Biodiversity Development Assessment Report

Streamlined Assessment – Small Area

24A Kingscliff Street, Kingscliff

FINAL REPORT 15th March 2024

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BIODIVERSITY ASSESSMENTS & SOLUTIONS PTY LTD

DOCUMENT CONTROL

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4	15/03/2024	Adam Gosling	AG	FINAL

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Summary

The subject land for which development approval is sought, is located at 24A Kingscliff Street, Kingscliff, NSW 2487 (Lot 1 DP 833926; Lot 5 DP 1016883; Lot 6 DP 1016883; Lot 7 DP 1016883; Lot 8 DP 1016883) and covers a total area of approx. 2.9 ha (Figure 1). The proponent, Uniting Church in Australia Property Trust (NSW), is seeking consent for a proposed Seniors Housing development (Figure 6 and Appendix H).

The proposed development requires the preparation of a Biodiversity Development Assessment Report (BDAR) as it is State Significant Development (SSD) (assessed under Division 4.7 of the Environmental Planning and Assessment Act 1979) that triggers the Biodiversity Offsets Scheme (BOS) area clearing threshold. This report has been prepared in accordance with the Biodiversity Assessment Method (BAM) 2020 to assess the biodiversity impact and offsetting obligation of the proposed development under the *Biodiversity Conservation Act 2016* (BC Act) and *Biodiversity Conservation Regulation 2017* (BC Regulation).

The subject land has already been previously cleared and partially developed (Plate 1), and currently contains an existing aged care facility, church, stormwater basin, and developed residential lots. The proposal seeks approval for development of much of the subject land, zoned primarily R1 – General Residential, with a small area of R2 – Low Density Residential located off Lorien Way. The subject land is surrounded by development for a minimum of 100 m, thus is completely fragmented from areas of available potential habitat elsewhere in the locality.

Vegetation within the subject land is primarily planted landscaped gardens with native and exotic plant species, and managed lawns. The stormwater basin in the south of the subject land, which is a primary focus of this streamlined BDAR, contains several regrowth native trees (e.g., Swamp Oak (*Casuarina glauca*), and groundlayer vegetation generally dominated by exotic grasses (e.g., Setaria (*Setaria sphacelata*)) and forbs (e.g., Singapore Daisy (*Sphagneticola trilobata*)), which includes wetland tolerant species (e.g., Swamp Ricegrass (*Leersia hexandra*) and Common Rush (*Juncus usitatus*)), that fluctuate in spatial extent and composition depending on climatic conditions and vegetation management schedule (i.e., mowing). The subject land contains limited biodiversity values and does not contain any significant habitat.

Within the subject land (2.9 ha), native vegetation surveys identified one (*n* = 1) Plant Community Type (PCT) and three (*n* = 3) vegetation zones;

i. PCT 3989: Far North Paperbark Fern Swamp Forest – cleared (0.83 ha);
ii. PCT 3989: Far North Paperbark Fern Swamp Forest – low condition (0.25 ha); and
iii. PCT 3989: Far North Paperbark Fern Swamp Forest – moderate condition (0.15 ha).

No streams, natural drainage lines or waterbodies occur on the subject land. The southern portion of the subject land is currently a constructed stormwater drainage channel and basin, which facilitates conveyance of stormwater south from the existing aged care facility, connecting to the local stormwater network at the southern boundary.

Targeted threatened flora and fauna species surveys (and desktop assessment of historical BioNet records and Important Habitat Maps) identified one (*n* = 1) species credit threatened species, Wallum Froglet (*Crinia tinnula*), listed under Schedule 1 of the BC Act, as having been recorded on or with the potential to occur on the subject land. The Wallum Froglet was recorded in July 2022, based on an

aural record during surveys in preparation for a previous BDAR by Green Tape Solutions. It was recorded within the southern stormwater basin, during a period of above average rainfall. The species was again targeted for surveys in October and November 2023 in preparation for this BDAR, in accordance with the Department's published survey guidelines, however, was not recorded despite suitable conditions. The subject land is unlikely to be capable of supporting a population of the Wallum Froglet due to its dysconnectivity from other potential habitat areas, lack of suitable vegetation, and regular management and disturbance.

Yet, given potential suitable habitat occurs in the locality, and marginal potential habitat does occur on the subject land, with a previous record attributed to the subject land, application of the precautionary principle indicates this species can be assumed to have the potential to occur. The Wallum Froglet (*Crinia tinnula*) is a species credit species that would be offset for areas on the subject land within 50 m of suitable potential habitat.

The proposed development has been located and designed with consideration of the principals of avoid and minimise, being located on low biodiversity value land with limited ecological constraints. The subject land has been historically cleared and partially developed, with a small area of regrowth vegetation located in the southern portion of the land, within a stormwater drain and basin, which is and has historically been regularly maintained. The surrounding area has also been completely developed with residential dwellings and local roads, with the nearest undeveloped area being > 100 m from the subject land. The proposal is for an infill development, with no direct or indirect ecological impacts likely to occur on adjacent land or in the wider locality.

Areas of vegetation on the subject land are generally landscaped gardens with native and non-native species, and native and exotic grasses associated with managed lawns and open areas. A small area of degraded regrowth vegetation, including native trees, occurs within the southern stormwater drain and basin, an area which is actively managed by slashing. Approx 97.5% of the subject land consists of existing hard surfaces, cleared land or low condition vegetation. The remaining 2.5% is classified as being moderate condition vegetation as assessed in accordance with the BAM.

The project design has incorporated a comparable spatial extent of grass and landscaped gardens as is currently present on the subject land. Given that proposed landscaping would utilise suitable native species in the project design, this would ultimately minimise potential future impacts and ensures no significant net loss in potential urban habitat for common native species that occur in the locality, providing similar stepping stone connectivity as is currently available.

For the purposes of this assessment, in the interest of applying a precautionary approach, and to facilitate the accurate and complete calculation of ecosystem and species credits under the BOS, all impacts (i.e., direct, indirect, and prescribed) have been considered to be direct impacts where future VIS = 0, with credits calculated accordingly. Some areas offset for direct impacts would be returned to similar vegetation currently contained on the subject land, which ultimately minimises potential impacts of the proposal, and existing cleared areas would be revegetated with suitable native species.

A range of mitigation and management measures have been incorporated into the proposal design to limit any potential impacts on the biodiversity values of the locality, during both the construction and operational phase of the proposal. The suite of mitigation measures detailed in Table 24 will further mitigate direct and indirect impacts of the proposal and limit total residual impacts to the subject land.

No SAII species occur on the subject land, nor have any been recorded historically.

Tables 1 and 2, and Figures 14 and 15, summarise the residual impacts of the proposal which require offsetting as calculated by the BAM-C for (i) vegetation communities; and, (ii) flora and fauna species recorded or assumed present on the subject land. They include:

- Impacts on 0.40 ha of PCT 3989 – Far North Paperbark Fern Swamp Forest, generating a credit obligation of 6 ecosystem credits.
- Impacts on 0.71 ha of potential Wallum Froglet (*Crinia tinnula*) habitat. The Wallum Froglet was previously recorded on the subject land, generating 4 species credits.

Matters of National Environmental Significance were assessed in accordance with the EPBC Act, and MNES are not likely to be significantly impacted by the proposed development. As such, a referral of the project to the Commonwealth is not required.

Table 1: Impacts that require an offset – ecosystem credits

Vegetation zone	**PCT**	**TEC/EEC**	**Impact area** (ha)	**No. of ecosystem credits required**
VZ 2 – Low Condition	PCT 3989	Yes	0.25 ha	3
VZ 3 – Moderate Condition	PCT 3989	Yes	0.15 ha	3
			TOTAL	**6**

Table 2: Impacts that require an offset – species credits

Common name	**Scientific name**	**Loss of habitat** (ha) or individuals	**No. of species credits required**
Wallum Froglet	*Crinia tinnula*	0.71 ha	4
		TOTAL	**4**

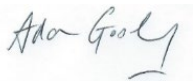
Shortened forms

APZ	asset protection zone
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BC Regulation	Biodiversity Conservation Regulation 2017 (NSW)
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offsets and Agreement Management System
BOS	Biodiversity Offsets Scheme
CEEC	critically endangered ecological community
DBH	diameter at breast height over bark
EC	ecological community listed under the EPBC Act
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EEC	endangered ecological community
HTW	high threat weed
IBRA	Interim Biogeographic Regionalisation for Australia
LLS Act	*Local Land Services Act 2013* (NSW)
MNES	matters of national environmental significance
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
PCT	plant community type
SAII	serious and irreversible impact
SEARs	Secretary's Environmental Assessment Requirements
TBDC	Threatened Biodiversity Data Collection
TEC	threatened ecological community
VEC	vulnerable ecological community
Vegetation SEPP	*State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017* (NSW)

Declarations

I. Certification under clause 6.15 Biodiversity Conservation Act 2016

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).

Signature: 

Date: 15/03/2024

BAM Assessor Accreditation no: BAAS18040

This BDAR has been prepared to meet the requirements of BAM 2020, Appendix C: Streamlined assessment module – Small area. Appendix A provides an assessment of compliance with the minimum information requirements outlined.

II. Details and experience of author/s and contributors

Adam Gosling of Biodiversity Assessments & Solutions is responsible for preparing this BDAR, as well as undertaking all surveys and investigations on which the BDAR relies (unless otherwise stated).

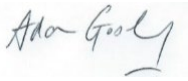
Table 3: Authors and contributors

Name	BAM Assessor Accreditation no.	Position/Role	Tasks performed	Relevant qualifications
Adam Gosling	BAAS18040	Lead Assessor	Fieldwork; BAM-C Analysis; Reporting	BAppSc; Scientific Licence No: 101796; Animal Research Licence 74529; Animal Research Authority (TRIM 16/1621 (2))

III. 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.

Signature: 

Date: 15/03/2024

BAM Assessor Accreditation no: BAAS18040

STAGE 1 – BIODIVERSITY ASSESSMENT

1. Introduction

1.1 Proposed development

1.1.1 Development overview

The Uniting Church in Australia Property Trust (NSW) for Uniting (NSW.ACT), are seeking consent for redevelopment of the Uniting Kingscliff site for the purposes of Seniors Housing. Future development will include seven buildings, providing a range of aged care accommodation and services (Figure 6).

The proposed development requires the preparation of a Biodiversity Development Assessment Report (BDAR) as it is State Significant Development (SSD) (assessed under Division 4.7 of the Environmental Planning and Assessment Act 1979) that triggers the Biodiversity Offsets Scheme (BOS) area clearing threshold. This report has been prepared in accordance with the Biodiversity Assessment Method (BAM) 2020 to assess the biodiversity impact and offsetting obligation of the proposed development under the *Biodiversity Conservation Act 2016* (BC Act) and *Biodiversity Conservation Regulation 2017* (BC Regulation).

This BDAR has been prepared to comply with the *Streamlined assessment module – Small area* module, as described in Appendix C of the BAM 2020.

1.1.2 Location

The development is proposed for an area previously developed and currently operating as an existing Uniting Kingscliff Seniors Housing community, a Uniting church, a stormwater detention basin, and two single storey dual occupancy dwellings (Plate 1 - 4). The development is proposed on the properties identified as 24A Kingscliff Street (Lot 1 DP833926) and 27, 29, 31 and 33 Lorien Way, Kingscliff (Lots 5, 6, 7 and 8, DP 1016883), NSW 2487 (Figure 1). The site is within the Tweed Shire Local Government Area (LGA).

Plate 1: Boundary of subject land (red polygon) surrounded by development.

1.1.3 Proposed development and the subject land

Development consent is sought by the proponent for redevelopment of the Uniting Kingscliff site for the purposes of Seniors Housing (Figure 6 and Appendix H). Key elements of the proposal include:

- A Residential Aged Care (RAC) building comprising 120 residential aged care beds;
- 211 Independent Living Units (ILUs) in a range of 1, 2 and 3-bedroom configurations divided across six (n = 6) buildings;
- A Seniors wellness centre;
- Spacious communal gathering and relaxation areas including landscaped gardens and rooftop spaces;
- Recreational amenities including a pool, seniors' gym, library, cinema, hairdresser, and day spa;
- Medical and allied health consulting rooms to care for residents; and
- Basement car parking.

The development site occurs over an area of approx. 2.9 ha, which represents the entirety of the subject land, and for the purposes of this assessment, the terms are interchangeable as the entirety of the subject land would be developed.

The development site is characterised by an almost entirely cleared landscape dominated by built structures, hard surfaces, native and exotic landscaping, managed lawns, and a stormwater detention basin containing several regrowth native trees and exotic and native grasses. The subject land is currently surrounded by low density and general residential development and associated infrastructure.

Plate 2: The subject land (red polygon) in July 1991 with the landscape being cleared and developed.

1.1.4 Other documentation

This BDAR is to be considered with other documents including:

- Environmental Impact Statement (EIS) prepared by Planit Consulting;
- Statement of Landscape Design Intent, prepared by Urbis Pty Ltd;
- Stormwater Management Plan (SWMP), prepared by Enscape Studio Pty Ltd;
- Stage 1 Preliminary Site Investigation (PSI) for Due Diligence, prepared by ADG Consulting Pty Ltd
- Geotechnical Report, prepared by Pacific Geotech Pty Ltd;
- Acid Sulfate Soil Report, prepared by Pacific Geotech Pty Ltd; and
- Flood Impact Assessment Report, prepared by Venant Solutions Pty Ltd.

Plate 3: The subject land is almost entirely cleared with small pockets of native and exotic regrowth in the southern undeveloped portion.

1.2 Biodiversity Offsets Scheme entry

This BDAR is required as the proposal seeks approval for the clearing of an area of mixed exotic and native vegetation which exceeds the maximum clearing area permitted before the Biodiversity Offsets Scheme (BOS) is triggered.

The development proposal occurs predominantly on land zoned R1 General Residential, with a small area of the proposal located on land zoned R2 Low Density Residential. Both zones on the subject land have a minimum lot size of 450 m^2. Therefore, the corresponding area clearing threshold for land with a minimum lot size of < 1 ha is 2,500 m^2.

The development site does not contain any areas mapped on the Biodiversity Values Map (Figure 7).

1.3 Excluded impacts

There are no excluded impacts associated with the proposal.

1.4 Matters of national environmental significance

The Protected Matters Search Tool was used to assess the area with a 1.5 km buffer applied and a report generated (Appendix G). The entities identified were considered throughout the preparation of this BDAR.

The development site occurs on developed land containing built structures, hard surfaces, native and exotic landscaping, managed lawns, and a stormwater basin with several regrowth native trees and occasional native, but predominantly, exotic grasses, forbs and sedges.

It is unlikely that the proposal would significantly impact on any matters of national environmental significance (MNES) such that it would be deemed a controlled action or need referral to the Department under the EPBC Act.

1.5 Information sources

Resources used or consulted in this assessment include:

- Biodiversity Assessment Method (BAM) 2020;
- Biodiversity Assessment Method Calculator (BAM-C);
- BioNet Vegetation Classification;
- BioNet Threatened Biodiversity Data Collection (TBDC);
- BioNet Atlas;
- BioNet Web Services;
- OEH Data Portal (SEED);
- PlantNET NSW;
- Biodiversity Offsets and Agreement Management System (BOAMS);
- Various scientific literature, field guides and textbooks; and
- Various site and proposal specific reports and surveys (refer Section 1.1.4).

Spatial data used or consulted in the assessment include:

- Cadastre (NSW Department of Finance, Services and Innovation 2023);
- Topography (NSW Department of Finance, Services and Innovation 2023);
- Survey Data for Proposal (APP 2023);
- IBRA Regions and Subregions (OEH 2016);
- NSW (Mitchell) Landscapes - version 3.1 (OEH 2016);
- CRAFTI Upper Northeast Floristics VIS 1108;
- NSW State Vegetation Type Map (DPE 2022);
- Tweed LGA Vegetation 2012. VIS_ID 3912 (TSC 2012);

- State Environmental Planning Policy (Coastal Management) 2018 (DPIE 2018);
- Tweed Shire Council Open Data Hub (TSC 2023);
- Biodiversity Values Mapping (DPE 2023);
- Directory of Important Wetlands in Australia (Australian Government Department of the Environment, Water, Heritage and the Arts 2010);
- Fauna Corridors for Northeast NSW (OEH 2018);
- Acid Sulfate Soils Risk map (OEH 1998);
- NSW Hydrography (Department of Finance, Services and Innovation 2018);
- Historical Imagery 1962 – 1997 (Department of Customer Service Spatial Services); and
- Nearmap Aerial imagery 2010 - 2023.

Plate 4: View of undeveloped southern portion which currently represents a stormwater drain and basin, which connects with the Council stormwater network.

555750

556000

6874750

BEACH ST

KINGSCLIFF ST

KINGSCLIFF LANE

SANDBANK PL

LORIEN WAY

SHOAL PL

CHANNEL PL

SHORE PL

DRIFT CT

SPOONBILL LANE

QUAIL PL

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Figure 1: Site map - 24A Kingscliff Street, Kingscliff

Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)

Contours 0.2m_clipped subject land

RoadCorridor

0 25 50 75 100 m

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Date: 11/12/2023
BDAR - Lot 1 DP 833926; Lot 5-8 DP 1016883
Coordinate System: GDA2020 MGA Zone 56

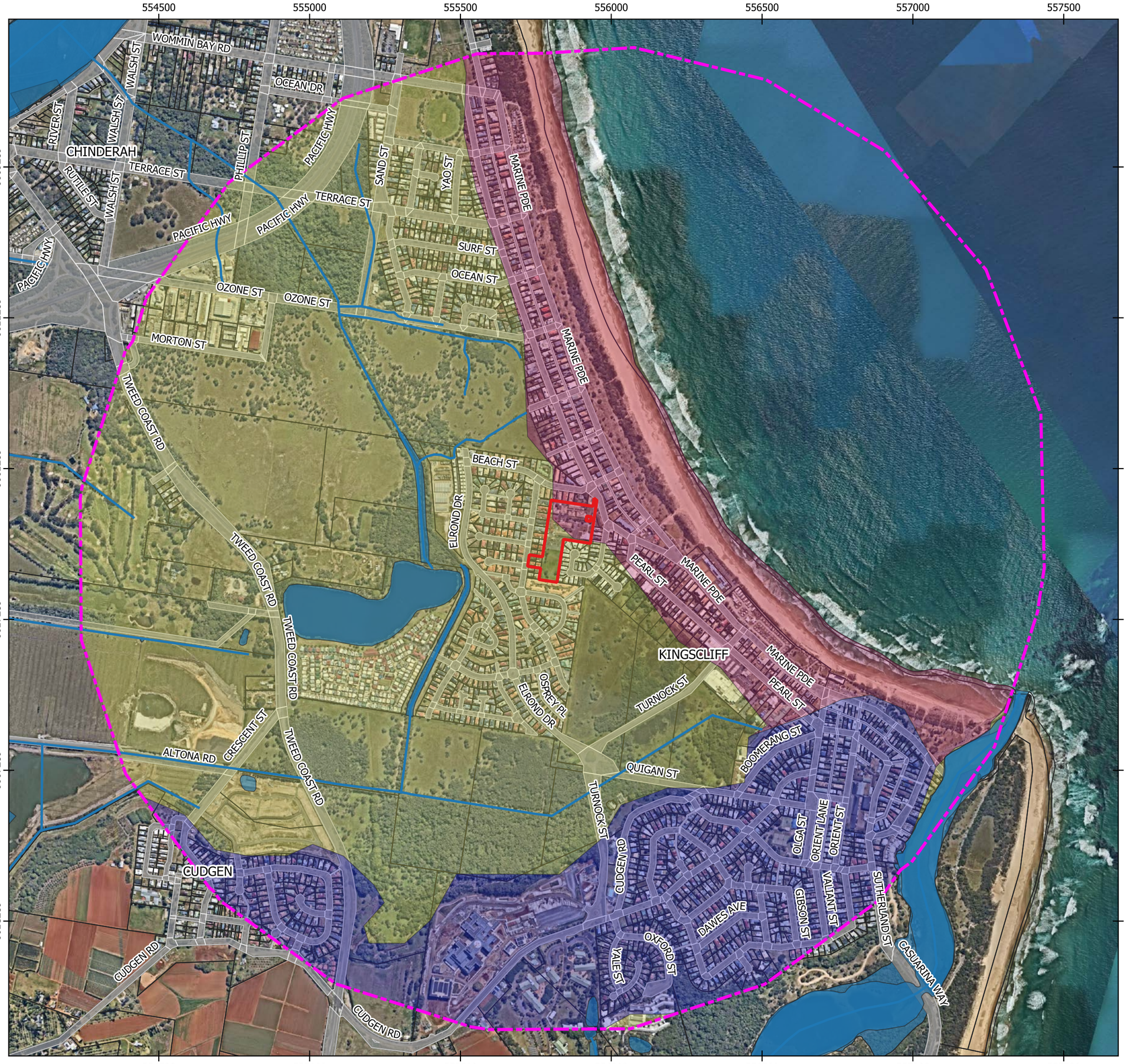

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Figure 2: Location map - IBRA Subregion and Mitchell Landscapes

- 1,500m Assessment Buffer
- Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)
- hydroline
- Water Feature (Rivers, Creeks, Dams, Lakes etc.)
- RoadCorridor

Mitchell Landscapes_clipped 1,500m

- Byron - Tweed Alluvial Plains
- Byron - Tweed Coastal Barriers
- Lamington Volcanic Slopes

SEQ IBRA Subregion

- Burringbar-Conondale Ranges

0 250 500 750 1,000 m

Date: 11/12/2023
BDAR - Lot 1 DP 833926; Lot 5-8 DP 1016883
Coordinate System: GDA2020 MGA Zone 56

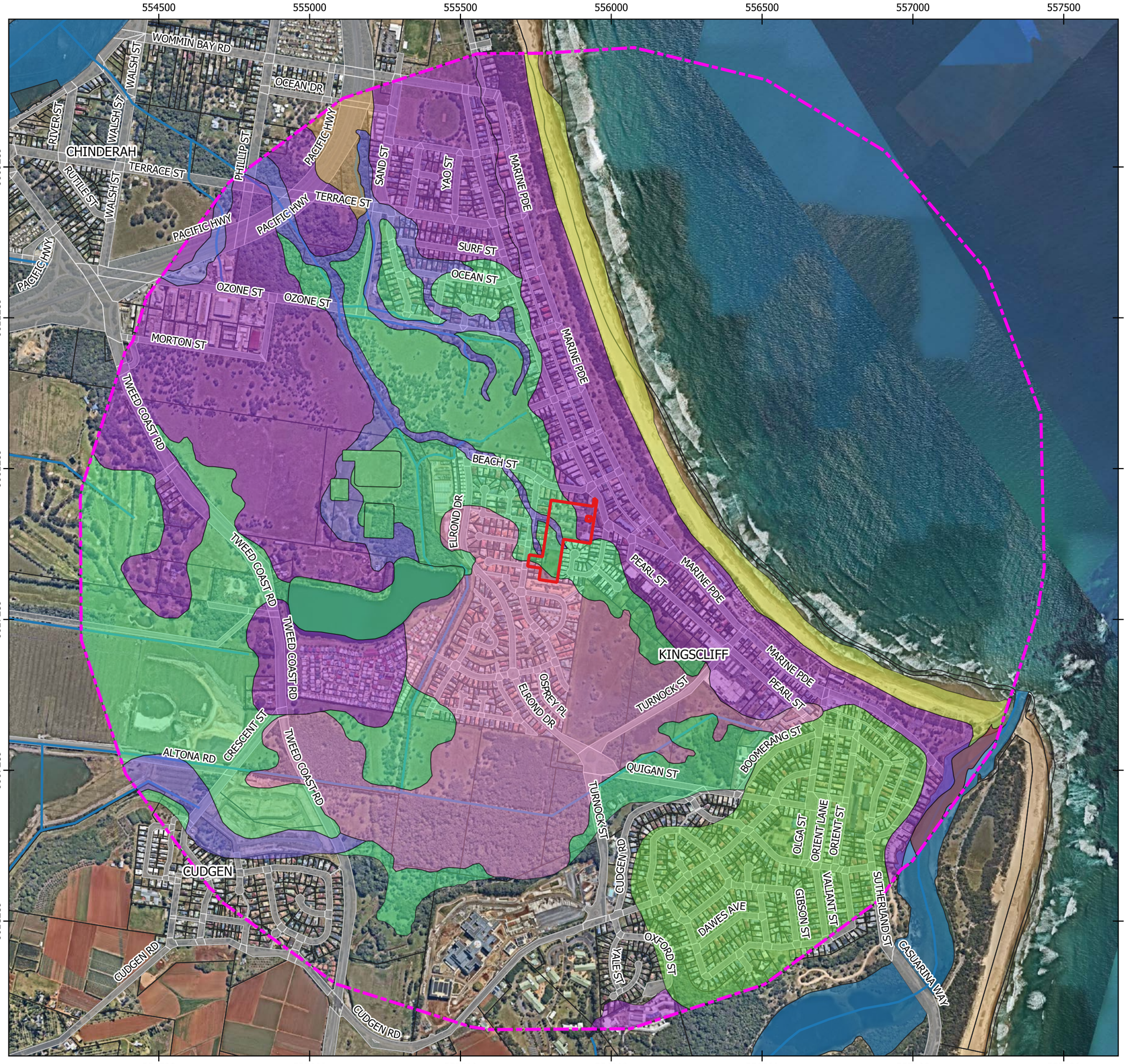

Figure 3: Location map - Geology

- 1,500m Assessment Buffer
- Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)
- hydroline
- Water Feature (Rivers, Creeks, Dams, Lakes etc.)
- RoadCorridor

Cenozoic Sedimentary Province_Rock Units - colours

- Coastal deposits - backbarrier flat facies
- Coastal deposits - beach facies
- Coastal deposits - bedrock-mantling dune facies
- Coastal deposits - dune facies
- Coastal deposits - lagoon facies
- Estuarine channel deposits (subaqueous)
- Estuarine in-channel bar and beach deposits
- Estuarine palaeochannel fill
- Estuarine tidal-delta flat

SEQ IBRA Subregion

- Burringbar-Conondale Ranges

0 250 500 750 1,000 m

Date: 11/12/2023
BDAR - Lot 1 DP 833926; Lot 5-8 DP 1016883
Coordinate System: GDA2020 MGA Zone 56

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Figure 4: Location map - acid sulfate soil risk and steep land

1,500m Assessment Buffer
Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)
Hydroline
Water Feature (Rivers, Creeks, Dams, Lakes etc.)
RoadCorridor

AcidSulfateSoilRisk_clipped 1,500m
Beach
Disturbed Terrain
High probability of occurrence
No known occurrence

0 250 500 750 1,000 m

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Topographic: © Land and Property Information [2023]
Cadastral: © Land and Property Information [2023]
Acid Sulfate Soils: © State Govt. of NSW [2022]

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Coordinate System: GDA2020 MGA Zone 56

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Figure 5: Location map - Strahler stream classification, and stream order setbacks, with native vegetation

- 1,500m Assessment Buffer
- Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)
- RoadCorridor
- Water Feature (Rivers, Creeks, Dams, Lakes etc.)
- Native Vegetation_1,500m_(TSC & PCT combined)

Hydroline_clipped 1,500m
- 1st Order
- 2nd Order
- 3rd Order
- 4th Order
- Stream Order Buffers_clipped 1,500m

Fauna Corridors_NE_NSW
- regional

0 250 500 750 1,000 m

Date: 11/12/2023
BDAR - Lot 1 DP 833926; Lot 5-8 DP 1016883
Coordinate System: GDA2020 MGA Zone 56

555750

556000

6874750

SANDBANK PL

BEACH ST

KINGSCLIFF ST

KINGSCLIFF LANE

LORIEN WAY

SHOAL PL

R3

KINGSCLIFF ST

R2

CHANNEL PL

LORIEN WAY

LORIEN WAY

R1

SHORE PL

DRIFT CT

DRIFT CT

SPOONBILL LANE

QUAIL PL

LORIEN WAY

BLUE JAY CCT

555750

556000

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Figure 6: Development layout and land zoning

Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)

RoadCorridor

EPI Land Zoning_clipped 250m

R1

R2

R3

Development Proposal (Indicative)

Driveway & parking

Existing building

Open space & landscaping

Proposed building

0 25 50 75 100 m

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BDAR - Lot 1 DP 833926; Lot 5-8 DP 1016883
Coordinate System: GDA2020 MGA Zone 56

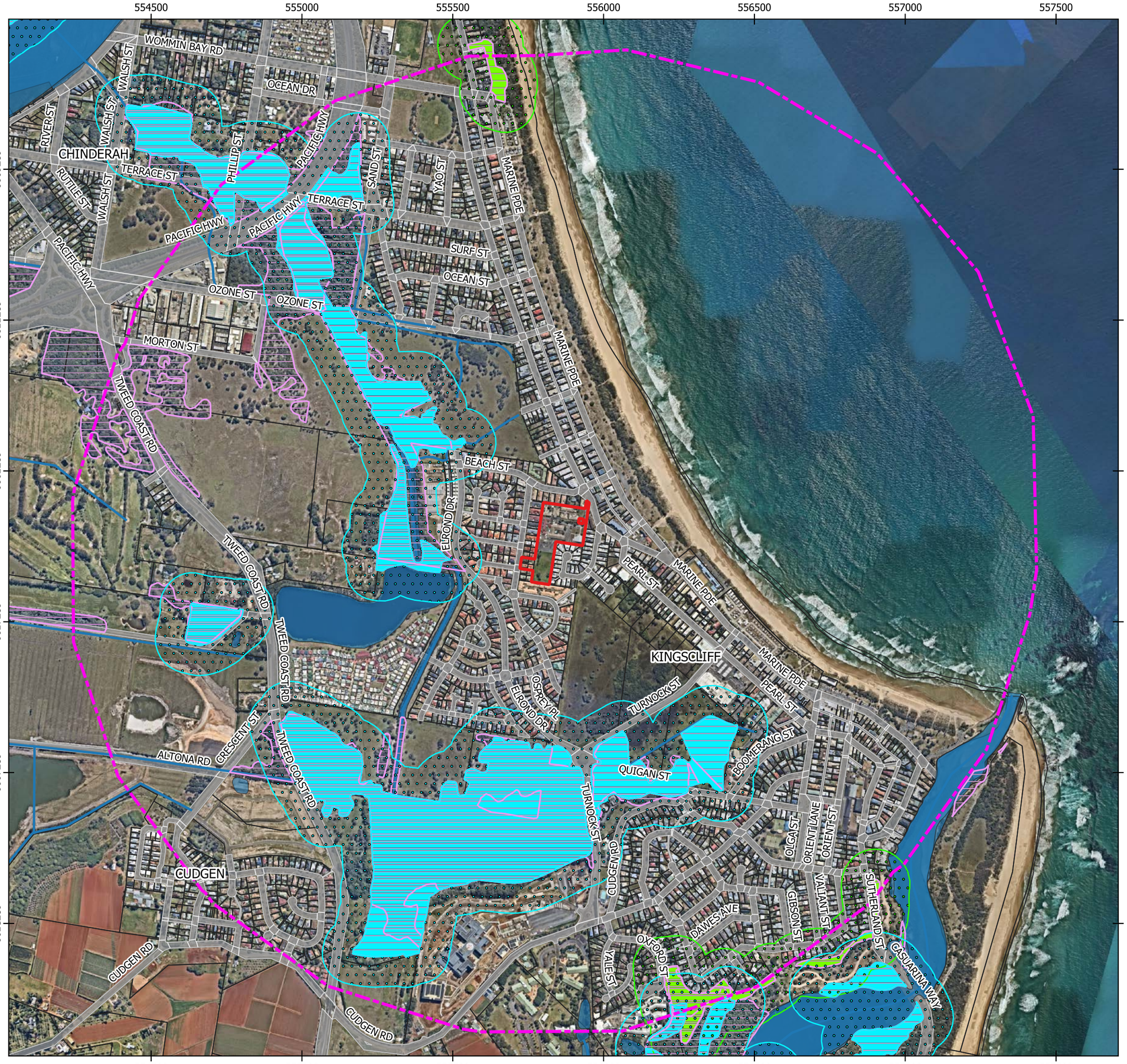

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Figure 7: Biodiversity values map and Coastal Management Act mapping

- 1,500m Assessment Buffer
- Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)
- RoadCorridor
- Hydroline
- Water Feature (Rivers, Creeks, Dams, Lakes etc.)
- Biodiversity Values Map
- Coastal Wetland
- Coastal Wetland Proximity Area
- Littoral Rainforest
- Littoral Rainforest Proximity Area

0 250 500 750 1,000 m

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Coordinate System: GDA2020 MGA Zone 56

2. Methods

2.1 Site context methods

2.1.1 Landscape features

Fieldwork was undertaken on the subject land by the author of this BDAR in October, November, and December 2023. Fieldwork included a combination of site inspections, detailed vegetation community surveys, targeted threatened species surveys, vegetation condition surveys and habitat suitability surveys. Data including landscape features have been collected during these surveys, in combination with GIS desktop spatial analysis.

2.1.2 Native vegetation cover

Native vegetation cover has been calculated using desktop aerial imagery interpretation (Nearmap 2010 – 2023) and field reconnaissance to confirm the extent and condition of native vegetation cover on the subject land and assessment area. Vegetation on the subject land has been assigned to PCTs aligned with the NSW State Vegetation Type Map (DPE 2022), and the BioNet Vegetation Classification database.

2.2 Native vegetation, threatened ecological communities and vegetation integrity methods

2.2.1 Existing information

Vegetation mapping for the subject land includes Tweed LGA Vegetation 2012. VIS_ID 3912 (TSC 2012) and the NSW State Vegetation Type Map (DPE 2022). The BioNet Vegetation Classification database provided additional information with respect to PCTs to be considered for mapping of the subject land. Ultimately, the NSW State Vegetation Type Map was used as the starting position for refinement of PCTs, which were then input into the BAM-C.

2.2.2 Mapping native vegetation extent

Native vegetation on the subject land has been mapped using a combination of high resolution digital aerial photography, site visits, field investigations and vegetation integrity surveys. Vegetation on the subject land has been assigned to PCTs aligned with the NSW State Vegetation Type Map (DPE 2022), and the BioNet Vegetation Classification database.

2.2.3 Plot-based floristic and vegetation integrity surveys

In November 2023, plot-based floristic vegetation surveys based on a 20 m x 20 m plot (i.e., 400 m^2) were undertaken to identify the most likely PCTs on the subject land and to inform the delineation of vegetation condition zones. These plot-based floristic vegetation surveys were also used to support the vegetation integrity survey (VIS) plots in accordance with Section 4.3 of the BAM (Plate 5).

A total of six (n = 6) plot-based vegetation surveys (400 m^2) and three (n = 3) VIS plots (1,000 m^2) were undertaken on the subject land – with all plots undertaken within the development site. A total of three (n = 3) VIS plots were entered into the BAM-C. The plot-based vegetation surveys assisted in the assignment of condition classes to the vegetation community identified on the subject land.

Plate 5: Vegetation integrity plots were undertaken after the area in the south was allowed to regenerate sufficiently for ID purposes.

2.3 Threatened flora survey methods

2.3.1 Review of existing information

A review of BioNet Atlas threatened species records identifies four (*n* = 4) threatened flora species, recorded within 1,500 m of the subject land (Table 4 and Figure 10).

The results from surveys undertaken in July 2022 by an accredited assessor in preparation for an earlier BDAR (Green Tape Solutions, 2022) were also reviewed and survey results utilised as a component of this assessment.

2.3.2 Habitat constraints assessment

Field surveys were undertaken to assess habitat constraints for threatened plant species. Specifically, meandering transects were undertaken on the subject land, where ecological factors that may exclude certain plant species (or make others more likely to occur) were noted. Habitat features and constraints informed the understanding of the potential habitat availability of the subject land, specifically for threatened species with the potential to occur.

2.3.3 Field surveys

Meandering transects and parallel traverses were used to assess threatened flora on the subject land, with surveys focusing on the portion of the subject land identified for development and areas immediately adjacent. VIS and plot-based vegetation surveys also served to search for threatened species. Searches were undertaken and data was collected with GPS tracks recorded and shown in Figure 8.

July 2022 fieldwork (Green Tape Solutions)

The report prepared by Green Tape Solutions (28 October 2022) describes general baseline botanical surveys and threatened species searches being undertaken over three (*n* = 3) days in July 2022, which involved the adoption of the random meander technique to survey the subject land. No threatened flora species were reported from those surveys on the subject land.

October / November / December 2023 fieldwork

Vegetation surveys, including threatened flora surveys and vegetation community assessment were undertaken on the subject land over three (*n* = 3) days (30th October 2023, 6th November & 11th December 2023).

Surveys were undertaken as meandering transects, parallel traverses and plot -based vegetation surveys targeting threatened flora species identified by the BAM-C as candidate species and other threatened flora species with the potential to occur. No threatened flora species were recorded on the subject land.

Plate 6: Threatened flora surveys were undertaken for candidate species identified as having the potential to occur on the subject land, including in areas of landscaping.

2.4 Threatened fauna survey methods

2.4.1 Review of existing information

A review of BioNet Atlas threatened species records identifies thirty (*n* = 30) threatened fauna species listed under Schedule 1 of the BC Act 2016 within 1,500 m of the subject land (Table 4 and Figure 10).

The results from surveys undertaken in July 2022 by an accredited assessor in preparation for an earlier BDAR (Green Tape Solutions (28 October 2022)) were also reviewed and utilised as a component of this assessment.

Table 4: BioNet Atlas threatened species records within 1,500 m of the subject land.

Kingdom	Class	Family	Species	Common Name	NSW Status	CTH Status
Fauna	Amphibia	Hylidae	*Litoria olongburensis*	Olongburra Frog	V,P	V
Fauna	Amphibia	Myobatrachidae	*Crinia tinnula*	Wallum Froglet	V,P	
Fauna	Aves	Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P	
Fauna	Aves	Accipitridae	*Pandion cristatus*	Eastern Osprey	V,P,3	
Fauna	Aves	Anseranatidae	*Anseranas semipalmata*	Magpie Goose	V,P	
Fauna	Aves	Apodidae	*Hirundapus caudacutus*	White-throated Needletail	P	V,C,J,K
Fauna	Aves	Burhinidae	*Burhinus grallarius*	Bush Stone-curlew	E1,P	
Fauna	Aves	Cacatuidae	*Calyptorhynchus lathami lathami*	South-eastern Glossy Black-Cockatoo	V,P,2	V
Fauna	Aves	Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P	
Fauna	Aves	Columbidae	*Ptilinopus magnificus*	Wompoo Fruit-Dove	V,P	
Fauna	Aves	Columbidae	*Ptilinopus regina*	Rose-crowned Fruit-Dove	V,P	
Fauna	Aves	Haematopodidae	*Haematopus fuliginosus*	Sooty Oystercatcher	V,P	
Fauna	Aves	Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher	E1,P	
Fauna	Aves	Laridae	*Sternula albifrons*	Little Tern	E1,P	C,J,K
Fauna	Aves	Petroicidae	*Petroica boodang*	Scarlet Robin	V,P	
Fauna	Aves	Rallidae	*Amaurornis moluccana*	Pale-vented Bush-hen	V,P	
Fauna	Aves	Strigidae	*Ninox strenua*	Powerful Owl	V,P,3	
Fauna	Gastropoda	Camaenidae	*Thersites mitchellae*	Mitchell's Rainforest Snail	E1	CE
Fauna	Mammalia	Dasyuridae	*Planigale maculata*	Common Planigale	V,P	
Fauna	Mammalia	Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P	
Fauna	Mammalia	Miniopteridae	*Miniopterus australis*	Little Bent-winged Bat	V,P	
Fauna	Mammalia	Miniopteridae	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P	
Fauna	Mammalia	Molossidae	*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	V,P	
Fauna	Mammalia	Molossidae	*Ozimops lumsdenae*	Northern Free-tailed Bat	V,P	

Kingdom	Class	Family	Species	Common Name	NSW Status	CTH Status
Fauna	Mammalia	Phascolarctidae	*Phascolarctos cinereus*	Koala	E1,P	E
Fauna	Mammalia	Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V
Fauna	Mammalia	Pteropodidae	*Syconycteris australis*	Common Blossom-bat	V,P	
Fauna	Mammalia	Vespertilionidae	*Myotis macropus*	Southern Myotis	V,P	
Fauna	Reptilia	Cheloniidae	*Caretta caretta*	Loggerhead Turtle	E1,P	E
Fauna	Reptilia	Cheloniidae	*Chelonia mydas*	Green Turtle	V,P	V
Flora	Flora	Fabaceae (Mimosoideae)	*Archidendron hendersonii*	White Lace Flower	V	
Flora	Flora	Lauraceae	*Cryptocarya foetida*	Stinking Cryptocarya	V	V
Flora	Flora	Myrtaceae	*Rhodomyrtus psidioides*	Native Guava	E4A	CE
Flora	Flora	Rutaceae	*Acronychia littoralis*	Scented Acronychia	E1	E

NSW Status: E4A = Critically endangered (BC Act, 2016); V = Vulnerable (BC Act, 2016); E1 = Endangered (BC Act, 2016); P = Protected (NP&W Act 1974); 2 = Category 2 sensitive species (Sensitive Species Data Policy); 3 = Category 3 sensitive species (Sensitive Species Data).

Cth Status: CE = Critically Endangered (Cth EPBC Act 1999); V = Vulnerable (Cth EPBC Act 1999); J = Listed on JAMBA; K = Listed on RoKAMBA; C = Listed on CAMBA.

2.4.2 Habitat constraints assessment

Field surveys were undertaken to assess habitat constraints for threatened fauna species. Specifically, meandering transects were undertaken on the subject land to assess habitat suitability, where ecological factors that may exclude certain animal species (or make others more likely to occur) were noted. Indicators of habitat use were also noted if present (e.g., presence of stick nests, scats, scratch marks). Habitat suitability surveys were undertaken in November 2020 as a component of other targeted and general surveys undertaken in preparation of this report. The observations and information gathered during these surveys, in addition to those from previous surveys and assessments, enabled confidence in the subsequent identification of habitat constraints and microhabitats present for the subject land.

2.4.3 Field surveys

Several field survey methods were adopted to identify or exclude the presence of (or the potential for occurrence of) threatened species generated by the BAM-C with regards to the subject land. GPS tracks were recorded and are shown in Figure 9.

<u>July 2022 fieldwork (Green Tape Solutions)</u>

The report by Green Tape Solutions (28 October 2022) describes fauna habitat values assessment and targeted fauna surveys undertaken over three (n = 3) days in July 2022. Targeted surveys included active ground searches, microbat acoustic survey, spotlighting, and call playback. One threatened species, Wallum Froglet (*Crinia tinnula*) was recorded (aural detection) on the subject land.

October / November 2023 fieldwork

Surveys were undertaken during late spring 2023 to assess the subject land for threatened fauna species habitat suitability, and to undertake targeted surveys. Habitat suitability surveys were undertaken as meandering transects to identify habitat features that might support threatened species occurring on the subject land, as well as any habitat constraints which may preclude the potential for certain threatened species occurring.

Targeted surveys were undertaken during October and November 2023 including active habitat searches, aural and visual surveys, call playback and spotlighting. Groups of species targeted included amphibians, reptiles, gastropods, nocturnal bird species and nocturnal mammals. No threatened fauna species were recorded on the subject land.

2.5 Summary of threatened species identified on the subject land

Targeted surveying efforts for threatened flora and fauna (as detailed in sections 2.3 and 2.4, respectively), combined with previous survey results, and available historical records, established the following one (*n* = 1) threatened species potentially associated with the subject land, i.e., Wallum Froglet (*Crinia tinnula*), which was recorded in July 2022 by Green Tape Solutions.

2.6 Weather conditions

Relevant weather details pertaining to the targeted threatened fauna surveys undertaken on the subject land are provided in Table 5. Where relevant, preceding weather conditions have also been documented leading up to the surveys. Analysis of the weather conditions suggests there were no significant weather events that would have precluded identification of threatened fauna or flora associated with the subject land. Some weather events, such as those that included heavy rainfall, were beneficial for detecting classes of targeted fauna such as amphibians.

Table 5: Environmental conditions during threatened fauna species surveys

Date	Survey undertaken (e.g., method / species)	Time (24 hr)	Temp. (°C)	Wind	Rainfall (mm)
30/10/2023	Habitat Suitability (all fauna) Ground Surveys (Reptilia & Gastropoda) Aural & Spotlight Survey, Call Playback (Amphibian, Mammal, Avifauna)	09:30 – 16:30 17:00 – 18:00 18:30 – 20:30	Min. 14.4 Max. 27.0	mod	0.0 mm (18 mm past 7 days)
06/11/2023	Aural & Spotlight Survey, Call Playback (Amphibian, Mammal, Avifauna)	19:00 – 21:30	Min. 16.0 Max. 23.6	mod	55.6 mm (141.8 mm past 7 days)
07/11/2023	Aural & Spotlight Survey, Call Playback (Amphibian, Mammal, Reptile)	19:00 – 21:15	Min. 13.2 Max. 24.5	mod	0.0 mm (141.8 mm past 7 days)

Date	Survey undertaken (e.g., method / species)	Time (24 hr)	Temp. (°C)	Wind	Rainfall (mm)
09/11/2023	Ground Surveys (Reptilia & Gastropoda) Aural & Spotlight Survey, Call Playback (Amphibian, Mammal, Avifauna)	16:30 – 18:30 18:45 – 21:00	Min. 14.2 Max. 25.5	light/mod	17.6 mm (159.5 mm past 7 days)

2.7 Limitations

There were some limitations associated with surveying of biodiversity values of the subject land. For some candidate threatened species, surveys were not possible within the requisite seasonal survey period (e.g., Laced Fritillary). If species were surveyed for and not recorded, yet habitat requirements for that species were present and potentially suitable, then those species were assumed present (i.e., Wallum Froglet).

Any minor limitations associated with surveys were mitigated by the survey effort undertaken relative to the subject land size, to ensure completeness. The subject land was also previously surveyed in July 2022, and extensive surveys have been undertaken in adjacent areas over the previous 10-15 years, for residential expansion in the locality. It is considered that the survey effort, combined with historical surveys, have mitigated limitations sufficiently to ensure that all potential impacts as a result of the development proposal are assessed.

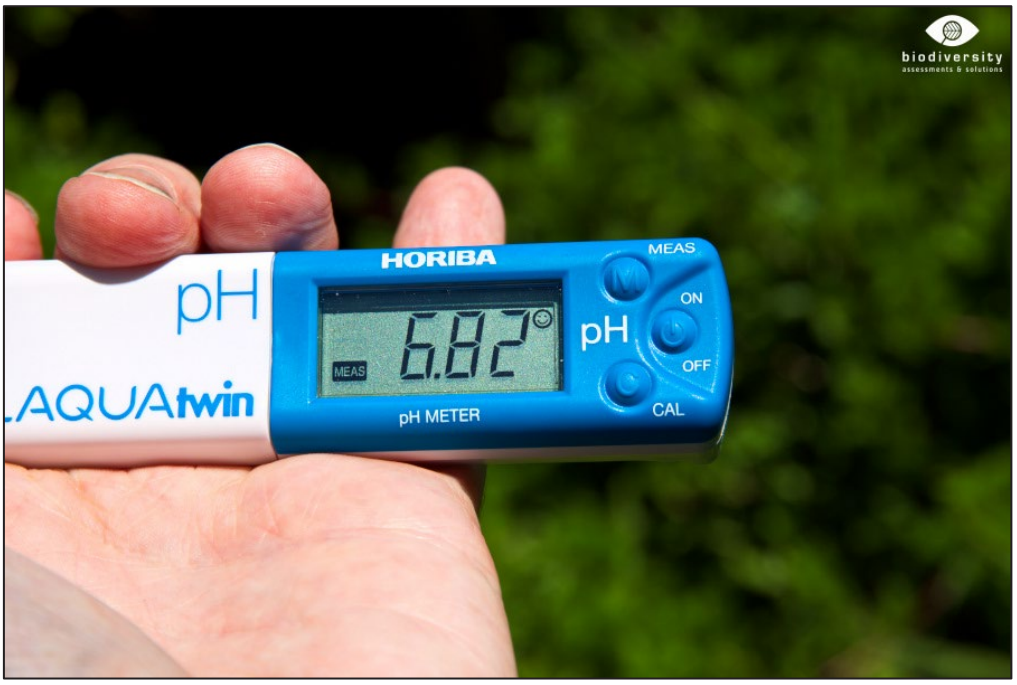

Plate 7: pH readings from within the stormwater drain were taken to support the habitat suitability assessment for acid frogs (sample taken 30/10/2023).

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6874750

BEACH ST

KINGSCLIFF ST

KINGSCLIFF LANE

SANDBANK PL

LORIEN WAY

SHOAL PL

CHANNEL PL

Plot 5

Plot 1

Plot 2

Plot 3

Plot 4

Plot 6

DRIFT CT

SHORE PL

QUAIL PL

BLUE JAY CCT

SPOONBILL LANE

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Figure 8: Field Survey Locations - BAM vegetation plots and flora survey tracks

Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)

RoadCorridor

Threatened flora & BAM survey tracks

11.12.2023

30.10.2023 & 06.11.2023

BAM VIS - 1,000 m2 Plot

BAM VIS - 400 m2 Plot

BAM - Centreline

0 25 50 75 100 m

Date: 11/12/2023
BDAR - Lot 1 DP 833926; Lot 5-8 DP 1016883
Coordinate System: GDA2020 MGA Zone 56

biodiversity assessments & solutions

Figure 9: Field Survey Locations - Fauna survey tracks and survey elements

- Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)
- RoadCorridor

Fauna survey tracks

- Amphibian/spotlight survey track_06.11.2023
- Amphibian/spotlight survey track_07.11.2023
- Amphibian/spotlight survey track_09.11.2023
- Amphibian/spotlight survey track_30.10.2023
- Ground habitat survey track_30.10.2023 & 09.11.2023
- Call Playback

0 25 50 75 100 m

Date: 11/12/2023
BDAR - Lot 1 DP 833926; Lot 5-8 DP 1016883
Coordinate System: GDA2020 MGA Zone 56

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Figure 10: NSW State vegetation type map and BioNet Atlas threatened species records within 1,500m

1,500m Assessment Buffer
Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)
Hydroline
Water Feature (Rivers, Creeks, Dams, Lakes etc.)

Vegetation_PCT NSW clipped_1,500m
Coastal Floodplain Wetlands
Coastal Freshwater Lagoons
Coastal Headland Heaths
Coastal Swamp Forests
Littoral Rainforests
Mangrove Swamps
North Coast Wet Sclerophyll Forests
Subtropical Rainforests
Wallum Sand Heaths

BioNet Atlas_TS Records Tweed_clipped 1500m
Amphibia
Aves
Flora
Gastropoda
Mammalia
Reptilia

FaunaCorridors_NE_NSW
regional

0 250 500 750 1,000 m

Date: 11/12/2023
BDAR - Lot 1 DP 833926; Lot 5-8 DP 1016883
Coordinate System: GDA2020 MGA Zone 56

3. Site context

3.1 Assessment area

The assessment area is approximately 820 ha and includes the subject land and the area of land within the 1,500 m buffer zone surrounding the subject land (Figures 2 - 5).

3.2 Landscape features

Landscape features identified within the subject land and assessment area are shown across Figures 2 - 5. In the following sections (3.2.1 – 3.2.8), relevant landscape features are discussed or justification for their exclusion is provided.

3.2.1 IBRA bioregions and IBRA subregions

The subject land and assessment area are entirely contained within the South Eastern Queensland (SEQ) Interim Biogeographic Regionalisation for Australia (IBRA) bioregion.

The subject land and development site is entirely contained within the Burringbar-Conondale Ranges IBRA subregion (Figure 2 - 5), and has been allocated accordingly in the BAM-C.

3.2.2 Rivers, streams, estuaries, and wetlands

The subject land does not contain any mapped hydrolines, nor does it contain any natural wetland elements. A stormwater drain and detention basin is located in the southern portion of the subject land, which transports stormwater through this area to the south. Depending on climatic conditions, the stormwater basin can contain freshwater wetland tolerant flora species when conditions are suitable. Several mapped streams and water bodies occur within the 1,500 m assessment area (Figure 5).

Plate 8: The locality is largely developed, with limited landscape features in the assessment area.

3.2.3 Habitat connectivity

The Cudgen-Wommin regional fauna habitat corridor is mapped as occurring on the southern portion of the subject land. This coastal corridor is identified as being of importance to the microbat species, Common Blossom Bat (*Syconycteris australis*) and the Northern Long-eared Bat (*Nyctophilus bifax*).

The subject land is completely encompassed by development, including residential dwellings, local roads, and community infrastructure. No areas of natural habitat occur within 100 m of the site, and little connectivity to or from the subject land exists for most threatened species with the potential to occur.

3.2.4 Karst, caves, crevices, cliffs, rocks, or other geological features of significance

There are no karsts, caves, crevices, cliffs, rocks, or other geological features of significance on the subject land or known from within the assessment area.

3.2.5 Areas of outstanding biodiversity value

There are no areas of outstanding biodiversity value as identified under the BC Act within the subject land or assessment area.

3.2.6 NSW (Mitchell) landscape

The subject land falls within the mapped boundaries of two (n = 2) Mitchell Landscapes. The Byron Tweed Coastal Barriers landscape covers the northern portion of the subject land, with the southern portion (in which the stormwater basin occurs), falls within the Byron-Tweed Alluvial Plains landscape. As the stormwater detention basin is entirely within the Byron-Tweed Alluvial Plains Mitchell Landscape, the proposal has been assigned to this landscape for the purposes of the BAM-C.

3.2.7 Additional landscape features identified in the Secretary's Environmental Assessment Requirements

No Secretary's Environmental Assessment Requirements (SEARs) apply for the development.

3.2.8 Soil hazard features

The southern portion of the subject land contains an area mapped as having a 'high probability of occurrence' of acid sulfate soils (ASS) (Figure 4). The remainder of the land, i.e., in the north-east of the subject land, is mapped as having 'no known occurrence'. Management of ASS in accordance with best management practices during the construction stage would be required.

The land does not contain any areas mapped as 'steep or vulnerable land' (i.e., with a slope > 18 degrees), nor does it contain any other known soil hazard features.

3.3 Native vegetation cover

Native vegetation cover was determined in accordance with Section 3.2 of the BAM, with the results provided below in Table 6. Native vegetation cover was calculated utilising available mapping including the NSW State Vegetation Type Map (DPE 2022) and the Tweed Vegetation 2012 VIS_ID 3912 (TSC 2012) datasets.

Table 6: Native vegetation cover in the assessment area

Characteristic	Value in the assessment area
Assessment area (ha)	822 ha
Total area of native vegetation cover (ha)	172 ha
Percentage of native vegetation cover (%)	20.9%
Class (0-10, >10-30, >30-70 or >70%)	>10-30

Plate 9: The locality is largely developed, with small and managed areas of habitat located to the south and south-east of the subject land.

4. Native vegetation, threatened ecological communities and vegetation integrity

4.1 Native vegetation extent

Native vegetation has been mapped on the subject land in accordance with Section 4.1 of BAM 2020 and following floristic vegetation surveys in accordance with Section 4.2 of BAM 2020 (Figure 11).

4.1.1 Changes to the mapped native vegetation extent

Native vegetation has been mapped using recent high resolution aerial imagery along with imagery from the previous decade and LIDAR contours. There is no discernible difference between the actual vegetation on the ground and that shown on the aerial imagery used in the figures within this report.

4.1.2 Areas that are not native vegetation

A large majority of the area on the subject land (approx. 87%), is completely absent of native vegetation or overwhelmingly dominated by exotic pasture grasses and / or exotic shrubs and / or trees. These areas include obvious developed hard surface such as internal roads, carparking and facility buildings, as well as managed lawns and landscape gardens. Vegetation that is not considered to be representative of native vegetation have been classified as cleared on report figures, or identified as landscape gardens (e.g., Figure 11). These areas contain little to no discernible native vegetation and includes areas calculated or assessed as having a VIS < 5.

Areas of vegetation on the subject land with some representative native species have been assigned to a PCT, including 'cleared' areas and existing managed gardens within the developed aged care facility. These areas have been assigned a vegetation zone and entered into the BAM-C as these areas would be impacted by the proposal. This is a precautionary approach and adopted to fully calculate offsets required for the proposal.

4.2 Plant community types (PCT's)

4.2.1 Overview

Vegetation within the subject land has been assessed as most closely aligning with the BioNet Vegetation Classification PCT detailed in Table 7. The extent of the PCT on the subject land is mapped to aerial photography and follows floristic and vegetation integrity surveys and is shown in Figure 11. Descriptions of each PCT condition zone are provided below in subsection 4.2.2.

Table 7: Plant Community Type's (PCT's) identified within the subject land

PCT ID	PCT name	Subject land area (ha)
3989	Far North Paperbark Fern Swamp Forest	1.23 ha^
	Total area	**1.23 ha***
Notes: ^ = Includes the area of land (i.e., 0.83 ha) assigned to PCT 3989 – Cleared Land; * = may differ from subject land total due to rounding errors.		

4.2.2 PCT 3989 – Far North Paperbark Fern Swamp Forest

4.2.2.1 PCT 3989 overview

PCT 3989 – Far North Paperbark Fern Swamp Forest analogous vegetation occurs on the subject land as small, fragmented areas of vegetation, which have been planted as part of the current development, are isolated remnant trees, or are regrowth areas of locally common native species. Three (*n* = 3) condition states have been identified as occurring within the subject land, from a 'cleared' condition state to a 'moderate' condition state (Figure 11).

Some areas of planted vegetation containing native species representative of this PCT (e.g., Tuckeroo, Willow Bottlebrush, Lilly Pilly and Bangalow Palm) were included in the highest condition zone for this PCT. This ensures that all impacts are fully offset under the BOS. Areas of landscape gardens which overwhelmingly contained species not endemic to NSW were assigned to the vegetation zone identified as 'Landscape Gardens' and excluded from calculations.

Table 8: PCT 3989 - Far North Paperbark Fern Swamp Forest

PCT ID	3989
PCT name	Far North Paperbark Fern Swamp Forest
Vegetation formation	Forested Wetlands
Vegetation class	Coastal Swamp Forests
Percent cleared value (%)	53.99 %
Extent within subject land (ha)	1.23^ ha
Notes: ^ = Includes the area of land assigned to PCT 3989 – Cleared Land (0.83 ha).	

4.2.2.2 Condition states (zones)

Three (*n* = 3) condition states for PCT 3989 have been identified as occurring on the subject land, which are also referred to interchangeably as 'zones'. All condition states are represented in the development site, and thus require input into the BAM-C. Condition states for PCT 3989 identified on the subject land are identified below and represented in Figure 11.

PCT 3989 – Cleared (0.83 ha): Occurs over much of the subject land as either low managed lawn within the existing developed residential aged care area, or as managed (i.e., slashed) exotic dominated grassland and forbland within the stormwater detention basin in the south of the subject land. The vegetation within this zone is subject to regular mowing management.

PCT 3989 – Low Condition (0.25 ha): Occurs over a small area within the stormwater detention basin in the south of the subject land. It generally contains wetland representative species with occasional regrowth seedlings of Swamp Oak (*Casuarina glauca*). This zone is generally dominated by exotic species (e.g., Singapore Daisy (*Sphagneticola trilobata*), but with some additional species diversity giving rise to a slightly higher VIS score.

PCT 3989 – Moderate Condition (0.15 ha): Occurs predominantly in association with the constructed stormwater drainage line in the south of the subject land where native trees are present, as well as in areas of landscaping that contain representative species of this PCT. These areas are generally overwhelmingly dominated by exotic species but contain sufficient trees and/or shrubs

representative of PCT 3989. These areas contain more mature vegetation and slightly more species diversity than lower condition states with additional species present including Swamp Oak (*Casuarina glauca*), Tuckeroo (*Cupaniopsis anacardioides*) and Broad-leaved Paperbark (*Melaleuca quinquenervia*). This gives rise to a slightly higher VIS score.

Plate 10: Regrowth vegetation in stormwater basin has been classified as PCT 3989 low condition.

4.2.2.3 Justification of PCT selection

PCT 3989 was selected as the best representative PCT available for the vegetation to which it has been assigned on the subject land based on factors including: landscape position, underlying soils and geology, and species present in the higher condition vegetation fragments recorded during plot-based floristic vegetation surveys. This PCT is mapped in proximity to the subject land for other areas of vegetation with similar characteristics within the assessment area, and is considered the most suitable representation of the vegetation present.

Species recorded on the subject land within the higher condition fragments of vegetation (which are also listed in the BioNet Vegetation Classification - Community Profile Report), with representation of all growth forms, include: Broad-leaved Paperbark (*Melaleuca quinquenervia*), Tuckeroo (*Cupaniopsis anacardioides*), Swamp Oak (*Casuarina glauca*), Lilly Pilly (*Acmena smithii*), Sally Wattle (*Acacia melanoxylon*), Willow Bottlebrush (*Callistemon salignus*), Blueberry Ash (*Elaeocarpus reticulatus*), Spiny-headed Mat-rush (*Lomandra longifolia*), Swamp Ricegrass (*Leersia hexandra*), Broadleaf Cumbungi (*Typha orientalis*), Indian Cupscale Grass (*Sacciolepis indica*), Frogsmouth (*Philydrum lanuginosum*), Slender Knotweed (*Persicaria decipiens*), Common Silkpod (*Parsonsia straminea*) and Bangalow Palm (*Archontophoenix cunninghamiana*).

A flora species list developed during this assessment is contained in Appendix E.

4.2.2.4 Alignment with Threatened Ecological Communities (TEC's)

Vegetation assigned to PCT 3989 is associated with the TEC Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions, listed in Schedule 2 of the BC Act.

Some but not all of the vegetation on the subject land assigned to this PCT shares similarities with the Scientific Committee Final Determination for the community, and despite the low condition and the history of disturbance across the entirety of the subject land, all vegetation fragments assigned to this PCTs higher condition states have been included as a TEC within the BAM-C as a precautionary approach for offsets.

4.2.2.5 Alignment with EPBC Act listed Ecological Communities (EC's)

PCT 3989 is not associated with any listed Ecological Community under the EPBC Act.

4.3 Threatened ecological communities (TEC's)

One (*n* = 1) threatened ecological communities (TEC), Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions, listed in Schedule 2 of the BC Act, has been identified as potentially occurring on the subject land. This TEC is associated with PCT 3989 – Far North Paperbark Fern Swamp Forest.

Areas on the subject land that fall into the low and moderate condition classes are considered to be potentially analogous with the identified TEC as described in the Scientific Committee Determination to be considered as such, however, there are significant limitations associated with the condition, extent and regeneration potential to provide an element of doubt as to if the vegetation on the subject land reaches the threshold of an EEC.

Areas that fall into the cleared / exotic condition category are unlikely to meet that description threshold, however, have been identified as a TEC in the BAM-C for offset calculation purposes. Therefore, in the interest of applying the precautionary principal, all areas that have been assigned to PCT 3989, have been classified as a TEC, so that if the Vegetation Integrity Score (VIS) is > 15 and occur within the development site, they would be offset.

Table 9: Threatened Ecological Communities (TEC's) within the subject land

TEC name	Profile ID (from TBDC)	BC Act status	EPBC Act status	PCT's, associated vegetation zones (VZs) and vegetation condition classes within the subject land	Area within subject land (ha)
Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	10786	Endangered Ecological Community	Not listed	VZ 2: PCT 3989 – Low VZ 3: PCT 3989 - Moderate	0.25 ha 0.15 ha

4.4 Vegetation zones

A total of three (*n* = 3) vegetation zones have been delineated on the subject land from the one (*n* = 1) PCT identified. The PCT and vegetation zones are presented in Table 10 and itemised below:

- Vegetation Zone 1: PCT 3989 – Cleared
- Vegetation Zone 2: PCT 3989 –Low
- Vegetation Zone 3: PCT 3989 – Moderate

Table 10: Vegetation zones and patch sizes

Vegetation zone (VZ) ID	PCT ID number	PCT condition	Area (ha)	Patch size class^ (ha)	No. vegetation integrity plots required	No. vegetation integrity plots completed	No. vegetation integrity plots used in assessment	Plot IDs of vegetation integrity plots used in assessment (if applicable)
VZ 1	PCT 3989	Cleared	0.83 ha	<5 ha	1	3	1	Plots 1, 4 & 6
VZ 2	PCT 3989	Low	0.25 ha	<5 ha	1	1	1	Plot 3
VZ 3	PCT 3989	Moderate	0.15 ha	<5 ha	1	2	1	Plot 2 & 5
Notes: ^ = select multiple patch size classes if areas of native vegetation are discontinuous. Categories include <5 ha; 5-24 ha; 25 – 100 ha; >100 ha.								

4.5 Vegetation integrity (vegetation condition)

4.5.1 Vegetation integrity survey plots

The minimum number of plots sampled for each vegetation zone within the development site was in accordance with BAM 2020. Additional plots were undertaken for the purpose of assisting with assigning vegetation zones. The highest VIS score for each vegetation zone was used in the BAM-C if additional plots were undertaken.

4.5.2 Vegetation Integrity Scores

Vegetation integrity scores for each vegetation zone on the subject land are presented in Table 11.

Table 11: Vegetation integrity scores across each vegetation zone on the subject land

Vegetation zone ID	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score	Hollow bearing trees?
VZ 1: PCT 3989 – Cleared	21.7	0	15	2.3	No
VZ 2: PCT 3989 – Low	38.3	25.3	15	24.4	No
VZ 3: PCT 3989 - Moderate	38.4	68.5	28.8	42.3	No

4.5.3 Use of benchmark data

Vegetation condition benchmark data, accessed from the BioNet Vegetation Classification database, was used to assess vegetation integrity attributes in each zone. Where benchmark variations are identified in the database, the default 'Average Rainfall' year was used.

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BEACH ST

KINGSCLIFF ST

KINGSCLIFF LANE

SANDBANK PL

LORIEN WAY

SHOAL PL

CHANNEL PL

LORIEN WAY

KINGSCLIFF ST

SHORE PL

LORIEN WAY

DRIFT CT

DRIFT CT

SPOONBILL LANE

QUAIL PL

LORIEN WAY

BLUE JAY CCT

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Figure 11: Plant community types, vegetation zones, and EEC's

Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)

RoadCorridor

Contours 0.2m_clipped subject land

Vegetation_Subject Land_FINAL

Hard Surfaces (1.51 ha)

Landscape Gardens (0.18 ha)

VZ 1: PCT 3989 - Cleared (0.83 ha)

VZ 2: PCT 3989 - Low (0.25 ha)*

VZ 3: PCT 3989 - Moderate (0.15 ha)*

* Analagous with EEC

0 25 50 75 100 m

Date: 11/12/2023
BDAR - Lot 1 DP 833926; Lot 5-8 DP 1016883
Coordinate System: GDA2020 MGA Zone 56

5. Habitat suitability for threatened species

5.1 Identification of threatened species for assessment

5.1.1 Ecosystem credit species

Table 12 lists ecosystem credit species automatically populated in the BAM-C predicted by vegetation surrogates and/or landscape features. No species have been added to the BAM-C generated list of ecosystem credit species.

Thirty-nine (*n* = 39) ecosystem credit species were accepted as having the potential to occur either fully or partially, with only partial exclusion for 'cleared' or 'low' vegetation zones for species requiring habitat features such as trees. Three (*n* = 3) ecosystem credit species, Black-necked Stork (*Ephippiorhynchus asiaticus*), Beach Stone-curlew (*Esacus magnirostris*), and Comb-crested Jacana (*Irediparra gallinacea*) were completely excluded due to a complete lack of habitat features or lack of suitability required for potential utilisation by those species (Table 12).

5.1.2 Species credit species

All predicted flora and fauna species credit species automatically populated in the BAM-C are listed in Tables 13 and 14, respectively. Two species (i.e., Wallum Froglet (*Crinia tinnula*) and Olongburra Frog (*Litoria olongburensis*) were manually added to the BAM-C for this case, to be surveyed for and assessed under this BDAR. Certain species have been excluded based on habitat constraints (e.g., subject land not on Important Habitat Map (Swift Parrot (*Lathamus discolor*), Eastern Curlew (*Numenius madagascariensis*)) or absence of key habitat features (e.g., absence of Arrowhead Violet (*Viola betonicifolia*) for Laced Fritillary (*Argynnis hyperbius*)).

Where species have been excluded, justification relating to the allowable reasons for exclusion has been provided in the aforementioned tables (Table 13 and Table 14).

Plate 11: The southern stormwater basin is overwhelmingly dominated by exotic species.

Table 12: Predicted ecosystem credit species

Common name	Scientific name	Listing status		Dual credit species	Sources^	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within	Sensitivity to gain class
		BC Act	EPBC Act						
Magpie Goose	*Anseranas semipalmata*	V	-	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	Moderate
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V	-	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	Moderate
Australasian Bittern	*Botaurus poiciloptilus*	E	E	No	☒ BAM-C ☒ TBDC	No	Habitat constraints	n/a	Moderate
Sanderling (Foraging)	*Calidris alba*	V	-	Yes	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 3	VZ 1, VZ 2	High
Red Knot (Foraging)	*Calidris canutus*	-	E	Yes	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 3	VZ 1, VZ 2	High
Curlew Sandpiper (Foraging)	*Calidris ferruginea*	E	CE	Yes	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 3	VZ 1, VZ 2	High
Great Knot (Foraging)	*Calidris tenuirostris*	V	CE	Yes	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 3	VZ 1, VZ 2	High
Glossy Black-Cockatoo (Foraging)	*Calyptorhynchus lathami*	V	V	Yes	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 1	VZ 2, VZ 3	High

Common name	Scientific name	Listing status		Dual credit species	Sources^	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within	Sensitivity to gain class
		BC Act	EPBC Act						
Greater Sand-plover (Foraging)	*Charadrius leschenaultii*	V	V	Yes	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 3	VZ 1, VZ 2	High
Lesser Sand-plover (Foraging)	*Charadrius mongolus*	V	E	Yes	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 3	VZ 1, VZ 2	High
Spotted Harrier	*Circus assimilis*	V	-	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	Moderate
Varied Sittella	*Daphoenositta chrysoptera*	V	-	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	Moderate
Spotted-tailed Quoll	*Dasyurus maculatus*	V	E	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	High
Black-necked Stork	*Ephippiorhynchus asiaticus*	E	-	No	☒ BAM-C ☒ TBDC	No	Habitat constraints	n/a	Moderate
Beach Stone-curlew (Foraging)	*Esacus magnirostris*	CE	-	Yes	☒ BAM-C ☒ TBDC	No	Excluded from VZ 3	VZ 1, VZ 2	High
Black Falcon	*Falco subniger*	V	-	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	Moderate
Little Lorikeet	*Glossopsitta pusilla*	V	-	No	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 1	VZ 2, VZ 3	High
White-bellied Sea-Eagle (Foraging)	*Haliaeetus leucogaster*	V	-	Yes	☒ BAM-C ☒ TBDC	Yes	Habitat constraints	n/a	High

Common name	Scientific name	Listing status		Dual credit species	Sources^	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within	Sensitivity to gain class
		BC Act	EPBC Act						
Little Eagle (Foraging)	*Hieraaetus morphnoides*	V	-	Yes	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	Moderate
White-throated Needletail	*Hirundapus caudacutus*	-	V	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	High
Comb-crested Jacana	*Irediparra gallinacea*	V	-	No	☒ BAM-C ☒ TBDC	No	Habitat constraints	n/a	Moderate
Black Bittern	*Ixobrychus flavicollis*	V	-	No	☒ BAM-C ☒ TBDC	No	Habitat constraints	n/a	Moderate
Swift Parrot (Foraging)	*Lathamus discolor*	E	CE	Yes	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 1	VZ 2, VZ 3	High
Bar-tailed Godwit (baueri) (Foraging)	*Limosa lapponica baueri*	-	V	Yes	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 3	VZ 1, VZ 2	High
Black-tailed Godwit (Foraging)	*Limosa limosa*	V	-	Yes	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 3	VZ 1, VZ 2	High
Square-tailed Kite (Foraging)	*Lophoictinia isura*	V	-	Yes	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	Moderate
Eastern Coastal Free-tailed Bat	*Micronomus norfolkensis*	V	-	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	High
Little Bent-winged Bat (Foraging)	*Miniopterus australis*	V	-	Yes	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	High

Common name	Scientific name	Listing status		Dual credit species	Sources^	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within	Sensitivity to gain class
		BC Act	EPBC Act						
Large Bent-winged Bat (Foraging)	*Miniopterus orianae oceanensis*	V	-	Yes	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	High
Barking Owl (Foraging)	*Ninox connivens*	V	-	Yes	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	High
Powerful Owl (Foraging)	*Ninox strenua*	V	-	Yes	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	High
Eastern Curlew (Foraging)	*Numenius madagascariensis*	-	CE	Yes	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 3	VZ 1, VZ 2	High
Eastern Osprey (Foraging)	*Pandion cristatus*	V	-	Yes	☒ BAM-C ☒ TBDC	No	Habitat constraints	n/a	Moderate
Scarlet Robin	*Petroica boodang*	V	-	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	Moderate
Grey-headed Flying-fox (Foraging)	*Pteropus poliocephalus*	V	V	Yes	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 1	VZ 2, VZ 3	High
Superb Fruit-Dove	*Ptilinopus superbus*	V	-	No	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 1	VZ 2, VZ 3	Moderate
Australian Painted Snipe	*Rostratula australis*	E	E	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	Moderate
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V	-	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, VZ 2, VZ 3	High
Terek Sandpiper (Foraging)	*Xenus cinereus*	V	-	Yes	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 3	VZ 1, VZ 2	High

Common name	Scientific name	Listing status		Dual credit species	Sources^	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within	Sensitivity to gain class
		BC Act	EPBC Act						
Notes: ^ Source categories include: BAM-C; TBDC; previous survey; current survey. Vegetation zone ID details as follows: VZ 1: PCT 3989 – Cleared; VZ 2: PCT 3989 – Low; VZ 3: PCT 3989 – Moderate.									

Table 13: Predicted flora species credit species

Common name	Scientific name	Listing status		Sources^	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within
		BC Act	EPBC Act				
Scented Acronychia	*Acronychia littoralis*	E	E	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 1	VZ 2, 3
Basket Fern	*Drynaria rigidula*	E	-	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 1	VZ 2, 3
Green-leaved Rose Walnut	*Endiandra muelleri subsp. bracteata*	E	-	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 1	VZ 2, 3
Yellow-flowered King of the Fairies	*Oberonia complanata*	E	-	☒ BAM-C ☒ TBDC	Yes	Excluded from VZ 1	VZ 2, 3
Sweet False Galium	*Oldenlandia galioides*	E	-	☒ BAM-C ☒ TBDC -C	Yes	Excluded from VZ 1	VZ 2, 3
Scrub Turpentine	*Rhodamnia rubescens*	CE	CE	☒ BAM-C ☒ TBDC -C	Yes	Excluded from VZ 1	VZ 2, 3
Native Guava	*Rhodomyrtus psidioides*	CE	CE	☒ BAM-C ☒ TBDC -C	Yes	Excluded from VZ 1	VZ 2, 3
Notes: ^ Source categories include: BAM-C; TBDC; previous survey; current survey. Vegetation zone ID details as follows: VZ 1: PCT 3989 – Cleared; VZ 2: PCT 3989 – Low; VZ 3: PCT 3989 – Moderate.							

Table 14: Predicted fauna species credit species

Common name	Scientific name	Listing status		Dual credit species	Sources^	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within
		BC Act	EPBC Act					
Laced Fritillary	*Argynnis hyperbius*	E	CE	No	☒ BAM-C ☒ TBDC	No	2. Habitat constraints: Arrowhead Violet does not occur	n/a
Curlew Sandpiper (Breeding)	*Calidris ferruginea*	E	CE	Yes	☒ BAM-C ☒ TBDC	No	2. Habitat constraints: breeding habitat does not occur	n/a
Great Knot (Breeding)	*Calidris tenuirostris*	V	CE	Yes	☒ BAM-C ☒ TBDC	No	2. Habitat constraints: breeding habitat does not occur	n/a
Wallum Froglet*	*Crinia tinnula*	V	E	No	☒ Previous survey ☒ TBDC	Yes	n/a	VZ 1, 2 & 3
Coxen's Fig-Parrot	*Cyclopsitta diophthalma coxeni*	CE	E	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 2 & 3
Beach Stone-curlew (Breeding)	*Esacus magnirostris*	CE	-	Yes	☒ BAM-C ☒ TBDC	No	2. Habitat constraints: breeding habitat does not occur	n/a
Swift Parrot (Breeding)	*Lathamus discolor*	E	CE	Yes	☒ BAM-C ☒ TBDC	No	2. Habitat constraints: breeding habitat does not occur	n/a
Olongburra Frog*	*Litoria olongburensis*	V	V	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, 2 & 3

Common name	Scientific name	Listing status		Dual credit species	Sources^	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within
		BC Act	EPBC Act					
Little Bent-winged Bat (Breeding)	*Miniopterus australis*	V	-	Yes	☒ BAM-C ☒ Current survey	No	2. Habitat constraints: breeding habitat does not occur	n/a
Large Bent-winged Bat (Breeding)	*Miniopterus orianae oceanensis*	V	-	Yes	☒ BAM-C ☒ TBDC	No	2. Habitat constraints: breeding habitat does not occur	n/a
Eastern Curlew (Breeding)	*Numenius madagascariensis*	-	CE	Yes	☒ BAM-C ☒ TBDC	No	2. Habitat constraints: breeding habitat does not occur	n/a
Coastal Petaltail	*Petalura litorea*	E	-	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 1, 2 & 3
Mitchell's Rainforest Snail	*Thersites mitchellae*	E	CE	No	☒ BAM-C ☒ TBDC	Yes	n/a	VZ 2 & 3

Notes: ^ Source categories include: BAM-C; TBDC; previous survey; current survey. Vegetation zone ID details as follows: VZ 1: PCT 3989 – Cleared; VZ 2: PCT 3989 – Low; VZ 3: PCT 3989 – Moderate.

*Manually added candidate threatened species.

5.2 Presence of candidate species credit species

From the remaining list of candidate species credit species, Tables 16 (flora) and Table 17 (fauna) identify those species determined to be present within the subject land based on:

- assumed presence within the subject land;
- an important habitat map (for dual credit species);
- targeted threatened species surveys; and/or
- an expert report.

This method is in accordance with the BAM (subsection 5.2.4).

Table 15: Determining the presence of candidate flora species credit species on the subject land

Common name	Scientific name	Listing status		Method to determine presence	Present?	Further assessment required?
		BC Act	EPBC Act			
Scented Acronychia	*Acronychia littoralis*	E	E	TTSS	No	No
Basket Fern	*Drynaria rigidula*	E	-	TTSS	No	No
Green-leaved Rose Walnut	*Endiandra muelleri subsp. bracteata*	E	-	TTSS	No	No
Yellow-flowered King of the Fairies	*Oberonia complanata*	E	-	TTSS	No	No
Sweet False Galium	*Oldenlandia galioides*	E	-	TTSS	No	No
Scrub Turpentine	*Rhodamnia rubescens*	CE	CE	TTSS	No	No
Native Guava	*Rhodomyrtus psidioides*	CE	CE	TTSS	No	No
Notes: TTSS = Targeted threatened species survey.						

Table 16: Determining the presence of candidate fauna species credit species on the subject land

Common name	Scientific name	Listing status		Method to determine presence	Present?	Further assessment required?
		BC Act	EPBC Act			
Laced Fritillary	*Argynnis hyperbius*	E	CE	Excluded (habitat constraints)	No	No
Curlew Sandpiper (Breeding)	*Calidris ferruginea*	E	CE	Excluded (habitat constraints)	No	No
Great Knot (Breeding)	*Calidris tenuirostris*	V	CE	Excluded (habitat constraints)	No	No

Common name	Scientific name	Listing status		Method to determine presence	Present?	Further assessment required?
		BC Act	EPBC Act			
Wallum Froglet*	*Crinia tinnula*	V	E	TTSS	No - Assumed present	Yes
Coxen's Fig-Parrot	*Cyclopsitta diophthalma coxeni*	CE	E	TTSS	No	No
Beach Stone-curlew (Breeding)	*Esacus magnirostris*	CE	-	Excluded (habitat constraints)	No	No
Swift Parrot (Breeding)	*Lathamus discolor*	E	CE	Excluded (habitat constraints)	No	No
Olongburra Frog*	*Litoria olongburensis*	V	V	TTSS	No	No
Little Bent-winged Bat (Breeding)	*Miniopterus australis*	V	-	Excluded (habitat constraints)	No	No
Large Bent-winged Bat (Breeding)	*Miniopterus orianae oceanensis*	V	-	Excluded (habitat constraints)	No	No
Eastern Curlew (Breeding)	*Numenius madagascariensis*	-	CE	Excluded (habitat constraints)	No	No
Coastal Petaltail	*Petalura litorea*	E	-	TTSS	No	No
Mitchell's Rainforest Snail	*Thersites mitchellae*	E	CE	TTSS	No	No
Notes: TTSS = targeted threatened species survey; AP = assumed present.						

5.3 Threatened species surveys

Where targeted threatened species surveys were used to determine presence of the species, details are provided in Table 17 (flora) or Table 18 (fauna).

Table 17: Threatened species surveys for candidate flora species credit species on the subject land

Common name	Scientific name	Threatened flora species surveys				Present	Further assessment required
		Survey method	Timing of survey – within recommended period? (BAM-C / TBDC)		Effort (hrs & people)		
Scented Acronychia	*Acronychia littoralis*	transects	☒ Yes 30/10/2023	☐ No	12 hrs x 1 person	No	No
Basket Fern	*Drynaria rigidula*	transects	☒ Yes 30/10/2023	☐ No	12 hrs x 1 person	No	No
Green-leaved Rose Walnut	*Endiandra muelleri subsp. bracteata*	transects	☒ Yes 30/10/2023	☐ No	12 hrs x 1 person	No	No
Yellow-flowered King of the Fairies	*Oberonia complanata*	transects	☒ Yes 30/10/2023	☐ No	12 hrs x 1 person	No	No
Sweet False Galium	*Oldenlandia galioides*	transects	☒ Yes 11/12/2023	☒ No 30/10/2023	14 hrs x 1 person	No	No
Scrub Turpentine	*Rhodamnia rubescens*	transects	☒ Yes 30/10/2023	☐ No	12 hrs x 1 person	No	No
Native Guava	*Rhodomyrtus psidioides*	transects	☒ Yes 30/10/2023	☐ No	12 hrs x 1 person	No	No

To inform survey timing and requirements, requirements for each species were identified in the BAM-C / TBDC and guidelines published by the department were consulted to inform survey timing and requirements. All species were surveyed for at some stage during their respective specified survey period. An additional threatened flora survey was undertaken on 11th December 2023 specifically targeting Sweet False Galium (*Oldenlandia galioides*) to capture the requisite survey period.

Specific survey requirements for each species were identified through the TBDC in consultation with BAM specific survey guidelines where available. Examples of BAM specific guidelines used by the author of this BDAR include:

- 'Species credit' threatened bats and their habitats. NSW survey guide for the Biodiversity Assessment Method.

- Surveying threatened plants and their habitats. NSW survey guide for the Biodiversity Assessment Method.
- NSW Survey Guide for Threatened Frogs. A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method.
- Threatened reptiles. Biodiversity Assessment Method survey guide.

If species specific or class specific guidelines developed for the BAM were not available, information regarding survey requirements in the TBDC was utilised. Where no survey guidelines were available in either the BAM or the TBDC, the Threatened *Biodiversity Survey and Assessment: Guidelines for Developments and Activities (2004) (working draft)* was referred to.

Plate 12: Targeted threatened fauna surveys were undertaken on the subject land in accordance with survey guidelines.

Table 18: Threatened species surveys for candidate fauna species credit species on the subject land

	Scientific name	Threatened fauna species surveys				Present	Further assessment required
		Survey method	Timing of survey – within recommended period?		Effort (hours & no. people)		
	Argynnis hyperbius	Habitat searches / targeted vegetation searches	☐ Yes	☒ No 30/10/2023 09/11/2023	12 hrs x 1 person	No	No – the subject land is highly modified, managed, disturbed and habitat is degraded. Although surveys were undertaken outside of the optimal survey period (flowering) for the species host plant, the plant was not recorded on the subject land, and it is highly unlikely to occur.
	Calidris ferruginea	Important habitat map	☒ Yes	☐ No	n/a	No	No – the subject land is not included on the important habitat map for migratory shorebirds.
	Calidris tenuirostris	Important habitat map	☒ Yes	☐ No	n/a	No	No – the subject land is not included on the important habitat map for migratory shorebirds.
	Crinia tinnula		☒ Yes 30/10/2023 06/11/2023 07/11/2023 09/11/2023	☐ No	9 hrs x 1 person	No**	Yes - the subject land is highly modified, disturbed and habitat is degraded. Potential habitat is also regularly managed. The subject land is surrounded by existing development and is therefore fragmented from areas of suitable preferred habitat (> 120 m), known to occur to the south-east of the subject land. PH measurements from the drain in the southern portion of the subject land consistently returned results > 6, supporting the conclusion that the subject land does not contain suitable typical breeding habitat. The species may occur temporarily on rare

	Scientific name	Threatened fauna species surveys				Present	Further assessment required
		Survey method	Timing of survey – within recommended period?		Effort (hours & no. people)		
							occasions if substantial rain events or local flooding occurs and spillover from other areas of habitat in the locality occurs through backflow of the stormwater system. However, the land is not likely to support a population.
	Cyclopsitta diophthalma coxeni	Habitat searches / targeted vegetation searches	☒ Yes 30/10/2023	☐ No	12 hrs x 1 person	No	No – the subject land does not contain vegetation communities, vegetation species, or habitat considered suitable or significant for this species.
	Esacus magnirostris	Surveys for potential breeding habitat	☒ Yes 30/10/2023	☐ No	12 hrs x 1 person	No	No – the subject land does not contain any suitable breeding habitat for this species.
	Lathamus discolor	Important habitat map	☒ Yes	☐ No	n/a	No	No – the subject land is not included on the important habitat map for Swift Parrot.
	Litoria olongburensis		☒ Yes 30/10/2023 06/11/2023 07/11/2023 09/11/2023	☐ No	9 hrs x 1 person	No	No - the subject land is highly modified, disturbed and habitat is degraded. Potential habitat is also regularly managed. The subject land is surrounded by existing development and is therefore fragmented from areas of suitable preferred habitat (> 120 m), known to occur to the south-east of the subject land. The subject land does not contain suitable habitat or the specific vegetation assemblages required by this acid frog species. PH measurements from the drain in the southern portion of the subject

	Scientific name	Threatened fauna species surveys				Present	Further assessment required
		Survey method	Timing of survey – within recommended period?		Effort (hours & no. people)		
							land returned results > 6, supporting the conclusion that the subject land does not contain suitable breeding habitat. The land is never likely to support a population of the species.
	Miniopterus australis	Surveys for potential breeding habitat	☒ Yes 30/10/2023	☐ No	7 hrs x 1 person	No	No – the subject land does not contain any suitable breeding habitat for this species.
	Miniopterus orianae oceanensis	Surveys for potential breeding habitat	☒ Yes 30/10/2023	☐ No	7 hrs x 1 person	No	No – the subject land does not contain any suitable breeding habitat for this species.
	Numenius madagascariensis	Important habitat map	☒ Yes	☐ No	n/a	No	No – the subject land is not included on the important habitat map for migratory shorebirds.
	Petalura litorea	TTSS – active ground searches for suitable habitat or evidence of utilisation.	☒ Yes 06/11/2023 09/11/2023	☐ No	10 hrs x 1 person	No	No – the subject land is highly degraded and does not contain any habitat nor habitat features required by this species. All groundlayer vegetation on the subject land is regularly managed and disturbed.
	Thersites mitchellae	TTSS – active ground searches for suitable habitat or evidence of utilisation.	☒ Yes 30/10/2023 09/11/2023	☐ No	4 hrs x 1 person	No	No – the subject land is highly degraded and does not contain any habitat nor habitat features required by this species. All groundlayer vegetation on the subject land is regularly managed and disturbed.
** The species was not recorded during targeted surveys in accordance with the guidelines, however, has been assumed present due to a historical record.							

5.4 Expert reports

No expert reports were relied on in preparation of this BDAR.

5.5 Area or count, and location of suitable habitat for a species credit species (a species polygon)

For species credit species either assumed to be present, identified as present, or likely to use suitable habitat on the subject land (determined by survey, expert report or important habitat map), a species polygon as specified in the TBDC has been applied detailing the extent (i.e., area in ha) of suitable habitat for the target species (Figure 15), and areas offset as calculated by the BAM-C.

No flora species credit species have been recorded within the subject land. One (*n* = 1) fauna species credit species (i.e., Wallum Froglet (*Crinia tinnula*)) was previously recorded on the subject land, and has been assumed present, despite not being recorded during targeted surveys for this assessment. The species has been offset for all areas within the TBDC identified buffer (50 m) allocated to the representative PCT (Table 19).

No Environmental Protection Biodiversity Conservation (EPBC) Act listed species recorded within the subject land (Table 20).

Plate 13: The open stormwater drain and basin in the south of the subject land represent occasional potential amphibian habitat, however it is not considered to be typical 'acid frog' habitat.

Table 19: Results for present species credit species (recorded within the subject land)

Common name	Scientific name	Biodiversity risk weighting	SAII entity*	Habitat constraints / vegetation zone	Abundance – No. individual plants present on subject land	Extent (ha) of suitable habitat on site	TBDC species specific recommendations e.g. buffers, general comments (where relevant)	Habitat condition^
Wallum Froglet	*Crinia tinnula*	Moderate (1.5)	No	VZ 1, 2, & 3	n/a	0.71 ha	**Potential habitat: Suitable breeding and non-breeding habitat consists of still waterbodies located in acid swamplands (pH<5.5), wallum heaths, open vegetation on sand plains, and flooded areas of swamp forests within the PCTs associated with the species. The acidity of the water must be recorded in the BAR to demonstrate suitable breeding habitat.** **Non-breeding habitat is any area of suitable PCT located on the subject land.** **Species polygon: The species polygon boundary should align with aquatic habitats linked directly to the record and a buffer, incorporating the PCTs with which the species is associated, of 50 metres radius from the top of bank.**	VZ 1 = 2.3 VZ 2 = 24.4 VZ 3 = 42.3
Notes: ^ = vegetation integrity score for each vegetation zone in the polygon – area species only. * = A list of SAII entities is available on the NSW department's website.								

Table 20: Results for Environmental Protection Biodiversity Conservation Act listed species present (recorded within the subject land)

Common name	Scientific name	Abundance – No. individual plants present on subject land (flora with unit of measure as count)	Extent (ha) of suitable habitat present on site (flora or fauna with unit of measure as area)
-	-	-	-

555750

556000

6974750

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Figure 12: Candidate species credit species records and species polygons

- Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)
- Contours 0.2m_clipped subject land
- Road Corridor
- Wallum Froglet Record (Green Tape Solutions_07/2022)
- Potential Wallum Froglet habitat
- 50m Species Buffer_Wallum Froglet

Vegetation clipped_wallum froglet 50m buffer

- PCT 3989 - Cleared_Exotic (0.46 ha)
- PCT 3989 - Low (0.18 ha)
- PCT 3989 - Moderate (0.07 ha)

0 25 50 75 100 m

Date: 11/12/2023
BDAR - Lot 1 DP 833926; Lot 5-8 DP 1016883
Coordinate System: GDA2020 MGA Zone 56

STAGE 2: IMPACT ASSESSMENT (BIODIVERSITY VALUES AND PRESCRIBED IMPACTS)

6. Avoid and minimise impacts

6.1 Avoid and minimise direct and indirect impacts

This section details how direct/indirect impacts arising from the development proposal may impact on the biodiversity and ecological values of the site.

"Direct impacts" are defined as impacts that result from clearing vegetation for a development. They are easily identified during the planning and design phase of a development, usually occur at or near to the subject land, and may result in partial or complete clearing of vegetation (BAM Operational Manual Stage 2, 2023).

"Indirect impacts" are defined as development related activities not explicitly associated with clearing of vegetation for the development yet can be reasonably attributed to the development. Examples include noise, dust, light spill, weeds, and edge effects. Indirect impacts may occur beyond the development footprint/site, may have variable intensity compared with direct impacts, may be harder to predict spatially and temporally, and may have unclear boundaries of responsibility. Nonetheless, indirect impacts must be considered during the site selection, design, and operational phases of the project.

6.1.1 Project location

The proposed development has been located on low biodiversity value land with limited ecological constraints. The subject land has been historically cleared and developed, with a small area of regrowth vegetation located in the southern portion of the land, within a stormwater drain and basin. The surrounding area has also been completely developed, with the nearest undeveloped area being > 100 m from the subject land. The proposal is for an infill development, with no direct or indirect ecological impacts likely to occur on adjacent land or in the wider locality.

Areas of vegetation on the subject land are generally landscaped gardens and native and exotic grasses associated with managed lawns and grassed areas. Approx 97.5% of the subject land consists of existing hard surfaces, cleared land or low condition vegetation. The remaining 2.5% is classified as being moderate condition vegetation as assessed in accordance with the BAM.

6.1.2 Project design

The project has been re-designed to increase the spatial extent of open grass and landscaped native gardens by reducing the bulk and scale of the proposal. Given that proposal landscaping would utilise suitable native species into the project design, this would ultimately minimise potential future impacts and ensures no significant net loss in potential urban habitat for common native species that occur in the locality.

6.2 Avoid and minimise prescribed impacts

"Prescribed impacts" are defined as impacts that may affect biodiversity values in addition to, or instead of, impacts from clearing vegetation. Such impacts can be difficult to quantify and offset as they may impact irreplaceable biodiversity values. It is therefore imperative to avoid and minimise such impacts, which are listed in the Biodiversity Conservation Regulation (cl. 6.1). Examples include impacts of the development on: (i) habitat of threatened species associated with karst, cave, crevices, cliffs, and other geological features; (ii) connectivity of different areas of habitat of

threatened species that facilitates their movement across their range or their life cycle; (iii) water quality, waterbodies and hydrological processes that sustain threatened species/communities; (iv) impacts of wind turbine strikes; and (v) impacts of vehicle strikes.

6.2.1 Project location

As identified for direct and indirect impacts, the proposed development has been located on low biodiversity value land with limited ecological constraints. The subject land is historically cleared and subsequently developed land. Areas of vegetation on the subject land are generally landscaped gardens and native and exotic grasses associated with managed lawns and grassed areas.

The subject land does not contain any significant geological features, it is currently already fragmented from more valuable habitat in the locality, it does not currently provide any significant connectivity value, it would not impact on water quality, waterbodies and hydrological processes that sustain threatened species/communities, nor would it likely result in any potential risk to threatened species from vehicle strike.

6.2.2 Project design

As has been identified above, the proposal would not result in any prescribed impacts on the biodiversity values of the locality. The project design incorporates areas of open space and landscaped gardens which provide comparable local connectivity and habitat values as is currently provided. The incorporation of updated construction design principles with regards to sustainability are also likely to mitigate any potential impacts.

6.3 Other measures considered

All measures considered to avoid and minimise impacts have been implemented and built on through the concept design process.

6.4 Summary of measures to avoid and minimise impacts

Table 21 documents the measures taken to avoid and minimise direct, indirect, and prescribed impacts.

Table 21: Avoidance and minimisation measures for direct, indirect and prescribed impacts

Action	Outcome	Timing	Responsibility
Locating the project on a low constraint area of infill development land with little biodiversity value.	The project is located on land which contains low biodiversity values, with the concept design incorporating a similar extent of open space and landscaping as is currently present, minimising any potential impacts on local native fauna of the locality from the intensification of use.	Concept design phase	proponent

Action	Outcome	Timing	Responsibility
Increased setbacks from boundaries to provide more open space and increase the area of landscaping available.	A new landscaping 'spine' now runs through the subject land, and an increased area of landscaping around the boundaries has increased the final proposed area of open space and landscaping,	Concept design phase	proponent
Reduction in the scale and redesign of concept layout to reduce development footprint.	The reduction in the number of buildings and other redesigned elements has reduced the bulk and scale of the proposal, and the incorporation of additional native landscaping minimises any potential impacts from an intensification of use of the subject land.	Concept design phase	proponent
Reduce the number of construction phases to minimise disturbance.	The project implementation has been amended to allow for realisation of the proposal to be undertaken in two construction phases, reduced from three initially. This will minimise any potential disturbance impacts on local fauna in the locality.	Concept design phase	proponent
Establishment of native vegetation plantings as part of landscaping plan to minimise direct and indirect impacts to habitat and corridor function.	The establishment of native species that provide foraging resources in landscaping would provide stepping-stone corridor function through the locality. This would provide several benefits, including minimising potential direct and indirect impacts on potential future fauna movement.	Construction & operation phase	proponent
Making provision for the demarcation, of retained native vegetation habitat on the development site.	Native vegetation within the proposed development footprint which do not require removal, would still be fully offset, yet would be retained and protected, and absorbed into the development. Tree Protection Zones (TPZs) would be established and maintained during the construction process.	Construction & operation phase	proponent

7. Impact assessment

7.1 Direct impacts

7.1.1 Residual direct impacts

Table 22 documents the residual impacts of the proposal likely to occur on the subject land. This is after the steps to avoid and minimise impacts have occurred, however, it is acknowledged that limited options for avoid are available, given the low biodiversity value of the subject land, and other practical requirements and limitations. Avoidance is considered as the utilisation of this limited ecological constraint land to avoid impacts elsewhere. Design considerations including reduction of bulk and scale, and the incorporation of additional open space and appropriate native vegetation landscaping which contributes to the minimisation of impacts.

Therefore, for the purposes of this assessment, in the interests of applying a precautionary approach, and to facilitate the accurate and complete calculation of ecosystem and species credits under the BOS, all impacts (i.e., direct, indirect, and prescribed) have been offset as direct impacts (i.e., future VIS = 0), with credits calculated accordingly.

7.1.2 Change in vegetation integrity score

Table 23 documents the change in vegetation integrity for residual direct impacts on native vegetation, TECs, threatened species and their habitat that were identified on the subject land. It is worth noting that the change in vegetation integrity for much of the development site overstates the actual likely potential impact of future development. It is also worth noting that the change in vegetation integrity score for some components of the development site would be significantly improved as a result of the proposal, e.g., those areas that would be revegetated as part of the landscaping plan, and exotic species that threaten other vegetation in the locality, would be removed. This would minimise impacts as a result of the proposal.

7.2 Indirect impacts

Table 22 documents the residual indirect impacts likely to occur on native vegetation, threatened entities and their habitat beyond the development footprint. Potential indirect impacts have been offset with direct impacts as calculated by the BAM-C. Figure 13, 14 & Figure 15 illustrate the final impacts likely to occur on the subject land regarding vegetation zones, threatened flora and candidate fauna species.

Table 22: Summary of residual direct and indirect impacts

Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	**BC Act status**	**EPBC Act status**	**SAII entity**	**Project phase/timing of impact** (e.g., construction, operation, rehabilitation)	**Extent** (ha, number of individuals)
PCT 3989: cleared condition (VZ 1) – the removal of an area of exotic and/or managed grassland. Some of this area would be revegetated as part of the landscaping plan.	n/a	n/a	No	construction	0.83 ha
PCT 3989: low condition (VZ 2) – the removal of a small area of landscaped gardens and managed grass/forbland.	EEC	Not Listed	No	construction	0.25 ha
PCT 3989: moderate condition (VZ 3) – the removal of a small area of native and exotic landscaped gardens, and regrowth vegetation in the southern detention basin which includes several trees and wetland analogous vegetation.	EEC	Not Listed	No	construction	0.15 ha
Profile ID 10183 - Wallum Froglet (*Crinia tinnula*)	V	Not listed	No	construction	0.71 ha

Table 23: Impacts to vegetation integrity

Vegetation zone	**PCT ID**	**Area (ha)**	**Before development**				**After development**				**Change**
			Composition	**Structure**	**Function**	**VI score**	**Composition**	**Structure**	**Function**	**VI score**	**Change in VI score**
VZ 1	PCT 3989	0.83	21.7	0	15	2.3	0	0	0	0	-2.3
VZ 2	PCT 3989	0.25	38.3	25.3	15	24.4	0	0	0	0	-24.4
VZ 3	PCT 3989	0.15	38.4	68.5	28.8	42.3	0	0	0	0	-42.3

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Figure 13: Final impacts likely to occur on the subject land

- Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)
- Contours 0.2m_clipped subject land
- Road Corridor

Vegetation impacted - Subject Land

- Hard Surfaces (1.51 ha)
- Landscape Gardens (0.18 ha)
- VZ 1: PCT 3989 - Cleared (0.83 ha)
- VZ 2: PCT 3989 - Low (0.25 ha)
- VZ 3: PCT 3989 - Moderate (0.15 ha)

0 25 50 75 100 m

Date: 11/12/2023
BDAR - Lot 1 DP 833926; Lot 5-8 DP 1016883
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7.3 Prescribed impacts

The NSW Biodiversity Conservation Regulation 2017 (BC Reg; clause 6.1) identifies actions that are prescribed as impacts to be assessed under the biodiversity offset scheme. An assessment of the prescribed impacts of this proposal and, where relevant, measures proposed to mitigate and manage impacts are identified in Table 27.

7.3.1 Karst, caves, crevices, cliffs, rocks or other geological features of significance

The development site does not contain karst, caves, crevices, cliffs and other features of geological significance, nor will any be impacted as a result of the proposal. The proposal would not result in any impacts to any geological features of significance.

7.3.2 Human-made structures

The northern portion of the subject land is an existing residential aged care facility, consisting of several interconnected buildings, roads and parking areas. These human-made structures would require demolition to accommodate the proposal.

7.3.3 Non-native vegetation

The subject land contains a mix of native and non-native vegetation, with respects to both landscape gardens and the underdeveloped southern portion. Non-native vegetation on the subject land provides little biodiversity value to the locality, with much of it regularly disturbed by way of active management.

The project design incorporates a comparable spatial extent of open managed lawns and landscaped gardens, spread throughout the subject land, which would mitigate any potential prescribed impact as a result of the removal of non-native vegetation. The expected impacts on native flora and fauna as a result of removal of non-native vegetation in the local context would be negligible.

7.3.4 Habitat connectivity

The subject land provides little habitat connectivity value for threatened species with the potential to occur in the locality. The subject land is highly fragmented from areas of endemic vegetation in the locality and surrounded by extensive residential development. It currently contains little habitat value and does not provide significant habitat connectivity that will facilitate movement of threatened species across their range. The incorporation of managed lawns and landscaped native gardens into the project design would provide a comparable level of connectivity in the locality as currently exists.

As a result, the impact on habitat connectivity and corridor function as a result of the proposal is likely to be negligible.

7.3.5 Waterbodies, water quality and hydrological processes

The subject land does not contain any mapped hydrolines or waterbodies. The southern portion of the subject land is currently a stormwater drain and managed detention basin, which transports stormwater south from the existing aged care facility to the local Council stormwater network to the south. It is regularly slashed and does not provide any significant values with respect to waterbodies, water quality or hydrological processes.

Appropriate erosion and sediment controls will be implemented during any civil and construction works to ensure that there is no pollution of any downstream receiving environments. The incorporation of improved water sensitive urban design into the proposal would further mitigate any potential impacts.

Given the separation between the subject land and areas of habitat value, it is unlikely that the development would have any significant impact on water quality or hydrological processes on the locality.

7.3.6 Wind turbine strikes

The proposed development is not associated with wind turbines.

7.3.7 Vehicle strikes

Internal roads associated with the proposed development will be speed limited as they are currently, used only for local access to proposed buildings, and therefore are unlikely to pose a significant vehicle strike risk to native fauna. The development site currently contains limited habitat value and does not represent a meaningful habitat corridor. Native fauna use of the site, as indicated by previous and current surveys, is unlikely to be significant.

7.4 Mitigating residual impacts – management measures and implementation

The sum of ecological impacts to enable the proposal are low, with the subject land containing limited biodiversity values. The proposal has been designed to incorporate comparable areas of open space and landscaped gardens, hence minimising the impacts on the biodiversity values of the locality overall.

Mitigation measures per se are largely intended to minimise impacts during the construction period, as well as to reduce unintended potential indirect impacts beyond the development site and subject land. The potential direct and indirect biodiversity impacts of the proposal, through both construction and operational phases, have been taken into consideration for this assessment, with key mitigation measures provided in the stage 2 section of this BDAR.

Environmental safeguards and mitigation measures are detailed in Table 24. These include mitigation recommendations specifically for areas to be revegetated, which would be guided by a Landscape Plan. This Plan would provide the overarching guidance for proposed landscaping as part of the development proposal.

7.5 Adaptive management strategy for uncertain impacts (where relevant)

The proposal has been located on low constraint land, which is currently surrounded by extensive urban development. The subject land provides limited biodiversity value to the locality. Areas beyond the subject land would be unlikely to be impacted by the proposal, either during the construction or operational phase.

As the proposal requires the removal of all vegetation on the subject land, which would be mitigated by future native landscaping of a comparable spatial extent, adaptive management with respect to this biodiversity assessment is of little relevance.

Table 24: Summary of proposed mitigation and management measures for residual impacts (direct, indirect and prescribed)

Mitigation measure - Method/technique	Timing	Frequency	Responsibility	Risk of Failure
1. Ecology & Biodiversity				
Ensure pre-clearing surveys are undertaken in all areas of habitat removed and ensure that a suitably qualified ecologist is present on site during this process as required.	Pre-clearing	As Required	Proponent	Negligible
Ensure searches of built structures for native fauna prior to demolishing and ensure the presence of a suitably qualified spotter catcher onsite during this process as required.	Pre-demolition	As Required	Proponent	Negligible
An assessment by a qualified arborist will be undertaken prior to construction to ensure adequate measures are provided for structural root zones (SRZs) and tree protection zones (TPZs) in the vicinity of construction activities for any large trees to remain, prior to construction activities commencing.	Pre-construction	As Required	Proponent	Negligible
If unexpected protected or threatened fauna are encountered, then work will stop immediately, and a qualified ecologist or wildlife carer will be contacted.	As Required	As Required	Proponent	Negligible
If a Koala is present within 30 metres of an area to be cleared/disturbed, then 24 hours must be provided for the animal to disperse of its own volition.	As Required	As Required	Proponent	Negligible
If any pruning of mature trees is required, it must be completed by a licensed arborist in accordance with appropriate standards if required.	As Required	As Required	Proponent	Negligible
If vegetation is removed (including pruning), it will be mulched/chipped and reused on site.	As Required	As Required	Proponent	Negligible
A Landscape Plan would be prepared to guide species selection and establishment of areas on the subject land to be used as open space of landscaped gardens.	Construction / Operation	As Required	Proponent	Negligible
2. Air Quality				
Vehicles and all fuel powered machinery and equipment will be maintained to meet the requirements of the POEO Act.	Construction	As Required	Proponent	Negligible
All vehicles transporting waste or other materials that may produce odours or dust are to be covered during transportation.	Construction	As Required	Proponent	Negligible

Mitigation measure - Method/technique	Timing	Frequency	Responsibility	Risk of Failure
Debris and wastes must be cleaned from the construction area as soon as practical to ensure light-weight material is not disseminated by wind gusts.	Construction	As Required	Proponent	Negligible
No burning of timber or other wastes will occur.	Construction	As Required	Proponent	Negligible
Dust suppression measures are to be implemented to minimise or prevent air pollution from dust during high winds.	Construction	As Required	Proponent	Negligible
Any stockpiles must be appropriately managed so the potential for air pollution is minimised.	Construction	As Required	Proponent	Negligible
3. Water Quality, Hydrology & Drainage				
Appropriate sedimentation and erosion controls must be installed and maintained always during construction and operations to limit impacts on adjacent vegetation and waterways.	Pre-construction	As Required	Proponent	Negligible
All proposed works will be postponed during periods of extreme weather.	Construction	As Required	Proponent	Negligible
All areas where excavation is required and/or vegetation is removed will be stabilised with the most appropriate method as soon as practical.	Construction	As Required	Proponent	Negligible
Fuels and oils will be stored in a safe and secure location during the construction phase of the development.	Construction	As Required	Proponent	Negligible
Refueling of plant and maintenance of machinery will be undertaken in accordance with best management practices to ensure no spills occur as a result.	Construction	As Required	Proponent	Negligible
Disturbed surfaces will be compacted and stabilised in anticipation of a rain event to reduce the potential for erosion.	Construction	As Required	Proponent	Negligible
Erosion and sediment controls will be monitored for effectiveness and be maintained until the site is remediated and stabilised.	Pre-construction until site stabilised	As Required	Proponent	Negligible
4. Aboriginal & Non-Aboriginal Heritage				
If any Aboriginal items or cultural heritage object (including human remains) are located during the works, all work will cease near the artefact and the Tweed/Byron Local Aboriginal Land Council (LALC) Aboriginal	Construction	As Required	Proponent	Negligible

Mitigation measure - Method/technique	Timing	Frequency	Responsibility	Risk of Failure
Sites Officer to be notified on 07 55361763. The find is also required to be reported to the NSW Office of Environment and Heritage (OEH).				
All staff and contractors will be made aware of their responsibilities under the NPW Act and made aware of the procedures in the event of unearthing an object.	Construction	As Required	Proponent	Negligible
5. Land Uses & Services				
Notification of any significant impacts to residents or nearby sensitive receivers will be provided at least five days prior to the commencement of construction activities where required.	Pre-construction	As Required	Proponent	Negligible
Any underground services will be clearly identified and marked near the excavation works if present.	Pre-construction	As Required	Proponent	Negligible
6. Dangerous Goods/Chemical & Waste Management				
Waste destined for recycling or reuse will be stored separately and in a suitable location to avoid mixing with other materials/wastes.	Construction	As Required	Proponent	Negligible
All residual waste material will be disposed to a suitably licensed landfill or waste management facility.	Construction	As Required	Proponent	Negligible
All working areas will be monitored to ensure they are kept free of rubbish and cleaned at the end of each working shift.	Construction	As Required	Proponent	Negligible
Storage and handling of any dangerous goods must be undertaken in accordance with *The Storage and Handling of Dangerous Goods Code of Practice 2005.*	Construction	As Required	Proponent	Negligible
Sufficient spill kits will always be kept on site.	Construction	As Required	Proponent	Negligible
Any excavated natural material will be treated in accordance with the requirements of the POEO Act.	Construction	As Required	Proponent	Negligible

8. Serious and irreversible impacts

8.1 Assessment for serious and irreversible impacts on biodiversity values

This section assesses whether the proposed development could have a serious and irreversible impact (SAII) on biodiversity values of the subject land. The BAM (Chapter 9, Section 9.1) requires identification and provision of further information regarding impacts on threatened entities at risk of SAII. Specifically, an assessor is required to undertake the following assessment of the development with respect to SAII:

1. BAM section 9.1(3): identify every threatened entity at risk of a SAII that would be impacted by the proposal;
2. BAM section 9.1.1: provide further information regarding the impacts on each Threatened Ecological Community (TEC) at risk of a SAII; and,
3. BAM section 9.1.2: provide further information regarding the impacts on any species at risk of a SAII.

These requirements are detailed below in Sections 8.2 & 8.3.

8.2 Additional impact assessment provisions for TECs at risk of an SAII

There are no identified SAII ecological communities located on the subject land, and none would be impacted as a result of the proposal. The ecological community identified as the most appropriate for this assessment, i.e., PCT 3989 – Far North Paperbark Fern Swamp Forest is not listed as an SAII TEC. Hence information relating to section 9.1.1 of the BAM for SAII TEC's is not required for this development proposal.

8.3 Additional impact assessment provisions for threatened species at risk of an SAII

There are no threatened species located on the subject land that are at risk of a SAII. The candidate threatened species assessed as requiring biodiversity credits under the BOS (i.e., Wallum Froglet) is not listed as an SAII species. The list of threatened entities (species) were reviewed at https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/local-government-and-other-decision-makers/serious-and-irreversible-impacts-of-development , and the BioNet Threatened Biodiversity Data Collection at https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/local-government-and-other-decision-makers/serious-and-irreversible-impacts-of-development.

Hence, information relating to section 9.1.2 of the BAM for SAII species is not required for this development proposal.

9. Impact summary

9.1 Determine an offset requirement for impacts

9.1.1 Impacts on native vegetation and TECs or EECs (ecosystem credits)

The proposal will have minimal ecosystem impacts due to the subject land currently being largely developed and containing predominantly low to very low (i.e., 'cleared') condition vegetation with little biodiversity value. Most of the vegetation to be impacted and requiring offsets is located in the southern portion of the subject land in the existing stormwater basin, which contains some low value managed vegetation, including several native trees. The subject land was historically cleared, and the majority developed, resulting in vegetation communities that are dominated by weeds and predominantly in very low to low condition.

The 'cleared condition' vegetation (PCT 3989) within the subject land, was below the vegetation integrity threshold under the BAM 2020, and no ecosystem credits are required (Table 25). This vegetation zone, along with areas already developed (i.e., hard surfaces and exotic landscaping), and do not require offsets make up approx. 87% of the subject land.

Approx. 13 % of the subject land, does require offsetting with ecosystem credits. Specifically, the vegetation integrity score (VIS) of the low and moderate condition vegetation assigned to PCT 3989 are above the vegetation integrity threshold required for offsetting, and contains at least partially, suitable habitat for thirty-four (n = 34) ecosystem credit species, and will therefore require ecosystem credits. A summary of ecosystem credit requirements is provided in Table 26.

The retirement of the final credits will be carried out in accordance with the NSW Biodiversity Offset Scheme (BOS). BAM credit summary reports are attached in Appendix F.

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

The proposal will potentially impact on the habitat of one (n = 1) species credits species, which due to a previous record and subsequent assumed presence, has been identified for species credit offsets as a precautionary measure despite not being recorded under targeted surveys in accordance with guidelines. This species is:

- Wallum Froglet (*Crinia tinnula*).

Species credits were calculated for this species across each of the vegetation zones that represents potential habitat or fell within the requisite threatened species polygon buffer specified for this species. A summary of species credits required for impacts is provided in Table 27.

The retirement of the final credits will be carried out in accordance with the NSW Biodiversity Offset Scheme (BOS). BAM credit summary reports are attached in Appendix F.

Table 25: Impacts that do not require offset – ecosystem credits

Vegetation zone	PCT name	TEC	Impact area (ha)	TEC association	Entity at risk of an SAII?	Current VI score
Hard surfaces / landscape gardens	n/a	No	1.69 ha	No	No	n/a
VZ 1	PCT 3989 - Cleared	No	0.83 ha	No	No	2.3

Table 26: Impacts that require an offset – ecosystem credits

Vegetation zone	PCT name	TEC	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required
VZ 2	PCT 3989 - Low	Yes	0.25 ha	24.4	0.0	-24.4	2.0	3
VZ 3	PCT 3989 - Moderate	Yes	0.15 ha	42.3	0.0	-42.3	2.0	3
							Total credits	6

Table 27: Impacts that require an offset – species credits

Common name	Scientific name	BC Act status	EPBC Act status	Loss of habitat (ha) or individuals	Biodiversity risk weighting	Number of species credits required
Wallum Froglet	*Crinia tinnula*	V	Not listed	0.71 ha	1.5	4
					Total credits	4

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Figure 14: PCTs and ecosystem credits required for development site

Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)

Contours 0.2m_clipped subject land

Road Corridor

Vegetation Impacted_Ecosystem Credits

- Hard Surfaces (1.51 ha) (0 Credits)
- Landscape Gardens (0.18 ha) (0 Credits)
- VZ 1: PCT 3989 - Cleared (0.83 ha) (0 Credits)
- VZ 2: PCT 3989 - Low (0.25 ha) (3 Credits)
- VZ 3: PCT 3989 - Moderate (0.15 ha) (3 Credits)

TOTAL = 6 ECOSYSTEM CREDITS

0 25 50 75 100 m

Date: 11/12/2023
BDAR - Lot 1 DP 833926; Lot 5-8 DP 1016883
Coordinate System: GDA2020 MGA Zone 56

556000

BEACH ST
KINGSCLIFF ST
KINGSCLIFF LANE
KINGSCLIFF ST
SANDBANK PL
LORIEN WAY
SHOAL PL
LORIEN WAY
CHANNEL PL
LORIEN WAY
LORIEN WAY
SHORE PL
DRIFT CT
DRIFT CT
SPOONBILL LANE
QUAIL PL
LORIEN WAY
BLUE JAY CCT

556000

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Figure 15: PCTs and candidate species credits required for development site

- Subject Land_24A Kingscliff St, Kingscliff (2.9 ha)
- Contours 0.2m_clipped subject land
- RoadCorridor
- Potential Wallum Froglet habitat
- 50m Species Buffer_Wallum Froglet_not clipped to SL

Vegetation Impacted_Species Credits (Wallum Froglet)

- PCT 3989 - Cleared_Exotic (0.46 ha) (1 Credit)
- PCT 3989 - Low (0.18 ha) (2 Credits)
- PCT 3989 - Moderate (0.07 ha) (1 Credit)

TOTAL = 4 SPECIESCREDIT

0 25 50 75 100 m

Date: 11/12/2023
BDAR - Lot 1 DP 833926; Lot 5-8 DP 1016883
Coordinate System: GDA2020 MGA Zone 56

10. Biodiversity credit report

10.1 Ecosystem credits

Biodiversity impacts as a result of the proposal which require ecosystem credits include the removal of approx. 0.25 ha of low condition vegetation, and approx. 0.15 ha of moderate condition vegetation attributed to PCT 3989: Far North Paperbark Fern Swamp Forest. This vegetation is contained in either landscape gardens which contain representative native species, and regrowth vegetation in the southern stormwater drain and basin.

Impacted vegetation zones were assessed as likely to provide potential habitat, at least in part, for thirty-four (*n* = 34) of the thirty-nine (*n* = 39) predicted ecosystem credit species identified by the BAM-C, as detailed in Table 12.

Vegetation integrity scores (VIS) were assessed for all vegetation zones by undertaking six (*n* = 6) vegetation survey plots (400 m²) and four (*n* = 4) VIS plots (1,000 m²) in accordance with the BAM. Three (*n* = 3) survey plots were used to input data into the BAM-C for the three (*n* = 3) vegetation zones within the development site. The VIS scores were: VZ 1 (PCT 3989 – cleared) was 2.3; VZ 2 (PCT 3989 – low) was 24.4; and VZ 3 (PCT 3989 – moderate) was 42.3.

The ecosystem credit requirements have therefore been calculated by the BAM-C for the following condition zones as follows:

- PCT 3989 - Low (0.25 ha) – 3 ecosystem credits: vegetation zone 2 (VIS = 24.4)
- PCT 3989 – Moderate (0.15 ha) – 3 ecosystem credits: vegetation zone 3 (VIS = 42.3)

Details on the ecosystem credit class and matching credit profiles are presented in Table 28 and illustrated in Figure 14.

10.2 Species credits

Impacted vegetation zones were assessed as likely to provide potential habitat in part for one (*n* = 1) candidate species credit species, Wallum Froglet (*Crinia tinnula*), which was previously recorded and assumed to be present for the purposes of this assessment as a precautionary measure.

No threatened flora species have been recorded on the subject land and therefore it is considered that none would be impacted as a result of the proposal.

The species credit requirements have therefore been calculated by the BAM-C as:

- Wallum Froglet (*Crinia tinnula*) – 4 species credits (zones 2 & zone 3) (0.4 ha).

Details on the species credit class and matching credit profile are presented in Table 29 and illustrated in Figure 15.

Table 28: Ecosystem credit class and matching credit profile

Ecosystem credit	Attributes shared with matching credits						
	PCT name	PCT vegetation class	PCT vegetation formation	Associated TEC or EC	Offset trading group	Hollow bearing trees?	IBRA subregion (in which proposal is located)
6	3989-Far North Paperbark Fern Swamp Forest	Coastal Swamp Forests	Forested Wetlands	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	No	Burringbar-Conondale Ranges, Scenic Rim and Sunshine Coast-Gold Coast Lowlands. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.

Table 29: Species credit class and matching credit profile

Species credit	Attributes shared with matching credits				
	Name of threatened species	Kingdom	BC Act status	EPBC Act status	IBRA region
4	Wallum Froglet (*Crinia tinnula*)	Fauna	V	Not listed	Any in NSW

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Appendix A: BDAR requirements compliance

Table 30: Assessment of compliance with BDAR minimum information requirements

BDAR section	BAM ref.	BAM requirement
Introduction Section 1 Section 2	Chapters 2 and 3	**INFORMATION** Introduction to the biodiversity assessment including: ☒ brief description of proposed development ☒ identification of subject land boundary, including: ☒ operational footprint ☒ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure ☒ general description of the subject land ☒ Sources of information used in the assessment, including reports and spatial data ☒ Identification of assessment method applied (i.e., linear or site-based)
Figures 1 Figure 6		**MAPS and TABLES (in document)** ☒ Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure (if BDAR)
		DATA (to be supplied) – N/A

BDAR section	BAM ref.	BAM requirement
Landscape Section 2.1 Section 3.2	Sections 3.1 and 3.2, Appendix E	INFORMATION Identification of site context components and landscape features at the proposed site, including: ☒ general description of subject land topographic and hydrological setting, geology and soils ☒ percent native vegetation cover in the assessment area (as described in BAM Subsection 3.2(4.) ☒ IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.)) Other relevant landscape features which may include: ☒ rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3–4.) and Appendix E) ☒ wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(4.)) ☒ connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.)) ☒ areas of geological significance and soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(10.) ☒ areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.))

BDAR section	BAM ref.	BAM requirement
Figures 2 - 6		MAPS and TABLES (in document) ☒ Site Map ☒ boundary of subject land ☒ cadastre of subject land ☒ landscape features identified in BAM Subsection 3.1.3 ☒ areas of outstanding biodiversity value within the subject land ☒ Location Map ☒ digital aerial photography at 1:1,000 scale or finer ☒ boundary of subject land ☒ 1500 m buffer area *or* 500 m buffer for linear development ☒ landscape features identified in BAM Subsection 3.1.3 ☒ additional detail (e.g. local government area boundaries) relevant at this scale ☒ areas of outstanding biodiversity value within the assessment area Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or Location map include: ☒ IBRA bioregions and subregions ☒ rivers, streams and estuaries ☒ wetlands and important wetlands ☒ connectivity of different areas of habitat ☒ areas of geological significance and soil hazard features
		DATA (to be supplied) ☒ All report maps as separate jpeg files Individual digital shape files of: ☒ subject land boundary ☒ assessment area (i.e. buffer area) boundary

BDAR section	BAM ref.	BAM requirement
		☒ cadastral boundary of subject land ☒ areas of native vegetation cover ☒ areas of habitat connectivity
Native vegetation, TECs and vegetation integrity Section 4.1 – 4.5	Chapter 4	INFORMATION ☒ Patch size (in accordance with BAM Subsection 4.3.2) ☒ Identification of the dominant PCT on the subject land and extent (ha) with justification of method used (existing information or plot-based survey data) ☒ Identification of any TEC associated with the PCT (BAM Subsection 4.2.2) ☒ Estimate of percent cleared value of dominant PCT (BAM Subsection 4.2.1(5.) ☒ Identification of any TEC on site that is not associated with the dominant PCT (Note: This TEC is required to be assessed and offset.) ☒ Equivalence with mapping units of previous vegetation maps reviewed as part of the assessment (i.e. equivalent mapping units) ☒ Vegetation integrity of the PCT(s) on the subject land as individual vegetation zones ☒ Justification for how this was determined (i.e. qualitatively by observing values for the condition attributes set out in Table 2 of the BAM or quantitatively by collecting field data for the condition attributes at a plot in accordance with BAM Subsection 4.3.4) ☒ Use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsections 4.3.3(5.)) Where use of more appropriate local benchmark data is proposed (as described in BAM Subsection 1.4.2, BAM Subsection 4.3.3(5.) and BAM Appendix A): ☒ identify the PCT or vegetation class for which local benchmark data will be applied ☒ identify published sources of local benchmark data (if benchmarks obtained from published sources) ☒ describe methods of local benchmark data collection (if reference plots used to determine local benchmark data) ☒ provide justification for use of local data rather than BioNet Vegetation Classification benchmark values
Figure 5		MAPS and TABLES (in document) ☒ Map of native vegetation extent for the subject land (as described in BAM Section 3.1) ☒ Map of PCT/vegetation zones within the subject land (as described in BAM Section 4.2(1.)

BDAR section	BAM ref.	BAM requirement
Figure 8 Figure 11 Table 11 Appendix F		☒ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries ☒ Map of TEC distribution on the subject land ☒ Patch size of native vegetation (as described in BAM Subsection 4.3.2) Table of current vegetation integrity scores for vegetation zone within the site including: ☒ composition condition score ☒ structure condition score ☒ function condition score ☒ Report from BAM-C (Small area module) including vegetation integrity scores (BAM Section 4.4)
		DATA (to be supplied) ☒ All report maps as separate jpeg files ☒ Plot field data (MS Excel format) ☒ Digital shape files for all maps and spatial data ☒ Field data sheets (if relevant) for determining vegetation integrity (BAM Subsection 4.3.4)
Habitat suitability for threatened species Section 5.1 – 5.5	Chapter 5 and Section 9.1	INFORMATION ☒ Describe the review of existing information and any field survey undertaken to assess habitat constraints and microhabitats for threatened species within the subject land ☒ Determination of the suite of threatened species likely to occur on or use the proposed site according to Steps 1 and 2 in BAM Section 5.2 including species to be assessed for ecosystem credits and the list of species to be assessed for species credits ☒ List of ecosystem credit species derived from the TBDC (as described in BAM Subsections 5.2.1 and 5.2.2) with justification for the exclusion of any ecosystem credit species based on habitat constraints (as described in BAM Subsection 5.2.2) ☒ Identification of candidate species credit species that are at risk of an SAII and therefore, must be further assessed (BAM Section 9.1) Note: Candidate species credit species that are not at risk of an SAII and not incidentally recorded on the subject land do not require further assessment. For candidate species credit species that are at risk of an SAII, a description of the species, any habitat constraints or microhabitats associated with the species on the subject land and information used to create the species polygon/s in accordance with Steps 3 to

BDAR section	BAM ref.	BAM requirement
		5 of BAM Section 5.2 including: ☒ justification for determining that a candidate species credit species at risk of an SAII is unlikely to have suitable habitat on the subject land or specific vegetation zone (based on a field assessment of the subject land and published literature or an expert report prepared in accordance with Box 3 of the BAM) ☒ determination of the presence of remaining candidate species credit species at risk of an SAII (by assuming presence, conducting a threatened species survey or an expert report). Note: If the subject land is mapped on an important habitat map for a species, or for a component of its habitat, the subject land is considered to have suitable habitat for the species to be present. ☒ species polygons identifying the location and area of suitable habitat for each candidate threatened species at risk of an SAII that is recorded on the subject land and is measured by area, OR ☒ species polygons identifying the area of suitable habitat and targeted surveys identifying the count and location of individuals on the subject land for each candidate threatened flora species at risk of an SAII that is recorded on the subject land and is measured by count ☒ species polygons for each threatened species identified on the subject land that is not at risk of an SAII (i.e. incidentally observed during site visit) ☒ Determination of habitat condition within species polygon/s for each threatened species (measured by area) at risk of an SAII or incidentally observed during the site visit (Step 6 of BAM Section 5.2) ☒ For flora species credit species at risk of an SAII or incidentally observed during site visit, provide a count, or an estimation, of the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(4.))
Table 12 Table 13 Table 14 Figure 12		MAPS and TABLES (in document) ☒ Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1, and: ☒ identifying any ecosystem credit species removed from the list of species on the basis of further assessment in accordance with BAM Subsections 5.2.2 and 5.2.3 ☒ identifying the sensitivity to gain class of each species (BAM Section 5.4) ☒ Table detailing species credit species within the subject land at risk of an SAII (BAM Section 9.1) or incidentally observed during the site visit including any associated habitat feature/components and its abundance (flora)/extent of habitat (flora and fauna) and biodiversity risk weighting (BAM Sections 5.2–5.4) ☒ Map of species credit species records within the subject land and species polygons for flora and fauna species at risk of an SAII or

BDAR section	BAM ref.	BAM requirement
		incidentally observed during the site visit (as described in BAM Subsection 5.2.5(1–7.))
		DATA (to be supplied) ☒ Digital shape files of species polygons ☒ Species polygon map in jpeg format ☒ Expert reports and any supporting data used to support conclusions of the expert report ☒ Field data sheets (if relevant) for threatened species surveys
Prescribed impacts Section 7.3 n/a	Chapter 6	INFORMATION ☒ Any prescribed impacts from the small area proposal must be set out in the BDAR consistent with Appendix K
		MAPS AND TABLES (in document) ☒ If relevant, maps showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human- made structures, etc.)
		DATA (to be supplied) ☒ If relevant, digital shape files of prescribed impact feature locations ☒ Prescribed impact features map in jpeg format
Avoid and minimise impacts Section 6.2 n/a	Chapter 7	INFORMATION Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative: ☒ modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology ☒ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location ☒ alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site ☒ Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Subsections 7.1.2 and 7.2.2 ☒ Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal

BDAR section	BAM ref.	BAM requirement
		(as described in BAM Subsection 7.2.1(3.)
Table 21 Figure 6		**MAPS and TABLES (in document)** ☒ Table of measures to be implemented before, during and after construction to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility ☒ Map of final proposal footprint, including construction and operation ☒ Maps demonstrating indirect impact zones where applicable
		DATA (to be supplied) Digital shape files of: ☒ final proposal footprint ☒ direct and indirect impact zones ☒ Maps in jpeg format
Assessment of Impacts Section 7.1 – 7.3	Chapter 8, Section 8.1 and 8.2	**INFORMATION** Determine the impacts on native vegetation and threatened species habitat, including: ☒ description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species habitat (as described in BAM Sections 8.1) ☒ description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal (as described in BAM Subsection 8.2 ☒ Any prescribed impacts from the small area proposal must be set out in the BDAR consistent with Appendix K
Table 23		**MAPS and TABLES (in document)** ☒ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts
		DATA (to be supplied) – N/A
Mitigation and Management of Impacts Section 7.4	Chapter 8, Section 8.4 and 8.5	**INFORMATION** Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Subsections 4.1 and 8.4.2, including (as described in BAM Subsection 8.4.1(2.): ☒ techniques, timing, frequency and responsibility

BDAR section	BAM ref.	BAM requirement
Table 24		☒ identify measures for which there is risk of failure ☒ evaluate the risk and consequence of any residual impacts ☒ document any adaptive management strategy proposed Identification of measures for mitigating impacts related to: ☒ displacement of resident fauna (as described in BAM Subsection 8.4.1) ☒ indirect impacts on native vegetation and habitat (as described in BAM Subsection 8.4.1(3.)) ☒ mitigating prescribed biodiversity impacts (as described in BAM Subsection 8.4.2) ☒ Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5)
		MAPS and TABLES (in document) ☒ Table of measures to be implemented before, during and after construction to mitigate and manage impacts of the proposal, including action, outcome, timing and responsibility
		DATA (to be supplied) – N/A
Thresholds for assessing and offsetting the impacts of the proposal Section 9.1	Chapter 9	**INFORMATION** ☒ Information from the TBDC and/or other sources to report on the current status of threatened species, threatened populations at risk of an SAII and TEC/s for the proposal, and ☒ Report on impacts of the proposal on TEC/s in accordance with BAM Subsection 9.2.1 ☒ Report on impacts of the proposal on threatened species and/or threatened populations at risk of an SAII in accordance with BAM Section 9.1 ☒ Identification of impacts requiring offset in accordance with BAM Section 9.2 ☒ Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.) ☒ Identification of areas not requiring assessment in accordance with BAM Section 9.3

BDAR section	BAM ref.	BAM requirement
n/a Figures 12 - 14		MAPS and TABLES (in document) ☒ Map showing the extent of TECs at risk of an SAII within the subject land ☒ Map showing the location of threatened species at risk of an SAII within the subject land Map showing location of: ☒ impacts requiring offset ☒ impacts not requiring offset ☒ areas not requiring assessment
		DATA (to be supplied) Digital shape files of: ☒ extent of TECs at risk of an SAII within the subject land ☒ threatened species at risk of an SAII within the subject land ☒ boundary of impacts requiring offset ☒ boundary of impacts not requiring offset ☒ boundary of areas not requiring assessment ☒ Maps in jpeg format
Applying the no net loss standard Section 10.1 – 10.2	Chapter 10	INFORMATION ☒ Description of the impact on PCTs/TECs ☒ Description of the impact on threatened species at risk of an SAII or incidentally observed via site visit ☒ Number of ecosystem credits required for impacts on biodiversity values according to BAM Subsection 9 ☒ Number of species credits required for impacts on biodiversity values according to BAM Subsection 10.1.3, including any species credit species that has been incidentally observed on the subject land Note: Species credits for any species at risk of an SAII are calculated in the event that the decision-maker forms the opinion that the proposed impact is unlikely to be serious and irreversible and therefore can be offset. ☒ Identification of credit class for ecosystem credits and species credits according to BAM Section 10.2 (this can be generated from BAM-C)

BDAR section	BAM ref.	BAM requirement
Tables 26 – 27 Tables 28 – 29 Appendix F		**MAPS and TABLES (in document)** ☒ Table showing biodiversity risk weightings ☒ Table of BC Act listing status for PCTs and threatened species requiring offset ☒ Table of PCTs requiring offset and number of ecosystem credits required (Subsection 10.2.1) ☒ Table of species at risk of an SAII or incidentally observed on site assessed for species credits and the number of credits required ☒ BAM-C credit report
		DATA (to be supplied) – N/A

Appendix B: Biodiversity Values Map and Threshold tool report

Department of Planning and Environment

Biodiversity Values Map and Threshold Report

This report is generated using the Biodiversity Values Map and Threshold (BMAT) tool. The BMAT tool is used by proponents to supply evidence to a consent authority to determine whether or not a Biodiversity Development Assessment Report (BDAR) is required under the Biodiversity Conservation Regulation 2017 (Cl. 7.2 & 7.3).

The report provides results for the proposed development footprint area identified by the user and displayed within the blue boundary on the map.

There are two pathways for determining whether or not a BDAR is required for the proposed development:

1. Is there Biodiversity Values Mapping?
2. Is the 'clearing of native vegetation area threshold' exceeded?

Biodiversity Values Map and Threshold Report

Date of Report Generation		05/11/2023 4:56 PM
Biodiversity Values (BV) Map Threshold - Results Summary		
1	**Does the development Footprint intersect with BV mapping?**	no
2	**Was ALL of the BV Mapping within the development footprinted added in the last 90 days?** (dark purple mapping only, no light purple mapping present)	no
3	**Date of expiry of dark purple 90 day mapping***	N/A
4	**Is the Biodiversity Values Map threshold exceeded?**	no
Area Clearing Threshold - Results Summary		
5	**Size of the development or clearing footprint**	26,912.9 sqm
6	**Native Vegetation Area Clearing Estimate (NVACE)**	1,118.4 sqm
7	**Method for determining Minimum Lot Size**	LEP
8	**Minimum Lot Size** (10,000sqm = 1ha)	450 sqm
9	**Area Clearing Threshold** (10,000sqm = 1ha)	2,500 sqm
10	**Is the Area Clearing Threshold exceeded?**	no

Is the proposed development assessed above the Biodiversity Offsets Schema (BOS) threshold? Exceeding the BOS threshold will require completion of a Biodiversity Development Assessment Report (BDAR). More details provided on page 2.	**no**

Department of Planning and Environment

What do I do with this report?

• If the result above indicates a BDAR is required, a Biodiversity Development Assessment Report may be required with your development application. Go to https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor to access a list of accredited assessors. An accredited assessor can apply the Biodiversity Assessment Method and prepare a BDAR.

• If the result above indicates a BDAR is not required, you have not exceeded the BOS threshold. This report can be provided to Council to support your development application. You may still require a permit from your local council. Review the development control plan and consult with council. You may still be required to assess whether the development is '"likely to significantly affect threatened species" as determined under the test in Section 7.3 of the Biodiversity Conservation Act 2016. You may also be required to review the area where no vegetation mapping is available.

• If all Biodiversity Values mapping within your development footprint are less than 90 days old, i.e. mapping is displayed as dark purple on the map, a BDAR may not be required if your Development Application is submitted within that 90 day period. *Any BV mapping less than 90 days old on this report will expire on the date provided in Line item 3 above.

For more detailed advice about actions required, refer to the Interpreting the evaluation report section of the Biodiversity Values Map Threshold Tool User Guide.

Review Options:

• If you believe the Biodiversity Values mapping is incorrect please refer to our BV Map Review webpage for further information.

• If you disagree with the NVACE result for Line Item 6 above (i.e. area of Native Vegetation within the Development footprint proposed to be cleared) you can undertake a self-assessment. For more information about this refer to the Guide for reviewing BMAT Tool area clearing threshold results.

Acknowledgement

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

Signature: _____ Date:_____

(Typing your name in the signature field will be considered as your signature for the purposes of this form)

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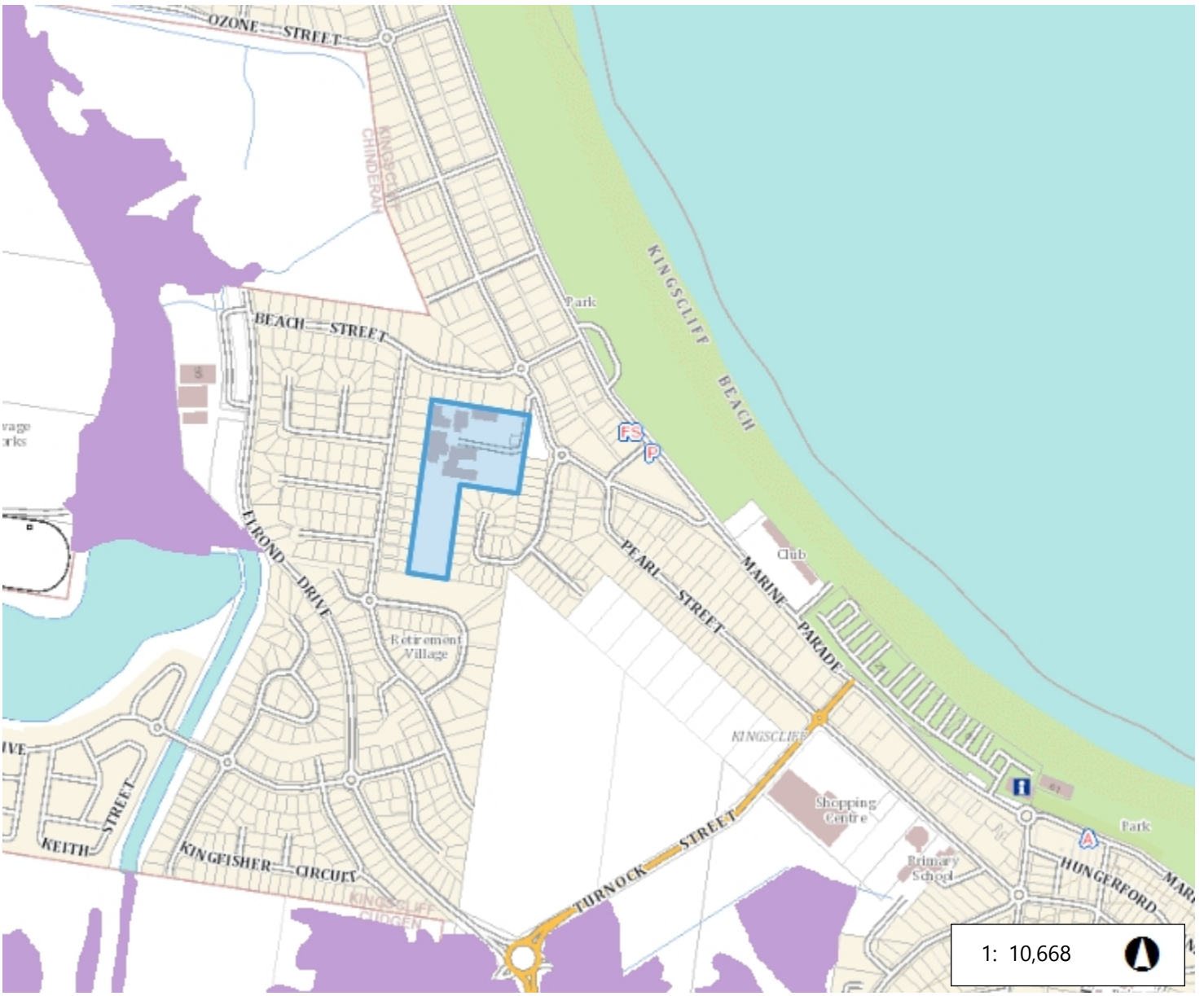
Biodiversity Values Map



541.9 0 270.97 541.9 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

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

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days
- Native Vegetation Area Clearing Estimate (NVACE)
- Development area selected by proponent

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The results provided in this tool are generated using the best available mapping and knowledge of species habitat requirements.

This map is valid as at the date the report was generated. Checking the Biodiversity Values Map viewer for mapping updates is recommended.

Appendix C: Vegetation survey data

Table 31: Vegetation survey data calculated across each BAM plot

plot	pct	area	patchsize	conditionclass	compTree	compShrub	compGrass	compForbs	compFerns	compOther	strucTree	strucShrub	strucGrass	strucForbs	strucFerns	strucOther	funLargeTrees	funHollowtrees	funLitterCover	funLenFallenLogs	funTreeStem5to9	funTreeStem10to19	funTreeStem20to29	funTreeStem30to49	funTreeStem50to79	funTreeRegen	funHighThreatExotic
Plot 1	3989	0.83	4	Cleared	56	555766	6874633.0	10	0	0	1	1	0	0	0.0	0.0	15.0	0.1	0.0	0.0	0	0	1.0	0.0	0	0	0
Plot 4	3989	0.83	4	Cleared	56	555802	6874707.0	190	1	0	5	1	0	0	0.2	0.0	2.2	0.1	0.0	0.0	0	0	1.0	0.0	0	0	0
Plot 6	3989	0.83	4	Cleared	56	555822	6874635.0	190	0	0	3	0	0	1	0.0	0.0	10.2	0.0	0.0	0.1	0	0	1.0	0.0	0	0	0
VZ 2 - Low																											
Plot 3	3989	0.25	4	Low	56	555824	6874721.0	190	1	0	8	7	0	0	0.1	0.0	33.9	0.7	0.0	0.0	0	0	1.0	0.0	0	0	0
VZ 3 - Mod																											
Plot 2	3989	0.15	4	Moderate	56	555789	6874728.0	190	1	0	5	3	0	2	50.0	0.0	45.1	0.4	0.0	1.0	0	0	1.0	0.0	1	1	1
Plot 5	3989	0.15	4	Moderate	56	555854	6874835.0	100	4	1	2	0	0	4	45.1	0.1	0.2	0.0	0.0	0.5	1	0	24.0	0.0	0	1	1
Benchmark	3989								7	6	7	5	2	5	39.0	10.0	83.0	2.0	1.0	4.0	5		42.0	44.0	1	1	1

Notes: For corresponding plot locations on the subject land, see Figure 8 (Survey Locations of BAM plots).

Appendix D: BAM Field Data Sheets - VIS Plots

BAM Site – Field Survey Form

Site Sheet no: 1 of 2

		Survey Name	Zone ID	Recorders			
Date	06 /11/ 2023	Kingscliff	Cleared (VIS = 0.4)	AG			
Zone 56	Datum GDA2020	**Plot ID**	Plot 1	**Plot dimensions**	10m x 100m	**Photo #**	
Easting 555766	Northing 6874633	**IBRA region**	SEQ	**Midline bearing from 0 m**	10 o		
Vegetation Class		Coastal Swamp Forests				Confidence: H M L	
Plant Community Type		PCT 3989 - Far North Paperbark Fern Swamp Forest		**EEC: No**		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of **Native Richness**	**Trees**	0
	Shrubs	0
	Grasses etc.	1
	Forbs	1
	Ferns	0
	Other	0
Sum of **Cover** of native vascular plants by growth form group	**Trees**	0
	Shrubs	0
	Grasses etc.	15
	Forbs	0.1
	Ferns	0
	Other	0
High Threat Weed cover		7.3

BAM Attribute (1000 m² plot)		
DBH	**# Tree Stems Count**	**# Stems with Hollows**
80 + cm	-	
50 – 79 cm	-	
30 – 49 cm	-	
20 – 29 cm	-	
10 – 19 cm	-	
5 – 9 cm	-	
< 5 cm	-	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0 m	

Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30…, 100, 200, 300…). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**

For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	1	1	1	1	1	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e
Average of the 5 subplots	1																			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m² plot: Sheet 2 of 2		Survey Name	Plot Identifier	Recorders
Date	06 /11/ 2023	Kingscliff	Plot 1	AG

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
Grass	*Cynodon dactylon*	N	15			
	Setaria sphacelata	E	10			
	Paspalum dilatatum	HTE	5			
	Setaria palmifolia	E	0.1			
	Axonopus fissifolius	HTE	2			
	Paspalum notatum	E	1			
	Paspalum urvillei	E	1			
	Arrhenarthereum elatius	E	0.1			
Forb	*Sphagneticola trilobata*	E	65			
	Crotalaria lanceolata	E	0.1			
	Hypochaeris radicata	E	0.1			
	Oxalis corniculata	E	0.1			
	Taraxacum officinale	E	0.1			
	Richardia brasiliensis	E	0.2			
	Trifolium repens	E	0.2			
	Conyza bonariensis	E	0.1			
	Cyanthillium cinereum	N	0.1			
	Solanum americanum	E	0.2			
	Bidens pilosa	HTE	0.2			
	Sonchus oleraceus	E	0.1			
	Polygala paniculata	E	0.2			
	Crassocephalum crepidioides	E	0.1			
Fern	*Nephrolepis cordifolia*	E	0.1			
Other	*Macrotyloma axillare*	E	0.1			
	Ipomoea cairica	HTE	0.1			

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

BAM Site – Field Survey Form

Site Sheet no: 1 of 2

		Survey Name	Zone ID	Recorders			
Date	06 /11/ 2023	Kingscliff	Mod (VIS = 42.3)	AG			
Zone 56	Datum GDA2020	**Plot ID**	Plot 2	**Plot dimensions**	10m x 100m	**Photo #**	
Easting 555789	Northing 6874728	**IBRA region**	SEQ	**Midline bearing from 0 m**	190 o		
Vegetation Class		Coastal Swamp Forests				Confidence: H M L	
Plant Community Type		PCT 3989 - Far North Paperbark Fern Swamp Forest		**EEC: No**		Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of **Native Richness**	**Trees**	1
	Shrubs	0
	Grasses etc.	5
	Forbs	3
	Ferns	0
	Other	2
Sum of **Cover** of native vascular plants by growth form group	**Trees**	50
	Shrubs	0
	Grasses etc.	45.1
	Forbs	0.4
	Ferns	0
	Other	1
High Threat Weed cover		5.2

BAM Attribute (1000 m² plot)		
DBH	**# Tree Stems Count**	**# Stems with Hollows**
80 + cm	-	-
50 – 79 cm	I	-
30 – 49 cm	-	-
20 – 29 cm	𝍸 𝍸	-
10 – 19 cm	𝍸 𝍸 𝍸	-
5 – 9 cm	𝍸 𝍸 III	-
< 5 cm	Y	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0 m	

Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30…, 100, 200, 300…). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**

For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	1	1	1	1	1	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e
Average of the 5 subplots	1																			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m² plot: Sheet 2 of 2		Survey Name	Plot Identifier	Recorders
Date	06 /11/ 2023	Kingscliff	Plot 2	AG

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
Tree	*Casuarina glauca*	N	50			
Grass	*Cyperus brevifolius*	E	0.5			
	Cynodon dactylon	N	1			
	Setaria sphacelata	E	1			
	Paspalum dilatatum	HTE	5			
	Leersia hexandra	N	40			
	Typha orientalis	N	2			
	Paspalum distichum	N	2			
	Juncus cognatus	E	0.1			
	Juncus prismatocarpus	N	0.1			
Forb	*Sphagneticola trilobata*	E	50			
	Cyclospermum leptophyllum	E	0.1			
	Hypochaeris radicata	E	0.1			
	Oxalis corniculata	E	0.1			
	Taraxacum officinale	E	0.1			
	Senecio madagascariensis	HTE	0.1			
	Trifolium repens	E	0.1			
	Conyza bonariensis	E	0.1			
	Persicaria decipiens	N	0.2			
	Solanum americanum	E	0.1			
	Polygala paniculata	E	0.1			
	Cuphea carthagenensis	E	0.5			
	Ageratum houstonianum	E	0.1			
	Ludwigia peploides	N	0.1			
	Crassocephalum crepidioides	E	0.1			
	Goodenia paniculata	N	0.1			
Other	*Macrotyloma axillare*	E	0.1			
	Ipomoea cairica	HTE	0.1			
	Archontophoenix alexandrae	E	1			
	Amyema congener	N	0.5			
	Amyema cambagei	N	0.5			

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

BAM Site – Field Survey Form

Site Sheet no: 1 of 2

		Survey Name	Zone ID	Recorders			
Date	06 /11/ 2023	Kingscliff	Low (VIS = 24.4)	AG			
Zone 56	Datum GDA2020	**Plot ID**	Plot 3	**Plot dimensions**	20m x 50m	**Photo #**	
Easting 555824	Northing 6874721	**IBRA region**	SEQ	**Midline bearing from 0 m**	190 º		
Vegetation Class		Coastal Swamp Forests					Confidence: H M L
Plant Community Type		PCT 3989 - Far North Paperbark Fern Swamp Forest		**EEC: No**			Confidence: H M L

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of **Native Richness**	**Trees**	1
	Shrubs	0
	Grasses etc.	8
	Forbs	7
	Ferns	0
	Other	0
Sum of **Cover** of native vascular plants by growth form group	**Trees**	0.1
	Shrubs	0
	Grasses etc.	33.9
	Forbs	0.7
	Ferns	0
	Other	0.0
High Threat Weed cover		15.6

BAM Attribute (1000 m² plot)		
DBH	**# Tree Stems Count**	**# Stems with Hollows**
80 + cm	-	
50 – 79 cm	-	
30 – 49 cm	-	
20 – 29 cm	-	
10 – 19 cm	-	
5 – 9 cm	-	
< 5 cm	Y	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0 m	

Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (e.g., 10, 20, 30…, 100, 200, 300…). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**

For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	1	1	1	1	1	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e
Average of the 5 subplots	1																			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m² plot: Sheet 2 of 2		Survey Name	Plot Identifier	Recorders
Date	06 /11/ 2023	Kingscliff	Plot 3	AG

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
Tree	*Casuarina glauca*	N	0.1			
Grass	*Cyperus brevifolius*	E	5			
	Cynodon dactylon	N	1			
	Setaria sphacelata	E	7.5			
	Paspalum dilatatum	HTE	15			
	Leersia hexandra	N	20			
	Typha orientalis	N	7.5			
	Paspalum distichum	N	5			
	Paspalum notatum	E	5			
	Paspalum urvillei	E	2.5			
	Juncus cognatus	E	0.1			
	Juncus prismatocarpus	N	0.1			
	Juncus planifolius	N	0.1			
	Juncus usitatus	N	0.1			
	Cyperus sesquiflorus	E	0.1			
	Cyperus polystachyos	N	0.1			
Forb	*Sphagneticola trilobata*	E	25			
	Sonchus oleraceus	E	0.1			
	Hypochaeris radicata	E	0.1			
	Oxalis corniculata	E	0.1			
	Taraxacum officinale	E	0.1			
	Senecio madagascariensis	HTE	0.1			
	Trifolium repens	E	0.5			
	Conyza bonariensis	E	0.2			
	Persicaria decipiens	N	0.1			
	Solanum americanum	E	0.1			
	Crassocephalum crepidioides	E	0.1			
	Polygala paniculata	E	0.1			
	Cuphea carthagenensis	E	5			
	Fimbristylis dichotoma	N	0.1			
	Ludwigia peploides	N	0.1			
	Bidens pillosa	HTE	0.5			
	Commelina cyanea	N	0.1			
	Hemarthria uncinata	N	0.1			
	Hydrocotyle bonariensis	E	0.5			
	Philydrum lanuginosum	N	0.1			
	Stellaria media	E	0.1			
	Goodenia paniculata	N	0.1			
Other	*Macrotyloma axillare*	E	0.1			
	Macroptilium atropurpureum	E	0.1			

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

BAM Site – Field Survey Form

Site Sheet no: 1 of 2

		Survey Name	Zone ID	Recorders			
Date	06 /11/ 2023	Kingscliff	Cleared (VIS = 2.3)	AG			
Zone 56	Datum GDA2020	**Plot ID**	Plot 4	**Plot dimensions**	20m x 50m	**Photo #**	
Easting 555802	Northing 6874707	**IBRA region**	SEQ	**Midline bearing from 0 m**	190 o		
Vegetation Class		Coastal Swamp Forests					Confidence: H M L
Plant Community Type		PCT 3989 - Far North Paperbark Fern Swamp Forest		**EEC: No**			Confidence: H M L

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of **Native Richness**	**Trees**	1
	Shrubs	0
	Grasses etc.	5
	Forbs	1
	Ferns	0
	Other	0
Sum of **Cover** of native vascular plants by growth form group	**Trees**	0.2
	Shrubs	0
	Grasses etc.	2.2
	Forbs	0.1
	Ferns	0
	Other	0
High Threat Weed cover		5.2

BAM Attribute (1000 m² plot)		
DBH	**# Tree Stems Count**	**# Stems with Hollows**
80 + cm	-	-
50 – 79 cm	-	-
30 – 49 cm	-	-
20 – 29 cm	-	-
10 – 19 cm	-	-
5 – 9 cm	-	-
< 5 cm	Y	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0 m	

Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30…, 100, 200, 300…). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**

For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	1	1	1	1	1	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e
Average of the 5 subplots	1																			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m² plot: Sheet 2 of 2		Survey Name	Plot Identifier	Recorders
Date	06 /11/ 2023	Kingscliff	Plot 4	AG

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
Tree	*Casuarina glauca*	N	0.2			
Grass	*Cynodon dactylon*	N	1			
	Setaria sphacelata	E	15			
	Juncus usitatus	N	0.1			
	Cyperus brevifolius	E	2			
	Leersia hexandra	N	0.5			
	Paspalum dilatatum	HTE	5			
	Paspalum urvillei	E	1			
	Typha orientalis	N	0.1			
	Hemarthria uncinata	N	0.5			
	Juncus cognatus	E	0.1			
Forb	*Sphagneticola trilobata*	E	70			
	Cuphea carthagenensis	E	2.5			
	Conyza bonariensis	E	0.1			
	Crotalaria lanceolata	E	0.1			
	Hypochaeris radicata	E	0.1			
	Oxalis corniculata	E	0.1			
	Taraxacum officinale	E	0.1			
	Cyclospermum leptophyllum	E	0.1			
	Trifolium repens	E	0.1			
	Hydrocotyle bonariensis	E	5			
	Bidens pilosa	HTE	0.2			
	Sonchus oleraceus	E	0.1			
	Polygala paniculata	E	0.1			
	Crassocephalum crepidioides	E	0.1			
	Goodenia paniculata	N	0.1			

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

BAM Site – Field Survey Form

Site Sheet no: 1 of 2

		Survey Name	Zone ID	Recorders			
Date	07 /11/ 2023	Kingscliff	Low (VIS = 33.6)	AG			
Zone 56	Datum GDA2020	**Plot ID**	Plot 5	**Plot dimensions**	10m x 40m	**Photo #**	
Easting 555854	Northing 6874835	**IBRA region**	SEQ	**Midline bearing from 0 m**	100 º		
Vegetation Class		Coastal Swamp Forests					Confidence: H M L
Plant Community Type		PCT 3989 - Far North Paperbark Fern Swamp Forest		**EEC: No**			Confidence: H M L

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of **Native Richness**	**Trees**	4
	Shrubs	1
	Grasses etc.	2
	Forbs	0
	Ferns	0
	Other	4
Sum of **Cover** of native vascular plants by growth form group	**Trees**	45.1
	Shrubs	0.1
	Grasses etc.	0.2
	Forbs	0
	Ferns	0
	Other	0.5
High Threat Weed cover		10.2

BAM Attribute (1000 m² plot)		
DBH	**# Tree Stems Count**	**# Stems with Hollows**
80 + cm	-	
50 – 79 cm	I	
30 – 49 cm	-	
20 – 29 cm	III	
10 – 19 cm	IIII	
5 – 9 cm	-	
< 5 cm	Y	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0 m	

Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30…, 100, 200, 300…). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**

For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	25	50	25	10	10	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e
Average of the 5 subplots	24																			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m² plot: Sheet 2 of 2		Survey Name	Plot Identifier	Recorders
Date	07 /11/ 2023	Kingscliff	Plot 5	AG

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
Tree	*Acmena smithii*	N	25			
	Cupaniopsis anacardioides	N	15			
	Callistemon viminalis	N	5			
	Acacia melanoxylon	N	0.1			
Shrub	*Grevillea australis*	E	5			
	Grevillea superba	E	1			
	Hibiscus rosa-sinensiscvs	E	2			
	Murraya paniculata	E	10			
	Westringia glabra	N	0.1			
Grass	*Cyperus brevifolius*	E	0.1			
	Dianella caerulea	N	0.1			
	Setaria sphacelata	E	0.1			
	Paspalum dilatatum	HTE	5			
	Lomandra longifolia	N	0.1			
Forb	*Sphagneticola trilobata*	E	5			
	Strelitzia nicolai	E	1			
	Strelitzia reginae	E	1			
	Hypochaeris radicata	E	0.1			
	Senecio madagascariensis	HTE	0.1			
	Trifolium repens	E	0.1			
	Conyza bonariensis	E	0.1			
	Agapanthus praecox	E	50			
	Aechmea gamosepala	E	5			
	Yucca aloifolia	E	0.5			
	Agave attenuata	E	0.2			
	Crassocephalum crepidioides	E	0.1			
Other	*Platycerium bifurcatum*	N	0.1			
	Ipomoea cairica	HTE	0.1			
	Stephania japonica	N	0.1			
	Smilax australis	N	0.1			
	Syagrus romanzoffiana	E	0.1			
	Asparagus aethiopicus	HTE	5			
	Liriope giganteum	E	1			
	Lepidozamia peroffskyana	N	0.2			

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

BAM Site – Field Survey Form

Site Sheet no: 1 of 2

		Survey Name	Zone ID	Recorders			
Date	07 /11/ 2023	Kingscliff	Cleared (VIS = 0.5)	AG			
Zone 56	Datum GDA2020	**Plot ID**	Plot 6	**Plot dimensions**	20m x 20m	**Photo #**	
Easting 555822	Northing 6874635	**IBRA region**	SEQ	**Midline bearing from 0 m**	280 º		
Vegetation Class		Coastal Swamp Forests					Confidence: H M L
Plant Community Type		PCT 3989 - Far North Paperbark Fern Swamp Forest		**EEC: No**			Confidence: H M L

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of **Native Richness**	**Trees**	0
	Shrubs	0
	Grasses etc.	3
	Forbs	0
	Ferns	0
	Other	1
Sum of **Cover** of native vascular plants by growth form group	**Trees**	0
	Shrubs	0
	Grasses etc.	10.2
	Forbs	0
	Ferns	0
	Other	0.1
High Threat Weed cover		29.2

BAM Attribute (1000 m² plot)		
DBH	**# Tree Stems Count**	**# Stems with Hollows**
80 + cm	-	
50 – 79 cm	-	
30 – 49 cm	-	
20 – 29 cm	-	
10 – 19 cm	-	
5 – 9 cm	-	
< 5 cm	-	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0 m	

Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30…, 100, 200, 300…). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**

For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	1	1	1	1	1	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e
Average of the 5 subplots	1																			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m² plot: Sheet 2 of 2		Survey Name	Plot Identifier	Recorders
Date	07 /11/ 2023	Kingscliff	Plot 6	AG

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
Grass	*Cynodon dactylon*	N	10			
	Setaria sphacelata	E	10			
	Paspalum dilatatum	HTE	10			
	Paspalum mandiocanum	HTE	15			
	Leersia hexandra	N	0.1			
	Melinis repens	E	0.1			
	Paspalum urvillei	E	5			
	Juncus usitatus	N	0.1			
	Axonopus fissifolius	HTE	2			
Forb	*Sphagneticola trilobata*	E	50			
	Senecio madagascariensis	HTE	0.1			
	Hypochaeris radicata	E	0.1			
	Crassocephalum crepidioides	E	0.1			
	Taraxacum officinale	E	0.1			
	Richardia brasiliensis	E	0.1			
	Trifolium repens	E	0.2			
	Conyza sumatrensis	E	0.1			
	Euphorbia cyathophora	E	0.2			
	Solanum americanum	E	0.1			
	Bidens pilosa	HTE	2			
	Sonchus oleraceus	E	0.1			
	Polygala paniculata	E	0.1			
	Cuphea carthagenensis	E	0.5			
	Hydrocotyle bonariensis	E	2			
Fern	*Nephrolepis cordifolia*	E	0.1			
Other	*Macroptilium atropurpureum*	E	0.1			
	Ipomoea cairica	HTE	0.1			
	Parsonsia straminea	N	0.1			

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

Appendix E: Flora species list

FAMILY	GENUS	SPECIES	STATUS
Amaranthaceae	*Amaranthus*	*viridis*	*
Amaryllidaceae	*Hymenocallis*	*littoralis*	*
Anacardiaceae	*Schinus*	*terebinthifolius*	*
Apocynaceae	*Parsonsia*	*straminea*	
Apocynaceae	*Plumeria*	*alba*	*
Araliaceae	*Hydrocotyle*	*bonariensis*	*
Araliaceae	*Hydrocotyle*	*tripartita*	
Arecaceae	*Archontophoenix*	*cunninghamiana*	
Arecaceae	*Archontophoenix*	*alexandrae*	*
Arecaceae	*Syagrus*	*romanzoffiana*	*
Asparagaceae	*Agave*	*attenuata*	*
Asparagaceae	*Asparagus*	*aethiopicus*	*‡
Asparagaceae	*Asparagus*	*africanus*	*
Asparagaceae	*Dracaena*	*spp.*	*
Asparagaceae	*Liriope*	*giganteum*	*
Asparagaceae	*Lomandra*	*longifolia*	
Asparagaceae	*Yucca*	*aloifolia*	*
Asphodelaceae	*Dianella*	*caerulea*	
Asteraceae	*Agapanthus*	*praecox*	*
Asteraceae	*Ageratum*	*conyzoides subsp. conyzoides*	*
Asteraceae	*Ageratum*	*houstonianum*	*
Asteraceae	*Ambrosia*	*artemisiifolia*	*‡
Asteraceae	*Bidens*	*pilosa*	*
Asteraceae	*Conyza*	*bonariensis*	*
Asteraceae	*Conyza*	*sumatrensis*	*
Asteraceae	*Cotula*	*australis*	
Asteraceae	*Crassocephalum*	*crepidioides*	*
Asteraceae	*Cyanthillium*	*cinereum var. cinereum*	
Asteraceae	*Gamochaeta*	*coarctata*	*
Asteraceae	*Gazania*	*rigens*	*
Asteraceae	*Gerbera*	*jamesonii*	*
Asteraceae	*Hypochaeris*	*radicata*	*
Asteraceae	*Senecio*	*madagascariensis*	*‡
Asteraceae	*Senecio*	*quadridentatus*	
Asteraceae	*Soliva*	*sessilis*	*
Asteraceae	*Sonchus*	*oleraceus*	*
Asteraceae	*Sphagneticola*	*trilobata*	*
Asteraceae	*Symphyotrichum*	*subulatum*	*
Asteraceae	*Taraxacum*	*officinale*	*

FAMILY	GENUS	SPECIES	STATUS
Brassicaceae	*Lepidium*	*virginicum*	*
Bromeliaceae	*Aechmea*	*gamosepala*	*
Cactaceae	*Hylocereus*	*polyrhizus*	*
Campanulaceae	*Lobelia*	*anceps*	
Caryophyllaceae	*Stellaria*	*media*	*
Casuarinaceae	*Casuarina*	*glauca*	
Commelinaceae	*Commelina*	*cyanea*	
Convolvulaceae	*Ipomoea*	*cairica*	*‡
Convolvulaceae	*Ipomoea*	*purpurea*	*
Crassulaceae	*Crassula*	*sieberiana*	
Cyperaceae	*Cyperus*	*brevifolius*	*
Cyperaceae	*Cyperus*	*difformis*	
Cyperaceae	*Cyperus*	*eragrostis*	*
Cyperaceae	*Cyperus*	*haspan subsp. haspan*	
Cyperaceae	*Cyperus*	*laevigatus*	
Cyperaceae	*Cyperus*	*polystachyos*	
Cyperaceae	*Cyperus*	*sesquiflorus*	*
Cyperaceae	*Fimbristylis*	*dichotoma*	
Cyperaceae	*Fimbristylis*	*polytrichoides*	
Cyperaceae	*Fimbristylis*	*velata*	
Elaeocarpaceae	*Elaeocarpus*	*reticulatus*	
Euphorbiaceae	*Euphorbia*	*cyathophora*	*
Euphorbiaceae	*Macaranga*	*tanarius*	
Fabaceae - Caesalpinioideae	*Delonix*	*regia*	*
Fabaceae - Caesalpinioideae	*Senna*	*septemtrionalis*	*
Fabaceae - Faboideae	*Macroptilium*	*atropurpureum*	*
Fabaceae - Faboideae	*Macrotyloma*	*axillare*	*
Fabaceae - Faboideae	*Medicago*	*lupulina*	*
Fabaceae - Faboideae	*Trifolium*	*repens*	*
Fabaceae - Mimosoideae	*Acacia*	*melanoxylon*	
Goodeniaceae	*Goodenia*	*paniculata*	
Iridaceae	*Sisyrinchium*	*rosulatum*	*
Juncaceae	*Juncus*	*cognatus*	*
Juncaceae	*Juncus*	*planifolius*	
Juncaceae	*Juncus*	*polyanthemus*	
Juncaceae	*Juncus*	*prismatocarpus*	
Juncaceae	*Juncus*	*usitatus*	
Lamiaceae	*Westringia*	*glabra*	
Lauraceae	*Cryptocarya*	*triplinervis var. triplinervis*	
Loranthaceae	*Amyema*	*cambagei*	
Loranthaceae	*Amyema*	*congener*	
Malvaceae	*Brachychiton*	*acerifolius*	

FAMILY	GENUS	SPECIES	STATUS
Malvaceae	*Hibiscus*	*rosa-sinensiscvs*	*
Malvaceae	*Sida*	*rhombifolia*	*
Menispermaceae	*Stephania*	*japonica*	
Myrtaceae	*Acmena*	*smithii*	
Myrtaceae	*Callistemon*	*viminalis*	
Myrtaceae	*Melaleuca*	*leucandendra*	
Myrtaceae	*Melaleuca*	*quinquenervia*	
Myrtaceae	*Syzygium*	*australe*	
Myrtaceae	*Trisaniopsis*	*laurina*	
Onagraceae	*Ludwigia*	*octovalvis*	
Onagraceae	*Ludwigia*	*peploides*	
Orchidaceae	*Microtis*	*unifolia*	
Oxalidaceae	*Oxalis*	*corniculata*	‡*
Oxalidaceae	*Oxalis*	*corniculata*	*
Passifloraceae	*Passiflora*	*foetida var. hispida*	*
Phyllanthaceae	*Breynia*	*oblongifolia*	
Phyllanthaceae	*Phyllanthus*	*tenellus*	*
Plantaginaceae	*Bacopa*	*monnieri*	
Plantaginaceae	*Plantago*	*lanceolata*	*
Poaceae	*Aristida*	*warburgii*	
Poaceae	*Arrhenatherum*	*elatius*	*
Poaceae	*Axonopus*	*compressus*	*
Poaceae	*Axonopus*	*fissifolius*	*
Poaceae	*Cynodon*	*dactylon*	
Poaceae	*Hemarthria*	*uncinata var. spathacea*	
Poaceae	*Ischaemum*	*australe var. australe*	
Poaceae	*Leersia*	*hexandra*	
Poaceae	*Melinis*	*repens*	*
Poaceae	*Panicum*	*effusum*	
Poaceae	*Panicum*	*repens*	*
Poaceae	*Paspalum*	*dilatatum*	*
Poaceae	*Paspalum*	*distichum*	
Poaceae	*Paspalum*	*mandiocanum*	*
Poaceae	*Paspalum*	*notatum*	*
Poaceae	*Paspalum*	*urvillei*	*
Poaceae	*Paspalum*	*vaginatum*	
Poaceae	*Sacciolepis*	*indica*	
Poaceae	*Setaria*	*palmifolia*	*
Poaceae	*Setaria*	*sphacelata*	*
Polygalaceae	*Emex*	*australis*	*
Polygalaceae	*Polygala*	*paniculata*	*
Polygonaceae	*Persicaria*	*decipiens*	

FAMILY	GENUS	SPECIES	STATUS
Polygonaceae	*Rumex*	*acetosella*	*
Polygonaceae	*Rumex*	*brownii*	
Polygonaceae	*Rumex*	*crispus*	*
Polypodiaceae	*Platycerium*	*bifurcatum*	
Polypodiaceae	*Platycerium*	*superbum*	
Primulaceae	*Lysimachi*	*arvensis*	*
Proteaceae	*Banksia*	*robur*	
Proteaceae	*Grevillea*	*australis*	*
Proteaceae	*Grevillea*	*banksii*	*
Proteaceae	*Grevillea*	*banksii alba*	*
Proteaceae	*Grevillea*	*excelsior*	*
Proteaceae	*Grevillea*	*robusta*	
Proteaceae	*Grevillea*	*superba*	*
Rutaceae	*Murraya*	*paniculata*	*
Sapindaceae	*Cupaniopsis*	*anacardioides*	
Smilacaceae	*Smilax*	*australis*	
Solanaceae	*Cestrum*	*nocturnum*	*
Solanaceae	*Solanum*	*americanum*	*
Solanaceae	*Solanum*	*mauritianum*	*
Solanaceae	*Solanum*	*nodiflorum*	*
Solanaceae	*Solanum*	*seaforthianum*	*
Strelitziaceae	*Strelitzia*	*nicolai*	*
Strelitziaceae	*Strelitzia*	*reginae*	*
Thymelaeaceae	*Wikstroemia*	*indica*	
Typhaceae	*Typha*	*orientalis*	
Verbenaceae	*Duranta*	*erecta*	*
Verbenaceae	*Lantana*	*montevidensis*	*‡
Zamiaceae	*Lepidozamia*	*peroffskyana*	
* denotes an introduced species			
+ denotes a threatened species			
‡ denotes a gazetted weed.			

Appendix F: Credit reports (FINALISED)

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00042864/BAAS18040/23/00042865	24A Kingscliff Street_Kingscliff_Seniors Housing	14/03/2024
Assessor Name	Report Created	BAM Data version *
Adam Gosling	14/03/2024	67
Assessor Number	BAM Case Status	Date Finalised
BAAS18040	Finalised	14/03/2024
Assessment Revision	Assessment Type	BOS entry trigger
3	Part 4 Developments (Small Area)	BOS Threshold: Area clearing threshold

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

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

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

Far North Paperbark Fern Swamp Forest												
1	3989_Moderate	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	42.3	42.3	0.15	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		3
2	3989_Low	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	24.4	24.4	0.25	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		3

3	3989_Cleared	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	2.3	2.3	0.83	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		0
											Subtotal	**6**
											Total	**6**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Crinia tinnula / Wallum Froglet (Fauna)									
3989_Low	24.4	24.4	0.18	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	2

3989_Cleared	2.3	2.3	0.46	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	1
3989_Moderate	42.3	42.3	0.07	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	1
								Subtotal	**4**

BAM Candidate Species Report

Proposal Details

Assessment Id 00042864/BAAS18040/23/00042865	Proposal Name 24A Kingscliff Street_Kingscliff_Seniors Housing	BAM data last updated * 14/03/2024
Assessor Name Adam Gosling	Report Created 14/03/2024	BAM Data version * 67
Assessor Number BAAS18040	Assessment Type Part 4 Developments (Small Area)	BAM Case Status Finalised
Assessment Revision 3	Date Finalised 14/03/2024	BOS entry trigger BOS Threshold: Area clearing threshold

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

List of Species Requiring Survey

Name	Presence	Survey Months
Acronychia littoralis Scented Acronychia	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Crinia tinnula Wallum Froglet	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Drynaria rigidula Basket Fern	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Endiandra muelleri subsp. bracteata Green-leaved Rose Walnut	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Litoria olongburensis Olongburra Frog	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Oberonia complanata Yellow-flowered King of the Fairies	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Oldenlandia galioides Sweet False Galium	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☑ Dec ☑ Survey month outside the specified months?

Petalura litorea Coastal Petaltail	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☑ Survey month outside the specified months?
Rhodamnia rubescens Scrub Turpentine	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Rhodomyrtus psidioides Native Guava	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Thersites mitchellae Mitchell's Rainforest Snail	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

Common Name	Scientific Name
Wallum Froglet	Crinia tinnula
Olongburra Frog	Litoria olongburensis

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Beach Stone-curlew	Esacus magnirostris	Habitat degraded Geographic limitations
Curlew Sandpiper	Calidris ferruginea	Habitat constraints
Eastern Curlew	Numenius madagascariensis	Habitat constraints

Great Knot	Calidris tenuirostris	Habitat constraints Geographic limitations
Laced Fritillary	Argynnis hyperbius	Geographic limitations
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Little Bent-winged Bat	Miniopterus australis	Habitat constraints
Swift Parrot	Lathamus discolor	Habitat constraints

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00042864/BAAS18040/23/00042865	24A Kingscliff Street_Kingscliff_Seniors Housing	14/03/2024
Assessor Name	**Report Created**	**BAM Data version ***
Adam Gosling	14/03/2024	67
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS18040	Part 4 Developments (Small Area)	Finalised
Assessment Revision	**BOS entry trigger**	**Date Finalised**
3	BOS Threshold: Area clearing threshold	14/03/2024

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

Common Name	Scientific Name	Vegetation Types(s)
Australian Painted Snipe	Rostratula australis	3989-Far North Paperbark Fern Swamp Forest
Bar-tailed Godwit (baueri)	Limosa lapponica baueri	3989-Far North Paperbark Fern Swamp Forest
Beach Stone-curlew	Esacus magnirostris	3989-Far North Paperbark Fern Swamp Forest
Black Falcon	Falco subniger	3989-Far North Paperbark Fern Swamp Forest
Black-tailed Godwit	Limosa limosa	3989-Far North Paperbark Fern Swamp Forest
Curlew Sandpiper	Calidris ferruginea	3989-Far North Paperbark Fern Swamp Forest
Dusky Woodswallow	Artamus cyanopterus cyanopterus	3989-Far North Paperbark Fern Swamp Forest
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	3989-Far North Paperbark Fern Swamp Forest
Eastern Curlew	Numenius madagascariensis	3989-Far North Paperbark Fern Swamp Forest
Great Knot	Calidris tenuirostris	3989-Far North Paperbark Fern Swamp Forest
Greater Sand-plover	Charadrius leschenaultii	3989-Far North Paperbark Fern Swamp Forest

Grey-headed Flying-fox	Pteropus poliocephalus	3989-Far North Paperbark Fern Swamp Forest
Large Bent-winged Bat	Miniopterus orianae oceanensis	3989-Far North Paperbark Fern Swamp Forest
Lesser Sand-plover	Charadrius mongolus	3989-Far North Paperbark Fern Swamp Forest
Little Bent-winged Bat	Miniopterus australis	3989-Far North Paperbark Fern Swamp Forest
Little Eagle	Hieraaetus morphnoides	3989-Far North Paperbark Fern Swamp Forest
Little Lorikeet	Glossopsitta pusilla	3989-Far North Paperbark Fern Swamp Forest
Magpie Goose	Anseranas semipalmata	3989-Far North Paperbark Fern Swamp Forest
Red Knot	Calidris canutus	3989-Far North Paperbark Fern Swamp Forest
Sanderling	Calidris alba	3989-Far North Paperbark Fern Swamp Forest
Scarlet Robin	Petroica boodang	3989-Far North Paperbark Fern Swamp Forest
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami	3989-Far North Paperbark Fern Swamp Forest
Spotted Harrier	Circus assimilis	3989-Far North Paperbark Fern Swamp Forest
Spotted-tailed Quoll	Dasyurus maculatus	3989-Far North Paperbark Fern Swamp Forest
Square-tailed Kite	Lophoictinia isura	3989-Far North Paperbark Fern Swamp Forest
Superb Fruit-Dove	Ptilinopus superbus	3989-Far North Paperbark Fern Swamp Forest
Swift Parrot	Lathamus discolor	3989-Far North Paperbark Fern Swamp Forest
Terek Sandpiper	Xenus cinereus	3989-Far North Paperbark Fern Swamp Forest
Varied Sittella	Daphoenositta chrysoptera	3989-Far North Paperbark Fern Swamp Forest
White-throated Needletail	Hirundapus caudacutus	3989-Far North Paperbark Fern Swamp Forest
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	3989-Far North Paperbark Fern Swamp Forest

Threatened species Manually Added

None added

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

BAM Predicted Species Report

Common Name	Scientific Name	Plant Community Type(s)
Australasian Bittern	Botaurus poiciloptilus	3989-Far North Paperbark Fern Swamp Forest
Black Bittern	Ixobrychus flavicollis	3989-Far North Paperbark Fern Swamp Forest
Black-necked Stork	Ephippiorhynchus asiaticus	3989-Far North Paperbark Fern Swamp Forest
Comb-crested Jacana	Irediparra gallinacea	3989-Far North Paperbark Fern Swamp Forest
Eastern Osprey	Pandion cristatus	3989-Far North Paperbark Fern Swamp Forest
White-bellied Sea-Eagle	Haliaeetus leucogaster	3989-Far North Paperbark Fern Swamp Forest

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

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Australasian Bittern	Botaurus poiciloptilus	Refer to BAR
Black Bittern	Ixobrychus flavicollis	Refer to BAR
Black-necked Stork	Ephippiorhynchus asiaticus	Refer to BAR
Comb-crested Jacana	Irediparra gallinacea	Refer to BAR
Eastern Osprey	Pandion cristatus	Refer to BAR
White-bellied Sea-Eagle	Haliaeetus leucogaster	Refer to BAR

BAM Vegetation Zones Report

Proposal Details

Assessment Id	Assessment name	BAM data last updated *
00042864/BAAS18040/23/00042865	24A Kingscliff Street_Kingscliff_Seniors Housing	14/03/2024
Assessor Name	**Report Created**	**BAM Data version ***
Adam Gosling	14/03/2024	67
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS18040	Part 4 Developments (Small Area)	Finalised
Assessment Revision	**Date Finalised**	**BOS entry trigger**
3	14/03/2024	BOS Threshold: Area clearing threshold

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Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones

1	3989_Moderate	3989-Far North Paperbark Fern Swamp Forest	Moderate	0.15	1	
2	3989_Low	3989-Far North Paperbark Fern Swamp Forest	Low	0.25	1	
3	3989_Cleared	3989-Far North Paperbark Fern Swamp Forest	Cleared	0.83	1	

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00042864/BAAS18040/23/00042865

Proposal Name
24A Kingscliff Street_Kingscliff_Seniors Housing

BAM data last updated *
14/03/2024

Assessor Name
Adam Gosling

Assessor Number
BAAS18040

BAM Data version *
67

Proponent Names

Report Created
14/03/2024

BAM Case Status
Finalised

Assessment Revision
3

Assessment Type
Part 4 Developments (Small Area)

Date Finalised
14/03/2024

BOS entry trigger
BOS Threshold: Area clearing threshold

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Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Botaurus poiciloptilus / Australasian Bittern
Ephippiorhynchus asiaticus / Black-necked Stork
Irediparra gallinacea / Comb-crested Jacana
Ixobrychus flavicollis / Black Bittern
Pandion cristatus / Eastern Osprey
Haliaeetus leucogaster / White-bellied Sea-Eagle

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

BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3989-Far North Paperbark Fern Swamp Forest	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	1.2	0	6	6

3989-Far North Paperbark Fern Swamp Forest

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	3989_Moderate	No	3	Burringbar-Conondale Ranges, Scenic Rim and Sunshine Coast-Gold Coast Lowlands. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	3989_Low	No	3	Burringbar-Conondale Ranges, Scenic Rim and Sunshine Coast-Gold Coast Lowlands. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	3989_Cleared	No	0	Burringbar-Conondale Ranges, Scenic Rim and Sunshine Coast-Gold Coast Lowlands. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Crinia tinnula / Wallum Froglet	**3989_Low, 3989_Cleared, 3989_Moderate**	0.7	4.00

Credit Retirement Options

Like-for-like credit retirement options

Crinia tinnula / Wallum Froglet	Spp	IBRA subregion
	Crinia tinnula / Wallum Froglet	Any in NSW

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00042864/BAAS18040/23/00042865

Proposal Name
24A Kingscliff Street_Kingscliff_Seniors Housing

BAM data last updated *
14/03/2024

Assessor Name
Adam Gosling

Assessor Number
BAAS18040

BAM Data version *
67

Proponent Name(s)

Report Created
14/03/2024

BAM Case Status
Finalised

Assessment Revision
3

Assessment Type
Part 4 Developments (Small Area)

Date Finalised
14/03/2024

BOS entry trigger
BOS Threshold: Area clearing threshold

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Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Botaurus poiciloptilus / Australasian Bittern
Ephippiorhynchus asiaticus / Black-necked Stork
Irediparra gallinacea / Comb-crested Jacana
Ixobrychus flavicollis / Black Bittern
Pandion cristatus / Eastern Osprey
Haliaeetus leucogaster / White-bellied Sea-Eagle

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3989-Far North Paperbark Fern Swamp Forest	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	1.2	0	6	6.00

3989-Far North Paperbark Fern Swamp Forest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	3989_Moderate	No	3	Burringbar-Conondale Ranges,Scenic Rim and Sunshine Coast-Gold Coast Lowlands. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	3989_Low	No	3	Burringbar-Conondale Ranges,Scenic Rim and Sunshine Coast-Gold Coast Lowlands. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	3989_Cleared	No	0	Burringbar-Conondale Ranges,Scenic Rim and Sunshine Coast-Gold Coast Lowlands. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Forested Wetlands	Tier 3 or higher threat status	3989_Moderate	No	3	IBRA Region: South Eastern Queensland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Forested Wetlands	Tier 3 or higher threat status	3989_Low	No	3	IBRA Region: South Eastern Queensland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Forested Wetlands	Tier 3 or higher threat status	3989_Cleared	No	0	IBRA Region: South Eastern Queensland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Crinia tinnula / Wallum Froglet	**3989_Low, 3989_Cleared, 3989_Moderate**	0.7	4.00

Credit Retirement Options

Like-for-like options

Crinia tinnula/ Wallum Froglet	Spp	IBRA region	
	Crinia tinnula/Wallum Froglet	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Burringbar-Conondale Ranges, Scenic Rim and Sunshine Coast-Gold Coast Lowlands. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Appendix G: Matters of national environmental significance

Matters of National Environmental Significance were assessed in accordance with the EPBC Act and are not likely to be significantly impacted by the proposed development. As such, a referral of the project to the Commonwealth is not required and no further information is required on the matter.

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 25-Oct-2023

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	92
Listed Migratory Species:	60

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	91
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	6
Key Ecological Features (Marine):	None
Biologically Important Areas:	5
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community likely to occur within area
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Critically Endangered	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area
FISH		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Seriolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
FROG		
Litoria olongburensis Wallum Sedge Frog [1821]	Vulnerable	Species or species habitat known to occur within area
Mixophyes fleayi Fleay's Frog [25960]	Endangered	Species or species habitat may occur within area
INSECT		
Argynnis hyperbius inconstans Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
MAMMAL		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Xeromys myoides		
Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat may occur within area
PLANT		
Acronychia littoralis		
Scented Acronychia [8582]	Endangered	Species or species habitat known to occur within area
Arthraxon hispidus		
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
Baloghia marmorata		
Marbled Balogia, Jointed Baloghia [8463]	Vulnerable	Species or species habitat may occur within area
Bosistoa transversa		
Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area
Cryptocarya foetida		
Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat known to occur within area
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat may occur within area
Diospyros mabacea Red-fruited Ebony, Silky Persimmon, Ebony [18548]	Endangered	Species or species habitat likely to occur within area
Diploglottis campbellii Small-leaved Tamarind [21484]	Endangered	Species or species habitat may occur within area
Endiandra floydii Floyd's Walnut, Crystal Creek Walnut [52955]	Endangered	Species or species habitat likely to occur within area
Endiandra hayesii Rusty Rose Walnut, Velvet Laurel [13866]	Vulnerable	Species or species habitat may occur within area
Fontainea australis Southern Fontainea [24037]	Vulnerable	Species or species habitat may occur within area
Leichhardtia longiloba listed as Marsdenia longiloba Clear Milkvine [91911]	Vulnerable	Species or species habitat may occur within area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat likely to occur within area
Ochrosia moorei Southern Ochrosia [11350]	Endangered	Species or species habitat may occur within area
Owenia cepiodora Onionwood, Bog Onion, Onion Cedar [11344]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat known to occur within area
Randia moorei Spiny Gardenia [10577]	Endangered	Species or species habitat likely to occur within area
Rhodamnia maideniana Smooth Scrub Turpentine [20665]	Critically Endangered	Species or species habitat likely to occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat likely to occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat likely to occur within area
Syzygium hodgkinsoniae Smooth-bark Rose Apple, Red Lilly Pilly [3539]	Vulnerable	Species or species habitat may occur within area
Syzygium moorei Rose Apple, Coolamon, Robby, Durobby, Watermelon Tree, Coolamon Rose Apple [12284]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Vincetoxicum woollsii listed as Tylophora woollsii [40080]	Endangered	Species or species habitat may occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
SHARK		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area
SNAIL		

Scientific Name	Threatened Category	Presence Text
Thersites mitchellae Mitchell's Rainforest Snail [66774]	Critically Endangered	Species or species habitat known to occur within area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Migratory Marine Species		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sousa sahulensis as Sousa chinensis Australian Humpback Dolphin [87942]		Foraging, feeding or related behaviour likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat likely to occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
[Charadrius veredus](#) Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area overfly marine area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Sterna striata White-fronted Tern [799]		Foraging, feeding or related behaviour likely to occur within area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Campichthys tryoni Tryon's Pipefish [66193]		Species or species habitat may occur within area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
Corythoichthys ocellatus Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus kelloggi Kellogg's Seahorse, Great Seahorse [66723]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Micrognathus andersonii Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area
Micrognathus brevirostris thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area
Microphis manadensis Manado Pipefish, Manado River Pipefish [66258]		Species or species habitat may occur within area
Solegnathus dunckeri Duncker's Pipehorse [66271]		Species or species habitat may occur within area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Reptile		
Astrotia stokesii Stokes' Seasnake [1122]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area

Scientific Name	Threatened Category	Presence Text
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Sousa sahulensis Australian Humpback Dolphin [87942]		Foraging, feeding or related behaviour likely to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State
North East NSW RFA	New South Wales

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Shopping Centre Development, Kingscliff	2005/1937	Controlled Action	Completed
Staged commercial, industrial and residential development	2002/715	Controlled Action	Completed
Tugun Bypass	2004/1861	Controlled Action	Post-Approval
Tugun Bypass Four-lane Dual Motorway	2003/1122	Controlled Action	Completed
Not controlled action			
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
Referral decision			

Title of referral	Reference	Referral Outcome	Assessment Status
Referral decision			
Breeding program for Grey Nurse Sharks	2007/3245	Referral Decision	Completed

Biologically Important Areas

Scientific Name	Behaviour	Presence
Dolphins		
Sousa chinensis		
Indo-Pacific Humpback Dolphin [50]	Foraging	Likely to occur
Tursiops aduncus		
Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Likely to occur
Marine Turtles		
Caretta caretta		
Loggerhead Turtle [1763]	Nesting	Known to occur
Sharks		
Carcharias taurus		
Grey Nurse Shark [64469]	Foraging	Known to occur
Whales		
Megaptera novaeangliae		
Humpback Whale [38]	Foraging	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Appendix H: Architectural Drawings (Plus Architecture)

Provided separately