



Biodiversity Development Assessment Report

**Kogarah Golf Club Redevelopment
13-19A Marsh Street, Arncliffe**

Stockland Development Pty Limited

Level 25, 133 Castlereagh Street
Sydney NSW 2223

Prepared by:

SLR Consulting Australia Pty Ltd

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Revision Record

Revision	Date	Prepared By	Checked/ Authorised By	Details
1.0	12 May 2026	M Freeman	C Eriksson Pinatacan	Final



Basis of Report

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Stockland Development Pty Limited (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.



Executive Summary

S1 The proposal

Stockland Development Pty Limited (the 'Client') are proposing to submit a State Significant Development Application (SSDA) (SSD-84467726) for a Concept Masterplan and Early Works associated with the redevelopment of the Kogarah Golf Club located at 13-19A Marsh Street, Arncliffe New South Wales (NSW) (the 'study area').

The vision for the Kogarah Golf Club Redevelopment, hereafter referred to as the 'project', is to create a world-class precinct that leverages the study area's strategic location adjacent to Sydney Airport and strong transport connections by delivering multi-level logistics development, trade-related enterprise and supporting uses with publicly accessible open space. It seeks to deliver state-of-the-art facilities that will redefine the logistics landscape in Australia, setting new benchmarks for scale, efficiency, sustainability and innovation.

S2 Landscape features

The project is located within the Pittwater Interim Biogeographic Regionalisation for Australia (IBRA) subregion, in the Sydney Basin Bioregion. The topography across the development site (hereafter referred to as the 'subject land') and wider study area range from a topographic high of 6 m Australian Height Datum (AHD), to a topographic low of approximately 2 m AHD.

The study area has had a varied history from the 1880s to 1950s, with sections having been previously used as a sewage farm, agriculture, recreational space and for infrastructure and military purposes (Department of Planning and Environment 2016). The study area has had significant changes in land form to accommodate the expansion of Sydney Airport and realignment of the Cooks River during the 1960s and 1970s. Portions of the study area were developed into the original Bonnie Doon golf course in 1928, while the Kogarah Golf Club Limited re-established the Kogarah golf course in the present location in 1956 and operated until March 2025 when the club vacated the site.

The majority of the subject land is comprised of lawns and other exotic grasslands which occupy the golf course fairways, while planted native vegetation occurs along the edges of each fairway. Only two small areas of native vegetation are present that conform to a plant community type (PCT).

Waterbodies in the form of artificial drainage lines and dams established for the golf course are also present within the subject land. Native vegetation cover within the assessment areas is calculated to be 9%, falling within the >0-10% Biodiversity Assessment Method (BAM) vegetation cover class. Patch size for all vegetation zones has been calculated as >100 ha.

S3 Assessment methods

Ecological surveys in accordance with the BAM were carried out across the subject land between July and December 2025, comprising:

- Vegetation assessment and PCT mapping;



- Vegetation integrity assessments (BAM plots);
- Habitat assessments;
- Targeted surveys for threatened fauna species comprising:
 - Diurnal bird surveys;
 - Raptor nest searches;
 - Spotlighting and call playback surveys;
 - Basking surveys; and
 - Passive acoustic detection surveys.

S4 Native vegetation

The golf course has been highly modified, landscaped, and filled, and no original vegetation remains. The study area was mostly free of mature wooded vegetation in 1943 besides planted figs surrounding the golf club house. A total of five vegetation communities were recognised and mapped in the study area by SLR for this assessment, which was consistent with the mapping undertaken for the Planning Proposal (PP-2022-1748) by Cumberland Ecology (now part of SLR). No remnant native vegetation occurs, though two vegetation types, are considered to conform to PCTs, including PCT 4091 Grey Mangrove-River Mangrove Forest and PCT 4097 Samphire Saltmarsh. These PCTs comprise areas of mangroves and saltmarsh, and are considered to be semi-natural, having recolonised small low-lying areas in the time since historical clearing of the study area was undertaken.

One threatened ecological community (TEC) was recorded within the subject land. PCT 4097 conforms to the TEC Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions which is listed as an Endangered Ecological Community under the NSW *Biodiversity Conservation Act* (BC Act). This PCT does not conform to the listing of the community under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act)

S5 Threatened species

In accordance with the BAM, threatened species have been assessed as ecosystem credit species or species credit species. A total of 45 ecosystem credit species are predicted to occur within the subject land based on associated PCTs in the BAM Calculator (BAM-C) and from records held within the NSW BioNet Atlas within the locality, being a five kilometre (km) radius of the subject land. There were three ecosystem credit species (or ecosystem components of dual credit species) recorded within the subject land during the field surveys:

- Grey-headed Flying-fox (foraging) (*Pteropus poliocephalus*) – vulnerable under the BC Act and EPBC Act;
- Little Bent-winged Bat (foraging) (*Miniopterus australis*) – vulnerable under the BC Act; and
- Large Bent-winged Bat (foraging) (*Miniopterus orianae oceanensis*) – vulnerable under the BC Act.



A total of eight threatened flora species credit species were predicted to occur within the subject land based on associated PCTs in the BAM-C and from records held within the NSW BioNet Atlas within the locality. However, no suitable habitat is considered to occur within the subject land and therefore no flora species credit species were retained for further assessment.

A total of 42 threatened fauna species credit species were predicted to occur within the subject land based on associated PCTs in the BAM-C and from records held within the NSW BioNet Atlas within the locality. Of these, 14 were considered to have potential to occur and were the subject of targeted surveys. Of these only one threatened fauna species credit species was recorded during the targeted surveys; the Green and Golden Bell Frog (*Litoria aurea*), which is listed as endangered under the BC Act and vulnerable under the EPBC Act.

S6 Avoidance and minimisation

As part of the Planning Proposal (PP-2022-1748), a number of avoidance and mitigation measures were identified to minimise impacts on biodiversity values. These were outlined within the Flora and Fauna Assessment (FFA) report prepared by Cumberland Ecology and factored into the project's Masterplan. While the Masterplan has been further developed for the project, it is still consistent with the Planning Proposal and approved rezoning.

Key avoidance and minimisation measures include:

- A reduced overall gross development precinct compared to the previous approved 2006 Stage 1 Development Application (DA) for the redevelopment of the whole study area;
- Locating the project outside of areas considered to be the most ecological significant;
- Retention of areas within the south-western portion of the study area which will be maintained as passive recreational space; and
- Increase in the area of C2 Environmental Conservation zone subject to rehabilitation as a functioning riparian corridor.

S7 Impact assessment

The project will directly impact up to approximately 5.55 ha of native vegetation within the subject land including:

- PCT 4091 Grey Mangrove-River Mangrove Forest (0.01 ha)
- PCT 4097 Samphire Saltmarsh (0.02 ha); and
- Planted native vegetation (5.52 ha).

Of the native vegetation to be directly impacted by the project, there would be direct impacts to 0.02 ha of PCT 4097 which conforms to the TEC Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions.



Impacts on threatened species have been considered in accordance with the BAM based on ecosystem credit species and species credit species. Impacts resulting from the proposal on threatened species includes:

- Loss of habitat for up to 45 ecosystem credit species predicted to occur within the subject land, including three ecosystem credit species recorded during field surveys.
- Direct impacts and prescribed impacts to one threatened fauna species credit species, the Green and Golden Bell Frog, recorded during field surveys.

S8 Mitigation

A range of impact mitigation strategies are proposed to mitigate the impact on biodiversity values prior to the consideration of offsetting requirements. This includes the following Management Plans which will be prepared post approval to mitigate impacts on biodiversity values:

- Biodiversity Management Plan;
- Green and Golden Bell Frog Management Plan;
- Construction Environmental Management Plan; and
- Landscape Management Plan.

S9 Offsets for residual impacts

Residual impacts that are not able to be managed through mitigation would be offset in accordance with BAM credit calculations for both ecosystem and species credits. The proposed offset obligation based on the subject land has been calculated to require the following biodiversity credits:

- Two ecosystem credits.
- Two species credits.

Details of the breakdown in credits is provided in Table E1 and Table E2.

Table E1 Impacts that require an offset – ecosystem credits

Vegetation Zone	PCT	TEC	Impact Area (ha)	Number of ecosystem credits required
Zone 1	PCT 4091 Grey Mangrove-River Mangrove Forest	Not listed	0.01	1
Zone 2	PCT 4097 Samphire Saltmarsh	Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions	0.02	1



Table E2 Impacts that require an offset – species credits

Scientific name	Common name	Loss of habitat (ha) or individuals	Number of ecosystem credits required
<i>Litoria aurea</i>	Green and Golden Bell Frog	0.03	2

The credit obligation will be met through the retirement of credits, as specified in Table E1 and Table E2, using the offset options available under the BC Act and Biodiversity Conservation Regulation (BC Regulation) including:

- Securing (purchasing) credits through the open credit market; and/or
- Paying into to the Biodiversity Conservation Fund (BCF).



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Appendices

- Appendix A BDAR requirements compliance**
- Appendix B Vegetation survey data**
- Appendix C Credit reports**
- Appendix D Fauna species recorded**



SHORTENED FORMS

Short Form	Long Form
AHD	Australian Height Datum
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
Bayside LEP	<i>Bayside Local Environment Plan 2021</i>
BC Act	Biodiversity Conservation Act 2016 (NSW)
BC Regulation	Biodiversity Conservation Regulation 2017 (NSW)
BCF	Biodiversity Conservation Fund
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offsets Scheme
CBD	Central Business District
CEEC	Critically Endangered Ecological Community
Council	Bayside Council
DA	Development application
DBH	Diameter at breast height over bark
DCCEEW	Department of Climate Change, the Environment, Energy and Water
DPIE	Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
EHG	Environment and Heritage
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)
FFA	Flora and Fauna Assessment
FM Act	<i>Fisheries Management Act 1994</i>
GFA	Gross Floor Area
GIS	Geographic Information System
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
JV	Joint Venture
Km	Kilometre
LGA	Local Government Area
Locality	5 km radius of the subject land
M	Metres



Short Form	Long Form
Microbat	Microchiropteran bat
MNES	Matters of National Environmental Significance
NSW	New South Wales
PCT	Plant Community Type
Project	Kogarah Golf Club Redevelopment
Resilience and Hazards SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021
RTA	Roads and Transport Authority
SAIL	Serious and irreversible impact
SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development
SSDA	State Significant Development Application
Study area	13-19A Marsh Street, Arncliffe NSW
Subject land	The area within the study area subject to development for the project
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened ecological community
The 'Client'	Stockland Development Pty Limited
VI	Vegetation Integrity
VPA	Voluntary Planning Agreement



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: 12/05/2026

BAM Assessor Accreditation no: BAAS19019

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

ii. Details and experience of author/s and contributors

Table DC1 Authors and contributors

Name	BAM Assessor Accreditation No.	Position/Role	Tasks Performed	Relevant Qualifications
Matthew Freeman	BAAS19019	Principal Ecologist	Report preparation, BAM-C data entry and analysis	Bachelor of Natural Science (Nature Conservation). University of Western Sydney, 2012
Cecilia Eriksson Pinatacan	BAAS19052	Principal Ecologist	Document review, field surveys	Master of Science (Major in Marine Science and Management). University of Technology, Sydney, 2013 Bachelor of Science (Honours) in Marine Biology. University of Technology, Sydney, 2008
Mikael Peck	BAAS19002	Principal Ecologist	Targeted threatened fauna surveys	Master of Marine Science and Management. Macquarie University, 2013 Bachelor of Science. Washington State University, 2005
Bryan Furchert	BAAS18095	Principal Botanist	Vegetation mapping, BAM plot surveys, PCT selection and	Bachelor of Biodiversity and Conservation. Macquarie University, 2012



Name	BAM Assessor Accreditation No.	Position/Role	Tasks Performed	Relevant Qualifications
			vegetation description write-up	Diploma of Conservation and Land Management. TAFE NSW, 2008
Joel Taylor	-	Senior Ecologist	Document preparation	Bachelor of Science (Biology). Macquarie University, 2021
Alix Murray	-	Senior Ecologist	Vegetation mapping, habitat assessment	Master of Biodiversity, Conservation and Ecosystem Management. University of Newcastle Upon Tyne, 2018
Vander Bertoldo	-	Ecologist	Targeted threatened fauna surveys	Master of Marine and Environmental Science, SCU University (2022) Bachelor's Degree in Biological Science (Honours), UNESC University (2013) Diploma in Business Management, Lexis School (2019) Certificate IV in Business, English in Paradise (2017)
Jesse Luscombe	-	GIS Specialist	Figure preparation, GIS area calculations	Bachelor of Marine Science. Macquarie University, 2013. Certificate III: Conservation and Land Management, TAFE NSW Ryde, 2016. BAM Accredited Assessor Training. Muddy Boots, 2018.



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: 12/05/2026

BAM Assessor Accreditation no: BAAS19019



STAGE 1: BIODIVERSITY ASSESSMENT

1.0 Introduction

1.1 Proposed Development

1.1.1 Development overview

This Biodiversity Development Assessment Report (BDAR) has been prepared for Stockland Development Pty Limited (the 'Client') to accompany a State Significant Development Application (SSDA) (SSD-84467726) for a Concept Masterplan and Early Works associated with the Kogarah Golf Club Redevelopment located on land identified as 13-19A Marsh Street, Arncliffe New South Wales (NSW) (the 'study area').

The vision for the Kogarah Golf Club Redevelopment, hereafter referred to as the 'project', is to create a world-class precinct that leverages the study area's strategic location adjacent to Sydney Airport and strong transport connections by delivering multi-level logistics development, trade-related enterprise and supporting uses with publicly accessible open space. It seeks to deliver state-of-the-art facilities that will redefine the logistics landscape in Australia, setting new benchmarks for scale, efficiency, sustainability and innovation.

The Concept & Early Works SSDA seeks consent for an overarching Concept Masterplan that establishes maximum building envelopes, Gross Floor Area (GFA), land uses, and other parameters through Urban Design Guidelines and technical reporting. It also seeks consent for the carrying out of Early Works to facilitate the initial site preparation and infrastructure works required to support future development and publicly accessible open space.

This BDAR will form part of the documentation to support an application for Development Consent under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.1.1.1 Secretary's environmental assessment requirements

This report addresses the relevant Planning Secretary's Environmental Assessment Requirements (SEARs) for SSD-84467726, as outlined in Table 1 below.

Table 1 SEARs compliance table

Relevant Requirements	Response
Biodiversity	
An assessment of the proposal's biodiversity impacts in accordance with the Biodiversity Conservation Act 2016, including the preparation of a Biodiversity Development Assessment Report (BDAR) where required under the Act,	This BDAR has been prepared as per the SEARs requirements.



Relevant Requirements	Response
except where a waiver for preparation of a BDAR has been granted	

1.1.2 Background

A Planning Proposal (PP-2022-1748) was previously submitted by John Boyd Properties for the Kogarah Golf Club Redevelopment site to amend and integrate planning controls into the *Bayside Local Environmental Plan 2021* (Bayside LEP 2021). It sought to deliver refreshed planning controls that prioritise land uses which support the adjacent Sydney Airport, as one of Australia's most important trade gateways.

The Planning Proposal was granted Gateway Determination on 5 August 2022 and publicly exhibited between 24 April 2023 and 6 June 2023. It was determined to proceed to finalisation in March 2024, with the amendments to the Bayside LEP 2021 gazetted on 9 May 2025.

Following gazettal, John Boyd Properties has entered a Joint Venture (JV) with Stockland for the Kogarah Golf Club Redevelopment. The JV will enable the effective development and future management of the strategically significant site for a world-class focused precinct by combining their expertise.

The amendments to the Bayside LEP 2021 are described as follows:

- Application of land uses, including:
 - SP4 Enterprise zone to form a development zone;
 - RE1 Public Recreation zone to facilitate the future Pemulwuy Park and overland flow areas;
 - C2 Environmental Conservation zone to enable the protection and conservation of land, including a foreshore zone; and
 - SP2 Infrastructure zone for land associated with the Marsh Street roadway and permanent M6/M8 Motorway Operation Facilities.
- An overall maximum building height of RL 51m (Lot 100 DP 1231954) graduating down to RL 40m in response to aviation controls in the south, and a maximum building height of 24m (Lot 31 DP 1231486);
- A total GFA of 343,250m², applied through:
 - Lot 31 DP 1231486 – A maximum FSR of 1.25:1 (3,250m²);
 - Lot 100 DP 1231954 – A total floorspace that does not exceed 340,000m² of GFA, inclusive of:
 - A maximum 20,000m² GFA for 'office premises';



- A maximum 20,000m² GFA for ‘hotel or motel accommodation’ and ‘serviced apartments’; and
- A maximum 10,000m² GFA for ‘shops’ and ‘food and drink premises’.
- Application of additional permitted uses including ‘Trade-related enterprises’ (Lot 100 DP1231954) and ‘Advertising structures’ (Lot 31 DP1231486).

1.1.3 Location

The project is located at 13-19A Marsh Street, Arncliffe within the Bayside Local Government Area (LGA). It is situated to the immediate west of the Cooks River and Sydney Airport, located approximately 6 km west of Port Botany and 10 km south of the Sydney Central Business District (CBD). It includes frontages to Marsh Street, providing direct access to the M5 Motorway, Sydney Airport and St Peters Interchange (via the Sydney Gateway).

The study area comprises land associated with nine (9) allotments and a total area of approximately 36.27 ha. The existing uses include the previous Kogarah Golf Club (vacated in March 2025) accessed via Levey Street and the temporary M6 Stage 1 construction compound (part of the Arncliffe Motorway Operation Complex) accessed directly from Marsh Street, as well as the RTA frog ponds. Remaining areas of the study area comprise easements and affectations as detailed further in the following sections. Surrounding development includes the Sydney Airport International Terminal precinct, Mercure Sydney Airport, an area of low-density dwellings presently transitioning to medium-high density residential flat buildings, recreation and open space facilities and road and airport related infrastructure.

The area subject to development for the project, referred to as the ‘subject land’, is primarily located within Lot 31 DP1231486 and Lot 100 DP1231954 which are zoned SP4 Enterprise and C2 Environmental Conservation under the Bayside LEP 2021, however also includes immediately adjoining areas of land zoned RE1 Public Recreation which will be subject to future dedication to Bayside Council (Council). Areas zoned SP4 enterprise comprise the development precinct, while areas of land zoned RE1 will comprise the overland flood pathway and areas zoned C2 Environmental Conservation will comprise the riparian buffer zone. The subject land is approximately 21.84 ha.

The study area is described in Table 2. The location of the study area and subject land area shown in Figure 1 and Figure 2.

Table 2 Study area description

Lot / DP	Address	Ownership
Lot 31 DP1231486	19 Marsh Street, Arncliffe	Cook Cove Nominees No 1 Pty Ltd as trustee of Cook Cove Property Trust 1
Lot 100 DP1231954	19A Marsh Street, Arncliffe	Cook Cove Nominees No 2 Pty Ltd as trustee of Cook Cove Property Trust 2
Lot 60 DP1301057	13 Marsh Street, Arncliffe	Bayside Council



Lot / DP	Address	Ownership
Lot 61 DP1301057	19 Marsh Street, Arncliffe	
Lot 62 DP1301057	Marsh Street, Arncliffe	Transport for NSW
Lot 63 DP1301057	Marsh Street, Arncliffe	
Lot 12 DP570900	Marsh Street, Arncliffe	
Lot 102 DP1231954	Marsh Street, Arncliffe	
Lot 103 DP1231954	Marsh Street, Arncliffe	

1.1.3.1 Kogarah Golf Club

Kogarah Golf Club was established in 1928, with the Club occupying the land subject to the project since 1955. At this time, the Cooks River was reconfigured to its current alignment to accommodate the expansion of Sydney Airport. The land presents a highly modified environment, with relatively flat topography, gently moulded fairways and greens, separated by strips of vegetation and man-made water bodies. The golf course clubhouse, car park and maintenance facilities are located in the northern corner of the study area, adjacent the Cooks River. Access is provided via Levey Street. The members of Kogarah Golf Club relocated from the site in May 2024 with the club vacating the site in March 2025.

1.1.3.2 Arncliffe Motorway Operations Complex

The temporary construction compound for the WestConnex M8 and M6 Stage 1 Motorway tunnelling works was originally established in June 2016. The temporary construction facility occupies approximately 7.5 ha and is expected to remain until 2030. At this time the facility will reduce to 1.5 ha to accommodate the permanent Arncliffe Motorway Operations Complex, located in the western corner of the site, adjacent Marsh Street. The complex will house ventilation and water treatment plant and maintenance equipment for both the M6 and M8 sub-grade motorways.

1.1.3.3 RTA Frog Ponds

The study area contains two fenced areas containing frog ponds in the western corner of the study area adjacent to Marsh Street (Figure 1). These ponds were constructed by the former NSW Roads and Transport Authority (RTA) (now Transport for NSW) as part of the M5 Motorway construction in 2002, as compensatory habitat for the Green and Golden Bell Frog.

1.1.3.4 Easements and Affections

The Sydney Desalination Plant pipeline runs through the study area, north-south adjacent to Cooks River. The pipe has a diameter of 1.8m and sits within an easement of 6-9m in width. From south to north the pipeline is constructed in a combination of trench and above ground with mounded cover and then transitions to micro-tunnel and typical depth of circa 11m. The



Moomba to Sydney Pipeline, containing ethane gas, follows a similar general alignment north-south adjacent to Cooks River. The pipe has a nominal 225mm diameter, within an easement generally 5m wide and with the pipe located at a depth of 1.2m-2.3m.

1.1.4 Proposed development and the subject land

The project seeks consent for the following:

- Concept Masterplan to support the staged delivery of the Kogarah Golf Club Redevelopment, including:
 - Maximum building envelopes, including maximum building heights and minimum building setbacks;
 - Maximum Gross Floor Area (GFA) up to 343,250m², comprising:
 - 3,250m² of GFA (FSR of 1.25:1) on Lot 31 DP1231486; and
 - 340,000m² of GFA on Lot 100 DP1231954.
 - Conceptual primary land uses, including:
 - Block 1 – Mixed-use and advertising structures;
 - Block 2 – Logistics and mixed-use;
 - Block 3A – Logistics;
 - Block 3B – Logistics; and
 - Block 3C – Logistics and data centres.
 - Urban Design Guidelines to guide future development of the built form and public domain; and
 - Strategies and mitigation measures to manage potential environmental impacts.
- Early Works to support the future delivery of built form and publicly accessible open space, including:
 - Site preparation works, comprising:
 - Demolition of existing structures;
 - Clearing of existing vegetation;
 - Remediation works; and
 - Bulk earthworks, including ground improvement and flood mitigation works.
 - Site servicing and infrastructure works, including:



- Construction of the Flora Street East extension consistent with Item 3 of the executed Voluntary Planning Agreement (VPA) with Council;
- Construction of stormwater infrastructure; and
- Construction and augmentation of service and utility infrastructure as necessary.

The Masterplan of the project is shown in Figure 3.

For a detailed description, refer to the Environmental Impact Statement prepared by Colliers Urban Planning.

1.1.5 Identification of the study area and subject land

The study area is comprised of the former Kogarah Golf Club, located at 13-19A Marsh Street, Arncliffe NSW. The development site footprint comprises the area of land directly impacted by the project and is referred to within this BDAR as the subject land. For the purposes of this assessment, the subject land comprises both the construction footprint and the operational footprint of the project. The operation footprint is wholly contained within the subject land, however it is located entirely within the SP4 Enterprise zone, however will exclude areas zoned C2 Environmental Conservation which will be subject to rehabilitation to re-establish a functioning riparian corridor, as well as areas of RE1 Public Recreation land identified for the establishment of the overland flood pathway which will be subject to future dedication to Council (Figure 1 and Figure 2). The study area is approximately 36.27 ha, while the subject land is approximately 21.84 ha.

1.1.6 Landscape context of the study area

1.1.6.1 Historical and present land use

The study area has had a varied history from the 1880s to 1950s, with sections having been previously used as a sewage farm, agriculture, recreational space and for infrastructure and military purposes (Department of Planning and Environment, 2016).

The study area has had significant changes in land form to accommodate the expansion of Sydney Airport and realignment of the Cooks River during the 1960s and 1970s. Portions of the study area were developed into the original Bonnie Doon golf course in 1928 prior to their relocation and the occupation of the site by the (Department of Planning and Environment, 2016). Figure 4 shows the study area in 1943, before the realignment of Cooks River.

Kogarah Golf Club Limited relocated from their former links at Moorefield race track and re-established the Kogarah Golf course in the present location in 1956, later purchasing the freehold component in 1970, and operated until their recent vacation of the site in March 2025. As mentioned in previous sections, works for the M5 “WestConnex” project (now the M6/M8 Motorway Operation Facilities) commenced in 2016 within a section of the golf course.



1.1.6.2 Topography, geology and soils

Historically, the subject land was a sandy, low-lying flood plain that was drained and modified early in the history of Sydney for agriculture. This is demonstrated by aerial photography taken in 1943 (Figure 4). Later, during the development of Sydney Airport, the course of the Cooks River was changed, and it was moved to its current alignment where it forms the eastern boundary of the subject land.

The subject land is relatively flat and has been highly modified in association with the realignment of the Cooks River, landfill operations, and the creation of the golf course (Hassell, 2016). The subject land has a topographic high of 6 m Australian Height Datum (AHD) and a topographic low of 2 m AHD. The geology underlying the subject land is described as peat, sandy peat and mud overlaying medium to coarse-grained quartz sandstone, very minor shale and laminate lenses of the Wianamatta Group (Consulting Earth Scientists, 2017).

The soils of the subject land currently consist of a thin topsoil layer, overlaying a modified sand profile (Hassell, 2016). The Soil Landscapes of the Sydney 1:100 000 Sheet (Chapman et al., 2005) indicates that the subject land is underlain by 'disturbed terrain'. The landscape and soil characteristics of this soil landscape are described as terrain being disturbed by human activity, often landscaped and artificially drained, with original vegetation completely cleared and replaced with turf or grassland.

1.1.6.3 Hydrology

The original hydrology of the subject land has been changed by the various historical works that have been undertaken including drainage for agriculture, moving of the Cooks River and construction of the golf course.

The land within the subject land generally drains from Marsh Street towards the Cooks River. There is a flood flow path across the existing golf course in the subject land, from Marsh Street, which operates in severe floods in the Cooks River, when flood waters back up behind the Marsh Street bridge (Hassell, 2016).

1.2 Biodiversity Offsets Scheme entry

Under the NSW *Biodiversity Conservation Act 2016* (BC Act), all development that requires development consent under Part 4 of the EP&A Act that is designated a State Significant Development (SSD) triggers the NSW Biodiversity Offsets Scheme (BOS) and must be assessed using the Biodiversity Assessment Method (BAM) with the results presented in a BDAR, unless the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values in which case a BDAR Waiver can be prepared. As outlined in Section 1.1.1.1, the Planning SEARs issued for the project (SSD-84467726) also outline the requirement to assess the projects biodiversity impacts in accordance with the BC Act, including the preparation of a BDAR or a BDAR waiver (if applicable).

As the project requires the removal of potential habitat for threatened fauna species, including the Green and Golden Bell Frog (*Litoria aurea*) which is known to occur within the subject land and wider study area, it is considered that the project has the potential to result in a significant



impact on biodiversity values and therefore this BDAR has been prepared to accompany the SSDA for the project.

1.3 Excluded impacts

No impacts have been excluded from this assessment.

1.4 Matters of national environmental significance

A referral application under section 68 of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was lodged on 3 February 2026 with the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) due to potential impacts of the project on Matters of National Environmental Significance (MNES). A decision was made on the referral on the 20 March 2026 confirming that the proposed action (i.e. the project) is not a controlled action and therefore no further assessment or approval under the EPBC Act is required.

1.5 Information sources

1.5.1 Databases

A number of databases were utilised during the preparation of this BDAR, including:

- NSW Environment and Heritage Group (EHG) BioNet Atlas (DCCEEW (NSW), 2025a);
- EHG BioNet (DCCEEW (NSW), 2025b) database ;
- EHG Threatened Biodiversity Data Collection (TBDC) (DCCEEW (NSW), 2026b);
- Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Species Profile and Threat Database (DCCEEW, 2024);
- DCCEEW Protected Matters Search Tool (DCCEEW (Cth.), 2026); and
- DCCEEW Directory of Important Wetlands in Australia.

1.5.2 Literature

This BDAR has utilised the results and/or spatial data from the following documents:

- NSW Department of Planning and Environment NSW State Vegetation Type Map (DCCEEW (NSW), 2025c)
- Soil Landscapes of the Sydney 1:100,000 Sheet (Chapman et al., 2005)
- Biodiversity Assessment Method 2020 (BAM);
- Guidance to assist a decision-maker to determine a serious and irreversible impact (NSW Government & Department of Planning, 2019);
- Biodiversity Assessment Method Calculator Version 1.4.0.00;



- Biodiversity Offsets and Agreement Management System;
- Surveying threatened plants and their habitats - NSW survey guide for the Biodiversity Assessment Method (DPIE, 2020);
- 'Species credit' threatened bats and their habitats (DPIE, 2021);
- NSW survey guide for threatened frogs – A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method (DPIE, 2020a);
- Threatened Species Survey and Assessment: Guidelines for developments and activities. Working Draft (DEC (NSW), 2004);
- Rockdale Biodiversity Strategy (Rockdale City Council, 2014);
- Green and Golden Bell Frog Monitoring Reports by AMBS Ecology & Heritage, for the Arncliffe population (AMBS Ecology & Heritage, 2020, 2021b, 2021a, 2025).
- Cooks Cove Northern Precinct Flora and Fauna Assessment prepared by Cumberland Ecology for the Cooks Cove Planning Proposal (Cumberland Ecology, 2023); and
- Landscape Concept and Early Works SSDA Report by Moir Studio (Moir Studio, 2025);
- Flood Impact Risk Assessment for Kogarah Golf Club Redevelopment prepared by Costin Roe Consulting Pty Ltd (Costin Roe Consulting, 2025);
- Arboricultural Impact Assessment and Tree Protection Plan (Version 1) for Kogarah Golf Club Redevelopment prepared by Canopy Consulting Pty Ltd (Canopy Consulting, 2025).
- Other previous ecological surveys and reports prepared for the study area.

Other sources of information have been referred throughout this BDAR.

1.5.3 Aerial photography

The aerial imagery used in this BDAR is sourced from NearMap and is dated 27 January 2025. Additional aerial images available on NearMap and SDT Explorer were also consulted.



2.0 Methods

2.1 Site context methods

2.1.1 Landscape features

Landscape features requiring consideration were determined via desktop assessment. A review of the field surveys completed for the Planning Proposal FFA (Cumberland Ecology, 2023) was undertaken to verify the following landscape features:

- Rivers, streams and estuaries;
- Important and local wetlands;
- Karsts, caves, crevices, cliffs and areas of geological significance; and
- NSW (Mitchell) Landscapes.

No amendments were required to be made to any of these landscape features following field surveys.

2.1.2 Native vegetation cover

The native vegetation cover was determined through the use of Geographical Information Systems (GIS). To calculate native vegetation cover within the subject land and assessment area, this assessment utilised the NSW State Vegetation Type Map (DCCEEW (NSW), 2025c) beyond the study area, and mapping prepared by SLR as part of this assessment for land within the subject land and wider study area.

2.2 Native vegetation, threatened ecological communities and vegetation integrity methods

2.2.1 Existing information

Several ecological studies have been undertaken in the study area and surrounds that have provided some indication of the existing vegetation and other habitats. A detailed vegetation map for the study area was produced by Cumberland Ecology (part of SLR) following field surveys in 2021 as part of the FFA prepared to support the approved Planning Proposal. Furthermore, a review was undertaken of the NSW State Vegetation Type Map (SVTM) and the associated profiles available in the NSW BioNet Vegetation Classification (DCCEEW (NSW), 2026a), as well as relevant scientific determinations.

2.2.2 Mapping native vegetation extent

The detailed mapping prepared by Cumberland Ecology (2023) for the Planning Proposal was further refined during vegetation mapping surveys between 23 and 24 July 2025, to capture any potential changes to the vegetation since the original 2021 field surveys. Vegetation mapping involved ground-truthing surveys to examine and verify the condition and extent of different vegetation communities. Where vegetation community boundaries were found to



differ from the previous mapping, records were made of proposed new boundaries using a hand-held Global Positioning System (GPS) and mark-up of aerial photographs. A review was also undertaken of the SVTM to compare boundaries and associated PCTs identified in the regional mapping when assigning PCTs.

The resultant information was synthesised using GIS to create a spatial database that was used to interpret and interpolate the data to produce a vegetation map of the study area. Mapping was completed using ArcGIS Pro Version 3.6.1.

2.2.3 Plot-based vegetation survey

Plot-based vegetation surveys, in accordance with BAM Subsection 4.2.1, were undertaken by SLR on the 23 and 24 July 2025. The location of plots was selected at random and sought to capture the environmental variation of the PCTs identified within the study area (see **Section 4.2**). A total of nine plots were surveyed within the subject land and wider study area. Data from the plot-based survey is provided in **Error! Reference source not found.** and the plot locations are shown in Figure 5.

2.2.4 Vegetation integrity survey

Vegetation integrity assessments were undertaken by Cumberland Ecology in the subject land in accordance with the BAM. BAM requires the establishment of a 20 x 50 m plot with an internal 20 m x 20 m plot. However, due to the small area of PCT 4097, the size of this plot was modified and data was collected from a 5 x 30m plot for all attributes. Furthermore, due to the small area of some PCTs, the options for location plots was limited therefore the plots are not wholly located within the respective vegetation zone, or the subject land.

The following data was collected within each of the plots:

- Composition for each growth form group by counting the number of native plant species recorded for each growth form group within a 20 m x 20 m or 5 x 30m floristic plot;
- Structure of each growth form group as the sum of all the individual projected foliage cover estimates of all native plant species recorded within each growth form group within a 20 m x 20m or 5 x 30 m floristic plot;
- Cover of 'High Threat Exotic' weed species within a 20 m x 20m or 5 x 30m plot;
- Assessment of function attributes within a 20 m x 50 m or 5 x 30 m plot, including:
 - Count of number of large trees;
 - Tree stem size classes, measured as 'diameter at breast height over bark' (DBH);
 - Regeneration based on the presence of living trees with stems <5 cm DBH;
 - The total length in metres of fallen logs over 10 cm in diameter;
 - Assessment of litter cover within five 1 m x 1 m plots evenly spread within the 20 m x 50 m or 5 x 30 m plot; and



- Number of trees with hollows that are visible from the ground within the 20 m x 50 m or 5 x 30 m plot.

Table 3 Table 1 summarises the plot requirements based on the size and number of vegetation zones in the subject land. As shown in this table, the minimum number of plots has been completed for each vegetation zone. In addition to the two plots that were required to assess the native PCTs identified within the subject land, plots were also undertaken within areas of Planted Native Vegetation and Exotic Dominated Grassland, despite not being a requirement under the BAM.

Plot data for all plots undertaken is provided in **Appendix B**.

Table 3 BAM plot survey requirements

Vegetation Zone	PCT	Condition	Area within the subject land (ha)	Minimum Number of Plots Required	Number of Plots Completed
1	4091	Moderate	0.02	1	1
2	4097	Degraded	0.01	1	1

2.3 Threatened flora survey methods

2.3.1 Review of existing information

The BAM calculator and a BioNet Atlas search were used to compile a list of threatened flora species for consideration as target threatened species. The TBDC was then used to identify habitat constraints and potential microhabitats (see Section **Error! Reference source not found.**) for each species likely to occur within the PCTs mapped for the subject land.

2.3.2 Habitat constraints assessment

Desktop assessments and field surveys within the subject land included assessment of habitat constraints and microhabitats for predicted species credit flora species.

2.3.3 Field surveys

No species credit flora species have been assessed as candidate species credit species for further assessment (see **Section 5.2**). Based on the nature of the subject land, with a highly modified and degraded understory that has been managed as a golf course, it is highly unlikely that any threatened flora species would be present within the subject land based on the degraded or absent microhabitats. Furthermore, the subject land and wider study area have been subject to numerous surveys, with the most recent undertaken by Cumberland Ecology (part of SLR) for the FFA that supported the Planning Proposal, and no threatened flora species have been identified within the subject land or wider study area. Nevertheless, searches for threatened flora were undertaken during BAM plot surveys and random meander surveys across the subject land. The locations of the flora surveys are shown in Figure 5.



A random meander survey and plot survey were undertaken within the subject land on 23 and 24 July 2025. Given the degraded nature of the subject land and detailed survey history the random meander surveys in conjunction with BAM plots were deemed appropriate to survey threatened flora species. Nevertheless, it should be noted that no species credit species have been assessed as candidate species credits for further assessment within this BDAR.

2.4 Threatened fauna survey methods

2.4.1 Review of existing information

The BAM calculator and BioNet Atlas search were used to compile a list of threatened fauna species for consideration as target threatened species. The TBDC was then used to identify habitat constraints and potential microhabitats (see Section **Error! Reference source not found.**) for each species likely to occur within the PCTs mapped for the subject land.

2.4.2 Habitat constraints assessment

Desktop assessments and field surveys within the subject land included assessment of habitat constraints and microhabitats for predicted species credit fauna species and assessment of potential breeding habitat for species/ecosystem credit species (hereafter referred to as dual credit species). This included desktop assessment of proximity of the subject land to features such as caves and waterways and field inspection of microhabitats including leaf litter, stick nests, hollowing-bearing trees, significant bush rock, fallen logs, culverts, water bodies and decorticated bark. Due to the historic disturbance and lack of structural layers within the subject land, the habitats within the subject land were sufficiently degraded to rule out the presence of several candidate fauna species credit species and dual credit species identified for the subject land.

2.4.3 Field surveys

Targeted threatened fauna surveys were undertaken within the subject land for species credit species or breeding habitat for dual credit species that were assessed as candidate species credit species for further assessment. Note that the list of candidate threatened species has been determined using the BAM-C, however, has been supplemented with additional species recorded within a 5 km locality of the subject land. This assessment has also utilised results from previous surveys completed by Cumberland Ecology (Part of SLR) for the FFA prepared for the approved Planning Proposal. As such, additional targeted threatened fauna surveys were undertaken to address threatened fauna species that required further assessment or were not previously assessed.

The survey design was guided by the following:

- NSW Government (2020): Biodiversity Assessment Method;
- NSW Department of Environment and Conservation (2004): Threatened Species Survey and Assessment, Guidelines for Development and Activities (Working Draft);



- Department of Planning, Industry and Environment (DPIE) (2020a): NSW Survey Guide for Threatened Frogs, a guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method; and
- DPIE (2021): 'Species credit' threatened bats and their habitats, NSW survey guide for the Biodiversity Assessment Method.

All surveys were undertaken during suitable conditions, following the periods specified in the TBDC (DCCEEW (NSW), 2026b) for each species and according to relevant survey guidelines. The only exception was surveys for the Little Eagle (*Hieraaetus morphnoides*), however, surveys undertaken within the subject land and wider study area along with results from previous surveys undertaken within the study area are considered suitable to assess the species presence. Table 4 provides a summary of the fauna species credit species surveyed for within the subject land, whilst detailed survey methods are described below.

The locations of the targeted fauna species surveys are shown in Figure 6 and Figure 7.

Table 4 Fauna survey effort

Scientific Name	Common Name	Recommended Survey Period	Dates of Survey within Subject Land	Survey Method
<i>Epthianura albifrons</i> - endangered population	White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	January–December	23-24 July 2025, 6 November 2025, 12 December 2025	Bird census, incidental observations
<i>Haematopus longirostris</i>	Pied Oystercatcher	August - January	23-24 July 2025, 6 November 2025, 12 December 2025	Bird census, incidental observations
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	July – December	23-24 July 2025, 6 November 2025	Habitat constraints assessment, raptor nest searches, bird census
<i>Hieraaetus morphnoides</i>	Little Eagle	August – October	23-24 July 2025, 6 November 2025	Habitat constraints assessment, raptor nest searches, bird census
<i>Litoria aurea</i>	Green and Golden Bell Frog	November - March	3-6 November 2025	Basking survey, aural-visual survey
<i>Lophoictinia isura</i>	Square-tailed Kite	September – January	23-24 July 2025, 6 November 2025	Habitat constraints assessment, raptor nest searches, bird census



Scientific Name	Common Name	Recommended Survey Period	Dates of Survey within Subject Land	Survey Method
<i>Miniopterus australis</i>	Little Bent-winged Bat	December – February	8-12 December 2025	Roost searches, passive acoustic detection
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	December – February	8-12 December 2025	Roost searches, passive acoustic detection
<i>Mixophyes iteratus</i>	Giant Barred Frog	October – March	3-6 November 2025	Aural-visual survey, spotlighting
<i>Myotis macropus</i>	Southern Myotis	October – March	8-12 December 2025	Roost searches, passive acoustic detection
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	January–December	23-24 July 2025, 6 November 2025, 12 December 2025	Bird census, incidental observations
<i>Nettapus coromandelianus</i>	Cotton Pygmy Goose	January–December	23-24 July 2025, 6 November 2025, 12 December 2025	Bird census, incidental observations
<i>Petauroides volans</i>	Southern Greater Glider	January – December	3-6 November 2025	Spotlighting

2.4.4 Diurnal bird surveys

Target Species: White-fronted Chat Population in the Sydney Metropolitan Catchment Management Area, Pied Oystercatcher, White-bellied Sea-Eagle, Little Eagle, Square-tailed Kite, Orange Bellied Parrot, Cotton Pygmy Goose.

Diurnal bird surveys have been undertaken within the subject land for previous ecological assessments, particularly those that informed the 2023 FFA that was prepared for the approved Planning Proposal. Additional diurnal bird surveys were undertaken to supplement the previous surveys and included three 20-minute area searches for birds in the afternoon on the 6 November 2025 and again on the 12 December 2025. Furthermore, incidental observations were made during all field surveys within the subject land to create a comprehensive list of bird species that utilise the subject land.

2.4.5 Raptor nest searches

Target Species: White-bellied Sea-Eagle, Little Eagle, Square-tailed Kite

Raptor nest searches were undertaken in conjunction with the habitat constraints assessment from 23-24 July 2025 and again on 6 November 2025. The subject land and wider study area were assessed for important habitat for raptors, with a particular focus on the presence of



large stick nests. During this assessment, any evidence of the presence of these species from observation or calls was recorded using a hand-held GPS.

2.4.6 Spotlighting surveys

Target Species: Southern Greater Glider,

Spotlighting surveys were undertaken in conjunction with aural-visual/call playback frog surveys, with searches of canopy trees undertaken along transects across the subject land and wider study area. While transects were located predominantly adjacent to waterbodies, they also followed the general location of the fairways which are bounded by native trees. Spotlighting was undertaken across four consecutive nights from 3-6 November 2026.

The location of spotlighting transects are shown in Figure 7.

2.4.7 Microchiropteran bat surveys

Target Species: Southern Myotis, Little Bent-winged Bat, Large Bent-winged Bat

Survey Guidelines: 'Species credit' threatened bats and their habitats (DPIE, 2021).

Microchiropteran bat (microbat) surveys were undertaken in the subject land via active searches of potential breeding habitat and passive acoustic detection. Searches of drainage culverts were undertaken using hand held spotlights on the 8 December 2025. While a couple of drainage culverts are present within the subject land most are subject to flooding during high tides and not suitable for roosting bats. A couple of large culverts have been installed for vehicle crossings which are not subject to flooding and were thoroughly searched. These are only short in length as shown in Photo 1. A couple of narrower culverts are also present which are located between fairways as shown in Photo 2. Whilst these may flood during heavy rain events, they are not subject to tidal flooding. These culverts were also searched thoroughly. Additional searches around the outside of the existing sheds and buildings were undertaken. All of these structures are currently used and are considered unlikely to provide roosting habitat for microbats.

Passive acoustic detection surveys for microbats were undertaken over a period of four consecutive nights from 8-12 December 2025 using Chorus units to record ultrasonic bat calls. A total of three locations were surveyed at locations identified in the habitat assessment as comprising potential foraging habitat for the species. Locations included vegetated areas near water bodies (see Figure 7). Bat detectors were set to activate before dusk each evening and switch off after dawn. Ultrasonic calls collected from the bat detector units were sent to Balance! Environmental for identification.

It is noted that passive acoustic detection and harp trapping were also undertaken within the subject land by Cumberland Ecology to inform the FFA. While several species were recorded by passive acoustic detection, no species were captured during harp trapping. Thorough searches of the culvert that offers potential habitat was undertaken and no microbats were identified. As such, further harp trapping was not considered to be required for the purpose of this BDAR.



Photo 1 Large culvert located along drainage line



Photo 2 Small culvert located along drainage line



2.4.8 Frog surveys

Target Species: Green and Golden Bell Frog

Survey Guidelines: NSW Survey Guide for Threatened Frogs: A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method (DPIE, 2020a).



Targeted fauna surveys for the Green and Golden Bell Frog (*Litoria aurea*) and Giant Barred Frog (*Mixophyes iteratus*) were undertaken between 3-6 November 2025, and included basking surveys and aural-visual/call playback surveys. The survey methods are detailed below while environmental conditions during targeted threatened frog surveys are provided in Table 5.

2.4.8.1 Basking surveys

A diurnal survey for basking Green and Golden Bell Frogs was undertaken on 6 November 2025 prior to the commencement of aural visual surveys. Areas targeted included water bodies and areas of grassland between water bodies known to be utilised for the Green and Golden Bell Frog for foraging (Figure 7).

2.4.8.2 Aural-visual/call playback surveys

Aural-visual surveys incorporating call-playback were undertaken for the Green and Golden Bell Frog and Giant Barred Frog concurrently over four nights from 3-6 November 2026. Surveys were conducted after dusk, along transects targeting water bodies and areas of grassland between water bodies known to be utilised for the Green and Golden Bell Frog for foraging. At each waterbody, an initial listening period was undertaken for five minutes. Following the initial listening period, call playback was undertaken for two minutes, followed by a further two minutes of listening for frogs responding. Listening and call playback surveys were repeated at each waterbody, or approximately every 50m along each of the waterbodies (where waterbodies were greater than 50m in length). A visual search for frogs was undertaken between listening and call playback stations where a hand-held spotlight was used to search for frogs. This process was repeated across multiple survey transects totalling approximately 500m in length within the subject land and wider study area.

The location of survey transects and call playback sites is shown in Figure 7.



Table 5 Environmental conditions prior to and during threatened frog surveys

Date	Daily Temperature (min. & max.)	Daily Rainfall (mm)	Humidity (%) (9am and 3pm)	Barometric Pressure (Mean Sea Level) (9am and 3pm)	Wind Speed (kph) (9am and 3pm)	Cloud Cover (eights) (9am and 3pm)	Moon Phase (%)
Proceeding Months*							
September 2025	13.3 – 23.5	113.6	54 – 43	1019.4 – 1015.8	18 – 26	3/8 – 3/8	n/a
October 2025	16.3 – 27.0	17.8	54 – 44	1014.7 – 1011.9	16 – 26	3/8 – 4/8	n/a
Proceeding Week							
27/10/2025	17.8 – 26.3	1.4	49 – 70	1002.4 – 1005.6	28 – 48	3/8 – 5/8	30
28/10/2025	12.6 – 18.4	0.2	48 – 38	1021.6 – 1020.1	20 – 15	7/8 – 7/8	39
29/10/2025	12.5 – 18.1	4.4	95 – 89	1019.0 – 1016.7	11 – 17	8/8 – 8/8	48
30/10/2025	14.2 – 20.9	10.2	85 – 80	1017.3 – 1015.7	11 – 24	4/8 – 1/8	59
31/10/2025	15.7 – 25.3	0	84 - 58	1019.4 – 1016.6	11 - 26	3/8 – 6/8	69
01/11/2025	16.7 – 22.8	15.2	84 – 66	1016.2 – 1013.8	9 – 6	7/8 – 6/8	79
02/11/2025	18.0 – 24.1	0.8	89 - 70	1015.0 – 1011.7	17 - 19	7/8 – 6/8	87
During Surveys							
03/11/2025	18.6 – 28.0	0	83 – 63	1005.8 – 1000.5	15 – 30	8/8 – 7/8	94
04/11/2025	17.6 – 24.4	19.8	37 – 30	1007.0 – 1000.5	20 – 43	3/8 – 6/8	99
05/11/2025	14.4 – 26.8	0.2	37 – 24	1013.6 – 1011.8	22 – 13	0/8 – 0/8	100
06/11/2025	14.4 – 25.8	0	41 – 28	1019.0 – 1015.0	13 – 13	1/8 – 2/8	99

*For preceding months values, temperatures are provided as a mean value, and rainfall is provided as a total



2.4.9 Incidental observations

Any incidental vertebrate fauna species that were observed, heard calling or otherwise detected on the basis of tracks or signs were recorded and listed in the total species list for the subject land.

2.5 Weather conditions

Weather conditions during field surveys are summarised in Table 6 below.

With respect to weather conditions required for target threatened species:

- Aural-visual surveys for the Green and Golden Bell Frog and Giant Barred Frog were undertaken following a period of relatively heavy rainfall and considered suitable for the detection of the Green and Golden Bell Frog.



Table 6 Environmental conditions during threatened species surveys

Survey undertaken (e.g. method / targeted species)	Date	Time	Daily Temperature (min. & max.)	Wind (light, mod...)	Daily Rainfall (mm)	Other conditions relevant to the species
Vegetation mapping, floristic plot surveys, habitat assessment and raptor nest searches	23 July 2025	8:30am – 4:30pm	12.6 – 19.7	Light	2.6	n/a
Vegetation mapping, floristic plot surveys, habitat assessment and raptor nest searches	24 July 2025	8:30am – 4:30pm	7.8 – 16.9	Light	0	n/a
Aural-visual/Call Playback Surveys	3 November 2025	8:15pm – 10:45pm	18.6 – 28	Light	0	n/a
Aural-visual/Call Playback Surveys	4 November 2025	7:50pm – 10:10pm	17.6 – 24.4	Moderate	19.8	n/a
Aural-visual/Call Playback Surveys	5 November 2025	8pm – 10pm	14.4 – 26.8	Light	0.2	n/a
Aural-visual/Call Playback Surveys	6 November 2025	8pm – 10pm	14.4 – 25.8	Light	0	n/a
Basking Surveys	6 November 2025	6:55pm – 8pm	14-4-25.8	Light	0	n/a



3.0 Site context

3.1 Assessment area

As the project is being assessed as a site-based project, the assessment area (in accordance with the BAM) comprises the area of land within a 1,500 m buffer around the outer boundary of the study area. The assessment area is approximately 1,064 ha in size and is shown on Figure 2.

3.2 Landscape features

Landscape features identified within the subject land and assessment area are shown on Figure 1 and Figure 2, respectively. A discussion of relevant landscape features is provided below.

3.2.1 IBRA bioregions and IBRA subregions

The subject land and assessment area occur within the NSW Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion and within the Pittwater Subregion.

3.2.2 Rivers, streams, estuaries and wetlands

The subject land and assessment area occur within the Cooks River Catchment, and is located immediately adjacent to Cooks River. An unnamed first order stream (according to the Strahler system) occurs within the centre of study area, flowing from east to west into Cooks River. The subject land is located approximately 1 km upstream from Botany Bay and as such, Cooks River and the unnamed first order stream within the study area would experience influxes of saltwater from Botany Bay. Previous assessments within the subject land have identified high numbers of Sea Mullet (*Mugil cephalus*) within the unnamed first order stream, and the presence of mangroves and other estuarine vegetation suggests the presence of estuarine habitat within and adjacent to the subject land.

Marsh Street Wetland and Eve Street Wetland are located approximately 350 m south west of the subject land, south of the M5 Motorway. Both of these wetlands are mapped as Coastal Wetlands under the State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP), however, as the project is located in the north east of the study area, no direct or indirect impacts to these wetlands are considered likely to occur.

Three artificial dams are located in or partially within the subject land, and will require removal to facilitate the project. Two additional dams, which comprise the RTA frog ponds are present within the south west corner of the study area.

Several watercourses are present within the wider assessment area. The Cooks River which borders the eastern boundary of the subject land is a 4th order stream, while tributaries including Alexandra Canal and Wolli Creek conform to 3rd order streams. Several other 1st and 2nd order streams are also present within the assessment area.



3.2.3 Habitat connectivity

The vegetation in the subject land consists mostly of scattered patches of planted native vegetation, and exotic vegetation that exist over a highly modified understorey. Parts of the native vegetation that may contribute to the movement of native fauna throughout different areas of habitat is proposed to be removed by the project. The treed habitat within the subject land and wider study area is considered to constitute “steppingstone” habitat, facilitating the movement of highly mobile and aerial fauna throughout the fragmented urban landscape.

Within the assessment area connectivity is limited predominantly to the south to areas of Barden Park and the Landing Lights Wetlands. Some minor connectivity exists to the north along the edge of the Cooks River, however the assessment area is highly developed with only small scattered trees dispersed across the urban landscape.

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

No karsts, caves, crevices, cliffs or areas of geological significance have been identified within the subject land or the assessment area based on searches of available aerial imagery from NearMap, or topographic data available from SixMaps.

3.2.5 Areas of outstanding biodiversity value

No Areas of Outstanding Biodiversity Value have been mapped within the subject land and/or the assessment area.

3.2.6 NSW (Mitchell) landscape

The subject land is located entirely within the ‘Sydney – Newcastle Barriers and Beaches’ NSW (Mitchell) Landscape. The assessment area comprises a mix of the ‘Sydney – Newcastle Barriers and Beaches’, ‘Woronora Plateau’, and ‘Port Jackson Basin’ landscapes.

3.2.7 Soil hazard features

A review of the acid sulphate risk mapping available on eSpade indicates that the subject land and wider study area contains a high probability of acid sulphate soils at 1-3 m below the ground surface. The EHG defines acid sulphate soils as natural sediments that contain iron sulphides which, when exposed to air, release acid that can damage built structures and harm or kill plants and animals.

3.2.8 Native vegetation cover

The native vegetation cover was determined through the use of GIS. To calculate native vegetation cover within the subject land and assessment area, this assessment utilised the NSW SVTM beyond the study area, and mapping prepared by Cumberland Ecology as part of this assessment for land within the study area.



The assessment area is approximately 1,064 ha in size, of which approximately 95.91 ha is comprised of native vegetation cover, which represents 9.01% of the assessment area. Therefore, the native vegetation cover value is assigned to the cover class of 0 - 10%.

The remaining land within the assessment area comprises cleared land, exotic vegetation, estuaries and wetlands. Table 7 summarises the extent of native vegetation cover within the assessment area. Figure 2 shows native vegetation cover within the assessment area.

Table 7 Native vegetation cover in the assessment area

Assessment area (ha)	1,064.59 ha
Total area of native vegetation cover (ha)	95.91 ha
Percentage of native vegetation cover (%)	9.01%
Class (0-10, >10-30, >30-70 or >70%)	0-10



4.0 Native vegetation, threatened ecological communities and vegetation integrity

4.1 Native vegetation extent

The subject land and wider study area has been subject to detailed surveys over several years by Cumberland Ecology, and this data has been used for the purpose of this BDAR. The native vegetation extent within the subject land was determined through aerial photography interpretation and field surveys. The native vegetation extent within the subject land is shown in Figure 8 (as represented by PCTs and planted native vegetation).

Native vegetation extent within the subject land has been calculated as occupying approximately 5.55 ha (including 0.03 ha of native PCTs and 5.52 ha of planted native vegetation), which represents 25% of the subject land.

No differences between the aerial photographs used in this assessment and the native vegetation cover shown in Figure 8 have been identified.

4.1.1 Areas that are not native vegetation

Approximately 16.29 ha of the subject land do not comprise native vegetation. These areas comprise exotic vegetation (0.27 ha), lawns and other exotic grassland (13.53 ha), waterbodies and aquatic vegetation (0.47 ha) and cleared land (2.02 ha). The extent of non-native vegetation within the subject land is shown in Figure 8 and includes all areas not mapped as native vegetation.

4.2 Plant community types

4.2.1 Overview

The golf course has been highly modified, landscaped, and filled, and no original vegetation remains. The subject land and wider study area was mostly free of mature wooded vegetation in 1943 besides planted figs surrounding the golf club house (see Figure 4). Since 1943, the eastern half of the golf course has been removed, assumedly during construction of Sydney Airport and the associated realignment of the lower reaches of the Cooks River, and fairways have been completely redeveloped to incorporate land to the south. Due to the substantial modification of the subject land, it is unlikely that any of the existing wooded vegetation is regrowth of the original vegetation communities that occurred in the area.

A total of five vegetation communities were recognised and mapped in the study area by SLR (Figure 9). No remnant native vegetation occurs, though two vegetation types, are considered to conform to PCTs, PCT 4091 and PCT 4097. These PCTs comprise areas of mangroves and saltmarsh, and are considered to be semi-natural, having recolonised small low-lying areas in the time since historical clearing of the subject land and wider study area was undertaken.



Planted native and exotic vegetation dominate almost all of the vegetated areas of the site. Details of each vegetation community are provided in Table 8, and descriptions are provided below.

Table 8 PCTs identified within the subject land

Vegetation Community	Study Area (ha)	Subject Land (ha)	BC Act Status	EPBC Act Status
Semi-natural Plant Communities				
PCT 4091 Grey Mangrove-River Mangrove Forest	0.02	0.02	Not listed	Not listed
PCT 4097 Samphire Saltmarsh	0.01	0.01	EEC	Not listed
Planted Native and Exotic Plant Communities				
Planted Native Vegetation	7.94	5.52	Not listed	Not listed
Exotic Vegetation	0.64	0.27	Not listed	Not listed
Lawns and other Exotic Grassland	17.49	13.53	Not listed	Not listed
Other				
Water Body with Fringing Aquatic Vegetation	0.58	0.47	Not listed	Not listed
Cleared Land	9.60	2.02	Not listed	Not listed
Total	36.27	21.84		

Key: EEC = Endangered Ecological Community



4.2.2 PCT 4091 Grey Mangrove-River Mangrove Forest

4.2.2.1 PCT overview

Table 9 PCT 4091

PCT ID	4091
PCT name	Grey Mangrove-River Mangrove Forest
Vegetation formation	Saline Wetlands
Vegetation class	Mangrove Swamps
Per cent cleared value (%)	13.27
Extent within subject land (ha)	0.02

4.2.2.2 BioNet Description

PCT 4091 is a low, mid-high or tall mangrove open forest or woodland, sometimes including a saltmarsh ground layer, occurring on tidal flats of the NSW coast. The tree canopy is sparse, mid-dense or sometimes dense and is almost always dominated by grey mangrove *Avicennia marina* subsp. *australasica*. River mangrove *Aegiceras corniculatum* is common, occurring at around half of the known locations, however usually with a more sparse projected foliage cover than *Avicennia marina* subsp. *australasica*. Other trees are rare, however may include a sparse cover of red mangrove *Rhizophora stylosa*, or on mangrove fringes *Casuarina glauca*, *Melaleuca linariifolia* or *Ficus rubiginosa*. Salt-tolerant ground cover species make a significant contribution to the species richness of this PCT overall, however are not always present. Where present, the ground layer is sparse to mid-dense. *Sarcocornia quinqueflora* subsp. *quinqueflora* occasionally occurs with sparse cover, while *Sporobolus virginicus* or *Samolus repens* rarely occur however generally with higher projected foliage cover. Other rare species with variable cover include *Juncus kraussii* subsp. *australiensis*, *Tecticornia arbuscula*, *Sesuvium portulacastrum* and *Spergularia marina* amongst other salt-tolerant grasses, forbs and sedges. This PCT is weakly floristically related to the saltmarsh PCT 4097, however PCT 4097 has only sparse mangroves, a more consistent cover of saltmarsh species, and occurs at sites with less frequent or shorter periods of tidal inundation. PCT 4091 is the only community in the Mangrove Swamps vegetation class that extends along the length of the coast. Mangrove PCTs 4140 and 4090 are both restricted to the northern half of the North Coast botanical division.

4.2.2.3 Study Area Description

This community occurs in a small water body in the south-east of the study area and is dominated by a single mangrove species. The water body the community occurs in is separated by approximately 70 m from Cooks River, is not tidally connected, and is an artificial habitat. The water body did not exist in 1943 (Figure 4). There is one condition zone of the PCT, which is described below.



Condition states

Within the subject land and study area, PCT 4091 occurs as one condition zone: moderate.

i. Moderate

This zone is the only condition zone of the PCT in the subject land and study area with the canopy, sub-canopy, and shrub layers all dominated by *Avicenna marina* subsp. *australasica* (Grey Mangrove). No other species occur in these layers. The ground layer in shoreline areas that are not permanently inundated have sparse occurrences of the native species *Suaeda australis* (Seablite), *Commelina cyanea* (Scurvy Weed), *Sarcocornia quinqueflora* subsp. *quinqueflora* (Samphire), and *Juncus kraussii* subsp. *australiensis* (Sea Rush). The exotic species *Atriplex prostrata* (Triangle Orache) and *Juncus acutus* (Sharp Rush) and the grass *Ehrharta erecta* (Panic Veldtgrass), are also scattered through the layer, along with a number of other weed species.

An example of this condition zone is provided below in **Photo 3**.

Photo 3 Moderate condition of PCT 4091 within the study area



4.2.2.4 Justification of PCT selection

Justification for the selection of PCT 4091 is provided in Table 10 below. A review of regional mapping shows the area is historically predicted to have been dominated by PCT 4091 in intertidal area, grading into forested wetlands in the west (DCCEEWS (NSW), 2025d).

Table 10 Justification for PCT 4091 selection

Method	Selection/Discussion
Non-Plot to PCT Tool	



Method	Selection/Discussion
Likely PCT matches from SVTM over or nearby to PCT 4091 polygons in site-specific mapping	PCT shortlist: 4027, 4028, 4057, 4091, 4097
Plot to PCT Tool	
PCTs with centroid matches within distance to centroid threshold	PCT Shortlist: 4097, 4091
PCT Selection	
Discarded PCTs	PCT 4027 – This PCT is co-dominated by <i>Avicennia marina</i> subsp. <i>australasica</i> (Grey Mangrove) and <i>Casuarina glauca</i> (Swamp Oak). The latter species was not present in this community within study area. PCT 4028 - This PCT is dominated by <i>Casuarina glauca</i> (Swamp Oak) trees, with a ground layer dominated by <i>Machaerina juncea</i>, which as not present in the vegetation at this location in the study area. PCT 4057 – This PCT is a forested wetland dominated by eucalypts and <i>Melaleuca</i> spp. Vegetation in this area of the study area lacks eucalypts and is dominated by the mangrove <i>Avicennia marina</i> subsp. <i>australasica</i>. PCT 4095 – This PCT is a saltmarsh community strongly associated with the fringes of saline lakes, and lagoons. Vegetation in this area is characterised by a dense mangrove canopy. PCT 4097 – This PCT shares similar ground layer species as PCT 4091, however is a saltmarsh community lacking a dense canopy of mangroves.
Selected PCT	PCT 4091 was selected as this PCT matches the vegetation in these areas of the subject land, being dominated by <i>Avicennia marina</i> subsp. <i>australasica</i> , with an understorey and ground layer of salt-tolerant shrubs and herbs such as <i>Sarcocornia quinqueflora</i> and <i>Triglochin striata</i> . The occurrence also matches the description of the PCT as occurring in estuarine areas with some tidal influence. Further, PCT 4091 is the only PCT that comprises the Mangrove Swamps Keith class that occurs as far south as the subject land.
Site species matches within each BAM Growth Form Group with Selected PCT	
Tree	<i>Avicennia marina</i> subsp. <i>australasica</i>



Method	Selection/Discussion
Shrub	<i>Sarcocornia quinqueflora</i> , <i>Suaeda australis</i>
Grass and Grass-like	<i>Juncus kraussii</i> subsp. <i>australiensis</i>
Forb	<i>Commelina cyanea</i> , <i>Triglochin striata</i> ,

4.2.2.5 Alignment with TECs

This PCT is not associated with any listed TECs, and the vegetation within the study area does not match any known TECs listed under the BC Act or EPBC Act.

Although not listed as a TEC, this community comprises marine vegetation which holds significance under the Fisheries Management Act 1994 (FM Act). Marine vegetation is considered to be key fish habitat and is protected under FM Act. The FM Act sets out provisions to protect marine vegetation (which includes mangroves, saltmarshes, seagrass and seaweeds) from 'harm'. Harm under the FM Act means 'gather, cut, pull up, destroy, poison, dig up, remove, injure, prevent light from reaching or otherwise harm the marine vegetation, or any part of it'.

4.2.3 PCT 4097 Samphire Saltmarsh

4.2.3.1 PCT overview

Table 11 PCT 4091

PCT ID	4097
PCT name	Samphire Saltmarsh
Vegetation formation	Saline Wetlands
Vegetation class	Saltmarshes
Per cent cleared value (%)	54.30
Extent within subject land (ha)	0.01

4.2.3.2 BioNet Description

PCT 4097 is a mid-high saline forbland, closed forbland or sparse to open tall shrubland, featuring *Sarcocornia quinqueflora* subsp. *quinqueflora* and occurring on littoral salt flats, estuaries, saline lagoons or tidal creek flats along the NSW coast at or very close to sea level. (DCCEEW (NSW), 2026a). The succulent *Sarcocornia quinqueflora* subsp. *quinqueflora* almost always forms a mid-dense ground layer in the saltmarsh, occasionally accompanied by sparse *Sporobolus virginicus* or rarely very sparse *Samolus repens*, *Suaeda australis* or *Juncus kraussii* subsp. *australiensis*. Other forbs can occur at high density at individual sites, such as *Tecticornia arbuscula* and *Sesuvium portulacastrum*. Mangroves, commonly *Avicennia marina* subsp. *australasica* and rarely



Aegiceras corniculatum, often form a sparse or very sparse cover, sometimes only as seedlings or scattered small bushes. The median native species richness for this PCT is low, with rarely more than seven species recorded in a plot. This PCT is likely to be more widely distributed than standard plots suggest, as saltmarsh dominated by *Sarcocornia quinqueflora* subsp. *quinqueflora* is known to be widespread along the NSW coast. The community is found on a wide range of substrates, from coarse sands to fine-grained silts and muds. This PCT occurs in similar environments as PCT 4091 (which has a greater dominance of mangroves and only very sparse *Sarcocornia quinqueflora* subsp. *quinqueflora*) and PCT 4103 (which has greater dominance of *Sporobolus virginicus* and only sparse *Sarcocornia quinqueflora* subsp. *quinqueflora*). This community occurs at locations that are intermediate between PCT 4091 and PCT 4103 in frequency or duration of tidal inundation. PCT 4141 also contains *Sarcocornia quinqueflora* subsp. *quinqueflora* together with other saltmarsh species, however, is easily distinguished by its occurrence on exposed cliff tops.

4.2.3.3 Study Area Description

PCT 4097 occurs predominately in the northern half of the subject land and study area and is present as two small patches in a single drainage line. The drainage line is likely artificial, and occurs mostly below ground in pipes, but occurs above ground in this location crossing a golf fairway. Despite the artificial nature of the drainage line, it is at an elevation that results in the water course being exposed to the tidal influence of the adjacent ocean within Botany Bay. It is suspected therefore that the occurrence of the PCT at this location is due to either wash of propagules into the drainage line, and/or colonisation by waterbird-dispersed propagules. Regardless, these two open sections of drainage line are dominated by native saltmarsh species. There is one condition zone of this PCT, degraded, which is described below.

Condition states

Within the study area, PCT 4097 occurs as one condition zone: degraded.

i. Degraded

This condition zone in the subject land and study area is dominated by the native *Sarcocornia quinqueflora* (Beaded Samphire). The native sedge species *Bolboschoenus fluviatilis* is common, and the rush *Juncus kraussii* subsp. *australiensis*, and graminoid *Triglochin striata* (Streaked Arrowgrass) also occur. The exotic species *Atriplex prostrata* (Triangle Orache) and *Juncus acutus* (Sharp Rush) are present, though in small abundances. Exotic weeds are common surrounding the fringes of the PCT, due to the surrounding golf course, with dominant species including the grass *Stenotaphrum secundatum* (Buffalo Grass), and common forbs including *Stellaria media* (Chickweed) and *Cotula coronopifolia* (Water Buttons).

An example of this condition zone is provided below in **Photo 4**.



Photo 4 Degraded condition of PCT 4097 within the study area



4.2.3.4 Justification of PCT selection

Justification for the selection of PCT 4097 is provided in Table 12 below. A review of regional mapping shows historically this area of the golf course is predicted to have supported PCT 4091 (DCCEEW (NSW), 2025d)(EHG, 2025), grading into forested wetlands PCT 4027 and PCT 4057 to the west.

Table 12 Justification for PCT 4091 selection

Method	Selection/Discussion
Non-Plot to PCT Tool	
Likely PCT matches from SVTM over or nearby to PCT 4091 polygons in site-specific mapping	PCT shortlist: 4027, 4028, 4057, 4091, 4097
Plot to PCT Tool	
PCTs with centroid matches within distance to centroid threshold	PCT Shortlist: 4097, 4095
PCT Selection	
Discarded PCTs	PCT 4027 – This PCT is a forested wetland, not a forbland, which is dominated by a canopy of <i>Casuarina glauca</i> (Swamp Oak) trees and mangroves. While a single <i>Avicennia marina</i> subsp. <i>australasica</i> (Grey Mangrove) was present, this was a juvenile shrub.



Method	Selection/Discussion
	PCT 4028 - This PCT is a forested wetland, not a forbland, which is dominated by a canopy of <i>Casuarina glauca</i> (Swamp Oak) trees, with a ground layer dominated by <i>Machaerina juncea</i>, which was not present in the vegetation at this location in the study area. PCT 4057 – This PCT is a forested wetland dominated by eucalypts and <i>Melaleuca</i> spp. Vegetation in this area of the study area is a herbaceous forbland, without canopy species. PCT 4091 – This PCT shares similar ground layer species as PCT 4097, however has a denser woody stratum dominated by mangroves – vegetation in this area of the study area lacks woody species. PCT 4095 – This PCT rarely occurs directly on the coastline, and is more strongly associated with the fringes of saline lakes, and lagoons. The presence of <i>Paspalum vaginatum</i> also typifies this PCT, and this species was not present within the study area.
Selected PCT	PCT 4097 was selected as it is associated with low elevation land subject to tidal inundation and dominated by the species <i>Sarcocornia quinqueflora</i> subsp. <i>quinqueflora</i> which dominates vegetation at this location in the study area. The dominance of this species generally separates PCT 4097 from other saltmarsh PCTs, which tend to be dominated or co-dominated by saline-tolerant grasses, or the rush <i>Juncus kraussii</i> subsp. <i>australiensis</i> . The occurrence of a single individual of <i>Avicennia marina</i> subsp. <i>australasica</i> also matches this PCT, which often has a sparse shrub layer of mangroves.
Site species matches within each BAM Growth Form Group with Selected PCT	
Tree	<i>Avicennia marina</i> subsp. <i>australasica</i>
Shrub	<i>Sarcocornia quinqueflora</i> subsp. <i>quinqueflora</i> , <i>Suaeda australis</i>
Grass and Grass-like	<i>Juncus kraussii</i> subsp. <i>australiensis</i> , <i>Cynodon dactylon</i>
Forb	<i>Triglochin striata</i> , <i>Apium prostratum</i>

4.2.3.5 Alignment with TECs

Although the saltmarsh occurrences within the subject land are within an artificial drainage line, the community is considered to meet the final determination description of the EEC 'Coastal saltmarsh in the NSW North Coast, Sydney Basin and Southeast Corner bioregions'



that is listed under the BC Act (NSW Scientific Committee, 2011). This is because it occurs in the intertidal zone of an estuary along the NSW Coast. Vegetation within the study area includes the characteristic species *Juncus kraussii*, *Sarcocornia quinqueflora* and *Triglochin striata*.

The occurrences of the PCT are not considered to conform to the EPBC Act listed 'Subtropical and Temperate Coastal Saltmarsh' (DoEE, 2013), as the total patch size of the community is less than 0.1 ha and does therefore not meet the condition thresholds for the Threatened Ecological Community (TEC).

Furthermore, this community comprises marine vegetation which holds significance under the Fisheries Management Act 1994 (FM Act). Marine vegetation is considered to be key fish habitat and is protected under FM Act. The FM Act sets out provisions to protect marine vegetation (which includes mangroves, saltmarshes, seagrass and seaweeds) from 'harm'. Harm under the FM Act means '*gather, cut, pull up, destroy, poison, dig up, remove, injure, prevent light from reaching or otherwise harm the marine vegetation, or any part of it*'.

4.3 Non-PCT Vegetation

4.3.1 Planted Native Vegetation

This community consists of plantings of species that are indigenous to NSW and classified as "native vegetation" as per the definition under the NSW *Local Land Services Act 2013*, which is utilised in the BAM. This definition of native species includes those species which occurred naturally in NSW prior to European Colonisation.

The Planted Native Vegetation community is scattered throughout the study area, comprising over half of the wooded vegetation, and is variable in species composition based on location (**Photos 5 - 8**). Vegetation in this community generally consists of planted trees/small trees and shrubs over exotic grassland, and in native garden beds.

Extensive areas of the subject land and wider study area consist of groves of trees between fairways that consist of mono-specific plantings and mixed plantings of tree species that may have been indigenous historically to the study area and are common in the locality. These species include *Melaleuca quinquenervia* (Broad-leaved Paperbark) and *Casuarina glauca* (Swamp Oak). Other planted species that may have been indigenous to the study area though have been less commonly planted include *Eucalyptus robusta* (Swamp Mahogany), *Eucalyptus botryoides* (Bangalay), and *Eucalyptus saligna* x *botryoides*.

These tree species are characteristic species of two EECs listed under the BC Act; Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions, and Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions. However, due to the complete lack of characteristic understorey and ground layer species associated with these stands of trees, and their planted status, stands of these trees in the subject land are not considered to conform to the description of either EEC. As seen in **Figure 4**, the relevant stands of Planted Native Vegetation were not present in 1943, hence are unlikely to be remnant vegetation.



Other tree species within the community include native species not indigenous to the Botany Bay or Sydney area such as *Eucalyptus nicholii* (Narrow-leaved Black Peppermint) and *Casuarina cunninghamiana* (River Oak). Locally native species include *Eucalyptus punctata* (Grey Gum), *Corymbia maculata* (Spotted Gum), *Banksia integrifolia* (Coast Banksia), and *Leptospermum laevigatum* (Coastal Tea Tree).

As with trees, native shrubs (or juvenile trees) planted throughout the golf course are a mix of natives that naturally occur within the Sydney Region and the locality, and natives not indigenous to Sydney. Local natives include *Callistemon citriodora* (Crimson Bottlebrush), *Melaleuca armillaris* (Bracelet Honey-Myrtle), *Tristaniopsis laurina* (Water Gum), *Banksia spinulosa* (Hairpin Banksia), and *Cupaniopsis anacardioides* (Tuckeroo). Non-local natives include *Acacia baileyana* (Cootamundra Wattle), *Leptospermum petersonii* (Lemon-scented Tea Tree), and *Melaleuca leucadendra* (Weeping Paperbark).

The ground layer of the community throughout the majority of the site consists of Exotic Grassland as described below. Garden plantings such as in the area surrounding the golf club house include the native *Dianella caerulea* (Blue Flax-lily) and the native cultivar *Lomandra longifolia* "Tanika".

Photo 5 Planted gardens surrounding the club house and practice greens



Photo 6 *Casuarina cunninghamiana* (River Oak) planting within the golf course



Photo 7 Planted *Casuarina glauca* (Swamp Oak) grove

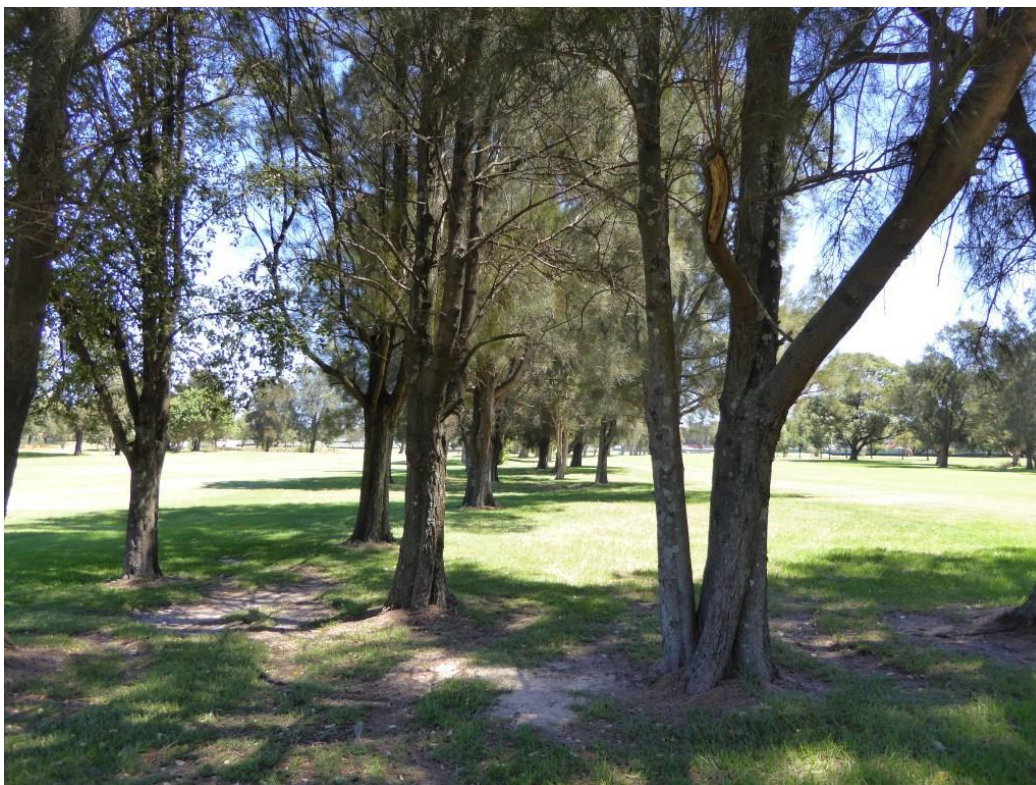


Photo 8 Mixed grove of *Melaleuca quinquenervia* (Swamp Paperbark) and *Casuarina glauca* (Swamp Oak)



4.3.1.1 Application of the Decision-Making Key

The BAM includes a streamlined assessment module for “planted native vegetation”. This module simplifies the assessment of impacts on planted native vegetation within a development site.

The decision-making key outlined in Section D.1 of Appendix D of the BAM provides a framework to determine whether the streamlined assessment module for planted native vegetation can be applied to a site. In accordance with the BAM, evidence demonstrating the application of the decision-making key to the planted native vegetation within a site, including determination of which subsection of the key applies to the native vegetation to be impacted by a project is required to be presented in the BDAR.

Table 13 below details the application of the decision-making key to the planted native vegetation in the subject land. It was determined that subsection 5 applies to the planted native vegetation that occurs in the subject land, as shown in Figure 9, as the vegetation has been planted for functional and aesthetic purposes as part of the landscaping in the golf course. This is consistent with the findings in the FFA report that was prepared for the approved Planning Proposal.



Table 13 Decision-making key to determine the application of the streamlined assessment module for planted native vegetation

Step	Comment
1. Does the planted native vegetation occur within an area that contains a mosaic of planted and remnant native vegetation and which can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal? i. Yes...The planted native vegetation must be allocated to the best-fit PCT and the BAM must be applied. ii. No...Go to 2.	No, all the planted native vegetation within the subject land is planted, as evident when reviewing historical aerial photographs. No remnant vegetation occurs in association with the planted native vegetation. Hence, the subject land does not contain a mosaic of planted and remnant native vegetation.
2. Is the planted native vegetation: a. planted for the purpose of environmental rehabilitation or restoration under an existing conservation obligation listed in BAM Section 11.9(2.), and b. the primary objective was to replace or regenerate a plant community type or a threatened plant species population or its habitat? i. Yes...The planted native vegetation must be assessed in accordance with Chapters 4 and 5 of the BAM. ii. No...Go to 3.	No, the planted native vegetation was not planted for any of the reasons outlined in points a and b.
3. Is the planted/translocated native vegetation individuals of a threatened species or other native species planted/translocated for the purpose of provided threatened species habitat under one of the following: a. a species recover project b. Saving our Species project c. other types of government funded restoration project d. condition of consent for a development approval that required those species to be planted or translocated for the purpose of providing threatened species habitat e. legal obligation as part of a condition or ruling of court. This includes regulatory directed or ordered remedial plantings (e.g. Remediation Order for clearing without consent issued under the BC Act or the Native Vegetation Act) f. ecological rehabilitation to re-establish a PCT or TEC that was, or is carried out under a mine operations plan, or	No, none of points a-g apply to the planted native vegetation in the subject land.



Step	Comment
g. approved vegetation management plan (e.g. as required as part of a Controlled Activity Approval for works on waterfront land under the NSW Water Management Act 2000)? i. Yes...The planted native vegetation must be assessed in accordance with Chapters 4 and 5 of the BAM. ii. No...Go to 4.	
4. Was the planted native vegetation (including individuals of a threatened flora species) undertaken voluntarily for revegetation, environmental rehabilitation or restoration without a legal obligation to secure or provide for management of the native vegetation? i. Go to D.2 Assessment of planted native vegetation for threatened species habitat (the use of Chapters 4 and 5 of the BAM are not required to be applied). ii. No...Go to 5.	No, the planted native vegetation was not planted for revegetation, environmental rehabilitation or restoration purposes.
5. Is the native vegetation (including individuals of threatened flora species) planted for functional, aesthetic, horticultural or plantation forestry purposes? This includes examples such as: windbreaks in agricultural landscapes, roadside plantings (including street trees, median strips, roadside batters), landscaping in parks, garden and sports fields/complexes, macadamia plantations or teatree farms? i. Go to D.2 Assessment of planted native vegetation for threatened species habitat (the use of Chapters 4 and 5 of the BAM are not required to be applied). ii. No...Go to 6.	Yes, the planted native vegetation was planted for functional and aesthetic purposes as part of a golf course.

*Step 6 of the decision-making key has not been included, as subsection 5 applies to the project.

All of the planted native vegetation mapped within the subject land and wider study area has been planted as part of the landscaping for the golf course, which is evident when reviewing historical aerial images of the site. As a result, the application of the streamlined assessment module for planted native vegetation outlined in Appendix D of the BAM can be applied for areas of planted native vegetation.

4.3.2 Exotic Vegetation

Exotic vegetation is defined in this report as species that would not meet the definition of native under the BAM, i.e. species not indigenous to Australia at all, or Australian native species that did not occur naturally in NSW prior to European colonisation. This community includes species that have been planted for landscaping purposes and exotic weed species which have



colonised areas of the site, such as along the south-western boundary of the site where there are infestations of *Lantana camara* (Lantana).

Trees and shrubs indigenous to Australia, but not NSW, include *Eucalyptus cladocalyx* (Sugar Gum), *Lagunaria patersonia* (Norfolk Island Hibiscus), *Ficus microphylla* var. *hillii* (Hill's Weeping Fig), *Agonis flexuosa* (Western Australian Peppermint), and *Corymbia ficifolia* (Albany Red Gum).

Exotic species include *Schinus areira* (Pepper Tree), *Salix babylonica* (Weeping Willow), *Gleditsia triacanthos* (Honey Locust), *Ficus benjamina* (Weeping Fig), *Metrosideros excelsa* (New Zealand Christmas Tree), *Nandina domestica* (Japanese Sacred Bamboo), *Buxus microphylla* (Japanese Box), and *Pinus radiata* (Radiata Pine).

Some exotic, ornamental, herbaceous species are also present planted in garden beds, such as around the club house and include *Tradescantia pallida* (Purple Queen), *Dietes grandiflora* (Fairy Iris), and *Clivia miniata* (Clivia).

On dry, unmown embankments in the south-western area of the study area in proximity to the RTA frog ponds, patches of weed-dominated shrubs and grassland also occur. This occurrence of exotic vegetation community is dominated by exotic species with a few scattered native small trees and shrubs of common non-threatened species (**Photo 9**).

Tree species within the community consist of the exotic weed species *Ligustrum lucidum* (Broad-leaved Privet), *Ulmus parvifolia* (Chinese Elm), and *Cinnamomum camphora* (Camphor Laurel). Small trees/tall shrubs present include the exotics *Celtis sinensis* (Chinese Celtis), *Morus alba* (White Mulberry), *Salix babylonica* and *Lagunaria patersonia*. The non-endemic natives *Melia azedarach* (White Cedar) and *Acacia saligna* (Golden Wreath Wattle) are present, along with scattered occurrences of *Pittosporum undulatum* (Sweet Pittosporum) and a single occurrence of *Melaleuca quinquenervia* (Broad-leaved Paperbark).

The shrub layer, where present, is dominated by the exotic species *Lantana camara* (Lantana), with *Cestrum parqui* (Green Cestrum) and *Ricinus communis* (Castor Oil Plant) occurring commonly, along with a small number of *Gleditsia triacanthos* (Honey Locust). The native species *Acacia longifolia* subsp. *sophorae* (Coastal Wattle) and *Pittosporum undulatum* have a scattered distribution within the layer of the community.

The ground layer is dominated by a dense covering of exotic forbs and grasses. Common exotic forbs include *Hydrocotyle bonariensis* (Pennywort), *Acetosa sagittata* (Turkey Rhubarb), *Bidens pilosa* (Cobbler's Pegs), and *Conyza sumatrensis* (Tall Fleabane). Exotic grasses include *Cenchrus clandestinus* (Kikuyu), *Paspalum dilatatum*, *Stenotaphrum secundatum* (Buffalo Grass), and *Melinis repens* (Natal Grass).



Photo 9 Exotic vegetation in the south-west of the study area



4.3.3 Lawns and Other Exotic Grassland

Mown lawns, mostly comprising golf course roughs, fairways, and greens, cover approximately 62% of the vegetated areas of the subject land (**Photo 10**). The majority of this vegetation is comprised of three exotic lawn grasses, *Stenotaphrum secundatum*, *Cynodon dactylon* (Common Couch), and *Cenchrus clandestinus*.

While the status of *Cynodon dactylon* has been changed from Exotic to Native by the Royal Botanic Gardens, the change from exotic to native is still highly debated/contested by botanists as the grass species is cosmopolitan and occurs widely throughout the world. Furthermore, because of its low growth form, this species was and is a commonly used species for landscaping areas, particularly golf courses where low growing grass varieties are extensively grown. Within the study area, *Cynodon dactylon* predominantly occurs within modified fairways of the golf course suggesting that it is an introduced species within the study area. For this reason, this species is an exotic (introduced) species within the study area.

A number of common exotic grasses are present as weeds throughout the subject land, especially where mowing is absent or less intensive. These include but are not limited to *Ehrharta erecta* (Panic Veldtgrass), *Sporobolus africanus* (Parramatta Grass), and *Eleusine tristachya* (Goose Grass).

Exotic forbs are scattered throughout the community, but tend to be uncommon, likely due to regular close mowing and the use of broadleaf herbicides during the operation of the site as a



golf course. Species present include *Paronychia brasiliiana* (Chilean Whitlow Wort), *Stellaria media* (Chickweed), *Polycarpon tetraphyllum* (Four-leaf Allseed), and *Sonchus oleraceus* (Milk Thistle)

Photo 10 Lawns in the south of the study area



4.3.4 Waterbodies and Aquatic Vegetation

Artificial water bodies such as dams within the golf course and a drainage channel through the centre of the study area contain fringes of native and exotic aquatic macrophyte species (aquatic and semi-aquatic plants). These areas have not been mapped separately due to their small size and are instead incorporated with the waterbodies mapped within the study area (see Figure 9).

Macrophyte species present include tall native rushes, grasses, and sedges such as *Typha orientalis* (Bulrush), *Schoenoplectus validus*, and *Phragmites australis* (Common Reed), which occur in dense patches in some areas. Other species scattered along the central drainage line include the native saltmarsh species *Sarcocornia quinqueflora*, *Bacopa monnieri*, and *Juncus kraussii*. The exotic species *Juncus acutus* and *Atriplex prostrata* are also present.

Some of the native aquatic species present in the water bodies of the study area are characteristic species of two EECs listed under the BC Act; Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions, and Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions. Individuals of these species are scattered, and where forming patches, they are too small to be mapped as a PCT.



The Freshwater wetlands EEC Final Determination notes that “Artificial wetlands created on previously dry land specifically for purposes such as sewerage treatment, stormwater management and farm production, are not regarded as part of this community, although they may provide habitat for threatened species” (NSW Scientific Committee, 2011). Due to the artificial nature of the water bodies within the study area, aquatic vegetation present is not considered to conform to this EEC.

The final determination for Coastal Saltmarsh describes the community as “occurring in the intertidal zone on the shores of estuaries and lagoons” (NSW Scientific Committee, 2011b). The saltmarsh species occurrences within the central drainage line are within an artificial water course and are not considered to be consistent with the final determination description of the EEC.

An example of aquatic vegetation within the study area is shown in **Photo 11**.

Photo 11 Aquatic vegetation within the central drainage line in the study area



4.4 Threatened ecological communities

One of the two PCTs identified within the study area, PCT 4097, has been assessed as being associated with a TEC. Table 14 summarises the TEC identified within the study area its distribution is shown in Figure 10.



Table 14 TECs within the subject land

TEC name	Profile ID (from TBDC)	BC Act status	EPBC Act status	Associated vegetation zones within the subject land	Area within subject land (ha)
Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions	10866	EEC	Not listed	PCT 4097	0.01

4.5 Vegetation zones

The native vegetation identified within the subject land was assigned to a vegetation zone based on PCTs and broad condition states. Patch sizes were subsequently assigned for each vegetation zone. The extent of vegetation zones and patch size classes within the subject land are provided in Table 15 and are shown in Figure 11.



Table 15 Vegetation zones and patch sizes

Vegetation zone ID	PCT ID number and name	Condition / other defining feature	Area (ha)	Patch size class (select multiple if areas of native vegetation are discontinuous)	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
1	4091	Moderate	0.02	>100 ha	1	1	1	P1
2	4097	Degraded	0.01	>100 ha	1	1	1	P2



4.6 Vegetation integrity (vegetation condition)

4.6.1 Vegetation integrity survey plots

Each vegetation zone was assessed using BAM plots (see **Section 2.2.3**) to determine the vegetation integrity (VI) score. BAM plot data utilised within the BAM Calculator (BAM-C) to determine the VI score is provided in **Appendix B**. The VI assessment utilised the benchmark data held within the BAM-C (as derived from the BioNet Vegetation Classification).. Vegetation zones and VI scores for the subject land are summarised in Table 16.

4.6.2 Scores

The vegetation integrity scores for each vegetation zone are presented in Table 16.

Table 16 Vegetation integrity scores

Vegetation zone ID	Composition condition score	Structure condition score	Function condition score (where relevant)	Vegetation integrity score	Hollow bearing trees present?
1_PCT 4091_Moderate	70.7	72.2	-	71.4	No
2_PCT 4097_Degraded	70.1	98.9	-	83.3	No

4.6.3 Use of benchmark data

Vegetation benchmarks used in calculating the VI score were not amended and were adopted as per the BAM-C available at the time of the assessment. This assessment therefore did not utilise local benchmarks.



5.0 Habitat suitability for threatened species

5.1 Identification of threatened species for assessment

The BAM-C generates a list of threatened species requiring assessment utilising a number of variables. The following criteria have been used to predict the threatened species requiring further assessment:

- IBRA Subregion: Pittwater;
- Associated PCTs: 4091 and 4097;
- Percent native vegetation cover in the assessment area: 9.01%;
- Patch size: ≥ 100 ha; and
- Credit type: Ecosystem and/or species.

Based on the above variables, the BAM-C generated a list of ecosystem credit species and species credit species. Furthermore, a search for threatened species recorded on NSW BioNet Atlas within 5 km of the study area was undertaken to generate a list of threatened species likely to utilise habitat within areas of planted native vegetation in the study area. The BioNet Atlas search identified an additional ten threatened ecosystem credit species and 12 species credit species of which have been added into the BAM-C for consideration. These species are automatically assigned by the BAM-C to both vegetation zones within the subject land. It is noted that additional marine and migratory species were also identified in the BioNet Atlas search, however these species have not been considered further as the subject land does not comprise suitable habitat for these species.

Ecosystem credit species and species credit species are assessed further in **Section 5.1.1** and **Section 5.1.2**, respectively.

5.1.1 Ecosystem credit species

Table 17 lists all ecosystem credit species predicted to occur on or use the subject land (based on the PCTs present and BioNet records), and:

- Identifies the source of information (e.g. automatically populated in BAM-C, recently listed under the BC Act and not yet added to the TBDC, previous ecological reports).
- Justifies species added to the BAM-C auto-populated list or removed from the list in accordance with BAM Subsections 5.2.1 and 5.2.2.
- Includes the sensitivity to gain class (from the TBDC).

One of the predicted ecosystem credit species has been excluded based on the TBDC geographic limitations



Table 17 Predicted ecosystem fauna credit species

Scientific name	Common name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
<i>Anthochaera phrygia</i>	Regent Honeyeater (Foraging)	CE	CE	Yes	BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V	-	No	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	Moderate
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E	No	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	Moderate
<i>Calidris alba</i>	Sanderling (Foraging)	V	-	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Calidris canutus</i>	Red Knot (Foraging)	-	E	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Calidris ferruginea</i>	Curlew Sandpiper (Foraging)	CE	CE	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Calidris tenuirostris</i>	Great Knot (Foraging)	V	V	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Calyptrorhynchus lathamii lathamii</i>	South-eastern Glossy Black	V	V	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High



Scientific name	Common name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
	Cockatoo (Foraging)								
<i>Charadrius leschenaultii</i>	Greater Sand-plover (Foraging)	V	V	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Charadrius mongolus</i>	Lesser Sand Plover (Foraging)	V	E	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Circus assimilis</i>	Spotted Harrier	V	-	No	BAM-C, BioNet	Yes	n/a	2_4097_degraded	Moderate
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	No	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	Moderate
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	No	BAM-C	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Epthianura albifrons</i>	White-fronted Chat	V	-	No	BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	Moderate
<i>Esacus magnirostris</i>	Beach Stone-curlew (Foraging)	CE	-	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Glossopsitta pusilla</i>	Little Lorikeet	V	-	No	BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High



Scientific name	Common name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle (Foraging)	V	-	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Hieraaetus morphnoides</i>	Little Eagle (Foraging)	V	-	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	Moderate
<i>Hirundapus caudacutus</i>	White-throated Needletail	V	V	No	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Ixobrychus flavicollis</i>	Black Bittern	V	-	No	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	Moderate
<i>Lathamus discolor</i>	Swift Parrot (Foraging)	E	CE	Yes	BAM-C	Yes	n/a	1_4091_moderate	Moderate
<i>Limicola falcinellus</i>	Broad-billed Sandpiper (Foraging)	V	-	Yes	BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Limosa lapponica baueri</i>	Bar-tailed Godwit (baueri) (Foraging)	-	V	Yes	BAM-C	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Limosa limosa</i>	Black-tailed Godwit (Foraging)	V	E	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High



Scientific name	Common name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
<i>Lophochroa leadbeateri</i>	Pink Cockatoo	V	E	Yes	BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	Moderate
<i>Lophoictinia isura</i>	Square-tailed Kite (Foraging)	V	-	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate	Moderate
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V	-	No	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Miniopterus australis</i>	Little Bent-winged Bat (Foraging)	V	-	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat (Foraging)	V	-	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Neophema pulchella</i>	Turquoise Parrot	V	-	No	BAM-C	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Numenius madagascariensis</i>	Eastern Curlew (Foraging)	-	CE	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Pandion cristatus</i>	Eastern Osprey (Foraging)	V	-	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	Moderate



Scientific name	Common name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
<i>Petroica boodang</i>	Scarlet Robin	V	-	No	BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	Moderate
<i>Petroica phoenicea</i>	Flame Robin	V	-	No	BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	Moderate
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	-	V	No	BAM-C	Yes	n/a	1_4091_moderate	High
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox (Foraging)	V	V	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Ptilinopus superbus</i>	Superb Fruit-Dove	V	-	No	BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	Moderate
<i>Rostratula australis</i>	Australian Painted Snipe	E	E	No	BAM-C	No	Geographic limitation	1_4091_moderate, 2_4097_degraded	Moderate
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V	-	No	BAM-C, BioNet	Yes	n/a	1_4091_moderate	High
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V	-	No	BAM-C	Yes	n/a	1_4091_moderate	High
<i>Stagonopleura guttata</i>	Diamond Firetail	V	V	No	BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	Moderate



Scientific name	Common name	Listing status		Dual credit species	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act						
<i>Sternula albifrons</i>	Little Tern (Foraging)	E	-	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High
<i>Stictonetta naevosa</i>	Freckled Duck	V	-	No	BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	Moderate
<i>Tyto longimembris</i>	Eastern Grass Owl	V	-	No	BAM-C	Yes	n/a	1_4091_moderate, 2_4097_degraded	Moderate
<i>Xenus cinereus</i>	Terek Sandpiper (Foraging)	V	V	Yes	BAM-C, BioNet	Yes	n/a	1_4091_moderate, 2_4097_degraded	High

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



5.1.2 Species credit species

Table 18 and Table 19 list the predicted species credit species for the vegetation zones within the subject land, and whether they have been retained within the assessment following consideration of habitat constraints, geographic limitations, vagrancy and quality of microhabitats. Under Section 5.2.3 of the BAM, further species credit species can be excluded from further assessment if an assessment of habitat constraints and microhabitats determines that the habitat within the subject land is substantially degraded such that the species credit species is unlikely to occur.

Habitat assessments of the subject land were undertaken as described in **Section 2.3.2** and **Section 2.4.2**. The habitat assessments focussed on habitat features relevant to species credit species predicted to occur. This included determining the presence/absence of the habitat constraints identified for the predicted threatened species and the condition of these habitat constraints and other microhabitats.

The habitat assessment surveys conducted focussed on determining if habitat for any potential species credit species (or relevant breeding component for dual credit species) was either not present or substantially degraded such that the species is unlikely to utilise the subject land or a specific vegetation zone in accordance with the requirements of Section 5.2.3 of the BAM.

A total of eight flora species credit species and 43 fauna species credit species (including dual credit species) have been predicted for the subject land, including species associated with PCTs in the BAM-C and records held in the NSW BioNet Atlas records. Of these, 15 fauna species have been retained for further assessment and have been targeted during surveys as outlined in Section 5.2.



Table 18 Predicted flora species credit species

Scientific name	Common name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
<i>Acacia pubescens</i>	Downy Wattle	V	V	BioNet	No	Habitat degraded. The subject land has been highly modified for the construction of the golf course and no suitable habitat is present.	n/a
<i>Acacia terminalis</i> subsp. <i>Eastern Sydney</i>	Sunshine Wattle	E	E	BioNet	No	Habitat degraded. The subject land has been highly modified for the construction of the golf course and no suitable habitat is present	n/a
<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	V	V	BioNet	No	Habitat degraded. The subject land has been highly modified for the construction of the golf course and no suitable habitat is present	n/a
<i>Eucalyptus scoparia</i>	Wallangarra White Gum	E	V	BioNet	No	Habitat constraint. The subject land is not located within 100m of cliffs or rocky areas.	n/a



Scientific name	Common name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
<i>Rhodomyrtus psidioides</i>	Native Guava	V	V	BAM-C	No	Habitat degraded. The subject land has been highly modified and maintained as a golf course. The species is typically found in littoral, warm and subtropical rainforest and wet sclerophyll forest which do not occur within the subject land.	n/a
<i>Senecio spathulatus</i>	Coast Groundsel	E	-	BAM-C	No	Habitat degraded. The subject land has been highly modified and maintained as a golf course. The species grows on coastal dunes which do not occur within the subject land.	n/a
<i>Syzygium hodgkinsoniae</i>	Red Lilly Pilly	V	V	BioNet	No	Habitat degraded. The subject land has been highly modified for the	n/a



Scientific name	Common name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act				
						construction of the golf course and no suitable habitat is present.	
<i>Wilsonia backhousei</i>	Narrow-leafed Wilsonia	V	-	BAM-C	No	Habitat degraded. The subject land has been highly modified and maintained as a golf course. While the species is typically found in the margins of salt marshes and lakes, the small areas of salt marsh within the subject land are highly degraded and occur as two very small patches on a drainage line.	n/a



Table 19 Predicted fauna 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 within, PCT ID	retained including
		BC Act	EPBC Act					
<i>Anthochaera phrygia</i>	Regent Honeyeater (Breeding)	CE	CE	BioNet	No	Habitat constraint – the subject land is not mapped on the Important Habitat Map	n/a	
<i>Burhinus grallarius</i>	Bush Stone-curlew (Breeding)	E	-	BAM-C	No	Habitat constraint – No fallen/standing dead timber including logs. The subject land has been managed as a golf course, and no suitable habitat is available.	n/a	
<i>Calidris alba</i>	Sanderling (Breeding)	V	-	BAM-C, BioNet	No	Habitat constraint – the subject land is not mapped on the Important Habitat Map	n/a	
<i>Calidris canutus</i>	Red Knot (Breeding)	-	E	BAM-C, BioNet	No	Habitat constraint – the subject land is not mapped on the Important Habitat Map	n/a	
<i>Calidris falcinellus</i>	Broad-billed Sandpiper	V	-	BioNet	No	Habitat constraint – the subject land is not mapped	n/a	



Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, PCT ID
		BC Act	EPBC Act				
						on the Important Habitat Map	
<i>Calidris ferruginea</i>	Curlew Sandpiper (Breeding)	CE	CE	BAM-C, BioNet	No	Habitat constraint – the subject land is not mapped on the Important Habitat Map	n/a
<i>Calidris tenuirostris</i>	Great Knot (Breeding)	V	V	BAM-C, BioNet	No	Habitat constraint – the subject land is not mapped on the Important Habitat Map	n/a
<i>Calyptorhynchus lathami lathami</i>	South-eastern Glossy Black Cockatoo (Breeding)	V	V	BAM-C, BioNet	No	Habitat constraint – the subject land does not contain living or dead trees with hollows greater than 15cm diameter and higher than 8m above the ground.	n/a
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	E	E	BAM-C, BioNet	No	Habitat constraint – Subject land is not within 2 kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or old mines or tunnels.	n/a
<i>Charadrius leschenaultii</i>	Greater Sand-plover	V	V	BAM-C, BioNet	No	Habitat constraint – the subject land is not mapped	n/a



Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, PCT ID
		BC Act	EPBC Act				
						on the Important Habitat Map	
<i>Charadrius mongolus</i>	Lesser Sand-plover	V	E	BAM-C, BioNet	No	Habitat constraint – the subject land is not mapped on the Important Habitat Map	n/a
<i>Crinia tinnula</i>	Wallum Froglet	V	-	BAM-C, BioNet	No	Geographic limitation – the subject land is not located within the Kurnell Peninsula on the margins of Botany Bay	n/a
<i>Epthianura albifrons</i> – endangered population	White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	E	-	BAM-C, BioNet	Yes	-	1_4091_moderate, 2_4097_degraded
<i>Esacus magirostris</i>	Beach Stone-curlew	CE	-	BAM-C, BioNet	No	Habitat degraded – the subject land does not provide suitable nesting or foraging habitat given the historical disturbance associated with the relocation of the Cooks	n/a



Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, PCT ID including
		BC Act	EPBC Act				
						River for the Sydney airport and use as a golf course. The species is found on beaches, islands, reefs and estuaries which do not occur within the subject land.	
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	V	-	BioNet	Yes	-	1_4091_moderate, 2_4097_degraded
<i>Haematopus longirostris</i>	Pied Oystercatcher	E	-	BAM-C, BioNet	Yes	-	1_4091_moderate, 2_4097_degraded
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle (Breeding)	V	-	BAM-C, BioNet	Yes	-	1_4091_moderate, 2_4097_degraded
<i>Hieraaetus morphnoides</i>	Little Eagle (Breeding)	V	-	BAM-C, BioNet	Yes	-	1_4091_moderate, 2_4097_degraded
<i>Lathamus discolor</i>	Swift Parrot (Breeding)	E	CE	BAM-C	No	Habitat constraint – the subject land is not mapped on the Important Habitat Map	n/a
<i>Limnodromus semipalmatus</i>	Asian Dowitcher	V	V	BAM-C	No	Habitat degraded – the species is a shorebird that occurs in sheltered coastal environments, such as	n/a



Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, PCT ID
		BC Act	EPBC Act				
						embayments, coastal lagoons, estuaries and tidal creeks. They are known to frequent shallow water and exposed mudflats or sandflats. The subject land does not provide suitable nesting or foraging habitat given the historical disturbance associated with the relocation of the Cooks River for the Sydney airport and use as a golf course.	
<i>Limosa lapponica baueri</i>	Bar-tailed Godwit (baueri) (Breeding)	-	V	BAM-C	No	Habitat constraint – the subject land is not mapped on the Important Habitat Map	n/a
<i>Limosa limosa</i>	Black-tailed Godwit (Breeding)	V	E	BAM-C, BioNet	No	Habitat constraint – the subject land is not mapped on the Important Habitat Map	n/a
<i>Litoria aurea</i>	Green and Golden Bell Frog	E	V	BAM-C, BioNet	Yes	-	1_4091_moderate, 2_4097_degraded



Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, PCT ID including
		BC Act	EPBC Act				
<i>Lophochroa leadbeateri</i>	Pink Cockatoo (Breeding)	V	E	BioNet	No	Habitat constraint – the subject land does not contain living or dead trees with hollows greater than 10cm diameter	n/a
<i>Lophoictinia isura</i>	Square-tailed Kite (Breeding)	V	-	BAM-C, BioNet	Yes	-	1_4091_moderate, 2_4097_degraded
<i>Miniopterus australis</i>	Little Bent-winged Bat (Breeding)	V	-	BAM-C, BioNet	Yes	-	1_4091_moderate, 2_4097_degraded
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat (Breeding)	V	-	BAM-C, BioNet	Yes	-	1_4091_moderate, 2_4097_degraded
<i>Mixophyes iteratus</i>	Giant Barred Frog	V	V	BAM-C	Yes	-	1_4091_moderate, 2_4097_degraded
<i>Myotis macropus</i>	Southern Myotis	V	-	BAM-C, BioNet	Yes	-	1_4091_moderate, 2_4097_degraded
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CE	CE	BAM-C	Yes	-	
<i>Nettapus coromandelianus</i>	Cotton Pygmy-Goose	E	-	BAM-C	Yes	-	
<i>Ninox connivens</i>	Barking Owl	V	-	BAM-C	No	Habitat constraint – the subject land does not	n/a



Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, PCT ID
		BC Act	EPBC Act				
						contain living or dead trees with hollows >20cm diameter that occur >4 metres above the ground.	
<i>Ninox strenua</i>	Powerful Owl	V	-	BioNet	No	Habitat constraint – the subject land does not contain living or dead trees with hollows greater than 20cm diameter and higher than 4m above the ground.	n/a
<i>Numenius madagascariensis</i>	Eastern Curlew (Breeding)	-	CE	BAM-C, BioNet	No	Habitat constraint – the subject land is not mapped on the Important Habitat Map	n/a
<i>Pandion cristatus</i>	Eastern Osprey (Breeding)	V	-	BAM-C, BioNet	Yes	-	1_4091_moderate, 2_4097_degraded
<i>Permeles nasuta</i> – endangered population	Long-nosed Bandicoot population in inner western Sydney	EP	-	BioNet	No	Habitat degraded – the subject land is managed as a golf course and has very little dense understorey vegetation suitable for the species.	n/a
<i>Petauroides volans</i>	Southern Greater Glider	E	E	BAM-C	Yes	-	



Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, PCT ID
		BC Act	EPBC Act				
<i>Petaurus norfolcensis</i> – endangered population	Squirrel Glider on Barrenjoey Peninsula, north of Bushrangers Hill	EP	-	BAM-C	No	Geographic limitation – the subject land is not located on the Barrenjoey Peninsula	n/a
<i>Phascolarctos cinereus</i>	Koala	E	E	BAM-C, BioNet	No	Habitat degraded – the subject land has been subject to a high level of disturbance, with the majority of vegetation present planted along fairways for the golf course. While some of these trees are known as Koala use trees, the subject land is located adjacent to the Sydney airport with limited to no connectivity to suitable habitat in the wider assessment area.	n/a
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox (Breeding)	V	V	BAM-C, BioNet	No	Habitat constraint – the subject land does not contain a breeding camp. The locations of breeding camps are well known and	n/a



Common name	Scientific name	Listing status		Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, PCT ID
		BC Act	EPBC Act				
						the closest camp is at Wolli Creek	
<i>Sternula albifrons</i>	Little Tern (Breeding)	E	-	BAM-C, BioNet	No	Habitat degraded – the subject land does not provide suitable nesting habitat given the historical disturbance associated with the relocation of the Cooks River for the Sydney airport and use as a golf course. No suitable sandy habitat in the form of low sand dunes or sandy beaches are present.	n/a
<i>Tyto novaehollandiae</i>	Masked Owl	V	-	BioNet	No	Habitat constraint – the subject land does not contain living or dead trees with hollows greater than 20cm diameter and higher than 4m above the ground.	n/a
<i>Xenus cinereus</i>	Terek Sandpiper (Breeding)	V	V	BAM-C, BioNet	No	Habitat constraint – the subject land is not mapped on the Important Habitat Map	n/a



5.2 Presence of Candidate Species Credit Species

No threatened flora species were identified as candidate species credits species requiring further assessment. However, the threatened fauna species listed in Table 20 were identified as candidate species credit species for further assessment and were targeted during surveys described in **Section 2.4**.

Table 20 Determining the presence of candidate fauna species credit species on the subject land

Common name	Scientific name	Listing status		Method used to determine presence	Present?	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
<i>Epthianura albifrons</i> – endangered population	White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	E	-	Targeted threatened species survey	No	No
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	V	-	Targeted threatened species survey	No	No
<i>Haematopus longirostris</i>	Pied Oystercatcher	E	-	Targeted threatened species survey	No	No
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle (Breeding)	V	-	Targeted threatened species survey	No	No
<i>Hieraaetus morphnoides</i>	Little Eagle (Breeding)	V	-	Targeted threatened species survey	No	No
<i>Litoria aurea</i>	Green and Golden Bell Frog	E	V	Targeted threatened species survey	Yes	Yes
<i>Miniopterus australis</i>	Little Bent-winged Bat (Breeding)	V	-	Targeted threatened species survey	Yes	Yes



Common name	Scientific name	Listing status		Method used to determine presence	Present?	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat (Breeding)	V	-	Targeted threatened species survey	Yes	Yes
<i>Mixophyes iteratus</i>	Giant Barred Frog	V	V	Targeted threatened species survey	No	No
<i>Myotis macropus</i>	Southern Myotis	V	-	Targeted threatened species survey	No	No
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	CE	CE	Targeted threatened species survey	No	No
<i>Nettapus coromandelianus</i>	Cotton Pygmy-Goose	E	-	Targeted threatened species survey	No	No
<i>Pandion cristatus</i>	Eastern Osprey (Breeding)	V	-	Targeted threatened species survey	No	No
<i>Petauroides volans</i>	Southern Greater Glider	E	E	Targeted threatened species survey	No	No

5.3 Threatened species surveys

Threatened fauna surveys (as detailed in Section 2.5) were undertaken with reference to the survey notes within the TBDC, as well as the following survey guidelines:

- 'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method (DPIE, 2021);
- Survey guidelines for Australia's threatened birds (DEWHA, 2010);
- Survey guidelines for Australia's threatened mammals (DoE, 2011); and
- NSW Survey Guide for Threatened Frogs: A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method (DPIE, 2020a).

Survey requirements and habitat considerations are summarised for each candidate fauna species below. Table 21 lists details of targeted threatened species surveys completed (to



date) for candidate species (where surveys have been used to determine presence). This includes details of survey method, effort and timing.

A list of fauna species recorded across all surveys conducted, as well as incidental sightings, is provided in **Appendix D**.

5.3.1 White-fronted Chat population in the Sydney Metropolitan Catchment Management Area

The TBDC identifies the survey period for the White-fronted Chat as January to December. The TBDC does not specify species survey guidelines. As the species is a highly mobile bird, area searches and opportunistic observations were undertaken across the subject land. As the species is a gregarious species usually found on bare or grassy ground in wetland areas the surveys are considered appropriate to detect the species. No individuals were identified during targeted surveys or incidentally during other surveys fauna surveys.

Furthermore, the subject land has been highly surveyed over the past 25 years, with the most recent surveys undertaken by Cumberland Ecology for the FFA to support the approved Planning Proposal. This included diurnal bird surveys at seven sites across the study area in February and March 2017 as well as additional observations throughout the fauna survey period (February 2017 – September 2021). The White-fronted Chat has not been recorded within the study area during previous surveys. Furthermore, there are only 12 records of the species held within the NSW BioNet within a 5 km locality, all of which are recorded from a single location in 1983 over Botany Bay to the south. Whilst there is a lack of records within the locality, it is acknowledged that the White-fronted Chat is described in the TBDC as being regularly observed in saltmarsh and on the sandy shoreline of a small island of Towra Point Nature Reserve. This area provides more suitable habitat in comparison to the 0.01 ha of saltmarsh vegetation within the subject land.

5.3.2 Sooty Oystercatcher

The TBDC identifies the survey period for the Sooty Oystercatcher as August to January which aligns with the breeding period. The TBDC does not specify survey methods, but given the species is an unmistakable large black wader with distinct red bill and eyes, area searches and opportunistic observations are considered suitable and have been undertaken across the subject land to target the species. Habitat within the subject land is extremely limited, as the species favours intertidal flats of inlets and bays and open beaches and sandbanks. No individuals were identified during targeted surveys or incidentally during other surveys fauna surveys.

Furthermore, the subject land has been highly surveyed over the past 25 years, with the most recent surveys undertaken by Cumberland Ecology for the FFA to support the approved Planning Proposal. This included diurnal bird surveys at seven sites across the study area in February and March 2017 as well as additional observations throughout the fauna survey period (February 2017 – September 2021). The Sooty Oystercatcher has not been recorded within the study area during previous surveys. Furthermore, there are only three records of the species held within the NSW BioNet within a 5 km locality, with the closest record located within suitable habitat at to the south of the subject land within the Landing Lights Wetlands.



5.3.3 Pied Oystercatcher

The TBDC identifies the survey period for the Pied Oystercatcher as August to January which aligns with the breeding period. The TBDC does not specify survey methods, but given the species is an unmistakable large black and white wader, area searches and opportunistic observations are considered suitable and have been undertaken across the subject land to target the species. Habitat within the subject land is extremely limited, as the species favours intertidal flats of inlets and bays and open beaches and sandbanks. No individuals were identified during targeted surveys or incidentally during other surveys fauna surveys.

Furthermore, the subject land has been highly surveyed over the past 25 years, with the most recent surveys undertaken by Cumberland Ecology for the FFA to support the approved Planning Proposal. This included diurnal bird surveys at seven sites across the study area in February and March 2017 as well as additional observations throughout the fauna survey period (February 2017 – September 2021). The Pied Oystercatcher has not been recorded within the study area during previous surveys. Whilst there is one record within the subject land held within the NSW BioNet Atlas, this record is likely to have been a vagrant record, given the subject land does not comprise suitable habitat for the species.

5.3.4 White-bellied Sea-Eagle

The TBDC identifies the survey period for the White-bellied Sea-Eagle as July and December. Surveys involve searching for breeding habitat (nests) and confirming species presence. Breeding habitat consists of large, live old trees within 1 km of rivers, lakes, large dams, creeks, wetlands or coastlines, and the presence of a large stick nest within tree canopy; or an adult carrying nest material; or adults observed duetting during the breeding period. Diurnal bird surveys, opportunistic observations, habitat constraints assessment and raptor nest searches undertaken in 2025 showed no signs of the species or suitable large nests.

Furthermore, the subject land has been highly surveyed over the past 25 years, with the most recent surveys undertaken by Cumberland Ecology for the FFA to support the approved Planning Proposal. This included habitat assessments across the study area (February 2017 and September 2021), diurnal bird surveys at seven sites across the study area in February and March 2017, and additional observations throughout the fauna survey period (February 2017 – September 2021). No large stick nests or White-bellied Sea-Eagles have been recorded within the study area during previous surveys.

While it is considered that the species may be observed on occasion in transit aerially across the subject land, given the abundance of records held within the NSW BioNet for the locality, the absence of nests and individual birds indicates that the subject land does not provide breeding habitat.

5.3.5 Little Eagle

The TBDC identifies the survey period for the Little Eagle as August to October. Surveys involve searching for breeding habitat (nests) and confirming species presence. Breeding habitat consists of live (occasionally dead) large old trees within vegetation and evidence of breeding activity, such as: presence of a male and female; adult carrying nesting material; an



individual on a large stick nest in the upper half of the tree canopy; pairs displaying (soaring, diving, chasing), or a male calling in flight while a female begs from a tree. Diurnal bird surveys, opportunistic observations, habitat constraints assessment and raptor nest searches undertaken in July, November and December 2025 and showed no signs of the species or suitable large nests. Whilst the surveys undertaken are outside of the survey period, the absence of nesting material suggests that the species does not use the subject land for breeding.

Furthermore, the subject land has been highly surveyed over the past 25 years, with the most recent surveys undertaken by Cumberland Ecology for the FFA to support the approved Planning Proposal. This included habitat assessments across the study area (February 2017 and September 2021), diurnal bird surveys at seven sites across the study area in February and March 2017, and additional observations throughout the fauna survey period (February 2017 – September 2021). No large stick nests or Little Eagles have been recorded within the study area during previous surveys.

The NSW BioNet holds 10 records of the species in the locality, none of which occur within the subject land or study area. The nearest record of the species is approximately 800m north of the subject land, on the northern side of the Tempe Recreation Reserve in 2013. The latest record of the species is from 2017 which is located approximately 4.7 km south-west of the subject land. Whilst the species has been recorded sporadically across the locality between 1982 and 2017, there have been no records during more recent survey by Cumberland Ecology or SLR which indicate that the subject land does not provide breeding habitat for the species.

5.3.6 Green and Golden Bell Frog

The TBDC identifies the survey period for the Green and Golden Bell Frog as November to March. Survey guidelines for the species are published in the NSW Survey Guide for Threatened Frogs, which identifies three survey techniques suitable for the species, including aural-visual surveys, acoustic recorder surveys and tadpole surveys. Surveys undertaken within the subject land and wider study area comprised aural-visual surveys undertaken along transects incorporating call-playback at points along each transect over 4 consecutive nights as outlined in Section 2.4.7. During surveys, the Green and Golden Bell Frog was recorded on nine occasions over the four nights with all records from two locations. Of the nine records, one was from a wetland in the central portion of the subject land, while the other eight records were from a wetland within the south-western portion of the subject land. It is expected that these records represent four individual frogs, all of which were first record on the first night of survey, as records on subsequent nights were confirmed to be of the same individuals based on their markings and colouration. The location of Green and Golden Bell Frogs recorded during surveys is shown on Figure 12.

Identification of the species within the subject land was to be expected with the presence of known population in the study area that has historically been centred on the RTA ponds, and given individuals have previously been recorded during surveys within the subject land and wider study area. This included aural-visual surveys undertaken by Cumberland Ecology between March 2017 and February 2020 which identified two individuals, as well as more recent records from monitoring surveys undertaken annually by AMBS Ecology & Heritage



(AMBS) between 2018 and 2024. Furthermore, the NSW BioNet holds 106 records of the species within the study area including 31 records within the subject land.

Monitoring of the Green and Golden Bell Frog population in Arncliffe by AMBS in the 2023-2024 season (AMBS Ecology & Heritage, 2025), identified over 600 records of the Green and Golden Bell Frog. Of these the majority were located within the M8 Marsh Street Habitat Area, which is a more recent artificially constructed area of habitat located between Marsh Street and Eve Street to the south-west of the study area. However, 42 individual observations of the species were made within the study area across five locations. Most of these observations (33) were in the two RTA ponds which were constructed by the RTA as part of the M5 Motorway construction in 2002, as compensatory habitat for the Green and Golden Bell Frog in the western corner of the study area. Only nine observations across three locations were made within the subject land.

Based on annual monitoring surveys from 2020-2024, AMBS concluded that the overall Arncliffe population estimate of adult Green and Golden Bell Frogs in 2023-2024 was approximately 288, however the population is a very challenged artificial population that is currently reliant on the ongoing captive breeding program given there has been no confirmed breeding events in the RTA ponds since January 2020. This is evidenced by previous monitoring results. As such, the records of the Green and Golden Bell Frog within the project footprint, and immediately adjacent ponds, are considered to have arisen from the 5,050 tadpoles that were released in 2023-2024 into the artificial ponds at Marsh Street (3,370) and the RTA ponds (1,680) as part of the captive breeding program. Therefore, the habitat within the project footprint and wider project area is considered to provide shelter and foraging resources for the Green and Golden Bell Frog, however, is not considered to comprise breeding habitat.

It is noted that all dams within the subject land were confirmed to contain Plague Minnow (*Gambusia holbrooki*). Whilst the species was identified within dams containing Plague Minnow, the presence of the Plague Minnow provides further evidence that these dams are not considered to provide suitable breeding habitat.

5.3.7 Square-tailed Kite

The TBDC identifies the survey period for the Square-tailed Kite as September to January. Surveys involve searching for breeding habitat (nests) and confirming species presence. Breeding habitat consists of live (occasionally dead) large old trees within vegetation and evidence of breeding activity, such as: presence of a male and female; adult carrying nesting material; an individual on a large stick nest in the upper half of the tree canopy; pairs displaying (soaring, diving, chasing), or a male calling in flight while a female begs from a tree. Diurnal bird surveys, opportunistic observations, habitat constraints assessment and raptor nest searches were undertaken in July, November and December 2025 and showed no signs of the species or suitable large nests.

Furthermore, the subject land has been highly surveyed over the past 25 years, with the most recent surveys undertaken by Cumberland Ecology for the FFA to support the approved Planning Proposal. This included habitat assessments across the study area (February 2017 and September 2021), diurnal bird surveys at seven sites across the study area in February



and March 2017, and additional observations throughout the fauna survey period (February 2017 – September 2021). No large stick nests or Square-tailed Kites have been recorded within the study area during previous surveys.

The NSW BioNet holds one record of the species in the locality from 2018, approximately 4 km north-west of the subject land. Given the absence of records during targeted surveys by Cumberland Ecology or SLR, and the lack of records within the locality, the subject land is not considered to provide breeding habitat for the species.

5.3.8 Little Bent-winged Bat

The TBDC identifies the survey period for the Little Bent-winged Bat as December to February. The Little Bent-winged Bat is listed as a species credit species for its breeding habitat. The TBDC identifies the habitat constraints for the species as *Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature.* A habitat constraints assessment was undertaken and the only potential habitat features identified were some small drainage culverts and existing structures including the Kogarah Golf Course Club House and associated maintenance sheds. Active searches were undertaken to assess potential breeding habitat as outlined in Section 2.4.7 and no evidence of use by any microbats were observed. As such the subject land is not considered to provide breeding habitat for the Little Bent-winged Bat.

The NSW survey guidelines '*Species credit' threatened bats and their habitats*' outlines that surveys for the Little Bent-winged Bat are to be undertaken using harp traps, placing traps close to the exit of caves, mines or tunnels identified as potential habitat. The guidelines also identify potential habitat as *'caves, tunnels, mines or other structures known or suspected to be used by M. australis including species records in the NSW BioNet Atlas with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature.* As no suitable breeding habitat was identified during the habitat constraints assessment, additional surveys with harp traps was not required.

Passive acoustic detection surveys were also undertaken within the subject land of which a single call was recorded of the Little Bent-winged Bat. Given no roosting habitat was identified and the species is known to roost and breed in large maternity colonies, the occurrence of a single record suggest that this record was of a bat foraging within the subject land. The location of the Little Bent-winged Bat recorded during surveys is shown on Figure 12.

Furthermore, the subject land has been highly surveyed over the past 25 years, with the most recent surveys undertaken by Cumberland Ecology for the FFA to support the approved Planning Proposal. This included habitat assessments across the study area (February 2017 and September 2021), and microbat surveys consisting of passive acoustic detection and harp trapping, of which no Little Bent-winged Bats were recorded.

The NSW BioNet holds seven records of the species in the locality across three locations, none of which occur within the subject land or study area. The nearest record of the species is approximately 3.1 kms north-east of the subject land within the Sydney Park Wetlands.



5.3.9 Large Bent-winged Bat

The TBDC identifies the survey period for the Large Bent-winged Bat as December to February. The Large Bent-winged Bat is listed as a species credit species for its breeding habitat. The TBDC identifies the habitat constraints for the species as *Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature.* A habitat constraints assessment was undertaken and the only potential habitat features identified were some small drainage culverts and existing structures including the Kogarah Golf Course Club House and associated maintenance sheds. Active searches were undertaken to assess potential breeding habitat as outlined in Section 2.4.7 and no evidence of use by any microbats were observed. As such, the subject land is not considered to provide breeding habitat for the Large Bent-winged Bat.

The NSW survey guidelines '*Species credit' threatened bats and their habitats*' outlines that surveys for the Large Bent-winged Bat are to be undertaken using harp traps, placing traps close to the exit of caves, mines or tunnels identified as potential habitat. The guidelines also identify potential habitat as *'caves, tunnels, mines or other structures known or suspected to be used by M. orianae oceanensis including species records in the NSW BioNet Atlas with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature.* As no suitable breeding habitat was identified during the habitat constraints assessment, additional surveys with harp traps was not required.

Passive acoustic detection surveys were also undertaken within the subject land of which six calls were recorded of the Large Bent-winged Bat. Given no roosting habitat was identified and the species is known to roost and breed in large maternity colonies (100 up to 150,000 individuals), the occurrence of only six records from two detectors over four nights suggest that these records are of the species foraging within the subject land. The location of Large Bent-winged Bats recorded during surveys is shown on Figure 12.

Furthermore, the subject land has been highly surveyed over the past 25 years, with the most recent surveys undertaken by Cumberland Ecology for the FFA to support the approved Planning Proposal. This included habitat assessments across the study area (February 2017 and September 2021), and microbat surveys consisting of passive acoustic detection and harp trapping. During these surveys no bats were captured in harp traps, however seven calls across two sites were positively identified from passive acoustic detection as the Large Bent-winged Bat.

The NSW BioNet holds 50 records of the species in the locality, with only the two records from Cumberland Ecology located within the subject land. No other records are located within the subject land or wider study area.

5.3.10 Giant Barred Frog

The TBDC identifies the survey period for the Giant Barred Frog as October to March. Survey guidelines for the species are published in the NSW Survey Guide for Threatened Frogs, which outlines the survey method for the species as aural-visual surveys. Surveys undertaken



within the subject land and wider study area comprised aural-visual surveys undertaken along transects incorporating call-playback at points along each transect over 4 consecutive nights as outlined in Section 2.4.7. No Giant barred Frogs were recorded during surveys.

Furthermore, the subject land has been highly surveyed over the past 25 years, with the most recent surveys undertaken by Cumberland Ecology for the FFA to support the approved Planning Proposal. This included aural-visual surveys undertaken by Cumberland Ecology in March 2017 and February 2020 and no Giant Barred Frogs were recorded. Additionally, the NSW BioNet does not hold any records of the species within a 5 km locality.

5.3.11 Southern Myotis

The TBDC identifies the survey period for the Southern Myotis as October to March. The Southern Myotis is listed as a species credit species for its breeding habitat. The TBDC identifies the habitat constraints for the species as *Waterbodies with permanent pools/stretches 3m or wider, including rivers, large creeks, billabongs, lagoons, estuaries, dams and other waterbodies, on or within 200m of the site*. These features were identified within the subject land during the habitat constraints assessment.

The NSW survey guidelines '*Species credit' threatened bats and their habitats*' identifies four survey techniques suitable for the Southern Myotis, including harp trap or mist netting, passive acoustic detection, active detection and roost searches (for artificial structures). Surveys within the subject land were undertaken using passive acoustic detection over four consecutive nights as outlined in Section 2.4.6. The Southern Myotis was not recorded on the bat detectors.

Furthermore, the subject land has been highly surveyed over the past 25 years, with the most recent surveys undertaken by Cumberland Ecology for the FFA to support the approved Planning Proposal. This included habitat assessments across the study area (February 2017 and September 2021), and microbat surveys consisting of passive acoustic detection and harp trapping. The Southern Myotis was not detected in any of these surveys.

The NSW BioNet holds three records of the species in the locality, no of which are within the subject land or study area.

5.3.12 Orange-bellied Parrot

The TBDC identifies the survey period for the Orange-bellied Parrot as January to December. The TBDC does not specify species survey guidelines. As the species is a highly mobile bird, area searches and opportunistic observations were undertaken across the subject land. The Orange-bellied Parrot is a small, stocky ground dwelling parrot that breed in Tasmania and migrates in Autumn to spend the winter on the mainland coast of south-eastern South Australia and southern Victoria, with only occasional reports of the species in NSW. Typical habitat in NSW includes saltmarsh and strandline/foredune vegetation communities either on coastlines or coastal lagoons. However, the species can also be found in weedy areas associated with these habitats or in highly modified landscapes such as golf courses. Nevertheless, no individuals were identified during targeted surveys or incidentally during other surveys fauna surveys.



Furthermore, the subject land has been highly surveyed over the past 25 years, with the most recent surveys undertaken by Cumberland Ecology for the FFA to support the approved Planning Proposal. This included diurnal bird surveys at seven sites across the study area in February and March 2017 as well as additional observations throughout the fauna survey period (February 2017 – September 2021). The Orange-bellied Parrot has not been recorded within the study area during previous surveys. Additionally, there are no records of the species held within the NSW BioNet within a 5 km locality. The nearest records held within the NSW BioNet are approximately 10 km east and includes six records from four locations in 2003 on the Malabar Headland. The next closest record is located on the headland at Bass Point more than 75 km south of the subject land. Despite the absence of records within the locality, and within the Sydney Basin IBRA region generally (only nine records), that the Orange-bellied Parrot can be found in highly modified landscapes such as golf courses, although more suitable habitat is available within national parks and reserves within the wider Sydney region.

5.3.13 Cotton Pygmy-Goose

The TBDC identifies the survey period for the Cotton Pygmy-Goose as January to December. The TBDC does not specify species survey guidelines. As the species is a highly mobile bird, area searches and opportunistic observations were undertaken across the subject land. Given the species is a small-surface feeding duck that inhabits freshwater lakes, lagoons, swamps and dams, the surveys are considered appropriate to detect the species. No individuals were identified during targeted surveys or incidentally during other surveys fauna surveys.

Furthermore, the subject land has been highly surveyed over the past 25 years, with the most recent surveys undertaken by Cumberland Ecology for the FFA to support the approved Planning Proposal. This included diurnal bird surveys at seven sites across the study area in February and March 2017 as well as additional observations throughout the fauna survey period (February 2017 – September 2021). The Cotton Pygmy-Goose has not been recorded within the study area during previous surveys. Furthermore, there are no records of the species held within the NSW BioNet within a 5 km locality. The nearest record is located within Centennial Park in Randwick, approximately 8 km north-east of the subject land. Only six additional records within the NSW BioNet are located within the Sydney Basin IBRA region, all of which are located within and adjacent to the Lane Cove National Park, approximately 16 km north of the subject land. Despite the absence of records within the locality, and within the Sydney Basin IBRA region generally (only seven records), it is acknowledged that the dams within the subject land may provide potential foraging habitat for the Cotton Pygmy-Goose, although more suitable habitat is available within national parks and reserves within the wider Sydney region

5.3.14 Eastern Osprey

The TBDC identifies the survey period for the Eastern Osprey as April and November. The Eastern Osprey is listed as a species credit species for its breeding habitat. The TBDC identifies breeding habitat as stick-nests in living and dead trees (>15m) or artificial structures within 100m of a floodplain for nesting. As such, surveys involve searching for breeding habitat (nests). Diurnal bird surveys, opportunistic observations, habitat constraints assessment and raptor nest searches undertaken in 2025 showed no signs of stick nests or of the species.



Furthermore, the subject land has been highly surveyed over the past 25 years, with the most recent surveys undertaken by Cumberland Ecology for the FFA to support the approved Planning Proposal. This included habitat assessments across the study area (February 2017 and September 2021), diurnal bird surveys at seven sites across the study area in February and March 2017, and additional observations throughout the fauna survey period (February 2017 – September 2021). No large stick nests or Eastern Ospreys have been recorded within the study area during previous surveys.

While it is considered that the species may be observed on occasion in transit aerially across the subject land, given the abundance of records held within the NSW BioNet for the locality, the absence of nests and individual birds indicates that the subject land does not provide breeding habitat.

5.3.15 Southern Greater Glider

The TBDC identifies the survey period for the Southern Greater Glider as January to December. The TBDC does not specify species survey guidelines. As the species is a nocturnal arboreal mammal, surveys for the species included spotlighting across the subject land and are considered appropriate to detect the species. No individuals were identified during targeted surveys or incidentally during other surveys fauna surveys.

Furthermore, the subject land has been highly surveyed over the past 25 years, with the most recent surveys undertaken by Cumberland Ecology for the FFA to support the approved Planning Proposal. This included spotlighting surveys via random meander transects across the study area in February 2017 as well as additional observations during nocturnal fauna surveys (February 2017 – September 2021). The Southern Greater Glider has not been recorded within the study area during previous surveys. Furthermore, there are no records of the species held within the NSW BioNet within a 5 km locality. The nearest records to the north are located within the Lane Cove National Park approximately 19 km away, and to the south within the Royal National Park approximately 20 km away. No records of the species occur within urban areas around Sydney. Records of the species in the Sydney Basin IBRA region are concentrated within National Parks and reserves which provide more suitable habitat.



Table 21 Threatened species surveys for candidate fauna species credit species on the subject land

Common name	Scientific name	Threatened flora species surveys			Present	Further assessment required
		Survey method	Timing of survey	Effort		
White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	<i>Epthianura albifrons</i> - endangered population	Diurnal bird surveys	6-Nov-25	1 hour, 2 persons	No	No
			12-Dec-25	1 hour, 2 persons	No	
		Incidental observations	During all survey	-	No	
Pied Oystercatcher	<i>Haematopus longirostris</i>	Diurnal bird surveys	6-Nov-25	1 hour, 2 persons	No	No
			12-Dec-25	1 hour, 2 persons	No	
		Incidental observations	During all survey	-	No	
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Habitat assessment	23-24 July 2025	16 hours, 2 persons	No	No
		Raptor nest searches	23-24 July 2025	16 hours, 2 persons	No	
		Diurnal bird surveys	6-Nov-25	1 hour, 2 persons	No	
			12-Dec-25	1 hour, 2 persons	No	



Common name	Scientific name	Threatened flora species surveys			Present	Further assessment required
		Survey method	Timing of survey	Effort		
Little Eagle	<i>Hieraaetus morphnoides</i>	Habitat assessment	23-24 July 2025	16 hours, 2 persons	No	No
		Raptor nest searches	23-24 July 2025	16 hours, 2 persons	No	
		Diurnal bird surveys	6-Nov-25	1 hour, 2 persons	No	
			12-Dec-25	1 hour, 2 persons	No	
Green and Golden Bell Frog	<i>Litoria aurea</i>	Basking survey	3-Nov-25	1 hour, 2 persons	No	Yes
		Aural-visual surveys	3-6 November 2025	12 hours, 2 people	Yes	
Square-tailed Kite	<i>Lophoictinia isura</i>	Habitat assessment	23-24 July 2025	16 hours, 2 persons	No	No
		Raptor nest searches	23-24 July 2025	16 hours, 2 persons	No	
		Diurnal bird surveys	6-Nov-25	1 hour, 2 persons	No	
			12-Dec-25	1 hour, 2 persons	No	
Little Bent-winged Bat	<i>Miniopterus australis</i>	Habitat assessment	23-24 July 2025	16 hours, 2 persons	No	Yes



Common name	Scientific name	Threatened flora species surveys			Present	Further assessment required
		Survey method	Timing of survey	Effort		
		Microbat surveys - passive acoustic detection	8-12 December 2025	4 trap nights	Yes	
		Microbat surveys - active searches	8-Dec-25	2 hours, 1 person	No	
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	Habitat assessment	23-24 July 2025	16 hours, 2 persons	No	Yes
		Microbat surveys - passive acoustic detection	8-12 December 2025	4 trap nights	Yes	
		Microbat surveys - active searches	8-Dec-25	2 hours, 1 person	No	
Giant Barred Frog	<i>Mixophyes iteratus</i>	Basking survey	3-Nov-25	1 hour, 2 persons	No	No
		Aural-visual surveys	3-6 November 2025	12 hours, 2 people	No	
Southern Myotis	<i>Myotis macropus</i>	Habitat assessment	23-24 July 2025	16 hours, 2 persons	No	No
		Microbat surveys - passive acoustic detection	8-12 December 2025	4 trap nights	No	
		Microbat surveys - active searches	8-Dec-25	2 hours, 1 person	No	



Common name	Scientific name	Threatened flora species surveys			Present	Further assessment required
		Survey method	Timing of survey	Effort		
Orange-bellied Parrot	<i>Neophema chrysogaster</i>	Diurnal bird surveys	6-Nov-25	1 hour, 2 persons	No	No
			12-Dec-25	1 hour, 2 persons	No	
		Incidental observations	During all survey	-	No	
Cotton Pygmy-Goose	<i>Nettapus coromandelianus</i>	Diurnal bird surveys	6-Nov-25	1 hour, 2 persons	No	No
			12-Dec-25	1 hour, 2 persons	No	
		Incidental observations	During all survey	-	No	
Eastern Osprey	<i>Petauroides volans</i>	Habitat assessment	23-24 July 2025	16 hours, 2 persons	No	No
		Raptor nest searches	23-24 July 2025	16 hours, 2 persons	No	
		Diurnal bird surveys	6-Nov-25	1 hour, 2 persons	No	
			12-Dec-25	1 hour, 2 persons	No	
Southern Greater Glider	<i>Epthianura albifrons</i> - endangered population	Habitat assessment	23-24 July 2025	16 hours, 2 persons	No	No



Common name	Scientific name	Threatened flora species surveys			Present	Further assessment required
		Survey method	Timing of survey	Effort		
		Spotlighting surveys	3-6 November 2025	12 hours, 2 people	No	



5.4 Assessment of planted native vegetation for threatened fauna

Planted native vegetation within the subject land is likely to provide habitat resources for a range of threatened fauna. The habitat assessment and subsequent field surveys undertaken confirmed that no suitable breeding habitat occurs within the subject land for any of the threatened species recorded, in accordance with the breeding habitat constraints detailed in the TBDC. However, the planted native vegetation within the subject land may provide potential breeding/roosting habitat for ecosystem credit species given the presence of hollows.

Several small to medium sized hollows and bark cavities were identified within areas of planted native vegetation that would be suitable for use by ecosystem credit fauna species such as microbats and small birds. However, most hollows are relatively small (<5cm diameter), with medium sized hollows with 5-15cm diameter generally being very narrow and linear in length which are not suitable for larger species such as cockatoos.

The planted native vegetation also offers suitable roosting and foraging habitat for a variety of predominantly aerial and highly mobile fauna species. Three of the threatened species recorded during field surveys, including the Little Bent-wing Bat, Large Bent-winged Bat and Grey-headed Flying-fox are considered to forage within areas of planted native vegetation. The smaller microbats are known to forage on insects beneath the tree canopy, while foraging habitat the Grey-headed Flying-fox occurs in all of the suitable mature trees in the project area.

The direct impact to potential foraging habitat for these species will occur in the permanent removal of 5.52 ha of potential foraging habitat from the subject land, which is represented by blossom-producing trees within the planted native vegetation. Several trees are proposed to be retained within the subject land, while approximately 2.42 ha of existing tree cover will be retained within the study area beyond the subject land. The trees to be retained within the subject land will be confirmed as part of a future detailed design SSDA, however include five large Moreton Bay Fig trees (*Ficus macrophylla*), which may be retained in their existing locations or transplanted (where possible) within the study area. Furthermore, additional plantings of native trees and shrubs are likely to be undertaken within the study area as part of the Pemulwuy Park embellishment works to be delivered by Council.

These species are also highly mobile species, and the foraging habitat is likely to be used as part of a much broader foraging range.

Overall, the removal of these(DCCEEW (NSW), 2026b) specific habitat features is considered to have only minor implications for threatened fauna species due to the modified ecological context within which the subject land occurs within, and the high mobility of the species likely to utilise these habitats. Nevertheless, mitigation and management measures in accordance with Section 8.4 of the BAM have been included in **Section 7.4** of this BDAR which address impacts to native vegetation and threatened species habitat.

5.5 Expert reports

No expert reports have been used to determine species presence/absence.



5.6 More appropriate local data (where relevant)

More appropriate local data has not been adopted for this assessment.

5.7 Species Polygons

Species polygons are based on the methods identified in the relevant BAM survey guidelines or the notes in the TBDC. One threatened fauna species, the Green and Golden Bell Frog was recorded within the subject land and a species polygon has been created as shown in Figure 13. The species polygon has been created in accordance with the NSW Survey Guide for Threatened Frogs which states that the species polygon for the Green and Golden Bell Frog is to be identified as follows:

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 200 metres radius from the top of bank. The polygon should include minimum 50 metre wide corridors of native and non-native vegetated areas linking the available waterbodies, where relevant.

As such, a 200m buffer has been added to the waterbodies within the subject land, and all areas comprising native PCTs within the buffer have been identified as the species polygon. This includes all areas of PCT 4091 and PCT 4097 within the subject land. As credits are not required for prescribed impacts areas of habitat including non-native vegetation and the waterbodies themselves have not been included within the species polygons. Prescribed impacts will be offset via alternative compensatory measures.

The results of candidate species recorded within the subject land that require further assessment are summarised in Table 22.

Of the other threatened species recorded within the subject land during surveys, three species are only listed as species credit species for their breeding habitat. This includes:

- Little Bent-winged Bat
- Large Bent-winged Bat
- Grey-headed Flying-fox.

A discussion around the definition of breeding habitat for each of these species is outlined in the sections below. As no breeding habitat has been identified within the subject land, species credits are not required for these three species and therefore no species polygons have been created.

5.7.1 Little Bent-winged Bat

As outlined in Section 5.3.7, the TBDC identifies the habitat constraints for the species as *Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature.* A habitat constraints assessment was undertaken and the only potential habitat features identified were some small drainage culverts and existing structures including the Kogarah Golf Course Club



House and associated maintenance sheds. Active searches were undertaken to assess potential breeding habitat as outlined in Section 2.4.7 and no evidence of use by any microbats were observed. As such the subject land is not considered to provide breeding habitat for the Little Bent-winged Bat.

5.7.2 Large Bent-winged Bat

As outlined in Section 5.3.8, the TBDC identifies the habitat constraints for the species as *Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature.* A habitat constraints assessment was undertaken and the only potential habitat features identified were some small drainage culverts and existing structures including the Kogarah Golf Course Club House and associated maintenance sheds. Active searches were undertaken to assess potential breeding habitat as outlined in Section 2.4.7 and no evidence of use by any microbats were observed. As such, the subject land is not considered to provide breeding habitat for the Large Bent-winged Bat.

5.7.3 Grey-headed Flying-fox

As outlined in Section 5.1.2, the Grey-headed Flying-fox was removed as a species credit species. The TBDC lists habitat constraints for the species as '*Breeding camps*'. Breeding camps for the Grey-headed Flying-fox are well known and are not located within the subject land. The closest known camp is the 'Wolli Creek' camp located within Turrella Reserve, approximately 2 km west of the subject land. Therefore, the species is only required to be assessed for as an ecosystem species credit species for foraging habitat.



Table 22 Results for species credit species recorded within the subject land

Common name	Scientific name	Biodiversity risk weighting	SAIL entity**	Habitat constraints / microhabitats present on the subject land / vegetation zone	Abundance – No. individual plants present on subject land (flora with unit of measure of count)	Extent (ha) of suitable habitat present on site (flora or fauna with unit of measure of area)	TBDC/BAM guideline species specific recommendations	VI Score
Green and Golden Bell Frog	<i>Litoria aurea</i>	High (2)	No	PCT 4091 and PCT 4097 within 1 km of semi-permanent/ ephemeral wet areas, swamps and waterbodies	N/A	0.03	Suitable breeding and non-breeding shelter habitat consists of any waterbody with emergent aquatic vegetation and without the plague minnow (<i>Gambusia holbrooki</i>), although the green and golden bell frog will still occasionally breed in sites with this introduced pest fish. Foraging habitat and migratory habitat are areas of native and non native vegetation. The species polygon boundary should align	4091 = 71.4 4097 = 83.3



Common name	Scientific name	Biodiversity risk weighting	SAIL entity**	Habitat constraints / microhabitats present on the subject land / vegetation zone	Abundance – No. individual plants present on subject land (flora with unit of measure of count)	Extent (ha) of suitable habitat present on site (flora or fauna with unit of measure of area)	TBDC/BAM guideline species specific recommendations	VI Score
							with aquatic habitats linked directly to the record and a buffer, incorporating the PCTs with which the species is associated, of 200 metres radius from the top of bank. The polygon should include minimum 50 m wide corridors of native and non-native vegetated areas linking the available waterbodies, where relevant.	



6.0 Identifying prescribed impacts

Prescribed impacts are identified in Clause 6.1 of the *Biodiversity Conservation Regulation 2017* (BC Regulation). Prescribed impacts are those that are additional to the clearing of native vegetation and associated habitat. These include:

- Development on the habitat of threatened species or ecological communities associated with:
 - karst, caves, crevices, cliffs, rock outcrops and other geological features of significance;
 - human-made structures; and
 - non-native vegetation;
- Development on areas connecting threatened species habitat, such as movement corridors;
- Development on water quality, water bodies and hydrological processes that sustain threatened species and TECs (including from subsidence or upsidence from underground mining);
- Wind turbine strikes on protected animals; and
- Vehicle strikes on threatened species or on animals that are part of a TEC.

An assessment of the relevance of these prescribed impacts to the project is provided in Table 23. The location of prescribed impacts is shown in Figure 15.

Table 23 Prescribed impacts identified

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
Karst, caves, crevices, cliffs, rocks or other geological features of significance	No	N/A	N/A
Human-made structures	Yes	Buildings within the Kogarah Golf Course including the club house, and maintenance sheds may provide potential roosting and	Whilst not recorded utilising these features there is potential for threatened birds and microbats (ecosystem and species credit



Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
		shelter habitat for threatened fauna specie.	species) to utilise these features for roosting/nesting. The removal of human-made structures would result in a long-term impact.
Non-native vegetation	Yes	Non-native vegetation occurring within the subject land comprises areas of exotic vegetation, lawns and other exotic grassland.	Non-native vegetation provides dispersal habitat for the Green and Golden Bell Frog. Non-native vegetation may also provide some low-value habitat for native fauna species, including threatened birds and bats (ecosystem credit species) on occasion. Impacts to non-native vegetation would occur during the construction phase of the project and result in a long-term impact.
Habitat connectivity	Yes	Scattered stands of planted trees within the subject land provide "stepping stone" habitat between other areas of treed habitat within the fragmented urban landscape. Grassland areas also provide connectivity between waterbodies for the Green and Golden Bell Frog	The reduction in habitat connectivity will predominantly affect the movement of threatened birds and bats across the study area and wider locality. However, planted native vegetation will be retained across the study area and continue to provide habitat connectivity for threatened species in the long term. Improvements in the extent and quality of vegetation along Cooks River as part of the project will also maintain connectivity to habitat in the wider locality.
Waterbodies, water quality and hydrological processes	Yes	The subject land contains existing drainage lines, overland flow paths and artificial dams. A new overland flood pathway will also be established within the subject land to redirect the flow of water across the subject land.	The Green and Golden Bell Frog was identified within two of the artificial waterbodies. The project will result in the removal of these waterbodies and will alter the hydrological characteristics of the subject land which is a long-term impact.
Wind turbine strikes (wind farm development only)	No	N/A	N/A



Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
Vehicle strikes	Yes	The proposed development will result in the creation of access roads and private driveways, thereby increasing future vehicle traffic within the subject land and thereby increase the potential of vehicle strike.	Native fauna including threatened species such as the Green and Golden Bell Frog. Increased risk of vehicle strike from the project will be a long-term impact.



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

7.0 Avoid and minimise impacts

7.1 Avoid and minimise direct and indirect impacts

As part of the Planning Proposal (PP-2022-1748), a number of avoidance and minimisation measures were identified and implemented to minimise impacts on biodiversity values. These were outlined within the FFA prepared by Cumberland Ecology and factored into the project's Masterplan. While the Masterplan has been further developed for the project, it is still consistent with the Planning Proposal and approved rezoning. As such, the avoidance and mitigation measures that were identified in the FFA for the approved Planning Proposal are applicable to the project. Further details on the avoidance measures that were implemented as part of the Planning Proposal are provided below while mitigation measures are provided in **Section 7.4**.

7.1.1 Project location

Most habitats within the subject land are comprised of planted trees and shrubs, with no substantial area of TEC's or other native vegetation occurring. Nevertheless, the subject land and wider study area provides habitat for several threatened species, including the Arncliffe population of Green and Golden Bell Frog.

The project has limited opportunities to avoid impacts to the Green and Golden Bell Frog and associated habitat. This is because the land owned by the client is not land that has historically been favoured by the species. The Green and Golden Bell Frog has typically been found closely in association with the RTA ponds and (historically) nearby areas of the golf course in the southern extent of the study area, of which are areas of land owned by Council, Sydney Water and Transport for New South Wales. The RTA ponds, located in the south-western corner of the study area, are considered to comprise the most ecologically significant area within the study area and has historically been the only verified breeding habitat for the species in the study area. These ponds along with adjacent habitat within the south-western portion of the study area provide the primary foraging and dispersal habitat for the species.

To conserve the primary Green and Golden Bell Frog habitat, the Masterplan prepared for the Planning Proposal was designed to avoid impacts to the south-western corner of the study area. As identified in the Masterplan, the project involves a development precinct that is set back significantly further away from the RTA ponds compared to the approved plans included in Eastern Precincts State Environmental Planning Policy (formerly SREP 33). As a result, the habitat that is in closest proximity to the RTA ponds will be retained. Furthermore, the wider south-western portion of the study area will be retained as passive recreational space and will therefore be utilised much the same as within the current golf course under an open space plan. These areas will form part of the future Pemulwuy Park. In addition to this, the areas comprising the RTA ponds and surrounding land have been rezoned as C2 Environmental Conservation. Within this area of the study area, in accordance with requirements for the



approved major projects SSI 6788 New M5 Motorway and SSI 8931 F6 Extension Stage 1, the existing Green and Golden Bell Frog habitat will be subject to maintenance and enhancement, while additional habitat will also be created in accordance with the approved Arncliffe Green and Golden Bell Frog Management Plan (REF).

The key avoidance measures undertaken during the development of the Masterplan for the Planning Proposal specific to the Green and Golden Bell Frog habitat in the study area include:

- A reduced overall gross development precinct compared to the previous approved 2006 Stage 1 Development Application (DA) for the redevelopment of the whole study area (as shown in Figure 14).
- Positioning of the subject land within the northern and eastern section of the study area, to avoid the primary Green and Golden Bell Frog habitat in the form of the immediate surrounding foraging and dispersal habitat areas surrounding the RTA ponds. The positioning of the subject land was also located further away from the land surrounding the RTA ponds compared to approved 2006 DA.
- Retention of areas within the south-western portion of the study area which will be maintained as passive recreational space.

Additionally, scattered planted trees will be retained where possible and incorporated into future open space areas. Higher value trees suitable for retention have been identified in the Arboricultural Impact Assessment prepared by Canopy Consulting (REF). Additionally project has been designed to retain/translocate and incorporate some of the *Ficus* spp. within the subject land where possible, to reduce the impacts on native fauna that potentially utilise these trees as habitat.

7.1.2 Project Design

The Masterplan went through a number of iterations during the preparation of the Planning Proposal to ensure that the project would result in a net benefit to biodiversity within the study area. Design changes were made following correspondence with Council, NSW Environment and Heritage Group, and Department of Primary Industries (DPI) Fisheries. To avoid and minimise impacts on vegetation and habitat, the specific design requirements that have been implemented include:

- Expansion of zoned riparian areas along the Cooks River. The width of the riparian buffer zones was increased from a 20m width to a 40m width within the southern section of the subject land.
- Design and enhancement to foreshore areas. Given the Cooks River is an unnatural diversion canal with generally degraded banks/seawalls the project will result in a much-improved foreshore zone compared to current condition in the golf course. A mix of landscaping and built treatments will be implemented resulting in a riparian area that is controlled and managed to reduce the risk of erosion. It will also substantially boost the biodiversity of the foreshore compared to current conditions by increasing native wetland vegetation cover and providing additional wildlife habitats for both riparian and aquatic fauna. Additionally, the proposed revegetation of the foreshore will provide



water plants including mangroves and reeds that are known to stabilise sediments, store nutrients and filter contaminants. Such plants also harvest carbon from the atmosphere and provide a carbon sink. As a result, the proposed riparian corridor provides a carefully designed, varied interface between the proposed development and the Cooks River, which will be managed and controlled to ensure that it is ecologically functional.

- Incorporation of a minimum 10m wide east-west vegetated habitat link to provide connectivity between the improved riparian buffer zone and Pemulwuy Park. This is identified within the Landscape Design Plan as Fig Tree Plaza (South) and is located between Warehouse Block 3b and Warehouse Block 3c.
- Strategic placement of infrastructure within the riparian buffer zones to enable passive recreational uses for pedestrians, cyclists, kayakers whilst still accommodating functional habitats for a range of riparian and aquatic flora and fauna species.

Further details on the revegetation within the subject land are provided in the Landscape Concept and Early Works SSDA Report prepared by Moir Studio (2025).

7.2 Avoid and minimise prescribed impacts

Five prescribed impacts have been identified for the project, including:

- Human made structures;
- Non-native vegetation;
- Habitat connectivity;
- Waterbodies, water quality and hydrological processes; and
- Vehicle strikes.

The measures taken to avoid and minimise direct impacts on native vegetation and habitat for native species also contribute towards avoidance and minimisation of prescribed impacts. Additional measures specific to prescribed impacts are summarised in Table 24.

Table 24 Actions for avoidance and minimisation of prescribed impacts

Prescribed Impact	Actions taken to avoid/minimise impacts
Human-made structures	The project will remove the existing club house as well as a couple of maintenance sheds. These buildings provide potential roosting/shelter habitat for ecosystem and credits species such as threatened microbats. Despite offering potential habitat, these buildings are in operation and are maintained and a search around the outside of the buildings did not detect any native fauna using the buildings. The removal of these structures is unable to be avoided or minimised in order to facilitate the commitments of the project for industrial development. However, minimisation of impacts to any individuals of threatened species potentially present will be undertaken



Prescribed Impact	Actions taken to avoid/minimise impacts
	in the form of implementation of pre-clearing surveys and clearing supervision as detailed in Section 7.4 .
Non-native vegetation	The removal of non-native vegetation cannot be avoided to facilitate the commitments of the project. Priority has focussed on situating the project as far as possible from native and non-native vegetation that provides primary foraging and dispersal habitat for the Green and Golden Bell Frog. Nevertheless, impacts to fauna species will be minimised by the implementation of management plans which will include educational signage, pre-clearing surveys, and clearing supervision along with the embellishment of habitat within the parts of the subject land and within Pemulwuy Park, as detailed in Section 7.4 .
Habitat connectivity	Parts of the native vegetation that may contribute to the movement of native fauna throughout different areas of habitat is proposed to be removed by the project. The subject land also forms part of the Rockdale Wetlands Corridor, which is a key biodiversity corridor linking a series of habitats between the Cooks River and Lower Georges River (Rockdale City Council 2014). The project will remove the biodiversity corridor linkage within the subject land, as a result of direct removal of vegetation. However, a corridor will be retained in the study area (referred to as Pemulwuy Park), which will continue to facilitate movement of fauna species across the study area and wider urban landscape. Furthermore, the retained corridor that forms Pemulwuy Park is large enough to provide significant habitat in its own right for species to exist within, not just pass through. Pemulwuy Park will be maintained and managed by Council and will continue to serve as a habitat corridor in the long-term. Additional landscaping within areas of the subject land identified as Fig Tree Plaza (north and south) will also improve connectivity across the subject land, connecting the foreshore areas with Pemulwuy Park. Revegetation within these areas with native vegetation will improve the biodiversity value of these areas beyond current conditions and subsequently improve connectivity across the subject land and wider study area in the long term.
Waterbodies, water quality and hydrological processes	The waterbodies and surrounding landform have been artificially constructed as part of the golf course. A number of waterbodies will be removed for the construction of the project, which cannot be avoided. This includes waterbodies within areas subject to warehouse construction, as well as areas within the overland flood pathway. The waterbodies provide habitat for a range of aquatic and terrestrial flora and fauna. Furthermore, the Green and Golden Bell Frog was recorded at two of the waterbodies within the subject land. The removal of the waterbodies will be a long-term impact, however additional waterbodies will be constructed within Pemulwuy Park (to be delivered by Transport for NSW as part of the M6 project). Furthermore, hydrological processes will be altered within the subject land. Drainage systems will be implemented to manage stormwater runoff within operational areas, while an overland flood pathway is to be constructed in



Prescribed Impact	Actions taken to avoid/minimise impacts
	the western portion of the subject land to manage flood risks. The overland flood pathway will be subject to impacts during construction and operation, however will be revegetated and managed as open space areas within Pemulwuy Park in the long term.
Vehicle strikes	There is limited scope to limit the prescribed impact of vehicle strike, however the anticipated speed limit of 50 km/hr is expected to appropriately minimise the potential impacts of vehicle strike. Furthermore, mitigation measures including the construction of frog proof fencing will minimise the risks of vehicle strikes on native fauna. While there is inevitably an increased potential for vehicle strikes given the construction of new access roads, any vehicle strikes on native fauna, in particular threatened species, associated with project are considered to be minimal.

7.3 Other Measures Considered

No other measures were considered in relation to avoiding and minimising project impacts.

8.0 Impact Assessment

8.1 Direct impacts

8.1.1 Residual direct impacts

The largest direct impact of the project is the removal of vegetation and associated habitats within the subject land. Although there are different types of flora and fauna habitat within the subject land such as water bodies and ground litter, the most extensive habitat to be impacted is represented by vegetation. Impacts likely to occur on the subject land after steps taken to avoid and minimise impacts are identified in Table 25.

Table 25 Summary of residual direct impacts

Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	BC Act status	EPBC Act status	SAIL entity	Project phase/timing of impact (e.g. construction, operation, rehabilitation)	Extent (ha, number of individuals)
Clearing of PCT 4091	Not listed	Not listed	No	Construction	0.02
Clearing of PCT 4097	EEC	Not listed	No	Construction	0.01



Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	BC Act status	EPBC Act status	SAIL entity	Project phase/timing of impact (e.g. construction, operation, rehabilitation)	Extent (ha, number of individuals)
Green and Golden Bell Frog Habitat	Endangered	Vulnerable	No	Construction	0.03

8.2 Indirect impacts

Table 26 documents the residual indirect impacts (likely to occur on native vegetation, threatened entities and their habitat beyond the subject land). The indirect impacts of the project are not considered likely to be significant and are likely to be able to be managed appropriately. Mitigation measures to be implemented to manage the indirect impacts of the project identified below are presented in **Section 7.4**.



Table 26 Summary of residual indirect impacts

Indirect impact (Describe impact, e.g. transport of weeds and pathogens from the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
Inadvertent impacts on adjacent habitat or vegetation	Foraging and dispersal habitat for the Green and Golden Bell Frog. Foraging habitat for the Grey-headed Flying-fox, Little Bent-winged Bat and Large Bent-winged Bat	Subject land (21.84 ha)	For the duration of construction	Medium term – 7 years	Construction	Low likelihood of occurring provided exclusion fencing is in place prior to construction. Disturbance and damage to adjacent vegetation and disturbance to resident individuals; reduction in quality of adjacent vegetation and habitats.
Reduced viability of adjacent habitat due to edge effects	Foraging and dispersal habitat for the Green and Golden Bell Frog. Foraging habitat for the Grey-headed Flying-fox, Little Bent-winged Bat and Large Bent-winged Bat	Subject land (21.84 ha)	For the duration of construction	Medium term – 3-5 years	Construction and operation	Low likelihood of occurring; could impact condition of retained vegetation and habitats.



Indirect impact (Describe impact, e.g. transport of weeds and pathogens from the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
Reduced viability of adjacent habitat due to noise, dust or light spill	Foraging and dispersal habitat for the Green and Golden Bell Frog. Foraging habitat for the Grey-headed Flying-fox, Little Bent-winged Bat and Large Bent-winged Bat	Subject land (21.84 ha)	For the duration of construction; possible ongoing lighting and noise impacts during operation	Medium term – 3-5 years Long term	Construction Operation	Dust likely to be deposited in vegetation adjacent to access roads, extending over approximately 5 - 10 m. Noise potentially resulting in disturbance of fauna over a wider distance. Lighting during operations limited to site buildings and safety requirements. Lighting can attract insects increasing feeding opportunities for microbats. Moderate likelihood of occurring; could reduce quality of habitats for foraging and breeding activities of local or resident fauna.



Indirect impact (Describe impact, e.g. transport of weeds and pathogens from the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
Transport of weeds and pathogens from the site to adjacent vegetation	Foraging and dispersal habitat for the Green and Golden Bell Frog. Foraging habitat for the Grey-headed Flying-fox, Little Bent-winged Bat and Large Bent-winged Bat	Subject land (21.84 ha)	For the duration of construction	Medium term – 3-5 years	Construction	Moderate likelihood of occurring; could result in an increase in cover and diversity of weeds (including high threat weeds), and function of the adjacent vegetation.
Increased risk of starvation, exposure and loss of shade or shelter	n/a	n/a	n/a	n/a	n/a	n/a
Loss of breeding habitats	n/a	n/a	n/a	n/a	n/a	n/a
Trampling of threatened flora species	n/a	n/a	n/a	n/a	n/a	n/a
Inhibition of nitrogen fixation and increased soil salinity	n/a	n/a	n/a	n/a	n/a	n/a



Indirect impact (Describe impact, e.g. transport of weeds and pathogens from the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
Fertiliser drift	n/a	n/a	n/a	n/a	n/a	n/a
Rubbish dumping	Foraging and dispersal habitat for the Green and Golden Bell Frog.	Subject land (21.84 ha)	For the duration of construction and operation	Long term	Construction and operation	Low likelihood of occurring; could result in reduced vegetation and habitat condition in immediately adjoining areas. However, these areas will form part of Pemulwuy Park and will be managed in the long- term by Council.
Wood collection	n/a	n/a	n/a	n/a	n/a	n/a
Bush rock removal and disturbance	n/a	n/a	n/a	n/a	n/a	n/a
Increase in predatory species populations	n/a	n/a	n/a	n/a	n/a	n/a
Increase in pest animal populations	n/a	n/a	n/a	n/a	n/a	n/a



Indirect impact (Describe impact, e.g. transport of weeds and pathogens from the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
Increased risk of fire	n/a	n/a	n/a	n/a	n/a	n/a
Disturbance to specialist breeding and foraging habitat	Foraging and dispersal habitat for the Green and Golden Bell Frog.	Subject land (21.84 ha)	For the duration of construction and operation	Long term	Construction and operation	Low likelihood of occurring; could result in reduced condition of foraging and dispersal habitat for the Green and Golden Bell Frog However these areas will form part of Pemulwuy Park and will be managed in the long- term by Council. Furthermore, the population of the Green and Golden Bell Frog is predominantly located in proximity to the RTA ponds. Habitat within these areas will not be affected by the project.



8.3 Prescribed impacts

The project has been assessed as resulting in five prescribed impacts, including:

- Human-made structures;
- Non-native vegetation
- Habitat connectivity;
- Waterbodies, waterways and hydrological features; and
- Vehicle strikes.

An assessment of these prescribed impacts is provided below while the location of prescribed impacts is shown in Figure 15. No additional uncertain biodiversity impacts have been identified for the project.

8.3.1 Human-made structures

8.3.1.1 Threatened entities affected

Microbats including the Little Bent-winged Bat and Large Bent-winged Bat. Whilst the species have not been recorded roosting within the subject land, human made structures offer potential roosting habitat.

8.3.1.2 Nature

Removal of several buildings within the subject land, including the club house and maintenance sheds as well as small drainage culverts which offer potential roosting habitat.

8.3.1.3 Extent

Human-made structures occupy approximately 0.25 ha and are mapped predominantly within areas of cleared land.

8.3.1.4 Duration

The removal of human-made structures is a long-term impact given the loss of potential roosting habitat.

8.3.1.5 Consequences

The project will result in the loss of potential, albeit marginal roosting habitat. The human made structures are in good condition and are in use, and are not currently used by microbats for roosting. Furthermore, the draining culverts that offer potential roosting habitat were assessed and not found to be used by microbats. Nevertheless, the removal of these features will reduce the potential roosting habitat available within the subject land.



8.3.2 Non-native vegetation

8.3.2.1 Threatened entities affected

Green and Golden Bell Frog and potentially occurring ecosystem credit species such as birds and bats

8.3.2.2 Nature

Non-native vegetation is comprised predominantly of lawns and other exotic grassland managed as part of the golf course as roughs, fairways and greens. It also includes small, scattered occurrences of exotic trees and shrubs planted for landscaping purposes and exotic weed species which have colonised areas of the subject land.

8.3.2.3 Extent

A total of 13.81 ha of non-native vegetation occurs within the subject land. This includes 0.27 ha of exotic vegetation (trees and shrubs planted for landscaping purposes) and 13.53 ha of lawns and other exotic grasslands

8.3.2.4 Duration

The removal of non-native vegetation is a long term impact given the overall reduction of non-native vegetation within the subject land and wider study area.

8.3.2.5 Consequences

The loss of non-native vegetation will reduce the available foraging and dispersal habitat for the Green and Golden Bell Frog within the subject land and wider study area. The species is known to utilise grassland areas for foraging and dispersal. Based on the distribution of historical records as well as more recent records documented by AMBS Ecology and Heritage (REF) as part of their Green and Golden Bell Frog monitoring surveys, the south-western portion of the study area represents the habitat that is mostly utilised by the species for dispersal. The non-native vegetation within the subject land is predominantly located beyond the known area of occurrence of the species. As such, the subject land is not considered to comprise habitat regularly used by the species.

The project includes the construction of an overland flood pathway within the western portion of the subject land. Disturbance within this area will be short term with the area to be revegetated post construction. Revegetation within this area will involve laying of turf which will restore the area similar to current conditions. This area will form part of Pemulwuy Park and be managed by Council in the long-term.

Nevertheless, the areas proposed to be removed within the subject land will result in the reduction of foraging and dispersal habitat for the species.



8.3.3 Habitat connectivity

8.3.3.1 Threatened entities affected

The habitat within the subject land is likely to provide connectivity for ecosystem species, such as the Grey-headed Flying-fox, microbats and birds, as well as the Green and Golden Bell Frog

8.3.3.2 Nature

Habitat connectivity is predominantly comprised of scattered trees that have been planted along fairways and provide connectivity to habitats to the north, east and south of the subject land as well as scattered trees and shrubs along the foreshore of the Cooks River. Grassland vegetation also provides connectivity across the subject land and wider study area for the Green and Golden Bell Frog.

8.3.3.3 Extent

Habitat connectivity will be reduced by the removal of 5.81 ha of woody vegetation from the subject land including 0.02 ha of PCT 4091, 5.52 ha of planted native vegetation and 0.27 ha of exotic vegetation, which form part of fragmented or stepping-stone habitats.

Additionally, 13.53 ha of lawns and other exotic grassland vegetation will be removed which provides connectivity across the subject land for the Green and Golden Bell Frog.

8.3.3.4 Duration

The reduction of habitat connectivity is considered to be a short-term impact as the project includes the establishment of a riparian corridor along the Cooks River and a planted landscape corridor between the Cooks River foreshore and Pemulwuy Park, which will ensure habitat connectivity is maintained across the subject land in the long-term.

The reduction in grassland areas is considered to partly be a short-term impact. The grasslands to be removed are located on the outer edge of the known occurrence of the species with areas subject to the overland flood pathway to be revegetated post construction. As such, habitat connectivity for the Green and Golden Bell Frog will be maintained within Pemulwuy Park and the RTA frog ponds in the long-term, which is the area that is known to be more frequently used by the species.

8.3.3.5 Consequences

The project will result in the reduction of habitat connectivity during the construction period, predominantly due to the removal of scattered woody vegetation that served as stepping stone habitat for potentially occurring ecosystem credit species. However, the riparian buffer zone along the Cooks River will be revegetated to form a functioning riparian corridor, which will continue to provide connectivity across the subject land. Furthermore, public open space areas of the subject land will be revegetated including a biodiversity corridor between the Cooks River foreshore and Pemulwuy Park.



The loss of grassland habitat is not expected to significantly reduce habitat connectivity for the Green and Golden Bell Frog. While there may be short-term impacts during the construction phase, the project includes the re-establishment of grassland areas within the overland flow path as well as the construction of a riparian corridor along the Cooks River. The Green and Golden Bell Frog isn't a highly mobile species and based on historical records the population within the study area is concentrated around the RTA frog ponds. Given the revegetation proposed within the overland flood pathway and subsequent management as part of Pemulwuy Park, as well as the establishment of the riparian corridor, dispersal and foraging habitat within the subject land will remain connected in the long-term within the areas of the site that are known to be used by the species.

8.3.4 Waterbodies, water quality and hydrological processes

8.3.4.1 Threatened entities affected

The waterbodies within the subject land provide foraging and shelter habitat for the Green and Golden Bell Frog.

8.3.4.2 Nature

The waterbodies within the subject land provide potential foraging and shelter habitat for the Green and Golden Bell Frog. The species has been recorded within an artificial drainage line as well as one golf course dam within the subject land by SLR. The species was also identified at one additional dam within the subject land by AMBS Ecology during the 2023-2024 annual monitoring. These waterbodies provide potential foraging and shelter habitat for the species however are not considered to comprise breeding habitat.

All of the waterbodies within the subject land were confirmed to have Plague Minnow (*Gambusia holbrooki*) present. Whilst the Green and Golden Bell Frog will occasionally breed within sites with this introduced pest being present, such ponds are not considered to comprise suitable breeding habitat. The RTA frog ponds within the south-western portion of the study area were the only known breeding ponds within the study area, however annual monitoring by AMBS Ecology concluded that there have been no confirmed breeding events within the RTA breeding ponds since January 2020. As such, the Arncliffe population is regarded as a very challenged artificial population reliant on the captive breeding program at Symbio Wildlife Park which has successfully released 5,050 tadpoles, including 3,370 tadpoles into the M8 Marsh Street Habitat and 1,680 tadpoles into the RTA ponds. Given the artificial breeding ponds are not located within or directly adjacent to the subject land, the project is not considered to impact breeding habitat for the species.

Hydrological processes within the subject land will also be altered by the project and may affect the condition of receiving habitats.

8.3.4.3 Extent

The project will result in the removal of approximately 0.47 ha of waterbodies and aquatic vegetation within the subject land which provides potential foraging and shelter habitat for the Green and Golden Bell Frog.



8.3.4.4 Duration

The prescribed impact of waterbodies, water quality and hydrological processes is a long-term impact given the waterbodies will be removed from the subject land and hydrological process altered given the bulk earthworks proposed and establishment of the overland flood pathway.

8.3.4.5 Consequences

The project will result in a reduction of foraging and shelter habitat for the Green and Golden Bell Frog. The habitat to be removed is considered to be suboptimal habitat that may be used on occasion by the species and does not form part of the core habitat used by the species, of which is restricted within the study area to the RTA frog ponds. Mitigation and compensatory measures will be implemented to minimise impacts on the Green and Golden Bell Frog due to the removal of waterbodies.

Additionally, water quality and hydrological processes could lead to erosion, sedimentation, pollution, weed invasion and changes to species composition. Stormwater management measures will be implemented to minimise these risks.

8.3.5 Vehicle strikes

8.3.5.1 Threatened entities affected

The threatened species most likely to be impacted by vehicle strikes are ecosystem credit species. This is primarily birds but may also impact the Green and Golde Bell Frog.

8.3.5.2 Nature

Mortality or injury to mobile threatened fauna due to collisions with moving vehicles, particularly heavy vehicles during construction and operational phases.

8.3.5.3 Extent

Collisions with native mobile fauna are more likely at dawn, dusk and night-time hours, when nocturnal fauna are active. The highest risk for vehicle strikes will occur within the construction phase, when heavy and light vehicles regularly access the subject land, including a large construction workforce.

8.3.5.4 Duration

Moderate likelihood during the construction phases, with lower likelihood during operation phases.

8.3.5.5 Consequences

Mortality or injury to individuals of threatened fauna species due to collision with moving vehicles. Specific site measures will be required to mitigate the risk of vehicle / animal interactions and consequent mortality of threatened species. Traffic control measures and signage will be implemented as part of a CEMP (Section 7.4.3).



8.4 Impacts to Threatened Species

Four threatened fauna species have been recorded within the subject land. The following sections outline impacts to these species and the significance of these impacts.

8.4.1 Green and Golden Bell Frog (*Litoria aurea*)

The Green and Golden Bell Frog (*Litoria aurea*) is listed as Endangered under the BC Act and Vulnerable under the EPBC Act. The species was recorded from two general locations during surveys by SLR consulting for this BDAR. In addition to the SLR survey results, monitoring undertaken of the Green and Golden Bell Frog population in Arncliffe by AMBS Ecology and Heritage (AMBS) in the 2023-2024 season, identified over 600 records of the Green and Golden Bell Frog. Of these the majority were located within the M8 Marsh Street Habitat Area, which is an artificially constructed area of habitat located between Marsh Street and Eve Street to the west of the study area. However, 42 individual observations of the species were made within the study area across five locations. Most of these observations (33) were in the two RTA ponds which were constructed by the RTA as part of the M5 Motorway construction in 2002, as compensatory habitat for the Green and Golden Bell Frog in the western corner of the study area. Only nine observations across three locations were made within the subject land.

Based on annual monitoring surveys from 2020-2024, AMBS concluded that the overall Arncliffe population estimate of adult Green and Golden Bell Frogs in 2023-2024 was approximately 288, however the population is a very challenged artificial population that is currently reliant on the ongoing captive breeding program given there has been no confirmed breeding events in the RTA ponds since January 2020. This is evidenced by previous monitoring results. As such, the records of the Green and Golden Bell Frog within the subject land, and immediately adjacent ponds, are considered to have arisen from the 5,050 tadpoles that were released in 2023-2024 into the artificial ponds at Marsh Street (3,370) and the RTA ponds (1,680) as part of the captive breeding program. Therefore, the habitat within the subject land and wider study area is considered to provide foraging and dispersal habitat for the Green and Golden Bell Frog, however is not considered to comprise breeding habitat. The only previously known breeding habitat within the study area is located within the RTA frog ponds approximately 400 m from the subject land which will be retained. Furthermore, embellishment works within Pemulwuy Park to be delivered by Council, including restoration works within the M6/M8 construction compound, will improve foraging and breeding habitat for the species within the study area in the long term.

A range of mitigation measures relevant to the Green and Golden Bell frog have been developed for the project and these are presented in Chapter 9.

8.4.2 Grey-headed Flying-fox

The Grey-headed Flying-fox (*Pteropus poliocephalus*) is listed as Vulnerable under the BC Act and EPBC Act. This species was recorded at numerous locations within the subject land during nocturnal surveys, and the species is expected to utilise most of the wooded areas of the subject land for foraging purposes.



The Grey-headed Flying-fox will primarily be impacted by the project through direct removal of foraging habitat within the subject land. Approximately 5.52 ha of suitable foraging habitat will be removed, which is represented by blossom-producing trees within the planted native woody vegetation. Approximately 2.42 ha of existing tree cover will be retained and additional plantings of native trees and shrubs will occur throughout the subject land.

Although the ongoing loss of foraging habitat is a threatening process to the species, the foraging habitat within the subject land is likely utilised as part of a much broader foraging range. The species is known to travel upwards to 50 km to forage, but more commonly commutes less than 20 km (OEH 2016b). Furthermore, additional areas of suitable foraging habitat within the locality will be retained within reserves in perpetuity. In addition to substantial areas of suitable forest and woodland vegetation, there is also a considerable amount of street and garden vegetation within the known foraging range for the Grey-headed Flying-fox, which may also be utilised for foraging by the species. The habitat to be removed is therefore unlikely to be important for the long-term survival of a local population in the locality, and the project is considered unlikely to have a significant impact on the Grey-headed Flying-fox.

A range of impact avoidance and mitigation measures have been developed for the project and these are presented in **Chapter 9**. A number of these measures are relevant to the Grey-headed Flying-fox.

8.4.3 Little Bent-winged Bat

The Little Bent-winged Bat (*Miniopterus australis*) is listed as Vulnerable under the BC Act, and is not listed under the EPBC Act. The species is known from the locality and was detected within the subject land during surveys by SLR for this BDAR.

The subject land provides potential foraging habitat for this species, which is likely to be utilised on occasion as part of a broader foraging range. However, as outlined in Section 5.7.1 a habitat constraints assessment was undertaken and the only potential habitat features identified were some small drainage culverts and existing structures including the Kogarah Golf Course Club House and associated maintenance sheds. Active searches were undertaken to assess potential breeding habitat as outlined in Section 2.4.7 and no evidence of use by any microbats were observed. As such, the subject land is not considered to provide breeding habitat for the Little Bent-winged Bat.

The Little Bent-winged Bat will primarily be impacted by the project through direct removal of habitat within the subject land. Approximately 5.99 ha of potential foraging habitat will be removed from the subject land, which is represented by planted native woody vegetation and wetlands. This loss of foraging habitat will result in a net decrease in the amount of suitable habitat available to this species within the study area. However, the foraging habitat to be removed is likely only utilised periodically as part of a broader foraging range and is not considered important to the long-term survival of a local population. Therefore, the proposed development is unlikely to have a significant impact on this species.

A range of impact avoidance, mitigation and compensation measures have been developed for the project and these are presented in **Chapter 5**. A number of these measures are relevant to the Little Bent-winged Bat.



8.4.4 Large Bent-winged Bat

The Large Bent-winged Bat (*Miniopterus orianae oceanensis*) is listed as Vulnerable under the BC Act, and is not listed under the EPBC Act. The species is known from the locality and was detected within the subject land during surveys by SLR for this BDAR.

The subject land provides potential foraging habitat for this species, which is likely to be utilised on occasion as part of a broader foraging range. However, as outlined in Section 5.7.2 a habitat constraints assessment was undertaken and the only potential habitat features identified were some small drainage culverts and existing structures including the Kogarah Golf Course Club House and associated maintenance sheds. Active searches were undertaken to assess potential breeding habitat as outlined in Section 2.4.7 and no evidence of use by any microbats were observed. As such, the subject land is not considered to provide breeding habitat for the Large Bent-winged Bat.

The Large Bent-winged Bat will primarily be impacted by the project through direct removal of habitat within the subject land. Approximately 5.99 ha of potential foraging habitat will be removed from the subject land, which is represented by planted native woody vegetation and wetlands. This loss of foraging habitat will result in a net decrease in the amount of suitable habitat available to this species within the study area. However, the foraging habitat to be removed is likely only utilised periodically as part of a broader foraging range and is not considered important to the long-term survival of a local population. Therefore, the proposed development is unlikely to have a significant impact on this species.

A range of impact avoidance, mitigation and compensation measures have been developed for the project and these are presented in **Chapter 5**. A number of these measures are relevant to the Large Bent-winged Bat.

8.5 Change in vegetation integrity score

Table 27 details the change in vegetation integrity score for each vegetation zone. The direct impacts of the project only involve one management zone, being the total clearing of vegetation within the subject land



Table 27 Impacts to vegetation integrity

Vegetation zone	PCT ID	Management zone	Area (ha)	Before Development				After Development				Chang in VI score
				Comp-osition	Struc-ture	Func-tion	VI score	Comp-osition	Struc-ture	Func-tion	VI score	
1	4091	Moderate	0.02	70.7	72.2	-	71.4	0.0	0.0	-	0	-71.4
2	4097	Degraded	0.01	70.1	98.9	-	83.3	0.0	0.0	-	0	-83.3



9.0 Mitigation and Management of Impacts

A range of mitigation measures will be implemented for the project. These measures will be implemented to minimise impacts to biodiversity values, and to provide ongoing management of native fauna species and retained and replanted vegetation, and to guide the overall management of the open space corridors and other landscape elements.

It should be noted commitment to implement the mitigation measures outlined below are mainly limited to the development precinct, which represents the land owned by the client. However, as part of this assessment it is recommended that the proposed mitigation measures are also adopted for all land outside of the development precinct within the subject land.

It is also recognised that the detailed design for mitigation measures involving habitat creation and plantings along the Cooks River foreshore will be subject to consultation with Sydney Airport, as National Airport Safety Framework Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports is not supportive of land uses in proximity to the airport that increase the probability of bird strike.

The following mitigation measures will be implemented prior to and during the construction phase to minimise any adverse effects of the project on biodiversity:

- Preparation and implementation of a Biodiversity Management Plan (BMP);
- Preparation and implementation of a Green and Golden Bell Frog Management Plan;
- Preparation and implementation of a Construction Environment Management Plan (CEMP);
- Preparation and implementation of a Landscape Management Plan.

The proposed mitigation measures are discussed in more detail below.

9.1.1 Biodiversity Management Plan

A BMP will be prepared and implemented to minimise and mitigate impacts to the biodiversity values found within the subject land and broader study area. A summary of the measures to be implemented under the BMP include, but are not limited to:

- Protection of vegetation and threatened species habitat outside of approved disturbance areas;
- Protection of fauna and their habitat through vegetation clearing and fauna management protocols;
- Protocols to control and manage weeds, pests, and pathogens;
- Incidental and unexpected finds protocol;
- Rehabilitation and restoration of vegetation and habitat within temporary disturbance areas (i.e. overland flood pathway);
- Habitat enhancement within landscaping areas (i.e. foreshore riparian buffer zones, Fig Tree Plaza (north or south)); and



- Nest box installation.

9.1.2 Green and Golden Bell Frog Management Plan

To manage and minimise the potential impacts specifically to the Green and Golden Bell Frog, a Green and Golden Bell Frog Management Plan will be prepared in accordance with the Eastern Precincts SEPP for the study area. The overall objectives of this Management Plan will be to ensure that the current Arncliffe population of the Green and Golden Bell Frog is maintained, to minimise threatening processes at the site and to improve habitat and connectivity for the species to enable successful breeding and on-going population viability. The GGBF Management Plan will complement the plan prepared for the major project SSI 6788, and will apply specifically to land owned by the client.

Specific management measures that will be undertaken to achieve these objectives include the following:

- Manage existing frog populations during construction by erecting frog proof fencing and conducting pre-clearance surveys;
- Increase connectivity between sites to encourage breeding;
- Maintain newly created breeding ponds;
- Improve water quality within existing and new ponds;
- Undertake population monitoring and reporting within land owned by Cook Cove Inlet;
- Provide for long-term habitat protection and management; and
- Address other Key Threatening Processes.

This plan will provide general plans for the management of the Green and Golden Bell Frog and its habitat in the subject land, but a detailed management protocol and contingency plan (referred to here as the Green and Golden Bell Frog Construction Plan) will also be produced at the during subsequent DA stages to deal with the detailed management of the Green and Golden Bell Frog prior to and during construction.

The Green and Golden Bell Frog Management Plan will be prepared as a condition of consent to be signed off by the consent authority prior to commencement of construction.

9.1.3 Construction Environment Management Plan

Prior to construction a Construction Environmental Management Plan (CEMP) will be prepared and implemented as part the project's construction. Mitigation measures proposed to be implemented under the CEMP include, but are not limited to:

- Traffic control including limiting speeds on internal roads;
- Stormwater management;
- Weed management;
- Fencing and access control;



- Bushfire management;
- Erosion and sediment control; and
- Workforce education and training.

9.1.4 Landscape Management Plan

As identified in the Rockdale Biodiversity Strategy (2014), sensitively designed landscaped areas, such as recreational open space, contribute to biodiversity corridors. The document also notes that even open space areas without significant vegetation, such as sports field, provide some form of foraging habitat.

The design of the project comprises a number of recreational open space areas, including parks and passive recreation areas where suitable plantings of trees, shrubs and groundcovers can be planted. Street trees and garden plantings can be used to establish linkages and address biodiversity corridor gaps (Rockdale City Council 2014).

A Landscape Concept and Early Works SSDA Report has been prepared by Moir Studio (2025) which identifies the projects landscape plans, including suitable species for replanting. Species selected for replanting have been based on native species known to occur within the subject land as well as species likely to occur within locally occurring PCTs. The tree species identified include seasonal feed trees suitable for species such as the Grey-headed Flying-fox (e.g. *Eucalyptus robusta*, *Melaleuca quinquenervia* and *Banksia serrata*), as a long-term strategy to minimise the impact of loss of foraging and roosting habitat.

9.2 Summary of measures to avoid and minimise impacts

Table 28 documents the measures to avoid and minimise direct, indirect and prescribed impacts associated with the proposed development.

Table 28 Avoidance and minimisation measures for direct, indirect and prescribed impacts

Action	Outcome (Describe the outcome of implementing the measure, with reference to specific entities identified in Sections 4 and 5)	Timing	Responsibility
Positioning of the subject land	The subject land was positioned in the most westerly portions of the study area to avoid and minimise impacts on known habitat for the Green and Golden Bell Frog	Design/SSDA	Proponent, designers



Action	Outcome (Describe the outcome of implementing the measure, with reference to specific entities identified in Sections 4 and 5)	Timing	Responsibility
Limit clearing of native vegetation.	Minimise overall areas of native vegetation, associated TECs and threatened species habitat to be directly impacted by proposed development. Retain trees where possible in accordance with the Arboricultural Impact Assessment (REF).	Design/SSDA	Proponent, designers
Biodiversity Management Plan	Enable protection and enhancement of retained vegetation. Reduce the introduction and spread of weeds and noxious species within the subject land and adjacent areas. Minimise impacts of vegetation clearing activities and allow for hollow and foraging resource replacement (i.e. nest boxes).	Implementation to begin at commencement of construction	Landowner, project ecologist
Green and Golden Bell Frog Management Plan	Minimise potential impacts on the Green and Golden Bell Frog. Embellishment of habitat for the species within the subject land and within Pemulwuy Park.	Implementation to begin at commencement of construction	Landowner, project ecologist
Construction Environment Management Plan	Reduce potential for impacts from traffic, sedimentation, erosion and stormwater Increase workforce awareness/education	Implementation to begin at commencement of construction	Proponent, Contractor, Environmental representative Lead



Action	Outcome (Describe the outcome of implementing the measure, with reference to specific entities identified in Sections 4 and 5)	Timing	Responsibility
Landscape Management Plan	Establishment of a riparian vegetation buffer zone along the Cooks River foreshore and improvement of habitat connectivity across the subject land and wider study area.	Design/SSDA	Proponent, designers



9.3 Mitigating residual impacts – management measures and implementation

Table 29 details the proposed mitigation and management measures for residual impacts (direct, indirect and prescribed) and Table 30 details the management and mitigation implementation.



Table 29 Summary of proposed mitigation and management measures for residual impacts (direct, indirect and prescribed)

Mitigation Measure (Specify if None Proposed and Ensure an Adaptive Management Strategy is Developed and Addressed in Section Error! Reference source not found.)	Method/ Technique	Timing	Frequency	Responsible Persons	Likely Efficacy (Including Risk of Failure)	MNES (When Relevant)
Fauna displacement (BAM 8.4.1, 2)						
<i>2a. Timing works to avoid critical life cycle events, such as breeding or nursing</i>	An ecologist must complete thorough pre-clearance checks, including the inspection of hollow-bearing trees prior to felling. Further details to be included in the BMP.	Site clearing and construction	One off	Proponent, construction team	High efficacy, low risk	n/a
<i>2b. Instigating clearing protocols, including pre-clearing surveys, daily surveys and staged clearing, and using a trained ecologist or licensed wildlife handler during clearing events</i>	Pre-clearance surveys and daily wildlife capture by a fauna spotter-catcher or suitably qualified ecologist.	Site clearing	Daily	Proponent, construction team, ecologist	High efficacy, low risk	n/a
<i>2c. Relocating habitat features (e.g. fallen timber, hollow logs) from the development or clearing site, to adjacent retained vegetation</i>	Relocate habitat features into adjoining vegetation, where possible.	Site clearing	Daily	Proponent, construction team, ecologist	High efficacy, low risk	n/a
Indirect impacts on native vegetation and habitats (BAM 8.4.1, 3)						



Mitigation Measure (Specify if None Proposed and Ensure an Adaptive Management Strategy is Developed and Addressed in Section Error! Reference source not found.)	Method/ Technique	Timing	Frequency	Responsible Persons	Likely Efficacy (Including Risk of Failure)	MNES (When Relevant)
<i>3a. Adoption of clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance; for example, a chainsaw is preferable to heavy machinery to remove native vegetation for partial clearing</i>	Hollow-bearing trees are to be removed one at a time, with a fauna spotter-catcher or suitably qualified ecologist on site during clearing works to complete daily wildlife capture as required. Spotter catcher to be present during dewatering of dams/waterbodies to capture and remove frogs and other aquatic species	Site clearing and construction	One off	Proponent, construction team, ecologist	High efficacy, low risk	n/a
<i>3b. Using noise barriers, or daily/seasonal timing of construction and operational activities to reduce impacts of noise</i>	Use of noise barriers and limiting construction works to daylight hours to minimise disturbance to nocturnal species.	Construction and operational	Daily	Proponent, construction team, site management	High efficacy, low risk	n/a
<i>3c. Using light shields, or daily/seasonal timing of construction and operational activities to reduce impacts of light spill</i>	Use of light shields and limiting evening construction works, where possible. Avoid construction activities between dusk and dawn	Construction and operational	Daily	Proponent, construction team, site management	High efficacy, low risk	n/a



Mitigation Measure (Specify if None Proposed and Ensure an Adaptive Management Strategy is Developed and Addressed in Section Error! Reference source not found.)	Method/ Technique	Timing	Frequency	Responsible Persons	Likely Efficacy (Including Risk of Failure)	MNES (When Relevant)
	(i.e. nocturnal hours), where possible.					
3d. Using adaptive dust management and monitoring programs to control air quality	Dust management and monitoring surveys	Construction	One off	Proponent, construction team	High efficacy, low risk	n/a
3e. Scheduling the timing of construction activities to avoid impacts (e.g. timing the construction for when migratory species are not at the site, or when particular species known to, or likely to use the habitat on the site, are not breeding or nesting)	n/a	n/a	n/a	n/a	n/a	n/a
3f. Erecting temporary fencing to protect significant environmental features, such as riparian zones	Temporary fencing of construction area, and along the proposed access track to temporarily restrict movement into active work site from adjacent intact vegetation.	Construction	One off	Proponent, construction team	High efficacy, low risk	n/a
3g. Using hygiene protocols to prevent the spread of weeds or pathogens between infected and uninfected areas	Machinery wash down prior to site entry.	Construction	Daily	Proponent, construction team	High efficacy, low risk	n/a



Mitigation Measure (Specify if None Proposed and Ensure an Adaptive Management Strategy is Developed and Addressed in Section Error! Reference source not found.)	Method/ Technique	Timing	Frequency	Responsible Persons	Likely Efficacy (Including Risk of Failure)	MNES (When Relevant)
3h. Training staff and conducting site briefings to communicate environmental features to be protected and measures to be implemented	Environmental site briefings identifying areas of retained native vegetation and potentially occurring threatened species.	Construction	One off	Proponent, construction team	High efficacy, low risk	n/a
3i. Preparing a vegetation management plan to regulate activity in vegetation and habitats adjacent to residential developments. The plan may include controls on pet ownership, rubbish disposal, wood collection, fire management, and disturbance to nests and other niche habitats	Prepare and comply with Biodiversity Management Plan which includes measures to reduce impacts to adjacent vegetation.	Operational	One off	Occupant, ecologist	High efficacy, low risk	n/a
3j. Providing for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on, or adjacent to, the development or clearing site	Prepare and comply with Biodiversity management plan which includes measures to reduce impacts to threatened fauna within the subject land	Operational	One off	Proponent, construction team, ecologist	High efficacy, low risk	n/a
Prescribed Impacts (BAM 8.4.2, 1)						
1a. Scheduling the timing of construction activities to avoid critical life cycle events (e.g. timing construction activities to	Temporary and permanent frog proof fencing of construction	Construction	One off	Proponent, construction team	High efficacy, low risk	n/a



Mitigation Measure (Specify if None Proposed and Ensure an Adaptive Management Strategy is Developed and Addressed in Section Error! Reference source not found.)	Method/ Technique	Timing	Frequency	Responsible Persons	Likely Efficacy (Including Risk of Failure)	MNES (When Relevant)
<i>avoid migratory species on site, or using the site)</i>	and operational areas to restrict movement of the Green and Golden Bell Frog into the active work site.					
<i>1b. Instigating clearing protocols, including pre-clearing surveys, daily surveys and staged clearing, and using a trained ecologist or licensed wildlife handler during clearing, construction and maintenance activities for human-made structures and non-native vegetation</i>	Pre-clearance surveys and daily wildlife capture by a fauna spotter- catcher or suitably qualified ecologist.	Site clearing	Daily	Proponent, construction team, ecologist	High efficacy, low risk	n/a
<i>1c. Retaining habitat features (e.g. fallen timber, hollow logs, rocks) within the subject land, or relocating them to adjacent retained remnant vegetation</i>	n/a	n/a	n/a	n/a	n/a	n/a
<i>1d. Installing artificial connectivity measures (e.g. glider poles, rope crossings, habitat bridges) to re- establish connections between habitat and favoured transport corridors</i>	n/a	n/a	n/a	n/a	n/a	n/a
<i>1e. Erecting temporary fencing to protect significant environmental features, such as karst, caves, rock outcrops and water bodies</i>	n/a	n/a	n/a	n/a	n/a	n/a



Mitigation Measure (Specify if None Proposed and Ensure an Adaptive Management Strategy is Developed and Addressed in Section Error! Reference source not found.)	Method/ Technique	Timing	Frequency	Responsible Persons	Likely Efficacy (Including Risk of Failure)	MNES (When Relevant)
<i>1f. Replacing habitat provided by human-made structures and non-native vegetation with alternative habitat</i>	Rehabilitation of non native vegetation within the overland flood pathway.	Post-construction	One off	Proponent, construction team	High efficacy, low risk	n/a
<i>1g. Using sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment</i>	Sediment barriers and sediment ponds	Construction and operation	One off	Proponent, construction team, Engineers	High efficacy, low risk	n/a
<i>1h. Training staff and conducting site briefings to communicate environmental features to be protected and the measures implemented to protect them</i>	Environmental site briefings identifying areas of retained native vegetation and potentially occurring threatened species.	Construction	One off	Proponent, construction team	High efficacy, low risk	n/a
<i>1i. Ecological restoration, rehabilitation actions and/or maintenance of retained native vegetation on, or adjacent to, the subject land</i>	Restoration and rehabilitation of construction areas including the riparian buffer zone and the overland flood pathway	Construction	One off	Proponent, construction team	High efficacy, low risk	n/a
<i>1j. Development control measures that regulate the types of activities that can occur in native vegetation and habitat adjacent to residential development,</i>	n/a	n/a	n/a	n/a	n/a	n/a



Mitigation Measure (Specify if None Proposed and Ensure an Adaptive Management Strategy is Developed and Addressed in Section Error! Reference source not found.)	Method/ Technique	Timing	Frequency	Responsible Persons	Likely Efficacy (Including Risk of Failure)	MNES (When Relevant)
<i>including prohibiting the collection of bush rocks</i>						

Table 30 Mitigation and management measure implementation

Measure/action	Monitoring and evaluation strategy (Data, frequency, timing and reporting)	Performance criteria (linked to monitoring and evaluation strategy)	Adaptive management threshold (trigger for adaptive management plan/actions)	Adaptive management response (when triggered)
A suitably qualified ecologist must complete a thorough pre-clearance survey, including inspection of all hollows immediately prior to clearing works. If an active breeding place is confirmed within works area, construction must cease, and advice sought from a qualified ecologist prior to recommencement.	Record timing of works and preclearance surveys in flora and fauna management report. Record fauna sightings and occupancy.	Hollow-bearing trees to be inspected prior to clearing.	Threatened species breeding place recorded during pre-clearance surveys or incidentally prior to clearing.	Seek ecological advice on how to best manage works to reduce impacts on breeding species (e.g. stagger work program, limit work to daylight hours).



Measure/action	Monitoring and evaluation strategy (Data, frequency, timing and reporting)	Performance criteria (linked to monitoring and evaluation strategy)	Adaptive management threshold (trigger for adaptive management plan/actions)	Adaptive management response (when triggered)
Pre-clearance surveys and daily wildlife capture.	Survey once prior to commencement of native vegetation clearing and daily during site clearing. Details and outcomes reported in flora and fauna management report.	Pre-clearance and daily surveys recorded in report. Fauna relocated safely.	Fauna injured during clearing.	Injured wildlife taken to nearest vet or animal carer and re-released on site.
Relocate habitat features - Ecologist to supervise relocation and placement of salvaged habitat features into retained bushland on site.	Once during site clearing or as needed. Relocated habitat features are to be mapped and documented in flora and fauna management report.	Suitable habitat features re-located and documented in report.	N/A	N/A
Use of light shields and limiting evening construction works.	For duration of construction and operation, compliance monitored and communicated in construction compliance documentation.	Light spill is reduced.	Light spill into adjacent vegetation.	Adjust lighting.
Dust management and monitoring surveys.	For duration of construction, compliance monitored and communicated in construction compliance documentation.	Dust generated by construction is appropriately managed.	Visible dust accumulations observed in adjacent habitats.	Review and improve dust management measures.
Temporary fencing of construction area.	For duration of construction, compliance monitored and communicated in construction compliance documentation.	Fencing is installed and condition is maintained for duration of works.	Fencing becomes damaged.	Reinstate fencing.



Measure/action	Monitoring and evaluation strategy (Data, frequency, timing and reporting)	Performance criteria (linked to monitoring and evaluation strategy)	Adaptive management threshold (trigger for adaptive management plan/actions)	Adaptive management response (when triggered)
Machinery wash down prior to site entry.	For duration of construction, compliance monitored and communicated in construction compliance documentation.	Machine hygiene is maintained for duration of works.	N/A	N/A
Environmental site briefings identifying areas of retained native vegetation and areas of environmental significance.	For duration of construction, compliance monitored and communicated in construction compliance documentation.	Workers are informed of areas of retained vegetation and areas of environmental significance for the duration of construction.	N/A	N/A
Rehabilitation survey and implementation	Ecologist to perform an inspection during construction and post construction to check condition of areas of retained native vegetation, documented in flora and fauna management report. Any areas of disturbance are mapped and photographed for rehabilitation.	Any areas of disturbance are rehabilitated.	N/A	N/A



9.4 Adaptive management strategy for uncertain impacts (where relevant)

An adaptive management plan can be used to address impacts that are infrequent or difficult to measure. These include indirect or prescribed impacts, or other remaining biodiversity impacts. The proponent must develop an adaptive management plan to address any remaining impacts where mitigation measures have not been proposed. SLR is of the opinion that all indirect, prescribed, or other residual biodiversity impacts are minor in nature and/or will be sufficiently mitigated and managed by implementing measures outline in this BDAR. As such, an adaptive management plan for uncertain impacts is not proposed.

9.5 Use of Biodiversity Credits to Mitigate or Offset Indirect or Prescribed Impacts

The project does not propose to use additional biodiversity credits to mitigate or offset indirect or prescribed impacts. However, compensatory measures are proposed to offset the prescribed impact features including non-native vegetation and waterbodies, water quality and hydrological processes, of which provide foraging and dispersal habitat for the Green and Golden Bell Frog. Compensatory measures will include off-site habitat creation and maintenance within Pemulwuy Park to be delivered by Council. Works will be funded via a monetary contribution from the client to Council, as set out in the approved VPA with Council.



10.0 Serious and irreversible impacts

10.1 Assessment for serious and irreversible impacts on biodiversity values

The project is not considered to have any impact on SAI entities, as identified in the Threatened Biodiversity Data Collection.



11.0 Impact summary

11.1 Determine an offset requirement for impacts

11.1.1 Impacts on native vegetation and TECs or ecosystem credits

In accordance with Appendix D of the BAM, impacts to planted native vegetation do not require an offset. The areas of planted native vegetation in the subject land comprise approximately 5.52 ha and these impacts will be mitigated and managed in accordance with Section 7.4.

Table 31 identifies impacts that require an offset (as per BAM Subsection 9.2.1(1.)). Thresholds for assessment and offsetting impacts are identified in Figure 16.



Table 31 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
Zone 1	PCT 4091 Grey Mangrove-River Mangrove Forest	Not a TEC	0.02	71.4	0	-71.4	1.75	1
Zone 2	PCT 4097 Samphire Saltmarsh	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.01	83.3	0	-83.3	2	1
Total credits								2



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

Table 32 identifies impacts on threatened species (species credits) that require an offset (as per BAM Subsection 9.2.2(2.)).

Table 32 Impacts that require an offset – species credits

Scientific name	Common name	BC Act status	EPBC Act status	Loss of habitat (ha) or individuals	Biodiversity risk weighting	Number of species credits required
<i>Litoria aurea</i>	Green and Golden Bell Frog	E	V	0.03	2	2
Total credits						2

Key: E = Endangered, V = Vulnerable

11.1.3 Indirect and prescribed impacts

The retirement of biodiversity credits may be used with other conservation measures to mitigate prescribed impacts or the indirect impacts of a proposal on areas of native vegetation, TECs and/or threatened species, or their habitat adjacent to the subject land. SLR is of the opinion that all indirect impacts are minor in nature and/or will be sufficiently mitigated and managed by implementing measures outlined in this BDAR.

Furthermore, compensatory measures are proposed to mitigate prescribed impacts on habitat for the Green and Golden Bell Frog. Compensatory measures will include off-site habitat creation and maintenance within Pemulwuy Park with works to be delivered by Council and funded via a monetary contribution from the client as set out in the approved VPA with Council. Works are proposed to tie in with the additional habitat to be created under the existing approval for the West Connex New M5 project, which includes the establishment of several new frog ponds.

As such, additional biodiversity credits to mitigate indirect or prescribed impacts are not proposed. A summary of the proposed offsets for residual prescribed impacts is provided in Table 33.

Table 33 Summary of proposed offsets for residual prescribed impacts

Residual prescribed impact	Proposed offset
Loss of non-native vegetation and waterbodies which provide habitat for the Green and Golden Bell Frog (<i>Litoria aurea</i>).	Monetary contribution set out in the approved VPA with Council for embellishment of habitat within Pemulwuy Park



11.2 Impacts that do not need further assessment

Table 34 identifies impacts that do not need further assessment (as per BAM Section 9.3(1–2)).

Table 34 Impacts that do not need further assessment

Impact	Location within subject land	Justification why no further assessment is required
Exotic vegetation	Scattered patches adjacent to fairways and between areas of planted native vegetation	No native vegetation present so no ecosystem credits required. While exotic vegetation offers some potential foraging habitat for threatened species, impacts will be mitigated in accordance with Section 7.4. As such, no species credits are required.
Lawns and other exotic grassland	Across all fairways throughout the subject land	No native vegetation present so no ecosystem credits required. Impacts to habitat associated with waterbodies and aquatic vegetation are to be mitigated in accordance with Section 7.4 with compensatory measures also proposed. As such, no species credits required.
Waterbodies and aquatic vegetation	Predominantly within the south-eastern portion of the subject land	Whilst the waterbodies do contain extremely small areas of aquatic vegetation (both native and exotic), these areas are too small to be mapped, hence they have been mapped as part of the waterbodies themselves. As such, these areas are not mapped as native PCTs and accordingly, no ecosystem credits are required. Impacts to habitat associated with waterbodies and aquatic vegetation are to be mitigated in accordance with Section 7.4 with additional compensatory measures proposed. As such, no species credits required.
Cleared land	Predominantly within the north-eastern portion of the subject land comprising carparking and club house. Also includes areas	No native vegetation or habitats for threatened species present and therefore no ecosystem or species credits required.



Impact	Location within subject land	Justification why no further assessment is required
	of the M6/M8 Motorway Operation Facilities in the north-western portion of the subject land	

12.0 Biodiversity credit report

The Biodiversity Credit Report for the project is included in **Appendix E**.

Biodiversity credits that share the same attributes form a class of credits. The credit classes for ecosystem credits and species credits are presented in Table 35 and Table 36.



12.1 Ecosystem credits

Table 35 Ecosystem credit class and matching credit profile

Ecosystem credit	Attributes shared with matching credits							
	PCT name	PCT vegetation class	PCT vegetation formation	Associated TEC	Offset trading group (BAM Section 10.2, Tables 4 & 5)	Hollow bearing trees present?	IBRA subregion (in which proposal is located)	Credits Required
PCT 4091	Grey Mangrove-River Mangrove Forest	Mangrove Swamps	Saline Wetlands	n/a	Mangrove Swamps - $\geq 50\%$ - $< 70\%$ cleared group (including Tier 3 or higher threat status).	No	Pittwater , Cumberland, Sydney Cataract, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site.	1
PCT 4097	Samphire Saltmarsh	Saltmarshes	Saline Wetlands	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 4040, 4094, 4095, 4096, 4097, 4101, 4102, 4103	No	Pittwater , Cumberland, Sydney Cataract, Wyong and Yengo. or Any IBRA subregion that is within 100	1



Ecosystem credit	Attributes shared with matching credits							
	PCT name	PCT vegetation class	PCT vegetation formation	Associated TEC	Offset trading group (BAM Section 10.2, Tables 4 & 5)	Hollow bearing trees present?	IBRA subregion (in which proposal is located)	Credits Required
							kilometres of the outer edge of the impacted site.	



12.2 Species credits

Table 36 Species credit class and matching credit profile

Species credit	Name of threatened species	Attributes shared with matching credits				
		Kingdom	BC Act status	EPBC Act status	IBRA region	Credits Required
Green and Golden Bell Frog	<i>Litoria aurea</i>	Animalia	Endangered	Vulnerable	Any in NSW	2



13.0 References

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FIGURE 1

LEGEND

- Subject Land
- Study Area
- Cadastrate
- Native Vegetation Cover
- Riparian Corridor
- Waterbody
- Stream Order**
 - 1st Order (10m buffer)
 - 2nd Order (20m buffer)
 - 3rd Order (30m buffer)
 - 4th Order (40m buffer)
- IBRA Bioregion**
 - Sydney Basin
- IBRA Subregion**
 - Pittwater
- NSW (Mitchell) Landscapes**
 - Sydney - Newcastle Barriers and Beaches
 - Woronora Plateau

Image Source: Nearmap (2026) Dated: 27/01/2025
Data Source: Interim Biogeographic Regionalisation for Australia (IBRA), Version 7 (Bioregions/Subregions) © Commonwealth of Australia and Department of Climate Change, Energy, the Environment and Water 2026
NSW (Mitchell) Landscapes - version 3.1, NSW Department of Climate Change, Energy, the Environment and Water
Sixmaps Clip & Ship, NSW Spatial Services
DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

0 65 130 m
Coordinate System: GDA 1994 MGA Zone 56
Scale: 1:3,584 at A3
Project Number: 610.032932.00001
Date Drawn: 12-May-2026
Drawn by: MD



FIGURE 2

LEGEND

- Subject Land
- Study Area
- Assessment Area (1500m)
- Native Vegetation Cover
- Patch Size: >100 ha
- Riparian Corridor
- Waterbody
- Habitat Connectivity
- Stream Order
 - 1st Order (10m buffer)
 - 2nd Order (20m buffer)
 - 3rd Order (30m buffer)
 - 4th Order (40m buffer)
- IBRA Bioregion
 - Sydney Basin
- IBRA Subregion
 - Cumberland
 - Pittwater
- NSW (Mitchell) Landscapes
 - Ashfield Plains
 - Port Jackson Basin
 - Sydney - Newcastle Barriers and Beaches
 - Woronora Plateau

Image Source: Nearmap (2026) Dated: 27/01/2025
Data Source: Interim Biogeographic Regionalisation for Australia (IBRA), Version 7 (Bioregions/Subregions) © Commonwealth of Australia and Department of Climate Change, Energy, the Environment and Water 2026
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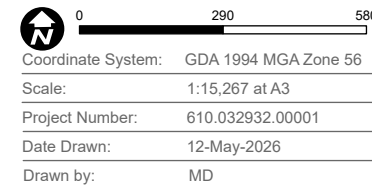
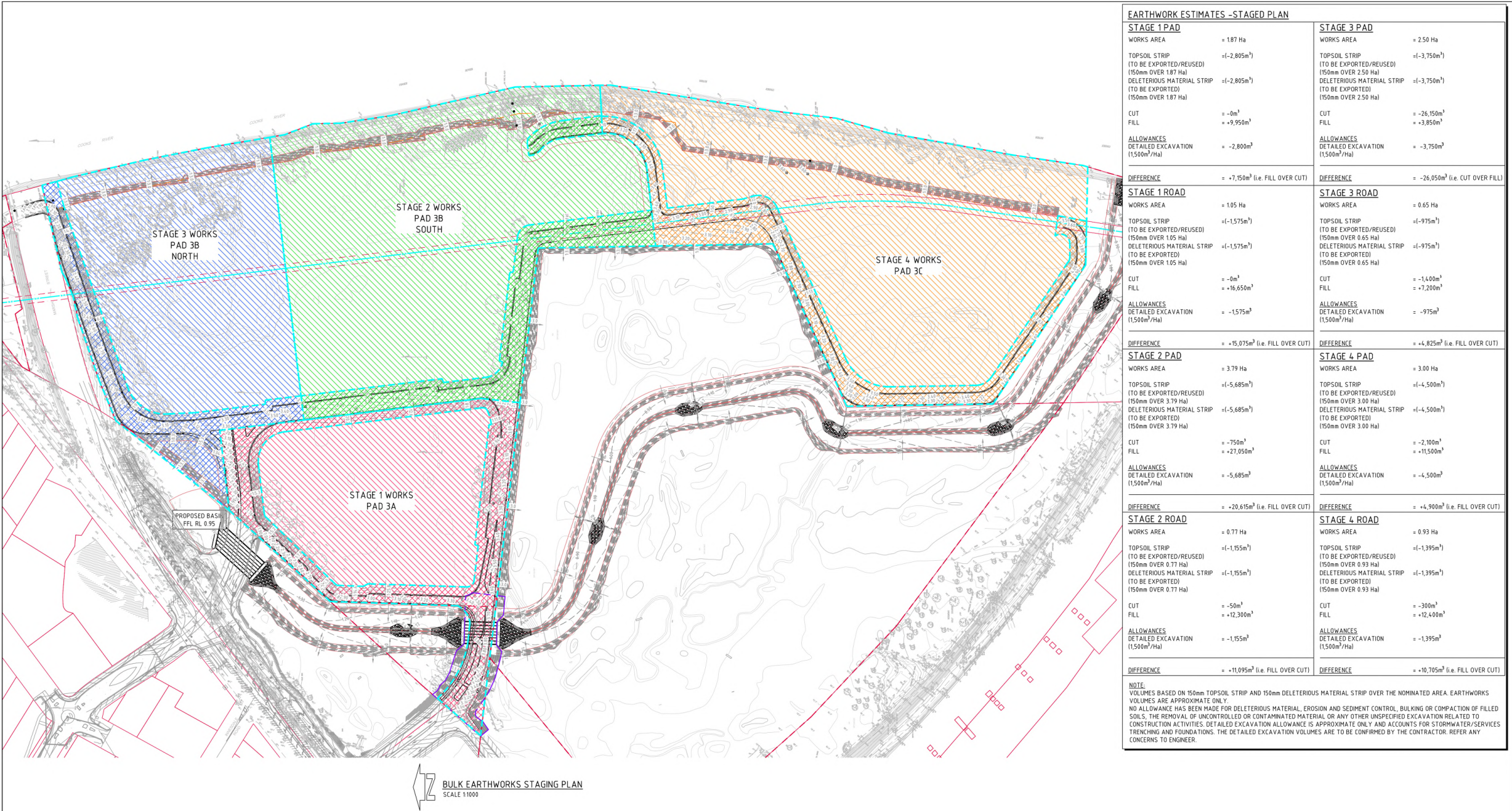


FIGURE 3



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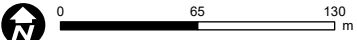




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Date Drawn: 12-May-2026

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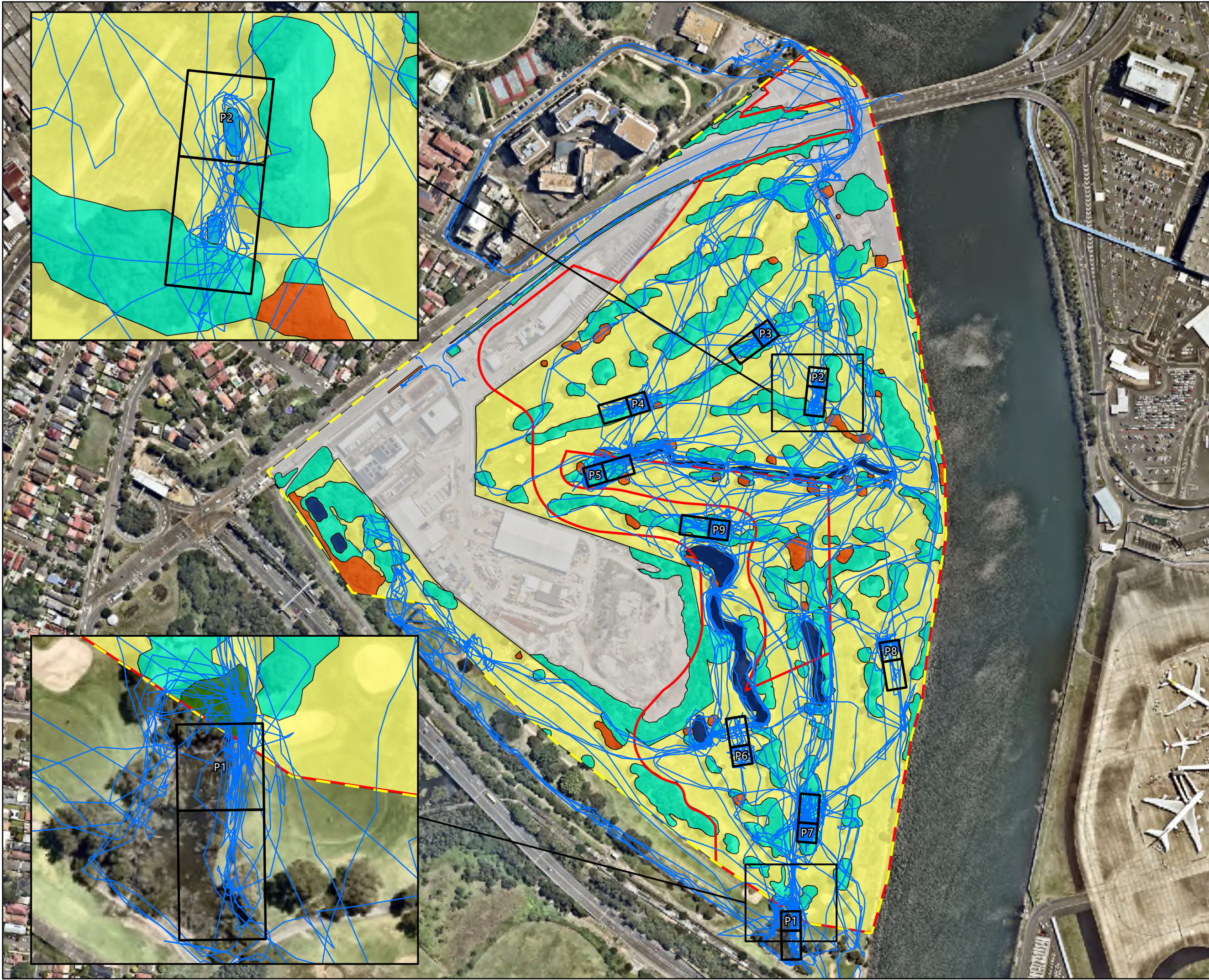
FIGURE 5

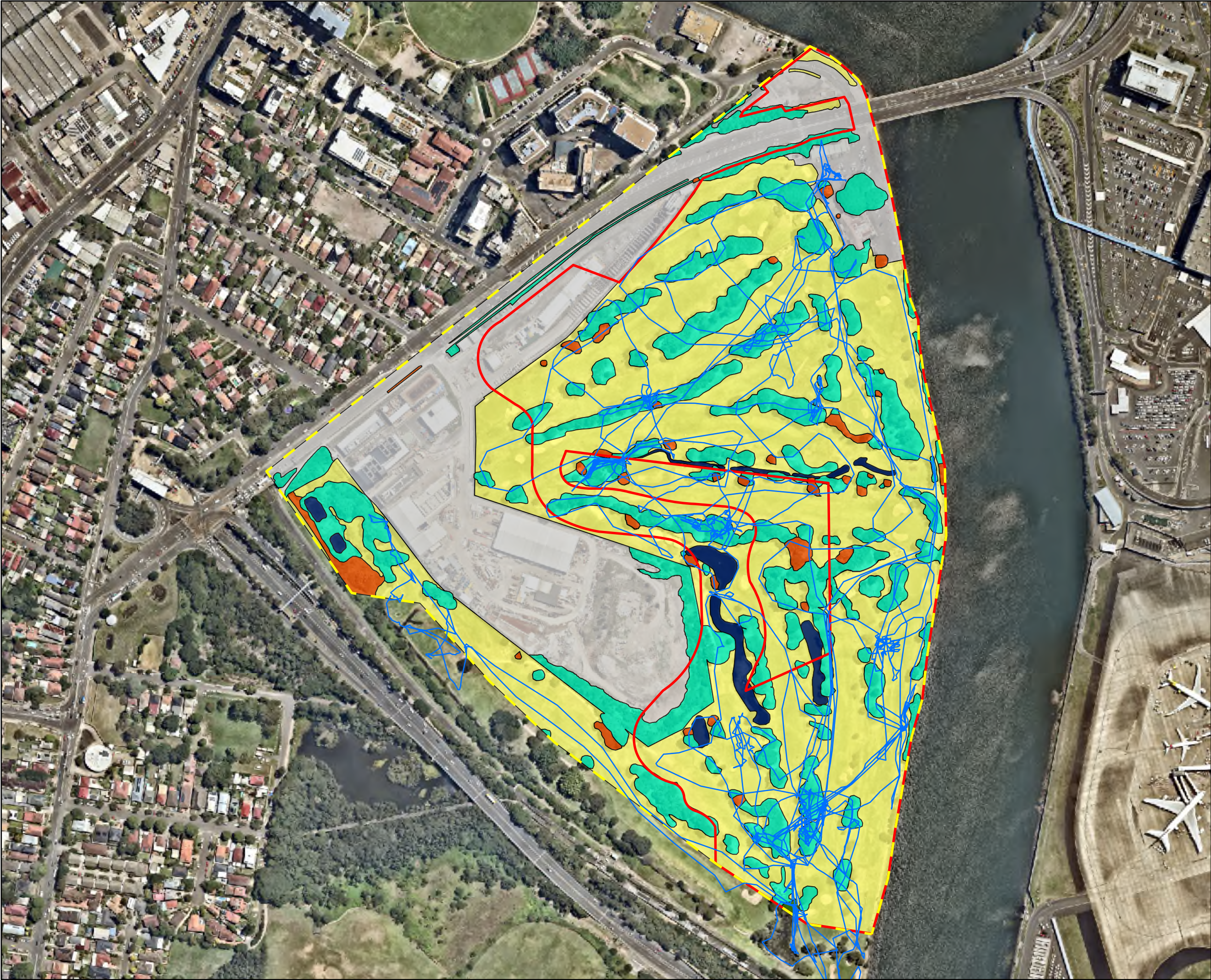
LEGEND

- Subject Land
- Study Area
- BAM Plots
- Field Survey Tracks - July 2025
- Plant Community Type**
 - PCT 4091 Grey Mangrove-River Mangrove Forest
 - PCT 4097 Samphire Saltmarsh
- Other Map Unit**
 - Planted Native Vegetation
 - Exotic Vegetation
 - Lawns and other Exotic Grassland
 - Waterbodies and Aquatic Vegetation
 - Cleared Land

Image Source: Nearmap (2026) Dated: 27/01/2027
DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

0 65 130 m
Coordinate System: GDA 1994 MGA Zone 56
Scale: 1:3,583 at A3
Project Number: 610.032932.00001 R01
Date Drawn: 12-May-2026
Drawn by: MD





KOGARAH GOLF CLUB

FAUNA SURVEY LOCATIONS –
HABITAT ASSESSMENT AND NEST
SEARCHES

FIGURE 6

- LEGEND**
- Subject Land
 - Study Area
 - Field Survey Tracks - July 2025
- Plant Community Type**
- PCT 4091 Grey Mangrove-River Mangrove Forest
 - PCT 4097 Samphire Saltmarsh
- Other Map Unit**
- Planted Native Vegetation
 - Exotic Vegetation
 - Lawns and other Exotic Grassland
 - Waterbodies and Aquatic Vegetation
 - Cleared Land

Image Source: Nearmap (2026) Dated: 27/01/2027
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0 65 130 m

Coordinate System: GDA 1994 MGA Zone 56

Scale: 1:3,583 at A3

Project Number: 610.032932.00001 R01

Date Drawn: 12-May-2026

Drawn by: MD





FIGURE 7

- LEGEND**
- Subject Land
 - Study Area
 - Plant Community Type**
 - PCT 4091 Grey Mangrove-River Mangrove Forest
 - PCT 4097 Samphire Saltmarsh
 - Other Map Unit**
 - Planted Native Vegetation
 - Exotic Vegetation
 - Lawns and other Exotic Grassland
 - Waterbodies and Aquatic Vegetation
 - Cleared Land
 - Field Survey Tracks**
 - December 2025
 - November 2025
 - Fauna Survey**
 - Call Playback
 - Diurnal Bird Census
 - Bat Detector

Image Source: Nearmap (2026) Dated: 27/01/2027
DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

0 65 130 m
Coordinate System: GDA 1994 MGA Zone 56
Scale: 1:3,583 at A3
Project Number: 610.032932.00001 R01
Date Drawn: 12-May-2026
Drawn by: MD



FIGURE 8

- LEGEND**
- Subject Land
 - Study Area
 - Native Vegetation
 - Exotic Vegetation

Image Source: Nearmap (2026) Dated: 27/01/2027
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Coordinate System: GDA 1994 MGA Zone 56

Scale: 1:3,583 at A3

Project Number: 610.032932.00001 R01

Date Drawn: 12-May-2026

Drawn by: MD



FIGURE 9

LEGEND

- Subject Land
- Study Area
- Plant Community Type**
 - PCT 4091 Grey Mangrove-River Mangrove Forest
 - PCT 4097 Samphire Saltmarsh
- Other Map Unit**
 - Planted Native Vegetation
 - Exotic Vegetation
 - Lawns and other Exotic Grassland
 - Waterbodies and Aquatic Vegetation
 - Cleared Land

Image Source: Nearmap (2026) Dated: 27/01/2027
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0 65 130 m

Coordinate System: GDA 1994 MGA Zone 56

Scale: 1:3,583 at A3

Project Number: 610.032932.00001 R01

Date Drawn: 12-May-2026

Drawn by: MD

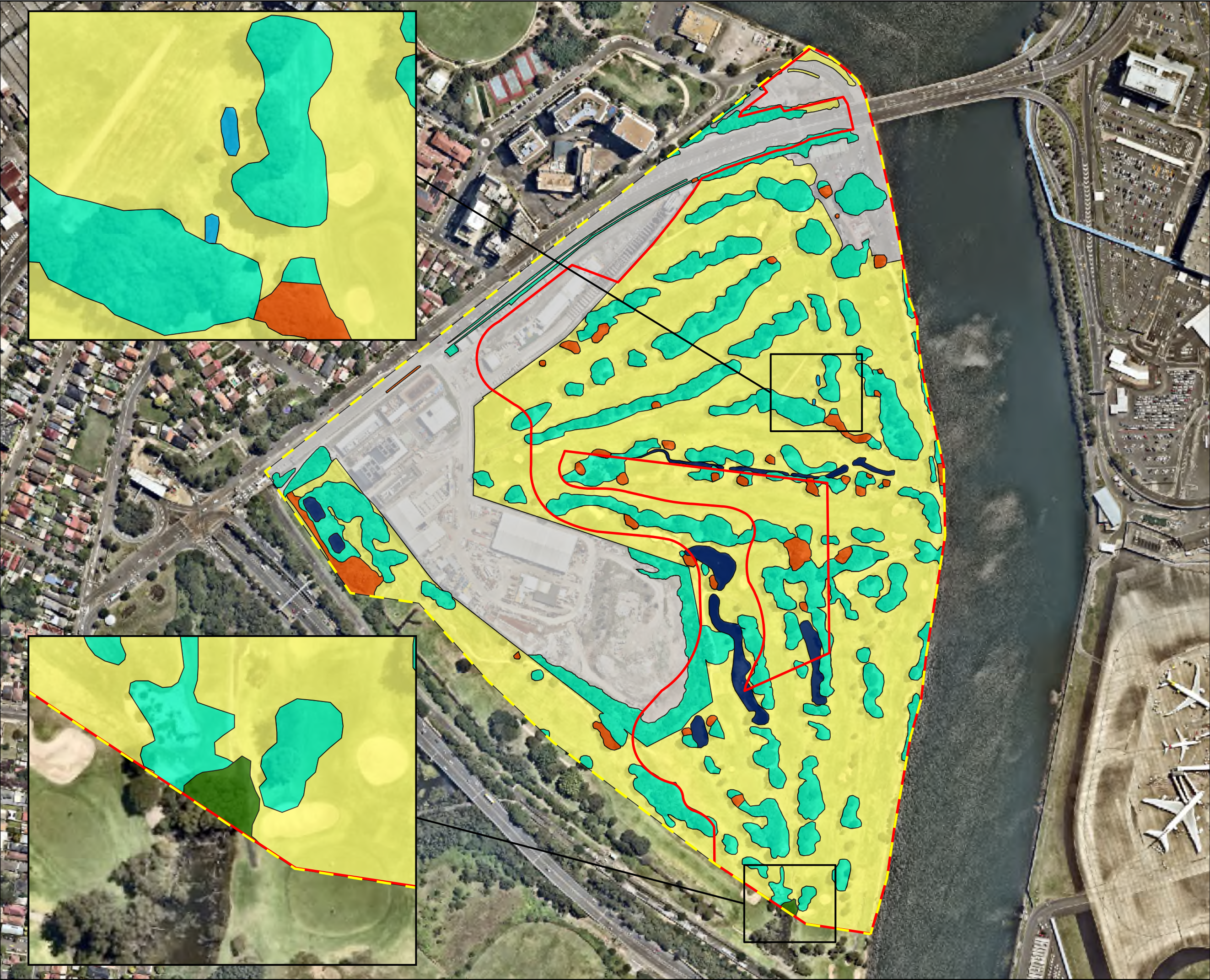




FIGURE 10

LEGEND

Subject Land

Study Area

Threatened Ecological Community

Coastal Saltmarsh in the New South Wales North

Coast, Sydney Basin and South East Corner Bioregions

Image Source: Nearmap (2026) Dated: 27/01/2027
DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

 0 65 130 m

Coordinate System: GDA 1994 MGA Zone 56

Scale: 1:3,583 at A3

Project Number: 610.032932.00001 R01

Date Drawn: 12-May-2026

Drawn by: MD



FIGURE 11

- LEGEND**
- Subject Land
 - Study Area
 - Vegetation Zone**
 - 4091_Moderate
 - 4097_Degraded

Image Source: Nearmap (2026) Dated: 27/01/2027
DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

	0	65	130
m			
Coordinate System:	GDA 1994 MGA Zone 56		
Scale:	1:3,583 at A3		
Project Number:	610.032932.00001 R01		
Date Drawn:	12-May-2026		
Drawn by:	MD		



FIGURE 12

LEGEND

- Subject Land
- Study Area

Threatened Species

- Green and Golden Bell Fro
- Large Bent-winged Bat
- Little Bent-winged Bat

Image Source: Nearmap (2026) Dated: 27/01/2027
DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

0	65	130
m		
Coordinate System:	GDA 1994 MGA Zone 56	
Scale:	1:3,583 at A3	
Project Number:	610.032932.00001 R01	
Date Drawn:	12-May-2026	
Drawn by:	MD	



FIGURE 13

- LEGEND**
- Subject Land
 - Study Area
 - Aquatic Habitat
 - Aquatic Habitat Buffer (200m)
 - Species Polygon**
 - Green and golden bell frog
 - Vegetation Zone**
 - 4091_Moderate
 - 4097_Degraded
 - Threatened Species**
 - Green and Golden Bell Frog

Image Source: Nearmap (2026) Dated: 27/01/2027
DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

0 65 130 m

Coordinate System: GDA 1994 MGA Zone 56

Scale: 1:3,583 at A3

Project Number: 610.032932.00001 R01

Date Drawn: 12-May-2026

Drawn by: MD

FIGURE 14. COMPARISON OF THE DEVELOPMENT FOOTPRINT FROM THE 2006 STAGE 1 DA AND THE 2023 PLANNING PROPOSAL

KOGARAH GOLF CLUB

2006 Development Footprint



2023 Development Footprint





FIGURE 15

- LEGEND**
- Subject Land
 - Study Area
 - Human Made Structures
 - Habitat Connectivity
 - Non-native Vegetation**
 - Exotic Vegetation
 - Lawns and other Exotic Grassland
 - Hydrology**
 - Waterbodies and Aquatic Vegetation

Image Source: Nearmap (2026) Dated: 27/01/2025
DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

0 105 210 m

Coordinate System: GDA 1994 MGA Zone 56

Scale: 1:5,663 at A3

Project Number: 610.032932.00001 R01

Date Drawn: 12-May-2026

Drawn by: MD

THRESHOLDS FOR ASSESSING
AND OFFSETTING IMPACTS

FIGURE 16

- LEGEND**
- Subject Land
 - Study Area
 - Vegetation Zone**
 - 4091_Moderate
 - 4097_Degraded
 - Green and golden bell frog
 - Impacts that do not require an offset**
 - Planted Native Vegetation
 - Impacts that do not require further assessment**
 - Exotic Vegetation
 - Lawns and other Exotic Grassland
 - Waterbodies and Aquatic Vegetation
 - Cleared Land

Image Source: Nearmap (2026) Dated: 27/01/2027
DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

0 65 130 m

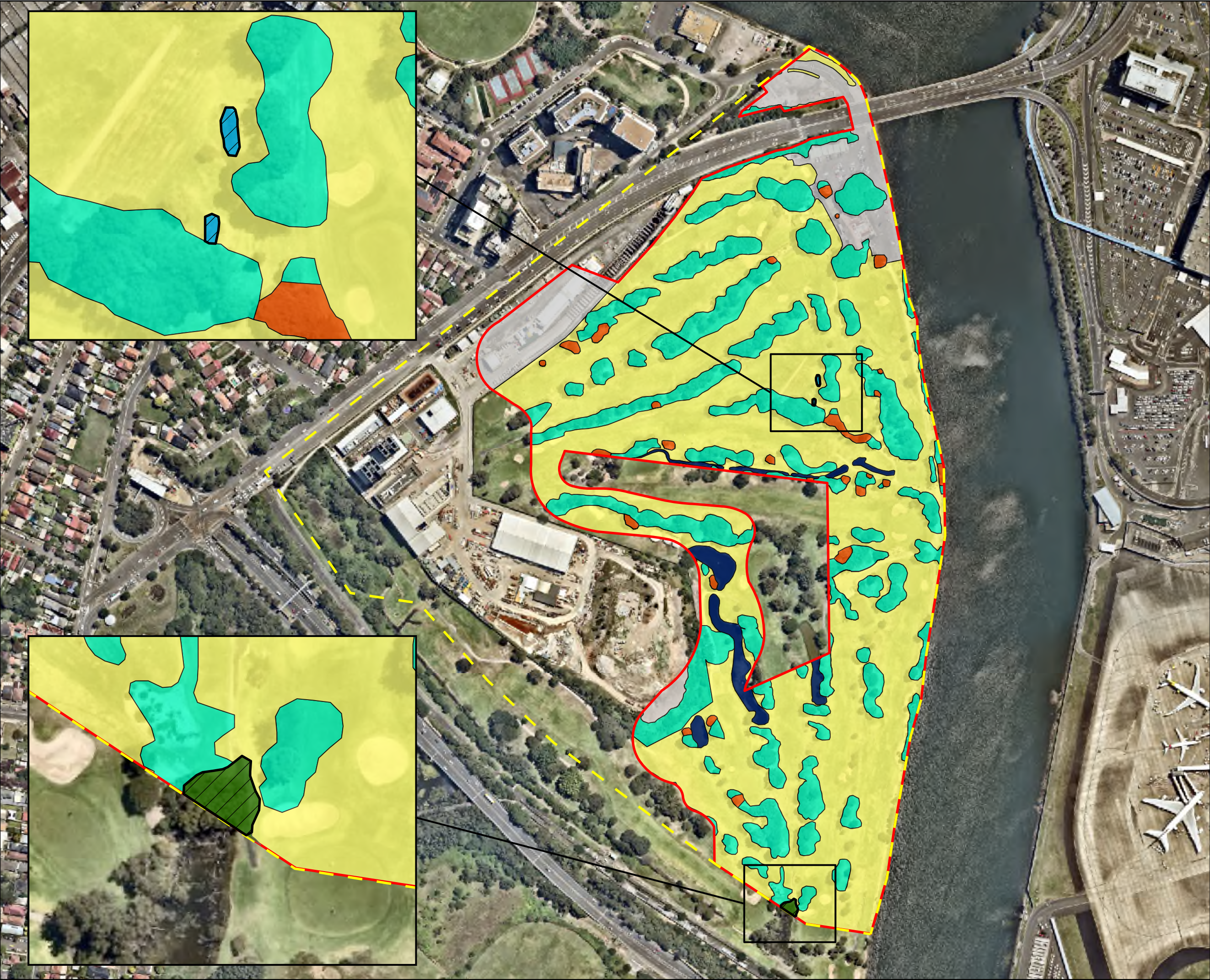
Coordinate System: GDA 1994 MGA Zone 56

Scale: 1:3,583 at A3

Project Number: 610.032932.00001 R01

Date Drawn: 12-May-2026

Drawn by: MD



14.0 Closure

This BDAR has been prepared to assess the impacts of the project on biodiversity values, in accordance with the BAM 2020. The project involves the redevelopment of the Kogarah Golf Club located in order to create a world-class precinct that leverages the projects strategic location adjacent to Sydney Airport and strong transport connections by delivering multi-level logistics development, trade-related enterprise and supporting uses with publicly accessible open space.

Historic construction and operation of the golf course has entailed complete removal of native vegetation and the creation of an artificial parkland landscape where low growing grasses are mown right up to groves of trees planted between the fairways. While some very small areas of native vegetation are present these are considered to have regenerated within previously disturbed areas of the golf course.

Impacts of the project are predominantly on planted native vegetation with only a couple of very small areas of native PCTs to be impacted. Nevertheless, the removal of native vegetation that confirms to PCT 4091 and PCT 4097 will require offsetting in the form of ecosystem credits. This assessment indicates that a total of two ecosystem credits are required, one for PCT 4091 and one for PCT 4097.

No species credit flora species have been recorded within the subject land and none are considered likely to occur. However one species credit fauna species, namely the Green and Golden Bell Frog is known to occur and will require offsetting in the form of species credits. This assessment indicates that a total of two species credits for the Green and Golden Bell Frog that the loss of 0.03 ha of suitable habitat (0.01 ha of PCT 4091 and 0.02 ha PCT 4097).

Further impacts of the project have been considered that may entail potential indirect impacts, including inadvertent impacts on adjacent habitat and reduced viability of adjacent habitat due to noise, dust or light spill, and prescribed impacts such as impacts to non-native vegetation and waterbodies that provide habitat for the Green and Golden Bell Frog.

A suite of mitigation measures are proposed to minimise and manage the impacts to biodiversity values, such as delineation of clearing areas, weed management, pre-clearance surveys, clearance supervision, frog proof fencing and sediment management. Extensive plantings of native vegetation are also proposed within the subject land, which will adequately mitigate the impacts of the project in the longer term. Compensatory measures are also proposed which include a monetary contribution to Council as set out in the approved VPA with Council for the embellishment and ongoing maintenance of habitat for the Green and Golden Bell Frog within Pemulwuy Park.

Under the current regime, there is no strategic management of flora and fauna for conservation purposes. There is no monitoring or active management and no strategy to maintain or improve biodiversity. As part of the project, the flora and fauna of the subject land will become the focus of management and will be actively managed to improve habitat for native species. A number of management plans will be implemented to ensure the long-term management of biodiversity within the subject land and wider study area.



With the implementation of the avoidance and mitigation measures proposed, the impacts of the project are considered to be minimal and can be appropriately managed and mitigated, whilst it is expected that the project will result in a positive biodiversity outcome in the longer term.

Yours sincerely

SLR Consulting Australia Pty Ltd

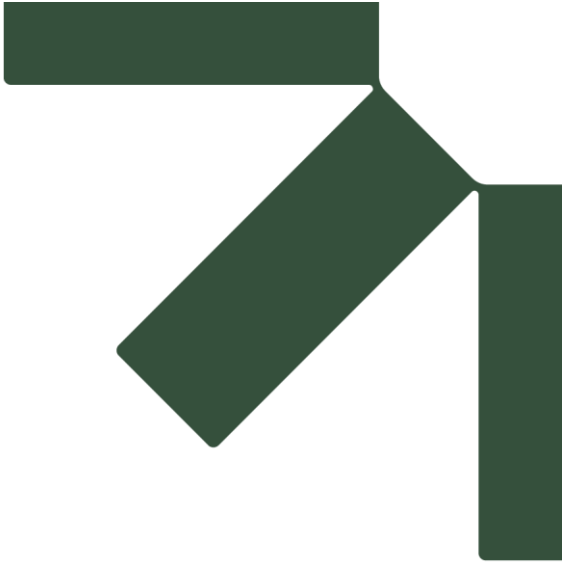


Matthew Freeman, BNatSc.
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Cecilia Eriksson Pinatacan, MSc.
Principal Ecologist – Ecology & Biodiversity





Appendix A BDAR requirements compliance

Biodiversity Development Assessment Report

Kogarah Golf Club Redevelopment
13-19A Marsh Street, Arncliffe

Stockland Development Pty Limited

SLR Project No.: 610.032932.00001

12 May 2026

Table A-1: Compliance of introduction chapter with BDAR minimum information requirements (BAM reference: Chapters 2 and 3)

Information Type	BAM requirement	Section in BDAR
Information	Introduction to the biodiversity assessment including:	1.0
	☐ brief description of the proposal	1.1.1, 1.1.4
	☐ identification of subject land boundary, including: ☐ operational footprint ☐ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure	1.1.5
	☐ general description of the subject land	1.1.2, 1.1.3, 1.1.5
	☐ sources of information used in the assessment, including reports and spatial data	1.5
	☐ identification and justification for entering the BOS	1.2
Maps and Table	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	Figure 1

Table A-2: Compliance of landscape chapter with BDAR minimum information requirements (BAM reference: Sections 3.1 and 3.2, Appendix E)

Information Type	BAM requirement	Section in BDAR
Information	Identification of site context components and landscape features, including:	–
	☐ general description of subject land topographic and hydrological setting, geology and soils	1.1.6
	☐ per cent native vegetation cover in the assessment area (as described in BAM Section 3.2)	2.1.2
	☐ IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))	3.2.1
	☐ rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E)	3.2.2
	☐ wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.))	3.2.2



Information Type	BAM requirement	Section in BDAR
	☐ connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))	3.2.3
	☐ karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(12.))	3.2.4
	☐ areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.))	3.2.5
	☐ any additional landscape features identified in any SEARs for the proposal	1.1.1.1
	☐ NSW (Mitchell) landscape on which the subject land occurs	3.2.6
	☐ details of field reconnaissance undertaken to confirm the extent and condition of landscape features and native vegetation cover (as described in Operational Manual Stage 1 Section 2.4)	2.1
Maps and tables	☐ Site Map ☐ Property boundary ☐ Boundary of subject land ☐ Cadastre of subject land (including labelling of Lot and DP or section plan if relevant) ☐ Landscape features identified in BAM Subsection 3.1.3	Figure 1
	☐ Location Map ☐ Digital aerial photography at 1:1,000 scale or finer ☐ Boundary of subject land ☐ Assessment area (i.e. the subject land and either 1500 m buffer area or 500 m buffer for linear development) ☐ Landscape features identified in BAM Subsection 3.1.3 ☐ Additional detail (e.g. local government area boundaries) relevant at this scale	Figure 2
	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 ☐ karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features ☐ areas of outstanding biodiversity value occurring on the subject land and assessment area	Figure 1, Figure 2



Information Type	BAM requirement	Section in BDAR
	☐ any additional landscape features identified in any SEARs for the proposal ☐ NSW (Mitchell) landscape on which the subject land occurs	
Data	☐ All report maps as separate jpeg files	-
	Individual digital shape files of:	-
	☐ subject land boundary	-
	☐ assessment area (i.e. subject land and 1500 m buffer area) boundary	-
	☐ cadastral boundary of subject land	-
	☐ areas of native vegetation cover	-
	☐ landscape features	-

Table A-3: Compliance of native vegetation chapter with BDAR minimum information requirements (BAM reference: Chapter 4, Appendix A and Appendix H)

Information Type	BAM requirement	Section in BDAR
Information	☐ Identify native vegetation extent within the subject land, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery (as described in BAM Section 4.1(1-3.) and Subsection 4.1.1)	4.1 and Figure 8
	☐ Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM Subsection 4.1.2)	4.1.1
	☐ Review of existing information on native vegetation including references to previous vegetation maps of the subject land and assessment area (described in BAM Section 4.1(3.) and Subsection 4.1.1)	2.2.2
	☐ Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	2.2.3
	☐ Where relevant, describe the use of more appropriate local data, provide reasons that support the use of more appropriate local data and include the written confirmation from the decision-maker that they support the use of more appropriate local data (as described in BAM Subsection 1.4.2 and Appendix A)	-
	For each PCT within the subject land, describe:	-
	☐ PCT name and ID	4.1 and Figure 9



Information Type	BAM requirement	Section in BDAR
	☐ vegetation class	4.2
	☐ extent (ha) within subject land	4.2
	☐ evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.))	4.2
	☐ plant species relied upon for identification of the PCT and relative abundance of each species	4.2
	☐ if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.))	4.2 and Figure 10
	☐ estimate of per cent cleared value of PCT (BAM Subsection 4.2.1(5.))	4.2
	Describe the vegetation integrity assessment of the subject land, including:	–
	☐ identification and mapping of vegetation zones (as described in BAM Subsection 4.3.1)	4.5 and Figure 11
	☐ description of vegetation zones within the subject land (as described in Operational Manual Stage 1 Table 2 and Subsection 3.3.2)	4.5 and Figure 11
	☐ area (ha) of each vegetation zone	4.5
	☐ assessment of patch size (as described in BAM Subsection 4.3.2)	4.5
	☐ survey effort (i.e. number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1–2.)	4.6.1
	☐ use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.))	4.6.3
	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):	4.6.3
	☐ 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)	4.6.3
	☐ provide justification for use of local data rather than BioNet Vegetation Classification benchmark values	4.6.3



Information Type	BAM requirement	Section in BDAR
	☐ provide written confirmation from the decision-maker that they support the use of local benchmark data	-
Maps and tables	☐ Map of native vegetation extent within the subject land at scale not greater than 1:10,000 including identification of all areas of native vegetation including areas that are ground cover only, cleared areas (as described in BAM Section 4.1(1–3.)) and all parts of the subject land that do not contain native vegetation (BAM Subsection 4.1.2)	Figure 8
	☐ Map of PCTs within the subject land (as described in BAM Section 4.2(1.))	Figure 9 Insert Figure 9
	☐ Map of vegetation zones within the subject land (as described in BAM Subsection 4.3.1)	Figure 11
	☐ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries	Figure 5
	☐ Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)	Figure 10 and Table 14
	☐ Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM Subsection 4.3.2)	Figure 2 and Table 15
	Table of current vegetation integrity scores for each vegetation zone within the site and including: ☐ composition condition score ☐ structure condition score ☐ function condition score ☐ presence of hollow bearing trees	Table 16
Data	☐ All report maps as separate jpeg files	-
	☐ Plot field data (MS Excel format)	Appendix B
	☐ Plot field datasheets	-
	Digital shape files of:	-
	☐ PCT boundaries within subject land	-
	☐ TEC boundaries within subject land	-
	☐ vegetation zone boundaries within subject land	-
	☐ floristic vegetation survey and vegetation integrity plot locations	-



Table A-4: Compliance of threatened species chapter with BDAR minimum information requirements (BAM reference: Chapter 5)

Information Type	BAM requirement	Section in BDAR
Information	Identify ecosystem credit species likely to occur on the subject land, including:	-
	☐ list of ecosystem credit species derived from the BAM-C (as described in BAM Subsection 5.1.1 and Section 5.2(1.))	Table 17
	☐ justification and supporting evidence for exclusion of any ecosystem credit species based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	5.1.1
	☐ justification for addition of any ecosystem credit species to the list	5.1.1
	Identify species credit species likely to occur on the subject land, including:	-
	☐ list of species credit species derived from the BAM-C (as described in BAM Subsection 5.1.1)	Table 18 and Table 19
	☐ justification and supporting evidence for exclusions based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	5.1.2
	☐ justification and supporting evidence for exclusions based on degraded habitat constraints and/or microhabitats on which the species depends (as described in BAM Subsection 5.2.2)	5.1.2
	☐ justification for addition of any species credit species to the list	5.1.2
	From the list of candidate species credit species, identify:	Table 20
	☐ species assumed present within the subject land (if relevant) (as described in BAM Subsection 5.2.4(2.a.))	Table 20
	☐ species present within the subject land on the basis of being identified on an important habitat map for a species (as described in BAM Subsection 5.2.4(2.d.))	
	☐ species for which targeted surveys are to be completed to determine species presence (BAM Subsection 5.2.4(2.b.))	
	☐ species for which an expert report is to be used to determine species presence (BAM Subsection 5.2.4(2.c.))	
	Present the outcomes of species credit species assessments from:	-
	☐ threatened species survey (as described in BAM Section 5.2.4)	Table 4 and Table 21



Information Type	BAM requirement	Section in BDAR
	☐ expert reports (if relevant) including justification for presence of the species and information used to make this determination (as described in BAM Subsection 5.2.4, Section 5.3, Box 3)	5.4
	Where survey has been undertaken include detailed information on:	-
	☐ survey method and effort (as described in BAM Section 5.3)	Table 4 and Table 21
	☐ justification of survey method and effort (e.g. citation of peer-reviewed literature) if approach differs from the department's taxa-specific survey guides or where no relevant guideline has been published	5.3
	☐ timing of survey in relation to requirements in the TBDC or the department's taxa-specific survey guides. Where survey was undertaken outside these guides include justification for the timing of surveys	Table 4 and Table 21
	☐ survey personnel and relevant experience	Declaration ii
	☐ describe any limitations to surveys and how these were addressed/overcome	5.3
	Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include:	-
	☐ justification of the use of an expert report	5.5
	☐ identify the expert, provide evidence of their expert credentials and departmental approval of expert status	
	☐ all requirements of Box 3 have been addressed in the expert report	
	Where use of local data is proposed (BAM Subsection 1.4.2):	-
	☐ identify relevant species	5.6
	☐ identify data to be amended	
	☐ identify source of information for local data, e.g. published literature, additional survey data, etc.	
	☐ justify use of local data in preference to VIS Classification or TBDC data	
	☐ provide written confirmation from the decision-maker that they support the use of local data	-
	Species polygon completed for species credit species present within the subject land (assumed present or determined on the basis of survey, expert report or important habitat map) ensuring that:	-
	☐ the unit of measure for each species is documented	Table 22
	for species assessed by area:	-



Information Type	BAM requirement	Section in BDAR
	☐ the polygon includes the extent of suitable habitat for the target species within the subject land (as described in BAM Subsection 5.2.5)	Figure 13
	☐ a description of, and evidence-based justification for, the habitat constraints, features or microhabitats used to map the species polygon including reference to information in the TBDC for that species and any buffers applied	5.7
	for species assessed by counts of individuals:	-
	☐ the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(3.))	-
	☐ the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken	-
	☐ the polygon includes all individuals located on the subject land with a buffer of 30 m around the individuals or groups of individuals on the subject land	Figure 13
	☐ Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4)	Table 22
Maps and tables	☐ Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1, and identifying:	-
	☐ the ecosystem credit species removed from the list	Table 17
	☐ the sensitivity to gain class of each species	Table 17
	☐ Table detailing species credit species in accordance with BAM Section 5.2 and identifying:	Table 18 and Table 19
	☐ the species credit species removed from the list of species because the species is considered vagrant, out of geographic range or the habitat or microhabitat features are not present	Table 18 and Table 19
	☐ the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	Table 20
	☐ Table detailing species credit species recorded or assumed as present within the subject land, habitat constraints or microhabitats associated with the species, counts of individuals (flora)/extent of suitable habitat (flora and fauna) (as described in BAM Subsection 5.2.6) and biodiversity risk weighting (BAM Section 5.4)	Table 20 and Table 22
	☐ Map indicating the GPS coordinates of all individuals of each species recorded within the subject land and the species polygon for each species (as described in BAM Subsection 5.2.5)	Figure 12



Information Type	BAM requirement	Section in BDAR
Data	☐ Digital shape files of suitable habitat identified for survey for each candidate species credit species	-
	☐ Survey locations including GPS coordinates of any plots, transects, grids	-
	☐ Digital shape files of each species polygon including GPS coordinates of located individuals	-
	☐ Species polygon map in jpeg format	-
	☐ Expert reports and any supporting data used to support conclusions of the expert report	-
	☐ Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc.	-



Table A-5: Compliance of prescribed Impacts chapter with BDAR minimum information requirements (BAM reference: Chapter 6)

Information Type	BAM requirement	Section in BDAR
Information	Identify potential prescribed biodiversity impacts on threatened entities, including:	-
	☐ karst, caves, crevices, cliffs, rocks and other geological features of significance (as described in BAM Subsection 6.1.1)	Table 23
	☐ occurrences of human-made structures and non-native vegetation (as described in BAM Subsection 6.1.2)	
	☐ corridors or other areas of connectivity linking habitat for threatened entities (as described in BAM Subsection 6.1.3)	
	☐ waterbodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4)	
	☐ protected animals that may use the proposed wind farm development site as a flyway or migration route (as described in BAM Subsection 6.1.5)	-
	☐ where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community (as described in BAM Subsection 6.1.6)	Table 23
	☐ Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts	Table 23
	☐ Describe the importance of habitat features to the species including, where relevant, impacts on life cycle or movement patterns (e.g. Subsection 6.1.3)	6.0
	Where the proposed development is for a wind farm:	-
	☐ identify a candidate list of protected animals that may use the development site as a flyway or migration route, including: resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the proposal area (as described in BAM Subsection 6.1.5)	-
	☐ provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.)	-
	☐ predict the habitual flight paths for nomadic and migratory species likely to fly over the subject land and map the likely habitat for resident threatened aerial and raptor species (BAM Subsection 6.1.5(4.))	-
	Where the proposal may result in vehicle strike:	-
	☐ identify a list of threatened fauna or protected fauna species that are part of a TEC and at risk of vehicle strike due to the proposal	Table 23



Information Type	BAM requirement	Section in BDAR
Maps and tables	☐ Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)	Figure 15
	☐ Map showing location of potential vehicle strike locations	-
	☐ Maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site (for wind farm developments only)	-
Data	☐ Digital shape files of prescribed impact feature locations	-
	☐ Prescribed impact features map in jpeg format	-

Table A-6: Compliance of avoid and minimise impacts chapter with BDAR minimum information requirements (BAM reference: Chapter 7)

Information Type	BAM requirement	Section in BDAR
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	7.1.1 and 7.1.2
	☐ routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route	7.1.1 and 7.1.2
	☐ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location	7.1.1 and 7.1.2
	☐ 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	7.1.1 and 7.1.2
	☐ Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Sections 7.1 and 7.2)	7.1.1, 7.1.2 and 7.2
	☐ Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal (as described in BAM Subsection 7.2.1(3.))	7.0
	☐ Detail measures or options considered but not implemented because they are not feasible and/or practical (e.g. due to site constraints)	7.3



Information Type	BAM requirement	Section in BDAR
Maps and tables	☐ Table of measures to be implemented to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility	Table 28
	☐ Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final proposal footprint, including construction and operation	Figure 14
	☐ Maps demonstrating indirect impact zones where applicable	-
Data	Digital shape files of:	-
	☐ alternative and final proposal footprint	-
	☐ direct and indirect impact zones	-
	☐ Maps in jpeg format	-

Table A-7: Compliance of assessment of impacts chapter with BDAR minimum information requirements (BAM reference: Chapter 8, Sections 8.1 and 8.2)

Information Type	BAM requirement	Section in BDAR
Information	☐ Determine the impacts on native vegetation and threatened species habitat, including a description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species habitat (as described in BAM Section 8.1)	8.1 and Table 25
	Assessment of indirect impacts on vegetation and threatened species and their habitat including (as described in BAM Section 8.2):	-
	☐ description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal	8.2 and Table 26
	☐ documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications	8.2
	☐ reporting any limitations or assumptions, etc. made during the assessment	8.2
	☐ identification of the threatened entities and their habitat likely to be affected	8.4 Error! Not a valid result for table.
	Assessment of prescribed biodiversity impacts (as described in BAM Section 8.3) including:	-
	assessment of the nature, extent frequency , duration and timing of impacts on the habitat of threatened species or ecological communities associated with:	-



Information Type	BAM requirement	Section in BDAR
	☐ karst, caves, crevices, cliffs, rocks and other features of geological significance	-
	☐ human-made structures	8.3.1
	☐ non-native vegetation	8.3.2
	☐ connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	8.3.3
	☐ movement of threatened species that maintains their life cycle	8.3.3
	☐ water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities	8.3.4
	☐ assessment of the impacts of wind turbine strikes on protected animals	-
	☐ assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	8.3.5
	☐ evaluate the consequences of prescribed impacts	8.3
	☐ describe impacts that are uncertain	8.3
	☐ document limitations to data, assumptions and predictions	8.3
Maps and tables	☐ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	Table 27
Data	N/A	-

Table A-8: Compliance of mitigation and management of impacts chapter with BDAR minimum information requirements (BAM reference: Chapter 8, Sections 8.4 and 8.5)

Information Type	BAM requirement	Section in BDAR
Information	Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Sections 8.4 and 8.5 including:	-
	☐ techniques, timing, frequency and responsibility	Table 29
	☐ identify measures for which there is risk of failure	
	☐ evaluate the risk and consequence of any residual impacts	
	☐ document any adaptive management strategy proposed	Error! Reference source not found.



Information Type	BAM requirement	Section in BDAR
	Identification of measures for mitigating impacts related to:	-
	☐ displacement of resident fauna (as described in BAM Subsection 8.4.1(2.))	Error! Reference source not found.
	☐ 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)	Error! Reference source not found.
Maps and tables	☐ 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	Table 30
Data	N/A	

Table A-9: Compliance of impact summary chapter with BDAR minimum information requirements (BAM reference: Chapter 9)

Information Type	BAM requirement	Section in BDAR
Information	Identification and assessment of impacts on TECs and threatened species that are at risk of a serious and irreversible impacts (SAIL, in accordance with BAM Section 9.1) including:	-
	☐ addressing all criteria in Subsection 9.1.1 for each TEC listed as at risk of an SAIL present on the subject land	-
	☐ for each TEC, report the extent of the TEC in NSW	Table 31
	☐ addressing all criteria in Subsection 9.1.2 for each threatened species at risk of an SAIL present on the subject land	-
	☐ for each threatened species, report the population size in NSW	-
	☐ documenting assumptions made and/or limitations to information	-
	☐ documenting all sources of data, information, references used or consulted	
	☐ clearly justifying why any criteria could not be addressed	
	☐ Identification of impacts requiring offset in accordance with BAM Section 9.2	Table 31, Table 32



Information Type	BAM requirement	Section in BDAR
		and Table 33
	☐ Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.)	Table 34
	☐ Identification of areas not requiring assessment in accordance with BAM Section 9.3	Table 34
Maps and tables	☐ Map showing the extent of TECs at risk of an SAIL within the subject land	-
	☐ Map showing location of threatened species at risk of an SAIL within the subject land	-
	Map showing location of:	-
	☐ impacts requiring offset	Figure 16
	☐ impacts not requiring offset	Figure 16
	☐ areas not requiring assessment	Figure 16
Data	Digital shape files of:	-
	☐ extent of TECs at risk of an SAIL within the subject land	-
	☐ location of threatened species at risk of an SAIL 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	-

Table A-10: Compliance of impact summary chapter with BDAR minimum information requirements (BAM reference: Chapter 10)

Information Type	BAM requirement	Section in BDAR
Information	Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:	-
	☐ future vegetation integrity score for each vegetation zone within the subject land (Equation 25 and Equation 26 in BAM Appendix H)	Table 31
	☐ change in vegetation integrity score (BAM Subsection 8.1.1)	
	☐ number of required ecosystem credits for the direct impacts of the proposal on each vegetation zone within the subject land (BAM Subsection 10.1.2)	

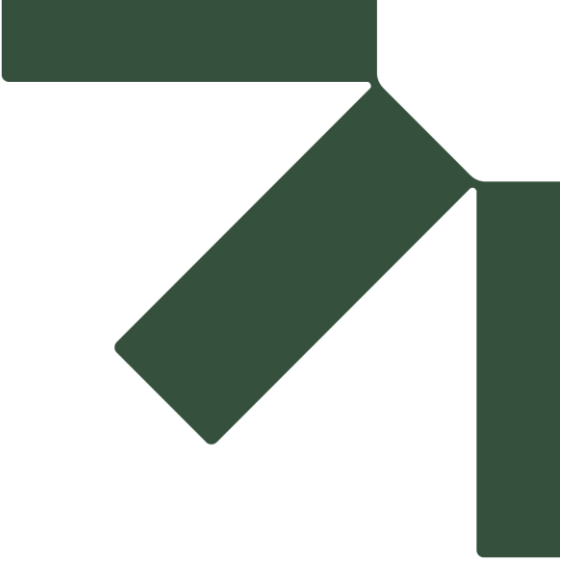


Information Type	BAM requirement	Section in BDAR
	☐ biodiversity risk weighting for each	Table 31 and Table 32
	☐ number of required species credits for each candidate threatened species that is directly impacted on by the proposal (BAM Subsection 10.1.3)	Table 32
Maps and tables	☐ Table of PCTs requiring offset and the number of ecosystem credits required	Table 31
	☐ Table of threatened species requiring offset and the number of species credits required	Table 32
Data	☐ Submitted proposal in the BAM Calculator	-

Table A-11: Compliance of biodiversity credit report chapter with BDAR minimum information requirements (BAM reference: Chapter 10)

Information Type	BAM requirement	Section in BDAR
Information	☐ Description of credit classes for ecosystem credits and species credits at the development or clearing site or land to be biodiversity certified (BAM Section 10.2)	Table 35 and Table 36
	☐ BAM credit report in pdf format	Appendix C
Maps and tables	☐ Table of credit class and matching credit profile	Table 36
Data	☐ BAM credit report in pdf format	Appendix C





Appendix B Vegetation survey data

Biodiversity Development Assessment Report

Kogarah Golf Club Redevelopment
13-19A Marsh Street, Arncliffe

Stockland Development Pty Limited

SLR Project No.: 610.032932.00001

12 May 2026

Table B-12: BAM Plot Data Summary

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
1	4091	0.02	100	moderate	1	2	1	3	0	0	35.0	2.5	1.0	2.1	0.0	0.0	0	0	0.0	0.0	1	1	0	0	0	0	10.2
2	4097	0.01	100	degraded	1	1	3	3	0	0	0.3	40.0	20.8	3.3	0.0	0.0	0	0	2.0	0.0	0	1	0	1	0	0	15.6
3	Planted Native	1	100	-	3	0	1	2	0	0	45.4	0.0	35.0	0.4	0.0	0.0	8	0	7.0	0.0	0	0	1	1	1	0	60.1
4	Planted Native	1	100	-	0	0	1	1	0	0	0.0	0.0	10.0	0.1	0.0	0.0	5	0	1.0	0.0	0	0	0	0	0	0	80.0
5	Planted Native	1	100	-	4	2	1	1	0	0	25.6	15.0	5.0	0.2	0.0	0.0	1	1	19.0	2.0	0	1	0	1	1	0	12.7
6	Exotic Grassland	1	100	-	0	0	0	1	0	0	0.0	0.0	0.0	0.2	0.0	0.0	0	0	2.0	0.0	0	0	0	0	0	0	97.0
7	Planted Native	1	100	-	1	0	1	1	0	0	35.0	0.0	20.0	0.1	0.0	0.0	2	1	41.0	0.0	0	0	1	1	1	0	65.2
8	Exotic Grassland	1	100	-	0	0	1	0	0	0	0.0	0.0	35.0	0.0	0.0	0.0	0	0	1.0	0.0	0	0	0	0	0	0	61.1
9	Planted Native	1	100	-	4	0	1	0	0	0	58.0	0.0	15.0	0.0	0.0	0.0	9	0	32.0	0.0	0	0	1	1	1	0	35.2

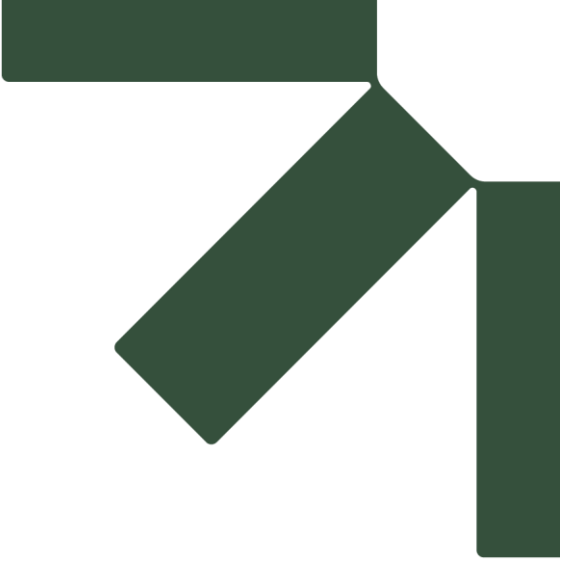


Table B-13: BAM Plot Data Summary

Scientific Name	Common Name	BAM Growth Form Group
<i>Agapanthus praecox</i> subsp. <i>orientalis</i>		n/a
<i>Apium prostratum</i>	Sea Celery	Forb (FG)
<i>Araujia sericifera</i>	Moth Vine	n/a
<i>Arctotheca calendula</i>	Capeweed	n/a
<i>Aster subulatus</i>	Wild Aster	n/a
<i>Atriplex prostrata</i>		n/a
<i>Avicennia marina</i> subsp. <i>australasica</i>	Grey Mangrove	Tree (TG)
<i>Bidens pilosa</i>	Cobbler's Pegs	n/a
<i>Bolboschoenus fluviatilis</i>	Marsh Club-rush	Grass & grasslike (GG)
<i>Brassica fruticulosa</i>	Twiggy Turnip	n/a
<i>Bromus catharticus</i>	Prairie Grass	n/a
<i>Capsella bursa-pastoris</i>	Shepherd's Purse	n/a
<i>Casuarina glauca</i>	Swamp Oak	Tree (TG)
<i>Celtis sinensis</i>	Japanese Hackberry	n/a
<i>Cenchrus clandestinus</i>	Kikuyu Grass	n/a
<i>Cenchrus setaceus</i>	Fountain Grass	n/a
<i>Cerastium glomeratum</i>	Mouse-ear Chickweed	n/a
<i>Cirsium vulgare</i>	Spear Thistle	n/a
<i>Clivia miniata</i>		n/a
<i>Commelina cyanea</i>	Native Wandering Jew	Forb (FG)
<i>Conyza bonariensis</i>	Flaxleaf Fleabane	n/a
<i>Conyza sumatrensis</i>	Tall fleabane	n/a
<i>Cotula australis</i>	Common Cotula	Forb (FG)
<i>Cotula coronopifolia</i>	Water Buttons	n/a
<i>Cupaniopsis anacardioides</i>	Tuckeroo	Tree (TG)
<i>Cynodon dactylon</i> var. <i>dactylon</i>	Common Couch	Grass & grasslike (GG)
<i>Dianella caerulea</i> var. <i>producta</i>		Forb (FG)
<i>Dietes grandiflora</i>		n/a
<i>Ehrharta erecta</i>	Panic Veldtgrass	n/a

Scientific Name	Common Name	BAM Growth Form Group
<i>Eucalyptus punctata</i>	Grey Gum	Tree (TG)
<i>Eucalyptus saligna</i>	Sydney Blue Gum	Tree (TG)
<i>Euphorbia prostrata</i>	Red Caustic Weed	n/a
<i>Ficus macrophylla</i>		Tree (TG)
<i>Galinsoga parviflora</i>	Potato Weed	n/a
<i>Gamochaeta americana</i>	Purple Cudweed	n/a
<i>Gamochaeta pensylvanica</i>	Cudweed	n/a
<i>Glochidion ferdinandi</i>	Cheese Tree	Tree (TG)
<i>Hydrocotyle sibthorpioides</i>		Forb (FG)
<i>Hypochaeris radicata</i>	Catsear	n/a
<i>Juncus acutus</i>	Sharp Rush	n/a
<i>Juncus kraussii</i> subsp. <i>australiensis</i>	Sea Rush	Grass & grasslike (GG)
<i>Lactuca saligna</i>	Willow-leaved Lettuce	n/a
<i>Lagunaria patersonia</i>	Norfolk Island Hibiscus	Tree (TG)
<i>Lepidium bonariense</i>	Argentine Peppergrass	n/a
<i>Lepidium didymum</i>	Lesser Swinecress	n/a
<i>Leptospermum laevigatum</i>	Coast Teatree	Shrub (SG)
<i>Lolium perenne</i>	Perennial Ryegrass	n/a
<i>Malva parviflora</i>	Small-flowered Mallow	n/a
<i>Medicago minima</i>	Woolly Burr Medic	n/a
<i>Medicago polymorpha</i>	Burr Medic	n/a
<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark	Tree (TG)
<i>Morus alba</i>	White Mulberry	n/a
<i>Ochna serrulata</i>	Mickey Mouse Plant	n/a
<i>Olea europaea</i> subsp. <i>europaea</i>	Olive	n/a
<i>Oxalis corniculata</i>	Creeping Oxalis	n/a
<i>Parietaria judaica</i>	Pellitory	n/a
<i>Paronychia brasiliensis</i>	Chilean Whitlow Wort, Brazilian Whitlow	n/a
<i>Poa annua</i>	Winter Grass	n/a
<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed	n/a
<i>Romulea rosea</i> var. <i>australis</i>	Onion Grass	n/a

Scientific Name	Common Name	BAM Growth Form Group
<i>Sarcocornia quinqueflora</i>		Shrub (SG)
<i>Senecio madagascariensis</i>	Fireweed	n/a
<i>Senna pendula</i> var. <i>glabrata</i>		n/a
<i>Solanum nigrum</i>	Black-berry Nightshade	n/a
<i>Soliva sessilis</i>	Bindyi	n/a
<i>Sonchus asper</i>	Prickly Sowthistle	n/a
<i>Sonchus oleraceus</i>	Common Sowthistle	n/a
<i>Sporobolus africanus</i>	Parramatta Grass	n/a
<i>Stellaria media</i>	Common Chickweed	n/a
<i>Stenotaphrum secundatum</i>	Buffalo Grass	n/a
<i>Suaeda australis</i>		Shrub (SG)
<i>Syzygium australe</i>	Brush Cherry	Shrub (SG)
<i>Taraxacum officinale</i>	Dandelion	n/a
<i>Trifolium repens</i>	White Clover	n/a
<i>Triglochin striata</i>	Streaked Arrowgrass	Forb (FG)
<i>Ulmus parvifolia</i>	Chinese Elm	n/a
<i>Veronica arvensis</i>	Wall Speedwell	n/a
<i>Vicia sativa</i>	Common vetch	n/a
<i>Waterhousea floribunda</i>	Weeping Lilly Pilly	Tree (TG)



Appendix C Credit reports

Biodiversity Development Assessment Report

Kogarah Golf Club Redevelopment
13-19A Marsh Street, Arncliffe

Stockland Development Pty Limited

SLR Project No.: 610.032932.00001

12 May 2026

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00061694/BAAS19019/25/00061695	Kogarah Golf Course Redevelopment	09/04/2026
Assessor Name	Report Created	BAM Data version *
Matthew Freeman	12/05/2026	Current classification (live - default) (94)
Assessor Number	BAM Case Status	Date Finalised
BAAS19019	Finalised	12/05/2026
Assessment Revision	BOS entry trigger	Assessment Type
0		Major Projects

* 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 SAI	Ecosystem credits

BAM Credit Summary Report

Grey Mangrove-River Mangrove Forest												
1	4091_moderate	Not a TEC	71.4	71.4	0.02	PCT Cleared - 53%	High Sensitivity to Gain			1.75		1
										Subtotal		1
Samphire Saltmarsh												
2	4097_degraded	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	83.3	83.3	0.01	Biodiversity Conservation Act listing status	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		1
										Subtotal		1
										Total		2

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 SAIL	Species credits

BAM Credit Summary Report

<i>Litoria aurea / Green and Golden Bell Frog (Fauna)</i>										
4091_moderate	71.4	71.4	0.02	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	False		1
4097_degraded	83.3	83.3	0.01	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Vulnerable	False		1
								Subtotal		2



BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00061694/BAAS19019/25/00061695	Kogarah Golf Course Redevelopment	09/04/2026
Assessor Name	Assessor Number	BAM Data version *
Matthew Freeman	BAAS19019	Current classification (live - default) (94)
Proponent Names	Report Created	BAM Case Status
	12/05/2026	Finalised
Assessment Revision	BOS entry trigger	Assessment Type
0		Major Projects
Date Finalised	* 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.	
12/05/2026		

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

Assessment Id	Proposal Name
00061694/BAAS19019/25/00061695	Kogarah Golf Course Redevelopment



BAM Biodiversity Credit Report (Like for like)

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT

No Changes

Predicted Threatened Species Not On Site

Name

Rostratula australis / Australian Painted Snipe

Lophochroa leadbeateri / Pink Cockatoo

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
4091-Grey Mangrove-River Mangrove Forest	Not a TEC	0.0	0	1	1
4097-Samphire Saltmarsh	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	0.0	0	1	1

BAM Biodiversity Credit Report (Like for like)

4091-Grey Mangrove-River Mangrove Forest	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Mangrove Swamps This includes PCT's: 4091	Mangrove Swamps >=50% and <70%	4091_moderate	No	1	Pittwater, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
4097-Samphire Saltmarsh	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 4040, 4094, 4095, 4096, 4097, 4101, 4102, 4103	-	4097_degraded	No	1	Pittwater, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

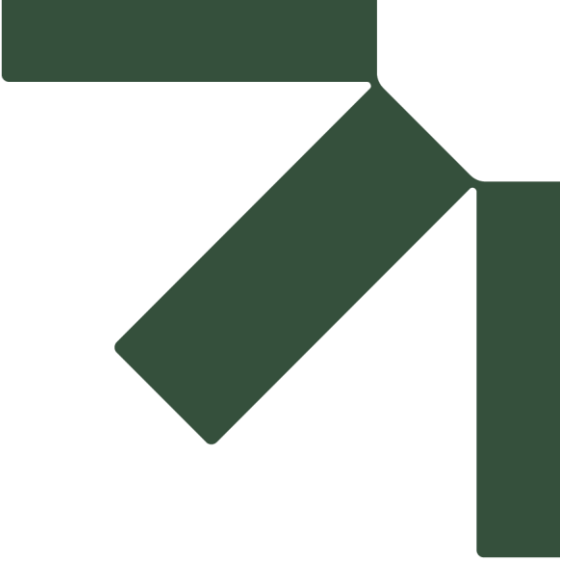
Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Litoria aurea / Green and Golden Bell Frog	4091_moderate, 4097_degraded	0.0	2.00

Credit Retirement Options

Like-for-like credit retirement options

Litoria aurea / Green and Golden Bell Frog	Spp	IBRA subregion
	Litoria aurea / Green and Golden Bell Frog	Any in NSW



Appendix D Fauna species recorded

Biodiversity Development Assessment Report

Kogarah Golf Club Redevelopment
13-19A Marsh Street, Arncliffe

Stockland Development Pty Limited

SLR Project No.: 610.032932.00001

12 May 2026

Table D-1 Fauna species recorded within the study area

Class	Scientific Name	Common name	BC Act Status	EPBC Act Status
Amphibia	<i>Limnodynastes peronii</i>	Spotted Marsh Frog	-	-
Amphibia	<i>Litoria aurea</i>	Green and Golden Bell Frog	E	V
Amphibia	<i>Litoria peronii</i>	Peron's Tree Frog	-	-
Aves	<i>Acridotheres tristis</i>	Common Myna	-	-
Aves	<i>Anas superciliosa</i>	Pacific Black Duck	-	-
Aves	<i>Anser sp.</i>	Settler Goose	-	-
Aves	<i>Anthochaera carunculata</i>	Red Wattlerbird	-	-
Aves	<i>Chenonetta jubata</i>	Australian Wood Duck	-	-
Aves	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	-	-
Aves	<i>Corvus coronoides</i>	Australian Raven	-	-
Aves	<i>Cracticus torquatus</i>	Grey Butcherbird	-	-
Aves	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	-	-
Aves	<i>Egretta novaehollandiae</i>	White-faced Heron	-	-
Aves	<i>Fulica atra</i>	Eurasian Coot	-	-
Aves	<i>Gallinula tenebrosa</i>	Dusky Moorhen	-	-
Aves	<i>Grallina cyanoleuca</i>	Magpie-lark	-	-
Aves	<i>Gymnorhina tibicen</i>	Australian Magpie	-	-
Aves	<i>Hirundo neoxena</i>	Welcome Swallow	-	-
Aves	<i>Malurus cyaneus</i>	Superb Fairy-wren	-	-
Aves	<i>Manorina melanocephala</i>	Noisy Miner	-	-
Aves	<i>Neochmia temporalis</i>	Red-browed Finch	-	-
Aves	<i>Ocyphaps lophotes</i>	Crested Pigeon	-	-

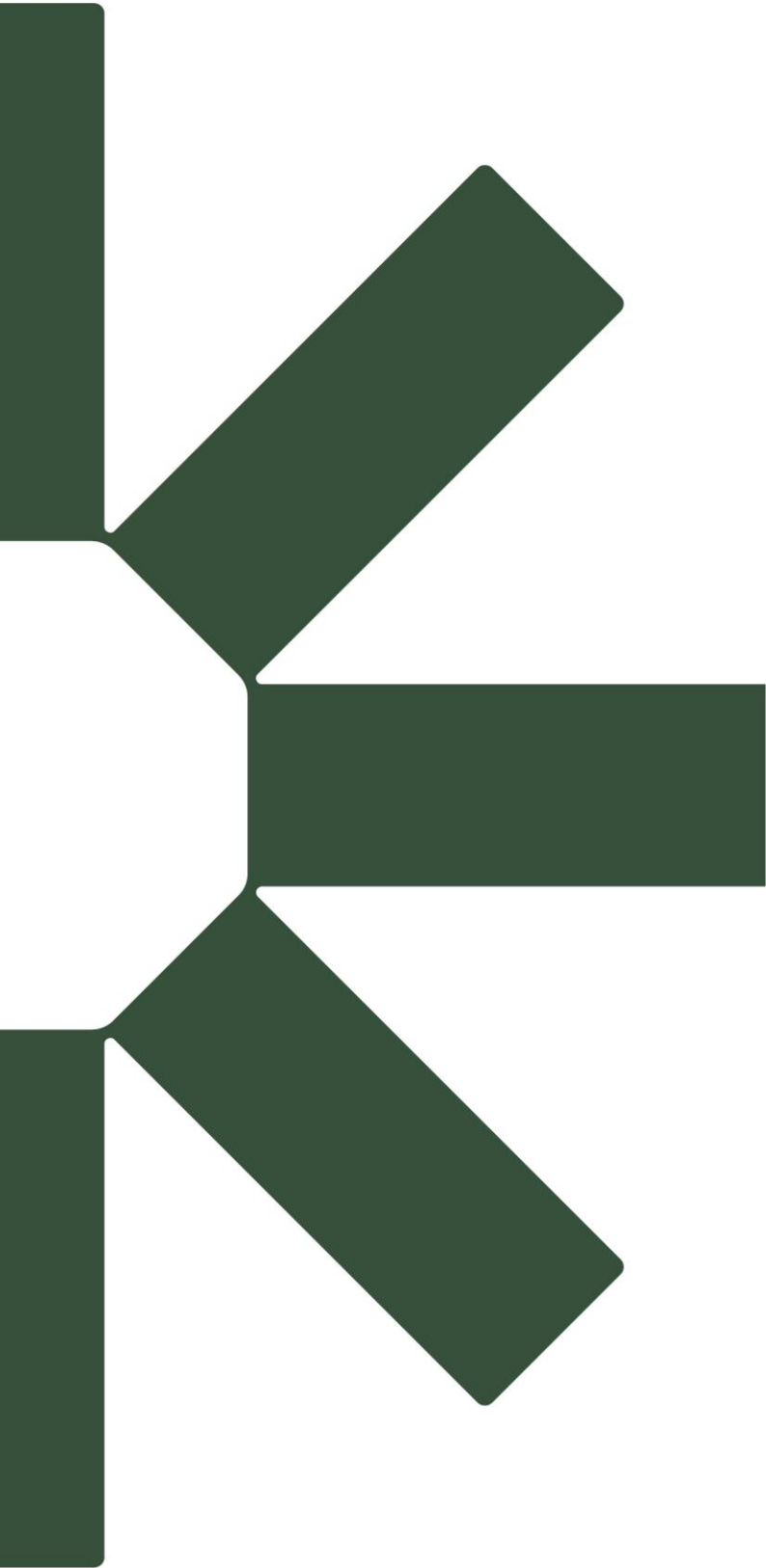


Class	Scientific Name	Common name	BC Act Status	EPBC Act Status
Aves	<i>Pardalotus punctatus</i>	Spotted Pardalote	-	-
Aves	<i>Petroica rosea</i>	Rose Robin	-	-
Aves	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	-	-
Aves	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	-	-
Aves	<i>Platalea regia</i>	Royal Spoonbill	-	-
Aves	<i>Psephotus haematonotus</i>	Red-rumped Parrot	-	-
Aves	<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	-	-
Aves	<i>Rhipidura albiscapa</i>	Grey Fantail	-	-
Aves	<i>Rhipidura leucophrys</i>	Willie Wagtail	-	-
Aves	<i>Strepera graculina</i>	Pied Currawong	-	-
Aves	<i>Threskiornis moluccus</i>	Australian White Ibis	-	-
Aves	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	-	-
Aves	<i>Vanellus miles</i>	Masked Lapwing	-	-
Aves	<i>Zosterops lateralis</i>	Silvereye	-	-
Mammalia	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	-	-
Mammalia	<i>Miniopterus australis</i>	Little Bent-winged Bat	V	-
Mammalia	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V	-
Mammalia	<i>Ozimops ridei</i>	Eastern Free-tailed Bat	-	-
Mammalia	<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum	-	-
Mammalia	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V
Mammalia	<i>Vespadelus darlingtoni</i>	Large Forest Bat	-	-



Class	Scientific Name	Common name	BC Act Status	EPBC Act Status
Reptilia	<i>Anguilla sp.</i>	Short/Long-finned Eel	-	-
Reptilia	<i>Chelodina longicollis</i>	Eastern Snake-necked Turtle	-	-





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