integrity. They include: native plant species richness, native over-storey cover, native mid-storey cover, native ground cover (grasses), native ground cover (shrubs), native ground cover (other), exotic plant cover (as a percentage of total ground and mid-storey cover), number of trees with hollows, proportion of over-storey species occurring as regeneration, and total length of fallen logs.
Site-based development	a development other than a linear shaped development, or a multiple fragmentation impact development
Species credits	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Biodiversity Data Collection.

Terminology	Definition
Subject land	Is land to which the BAM is applied in Stage 1 to assess the biodiversity values of the land. It includes land that may be a Subject Land, clearing site, proposed for biodiversity certification or land that is proposed for a biodiversity stewardship agreement.
Threatened Biodiversity Data Collection	Part of the BioNet database, published by DPIE and accessible from the BioNet website.
Threatened species	Critically Endangered, Endangered or Vulnerable threatened species as defined by Schedule 1 of the BC Act, or any additional threatened species listed under Part 13 of the EPBC Act as Critically Endangered, Endangered or Vulnerable.
Vegetation Benchmarks Database	A database of benchmarks for vegetation classes and some PCTs. The Vegetation Benchmarks Database is published by OEH and is part of the BioNet Vegetation Classification.
Vegetation zone	A relatively homogenous area of native vegetation on a Subject Land, land to be biodiversity certified or a biodiversity stewardship site that is the same PCT and broad condition state.
Wetland	An area of land that is wet by surface water or ground water, or both, for long enough periods that the plants and animals in it are adapted to, and depend on, moist conditions for at least part of their life cycle. Wetlands may exhibit wet and dry phases and may be wet permanently, cyclically or intermittently with fresh, brackish or saline water
Woody native vegetation	Native vegetation that contains an over-storey and/or mid-storey that predominantly consists of trees and/or shrubs

Appendix B LLS Category 1 Land

In accordance with the SEARs Category Mapping was determined for the Subject Land. Email correspondence was sent to data.broker@environment.nsw.gov.au (dated 1st Feb 2024). Will Dorrington replied 2nd Feb 2024 with a link to the SEED portal.

Native Vegetation Regulatory Mapping was downloaded from SEED was overlayed on the Subject Land. Grey areas depict land excluded from the LLS Act. The Subject Land was not considered to be Category 1 Land.



Appendix C Vegetation Floristic Plot Data

See attached Excel Spreadsheet

Appendix D Bat Analysis

See attached

Appendix E Staff CVs

Dr Cheryl O' Dwyer **PRINCIPAL ECOLOGIST**

Cheryl joined ELA in Feb 2018 and brings with her over 35 years professional experience as an Ecologist, Lecturer, and manager working across Victoria, Northern Territory and the top end of Western Australia. Cheryl has worked with a variety of Government and Non-Government agencies developing conservation programs and threatened species management plans, including those for threatened insects (*Synemon plana*, Golden Sun Moth; *Paralucia pyrodiscus lucida* Eltham Copper Butterfly and *Hesperilla flavescens* Altona Skipper Butterfly).

She has also worked alongside Indigenous rangers on Country incorporating traditional ecological knowledge to deliver environmental outcomes. Cheryl has also been a University lecturer / researcher for 10 years delivering Degree programs in Ecology including Conservation and wildlife management, Sustainable catchment management and Biology. She has been the principal researcher on many projects and has published research findings in scientific journals. She has well developed skills in the areas of environmental management, impact assessments, plant identification, restoration management and weed control techniques. Cheryl has experience in the design, planning and execution of flora and fauna surveys, she has developed and managed numerous field projects, has experience in collecting and analysing data and is skilled in the instruction and management of staff and volunteers in environmental programs.

Cheryl is an Accredited NSW BAM Assessor and has experience in executing flora and fauna surveys using this methodology and the implementation of the Biodiversity Offset scheme (BOS).

QUALIFICATIONS

- Ph.D Botany/Zoology, University of Melbourne 2010. Insect ecology in fragmented Grey Box Grassy Woodlands in North Central Victoria
- Master of Science, University of Melbourne. Restoration of a native grassland inhabited by *Synemon plana* (Lepidoptera)
- Bachelor of Science, Major in Botany and Zoology, University of Melbourne
- Certificate IV Workplace Training and Assessment (TAE40110 + LLN Upgrade)
- Certificate IV Conservation and Land Management
- BEN301 Environmental Assessment
- Certificate IV Occupational Health and Safety BSB41407
- Certificate II Medical Service First Response HLT21015
- Certificate III Basic Health Care
- NSW Accredited BAM Assessor

PROJECT EXPERIENCE

State Significant Development and State Significate Infrastructure

- Biodiversity Development Assessment Report (BDAR) Burrendong Wind Farm (In prep)
- Biodiversity Development Assessment Report (BDAR) Stubbo 2 Solar Farm (In prep)
- Biodiversity Development Assessment Report (BDAR) SaddleTop Wind Farm (In prep)
- Biodiversity Assessment Reports (BAS) Santos pipeline Narrabri (in prep)

- Biodiversity Stewardship Site Assessment Report (BSSAR) Glen Maye (CWP Renewables 2022)
- Biodiversity Stewardship Site Assessment Report (BSSAR) Gilgal (Yancoal, 2022)
- Undertaking threatened flora and fauna surveys across a range of species for Biodiversity Assessment Reports (2018-2024) including use of trapping equipment, sweep nets, cameras and point surveys.
- Crudine Ridge Wind Farm Bird and Bat utilisation surveys (2021)
- Epuron Windfarm Environmental Impact Statement (2021)
- Epuron Windfarm Biodiversity and habitat assessments (2020)
- Crudine Ridge Wind Farm Habitat assessments (Zenviron 2020)
- Crudine Ridge Wind Farm Biodiversity Development Assessment Report (BDAR) Aarons Pass Road (CWP Renewables 2019)
- Moolarben Coal Mine Biodiversity Development Assessment Report (BDAR) Modification (Yancoal 2018)
- Ungula Wind Farm (CWP Renewables 2018)

Monitoring Programs

- Wilpinjong Coal Mine, Flora and Fauna monitoring (Peabody 2023)
- MCO Flora and fauna monitoring (Yancoal 2023)
- Ulan Coal Mine Subsidence monitoring (Glencore 2023)
- Narrabri Coal Mine Flora and fauna monitoring (Whitehaven Coal 2023)

Management Plans

- Glen Maye Weed Management Plan (CWP Renewables 2020)
- Wilpingjong Coal Mine Weed Management Plan for BOA's (Peabody 2020)
- Crudine Ridge Wind Farm Biodiversity Management Plan (CWP Renewables 2018)
- Flying Fox Management Plan (Bathurst City Council 2018)

Environmental Impact Assessments

- Rosedale Biodiversity Assessment Report (2023)
- Mulwala EIA (2022)
- Dappo Road Subdivision (Narromine Shire Council 2020)
- Dappo Road Subdivision (Trimbrebongie House 2020)
- Wollar Road Upgrade (Mid-Western Regional Council 2019)
- Moorlarben Coal Mine Flora and Fauna assessments at OC4 (Yancoal 2019)
- Inverell subdivision BDAR (Bunnings Group Ltd 2018)

Initial Constraints / Due Diligence Assessments

- Brooklyn Fields Estate (2022)
- Crudine Ridge Wind Farm Targeted surveys (CWP Renewables 2020)
- Moolarben Coal Mine Targeted surveys (Yancoal 2019)
- Bunnings Group Ltd 2019 Inverell
- Urban subdivision (Bathurst Regional Council 2019)

- Hill End Rd Subdivision – (Petrovski 2018)

Flora and Fauna Assessments

- Surveys for *Leucochrysum albicans* for Mid Western Regional Council (2023)
- Narromine Aerodrome Flora and Fauna Assessment (2022)
- Crudine Ridge Wind Farm Monitoring of threatened species (CWP Renewables 2020)
- Flirtation Hill (Mid Western Regional Council 2019)
- Hargraves (Rural Fire Services 2019)
- Uungula Wind Farm (CWP Renewables 2019)

ADDITIONAL PROJECTS

- Fauna Surveys to assess for PFAS, Darwin NT
- Ghost net monitoring program. Dhimurru and Yirralka Rangers, East Arnhem Land NT
- Gove Crow Butterfly Monitoring and management plan. Dhimurru Rangers, East Arnhem Land NT
- Biodiversity survey at Lake Evella, Gapuwiyak Homeland School, East Arnhem Land, NT
- Buffalo and feral pig surveying, Yirralka Rangers, East Arnhem Land, NT.
- Weed management and monitoring, Dhimurru and Yirralka Rangers, East Arnhem Land, NT
- Flora and Fauna surveys Rio Tinto Mining Lease, Dhimurru Rangers, East Arnhem Land, NT
- Fauna surveys in the Kimberley. Cane Toad Management Team Department of Environment.
- **Golden Sun Moth**, monitoring and mapping. Biosis Consultancy Vic
- Grazing and weed control trial Ulupna Island, Barmah State Park, Parks Vic.
- Distribution of feral olives, Dookie Campus University of Melbourne
- Restoration of a native grassland for ***Synemon plana***. Victoria's Open Range Zoo.
- Golden Sun Moth Recovery Team, DSE, Vic

PEER REVIEWED PUBLICATIONS

Ayre, M.L., Yunupingu, D., Wearne, J., **O'Dwyer,C**., Vernes, T., and Marika, M. (2021). Accounting for Yolgnu ranger work in the Dhimurru Indigenous Protected Area, Australia. Ecology and Society, Vol 26 (1). 24-42

Hamilton, S., Minotti, T., **O'Dwyer, C** and Brodie, G. (2011). A case study of feral olive (*Olea europaea*) dispersal in northern Victoria. 1. Plant age and growth habit characteristics. Plant protection quarterly, Vol 26 (1). 17-21

Gilmore, D. Koehler, S. **O'Dwyer C**. and Moore, W. (2008). Golden Sun Moth, *Synemon plana*, (Lepidoptera: Castniidae): results of a broad survey around Melbourne. Victorian Naturalist, 125 (2) 39-46

Hamilton, S.D., Brodie, G., and **O'Dwyer, C**. (2005) Allometric relationships for estimating biomass in Grey Box *Eucalyptus microcarpa*. *Australian Forestry*, **68** (4) 267-273.

Hamilton S.D., **O'Dwyer C**., Dettmann P.D. and Curtis A.L. (2004) The habitat quality of private land Box-Ironbark remnant vegetation in southern Australia. *Journal of Sustainable Agriculture,* **25** (1) 19-42.

Hamilton, S.D., Hunter, D., Costello, K., **O'Dwyer, C**., and Jones, S. (2002). Vascular flora and vertebrate fauna of the Dookie Bushland Reserve, Victoria. *Proceedings of the Royal Society of Victoria* **114**(1): 1-20.

O'Dwyer, C., Hamilton, S. and Clarke, G. (2002). *The value of remnants on farms for invertebrate biodiversity: a preliminary study.* In: Rural Land-Use Change. Yes! But will biodiversity be okay (Ed Crosthwaite, J., Farmar-Bowers, Q., and Hollier, C.). Proceedings of a conference at Attwood, Victoria. August 2002. Department of Sustainability and Environment, Melbourne (CD ROM).

O'Dwyer, C. and Attiwill, P.M. (2000). Restoration of a native grassland as habitat for the Golden Sun Moth *Synemon plana* Walker (Lepidoptera; Castniidae;) at Mount Piper, Australia. *Restoration Ecology* 8 (2), 170-174.

Clarke, G.M. and **O'Dwyer, C.** (2000) Genetic variability and population structure of the endangered Golden Sun Moth, *Synemon plana* (Walker). *Biological Conservation* 92. 371-381.

O'Dwyer, C. and Attiwill, P.M. (1999). A comparative study of the habitats of *Synemon plana* Walker (Lepidoptera; Castniidae): Implications for restoration. *Biological Conservation* 89, 131-141.

O'Dwyer, C. (1999). Germination and sowing depth of *Austrodanthonia eriantha*: techniques to maximise restoration efforts. *Victorian Naturalist*, 116 (6) 202-209.

PUBLIC CONSULTANCY REPORTS

Furphy, G. and **O'Dwyer, C**. (2008). Threatened Species Report Golden Sun Moth (*Synemon plana*) in the Goulburn Broken 2007-2008. Internal report for Department of Sustainability and Environment.

O'Dwyer, C. (2008). Surveys of grasslands and grassy woodlands within the Goulburn Broken Catchment for the endangered Golden Sun Moth, *Synemon plana.* A draft summary report prepared for the Goulburn Broken Catchment Management Authority. University of Melbourne, Dookie Campus.

O'Dwyer, C. (2006). Surveys throughout Victoria's northern plains grasslands for the Endangered Golden Sun Moth, *Synemon plana* and the endangered Pale Sun Moth, *Synemon selene*. A report prepared for Trust for Nature.

O'Dwyer, C. (2005). Surveying the population of the Golden Sun Moth (*Synemon plana* Walker; Lepidoptera) at Mount Piper, Broadford, Victoria; a protocol. Prepared for Department of Sustainability and Environment.

Hamilton, S. and **O'Dwyer, C.** (2004) Interim report to Parks Victoria. Barmah State Park. Ulupna Island grazing and weed control trial and Machonicies Ridge grazing trial. A report prepared for Parks Victoria. Dookie Campus, University of Melbourne.

Hamilton, S. and **O'Dwyer, C**. (2002). Monitoring the impacts of cattle grazing in the Barmah State Park: A proposed methodology. A report prepared for Parks Victoria. Dookie College, University of Melbourne.

Clarke Geoff. M. and **O'Dwyer Cheryl**. (1999). Further survey in southeastern New South Wales for the Endangered Golden Sun Moth, *Synemon plana.* A report prepared for the Threatened Species Unit, NSW National Parks and Wildlife Service, southern zone. CSIRO, Canberra.

Clarke Geoff.M. and **O'Dwyer Cheryl**. (1998). Genetic analysis of populations of the endangered Golden Sun Moth, *Synemon plana*. A report prepared for the Threatened Species Unit, NSW National Parks and Wildlife Service, southern zone, and the Wildlife Research and Monitoring Unit, Environment ACT. Entomology, CSIRO, Canberra.

CONFERENCE PROCEEDINGS

O'Dwyer, C. (2009). Insect Assemblages in Grey Box Grassy Woodlands. Darwin 200 Evolution and Biodiversity 9th Invertebrate biodiversity and conservation conference. Darwin 25-28th September 2009. ***Award for best spoken paper***.

O'Dwyer, C. (2008). Does habitat quality reflect insect diversity? ESA conference, Interactions in science, interactions in nature. Sydney University 1-5th Dec 2008.

O'Dwyer, C. (2007). Management of the grassy woodland for the Golden Sun Moth *Synemon plana* Walker (Lepidoptera: Castniidae) at Mount Piper Nature Conservation Reserve, Broadford, Victoria. Invertebrates Biodiversity Conference, Brisbane University Dec 4th 2007.

Ryan Smithers

Principal Ecologist

Ryan brings to ELA 30 years experience in ecology and natural resource management. He has extensive practical experience in flora and fauna surveying, firefighting, planning and land management throughout southern NSW and has undertaken hundreds of flora and fauna surveys, biodiversity plans, environmental impact assessments, vegetation management plans, fire management plans and weed management plans.

Ryan has extensive experience in general and targeted fauna surveys using a diverse range of survey techniques. Ryan is based in the Eurobodalla (Narooma) and has undertaken many flora and fauna surveys on the NSW south coast, southern tablelands and in the Australian Alps, and in other parts of Australia including in the Northern Territory.

Ryan is an accredited BAM Assessor and has undertaken numerous surveys using OEH Vegetation Survey Standard or very similar methodologies. Ryan project managed ELAs contributions to the Full-floristic Vegetation Survey and Condition Assessment for the South-east Highlands and Australian Alps of the Upper Murrumbidgee Catchment and South-east Corner Biometric Benchmark projects which involved the collection of more than 250 plots.

QUALIFICATIONS

- BEnvSc (Land Resources Management), University of Wollongong with1st Class Honours.
- Accredited Biodiversity Assessment Method (BAM) Assessor
- Alpine Ecology Course Australian Alpine Institute and La Trobe University
- NSW RFS Bush Firefighter and Village Firefighter.

PROJECT EXPERIENCE

Hundreds of flora and fauna surveys and assessments in southeast NSW

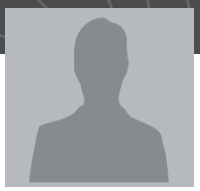
Specific experience includes:

- Mirador Estate Ecological Assessment
- Merimbula STP Upgrade Terrestrial Ecological Assessment
- Broulee and South Moruya Biocertification Project
- North Moruya Biodiversity Study
- Eurobodalla Vegetation Mapping Validation
- Eurobodalla Biodiversity Study for future Urban Expansion Lands
- Far South Coast Biometric Benchmarks
- Cobowra LALC Lands Biobanking Assessment

- Jervis Bay Biodiversity Assessment
- Lake Wallace Flora and Fauna Assessment for Cooma Monaro Shire at Nimmitabel
- South-east Highlands and Australian Alps of the Upper Murrumbidgee Catchment Full Floristic Survey and Condition Assessment
- Guthega Quad Chair Flora and Fauna Assessment
- Numerous Impact Assessments in alpine and sub-alpine environments for OEH, Perisher Blue, Kosciuszko-Thredbo and Charlotte Pass Ski Resorts
- Boco Rock Wind Farm Ecological Assessment and Offsets Analysis
- Queanbeyan Biodiversity Study
- Mount Jerrabomberra Ecological Assessment
- Upper Lachlan Shire Biodiversity Planning Framework
- Parkes, Cabonne, Bland, Upper Lachlan and Temora Shires Biodiversity Assessment and NRM Projects
- Old Comma Road deviation Species Impact Statement
- Flora and Fauna Assessment Edwin Lane Parkway Extension
- Ecological Studies – Proposed Googong township
- Jumping Creek Threatened Biodiversity Report
- Ecological Assessment & VMP Stringybark Reserve Queanbeyan
- Tarrawonga Biobanking Assessment – Boggabri
- Katherine to Gove Pipeline – Mitchell Ranges fauna surveys
- Darwin regional flora and fauna survey RAAF Darwin, defence establishment Berrimah and Shoal Bay receiving station.

RELEVANT LAND AND ENVIRONMENT COURT EXPERIENCE

- Mossy Point Investments Pty Ltd v Eurobodalla Shire Council LEC Case No. 2024/00183498
- EPA Investigation of harvesting planning and operations at Mogo State Forest (2018)
- NSW Office of Environment and Heritage v Forestry Corporation of NSW – Compartments 2021 Badja State Forest. No. 160286 of 2016
- NSW Office of Environment and Heritage v Forestry Corporation of NSW – Compartments 2330 and 2335 Glenbog State Forest. No. 160286 of 2016
- Allan James Hanson v Eurobodalla Shire Council LEC Proceedings No. 11180,11181,11182,11183 of 2011
- Kim Elzerman v Eurobodalla Shire Council LEC Proceedings No. 10284 of 2010



David Coombes **SENIOR ECOLOGIST**

David has 15 years of experience in ecological survey, assessment and natural resource management. As a consultant, this has included a range of flora and fauna assessments, biodiversity and threatened species projects for commonwealth, state, local government and private sector clients. Duties have included supervision and training of staff, field survey, GIS mapping and analysis, research, impact assessment and mitigation, preparation of various assessment reports and management plans. David has held various positions with NSW National Parks and Wildlife Service including Project Officer, Threatened Species Planning Officer and Technical/GIS Officer. In these positions, David was responsible for natural heritage issues including threatened species survey, environmental assessment, protected area management and resource mapping. During his time at NSW State Forests (Research Division), David investigated large forest owl ecology and response to habitat disturbance for over three years and coordinated field work including surveys, trapping and radio-tracking. David has also coordinated environmental education programs for local government focussing on the ecology and management of the urban bushland environment.

QUALIFICATIONS

- Bachelor of Applied Science, Charles Sturt University

PROJECT EXPERIENCE

- Hundreds of flora and fauna surveys and assessments in south east NSW

SPECIFIC EXPERIENCE INCLUDES:

- Threatened Biodiversity Assessments: Heritage, Verons, Nebraska & Jerberra Estates, Shoalhaven Council
- Nowra-Bomaderry Structure Plan flora and fauna studies
- Flora and fauna assessments for residential, rural and industrial subdivisions, Shoalhaven area
- Flora and Fauna Assessments for ecotourism, industrial and sporting facilities, Shoalhaven area
- Old Cooma Road realignment Species Impact Statement & EPBC referral, Queanbeyan Council
- Green and Golden Bell Frog study, Shoalhaven City Council
- Environmental Management Plans, Vincentia, Nowra
- Review of Environmental Factors, Shoalhaven area
- Numerous targeted surveys for 8 threatened orchid species
- Jervis Bay National Park mammal, reptile and frog surveys
- Powerful Owl surveys and assessments, Shoalhaven Council, NPWS, Environment Australia, Sydney Water
- Yellow-bellied Glider surveys, Shoalhaven Council, NPWS
- Nocturnal bird and mammal surveys, south eastern NSW, Forests NSW
- Berowra Valley Bushland Park Threatened Flora and Fauna survey, Hornsby Shire Council
- Pre-clearing fauna surveys and supervision of clearing for major residential centres at Vincentia and Horsley.
- Threatened species and EEC monitoring, Vincentia, Nowra, Worrigee, Horsley

Kylie Lopes **GRADUATE ECOLOGIST**

Kylie graduated with a Bachelor of Science from University of Southern Queensland in 2015 and has experience in environmental assessments, research and monitoring, report writing and field work.

Kylie's fauna experience includes targeted fauna surveys, fauna monitoring and trapping, Koala surveys, fauna handling, rescue and relocation, fauna habitat inspection. She is a trained and accredited member of Wires with experience in wildlife capture, handling and first-aid. Her flora experience includes targeted flora surveys, flora monitoring and plant identification. She has also assisted with habitat assessment and BAM surveys.

Kylie began her employment with Eco Logical Australia in 2021. She has experience within ELA on a variety of Project and assessment types including (but not limited to): Ecological constraints assessments, FFAs, REFs, BDARs, stewardship site assessments, and species-specific expert assessments. She has previous experience in a wide variety of field work and assessment techniques including work within Forestry management, Fire ecology, and Estuarine and coastal Ecology research.

Kylie specialises in nocturnal mammals, particularly with microbats and arboreal mammals. She is currently the coordinator for Bat rescue, relocation and care in the NSW south coast with WIRES.

QUALIFICATIONS

- Bachelor of Science (Biology and Ecology) -2015
- Work Safely in the Construction Industry – White Card – 2021
- Bushfire fighter BF1 (RFS)- 2020
- RRIC Wires accreditation
- Species specific Training; Macropods, reptiles, Raptors, seabird rescue, Avian care, mega and Micro bats. Small mammal and glider care.
- Licenced Snake Handler
- Lyssavirus Vaccinated
- RFS first aid accredited

EXPERIENCE

Selected Project experience

- Preparation of biodiversity assessment and field surveys to support Review of Environmental Factors assessments for the Monaro Highway upgrade near Nimmitabel, for Transport for NSW
- Akolele sewerage upgrade FFA, for NSW Roads and Maritime
- Talbingo Dam Aquatic Assessment, Murray River Cray clearance, for Snowy Hydro
- Euston Sandmine Biodiversity Assessment. Bat and Nocturnal Reptile Surveys
- Culburra West EPBC assessments
- Rosedale Subdivision BDAR

Selected Fauna experience

- Murray River Crayfish clearance and relocation, Talbingo Dam
- *Pseudophryne pengilleyi* (Northern Corroboree frog) Targeted species surveys OEH
- *Litoria Aurea* (green and golden bell frog) monitoring and targeted surveys
- *Carcharhinus leucas* (Bull shark) tag and release monitoring, Gold coast Canals QLD
- Detritus feeder monitoring, Brisbane river QLD
- Biodiversity site assessment, Gold coast hinterland QLD
- Targeted Koala surveys (IFOA), Bodalla State forest
- *Tyto tenebricosa* (Sooty owl) habitat assessment, Currowan state forest
- *Petaurus australis* (Yellow-bellied glider) Targeted species surveys, Bago State Forest
- *Menura novaehollandiae* foraging assessment and fire damage evaluation
- Post fire Owl prey preferences study, South coast Region NSW
- *Petauroides Volans* (Greater Glider) targeted surveys, Murramarang NP
- Clearance work (various) Fauna capture, handling and relocation

Selected Flora experience

- Habitat assessment (Eurobodalla Koala project), Dampier State forest
- *Pterostylis oreophila* and *Thelymitra atronitida* Targeted species surveys
- *Correa baeuerlenii* targeted surveys and habitat assessment, Currowan State forest
- *Genoplesium vernale* targeted surveys, South coast region SF
- *Rhodamnia rubescens* habitat assessments and health/viability assessment, Dampier SF
- Koala habitat assessment (Feed tree identification), Bodalla SF

Appendix F: Biodiversity credit report

See attached

Appendix G: Offset Credit Requirements and Staging

The offset retirement will be implemented using a staged approach, allowing flexibility in credit acquisition and alignment with the timing of impacts across the 13 development stages (Figure G1). This approach ensures offset obligations are progressively met in accordance with development sequencing.

Credit retirement will be undertaken in accordance with the Biodiversity Offsets Scheme (BOS), using either direct like-for-like credit retirement and/or payments into the Biodiversity Conservation Fund (BCF).

Based on the impact areas assessed in this BDAR, a total of 1,373 ecosystem credits are required for the proposed development. Walker Corporation proposes to retire these credits proportionally across the 13 stages. Credit requirements per stage were calculated by multiplying the credits per hectare for each impacted PCT by the area of that PCT within each stage. Results are presented in Tables G1 and G2.

In addition, 105 species credits are required for the Southern Myotis, to offset residual impacts to 2.89 ha of habitat (36.3 credits/ha). Credit requirements per stage were calculated by multiplying 36.3 credits/ha by the total area of habitat within each stage, as shown in Table G3.

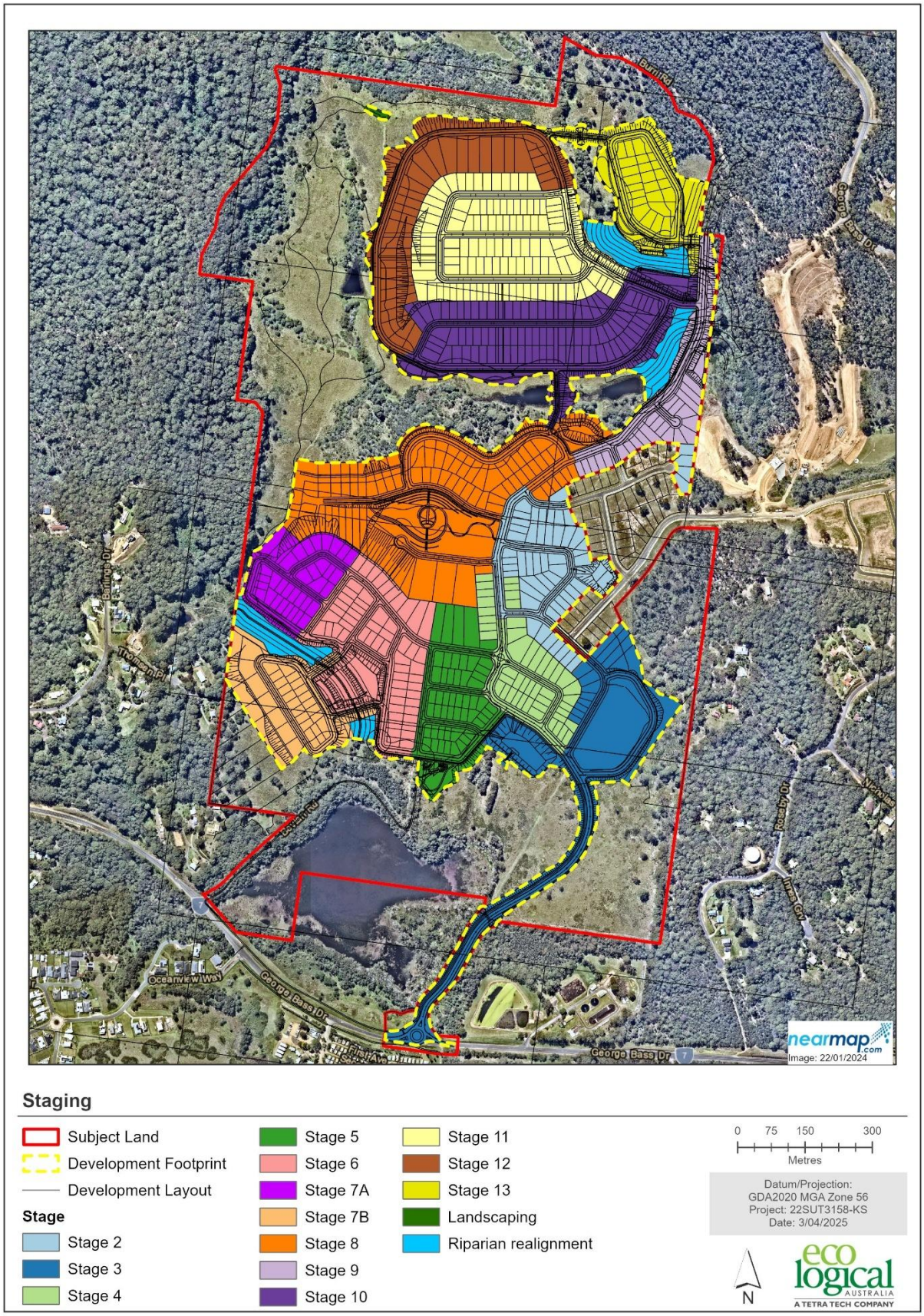


Figure G1: Staging for Rosedale

Table G1: Area of offset ecosystem credits for each stage

PCT	Stage 2 (ha)	Stage 3 (ha)	Stage 4 (ha)	Stage 5 (ha)	Stage 6 (ha)	Stage 7A (ha)	Stage 7B (ha)	Stage 8 (ha)	Stage 9 (ha)	Stage 10 (ha)	Stage 11 (ha)	Stage 12 (ha)	Stage 13 (ha)	Landscape (ha)	Riparian (ha)	Total Area (ha)	Offset ecosystem credits	Credits / ha
3045 Good												0.01				0.01	1	98.07
3274 Exotic								0.62	0.28	0.24	1.10	1.39		0.09		3.72	0	0.00
3274 Good							0.52	0.95		0.03					0.03	1.54	38	24.69
3274 Low					0.52	2.92	1.64	1.37		2.45		2.74			0.32	11.96	0	0.00
3274 Regen					0.05		2.09	1.99							0.49	4.62	75	16.23
3275 Regen			0.01					1.91								1.91	46	24.03
3275 Good	0.74	0.00	0.45	1.31	0.65			0.83	1.56	1.76	0.65	0.32	1.04		0.96	10.26	299	29.13
3275 Low	4.50	3.96	2.11	1.91	0.52	0.14		5.66	1.68	6.39	8.68	3.64	4.45		1.21	44.87	465	10.36
3275 Moderate		0.14	0.27	0.92	4.50		0.01	1.73	0.12	0.12	0.21	0.16			0.01	8.19	146	17.83
4056 Good		0.45		0.02	0.33		0.17								0.19	1.16	43	37.07
4056 Moderate		4.75	1.73	1.34	1.32	0.81	0.52								0.27	10.74	260	24.20
Total	5.24	9.30	4.56	5.50	7.90	3.87	4.97	15.07	3.64	11.00	10.62	8.26	5.49	0.09	3.48	**98.9**	**1373**	

Table G2: Ecosystem Offset Credits for each stage

PCT	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7A	Stage 7B	Stage 8	Stage 9	Stage 10	Stage 11	Stage 12	Stage 13	Landscape	Riparian	Total Area (ha)	Offset ecosystem credits	Credits / ha
3045 Good												1				0.01	1	98.07
3274 Exotic																3.72	0	0.00
3274 Good							13	23		1					1	1.54	38	24.69
3274 Low																11.96	0	0.00
3274 Regen					1		34	32							8	4.62	75	16.23
3275 Regen								46								1.91	46	24.03
3275 Good	21		13	38	19			24	45	51	19	9	30		28	10.26	299	29.13
3275 Low	47	41	22	20	5	1		59	17	66	90	38	46		13	44.87	465	10.36
3275 Moderate		2	5	16	80			31	2	2	4	3				8.19	146	17.83
4056 Good		17		1	12		6								7	1.16	43	37.07
4056 Moderate		115	42	32	32	20	13								7	10.74	260	24.20
Total	**68**	**175**	**82**	**107**	**150**	**21**	**66**	**215**	**65**	**121**	**112**	**51**	**76**	**0**	**63**	**98.9**	**1373**	

Table G3: Southern Myotis Offset Credits for each stage

PCT	Stage 2	Stage 8	Stage 9	Stage 10	Stage 13	Riparian	Total Area (ha)	Offset ecosystem credits	Credits / ha
3274 Exotic			0.01				0.01	1	
3274 Good		0.32		0.02			0.34	11	
3275 Good	0.05	0.13	1.05	0.24	0.26	0.52	2.26	88	
3275 Low	0.06		0.10	0.02		0.01	0.19	3	
3275 Moderate			0.10				0.10	2	
Total Area	0.11	0.45	1.25	0.28	0.26	0.53	2.89		
Total Credits	**4**	**16**	**46**	**10**	**9**	**13**		**105**	**36.3**

Appendix H: BOS Helpdesk

DPE-6638 Southern Myotis Species Polygon

Richard.kind <jira@boshelpdeskdpensw.atlassian.net>
To ODwyer, Cheryl

Reply | Reply All | Forward

Wed 18/12/2024 9:33 AM

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Richard.kind commented:

Hi Cheryl O'Dwyer

Thank you for your enquiry.

The BOS Subject Matter Officer has provided the following response to your enquiry:

'Thank you for your enquiry regarding the application and creation of species polygons for Southern Myotis.

To exclude an area of a PCT located on the subject land, which is associated with Southern myotis (as per the TBDC), and is within 200 meters of waterbodies with pools/ stretches 3m or wider, from the species polygon, you must:

1. identify and map these areas as separate vegetation zone(s) in accordance with BAM Subsection 4.3.1
2. assess Southern Myotis as unlikely to occur in the specific vegetation zone(s) in accordance with BAM Subsection 5.2.3 (Step 3)

A vegetation zone is an area of the same PCT with the same broad condition state. Vegetation zones are mapped in accordance with BAM Subsection 4.3.1.

The assessor must:

- stratify areas of each PCT that are in different broad condition states into separate vegetation zones (e.g. sections of vegetation in good condition should be separated from sections that have been significantly degraded or where strata layers are absent)
- describe each vegetation zone in the BAR to accurately reflect significant and distinct differences in condition
- calculate the area of each vegetation zone in hectares. The assessor enters each vegetation zone into the BAM-C. The BAM-C will assign it a zone number and the relevant PCT number with space for the assessor to type a general description of the zone

A species can be assessed as unlikely to occur in a specific vegetation zone if microhabitats are absent or degraded to the point the species would not use that zone. The assessor must base this assessment on evidence such as published literature. BAM Subsection 5.2.3 (Step 3) outlines options for removing a species credit species from the list auto-generated in the BAM-C. The BAR must include:

(a) a description of microhabitats required by the species, supported by evidence such as published literature
(b) details of the habitat constraints listed in the TBDC for the species (where relevant), and then
(c) details of the field assessment conducted to determine if (a) is absent, or if present, whether (a) and/or (b) are degraded to the point that the species is unlikely to use the subject land (or specific vegetation zones).

To apply Step 3 to a candidate species credit species, evidence to support the absence or degradation of habitat features listed in (a) and (b) above could include reference to the attribute scores for the VI assessment to illustrate if these conform to the habitat constraint or microhabitats on the site, photographic evidence, maps, etc. Describing a vegetation zone as degraded or low/poor condition is not adequate justification to remove a candidate species credit species from the generated list. Evidence must support (a) and (b) above.

A candidate species credit species that does not have suitable habitat as per BAM Subsection 5.2.3, does not require further assessment'.